

Currency

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Navigate the model maze

By Bernadette Kogler, managing principal and founder, ELAanalytics, LLC and John Ziegelbauer, managing partner, Grant Thornton's Financial Institutions practice

Financial models are increasingly used to report key financial metrics and confirm ongoing business decisions. These powerful tools are used to support asset valuations, generate forecasts, set reserves, and communicate with regulators and external agencies. Regardless of model complexity, all models carry some level of operational risk.

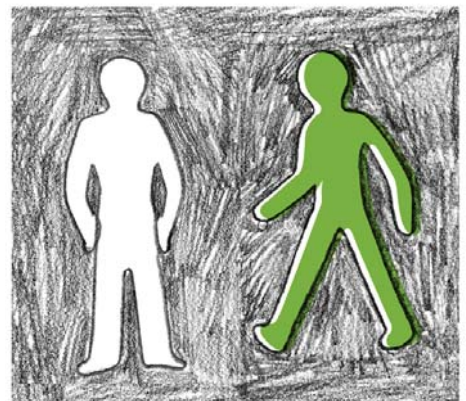
Model risk arises from erroneous calculations, faulty assumptions, overly broad interpretations of results or incorrect usage. Surprisingly, many institutions continue to underestimate the potential damages an erroneous model might cause when a model validation process is not implemented. To minimize risk, the underlying model assumptions, data quality and model quality must be addressed.

Modeling credit risk

Modeling for credit risk and issues surrounding model governance are at the heart of the subprime mortgage debacle. Simply put, many originators did not accurately estimate losses, particularly for certain mortgage products or loan collateral. Pricing and investing decisions have come back to haunt management because of these inaccurate estimates.

The last few years of mortgage origination have been characterized by the emergence of untested products and unprecedented risk layering. Underwriting standards eroded as issuers struggled to maintain volume and home prices soared. In addition, this environment increased the likelihood of fraud, as lenders and aggregators reduced quality control and due diligence staff. With a lack of performance history, internal credit models became less effective as risk mitigation tools. In response to recent industry events, model performance

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Navigate the model maze (continued)

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Credit loss, prepayment assumptions and the discount rate are key factors underlying assumptions in calculating loan valuations or setting appropriate reserves. Getting these assumptions wrong can lead to bad lending and investing decisions. The figure below demonstrates the difference in timing observed between subprime defaults and excess spread (the remaining net interest from the underlying assets of an asset-backed security deal) throughout the life of a structured transaction. By the end of the third year, defaults are typically greater than available excess spread. While some originators are able to make corrections to asset valuations, others are slow to mark assets to market.

Modeling loan loss forecasts to develop reserve estimates

As whole loan portfolio performance continues to deteriorate, financial models have become an indispensable means to provide data points for determining loan loss reserves. Models provide data points around historical and current delinquency severity and duration; they also factor in trends through the use of data, such as futures contracts that can be used to assess inherent portfolio losses.

The data related to the trend of losses can serve as an input in calculating more accurate loan loss reserves. The complexity and interdependency of portfolio characteristics, including borrower credit worthiness, insurance coverage, historical default performance, seasoning, servicer quality and collateral

considerations drive delinquency roll rates (the percentage of loans that move from one stage of delinquency to another). Accountants rely on roll rates to estimate the percentage of performing loans that will enter delinquency and the percentage of loans in delinquency that will flow through foreclosure or charge-off. Conventional spreadsheets are not up to this task — estimating the effects of impairment at this level requires sophisticated financial modeling.

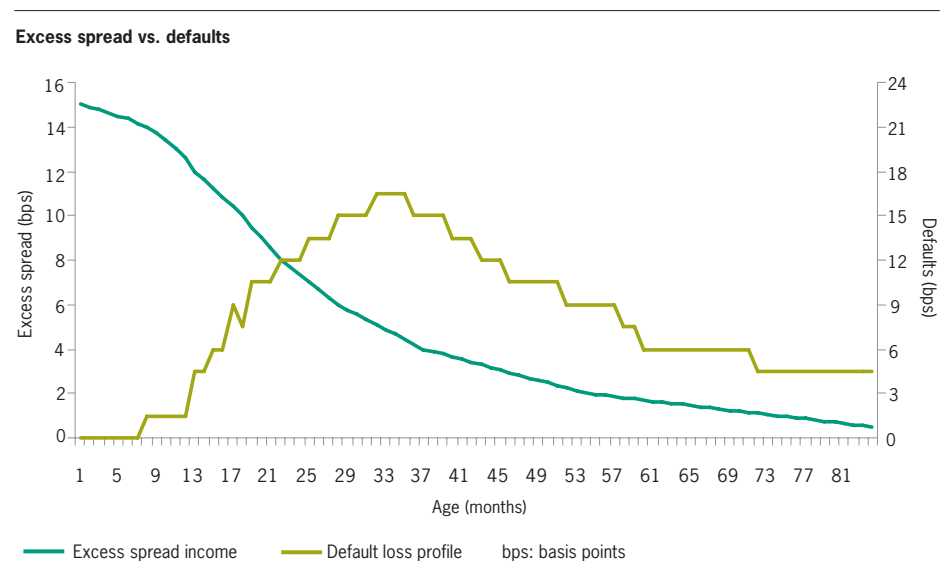
As with other types of financial models, those designed to provide data points in calculating inherent losses in order to estimate loss reserves rely on valid inputs and up-to-date coefficients in order to maximize precision. Rigorous governance is required to ensure that inputs are accurate and up-to-date.

Equally important, the underlying model coefficients — factors applied to the model inputs in order to generate the appropriate outputs — must be regularly

monitored and backtested (comparing actual results against original modeling assumptions) if managers are to ensure they are not applying yesterday's assumptions to today's portfolios. In the current dynamic credit environment, loan loss coefficients must be regularly maintained as observed loan performance continually evolves.

Best practices in managing model risk

The goals of model risk management include avoidance of unexpected material adjustments to previous estimates and minimizing headline risk with a focus on increasing model reliability and promoting continual model improvement. As a best practice, companies should implement an ongoing improvement process to calibrate models to reflect new information relevant to future expectations. At a minimum, best practices call for an inventory of models, a methodology for risk-ranking models,



proper governance and an appropriate level of model validation. Additional best practices exist to monitor, measure and control model assumptions and related data. Ultimately, sound risk management programs incorporate disciplined model development, model validation, process controls, thorough documentation and appropriate governance.

The first step in developing the framework to improve models and the modeling process is to determine what the model is attempting to measure. A lack of clarity in this area is often the primary cause of disagreements about the allowance for loan losses. Disparate interested parties are often attempting to measure different amounts for different purposes. When it comes to an overarching model framework, establish a formal model risk management policy that governs a variety of models across the organization.

Validation procedures

Recognizing the importance of proactively managing model risk, the Office of the Comptroller of the Currency issued Bulletin 2000-16 to address the issue of model validation. This bulletin has become a de facto validation guideline that points to a three-step model validation program focusing on:

- Model input
- Model calculations based on a defined theory
- Model results

Beyond validation of model calculation (or code) is a vital need for validation of model inputs, namely, data and modeling assumptions. Bad data or inaccurate assumptions can be catastrophic. Validation of modeling assumptions can take many forms, including a review for reasonableness and backtesting when feasible.

The validation of model results is equally critical and can be accomplished by using benchmarks to comparable models, market pricing and qualitative review by subject matter experts. Differences should be reconciled by verifying that all computations were executed correctly and by determining the reasons for departures in projected outcomes. The extent of the variances will determine whether corrective action is required for the model assumptions to better align results with reality.

Conclusion

The consequences of complacency with regards to model risk management can be severe, because a lack of model validation can lead to significant unexpected future shortfalls. For models to remain effective, baseline assumptions and sensitivities must be continually updated to reflect the changing parameters of the market. As models become an increasingly essential component of doing business, the consistent monitoring and improving of models must be a parallel function. A structured and formalized model risk management and surveillance program will become necessary practice for all. •

About the authors

Bernadette Kogler is managing principal and founder of ELAanalytics LLC. She has more than 20 years of experience in risk management, financial services consulting and corporate finance. Bernadette oversees ELA's model validation efforts, operational risk management, internal controls and audit focused engagements. Throughout her career, she has supported some of the nation's largest financial institutions.

John Ziegelbauer is the national managing partner of Grant Thornton's Financial Institutions practice.

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For more information about the Financial Institutions practice, contact financialservices@gt.com or dial 877.835.1723.

Contact information

John Ziegelbauer
Managing Partner
Financial Institutions Practice

Editor: Emily Ford, financialservices@gt.com

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