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CECLnomics and the Promise of Countercyclical Loss Accounting

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Introduction

The Current Expected Credit Loss, or CECL, standard is set to take effect in 2020 for institutions registered with the Securities and Exchange Commission. Under CECL, banks, credit unions and other lenders will need to provide for future credit losses as soon as they originate loans rather than waiting for signs of deterioration, as they do currently under the "incurred-loss" method for setting loan loss reserves. In addition to the complexity that adding a forward-looking view to financial accounting entails, bankers and other analysts have wondered how CECL might impact their business models. Some have suggested that CECL may be counterproductive, resulting in a system that is even more procyclical than we have today based on aggregated time-series analysis of bank call reports. However, these data are inadequate to capture the loan origination and lifetime aspects of CECL. In this study, we address these shortcomings by utilizing data that track loan volume and performance to ascertain CECL's cyclical impact. We conclude that although specific results will depend crucially on the forward-looking assumptions that lenders make when setting their reserves, the lifetime loss and origination aspects of CECL should result in a more countercyclical system.

CECLnomics and the Promise of Countercyclical Loss Accounting

BY CRISTIAN DERITIS, SENIOR DIRECTOR, MOODY'S ANALYTICS

The Current Expected Credit Loss, or CECL, standard is set to take effect in 2020 for institutions registered with the Securities and Exchange Commission. Under CECL, banks, credit unions and other lenders will need to provide for future credit losses as soon as they originate loans rather than waiting for signs of deterioration, as they do currently under the "incurred-loss" method for setting loan loss reserves. In addition to the complexity that adding a forward-looking view to financial accounting entails, bankers and other analysts have wondered how CECL might impact their business models. Some have suggested that CECL may be counterproductive, resulting in a system that is even more procyclical than we have today based on aggregated time-series analysis of bank call reports. However, these data are inadequate to capture the loan origination and lifetime aspects of CECL. In this study, we address these shortcomings by utilizing data that track loan volume and performance to ascertain CECL's cyclical impact. We conclude that although specific results will depend crucially on the forward-looking assumptions that lenders make when setting their reserves, the lifetime loss and origination aspects of CECL should result in a more countercyclical system.

Accounting for the future

Historically, accounting regulations have not served as regulatory tools in bank examiners' toolkits. Economic capital calculations, leverage ratios, and stress tests are used to assess capital adequacy, while the primary purpose of financial statements has been to inform investors of the recent performance and current financial position of institutions. Accounting has acted primarily as a scorekeeper rather than playing a starring role in banks' lending decisions.

This distinction will change with the introduction of the Current Expected Credit Loss, or CECL, standard. Under CECL, lenders will need to provide for potential credit losses as soon as they originate loans or lines of credit rather than waiting for delinquencies or other signs of deterioration as they do currently under the "incurred-loss" method for setting loan-loss reserves.

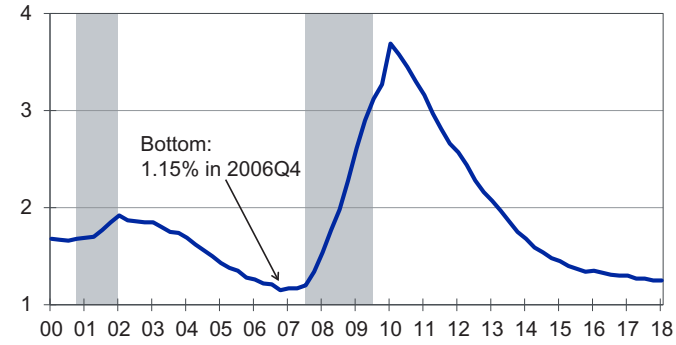
As a result, the new rule could change the economics of lending in a profound way through both the timing and level of loss recognition. First, CECL may increase the cost of borrowing, given that lenders will need to set aside some capital much earlier in the life of all loans. Today, lenders can originate loans and start to collect payments in anticipation of any losses, offsetting some of their costs. Second, the need to project over the lifetime of loan assets rather than a more limited loss-emergence period could increase loss reserves and introduce an uncertainty premium as lenders consider a variety of potential economic outcomes in their forecasts.

Some of the impact of this higher cost will be offset by a lower cost of capital as bank investors perceive a lower probability of insolvency for institutions with higher reserves. CECL may also favor shorter-term lending, resulting in a better match of bank assets and liabilities and lowering liquidity risk—an issue that has troubled banks in past recessions. From a macroeconomic perspective, the effect of reduced credit availability should be minimal in the long run, although there is the potential for a credit crunch around the time of adoption. The transition could be particularly rocky if the 2020 CECL adoption date happens to coincide with the economic slowdown now being projected by many professional economic forecasters including Moody's Analytics.

Beyond the transitory effects, a more salient question revolves around the long-term impact of CECL on cyclical credit formation and the recognition of losses on nonperforming assets. The origin story for CECL has its roots in the 2008 financial crisis and the Great Recession. Based on the historical record, in which banks actually decrease their

Chart 1: Loss Allowance in Housing Boom

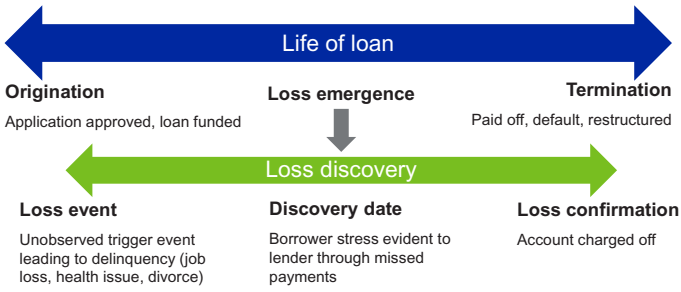
Ratio of loss allowance to loans and leases, commercial banks, %



Sources: FDIC, Moody's Analytics

Chart 2: Loss Discovery and Life of Loan

CECL requires a lifetime loss estimate



loss reserves to a record low in 2006 just before their loan losses skyrocketed to record levels, the policymakers at the Financial Accounting Standards Board determined it would be wise to change the rules for loss accounting to avoid the recurrence of a similar "too little, too late" approach to reserving in the future (see Chart 1).

Forcing earlier recognition of losses would have obvious benefits for the financial system and the economy more broadly. However, it is important to highlight that FASB's motivation for adopting CECL was not to guard against systemic risk. After all, this is neither its mission nor the role of financial reporting. Rather, FASB's motivation was to better inform investors of the financial condition of institutions. Greater disclosures and transparency should lead to more accurate risk assessment, thereby reducing volatility and the mispricing of risk as a byproduct.

In the sections that follow, we focus on the question of whether CECL will lead to a more procyclical system of loss recognition and credit formation and contraction than the current system. We identify and discuss three potential sources of countercyclical loss reserving that may result from the CECL guidelines: (1) portfolio composition, (2) lifetime loss recognition at origination, and, (3) the use of forward-looking economic scenarios. We note the potential benefits that the CECL standard could bring but also highlight the importance of forecast assumptions in determining CECL's correlation with the business cycle.

Insurance company experience

Reserving for potential credit losses on loans and leases is conceptually similar to insurance companies setting aside the reserves needed for potential claims.

One reason the insurance industry is heavily regulated is the timing of insurance contracts, where premiums are paid well in advance of potential claims. This structure lends itself to the moral hazard that insurance companies could pay out premiums in the form of dividends soon after collecting them, leaving them exposed to insolvency when they receive claims at a later date. Indeed, a study of historical insurance company bankruptcies cited "under-reserving" as the principal cause of insolvency.[1] For this reason, regulators require insurance companies to establish reserves when policies are initiated. When an insurer underwrites a new policy, it records a premium receivable (an asset) and a claim obligation (a liability). The liability is considered part of the unpaid losses account, which represents the loss reserve.

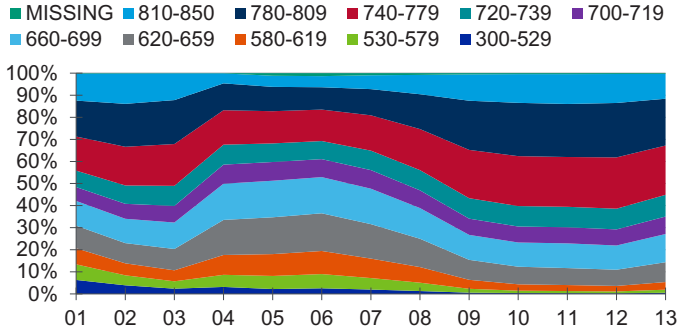
Similarly, lenders today record the value of the asset when they originate a new loan, but—unlike insurance companies—they do not record an estimate of unrecoverable losses until the loan crosses a "probable threshold of loss" during the "loss discovery period" (see Chart 2). For example, if a borrower fails to make minimum payments or files for bankruptcy, the lender then will start preparing for the high likelihood of having to write off the loan in coming months. Under most circumstances, this procedure will not threaten the solvency of the lender, given that revenue from interest and principal payments on performing loans offsets the minority of loans that fail in a given period. However, this may not be the case under extreme conditions such as those experienced during the Great Recession. More important, the incurred-loss method of reserving for losses may not provide investors with sufficient information on the risk of the portfolio to accurately assess the financial condition or economic value of the lender in advance of charge-offs.

CECL is an attempt to improve the disclosures and information flow so that investors can make more accurate and timely assessments of credit risk. Forcing institutions to build loss reserves earlier on in the life of all loans will strengthen their financial conditions, making the possibility of insolvency more remote. Equally important—or perhaps more important—is that changes in reporting should change behavior. The intent of CECL should not be simply to make banks and other lenders more resilient to the losses they incurred during the Great Recession. Rather, sharp increases in reserves should send the signal to lenders to restrain their lending well before it gets out of hand. Ultimately, a countercyclical system would lean against the excesses of the boom-bust lending cycle.

1 See https://www.actuary.org/pdf/casualty/PC_Insurance_Company_Insolvencies_9_23_10.pdf

Chart 3: Scores Fell During Housing Boom

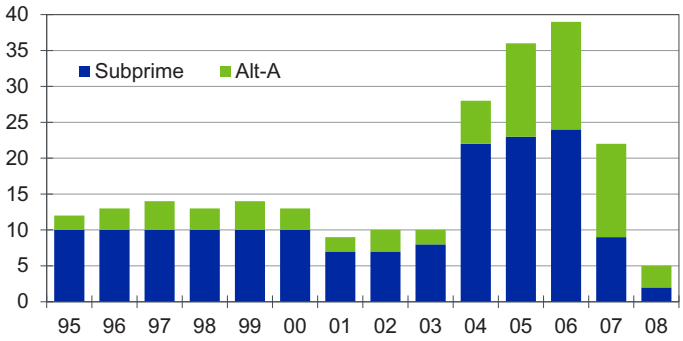
Distribution of new first-mortgage originations by credit score



Sources: CreditForecast.com, Moody's Analytics

Chart 4: Share of Alt-A Mortgages Rose

Share of first-lien mortgage originations, %



Sources: Inside Mortgage Finance, Moody's Analytics

Theory and practice

The idea of increased transparency under CECL is appealing. But it is one thing to think retrospectively armed with full information of what happened in the past; it is quite another in a world filled with uncertainty. If lenders knew how different groups of loans were going to perform ahead of time, they could provide wonderfully transparent financial statements—or avoid making bad loans altogether. But reality is quite different. Loan performance is the result of multiple factors, including credit quality and economic outcomes. A group of poorly underwritten loans may perform wonderfully if the lender is lucky enough to experience an economic boom. Conversely, even the most cautiously conservative lender with state of the art underwriting systems could experience large losses if it happens to originate loans just before an economic downturn.

To understand the cyclical impact of CECL adoption, we considered the following experiment. Suppose a mortgage lender preparing its financial statements in 2005 needed to set its CECL reserves based solely on the current conditions, historical loan performance, and economic information available up until December 2004. How would the credit policy choices that defined the profile of the portfolio along with the lender's assumptions of the future state of the economy impact loss forecasts?

Compositional effects

One key feature of CECL will be earlier recognition of differences in the credit quality of new loan originations. Simply shifting the timing of loss recognition from the observance of an incurred-loss event to loan origination will introduce a countercyclical component that is currently lacking. Continuing with our example, we examined the distribution of borrower credit scores by origination year for first mortgages using data from CreditForecast.com. Based on this source, we observe the surge in lending to borrowers with lower credit scores that took place from 2003 to 2006 (see Chart 3). The fraction of borrowers with a credit score below 700 grew from just more than 30% in 2003 to more than 50% in 2006.

Another key factor in determining default risk is the size of the borrower's down payment relative to the size of the loan. We consulted publicly available historical loan-level data provided by Fannie Mae and Freddie Mac to understand these trends. While 26% of new-origination loans had a loan-to-value ratio of greater than 80% in 2003, more than 35% of originations had a high LTV ratio by 2007. On average, borrowers decreased the relative size of their down payments throughout the boom. With less "skin in the game," expected default probabilities—and CECL reserves by extension—would have risen through this period, holding all other assumptions equal.

In addition to the migration in credit scores and LTV ratios, the most significant change in the profile of new mortgage originations over the period leading up to 2007 was the rise of subprime and Alt-A lending. These programs injected significant risk into the portfolios, primarily by allowing borrowers to obtain loans without having to document their employment status, incomes and/or financial assets. The rise of so-called liar loans to a market share in excess of 35% by 2006 pointed directly to the weakness of lending standards within lenders' portfolios (see Chart 4). Even though lenders may have woefully under-predicted the true risk of these loans at the time, they did realize that there was enough additional risk to justify an interest rate premium. Booked loss reserves for these loans at origination would have been larger than comparable full documentation loans as a result.

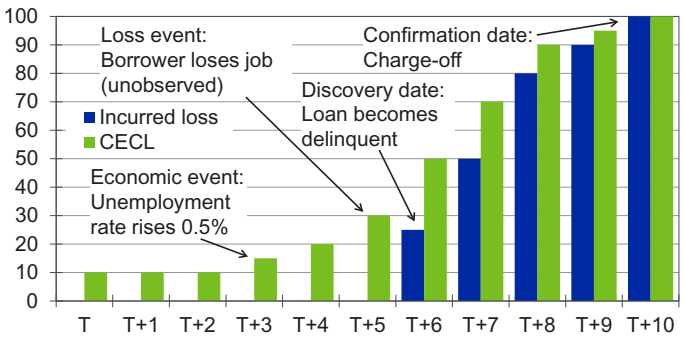
CECL's requirements for greater disclosure and attribution analysis by vintage would have provided investors examining financial statements in 2005 with additional information on the shifting composition of loan portfolios. Though insightful, CECL requires institutions to translate these shifts in composition to loss expectations. Investors may be informed by and react to changes in portfolio profile, but what really gets their attention is the bottom line. They will take immediate notice if earnings drop because of a rise in loss reserves due to weakening lending standards.

Jumping the cliff

As alluded to in the introduction, CECL will significantly change the horizon over which lenders reserve for losses. Under current generally accepted accounting principles, lenders are restricted to reserving losses on those loans in their portfolio that

Chart 5: Rules Led to Loss-Allowance Cliff

Loss allowance from origination



Source: Moody's Analytics

T=qtr loan originated

are "confirmed" by having passed a sufficiently high probable loss threshold. This is often a set number of days of past-due payments or an event such as a ratings downgrade or a bankruptcy filing. Current rules do not permit lenders to reserve for other "unknown" losses even if the lender can assign a large probability to their occurrence. So, even if the likelihood of default has risen because of a sharp uptick in unemployment or a collapse in the real estate market, the lender must wait until losses in the portfolio are discovered. As illustrated in Chart 5, this restriction can result in a "cliff effect," where loss reserves suddenly accelerate as the discovery of incurred losses is revealed by missed payments. The ability to incorporate forward-looking information under CECL should result in a more gradual increase in loss recognition.

Forecast horizon

A key assumption in the incurred-loss model is the concept of a loss-emergence period, which represents a bank's estimate of the average elapsed time from when a loss is incurred to when the loss is confirmed with a charge-off. A short LEP can lead to the reserve being understated, as certain inherent losses will be missed. A long LEP can lead to overstatement, as it could include losses from loans that may not actually default.

According to the Office of the Comptroller of the Currency, 12 months is a typical LEP, though this may vary by product, borrower characteristics, and lender servicing practices. Respondents to a 2012 KPMG survey indicated that residential mortgage products had a median LEP of 21 to 24 months, while most other consumer products averaged 12 to 18 months.

CECL radically changes this practice by requiring an estimate of all future expected lifetime losses. The impact on reserves will likely be substantial for most consumer lending products—particularly those with longer terms such as mortgages or student loans.

The lifetime concept introduces countercyclicality in two fundamental ways. First, CECL effectively subsumes the existing incurred-loss model. Lenders still need to consider the historical data and current conditions they use today. Therefore, if a loan is significantly past due, the expected credit loss on that loan should be no less than that recognized under the incurred-loss model, given that the impact of any forward-looking view would be negligible for a loan that has already been subject to multiple missed payments. Effectively, CECL will only add to—not subtract from—this loss estimate, making it difficult to reach the conclusion that CECL could be more procyclical than today's framework. The degree of countercyclicality depends on several forecasting choices addressed in the next section, but only under highly optimistic assumptions could CECL be more procyclical than the current model.

Second, the lifetime concept makes the transition from zero allowance to a positive allowance less discrete than the current system. Though small, all loans will carry some projected ECL from origination, which will be constantly updated throughout the life of the loan. The ECL will gradually rise as the economy deteriorates, allowing for a smoother recognition of losses versus a discrete trigger event.

The switch to a lifetime-loss estimate will move some of the sharp rise in allowance from the incurred-loss model to earlier periods. CECL will also allow lenders to incorporate allowances for anticipated high probability events such as a rise in defaults from house price declines well before today's threshold conditions are met.

A simple forecast

The CECL guidelines are nonprescriptive, allowing each institution to implement a forecasting methodology that is commensurate with the size and complexity of its lending business. The simplest approach would consider the historical performance of loans with characteristics similar to the lender's existing book of business as a starting point. Adjustments to these predictions could be made to account for expected changes in future economic conditions to generate management's best estimate of future losses.

To this end, Table 1 (at the end of this paper) provides cumulative default rates for first mortgages that were guaranteed by Freddie Mac broken out by origination year, origination LTV ratio, and origination credit score. The data show the sharp rise in default rates for the 2006-2008 vintages consistent with the Great Recession. Of course, no lender in 2005 would have had perfect foresight into the maelstrom that was to come. A reasonable—but naïve—approach to forecasting losses would have been to use the observed experience of 1999-2001 loan originations. These origination vintages would have had four to six years to season by 2005 and therefore would represent a good approximation of lifetime losses, given that most of the loan originations had either paid off, refinanced or defaulted over this time horizon.

Applying the default rates from the 2001 book of business to other origination years, controlling for credit score, resulted in rising default rate projections throughout the housing boom as credit quality deteriorated (see Chart 6). At just less than 1.6%, the default rate is well below the 7.3% rate that the 2005 originations ultimately incurred, but it represents a 40% increase over the 1.1% projected defaults for 2003 origina-

tions. Layering on a riskier LTV distribution and the larger share of subprime and Alt-A loans would have pushed the projection closer to 4%—before any consideration of future house price movements. Presumably, investors would have raised an eyebrow or two if the loss allowance suddenly increased in 2005 simply because of a riskier portfolio composition.

Under the existing incurred-loss approach, the loan loss reserve would not have changed in 2005 because of the riskier originations being booked by the lender. Rather, the loans would have been originated and no additional reserves would have been added until the loans showed some sign of deterioration. Indeed, as we saw in Chart 1, loss reserves hit an all-time low in 2006 despite the fact that the credit risk profile deteriorated significantly. It was not until the loans started to go delinquent and borrowers declared bankruptcy in 2008, 2009 and 2010 that lenders began dramatically adding to their loss reserves—shortly before charging off the loans.

Would the change in loss reserving to better reflect the credit quality of new originations have been enough to curb lending practices and avoid the Great Recession in a completely countercyclical fashion? Perhaps not, given the deterioration in underwriting processes and the belief that "this time was different." But shifts in portfolio composition would have led to higher loss reserves on new loan originations throughout the housing boom, leading to a less procyclical outcome than the incurred-loss framework.

Forecasting trouble

Better accounting for compositional effects at loan origination is one thing, but CECL goes beyond simply requiring more granular use of historical data. According to the standard, lenders need to also consider current conditions and reasonable and supportable forecasts when making their loss projections. Estimating a higher loss projection for 2005 originations based on portfolio composition is useful, but ideally standard-setters would have wanted the 2005 loss projections to approach the 7.3% loss rates that were ultimately experienced. This forecasting aspect of CECL—and the inherent uncertainty of economic forecasts—is at the heart of the CECL cyclicality debate.

In order to introduce economic sensitivity, a model that can incorporate a forecast of future economic conditions in a logically consistent fashion is needed. The relationship between the credit quality of individual borrowers, loan age, economic factors, and loan performance needs to be informed by history so that any change in loan characteristics or forecast assumptions alters the forecast accordingly.

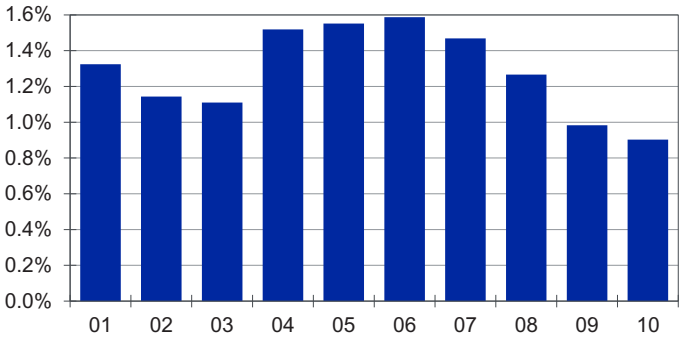
We developed a simplified econometric model based on the historical single-family loan-level data provided by Freddie Mac and Fannie Mae. Utilizing a random sample of loan originations, we constructed a monthly panel-level dataset in which we tracked the performance of every loan from origination to termination, either through default or payoff. We merged on economic information, including house prices and unemployment rates, and computed the age of each loan-month observation from the time of origination. We estimated a probability of default model for each loan as a function of these factors using a logistic modeling framework:

$$\text{Prob of Default (PD)}_{it} = \frac{e^{X_{it}\beta}}{1 + e^{X_{it}\beta}}$$

where for each loan i and observation month t, X contains all of the explanatory variables: age, combined loan-to-value ratio, borrower's credit score at origination, unemployment rate, and the year- over-year change in house prices. The variables were either bucketed or transformed with piecewise linear splines in order to capture nonlinearities in the response of borrowers' propensity to default to changes in the independent variables. The β vector contains the vector of estimated model parameters.

Chart 6: Projections Based on 2001 Figures

Projected cumulative default rate based on performance of 2001 orig



Source: Moody's Analytics

The model is a highly simplified version of a full-scale probability of default model in that it does not control for all of the important factors impacting mortgage performance. We focus on the default rate as a proxy for losses for ease of interpretation, given that severity rates tend to be highly correlated with defaults. In part this is done to keep the analysis parsimonious—LTV and credit score are by far the most important explanatory variables of loan performance. The simplified model was also selected to address the concern that CECL will punish smaller institutions that may have limited data and lack the resources to construct more comprehensive models. As the results in the next section show, the forecasts generated by this simplified approach are directionally consistent and illustrative of the loss reserving that institutions would have performed prior to the financial crisis. A more comprehensive model would only have increased the precision of the forecasts.

CECL: Yesterday, today and tomorrow

The loan-level detail in the estimated default model makes it well-suited to address questions around CECL's cyclicality. Vintage-based approaches that consider the performance of loans segmented by their origination date are also viable alternatives in that they can control for both the compositional mix and lifetime mix of credit portfolios. However, aggregate portfolio-level approaches such as those that leverage bank call reports will fail to capture the effect of portfolio composition and

origination aspects that are central to CECL. Lenders will need to make loss projections and set aside reserves at origination for the loans they book. This imposes a very different dynamic than the historical allowance process. An analysis based on aggregate historical loss-reserve data and historical charge-off rates will fail to capture this important distinction.

Given an econometric model that is sensitive to economic conditions, we can generate scenario-conditioned forecasts based on forward-looking economic scenarios. Returning to our original thought exercise, we can consider the following options for these scenarios:

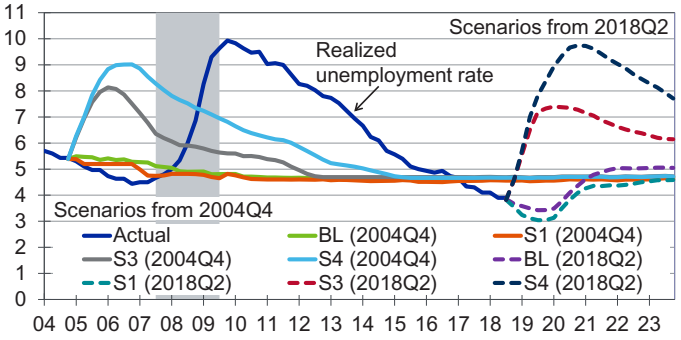
1. **Perfect Foresight.** We generate forecasts based on how we know the economy actually turned out. In practice, this scenario will never be known ex ante, but it can serve as a useful benchmark.
2. **Constant Economy**. We hold economic indicators flat at December 2004 levels. That is, unemployment rate, GDP growth rate, interest rates, etc. are unchanging through the forecast horizon under this naïve forecast.
3. **Moody's Baseline**. We use the Moody's Global Macroeconomic Model to generate a retrospective scenario using economic conditions as of December 2004. We generate the forward view for all variables using the Moody's model for a single, baseline ("most likely") path.
4. **Moody's Baseline + Alternative Scenarios**. Similar to Option 3, we use the Moody's global economic forecasting model to generate a retrospective scenario as of December 2004. Rather than producing a single, baseline path, we generate a distribution of potential economic outcomes and choose the 10th and 90th percentile paths based on the severity of the unemployment rate. These scenarios correspond to Moody's Scenarios 1 and 3, which many firms plan to use as they adopt CECL in 2020.

Chart 7 depicts the unemployment rate scenarios used for our loss-estimation study. The "Actual" line corresponds to the unemployment rate as reported by the Bureau of Labor Statistics over time. These values are used in our exercise to estimate losses under Perfect Foresight.

The solid-line BL, S1, S3 and S4 scenarios depict the Moody's Analytics scenarios produced by the latest vintage of its macroeconometric model but ignoring any economic data that was recorded after December 2004. It represents a back test of the economic model. As we can see, the baseline forecast that would have been produced was relatively flat. The trajectory of the economy at the time was fairly positive, given that unemployment had been trending downward for many years and house prices were peaking.

Chart 7: Many Scenarios Are Necessary

Alternative scenario forecast for unemployment rate, %



Sources: BLS, Moody's Analytics

While the baseline forecast at the time may have been "reasonable and supportable" from the standpoint of observable market conditions and trends at the time, it deviated significantly from the reality that unfolded over the following decade. It is notoriously difficult to capture turning points in the economy, and that highlights the need for institutions to consider more than one economic scenario when setting their reserves.

The S1 scenario shown in Chart 7 characterizes an upside scenario with a 10% chance that the economy would perform like it or better. The S3 scenario shown characterizes a downside scenario with a 10% chance that the economy would perform like it or worse, while the S4 scenario shown represents a downside scenario with a 4% chance that the economy would perform worse. Based on the chart, it is clear that the risks were decidedly weighted toward the downside, with a lot more room for deterioration than improvement in the unemployment rate. Indeed, the Great Recession that followed exceeded the severity of the S4 scenario, suggesting that it was closer to a 98th or 99th percentile event versus the 96th percentile.

To provide context, Moody's alternative forecast scenarios from August 2018 show a somewhat wider range, given that the economy was at a different point in the business cycle with unemployment near an all-time low and with the expansion continuing into its ninth year. Here, too, an institution would benefit from running its loss-forecasting analysis under the range of scenarios rather than relying too heavily on the baseline forecast alone.

Results

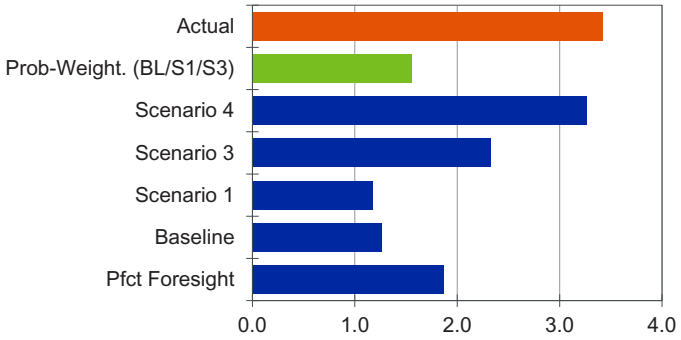
The results from our forecasting exercise are presented in both Table 2 and Chart 8. Loss estimates are ordered with weighted expected losses coming in at just more than 1.5%. This is in contrast to losses computed with Perfect Foresight of 1.9%.

The results provide several notable findings with regard to how CECL would have operated had it been in place in 2005. First, the cumulative default rate predicted by the model using Perfect Foresight was lower than the realized, actual default rate through 2018. This deviation points to the quality of the model and the fact that it did not control for loan characteristics beyond the LTV and credit score. Even with perfect economic foresight, institutions will need to constantly monitor and update their modeling processes to capture new information and insights into consumer behavior. CECL is not a "set it and forget it" process. FASB expects that estimates will be continuously revised throughout the life of each loan.

Turning to the scenario-specific results, we observe evidence of the nonlinearity in the loss estimates. The difference in the

Chart 8: Model-Based Estimates Vary

Projected cumulative default-rate-based scenarios as of Dec 2004



Source: Moody's Analytics

Table 2: December 2004 Portfolio Loss Forecasts

Economic scenario	Lifetime loss rate
Actual	3.42%
Perfect Foresight	1.87%
Constant Economy	1.34%
Baseline	1.26%
Scenario 1 (S1) upside 10th pctile	1.18%
Scenario 3 (S3) downside 90th pctile	2.33%
Scenario 4 (S4) downside 96th pctile	3.27%
Probability-Weighted (BL/S1/S3)	1.56%

Source: Moody's Analytics

estimate between Baseline and the upside scenario, Scenario 1, is much smaller than the difference between the Baseline and the equidistant downside scenario, Scenario 3. The convexity of losses supports the best practice of examining losses under more than one scenario when determining CECL reserves.

The results demonstrate the benefit of relying on multiple scenarios to reduce volatility. The estimate based on the probability-weighted combination of the Baseline, Scenario 1 and Scenario 3 is much closer to both the Perfect Foresight and Actual loss results. Institutions that rely on a single scenario will be more exposed to unanticipated changes in the economy. In the extreme, an institution that based its forecast solely on Scenario 1 would have had to significantly add to its loss reserves as the economy began to deteriorate. However, even these additions to reserves would have occurred earlier than under the incurred-loss model. Incremental additions to the Probability-Weighted estimate would have been much smaller.

It is interesting to observe how close the estimate under Scenario 4 was to the Actual losses incurred. At first blush the result may seem questionable, given that peak unemployment under Scenario 4 (9%) was lower than that experienced during the Great Recession (10%). However, unlike the realized path that saw the unemployment rate *decline* from 2005 to 2007 before rising, Scenario 4 expected an immediate increase in unemployment at the start of the forecast—when the impact on defaults is greatest.

Basing a forecast solely on an expectation of 8% unemployment would have been highly suspicious in 2005 with unemployment at 5% and trending downward. However, allowing for the possibility with a probability-weighted approach was much more "reasonable and supportable" in retrospect than relying on a single Baseline, Constant Economy or Consensus view alone.

In summary, our forecasting experiment concluded that CECL will not be perfectly countercyclical. No credit loss forecasting model is perfect, and no set of economic scenarios has perfect foresight, either. However, the origination and lifetime forecasting requirements result in less procyclicality than the current incurred-loss process. Lifetime loss estimates for new originations would have risen as lending standards loosened from 2004 to 2007. As a result, institutions would have added to reserves under CECL throughout the housing boom—well before the peaks in unemployment and charge-offs.

A change for the better

The motivation and support for developing CECL is summarized on pages 247-248 of the standard itself:

> *Many investors noted that the probable threshold that had existed for recognizing credit losses prevented financial institutions from recognizing credit losses that were imminent in 2007 and 2008.* [BC19, p247]
>
> *Generally, U.S. preparers and auditors supported the development of an impairment model that would address the "too little, too late" concern. The procyclicality of reserving also was an overriding concern of those stakeholders. Furthermore, they supported moving away from the "probable" threshold that was required to recognize credit losses.* [BC 22, p248]

Most stakeholders agreed that the existing incurred-loss framework needed to be revised. CECL is the replacement that FASB adopted after considering multiple options. Is it perfect? Certainly not. Are there risks that some institutions may interpret the guidelines liberally to move the numbers in their favor? Certainly, but these risks already exist today.

Generally Accepted Accounting Principles are an attempt to achieve conceptual consistency across institutions, as imperfect as they may be. To the extent institutions believe that the results they are required to report under GAAP are incomplete, they are free to present their own version of non-GAAP results. To the extent CECL provides additional estimates and greater disclosures, it will be to investors' and lenders' mutual benefit.

Our analysis suggests CECL will be less procyclical than the incurred-loss model for three main reasons: (1) CECL's requirement to begin reserving for expected losses at the time of loan origination better reflects the risk in the portfolio well before default; (2) estimation of lifetime losses pulls forward loss estimates that may be censored under an institution's choice of the loss-emergence period under the current framework; and (3)

the use of forward-looking economic scenarios permits institutions to recognize losses that will result from a deteriorating economy in anticipation of the discoverable trigger events that constrain them today.

We argue that CECL will be less procyclical than the incurred-loss model under reasonable assumptions. Aggressive lenders that make rosy assumptions or rely heavily on recent data to make their forecasts—that is, forecasting with a ruler—will be more susceptible to procyclicality. The transparency that CECL requires through its disclosures and attribution analysis should prevent lenders from being overly optimistic, but auditors, regulators and investors will need to be vigilant.

A multiple scenario approach, whether formally incorporated through probability weighting or through empirically supported qualitative adjustments, will provide more of a countercyclical weight compared with relying on a single scenario, given the uncertainty inherent in any forecast. As shown in our exercise, multiple scenarios are also useful to capture and understand nonlinearities.

Although we have considered the cyclical implications of CECL, countercyclical measures are in the domain of capital calculations rather than financial reporting. Regulators could impose a countercyclical capital framework by tying capital requirements to exogenous indexes of business cycle risk. For example, the higher house prices are above trend, the more capital banks should be required to hold, given the higher risk of a correction. To the extent that CECL formally recognizes some of the lifetime losses that are currently accounted for in risk-based capital calculations, one could argue that a greater proportion of the CECL loss reserve should be counted as capital.

The bottom line is that CECL is not a panacea. By our account, it will be less procyclical than the incurred-loss model, but the extent of its countercyclicality will depend on several key assumptions and modeling choices. It may shift reserve recognition back by only a few quarters rather than a few years under certain conditions, but even this would be an improvement.

CECL alone may not prevent another financial crisis. But it is a step in a positive direction. Just as with bank stress-testing that came before, it will take the industry some time to adopt and optimize its processes around CECL. Auditors, regulators and investors will all need to adjust their frame of reference as well. Once it is fully implemented, the benefits of a transparent, forward-looking view of losses will pay dividends in terms of greater investor confidence and a reduction in procyclicality.

Table 1: Default Rates by Origination Year, LTV and Credit Score

Origination yr	Origination FICO score	Origination loan-to-value ratio					
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
1999	>750	0.1%	0.1%	0.2%	0.4%	0.8%	0.2%
	700 to 750	0.1%	0.3%	0.4%	0.9%	1.1%	0.6%
	<700	0.6%	1.0%	1.7%	3.0%	3.2%	2.2%
	Total	0.2%	0.4%	0.8%	1.8%	2.1%	1.1%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2000	>750	0.0%	0.1%	0.2%	0.6%	0.9%	0.2%
	700 to 750	0.1%	0.2%	0.4%	1.0%	1.2%	0.5%
	<700	0.5%	1.0%	1.6%	3.5%	3.5%	2.3%
	Total	0.1%	0.4%	0.7%	2.1%	2.4%	1.1%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2001	>750	0.1%	0.1%	0.2%	0.7%	1.0%	0.3%
	700 to 750	0.1%	0.3%	0.5%	1.4%	1.6%	0.7%
	<700	0.6%	1.1%	1.9%	4.5%	5.0%	2.6%
	Total	0.2%	0.5%	0.9%	2.8%	3.3%	1.2%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2002	>750	0.1%	0.2%	0.4%	1.2%	1.7%	0.4%
	700 to 750	0.3%	0.6%	0.9%	2.2%	2.5%	1.0%
	<700	0.9%	1.7%	2.6%	5.7%	6.3%	3.3%
	Total	0.3%	0.7%	1.3%	3.7%	4.4%	1.6%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2003	>750	0.2%	0.5%	0.9%	2.0%	2.6%	0.8%
	700 to 750	0.6%	1.3%	2.0%	3.8%	4.3%	2.0%
	<700	1.8%	3.4%	4.5%	7.2%	8.5%	4.9%
	Total	0.6%	1.5%	2.4%	4.9%	6.0%	2.4%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2004	>750	0.4%	1.1%	1.7%	3.4%	4.7%	1.5%
	700 to 750	1.2%	2.6%	3.7%	6.2%	6.9%	3.6%
	<700	3.3%	6.0%	7.4%	10.9%	12.2%	7.7%
	Total	1.4%	3.3%	4.3%	7.9%	9.3%	4.4%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2005	>750	0.7%	2.4%	3.9%	6.4%	7.9%	2.9%
	700 to 750	2.3%	6.3%	8.1%	11.0%	12.4%	7.1%
	<700	5.6%	11.8%	14.1%	17.2%	19.5%	13.0%
	Total	2.3%	6.6%	8.5%	12.7%	14.8%	7.3%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2006	>750	1.1%	3.6%	5.4%	8.3%	9.7%	4.3%
	700 to 750	3.6%	9.5%	11.6%	14.7%	15.3%	10.3%
	<700	8.1%	16.9%	18.7%	22.5%	25.9%	17.8%
	Total	3.5%	9.8%	11.4%	16.8%	19.6%	10.4%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2007	>750	1.0%	3.7%	5.7%	10.4%	11.9%	4.9%
	700 to 750	3.3%	9.6%	12.4%	17.8%	19.0%	11.6%
	<700	8.8%	18.1%	20.2%	26.7%	30.0%	20.5%
	Total	3.4%	10.0%	12.1%	20.1%	22.5%	11.9%

Table 1: Default Rates by Origination Year, LTV and Credit Score

Origination yr	Origination FICO score	Origination loan-to-value ratio					
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2008	>750	0.5%	1.8%	2.8%	6.6%	6.2%	2.5%
	700 to 750	2.0%	5.4%	7.4%	12.4%	11.6%	7.0%
	<700	6.2%	13.3%	14.5%	21.4%	21.4%	14.4%
	Total	1.7%	5.3%	6.5%	12.5%	12.5%	6.2%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2009	>750	0.1%	0.3%	0.6%	1.2%	1.4%	0.4%
	700 to 750	0.4%	1.0%	1.8%	2.3%	2.9%	1.3%
	<700	1.6%	3.6%	4.3%	5.7%	6.3%	3.3%
	Total	0.3%	0.7%	1.1%	1.8%	2.4%	0.8%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2010	>750	0.0%	0.1%	0.2%	0.5%	0.7%	0.2%
	700 to 750	0.2%	0.5%	0.8%	1.0%	1.7%	0.7%
	<700	1.0%	1.8%	2.3%	2.3%	2.9%	1.8%
	Total	0.1%	0.4%	0.5%	0.7%	1.2%	0.4%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2011	>750	0.0%	0.0%	0.1%	0.2%	0.4%	0.1%
	700 to 750	0.2%	0.3%	0.4%	0.7%	0.9%	0.4%
	<700	0.7%	1.3%	1.5%	1.7%	2.6%	1.3%
	Total	0.1%	0.2%	0.3%	0.5%	0.7%	0.2%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2012	>750	0.0%	0.0%	0.1%	0.1%	0.2%	0.1%
	700 to 750	0.1%	0.1%	0.2%	0.4%	0.5%	0.2%
	<700	0.4%	0.7%	0.7%	0.9%	1.2%	0.7%
	Total	0.0%	0.1%	0.1%	0.2%	0.4%	0.1%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2013	>750	0.0%	0.0%	0.0%	0.1%	0.2%	0.0%
	700 to 750	0.1%	0.1%	0.2%	0.3%	0.5%	0.2%
	<700	0.3%	0.5%	0.5%	0.8%	1.3%	0.6%
	Total	0.1%	0.1%	0.1%	0.2%	0.4%	0.1%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2014	>750	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%
	700 to 750	0.1%	0.1%	0.1%	0.2%	0.3%	0.2%
	<700	0.2%	0.4%	0.4%	0.8%	1.0%	0.5%
	Total	0.1%	0.1%	0.1%	0.2%	0.3%	0.2%
		<60	60 to 70	>70 to 80	>80 to 90	>90 to 100	Total
2015	>750	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	700 to 750	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
	<700	0.1%	0.1%	0.2%	0.3%	0.4%	0.2%
	Total	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%

Sources: Freddie Mac, Moody's Analytics

About the Author

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.

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