

Credit Risk Measurement: Avoiding Unintended Results

Part 4: Loan Loss Reserves and Expected Losses

by Peter O. Davis and Darrin Williams

This series emphasizes the nuances of credit risk measurement to avoid the consequences of applying methods developed for one use to those for which they are not appropriate. Parts 2 and 3 looked at two specific credit risk metrics: probability of default and loss given default. This article examines the potential pitfalls in comparing loan loss reserves to measures of expected loss. These two concepts are similar, but perhaps not as directly comparable as is often assumed.

For many bankers, the most familiar credit risk metric is the loan and lease loss reserve, often called simply the *loan loss reserve*. The allowance for loan losses provides for credit losses inherent in the bank's portfolio. According to conventional wisdom, the loan loss reserve is intended to absorb anticipated losses—not the worst or best case, but management's view of the most likely case.

The integration of bankwide credit risk metrics, a process already under way, has been accelerated by the introduction of Basel

II. Under the new Accord, qualifying banks will be able to use their internal expected loss credit models to drive their minimum regulatory capital requirements.¹ The growing use of internal credit models—an initiative accelerated by Basel II's capital requirements—has placed a more intense focus on the consistency of these models with other internal bank metrics, such as the loan loss reserve.

At this juncture, the question is whether the anticipated, or expected, loss reflected in the loan loss reserve is the same as the expected loss (see Figure 1 for a

definition of expected loss) found in banks' internal credit models. The short answer? No. That doesn't mean the two measures can't be compared. It just requires an understanding of how they differ and where they should converge.

Origins

The loan loss reserve was established in 1947² as a financial reporting measure for investors; expected loss was developed by financial engineers—often referred to as “quants”—for risk management. Many of the differences between the two measures

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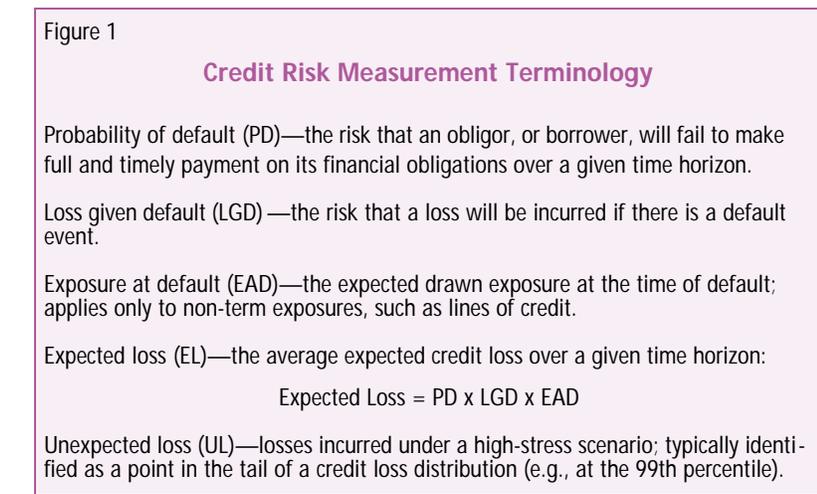
stem from their different origins.

Loan loss reserves are based on empirical data and management's judgment; complex models, when used, play a supporting role. The past several years have witnessed unprecedented scrutiny of the loan loss reserve by regulatory bodies. While concerns about earnings management and inadequate disclosure drive the Securities and Exchange Commission, bank regulators focus on capital adequacy and conservative reserve amounts. These differing viewpoints and heightened scrutiny have at times left the banking industry and public accountants feeling caught in the middle.³

The quants, meanwhile, developed the quantitative concept of *expected loss* (EL) versus *unexpected loss* (UL) to distinguish between "ordinary" credit losses and high-impact, low-frequency default events. The current framework for measuring credit risk—described in the first article in this series and embraced by bank regulators through Basel II—reflects an attempt to quantitatively measure credit risk. Originated in academia, this framework migrated to large banks and vendors as the models became more robust over the past 10-15 years. So there are two "versions" of expected loss: one originated qualitatively by banks from loan loss reserves, and the other quantitatively based on an EL/UL framework.

Comparing Loan Loss Reserves and Expected Loss

Conventional wisdom holds that reserves cover expected loss-

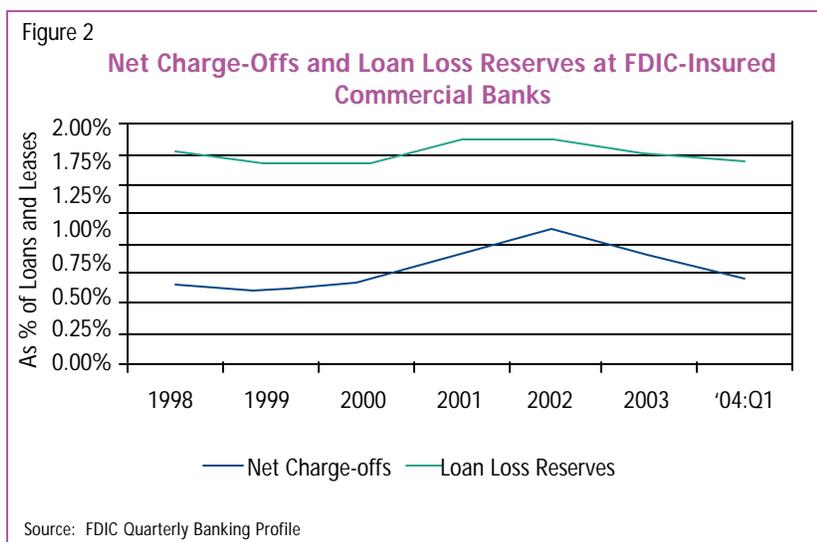


es and capital covers unexpected losses. But in the U.S., except at a very abstract level, expected loss and the loan loss reserve are never equivalent. Expected loss is defined as the product of PD, LGD, and EAD (see Figure 1) or the mean of a loss distribution, measured over a one-year horizon. Actual losses over a one-year horizon are approximated by the annual net charge-off rate.

If expected losses and loan loss reserves were the same, one would expect loan loss reserves to roughly equal a bank's annual net charge-off rate. As shown in

Figure 2, for U.S. banks this is not the case. Across the banking system, loan loss reserves currently are roughly double the annual charge-off rate. For banks with low charge-off rates, the ratio of loan loss reserves to charge-offs is typically much higher.

As a result, banks' loan loss reserves are somewhere well north of one-year expected losses, functioning partly like capital in the idealized EL/UL credit risk measurement framework. Recognizing that banks' reserves may exceed one-year expected losses, under Basel II banks will be



able to count a portion of their loan loss reserves in excess of EL as eligible capital. Figure 3 shows that reserves at U.S. banks typically fall somewhere between EL and UL (with capital conceptually held to withstand losses at the 99.9 or greater confidence interval).

Differences Between Loan Loss Reserves and Expected Loss

One might easily look at the difference between the loan loss reserve and expected loss and conclude that banks aren't being consistent in how they report risk. In fact, this isn't necessarily so. There are a number of reasons for the two metrics to differ, even if the underlying risks of default and recovery are measured the same. Here are five:

1. Time horizon.
2. Look-back period.
3. Unfunded commitments.
4. Expected versus incurred risks.
5. Charge-off versus economic loss.

Time Horizon

Thanks to Basel II, the industry has standardized around a one-

year time horizon for expected loss. However, for loan loss reserves, U.S. banks do not use a fixed time horizon. Some institutions either explicitly or implicitly (through conservative assumptions) use a life-of-the-loan time horizon. Reserves are held to cover all losses likely to be incurred for the outstanding portfolio, or reserves to cover a multi-year period. Others have adopted a "loss confirmation period" concept, where reserves are held to cover the time period from a credit event (e.g., major customer, leading to business failure) to charge-off. The time horizon may vary by product. For example, retail products may have a one-year-or-less time horizon, while commercial products may have multiyear time horizons. Still other banks have not explicitly established a time horizon.

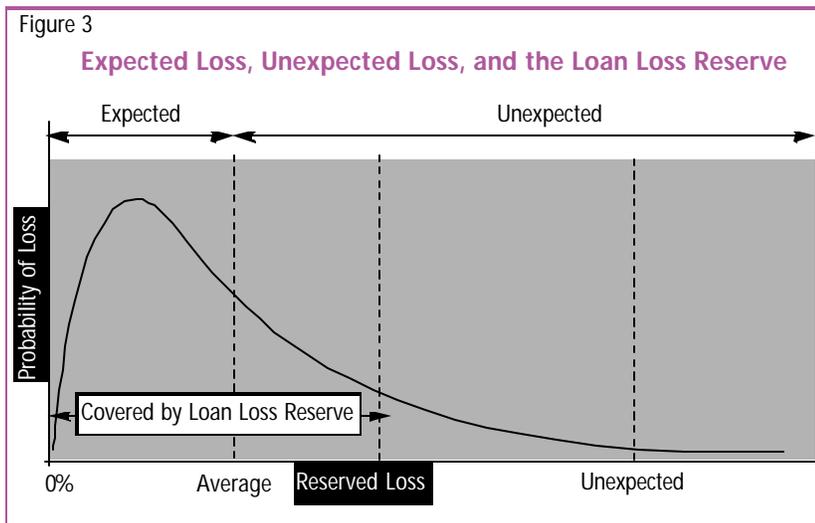
Clearly, an EL measure that is based on a one-year horizon cannot be directly compared to loan loss reserves that are based on a multiyear horizon. Differences in time horizon alone could result in major differences between a one-

year EL and reserves, even if both calculations relied on the same underlying default and loss given default models.

Look-back Period

The look-back period is the number of years of history on which the loss estimate is based. Banks that will use their internal models under Basel II to get to EL are required to base their default probabilities (PDs) and losses given default (LGDs) on at least five to seven years of data, respectively. No such requirement exists for calculating loan loss reserves. A bank may adopt a short or long look-back period as part of its overall loan loss reserve methodology. It may even choose to vary the look-back period by product.

When moving through the business cycle, differences in look-back periods will produce different results. Since a longer look-back period smooths the economic cycle, if different look-back periods are used for EL and loan loss reserves, the impact will be greatest around the trough/peak in the business cycle.



Unfunded Commitments

Expected loss typically includes unfunded commitments; loan loss reserves do not. Under Basel II exposure at default (EAD) assumptions, off-balance-sheet commitments are translated into loan equivalents and incorporated into expected loss. Under U.S. accounting rules, losses on unfunded commitments are included as an "other liability" on the balance sheet. To compare expected loss with loan loss reserves, the "other liability"

would need to be added to the loan loss reserve.

Expected Versus Incurred Risks

Expected loss estimates can incorporate the impact of future events. Loan loss reserves are set aside only for events that have already occurred.

For EL/UL frameworks, credit losses over the defined risk horizon (typically one year) are estimated based on events that have already occurred and that might occur during the risk horizon. As part of the UL modeling, future stress events (e.g., sudden changes in interest rates) are often built into the model. For reserving purposes, however, changes in the risk factor and the resulting losses need to have already occurred if reserves are to be set aside. For example, in determining loan loss reserves, a bank might consider the impact of current unemployment levels on consumer default rates, but it could not consider the default risk resulting from future increases in unemployment rates.

Charge-Off versus Economic Loss

Technical measurement issues around the calculation of loss can further complicate comparisons between loss metrics. Basel II states that loss given default should represent the economic

loss resulting from a default event. In calculating LGD, banks are required to include direct and indirect costs and to discount cash flows at a market-based discount rate. When calculating loan loss reserves, banks are prohibited from including personnel-related direct and indirect costs. In addition, when using the cash flow approach to setting specific reserves, banks are required to use each loan's effective interest rate for calculating the present value of the cash flows.

These seemingly small technical differences can have a significant impact on the resulting metrics. (The impact of differences in discounting approaches was highlighted in the previous article in this series.) They also add another layer of complexity when attempting to compare expected losses to loan loss reserves.

Convergence?

All of the articles in this series explore the theme of getting "under the hood" to see what metrics really measure. Expected loss and the loan loss reserve were developed for different purposes, in different eras, by different groups and for different audiences. It should not be surprising that they measure different attributes.

Given their different heritages, it should also not be surprising if they measure the same

thing differently. The EL/UL framework established for Basel II banks will require banks to take a closer look at the differences and similarities between the EL concept that will drive regulatory capital and the incurred loss concept that drives loan loss reserves. Differences that exist simply because the two metrics have grown up in different parts of the bank will need to be harmonized. (Excessive conservatism will need to be explained.) And differences that exist because of dissimilarities in the two measurement concepts will need to be better understood by all parties attempting to make a direct comparison.

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Notes

1. Under Basel II's Advanced Internal Ratings Based approach, banks will use their internal models/grading systems for measuring obligor probability of default, obligation loss given default, and exposure at default to calculate minimum regulatory capital levels. Banks will not be allowed to use their internal credit capital models.

2. Before 1947, most U.S. banks simply deducted loan losses from earnings or net worth as they occurred. In 1975, with the release of FAS 5, accountants clarified what belonged in the loan loss reserve.

3. The American Institute of Certified Public Accountants tried to bring clarity to the appropriate accounting treatment for reserves. Their five-year effort was reduced in scope early in 2004 because common ground could not be found among all interested parties.



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Credit Risk Measurement Under Basel II. K Munniksma. The Basel II IRB Approach for Credit Portfolios: A survey. Our results show that intensities of occurrence of credit events are significantly influenced by macro factors. View. Show abstract. Credit Risk Measurement: Avoiding Unintended Results - Part 2: Weighting on defaults - Knowing your institution's default metrics. Article. Jan 2004. Managing credit risk is a complex multidimensional problem and as a result there are a number of different approaches in use, some of which are quantitative while others involve qualitative judgements. Whatever the method used, the key element is to understand the behaviour and predict the likelihood of particular credits defaulting on their obligations. Finally, the fourth factor is the enforcement risk from the legal system in the debtor country. Because a creditor has to go through a foreign legal system, it has been known for debtors to use their domestic legal process to stall or attempt to avoid paying, claiming that rules from their home country apply. Another important credit risk is industry risk, which is a form of concentration risk. 4. Credit risk transfer and trading in credit markets. 5. Systemic risk across countries. 6. Risk measurement and market dynamics. 7. Stress testing and financial stability policies. Part 1 opening remarks, concluding remarks and dinner address. European central bank. Risk measurement and systemic risk. In 2007 all ECB publications. feature a motif taken from the €20 banknote. The results suggest that estimated extreme spillover risk in the US is higher than in the euro area, mainly as cross-border risks are still relatively mild in Europe. In contrast, extreme systematic risk is very similar on both sides of the Atlantic. Moreover, the evidence suggests that both forms of systemic risk have increased during the 1990s.