Navigating Emerging Model Risks:

Model Validation in the Current Economic Environment

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The recent downturn in the U.S. housing market has brought to light certain weaknesses in the ability of existing risk models to forecast accurately expected credit losses — particularly for subprime mortgage products. Given the significant volume of securities backed by subprime mortgage loans, and their diffusion throughout the global economy, these events have had dramatic impacts on global credit markets and on the financial institutions holding these assets.

Furthermore, as mortgage originators respond to these events by discontinuing certain products and/or strengthening their underwriting criteria, financial institutions are also discovering that historical relationships between borrower behavior (such as default and prepayment) and economic / transaction characteristics may no longer hold in the current environment — thereby further complicating their ability to measure and manage the risks of these assets.

Given the significant importance of mortgage credit and prepayment models to the financial reporting processes of many financial institutions, and the need for these institutions to ensure the continued validity of these models — both from a regulatory and an internal control perspective — it is no surprise that these models are experiencing significant scrutiny by management, auditors, and regulators. Furthermore, in many cases, companies are addressing the weaknesses noted above by implementing changes / adjustments to these models and model-based estimates which, if not done in a well-controlled manner, further increases the risk profile of the company's financial estimates.

Our focus in the current article is to identify emerging model risk issues driven by recent credit market events, and to offer some suggestions on how these risks may be mitigated.

Validation of Existing Financial Models

Many existing mortgage credit and prepayment models were developed based on loan performance data that reflected periods of low interest rates, high house price growth rates, and relatively permissive underwriting standards. As such, current predictions of default and severity rates from such models may be significantly understated — while estimates of prepayment speeds may be overstated. Reliance on standard backtesting results for these models to make this determination is of limited value since the model's historical predictive performance (during periods of stronger house price appreciation rates and easier credit) is likely not an accurate indicator of the reasonability of its estimates in the current environment.

One way to assess model reasonability in the current environment is by benchmarking the model's key outputs (i.e., prepayment rates, default rates, and loss severity rates) to the company's most recent experience, as

well as to available third-party benchmarks for similar collateral segments and vintages. Where appropriate, the company may wish to modify its model-based estimates in response to these benchmarks with well-documented and supported adjustments. Additionally, the company should consider monitoring model performance at a more granular level to identify potential pockets of poor performance — e.g., at least monthly and with a greater focus on vintages to identify and respond in a timely manner to material trends in model forecast errors.

Finally, the company may wish to deploy alternative forecasting techniques that make use of more recent loan performance information to assess the reasonability of its existing model's predictions. For example, in predicting loan defaults, a company could develop a "roll rate" or "transition matrix" model based on recent delinquency migration data. The results from this model, carefully analyzed, may be useful as an additional benchmark to the estimates produced by the company's existing default model.

Consistency of Multiple Model Platforms

In many companies, there may be multiple credit and prepayment model platforms used for various purposes — such as risk management, estimation of Allowance for Loan Loss ("ALL"), estimation of asset/liability fair values, etc.; for example, a company may have its own internal prepayment model that it uses as part of its ALL estimation process, and have a separate vendor prepayment model for use in certain fair value estimations. These different model platforms for the same collateral create the risk that: (1) the company is effectively employing materially different assumptions across financial reporting segments, and (2) changes / adjustments made to one of these platforms in response to recent events may not flow through to other platforms. Companies may wish to ensure that they have fully identified instances of multiple model platforms, and should be able either: (1) to reconcile adequately the differing credit views (or prepayment views) across these model platforms, or (2) to synchronize these views for financial reporting.

Use of Existing Models on New Loan Populations

The significant deterioration in liquidity and prices in secondary markets for non-conforming mortgage-backed assets has led a number of companies to reclassify segments of their loan portfolio from Held for Sale ("HFS") to Held for Investment ("HFI") — thereby increasing the population of loans on which loan loss reserves are estimated. In some cases, models currently being used as part of the ALL process may not have been validated for the products and/or characteristics of these HFS loans. For example, if a company previously sold all of its PayOption ARM loan production in the secondary market, then it is unlikely that its ALL models would have been developed for, or validated on, this product. As such, companies should ensure that they can adequately

support the reasonable predictive performance of its credit and prepayment models for these new loans — such as through benchmarking and/or recent backtesting.

Revalidation of Key Model Assumptions

Given the significant recent changes to the U.S. housing market, other key credit loss assumptions should be identified and revalidated; for example,

- Pre-foreclosure expenses and lost interest may be materially different than historical experience due to changes in foreclosure timelines.
- Models that estimate credit losses based on a historical mix of loss mitigation strategies — such as REO, short-sale, third-party sale, or write-off — may need to be adjusted to reflect the changing mix of these strategies in the current economic environment.
- Models that incorporate expected recoveries from third parties — such as credit enhancement or repurchase proceeds — may need to be evaluated for changes in counterparty credit risk that could materially reduce the probability of receiving some or all of these proceeds.

Adoption of Third-Party Financial Models

In some cases, the breakdown of internal models may lead companies to license third-party credit and/or prepayment models for use in estimating their ALL or mortgage-related valuations. We note, however, that:

- Regardless of whether key assumptions are generated by internal or external models, management should still ensure the reasonability of these assumption estimates for the purposes to which they are being applied; and
- Nearly all vendor models contain dials and/or settings for users to calibrate or tune the model's default, prepayment, loss severity, house price forecast, and interest rate forecast assumptions. As such, it is crucial that companies be able to support through back-testing or benchmarking the reasonability of its model calibration and, ultimately, the reasonability of the model's predictions for its specific portfolio.
- Companies generally should not be using vendor models "out-of-the-box" — that is, solely with the vendor's default set-up — without a reasonable basis for doing so.

On-Top Adjustments to Model Estimates

For a number of companies, material ad hoc / on-top adjustments to model-based estimates typically fall outside the scope of their Model Validation programs. Since these adjustments are typically quantified by modeling personnel and sometimes employ complex data processing and estimation methodologies, they frequently involve significant "model-type" risks. Therefore, management should either scope the independent review of these adjustments into its Model Validation program, or employ appropriate control processes to ensure the reasonability and accuracy of these computations.

Model Change Management

Management's responses to current events may result in an atypically high number of model changes / enhancements. By opening up the models for these changes, companies create the potential for implementation errors and/or unauthorized changes to the model — thereby highlighting the importance of effective pre-implementation testing and associated model change management controls.

Conclusion

Model risks are continuously evolving in response to change, both within a company — such as the introduction of new products or markets, updates to underwriting criteria, changes in accounting, or changes to operational processes — or outside the company from changes to the broader industry or the economy. As such, while core model risks (such as those associated with OCC 2000-16) will always be present, it is equally important that companies continuously assess and address the emerging model risks that these internal and external changes create.

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