MOODY'S ANALYTICS

Reasonable and Supportable Forecasts— From Principles to Practice

Introduction

The new accounting standard Current Expected Credit Loss is principles based. The guidelines provided in the Financial Accounting Standards Board's 291-page Accounting Standards Update No. 2016-13 are intentionally short on specifics. But perhaps no part of the new standard has left financial institutions more confused than the requirement that forward-looking assumptions be "reasonable and supportable" (R&S). The term appears more than 50 times in the guidelines but is never defined, leaving it open to multiple interpretations. Related to the R&S concept is another commonly used CECL term lacking detailed explanation—reversion to historical loss information, or the appropriate treatment of the periods beyond the R&S horizon. With many of the larger SEC filers well ahead in their CECL preparations and gearing up for validation, this is an appropriate time to examine how the requirements of an R&S forecast and reversion may be interpreted.

Reasonable and Supportable Forecasts— From Principles to Practice

BY SOHINI CHOWDHURY AND CRIS DERITIS

The new accounting standard Current Expected Credit Loss is principles based. The guidelines provided in the Financial Accounting Standards Board's 291-page Accounting Standards Update No. 2016-13 are intentionally short on specifics. But perhaps no part of the new standard has left financial institutions more confused than the requirement that forward-looking assumptions be "reasonable and supportable" (R&S). The term appears more than 50 times in the guidelines but is never defined, leaving it open to multiple interpretations. Related to the R&S concept is another commonly used CECL term lacking detailed explanation— reversion to historical loss information, or the appropriate treatment of the periods beyond the R&S horizon. With many of the larger SEC filers well ahead in their CECL preparations and gearing up for validation, this is an appropriate time to examine how the requirements of an R&S forecast and reversion may be interpreted.

The R&S ambiguity

CECL requires financial institutions to provision for the lifetime losses from loans or leases they originate or acquire (and other scoped-in instruments), by considering historical information, current conditions, and R&S future conditions. The guidance states:

"The measurement of expected credit losses is based on relevant information about past events, including historical experience, current conditions, and reasonable and supportable forecasts that affect the collectability of the reported amount. An entity must use judgment in determining the relevant information and estimation methods that are appropriate in its circumstances."
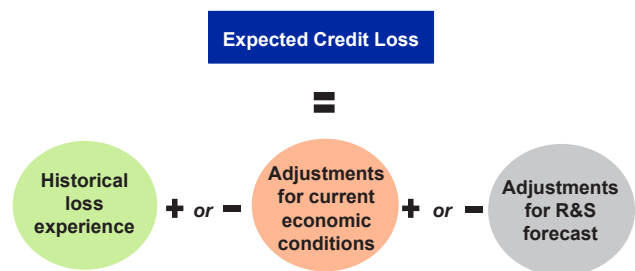
—Page 2, Financial Instruments— Credit Losses (Topic 326), FASB, No. 2016-13, June 2016

These requirements are represented schematically in Chart 1.

The third requirement, being the most subjective, is the most unclear. It is also perhaps the most significant difference between CECL and its predecessor—the "incurred loss approach" to allowance for loan and lease losses accounting as defined in Accounting Standards Codification 450-20 (formerly known as FAS 5).

While the CECL guidelines require the consideration of R&S future conditions, they also recognize that some institutions might not be able to forecast for the full life of their assets. In such situations, the guidelines allow institutions to forecast through the period that they can reasonably justify and revert to historical loss information after

Chart 1: CECL Formula in a Nutshell

that period. This historical loss information should be based only on historical data, and not controlled for current conditions or future expectations. The rationale is that for periods beyond which a reasonable forecast can be formed, historical performance is the best indicator.

With this, the obvious questions are:
1. What is an appropriate R&S forecast horizon?

2. After the R&S time horizon, how should an entity revert to its historical loss information?

The remainder of this paper clarifies the responses of Moody's Analytics to these questions based on accounting literature, lessons learned from CECL implementations, and the nature and design of Moody's Analytics forecasts.

Approach 1: R&S period spans the entire contractual life[1] of the financial asset, or 'lifetime R&S'

An R&S period spanning the entire contractual life of the loan is only appropriate if these two conditions are met:

1. The macroeconomic forecasts that are inputs to the credit loss models— assuming the credit loss models use economic concepts as drivers—are R&S over the entire contractual life of the loan.
2. The credit loss models produce R&S estimates of losses over the entire contractual life of the loan.

If both conditions are met, then the entire contractual life of the financial asset can be considered R&S and the institution can elect a lifetime R&S.

What satisfies the first condition? Economic forecasts are considered R&S over the contractual life of the loan when they are produced by an economic model that incorporates interlinkages among the various sectors of the economy following well-accepted economic theory. The interlinkages are necessary to ensure that a shock to one sector, such as the financial sector, travels to the rest of the economy through the expected channels and with the expected sensitivities.

In addition, the economic model should be based on information from past business cycles and current conditions and reasonably project the economy in broad strokes for a couple of years out into the next business cycle. Beyond this period, the model

should produce a forecast that converges to a long-run equilibrium trend. Chart 2 shows the forecast of the annualized growth rate of U.S. real GDP as produced by the Moody's Analytics Global Macroeconomic Model. This entire 30-year forecast, which is shaded in the chart, can be considered R&S because it satisfies all the previously discussed criteria.

Along with the first condition, a financial institution also needs to satisfy the second condition if it wants to produce the lifetime R&S CECL estimate. For example, an institution cannot use a model that estimates credit loss built on a short history, as it will not meet the second condition. Such a model will not show how the institution's losses reacted to the previous business cycles and will not be able to produce reasonable projections of losses beyond the immediate near term. In this case, the financial entity cannot assume a lifetime R&S even though the economic forecasts are reasonable over the lifetime.
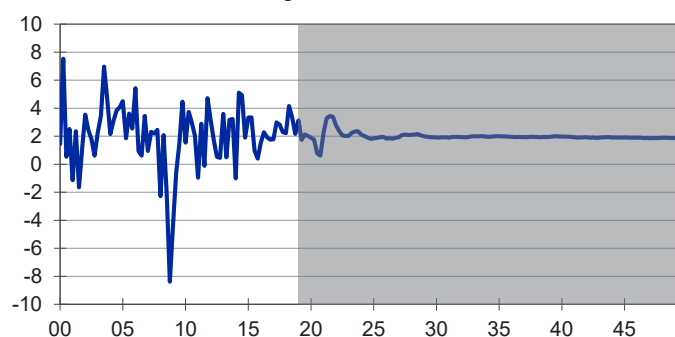
However, if the credit loss models indeed produce reasonable forecasts over the contractual life of the loan, the CECL calculations are straightforward. A financial institution can run its loss models over the contractual life of the loan based on the economic inputs. Since the economic forecasts used as inputs in this model converge over the long term to historical trends, the projected credit losses will also converge to some steady state. This will satisfy the CECL requirement of an R&S expectation of future losses.

R&S period shorter than the contractual life of the financial asset

If an institution cannot assume the entire contractual life of the loan as R&S, it will have to explicitly elect an R&S

period of a certain number of months or quarters. The losses over this R&S period will consider historical information, current conditions and future expectations. Beyond the R&S period, the institution will have to revert to historical loss information that reflects expected credit losses during the remaining contractual term of the financial asset.

This requirement shows the FASB's emphasis on the relevance of known loss experiences that have occurred in the past. However, the FASB's guidance makes it clear that while historical loss information may be adjusted to account for differences in the asset's current risk, it may not be adjusted to account for current economic conditions and expectations of future conditions.

This condition is meant to simplify the estimation process and to address concerns about the reliability of estimated losses in periods of declining precision. The reversion to historical loss information may occur at the input level or be based on the entire estimate, that is at the output level. The mechanism of both approaches is discussed below.

Approach 2: Reversion in inputs

Here the economic forecasts are determined by an economic model only for the R&S period elected by the institution. After the R&S period, these forecasts are reverted, either immediately or gradually, to some level that reflects average historical behavior over a "reversion period" and is elected by the institution. The

Chart 2: Moody's Forecast Is R&S Over Life
U.S. real GDP, annualized growth rate, %

Sources: BLS, Moody's Analytics

---

1   Throughout this paper, "contractual life" refers to contractual life adjusted for prepayments.

forecasts then stay at this level during the entire "post-reversion" period. The entire forecast, composed of the R&S period, the reversion period, and the post-reversion period, is then used to estimate the lifetime credit loss.

Suppose the credit loss model used for CECL by a certain financial institution has only one economic driver—the U.S. unemployment rate. And the institution has decided to go with a two-year R&S period, during which it uses the forecasts from the Moody's Analytics Global Macroeconomic Model. At the end of the two-year period, the institution must ignore the forecasts produced by the model and instead revert to some historical level. Also, suppose the institution chooses to revert to the historical average—the arithmetic mean calculated over all the past unemployment values during a certain historical period.

Here is where the institution must decide how many historical datapoints to consider. Assuming the entity chooses a lookback period of five years, the historical average unemployment rate over this period is 4.6%. This is the level of the unemployment rate to which the entity will revert over the reversion period.

Suppose the entity chooses a reversion period of one year and a straight-line reversion method. After reversion is completed, the unemployment rate forecast stays at 4.6% during the entire post-reversion period. The 30-year forecast of the unemployment rate using these user-defined parameters is compared with the Moody's Analytics 30-year forecast in Chart 3.

Approach 3: Reversion in outputs

In this approach the losses over the R&S period are produced by the credit models. Beyond the R&S period, the losses are reverted, either immediately or gradually, to some level that reflects historical loss information. This level is usually an average loss calculated over a certain lookback period that does not consider current conditions or future expectations, although it may be adjusted to account for changes to the current risk of assets.

Chart 4 shows an example of how an institution may apply reversion in outputs in practice. In this example, the institution elects an R&S period of three years, during which it uses its credit model to produce estimates of the monthly loss rates. Thereafter, the institution chooses to revert to a historical average loss rate of 0.1% either immediately or over a one-year period using straight-line reversion. The loss rates stay at this level throughout the post-reversion period.

Which approach to use

Since all three approaches are acceptable in CECL, an institution's choice will ultimately depend on its understanding of the requirements of each approach, ability to support it, capacity to explain and document it, and the operational costs and benefits.

In both the input and output reversion approaches, the forecast is broken into three distinct time periods—the R&S period, the reversion period, and the post-reversion period. Since the forecast over each period is produced using different rules, or "mechanics," each portion of the forecast will require separate validation.

Institutions will need to defend their choice of the R&S period, the reversion period, the reversion technique, and the lookback period over which they calculate the historical averages, because these choices will critically affect their estimate of lifetime losses. A shorter R&S period will direct auditors' attention to the "mechanics of reversion," since that, and not the model, will produce most of the forecast.

The chosen lookback period will also be subject to special scrutiny because it can significantly impact future loss estimates. Given the current U.S. economic expansion—the longest in the nation's history—economic fundamentals have been very strong in recent years and credit losses have been historically low. So, reverting in either input or output will most likely underestimate lifetime losses unless a lookback period of more than 10 years is chosen to include the Great Recession.
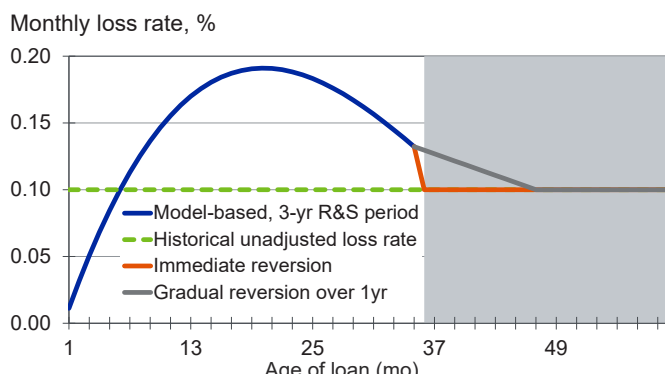
This might work for input reversion because there are data on economic indicators during this period. But this will not work for output reversion for portfolios that are relatively new or that fundamentally changed after the financial crisis, as most lending portfolios did. Moreover, dissimilar portfolios will likely require different lookback periods. So, for firms with many different portfolios, justifying the parameters for output reversion for each portfolio quickly becomes challenging.

Chart 3: Example of Reversion in Inputs

U.S. unemployment rate, %, SA

Lookback period=20 qtrs
Historical unadjusted avg=4.6%
R&S period=8 qtrs
Reversion period=4 qtrs
Reversion technique=Straight line

— Moody's Analytics baseline forecast
— User-defined forecast showing reversion

Sources: BLS, Moody's Analytics

Chart 4: Example of Reversion in Outputs

Monthly loss rate, %

— Model-based, 3-yr R&S period
- - - Historical unadjusted loss rate
— Immediate reversion
— Gradual reversion over 1yr

Age of loan (mo)

Source: Moody's Analytics   For illustration purposes only

Table 1: Comparing the Different R&S Approaches

R&S approach	Pros	Cons
Approach 1: Lifetime R&S	• Easier to interpret, monitor and validate a forecast coming out of a single model. • Convergence is to a historical trend that is intuitive and model determined.	• Requires economic forecasts that are R&S through the life of the loan. • Requires credit loss models that produce valid results through the life of the loan. • Might underestimate provisions in certain cases.
Approach 2: Reversion in inputs	• Requires economic forecast only through R&S period. • Requires credit loss model to produce defendable forecasts only through R&S period.	• Estimate of lifetime loss is produced by three distinct rules, or "mechanics," making it harder to validate and monitor. • Must defend choice of R&S period, reversion period, lookback period and reversion technique. • Might underestimate provisions in certain cases.
Approach 3: Reversion in outputs	• Requires economic forecast only through R&S period. • Requires credit loss model to produce defendable forecasts only through R&S period. • Works in cases where historical losses have not been sensitive to economic fundamentals.	• Estimate of lifetime loss is produced by three distinct rules, or "mechanics," making it harder to validate and monitor. • Must defend choice of R&S period, reversion period and reversion technique. • Must defend portfolio-specific lookback period if the portfolios have different historical loss experience.

Source: Moody's Analytics

Given the challenges with reverting to historical loss information in either inputs or outputs, we expect to see more institutions opting to use a lifetime R&S period if their credit loss models and forecasting operations permit them to do so. The advantage of electing a lifetime R&S is that the forecast is easier to validate, interpret and monitor. This is because the economic forecast during the entire contractual life of the loan, including the convergence to the long-term historical trend, is produced by a single model. Further, this long-term equilibrium trend is more intuitive because it considers the effect of factors like changes in the economy or demographic patterns. In our conversations with auditors, this was the preferred approach.

However, to elect the lifetime as R&S, an institution requires economic forecasts that are reasonable and cover the life of most loans. It also requires credit models that produce valid loss estimates over the entire period. Both conditions are prerequisites for electing the lifetime as R&S.

Another challenge of using a lifetime R&S is that it might underestimate lifetime losses. Given that credit losses are usually nonlinear in how they respond to economic shocks, losses in an average economy will be lower than average losses over a period that includes an economic downturn. In many cases, this is not a serious problem, since by the time the economic forecasts converge to their long-run equilibrium, most of the portfolio would have either matured or seasoned enough to produce little to no additional losses, especially given the small outstanding balances.

In the event institutions have longer duration assets with back-loaded losses, they may wish to examine their loss estimates under a variety of scenarios and make subsequent qualitative adjustments to account for the additional risk. For most wholesale and retail products, the bulk of the losses on the portfolio will be captured within the first five years.

Table 1 summarizes the pros and cons of the different approaches.

Conclusion

The CECL guidelines require that any forward-looking information used in estimating lifetime losses be reasonable and supportable. In this paper we have discussed the different approaches institutions can take to meet the requirement, examining the benefits and drawbacks of each. With all three approaches being CECL compliant, institutions should be prepared to defend their choice. We expect the choices made to comply with the R&S aspect of CECL will draw special scrutiny from auditors and regulators given their material impact on loss provisions.

About the Authors

Sohini Chowdhury is a director and senior economist with Moody's Analytics, specializing in macroeconomic modeling and forecasting, scenario design, and market risk research, with a special focus on stress-testing and CECL applications. Previously, she led the global team responsible for the Moody's Analytics market risk forecasts and modeling services while managing custom scenarios projects for major financial institutions worldwide. An experienced speaker, Sohini often presents at client meetings and industry conferences on macroeconomic models, scenarios and CECL solutions. Sohini holds a PhD and a master's degree in economics from Purdue University, and a master's degree in applied statistics from West Chester University in Pennsylvania. Before joining Moody's Analytics in 2011, she taught economics at the University of Cincinnati.

Cristian deRitis is a senior director at Moody's Analytics, where he leads a team of economic analysts and develops econometric models for a wide variety of clients. His regular analysis and commentary on consumer credit, policy and the broader economy appear on the firm's Economy.com web site and in other publications. He is regularly quoted in publications such as The Wall Street Journal for his views on the economy and consumer credit markets. Currently he is spearheading efforts to develop alternative sources of data to measure economic activity more accurately than traditional sources of data.

Before joining Moody's Analytics, Cristian worked for Fannie Mae and taught at Johns Hopkins University. He received his PhD in economics from Johns Hopkins University and is named on two U.S. patents for credit modeling techniques.

About Moody's Analytics

Moody's Analytics provides financial intelligence and analytical tools supporting our clients' growth, efficiency and risk management objectives. The combination of our unparalleled expertise in risk, expansive information resources, and innovative application of technology helps today's business leaders confidently navigate an evolving marketplace. We are recognized for our industry-leading solutions, comprising research, data, software and professional services, assembled to deliver a seamless customer experience. Thousands of organizations worldwide have made us their trusted partner because of our uncompromising commitment to quality, client service, and integrity.

Concise and timely economic research by Moody's Analytics supports firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our economic research publications provide in-depth analysis of the global economy, including the U.S. and all of its state and metropolitan areas, all European countries and their subnational areas, Asia, and the Americas. We track and forecast economic growth and cover specialized topics such as labor markets, housing, consumer spending and credit, output and income, mortgage activity, demographics, central bank behavior, and prices. We also provide real-time monitoring of macroeconomic indicators and analysis on timely topics such as monetary policy and sovereign risk. Our clients include multinational corporations, governments at all levels, central banks, financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

Moody's Analytics added the economic forecasting firm Economy.com to its portfolio in 2005. This unit is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at www.economy.com.

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). Further information is available at www.moodysanalytics.com.

DISCLAIMER: Moody's Analytics, a unit of Moody's Corporation, provides economic analysis, credit risk data and insight, as well as risk management solutions. Research authored by Moody's Analytics does not reflect the opinions of Moody's Investors Service, the credit rating agency. To avoid confusion, please use the full company name "Moody's Analytics", when citing views from Moody's Analytics.

About Moody's Corporation

Moody's Analytics is a subsidiary of Moody's Corporation (NYSE: MCO). MCO reported revenue of $4.4 billion in 2018, employs approximately 13,100 people worldwide and maintains a presence in 42 countries. Further information about Moody's Analytics is available at www.moodysanalytics.com.