

bank compares additional drawdowns to the total commitment but undrawn amount that existed at the start of a fixed interval prior to the date of the default (the horizon). For example, the bank might base its estimates on a reference data set that supplies the actual exposure at default along with the drawn and undrawn amounts (as well as relevant drivers) at a date a fixed number of months prior to the date of each default, regardless of the actual calendar date on which the default occurred. Estimates of LEQ are computed from the average drawdowns that occur over the fixed-horizon interval, for whatever combinations of the driving variables the bank has determined are relevant for explaining and predicting exposure at default.

Evidence may indicate that LEQ estimates are positively correlated with economic downturns; that is, it may be that LEQs increase during high-default periods. If so, the higher drawdowns that occur during high-default periods are denoted "stress-condition LEQs," analogous to the "stress-condition LGDs" discussed earlier in this chapter. For any exposure type whose LEQ estimates exhibit material cyclicity, a bank must use the stress-condition LEQ for purposes of calculating EAD.

In general, all available data should be used; particular observations or time periods should not be excluded from the data sample. Any adjustments a bank makes to the estimation results should be justified and fully documented. The analysis should be refreshed periodically as new data become available, and a bank should have a process in place to ensure that advances in analytical techniques and industry practice are considered as they emerge and are incorporated as appropriate. LEQ estimates should be updated at least annually. Detailed documentation, ongoing validation, and adequate oversight are fundamental controls that support a sound estimation process.

Mapping

If the same variables that drive exposure in the reference data are also available for facilities in the portfolio, mapping may be relatively easy. However, the bank must still review the definitions to ensure that variables that seem to be the same actually are. If the relevant variables are not available in a bank's current portfolio information system, the bank will encounter the same mapping complexities that it does when mapping for PD and LGD in similar circumstances. A bank should have well-documented policies that govern the mapping. Any exceptions to mapping policy should be reviewed,

justified and fully documented. Mapping may be done for each exposure or for broad categories of exposure; the latter would be analogous to the "grade mapping" discussed earlier in this chapter.

Application

In the application stage, the estimated relationship between drivers and LEQ is applied to the bank's actual portfolio. To ensure that estimated EAD is at least as large as the currently drawn amount for all exposures, LEQs must not be negative. Multiple reference data sets may be used for LEQ estimation and combined at the application stage; those combinations should be rigorously developed, approved, and documented. Any smoothing or use of expert judgment to adjust the results should be well-justified and clearly documented. This includes any adjustment for definitions of default that do not meet the supervisory standards. The less robust the process, the more conservative the result should be.

Some facility types may be treated as exceptions, and assigned an LEQ that does not vary with characteristics such as line of business or risk rating. Such exceptional treatment should be clearly justified, and the justification should be fully documented.

EAD may be particularly sensitive to changes in the way banks manage individual credits. For example, a change in policy regarding covenants may have a significant impact on LEQ. When such changes take place, the bank should consider them when making its estimates—and it should do so from a conservative point of view. Policy changes likely to significantly increase LEQ should prompt immediate increases in LEQ estimates. If a bank's policy changes seem likely to reduce LEQ, estimates should be reduced only after the bank accumulates a significant amount of actual experience under the new policy to support the reductions.

E. Maturity (M)

A bank must assign a value of effective remaining maturity (M) to each credit exposure in its portfolio. In general, M is the weighted-average number of years to receipt of the cash flows the bank expects under the contractual terms of the exposure, where the weights are equal to the fraction of the total undiscounted cash flow to be received at each date. Mathematically, M is given by:

$$M = \sum_t t \times w_t$$

where w_t is the fraction of the total cash flow received at time t , that is:

$$w_t = C_t / \sum_t C_t$$

C_t is the undiscounted cash flow received at time t , with t measured in years from the date of the calculation of M.

Effective maturity, sometimes referred to as "average life," need not be a whole number, and often is not. For example, if 33 percent of the cash flow is expected at the end of one year ($t=1$) and the other 67 percent two years from today ($t=2$), then M is calculated as: $M = (1 \times 0.33) + (2 \times 0.67) = 1.67$ for an effective maturity of 1.67 years. This value of M would be used in the IRB capital calculation.

The relevant cash flows are the future payments the bank expects to receive from the obligor, regardless of form; they may include payments of interest or fees, principal repayments, or other types of payments depending on the structure of the transaction. For exposures whose cash flow schedule is virtually predetermined unless the obligors defaults (fixed-rate loans, for example), the calculation of the weighted-average remaining maturity is straightforward, using the scheduled timing and amounts of the individual undiscounted cash flows. These cash flows should be the contractually expected payments; the bank should not take into account the possibility of delayed or reduced cash flows due to potential future default.

Cash flows associated with other types of credit exposures may be somewhat less certain. In such cases, the bank must establish a method of projecting expected cash flows. In general, the method used for any exposure should be the same as the one used by the bank for purposes of valuation or risk management. The method must be well-documented and subject to independent review and approval. A bank must demonstrate that the method used is standard industry practice, that it is widely used within the bank for purposes other than regulatory capital calculations, or both.

To be conservative, a bank may set M equal to the maximum number of years the obligor could take to fully discharge the contractual obligation (provided that the maximum is not longer than five years, as noted below). In many cases, this maximum will correspond to the stated or nominal maturity of the instrument. Banks must make this conservative choice (maximum nominal maturity) if the timing and amounts of