

the cash flows on the exposure cannot be projected with a reasonable degree of confidence.

Certain over-the-counter derivatives contracts and repurchase transactions may be subject to master netting agreements. In such cases, the bank may compute a single value of M for the transactions as a group by weighting each individual transaction's effective maturity by that transaction's share of the total notional value subject to the netting agreement, and summing the result across all of the transactions.

For IRB capital calculations, the value of M for any exposure is subject to certain upper and lower limits, regardless of the actual effective maturity of the exposure. In all cases, the value of M should be no greater than 5 years. If an exposure clearly has an effective maturity that exceeds this upper limit, the bank may simply use a value of M=5 rather than calculating the actual effective maturity.

For most exposures, the value of M must be no less than one year. For certain short-term exposures (repo-style transactions, money market transactions, trade finance-related transactions, and exposures arising from payment and settlement processes) that are not part of a bank's ongoing financing of a borrower and that have an original maturity of less than three months, M may be set as low as one day. For over-the-counter derivative and repurchase-style transactions subject to a master netting agreement, weighted average maturity must be set at no less than five days.

F. Validation

Values of PD, LGD, and EAD are estimates with implications for credit risk and the future performance of a bank's credit portfolio under IRB; in essence, they are forecasts. "Validation" of these estimates describes the full range of activities used to assess their quality as forecasts of default rates, loss severity rates, and exposures at default. Chapter 1 discusses validation of IRB systems in general; this section focuses specifically on ratings quantification, which includes the assignment of PD to obligor grades and the assignment of LGD, EAD, and M to exposures.

S. A validation process must cover all aspects of IRB quantification.

Banks must have a process for validating IRB quantification; their policies must state who is accountable for validation, and describe the actions that will proceed from the different possible results. Validation should focus on the three estimated IRB parameters (PD, LGD, and EAD). Although the established validation process should

result in an overall assessment of IRB quantification for each parameter, it also must cover each of the four stages of the quantification process as described in preceding sections of this chapter (data, estimation, mapping, and application). The validation process must be fully documented, and must be approved by appropriate levels of the bank's senior management. The process must be updated periodically to incorporate new developments in validation practices and to ensure that validation methods remain appropriate; documentation must be updated whenever validation methods change.

Banks should use a variety of validation approaches or tools; no single validation tool can completely and conclusively assess IRB quantification. Three broad types of tools that are useful in this regard are evaluation of the conceptual soundness of the approach to quantification (evaluation of logic), comparison to other sources of data or estimates (benchmarking), and comparisons of actual outcomes to predictions (back-testing). Each of these types of tools has a role to play in validation, although the role varies across the four stages of quantification.

Evaluation of logic is essential in validating all stages of the quantification process. The quantification process requires banks to adopt methods, choose variables, and make adjustments; each of these actions requires an exercise of judgment. Validation should ensure that these judgments are plausible and informed.

A bank should also validate estimates by comparing them with relevant external sources, a process broadly described as benchmarking. "External" in this context refers to anything other than the specific reference data, estimation approach, or mapping under consideration. Reference data can be compared with other data sources; choices of variables can be compared with similar choices made by others; estimation results can be compared with the results of alternative estimation methods using the same reference data. Other data sources may show that default and severity rates across the economy or the banking system are high or low relative to other periods, or may reveal unusual effects in parts of the quality spectrum.

Effective validation must compare actual results with predictions. Such comparisons, often referred to as "back-testing," are valuable comprehensive tests of the rating system and its quantification. However, they are only one element of the broader validation regime, and should not be a bank's only method of validation. Because they test

the results of the rating system as a whole, they are unlikely to identify specific reasons for any divergence between expectations and realizations. Rather they will indicate only that further investigation is necessary.

By applying back-testing to the reference data set as it is updated with new data, a bank can improve the estimation process. To further improve the process, a bank must regularly compare realized default rates, loss severities, and exposure-at-default experience from its portfolio with the PD, LGD, and EAD estimates on which capital calculations are based. Realizations should be compared with expected ranges based on the estimates. These expected ranges should take into account the bank's rating philosophy (the relative weight given to current and stress conditions in assigning ratings). Depending on that philosophy, year-by-year realized default rates and loss severities may be expected to differ significantly from the long-run average. If a bank adjusts final estimates to be conservative, it should likely do its back-testing on the unadjusted estimates.

A bank's quantitative testing methods and other validation techniques should be robust to economic cycles. A sound validation process should take business cycles into account, and any adjustments for stages of the cycle should be clearly specified in advance and fully documented as part of the validation policy. The fact that a year has been "unusual" should not be taken as a reason to abandon the bank's standard validation practices.

S. A bank must comprehensively validate parameter estimates at least annually, must document the results, and must report these results to senior management.

A full and comprehensive annual validation is a minimum for effective risk management under IRB. More frequent validation may be appropriate for certain parts of the IRB system and in certain circumstances; for example, during high-default periods, banks should compute realized default and loss severity rates more frequently, perhaps quarterly. They must document the results of validation, and must report them to appropriate levels of senior risk management.

S. The validation policy must outline appropriate remedial responses to the results of parameter validation.

The goal of validation should be to continually improve the rating process and its quantification. To this end, the bank should establish thresholds or accuracy tolerances for validation results. Results that breach thresholds