

Consistency and credit risk models

If banking supervisors are to allow use of credit risk models to calculate regulatory capital requirements, how can they be sure the figures they are receiving are accurate?

By David Rowe

Last month, I talked about two desirable, but often conflicting characteristics of regulatory reports: comparability and usefulness. Comparability requires two things. The first is common units of measurement across institutions. The second is consistent, though not identical, methods for deriving these measures. Consistency is relevant even for traditional regulatory reports. For example, reporting of loans broken down by categories such as “uncriticised”, “special mention” and “doubtful” assumes a consistent framework for making such judgements across institutions. Evaluating the basis for such judgements is an important part of the bank examination process. The categories cited are an American banking supervisory convention, and bank examiners strive to assure a consistent basis for making such classifications across different institutions. As the measures involved in reporting become analytically more complex, ensuring consistent derivation across institutions grows more difficult.

As market risk models illustrate, consistent derivation is not the same as the use of identical methodologies. Market value-at-risk can reasonably be derived by any one of three main methods.¹ Furthermore, implementation of any one of these will necessarily reflect a series of detailed technical choices made in different ways in different institutions. While the units of measurement are the same (potential loss at a given confidence level over a given holding period), the analytical processes for arriving at these estimates differ.²

How then can the consistency of the results be assured despite these differing estimation methods. For market risk, the regulatory solution to this quandary is back-testing. While the mandated VAR estimates must reflect a 10-day horizon, these are generally based on calculations of daily VAR scaled by the square root of 10.³ As daily VAR based on closing positions can be compared with actual P&L for the following day, a time series of potential loss versus actual P&L can be built up fairly quickly.

In addition, a hypothetical “static position P&L” can be calculated by applying day-to-day price changes to the previous day’s positions. Comparing this with the VAR estimates constitutes a purer test of the risk methodology because it eliminates the impact of intra-day position changes that affect the actual P&L.⁴

Unfortunately, there is no such readily available basis for back-testing credit risk models. Credit losses need to be modelled over a much



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longer time horizon than makes sense for market-related trading losses. In addition, what needs to be estimated is the tail of the distribution of credit losses, not just the expected level. Accurate analysis of the likelihood of outliers requires especially large quantities of data.

Finally, even if sufficient historical data existed for back-testing, they would be drawn from such a long period that structural changes would probably undermine the accuracy of the estimate. Certain types of credit exposure, such as auto loans and credit card receivables, can be validated through a form of back-testing. For many types of exposures, however, back-testing of the kind applied for validating market risk VAR models is simply not an option for credit risk models.

How then can we assure reasonable consistency of credit risk capital estimates derived using analytical approaches that are at least as diverse as those used for market VAR? I believe this will require much more continuous oversight and sophisticated judgement on the part of regulators than is the case for market risk models. As the Global Association of Risk Professionals (Garp) pointed out in its response⁵ to the Bank for International Settlements’ consultative paper on credit risk modelling⁶, the appropriate threshold for judging the adequacy of such models should be “material incremental improvement over the simple, clear-cut, but very approximate rules first laid out in 1988”. Furthermore, credit risk models cannot

be applied in nearly as mechanical a fashion as market VAR models. What is required is “model-assisted, numerically sophisticated analysis”.

What I have said elsewhere about model-based forecasts of economic activity is applicable to credit risk modelling as well. The process involves using the model to condition the judgement of the analyst in structured and disciplined ways. In both cases, judgement plays an important role in the final result. This implies that regulatory validation must include not only “the model or models” but also “the way they are used to compute the regulatory capital requirement”⁹.

Resulting demands

This type of review is not new to the regulatory process. It is, however, more similar to my original example of assuring reasonable consistency in the classification of loans by credit quality than in reviewing market VAR models. Maintaining consistency of model-based credit risk capital estimates across institutions will require continuous review of both the models and the process of their use by experienced regulatory staff. Such staff need to be highly knowledgeable in the field and able to hold their own in discussions with experts in the institutions they regulate. Without reasonable assurance that such a process can be sustained, it is unlikely that credit risk models will gain regulatory approval and we will all be the losers as a result. ■

¹ *Correlated aggregation, historical simulation and Monte Carlo simulation*

² *Some methods may be more reliable than others, especially when significant non-linearities exist in the relationship between portfolio values and market data realisations*

³ *The most appropriate method for estimating VAR over horizons longer than a day will be discussed next month*

⁴ *It should be noted that comparing VAR with next-day P&L is not a straightforward exercise. This is because booking errors undermine the statistical integrity of accounting data from a time-series perspective. Standard accounting practice is to fix a booking error on one day with a correcting entry on the next day or later. This distorts the P&L on both the day the error is made and the day it is corrected. Adjusting for such booking errors and their subsequent correction is a continuing chore in preparing meaningful back-testing comparisons*

⁵ *Response to Basle Committee on Banking Supervision’s ‘Credit Risk Modelling: Current Practices and Applications’*, Global Association of Risk Professionals, September, 1999

⁶ *‘Credit Risk Modelling: Current Practices and Applications’*, Basle Committee on Banking Supervision, April, 1999

⁷ *Garp, op cit, page 52*

⁸ *Ibid, page 52*

⁹ *Ibid, page 52. Emphasis in the original*