

**Basel Committee on Banking Supervision Consultative Document**

***Fundamental Review of the Trading Book***

**Dated May 2012**

**Response of the International Swaps and Derivatives Association, Inc,  
the Global Financial Markets Association,  
the Institute of International Finance and  
the International Banking Federation.**

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## 1 Introduction

The Associations are supportive of the Fundamental Review's aims and objectives both in strengthening capital standards and delivering a regulatory framework which achieves comparable levels of capital internationally. In discussing the Fundamental Review and formulating our response we have focused on the nature and purpose of capital. In consequence this response should be read in conjunction with previous input including ISDA's November 2011 paper<sup>1</sup>.

**Need for a coherent, risk-based framework.** The Associations are supportive of BCBS's agenda of reforming bank regulatory standards to address the lessons of the financial crisis. In particular, the Associations believe that it is important to develop a coherent and comprehensive framework which is risk sensitive at both the individual position and portfolio levels.

The BCBS has recognised that the principal criticism of the Basel 2.5 framework is the "patchwork" nature of rules. Value at Risk ("VaR"), stressed VaR, Incremental Risk Charge and the Comprehensive Risk Measure all, to some extent, cover the same risks. Further, the Basel I counterparty risk rules capitalise the risk of default whereas the Credit Valuation Adjustment ("CVA") rules capitalise the risks of credit migration up to and including default, thereby introducing further double counting which magnifies the divergence between economic risk and regulatory capital. In crafting a new coherent framework, great care needs to be taken not only to simplify the overall trading book framework but, more importantly, to achieve a closer alignment between risk and regulatory capital.

Any new regulatory framework that will be introduced must be clearly aligned to the economic risks of the business. Where firms are forced to carry out calculations which are not central to managing the risks, these are unlikely to prove a good use of resource. More importantly, trading is an area where solutions that are too simple or eschew modern modeling capabilities in a simplistic way can also cause systemic issues and unfortunate effects not only on the bank's business but also on the market and on the economy. This is a very important point especially now that regulatory capital is rapidly becoming a significant constraint on the business. It follows that a failure to more effectively align risk and regulatory capital will distort the effective deployment of capital and affect business decisions with often adverse economic consequences.

In this respect, it is important to recognise that firms' internal models have been significantly upgraded since the financial crisis and leverage has been reduced. There has also been a large reduction in risk following the introduction of Basel 2.5. Firms should be permitted to utilize these significantly enhanced models.

The Associations strongly support the continued development of risk sensitive models to calculate regulatory capital. Firms should be encouraged to continually develop and improve models, and work with regulators to strengthen modeling standards. This contrasts with certain aspects of the Basel III rules where there appear to be disincentives to modeling.

**Need for a framework that would be reasonably comparable across jurisdictions.** The international dimension is clearly important and the BCBS recognises that, unless agreement is reached across jurisdictions, the resulting "un-level playing field" may pose significant threats to financial stability. We fully support this aim and urge regulators to agree international standards whilst allowing

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<sup>1</sup> The Market Risk Capital Framework, A contribution to the Fundamental Review of the Trading Book, November 2011

sufficient flexibility for local implementation where necessary to reflect market specificities within a coherent, risk-based, overall approach. This is not easy and it will require hard work to ensure strong standards are applied in a reasonably comparable manner. But it is essential.

**Need to take account of strong governance and internal controls, sound risk management, and effective supervision in the fundamental review.** Minimum capital standards are just one component of an effective regulatory regime and have been already materially increased under Basel 2.5 and Basel 3. Individual jurisdictions have in addition authority to impose capital add-ons above those minima and many are in the process of implementing “gold plated” versions of the international standards (for example in Europe with systemic buffer and the macro prudential measures). Risk management standards, management information systems and senior level awareness of the business and its inherent risks are also critical and it is vital that the Fundamental Review put as much emphasis on the importance of governance, risk management, independent control and effective supervision as on minimum capital requirements. The IIF-Ernst & Young paper – *Progress in financial services risk management* (June 2012) – provide some evidence of progress in these areas.

**Trading Book/Banking Book boundary.** We broadly support the trading evidence-based boundary because it aligns more closely regulatory capital with how risks are managed by banks. In addition, it should be noted that the concept of portfolio is important for the Trading Book/Banking Book Boundary question. We believe that the unit of account in determining the Boundary should be at the portfolio, and not at the position, level. It is important that portfolios are not split between the Trading and Banking Books as the breaking up of netting sets and separation of hedges from underlying positions can have serious unintended consequences.

**Market liquidity.** We support the idea to incorporate market liquidity in the trading book capital framework. As we have learned from the recent financial crisis, a sudden and severe impairment of liquidity can lead to difficulties in hedging and exiting positions, resulting in significant cumulative mark-to-market losses. However, this should be done carefully to minimize unintended consequences.

**Model approval.** We are supportive of the change in model approval to operate at the desk level. However, the term “desk” needs further discussion and steps need to be taken to ensure that portfolios are “in” or “out” to ensure that positions are not split from their associated hedges. We also put forward a proposal to smooth the transition from model to non-model approaches to eliminate the “cliff effect” of switching off model approval.

**Relationship between standardised and internal model approaches.** There should be coherence between the standardised and internal model approaches with the former being enhanced to be more risk sensitive than the current standardised rules. We recognize, however, that there are likely to be issues applying complex standardised methodologies to smaller, less sophisticated banks. Perhaps some simpler, and sufficiently conservative, standardised rules should be developed for them.

Implementation of both standard and internal approaches (“IMA”) will require a substantial investment from firms both at inception (e.g., feeding all relevant information into the regulatory calculation process) and for regular production (market data, mapping, maintenance etc.). Therefore, the operational consequences should be carefully considered when the TBG assesses the frequency of how often IMA firms need to calculate the standard approach capital figures.

**Proposed revised standardised approaches.** We believe that the Fuller Risk Factor Approach is closer to the models currently used by firms under the internal models approach of the trading book framework, and will likely be chosen by them. For firms with no current model approval, developing a Partial Risk Factor Approach will involve almost as much effort as developing a Fuller Risk Factor Approach Model but without yielding many of the advantages.

**CVA.** We believe that the Basel III proposals for Credit Valuation Adjustment (“CVA”) require further development. The Basel 3 framework achieves higher levels of capital, but the distribution of that capital burden has already begun to skew market practice and marginalized the use of derivatives in certain activities unrelated to the financial crisis. We are keen to work with the appropriate group within the Basel Committee to produce a more coherent and workable CVA framework that is aligned to the objectives of the Fundamental Review. We will follow this response with a paper more focused on CVA issues. However, it should be clear to the Committee that if they leave the CVA variability charge untouched whilst changing the Trading Book rules, new regulatory arbitrage opportunities will open up between the CVA hedge book and the trading book. Careful reconsideration of the where CVA risk lies relative to the Trading Book/Banking Book boundary should be the starting point of an extensive review.

**QIS.** The proposed Quantitative Impact Study needs close industry involvement and we remain committed to working with regulators in this important area. The QIS should aim not only to test the detailed proposals that the TBG will issue, but to determine their macroprudential as well as microprudential implications.

## 2 Trading Book Banking Book Boundary

### 2.1 Introduction

In relation to Question 1 in section 3.1 of the Fundamental Review:

***“Which Boundary Option do you believe would best address the weaknesses identified with the current boundary, whilst meeting the Committee’s objectives?”***

For the Trading Book/Banking Book Boundary (the “Boundary”) we broadly support the first option set out in the Fundamental Review; that of a trading evidence based boundary because it aligns more closely regulatory capital with how risks are managed by banks. However, we believe that the boundary should be defined at the portfolio, and not the position, level for further commentary see ISDA’s June 2011 paper<sup>2</sup>.

We believe that the Fundamental Review should begin by defining the function and characteristics of each Book i.e. Banking and Trading and then determining the appropriate minimum level of capital required. This should include analysis of the nature of the risks and how they are managed, as well as the role and purpose of capital which was discussed in a paper by ISDA published in November 2011<sup>3</sup>. . We would like to work with the BCBS on this.

By way of example, during the recent financial crisis, very large economic losses occurred to credit sensitive instruments in the trading book, primarily driven by a dramatic increase in the liquidity risk premium. For many types of credit sensitive products, an objective assessment of the stressed potential cumulative lifetime credit losses of the portfolio was less than the loss in price. These portfolios would thus require more capital in a trading book than a banking book, because the stressed price loss of the former exceeded the stressed cumulative lifetime default loss of the latter. The conclusion from this observation is that aligning minimum capital requirements to risk does not necessarily mean that the capital required for a portfolio of credit sensitive instruments needs to be the same in the banking book and the trading book. Different capital requirements can be appropriate, if the nature of the risk and how the risk is managed are different.

BCBS has consulted on the “permeability” of the Boundary. Whilst broadly in agreement that migration between the Trading and Banking Books should be rare and closely controlled, we believe that the Boundary should not be impermeable as trading intent, and hence the evidence supporting that intent, can change.

Although not expressed in FRTB, we believe the purpose of market risk capital in the Trading Book is to provide a cushion to absorb losses to avoid insolvency. Losses arise from positions being marked to market or “fair valued”. At first sight, therefore, the valuation based approach seems more

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<sup>2</sup> Notes on the Trading Book/Banking Book Boundary June 2011

<sup>3</sup> The Market Risk Capital Framework: A Contribution to the Fundamental Review of the Trading Book. ISDA November 2011.

coherent. However we have looked closely at this approach and set out below the reasons for our preference. These revolve principally around the inclusion into the Trading Book of portfolios currently and appropriately held in the Banking Book but which are fair valued.

## 2.2 Valuation Based Approach

The Valuation-based approach, as written, has several issues that make it undesirable from a policy perspective. It represents a significant change from current practices which are well understood and have incorporated lessons from the financial crisis. Essentially the way in which it is formulated requires the assets (but not the liabilities) of Available for Sale (“AFS”) and other portfolios which are fair valued to be included in the Trading Book and assigned market Risk Weighted Assets (“RWA’s”). Although certain carve-outs are contemplated, the effect of this is:

- It creates a material break between the regulatory categorization of risk and how the risk is actually managed.
- It further creates a material break between economic risk and RWA’s, in that the liability side of the balance sheet is ignored in the latter case.

Further, the proposal may result in significant inconsistencies in RWA’s due to differences in accounting standards between jurisdictions. As set out in the June ISDA paper: “ It is more appropriate for bank regulation to have an appropriate boundary than for it to have one that is completely consistent with accounting, especially given that accounting is not itself internally consistent.”

We note that although the Basel Committee defined the scope of its application by an “intent to trade” standard, the US implementation of the 1996 Market Risk Amendment (“MRA”) defined the scope of its application by accounting category. In the US, the MRA only applied to instruments in the Trading category albeit some such positions do not qualify for regulatory trading book treatment.

This is an example of an accounting definition of trading that does not include assets in an Available For Sale (“AFS”) or a loan portfolio.

## 2.3 Trading Evidence Based Approach

The Trading Evidence Based Approach aligns regulatory capital with how risks are managed by banks. It is well understood by senior management and regulators. Risk management for trading books tends to be carried out on a very proactive basis, typically daily, and sometimes intra-day. This includes limits which are set and monitored for appropriateness, daily marking-to-market, portfolios which are reported to senior management as an integral part of the institution’s risk management process, active and observable management action and rehedging/rebalancing of risks. Risk management occurs at the portfolio level and therefore the trading book classification should also occur at this level.



This approach also overcomes the other material concerns with the Valuation Based Approach and presents a workable solution. In particular it eliminates the break between the way in which fair valued portfolios in the Banking Book are managed and their accounting treatment. However, there remain a small number of shortcomings which we summarise below but cover in greater detail in Section 2.4.2:

- We would like to work closely with the BCBS to arrive at the “objective evidential requirements” to substantiate trading intent, and wish to highlight from the outset that an evidence based framework should act as guidance rather than a rigid checkbox exercise, reflecting the fact that trading intent cannot be evidenced in every case in exactly the same way.
- The Industry is concerned with the difficulties in assessing the feasibility of trading liquidity (see section 5).
- The rules for transferring assets from the Trading Book to the Banking Book (permeability) should not be so rigid as to prevent a bank from making that switch, so long as there is both strong supervisory oversight and bank governance and controls that monitor these movements. This may occur if market liquidity dries up and the bank chooses to hold to maturity rather than continue to hold the assets in a trading portfolio. If trading intent changes due to exogenous conditions then the evidence supporting that intent will also change.
- The BCBS has highlighted the concern that certain fair valued assets classified in the banking book will not receive appropriate prudential requirements. We understand and agree with this concern. We therefore acknowledge that further work needs to be undertaken to properly capture the risks in such portfolios. We note that the credit risk of AFS portfolios (both bonds and equities) is already addressed in the existing regulatory framework. (Interest Rate Risk in the Banking Book or “IRRBB”) is currently captured by a Pillar 2 context. Including IRRBB under Pillar 1 is not easy, because many of the assets and liabilities in the banking book have indefinite maturities. The effective tenors assigned to such assets and liabilities will have a material impact on the measured interest rate risk. The Associations are willing to work closely with the BCBS on the feasibility of establishing Pillar 1 standards for measuring IRRBB. We believe this will likely lead to a more appropriate outcome than simply classifying such portfolios as trading, when there is a clear lack of trading intent, and where the portfolios in question are not risk managed like other trading portfolios.

## 2.4 More detailed points

### 2.4.1 The Valuation Based Approach has Several Issues:

*The Valuation Based Approach causes a material break between the regulatory categorization of risk and how the risk is actually managed:*

This proposal may very materially expands the set of instruments and portfolios included in the calculation of RWA's for trading, even though those newly captured portfolios are not currently managed like trading portfolios. The proposal would affect both debt and equity securities held in AFS portfolios. Most fixed income portfolios categorized as AFS are held for the purpose of liquidity risk management (including investing excess liquidity), and/or because local regulators require banks to hold local currency sovereign debt securities. These are typically long-term structured positions that are not managed like trading portfolios.

*The Valuation Based Approach causes a material break between economic risk and risk weighted assets:*

The proposal would apply RWA methodology to AFS portfolios as an artefact of AFS accounting, without any relationship to the actual interest rate risk of such portfolios. This would capture the market risk of the AFS portfolio assets but not the offsetting risk of the liabilities that fund these assets. The interest rate risk of the AFS portfolio, like other banking book portfolios, may also include interest rate derivative hedges. The actual measure of the economic risk of the portfolio requires the inclusion of all relevant assets, liabilities, and hedges, although certain carve-outs are contemplated for positions that hedge interest rate risk in the banking book.

An extreme example, to illustrate the problem, would be an AFS portfolio that was a "matched book", with no interest rate risk. Because of the unilateral focus on the market risk of the assets, independent of the liabilities which fund them, the proposal would result in a large marginal increase in Trading Book RWA, even though by construction the AFS portfolio in this example had no interest rate risk. The interest rate risk of AFS portfolios would be better captured by explicitly modelling interest rate risk in the banking book ("IRRBB") and incorporating a rational economic measurement of that risk as a separate Pillar 1 charge.

Currently banks in many regions would all be affected by this proposal. However, the magnitude of the impact on any bank will depend on the extent to which it is required to keep its liquidity-risk-management investments and equity investments in AFS portfolios which may in turn depend on the relevant GAAP<sup>4</sup> and IFRS<sup>5</sup> rules, aspects of which are still being worked on by the FASB and IASB respectively.

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<sup>4</sup> Generally Accepted Accounting Principles issued by the US Financial Accounting Standards Board ("FASB")

<sup>5</sup> International Financial Reporting Standards issued by the International Accounting Standards Board ("IASB")

### *Significant inconsistencies in RWA due to differences in accounting standards between jurisdictions:*

Accounting Standards across jurisdictions differ, so that even if the valuation-based proposal were uniformly implemented, it could potentially produce materially different effects if there were material differences in accounting standards, e.g. with regard to AFS portfolios. As set out in the June 2011 ISDA paper: “It is more appropriate for bank regulation to have an appropriate boundary than for it to have one that is completely consistent with accounting, especially given that accounting is not itself internally consistent.”

#### **2.4.2 Issues with the Trading Evidence Based Approach**

The Trading Evidence Based Approach overcomes most of the material concerns with the Valuation Based Approach. It better aligns regulatory capital with how risks are managed by firms. Risk management for trading books is carried out proactively, typically daily and often intra-day. Limits are set and monitored, Daily mark to market takes place with reporting to senior management. Risk management occurs at the portfolio level and it follows that Trading Book classification should also occur at this level.

However, we offer the following comments that we hope will be taken into account in developing a Trading Evidence Based Approach:

##### *Objective evidential requirements*

We would like to work closely with the TBWG to arrive at the “objective evidential requirements” to substantiate trading intent, and wish to highlight from the outset that an evidence based framework should act as guidance rather than a rigid checkbox exercise, reflecting the fact that trading intent cannot be evidenced in every case in exactly the same way.

##### *Difficulties in Assessing Trading Liquidity*

The FRTB paper states in the paragraph requiring “objective evidence that trading instruments are actively managed” that “banks would be required to monitor market liquidity levels (including availability of market data)”.

As stated in Section 5 the Associations believe that assessment of the trading liquidity of instruments should focus on the liquidity of market risk factors (i.e. on the ability to hedge) and not on the liquidity of the instruments alone.

Standards for assessing trading liquidity face a “chicken-and-egg” problem. Trading liquidity initially will be shallow for new products, broadly defined:

- A new form of a contract on standard market factors (i.e. a new form of an option on interest rate).
- The extension of a currently traded contract to a new market factor (e.g. trading a standard call option on a new underlying currency pair or a new equity).
- The extension of a currently traded contract on a market factor to a new tenor (e.g. trading an FX option at a longer time to expiration, or trading an interest rate swap at a longer tenor).

If banks were to be prohibited from including any of the above transactions in their trading portfolios, then liquidity in those markets likely would never develop. If rules of this sort had been in place thirty years ago, important financial markets may not have developed. Many banks have already established procedures to capture the potential risk of new market factors, for which insufficient time series exist, by the use of prudent proxies that are subject to supervisory review. The liquidity risk of new market factors, that are not yet highly liquid, can be captured by the use of appropriate trading liquidity horizons, as described below. The Associations are concerned that evidence standards should not be so rigidly defined that it would force portfolios held for trading purposes into the Banking Book.

### *Transfer of Assets from the Trading Book to the Banking Book*

The rules governing such transfers should not be so rigid as to prevent a bank from making that switch if it is appropriate. For example if market liquidity dries a bank may determine that the prices of the assets in a portfolio have fallen far below their true economic value, even when measured against stressed cumulative lifetime loss estimation. The bank may conclude that it would be economically justified to move the assets, at their current distressed value, into the Banking Book, with the expectation of realizing a gain in value at maturity. This could happen after, for example, under the current proposal if the portfolio of illiquid assets has been moved already to the longest liquidity horizon but the cost of exit still presents unacceptable losses, considering the economic value of the portfolio.

A bank should have this option because under stressed conditions, such as occurred during 2008, the continued loss in market value of credit sensitive portfolios will be primarily driven by increases in the market liquidity premium rather than by objective stressed estimates of cumulative lifetime default loss. Under such conditions it no longer makes sense to hold certain portfolios on a trading basis.

This is consistent with the first point we made regarding the distinction between the risks in a Trading Book as opposed to a Banking Book based on how each portfolio is managed.

To conclude, transfers from the trading book to the banking book should be authorized when circumstances warrant and provided they are subject to strong governance and controls, and duly documented and disclosed. Such transfers should also be subject to supervisory approval.

We do not believe internal audit should be first line of control to ensure positions meet the criteria. Instead firms should rely on established control structures with the first line of control being front office supervision, the second line of control being risk management, and the third being internal audit.

*Concerns about hiding trading activity in a liquidity AFS or HTM portfolio.*

We understand the regulatory concern that a bank could hide trading activities in the banking book, for example in an AFS portfolio used to manage funding liquidity risk. We also accept that where a portfolio is under AFS, adverse market movements do feed through to CET 1. However, we do not think the appropriate solution to that valid concern is the imposition of the Valuation Based Approach. Other approaches should be considered to address this concern. Instead we think that the Trading Book should properly be defined by how a portfolio is managed (Evidence Based Intent). The Fundamental Review should include a specification of what may not be included in the Trading Book (i.e. prohibiting certain types of transaction with certain features) and what must be included in the Trading Book (i.e. because of how a portfolio is managed).

### 3 Interest Rate Risk in the Banking Book

The FRTB paper indicates that it is the intention of the BCBS to consider the timing and scope of further work on IRRBB later this year (including possible application of a Pillar 1 capital charge for IRRBB). However, the Associations would like to share their views on this issue. Including IRRBB under Pillar 1 would not be easy because many of the assets and liabilities in the banking book have indefinite maturities. We are concerned that if IRRBB were included in Pillar 1, fixed regulatory assumptions might impose unrealistic maturity profile assumptions on indefinite maturity assets and liabilities and on contingent assets that would not correspond to a bank's actual experience. The result would likely be unrealistic measures of RWA for IRRBB. We do, however, note that an IRRBB has been imposed by the Australian authorities in Pillar I. The Associations are willing to work closely with the BCBS on the feasibility of establishing Pillar 1 standards for measuring IRRBB

Indefinite maturity liabilities include Demand Deposit Accounts ("DDA's"). Large banks have developed methods for distinguishing between "core deposits", which are stable and "non-core" deposits, which can run off. As a matter of illustration, one of the reasons for which DDAs' schedules are long (and much longer than 5 years) is typically because they are coming from clients who have a mortgage or otherwise have a long term relationship with the bank. The liabilities schedules can't be determined without considering the global relationship with the clients holding these deposits. These behavioural assumptions are complex and will vary widely between banks. For example a bank suffering an idiosyncratic reduction in credit worthiness may see DDA's fall rapidly whereas the same bank facing the same rating downgrade may see DDA balances rise if the disruption is market wide and it maintains or improves its rating relative to the industry ("flight to quality").

Indefinite maturity assets include credit card receivables which roll over. Large banks have developed methods for modelling the duration of these assets.

Other assets that create challenges in modelling are contingent credit lines, in both retail (i.e. unused credit card lines) and wholesale (unused commitments) portfolios. Banks have historical data on which to model these potential assets.

The Associations want to emphasize that the while we are willing to work with the BCBS on the feasibility of establishing Pillar 1 standards for IRRBB, we do not support the inclusion of IRRBB in the Trading Book framework. IRRBB should be considered independently due to the following reasons The calculation of economic capital, or RWA, for IRRBB necessarily rests on complex assumptions about the behaviour of depositors and borrowers as a function of the state of the economy, the state of the market, and other factors. The challenge of including IRRBB risk in Pillar 1 is the need to develop broad uniform principles with the flexibility to allow banks to use different assumptions, but assumptions that are capable of being validated, based on their own experience, the characteristics of the markets they are in, the characteristics of their depositors, borrowers, and other counterparties. Given these constraints, we do not see how a standardised or uniform approach would be useful in the case of IRRBB.

Any eventual inclusion of IRRBB in Pillar 1 also should take into account the fact that this risk often has a negative or very small positive correlation with other risk types. For example, during an economic downturn central banks typically lower interest rates. Banks typically have long dated assets and shorter dated liabilities and thus are thus structured to make money when interest rates

fall. In addition, bank treasurers can and will use interest rate derivatives to enhance the sensitivity of the banking book to a fall in interest rates. As a consequence, the increased net interest revenue that results from falling rates is usually an offset to increased credit losses during an economic downturn. Consequently a simple addition of RWA across all risk types, including IRRBB risk, would tend to exaggerate the marginal contribution of this risk to total economic risk.

We have commented in the previous section that there is a close link between the Trading Book boundary and the appropriate IRRBB charge.

## 4 Choice of Risk Metric and Calibration to Stressed Conditions

### 4.1 Introduction

In relation to Question 8 in section 4.6 of the Fundamental Review:

*“What are the likely operational constraints with moving from VaR to ES, including any challenges in delivering robust back testing, and how might these be best overcome?”*

The Associations are supportive of the proposal to move from Value at Risk (“VaR”) to Expected Shortfall (“ES”) but recognises that, for smaller or less sophisticated institutions this may present significant infrastructure and processing burdens. ES is a coherent risk measure and is sub-additive. Further, because ES is the mean loss above the threshold (i.e. is an average number) while VaR is just one point of the distribution, we would expect ES to be more stable than VaR. However, on theoretical grounds and for practical purposes, we make a number of recommendations.

### 4.2 Appropriate Percentile

We believe that the 95<sup>th</sup> percentile would be a more appropriate threshold from which to calculate ES. There are three principal reasons:

- a. Expected Shortfall is defined as the average of VaR-s over various percentile levels. For continuous distributions it equals to a conditional expected value or tail integral. There are various ways to calculate it. One could take the average of losses exceeding the VaR level; calculate the integral of VaR-s of a constructed empirical distribution; fit a parametric distribution to historical Profit and Loss (“P/L”) in order to perform the integral; or, do a Monte Carlo simulation to generate additional loss realisations beyond the threshold. However the simulation might itself need to make assumptions about the distribution of P/L. The main benefit from choosing a lower percentile is that lower thresholds allow more observations from which to form the average and therefore give a more stable and accurate approximation. A lower percentile (e.g. the 95th percentile) would give a larger number of excess P/L observations to average over, which improves the statistical significance of the results and enhances their stability. By contrast, estimations beyond the 99th percentile would be unacceptably volatile when scenarios are rolled for those using historical simulation.
- b. ES computed from a lower percentile will deliver a similar capital standard to VaR computed at the 99th percentile for P/L tails of medium fatness. We show that Expected Shortfall with a lower confidence level is equivalent to VaR based on the Generalised Pareto Distribution and a range of assumptions for the tail parameter (See Appendix 1).
- c. In order to maintain an ES based metric as a risk management tool it is essential that its implied regulatory capital is not only driven by a few extreme tail events but a tail which is representative of the firm’s business model. Choosing the threshold too high is likely to



result in an unstable allocation of regulatory capital to individual business lines. An additional unintended consequence is that business lines which incur some, but not excessive, tail risk may not attract any regulatory capital.

With respect to robustness of back testing, we believe that, while back testing the ES metric itself is not meaningful, the established outlier back testing is important to continuously monitor model performance. This follows because the quality of the ES metric is directly implied by the quality of the simulated or projected P/L distribution. The present regulatory back testing, however, could be enhanced by considering the full distribution rather than one selected percentile.

We assume that in moving to ES with tail risk properly captured, the floor to the regulatory multiplier would be lowered to one. Appendix 1 provides some theoretical arguments for doing this.

In addition, we believe that some of the backtesting and mechanisms based on backtesting that we are proposing to allow a smooth transition to standard rules in the case that models do not perform as anticipated, would render a multiplier redundant.

Similarly our backtesting proposals render a floor to capital derived from internal models based on standard rules unnecessary.

### 4.3 Direct versus Indirect Approach

In relation to Question 5 in section 4.5 of the Fundamental Review:

***“What are commenters’ views on the merits of the “direct” and “indirect” approaches to deliver the Committee’s objectives of calibrating the framework to a period of significant financial stress?”***

The Industry welcomes the Committee’s acknowledgement of the practical difficulties surrounding the “direct method” of identifying a suitable stress period. However we have concerns regarding the specific example of an “indirect method” although we believe suitable alternatives exist.

The indirect method example proposed takes the form:

$$ES_S = MaxStressLoss_R \frac{ES_{FC}}{ES_{RC}}$$

Where  $ES_S$  is the proposed stressed measure,  $ES_{FC}$  is Expected Shortfall based on the full set of risk factors in the current period,  $ES_{RC}$  is expected shortfall based on reduced set or risk factors in the current period and  $MaxStressLoss_R$  is the maximum stressed loss based on the restricted set of risk factors. One issue with this method is that  $ES_S$  is not a stressed Expected Shortfall but rather a maximum stressed loss scaled by the ratio of two expected shortfall measures. It is not even clear that the scalar would necessarily be greater than unity but in any case it is simply not the intended risk measure and would likely be unstable and very extreme. We believe a measure that better captures the intent is as follows:

$$ES_S = ES_{FC} \frac{ES_{RS}}{ES_{RC}}$$

This approach provides an Expected Shortfall measure based on current expected shortfall and scaled by the ratio of expected shortfall based on a set of reduced risk factors scenarios observed in a period of stress to the expected shortfall based on the same reduced set of risk factors observed in the current period. Another possible scaling factor could be based on the ratio of standard rules in the stressed period to standard rules in the current period. This would of course only work in the second of the two proposals for standard rules – the “fuller risk factor approach” for revised standard rules.

We think that both of these proposals have the following benefits:

1. Makes use of ES calibrated to current market conditions which is a better risk management tool.
2. Avoids the calibration period being too short if we are restricted to a period of stress – especially for longer liquidity horizons.
3. Backtesting of ES or its underlying distribution calibrated to a period of stress would not be very meaningful in benign times.
4. ES based on a period of stress – especially with few scenarios – would be easy for firms to arbitrage.

There are alternatives, however, to the direct and indirect methods. These include scaling up/down scenarios to reflect stress, including extreme scenarios and the use of theoretical distributions to estimate tail risk. There is an interesting theoretical consideration about whether P/L distributions observed in ‘benign’ times are a result of benign volatility or simply reflect that there should be periods of time when observations are drawn repeatedly from the body of the distribution. That is, there is an observability issue about the distinction between time varying volatility and tail risk. Even when observations from the body of a distribution are being observed it is still possible to calibrate the parameters of the distribution and then extrapolate the tail to compute an expected shortfall measure.

We also note that other capital buffers, for example Pillar 2 charges, the conservation buffer, SIFI charge and CCAR<sup>6</sup> already provide stressed buffers. Stressed ES in Pillar 1 is double counting, a weakness of the current regime that regulators were seeking to remove. One could imagine an ES in normal times for Pillar 1 and a Pillar 2 buffer based on the difference between stressed ES and non-stressed ES.

Calibrating ES to a stressed scenario is not really practical for a diversified portfolio where basis risk is the main driver. A stress period calibration is suitable only for directional portfolios.

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<sup>6</sup> Comprehensive Capital Analysis and Review, Federal Reserve Board Methodology and Results for Stress Scenario Projections, March 2012

## 5 Liquidity Adjusted Value at Risk or Expected Shortfall

### 5.1 Introduction

In relation to Question 2 in section 3.3 of the Fundamental Review:

***“What are commenters’ views on the likely operational constraints with the Committee’s proposed approach to capturing market liquidity risk including the endogenous component and how might these best be overcome?”***

Section 3.3 of the Fundamental Review addresses how to factor in market liquidity. It proposes that liquidity risk should be captured in Value at Risk (“VaR”), or Expected Shortfall (“ES”) by assigning instruments or risk factors to one of five liquidity buckets.

The Associations support the idea of incorporating market liquidity in the Trading Book capital framework. As we have learned from the recent financial crisis, a sudden and severe impairment of liquidity can lead to difficulties in hedging and exiting positions, resulting in significant cumulative mark-to-market losses. However, this should be done carefully because the scaling of shocks by the square-root of time, as proposed in the consultative paper, can have a very big effect when the specified liquidity horizon is long. The effect on the relative contribution by risk factors of different liquidity horizons can also be very significant. Furthermore, the incorporation of market liquidity into VaR or expected shortfall overlaps, to a certain extent, other Fundamental Review recommendations such as restricting the recognition of hedging and diversification benefits and stress calibration.

### 5.2 Practical Considerations

The Associations see a number of practical considerations which could affect the incorporation of market liquidity in the market risk framework.

First, one could defease risk exposures via unwinding positions, hedging underlying risk factors or a combination of both. To encompass such possibilities, the framework should reference the liquidity of risk factors as oppose to liquidity of instruments. The measurement of liquidity is a complex task and it is even more complicated when we need to look at “speed” to hedge vs “speed to unwind” and that a position can be sensitive to multiple risk factors.

Second, there is a tradeoff between the speed at which risk is being defeased and the cost to unwind or hedge. One can choose to defease risk faster by “paying” for the ability to do so quickly. One can unwind positions at a pace that minimizes its impact on market prices, or accumulate hedges slowly without having to incur extra hedging cost. At the other extreme, one can also attempt to eliminate risk exposures in a day (or less) by accepting large price concessions and/or elevated hedging cost.

Third, the speed at which a firm chooses to defease its risk factor exposures also depends on the composition of the portfolio and the correlations among risk factors. Large concentrated risk factor exposures would need more time to defease, or, a higher cost to defease if done over a short period of time. Also, if a liquid risk factor is “hedging” other less liquid risk factors via correlation, one might want to defease these liquid and illiquid risk factors in locked steps and with proper rebalancing to avoid an unexpected increase in risk during the risk reduction process. Furthermore, firms might have differential access to markets. Client relationship and other considerations will also affect a firm’s choice of speed vs cost to defease risk.

### 5.3 Conceptual Framework

Given the above considerations, conceptually, one can think of a general framework in which the liquidity adjusted expected shortfall (LES) is composed of two components: A component that is related to the forward Mark to Market (“MTM”) risk related to the liquidity horizons of its risk factor exposures (ESh), and a component that is like an add-on that captures hedging/unwinding cost (ESc).

$$LES = ESh + ESc$$

The ESh component can incorporate risk factor liquidity horizons that are long enough such that ESc is minimal. Alternatively, a firm can choose to defease its risk factor exposures at a fast speed such that ESh is small but ESc is big. In fact, a firm could even choose a uniform horizon for all its risk factor exposures. In that case, it would have to pay for much higher hedging/unwind cost for its less “liquid” and/or more “concentrated” risk factors. It is also important to note that while ESc could simply be the sum of hedging/unwinding costs across risk factors, the relationship might be more complicated as the amount one is willing to pay to defease certain risk would also depend on whether there are other hedging or diversification benefits associated with having the particular risk factor exposures.

Firms might find a different optimal combination of ESh and ESc. *Some firms* might prefer to have a model that capture liquidity risk primarily based on ESh while others might prefer to model the effect of liquidity risk via ESc. Some might prefer a more general setup with a combination of the two components. Furthermore, since firms can have a different optimal combination of liquidity horizons vs defease costs, it would be difficult to have one set of liquidity horizons or one set of transaction costs that would work for all firms. Imposing such restrictions could lead to distortions.

However, to facilitate comparison across firms, one could compute an implied liquidity horizon from a firm’s LES and one day ES. Specifically, if firm *i* has  $LES(i) = ESh(i) + ESc(i)$  and it has a one day expected shortfall of  $ES1(i)$ , then one can always compute an implied uniform liquidity horizon  $T(i)$  such that  $LES(i) = ES1(i) * \sqrt{T(i)}$ . In other words, firms can have their own preferred setup and liquidity horizons / transaction cost combinations but then can be compared via their implied uniform liquidity horizons. Firms should stand ready to justify their calculations and their different

implied uniform liquidity horizons. However they should be given some flexibility in terms of how they implement market liquidity and their estimates of liquidity horizons and hedging/transaction cost across risk factors.

This approach is similar to option 3 discussed in Annex 4 of the Fundamental Review except that the uniform liquidity horizon is not necessarily calculated by some prescribed weighted averaging based on regulatory risk factor horizons. Similar to the market liquidity requirement for IRC, there should be a uniform requirement, in principle, across jurisdictions on the capturing of market liquidity risk. However, firms should be given flexibility on implementation.

## 6 Hedging and Diversification

### 6.1 Introduction

The Associations understand that regulators are concerned about excessive diversification in Value at Risk (“VaR”) or Expected Shortfall (“ES”) models, but see several technical challenges with the proposed approach. We believe that an internal model incorporating full diversification but appropriately calibrated to stress conditions (and satisfying the enhanced validation standards outlined in FRTB) offers a better approach for cross risk-diversification, eliminating the issues described above and linking capital more closely to firm’s internal risk management processes.

### 6.2 Technical issues with the proposed approach

These include:

1. The formula specified in Equation 1 (Section 4.5.6) of the FRTB requires firms and/or regulators to determine whether a category of risk is ‘long’ or ‘short’. It is not clear how this could be done in practice, given a complex portfolio which may be subject to range of complex risk factors - see examples below.
2. The proposed approach requires risk factors to be classified by risk type. This may be clear for most risk factors, but in some cases the allocation would be ambiguous – for example, should local currency sovereign bond yields be classed as interest rate risk (as they will often be classified for risk management purposes on non-distressed sovereigns) or credit risk (as would seem to be implied by recent guidance on IRC models)? Under the proposed approach, such judgmental classification could have material impact on capital held by a firm, for example by effectively disallowing the hedging of swaps (interest rate risk) with local currency sovereign bonds (possibly classed as credit risk).
3. Under the proposed approach we may see examples of portfolio risk failing to be sub-additive, i.e. where  $\text{Capital}(X) + \text{Capital}(Y) < \text{Capital}(X+Y)$ . By replacing VaR with ES as a risk metric the FRTB would eliminate one potential cause of this undesirable effect, so it seems unfortunate if this is re-introduced via the diversification framework.<sup>7</sup>
4. It is not clear how cross-risk calibrations could be calibrated – the true correlation between potential losses in different risk types will depend heavily on the portfolio composition – see example below. Whichever values are chosen would then imply optimal portfolio weights/hedge ratios to minimize total capital – is it desirable for regulators to pre-specify these weights, regardless of portfolio composition?

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<sup>7</sup> See Marinescu & Piterbarg (2012), ‘On the non-coherence property of the aggregate models-based regulatory capital formula’, Barclays technical note

5. A maximally conservative result could of course be achieved by simply taking the sum of each risk category. However this would create the perverse incentive for firms to take risk in concentrated risk categories (within which diversification can be modeled by firms), rather than a diversified business model.

### 6.3 Proposed Approach, should modeling not be acceptable

If, despite the additional controls proposed in the Fundamental Review, regulators are not confident in the level of diversification implied by internal models, an alternative is to compute the ‘diversification benefit’, defined as the sum of standalone risk by category, minus the fully diversified risk value. Capital could then be set as the sum of the standalone values, less some proportion  $\alpha$  of the diversification benefit. Using the notation of the Fundamental Review,

$$\text{Capital} = \sum_{i=1}^N \text{IMCC}(C_i) \times (1 - \alpha) + \text{IMCC}(C) \times \alpha$$

where  $\alpha$  would be a factor between 1 and 0 set by supervisors according to their view on the quality of a firm’s model of diversification<sup>8</sup>. This would be a more natural approach since it does not seek to specify a hard-to-calibrate set of cross-risk correlation factors and long/short classification of portfolios, but instead uses a risk-sensitive portfolio model, with a limit on correlation benefit. This would still require some categorisation of risk types, but is seen as preferable to the approach proposed in Equation 1 of the Fundamental Review.

If an approach based on a prescribed set of correlations must be adopted, it is preferable that this be based on risk factors rather than trading units, as correlations between the former would be somewhat more stable than between the latter, although subject to the multiple technical issues outlined above.

### 6.4 Detailed examples on Hedging & Diversification

#### *Specific examples of why long/short categorizations may not work*

Example 1: suppose a firm has a \$100 long equity position in stock A and \$75 short position in stock B. Presumably this would be a ‘long’ portfolio due to net \$25 long position, but what if stock B is twice as volatile as stock A, or has higher systemic risk? Is this portfolio ‘long or ‘short’? Should we also take into account difference in the correlation of the stocks to systemic risk (i.e. compute beta), and if so how is systemic risk defined?

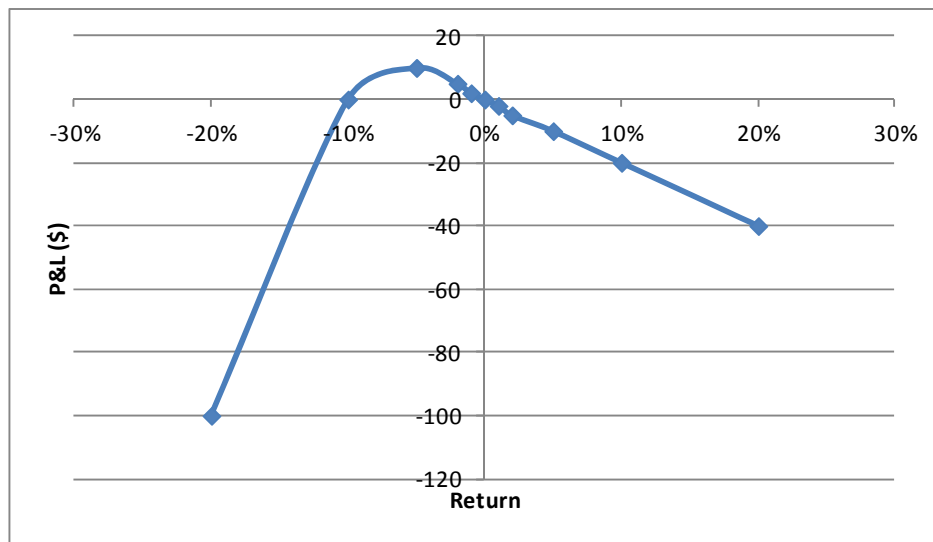
Example 2: suppose a firm is trading basis risk between two stocks, and holds a sell protection position in stock A with value \$100, and a bought protection position in another similar stock B with value -\$98. Presumably this would be considered as a ‘long’ position, even though the key risk to this

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<sup>8</sup> With  $\alpha = 1$  corresponding to full modeling of diversification and  $\alpha = 0$  corresponding to simple addition of risk by category with no diversification.

portfolio is clearly the basis between the two stocks rather than directional market moves. If the firm makes a small change to its exposure to have -\$101 position in stock B, the portfolio would flip from 'long' to 'short', with possibly large capital impact, even though the risk exposure (around \$100 exposure to basis risk between the stocks) has hardly changed.

Example 3: suppose the firm holds a position in a derivative which results in the exposure profile shown below – a loss if asset prices rise, a gain if asset prices fall a little, and a large loss if asset prices fall a lot. How could firms decide if this portfolio should be considered as 'long' or 'short'?



### *Example of difficulty in calibrating cross risk correlations*

To illustrate how the correlation between risk categories could depend on portfolio composition in a complex way, consider the correlation between the 'equity' and 'interest rate' categories. For spot prices we expect the correlation to be quite low, and this is what we see in the below example – correlation of 10-days changes in S&P500 and 3m USD LIBOR during the 2008-09 stress period is just -6%. This may lead one to set a low correlation between the Equity and Interest Rate risk classes, reflecting the diversification one would usually expect to see. But, the correlation between changes in implied volatility risk could be much greater – as shown below, the correlation between changes in equity implied volatility ("vol"<sup>9</sup>) and interest rate implied vol<sup>10</sup> over the same period is much higher. So while 'most' interest rate portfolios will have low correlation to equity portfolios, even in a stress, this would not be conservative for two portfolios driven by vega risk.

<sup>9</sup> 3 month ATM implied vol on S&P 500

<sup>10</sup> 3 month – 3 month EUR caplet implied vol



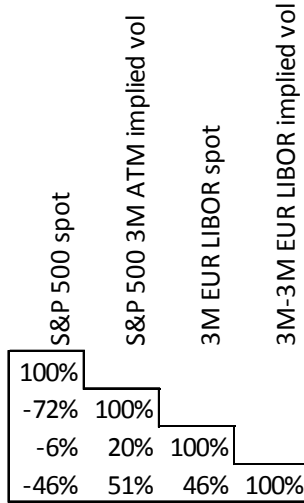
**Correlation of 10-day changes,  
2008-2009**

S&P 500 spot

S&P 500 3M ATM implied vol

3M EUR LIBOR spot

3M-3M EUR LIBOR implied vol



## 7 Revised Standardised Approach

### 7.1 Introduction

In relation to Question 9 in section 5.3 of the Fundamental Review:

***“Which of the two approaches better meets the Committee’s objectives for a revised standardised approach?”***

We believe that the ideas underlying the revised Standardised Approaches constitute a step in the right direction as they consider key elements of modern market risk measurement, in particular long-/short offsetting and risk driver dependencies. This will also better align properties of the Standardised Approaches with Internal Models based-approaches to enable a stronger relationship between the two.

If the Standardised Approach were to be used as a fallback approach for banks using internal models, as proposed in the Fundamental Review, we believe that the full risk factor approach would be appropriate for banks using internal models. The Full Risk Factor Approach is closely aligned with banks’ internal models; hence, it would be relatively easy to implement this approach by these banks. More importantly, the Full Risk Factor approach is more risk sensitive than the Partial Risk Factor Approach.

It is recognized, however, that implementing the Full Risk Factor Approach may be challenging to banks that are currently under the Standardised Approach. We recommend therefore that BCBS seriously consider two standardised approaches – one to be used as a fallback for banks using internal models, and another (simpler) one for banks using only the Standardised Approach. This is consistent with the credit risk and operational risk frameworks of the Basel rules, which offer multiple alternative approaches to banks.

### 7.2 Mandatory Calculation of Standardised Capital Requirements

We agree that a mandatory calculation of standardised capital requirements for all banks would be appropriate if the Standardised Approach were to serve as a fallback to internal models. We propose below an approach to operationalising this that avoids the “cliff effect” expected from an automatic shift from internal models to Standardised Approach.

However, such mandatory calculation needs to be designed in such a way not overburden internal model banks with:

- too many parallel regulatory capital processes (e.g., in case the Basel I transitional floor calculations are maintained) or
- high reporting frequencies (e.g., daily) for a metric which is not relevant in day-to-day risk management.

### 7.3 Regulatory Capital Floors based on the Standardised Approach

We believe the introduction of regulatory capital floors based on the standardized approach would be harmful to systemic stability, as it risks disincentivizing the use and development of internal models. If the standardized approach resulted in a capital floor that would be significantly higher than the floor as calculated under the internal models method, the standardized approach would become the binding constraint. The potential unwanted outcome would be to reduce incentives to improve banks' internal models, which could not be good for risk management.

We believe that it is essential that firms and the regulators are incentivized to adjust and improve internal risk models over time. The core use of the standardized models should be to fuel a dialogue between banks and their regulators as to the adequacy of their current internal models and to provide regulators with improved understanding of those models and the ongoing evolution of risk in the financial system. This improved understanding can then be used to improve both internal models and standardized models. This process of ongoing improvement is best served by keeping the internal models as the clear primary tool and the standardized models as a backstop. If the standardized models implicitly become the primary risk model, then further progress in modeling risk will stall. Firms will be incentivized to optimize behavior against weakness in the standardized models rather than better modeling their actual risk.

Basing regulatory capital floors on the standardized approach would also pose challenges and extraordinary demands on the Basel Committee to make sure that the standardized approach is calibrated properly. This is because if a regulatory floor based on the standardized approach were to be implemented, the implicit assumption is that the standardized approach produces capital requirements that are more reliable and that more accurately capture the risks compared to internal models. This would require continuous validation and updating of the standardized approach. Moreover, the standardized approach is likely to be much less risk sensitive than an Internal Model-based calculation. The resulting conflicts between risk management and capital management make it more difficult for risk managers to communicate with Front Office the need to hedge or otherwise de-risk a portfolio, in cases where this will not lead to a reduction in allocated capital usage, which is an increasingly important constraint in assessing business performance.

## 8 Relationship between Standardised and Models Based Approaches

### 8.1 Introduction

In relation to Question 3 in section 3.5 of the Fundamental Review:

*“What are commenters’ views on the proposed regime to strengthen the relationship between the standardised and internal models based approaches?”*

The Associations broadly agree with the aims and objectives of the BCBS to:

1. Strengthen requirements for defining the scope of portfolios that will be eligible for internal models treatment, and
2. Strengthen the internal model standards to ensure that the output of such models reflects the full extent of trading book risk that is relevant from a regulatory capital perspective.

### 8.2 Approval Criteria

The Associations understand that regulators want to develop a methodology which allows model approval to be “turned-off” in a more controlled way than at present. The current regime is binary with approval being full-on or full-off. The Industry agree that a blanket approval approach does not adequately differentiate the areas where a model works and where it doesn’t, and the consequence of turning off model approval presents a cliff effect.

To achieve this goal, the regulators have proposed two key changes to the regulatory regime. The first is to have a standardized calculation that allow for better recognition of hedging and diversification benefits – the industry welcome this change. The second is to break model approval into smaller, more discrete steps, including at the trading desk level where Profit and Loss (“P&L”) is more readily available for performance verification. This has the advantage of not only “localizing” the effect of model disapproval but also enhancing the tie between the unit at which model approval is being done and the unit at which model testing is being performed.

The Associations welcome such changes but would point out two additional aspects which are equally important towards this goal but are not discussed in the consultative paper.

### 8.3 The Treatment of Unapproved Desks or Positions

One is related to the treatment of unapproved model. In particular, whether portfolios / desks affected by the unapproved models are being excluded from overall model risk calculation in addition to standardized charges or they are still allowed to be part of the portfolio model risk calculation. The industry’s experience is that the former approach of excluding such positions from the model risk calculation can potentially create unpredictable and very punitive additional penalty when trades and corresponding hedges are not receiving model based treatment together.

This breakage of trade and hedges, creates seemingly one sided trade which can lead to very sizable model based charge not reflective of the actual risk. On this, the industry is feeling very strongly that

it is very important to have all components of risk included in the model based risk calculation to maintain the coherence of the model based calculation. If an add-on or standardized charge is already being imposed on an unapproved model/desk, there is no reason to pull it out from the overall portfolio risk calculation. Doing so only creates unbalanced treatment and distortions.

## 8.4 A Potential Approach Using Scaling

Another important aspect to consider is related to the proportionality between penalty and model performance. Under the current regime, if a model has a high number of backtest exceptions, it might be disapproved regardless of the materiality of such exceptions. In other words, both portfolio A and B have 11 exceptions but for A, the exceptions are associated with very large losses relative to VaR while for B, the losses are just marginally beyond that predicted by VaR, then one should expect B to receive a smaller penalty than A.

A way to achieve this is to employ an add-on for a model/desk that is a scaled magnitude of the standardized charge or a scaled magnitude of the difference between the standardized charge and the internal model based charge; with the scaling factor being a number between zero and one driven by model performance. For a well performing desk/model the scalar shall take a value of zero (meaning no add-on). As performance worsens, the scalar shall increase towards one. This gradual penalty approach can also help avoid the cliff effect of model disapproval and make the outcome more rational. In the event that the model charge of each desk/portfolio are considered separately, this approach reduces to simply a weighted average between the internal model charge and the standardized charge.

Let  $IMCC(C_i)$  be the regulatory capital charge for a given portfolio  $C_i$  using an approved model.

Let  $SCC(C_i)$  be the regulatory capital charge for the same portfolio using a standardized approach.

Then the actual regulatory capital charge for portfolio  $C_i$  could be calculated as:

$$\begin{aligned} \text{Charge}(C_i) &= \beta \times SCC_i + (1-\beta) \times IMCC_i \\ &= IMCC_i + \beta \times [ SCC_i - IMCC_i ] \end{aligned}$$

Where  $0 \leq \beta \leq 1$  is a scaling factor set by the firm's supervisors based on backtesting. When  $\beta = 0$ , full model approval results, as the model underperforms  $\beta$  can increase to one at which point (assuming  $IMCC(C_i) < SCC(C_i)$ ) the standardized approach is used. The transition is smooth and incentivizes firms to develop well behaved models. Note that in the equation, the capital charge for the portfolio is a weighted average of the standardized charge and the internal model based charge. It can equivalently be written as the internal model based charge plus an add-on equal to a scalar times the difference between the standardized charge and the internal model based charge.

In a general setting with many sub-portfolios, we can express the equation as:

$$\text{Portfolio Charge} = IMCC(\text{whole portfolio}) + \sum_i \alpha_i [ SCC_i - IMCC_i ]$$

Where  $SCC_i$  is the standardized charge of sub-portfolio  $i$  and  $IMCC_i$  is the internal model charge for sub-portfolio  $i$ .

One could also contemplate a calculation that simply utilizes the scaled standardized charge as the add-on rather than the scaled difference between the standardized charge and the internal model

based charge. That has the advantage of making the calculation even simpler but with some degree of double count.

## **8.5 Eligibility for internal models approach**

A risk factor that is eligible for modeling needs to have adequate historical data taking into account the frequency with which such data can be updated. A flexible and sensitive approach need to be taken in this determination otherwise certain risk factors would flip-flop back and forth between modelable and non-modelable status, due to temporary impairments in liquidity.

The Associations support an approach to move away from reliance on exception counts to a method that incorporates size of exceptions. Indeed, a high frequency of near misses should also count. At the same time, the risk metrics should be amenable to objective testing, and the Basel Committee should avoid prescribing measures that are volatile or difficult to objectively measure such as “very high percentile” or “long holding period”.

## 9 Credit Risk in the Trading Book (Excluding CVA)

### 9.1 Introduction

The objective of this section is to capture and capitalise credit risk in the trading book which is not already included in other risk metrics. This concept should not be confused with the Basel 2.5 notion of “Incremental Risk”. There are a number of ways of achieving this and no single prescriptive method is advocated. Rather the principles are set out followed by an example of one way in which true uncapitalised credit risk (above that already captured) can be calculated. The Industry is supportive of developing a framework which would capture spread risk within ES whilst maintaining a separate charge for default risk.

Most of the credit risk of debt securities in the trading book can be captured by a robust simulation in the change of credit spreads over the appropriate liquidity risk horizon. The widening of credit spreads over the liquidity risk horizon, during stressed periods such as 2008, tends to be much larger than would be estimated by multiplying the daily spread volatility by the square root of the number of days during the period. This occurs because during a crisis highly leveraged firms sell assets to meet margin calls or to preserve capital ratios. Consequently, daily changes in spreads tend to have positive serial correlation. In contrast the square root of time calculation assumes no serial correlation.

Let us define the incremental economic risk of a downgrade over the liquidity horizon as the potential economic loss that is not already captured in the robust simulated widening of credit spreads over that time period. The incremental economic risk of a downgrade will tend to be negligible. This is because markets spreads tend to be a leading rather than a lagging indicator of ratings changes. So long as changes in credit spreads over a liquidity horizon have been robustly simulated, they will tend to fully include the consequence of a downgrade.

Let us define the incremental default risk over a liquidity horizon as the potential economic loss that is not already captured by the robust simulated widening of credit spreads over that time period. A conceptual method for doing this is described below:

The full economic risk over the liquidity horizon is the sum of two probability weighted terms: Loss Given Default + Loss Given Non-default

- The probability weighed loss conditional on default over the liquidity horizon is equal to: :
  - $\text{Loss|Default} = \text{PD} * \text{LGD}$   
where
  - PD is calculated over the liquidity horizon
  - LGD has to be with respect to the current market price, not par – i.e. it is the difference between the current market price of the security and its price given default.

The probability weighted loss conditional on non-default is equal to one minus the probability of default over the liquidity horizon, multiplied by the loss on the debt security due to the simulated change in spread:

- $\text{Loss} | \text{Non-Default} = (1 - \text{PD}) * (\text{loss due to spread change})$

Where:

- PD is calculated over the liquidity horizon
- The loss in market value due to spread change over the liquidity horizon is with respect to the current market value not par.

The above analysis assumes that because the debt security is in a trading portfolio it is marked-to-market and has no reserve for credit loss. The current market value of the security may already be less than par because of the widening of credit spreads that has already occurred

The incremental economic risk from default over the liquidity horizon is the difference between the full economic risk, described above, and the loss in value that measured by the simulated widening of credit spreads over the liquidity horizon.

The above analysis assumes that the same liquidity horizon should be used to measure the loss conditional on the default and the loss conditional on non-default. Under that assumption, the incremental loss conditional on default can be taken into account by a scaling up of the change in credit spreads over the liquidity horizon, as a function of rating, tenor and asset type.

The analysis could be extended to a different set of assumptions, i.e. if the FRTB requires banks to calculate incremental default risk over a full year while measuring incremental spread risk only over the appropriate liquidity horizon.

- One would have to define the total economic risk as the probability weighted sum of the loss conditional on default anytime over the year plus the loss due to a widening of credit spreads over the liquidity horizon, conditional on no default occurring anytime over the year:
  - $\text{PD}(1\text{yr}) * \text{LGD}(1\text{yr}) + (1 - \text{PD}(1\text{yr})) * \text{Loss from credit spread}(\text{liq horizon})$
- The incremental loss due to default would then be the difference between the total economic risk, as calculated above, minus the loss over the liquidity horizon due to credit spread widening. In principle, if this difference is relatively small compared to the spread widening loss over the liquidity horizon, then the latter can be scaled up (as above) to take into account the incremental risk due to default.



## 10 Partial and Fuller Risk Factor Approaches

### 10.1 Partial Risk Factor Approach

The Partial Risk Factor Approach is a simple methodology in that it produces an inner product of risk weighted market values aggregated over buckets.

Strict reliance on regulatory prescribed method and parameterisation will help comparability and support level playing field

Input requirements broadly in line with COREP framework – reducing additional implementation work

However, many firms who progress beyond the simple approach will not follow this path. They will, rather, develop models more along the lines of the fuller factor approach. As such, Partial Risk Factor Approach entails a considerable degree of modeling but without the benefits of a Fuller Risk Factor Approach. Firms which already have IMM models will more naturally adopt the Fuller Risk Factor Approach.

### 10.2 Fuller Risk Factor Approach

This represents a more sophisticated approach which applies prescribed shocks to positions mapped to respective risk factors. It is similar in complexity to an internal (full revaluation) model but the somewhat simple aggregation method reduces the quality of the overall result.

Reliance on bank's own valuation routines curbs comparability

### 10.3 Internal models-based approaches

The Industry supports the aim of aligning the properties of standardised approaches with internal models-based approaches to develop a stronger relationship between the two.

We believe that the ideas underlying the revised standardised approaches constitute a step in the right direction as they consider key elements of modern market risk measurement, in particular long-/short offsetting and risk driver dependencies.

However, implementation of both approaches will require a substantial investment both at inception (e.g., feeding all relevant information into the regulatory calculation process) and for regular production (market data, mapping maintenance).

From a methodology viewpoint, both approaches base on simple Gaussian and Taylor assumptions, which are not capable of reflecting complex tail risks. The bucketing is also unlikely to capture basis risks. Hence, in order to avoid producing results well below those derived from internal models, a conservative calibration will be essential.

It is also not clear to us how the output of the approaches shall be validated as no direct link to a loss distribution approach and relevant time horizon is given. Outlier back-testing (albeit not required in the paper) is not an option here.

The proposed approaches are heavy on underlying assumptions (e.g., risk factor mappings) and rely on a broad set of parameter (e.g., correlations); this will require a timely maintenance process to adapt these models to changes in the market environment. We would like to know how policy makers plan to achieve this.

At this stage, we are not in a position to decide on which one of the two proposed new standardised approaches should be preferred. Such a decision should be based on a thorough quantitative impact study following a detailed model description and an initial parameterisation proposal. Initial comments on the approaches:

Given the significant efforts involved with implementing a new standardised approach, be it partial or full risk factor approach, banks should also have the option to stay with the current standardised approach framework. This is in particular relevant for banks with small trading units.

We also agree that a mandatory calculation of standardised capital requirements for all banks would be beneficial as a uniform benchmark. However, such a requirement needs to be designed to not overburden internal model banks with too many parallel regulatory capital processes (e.g., in case the Basel I transitional floor calculations are maintained) or high reporting frequencies (e.g., daily) for a metric which is not relevant in day-to-day risk management.

We disagree with the introduction of regulatory capital floors based on standardised approaches as it disincentivises the use and further development of internal models and increases the difficulty of calibrating the standardised approach. Instead, one could introduce a smooth transition between the two (e.g., by a weighted average of both outputs depending on model performance).

## Appendix 1: Expected Shortfall and VaR Equivalents under the Generalised Pareto Distribution

We have suggested in our response that calibration to a lower percentile would be appropriate to meet the objective of increased risk sensitivity by using ES, while maintaining the broad in line with current levels. This percentile is based on practice at firms, and in this Appendix we provide some additional quantitative support for this choice.

Assessment of the relative behaviour of ES and VaR at high percentiles must be based on information about the shapes of tails of market distributions. Practice at firms is based on empirical evidence and leads to the suggested percentile mentioned above. Here we triangulate this conclusion by making a parametric assumption about tail shape, namely, we assume that the tail of the distribution, corresponding to losses above a suitable threshold, has a general power shape.<sup>11</sup>

The tail probability  $T(x) = (1 - F(x))$ , the probability of a loss greater than  $x$ , is given, up to a constant of proportionality, by a general power law

$$T(x) \propto (a + x)^{-\frac{1}{\xi}}$$

for parameters  $a$  and  $\xi$ . The value of the tail shape parameter determines the relationship between percentile and expected shortfall based risk measures for distributions with this tail. (The "location" parameter  $a$  will not need to be estimated for our discussion)

If  $ES(q)$  denotes the expected shortfall at percentile  $q$  :

$$\begin{aligned} ES(q) &= \frac{1}{q} \int_0^q T^{-1}(u) du \\ &= E[L | L > VaR(q)] \\ &= \int_{T^{-1}(q)}^{\infty} x T'(x) dx \end{aligned}$$

then a quick calculation shows

$$\begin{aligned} ES(q) &= \frac{1}{q} \int_0^q x(a+x)^{-\frac{1}{\xi}-1} dx \\ &= T^{-1}(q) + \frac{T^{-1}(q) + a}{\frac{1}{\xi} - 1} \end{aligned}$$

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<sup>11</sup> Pickands–Balkema–de Haan theorem:

Balkema, A., and de Haan, L. (1974). "Residual life time at great age", *Annals of Probability*, 2, 792–804.

Pickands, J. (1975). "Statistical inference using extreme order statistics", *Annals of Statistics*, 3, 119–131.

Comparing the result with the formula for the tail probability gives us a useful relationship, depending only on the tail shape parameter  $\xi$  :

$$T(ES(q)) = q \times (1 - \xi)^{\frac{1}{\xi}}$$

This is useful for comparing overall capital requirements from an expected shortfall capital measure with the current percentile-based VaR measure, based on the broadly supported hypothesis that market losses tend to follow a power law.

Given a suitable value for the tail shape parameter  $\xi$  , we can assess that choice of  $q$  will be capital neutral, relative to the current VaR measure. For capital neutrality, as VaR is calibrated to 99% confidence corresponding to a tail property of 1%, we need  $q$  to be the solution of

$$ES(q) = VaR(0.99) = T^{-1}(0.01)$$

Applying the approximation derived above, we find that the required confidence level  $q$  is given by

$$q = 0.01 \times (1 - \xi)^{\frac{1}{\xi}}$$

In order to use this equation we need an estimate of the tail parameter  $\xi$  . The tail parameter also governs the value of the moments of the distribution, meaning the  $n$  -th moment is finite if and

only if  $n < \frac{1}{\xi}$  . Since most financial data shows the 3<sup>rd</sup>-4<sup>th</sup> moment to still be finite, the  $\xi$  parameter

should be chosen from the interval  $\left[ \frac{1}{4.1}, \frac{1}{3} \right]$ , which leads to a confidence level for the expected shortfall at **[96.6%, 96.8%]**.

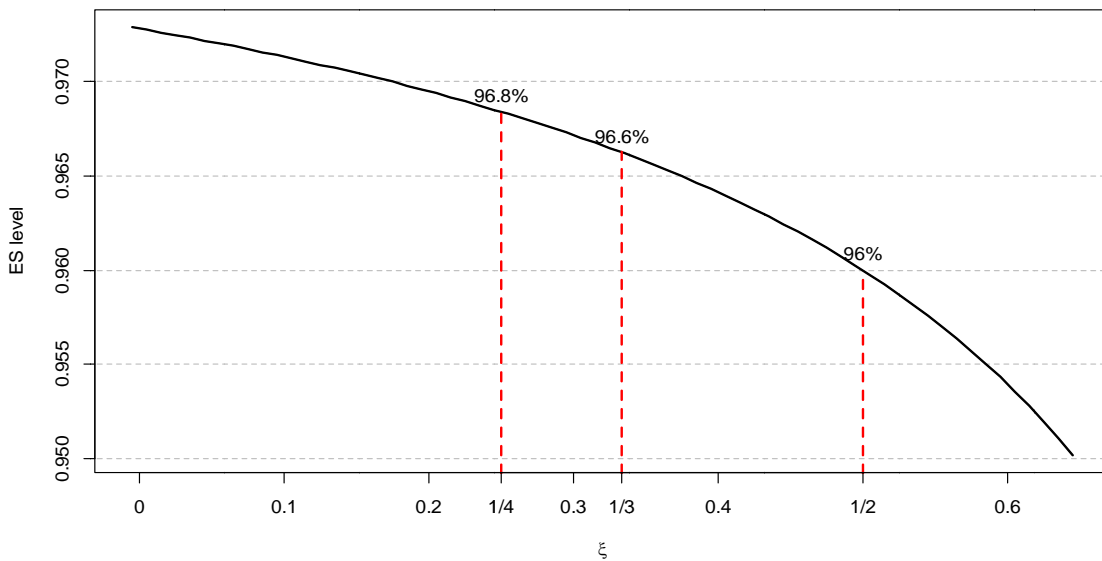


Figure 1 99% VaR equivalent ES confidence levels for various tail parameters in the GPD distribution