
To: Credit Risk Standing Group Date: 30 July 2007

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Subject: **Use of variable scaling factors to derive long run probabilities of default for Retail portfolios**

Introduction

1. The FSA put forward a note to last November's CRSG, setting out the background to, and the circumstances under which we would allow, in PD estimation for Retail exposures, what we described as varying scaling factors. Broadly speaking these are transformations of the outputs of relatively point in time (PiT) models to produce final estimates for IRB purposes that are based on portfolio level average long run default rates; with the consequence that they reduce/eliminate the cyclicity of the regulatory capital requirement as far as the PD parameter is concerned.
2. In summary we said that it was acceptable in principle for firms to use such approaches provided:-
 - a) They met 4 principles which focused on what we saw as the considerable conceptual and technical challenges which needed to be overcome in order to carry out such adjustments in an appropriate way;
 - b) Their stress testing included an additional "once in 25 years" stress test based on the PDs of the underlying PiT rating system, in addition to the stress test based on the parameters used in the Pillar 1 capital calculation (i.e. the portfolio level average long run default rates); and
 - c) They were able to understand and articulate up-front how the scaling factor would vary over time in order to achieve the intended effect.
3. **The purpose of this paper is, in the light of our experience with firms over the last 9 months, to inform the industry of our latest thinking on how the 4 principles might be met, and how we will react to firms who put forward approaches that do not yet meet these principles.**
4. **In particular the high level conclusion arising from this paper is that a firm who wishes to use a varying scalar approach, and whose underlying PiT models are acceptable, will be allowed to do so provided:-**
 - a) **It is able to meet Principles 2 and 3 in the original CRSG paper;**

- b) **It is able to produce a well thought out road map, supported by commitment from the senior management of the firm, as to how it will meet Principle 1 and 4, and therefore achieve full-compliance with the FSA's standards as set out in this and the previous paper, by end 2009; and**
 - c) **The PDs resulting from its varying scalar approach will not be allowed to fall below the PDs resulting from the underlying PiT models until it is deemed by the FSA to be in full compliance,.**
5. **Firms should work on the assumption that, if they are not able to achieve full compliance by end 2009, they will not be able to continue to use the variable scalar approach.**
6. For readers who are not fully acquainted with the background, this paper needs to be read in conjunction with the earlier note to the CRSG (and which is accordingly recirculated to CRSG members at this time as an Appendix to this paper).

The Four Principles

7. In the earlier note these were identified as follows:-

Principle 1: Both the initial calculation of and subsequent changes to the scalar must be able to take account of changes in default risk that are not purely related to the changes in the cycle.

Principle 2: A firm must be able to accurately measure the long run default risk of its portfolio even if there were no changes in the business written.

Principle 3: A firm must use a data series of appropriate length in order to establish the long run default risk.

Principle 4: A firm must be able to demonstrate the appropriateness of the scaling factor being used across a portfolio.

8. We would make the following observations as regards these principles:-
- To some extent the distinctions made between these principles are arbitrary, and are simply the attributes that we would expect a variable scalar rating system to display. The principles were broken down in this way to reflect the steps that we observed firms going through in order to arrive at "long run default rates" for residential mortgages.
 - Of the four principles, the one that is most challenging across the board, and most important to get right for residential mortgages, is Principle 1.
 - As is explained below there is a natural connection between the first and fourth principles, as we now believe that the proper application of the first principle will result in the fourth principle being automatically satisfied.
 - While the CML data provides at least a basis (see below) for satisfaction of Principle 2 as far as residential mortgages are concerned, the lack of an equivalent database for

other forms of retail lending makes satisfaction of even this principle accordingly harder at this time for firms with non-mortgage portfolios who lack internal data.

Long run default rates

9. This section of this paper seeks to reprise and confirm the nature of the default rate required for IRB purposes, as our experience suggests that there is still some confusion amongst firms on this basic point.
10. Estimates of PD should measure the **willingness** and **ability** of a borrower to meet scheduled payments under the relevant facility. If either of these change, then the PD should rise or fall commensurately. This is in principle well-addressed by PIT estimates. Under a pure PIT scorecard such fluctuations should result in a rise or fall in the score assigned to that facility.
11. The IRB requirement is for the PD to be the average of long run default rates – what the average default rate is expected to be over a representative mix of good and bad economic periods. No further elaboration is needed for a pure PIT scorecard, as all changes in willingness or ability to repay should be reflected in migration to a different score.
12. However if the rise or fall in willingness or, more likely, ability to repay is due entirely to changes resulting from fluctuations in the economic cycle, then such changes may in effect be averaged away. This is the essence of allowing non-PIT rating systems. For firms using the long run default rates of such a system, the PD estimate they are targeting is what the average default rate of each score (or range of scores, or pool, or grade) is expected to be over a representative mix of good and bad economic periods.
13. Where a firm is using a variable scalar approach then its primary focus is on a long run portfolio default rate, and it is less immediately obvious how this should vary. In particular we are well aware that actual default rates incurred on any given portfolio will vary over time for reasons other than purely related to the impact of the economic cycle on its customers. For example its mix of customers will change (e.g. more or less first time buyers), the attitudes of consumers in general as regards credit may change (e.g. greater propensity to enter bankruptcy arrangements), and a firm's risk appetite as regards its customers is also likely to vary. Meeting Principle 1 requires a firm to be able to distinguish such movements from changes purely related to the economic cycle, and not to average these away. For example, scalar calculations will have to account for changes in the non-cyclical risk of the portfolio (e.g. portfolio mix) and changes in the structure of the market in which it is operating (e.g. greater propensity to enter bankruptcy).
14. Accordingly, for firms using variable scalars the long run default rate required is:-
 - a) The long run default rate expected over a representative mix of good and bad economic periods; assuming
 - b) The current lending conditions including borrower mix and attitudes and the firm's lending policies remain unchanged.

15. In essence, the true long-run average default rate of a firm's portfolio can only truly be measured by observing the default rates of the same portfolio with a constant market structure under different economic conditions.

An approach based on Segmentation

16. Our experience to date confirms our initial intuition that firms would find it extremely challenging to distinguish between the various factors that result in changes in incurred default rates across a portfolio. There is still much work to be done in this regard. However, at this time, we see the most promising avenues as being based on:-
 - a) Segmenting a portfolio by its underlying drivers of default risk; and
 - b) Estimating separate long run default rates for each of these segmented pools.
17. If done properly this will satisfy both Principle 1 and Principle 4. However we should re-emphasise that both elements of these remain challenging tasks. Both the choice of the basis of segmentation and the calibration of the estimated long run default rate for the segments are critical issues. In practice this could be seen as building a through-the-cycle rating system which estimates the average long-run default rates for homogenous risk segments of the portfolio.
18. Segmentation needs to be done on the basis of the main drivers of both **willingness** and **ability** to pay. In the context of residential mortgages an example of the former is the amount of equity in the property and an example of the latter is debt to income.
19. Firms should be trying to incorporate as many drivers of risk as possible within the segmentation, as this will maximise the accuracy of the system. Given the significance of the choice of drivers, firms will need to provide detailed explanations supporting their choices, including an explanation of the drivers they have considered and chosen not to use. We would also expect the drivers to reflect the firm's risk processes and lending policy, and therefore not chosen only using statistical criteria (i.e. a judgemental assessment of the drivers chosen must be applied). Firms can expect a robust challenge from the FSA on these choices.
20. Mirroring what we see in wholesale rating systems, change in non-cyclical risk needs to be reflected in movements of existing exposures between segments (as well as in a different pattern of allocation to new exposures to the various segments). It is not therefore suggested that the drivers should themselves necessarily be non-cyclical, and one of the challenges that firms need to overcome is how to apply this approach with a driver such as the amount of equity that can vary for both cyclical and non-cyclical reasons.
21. To the extent that the basis of segmentation is itself insufficient to completely explain movements in non-cyclical default risk, then the long-run default rate for that segment will not be stable (e.g. a change in the mix of the portfolio within the segment could change the long run default rate). Therefore, there needs to be a compensating adjustment to the calibration of the long run PD or underlying PiT models for the affected segments. This is considered a second-best solution as it is inevitable that a significant, and possibly excessive, element of "judgment" will need to be applied in making such adjustments. Such judgment will need to be applied with perhaps

considerable conservatism – but it is emphasised that conservatism applied for this reason should not be removed as the cycle changes.

22. Putting to one side the need to adjust the segment PDs as set out in the previous paragraph, it will be the case that over time the actual default rates incurred in each segment will form the basis of the PD estimate for the segments. However, unless firms are able to robustly segment their portfolios back to the early 1990s, this will not be the case for some years, i.e. at least until there is another economic downturn in the UK. This being the case, the key calibration issue will be the setting of the initial long run default rate for each segment, as this will underpin the PD of the entire portfolio for some years to come. This will also therefore receive particular scrutiny from the FSA and, again, conservatism will need to be applied.
23. Subsequently, on a regular (at least an annual) basis, a firm will need to review and amend as necessary the long run default rate to be applied to each segment. We envisage that firms following the variable scalar approach will be applying the scalars to the scores produced by its PiT models. Where this is the case, they will need to review/amend both the appropriateness of the PiT PD for each score and the scalar to be applied. Firms may find the use of stress testing techniques to be helpful in this regard.
24. This process will require firms choosing to use the variable scalar approach to have a deep understanding of how and why its default rates vary over time. However we think this is particularly necessary in this case as such a firm wishes to reduce its PDs at a time of vulnerability below those produced by its business scorecards.
25. Firms will need to put into place a governance process to provide a judgmental overlay to assess their choices of segments, PD estimates and scalars, both initially and during subsequent reviews. Moreover, where the basis of their estimation is some kind of formulaic approach, firms are reminded that either accepting or adjusting the estimate suggested by the formula represents the exercise of judgment.
26. As mentioned earlier, we would expect a review to occur at least annually or when a material change to the scalar occurs (suggesting a material change in economic conditions). As part of their reviews the governance process will need to consider the extent to which the recent realised default rates and the outlook suggest either:-
 - a) Realised default rates are changing due to cyclical factors and the scaling factors needs to be changed;
 - b) New information suggests that both the PiT PDs and the long run PDs need to be changed;
 - c) New information suggests that the basis of segmentation needs to be amended.
27. The following represents an example of the thinking we expect a firm to apply. *A segment is expected in benign conditions to incur an average default rate of 0.5% p.a. A "4 times" scalar is applied which results in a long run PD estimate of 2% for that segment. Actual experience over a recent period shows the actual default rate to be 1.5%. The review shows that the economic conditions remain benign, and that the*

predominant cause of the increase in default rates was the consequences of widespread flooding.

28. *It would not be appropriate to amend the scaling factor as there has been no change in economic conditions. It would also not be appropriate to amend the PiT calibration from 0.5% to 1.5% as flooding on such a scale is not expected to recur every year. However the firm should consider whether the evidence suggests that there is a permanently increased possibility of flooding which would indicate a rise in the PiT PD above the previous level of 0.5%, through a recalibration affecting some or all exposures in the segment; and consequently a rise in the long run default rate above 2% as the scaling factor remains at 4.*
29. Firms should consider what use they can make of industry information. However they are also reminded that we are seeking to measure the absolute level of and changes in their own default risk, not how their default risk has changed relative to the industry as a whole. The distinction between cyclical and non-cyclical changes is not the same as the distinction between systematic and idiosyncratic factors. For example, we would expect a variable scalar approach (or indeed any through the cycle rating system) to average out movement in default rates due to changes in the economy, but not movement in default rates due to changes in the market structure or due to a factor such as greater take-up of IVAs. Accordingly it is not a mitigant that a firm's default risk is changing in the same way as the industry as a whole.
30. Firms will need to demonstrate to the FSA that they have adequate information and process in order to make the decisions outlined in the preceding paragraphs, and we would expect this to be reflected in the reports and information being used to support the variable scalar governance process. Given that, for Retail business, the decisions seem likely to affect only the regulatory capital requirements of the firm and not the day-to-day running of its business, the use test seems likely to be met only weakly in respect of this process. Accordingly the FSA has some scepticism over firms' ability to adequately maintain this governance process, and will be looking for a high level of reassurance and commitment from firms' senior management in this regard.

Some considerations for Principles 2 and 3

31. Amongst the points made in the previous note to CRSG as regards UK mortgages were:-
 - a) As regards Principle 2, the commonly used CML database was based on arrears data and not defaults during a period, and this undermines the accuracy of the calculations that firms are making as regards long run default rates;
 - b) As regards Principle 3, the historical data time period chosen for use in the calculations will vary the long run PDs and thus capital requirements for no change in the underlying risk.
32. While firms do recognise both these points in principle, we do observe a reluctance to address their implications, and we therefore include in this paper some further more specific material on our expectations.

33. Where firms are including mortgage arrears data as a proxy for default data, they should:-
- a) Carry out sensitivity analysis which identifies the circumstances in which the assumption that arrears may be used as a proxy for default will produce inaccuracy in its long run PD estimates;
 - b) Set a standard for what might constitute a potentially significant level of inaccuracy, and demonstrate why in practice the use of this proxy will not result in any significant inaccuracy in its particular case;
 - c) Institute a process for assessing the ongoing potential for inaccuracy, including trigger points beyond which the level of inaccuracy may no longer be insignificant; and
 - d) Consider the use of conservative adjustments to address the potential inaccuracy.
34. Where firms are using historical mortgage data as a key input into their variable scalars, they should:-
- a) Carry out sensitivity analysis which identifies the implications of using different cut-off dates for the start of the reference data set; and
 - b) Justify the appropriateness of their choice of cut-off date.
35. As this is in part a level playing fields issue, CRSG members input is sought as to whether, and if so how, steps should be taken to deliver consistency between the estimates of various firms as regards this specific point. For example, Industry Guidance might be a possibility.

Road map to compliance

36. We recognise that, as regards the “Approach based on Compliance”, firms are still some way from being able to achieve the required standard. However given the fundamental nature of an approach to capital requirements which allows a firm to reduce its measures of credit risk (for some internal purposes, and also external reporting, as well as regulatory capital) at a time when risk measured by realised default rates is increasing we think these standards are necessary.
37. However we do not want to discourage the use of variable scalars, and also recognise that protection against inappropriate use of such mechanisms at this time is provided by the presence of the floors on reductions in capital requirements, and by the present state of the economic cycle in the UK which results in varying scalars producing increases in Pillar 1 requirements over the PiT approaches we would be prepared to accept.
38. Accordingly, as set out at the start of this paper, a firm who wishes to use a variable scalar approach, and whose underlying PiT models are acceptable, will be allowed to do so provided:-
- a) It is able to meet Principles 2 and 3 in the original CRSG paper;

- b) It is able to produce a well thought out road map, supported by commitment from the senior management of the firm, as to how it will achieve full-compliance with the FSA's standards as set out in this and the previous paper, by end 2009; and
 - c) Until it is deemed by the FSA to be in full compliance, the PDs resulting from its varying scalar approach will not be allowed to fall below the PDs resulting from the underlying PiT models
39. Firms should work on the assumption that, if they are not able to achieve full compliance by end 2009, they will not be able to continue to use the varying scalar approach.