September 11, 2015

Mr. Jakob Lund
Mr. Toshio Tsuiki
Co-Chairs, Task Force on Interest Rate Risk in the Banking Book (TFIR)
Basel Committee on Banking Supervision (BCBS)
Centralbahnplatz 2
Basel, Switzerland

Re: BCBS Consultative Document on Interest Rate Risk in the Banking Book (IRRBB)

Dear Messrs. Lund and Tsuiki:

On behalf of the industry IRRBB Working Group,[1] please find attached the joint Associations' response to the BCBS Consultative Document on IRRBB, which was issued on June 8, 2015.

The response elaborates on the industry's main points, as follows:

1. The industry continues to believe that a Pillar 1 approach, with its inherent methodological simplifications, standardization or constraints on internal parameters/measures, is not appropriate for IRRBB;

2. The problems of the proposed Pillar 1 approach are fundamental and cannot be addressed adequately;

3. Any capital requirement for IRRBB should consider potential loss of capital, not variability risk. Nevertheless, the nature of IRRBB puts into question the reasonableness of specific capital allocation. Allocating capital against embedded net interest margin is also problematic;

4. The industry supports a genuine Pillar 2 approach; and

5. Appropriate public disclosure is important, but disclosure of standardized calculation will be misleading.

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[1] The Industry IRRBB Working Group is chaired by Stephane Denise of BNP Paribas.

We hope to discuss our response with the BCBS TFIR at the soonest convenient time. In the meantime, if you have questions, please feel free to contact the undersigned or Jermy Prenio of the IIF (jprenio@iif.com).
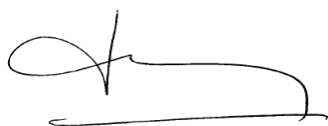
Best regards,

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The Institute of International Finance (IIF), the International Banking Federation (IBFed), the Global Financial Markets Association (GFMA), and the International Swaps and Derivatives Association (ISDA), together "the Associations", appreciate the opportunity to comment on the Basel Committee on Banking Supervision's (BCBS) consultative document (CD) on Interest Rate Risk in the Banking Book (IRRBB).

This paper discusses the Associations' response to the CD. It should be read together with our past submissions to the Task Force on IRRBB (TFIR), particularly the IIF-IBFed paper dated June 26, 2014. We discuss in Sections 1 and 2 the reasons why the industry continues to believe that a Pillar 1 approach will be ineffective in the assessment of IRRBB and that a "genuine" Pillar 2 approach is appropriate. Section 3 defines what the industry believes should be reflected in an appropriate estimate of IRRBB capital – i.e. loss risk and not variability risk. Sections 4 and 5 provide industry comments and suggestions on how to improve the proposed Pillar 2 framework and public disclosure (Pillar 3).

1. **The industry continues to believe that a Pillar 1 approach, with its inherent methodological simplifications and standardization or constraints on internal parameters/measures, is not appropriate for IRRBB.**

The Associations are aware that there are differing views within the BCBS as to how IRRBB should be addressed in the context of the Basel framework. We therefore appreciate the efforts made by the Committee in attempting to reconcile these various views by proposing two options for consideration in its CD.

However, the industry continues to believe, and as even the CD notes, that the reasons why the BCBS previously decided to adopt a Pillar 2 approach based on the conclusion that "management and measurement of interest rate risk was not amenable to an internationally harmonized Pillar 1 capital framework" continue to remain valid.[2]

The existing national regulatory frameworks for IRRBB provide further evidence that an *internationally harmonized* Pillar 1 capital framework is simply unrealistic. According to a survey of BCBS members cited in the CD, only two jurisdictions have a Pillar 1 approach to IRRBB.[3] More importantly, in terms of the metric to use in measuring IRRBB, "about half of the jurisdictions that participated in the survey did not prescribe any particular methodology and left banks the flexibility to choose what they considered to be the most appropriate … few provide greater prescriptions on bucketing, including on the duration of non-maturity deposits (NMDs)" and "most member jurisdictions rely on banks' internal models …"[4] If most national regulators found it unrealistic to develop a regulatory capital framework for IRRBB in their respective jurisdictions

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[2] Section I.4.4, page 9
[3] These jurisdictions (Australia and Mexico) do not prescribe a standardized approach and instead allow banks to use internal models (or at least allow behavioralization, such as in Mexico), indicating that while a Pillar 1 approach for IRRBB can be done at the national level, this is done with a lot of flexibility given to banks in measuring IRRBB and there is no uniform way of doing it in these jurisdictions.
[4] Section I.3 of the CD

(e.g. failed attempt to introduce such a capital charge in the US), how can the BCBS achieve a harmonized Pillar 1 at the global level?

The problem of a Pillar 1 approach for IRRBB is accentuated by the proposed standardization in the CD

Our overall assessment of the proposals is that the BCBS is effectively suggesting a highly standardized approach to calculating capital requirements for IRRBB in the case of both of the options presented. Indeed, the proposed Pillar 2 approach requires the calculation and public disclosure of the outcome of the standardized approach together with the requirement for supervisors to use the standardized framework as a comparison metric (benchmark) and fallback approach. We believe that this will act as a de facto constraint on banks' internal assessment of IRRBB and most probably as a floor to the capital that banks should hold. In substance, the proposed Pillar 2 approach is therefore no different than the proposed Pillar 1 approach. Moreover, it adds operational and technological burden on banks that would distract from their efforts to maintain a robust and integrated IRRBB management framework, which is the thrust of most of the proposed Pillar 2 Principles.

We would like to reiterate the industry strongly held view that the standardization of parameters under the Pillar 1 approach is not fit for purpose. Given its simplified and standardized nature to accommodate global application, it will not reflect banks' actual levels of interest rate risk. As already pointed out in our various letters to the BCBS TFIR, banks' approaches to IRRBB are adapted to cater for the specificities of, inter alia, their different product offerings, market and regulatory environments, business models and customers' behavior, resulting in justifiably heterogeneous assumptions, monitoring, measurement techniques and risk management. The CD itself demonstrates the sheer number of parameters that would have to be set – many of them inevitably not representative for individual markets – to devise a standardized approach for IRRBB. Hence, a Pillar 1 approach simply cannot cater to the diversity of products and risks inherent in IRRBB, and reliance on any standardized results would most likely lead to misinformed and wrongly-placed considerations and recommendations for banks' IRRBB management and regulation. The BCBS's first criterion in developing choices for an IRRBB minimum capital requirement – risk sensitivity (i.e. reflecting the risk characteristics of instruments/positions) – is therefore not met by a Pillar 1 approach.[5]

Moreover, we are concerned about the definition of "comparability" that the BCBS may have in mind in identifying it as one of the criteria for developing an IRRBB minimum capital requirement.[6] While imposing a standardized methodology leads to comparable numbers in the sense that they are computed in the same way, it does not lead to comparable outcomes. As a concrete example, the US Office of Thrift Supervision (OTS) used to require reporting of standardized IRR metrics (TB13 reporting). After the OTS was shut down, the Fed discontinued the report as it failed to provide accurate measurements even for "US only" small banks with very simple balance sheets. Indeed, achieving such standardized IRR metrics would be even less feasible at the global level involving much larger and more complex banks

Therefore, it should not be the goal of the BCBS to develop a "comparable" measure of IRRBB since incomparable products, markets, practices, business models, etc. do not make this

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[5] Section II.1.1, page 10 of the CD
[6] ibid

possible. The goal of supervisors should instead be to ensure that banks continue to manage IRRBB effectively and that appropriate transparency is achieved for stakeholders to properly gauge banks' IRRBB exposure. This goal can be pursued within the Pillar 2 and Pillar 3 frameworks.

We are also concerned that standardization will result in significant difference between economic and regulatory measures of IRRBB, which could lead to deviations in banks' hedging programs away from hedging true risk to hedging for a standardized regulatory metric with the goal of reducing regulatory capital requirements. This will result in an increase in economic risk. In addition, some jurisdictions' wholesale markets have inadequate depth to absorb the risk that banks would immediately recognize under the proposed standardized approach.

We are also concerned that the proposed approach will increase systemic risk due to a clustering of banks around the same shorter investment horizon to manage regulatory standardized risk metrics.

To illustrate the above, let us quote from the IIF-IBFed paper submitted to the TFIR on June 26, 2014:

> *…a Pillar 1 standardized framework incentivizes banks to shorten the overall duration of their balance sheets and/or cluster around the same investment horizon because there would be insufficient flexibility in the regulatory framework. This could lead to more volatile earnings, impact on customer pricing and product offered by banks, and in general could pose systemic risk instead of strengthening financial stability.*

> *As an illustration, a 1-year investment horizon of capital is applied in one jurisdiction for the purpose of a Pillar 1 charge on IRRBB. However, banks invest capital at a longer horizon in line with a desired level of stability in earnings. This difference in capital investment horizon assumption accounts for the largest proportion of regulatory capital in that jurisdiction.*

> *In general, applying an artificially short duration to equity or NMDs may create adverse incentives to (i) place long liability positions in the banking book; and (ii) invest capital over a shorter horizon, which results in less stable earnings. In addition, the cost of capital that the banks carry due to the difference in investment horizon may be passed on to customers through increased lending costs, changed product offering that could transfer risks to the customers, or worst, dampened availability of credit in the economy.*

> *As another illustration, if NMDs' regulatory duration was shorter than banks' estimates, banks may be led to decrease their offering of fixed rate loans and substitute to floating rate loans, which are riskier from a credit risk standpoint since customers are exposed to an increase in market rates.*

Indeed, it is worth emphasizing two major potential implications of a Pillar 1 approach to IRRBB:

1. The maturity transformation service that banks provide, which is banks' raison d'etre, will be drastically curtailed with higher earnings variability for banks. When combined with the impact of the BCBS liquidity ratios on maturity transformation, this could also potentially lead to detrimental effects on the economy – one particularly striking example is the impact on long-term fixed-rate mortgages (e.g. contractually 20-30-year mortgages) with

the interest rate risk profile hedged with NMDs whose maximum maturity would be capped at 6 years; and

2. Rate variability will be transferred to the general public, especially retail customers who are least equipped to manage this risk thus creating potential credit risk for banks in a rising rate environment.

The proposals also do not consider differences in how banks manage their IRRBB

Pushing ahead with the proposed Pillar 1 approach (or a standardized-based Pillar 2 approach) will not only lead to a distorted view of risk and all its attendant consequences but it will also not align with how most banks manage risk, i.e. assuming a dynamic balance sheet considering a number of factors such as roll-over of existing businesses, the emergence of new businesses, customer behavior, etc. The disconnect that this will create between actual IRRBB management and regulatory capital to cover IRRBB could lead to adverse consequences resulting from wrong incentives. In addition, the proposed Pillar 1 approach does not give any consideration to important differentiators in how banks manage IRRBB. This includes frequency of internal measurement/management decisions, sophistication regarding hedging strategies (including dynamic risk management), alignment of accounting results for hedge instruments with accrual treatment of balance sheet items, and robustness of internal models/approaches for behavioral options.

The cited motivations for a Pillar 1 approach to IRRBB do not seem justified

We understand that one of the motivations of the BCBS in undertaking this review of the IRRBB framework is the potential for arbitrage between the banking book (BB) and the trading book (TB). However, we are unclear on how the proposed standardized approach would address the problem of arbitrage as this is not explicitly described in the CD.

The CD, for example, cites that during the crisis the BB experienced material losses and notes that in one jurisdiction losses in the regulatory BB were due to instruments originally accounted as held-for-trading (HFT) but subsequently reclassified. First, it is important to clarify that the losses experienced during the crisis were not due to interest rate movements but because of deteriorating market liquidity mainly due to price uncertainty in the markets, which in turn reduced the value of financial instruments held by banks in their TB. These losses did not relate to BB items that were intended to be held to maturity. Secondly, losses mentioned in the CD due to reclassification would have stayed in the TB had the reclassification not been allowed by the IASB limited amendment in October 2008 that was prompted by the continuing decline in value of TB assets at that time. In essence, therefore, the losses noted by the CD were not the result of an IRRBB problem. As such, we do not think that the existence of an IRRBB Pillar 1 framework would have prevented or even mitigated those losses.

We disagree with the idea that the FRTB only addresses the arbitrage issue *after* inception and not *at* inception.[7] While the FRTB restricts capital benefit in the case of re-designation of existing

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[7] This was mentioned at the July 7, 2014 meeting between the industry and the TFIR, and alluded to in footnote 5 of the CD.

instruments or portfolios, it also provides a list of instruments presumed to be designated to the BB or TB.[8] The latter clearly affects newly entered positions and not just re-designations.

We believe supervisory rules pertaining to the BB and TB boundary can be tightened without resorting to yet another layer of capital rules. For example, banking laws in some jurisdictions[9] could be leveraged by national supervisors to address any residual arbitrage concern.

A related issue to the TB-BB boundary is the definition of eligible internal risk transfers (IRT) that is being consulted in the context of the TB review but not in the IRRBB, which is surprising given that it would also have implications on the latter. The industry reiterates the views expressed through the FRTB process that the proposed IRT definition will result in the inability of banks to manage banking book risks on a diversified portfolio basis, which in turn reduces risk management efficiency. The proposed IRT definition will also introduce additional complexity to the structure and operations of banking book hedging activities, which could serve as a disincentive to the effective management of these risks.

2. The problems of the proposed Pillar 1 approach are fundamental and cannot be addressed adequately

Typical of a Pillar 1 approach, the CD proposes some constrained use of internal modelling through the time series approach for NMDs and supervisory discretion in allowing firms to establish baseline scenarios for other positions with behavioral options, as well as the use of fixed parameters and caps and floors involved in attempting to standardize these positions. These are not reflective of the diversity banks' face in practice, and therefore will lead to under or overestimation of risk with the potential consequences previously described.

The following areas in particular pose problems to the sound estimation of IRRBB:

- <u>Economic Value of Equity (EVE) and Net Interest Income (NII)</u>. Although the CD recognizes the flaws and the potential unintended consequences of solely relying on an EVE approach and states that "there is a trade-off between optimal duration of equity and earnings stability", [10] the proposals for calculating minimum capital requirements under the standardized approach fail to capture these critical trade-offs, and substantially are still based on the EVE sensitivity approach. In this regard, *Appendix 1* illustrates in greater detail the pros and cons of both EVE and NII. While we have already made such illustration in our previous submissions, we believe that certain key points are worth repeating. *Appendix 2*, on the other hand, discusses why the proposed earnings overlay approaches are not in line with the earnings-based measurement approaches applied in practice by banks.

- <u>NMDs</u>. The proposed standardized treatment of NMDs, which is constrained by both the pass-through floors and stability parameters and maximum maturities of core NMDs, is far too restrictive and does not enable a realistic representation of the interest rate sensitivity of deposits. Banks offer different types of deposit products whose specific characteristics should be considered, including in how they are managed and hedged. Hence, applying a one-size-

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[8] Paragraphs 22 and 14, respectively, of the updated draft of the market risk framework (Annex 4 of the Instructions for Basel III monitoring, February 13, 2015)
[9] Volcker Rule in the US, Belgium, French and German Banking Laws, European Structural Reform
[10] Section I.4.2 of the CD

fits-all approach to all NMDs across all countries, business models and product types runs counter to how banks manage NMDs. Please see *Appendix 3* for more discussion on NMDs.

- **Investment of equity**. The assumption of a standardized zero duration of equity in the CD is in sharp contrast to some banks' actual investment duration of equity, and will be a key driver of regulatory capital outcomes. This will misrepresent actual risk, while also masking the sensitivity of IRRBB to more relevant risk drivers. Please see *Appendix 4* for more discussion on investment of equity

- **Behavioral options**. The standardized multipliers to the baseline conditional prepayment rate (CPR) for fixed rate loans are completely at odds with a bank's expected prepayment rates with no directional bias, i.e., depending on the level of the rate incentives, standardized prepayment rates alternatively overestimate or underestimate a bank's expected prepayment rates. For fixed rate loan commitments, the proposed methodology leads to the extreme outcomes of 100% or 0% drawdown and also suggests an unrealistic scenario that a significant portion of loan commitments would be drawn down overnight for a "Parallel Up" shock. Please see *Appendix 5* for more discussion on fixed rate loan with prepayments and fixed rate loan commitments.

- **Basis risk**. The CD captures basis risk by aggregating balances repricing at different indexes, which could result in wrong basis risk estimates. We understand that the TFIR recognizes the flaws of the proposed approach. *Appendix 6* presents some industry practices in capturing basis risk for the TFIR's reference. We do not believe in a standardized way of capturing basis risk, especially a simplified one, as this would only misrepresent the risk without contributing to improvement in risk management.

- **Shock scenarios**. The proposed methodology in the CD in designing shock scenarios does not take into account local volatility, but instead combines different rate curves in different currencies to arrive at a set of standardized global shock parameters. As a result, the scenarios do not reflect the relative levels of volatility in different currencies. The proposed stress scenarios will therefore likely underestimate risk in some jurisdictions or rate environments and overestimate risk in others. More importantly, the specification of the shock scenarios as proportional to the current level of interest rates means that volatility in fixed income markets will also be reflected in the capital measure, leading to a very unstable capital requirement even without a change in banks' balance sheet. Please see *Appendix 7* for more discussion on stress scenario design.

- **Currency aggregation**. The proposed currency aggregation approach in the CD does not reflect market reality and as such will result in an output that misrepresents the risk that banks are managing. Global banks operating in multiple currencies have already developed currency aggregation techniques within their existing risk management frameworks that more realistically reflect the correlations between currencies. Please see *Appendix 8* for more discussion on currency aggregation.

3. **Any capital requirement for IRRBB should consider potential loss of capital, not variability risk.**

Banks' IRRBB management focuses both on earnings variability risk and loss risk (loss of capital). Volatile earnings are undesirable from a shareholder value management perspective but, as long as earnings remain positive and pose no threat to solvency, then it should not attract a capital charge. An assessment of regulatory capital for IRRBB should only be made if there is loss risk.

In practical terms, requiring capital only for loss risk means taking into account future margins in either NII or EVE metrics such that capital is required only when changes in NII cause earnings to go below zero or changes in EVE cause EVE to drop below the book value of EVE. The appropriateness of considering future margins is recognized in the CD in the form of option 4 for computing capital requirements in the Pillar 1 approach. However, only limited recognition of expected earnings in the "near future" is given and is done within the context of the Pillar 1 approach, which is problematic in many other respects as well, as demonstrated in this paper.

The nature of IRRBB puts into question the reasonableness of specific capital allocation

Considering the progress made by banks and regulators in the area of capital planning processes and stress testing since the 2008 crisis, it is questionable whether IRRBB , which is dynamic and multi-period in nature, should be considered as a stand-alone risk with a point-in-time capital adequacy assessment even under Pillar 2, let alone under Pillar 1. We believe the capital planning processes (e.g., ICAAP) under Pillar 2 is the component of the overall framework most appropriate for capturing IRRBB. IRRBB should be evaluated in capital planning exercises (e.g., stress testing) and incorporated into the overall assessment of the adequacy of capital buffers. With this approach, while capital is not directly allocated specifically to IRRBB, the potential loss over a stated horizon is considered when defining capital buffers.

This capital planning exercises should capture, in particular, the potential knock-on impacts materializing under a stressed, or in extremis, a gone concern situation that could significantly alter a bank's IRRBB exposure (e.g. fixed rate loans that would be written off due to credit risk, decrease in equity due to materialization of other risks, accelerated deposit run-off due to liquidity stress). Such situation, which is caused not purely by IRRBB but arises mainly from other sources such as market and/or firm-specific liquidity stress, should be left to a comprehensive stress testing approach that encompasses all significant risk categories within a Pillar 2 capital planning process.[11] We do, however, recognize that within their IRRBB management banks must prudently take account of potential significant shifts in IRRBB (e.g. significant reduction in deposit volume) that can occur within a "going concern" environment. This should cover volume effects that are directly triggered by – potentially large – interest rate movements.

Allocating capital against embedded net interest margin is problematic

Another aspect of the CD that gives rise to concern is the requirement to allocate capital against embedded net interest margin. In this case, the economic value sensitivity of embedded interest margin in an accrual accounted exposure shock does not affect the solvency of a bank. A positive nominal accrual will continue to accrete to income even if the path of interest rates changes. Nonetheless, the consultation paper proposes that banks allocate capital to the sensitivity of the value of this margin. This aspect of the proposal will make higher interest rate margin business more capital intensive than low interest rate margin and so a bank could be required to hold a higher level of capital potentially for no reason apart from having successfully negotiated business at a higher rate than its competitors.

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[11] This view is consistent with Principle 2 of the proposed Pillar 2 framework as discussed in page 40 of the CD: "Board directors should understand the implications of their IRRBB strategies, including the potential interlinkages with and impacts on market, liquidity, credit and operational risks."

Whatever its form, a capital requirement for IRRBB should appropriately consider future earnings in a time horizon that is consistent with that of the respective risk measure (e.g., 1 year of earnings for a 1-year ΔNII risk measure).

4. The industry supports a genuine Pillar 2 approach

The industry reiterates its support for a "genuine" Pillar 2 approach. The Pillar 2 approach was first introduced under Basel II in recognition of the fact that (1) not all risk can be captured (whether fully or partially) in an explicit minimum regulatory capital requirement under Pillar 1, and (2) increasing capital is not the end-all and be-all solution to the risks that banks face, and that a strengthened internal risk management and governance processes are equally important.[12] To this end, supervisors have an important role to play in establishing an effective supervisory review and evaluation process (SREP) to ensure that banks are both sufficiently capitalized and adequately managing their risks. This approach should be maintained to preserve the integrity of each Pillar of the Basel Capital Framework and not blur the lines between Pillar 1 and Pillar 2.

However, the proposed Pillar 2 approach in the CD broadly deviates from a pure Pillar 2 approach. For one, it seeks to make use of the proposed Pillar 1 standardized calculation for disclosure and benchmarking purposes, and as a fallback approach. As we state above, we believe this will effectively act as a constraint on banks' internal measurement and management of IRRBB and as a de facto floor to the capital banks should hold. In substance, by using the standardized calculation, the proposed Pillar 2 approach is therefore no different than the proposed Pillar 1 approach. Hence, the same problems identified with an IRRBB Pillar 1 approach would still arise.

The discussions in Sections 1 and 2 illustrate why standardization, and hence an internationally harmonized Pillar 1 approach, is not possible for IRRBB purposes. If the BCBS ultimately draws the same conclusion as it did in 2003 and continues to support a Pillar 2 approach for IRRBB, we find it incongruous that the standardized calculation that is intended for a Pillar 1 measure and that is deemed ineffective would still be used for Pillar 2.

The underlying assumption that should govern why a certain methodology is used for disclosure, benchmarking and fallback purposes is that it provides credible results that can be used for comparison and additional analysis. This is clearly not the case for IRRBB, where standardization results in incorrect assessments of risk that produces artificial comparability and could have substantial adverse consequences, as indicated in Section 1 of our comment letter. Public disclosure of incorrect assessments of risk is especially dangerous as it may mislead the majority of stakeholders who may automatically assume that the regulatory standardized measure is more accurate.

The "strong presumption of capital consequences" under the proposed enhanced Pillar 2 is also a sharp reversal of the BCBS view under Basel II that "capital should not be viewed as the only option for addressing increased risks confronting the bank" and that "capital should not be regarded as a substitute for addressing fundamentally inadequate control or risk management

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[12] Paragraph 723 and 724 of Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework

processes." [13] Indeed, there are other means of addressing risk such as strengthening risk management, applying internal limits, strict monitoring, and improving internal controls which should be further considered.

Below we provide some more comments on the proposed Pillar 2 Principles, as well as suggestions on how to achieve a "genuine" Pillar 2 approach.

Specific comments and suggestions on the proposed Pillar 2 Principles

Principles 1-7

We fully support the main thrust of Principles 1-7, which is to ensure that banks have sound risk management frameworks and robust control and governance for IRRBB that is commensurate with their "nature, size and complexity as well as its structure, economic significance, and general risk profile." [14] This is fully aligned with the General Framework on IRRBB measurement scope, management and governance that was recommended in the June 26, 2014 IIF-IBFed paper.

Nevertheless, it should be ensured that banks are given the full flexibility to use their internal measurement systems (IMS) for IRRBB in Pillar 2, subject to supervisory review, and that national regulators should not impose discretionary restrictions (e.g. caps/floors on NMD). We understand of course that if a bank is found to have undue exposure to IRRBB, there would be consequences in terms of additional capital or requirements to improve the management of risk.

We also believe that credit spread risk in the banking book (CSRBB) should be excluded from the scope of IRRBB principles (specifically Principle 1), and be dealt with separately, with consideration of the existing framework for credit risk (i.e. capital allocated for credit risk). The concept of CSRBB is not sufficiently developed in the CD for it to be included in the scope of this consultation.

We believe it is important to clearly define the scope of IRRBB for Pillar 2 purposes. The proposed Pillar 1 definition enumerates in an exhaustive way BB positions that are excluded (e.g. fixed assets, equity, capital instruments). This leads to the interpretation that all other BB positions not explicitly mentioned, including non-interest rate sensitive positions, would have to be included in measuring IRRBB. We seek clarification if indeed this is the case.

Principle 8

The industry finds very problematic the public disclosure, regulatory reporting, and the requirement to use the standardized approach calculation for reasons we already cite above. The next section of our comment paper provides industry recommendations on public disclosure for IRRBB purposes. Specifically, references to "Standardized Framework" on Table 15 (page 51 of the CD) should be deleted.

In terms of reporting to supervisors, the CD states that "banks should report the results of their internal models for quantification of IRRBB, in terms of impact on both EV and earnings to their

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[13] Paragraph 723 of Basel II: International Convergence of Capital Measurement and Capital Standards: A Revised Framework
[14] Section III.2.3, page 38

supervisors when requested."   We would note that under the current Pillar 2 framework, supervisors have the ability to, and they regularly do, request information and insight into banks' internal models and this forms a natural part of the SREP. SREP also provides for a deeper discussion between the bank and the supervisor to ensure common understanding on practices used internally as well as assessing robustness of the bank's governance process and any significant changes that have occurred. Moreover, supervisors in most, if not all, jurisdictions have access to banks' Asset and Liability Committee's (ALCO) and/or Market Risk Committee's documents and minutes, IRRBB Policy and Process documents, and other relevant documents during the course of their regular review. We therefore suggest that national supervisors refer to their respective SREP in determining the appropriate additional information, if any, which banks may need to report.

While the proposed items for supervisory reporting are generally acceptable, we do not think that banks necessarily have to notify their supervisors *"in advance"* of significant changes. Significant changes should certainly be regularly discussed with supervisors, but banks should have the flexibility to have that discussion before or after the change has been implemented without putting a constraint on banks' internal modelling and IRRBB management framework.

The language on supervisory reporting also seems to suggest that banks should contact their supervisors on an ad hoc basis to notify them of changes to assumptions, modelling systems or methodologies, or limit structures. There is also an interpretation to be made by individual firms (or for competent authorities to define?) as to what is defined as a "significant" change, as institutions would have hundreds of assumptions and notification to the supervisor could easily lead to information overload. We question what supervisors are expected to do with this information and why this could not form part of the regular SREP. Also, in some jurisdictions there are regulatory reporting templates in place with regular submission (e.g. quarterly) that already captures this information. If the purpose of the request above is to ensure that the reasonableness of the bank's assumptions or that the bank is not changing its assumptions on a too frequent or arbitrary basis, this should be addressed by ensuring that there are independent risk and control functions and robust internal governance in place.

Principle 9

As we note in Section 3, we find it questionable to specifically allocate capital for IRRBB given its nature, and that it is most appropriate to assess potential loss risk due to IRRBB in a comprehensive capital planning process. Please see Section 3 of our comment paper for more discussion.

We also reiterate our view that any capital requirement for IRRBB should reflect potential loss of capital and not variability risk. Principle 9 seems to focus on the latter. For example, it states that "banks should consider the adequacy of capital buffers held against the risk that future earnings may be lower than expected". Future earnings may be lower than expected but this does not necessarily lead to a loss of capital.

Principle 9 also states that quantification of internal capital allocations should take into account internal limits on IRRBB (including CSRBB) positions, and whether these are fully used at the point of capital calculation. While we understand that this is only one of the many things that banks should take into account in quantifying internal capital allocations for IRRBB, this seems to be based on the wrong assumptions that IRRBB is not managed, while IRRBB is actively managed using hedging instruments (i.e. future, OIS, IRS). Using full usage of risk limits to allocate capital

for IRRBB will not actually produce comparable results given that the metrics and methodologies for calculating those metrics will differ between banks. We confirm that, as for all other risks, the potential need for capital should be calculated based on the actual IRRBB exposure.

Principle 10

Principle 10 requires supervisors to collect standardized information from banks on the level of IRRBB. This includes the outcome of the proposed standardized calculation, which will also be used as a metric for comparing and assessing banks' internal measures, as a fallback if the supervisor is not satisfied with the supervisory review as set out in Principle 11, and as a trigger for supervisory review and dialogue if materially different from the outcome of the internal measures.

Given the problems associated with using a standardized approach in the IRRBB context that we discuss above and that have been acknowledged to some extent in the CD, we are surprised by the importance attached to the proposed standardized calculation under Pillar 2. We are concerned that important supervisory decisions and actions would be based on such a problematic and misleading measure. We therefore emphasize our view that the proposed standardized calculation should not be used as a common metric to compare banks, should not be used to compare with and as a fallback approach to IMS, and should not be part of reporting to supervisors.

Principle 11

We fully support the idea that supervisors should have specialist resources in the area of IRRBB. In performing regular assessments of the effectiveness of each bank's approach to the identification, measurement, monitoring and control of IRRBB, supervisors should have the proportionality principle (Section III.2.3 of the CD) in mind. That is, these assessments should take into account the "bank's nature, size and complexity as well as its structure, economic significance, and general risk profile." While this may have been the intent of the BCBS, we think it is quite important to emphasize in our response.

Principle 12

We understand the need for supervisors to improve and harmonize the identification of potential outlier banks to ensure that any bank could be identified as a potential outlier for the same reasons. We would emphasize, however, that the risk measures used in the identification of potential outlier banks should be based on banks' IMS. Moreover, the identification of potential outlier banks would work only if it does not result in an automatic additional capital charge but would instead be used as a trigger for further discussion between the bank and its supervisor. Given the heterogeneity inherent in IRRBB, there could be a number of reasons why a bank may be identified as a potential outlier, with some that may not even require supervisory intervention. As such, any supervisory action should be on a case-by-case basis.

In this regard, we suggest some modifications to the proposed mechanism of identifying potential outlier banks on page 55 of the CD:

> *Moreover, a bank should be considered an outlier, for example, if the limited set of BCBS-specified interest rate shock scenarios, <u>as applied to banks' IMS</u>, result in EVE and NII that exceeds pre-defined thresholds.*

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However, regulators with sufficient expertise should have the discretion to use their own assumptions as to shock scenarios.

5. Appropriate public disclosure is important, but disclosure of standardized calculation will be misleading

The industry finds very problematic the public disclosure of the standardized approach calculation for reasons we already cite above. While we do understand that public disclosure of appropriate information is necessary for stakeholders to be able to assess banks' IRRBB exposure, we do not believe that this can be achieved by disclosing a standardized measure as this will only lead to simplistic and misleading conclusions. This is especially concerning since most stakeholders are likely to assume that the regulatory standardized measure is an accurate reflection of risk, which is not consistent with industry and national supervisory experience. Therefore, this approach will only result in a false sense of comparability.

Moreover, the additional operational cost in terms of infrastructure investments needed to conduct and report the standardized calculation cannot be justified as there is no benefit both to banks' internal risk management and to the understanding of banks' IRRBB exposure by supervisors and other stakeholders. This will be done therefore purely for compliance purposes.

Nevertheless, we do understand that there will be varying degrees of sophistication across banks with regard to their IRRBB IMS. As such, we suggest that national supervisors should be well engaged and informed on all assumptions inherent in a bank's calculation of IRRBB, and to the extent that supervisors are not comfortable with a bank's assumptions, supervisors should engage with the bank and have it take remedial action to enhance its processes, which would then find its way into the bank's reporting.

We reiterate the point we made in the IIF-ISDA-GFMA letter to the BCBS on Pillar 3 review, dated October 10, 2014, that placing the usefulness of disclosure at the forefront is key. While the market clearly favors transparency and comparability, it does not wish to receive voluminous prudential information at unreasonable frequency, because receiving detailed information too frequently is not generally useful.

We offer below some comments/suggestions on IRRBB disclosure:

1. The CD should clarify that the proposed public disclosure applies only at the consolidated level, so as not to pre-empt national implementation that may seek disclosure at the legal entity level;
2. While the proposed qualitative disclosures in Table 14 (items (a) to (h)) are generally acceptable (with the exception that CSRBB should be out of scope), we would like to clarify the expectation with regard to item (d) on behavioral assumptions and item (g) on risk measurement assumptions. While some of these are already required under the current Pillar 3, it is our understanding that this requires only a general discussion on assumptions. We do not believe this involves a detailed discussion of banks' assumptions since these are sensitive and proprietary information that will give insight in the bank's product pricing strategy. Disclosure of such information might even be seen as in conflict with anti-trust legislation. These concerns are already recognized in the revised Pillar 3

text, which states that a bank does not need to disclose information that may reveal the position of a bank or contravene its legal obligations;[15]

3. In terms of quantitative disclosures, we propose disclosure of banks' own estimates of EVE and/or NII sensitivities under a limited set of supervisor-prescribed interest rate scenarios (the choice of metric would depend on what banks are using internally).

4. Item (k) of Table 14 should not be disclosed as it will raise the same concerns as disclosing the detailed behavioral and modelling assumptions;

5. Table 15 should be deleted as the quantitative disclosures are already covered in item 3 above.

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[15] See paragraph 11 on page 3, BCBS Standards – Revised Pillar 3 disclosure requirements, http://www.bis.org/bcbs/publ/d309.pdf

Appendix 1 (Comparison between EVE and NII)

IRRBB involves the risk to earnings or capital arising from the movement of interest rates. The impact of IR Exposure can be measured based on a bank's future dynamic NII over several years and/or a bank's Economic value (EV). The management of IRRBB encompasses managing future flows of assets and liabilities and managing the stability of earnings over the business cycle (including *structural interest rate risk*). **The regulatory approach to IRRBB** should reflect these perspectives and be based on **a dynamic/going concern principle to IR steering.**

For measuring IRRBB, banks may use an Earnings-at-Risk measure: NII and/or the sensitivity of the EV. Depending on the risk definition in use, those metrics should allow for the reflection of a dynamic/going concern principle by taking into account existing *and* future applicable risks through their assumed interest rate risk profile. The horizon over which future transactions are considered should be consistent with the business model of the bank as described in the IRRBB framework decided by the bank and the average duration of the BB.

EV metrics are based on changes in present value derived from discounted future cash-flows of assets and liabilities on all horizons. They consider only transactions that are currently on the balance sheet, and potentially future transactions over the retained dynamic horizon. Earnings based metrics, on the other hand, include future transactions into account in a fully dynamic/going concern mode. This allows for a better reflection of a BB business risk and a stabilization of BB earnings.

It is impossible to stabilize both NII and EVE. For banks that use both measures, senior management should assign ranges of acceptable sensitivities to NII and EVE. This notably enables to strike a balance between NII sensitivity and EVE sensitivity.

Assessment of IRRBB Metrics

Earnings-based metrics – Dynamic metrics over several-year horizon

Earnings-based metrics focus on the impact IR changes have on a bank's earnings and aim at identifying the changes in future NII, typically over a horizon based on planning assumptions. They are consistent with the accounting framework for BB and offer a direct view of future earnings, dynamics of the balance sheet earnings and potential detrimental impacts on capital (i.e. negatively impacted when earnings become negative). NII projections are calculated with different interest rate scenarios and with a *dynamic* balance sheet. Hence, expected future transactions/balances are considered.

Earnings metrics comprehensively measure the risk, including **structural interest rate risk,** mainly originating from non-interest rate bearing deposits having to be reinvested at future uncertain interest rates. In this case, an increase in interest rate is most often *beneficial over time* to the bank since non-interest bearing deposits will be invested in higher rates. Conversely, a decrease in rates is most often detrimental over time to the bank. Earnings metrics are usually used to stabilize earnings over a defined time horizon which is consistent with the risk horizon of IRRBB for the Banking Book.

A shortcoming of this metric is that the measurement period is limited to projections for few years. In addition, modelling future expected transactions requires a sound governance and risk framework overseen by regulators familiar with the characteristics of the institution and markets.

Economic value-based metrics focus on the impact IR changes may have on the EV by discounting expected cash flows. The proper assessment of IRR exposure requires accurate information on balance sheet composition i.e. assets and liabilities. Similar to earnings-based metrics, different interest rate scenarios are envisaged. However, only the cash flows from existing exposures (and their contractual-equivalent) are considered in economic value-based metrics. Future exposure dynamics are not fully taken into account. These metrics are thus not able to comprehensively measure structural interest rate risk, i.e. reinvestment risk on earnings, in particular earnings from non-interest bearing funding sources (non-interest bearing deposits and equity). Economic value-based metrics show that an increase in rates is usually detrimental to the bank (assuming that the bank has a net asset position, i.e. provides longer-dated assets funded by shorter-dated liabilities), whereas earnings-based metrics show that an increase in rates is beneficial to the bank's earnings. This simply means that a bank cannot make both its dynamic/going concern NII and its static gone concern EV insensitive to changes in rates.

While the standard EV measure looks at the existing balance sheet only, some banks might utilize a dynamic view of the economic value sensitivity by considering expected future exposures in the economic valuation process. Expected future exposures that will be originated at market rates, such as fixed rate loans, may be ignored as their present value will not be dependent on the considered interest rate scenario. Conversely, the expected future exposure that will not be originated at par, such as non- or low-interest bearing deposits and the target duration of the equity, need to be considered. This leads to a dynamic economic value of the BB including the effects of expected future exposures.

In any case, a present value analysis does not show the periodic effects on earnings. This may therefore not necessarily be a sufficient risk-sensitive metric since a bank may have a positive present value from current BB transactions that potentially offsets negative future NII in other years.

A specific case of EV is the Economic Value of Equity (EVE), which excludes equity. EVE sensitivity is a measure of the actual investment of equity. To stabilize earnings, equity is invested over medium to long term horizons, which makes EVE sensitive to change in interest rates: the EVE sensitivity is all the higher as the earnings from the investment of equity are all the more stable.

Pros and cons with EV approaches

Pros
- Works for risk assessment of positions as a snapshot in time (one-off economic value assessment)
- Gives a good operational indication of where open contractual mismatches might sit

Cons
- Does not cover the dynamic structural interest rate risk and margin compression risk
- For the BB projected changes in value usually do not immediately hit P&L
- Implementation still requires a number of assumptions to be made

We believe that the TFIR is attempting to interpret EV as a measure of bank gone concern solvency by applying a Trading Book type approach of viewing the EV of the Banking Book as the

fair or liquidation value of the balance sheet. The value of a Banking Book in a liquidation or bail out scenario is extremely unlikely to equal the assumed discounted value of its fixed cash flows, and certainly not the discounted value of its existing (pre-failure) fixed cash flows. The purpose of EV is to provide an estimate of the value of the static balance sheet i.e. it is a proxy for long-term static balance sheet earnings ignoring the dynamic nature of the balance sheet (most important of which is the structural interest rate risk), accounting conventions and the timing of income statement recognition. Therefore EV and its sensitivity are useful to banks' management and to regulators but they are not directly related to a capital loss due to IRRBB.

BB IR risk does not have the same characteristics as the risk in the TB. Therefore its measurement and management need to follow adapted principles. These principles must be part of a comprehensive governance framework and need to address the challenges of BB risk models (including behavioral modelling aspects across different BB items). As the capturing of value and capital definition within a bank's P&L statements is not straightforward either, any metric used for potential capital charges need to be enhanced to cover required elements. Both the NII and the EV metrics require this governance which needs to be monitored by regulators under a Pillar II framework.

Given that the earnings/NII approach and the EV approach to interest rate risk can give opposite signals regarding the sensitivity to interest rate changes, the banking industry is advocating the application of the earnings/NII and the EV approaches for variability risk measurements.

Some illustrations of the shortcomings of parameter standardization within an IRRBB framework based on EVE and NII

Consider the following stylized balance sheet of a retail bank:

Assets		Liabilities	
		10	Equity
Fixed Rate Mortgages	100	90	Non-interest bearing deposits

The stylized facts easily extend to more complex balance sheets.

1. Description of Fixed Rate Mortgages :

Let's assume that the fixed rate mortgage portfolio is built of 20 year initial maturity fixed rate mortgages with a constant payment-amortizing profile (3% rate) and an expected prepayment (3%).

The table below shows the average outstanding balance in runoff mode for individual mortgage from a contractual standpoint and with the expected prepayment, and for a portfolio of fixed rate mortgages:

		Average Life (year)	Year 1	Year 2	Year 3	Year 4	Year 5	Years 6-10	Years 11-15	Years 16-20
Individual Mortgage	Contractual	11.0	98.3	94.6	90.7	86.7	82.6	69.3	44.7	16.1
	Expected	9.0	97.0	90.5	84.2	78.0	72.1	55.5	30.8	9.7
Mortgage Inventory – Expected		6.4	95.0	84.6	74.9	65.9	57.5	36.9	13.0	1.8
New cumulated production to maintain constant mortgage			5.0	15.4	25.1	34.1	42.5	63.1	87.0	98.2

The amortizing profile of the fixed rate mortgage leads to an average life of 6.4 year, which is very consistent with the analyzed stability of retail demand core deposits.

Similarly, equity is used to fund the mortgages and is invested at 6.4 years.
Both non-interest bearing demand deposits and equity are *naturally* invested into the fixed rate mortgages: there is no need to adjust the interest rate position of the bank.

a) Net Interest Income perspective :

The table below shows the yearly NII, assuming a constant balance sheet, over the next five years, in the base case scenario (3% constant rate) and in the +200bp rate scenario:

Yearly NII in difference scenarios		Year 1	Year 2	Year 3	Year 4	Year 5
Base Scenario	Runoff	2.85	2.54	2.25	1.98	1.73
	New Production	0.15	0.46	0.75	1.02	1.27
	Total	3.00	3.00	3.00	3.00	3.00
Rate +200bp	Runoff	2.85	2.54	2.25	1.98	1.73
	New Production	0.27	0.79	1.27	1.72	2.14
	Total	3.12	3.32	3.52	3.70	3.86
	ΔNII	+0.12	+0.32	+0.52	+0.70	+0.86

In the base scenario, the NII is simply 3%*100.00 as 3% interest bearing fixed rate mortgages are funded with *non*-interest bearing deposits and equity.
The *NII increases* with the *increase* in rates since *non*-interest bearing deposits and equity are progressively invested at higher rate.

b) Economic Value perspective :

The *EVE* is calculated as the discounted value of fixed rate mortgages' cash flows less the discounted value of non-interest bearing deposits. The table below shows the *EVE* in the base case scenario and in the +200bp rate scenario, as well as the embedded value, which is defined as the difference between the *EVE* and Equity:

Economic Value in different scenarios	Values
EVE(base scenario)	24.93
Embedded Value(base scenario)	14.93
EVE(+200bp)	22.80
Embedded Value(+200bp)	12.80
ΔEVE	- 2.13

The positive embedded value originates from the fact that non-interest bearing deposits and equity are invested in interest earning assets. The table shows that **the *EVE* and the *Embedded Value* decrease with the increase in rates: it measures the *opportunity cost* of having invested *non*-interest bearing deposits and equity at 3% while they could be invested at 5% (after considering the +200bp increase in rates)**.

However, **the *Embedded Value* remains positive (i.e. 12.80) after the increase in rates: in other words, there is no *loss* in EVE and the increase in rates is *beneficial* to the bank's NII.**

2. Consequences of an EVE-sensitivity based *prudential framework :*

Should a prudential framework be based only on the sensitivity of *EVE*, it could act as a strong incentive to *decrease* the portion of fixed rate mortgages by investing equity into overnight deposit (or floating rate mortgages) rather than fixed rate mortgages. For NII based metrics, however, investment should theoretically be done to perpetuity to fully hedge NII sensitivity.

The balance sheet would be modified into:

Assets			Liabilities
Overnight deposits (or floating rate mortgages)	10	10	Equity
Fixed Rate Mortgages	90	90	Non-interest bearing deposits

This would lead to higher *NII* sensitivity, as illustrated in the table below:

Yearly NII in difference scenarios		Year 1	Year 2	Year 3	Year 4	Year 5
Base Scenario	Runoff	2.57	2.28	2.02	1.78	1.55
	New Production	0.13	0.42	0.68	0.92	1.15
	Overnight	0.30	0.30	0.30	0.30	0.30
	Total	3.00	3.00	3.00	3.00	3.00
Rate +200bp	Runoff	2.57	2.28	2.02	1.78	1.55
	New Production	0.24	0.71	1.14	1.55	1.92
	Overnight	0.50	0.50	0.50	0.50	0.50
	Total	3.31	3.49	3.67	3.83	3.98
	ΔNII	0.31	0.49	0.67	0.83	0.98

The *EVE* sensitivity would be lower but still sensitive to changes in rates: the sensitivity would be due to the locked interest margin of non-interest bearing deposits invested in interest bearing fixed rate mortgage:

Economic Value in different scenarios	Values
EVE(base scenario)	24.93
Embedded Value(base scenario)	14.93
EVE(+200bp)	23.80
Embedded Value(+200bp)	13.80
ΔEVE	- 1.13

Even by investing equity at short term rates, *EVE* would still be sensitive to changes in rates to the extent of the locked margin. This illustrates the odd situation that an *EVE*-sensitivity-based framework would require all the more prudential capital the higher the "locked-in" margin.

Conclusion:

The metrics discussed above deliver different signals about the IR risk exposure in different scenarios – this underlines the need for IRR management to follow the 2 metrics and define appropriate boundaries depending on agreed strategy and risk appetite.

The examples above have shown that a purely EVE-sensitivity based prudential framework could have following consequences:
- the prudential charge would be needed for scenarios beneficial to the bank's NII
- the prudential charge would be higher for high margin businesses
- the prudential charge would be all the higher for well capitalized banks
- to mitigate the capital charge, banks would be led to modify their balance sheets to a higher NII sensitivity by decreasing their fixed rate interest bearing assets, thus transferring risk exposure to external clients (through variable asset products)

Appendix 2 (Critique on the proposed earnings overlay approaches)

This appendix discusses the industry comments on minimum capital requirements measures in standardized approach proposed in the CD, particularly usage of NII in the IRRBB measures. This discussion is intended to contribute to the two objectives: (1) to describe the limitation of standardized approach (SA) as a measure for IRRBB more specifically than we did in the main body; and (2) to give industry practices and highlight the gaps with the proposed standardized methodologies. It should be noted that any comments or suggestions in this paper do not reflect any industry endorsement to the standardized approach to IRRBB, but are only intended to enhance constructive discussions in the consultation process.

1. General Comments

Current IRRBB measurement approaches applied by many banks have a much higher focus on earnings, (i.e., a NII-based risk measure) than the CD whose focus is on EVE. A best practice approach to NII modelling includes dynamic modelling with assumptions on roll-over of existing business, assumptions on new business in line with budget/multi-year planning and modelling of customer behavior under different interest rate scenarios, etc. The earnings measure introduced by the BCBS is a crude, simplified and static measure which lacks any dynamic modelling elements, especially assumptions on volume of new business, interest term structure of rolled-over/new business, margins of rolled-over/new business, timing of interest rate curve changes, etc. The number of interest rate shocks is reduced to just two parallel shocks in order to keep methodological consistency. The discounting feature of the approach is understood to ensure comparability with the EVE approach, however is not at all in line with earnings-based measurement approaches applied by banks. In essence, the earnings approach is equivalent to the EVE approach (i.e. EVE "in disguise") the main difference being that the time horizon of the earnings measure is limited (with specific horizon T still to be determined by the BCBS), whereas the time horizon of the EVE approach is not.

For T, the time horizon applied to the earnings measure, referring to footnote 48 of the CD, should be consistent with the planning horizon of the institutions.

2. Comments on the Proposed Standardized Approaches (Options 1 to 4)

NII (not ΔNII) should be applied in the earnings based Approach

The CD proposes expected NII change (ΔNII) as earnings-based measure for IRRBB (4.1 to 4.3 on Page 31 of the CD), and this measure is used in the proposed standardized approach (Options 2, 3) However, it would be more appropriate to use the expected NII level (not change) as this measure. The idea of earnings outlay approach (ΔEVE are offset by future earnings) is based on the notion that the capital impact of the negative change in economic value of BB can be offset by positive accumulated net interest rate income, that is measured as NII, not by NII changes.

NII (not NIP) should be applied in the earnings based approach

The CD also proposes Net Interest Profit (NIP), an alternative measure of earnings based approach. NIP is defined as NII less expenses and costs (5.5. and Annex 3 of the CD). This measure deviates from current industry practice in two aspects.

First, in industry practice, NII is measured as net interest income before expenses and costs

adjustments. In measuring NII as a cushion for the possible negative EVE change it should focus on the interest rate risk sensitive portion of interest rate income and expenses. Standardized NIP measure is not appropriate as a regulatory EVE approach for the following reasons:

- Accounting rules for expenses and costs differ across the jurisdictions, and so it is difficult to measure NIP in a consistent manner;
- Incurred expenses and costs are implicitly priced in the loan/deposit rates and margins. However, pricing models that reflect the expenses and costs differ across banks, which is not suitable for standardization.

Second, in the CD, NIP is defined as historical average of banking book profits, and not subject to the interest rate shock scenarios. It is thus not consistent with the measure of economic value, which is subject to those scenarios. The Earnings-based measure that offsets ΔEVE measures should be based on the same interest rate scenarios as the EVE measures. Also, the capital charge is driven by the EVE sensitivity of future earnings, whereas the offsetting NIP is based on a historical average, hence not comparing like for like.

NII should be measured on a dynamic balance sheet that reflects the future reinvestment at the maturity of assets

We understand that the CD assumes a NII measure based on a "constant" balance sheet (i.e. not on a "run-off" basis). In order to be more in line with the industry practice in calculating NII, it is necessary to make going concern assumptions on volume, maturity and pricing for new business.

3. Conclusion

In conclusion, when measuring IRRBB, positive NII accumulation over several years based on a dynamic balance sheet that absorbs a negative ΔEVE should be taken into account. Moreover, both of these elements should be subject to the same interest rate shock scenario.[16,17] None of the proposed 4 options in the CD fully respect these criteria.

However, we remind here that as all the suggested metrics focus on variability risk and not loss risk, they are not appropriate to identify and quantify potential capital need for loss due to IRRBB.

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[16] To be exact, negative ΔEVE (gone concern based capital loss) at the end of the holding period t1 (ΔEVE_{t1}) with the interest rate shocks applied, is partially recovered by the realized NII during the holding period between t0 and t1 (NII $_{t0t1}$) also subject to the same interest rate shock applied. If the interest rate shock impact to the EVE is sufficiently larger than the depreciation of EVE during the holding period, the difference between ΔEVE_{t0} and ΔEVE_{t1} may not be material. In that case we may use $\Delta EVE_{t0}+NII_{t0t1}$ (both subject to the same interest rate shock scenario) as an alternative measure for the IRRBB. Still, as projection of ΔEVE_{t1} is even much more complex process than that of ΔEVE_{t0} and more dependent on each bank's internal modelling methodology. It is difficult to create accurate measures within a simple standardized methodology. That is why we think that IRRBB should be measured in more appropriate models that are suitable for the banks' portfolios.

[17] We observe that the Option 3 and Option 4 of the proposed standardized capital measures would only partially reflect industry practices as they take into account the earnings-based measures. Still those options deviates from the industry practice in those features that they are subject to hard coded, evidence conflicting standardized behavior models and they use changes in EVE (instead of the level of EVE) and the change in NII or NIP instead of NII, and that NIP ignores the future business

General Comments on the Principles of NMD IRRM

Enforcing arbitrary or non-transparently determined constraints on how to best model NMDs is counter to the discipline to reflect actual product characteristics in the management of IRR. The object of modelling NMDs is to determine management strategies to stabilize the product margin over time. As with all going concern businesses in every industry, a stable gross margin is a key objective to managing a business over a business cycle and to cover the large fixed cost base associated with the offering of this type of product.

The proposed standardized treatment of NMDs is far too restrictive. As a consequence banks will not be able to report what an accurate, realistic and objective representation of interest rate sensitivity of deposits in their interest rate risk position is. Banks will face a stark choice between managing rate risk in accordance with regulation or true product economics. We note that the BCBS CD is in sharp contrast with both risk management practices of banks and the approach taken by other jurisdictions (see for instance the recently published European Banking Authority (EBA) Guidelines for IRRBB).

In the first sections we describe the difference between the proposed regulations and the observations what deposit products are sold and how these are used by the clients. In the later sections we point into a direction which bases modelling on economic facts.

Pass-Though Floor

The 50% Pass-through floor for the Wholesale NMDs is significantly higher than experienced by banks and hence some of banks' Pass-through rate estimated by its internal models and systems. The practice in some banks is to use the same pass-through rate for retail and wholesale depositors. Moreover, in many markets, the wholesale depositors hold non-interest bearing deposits for daily operations. Hence, the pass-through rate for wholesale depositors may be the same or even lower than that for retail depositors. Irrespective of the appropriateness of treating retail and wholesale deposits separately and/or distinguishing between transactional and non-transactional deposits within NMD modelling for the purpose of interest rate risk management, the approach proposed in the BCBS CD appears highly inconsistent in that it splits transactional vs. non-transactional deposits for retail clients but not for wholesale clients. While we do not advocate applying a liquidity-risk treatment for IRRBB, it is also worth noting that this approach disregards the distinction which the Basel Committee makes in its liquidity framework (or prior standards) between operationally linked wholesale deposits and wholesale deposits generally.

Also, there are significant markets where sight deposits (current accounts) are not remunerated at all to the customers, i.e. pass-through rate exactly equals zero over the interest rate cycle.

Therefore, in order to allow for a correct representation of NMDs in a bank's interest rate risk position, a standardized pass-through floor is not a reasonable assumption.

Stability cap

The representation of NMDs should focus on an adequate modelling of the interest rate sensitivity and not refer to liquidity or funding aspects (e.g. LCR or NSFR assumptions), which should be treated separately from IRRBB.

The approach adopted in the CD to estimating stability is demanding in the extreme. Banks, using the more sophisticated of two time series approaches (TIAs), must go back over 10 years data at account level, inspect the minimum balance by account and sum the results. It is unclear in what scenario, other than a run on the bank, which is a *liquidity* stress, NMDs across multiple product types might drop to the sum of their historic account-level minima. In addition, if we assume an example where the account was launched 10 years ago, this approach would return a minimum balance of zero. By its nature, stability in the context of IRRBB, exists at the aggregate (or high-level sub-aggregate) level where changes up and down in the balance on individual accounts are diversified away.

Maturity of core and non-Over Night (O/N) pass-through rates

There can be no empirical justification for a minimum pass-through rate of 0.25, which amounts to a 25% haircut on the measurement of non-interest bearing balances (that have already been conservatively estimated by the proposed TIA stability measure). By constraining pass-through and stability parameters and prescribing a maximum investment life, the CD is doubling up on conservatism.

The core amount represents the stable and rate insensitive part of the NMDs in a dynamic/going concern scenario. To manage the associated inherent interest rate risk, it is therefore essential to assign a maturity in the IRRBB process that hedges the product appropriately over the duration of a full rate cycle. From this perspective, the proposed maximum average duration of 3 years as well as the maximum investment tenor of 6 years is not appropriate (although not always binding) as it is arbitrary and would have significant adverse implications, i.e. increase earnings volatility through a rate cycle (please see illustration below).

To represent the IRR of the product itself, the stable portion should be modelled based on facts and circumstances relevant for each considered product. Here again the CD makes the false assumption that the pass-through rate is always O/N. Rather, the pass-through rate is often a long-term average long tenor rate. Take savings accounts or retirement accounts as an example. Here the pass-through rate is quite high, but based on a rolling average of a tenor much longer than O/N. A bank would not be able to hedge these products, which are quite stable, using simply O/N.

The general approach of estimating the stable core element first and then, in a second stage, applying pass-through analysis is not grounded in an intuitive or plausible behavioral model of these liabilities and will lead to numbers that have little or no economic meaning. A more relevant starting point would be a pass-through analysis applied to the *current* level of the main classes of NMD (or possibly some smoothed measure such as the preceding 12 month average or the prediction from a simple time series model). The pass through betas could be unconditional through-the-cycle re-pricing elasticity but will more likely be conditional on the prevailing level of rates and the next phase of the cycle and will include an element of expert judgment. Most banks will have an expectation for the behavior of the balances on the main NMD classes that are associated with their forward-looking pass-through betas for these products. This may well involve an expectation that low-rate / low-beta balances will fall, particularly in the up-phase of the cycle. Banks also understand that this expectation is subject to uncertainty and there is, in effect, a confidence interval around this expectation. Balances might fall by more than expected. *The derivation of the balance for a class of NMD that is hedged to a duration longer than O/N should take all of these related factors into account in an integrated behavioral model, as opposed to the non-integrated two-stage method proposed in the CD.*

Ensuring that banks have appropriately modelled the tenor of NMDs should be achieved by way of robust supervisory review and challenge, rather than by the imposition of a standardized template that will actually discourage meaningful modelling efforts in this area.

Maximum modelled tenor

There is no reason to put a pre-defined limit on maximum tenor of NMDs. It is important to consider that the long-term portion of NMDs enable to naturally mitigate the IRRBB exposure from long-term loans, notably fixed rate mortgages. Putting an arbitrary limit on the maximum tenor of NMDs would destabilize and limit the fixed rate loans offering of banks. In particular, the ability of banks to provide long-term fixed-rate mortgages (e.g. contractually 20-30-year mortgages) with interest rate risk profile hedged by NMDs could be severely curtailed, with significant potential impact on affordability of home ownership, which is a core public policy concern in many countries.

The same issue arises with the volume-weighted average duration for the core part (as derivable from Table 5 of the CD), which is limited to 36 months / 3 years. Applying the 60% cap to the core part as given in Table 4 for retail / transactional NMDs leads to an average duration of just 1.8 years for the core part and an average duration of 1.08 years for the whole NMD-volume (core & non-core). This is in sharp contrast with the average duration applied by banks to NMDs which is typically much longer.

Simplified Time Series Approach (STIA)

The simplified TIA (STIA) – although being called "simplified" – would not be simple to implement, as the required data on single customer level (as can be derived from Table 7) is currently not available in many banks. Hence an implementation of the STIA would require substantial IT effort.

Ability to hedge artificially short tenors in some markets

In case NMD modelling is artificially shortened through a standardized framework, a mismatch between the asset and liability sides will result. This mismatch can be balanced by either shortening the asset side or entering into hedging transactions. In less developed markets there might be restrictions on the availability of such hedges (tenor- and volume-wise) in the market so that banks could end up with undesired open risk positions that they cannot appropriately manage, creating the need for additional capital.

The theoretical foundation for the BCBS CD prescribed NMD durations

Almost all banks have dedicated staff and departments to measure the IRR of NMDs. The NMD models that are deployed are subject to rigorous technical and quantitative risk reviews assessing their veracity, applicability and ultimate fitness for purpose.

It would be constructive to understand the theory, construction, testing and how the final fitness for purpose decision of the BCBS standardized NMD limits proposal in the CD was determined. By comparing the BCBS modelling methods with the industry methods we could best understand what fundamental differences the BCBS vs. industry approaches have and how best to reconcile these differences for application in the ultimate regulatory standards.

Summary

The following points summarize potential guidelines that could be introduced to ensure appropriate modelling:

- The objective of managing NMD is to stabilize net interest income and product margin over time
- The IRR of NMD should be represented by a set of financial instruments which are rolled through time based on a model approach determined by the bank
- This model has to be chosen and calibrated in such a way that (a) the changes of the client rate is reproduced to a maximum extent (to meet the objective) and (b) the volume of the financial instruments always matches the volume of the modelled deposits
- This calibration shall be done under several (also adverse) interest rate scenarios (the generation of scenarios could be further specified; to better reflect reality they should be dynamic over time and not just one-off shock scenarios) in a dynamic/going concern approach
- The simulation horizon for calibration shall be at least as long as the tenor of the longest tenor
- NMD models should take into account, based on facts and circumstance, the potential shift into alternate products (on- or off-balance sheet, with or away from the bank) driven purely by large market-rate moves (and as a function of the bank's pricing reaction /ability / willingness), by assigning a large-enough portion of the NMD product volume to a short-tenor re-pricing bucket to mitigate this risk.

Illustration of potential consequences of a standardized amortizing profile for NMDs (based on numbers used in the example given in Appendix 1)

The CD suggests an amortizing profile no longer than 40% at O/N and 60% with a 6 year linear profile (or 3 year maximum average life with a maximum of 6 year), leading to an average duration 1.8 year far shorter than what is usually modelled and applied.

The impact of such a standardization of non-interest bearing deposits, on the balance sheet described below, would have exactly the same impact as ignoring that equity could be invested at medium term horizon: **the *EVE* could be both lower** (due to lower value of non-interest bearing deposits since shorter than expected) *and* **more sensitive to rates.**

Assets		Liabilities	
		10	Equity
Fixed Rate Mortgages	100	90	Non-interest bearing deposits

The impact is shown in the table below based on our illustrated balance sheet:

Economic Value in different scenarios	Values
EVE(base scenario)	14.85
Embedded Value(base scenario)	4.85
EVE(+200bp)	7.76
Embedded Value(+200bp)	- 2.24
ΔEVE	- 7.09

A prudential charge based on EVE-sensitivity would act as a strong incentive to significantly decrease the portion of fixed rate mortgages in the balance sheet.

To get an insensitive *EVE*, the bank would have to reduce its fixed rate mortgage by 70.80%:

Assets		Liabilities	
Overnight deposits (or floating rate mortgages)	70.8	10	Equity
Fixed Rate Mortgages	29.2	90	Non-interest bearing deposits

This would lead to significantly higher *NII* sensitivity:

Yearly NII in difference scenarios		Year 1	Year 2	Year 3	Year 4	Year 5
Base Scenario	Runoff	0.83	0.74	0.66	0.58	0.50
	New Production	0.04	0.13	0.22	0.30	0.37
	Overnight	2.12	2.12	2.12	2.12	2.12
	Total	3.00	3.00	3.00	3.00	3.00
Rate +200bp	Runoff	0.83	0.74	0.66	0.58	0.50
	New Production	0.04	0.13	0.22	0.30	0.37
	Overnight	3.57	3.63	3.69	3.74	3.79
	Total	4.45	4.51	4.57	4.62	4.67
	ΔNII	1.45	1.51	1.57	1.62	1.67

1. Overview

This appendix presents the industry perspective on investment of equity, addressing:
- The rationale underlying banks' typical treatment of the investment of equity, implicit and explicit duration of equity, as well as banks' risk management practices that support effective oversight and governance of associated risks;
- An example showing that the typical investment of equity process followed by a bank should lead to lower earnings variability compared with an alternative of investing at O/N;
- The potential issues introduced by the BCBS proposal to apply a uniform zero duration to equity, which may result in higher earnings volatility, mask the risk sensitivity of IRRBB measures and misrepresent the actual risk; and
- A potential alternative approach that addresses the regulatory concern regarding underlying risks associated with the investment of equity while providing a more accurate representation of associated interest rate risks.

2. Banks' practices for management of equity – implicit vs. explicit duration of equity

For banks that assume an investment of equity, it is normally implemented in two ways: explicit investment with a target duration or implicit/asset driven strategy.

The assets driven/implicit modelling of equity leads to consideration of equity as a liability with a duration equal to the average duration of assets as equity is pro-rata invested in bank's assets. Applying implicit duration of equity, the equity duration is simply the residual of the net assets (which could be positive or negative) when all other assets and liabilities are matched.

The explicit modelling of equity for IRRBB leads to equity being treated as an amortizing fixed rate liability with a well-defined structure and duration. Banks typically define a medium-to-longer term "safe harbor" investment of equity in order to generate earnings within a defined risk appetite on earnings volatility. Thus, this target investment term also acts as a hedge against the bank's fixed cost base, helping to mitigate the risk of a net operating loss in periods of stress. The cost / income ratio is likely to remain a critical performance metric (internal and external) for retail / commercial banks and more volatile earnings may lead to requirements for more aggressive cost management.

A case can also be made that the earnings process that results from the investment of equity, which typically reflects a moving average of medium-term yields, will track a bank's cost of capital more effectively than investment at O/N or short rates.

The stabilization of earnings that is the principal objective of this process - and indeed of the broader process of investing other non-interest bearing liabilities - plays a key role in the management of retail and commercial banks.

Applying a shorter investment term of equity (as per the approach in the CD) is likely to result in higher earnings volatility, as discussed in Section 3 below. Increased earnings volatility may require banks to manage their costs more aggressively over the interest rate cycle, potentially resulting in a disruptive pattern of expansion and contraction in the supply of banking products and services. Further it will make funding planning more uncertain, as earnings volatility will make raising long term debt difficult assuming there is an expectation from investors of stable earnings.

There is also an increased risk of systemic stress if there is a major interest rate-driven fall in earnings.

As noted in the CD, there is a trade-off between the optimal investment term of equity and earnings stability, where it is not possible to minimize both NII sensitivity and EV sensitivity simultaneously.

The implicit or explicit investment term of equity is typically established by senior management and presented to the Board as a function of its risk appetite for volatility in earnings. The settings approved by the Board are reviewed over a defined cycle, or with key changes to the bank's balance sheet structure and/or macroeconomic drivers; however, it is not subject to frequent changes. The bank's Asset Liability Management / Treasury function is usually tasked with managing the investment of equity within target by netting the equity against assets or undertaking hedging in the external market. It is usual for banks to cap the investment term of equity such that it does not exceed the longest asset duration of the balance sheet.
Risk management practices, including Board-approved limit structures, senior management oversight and stress-testing, support the effective management and monitoring of the interest rate risks associated with the duration of equity.

3. The Investment of Bank Equity Reduces the Volatility of Earnings over the Rate Cycle

Loss-absorbing capacity refers to the ability of a bank to withstand losses without falling below regulatory minima of capital and requiring re-capitalization or resolution. In order to achieve this goal, the predominant form of capital must be common shares and retained earnings. For instruments other than common equity to be included in Tier 1, specific criteria are set to ensure these also instruments absorb losses on a going- concern basis.

As demonstrated below, an investment process that generates earnings based on average yields through time is likely to reduce NII volatility and ensure a more stable buffer against adverse scenarios in a going-concern scenario, leading to a more a stable path for both earnings and the value of equity. In contrast, the incentive to shorten the investment horizon of equity to reduce the impact of the regulatory treatment could reduce the bank's ability to absorb shocks through earnings and could intensify the impacts of an economic downturn.

In order to demonstrate how a term investment of equity reduces earnings volatility, a historical simulation was performed for main currencies: EUR, USD, and JPY.

The simulation compares the average yield earned on a short-term investment portfolio vs. the yield on a medium to long term investment portfolio.

In the simulation deposit rates for short term investment (3M) or swap rates for medium/long term investment (3Y, 5Y, 10Y) are used. In the simulation the amount of equity is kept constant for the whole period and the yield for the medium long term investment portfolio is calculated considering a rolling strategy where each quarter a constant amount matures and the same amount is invested up to the original maturity of the strategy (3Y, 5Y, 10Y).

The graphs below show the average portfolio yields based on equity investment strategies of varying maturities for each currency. The graphs begin at 2005 to encompass a full investment cycle for each maturity, where the investments are assumed to have started in 1995."

EUR

USD

JPY
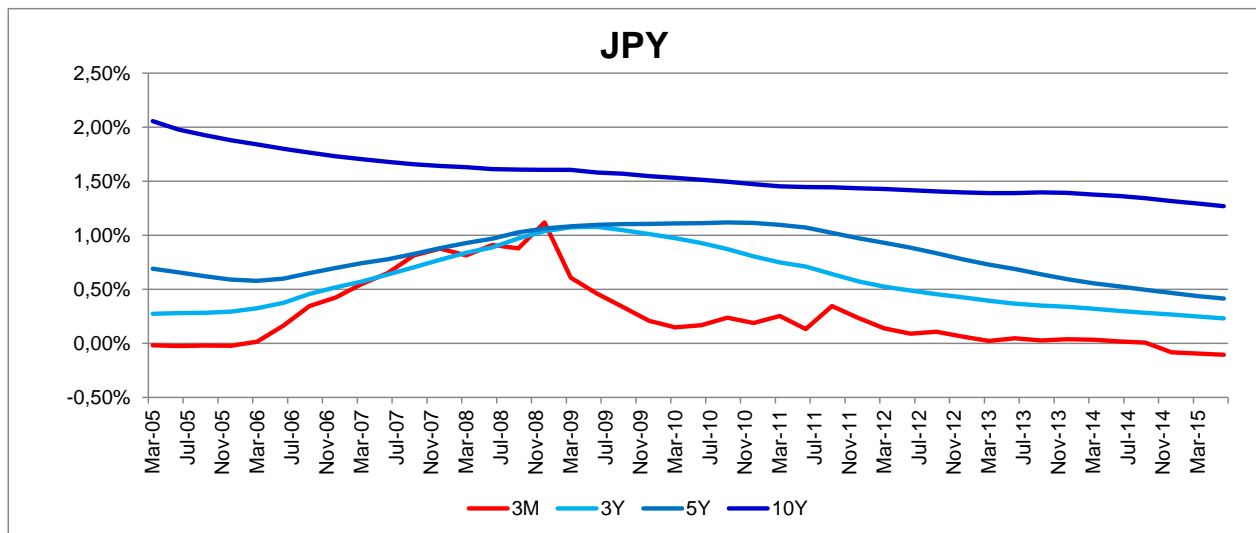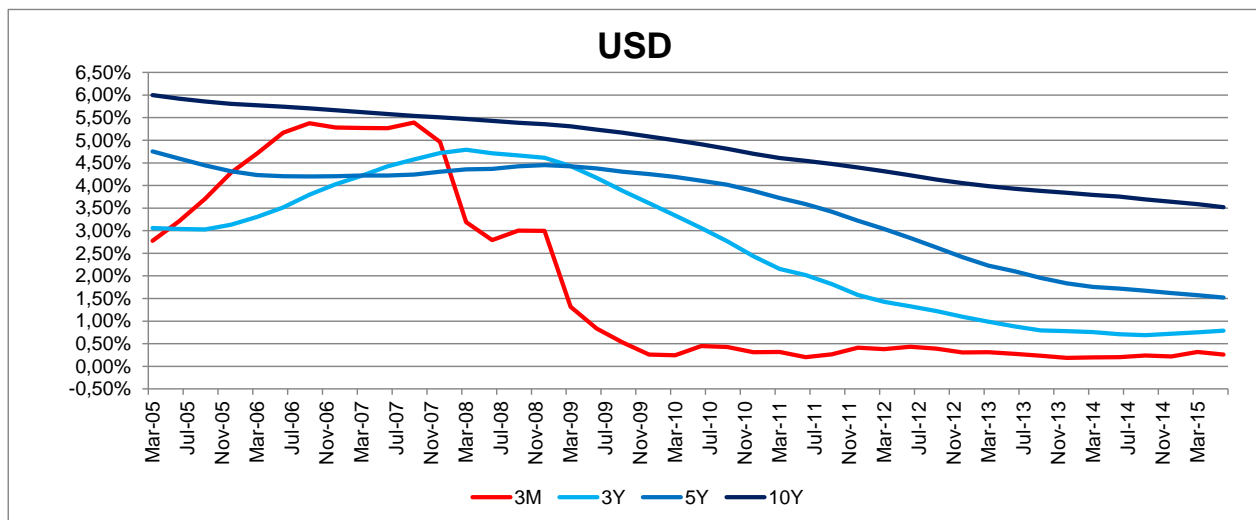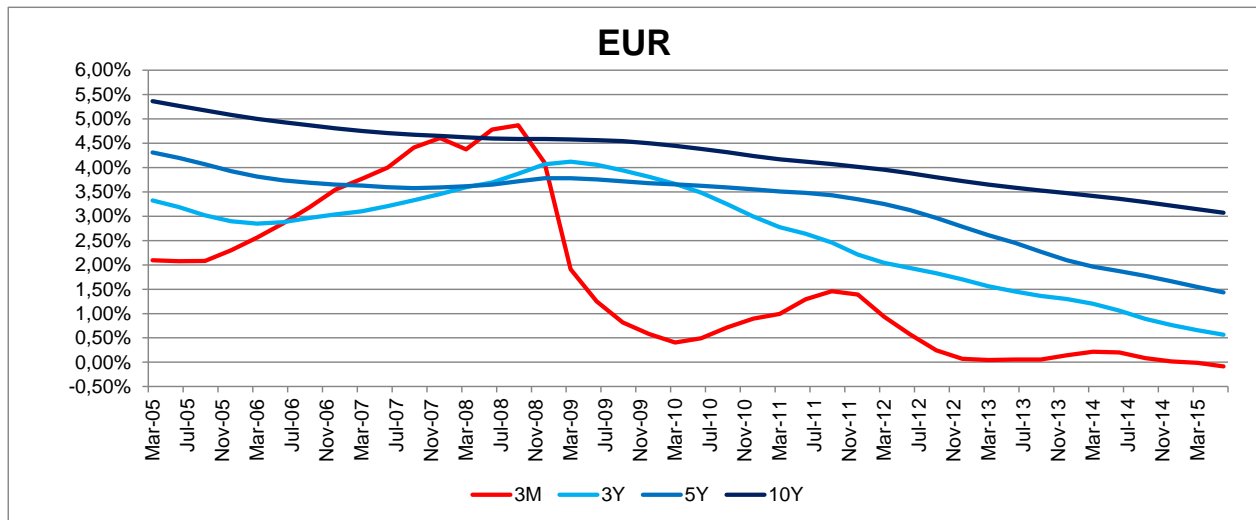
In the historical period considered, the simulation shows that the higher the maturity for the term rolling strategy, the lower the volatility for the average portfolio's yield: a 10Y rolling strategy has an earnings volatility that is less than half of a 3M investment.

Standard Deviation	3M	3Y	5Y	10Y
EUR	1,64%	1,06%	0,76%	0,59%
USD	2,01%	1,49%	1,06%	0,76%
JPY	0,32%	0,27%	0,23%	0,16%

Furthermore historical data shows that in an economic downturn, there is a general decrease in short term rates at the same time as credit is deteriorating. The investment of equity is a countercyclical strategy and does not emphasize the economic downturn. An overnight investment in this context implies a less resilient interest margin when it is most needed.

The BCBS proposal suggests banks should exclude equity as well as additional Tier 1 (AT1) or Tier 2 capital instruments. This gone-concern type approach that sets the duration of all these balances to zero seems to lack economic basis. It appears to link to other parts of the regulatory framework such as the banking recovery and resolution directive. As it is common risk management practice for banks to hedge the interest rate risk from these kinds of instruments at issuance and the BCBS approach will likely result in a capital penalty in this case as the hedge position will appear as an open position, and perversely the stronger the capital position, the more at risk the bank will appear to be, assuming the same hedging practices. The increase in capital base requested by regulators in the latest years magnifies the impact. Conceptually and historically the objective of interest rate risk management in the Banking Book is to stabilize the interest margin in order to hedge and manage a large and intransigent cost base. This objective seems to be overseen in the current BCBS proposal.

A strategy with too short term could be detrimental on bank's ability to generate capital in a going concern scenario as explained in detail in the section above. In fact, the increased earnings volatility from managing structural hedging of equity on a very short investment term could increase risk to banks insolvency under stressed conditions.

4. Issues associated with the BCBS proposal on a standardized "one size fits all" duration of equity

The BCBS proposal to apply a standardized approach to treatment of equity, an effective duration of zero, poses significant challenges to the risk sensitivity of IRRBB measures and may create adverse risk management incentives, as follows.

a. **Risk sensitivity**: The difference between a fixed shorter-term regulatory assumption and banks' actual investment duration will be a key driver of the regulatory IRRBB measure, which is likely to **mask the sensitivity of the IRRBB measure to more significant risk drivers**. For example, a net asset position arising from the investment of equity will offset a net liability position arising from an unhedged deposit or funding book, when in practice a prudently managed bank will view these risks quite differently. Thus, while a uniform regulatory assumption of zero duration for equity may create a perception of greater comparability, it **will effectively dampen** the **actual comparability** and risk sensitivity of the IRRBB measure.

b. **Earnings stability**: Banks may be encouraged to target an investment term of equity to match the regulatory assumption and as a consequence may experience a significant **increase in earnings volatility**, with associated impacts on banks' longer-term stability and viability as well as the potential for **increased systemic risk** as a result of **heightened procyclicality in bank earnings**.

c. **Adverse incentives**: The regulatory prescribed approach to treatment of equity and associated impacts on IRRBB measures may create adverse incentives to leave longer-duration liability positions uncovered to compensate for the treatment of equity, which may introduce further earnings volatility and **result in greater underlying (actual) interest rate risk.**

As noted above, permitting banks to apply their defined investment of equity in accordance with risk appetite, and having this duration appropriately embedded in the risk management framework, is critical for effective management and measurement of IRRBB and well managed earnings volatility.

5. Proposed approach to address Regulatory Concern about Banks Loss Absorbing Capacity

We recommend that IRRBB should be analyzed in a "dynamic/going-concern" perspective, aligned with banks risk management. However, we understand that the regulators are concerned about banks loss absorbing capacity in a "gone concern" or very extreme stress scenario where an unexpected loss may reduce the equity and hence capital balance available.

We recommend that the "gone concern" perspective should be part of the wider regulatory framework such as comprehensive stress test (e.g. CCAR, ECB Stress Test) and resolution and recovery planning where it could make sense to stress assumptions to adopt a partial or total gone concern perspective where the stability of the equity position is tested. Banks should measure their vulnerability to interest rate loss under stressful market conditions – including the breakdown of key assumptions.

Hence, in response to the secondary interest rate losses that may arise if equity that is invested at term is required to be written down immediately in the case of a significant unexpected stress event, the industry proposes that this component of interest rate risk should be quantified as part of the bank's regular comprehensive enterprise wide stress-testing process. An equity write-down would only be triggered by a significant unexpected stress event that exceeds 'expected' or cyclical losses, which are typically absorbed by current year earnings or provisions without requiring a write-down of equity. Thus, only a limited quantity of equity may be expected to be written off in response to unexpected stressed losses over the shorter term. It should also be noted that potential adverse impact from the comprehensive stress test may be mitigated through managing natural expiry of hedge transactions over the horizon of the stress test.

INTRODUCTION

This appendix illustrates the issues with the BCBS proposed approach to standardized prepayment rates and fixed rate loan commitments.

STANDARDIZED PREPAYMENT RATE

1) Interest rate dependent prepayment rates

The below example on fixed rate mortgages shows the severe limitations of a standardized approach for setting prepayment rate in the ±200bp rate shock scenarios. Indeed, the CD suggests deriving those prepayment rates in the specific scenarios from the bank-expected prepayment rate in the base case scenario by multiplying factors x 2 (for the – 200bp scenario) and x 0.75 (for the +200bp scenario).

Consider that the bank expected prepayment rate is based on the rate incentive for the customers[18] (difference between the current mortgage rate and the customer mortgage rate) as shown in the below graph. The bank-expected prepayment rate is derived from historical analyses based on actual historical data.

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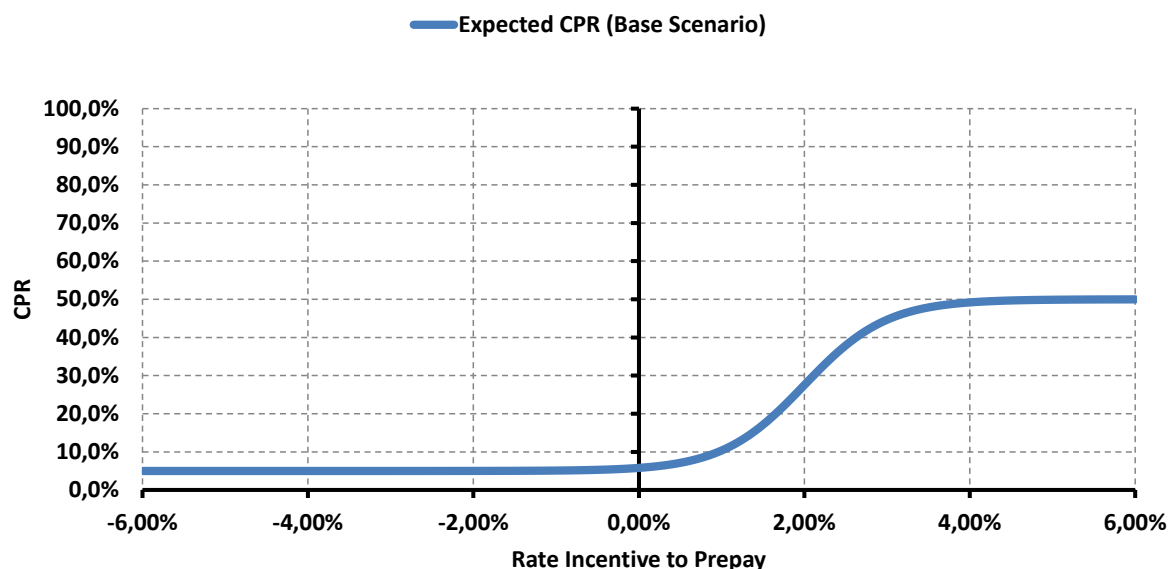
[18] This is a simple example in which the bank-expected prepayment rate is only dependent on rate incentive. In reality, bank-expected prepayment rate depends on other factors such as e.g. the seasoning, loan-to-value, loan size, credit risk, customer's profile, burnout effect but also jurisdictional characteristics and tax arrangements.

The graph below shows the bank-expected prepayment rates, for each rate incentive value, for the - 200bp rate scenario (red curve) and +200bp rate scenarios (green curve) :
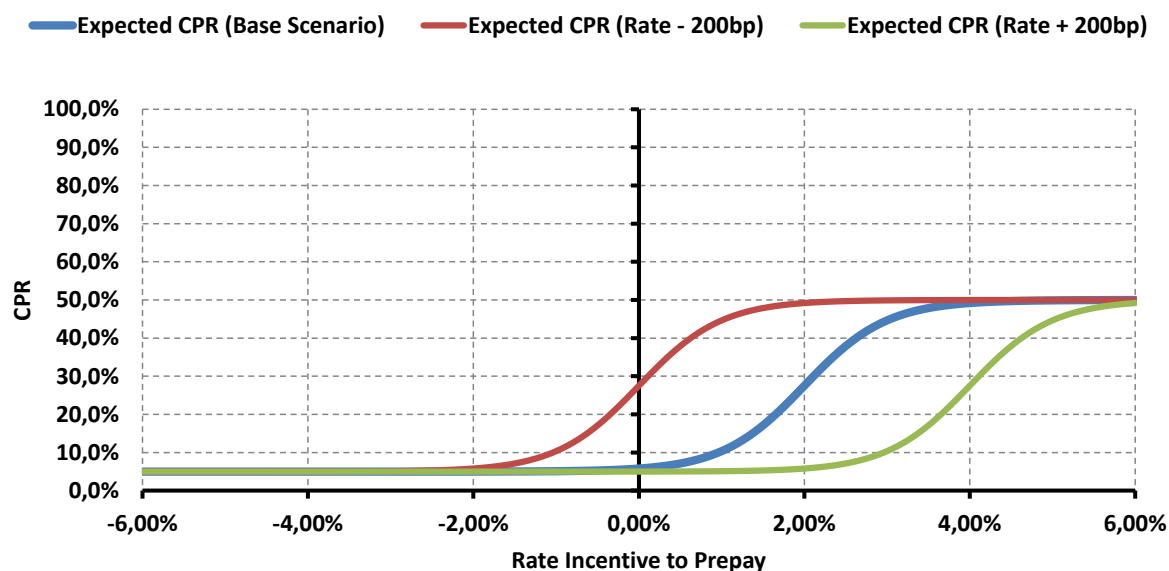
The graph below shows the standardized prepayment rates according to the BCBS proposals, for each rate incentive value, for the - 200bp rate scenario (dotted red curve) and +200bp rate scenarios (dotted green curve):
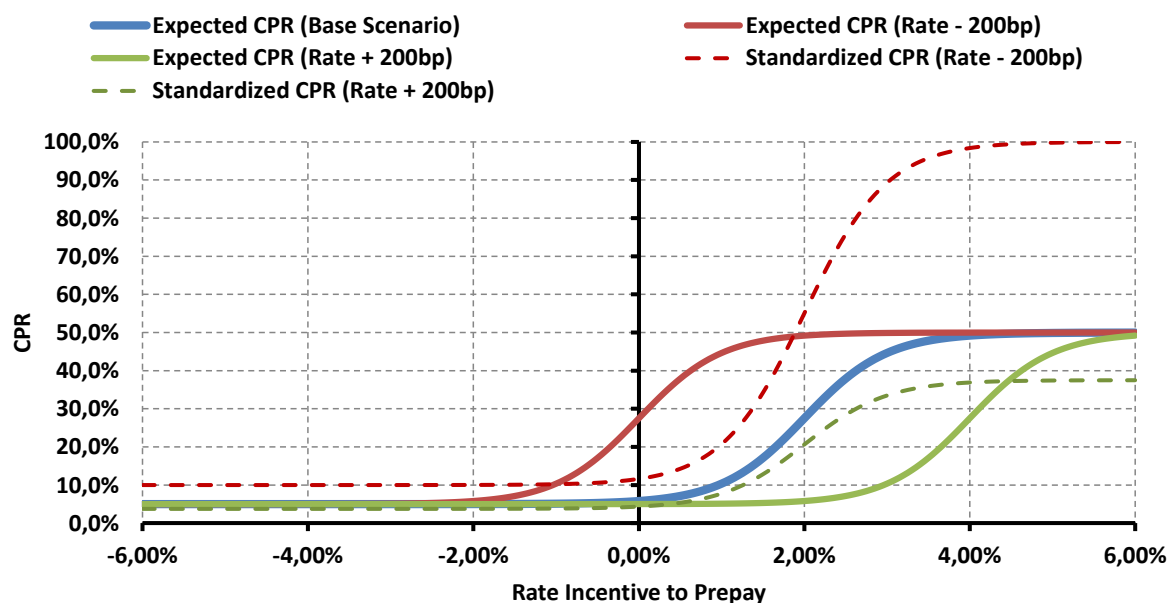
This clearly shows that **the standardized prepayment rates are completely at odds with this bank's expected prepayment rates with no directional bias: depending on the level of the rate incentives, standardized prepayment rates alternatively over-estimate or under-estimate the bank-expected prepayment rates**.

Such standardization of prepayment rates does not make much economic sense and the underlying evidence is not clear. Furthermore, banks already use the interest rate differential as an input parameter in their models, therefore an additional factor is not necessary.

This can be illustrated with the amortizing profiles of a 30 year fixed rate mortgages to which the different prepayment rates are applied:
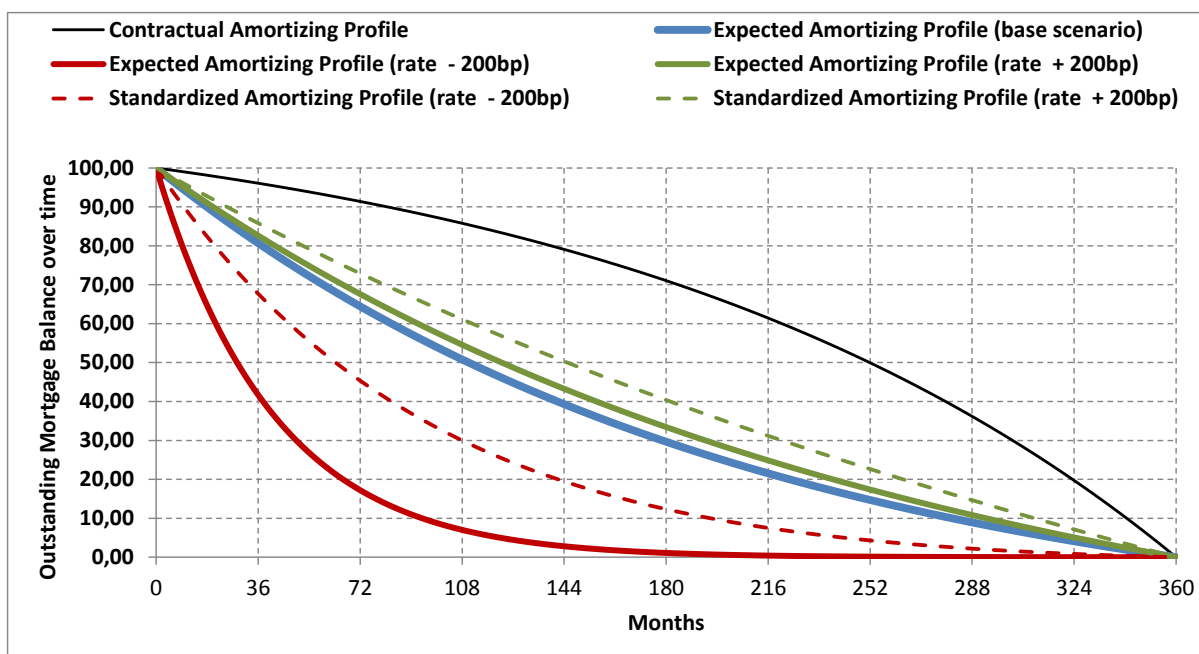
The table below shows the average life of the fixed rate mortgage related to the particular example bank illustrated:

Scenario		Average Life in years
Contractual Profile		19.3
bank-expected profile with base rate scenario		10.9
rate - 200 bp	bank-expected prepayment rates	3.4
	standardized prepayment rates	7.1
rate +200 bp	bank-expected prepayment rates	11.7
	standardized prepayment rates	13.1

The impact from changing interest rates can also be represented with the economic value of the mortgages for different changes in interest rates the since the origination of the mortgage.
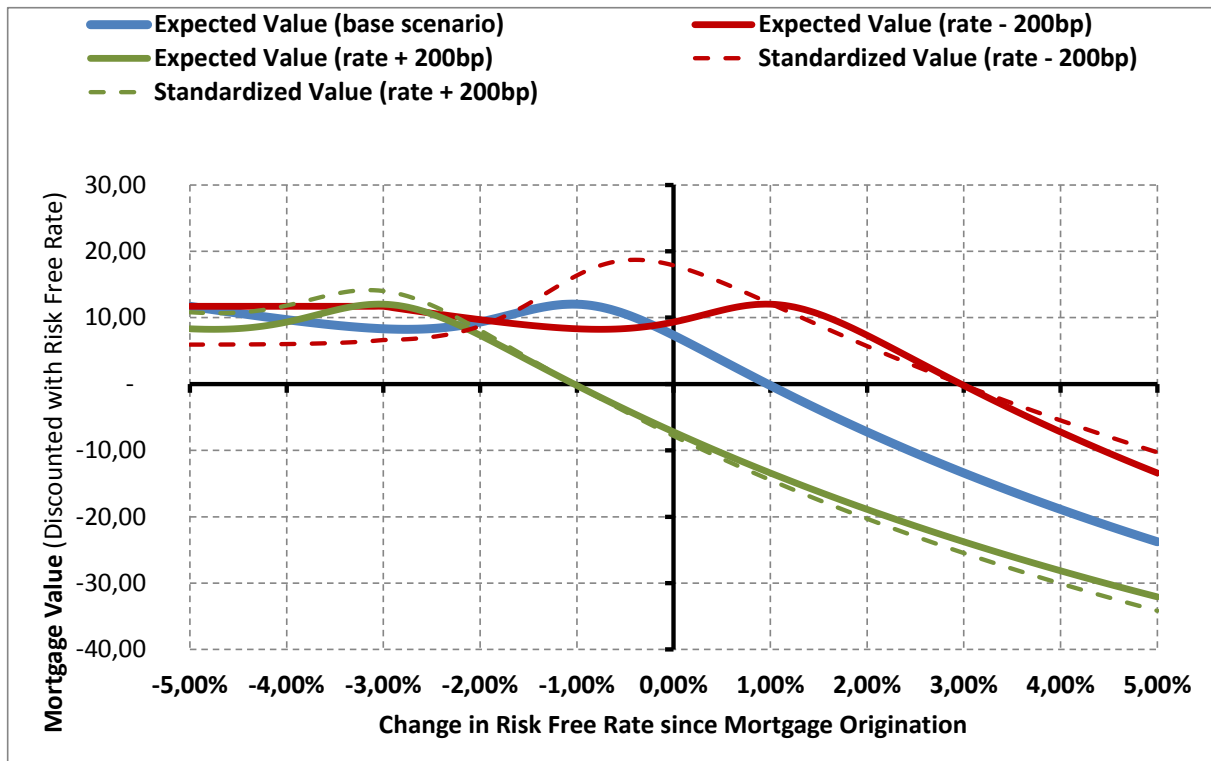
NB : the economic value at mortgage origination date is positive since it is derived from discounting at risk free rate the expected cash flows of the mortgage which embeds a (commercial) margin.

The graph below shows the changes in economic values to the base rate scenario:

Legend:
- Change in Expected Value (rate + 200bp)
- Change in Standardized Value (rate + 200bp)
- Change in Expected Value (rate - 200bp)
- Change in Standardized Value (rate - 200bp)

Y-axis: Change in Mortgage Value (Discounted with Risk Free Rate)

X-axis: Change in Risk Free Rate since Mortgage Origination
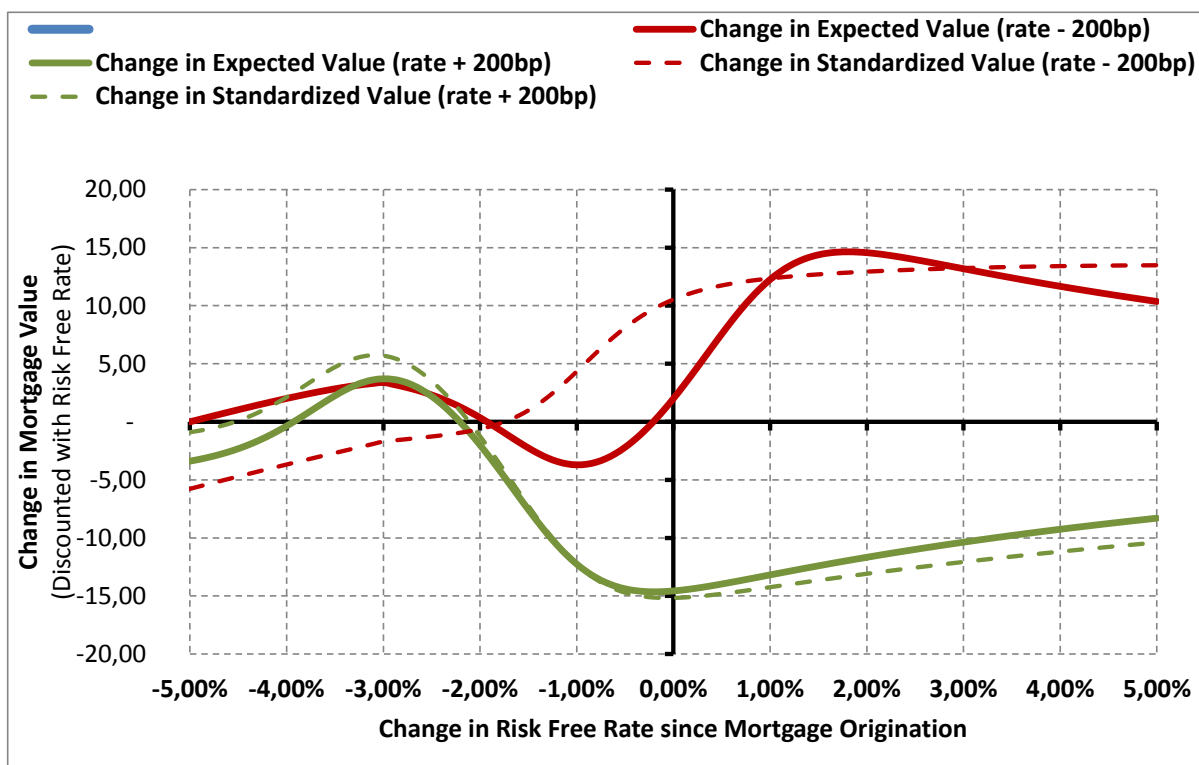
Hence, the changes in economic values based on standardized prepayment rates are not consistent with the changes in economic values based on bank-expected prepayment rates.

Applying those stress factors would only make sense if banks would use static models for clearly interest rate driven prepayments.

However, given the dynamic stress scenarios may occur in various jurisdictions, the prescriptive and hardcoded standardized prepayment rates are not fit for purpose. If rates move from a higher absolute level, there is a higher impact on prepayment rates, especially as the applied rates do not take into account the current rate cycle and baseline rate level.

There is little evidence that with these hardcoded multiplying factors the customers' behavior would change in a given jurisdiction.

2) <u>Interest rate independent prepayment rates</u>

The CD envisions that the usage of prepayment rights is always interest rate driven. In reality there are other factors driving prepayments that are basically insensitive to changes in interest rates, below are a number of factors outlined.

a) Partial prepayment options at mortgages

A common feature of fixed rate mortgage contracts, notably in Germany, is the right to prepay a fixed amount (e.g. 5% of notional) without incurring prepayment penalties.

If interest rates decrease, the prepayable amount would be too small to enable refinancing with another loan.

Conversely, if interest rates increase, customers with free liquidity may still prefer to reduce their loan. The usage of this option is therefore driven by liquidity not by interest rate differences. Changing the prepayment assumption based on the interest rate differential will therefore just overestimate risk.

b) Consumer loans

In many jurisdictions, consumers have the right to prepay their loans at any time without occurring a prepayment penalty. Typically however prepayment is driven by the ability to refinance not by changes in interest rates due to the already high margins charged by most consumer products. This is a constant process with stable percentages over time. Therefore as in a) changing the prepayment assumption based on the interest rate differential will solely overestimate risk.

c) Prepayments where the economic cost is charged to the customer

In certain jurisdictions, e.g. the UK, the tenors of fixed rate mortgages are relatively short, in addition to this prepayment charges apply. This means that there is very little financial incentive for customers to repay early. However, even in jurisdictions where the economic cost is charged to the customer prepayments regularly occur for a variety of reasons. Currently the consultation paper is from our view unclear on how to treat these. We would assume that those prepayments can be modeled as well in order to show the realistic payback profile of the portfolio without using multipliers in different interest rate scenarios.

d) Other drivers for prepayments

An important characteristic of the Brazilian credit market is the short term credit duration. Main factors responsible for this short term duration are for example high prepayment speed in personal loans, as well as, in the mortgage portfolio due to specific government supported arrangements and there is no evidence that the prepayment behavior is interest rate driven.

3) Portfolio cuts

In order to introduce relevant prepayment assumptions a certain sample size is needed. In case we apply all assumptions below to a small loan portfolio, we may lose sight of the behavior of the portfolio and reach wrong conclusions.

The paper states:

> *Banks must carefully consider how these likelihoods will vary not only under the interest rate shock scenario but also at a minimum for loans of different (i) size; (ii) loan-to-value ratio (LTV); (iii) borrower characteristics, including demographics; (iv) contractual interest rates; (v) seasoning; (vi) geographic location; (vii) original (vintage) and remaining maturity; and (viii) other historical factors. With respect to loan prepayment models, a bank's parameters need to be consistent and reasonable for each interest rate shock scenario used.*

From our point of view for e.g. a typical retail portfolio by using that many clusters you lose the information of the overall portfolio behavior leading to suboptimal behavior assumptions.
Portfolios should be clustered due to their prepayment characteristics which may or may not include some or all of the above given points.

4) Conclusion

Banks' models already incorporate the interest rate dependency on prepayment rates if applicable. Standardized factors would artificially inflate the risk position without giving further relevant information. Applying globally standardized multipliers representing prepayment speed changes under different stress scenario is not reflecting reality as experienced by banks and will likely misrepresent the underlying risk.

FIXED RATE LOAN COMMITMENTS

As per the BCBS CD, under the fixed rate loan commitment, customers could draw down a credit line up to a specified amount, at a fixed rate, for a fixed term, at any time within a specified period. The pull-through rates ('PtRs') have been determined by the supervisor as seen below.

1) Fixed rate loan commitment with two periods under the baseline and parallel interest rate shock scenario

The table below shows an example of behavior of loan commitments using methodology as presented in the BCBS CD page 26:

Scenario Multipler	Base 100%		Parallel Up 70%		Parallel Down 150%	
Period	PtR	Cashflow	PtR	Cashflow	PtR	Cashflow
ON	20%	20	44%	44	Not shown	
<= 1Mt	30%	30	51%	51		
Total Drawdown:		**50**		**95**		

2) Fixed rate loan commitment with extended periods under the baseline and parallel interest rate shock scenario

Below are the results if the BCBS CD example is extended to further time periods:

Scenario Multipler	Base 100%		Parallel Up 70%		Parallel Down 150%	
Period	PtR	Cashflow	PtR	Cashflow	PtR	Cashflow
ON	20%	20	44%	44	0%	-
<= 1Mt	30%	30	51%	51	0%	-
2-3M	0%	-	5%	5	0%	-
4-6M	0%	-	0%	-	0%	-
7-9M	0%	-	0%	-	0%	-

Total Drawdown: **50**   **100**   **-**

Conclusion:

Extending the BCBS CD model under the prescribed methodology shows that this leads to extreme results of 100% and 0% drawdown in the respective Parallel Up and Down scenarios. This however is neither evidenced by banks nor is supported by their experience.

3) Fixed rate loan commitment with extended periods under the baseline and parallel interest rate shock scenario based on the UK mortgage market

Base on a UK example, mortgage applications typically complete over a 6 month time frame. The example below assumes a typical drawdown distribution, and is influenced by external factors associated with house purchase such as conveyance.

Scenario Multipler	Base 100%		Parallel Up 70%		Parallel Down 250%	
Period	PtR	Cashflow	PtR	Cashflow	PtR	Cashflow
ON	0%	-	30%	30	0%	-
<= 1Mt	5%	5	34%	34	0%	-
2-3M	30%	30	37%	37	0%	-
4-6M	35%	35	0%	-	0%	-
7-9M	0%	-	0%	-	0%	-

Total Drawdown   **70**   **100**   **-**

Conclusion:

The proposed methodology and multipliers leads to the extreme outcomes of 100% or 0% drawdown. It also suggests most loans would be drawn down overnight for a "Parallel Up" shock – this is highly unrealistic for a residential mortgage.

Appendix 6 (Basis risk)

It is our understanding that the TFIR recognizes the flaws of the proposed approach for basis risk. The objective of this appendix is to present some industry practices for reference purposes.

Our view is that even a simplified basis risk framework requires identifying all reference indexes and determining interest rate shocks using economic consistent scenarios. Aggregation of balances repricing at different indexes may result in wrong basis risk estimates.

1. Reference Curves, Repricing Tenor and Aggregation

   Industry sound practice avoids aggregating balances repricing at different indexes (e.g. LIBOR 1 month, LIBOR 3 month and LIBOR 6 month are different indexes) since each of them has a different reference curve (Mercurio, 2009; Bianchetti, 2010).

   ### Example 1:
   Basis risk resulting from a $1,000m asset repricing at LIBOR 1 month funded with a $500m liability repricing at LIBOR 3 months and $500m liability repricing at LIBOR 6 months
   Assuming 0.5 basis shock and 0.2 non-parallel gap shock (as per BCBS CD).
   Assuming both legs repricing in the very short term

   Applying the CD methodology:
   Reference rate basis risk = 0 = 0.50% x (1,000-500-500) [all LIBOR balances aggregated]
   <u>Non-parallel gap risk   = -2 = 1,000* -0.20%</u> [1-3 month and 1-6 month both using 0.2%]
   Total basis risk   = -2.0

   Applying a market based methodology (using OIS vs. LIBOR basis swaps):
   Asset basis risk   =   5.0 = 1,000 *0.5%   [Libor 1 month shifts 0.50% vs. OIS]
   3 month liability basis risk   = -3.5 = -500 *0.7% [0.5% + 0.2%, 1-3month gap]
   <u>6 month liability basis risk   =   -4.5 = -500 * 0.9   [0.7% + 0.2%, 3-6month gap]</u>
   Total basis risk   =   -3.0

   In the previous example, the two calculations would equal only if the 3 and 6 month LIBOR rate gap shock is zero, which makes the CD methodology self-contradictory. Aggregating exposures in different indexes would lead to overestimation or underestimation depending on the overall repricing structure under analysis.

   Analyzing each index separately is easier, accurate and renders the short-term non-parallel gap risk calculation unnecessary.

2. Reducing the Number of Combinations under Analysis

   Basis risk can be understood as spread risk. The original CD methodology runs through all combinations of pairs of yield curves to determine the spreads under analysis. Alternatively, the industry practice defines all spreads in terms of a reference rate.

   Since we are not interested in the spreads, but in their variance, a reference yield with no embedded spreads such as OIS can be applied instead of a cost of funds. This methodology

enables reducing the number of combinations under analysis and is natural to the ALM systems in place.

Example 2:

Analysis of basis risk with 10 yield curves

Applying the CD methodology: 45 combinations (9+8+7+...+2+1)
Applying the recommended methodology: 9 spreads (one of the 10 yields is the risk free reference yield)

3. Impact of Repricing Schedule

The CD considers the same impact for the cumulative repricing balances regardless of their fixing tenor or repricing date. In practice, earlier repricing balances will have more impact than later ones. Similarly the O/N and monthly fixings, in average, are expected to have more impact to an immediate shock than 3 month or 6 month fixings.

Example 3:

Basis risk resulting from a $1,000m asset repricing in 6 months at LIBOR 6 month rate funded with a $1,000m liability repricing in three months at LIBOR 6 months.
Assuming 0.5 basis shock (as per BCBS CD).

Applying the CD methodology:
Reference rate basis risk = 0 = 0.50% x (1,000-1,000) [all LIBOR balances aggregated]
Total basis risk   = 0

Considering the actual repricing profile:
Asset basis risk   =   2.50 = 1,000 * 0.5% *6/12 [reprice in 6 months, impact 6/12]
Liability basis risk   = -3.75 = -1,000 * 0.5% *9/12 [reprice in 3 months, impact 9/12]
Total basis risk   = -1.25

The CD methodology may overestimate or underestimate depending on the actual repricing schedule.

4. Treatment of Managed Rates for Loans and Deposits

Managed rate deposit balances should not be aggregated into one reference category. The basis risk analysis should provide with a tool to analyze the sensitivity of the different products independently.

Managed rates on loans are discretionary and should not be taken in account for IRRBB capital calculation. As such, managed rate pricing decisions are not purely driven by the level of interest rates but impacted by a range of factors such as regulatory expectations, competitor pressure and customer behaviors and could be considered as a business risk and not basis risk.

Conversely, managed rates on deposits, under certain scenarios, may be required to be stressed to analyze margin compression effects. Aggregating balances on managed loans and deposits would distort the analysis.

Example 4:

Basis risk resulting from $1,000m overdraft funded with $1000m saving accounts
Interest rates close to zero at 0.30%, current margin on savings 0.15%
Assuming 100% pass-through (simplification for illustrative purposes)
Assuming 0.5% basis down shock (as per BCBS CD)

Applying the CD methodology:
<u>Reference rate basis risk = 0</u> = 0.50% x (1,000-1,000) [all balances aggregated]
Total basis risk   = 0

Considering the actual repricing profile:
Asset basis risk   =   0   [managed rate assets not included]
<u>Liability basis risk</u>   = -1.5 = -1,000 * 0.15% [margins floored at zero]
Total basis risk   = -1.5

5. <u>Scenario Internal Consistency</u>

Applying a common 50bps shock to every pair of reference yields appears very conservative (assumes that all exposures will generate a loss simultaneously). Conversely, if the common shock is calibrated to compensate this issue, the methodology may underestimate the risk, depending upon the actual profile.

As industry practice, banks use multiple interest rates scenarios that reflect the underlying interest rate risk of different products (government bonds yields by country, corporate bonds by rating, etc.). Thus, basis risk is captured by measuring IRRBB by underlying product categories. Basis risk shocks should be prescribed consistently with the overall NII scenario under analysis.

6. <u>References:</u>

- Mercurio, F. (2009) "Interest Rates and The Credit Crunch: New Formulas and Market Models". Bloomberg portfolio research paper 2010-01. Available at: http://www.fabiomercurio.it/LMMpostcrunch5.pdf

- Bianchetti, M. (2010) "Two Curves, One Price" *Risk* 23 (8), 66. Revised version Available at: http://arxiv.org/pdf/0905.2770.pdf

This appendix illustrates the issues with the BCBS proposed stress scenario design. The industry has concerns that the proposed design of the stress scenarios will increase procyclicality of capital requirements and hence the instability of capital metrics. Further, the standardized stress scenarios may misrepresent the actual interest rate risk in the banking book.

Shock scenario design leading to procyclicality of capital requirements

- The specification of the shock scenarios as proportional to the current level of interest rates means that the capital measure will inherit fixed income markets volatility, leading to a potentially very unstable metric with no change in balance sheet.
- In a low interest rate environment a zero percent floor is applied and we note that this has the result that for non-parallel scenarios the floor of a 100bp shock size will produce similar curves to the parallel shocks (with the floor), i.e. all six BCBS proposed shock scenarios will be very similar.
- The way the stress scenarios are combined in the proposed capital measures will be in general inconsistent with the underlying correlation structure, both between currencies, and among tenors for a given currency.
- The holding period in the BCBS approach is defined as 6 months. If the holding period should correspond to the longest period needed for an orderly hedge of the portfolio, a conservative estimate is that the portfolio could be hedged in less than 3 months' time.
- The BCBS methodology does not take into account local volatility but combines different current rate curves in different currencies to arrive at a set of standardized global shock parameters.
- As a result the scenarios do not reflect the relative levels of volatility in the different currencies and this leads to divergence to internal risk management practices and distorts the outcome.
- As a consequence of the above, the BCBS approach will over- or understate the interest rate shock.

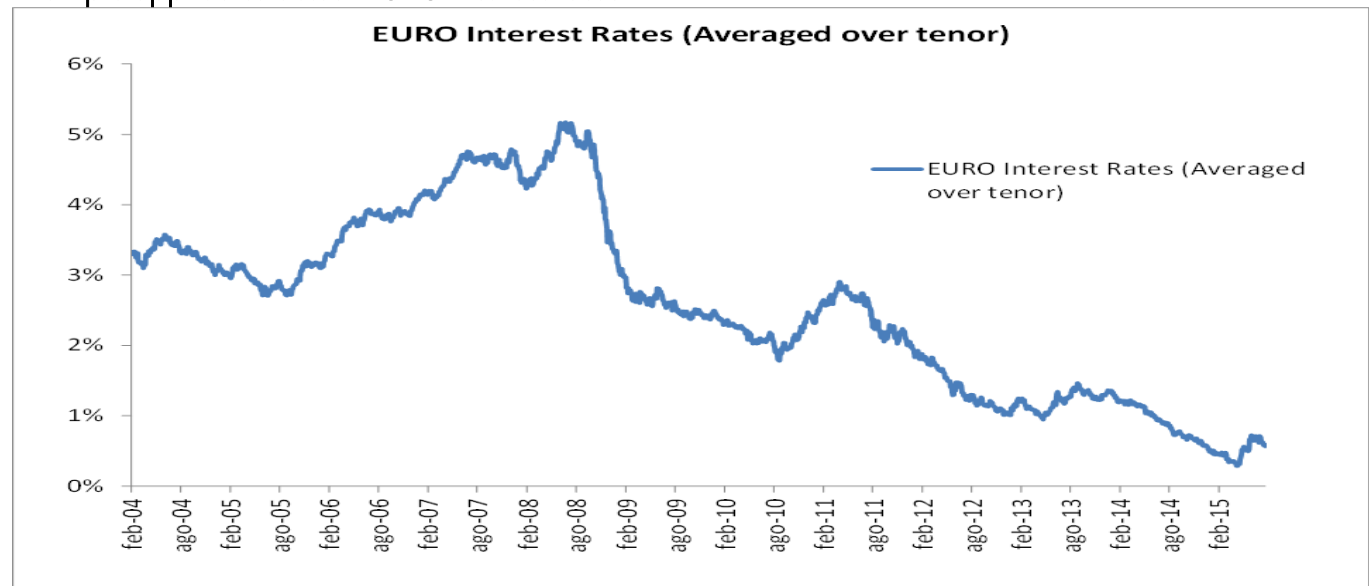### Example applied to actual EURO interest rates:

Figure 1: Evolution of Euro interest rates, averaged over tenors, from 2004 to date. In the period, Euro rates have fluctuated between zero to around 5%.
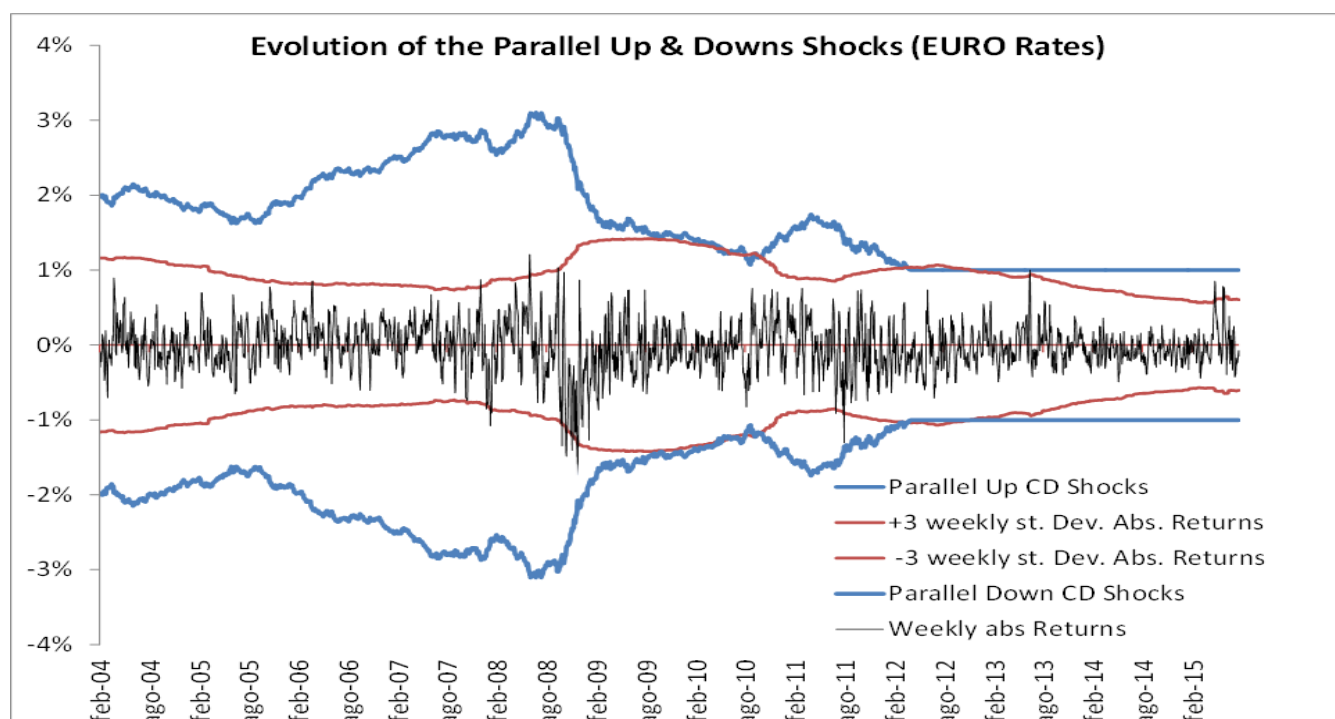
Figure 2: Evolution of the parallel standard shocks (up & down) as prescribed by the BCBS CD.

The CD prescribes a shock 60% of prevailing rates (see below table) with a floor at 1% and a cap at 4% for a parallel shock.

Global Interest Rate Shock Parameters

Parallel	$\bar{\alpha}_{parallel}$	60%
Short rate	$\bar{\alpha}_{short}$	85%
Long rate	$\bar{\alpha}_{long}$	40%

For Euro rates, this means that between 2004 to date, the magnitude of the shock would have varied by a factor of 3, which would have translated in a corresponding factor of 3 for the capital measure (at constant positions). For comparison, we show also shocks calculated as 3 times the standard deviation of the absolutes weekly returns, using a 2 year moving window. This measure is more stable in comparison.

Conclusion

As shown in the above example, the BCBS proposed stress scenarios will lead to unstable capital requirements and hence capital ratios, unrelated to balance sheet structure. The proposals will also underestimate risk in some jurisdictions and overestimate risk in others. We believe that a better option would be to prescribe the stress scenario construction for a given currency and let the banks themselves do the calculations, subject to approval by the supervisors. The methodology for the construction of the scenarios should be adapted for the specific behavior of each currency, which may depend on the level of the rates and their volatilities, and may be better modeled in terms of additive rather than multiplicative returns. For example, there are well tested models that can deal with the transition from high to low interest rate regimes that could be applied to improve the methodology.

The Industry has concerns on how the CD proposes to calculate the minimum capital requirements (MCR) for balance sheets that have multi-currency exposures.

In this note we examine only 5.2. of the CD (Pure EVE minimum capital requirements measure option 1). The other 3 options detailed within the CD apply similar concepts, albeit with additional NII contributions and mitigating factors.

Under the proposed Pure EVE minimum capital requirements measure (Pure EVE), $\Delta EVE_{i,c}$ results are aggregated across currencies. Individual currency $\Delta EVE_{i,c}$ are calculated under the prescribed six interest rate shock scenarios, with total losses aggregated against gains for each interest rate shock scenario. The aggregation of gains is subject to the parameter w which is expected to be calibrated within a range between 0 and 0.5. The preliminary value of w is stated to be 0.25.

$$MRC_1 = \max_{i \in \{1,2,\ldots,6\}} \left\{ \max\left(0; \sum_{c \ni \Delta EVE_{i,c} > 0} \Delta EVE_{i,c} + w \cdot \sum_{c \ni \Delta EVE_{i,c} < 0} \Delta EVE_{i,c} \right) \right\}$$

The above aggregation has two main shortcomings, when compared to industry sound practice. The first is the lack of appreciation for highly correlated currencies, e.g. EUR/DKK (where the interest rate risks of one currency is typically used to hedge the interest rate risks of the other). In addition, the approach appears to penalize banks that have a diverse business model (which could contain highly correlated and non- correlated currencies). As such, the Industry feels the aggregation technique proposed would misrepresent the IRRBB that banks are running and as such would impose a measure that is arbitrary (rather than one that the Industry would consider best practice).

Looking at correlations, the following study has been made based upon market data from January 1999 to date (sourced from Bloomberg and Danske Bank). The below tables seek to record the actual market correlations of weekly changes in swap rates (for 2Y, 5Y and 10Y Swap Rates). These tables show that there is correlation between different currencies and the results can be summarized as follows:

- The highly correlated nature of the Scandinavian interest rates (EUR, DKK, SEK and NOK); and
- The low potential correlation of interest rates of Global Banks and European Banks with a Latin American footprint.

In either example (where there is an $\Delta EVE_{i,c}$ loss in one major balance sheet currency and an $\Delta EVE_{i,c}$ gain in another currency), the use of an arbitrary w parameter would misrepresent the IRRBB of the multi-currency exposures within a bank balance sheet. To illustrate this, the outcome of parallel-up and parallel down scenarios using two currencies will be considered:

- <u>Net asset sensitivity in both currencies</u>. In this case, the MRC will be generated under the parallel up scenario and this will be the sum of the losses generated under both currency

exposures. In such an example, the correlation parameter is 1 as the losses are summed. The industry would view such a scenario as a tail event of a tail event for correlated currencies;

- Net asset sensitivity in one currency, net liability sensitivity in the other. In this case, the parallel-up scenario will produce losses in one currency and gains in the other. The roles will be reversed in the parallel-down scenario. For both scenarios the risk would be incorrectly assessed and the risk would be misrepresented. In either case, a standard w parameter is flawed.

To summarize the industry views on the proposed Pure EVE metric, please refer to the below table for an illustration of the outcome of the approach that is currently being proposed:

	High Correlation	Low Correlation
Same Sign Net Position	This would deliver an output that the Industry would recognize, i.e. for highly correlated currencies risks should add-up	This scenario is punitive, and would misrepresent IRRBB, as it sums risk in currencies that should yield diversification benefits
Opposite Sign Net Position	This scenario would misrepresent the IRRBB risk, the magnitude of which would depend upon the specific interest rate currency crosses (due to w parameter)	This would misrepresent the risk, as the w parameter is not a good proxy for interest rate currency crosses.

Actual Market Correlation

The following three tables have been produced to demonstrate the actual market correlations that banks are currently managing. These tables clearly show that a fixed w parameter is a flawed technique. In addition, there has been work already undertaken with regards correlation and the Industry would like to highlight the EBA study (Implementing Technical Standards (ITS) on closely correlated currencies):

Source: https://www.eba.europa.eu/regulation-and-policy/market-risk/draft-implementing-technical-standards-its-on-closely-correlated-currencies

Correlation 2Y Swap rates

	USA	Euro	Japan	UK	Sweden	Norway	Denmark	Czech	Australia	N. Zealand	Hong Kong	Taiwan	Indonesia	Mexico	Brazil	Chile	S. Africa
USA	100%	66%	29%	61%	46%	35%	59%	12%	46%	36%	57%	5%	-17%	6%	-2%	10%	17%
Euro	66%	100%	27%	65%	70%	49%	90%	8%	49%	35%	41%	-2%	-5%	5%	0%	17%	16%
Japan	29%	27%	100%	26%	19%	10%	23%	-7%	15%	10%	17%	2%	-15%	6%	-10%	6%	3%
UK	61%	65%	26%	100%	56%	42%	59%	2%	48%	38%	39%	1%	-8%	2%	-2%	9%	13%
Sweden	46%	70%	19%	56%	100%	54%	67%	1%	47%	39%	35%	-2%	0%	-1%	0%	22%	16%
Norway	35%	49%	10%	42%	54%	100%	48%	3%	33%	31%	25%	-1%	-2%	-4%	6%	22%	11%
Denmark	59%	90%	23%	59%	67%	48%	100%	9%	42%	32%	38%	1%	-6%	2%	2%	15%	16%
Czech	12%	8%	-7%	2%	1%	3%	9%	100%	9%	5%	4%	3%	-9%	-2%	5%	11%	-2%
Australia	46%	49%	15%	48%	47%	33%	42%	9%	100%	59%	36%	-6%	-7%	4%	-3%	17%	15%
N. Zealand	36%	35%	10%	38%	39%	31%	32%	5%	59%	100%	36%	2%	-12%	4%	1%	15%	14%
Hong Kong	57%	41%	17%	39%	35%	25%	38%	4%	36%	36%	100%	15%	-15%	4%	-3%	7%	20%
Taiwan	5%	-2%	2%	1%	-2%	-1%	1%	3%	-6%	2%	15%	100%	-5%	6%	-5%	4%	6%
Indonesia	-17%	-5%	-15%	-8%	0%	-2%	-6%	-9%	-7%	-12%	-15%	-5%	100%	0%	14%	2%	0%
Mexico	6%	5%	6%	2%	-1%	-4%	2%	-2%	4%	4%	4%	6%	0%	100%	7%	12%	3%
Brazil	-2%	0%	-10%	-2%	0%	6%	2%	5%	-3%	1%	-3%	-5%	14%	7%	100%	15%	11%
Chile	10%	17%	6%	9%	22%	22%	15%	11%	17%	15%	7%	4%	2%	12%	15%	100%	11%
Hong Kong	17%	16%	3%	13%	16%	11%	16%	-2%	15%	14%	20%	6%	0%	3%	11%	11%	100%

Correlation 5Y Swap rates

	USA	Euro	Japan	UK	Sweden	Norway	Denmark	Czech	Australia	N. Zealand	Hong Kong	Taiwan	Indonesia	Mexico	Brazil	Chile	S. Africa
USA	100%	70%	34%	67%	59%	46%	66%	14%	62%	43%	60%	2%	-2%	9%	9%	16%	20%
Euro	70%	100%	34%	75%	79%	61%	94%	11%	59%	41%	47%	-1%	2%	8%	4%	20%	17%
Japan	34%	34%	100%	33%	29%	22%	32%	-10%	25%	22%	25%	3%	-3%	-2%	0%	12%	5%
UK	67%	75%	33%	100%	68%	55%	73%	2%	59%	43%	45%	1%	2%	6%	6%	16%	16%
Sweden	59%	79%	29%	68%	100%	63%	80%	1%	54%	45%	46%	-3%	0%	7%	6%	22%	16%
Norway	46%	61%	22%	55%	63%	100%	62%	4%	41%	38%	35%	0%	1%	7%	2%	28%	13%
Denmark	66%	94%	32%	73%	80%	62%	100%	10%	55%	42%	45%	-2%	3%	9%	5%	20%	18%
Czech	14%	11%	-10%	2%	1%	4%	10%	100%	13%	10%	5%	11%	-4%	8%	-2%	12%	-3%
Australia	62%	59%	25%	59%	54%	41%	55%	13%	100%	64%	49%	-1%	4%	5%	4%	15%	15%
N. Zealand	43%	41%	22%	43%	45%	38%	42%	10%	64%	100%	46%	2%	5%	8%	7%	13%	14%
Hong Kong	60%	47%	25%	45%	46%	35%	45%	5%	49%	46%	100%	8%	3%	8%	7%	11%	26%
Taiwan	2%	-1%	3%	1%	-3%	0%	-2%	11%	-1%	2%	8%	100%	-8%	6%	-10%	6%	7%
Indonesia	-2%	2%	-3%	2%	0%	1%	3%	-4%	4%	5%	3%	-8%	100%	-3%	-1%	1%	3%
Mexico	9%	8%	-2%	6%	7%	7%	9%	8%	5%	8%	8%	6%	-3%	100%	15%	8%	11%
Brazil	9%	4%	0%	6%	6%	2%	5%	-2%	4%	7%	7%	-10%	-1%	15%	100%	0%	6%
Chile	16%	20%	12%	16%	22%	28%	20%	12%	15%	13%	11%	6%	1%	8%	0%	100%	10%
Hong Kong	20%	17%	5%	16%	16%	13%	18%	-3%	15%	14%	26%	7%	3%	11%	6%	10%	100%

Correlation 10Y Swap rates

	USA	Euro	Japan	UK	Sweden	Norway	Denmark	Czech	Australia	N. Zealand	Hong Kong	Taiwan	Indonesia	Mexico	Brazil	Chile	S. Africa
USA	100%	71%	35%	71%	61%	54%	68%	16%	72%	50%	60%	-1%		-1%		10%	20%
Euro	71%	100%	34%	82%	82%	66%	95%	11%	64%	48%	44%	-3%		-1%		9%	15%
Japan	35%	34%	100%	36%	32%	33%	33%	-5%	31%	29%	28%	2%		-1%		7%	7%
UK	71%	82%	36%	100%	71%	62%	80%	8%	66%	49%	46%	-3%		0%		11%	16%
Sweden	61%	82%	32%	71%	100%	63%	83%	3%	59%	49%	47%	-7%		-2%		12%	16%
Norway	54%	66%	33%	62%	63%	100%	66%	6%	53%	47%	42%	-1%		-3%		8%	14%
Denmark	68%	95%	33%	80%	83%	66%	100%	8%	63%	48%	43%	-4%		2%		9%	17%
Czech	16%	11%	-5%	8%	3%	6%	8%	100%	15%	12%	5%	7%		11%		11%	-4%
Australia	72%	64%	31%	66%	59%	53%	63%	15%	100%	67%	52%	0%		0%		8%	18%
N. Zealand	50%	48%	29%	49%	49%	47%	48%	12%	67%	100%	51%	2%		5%		9%	14%
Hong Kong	60%	44%	28%	46%	47%	42%	43%	5%	52%	51%	100%	3%		2%		12%	26%
Taiwan	-1%	-3%	2%	-3%	-7%	-1%	-4%	7%	0%	2%	3%	100%		22%		6%	4%
Indonesia																	
Mexico	-1%	-1%	-1%	0%	-2%	-3%	2%	11%	0%	5%	2%	22%		100%		6%	10%
Brazil																	
Chile	10%	9%	7%	11%	12%	8%	9%	11%	8%	9%	12%	6%		6%		100%	1%
Hong Kong	20%	15%	7%	16%	16%	14%	17%	-4%	18%	14%	26%	4%		10%		1%	100%

How high correlations could be assessed more accurately

The pure EVE metric suggests a perfect correlation between negative changes, but only a small correlation between negative and positive changes. The industry would not recognize this as best practice and each bank has developed risk management approaches for the major balance sheet interest rate currency crosses. The exact nature of these will depend upon the business model of each bank and the industry expects there will be a jurisdictional pattern (i.e. Nordic Banks will have a similar interest rate cross currency crosses). If the BCBS wanted to develop an approach that the industry could recognize, the following approach might be a more appropriate methodology **for very highly correlated currencies**:

Let us for simplicity assume that ΔEVE's are normally distributed with a zero mean, with some factors driving the yield curves as underlying stochastic variables. The zero mean is a cautious assumption as banks are expected to construct their portfolios with a positive expected return.

> Let X = ΔEVE_{c1} and Y = ΔEVE_{c2} be stochastic variables describing the losses in these two currencies for a given bank that only operates in these two currencies. This means X $\sim N(0,\sigma_X)$, Y $\sim N(0,\sigma_y)$ and their correlation coefficient is expressed by ρ. Finally it is assumed that ΔEVE represent scenarios that are equally likely in the two scenarios. This implies that:
>
> $$\Delta EVE_{s,c1}\big/\sigma_X = \Delta EVE_{s,c2}\big/\sigma_Y.$$
>
> What is the expected negative change for this bank if an adverse scenarios **s** happens in currency c1? With the assumption of normal distributions we know $E[X+Y \,|X = \Delta EVE_{s,c1}]$ = $\Delta EVE_{s,c1}$ + ρ $\Delta EVE_{s,c2.}$
>
> This is true because of the assumption of normal distributions, where $Y = \rho\,{}^{\sigma_Y}\big/_{\sigma_X} X + \sqrt{1-\rho^2}\sigma_Y Z$, where Z $\sim N(0,1)$ and is uncorrelated to X.
>
> To use this methodology across currencies and across scenarios the following metric is suggested.
>
> $$MRC_1 = \max_{i\in\{1,2,\cdots,6\}}\left\{0; \max_{c1}\left\{\sum_{c2}\rho_{c1,c2}\Delta EVE_{i,c2}\right\}\right\}$$
>
> Where $\rho_{c1,c2}$ is the correlation between currency c1 and c2 and $\rho_{c,c}$= 1.

This measure captures the maximum expected negative changes from interest rate risk across the adverse scenarios in all currencies. At the same time it does take sound practices of portfolio management into account, where the covariance between interest movements is accounted for. **It is important to reiterate that the above only considers highly correlated currencies and that the Industry is not suggesting that such an approach could be applied across all currencies.**

Conclusion

The industry is concerned with the proposed pure EVE metric and would welcome the opportunity to discuss this further with the TFIR. Local regulators are aware of the balance sheet composition of the banks that they regulate, together with the risk management processes that are used to manage the resulting IRRBB. This document has sought to highlight that global banks operating in multiple currencies will have developed currency aggregation techniques within their existing risk management frameworks. The suggested aggregation technique is disconnected from market reality and as such will deliver an output that would misrepresent the risk that banks are managing. The industry is concerned that this could lead to the wrong incentives, with a resulting divergence from what the industry would recognize as best practice.