



MARKET RISK MANAGEMENT BANK

P.O. Box 1800, 1000 BV Amsterdam

Basel Committee on Banking Supervision

Department
MRMB - Trading Risk -
Quantitative Analytics

Location
ALP B 03.082

Subject
Response to consultation FRTB

Date
February 16, 2015

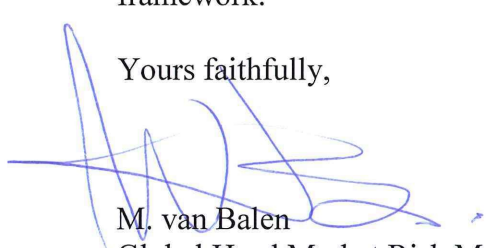
Dear Madam, Sir,

With this letter we would like to take the opportunity to respond to the third consultative document on the Fundamental Review of the Trading Book published in December 2014.

We appreciate the efforts of the Committee to enhance the capital framework for the trading book and support the objectives. The slides below discuss our main comments to the consultation paper by topic. If applicable, we have also included our response on the adjustments that were published in the QIS3 instructions. Additionally, we have been fully involved in and support the response to the consultation paper by the trade associations (ISDA/IIF/GFMA).

We will be pleased to answer any questions that may arise from our response. We are more than willing to work with the Committee to further develop a consistent trading book framework.

Yours faithfully,



M. van Balen

Global Head Market Risk Management Bank - Trading



FRTB

Consultation Paper 3 response

Thelma Stahlie – Trading Risk Consolidation

Frits Hermans – Trading Risk Quantitative Analytics

Contents

As requested by TBG, for this response we confine ourselves to the updates in the Consultative Document and the latest Instructions for Basel III monitoring. We emphasize that many questions and doubts on the methodological soundness that we raised in previous consultations are not yet fully addressed.

To answer question 1* and 2**, we discuss the next topics in this consultation response:

- Balance between simplicity, comparability and risk sensitivity
- Internal risk transfers between the banking book and the trading book
- The revised standardised approach for market risk
- Incorporating the risk of market illiquidity in the internal models approach

* Q1 What are your views on the specific refinements described in the three sections of this consultative document?

** Q2 Do these specific proposals strike the right balance between simplicity, comparability and risk sensitivity?



**Balance between simplicity,
comparability and risk
sensitivity**

Balance between simplicity, comparability and risk sensitivity

ING appreciates the efforts taken by TBG to amend the framework by extending and refining requirements. However, we believe the current framework has become overly complex. Moreover, we observe that each refinement of the framework introduces new flaws.

- **SBA as a floor:** When the SBA is used as a capital floor, a disincentive to improve models is introduced. Eventually, traders might construct their portfolios in order to minimize capital requirements instead of hedging their exposures.
- **Simplicity:** The standardised approach is meant as a relatively simple fallback for small banks. However, the standardised approach is extremely complicated. The internal model approach requires a significant investment in IT since much more runs need to be calculated.
- **Comparability:** The proposed framework is lacking detailed clarity on implementation which inevitably will lead to different interpretations by banks. This in turn reduces comparability significantly.
- **Risk sensitivity:** The framework as it is now will considerably reduce the usage of internal models. Although the standardised approach might impose larger capital requirements, it is less risk sensitive. Risk weights are assigned at coarse levels; e.g. the same risk weights are used for all currencies or IR curves. When an internal model turns out to be inadequate, the fallback to the sensitivity based approach does not lead to an improvement of the risk measure and it is even doubtful if the missing risk factor is part of the standard model in the first place.

An aerial photograph of a wind farm in a rural landscape. In the foreground, the white nacelle and part of a wind turbine are visible. In the background, several other wind turbines are scattered across a patchwork of green and brown fields. A large, semi-transparent orange rectangle is overlaid in the center of the image, containing white text.

Internal risk transfers between the banking book and the trading book

think**forward**

Internal risk transfer between trading and banking books

ING recognises the necessity of preventing regulatory capital arbitrage between trading and banking books. However, the current draft regulation will not serve its purpose.

- Consider a loan in the banking books. The interest rate risk is transferred to the treasury department of a bank where all outright IR risk is aggregated. Treasury will hedge the exposure of the loan *as part of the aggregated IR exposure* via the IR trading desk.
- Two possibilities for risk transfer:
 1. IR trading desk unwinds directly with a third-party protection provider. In this case
 - Bid-ask spread is paid
 - Economic risk is mitigated
 - No capital is required.
 - When unwinding is not done immediately but over a period, then in the course of hedging regulatory capital in the trading book is attracted
 2. IR trading desk unwinds exposure by netting against IR exposure already existing in IR trading books
 - No bid-ask spread is paid
 - Economic risk is (partially) mitigated
 - No (less) capital is required
- CP3 does not allow for possibility 2. This potentially incentivises banks to:
 - do not hedge but keep IR exposure in the banking books where (currently) no capital is required, or
 - move hedging costs (bid-ask spread) on to clients leading to higher prices of loans, mortgages etc., or
 - cooperate with other banks to do two perfectly offsetting trades as to move exposure from the banking books to the trading books or vice versa, without charging the bid/ask spread
- Since treasury departments generally hedge aggregated exposure, linking individual hedges to banking book assets is unfeasible. Moreover:
 - a single mortgage may require multiple swaps to hedge
 - a series of loans may require a single swap to hedge
- IRRBB capital requirements should reduce interest rate regulatory capital arbitrage incentives.
- As long as IRRBB is not in place, strict governance rules should ensure a watershed between the trading book and the banking book.

The background image shows a busy port scene. In the foreground, a large container ship is docked, its deck filled with stacks of blue and green shipping containers. Below the containers, the hull of a cargo ship is visible, with the name 'ITAL CONTESSA' and 'HAMBURG' painted in orange. The ship is moored at a pier with orange bollards. In the background, a body of water stretches to the horizon, where another large white ship is visible. The sky is blue with scattered white clouds. A semi-transparent orange rectangle is overlaid on the middle of the image, containing the main title text.

The revised standardised approach for market risk

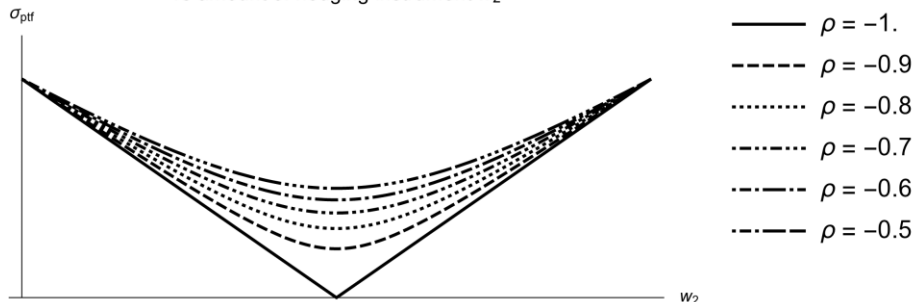
Treatment of basis risk

Correlation scaling seems to be an improvement compared to disallowance since it better resembles the real economic basis risk. However we emphasize that correlations should be calibrated realistically.

- Perfectly offsetting positions (same curve, same maturity bucket, opposite exposure) leading to zero economic risk now give a zero risk measure
- The correlation scaling approach better reflects the portfolio risk than the disallowance factor approach:
 - The formula for portfolio standard deviation reads:

$$\sigma = \sqrt{\sum_k w_k^2 \sigma_k^2 + \sum_k \sum_{k \neq l} w_k \cdot \sigma_k \cdot w_l \cdot \sigma_l \cdot \rho_{k,l}}$$

Portfolio standard deviation
vs amount of hedging instrument w_2



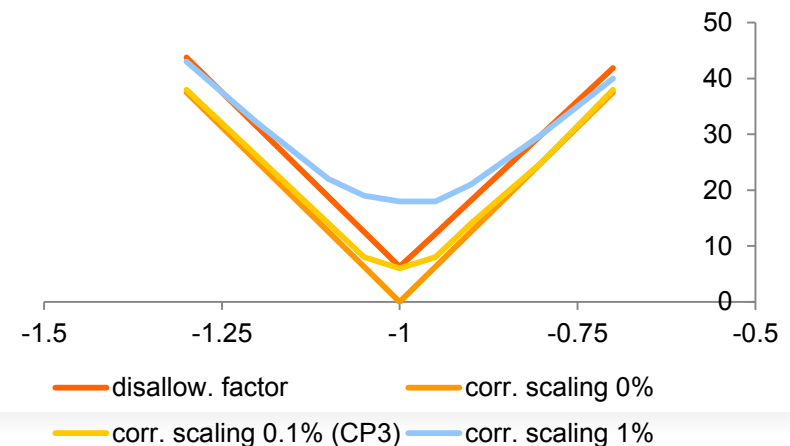
- The 'correlation scaling method' is similar to the portfolio standard deviation so the *risk measure* resembles the *real economic basis risk*:

$$K = \sqrt{\sum_k WS_k^2 + \sum_k \sum_{k \neq l} WS_k \cdot WS_l \cdot \rho_{k,l}^*}$$

with $\rho_{k,l}^* = \text{Min}[\rho_{k,l} \cdot (1 \pm x), 1]$

- The disallowance factor approach would assume perfect $\pm 100\%$ correlation but *limits offsetting to an arbitrary limit of 95%*.
- Below shows risk measure for portfolio of 1 bp Eonia long and varying exposure xbor short, for three different values of rho basis x

Risk measures for portfolio Eonia and Bor, varying amount of Bor



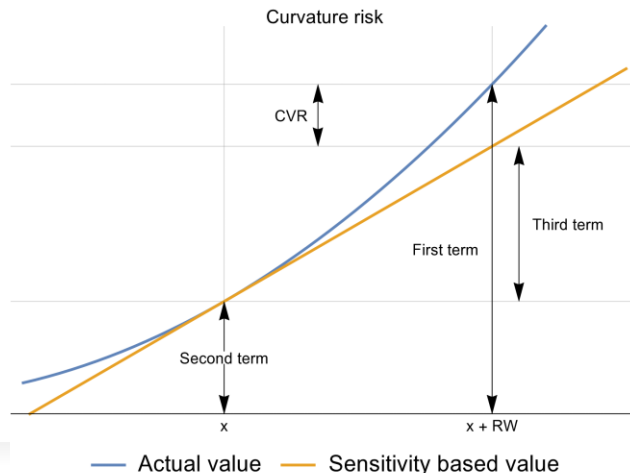
Treatment of optionality: vega and curvature risk (1)

The vega and curvature risk framework requires clarification to avoid different interpretations across banks

- It is unclear how to apply the 'scalar in the vega risk formula'. It leads to shifts larger than 100% so volatility could drop below 0%:

$$relative\ risk\ weight = 0.55 \cdot \sqrt{\frac{LH}{10}}$$

- From the text on curvature risk for GIRR and CSR, we understand that a parallel shift should be applied in order to calculate the second order price effect of the shift.



- Therefore we believe that the formula...

$$CVR_k = -\min \left[\sum_i V[x_{it} + RW_{ik} \forall t \in k] - V[x_{it} \forall t \in k] - \sum_{t \in k} RW_{it} \cdot s_{it} \right. \\ \left. \sum_i V[x_{it} - RW_{ik} \forall t \in k] - V[x_{it} \forall t \in k] + \sum_{t \in k} RW_{it} \cdot s_{it} \right]$$

...should be read as

$$CVR_k = -\min \left[\sum_i V_i[x_t + RW_k, \forall t \in k] - V_i[x_t, \forall t \in k] - \sum_{i,t \in k} RW_k \cdot s_{it} \right. \\ \left. \sum_i V_i[x_t - RW_k, \forall t \in k] - V_i[x_t, \forall t \in k] + \sum_{i,t \in k} RW_k \cdot s_{it} \right]$$

- However, from the latest version of the Basel III monitoring instructions, we understand that a 'bucket' is a curve/currency (p.181) and maturities within in bucket are netted (p.161) without making use of the correlation matrix. Conversely, article 80 (p.191) states that basis risk within the same bucket should be recognised by scaling with a correlation basis factor.
- Unclarity in the curvature risk calculation causes different interpretations by banks.

Treatment of optionality: vega and curvature risk (2)

Vega smile risk bucketing

- The latest Basel III monitoring instructions define three moneyness buckets (80%, 100% and 120%) for vega smile risk. However, the 'regulatory projection procedure' is not clarified. The bucketing can be interpreted in many ways by industry participants:
 - $\leq 80\%$, $> 80\%$ and $\leq 120\%$, $> 120\%$
 - $< 90\%$, $\geq 90\%$ and $\leq 110\%$, $> 110\%$
 - Projection to multiple buckets: e.g. 85% moneyness is assigned with fraction $\frac{15}{20}$ to the 80% bucket and $\frac{5}{20}$ to the 100% bucket

Correlation

- The Basel III monitoring instructions introduce correlation formulas for maturities and strikes for which parameters α and β are not yet provided:
 - $\rho_{T_i, T_j} = e^{-\alpha(T_j - T_i)}$
 - $\rho_{K_i, K_j} = e^{-\beta(T_j - T_i)}$

- It is not clear how to use the maturities T
 - Are these option maturities or underlying maturities
 - In either case one dimension is missing; one needs the option maturity and underlying maturity for a pair
 - $(T_j - T_i)$ should be $|T_j - T_i|$ as to guarantee a symmetric correlation matrix
- Although we have not yet received actual values of α , we have the experience that a correlation parametrisation of one single parameter in the maturity direction is not sufficient to calibrate both short ($< 0.25Y$) and long ($> 30Y$) maturities.
 - In order to assure a realistic correlation term structure for a large range of maturities, we suggest to consider slightly more advanced formulas like Rebonato's parameterisation:

$$\rho_{T_i, T_j} = \rho_{\infty} + (1 - \rho_{\infty}) \exp[-|T_j - T_i| \cdot (\beta - \alpha \cdot (\max[T_i, T_j] - 1))]$$

- For the strike correlation formula it is unclear which strikes K_i and K_j to enter
 - Actual strike?
 - 80%, 100% and 120%?

Vega risk for spread options

Assigning all spread options to the residual bucket is inconsistent with vega risk for plain vanilla options

- SBA text: *“All other options (eg spread options) should be treated in the residual bucket for vega risk. The vega risk positions are then multiplied by [200%] and the weighted vega risk positions are added up irrespective of sign.”*
- In commodity markets spread options are the standard trading instruments. Each spread option can be replicated by plain vanillas:
 - Calendar spread option = long call on maturity 1 + short call on maturity 2
 - Crack spread option = long call on grade 1 + short call on grade 2
 - Geographical spread option = long call for delivery at location 1 + short call for delivery at location 2
- A risk measure should give the same value for a spread option and its replication by plain vanillas
- The risk driver of spread options is the correlation between underlyers, which is already extensively accounted for by low correlation parameters and the additional basis risk scaling of correlations (p.199)
- Since the spread option rule does not add a economic risk that was not already factored in we propose to remove it

Treatment of indices

ING supports the objective to capture the risk of dispersion trades. However, we believe that the proposed look-through approach (CP3) is overly complex and does not meet the objective

- Consider a simple basket option on two underlying indices: Nikkei 225 and S&P 500
 - A bank would price this option using two volatilities of the indices and one correlation parameter – all easily observable in the market. The option is hedged by *index* futures and *index* options.
 - In the look-through approach, a bank would need to price the basket option using 725 volatilities and a correlation matrix of 725 x 725. Especially the correlations are not all observable in the market and need to be estimated differently.
 - In the latest version of the Basel III monitoring instructions this was solved for by allowing to distribute vega to index constituents by index weights.
- The look-through approach aims to quantify a source of risk that is only present in the case individual index components are used as hedging instruments.
 - This objective is not achieved since the lookthrough approach decomposes index exposure to its index members in the same way as the hedge is setup; the net exposure per index member is netted and no basis risk is captured

Real exposure

	SPX Index	N225 Index
SPX Index	1	ρ
N225 Index	ρ	1

Look-through approach CP3

	SPX share 1	SPX share 2	...	SPX share 499	SPX share 500	N225 share 1	N225 share 2	...	N225 share 224	N225 share 225
SPX share 1	1									
SPX share 2		1								
...			...							
SPX share 499				1						
SPX share 500					1					
N225 share 1						1				
N225 share 2							1			
...								...		
N225 share 224									1	
N225 share 225										1

262,450 elements to be estimated

Remarks on individual risk factors and sensitivity calculation

We propose to reconsider a few asset class specific choices that have been made in SBA

- Equity
 - In CP3, repo and dividend are added to the equity risk factors and aggregated along with delta.
 - ING supports to include dividend as a risk factor, since dividends are often forecasts and therefore uncertain by nature
 - Total return swaps and dividend swaps are used to derive dividend data. Repo in turn is a final adjustment to the interest rate in order to match forward values and not the market rate for repo deals. The impact of repo is rather small and we believe it does not have a meaningful impact on the trading book risk
- FX
 - Tenor impact of cross-currency swaps is included in both FX and IR, resulting in a double count. We propose to keep maturity impact only in GIRR.
- IR
 - For the IR risk factors, market rates (and not zero coupon rates) should be used to construct the risk-free yield curve
 - Converting zero rate sensitivities to market rates sensitivities requires significant development effort by banks
- Since zero rates are more widely used in the industry, we suggest to use zero rates instead of market rates
- Inflation
 - Article 57 states: "The GIRR delta risk factor also includes a flat curve of risk-neutral inflation rates for each currency."
 - However, in table 75 a risk weight of 150 bp is assigned to inflation
 - This seems to be a parallel shift instead of a flat curve.
- Sensitivity calculation
 - The instructions prescribe how to calculate sensitivities using a forward, central or backward finite difference calculation with a prescribed 'bump' size
 - For many commercial systems, it is not possible to adjust the bump size. For most products the bump size has very small impact on the sensitivity outcome. Banks should be allowed to use the finite difference implementation as available in their systems.



Incorporating the risk of market illiquidity in the internal models approach

Floored liquidity horizons between correlated risk factors (1)

ING appreciates the proposal of a 'liquidity horizon floor' to solve for the flaw of broken hedges. Nevertheless some further clarification is required to assure industry-wide consistent implementation of the methodology.

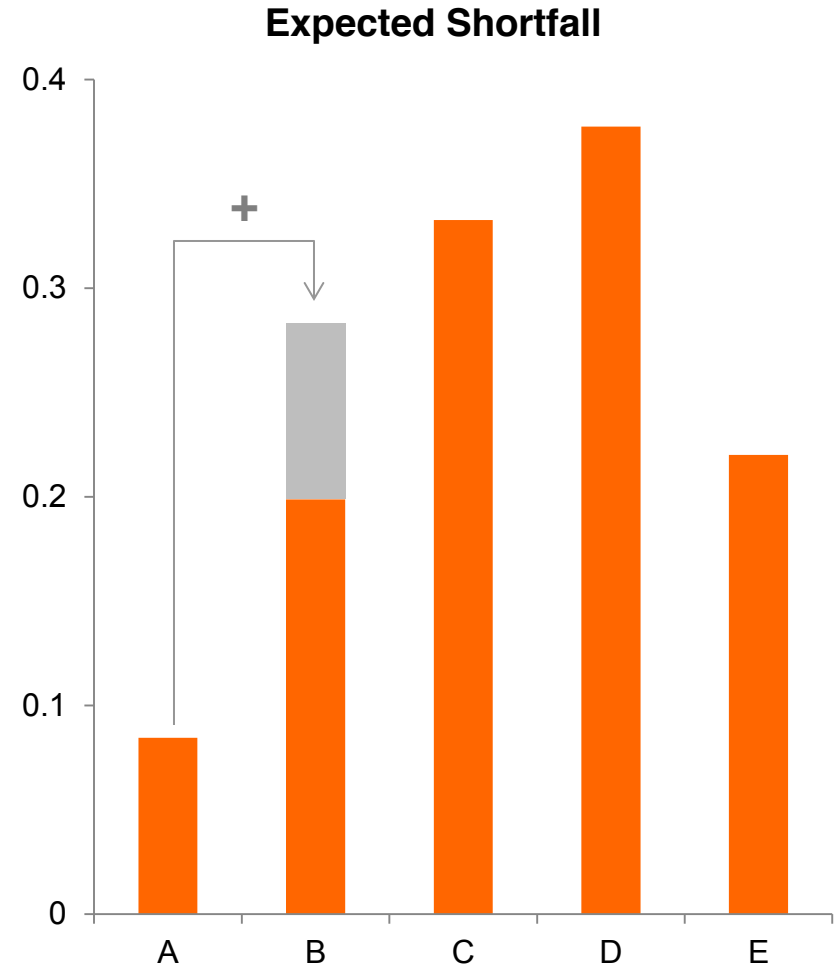
CP3: *"If the bank wishes to use a longer liquidity horizon for a certain risk factor, it has to do so for the whole trading desk."*

- What is considered as a risk factor?
 - a) Any individual IR curve/credit spread/share/swap/etc? or
 - b) A 'broad category of risk factors' to which liquidity horizons are assigned (26 in total)?
- If liquidity horizons may be floored on the level of a single underlying, the finest hedge relations can be allocated; e.g. the Itraxx index (60D) can be allocated to 120D as it is used to hedge high yield credit spread positions, whereas all other investment grade credit spread positions can remain on 60D where their real risk lies. However, this could lead to enormous administrative complexity for both the bank and the supervisor.
- If liquidity horizons can be increased at the level of the 'broad category of risk factors', broken hedges will still occur and unwanted incentives arise:
 - Banks might rearrange their trading desks to benefit the most from the floored liquidity horizons; e.g. a developed markets credits desk will be split up into a government bond desk (20D), an investment grade corporate bond desk (60D) and a high yield corporate bond desk (120D). This leads to a more complex supervision for risk and supervisory purposes.
 - Hedging within a desk might be disadvantageous potentially leading to more unhedged positions.
Banks might hedge regulatory capital instead of economic risk.
- For an outright position, the framework assumes the full exposure is held during the whole liquidity horizon.
 - A gradual unwind of the position would be more realistic
 - The possibility of *buying* a (liquid proxy) hedge, which only leaves a basis risk, is not considered
 - Ideally all risks should be defined as basis risks

Floored liquidity horizons between correlated risk factors (2)

When liquidity horizons should be floored on a 'broad category of risk factors' level, the problem of broken hedges is not fully solved. We demonstrate this with an example.

- Assume one desk with two hedged positions
 - Equity price small cap¹ (20D) hedged with equity price large cap² (10D)
 - Credit spread corporate HY³ (120D) hedged with a different equity price large cap⁴ (10D)
- The graph shows ES for five cases:
 - A. Equity price small cap hedged with equity price large cap (increased LH to 20D)
 - B. Credit spread corporate HY hedged with equity price large cap (increased LH to 120D)
 - C. Combined portfolio, all equity price large cap to 20D
 - D. Combined portfolio, all equity price large cap to 120D
 - E. Combined portfolio, one equity large cap assigned to 20D, the other assigned to 120D
- In this example assigning a larger liquidity horizon to equity price large cap leads to a larger ES measure (C or D) than when both hedged positions (A and B) would be booked in separate desks and summed up (B, gray bar). This incentivises banks to setup more desks which will cause a larger administrative complexity, also for regulators.
- The assigning liquidity horizons on the hedge instrument level (E) measures basis risk more accurately but introduces administrative complexity since for each initial exposure the related hedge instrument should be administered.



¹ Russell 2000 Index, ² S&P 500, ³ Itraxx Xover CDS index, ⁴ Eurostoxx index

Floored liquidity horizons between correlated risk factors: ING's proposal (1)

The current framework only considers unwinding risk by *selling* an instrument and neglects the possibility of *buying* a hedge

- The real economic risk is not the open outright position for the whole period, but:
 - the risk of the open outright position *until a hedging instrument can be acquired*, and
 - the *basis risk* that one runs after the hedge is in place
- This reasoning follows directly from the logic of the cascade approach; e.g. if one assumes an instrument can be *sold* in 20D, one assumes an instrument in the same liquidity horizon class could also be *bought* in 20D
- **We propose the following:**
 - **For each desk the basis risk for open positions –aligned with the trading strategy– should be set. E.g. an investment grade bond desk in developed markets could define Itraxx generic CDS as an instrument to which the basis risk for open positions is calculated.**
 - **The next slide shows an example**

Floored liquidity horizons between correlated risk factors: ING's proposal (2)

Example: assume an open position of the high yield corporate CDS Itraxx Xover with a liquidity horizon of 120D for which the logic hedging instrument would be the 60D investment grade Itraxx Generic CDS. Compare three cases:

- The current framework considers an open position for the Xover CDS for the period of 120D:

$$ES = \sqrt{\left(ES_{10}(Xover) \cdot \sqrt{\frac{10}{10}} \right)^2 + \left(ES_{10}(Xover) \cdot \sqrt{\frac{(20-10)}{10}} \right)^2 + \dots + \left(ES_{10}(Xover) \cdot \sqrt{\frac{(60-20)}{10}} \right)^2 + \left(ES_{10}(Xover) \cdot \sqrt{\frac{(120-60)}{10}} \right)^2}$$

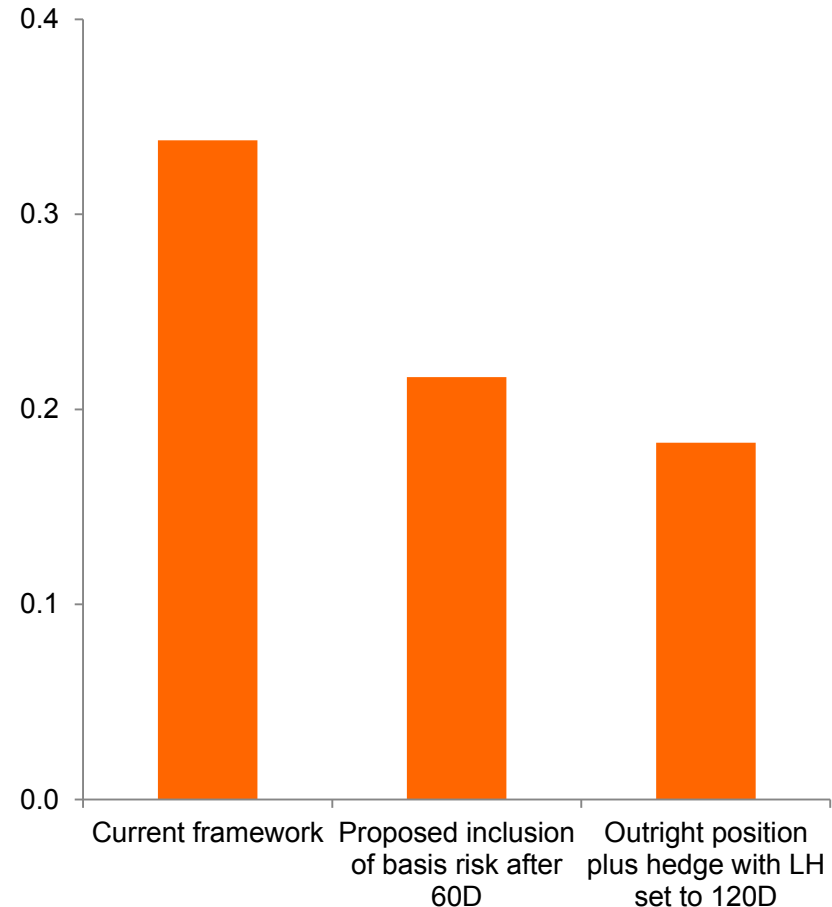
- Proposed solution: following the logic of the framework, the hedging instrument could be obtained in 20D:

$$ES = \sqrt{\left(ES_{10}(Xover) \cdot \sqrt{\frac{10}{10}} \right)^2 + \left(ES_{10}(Xover) \cdot \sqrt{\frac{(20-10)}{10}} \right)^2 + \dots + \left(ES_{10}(Xover) \cdot \sqrt{\frac{(60-20)}{10}} \right)^2 + \left(ES_{10}(Xover - \text{Generic}) \cdot \sqrt{\frac{(120-60)}{10}} \right)^2}$$

After 60D the Itraxx Generic CDS could be obtained as a hedge and only the basis risk remains

- Fully hedged position from the start: the outright position plus hedge for which the liquidity horizon is set to 120D. In this case the term $ES_{10}(Xover + Generic)$ appears four times under the square root.

Basis risk for outright positions



Liquidity horizons for interest rates

A lower liquidity horizon of 10D is assigned to interest rate in ‘the domestic currency of a bank’, EUR, USD, GBP, AUD, JPY, SEK, CAD. IR exposure in a different currency is given a 20D liquidity horizon. This refinement requires clarification:

- Does TBG make distinction between parent company, local entity and branch?
- If one considers a local entity in a different country as where the parent company is incorporated, would the local entity be allowed to consider the local currency as ‘domestic currency’?
- What is the reason to include ‘the domestic currency of a bank’? A local entity or branch of a European bank in an emerging market has equal access to the IR market as a local, domestic bank.
- The refinement of ‘the domestic currency of a bank’ harms the level playing field.

PnL attribution and backtesting

- The QIS 3 instructions distinguish three types of PnL:
 - Actual daily P&L: the daily economic P&L based on the marking to market of the books and records of the bank excluding fees and commissions
 - “Risk-theoretical” P&L: The daily desk-level (hypothetical) P&L that is predicted by the risk management model conditional on a realisation of all relevant risk factors that enter the model.
 - Hypothetical P&L: The P&L produced by revaluing the positions held at the end of the previous day using the market data at the end of the current day
- Three thresholds are proposed that decide on the fallback of a desk to the standardised approach:
 - Unexplained daily P&L = Theoretical P&L – Hypo P&L
 - $-10\% \leq \text{Mean Unexplained} / \text{St Dev Hypo} \leq 10\%$
 - $\text{Variance Unexplained} / \text{Variance Hypo} \leq 20\%$
- We do not believe that when these thresholds are breached, fallback to SBA is the solution; when the internal model does not capture all risk factors to sufficient extent, using a less specific methodology does not solve the problem.
- We emphasize again the importance of incentivising banks to develop accurate internal models as to manage their risks. When it is in any case impossible to use an internal model for certain asset classes because of the abovementioned rules, development of internal models will be brought to a standstill.

Incremental Default Risk

The QIS 3 instructions require a default simulation model with two systemic risk factors. Default correlations must be based on credit spreads or listed equity prices.

- It is not clear from the instructions what the two systemic risk factors should be
 - One factor for state of the economy and one for issuer specific industry?
 - One global factor and one regional factor?
 - One regional factor and one industry factor?
- Since it is not clear which systemic risk factors to use, determination of correlations and simulation is not trivial.
- Interpretation differences across banks will lead to a decrease of comparability.
- All sovereign positions should be included and will be subject to a 3 bp PD floor, but there will be national discretion to apply 0 risk weights to sovereigns. This harms the level playing field and counteracts the TBG's objective to implement a framework that leads to risk outcomes that could be compared.



think**forward**