MOODY'S ANALYTICS

Authors
Amnon Levy
Managing Director–Research
+1.415.874.6279
amnon.levy@moodys.com

Masha Muzyka
Senior Director–Risk and Accounting
+1.212.553.7215
masha.muzyka@moodys.com

Pierre Xu
Director–Research
+1.4158746290
pierre.xu@moodys.com

Concentration Risk Consideration During the Allowance Process and COVID-19's Impact

Abstract

Accounting Standards Update 2016-13, also known as the Current Expected Credit Loss (CECL) standard, was issued as the FASB's answer to the 2007–2009 financial crisis. Its objective is early recognition of expected credit losses, allowing banks to proactively react to actual and expected future changes in the credit environment. CECL is one of the few accounting standards that has caused tremendous controversy and speculation regarding its impact on allowance and earnings, and the potential unintended consequences on lending and credit markets. This issue has become increasingly relevant at the time of this writing, as the COVID-19 virus spreads and its social and economic impacts reverberate throughout the credit markets as future expected credit losses mount.

By design, CECL is more reactive to changes in the credit environment. In addition, CECL adoption should result in clear alignment between credit risk management and accounting for credit losses. Most notably, CECL incorporates forecasts into the loss estimate and requires measurement on a collective or pool basis when similar risk characteristics exist. Allowance can exhibit material sensitivity to changes in the credit environment, resulting in credit losses, when a pool contains significant product, industry, geography or borrower risk concentration. These dynamics have not been as easily visible or expected when an individual borrower or transaction is assessed as it was under incurred loss. In this paper, we explore the consequences of CECL on the manifestation of concentration risk and introduce an approach to quantify and allocate that risk.

Additionally, economists are struggling to measure COVID-19's potentially profound impact on economic activity as the markets attempt to find their footing. This event represents the first materially deteriorated credit environment since CECL adoption. The first credit defaults have already occurred. If the CECL model works as intended, many banks and other financial institutions will experience pronounced increases in allowance, as forward-looking models that feed into CECL react to the expected credit environment deterioration. However, the speed of economic decline due to the pandemic is startling, and we see that, even under the incurred loss approach, allowances will increase almost as soon as with CECL, because the probability threshold for the credit loss event to occur used in the incurred loss approach was already met in Q1 2020. With this, the unprecedented environment has prompted the Federal Reserve and other agencies and regulatory bodies to bolster the system, allowing organizations leeway with implementation, delayed adoption, and to use increased levels of judgment in assessing how the environment enters into the allowance. Regardless, deterioration in the credit environment will ultimately lead to a reduction in earnings and capital.

Table of Contents

Background

To illustrate concentration manifestation, consider two otherwise identical segments: same product type, maturities, industry, loan-to-value (LTV), debt service coverage ratio (DSCR), risk ratings, and geography. Assume Pool 1 has 100 loans, each with $10,000 amortized cost, while Pool 2 has 97 loans with $10,000 amortized cost and 3 loans with $100,000 amortized cost. If the credit loss model driven by industry, LTV, and DSCR produces the same expected default rate of 6% and LGD of 100%, expected credit loss rate will be 6%. When calculating the allowance, we need to multiply the loss rate by the pool's amortized cost. For the first pool, we multiply $1 million by 6% and arrive at $60,000 of allowance. For the second pool, we multiply $1.27 million by 6% to arrive at $76,200. Now assume that three loans default and are subsequently charged off. Any three loans charged off in Pool 1 will result in a $30,000 loss and will be fully covered by the reserved allowance. However, if even one loan out of the three largest loans in Pool 2 defaults, the reserve will not be sufficient.

The simplistic example above demonstrates that balance (or borrower name), concentration needs to be considered when calculating the allowance. However, what if all three of the largest loans in Pool 2 mature within the next month? What if they are fully collateralized? What if the entire portfolio is in oil and located off the Gulf Coast and climate change becomes more pronounced, which may significantly raise the production costs, while the availability of renewable energy reduces the demand for oil? What if these pools are concentrated in passenger airlines and cruise lines? When a single (or small number of) probable event(s) or factors can drive material losses, concentration should be explicitly incorporated into the credit loss calculation.

The degree to which allowance fluctuates is related directly to the degree to which a portfolio is concentrated or diversified. A highly concentrated portfolio is more likely to exhibit concentrated losses, when compared with a well-diversified portfolio where segments are exposed to relatively uncorrelated factors. Institutions should recognize that variation in concentration over time often causes estimated credit losses associated with the institution's existing portfolio to differ from historical loss experience. Given that loss allowance reflects anticipated credit losses within a bank's portfolio, and that loss is uncertain, segments with higher risk concentration are more likely to experience a high-loss event and require a concentration-loss adjustment. For example, risk concentration of an all-oil portfolio will look very different than one diversified across oil, agriculture, auto, airlines, and banking, as the price of oil fluctuates over time and the credit quality of the oil segment fluctuates accordingly. This has become evident through the observed cross-sectional variation in reactions to COVID-19 across industries.

This event represents the first materially deteriorated credit environment since CECL adoption. While signs point to a pullback, Federal Reserve action and Federal and State stimulus will offset some of the impact; the speed at which banks react is yet to be seen. Importantly, CECL standard is principles-based (as was incurred loss), and the ways in which economic forecasts translated into credit loss allowance under CECL will differ from firm to firm. But with organizations managing their portfolios to numbers the market ultimately judges them against — allowance, earnings, and their volatility — it is likely that banks will shy away from, or more aggressively price, deteriorated segments than in previous downturns. This change is reassuring, as it can ultimately contribute to a more stable financial system. For those that withstand the short-term impacts, the widening spreads foreshadow the medium- to long-term challenge: mounting credit losses. The first credit defaults have already occurred. They highlight unanticipated downstream impacts: weak credits felled by supply chain disruptions caused by coronavirus.[1] What does this mean for credit portfolios, and what are the implications for banks and their ability to navigate through these tumultuous times? Our experience through the Great Recession provides a partial sense for what to expect from first quarter 2020 earnings, which will be reported under CECL by some SEC filers[2] in mid-April, 2020. The Great Recession provides an important benchmark in actual losses, but not in balance sheet's reactions to changing loss expectations. At that time, banks reported allowance under the less reactive incurred model, which is inherently backward-looking. CECL adoption intends to allow expected changes in the credit environment to immediately impact reserves, thereby increasing the "cushion" for future credit losses. If the CECL model works as intended, many banks and other financial institutions will experience pronounced increases in allowance, as forward-looking models that feed into CECL react to the expected credit environment deterioration. This change will ultimately lead to reduction in earnings, prior to the manifestation of credit events. The impact might be startling at first look.

---

[1]   Valeritas Holdings, a medical company, filed for Chapter 11 on February 10, 2020 citing supply chain disruptions linked to the coronavirus (COVID-19).

[2]   CECL is effective for the public business entities that are SEC filers and not Small Reporting Companies for fiscal years beginning after December 15, 2019. Furthermore, SEC issued an order on March 25, 2020, under which public companies unable to meet filing deadlines due to COVID-19-related circumstances will have an additional 45 days to submit certain disclosure reports (e.g., Forms 10-K, 10-Q, 20-F) that would otherwise have been due between March 1 and July 1, 2020. As a result, the relief can be applied to March 31, 2020 Forms 10-K and 10-Q. https://www.sec.gov/rules/exorders/2020/34-88465.pdf

With this setting as the backdrop, we articulate concentration risk as the impact of common risk factors that can result in substantial losses to a segment of a credit portfolio. Concentration risk can be generated from common factors, for instance, the degree to which an Oil & Gas portfolio has exposure to oil prices. Alternatively, concentration risk can manifest through concentrated exposure to a corporate counterparty such as, say, JP Morgan Chase, or a municipality such as the City of Detroit.

We organize the remainder of this paper as follows:

» Section 2 explores the manifestation of concentration risks under the CECL model in comparison to the incurred loss model.

» Section 3 describes an approach to quantify concentration risk in the allowance process;.

» Section 4 walks through a series of case studies that demonstrate dynamics of the concentration measure when applied to various portfolios.

» Section 5 explores implications for expected credit loss disclosures and credit portfolio management.

» Section 6 concludes.

The Manifestation of Concentration Risks under CECL in Comparison to Incurred Loss

A material difference between allowance under incurred loss, which is, inherently, a historic measure, and CECL, which is intended to be forward-looking (FL), is the reactive nature of allowance to the expected changes in the credit environment. In the context of this discussion, this trait is relevant to the extent to which concentration risk manifests.

To get a sense of the difference between historic measures, frequently leveraging measures associated as Through-the-Cycle (TTC), and FL measures, Figure 1 compares Through-the-Cycle and Point-in-Time measure across time, maps out the average one-year default probability for the overlapping sample of U.S. Moody's-rated firms and firms with Moody's Analytics EDF™ (Expected Default Frequency) credit measure. While there is a range of approaches to measuring a TTC credit measure, the Moody's rating coupled with the idealized default rate is one common approach. Similarly, the EDF measure is one commonly used FL measure. The dramatic increase in the average one-year FL probability of default (PD) in the Tech-Telecom downturn and the Great Recession is not nearly as pronounced under the TTC measure. Figure 1 plots the average annualized PDs across all U.S. publicly listed firms with Moody's rating. The forward-looking PD (blue line) for each firm represents the EDF measure calculated by Moody's Analytics CreditEdge™ model. The TTC PD (blue line) for each firm is calculated based on the Moody's rating for the firm. The rating is converted to TTC PD according to the historical average EDF measure and rating mapping. When compared with actual corporate default rates, depicted in Figure 2, it is clear that the FL measures indeed capture the credit environment. Consequently, allowance calculation based on historical TTC measures unadjusted for the current and future expected economic environment would not be as reactive and dynamic compared to the FL-based calculations.

Figure 1   Comparing Through-the-Cycle and Point-in-Time Credit Risk Measures Across Time
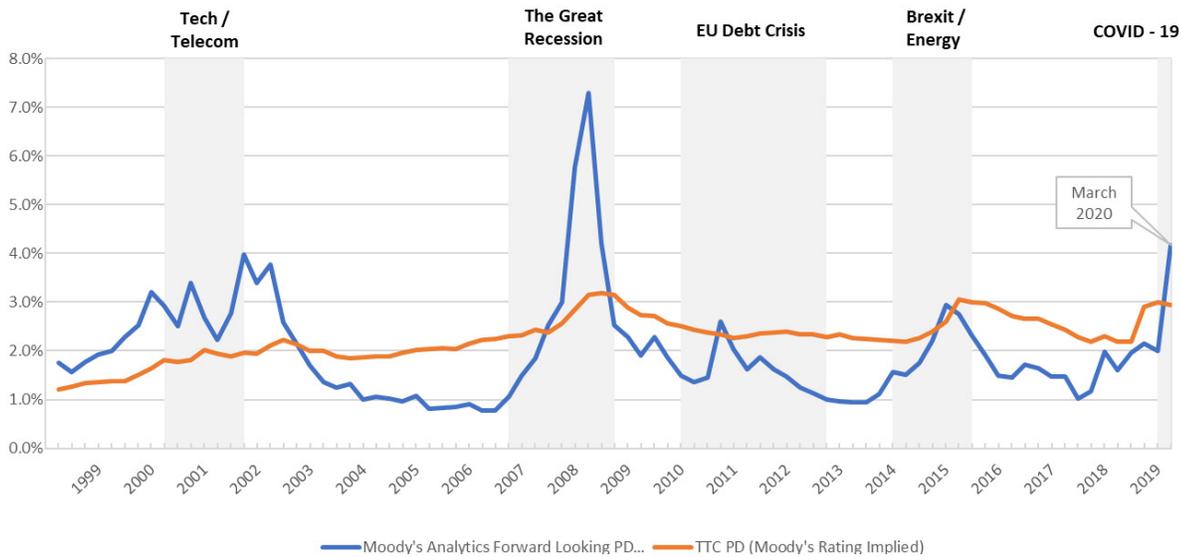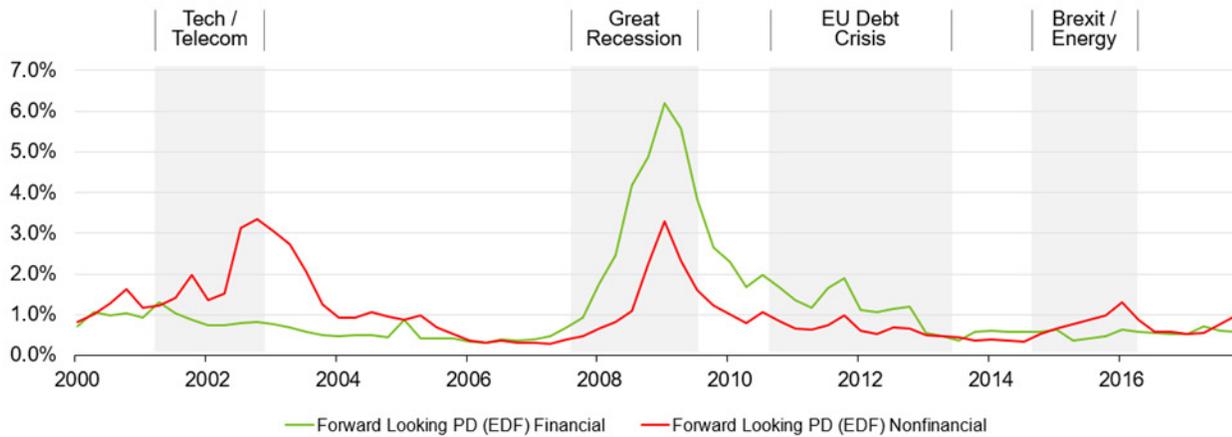

Source: Moody's Analytics

Figure 2   Historical and Forecast Corporate Default Rates
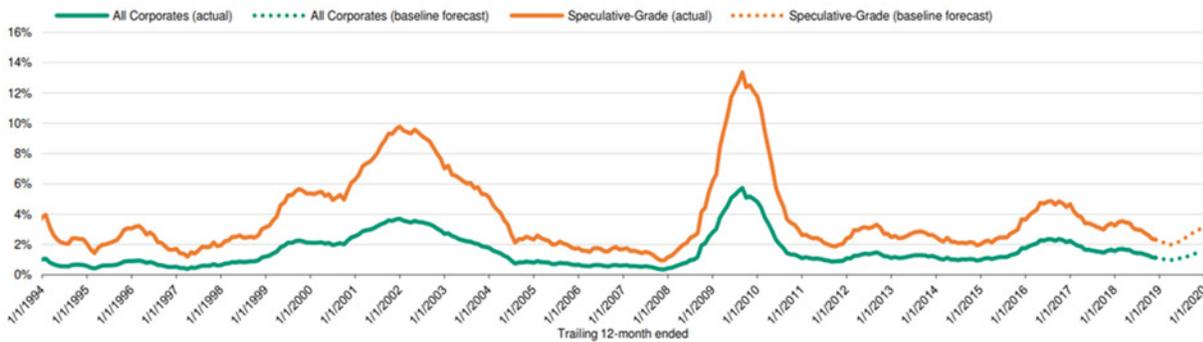
Source: Moody's Investors Service

We next turn to the question of manifestation of concentration risk across segments under FL credit measures. Figure 3 depicts the average FL measures segmented across financial institutions and non-financial institutions. The figure highlights that concentration risks manifest more observably under FL measures when, for example, Tech and Telecom companies deteriorated in credit quality during the early 2000s. It is worth observing that if we use these FL measures, the portfolio would have steered aggressively away from non-financial institutions during the Tech-Telecom downturn, and away from Financials at the onslaught of the Great Recession; clearly not in the same way that a TTC measure would have the organization steer. The next section explores these concepts more formally. Figure 3 plots the average annualized PDs across all U.S. Financial and Non-financial publicly listed firms with a Moody's rating. PDs are calculated using Moody's Analytics CreditEdge model.

Figure 3   Forward-Looking PDs for Financials vs. Non-Financial Firms

Source: Moody's Analytics

Alternatively, consider the cross-sectional impact of the COVID-19 outbreak on businesses that rely on their customers' physical proximity, such as hotels, restaurants, and transportation segments, and the effect of a reduction in tourism and business travel with airline passenger travel coming to a halt. Supply chain disruptions are affecting operations — in particular those that rely heavily on China, Italy, Spain, and France. And of course, luxury brands are taking a hit as consumers pull back on discretionary spending. Energy and oil segments have been hit, with a drop in oil prices reinforced by Saudi Arabia's move to further cut prices. These dynamics will naturally have negative reverberations in their relevant commercial real estate markets. But performance is not all negative, with expectations that segments such as pharmaceuticals, food and beverage, and medical services are reasonably resilient to recent events. Figures 4 and 5 track relative sector performance using Moody's Analytics EDF credit measures, which provide a forward-looking estimate of the one-year default probability for publicly traded corporate entities.

Figure 4   Varying Industry Sensitivity to COVID-19 — High Impact
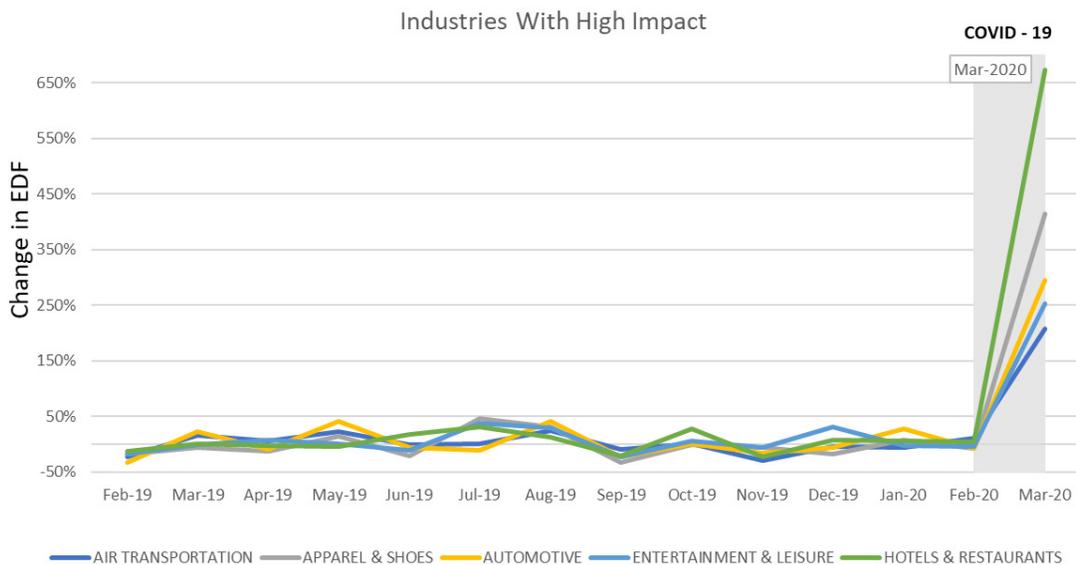
Source: Moody's Analytics

Figure 5 Varying Industry Sensitivity to COVID-19 — Low Impact
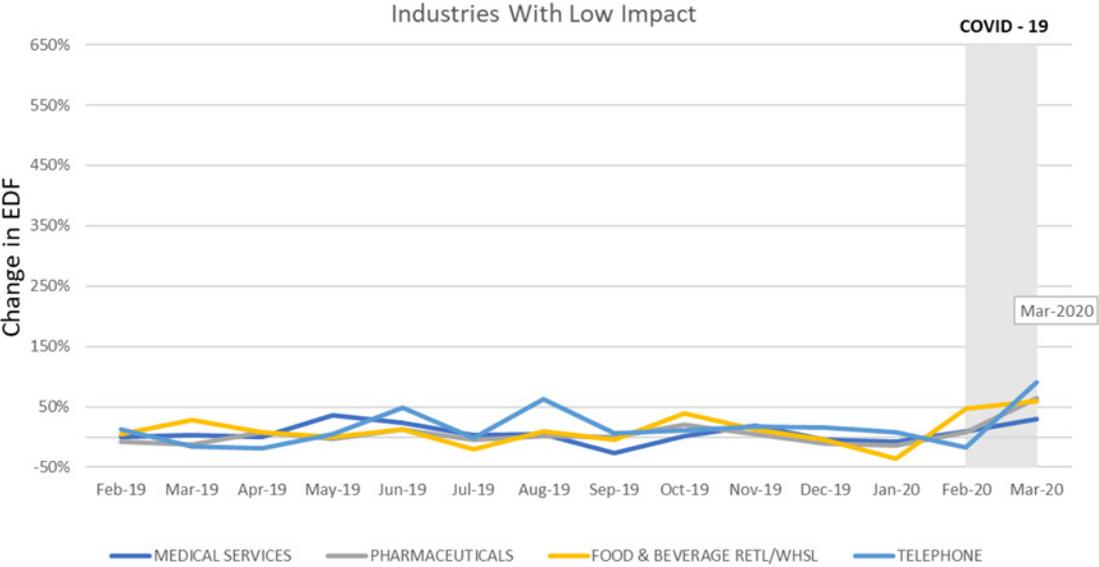
Source: Moody's Analytics

Recognizing the wide cross-sectional variation across credit market segments, banks and other credit market participants can experience wildly different earnings impacts in the coming quarters as COVID-19 plays out. Banks must now incorporate their forward-looking indicators into CECL models, and have an incentive to increase required rates on assets that attract a higher level of allowance under the CECL lifetime expected credit loss models. In some cases, they may pull out of deteriorating lending segments altogether.

The bottom-line: CECL measures result in allowance being more reactive to the credit environment — by design — and concentration risks will be more pronounced under CECL. This said, by their forward-looking nature, the measures lend themselves to more robust credit portfolio management.

The next section explores a framework that quantifies concentration dynamics that can be applied in the allowance process.

An Approach to Quantifying Concentration Risk During the Allowance Process

Traditionally, concentration risk is set heuristically, through managerial overlays, and added on top of existing metrics. While typically intuitive, there is a hand-waving element that leaves much to be desired. In contrast, we propose a quantitative approach that can be used as a starting point for assessing concentration risk.

Our approach measures concentration as a contribution to portfolio losses, recognizing that pockets of concertation are more likely to contribute to material losses. To illustrate the approach, we define credit earnings as interest income net of changes in loss allowance due to credit migration and resulting changes in expected credit losses and default loss. To quantify concentration risk, we model possible combination of scenarios and possible gains and losses, recognizing concentration, correlation, terms and conditions, and so forth. Referencing the discussion above, we account for the likelihood that oil prices and other correlated factors might drive material losses in the portfolio.

More generally, we must predict not only the average earnings but the entire earnings distribution, as depicted in Figure 6, which maps out possible realizations over a horizon of say, one year. Over the year, a good credit scenario might result in 10% earnings, while a baseline or downturn scenario might be 5% or -4%. In general, the more concentrated the portfolio, the more extreme the difference between positive and downturn scenarios. In fact, this difference should be close to zero for a fully-diversified portfolio with no common risk factors.

Figure 6   Credit Earnings for an Amortized Cost Term Loan Portfolio
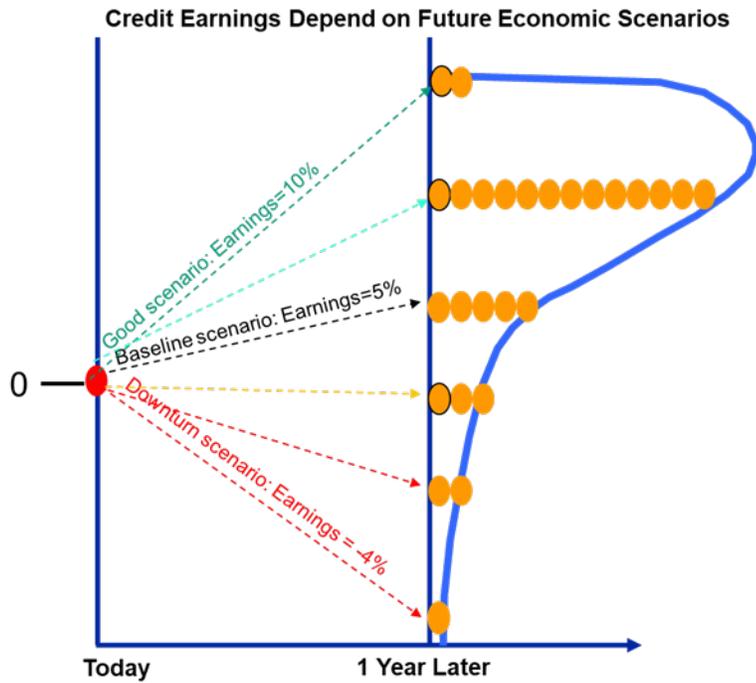
Figure 6 provides a stylized example of the distribution of credit earnings of a portfolio of amortized cost term loans. The process of allocating concentration add-on for each segment involves estimating each segment's average loss when the portfolio suffers an event such as a 1-in-10-year loss. This measure is called the segment tail-risk contribution. We set the allowance of the segment to the segment tail-risk contribution.

There are several aspects to modeling loss allowance concentration add-on worth discussing. It is important that the model differentiates across portfolio segments, such as Tech/Telecom, Energy, and Finance, to name a few prominent sectors that have suffered in various ways recently. For retail and commercial real estate (CRE), metropolitan statistical analysis (MSA), and product/property type, differentiation is imperative. It is also important to account for name concentration for commercial and industrial (C&I), municipal, and other asset classes typically held at concentrated levels. A slew of other factors, such as terms and conditions and maturity (in particular for CECL), are particularly relevant for this exercise, articulated in Figure 7.

Finally, the extreme nature of the event, such as a 1-in-10 or -20 years, must be considered. This is organization-specific, related to qualitative judgment, and can be tied to an institution's risk appetite; the more averse the institution is to risk, the lower the event probability, resulting in a higher concentration add-on. This situation may also depend upon the credit environment.

Figure 7   Factors Behind Concentration Add-on

Event Probability
Preventing a one-in-twenty year loss requires 50% higher ALLL adjustment than preventing a one-in-ten-year loss does for C&I loans.

Maturity
Long-dated instruments have higher loss allowance under CECL, but also more likely to incur large losses.

Coupon
Interest income offsets losses. Large coupon payment thus reduces the need to have concentration add-on.

Name Concentration
Sectors with high concentration in a few names are more susceptible to large losses if these names default.

Correlation
Low correlation increases diversification and thus reduces the chance of large losses.

Others
Loan characteristics such as PD and LGD also play significant roles, which intertwine with other factors.

Next, we explore framework dynamics using a series of case studies.

Dynamics in Concentration: Case Studies

We begin with a sample of U.S. corporate loan portfolios and explore our concentration measure, based on tail-risk contribution. As a starting point, Figure 8 compares the percentage of portfolio holding attributed to each sector against the percentage of portfolio tail-loss attributed to each sector. As expected, sectors with larger exposures tend to contribute more to portfolio tail-loss. However, the contribution is by no means proportional to holding, due to the difference in other factors that impact concentration risk, such as PD and maturity. For example, COVID-19 and the 2020 oil price crash has caused the PD's of the Transportation, Hotels, and Energy sectors to spike, resulting in large portfolio tail losses attributed to these sectors.

Figure 8   Comparison of Each Segment's Holding and Its Contribution of Portfolio Tail-Loss
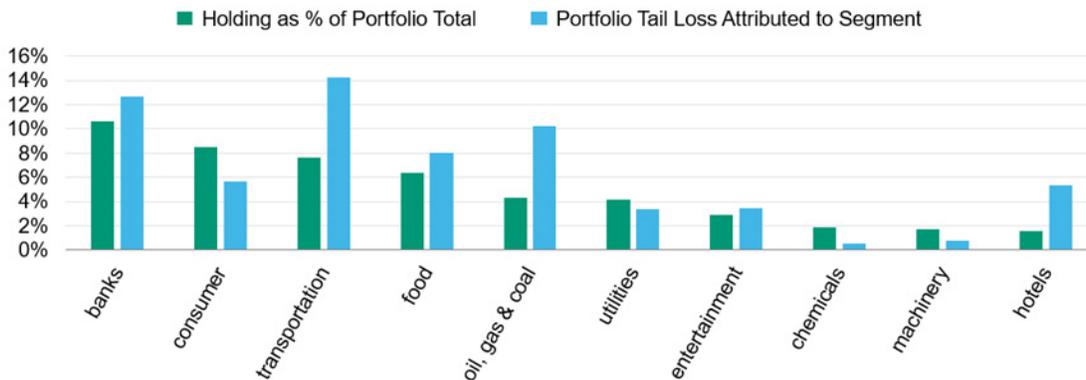
Source: Moody's Analytics

Figure 8 plots the holding amount of each sector as the percentage of total portfolio holding and the tail-risk contribution of each sector as a percentage of total portfolio tail-loss. It shows only the 10 sectors with the highest amount of holdings in the portfolio.

Figure 9 presents segment loss allowance concentration add-on, according to segment tail-risk contribution as a percentage of segment holding. The green bars represent the loss allowance calculated under CECL, which can be thought of as roughly lifetime PD times the loss given default (LGD) associated with each segment. The blue bars show the concentration add-ons. We see that a few sectors have significantly higher concentration adjustment than others. The Banking sector is one example. It turns out that the borrowers in this sector are highly correlated with the systematic risk factors that drive portfolio loss, and thus introduce relatively more concentration risk. In contrast, the borrowers in the Food and Utilities sectors have low correlation with portfolio systematic credit risk factors and thus add little concentration risk to the portfolio. Another example is the Hotel sector. In this

particular portfolio, the Hotel sector's exposures are concentrated in a relatively small number of borrowers compared to other sectors. Consequently, the concentration add-on for this sector is also relatively high, even though the basic loss allowance level for the sector is already the highest across all sectors as a consequence of COVID-19. Figure 9 shows only the 10 sectors with the highest amount of holdings in the portfolio.

Figure 9   Loss Allowance and Concentration Add-on for Each Sector
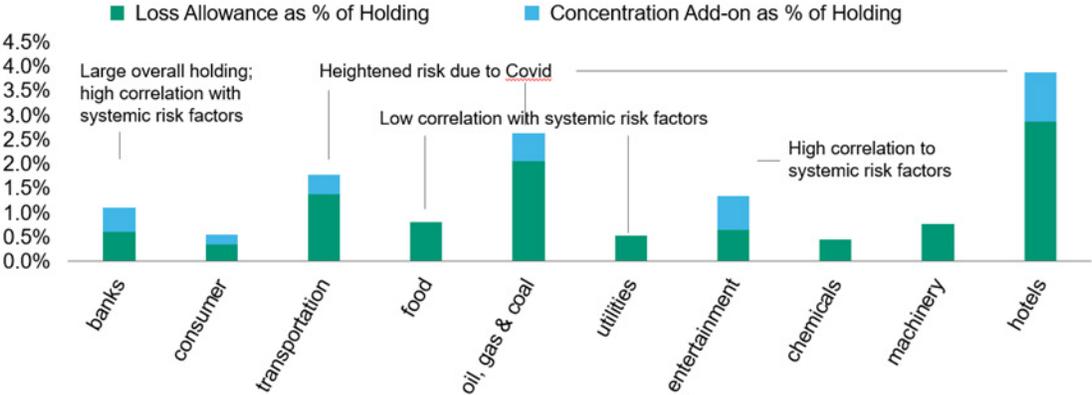
Source: Moody's Analytics

Implications for Credit Loss Disclosures and for Credit Portfolio Management

If an institution had perfect foresight at origination, there would be no uncertainty with credit loss expectations. In reality, economic forecasts are never perfect, and available usable data to support future expected credit loss calculations is often far from granular enough to provide transparency into portfolio concentration risk. Concentration risk allowance adjustments may either not be statistically calculated or overlooked. As institutions align their accounting with credit risk management (and ultimately adjusting their allowance levels to achieve accurate and timely coverage for credit losses), investors and readers of financial statements seek transparency and understanding of original lifetime credit loss estimate and how it plays out over time. More specifically, they want to understand significant drivers of changes in the lifetime estimate compared to Day 1. Dependent on the portfolio segment and economic cycle, concentration may cause material changes and require disclosure considerations to help tell the story.

Entities may want to consider supplementing their required amortized cost vintage disclosure with information about concentration risk and factors that could influence this risk to become more pronounced. This information, together with statistical measurements, boosts investors' confidence despite expected volatility in CECL allowance.

Conclusions and Market Trends

Institutions and the market must navigate CECL and explore the implications on allowance dynamics and necessary disclosures, especially given the current complexities created by COVID-19. It is apparent that the forward-looking measures will have concentration risks that manifest in a more pronounced way — by design — and these measures have a wide range of applications related to credit portfolio management. This paper provides a natural quantitative approach for incorporating concentration in the allowance process.

At the time of writing this article, COVID-19 is making banks increasingly attune to dynamics under CECL, and increasingly looking for more granular, more robust, forward-looking measures to manage their credit portfolios (e.g., Saporta, 2019).

As a final note, it is worth observing that the concepts and approach introduced in this paper apply to IFRS 9 as well, and relevant in the context of some trending European regulations. The ECB Guide to the Internal Capital Adequacy Assessment Process (ICAAP), for example, now requires institutions to consider forward-looking capital adequacy assessments.[3] Recognizing the wide

---

[3]   For further discussion, see, Levy and Xu (2019).

cross-sectional variation across credit market segments, banks and other credit market participants can experience wildly different earnings impacts during the coming quarters as COVID-19 plays out. Banks must now incorporate their forward-looking indicators into CECL models, and they are incentivized to increase the required rates on assets that attract a higher level of allowance under the CECL lifetime expected credit loss models. In some cases, they may pull out of deteriorating lending segments altogether.

This event represents the first materially deteriorated credit environment since CECL adoption. While signs point to a pullback, Federal Reserve action and Federal and State stimulus will offset some of the impact; the speed at which banks react is yet to be seen. Importantly, CECL standard is principles-based (as was incurred loss), and the ways in which economic forecasts translated into credit loss allowance under CECL will differ from firm to firm. But with organizations managing their portfolios to numbers the market ultimately judges them against — allowance, earnings, and their volatility — it is likely that banks will shy away from, or more aggressively price, deteriorated segments than in previous downturns. This change is reassuring, as it can ultimately contribute to a more stable financial system. After all, the CECL measures can be used to inform and improve lending standards. For organizations that actively monitor cross-sectional dynamics and manage credit portfolio diversification, these measures can facilitate steering portfolios to minimize volatility in expected credit losses. Therefore, CECL adoption has the potential of mitigating a credit crisis seen during the Great Recession partially caused by continued investment in segments whose credit has deteriorated.

Market dislocations caused by COVID-19 will serve as the first real test of the CECL allowance model. Q1 and Q2 results from lending institutions will highlight the changing credit environment, largely driven by the COVID-19 impact on the economy. However, we still do not know the extent to which CECL will impact lending, potentially resulting in a pullback in the short-run and possibly accelerating entry of new players in the credit market down the road. There are also many levers being discussed that must be monitored more carefully by policymakers as the Q1 and Q2 numbers are released. Programs designed to bolster the functioning of credit markets in segments of greatest need — such as those of the Small Business Administration and Federal Housing Finance Agency — must be reassessed and, perhaps, reinforced, as the market works through the transition.

References

Levy, Amnon and Pierre Xu, "The Role of Banks in Illiquid Credit Markets, and the Disruption and Evolution of Credit Portfolio Management." Risk Books: *Credit Risk Measurement and Management: Disruption and Evolution*, 2019.

» Saporta, Victoria, "Written Auditor Reporting: Update and Main Thematic Findings." Letter to Chief Financial Officers of Selected Deposit Takers, Bank of England Prudential Regulation Authority, URL: https://bit.ly/2TdAYyx, 2019.