

Consultation Paper

On revision of the 'Guidelines on Technical aspects of the management of interest rate risk arising from non trading activities in the context of the supervisory review process' from 3 October 2006, under Articles 123, 124 and Annex 5 of Directive 2006/48/EC of the European Parliament and the European Council.



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1. Responding to this Consultation

The EBA invites comments on all proposals put forward in this paper and in particular on the specific questions summarised in Part 5.2.

Comments are most helpful if they:

- respond to the question stated;
- indicate the specific point to which a comment relates;
- contain a clear rationale;
- provide evidence to support the views expressed/ rationale proposed; and
- describe any alternative regulatory choices the EBA should consider.

Submission of responses

To submit your comments, click on the “send your comments” button on the consultation page by 27 September 2013. Please note that comments submitted after the deadline, or submitted via other means may not be processed.

Publication of responses

Please clearly indicate in the consultation form if you wish your comments to be disclosed or to be treated as confidential. A confidential response may be requested from us in accordance with the EBA’s rules on public access to documents. We may consult you if we receive such a request. Any decision we make not to disclose the response is reviewable by the EBA’s Board of Appeal and the European Ombudsman.

Data protection

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2. Executive Summary

This consultation paper (CP) proposes amendments and additions to strengthen the CEBS Guidelines of 3 October 2006 entitled 'Technical aspects of the management of interest rate risk arising from non-trading activities under the supervisory review process' (henceforth 'original CEBS Guidelines'). Those guidelines are concerned with the application, by both supervisors and institutions, of the Supervisory Review Process under Pillar 2 of Directive 2006/48/EC. Please note that the treatment of interest rate risk in the banking book may be subject to further international work and consequently this CP does not preclude further development in the area at a later stage.

This Directive is currently in force, but negotiations among EU institutions are near finalisation on an updated Directive (part of a package of legislation commonly referred to as CRD IV) which is expected to replace it. One consequence will be the re-numbering of the Articles of the Directive referred to in the original CEBS Guidelines in addition to any changes to the wording of the Articles themselves. In order to avoid pre-empting future legislation, this CP makes references to Directive 2006/48/EC throughout: such references may be updated to the CRD IV references in the final version of the Guidelines, if the CRD IV final text is made available in the meantime.

For the purposes of the guidelines, and the amendments proposed in this CP, 'interest rate risk arising from non-trading activities' is referred to as 'interest rate risk in the banking book' ('IRRBB'). Interest rate risk arising from trading activities is outside the scope of the guidelines (and the proposed amendments).

The rationale for the proposed changes is set out in Part 3, and the proposed amendments to the main Guidelines are explained in Part 4.1. These include replacement of the introductory text of the CEBS Guidelines (which requires revision as a result of the passage of time); and changes to some of the high level (numbered) guidelines, in order to both clarify and extend the guidance given in respect of internal governance and the calculation of the supervisory 'standard shock' specified in Article 124(5) of the said Directive.

Part 4.2 includes the text of a proposed new technical guidance supplement, to be read alongside the original guidance (as amended). This technical guidance is arranged thematically under five main headings:

- a. Scenarios & Stress Testing.
- b. Measurement assumptions.
- c. Methods for measuring interest rate risk.
- d. The governance of interest rate risk.
- e. The identification, calculation and allocation of capital to interest rate risk.

A table of cross-references back to the original Guidelines is included as an annex, to assist with navigation, as well as a short glossary of terms.

The overall effect of the proposed changes is intended to be that institutions review, and where necessary improve, their identification, measurement, monitoring and control of interest rate risk in the banking book, and that supervisory assessment of interest rate risk is enhanced. In particular, institutions will be expected to:

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- a. stress test their exposure to risk under a range of scenarios, rather than just using the supervisory standard shock stress;
 - b. apply the supervisory standard shock in a consistent way across institutions and jurisdictions, in order to achieve a higher degree of comparability;
 - c. understand and control the impact of assumptions made about the behaviour of customers and products, and planning assumptions made for the investment term of equity capital;
 - d. use a range of measurement methods, commensurate with the sophistication of their business model but always including at least one economic value and one earnings measure;
 - e. have in place appropriate risk policies, processes and controls over interest rate risk, including standards for data quality and processing, and adequate internal reporting; and,
 - f. allocate an appropriate level of internal capital to interest rate risk, aligned with their risk appetite as expressed through policy limits and with their own corporate planning assumptions.

The EBA recognises that the measurement and control of interest rate risk may sometimes involve accepting a trade-off between different risk types and objectives, and this is reflected in the proposed changes. The proportionality principle also applies to all of the new guidance.

Part 5 contains a draft assessment of the cost-benefit analysis and of the potential impact of amending the CEBS guidelines. This section concludes that a fully-quantified cost-benefit analysis is not required given that these improvements to risk management resulting from adoption of the guidance should result in net benefits rather than net costs.

In parallel with the public consultation, the EBA shall seek the views of the EBA's Banking Stakeholder Group, in accordance with Article 37 of Regulation 1093/2010 ('the EBA Regulation'). A public hearing is planned to be held towards the end of the three month consultation, the date and venue of which will be advised in due time.

Following completion of the consultation, the EBA shall review the feedback provided, shall publish a feedback statement, and shall take any feedback into account in revising the final Guidelines, where appropriate. It is envisaged that this work is completed by the end of 2013, with the revised Guidelines applying – subject to endorsement by the EBA's Board of Supervisors – in early 2014.

3. Background and rationale

1. This consultation paper (CP) proposes both amendments and additions to the Guidelines of 3 October 2006 entitled 'Technical aspects of the management of interest rate risk arising from non-trading activities under the supervisory review process' (hereinafter 'the original Guidelines'). The risks covered by the original Guidelines are commonly referred to as 'interest rate risk in the banking book' (hereinafter 'IRRBB'). These Guidelines were produced by the Committee of European Banking Supervisors (CEBS), the tasks of which have been taken over the EBA. The work on the revision of the original Guidelines started already under CEBS and was completed after the transition to the EBA. Please note that the treatment of interest rate risk in the banking book may be subject to further international work and consequently this CP does not preclude further development in the area at a later stage.
2. The proposed revisions of the original Guidelines aim at:
 - a. improving the 'general guidance' (the principles of the original Guidelines numbered as IRRBB 1 to 9);
 - b. providing additional technical guidance for both institutions and supervisors on various aspects of the management and the assessment of interest rate risk in the banking book (which specifies the principles of the 'general guidance').
3. The amendments to the original general guidance (IRRBB 1 to IRRBB 9 and associated text) are focussed in two areas:
 - a) insertion of an additional item of high level guidance for institutions on the need for robust internal governance arrangements for IRRBB (numbered as IRRBB 4.1); and
 - b) clarification of the guidance on calculation of the supervisory standard shock, in terms both of the size of the shock and the suggested calculation method (changes to the text associated with IRRBB 1 and IRRBB 5, and a supplementary annex).
4. The additional technical guidance is intended to highlight key aspects of the main IRRBB risks to be considered, and to provide an overview of how managers of institutions, and their supervisors, may take these into account in assessing IRRBB under the Internal Capital Adequacy Assessment Process (ICAAP) or the Supervisory Review And Evaluation Process (SREP). This additional guidance is focussed thematically on five areas of interest risk assessment/control:
 - a. the setting and use of scenarios for stress testing purposes;
 - b. measurement assumptions;
 - c. methods of measuring interest rate risk;
 - d. the governance of interest rate risk;
 - e. the identification, calculation and allocation of capital to IRRBB.

The additional technical guidance cross-refers to the relevant general guidance.

The final text of the revised Guidelines will be provided in its consolidated version (i.e. including the relevant text from the original Guidelines together with the revisions and additions).

4. Proposed revisions to the original Guidelines

Between the consultation text on the draft amendments to the Guidelines that follows, further explanations are given of the rationale behind proposals for changing/making guidance, or specific questions for those reviewing the consultation paper to consider in responding. Where this is the case, this text appears in framed text box such as this one.

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4.1. Revision of the Original Guidelines

4.1.1. Specification of the calculation of the 'standard shock'

The Directive requires institutions to report to their supervisors if its economic value may decline by more than 20% as a result of applying the supervisory standard shock. The Basel Committee on Banking Supervision provided an example of both the calibration of the shock itself and a standardised framework for calculating the impact of a standard shock, in its paper of June 2004 on International Convergence of Capital measurement and Capital Standards (this was included as an annex to the original Guidelines).

The expert group reviewing the original guidelines found that there was a range of practices across both institutions both in the method of calculation of the change in economic value, and in the quantum of the standard shock that was being applied. The effect of this variation was to make comparisons of the outcome of such calculations by different institutions and supervisors extremely difficult, since the 'answers' were based on inconsistent assumptions and/or approaches. In the context of increasing cross-border operations by banks, and the resultant need for supervisory college discussions as part of the Joint Review and Decision Process (JRAD), the expert group considered that a more homogeneous approach to these calculations would be beneficial and promote convergence of supervisory practice (N.B.: the calculation is designed by supervisors for the purpose of identifying outliers that may need to be subject to supervisory intervention or measures, and is not intended to be used as the main basis for management of IRRBB by institutions themselves).

The proposed amendments seek to promote more harmonisation in three areas:

- the expectation that supervisors should define the standard shock as a sudden parallel shift of +/- 200 basis points (applying a 0% floor), rather than any alternative shift based for example on the 1st and 99th percentile of observed interest rates over 5 years with 1 day movements scaled up to a 240 day year (as proposed originally by Basel). The definition would remain subject to periodic review;
- the calculation of the change in economic value should be harmonised in that equity capital should be excluded, and the assumed repricing behaviour of customer accounts (liabilities) without specific repricing dates should be constrained to a maximum average duration of 5 years; and
- the calculation of change in economic value should use a risk free yield curve that excludes instrument or entity specific credit risk spreads and/or liquidity risk.

In order to achieve the desired outcomes, the following amendments to the original Guidelines text of IRRBB 1 and IRRBB 5 are proposed, along with a new Appendix (Appendix III) to specify the standard shock calculation.

IRRBB 1 of the original Guidelines should be replaced with the following:

'IRRBB1

Institutions should be able to demonstrate that their internal capital is commensurate with the level of the interest rate risk in their banking book. In that respect, institutions should be able to calculate the:

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- potential changes in their economic value resulting from changes in the levels of interest rates. It is the responsibility of the institutions to develop and use their own methodologies in accordance with their risk profile and risk management policies. Supervisors may however reserve the right to require institutions to apply an additional standardised methodology, when for example the institution's internal methodology is inadequate or does not exist, and,
 - the overall interest rate risk in the banking book at various levels of consolidation, sub-consolidation and solo entity if required to do so by supervisors.'

IRRBB 5 of the original Guidelines should be replaced with the following:

'IRRBB 5

Supervisory authorities will set a comparable standard shock as referred to in Article 124(5) of the Directive 2006/48/EC and applicable to the non-trading book of all their relevant institutions. Supervisors may decide to set different standard shocks for different currencies. The following guidelines will be put in place:

- As a general rule, the EBA expects supervisors to set the standard shock at a level that is broadly equivalent to the 1st and 99th percentile of observed interest rate changes (five years of observed one day movements scaled up to a 240 day year).
- However, in times of low observed interest rate volatility, this rule may lead to a standard shock level that is insufficient for stress testing purposes. The rule may also lead to different standard shocks imposed by different supervisors.
- In order to allow more consistent comparisons across institutions and across supervisory jurisdictions, the EBA therefore expects supervisors to use a sudden parallel +/- 200 basis point shock (applying a 0% floor in a low interest rate environment) as the standard shock across the EU for detecting outliers, in the context of Article 124(5) of the CRD, under the Supervisory Review Process.
- The EBA will periodically review the continuing relevance of 200 basis points as the common standard shock.
- In addition to using the parallel +/- 200 basis point shock as the standard shock, supervisors may also consider using their own designated shock scenarios (larger or smaller, for all or some currencies, allowing for non-parallel shifts in rates, considering basis risk etc.). When deciding at what level to set these additional shock scenarios, supervisors will need to take into account factors such as the general level of interest rates, the shape of the yield curve and any relevant national characteristics in their financial systems. Institutions' internal systems should therefore be flexible enough to compute their sensitivity to any standard shock that is prescribed. Supervisors will not, however, make frequent or minor amendments for the purpose of spurious statistical accuracy.
- Where an institution is a subsidiary of an institution which is authorised in another EU member state, the respective supervisors will, in accordance with the guidelines on the joint assessment and joint decision regarding the capital adequacy of cross-border banking groups, seek to coordinate their approaches on the standard shocks to be applied.'

Appendix 3 should be added to the original Guidelines:

APPENDIX III

Guidance on the calculation of the impact of the supervisory ‘standard shock’

This appendix provides further guidance on the calculation of the supervisory shock specified in Article 124(5) of the Directive 2006/48/EC and in the general Guidelines.

Scenarios (IRRBB 5):

IRRBB 5 guides supervisors to use a sudden parallel +/- 200 basis point shock (applying a 0% floor in a low interest rate environment) as the standard shock across the EU for detecting outliers, in the context of Article 124(5) of the CRD, under the Supervisory Review Process.

1. In addition to using the parallel +/- 200 basis point shock as the standard shock, supervisors may also consider using their own designated shock scenarios.

Behavioural and corporate planning assumptions (IRRBB 2 and IRRBB 8):

2. In order to be able to understand the impact of behavioural and/or corporate planning assumptions, both institutions and supervisors should ensure that, in computing the change in economic value as a result of applying the standard shock (IRRBB 2), the following methodology is applied in respect of behavioural and corporate planning assumptions:
 - a. Equity capital should be excluded from liabilities so that the effect of the stress scenario on the economic value of assets represented by equity capital can be noted;
 - b. The average assumed behavioural repricing date for customer balances (liabilities) without specific repricing dates should be constrained to a maximum of 5 years (where the average assumed repricing date is computed as the average of the assumed repricing dates of different accounts subject to behavioural repricing weighted by the nominal value of all such accounts - this means that for the computation of the average maturity, the stable core as well as the volatile portion will be included).

Measurement requirements (IRRBB2)

3. The effect of the standard shock as defined by IRRBB 5 and further specified in the section on scenarios and stress testing in the additional technical guidance of this appendix should be calculated as the change in the economic value of equity under the interest rate stress scenario.
4. An appropriate general ‘risk free’ yield curve should be applied. That curve should not include instrument specific or entity specific credit risk spreads or liquidity risk spreads (for example the plain vanilla interest rate swap curve).

Questions for consultation:

Q1. Do you agree that the proposed changes to the original Guidelines text of IRRBB 1 are required in order to make clear that institutions’ internal capital should be commensurate with the level of the interest rate risk in their banking books?

Q2. Do you agree that a more consistent approach to calculating the effect of the standard supervisory shock is necessary? Will the proposed changes to the text of IRRBB 5 achieve a more consistent approach?

Q3. Do you agree that an average duration of 5 years is appropriate for the behavioural assumption for non-maturity liabilities when calculating the effects of the standard shock? If not, what duration and/or measure would you suggest instead? Should the volatile portion be included in the average, or just the stable core?

Q4. Should the calculation of the level of the economic value use a risk free yield curve that excludes instrument or entity specific credit risk spreads and/or liquidity risk, or should assets and liabilities be valued using an institution-specific credit risk curve? Should the calculation of the net interest income consider the change of the credit spread of assets and liabilities for the repricing of instruments that mature?

Q5. Do you agree that equity capital should be excluded from the calculation of the impact of the standard shock, when the results are used for supervisory purposes?

4.1.2. General Guidance on internal governance arrangements

The Basel Committee principles for managing IRRBB contain specific guidance (Principles 1-3 and 10) on the need for robust internal governance and controls, but this element is missing from the original Guidelines. In part this is because the general, overarching need for robust systems and controls is covered elsewhere in CEBS/EBA guidance – in particular in the EBA’s Guidelines on Internal Governance (GL 44).

The expert group considered that there were some specific aspects to managing IRRBB that could usefully be provided as additional technical guidance. However, the need for additional guidance (details set out later in this consultation paper) highlighted the absence of general guidance on internal governance in the original Guidelines. The group therefore proposes that a new principle should be inserted as general guidance on governance. To avoid more general changes to the numbering of the existing Guidelines, this new general guidance should be numbered as IRRBB 4.1, with the existing principle IRRBB 4 renumbered as IRRBB 4.2. In order to achieve the desired outcome, the following amendment to the original guidelines is proposed.

Question for consultation:

Q6. Do you agree that the original Guidelines should be amended to include a principle covering internal governance arrangements?

IRRBB 4 of the original Guidelines should be renamed to ‘IRRBB 4.2’.

The following principle IRRBB 4.1 should be introduced in addition to the original guidelines:

‘IRRBB 4.1

Institutions should have robust internal governance arrangements with regard to IRRBB.

- The management body bears the ultimate responsibility for control of IRRBB. It should determine the institution's overall IRRBB strategy and approve the respective policies and processes.
- Institutions should ensure the regular validation of the models used to quantify their IRRBB. Their IT systems should enable them to fully measure/assess and monitor the contribution of individual transactions to their overall exposure.
- Finally, institutions’ internal risk reporting system should provide timely and thorough information about their exposures to IRRBB.’

4.2. Draft additional technical guidance

Background and rationale

Whilst the general guidance set out in the original Guidelines has stood the test of time well, the expert group considered there was a need for more specific technical guidance on what is a particularly complex type of risk that is not always well understood. Through discussions with institutions and between supervisors, the group became aware of divergent practices that produced inconsistent outcomes – both in terms of the safe management of IRRBB by institutions, and in the supervisory response to poor risk management or high risk appetite. Accordingly, the expert group sought to codify good practice in order to promote better understanding of the key risks, and to encourage convergence of supervisory practice. The additional technical guidance is set out below as continuous text (as it would be published in final form, if agreed following this consultation) in order to aid clarity. The background and key considerations for each section are highlighted in ‘context’ boxes, and where additional clarification is required. Consultees are invited to provide comments on a section-by-section basis, as set out in the consultation questions below.

Questions for consultation:

- Q7. Is the provision of additional technical guidance, to be read alongside the original Guidelines (as updated), helpful in highlighting the key issues to be considered by both institutions and supervisors?**
- Q8. Should the Technical Guidance remain a separate document, or should it be embedded within the overall guidelines?**

EBA TECHNICAL GUIDANCE ON IRRBB:

Risk identification and measurement, monitoring and control

1. This technical guidance supplements the EBA's 'General Guidelines on Technical aspects of the management of interest rate risk arising from non trading activities under the supervisory review process' (hereafter 'the general Guidelines').
2. It provides additional guidance for both institutions and supervisors on various aspects of the management / assessment of interest rate risk in the banking book ('IRRBB'). The EBA recognises that the measurement and control of interest rate risk may involve a trade-off between different risk types and objectives. However, the additional guidance is intended to highlight the main risks to be considered, and to provide an overview of the key issues that managers of institutions, and their supervisors, may take into account in assessing IRRBB under the ICAAP/SREP.
3. The framework for the management of interest rate risk should be proportionate to the nature, scale and complexity of an institution.
4. This additional technical guidance focuses specifically on five areas of interest rate risk assessment/control (numbered by section):
 - 1) Scenarios and stress testing.
 - 2) Measurement assumptions.
 - 3) Methods for measuring interest rate risk.
 - 4) The governance of interest rate risk.
 - 5) The identification, calculation and allocation of capital to IRRBB.
5. The additional technical guidance also contains the following annexes:
 - A. Table of cross-references to the main guidelines.
 - B. Glossary of Technical Terms.

4.2.1. SCENARIOS AND STRESS TESTING

Summary

1.1 This section provides technical guidance on:

- a. IRRBB 3 and 4.2: the interest rate scenarios to be used by institutions for their ongoing internal management of interest rate risk arising from non-trading activities and for stress testing this risk category; and
- b. IRRBB 5: the interest rate scenario to be used by supervisors for detecting outliers in the context of Article 124(5) of the CRD under the Pillar 2 supervisory review process.

Context

The interest rate scenario chosen may have material implications for the level of risk calculated under different IRRBB measurement systems (see section 3 of this additional technical guidance). Whilst most institutions and supervisors review the outcome of standard shocks based on sudden parallel shifts of the yield curve, these stress results may not always pick up risk positions at specific points on the curve, and may assume offsets that would not occur under slightly different scenarios. Both institutions and supervisors therefore need to be confident that the scenarios used for measurement and stress testing purposes are adequate to identify all material interest rate risks.

Depending on local market rates and circumstances, some of the scenarios suggested below under the heading 'Interest rate scenarios for stress testing' may also become relevant for ongoing internal management.

Additional guidance on such stress testing for interest rate risk arising from non-trading activities can be found in Annex 6 of the CEBS Guidelines on Stress Testing of 26 August 2010:

(http://eba.europa.eu/documents/10180/16094/guidelines_IRRBB_000.pdf)

Additional guidance on IRRBB 3 and 4.2

Interest rate scenarios for ongoing internal management

1.2 Institutions should regularly measure their exposure as a result of an appropriate range of different interest rate scenarios. When selecting the scenarios to be used, institutions should consider the following:

- g. sudden up and down parallel shifts in the yield curve of varying magnitudes;
- h. sudden tilts and changes in the shape of the yield curve (e.g. short-term interest rates increasing/decreasing/remaining unchanged while medium-term and/or long-term interest rates moving at a different pace or even in opposite direction; furthermore, even within the categories of short-term, medium-term and long-term interest rates, shocks may diverge at different points in the yield curve);

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- i. basis risk (including that arising from changes in the relationships among key market rates);
 - j. applying specific interest rate scenarios for exposures in different currencies.
- 1.3 Institutions may supplement their analysis by introducing, for instance:
- a. gradual (as opposed to sudden) shifts, tilts or changes in the shape of the yield curve;
 - b. scenarios based on statistical analysis of past behaviour of interest rates;
 - c. scenarios based on simulations of future interest rate paths;
 - d. scenarios based on the assumptions underlying the institution's corporate profitability forecasts.
- 1.4 As already stated under 'General considerations' of the Guidelines, institutions are expected to consider the effect of their scenarios on both economic value and earnings.
- 1.5 In performing their scenario analysis, institutions should at a minimum be able to demonstrate that:
- a. the underlying assumptions of the internal measurement system (see sections 2 and 3 of this technical guidance) are adapted to the different interest rate scenarios used; and
 - b. economic consistency considerations have been properly taken into account when specifying scenarios (e.g. consistency between interest rate shocks in different currencies and foreign exchange rates used when computing the overall impact expressed in the institution's base reporting currency).

Additional guidance on IRRBB 5

Interest rate scenarios for stress testing

- 1.6 Institutions should from time to time perform stress tests in order to measure their vulnerability under stressed market conditions. Stress testing for interest rate risk should be integrated in the institution's overall stress testing structures and programmes. In these stress tests interest rate risk should interact with other risk categories and second round effects should be computed. These tests may be less frequent than the calculations presented above under the heading 'Interest rate scenarios for ongoing internal management'.
- 1.7 In addition to the supervisory standardised 200 basis point parallel interest rate shock (see IRRBB 5), which was itself intended to represent a stress scenario, institutions should consider using an appropriate range of different stress scenarios such as:
- a. sudden parallel interest rate shocks larger than 200 basis points (including extreme shifts);
 - b. substantial tilts and shifts in the shape of the yield curve (for instance based on those for ongoing internal management, but with more extreme rate changes), and
 - c. substantial changes in the relationships among key market rates (basis risk).
- 1.8 Furthermore, stress tests should consider:
- a. a breakdown in key assumptions about the behaviour of asset and/or liability classes;
 - b. changes in key interest rate correlation assumptions;

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- c. significant changes to current market and macro conditions and to the competitive and economic environment, and their possible development; and
 - d. specific scenarios that relate to the individual business model and profile of the institution.

1.9 Interest rate risk in the banking book should also be considered as one of the potential drivers in the institution's overall reverse stress testing programmes.

Questions for consultation:

Q9. Do you agree that institutions should regularly measure their IRRBB exposure under an appropriate range of different interest rate scenarios, not just comprising standard shocks based on sudden parallel shifts of the yield curve? If so, how frequently should this be done?

Q10. Should stress testing for IRRBB be integrated into the institution's overall stress testing structures and programmes?

4.2.2. MEASUREMENT ASSUMPTIONS

Summary

2.1 This section provides technical guidance on

- a. **IRRBB 2:** Institutions must be able to compute and report to their supervisory authority the change in their economic value as a result of applying the standard shock prescribed by the authority in the context of Article 124 (5) of the CRD;
- b. **IRRBB 3:** Besides the standard shock, Institutions should be able to measure their exposure, if material, and sensitivity (to changes in the shape of the yield curve, changes between different market rates (i.e. basis risk) and changes to assumptions, for example those about customer behaviour);
- c. **IRRBB 4.2:** Institutions should have a well reasoned, robust and documented policy to address all issues that are important for their assessment of their IRRBB;
- d. **IRRBB 8:** Supervisors should understand the institution's internal method for calculating the IRR in the banking book, including underlying assumptions (e.g. yield curves used, treatment of optionality);
- e. **IRRBB 9:** Prompt prudential measures, including both qualitative and quantitative elements tailored to an institution's specific circumstances, may be required from either the overall supervisory assessment or, as stated in Article 124 (5) of the CRD, in response to an institution reporting that its economic value may decline by more than 20% of own funds as a result of applying the supervisory standard shock.

Context

One of the challenges in the measurement of interest rate risk in the banking book is the identification and the incorporation of products or positions where the assumed behavioural repricing date differs significantly from the contractual repricing date, or where there is no stated contractual repricing date. In assessing their exposure to interest rate risk, institutions necessarily have to make numerous assumptions in order to be able to design appropriate measurement systems for both economic value and earnings at risk. These assumptions are critical to the outcome of any risk assessment.

Broadly, the key assumptions can be categorised into three types:

- *Behavioural assumptions for accounts with embedded customer optionality (e.g. loans with prepayment features, deposits with notice terms, revolving credit arrangements and lending commitments that may or may not get drawn);*
- *Behavioural assumptions for customer accounts without specific repricing dates, particularly those with no (or a very low) interest rate attached (e.g. current accounts & variable rate savings accounts that contribute significantly to the net interest margin); and*
- *Corporate planning assumptions for the investment term of equity capital (non-interest bearing capital resources) where stabilisation of the income derived from assets financed by equity is judged by the institution to be a key objective.*

The assumptions made in all these cases can have a material impact on the economic value and/or on earnings at risk sensitivity of the institution to changes in interest rates, and it is therefore very important that both institutions and supervisors are able to identify the risks that might arise were the assumptions

to prove incorrect or unjustified.

Additional Guidance on IRRBB 3 and IRRBB 4.2

(a) Behavioural assumptions for accounts with embedded customer optionality

Some products contain customer exercisable embedded options which affect their interest rate repricing characteristics. Examples for loans would include:

- *prepayment options (e.g., discretion given to borrowers to prepay their mortgages); or*
- *options to extend duration (e.g., lengthening the term of housing loans); or*
- *options to change interest rate basis (e.g. transition from fixed rate to variable rate, or vice versa etc.).*

Embedded optionality creates uncertainty about the timing of the cash flows associated with these products and necessitates further estimation and/or modelling effort by the institution to understand and manage the interest rate risk.

2.2 In assessing the implications of such optionality, institutions should be able to take account of the potential:

- a. impacts on current and future loan prepayment speeds arising from the underlying economic environment, interest rates and competitor activity;
- b. speed/elasticity of adjustment of product rates to changes in market interest rates; and
- c. migration of balances between product types as a result of changes in their features, terms and conditions.

2.3 Institutions should have in place policies governing the setting of, and the regular assessment of, the key assumptions for the treatment of on and off-balance sheet items that have embedded options in their interest rate risk framework. This means that institutions should:

- a. Be able to identify all material products and items subject to embedded options that could affect either the interest rate charged or the behavioural repricing date (as opposed to contractual maturity date) of the relevant balances;
- b. Have appropriate pricing and risk mitigation strategies (e.g. use of derivatives) to manage the impact of optionality within risk appetite, which may include early redemption penalties chargeable to the customer as an offset to the potential break costs (where permitted);
- c. Ensure that modelling of key behavioural assumptions is justifiable in relation to the underlying historical data, and based on prudent hypotheses. A margin of conservatism should be used where there are uncertainties, especially when actual experience differs from past assumptions and expectations;
- d. Be able to demonstrate that they have accurate modelling (back-tested against experience);
- f. Maintain appropriate documentation of assumptions in their policies and procedures, and have a process for keeping them under review;

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- g. Understand the sensitivity of the institution's risk measurement outputs to these assumptions, including undertaking stress testing of the assumptions and taking the results of such tests into account in internal capital allocation decisions;
- h. Perform regular internal validation of these assumptions in order to verify their stability over time and to adjust them if necessary.

Certain types of assets are more complicated to model for behavioural purposes, and need special attention, e. g.:

- *Credit card portfolios (including charge cards requiring full repayment on a monthly basis) may need to be separated into their constituent components (repayment types, introductory offers, interest bearing, non interest bearing, and transaction balances). Sub-product analysis will often be required to understand how environmental and competitive factors may affect balances and product rates on these portfolios under different stress scenarios.*
- *Overdrafts tend to have no specified maturity date or repayment profile other than being repayable on demand. To understand the interest rate risk of these, and similar revolving credit products, institutions will need to make assumptions about how they will be funded and priced. IRR from these portfolios will change over time in response to competitor and environmental factors, so the modelling needs to be capable of reflecting this dynamically.*
- *Pipeline exposures (e.g. where a loan has been agreed and the customer has an option whether to draw down or not) effectively provide the customer with an option that will most likely be exercised when market conditions least suit the institution (negative convexity). Management of pipeline exposures relies on accurate data on applications received, and modelling of expected drawdowns.*

(b) Behavioural assumptions for customer accounts without specific repricing dates

For certain items – e.g. current accounts and certain variable rate savings accounts – the contractual maturity structure and/or an interest rate reprice date may not be representative of the actual outcomes expected in the event of changes to market rates. For such products, where interest is paid at all, the rate may be significantly below wholesale market levels and, although the institution usually has the contractual right to reprice the product at short notice, in reality the rate may behave as though fixed and the balances may exhibit a longer maturity profile than indicated by the strict contractual position. The limited scope to reduce already low rates (which are effectively floored at or above 0%) on balances held in such accounts may result in the interest margin earnings of the institution being significantly sensitive to any rapid reduction in the interest rate earned on the assets funded by these balances.

Institutions may therefore seek to mitigate the margin compression risk in a reducing interest rate environment, where earnings generated by assets funded from these low cost liabilities would reduce, by estimating the likely behavioural repricing and maturity profile of these liabilities and locking in a margin return by creating a portfolio of assets (including possibly derivatives) that matches the expected behaviour of the liabilities. For example, by creating a replicating asset portfolio to represent the low cost liabilities, the interest rate on that portfolio could effectively be set to earn the moving average of interest rates corresponding to the repricing behavioural assumption for the liabilities – so, if the behavioural assumption is that balances would reprice over 5 years, every month the portfolio would need to be extended back to 5 years as the first month of the series matures, and the rate earned on the portfolio would be the average of the 5 year rate for the previous 60 months. Thus, if market rates were to fall, the moving average rate would also fall, but much more slowly, and vice versa should market rates rise.

In order to estimate the expected repricing rate of such balances, and thus the period over which margin hedging should operate, institutions will need to assess how fast such low cost balances might decay and have to be replaced with funding that is subject to a higher interest rate. These assumptions should be sensitive to potential changes in the behaviour of their customers in response to changes in the economic

environment or from evolution of the institution's own particular strategies, or those of its key competitors. Clearly, the downside of locking in a margin under a scenario of falling rates is that the institution will be less able to benefit from the additional margin potentially available under a rising rates scenario. The impact of this trade-off can be identified through measurement of the economic value risk arising from the approach adopted to earnings stabilisation.

In using an assumed maturity profile for the purposes of interest rate risk management, an institution runs modelling risk. The longer the assumed run-off profile, the larger is the potential margin of error caused by using potentially incorrect assumptions. Thus, although an institution may be able to demonstrate to itself that the balances will remain (at substantially unchanged rates) for a very long period, it will nonetheless wish to ensure that the benefits of locking in returns to match the expected repricing profile outweigh the risks that the balances may decay/reprice more quickly than anticipated, potentially resulting in the locked in return on assets being less than the repriced cost of funding.

The behavioural assumptions for interest rate risk management purposes may differ substantially from those developed for liquidity risk purposes. For instance, an Institution's assumption may be (for liquidity purposes) that certain deposits have a long behavioural maturity, but this does not mean that the interest rate to be paid on those deposits will remain unchanged for that same period.

2.4 In making behavioural assumptions about accounts without specific repricing dates for the purposes of interest rate risk management, institutions need to:

- a. Be able to identify 'core' (as opposed to 'transient') balances on transaction accounts – i.e. that element of the balance that is consistently kept in the customer account as distinct from balances that are drawn down regularly and then replaced;
- b. Ensure that assumptions about the decay of low cost balances are prudent and appropriate in balancing the benefits to earnings at risk against the additional economic value risk entailed in locking in a future interest rate return on the assets financed by these balances, and the potential foregone revenue under a rising interest rate environment;
- c. Have appropriate documentation of these assumptions in their policies and procedures, and a process for keeping them under review;
- d. Understand the impact of the assumptions on the institution's own chosen risk measurement outputs, including by regular calculation of the measures using contractual terms rather than behavioural assumptions to isolate the effects on both economic value and earnings at risk; and
- e. Undertake stress testing to understand the sensitivity of the chosen risk measures to changes in key assumptions, taking the results of such tests into account in internal capital allocation decisions.

(c) Corporate planning assumptions for equity capital

In measuring and managing their exposures to interest rate risk, some institutions may seek to stabilise the earnings on assets financed by equity capital. In order to achieve this, they may decide either to designate a 'capital portfolio' of assets (possibly including derivatives such as receiver swaps) to be managed for return/duration; or they may ascribe a specific maturity profile to equity capital to be used in overall IRR measurement systems. However, both methods are subject to local supervisory guidance and may not be permitted in some EU member states.

In determining what constitutes the quantum of equity capital to be subject to planning assumptions, institutions will need to take account of the expected movement in balances (e.g. of specific reserves such as those providing for the payment of dividends and / or restructuring including acquisitions, disposals

etc.).

As with behavioural assumptions for current or non-maturity customer accounts, the longer the assumed investment period for equity capital during which income is stabilised, the greater the risk that assumptions prove to be incorrect. In case of extreme interest rate changes, the income of the institution could be stabilised but at far lower levels than would have been available had repricing been possible earlier (e.g. if the stabilised rate were say 3% against market spot rates of say 12%).

Theoretically, if no stabilization of earnings on capital is undertaken and all reprice gaps (> 3 months) in the balance sheet are matched, the capital will effectively be financing very short-term assets and the interest return on capital will fluctuate with short-term market rates earned on those assets. If reprice gaps are not matched, the earnings on capital will reflect the extent and timing of those interest rate gaps.

- 2.5 In the event that institutions decide to adopt a policy intended to stabilise earnings, they should:
- a. Have an appropriate methodology for determining what element of equity capital should be considered eligible for such treatment (e.g. adjusting for capital invested in non-interest earning assets such as tangible assets, intangible assets, investments in associates etc.);
 - b. Determine what would be a prudent investment maturity profile for the eligible equity capital (e.g. expressed in terms of a particular run-off profile, average maturity or duration range/profile) which balances the benefits of income stabilisation arising from taking longer dated fixed return positions against the additional economic value sensitivity of those positions under an interest rate stress, and the risk of earnings underperformance should rates rise;
 - c. Have appropriate documentation of these assumptions in their policies and procedures, and a process for keeping them under review (with appropriate audit trail);
 - d. Understand the impact of the chosen maturity profile on the institution's own chosen risk measurement outputs, including by regular calculation of the measures without inclusion of the equity capital in order to isolate the effects on both economic value and earnings at risk; and
 - e. Undertake stress testing to understand the sensitivity of risk measures to changes in key assumptions for equity capital, taking the results of such tests into account in their IRRBB internal capital allocation decisions.
- 2.6 In deciding the investment term assumptions for equity capital, institutions should avoid taking income stabilisation positions which significantly reduce their capability to adjust to significant changes in the underlying economic and business environment.
- 2.7 The investment term assumptions used to manage the risks to earnings and value sensitivity arising from equity capital should be considered as part of the normal corporate planning cycle, and such assumptions should not be altered just to reflect a change in the institution's expectations for the path of future interest rates. Any use of derivative or asset portfolios to achieve the desired investment profile should be clearly documented and recorded.
- 2.8 If an institution prefers not to set explicit assumptions for the investment term of equity capital (or sets assumptions that are explicitly short-term), the return generated on assets financed by such capital may be more volatile. It will therefore still need to have robust systems and management information to identify the implications of its chosen approach for the volatility of both earnings and economic value.

Additional guidance on IRRBB 2

- 2.9 In order to be able to understand the impact of behavioural and/or corporate planning assumptions, both institutions and supervisors should ensure that, in computing the change in economic value as a percentage of own funds resulting from the application of the standard shock (IRRBB 2), the following methodology applies in respect of behavioural and corporate planning assumptions:
- a. Equity capital should be excluded from liabilities so that the effect of the stress scenario on the economic value of assets represented by equity capital can be noted; and
 - b. The average assumed behavioural repricing date for customer balances (liabilities) without specific repricing dates should be constrained to a maximum of 5 years (where the average assumed repricing date is computed as the average of the assumed repricing dates of different accounts subject to behavioural repricing weighted by the nominal value of all such accounts - this means that for the computation of the average maturity, the stable core as well as the volatile portion will be included).
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Additional guidance on IRRBB 8 and IRRBB 9

- 2.10 Supervisors should ensure that appropriate documentation and justification are collected to be able to challenge internal behavioural and planning assumptions used by banks for the purposes of IRRBB. Particular attention should be paid to understanding modelling approaches and the sensitivity of output measures to key assumptions. In considering the overall level of IRRBB in an institution, and the level of Pillar 2 capital allocated to IRRBB under the SREP, supervisors should therefore:
- a. Be prepared to challenge the rationale for behavioural assumptions, particularly where the average maturity profile is longer than that defined for the standard supervisory shock; and
 - b. Take account in the SREP of the economic value impact of any corporate planning assumptions for equity capital (where permitted by the supervisor), in determining the level of capital to be allocated to IRRBB.
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Questions for consultation:

Q11. Do you agree that key behavioural assumptions affecting accounts with embedded customer optionality should be subject to regular review and testing to ensure that they remain valid?

Q12. Do you agree that behavioural assumptions about the re-pricing characteristics of customer accounts without specific repricing dates should be prudent and appropriate in balancing the benefits to longer-term earnings against the economic value at risk?

Q13. Do you agree that assumptions for the investment term of equity capital should be fully recorded and considered as part of the institution's corporate planning cycle (rather than as a tactical decision in reaction to changes in market rates)? Is further guidance needed on calculating the investment term of equity?

4.2.3. METHODS FOR MEASURING INTEREST RATE RISK

Summary

3.1 This section provides technical guidance on:

- a. **IRRBB 1:** Institutions should be able to demonstrate that their internal capital is commensurate with the level of the interest rate risk in their banking book. In that respect, institutions should be able to calculate the:
 - potential changes in their economic value resulting from changes in the levels of interest rates
 - the overall interest rate risk in the banking book.
- b. **IRRBB 2:** Institutions must be able to compute and report to their supervisory authority the change in their economic value as a result of applying a standard shock prescribed by the authority in the context of Article 124(5).
- c. **IRRBB 3:** Besides the standard shock, institutions should be able to measure their exposure, if material, and sensitivity to changes in the shape of the yield curve, changes between different market rates (i.e. basis risk) and changes to assumptions, for example those about customer behaviour.
- d. **IRRBB 8:** Supervisors should understand the institutions' internal method for calculating the IRR in the banking book, including underlying assumptions (e.g. yield curves used, treatment of optionality).
- e. **IRRBB 9:** Prompt prudential measures, including both qualitative and quantitative elements tailored to an institution's specific circumstances, may be required from either the overall supervisory assessment or, as stated in Article 124 (5) of the CRD, in response to an institution reporting that its economic value may decline by more than 20% of own funds as a result applying the supervisory standard shock.

Context

Specifically this section provides additional guidance on measuring techniques and supervisory expectations regarding the measuring standards. The measuring techniques described in the supporting Basel document attached to the original Guidelines (as Appendix II) were used as a starting point. The section is organised into three sub-sections:

- *A description of the technical aspects of the quantitative tools and models with emphasis on their advantages and limitations (IRRBB 1) and the different interest rate risk types they potentially capture (IRRBB 3). The list of measures reviews the quantitative tools for economic value perspective as well as earnings perspective, but it does not aim to cover all the possible quantitative methods available;*
- *Additional guidance on quantitative methods used for computing the effect of the supervisory standard shock on the economic value of the institution that is reported to the supervisor for the purposes of the outlier criterion. (IRRBB 9); and*
- *A matrix depicting different sophistication levels for each quantitative tool. From this matrix an appropriate combination of measures together with an appropriate sophistication level per instrument can be selected for individual institutions to reflect supervisory expectations (under IRRBB 8). By selecting the measures with appropriate sophistication levels the principle of*

proportionality will be applied.

Additional guidance on IRRBB 1, IRRBB 3 and IRRBB 8

- 3.2 Because of the complexity of interest rate risk and the different forms that it takes, institutions should not rely on a single measure of risk but instead use a wide range of quantitative tools and models to ensure that the various aspects of interest rate risk are captured adequately. The number and the complexity of different quantitative tools and models used by an institution for measuring interest rate risk should be proportional to the nature, scale and complexity of the activities of the institution. The limitations of each quantitative tool and model used should fully be understood by the institution, and these limitations should be taken into account in the interest rate risk management process. By assessing the interest rate risk, an institution should be aware of the risks that may arise as a consequence of accounting treatment of transactions in the banking book.

Tools for measuring different components of interest rate risk

In table 1 below, the quantitative tools and models are divided into groups of earnings and economic value measures and further into groups of static and dynamic models. For each quantitative tool, the table states which interest rate risk components it potentially measures. The four components of IRRBB are defined in Box 2 of the Guidelines: repricing risk, yield curve risk, basis risk and option risk. Whether a quantitative tool captures a certain interest rate risk component is dependent on the stress scenario that is used in the particular model. The list of measures in the table is not exhaustive and institutions might consider using additional measure or modified/enhanced versions of the listed tools to capture their particular IRRBB adequately. One group of measures relating to IRRBB not covered in the table below are measures of the income effect resulting from accounting treatment of transactions in the banking book. If the accounting treatment to these transactions poses a material risk, institutions should develop measures to capture this risk adequately.

Economic value measures versus earnings measures

The earnings measures capture the short-term effect of the interest rate changes on the earnings of an institution and thus, indirectly through profitability, a short-term solvency effect. These tools are especially suitable for measuring the effect of changes in interest rates that potentially have a strong effect in the short run such as steepening or flattening of the yield curve which is caused by changes in short-term rates.

Economic value measures capture the long-term effect of the interest rate changes. These measures capture the entire effects of interest rate changes, which is an important aspect in choosing a business strategy and keeping an adequate level of capitalisation in the long run. However, these measures may provide insufficient information on a possible inadequate capitalisation in the short run, when extreme temporary shocks could cause large losses.

Interest rate risk has two forms, economic value volatility and earnings volatility, and the measurement of both of these forms is complementary in understanding the complete scope of interest rate risk in the banking book. This is due to the fact that an interest rate transaction cannot stabilise earnings and economic value at the same time. The higher the duration of a transaction, the stronger the stabilising effect on earnings, but the weaker the effect on economic value. A bank choosing an interest rate risk profile should make a decision based on the trade-off between the earnings volatility and economic value volatility and should therefore monitor the metrics of both quantities.

Static and dynamic models

Static models measure the effect of the interest rate change on the portfolio without adjusting the assumptions in the models and composition of the banking book. The dynamic models measure the effects of the interest rate changes by adjusting some of the assumptions concerning the cash flows and customer behaviour and/or incorporate a development of the size and composition of the banking book over time.

General principles that should be applied to all measures

3.3 In using the interest rate measures listed in table 1 the following general principles should be applied:

- a. A base scenario should reflect the assumptions regarding business development and customer behaviour incorporated into the institution's business plans. The interest rates used for repricing in the base scenario should be derived from forward rates by applying appropriate spreads for different instruments.
- b. The refinement of time bands into which the portfolio is divided should adequately reflect the exposures in the portfolio. Institutions should particularly prevent offsetting of large exposures of maturities too far apart and hiding yield curve risk.
- c. When selecting the discount rates, for each instrument type an appropriate yield curve should be selected that most closely represents the characteristics of the instrument type concerned.
- d. When assessing IRRBB, institutions are encouraged to use different types of yield curves for different measurements. The set should always include a measurement of the IRRBB using a 'risk free' yield curve which does not include instrument specific or entity specific credit risk spreads or liquidity risk spreads. An example of an acceptable yield curve is the 'plain vanilla' interest rate swap curve.
- e. When modelling a yield curve, an adequate number of tenors and adequate interpolation techniques should be applied. A set of six tenors will be generally perceived as a bare minimum.
- f. When assessing IRRBB, interest rate scenarios should be used as set out in the section on scenarios and stress testing in the additional technical guidance. These scenarios should be designed to reflect the specificities and material risk exposures of each institution.

Table 1: Tools for measuring different components of interest rate risk

Quantitative tools and models	Description	Advantages and limitations	Risk types potentially measured
Earnings measures			
Static Model Gap analysis	<p>Gap analysis is a simple tool for identification and estimation of the interest rate exposure to repricing risk. It measures the arithmetic difference between the nominal amounts of interest-sensitive assets and liabilities of the banking book in absolute terms. Gaps with a larger volume of assets have a positive sign reflecting increasing value (income) of the banking book with rising value (income) of assets. Liability gaps have a negative sign reflecting decreasing value (income) of the banking book with rising value (income) of liabilities. Gap analysis allocates all relevant interest-sensitive assets and liabilities into a certain number of predefined time bands according to their next contractual repricing date or behavioural assumptions regarding the maturity or the repricing date. A gap can be multiplied by an assumed change in interest rates to yield an approximation of the change in net interest income that would result from such an interest rate movement.</p>	<p>Advantage: Simple method which is relatively easy to understand and explain.</p> <p>Limitations: Based on the assumption that all positions within a particular maturity segment mature or reprice simultaneously.</p> <p>Static model that does not take account of the interest sensitivity of the optionality parameters.</p> <p>Yield curve and/or basis risk cannot be analysed adequately using gap analysis.</p>	Repricing risk

Dynamic model**Earnings at risk**

EaR measures the loss of net interest income over a particular time horizon (1 to 5 years) resulting from interest rate movements, either gradual movements or as a one-off large interest rate shock. Allocation of relevant assets and liabilities to time bands by maturity or repricing date is a starting point. EaR is the difference in net interest income between a base scenario and alternative scenario. The interest rates used for repricing in the base scenario are derived from the forward rates by applying appropriate spreads for different instruments. In the alternative scenario, the interest rate shifts are added onto the forward rates used in base scenario.

With properly designed comprehensive stress test scenarios it is a dynamic method that takes account of all components of the interest rate sensitivity including yield curve risk, basis risk and insight into the changes in savings and payment behaviour taking account of projected changes in maturities and repricing relationships and the size of the banking book. EaR can be applied as a measure for a single shock or as a simulation method applying a large range of scenarios followed by computation of a maximum loss within predefined confidence interval.

Advantages:

It analyses the interest rate risk profile of the banking book in a detailed way tailored to the bank's specific circumstances.

Comprehensive dynamic method that takes account of all components of the interest rate sensitivity and gives a good indication for the short-term effects of convexity and yield curve risk.

Limitations:

The results of the modelling are highly sensitive to assumptions about customer behaviour and management responses to different scenarios.

It covers a relatively short horizon, so changes in earnings outside the observation period are ignored.

*Repricing risk
Yield curve risk
Basis risk
Option risk*

Economic value measures

Static model

Modified duration of equity and PV01 of equity Modified duration shows the relative change in the market value of a financial instrument corresponding to marginal parallel shifts of the yield curve by one percentage point. On an aggregated basis it can be applied to the total banking book. The exposure to repricing risk in the banking book is expressed by the modified duration of equity. An absolute measurement derived from modified duration of equity is PV01 of equity. This measure expresses the absolute change of the equity value resulting from a one basis point (0.01%) parallel shift of the yield curve.

Starting point is the allocation of assets and liabilities into time bands according to their repricing date and the type of instrument. For each instrument type an appropriate yield curve is selected. For each time band and instrument type a modified duration is computed. The modified duration of equity is then computed as an average of the modified durations of all time bands weighted by the exposures in the appropriate time bands (positive sign for asset gaps and negative sign for liability gaps). PV01 of equity is derived by multiplying the modified duration of equity by the value of equity (assets – liabilities) and divided by 10,000 to arrive at basis point value.

Partial modified durations and partial PV01 Partial modified durations and PV01 are computed for the net interest rate positions in sub-portfolios representing different time bands of the banking book according to the methodology described above. These partial measures show the sensitivity of the market value of the banking book to a marginal parallel shift of a yield curve in particular maturity segments. To each sub-portfolio's partial measure a different magnitude of a parallel shift can be applied by which the effect of the change of the shape of the yield curve can be computed for the entire portfolio. By dividing the banking book into time band sub-portfolios, institutions should consider the distribution of exposures across the time bands so that the sub-portfolios reflect the exposure of the banking book to the yield curve risk adequately.

Advantages:

It analyses the economic value impact of a given change in interest rates relating to a particular class of assets and liabilities or the balance sheet as a whole in a simple way.

Limitations:

It only applies to marginal shifts of the yield curve. Relatively large movements in interest rates, and therefore convexity, cannot be measured accurately.

It only applies to parallel shifts of the yield curve and it cannot be used to measure basis or yield curve risk.

It is a static model that does not take account of the interest sensitivity of the optionality parameters.

Advantages:

It analyses the impact of the changes of yield curve shapes on the economic value of the banking book.

Limitations:

It only applies to marginal shifts of the yield curve within each segment.

It is a set of static measures that does not take account of the optionality, basis risk and convexity.

Repricing risk

Yield curve risk

Dynamic models

Effective duration of equity	<p>Effective duration measures value changes due to marginal parallel shifts of the yield curve. An example is the modified duration that additionally arises from the interest rate sensitivity of embedded optionality. The computation of the effective duration is based on deriving the change in value of a portfolio due to an interest rate increase or decrease compared to a base scenario, where not only the changes in the discount rate are incorporated, but also the interest rate related changes in the magnitude of the expected cash flows for instruments containing embedded options.</p>	<p>Advantages: It analyses the economic value impact of a given change in interest rates taking account of the option risk in a simple way.</p> <p>Limitations: It only applies to marginal shifts of the yield curve and it accounts only for the interest sensitive part of the option risk in the portfolio.</p>	<p>Repricing risk Option risk</p>
Capital at Risk / Economic Value of Equity	<p>CaR/EVE measures the theoretical change in the net present value of the balance sheet and therefore of its equity value resulting from an interest rate shock. In this method the value of equity under alternative stress scenarios is compared with the value under a base scenario. The value of equity is computed as the present value of assets less liabilities, not including assumptions about equity capital. For internal purposes, institutions may complement this computation of CaR/EVE with a model of CaR/EVE that takes the assumptions regarding equity capital into account.</p> <p>The accuracy of the valuation of the balance sheet positions is extremely dependent upon the cash flows calculated and the discount rates used. When the cash flows are calculated, account needs to be taken of the fact that the size and the timing of the cash flows may differ under the various scenarios as a result of customer behaviour in reaction to the chosen scenario. This measure is designed to account also for basis risk and it can estimate the long-term effect of a change of a yield curve shape if alternative scenarios are adequately designed.</p>	<p>Advantages: As long as the alternative stress scenarios are adequately designed, it is a comprehensive measure of interest rate risk that takes account of all components of interest rate risk.</p> <p>Limitations: Valuation based on net present value calculations is heavily dependent upon assumptions made as to timing of cashflows and the discount rate used. The method may underestimate the short-term effect of convexity and yield curve risk on the solvency of the institution.</p>	<p>Repricing risk Yield curve risk Basis risk Option risk</p>

Value at Risk

The VaR method measures the expected maximum loss of market value that can be incurred under normal market circumstances over a given time horizon and subject to a given confidence level. For calculation of VaR in the banking book the changes in the market value of the banking book and thus of the equity is computed for a set of alternative yield curve scenarios. When the VaR approach is applied to the banking book, the time horizon should be consistent with the economic model of the banking book and is usually expected to be one year.

The VaR approach covers three different techniques:

- *Historical simulation: alternative interest rate scenarios are derived from historical observations. Historical periods applied need to be long enough to capture significant shocks and not too long to still be relevant. Choosing a holding period for computational purposes, an institution needs to avoid autocorrelation within the sample, but at the same time assure a significant number of observations and presence of a shock within the observations.*
- *Variance-covariance matrix: interest rates of different tenors for simulations derived from historical observations and variance-covariance matrix used to account for the correlations of the rates between tenors. The same considerations as by historical VaR apply.*
- *Monte Carlo simulation: interest rate yield curves and interest rate paths randomly simulated. This technique is especially suited for valuation of products containing options.*

The extent to which different interest rate risk types are measured depends on the model design and scenarios used. VaR models are suited to capture the optionality and convexity of products as well as yield curve risk and basis risk.

Advantages:

It takes account of the historical volatility of prices and interest rates.

It takes account of diversification effects in or between portfolios or balance sheet positions. The method also not only measures the magnitude of the loss, but also allows choosing the probability of the loss.

Limitations:

VaR measure is designed for normal market circumstances and does not adequately cover the tail risk. It is therefore not sufficient to rely only on VaR measures when extreme distress situations are considered.

Both historical VaR and variance-covariance VaR are backward-looking methods where history is indicative of the future and therefore more prone not to capture the tail risks.

Variance-covariance method assumes that the returns are normally distributed statistically, and that the portfolios are a linear combination of the underlying positions; this makes the method less appropriate for portfolios with high optionality.

The Monte Carlo simulation method is very demanding in terms of technology and computation.

VaR models can become 'black box' systems which users rely upon without fully understanding them.

Repricing risk
Yield curve risk
Basis risk
Option risk

Additional guidance on IRRBB 1 and IRRBB 8

Supervisory expectations regarding an institution's measurement of interest rate risk

- 3.4 An institution should identify all different components of the interest rate risk in the banking book, as defined in the introduction of the main guideline. All risk types that are material should be measured. Table 2 gives an overview of methods to identify the different types of interest rate risk in the banking book.

Table 2: Identification of different interest rate risk types in the banking book

Component	Method	Focus
<i>Repricing risk</i>	<i>Gap analysis</i>	<i>The volume of mismatches in different time bands</i>
<i>Yield curve risk</i>	<i>Gap analysis, partial durations</i>	<i>The dispersion and concentration of mismatches in different time bands</i>
<i>Basis risk</i>	<i>Inventory of instrument groups based on different interest rates</i>	<i>Use of derivatives and other hedging instruments in terms of different bases, convexity and timing difference neglected by gap analysis</i>
<i>Option risk</i>	<i>Inventory of all instruments with embedded options</i>	<i>The volume of mortgages, current accounts, savings and deposits where the customer has the option to deviate from the contractual maturity</i>

- 3.5 The set of methods used by an institution should be proportionate to the nature, scale and complexity of the activities of that institution. An institution is expected to use **at least one earnings-based measure and at least one economic value measure of interest rate risk**, but more sophisticated business models may require multiple measures of both types, which in combination appropriately capture all the material interest risk types in the banking book. The application of simple models and measures is acceptable only where it can be shown that these are sufficient to produce a prudent estimate of risk.
- 3.6 Table 3 contains a matrix depicting different sophistication levels for each quantitative tool and model. From this matrix an appropriate combination of measures together with an appropriate sophistication level per instrument should be selected for individual institutions to reflect supervisory expectations.

Table 3: Different sophistication levels of interest rate risk measurement

Quantitative tools and models	Indicative sophistication levels of quantitative tools and models			
	Level 1	Level 2	Level 3	Level 4
Earnings measures				
Gap analysis	Time bands advised in Basel.	More refined time bands reflecting the banking book composition.	Dynamic GAP taking into account run-off activities, financial plans and put commercial margins in perspective with interest rate environment.	Dynamic GAP taking into account run-off activities, financial plans and put commercial margins in perspective with interest rate environment.
Earnings at risk	Standard shock applied to earnings in a static balance sheet. Based on time bands advised in Basel.	Standard shock and other yield curve stress tests set out in the section on scenarios and stress testing in the additional technical guidance applied to earnings, reflecting simple assumptions about future business development.	Yield curve stress tests, basis risk stress tests and option stress tests as set out in the section on scenarios and stress testing in the additional technical guidance separately applied to earnings projected by business plan.	Comprehensive stress scenarios combining the shifts of yield curves with changes of basis spreads and changes in customer behaviour applied to earnings projected by business plan that change adequately with assumptions commensurate with different scenarios.
Capital measures				
Modified duration of equity and PV01 of equity	Time bands and weights advised in Basel. Application of standard shock. Yield curve model minimum 6 tenors.	More refined time bands reflecting the banking book composition with own duration weights. Application of standard shock and other yield shifts set out in the section on scenarios and stress testing in the additional technical guidance. Sufficient yield curve tenors.	Refined time bands subdivided into instrument types with own duration weights. Application of standard shock and other yield shifts set out in the section on scenarios and stress testing in the additional technical guidance. Adequate tenors in yield curves. Application of partial measures per time band.	Duration computed per transaction in the banking book. Application of standard shock and other yield shifts set out in the section on scenarios and stress testing in the additional technical guidance. Adequate tenors in yield curves. Application of partial measures per time band.
Effective duration of equity	Alternative scenarios based on standard shock and effect of option estimated roughly for entire portfolio.	Alternative scenarios based on standard shock and other shifts of yield curve as set out in the section on scenarios and stress testing in the additional technical guidance. The effect of options estimated per instrument type.	Alternative scenarios based on standard shock and other shifts of yield curve as set out in the section on scenarios and stress testing in the additional technical guidance. The effect of options estimated on transaction level.	Alternative scenarios based on standard shock and other shifts of yield curve as set out in the section on scenarios and stress testing in the additional technical guidance. The effect of options estimated on transaction level.
Capital at risk / Economic	Time bands and weights advised in Basel. Application of standard shock. Yield curve model	More refined time bands reflecting the banking book composition with own duration	Refined time bands subdivided into instrument types with own duration weights. Application of	Duration computed per transaction in the banking book. Comprehensive stress scenarios

value or Equity	minimum 6 tenors.	weights. Application of standard shock and other yield shifts set out in the section on scenarios and stress testing in the additional technical guidance. Sufficient yield curve tenors.	standard shock and other yield shifts set out in the section on scenarios and stress testing in the additional technical guidance. Adequate tenors in yield curves. Yield curve stress tests, basis risk stress tests as set out in the section as above. Modelling the interest rate sensitivity of modelling assumptions taking into account convexity.	combining the shifts of yield curves with changes of basis spreads and changes in customer behaviour. Dynamic balance model taking balance growth into account.
Value at risk	Yield curve model minimum 6 tenors.	Sufficient tenors on yield curves where exists material exposure. Inclusion of other sensitivity parameters as well as delta (Greek letters).	Adequate tenors in yield curves where exists material exposure. Full optionality valuation. Daily risk factors update. Usage of, at least, volatility smiles.	Adequate tenors in all yield curves. Full optionality valuation. Include Monte Carlo simulations on portfolios with material optionality. Daily risk factors update. Usage of volatility surfaces for all underlyings in banking book.

Additional guidance on IRRBB 2 and 9

Guidance on computation of the effect of the supervisory standard shock on the economic value of the institution, for reporting against the outlier criterion in Article 124(5).

- 3.7 When computing the effect of the supervisory standard shock on the economic value, the institutions should follow the principles set out for the computation of Economic Value of Equity / Capital at Risk in Table 1 of this section. The sophistication level applied to this computation should be derived from Table 3 in this section.
- 3.8 In computing the present value of assets and liabilities an appropriate general 'risk-free' yield curve should be applied. That curve should not include instrument-specific or entity-specific credit risk spreads or liquidity risk spreads. An example of an acceptable yield curve is the 'plain vanilla' interest rate swap curve.

It should be noted that the supporting Basel document referred to under guidance on IRRBBB 1 (included as Appendix II of the general guidelines) states that 'Such a framework is intended for supervisory reporting purposes only, and is not intended to represent an adequate framework for internal risk management purposes'.

Questions for consultation:

- Q14. Do you agree that institutions should monitor both risk to earnings and risk to economic value?**
- Q15. Do you agree that institutions should use a variety of risk measures to ensure better coverage of embedded risks?**
- Q16. Do you agree with the guidance matching measures with different levels of sophistication in Table 3?**

4.2.4. THE GOVERNANCE OF INTEREST RATE RISK

Summary

4.1 This section provides technical guidance on

- a. **IRRBB 4.1:** Institutions should have robust internal governance arrangements with regard to IRRBB.
- b. **IRRBB 4.2:** Institutions should have a well reasoned, robust and documented policy to address all issues that are important for their assessment of their IRRBB.

Context

This guidance clarifies various elements of internal governance specific to IRRBB. It is closely related to and should be read together with the EBA's Guidelines on Internal Governance (GL 44) dated 27 November 2011.

As elaborated in the GL 44 principles numbered 5 and 9, the management body bears the ultimate responsibility for the risks undertaken by an institution. With regard to IRRBB this includes:

- *the ability to assess (estimate) whether IRRBB is a material risk in the institution;*
- *understanding the fundamentals of the measurement/assessment of IRRBB as applied in the institution;*
- *understanding the strengths and weaknesses of the institution's IRRBB management system; and*
- *the ability and specific, IRRBB-related knowledge to cooperate effectively with supervisors in the ICAAP-SREP dialogue.*

The general requirements for risk policies and processes are elaborated in GL 44, especially in Chapter III, section C.

Additional guidance on IRRBB 4.1 and IRRBB 4.2

Overall IRRBB strategy

- 4.2 Based on the overarching business strategy, the management body (management function) should approve the overall IRRBB strategy of the institution, including the acceptable level for IRRBB and IRRBB mitigation (see Principle 17 of GL44).
- 4.3 The IRRBB tolerance should be expressed in terms of the acceptable short-term and long-term impact of fluctuating interest rates on both economic value and earnings and be reflected in appropriate limits. Institutions with significant exposures to basis risk, yield curve risk or positions with explicit or embedded options should define their risk tolerance vis-à-vis each of these material sub-types of IRRBB.

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- 4.4 The overall IRRBB strategy should also include the decision about the extent to which the business model should rely on generating earnings by ‘riding the yield curve’, i.e. normally by refinancing assets with a comparatively long repricing period through liabilities with a comparatively short repricing period. In case it relies heavily on this source of earnings, the management body should explain its IRRBB strategy and how it plans to survive periods of flat or inverse yield curves.
- 4.5 IRRBB is frequently one of the most important categories of risk faced by institutions. Therefore, supervisors expect them to assess this risk as material (where appropriate) and to address it explicitly and comprehensively in their risk management processes. Any other approach should be fully documented and discussed in the course of the ICAAP-SREP dialogue.
- 4.6 Limit controls should be in place to ensure positions that exceed certain predetermined levels trigger prompt management reaction.
- 4.7 Institutions using derivative instruments to mitigate IRRBB exposures should possess the necessary knowledge and expertise. They need to be aware that hedging with interest rate derivatives is a potentially complex activity that can have unintended consequences, including compounding losses, if used incorrectly. Each institution should demonstrate that it understands the consequences of hedging with interest rate derivatives.
- 4.8 When deciding about hedging activities, institutions should be aware of the effects of accounting policies, but they should not let the accounting treatment become the driver of their risk management approach. The management of economic risks should be a priority, and the accounting impacts managed as a secondary impact.

Risk policies, processes and controls

- 4.9 In relation to IRRBB, the management body (management function) should - based on its overall IRRBB strategy- implement robust risk policies, processes and systems which should ensure that:
- a. procedures for updating scenarios for the measurement/assessment of IRRBB are defined;
 - b. the measurement approach and the corresponding assumptions for measuring/assessing IRRBB, including the allocation of internal capital to IRRBB risks, are appropriate and proportional;
 - c. the assumptions of the models used are regularly reviewed and amended;
 - d. standards for the evaluation of positions and the measuring of performance are defined;
 - e. an appropriate documentation and control over permissible hedging strategies and hedging instruments exists; and
 - f. the lines of authority and responsibility for managing IRRBB exposures are defined.
- 4.10 Institutions should regularly validate their IRRBB models and respective IT-systems. This should be conducted by a suitably qualified and independent function.
- 4.11 Institutions may rely on third-party IRRBB models to manage and control IRRBB, provided that these models are adequately customized to properly reflect the specifics of the particular institution they are used at. Institutions are expected to understand fully the underlying analytics, assumptions, and methodologies of the third-party models and to

ensure that they are adequately integrated into the institutions' overall risk management systems and processes.

IRRBB IT systems and data quality

- 4.12 The IT systems and applications used by the institution to carry, process and record operations and to generate reports should be capable of including IRRBB. Specifically, the systems:
- a. should be capable of fully and clearly recording all transactions made by the institution, taking into account their IRRBB characteristics;
 - b. should be tailored to the complexity and number of transactions bearing IRRBB; and
 - c. should be sufficiently flexible to accommodate a reasonable range of stress scenarios and new scenarios.
- 4.13 The IT system/transaction system should be capable of recording the repricing profile, interest rate characteristics and option characteristics of the products to enable measurement of repricing as well as yield curve, basis and option risk. The transaction system should especially be able to gather detailed information on repricing date(s) of a given transaction, interest rate type or index, any options (including early repayment or redemption) as well as fees referring to the exercise of these options.
- 4.14 In case of complex, structured products the transaction system should be able to gather information about the separate parts of the product and to capture their IRRBB characteristics (e.g. the characteristics of assets and liabilities grouped by certain characteristics like repricing dates or optionality elements). The institution should ensure that the IT system is able to keep up with the introduction of new products.
- 4.15 The systems used to measure the IRRBB should be capable of capturing the IRRBB characteristics of all products. The systems should also allow for the disaggregation of the impact of individual IRRBB instruments/portfolios on the risk level of the banking book.
- 4.16 There should be adequate organisational controls over IT systems to prevent corruption of data used by IRRBB computer systems and applications, and to control changes to the coding used in those applications, so as to ensure:
- a. the reliability of data used as input, and the integrity of processing systems for IRRBB models;
 - b. that the likelihood of errors in the IT system, including those occurring during data processing and aggregation, are minimized; and
 - c. that adequate measures are taken in case of any market disruptions or slumps.
- 4.17 The risk measurement should be based on reliable market and internal data. Institutions should scrutinize the quality of the external sources of information used to establish the historical databases of interest rates, as well as the frequency at which databases are updated. In order to ensure high data quality, institutions should implement appropriate processes which ensure that the data input of the IT system is correct. Institutions should also establish appropriate mechanisms to verify of the correctness of the aggregation process and the reliability of model results. Such mechanisms should confirm the accuracy and reliability of data.
- 4.18 The institution should have appropriate procedures to handle any discrepancies and irregularities, which may arise at the time of data processing. The institution should also determine the reasons for these and should have in place procedures for mutual

reconciliation of the positions, which will allow the elimination of any such discrepancies and irregularities.

- 4.19 The institution should ensure, by setting up an appropriate process, that the data used to feed models measuring the IRRBB across the group, e.g. for simulating earnings, is consistent with the data used for corporate planning.

Internal Reporting

- 4.20 The frequency of internal reports should increase with the complexity of the institution's operations, quarterly reports being the minimum frequency for institutions with less complex portfolios. Similarly, the content of the reports should reflect changes in the risk profile of the institution and in the economic environment.
- 4.21 Internal reports should be provided to the different levels of management, containing the level of information appropriate for the particular level (e.g., management body, senior management) and for the specific situation of the institution and the economic environment.
- 4.22 The aggregated information should provide sufficient detail to enable the management to assess the sensitivity of the institution to changes in market conditions and other important risk factors. The reports should contain information on exposures to repricing, basis, yield curve and optionality risk as well as information on the types and results of stress tests performed, including the standard shocks prescribed by supervisors.
- 4.23 The risk measurement system should generate reports in a format which allows the different levels of the institution's management to understand them easily and to take timely and appropriate decisions. The reports should constitute the basis for regularly monitoring whether the institution operates in line with its strategy and the interest rate risk limits it has adopted.

Questions for consultation:

Q17. Do you agree that there should be additional guidance provided on aspects of internal governance specific to IRRBB?

Q18. Do you agree that the main governance issues for IRRBB relate to overall IRRBB strategy, risk policies, processes and controls, IRRBB IT systems and data quality, and internal reporting?

4.2.5. CAPITAL IDENTIFICATION, CALCULATION AND ALLOCATION

Summary

5.1 This section provides technical guidance on:

- a. **IRRBB 1:** Institutions should be able to demonstrate that their internal capital is commensurate with the level of the interest rate risk in their banking book.
- b. **IRRBB 6:** The supervisory review should encompass an assessment of the adequacy of the relationship between interest rate risk and internal capital.
- c. **IRRBB 9:** Prompt prudential measures, including both qualitative and quantitative elements tailored to an institution's specific circumstances, may be required from either the overall supervisory assessment or, as stated in Article 124(5) of the CRD, in response to an institution reporting that its economic value may decline by more than 20% of own funds as a result of applying the supervisory standard shock.

Context

Institutions and supervisors both recognise that the mitigation and management of interest rate risk is a complex activity which can involve the exercise of judgment in balancing risks to economic value and the risks to future earnings that arise from mismatches in the tenor and interest rate characteristics of assets and liabilities re-pricing at future periods.

Each institution will have its own view on the relative importance of mitigating the impact of interest rate changes on economic value at risk and/or future earnings at risk – for retail banks, the latter measure may be more important, whilst wholesale/investment banks may focus more on the former. However, the management of each institution should consider both risks in the context of the longer-term strategy for their business, and the expectations/concerns of its customers, owners and the markets in which it operates. Similarly, supervisors need to be fully aware of the extent to which interest rate risks arise from business activities and strategies, and of any trade-off being exercised between mitigating economic value at risk and earnings at risk.

From a supervisory perspective, the future earnings of the institution are clearly important, but supervisors particularly need to understand the economic value sensitivity of an institution under stressed conditions – for example, what would be the economic cost of unwinding longer-term fixed rate positions designed to reduce earnings volatility, in circumstances where the behavioural assumptions underlying those positions broke down (e.g. under severe economic stress or insolvency). Supervisors will therefore wish to understand both the inherent economic value at risk arising from the institution's individual business model and interest rate structure, and its approach to managing that risk. This supervisory assessment should also review the extent to which the institution's policies and/or limits permit interest rate positions (other than those governed by behavioural or corporate planning assumptions as detailed in Section 3) to arise in the banking book, or whether the policies encourage the transfer of the interest risk element (only) of such banking book positions to the trading book (where one exists). In particular, supervisors will need to understand fully the implications of any key assumptions built into the interest rate risk management approach adopted by the institution, and the time horizon over which any such assumptions operate, in order to judge whether the internal capital allocation is acceptable.

In arriving at a supervisory judgement, it is important to understand that the supervisory 'standard shock' outlier test is generic to all institutions, so the results will not always reflect accurately the real level of inherent interest rate risk for a particular institution. Supervisors will therefore need to establish whether the outcome of the outlier test actually reflects the specificities of the institution and/or local market (especially where idiosyncratic products with unusual risk profiles may be a significant factor) in order to determine whether the institution should correctly be labelled as an outlier.

The additional guidance below particularly covers:

- *The methods that institutions should consider to identify and allocate internal capital to IRRBB;*
- *The approaches that supervisors should consider in assessing capital requirements for IRRBB as part of the SREP; and*
- *The types of supervisory actions that could be contemplated in case the supervisor identifies issues concerning the management of IRRBB in an institution.*

Additional guidance on IRRBB 1

- 5.2 In their ICAAP analysis of the amount of capital required for IRRBB, institutions may consider differentiating between:
- a. Internal capital required for risks to economic value that could arise from a sudden interest rate shock (these risks would have to be considered under Element 3 of the Pillar 2 framework outlined in GL03 – Dialogue 2 (pages 34-5)); and
 - b. The implications for future internal capital requirements of the impact of rate changes on future earnings capacity (These risks would have to be considered under Element 4 of the Pillar 2 framework).
- 5.3 Where an institution’s policies/limits permit the taking of interest rate risk positions within the banking book, these risks should be measured and monitored like any other market risk. Internal capital should be specifically allocated to reflect these risks, the quantum of which may be gauged by considering other capital requirements for market risk. Institutions should consider regularly whether any positions held ought to be characterised as ‘trading’ and thereby treated accordingly for capital adequacy purposes.
- 5.4 In addition to considering whether internal capital should be held for actual IRRBB economic value risk, institutions should also consider:
- a. The size and tenor of any mismatch limits intended to allow the institution to take advantage of an interest rate expectation by creating or leaving un-hedged interest rate risk positions in the banking book (subject to appropriate governance and within an agreed risk appetite definition);
 - b. The size and tenor of any mismatch limits put in place to allow for small timing and balance mismatches arising from retail banking products where precise micro-hedging may be impractical;
 - c. The sensitivity of the calculated interest rate risk to imperfect modelling assumptions (model risk); and
 - d. Short-term timing and other imperfections in the matching of portfolios to behavioural/planning assumptions, or where the policy allows discretion by indicating a duration range or allowing mismatch tolerances for behavioural items.
- 5.5 In order to calibrate the amount of internal capital to be held for IRRBB economic value risk, institutions should use appropriate economic value measurement systems for their business profile (see section 3), and an appropriate range of interest rate scenarios (see the section on scenarios and stress testing in the additional technical guidance), in order to quantify the potential scale of any IRRBB effects under stressed conditions. In particular:
- a. Institutions should consider whether an allocation of internal capital is appropriate for some (or all) of the economic value at risk resulting specifically from behavioural or

corporate planning assumptions (see Section 2).

b. Those institutions that operate economic capital (EC) models should ensure that the internal capital allocation for IRRBB is properly factored into the overall EC and that any assumptions on diversification are documented and derived from full analysis of the underlying correlation data. Economic capital costs may be allocated back to business units and products in order to ensure that the full costs of the underlying business/products are properly understood by those responsible for managing them.

c. Institutions that are exposed to interest risk in different currencies should ensure that all material positions are taken into account, and that internal capital allocated for economic value at risk allows for different changes in interest rates for each currency (as opposed to assuming all rates for all currencies will move in parallel).

5.6 In considering whether an allocation of internal capital should be made in respect of interest earnings at risk (as part of a capital allocation for stress testing), institutions should take account of:

a. The relative importance of net interest income (NII) to total net income, and therefore the impact of significant variations in NII from year to year;

b. The actual levels of NII achievable under different scenarios (i.e. the extent to which margins are wide enough to absorb volatility arising from interest rate positions, changes in the cost of liabilities); and

c. The potential for actual losses to be incurred under stressed conditions, or as a result of secular changes in the market environment, where it might become necessary to liquidate positions that are intended as a long-term hedge to stabilise earnings.

5.7 In order to determine whether an amount of internal capital should be allocated for potential future risks to earnings arising from changes to interest rate risks under stressed conditions, institutions should use appropriate earnings at risk measurement systems for their business profile (see section 3) and an appropriate range of interest rate scenarios (see the section on scenarios and stress testing in the additional technical guidance).

5.8 Institutions should allocate internal capital where the results of their stress testing highlight the potential for reduced net interest income (and therefore reduced capital generation capacity) under stress scenarios. To the extent that NII has been protected / stabilised against adverse movements in rates through risk management strategies based on behavioural and/or corporate planning assumptions, institutions may be able to reduce the size of this internal capital allocation.

Additional Guidance on IRRBB 6 and IRRBB 9

5.9 In undertaking their supervisory review (SREP) of an institution's ICAAP, supervisors should consider whether the institution's allocation of capital to IRRBB is adequate in relation to its risk appetite and its governance/control structure. Where there is a mismatch of risk taken with risk management capability, supervisors should take appropriate measures to reduce the quantum of risk taken and/or to strengthen the institution's approach to risk management.

5.10 In respect of capital allocations made by the institution for economic value at risk, supervisors should:

a. Consider the results of the supervisory standard stress test under Article 124(5) of the CRD and, where the institution is an outlier, determine whether supervisory measures are required in order to obtain a reduction in the size of positions that are causing the economic value impact and/or whether an additional capital allocation under

Pillar 2 is necessary;

b. Review the size and tenor of mismatch limits allocated by the institution, to ensure that they are justified in terms of business volume and hedging strategies – and, in particular, whether the allocation of limits and positions between the trading book (where one exists) and the banking book has been correctly undertaken;

c. Satisfy themselves that the institution's internal capital allocation for any IRRBB positions adequately reflects the inherent market interest rate risk taken, and that potential future positions (e.g., assuming full usage of agreed limits) are included within the calculated capital allocation;

d. Understand the implications of the institution's behavioural or corporate planning assumptions and, in particular, the extent to which their impact on the relevant portfolios could present a significant risk to economic value under stressed conditions. Supervisors should consider whether additional capital may be required under Pillar 2 where, in their judgement, the economic value at risk arising from (mainly longer-term) assumptions outweighs the benefits to the stability of future earnings arising from portfolios implementing those assumptions (particularly where the stabilised earnings arise in periods beyond the end of the institution's strategic planning horizon);

e. Understand fully any 'prepayment' behavioural models (see section 3) used by the institution and consider whether any allocation of internal capital by the institution for model risk is adequate. Mitigation of such risks could include either an additional internal capital allocation and/or a requirement to improve the model; and

f. Understand fully the treatment of optionality (both explicit and embedded within products) in the institution's IRRBB management systems, and confirm that sufficient internal capital has been allocated against unhedged options.

5.11 In respect of potential capital requirements for stress testing, to mitigate the risk of volatility of future earnings, supervisors should:

a. Consider whether the projected net interest income volatility under stress scenarios would produce a significant risk to future overall profitability and thus a threat to future generation of core capital: potential future income volatility may result in a need to ensure that institutions hold more internal capital up front (in the form of buffers) that can be used in the event that the stress scenarios materialise;

b. Understand the basis of the net interest income modelling system, including key new business assumptions and the relationship of the NII projections to the institution's forward business/financial plans (do the numbers come from the same system, are they reconciled, etc.?). Supervisors may need to consider measures, including additional capital allocation, to mitigate earnings model risks; and

c. Confirm that the modelling system used by the institution is sufficiently granular to identify any significant basis risk positions, and that the scenario analysis undertaken includes earnings at risk outcomes where basis divergence is captured.

Questions for consultation:

Q19. Do you agree that it is helpful to distinguish between capital allocated for the potential IRRBB impact on economic value, and the implications for future capital requirements arising from changes to earnings resulting from interest rate risks?

Q20. Do you agree that the quantum of internal capital allocated against market risk positions in the banking book should be gauged by considering other capital requirements for market risks?

Q21. Do you agree that institutions should hold internal capital based on available limits rather than actual utilisation of those limits?

Q22. Do you agree that institutions should allocate internal capital against potential future earnings at risk, based on the result of their stress-testing?

ANNEX 1 – Correspondence tables of general guidance and additional technical guidance

Summary of additional guidance – by section

<u>Section</u>	<u>Guideline</u>	<u>Paragraphs –</u>
1. Scenarios and stress testing	IRRBB 3	2-5
	IRRBB 4.2 (new)	
	IRRBB 5	6-9
2. Measurement Assumptions	IRRBB 3	2-8
	IRRBB 4.2 (new)	
	IRRBB 2	9
	IRRBB 8	10
	IRRBB 9	
3. Methods For Measuring Interest Rate Risk	IRRBB 1	2-6
	IRRBB 8	
	IRRBB 3	2-4
	IRRBB 2	7-8
	IRRBB 9	
4. The Governance Of Interest Rate Risk	IRRBB 4.1 (new)	2-23
	IRRBB 4.2 (new)	
5. Capital Identification, Calculation And Allocation	IRRBB 1	2-8
	IRRBB 6	9-11
	IRRBB 9	

Summary of additional guidance – by guideline

<u>Guideline</u>		<u>Section</u>	<u>Paragraphs</u>
IRRBB 1	3.	Methods For Measuring Interest Rate Risk	2-6
	5.	Capital Identification, Calculation And Allocation	2-8
IRRBB 2	2.	Measurement Assumptions	9
	3.	Methods For Measuring Interest Rate Risk	7-8
IRRBB 3	1.	Scenarios and stress testing	2-5
	2.	Measurement Assumptions	2-8
	3.	Methods For Measuring Interest Rate Risk	2-4
IRRBB 4.1 (new)	4.	The Governance Of Interest Rate Risk	2-23
IRRBB 4.2 (new)	1.	Scenarios and stress testing	2-5
	2.	Measurement Assumptions	2-8
	4.	The Governance Of Interest Rate Risk	2-23
IRRBB 5	1.	Scenarios and stress testing	6-9
IRRBB 6	5.	Capital Identification, Calculation And Allocation	9-11
IRRBB 8	2.	Measurement Assumptions	10
	3.	Methods For Measuring Interest Rate Risk	2-6
IRRBB 9	2.	Measurement Assumptions	10
	3.	Methods For Measuring Interest Rate Risk	7-8
	5.	Capital Identification, Calculation And Allocation	9-11

NB: *Guideline IRRBB 7 has no associated technical guidance*

ANNEX 2 –Glossary of Technical Terms

Term	Definition
Basis Risk	Arises from hedging exposure to one interest rate with exposure to a rate which reprices under different conditions
Behavioural Repricing	The repricing schedule used by the institution for savings, deposits and current accounts and based on the behaviour of customers; the schedule will be derived from historic observations, modelling and the assumptions that are made about future customer behaviour
Earnings at Risk (EaR)	The sensitivity of earnings in the short-term to interest rate movements
Economic Value (EVE)	The present value of the bank's expected net cash flows in the future, focussing on the sensitivity of the economic values of the banking book items to interest rate changes
Equity Capital	The capital that comprises non-interest bearing capital
Interest Rate Risk in the Banking Book (IRRBB)	The current or prospective risk to both the earnings and capital of institutions, in respect of the banking book only, arising from adverse movements in interest rates
Internal Capital	The capital that the institution assigns to risk types to cover the nature and level of the risks to which it might be exposed
Option Risk	Arises from options, including embedded options, e.g. consumers redeeming fixed rate products when market rates change
Own Funds	The financial resources of an institution as defined in Articles 57 to 61 and Articles 63 to 66 of Directive 2006/48/EC (14 June 2006)
Repricing Risk	Related to the timing mismatch in the maturity and repricing of assets and liabilities and off balance sheet short and long-term positions
Spread Risk	Risk arising from variations in the 'premium' that the market requires for different types of instrument, reflecting both credit and other market risks (e.g. liquidity).
Standard Shock	The prescribed shock to be applied to the institution's portfolio in order to determine the impact on the economic value of the institution (also called the 'outlier test')
Yield Curve Risk	Arises from changes in the slope and the shape of the yield curve

Questions for consultation

Q23. Are the cross-references between the high level guidelines and the technical guidance helpful?

Q24. Does the glossary need to be extended to cover more technical terms? If so, please suggest additional terms and definitions.

Q25. Should credit spread risk (both the institution's own credit spread, and market spreads more generally) be treated as a form of basis risk to be factored into the measurement of IRRBB, and, if so, how should this best be achieved?

5. Accompanying documents

5.1. Draft Cost- Benefit Analysis / Impact Assessment

Introduction

The objectives of the amendments and additions to the original Guidelines are:

- a. To improve the management of IRRBB by EEA institutions, by setting out good risk management practice and by guiding institutions towards improved approaches where they currently fall short; and
- b. To promote convergence amongst EEA Supervisors of the assessment of IRRBB, in particular by providing guidance on the standard stress test to ensure that the results are broadly comparable across institutions and countries.

The Guidelines (both original and as proposed to be amended) contain no mandatory requirements for either institutions or national supervisors, but the EBA would expect both to benchmark their current practices against the recommended practice in order to establish whether there are any significant gaps that might be addressed. Where these are identified, the expectation would be for the institution, or supervisor, to consider whether their existing approach is adequate given their own market and business model idiosyncrasies. It is envisaged that there will be a post-implementation review of the Guidelines (the aim will be to carry this out approximately one year after implementation) and supervisors can expect peer review work to take note of how the Guidelines have been implemented nationally.

The costs for institutions of any changes resulting from the implementation of the Guidelines are therefore expected to be almost entirely attributable to the implementation of improvements to their institutional management of IRRBB – there are expected to be some overhead costs resulting from understanding the content of the guidelines and assessing their relevance to the institution, but these will be minimal. The costs of any improvements to the risk management of IRRBB are therefore expected to be costs that a well-run institution should be incurring in the normal course of business, and these are expected to be more than outweighed by the benefits both of improved risk understanding and mitigation of risk (which will reduce unexpected losses).

Similarly, for national supervisors there are expected to be some minor costs associated with implementing the Guidelines (including, potentially, providing additional training to front-line supervisors and specialists), but these are expected to be outweighed by the benefits of improved understanding of the level of risk within individual institutions, and the mitigation of risks to financial stability through improved overall management of IRRBB. At the EEA level, and particularly for the EBA's area of responsibility, the convergence of supervisory practice is expected to improve the operation of the JRAD process for arriving at joint decisions in the supervisory review of cross-border groups, and to enhance the ability of the EBA to monitor the scale of IRRBB through use of comparable data and key metrics.

No alternative regulatory options were considered to be appropriate – implementation of binding technical standards for IRRBB is not required by the Directive, and the need for judgement in managing the impact of IRRBB means that rules would potentially be too rigid (or even counter-productive). Similarly, leaving the original guidelines unchanged would not achieve the supervisory objectives set out above.

Guidance on the calculation of the supervisory ‘standard shock’

The ‘standard shock’ specified in Art 124(5) of [the CRD] is intended to prompt supervisory action where the level of IRRBB potentially is of a scale that could affect the safety and soundness of an institution. Its aim is therefore not only to safeguard the financial stability and enhance the resilience of the banking sector but also to improve consumers’ confidence on banks’ resilience.

In reviewing the Guidelines, it became clear that the existing Guidelines had produced differences of interpretation that made comparison of standard shocks across institutions and supervisory authorities more difficult, and which could lead to inconsistent outcomes. As a result, consideration was given to ways in which the guidance could be made more explicit, and the CP proposes a clearer definition of how the supervisory standard shock should be calculated and used by supervisors. These are summarised in the proposed new Appendix III to the Guidelines.

Two important clarifications are in respect of the exclusion of capital from the calculation and the constraint on behavioural adjustments for customer balances (liabilities) without specific repricing date as to a maximum of 5 years. The third element is the extent of movement in the yield curve that should be deemed to represent a standard market shock under which IRRBB should be measured against capital.

The original Guidelines (in IRRBB 5) give as an example a sudden parallel shock to the yield curve based on the 1st and 99th percentile of observed interest rates over the last 5 years: at the time the Guidelines were drafted this equated to approximately + / - 200 basis points and the text therefore refers mainly to the + / - 200 basis points test.

To improve the Guidelines, two options were considered for the shift of the yield curve for stress testing purposes: (a) formalising the test as precisely a sudden parallel shift of + / - 200 basis points (applying a 0% floor) and (b) explicitly stating that the shift should be based on the 1st and 99th percentile of observed interest rates over the last 5 years (i.e. making this guidance rather than an example)

The latter option retains the advantage of adjusting the shift of the yield curve according to the prevailing economic conditions. However, in times of low observed interest rate volatility, this guidance may lead to a standard shock that is insufficient for stress testing purposes. Moreover, it may also lead to different standard shock imposed by different supervisors in different jurisdictions, something which does not promote comparability of calculation or convergence of outcomes – a key objective of the revised guidance.

On the other hand, the former option, i.e. + / - 200 basis points sudden parallel shift, would allow more consistent comparisons across institutions and across supervisory jurisdictions, and is sufficiently

conservative for stress testing exercises during normal market and economic conditions. However, during stressed market and economic conditions, the real changes in interest rates exceeded this level quite frequently in certain jurisdictions.

Considering the pros and cons of the aforementioned options, the sudden parallel shift of + / - 200 basis points is the preferred option, on the clear condition that it should be kept under close scrutiny and that the EBA should periodically review the continuing appropriateness of this level of shift as the common standard shock.

The costs of implementing and complying with the amended guidance are expected to be negligible, as most of the larger institutions already have the capability to model such stress scenarios, while the smaller institutions will be in the position to adjust at a low cost their IT systems to comply with the new standard shock (and setting a stable standard shock level will reduce the frequency of such adjustments needed to react to changes in market observed rates).

General Guidance on internal governance arrangements

The original Guidelines did not include specific guidance on the need for robust internal governance and controls, in part because the general, overarching need for robust systems and controls was covered elsewhere in CEBS/EBA guidance¹. Two options were considered to deal with the lack of guidance on internal governance arrangements for IRRBB: (a) to follow the Basel Committee's specific guidance for managing IRRBB (Principles 1-3 and 10) or (b) to establish a new guidance.

The development of the latter option was deemed likely to be time-consuming, and in any case was not considered likely to result in different guidance to that by the Basel Committee. It is recognised that the principles and guidance from the Basel Committee have not yet been updated to reflect the lessons learnt from the recent market crisis, but they are still considered to be appropriate for the governance of IRRBB and, if they should subsequently be revised, those revisions can easily be integrated into the EBA's Guidelines. Thus, option (a) is proposed for adoption. There are no cost implications for institutions or supervisors.

Quantitative tools and models for assessing IRRBB

The EBA has observed that, in practice, credit institutions apply a wide range of tools and models to assess their interest rate risk. These tools and models focus on two different measures of interest rate risk: (a) Earnings measures and (b) Economic values measures. Within each category there are static and dynamic models. According to existing literature and empirical evidence, dynamic models tend to be more complete than the static ones since they cover all the IRRBB risk types (Re-pricing risk, Yield curve risk, basis risk and especially option risk) on a forward looking basis – which is particularly important in estimating earnings effects. However, the implementation of dynamic models in small credit institutions could pose a non-proportional cost and burden compared to the benefits resulting from the improved identification and measurement of risk.

¹in particular in the EBA's Guidelines on Internal Governance (GL 44)

In order to respect the principle of proportionality, it is proposed that credit institutions should, at a minimum, model both economic value and earnings on a static basis, but that larger and more sophisticated institutions should be encouraged to use more complex and dynamic models, commensurate with the complexity of their business and the level of IRRBB that is inherent in the business model. The new Guidance proposed is intended to ensure that such models are subject to proper governance, have been properly specified and tested, and are updated in line with market developments and practice. The guidance does not propose a supervisory approval process for such models, but does seek to ensure that supervisors are fully sighted of the implications of such models, and that they are able to provide appropriate challenge where the outcome is inadequate or unsafe.

It is possible that some (mainly smaller) institutions do not currently measure both economic value and earnings risk – especially as the standard supervisory shock essentially measures only economic value risk. However, it is considered to be very important that both the governing bodies of institutions, and their supervisors, should have a proper understanding of both risk measures, since management of IRRBB can involve balancing the impact of the two risk aspects (which tend to work in contention with each other). There may be additional costs for some institutions in adapting their existing risk measurement systems to measure earnings at risk as well as economic value at risk, but these costs are not expected to be significant, and the benefits of increased risk awareness are expected to be substantial.

Questions for consultation:

Q26. Do you agree with the main conclusions of the Cost-Benefit Analysis / Impact Assessment? If no, please elaborate your opinion.

Q27. Do you agree that all institutions should be able to implement both economic value and earnings measures of IRRBB without significant additional cost? If no, please provide adequate reasoning and evidence.

5.2. Overview of questions for Consultation

- Q1. Do you agree that the proposed changes to the original Guidelines text of IRRBB 1 are required in order to make clear that institutions' internal capital should be commensurate with the level of the interest rate risk in their banking books?
- Q2. Do you agree that a more consistent approach to calculating the effect of the standard supervisory shock is necessary? Will the proposed changes to the text of IRRBB 5 achieve a more consistent approach?
- Q3. Do you agree that an average duration of 5 years is appropriate for the behavioural assumption for non-maturity liabilities when calculating the effects of the standard shock. If not, what duration and/or measure would you suggest instead? Should the volatile portion be included in the average, or just the stable core?
- Q4. Should the calculation of the level of the economic value use a risk free yield curve that excludes instrument or entity specific credit risk spreads and/or liquidity risk, or should assets and liabilities be valued using an institution-specific credit risk curve? Should the calculation of the net interest income consider the change of the credit spread of assets and liabilities for the repricing of instruments that mature?
- Q5. Do you agree that equity capital should be excluded from the calculation of the impact of the standard shock, when the results are used for supervisory purposes?
- Q6. Do you agree that the original Guidelines should be amended to include a principle covering internal governance arrangements?
- Q7. Is the provision of additional technical guidance, to be read alongside the original Guidelines (as updated), helpful in highlighting the key issues to be considered by both institutions and supervisors?
- Q8. Should the Technical Guidance remain a separate document, or should it be embedded within the overall guidelines?
- Q9. Do you agree that institutions should regularly measure their IRRBB exposure under an appropriate range of different interest rate scenarios, not just comprising standard shocks based on sudden parallel shifts of the yield curve?
- Q10. Should stress testing for IRRBB be integrated into the institution's overall stress testing structures and programmes?
- Q11. Do you agree that key behavioural assumptions affecting accounts with embedded customer optionality should be subject to regular review and testing to ensure that they remain valid?
- Q12. Do you agree that behavioural assumptions about the re-pricing characteristics of customer accounts without specific repricing dates should be prudent and appropriate in balancing the benefits to longer-term earnings against the economic value at risk?
- Q13. Do you agree that assumptions for the investment term of equity capital should be fully recorded and considered as part of the institution's corporate planning cycle (rather than as a tactical decision in reaction to changes in market rates)? Is further guidance needed on calculating the investment term of equity?
- Q14. Do you agree that institutions should monitor both risk to earnings and risk to economic value?
- Q15. Do you agree that institutions should use a variety of risk measures to ensure better coverage of embedded risks?

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- Q16. Do you agree with the guidance matching measures with different levels of sophistication in Table 3?
- Q17. Do you agree that there should be additional guidance provided on aspects of internal governance specific to IRRBB?
- Q18. Do you agree that the main governance issues for IRRBB relate to overall IRRBB strategy, risk policies, processes and controls, IRRBB IT systems and data quality, and internal reporting?
- Q19. Do you agree that it is helpful to distinguish between capital allocated for the potential IRRBB impact on economic value, and the implications for future capital requirements arising from changes to earnings resulting from interest rate risks?
- Q20. Do you agree that the quantum of internal capital allocated against market risk positions in the banking book should be gauged by considering other capital requirements for market risks?
- Q21. Do you agree that institutions should hold internal capital based on available limits rather than actual utilisation of those limits?
- Q22. Do you agree that institutions should allocate internal capital against potential future earnings at risk, based on the result of their stress-testing?
- Q23. Are the cross-references between the high level guidelines and the technical guidance helpful?
- Q24. Does the glossary need to be extended to cover more technical terms? If so, please suggest additional terms and definitions.
- Q25. Should credit spread risk (both the institution's own credit spread, and market spreads more generally) be treated as a form of basis risk to be factored into the measurement of IRRBB, and, if so, how should this best be achieved?
- Q26. Do you agree with the main conclusions of the cost/benefit analysis / impact assessment? If no, please elaborate your opinion.
- Q27. Do you agree that all institutions should be able to implement both economic value and earnings measures of IRRBB without significant additional cost? If no, please provide adequate reasoning and evidence.