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Secretariat of the Basel Committee on Banking Supervision
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Dear Sirs

FUNDAMENTAL REVIEW OF THE TRADING BOOK

Barclays welcomes the Basel Committee's consultation document "Fundamental review of the trading book" (BCBS219, "the Review") and we acknowledge the significant amount of work that has gone into the paper and the importance of the issues the paper seeks to address.

In the response outlined below we present our key messages on the proposals, while answering the specific questions posed by the Basel Committee on Banking Supervision's Trading Book Working Group (TBG) in Appendix 1. In Appendix 2 we include some detailed quantitative analysis to support one of the alternative proposals that features in the joint trade associations (GFMA, ISDA, IIF, and The Clearing House) response to the Review.

Key Messages

We fully support the work of the TBG in conducting a Fundamental Review of trading book capital requirements and the need to reform capital standards for market risk.

Whilst we note that the Basel II.5 revisions were successful in driving an increase in capitalisation of the trading book we agree that they did not fully address the shortcomings of the overall design of the regime as well as the perceived weaknesses in risk measurement under both the "internal models-based" and "standardised" approaches. The current framework with its diverse array of overlapping capital charges, incorporating varying degrees of stress, look-back periods, liquidity horizons, confidence intervals and multipliers, is difficult to maintain, communicate (internally and externally to regulators), and to explain.

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A revised framework

We believe the new framework should be designed to result in a more coherent measure of risk, where the performance of models can be more realistically assessed on an ongoing basis, and metrics can be aggregated in a meaningful way that also reduces instances of double-counting of risks and overlapping capital charges that exist under Basel II.5.

The new framework should be designed to align regulatory capital more closely with the effective day-to-day risk management of trading activities, providing for a range of approaches depending on the complexities of the trading strategies and the size and levels of sophistication of the firms required to apply the charges.

Whilst a more sophisticated model could, in theory, produce a higher regulatory capital charge than a less advanced "standardised" modelling approach, at either a transaction or portfolio level, perhaps due to a greater level of accuracy derived from a broader set of modelling parameters, we would not expect the calibration of a revised framework to systematically produce higher capital charges for those firms who invest in more accurate measures of risk. A key principle of the revised framework should be that firms investing in more advanced risk management technologies ("internal models" based approaches), in aggregate, should not be unduly penalised by capital charges that would otherwise overall be lower under less sophisticated models ("standardised approaches").

Relationship between standardised and "internal models" based approaches and mandatory "standardised" measurement

The Fundamental Review proposes a much closer relationship between the two approaches than currently exists, with a view to creating a more credible option for the withdrawal of model approval.

This is to be achieved, in part, by placing more restrictions and constraints on the "internal models" based approach while introducing more risk sensitivity in to the "standardised" approach albeit at the expense of simplicity. The Review also proposes to make the "standardised measurement" mandatory for all firms.

However the TBG acknowledges that the two approaches serve two different purposes (and we observe, are generally adopted by different types of firms) and in seeking to bring them closer together there is a danger we end up simultaneously diluting the core values of each approach.

We see the core values of the standardised approach as "simplicity" and "affordability", for business models that do not require a sophisticated measure of market risk. An "internal models" based approach needs to be closely aligned to the management of trading book risks and one way to achieve this is to utilise a firm's own risk management models. The more aspects of an "internal model" that are externally prescribed, the less likely they are to be of use in day-to-day risk management. We believe that a revised "internal models" based approach must remain relevant to how a firm views and manages its market risks.

We understand the primary regulatory benefit of requiring firms to run both sets of models in tandem, as to introduce a more realistic mechanism by which higher capital charges would be imposed on firms whose internal models underperform. We also believe that mandatory standardised calculations will go a long way in achieving one of the TBG's stated objectives of more comparability across firms, and that standard rules not internal models should be relied on for this purpose.

We do have concerns around the use of the standardised approach as a floor (or "back stop"), as with the Comprehensive Risk Measure (CRM) in Basel II.5. In our experience this can lead to the modelled approach being ignored, with business incentives set by regulatory capital allocations driven by the standardised measure, and regulators more focused on the capital than an understanding of the underlying risks ("I don't care if you are stupid as long as you are rich"). It is also possible that externally prescribed parameters for "internal models" have played a part in contributing to this experience.

We believe the TBG could better achieve their objectives by using the standard rules as a surcharge and take a blended view of modelled and standardised outputs. The blend would be predominantly based on the modelled output, but if back testing results were to deteriorate, or other issues arose, the blend could be adjusted progressively towards a standardised output. This avoids the cliff effects of the floor and retains the information content of both models and standardised approaches in the outcome.

The trading book/banking book boundary

We support a trading evidence based boundary, which we firmly believe can achieve the objectives set out in the Review.

We believe this will strengthen the current regulatory requirement. We see this as an evolution of the existing "trading intent" based boundary (for us) and reflects the current direction of regulatory travel with an enhanced focus on liquidity and pricing for these positions.

We are supportive of making the boundary less permeable but would draw the line at making it impermeable. Our existing policies set a very high bar for transfers requiring approval from all impacted infrastructure areas (at a senior level) and CFO sign off. Transfers with a material impact would already need disclosure to our regulator.

Transfers would continue to be needed in certain cases, such as when a developing market (product or location) may not be liquid or the firm may not have adequate market access. As liquidity or access improves with a market, the case for trading book treatment would improve. It would be illogical to leave pre-existing trades (managed consistently with the new trading book trades) orphaned on a banking book. In other cases, market liquidity or access may dry up in a manner which is not temporary, particularly if the firm subsequently puts the books into "run-off" there would be a clear failure of a trading evidence based boundary.

Given the need for transfers it is important to recognise the TBG's concern that the boundary may be arbitraged. We propose an appropriate level of disclosure of transfers within Pillar 3 would provide adequate information to users and appropriate incentives to firms to ensure transfers are only undertaken in rare circumstances and only when sufficient justification can be provided.

The alternative proposal for a valuation based boundary has many problems. At an absolute minimum the potential adjustment for allowing ALCO type swaps into the banking book (with hedging evidence), would need to be adopted. Further consideration should also be given to other banking book hedges such as hedges of FX and credit. Another concern is that a valuation based boundary will bring many firms into the trading book capital rules which had not been subjected to these charges before due to financial accounting issues. Given the increased level of complexity of the standard rules charges suggested in the proposals this would be potentially disproportionate. Another concern is that a valuation based boundary is delegating a key control to accounting standard setters who are not as focussed on the regulatory capital implications of changing their accounting rules which have a much broader application than just for financial firms.

A comprehensive incorporation of the risk of market illiquidity

We agree the Review needs to consider the risk of trading book losses due to the illiquidity of products/risk factors and that liquidity of risk factors can change in times of stress. The Review should also recognise the valuation aspect to liquidity, and factor in the portion of illiquid risk that is already captured via bid-offer valuation adjustments to avoid double counting.

We believe the trading book should be restricted to those positions with risks/risk factors that are liquid enough to trade in/out of over a short time horizon. For this reason, we believe the concept of liquidity in market risk regulatory capital charges should be reserved only for highly complex products where some of the risks/risk factors may not be easily traded in/out of (vanilla products/risk factors should not be impacted). For such positions you could consider a longer liquidity horizon, to reflect risks beyond those captured via valuation adjustments, as a form of penalty. This could be a useful way to build out the tail scenarios with additional losses where risks/risk factors cannot be effectively hedged or positions unwound.

While pre-imposed liquidity horizons or liquidity horizon floors from regulators can provide for some consistency in approaches between firms, we recognise the significant challenge that regulators would be taking on to ensure accurate and up-to-date estimates for liquidity horizons across a large number of risks/risk factors. We are also concerned that not all firms have the same levels of market access and client base and firms' own views of liquidity may differ and differ from those estimates proposed by external regulators.

We believe it would be better to allow individual firms to scale risk factor moves by corresponding liquidity horizons to more effectively capture the differences between liquid and illiquid risk factors. This process could be supported by regular benchmarking exercises or "peer group" comparisons to ensure broadly consistent approaches and enhanced comparability across

firms. We think conducting these exercises would be less burdensome than the challenge of providing and updating regulatory estimates of risk/risk factor liquidity (but perhaps equally as effective).

Note that we don't think it would be that useful to have an overall scaling given by some weighted average horizon (Annex 4, pg 70, Option 3). The reason being that scaling by the average does not really distinguish between the liquid and illiquid positions/factors.

Moving from value-at-risk to expected shortfall

We broadly support the proposed change from VaR/"Stressed" VaR to an Expected Shortfall ("ES") measure. There are several reasons to favour the ES over VaR. The most important are: the ability of ES to take explicitly under consideration the magnitude of the extreme loses beyond a certain confidence level, as well as the more adequate mathematical properties that the ES risk measure enjoys, namely the coherence.

A risk measure is called coherent if it is: translation invariant, monotonic, positive homogeneous, and sub-additive. In general VaR is not sub-additive and so it is not a coherent risk measure. In contrast, an ES risk measure is sub-additive and it is a genuine coherent risk measure.

However we are concerned that the risk-based capital measure formula proposed in the Review (Section 4.5.6) is not a coherent risk measure. But we believe that a simple variant of the aggregate risk measure put forward in the paper that preserves the coherence introduced by the ES measure is in the spirit of the Review and is worth the TBG considering. For this reason we support the joint trade association's proposal (GFMA, et al) which considers the ES of the aggregated portfolio as the risk measure defining the risk-based capital. In this case the correlation matrix between the risk classes will be picked up naturally by a historical simulation approach, making superfluous the need for a supervisor-prescribed inter-risk class correlation matrix. (See Appendix 2 for detailed quantitative analysis on this).

As highlighted above, we believe better comparability across firms is best achieved via the revised standardised approach and not via the internal models based approach.

Treatment of hedging and diversification

We believe an ES measure incorporating full diversification but calibrated to a stressed period is the most effective way of curtailing excessive diversification under the "internal models" based approach.

However, if despite all the additional controls proposed by the Review, regulators remain unconvinced by the levels of diversification implied by internal models, we support the industry's alternative proposal to compute the 'diversification benefit', defined as the sum of standalone risk by category, minus the fully diversified risk value. Regulatory capital could then be calculated based on a cap on diversification or as the sum of the standalone values, less some proportion of the diversification benefit.

Revised standardised approach

We support the derivation of a more risk sensitive standardised approach to the calculation of regulatory capital. However, we are concerned that increased risk sensitivity and simplicity are mutually exclusive objectives.

At present the standardised approaches include a menu of options for reporting banks from simplified approaches to more complex approaches. This is reasonable given the differing levels of sophistication of such institutions, with more sophisticated firms being able to report capital on a more efficient basis. Whilst we recognise that a menu of choices reduces comparability between firms we are concerned that applying a single approach to all firms could result in unnecessary complexity for smaller firms or less risk sensitivity for more complex firms.

If there is only to be a single standardised approach, we are generally supportive of the "partial risk factor" approach, however are concerned that the cross cutting general interest rate risk approach is significantly more complex than the existing set of rules. The existing modified duration approach is already sufficiently complicated as this information would not normally be available in Finance systems. The cash flow vertices approach sounds risk sensitive, however, it will be highly data intensive and it is unclear how many banks could implement this without highly significant upgrades to financial reporting systems. Furthermore, the use of cash flow data will reduce the "audit-ability" of the standard rules calculation as the existing link to the audited balance sheet will be broken. It is unclear how much more risk sensitive the approach would be mapping each contractual cash flow rather than a duration by instrument.

Interest rate risk in the banking book / Interaction of market and counterparty risk (CVA)

We agree with joint trade association response (GFMA et al) that the IRRBB should remain as part of Pillar 2. IRRBB is not a risk which is actively sought by banks. It is a residual risk arising from a bank's activities of taking deposits and extending loans to the real economy. Unlike operational risk, which also arises from these activities, there are a number of liquid products (treasuries and swaps) which are used by banks to reduce IRRBB to very low levels. Consequently we do not feel that it is proportionate to develop a Pillar 1 charge specifically for IRRBB, and the capitalisation of this risk should remain in Pillar 2. We are happy to continue to support industry efforts in working with the TBG on developing standards for measuring IRRBB.

We also support the efforts of the international trade associations in helping to further develop the Basel III proposals for the treatment of CVA to produce a more coherent and workable CVA framework.

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We would like the TBG to avoid hasty introduction of these proposals (as was undertaken with Basel II.5) and allow sufficient time to:

- Allow current changes to bed down, there should be a period of stability to enable the effectiveness of these new regimes to be assessed and to allow any residual implementation issues to be worked out;
- Adequately calibrate the new regime; and
- Allow the significant investment in infrastructure which is likely as a result of these changes to be implemented in an appropriate manner.

Please do not hesitate to contact Barclays if you have any questions or comments on any of the issues raised in this response. Furthermore, we would be happy to continue to participate in the relevant fora to discuss the issues presented in this paper in more depth.

Yours sincerely,

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Barclays

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Co-Chief Risk Officer
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Appendix 1: Answers to BCBS questions (1-10)

1. Which boundary option do you believe would best address the weaknesses identified with the current boundary, whilst meeting the Committee's objectives?

We support a trading evidence based boundary which we firmly believe can achieve the objectives on the boundary set out in the Review.

We believe that this is an evolution of the existing trading intent based boundary (for us) and reflects the current direction of regulatory travel with enhanced focus on liquidity and pricing of these positions.

This will result in a narrower trading book, albeit for banks that already apply strict trading intent criteria such as us the narrowing will be limited. Anecdotal evidence suggests that banks in other jurisdictions may have had much broader trading books e.g. loan warehouses for securitisation and structured equity financing transactions.

The trading evidence based boundary has certain requirements which are in addition to existing practice:

- Control functions to undertake ongoing reviews of what's in banking and trading books
- Provision of objective evidence as to active management
- Proof of market access

We are supportive of making the boundary less permeable but would draw the line at making it impermeable. Our existing policies set a very high bar for transfers requiring approval from all impacted infrastructure areas (at a senior level) and CFO sign off. Transfers with a material impact would already need disclosure to our regulator.

Transfers would continue to be needed in certain cases, such as when a developing market (product or location) may not be liquid or the firm may not have adequate market access. As liquidity or access improves with a market, the case for trading book treatment would improve. It would be illogical to leave pre-existing trades (managed consistently with the new trading book trades) orphaned on a banking book. In other cases, market liquidity or access may dry up in a manner which is not temporary, particularly if the firm subsequently puts the books into "run-off" there would be a clear failure of a trading evidence based boundary.

Given the need for transfers it is important to recognise the TBG's concern that the boundary may be arbitraged. We propose an appropriate level of disclosure of transfers within Pillar 3 would provide adequate information to users and appropriate incentives to firms to ensure transfers are only undertaken in rare circumstances and only when sufficient justification can be provided.

The alternative proposal for a valuation based boundary has many problems. At an absolute minimum the potential adjustment for allowing ALCO type swaps into the banking book (with hedging evidence), would need to be adopted. Further consideration should also be given to other

banking book hedges such as hedges of FX and credit. Another concern is that a valuation based boundary will bring many firms into the trading book capital rules which had not been subjected to these charges before due to financial accounting issues. Given the increased level of complexity of the standard rules charges suggested in the proposals this would be potentially disproportionate. Another concern is that a valuation based boundary is delegating a key control to accounting standard setters who are not as focussed on the regulatory capital implications of changing their accounting rules which have a much broader application than just for financial firms.

2. What are commenters' views on the likely operational constraints with the Committee's proposed approach to capturing market liquidity risk and how might these be best overcome?

We agree with the TBG that any assignment of risks to liquidity horizons will involve an element of judgement, and we think that the judgement would need to be applied frequently to ensure on going accuracy and relevance.

We think it will be extremely challenging for regulators to provide accurate, relevant (to the individual firm required to apply them), and up-to-date estimates for liquidity horizons across a huge number of risk factors.

We are also concerned that not all firms have the same levels of market access and client base and firms' own views of liquidity may differ and differ from those estimates proposed by external regulators.

We suggest it might be better to allow firms to model risk factor moves by corresponding liquidity horizons (perhaps deploying fewer buckets than proposed in the Review to reduce the element of judgement involved and the level of accuracy implied) – and then commit the necessary resources to efforts to ensure consistency in approaches and comparability across firms (such as through regular benchmarking exercises and frequent peer group reviews). Initial benchmarking studies could be conducted as part of planned Quantitative Impact Studies or as part of formal parallel running requirements with a view to achieving a degree of consistency prior to implementation.

Note that we agree with joint association response (GFMA, et al) in that we don't think it would be that useful to have an overall scaling given by some weighted average horizon. The reason being that scaling by an average does not effectively help to distinguish between the liquid and illiquid positions/risk factors.

3. What are commenters' views on the proposed regime to strengthen the relationship between the standardised and internal models-based approaches?

The Fundamental Review proposes a much closer relationship between the two approaches than currently exists, with a view to creating a more credible option for the withdrawal of model approval.

This is to be achieved, in part, by placing more restrictions and constraints on the "internal models" based approach while introducing more risk sensitivity in to the "standardised"

approach albeit at the expense of simplicity. The Review also proposes to make the "standardised measurement" mandatory for all firms.

However the TBG acknowledges that the two approaches serve two different purposes (and we observe are generally adopted by different types of firms) and in seeking to bring them closer together there is a danger we end up simultaneously diluting the core values of each approach.

We see the core values of the standardised approach as "simplicity" and "affordability", for business models that do not require a sophisticated measure of market risk. An "internal models" based approach needs to be closely aligned to the management of trading book risks and one way to achieve this is to utilise a firm's own risk management models. The more aspects of an "internal model" that are externally prescribed, the less likely they are to be of use in day-to-day risk management. We believe that a revised "internal models" based approach must remain relevant to how a firm views and manages its market risks.

We understand the primary regulatory benefit of requiring firms to run both sets of models in tandem, as to introduce a more realistic mechanism by which higher capital charges would be imposed on firms whose internal models underperform. We also believe that mandatory standardised calculations will go a long way in achieving one of the TBG's stated objectives of more comparability across firms, and that standard rules not internal models should be relied on for this purpose.

We do have concerns around the use of the standardised approach as a floor (or "back stop"), as with the Comprehensive Risk Measure (CRM) in Basel II.5. In our experience this can lead to the modelled approach being ignored, with business incentives set by regulatory capital allocations driven by the standardised measure, and regulators more focused on the capital than understanding the underlying risks ("I don't care if you are stupid as long as you are rich"). It is also possible that externally prescribed parameters for "internal models" have played a part in contributing to this experience.

We believe the TBG could better achieve their objectives by using the standard rules as a surcharge and take a blended view of modelled and standardised outputs. The blend would be predominantly based on the modelled output, but if back testing results were to deteriorate, or other issues arose, the blend could be adjusted progressively towards a standardised output. This avoids the cliff effects of the floor and retains the information content of both models and standardised approaches in the outcome.

4. What are commenters' views on the Committee's proposed desk-level approach to achieve a more granular model approval process, including the implementation of this approach for banking book risk positions? Are there alternative classifications that might deliver the same objective?

We understand the TBG wants to develop a framework whereby regulators can simply remove a firm's model approval in a way that would have a less material impact than if they were to remove a VaR model approval in today's framework. However, we note that ultimately this is about

providing regulators with a tool to impose higher (but more realistic) regulatory capital charges on firms whose models are seen to underperform. Currently VaR-based regulatory capital requirements increase as the performance of the model deteriorates. However, this is generally subject to a cap (based on a maximum "plus factor") which can result in a significant cliff effect should the VaR model approval be withdrawn and standard rules charges required.

We agree with the joint associations (GFMA et al) that this approach does not adequately differentiate the spectrum of potential model failures that may occur and the consequence of turning off the VaR model at a firm level can be quite extreme.

Our experience with regulators under the current framework has required us to consider, from time to time, a number of different levels of the firm prior to applying an "internal models" based approach for regulatory capital reporting purposes (Legal Entity, Business Lines, Product/instrument types, and Risk Factors):

- At the product/instrument level, model approvals are high maintenance and require continual review and update. There can also be ambiguity around product names and instrument types, which can lead to detailed and lengthy discussions with our regulators. This ambiguity can increase over time as markets evolve and continue to innovate. Product level approvals can also lead to split hedging issues (i.e. "out of scope" product hedged by "in scope" product, leading to one-sided risk capitalised under both the "internal models" based approach and "standardised" approach)
- At the Legal Entity and Business Line levels, inconsistencies in model approval coverage are hard to explain (when the model in question is the same model) and due to the different regulatory capital treatment can lead to unintended consequences (e.g. Credit may have approval for a specific risk model that Rates do not, but Rates run the same risks?). They also lead to split hedging issues which we would like to avoid under a revised framework. Regulatory capital should not, where possible, have the potential to influence where a risk gets booked within a firm and by whom.

To this end a number of alternative approaches to the "trading desk" level should be considered further by the TBG. Overall, we agree that a portfolio level approach is likely to have fewer unintended consequences.

We also agree with the joint associations (GFMA, et al) that the treatment of "unapproved" desks, and whether they are to be excluded from the overall model in addition to having standardised rules applied, should be covered in the Review.

Our experience under the current framework is that excluding positions from the model based charges can lead to "one way" risk not only going through standard rules, but also through the internal model charge. We think it is appropriate in certain circumstances to continue to allow for "unapproved desks" to run through the models based calculation, thereby allowing for a complete picture of the risk to remain modelled, while in addition an add on/standard rules approach is applied.

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5. 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?

There are practical difficulties with regards to applying a "direct method" of identifying a suitable stress period, while we agree with the industry's concerns raised about the "indirect method" (GFMA et al) and to this end we suggest the TBG consider alternatives to the "indirect method" as put forward in the joint trade association response.

This approach provides an ES measure based on current ES 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.

We currently run something like the "direct method" to confirm and keep up-to-date the stressed period for the stressed VaR calculation on a quarterly basis. This is a hugely involved process consuming significant risk and risk technology resources. We believe a streamlined process (something like a revised "indirect approach") would enable firms to run it more frequently and efficiently without any material differences in the results. 6. What are commenters' views on the merits of the desk-based and risk-factor-based aggregation mechanisms to deliver the Committee's objectives of constraining diversification benefits?

We believe an ES measure incorporating full diversification but calibrated to a stressed period is the most effective way of curtailing excessive diversification under the "internal models" based approach.

However, if despite all the additional controls proposed by the Review, regulators remain unconvinced by the levels of diversification implied by internal models, we support the industry's alternative proposal to compute the 'diversification benefit', defined as the sum of standalone risk by category, minus the fully diversified risk value. Regulatory capital could then be set as the sum of the standalone values, less some proportion of the diversification benefit.

7. How can regulators ensure robust supervision of integrated market and credit risk modelling? In particular, how would an integrated modelling approach affect other elements of the proposed framework (eg the choice of the quantile parameter for ES, the P&L attribution and back testing processes, etc)?

We believe a revised framework should provide opportunities for firms to develop and evolve integrated market and credit risk modelling that could be used for regulatory capital reporting purposes.

A consistent approach to any risk is desirable, provided this does not disincentivise risk reducing activities such as hedging. There maybe a number of different ways of looking at this – and no one single approach, but we would support a continuum of approaches based on the liquidity profile of

the exposures in question (e.g. a robust simulation of changes in credit spreads over an appropriate liquidity horizon, calibrated to a stressed period).

8. What are the likely operational constraints with moving from VaR to ES, including any challenges in delivering robust backtesting, and how might these be best overcome?

We already report a measure of ES in our annual reports and therefore do not consider there to be significant operational constraints in simply moving from VaR to ES for regulatory capital reporting purposes, however, there are core features of the ES measure proposed that we believe will present significant operational challenges.

We believe revisions to the ES measure as currently proposed can go a long way to addressing these operational concerns while still achieving the stated objectives of the Review.

The ES measure itself must be based on an appropriate percentile threshold, allowing for an appropriate level of observations from which to form an average over (n.b. a lower percentile would give a larger number of excess PnL observations). For firms using an historical simulation approach, whereby scenarios would be rolled, a higher percentile will result in a more volatile capital charge. In order to set a similar capital standard to VaR computed at the 99th percentile, ES would need to be computed from a lower percentile, e.g. using the 95th percentile. We also believe that a lower percentile ES measure will result in more reliable and meaningful back testing results, although we note that back testing ES calibrated to a period of stress will be less meaningful in benign times.

While we understand the concerns expressed about excessive diversification in VaR we see several operational challenges with the proposed approach for ES:

- Implicit in the formula given for the calculation and aggregation of the capital requirement across "risk classes" (Section 4.5.6) is a requirement to determine whether risk is "long" or "short", which for a complex portfolio is more complicated than one might think (the joint trade association response provides some useful examples of circumstances where this might be the cases).
- The process by which risk factors are to be grouped under different risk factor classes may not be straightforward as there are some risk factors you might choose to group in multiple risk factor classes (e.g. certain interest rate risks that might also be classified as credit risks, such as bond yields). Appropriate classification could have a significant impact on hedging relationships within and across risk factor classes (e.g. hedging of swaps with bonds) and therefore have a material impact on capital.
- Any assessment of liquidity as part of the ES measure (the liquidity bucketing approach) should focus as much on the liquidity of the risks/risk factors as on the liquidity of the product/instruments themselves. As with the current Basel II.5 framework, we believe it is difficult to aggregate risk measures across different liquidity horizons in a meaningful way.

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9. Which of the two approaches better meets the Committee's objectives for a revised standardised approach?

We support the derivation of a more risk sensitive standardised approach to calculation of regulatory capital. However, we are concerned that increased risk sensitivity and simplicity are mutually exclusive objectives.

At present the standardised approaches include a menu of options for reporting banks from simplified approaches to more complex approaches. This is reasonable given the differing levels of sophistication of such institutions, with more sophisticated firms being able to report capital on a more efficient basis.

We are of the opinion that there should still be a menu of choices available for firms, in particular, if the trading book boundary is based on valuation and hence more and less sophisticated firms are brought into the scope of reporting trading book capital:

- Where the reporting firm is not seeking to use a model based capital requirement (i.e. a small firm or a new/small trading location) it may be appropriate to use a simple, conservative and less data intensive approach.
- Where the firm wishes to use a model (e.g . Expected Shortfall) the increased risk sensitivity and credible fallback provided by a more data intensive and complex methodology may be warranted.
- It will be important to ensure that incentives remain to adopt the more risk sensitive approaches. We recognise the Committee's objective to have credible fallbacks and avoid a cliff effect with changes to model permissions, however, there still need to be incentives for firms to invest in the overheads associated with more complex and modelled approaches.

If there is to only be a single standardised approach, we are generally supportive of the "partial risk factor" approach however are concerned that the cross cutting general interest rate risk approach is significantly more complex than the existing set of rules. The existing modified duration approach is already sufficiently complicated as this information would not normally be available in Finance systems. The cash flow vertices approach sounds risk sensitive, however, it will be highly data intensive and it is unclear how many banks could implement this without highly significant upgrades to financial reporting systems. Furthermore, the use of cash flow data will reduce the "audit-ability" of the standard rules calculation as the existing link to the audited balance sheet will be broken.

The "fuller risk factor" approach is intuitively attractive in as much as it allows more risk types to be seen as cross-cutting and hence hedgeable. It appears highly complex and we would question the overhead associated with running both a ES model approach and the full risk factor "quasi model" approach. It would be more appropriate to ensure that the partial risk factor approach is calibrated in an appropriate manner to yield the desired outcome. A concern raised with the full risk factor approach is its dependant upon pricing models; this should be less of a concern for banks with approved ES models. The pricing models would be one of the basic inputs into such a regime.

We believe that the menu of options should include an appropriately calibrated partial risk factor approach and a variant of the existing standardised rules for firms with smaller and simpler trading books.

10. Do commenters propose any amendments to these approaches?

It is very hard to comment on the proposals in the abstract without any guidance on their calibration. Basel II.5 market risk amendments sought to provide the 2-3x increase in trading book capital required by the Basel committee in response to the financial crisis. The approach taken for Basel II.5 was tactical and had the disadvantage of charging for some risks multiple times and not necessarily picking up other factors such as market liquidity.

It is unclear from the proposals whether the Review is seeking to change the overall level of capital associated with the trading book. If there is a desire to increase capitalisation beyond the levels committed to in Basel III it would be highly undesirable. Ever increasing levels of capitalisation have diminishing returns in terms of prudential safety and have real world consequences as banks are less able to provide credit to the real economy.

We have significant concerns regarding the potential use of a standardised approach as a floor to an ES basis of calculating capital. If the floor bites the firm would be reduced to calculating capital on the basis of the standardised approach and the modelled approaches would fall away. Depending on the risk sensitivity of the standardised approach, this could result in a choice of hedging economic risk or regulatory capital.

Rather than a floor it may be preferable to use a blended charge using both the model and standard rules. Where the model is under question (maybe due to back-testing exceptions) the blend could be progressively biased towards the standard rules charge. A benefit of this approach would be the progressive shift towards a standardised approach rather than a potential cliff effect.

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Appendix 2

On the non-coherence property of the aggregate models-based regulatory capital formula

Comments to the Fundamental Review of Trading Book

Mircea Marinescu and Vladimir Piterbarg

August 14, 2012

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On the non-coherence property of the aggregate models-based regulatory capital formula

Comments to the Fundamental Review of Trading Book

Abstract

We study the coherence property of the risk measure implied by the risk-based capital formulas from the "Fundamental Review of the Trading Book" (FRTB) and "Industry Response to the Fundamental Review of the Trading Book" documents. We find that the formula from the FRTB document violates the sub-additivity property even in a simple Gaussian setup, where even the Basel II VaR risk measure does not. In contrast, the industry proposal leads to a genuine coherent risk measure that in addition provides a simple mechanism to control the diversification level.

1. Coherence and the aggregate risk measure

On the consultative document "Fundamental review of the trading book" (FRTB) the Basel Committee on Banking Supervision (BCBS) proposes the use of Expected Shortfall (ES), see Sec. 3.2.1 in Ref. [1], as the main risk measure in defining the risk-based capital. There are several reasons to favor the ES over Value at Risk (VaR). The most important are: the ability of ES to take explicitly under consideration the magnitude of the extreme loses beyond a certain confidence level, and the favorable mathematical properties that the ES risk measure enjoys, namely the coherence.

We remind the reader that a risk measure is called coherent if it is translation invariant, monotonic, positive homogeneous, and sub-additive. In general VaR is not sub-additive and so it is not a coherent risk measure. In contrast, the ES risk measure is sub-additive and is thus a genuine coherent risk measure.

The risk-based capital formula proposed in FRTB, Sec. 4.5.6 in Ref. [1], is in essence an aggregation of the standalone risk class ES's, involving a supervisor-prescribed correlation matrix. More precisely, the risk measure used in the definition of the regulatory capital can be written as

$$R(X) = \left[\sum_{i=1}^{N} ES[X_i]^2 + \sum_{i\neq j}^{N} \rho_{ij} L_i L_j ES[X_i] ES[X_j]\right]^{1/2}, \tag{1.1}$$

where $\{X_i\}_{i=1\cdots N}$ the set of the risk class components of portfolio $X = \sum_{i=1}^{N} X_i$. The correlations ρ_{ij} are supervisor-prescribed quantities, and the L coefficients are equal to ± 1 according to the long/short position of the underlying risk class[1].

The central question that is the focus of this section can be formulated as follows. While the ES is a coherent risk measure, is the aggregate risk measure, $R(\cdot)$ from Eq. (1.1), also a coherent risk measure?

The answer is no. We prove this by giving a simple example where the risk measure $R(\cdot)$ is super-additive.

Let us assume that there are only 2 risk classes. And let $X = X_1 + X_2$ and $Y = Y_1 + Y_2$ be two portfolios, where X_1 and X_2, and Y_1 and Y_2 are the risk class components (projections) of X and Y, respectively. We want to analyze the relation between $R(X + Y)$ and $R(X) + R(Y)$.

We assume that the portfolio X is long both risk classes, 1 and 2, and we write this as $X \sim (L, L)$. Similar, we assume that $Y \sim (L, S)$ is long the first risk class and short the second risk class, such that the total portfolio $X + Y \sim (L, L)$ is long both risk classes. These characteristics define completely the values of coefficients L entering in Eq. (1.1).

In order to simplify the problem further, we assume that X_i and Y_i are normally distributed random variables with mean zero and variance σ^2. Moreover, we assume that the correlations between X_1 and Y_1, and X_2 and Y_2 are zero.

It is well known that under Gaussian assumptions the ES of a given portfolio is proportional to the square root of the portfolio variance. The proportionality coefficient, c, is dependent only on the confidence level. Thus, under the above assumptions, the aggregate risk measure for X is given by

$$R(X) = \sqrt{2}\, c\sigma(1 + \rho)^{1/2}, \tag{1.2}$$

[1] The long or short character of a portfolio is given by the sign of the delta sensitivity -- see "Industry Response to the Fundamental Review of the Trading Book" for potential ambiguities in defining these quantities.

where we have taken under consideration that $L_1 = L_2 = 1$ for $X \sim (L, L)$. Here ρ is the supervisor-prescribed correlation coefficient between risk classes 1 and 2. A similar expression holds for Y portfolio, *i.e.*,

$$R(Y) = \sqrt{2}\, c\sigma(1-\rho)^{1/2}, \tag{1.3}$$

where $L_1 = 1$ and $L_2 = -1$ since $Y \sim (L, S)$, explaining the negative sign in front of ρ. For the total portfolio $X + Y$ the aggregate risk measure has the following expression

$$R(X+Y) = 2c\sigma(1+\rho)^{1/2}, \tag{1.4}$$

where under our assumptions, the variance of $X_i + Y_i$ is $2\sigma^2$ and $L_1 = L_2 = 1$ since $X + Y \sim (L, L)$.

It is easy to observe that the equation $R(X+Y) = R(X) + R(Y)$, as a function of ρ, has a unique root for $\rho = 1/\sqrt{2}$. Thus, we conclude that for any supervisor-prescribed value for correlation bigger than $1/\sqrt{2}$ the aggregated risk measure is super-additive, *i.e.*,

$$R(X+Y) \geq R(X) + R(Y) \qquad (\forall)\, \rho \geq \frac{1}{\sqrt{2}}\,. \tag{1.5}$$

Therefore, the aggregate risk measure entering in the expression of the risk-based capital formula from FRTB, Sec. 4.5.6, is not a coherent risk measure.

Analyzing the above example one may be tempted to conclude that the presence of L coefficients in Eq. (1.1) are the culprit leading to the violation of the coherence. We mention that it can be proved (in a rather complicated fashion) that even after eliminating the L coefficients, Eq. (1.1) does not lead to a coherent risk measure.

A better approach may be to consider the ES of the aggregated portfolio as the risk measure defining the risk-based capital. In this case the correlation matrix between the risk classes will be picked up naturally by a historical simulation approach, making superfluous the need for a supervisor-prescribed inter-risk class correlation matrix.

2. Remedies

In the previous section we concluded that the aggregate risk measure defining the risk-base capital from FRTB, Sec. 4.5.6, is not a coherent measures. Moreover, the coherence, through the sub-additivity property, is violated even under simple Gaussian assumptions.

In this section we turn our attention to the recently proposed risk-based capital formula presented in the "Industry Response to the Fundamental Review of the Trading Book" (IR-FRTR) document, Ref. [2].

The risk measure implied by the risk-based capital formula from Sec. 6.3, Ref. [2], can be written as

$$R(X) = (1-\alpha)\sum_{i=1}^{N} ES[X_i] + \alpha\, ES[X], \tag{2.1}$$

where we use the same notations as in the previous section, with X being the aggregated portfolio and X_i being its risk class components. The coefficient α takes values between 0 and 1 and is a supervisor-prescribed quantity controlling the level of diversification.

The r.h.s. of Eq. (2.1) is a liner interpolation formula between the ES of aggregated portfolio and the sum of the standalone ES's of risk class components. Thus, $R(\cdot)$ from Eq. (2.1) is a coherent risk measure as the sum of positively weighted coherent risk measures.

We mention that the aggregate risk measure from Eq. (2.1) is in the spirit of the FRTB document, in the sense that it provides a mechanism to control the level of diversification without compromising the coherence property introduced by the adoption of the ES risk measure.

3. Final Remarks

We have shown that the aggregate risk measure entering in the risk-based capital formula proposed in the FRTB document, Sec. 4.5.6 (Ref. [1]), is not a coherent risk measure. The coherence is violated even in a simple Gaussian setup. We stress that the VaR risk measure entering in the Basel II risk-based capital formula is coherent under Gaussian assumptions. VaR violates the coherence only in extreme cases of heavy tail distributions of returns that are rarely seen in practice. From this point of view it appears that the FRTB proposed aggregate risk measure is weaker than the Basel II VaR, in the sense that it is expected to violate the coherence even for cases with realistic values of correlation parameters.

On the other hand, the aggregate risk measure presented in the IR-FRTB document, Sec. 6.3 (Ref. [2]), is a genuine coherent risk measure. Moreover, it supports the BCBS requirement in providing a mechanism to reduce the diversification benefit to a supervisor-prescribed level. From this point of view, this aggregate risk measure appears to be superior to the Basel II VaR and to the FRTB version.

References

[1] "Fundamental review of the trading book", Basel Committee on Banking Supervision, May 2012, http:\\www.bis.org\publ\bcbs219.pdf

[2] "Industry response to the Fundamental Review of the Trading Book" - *Draft*, ISDA , Aug 2012, *work in progress*.