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A Practical Guide for ALM Model Validation

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Overview

“If there’s no clock, we go seeking the right time. But a wrong clock? We’re going to be tempted to accept what it tells us.” - Seth Godin

With interest rates at or near record lows and central banks around the world revving up the printing presses, interest rate risk is a looming threat for the banking industry. Bank regulators have consequently intensified the scrutiny on financial institutions, with the S for Sensitivity getting an increased share of the CAMELS attention. Of course, the interesting aspect of interest rate risk is that it is “self tested” by even the smallest institutions, and is inherently complex to measure. For this reason, financial institutions are graded as much on their process as they are on their actual risk levels. After all, as Mr. Godin so eloquently states in the quote above, wrong clocks are far more dangerous than having no clock at all. For this reason, even small and relatively low risk institutions are held to high modeling standards, and a formal interest rate risk model validation is now standard fare on exam request lists. Institutions have reluctantly been adding model validation engagements to their growing lists of regulatory costs. However, the majority of institutions can handle these model validations (of both internal and outsourced models) internally with minimal pain as long as they follow a disciplined approach¹. This paper will describe this approach, create a checklist of the necessary documentation, and establish a schedule for each component.

What is model validation?

The best place to start is a definition, as institutions often lack a clear understanding of exactly what is being requested when an examiner asks for a

¹ The regulatory guidance addresses the validation of vendor and third party models, which is a slightly different process than validating internally built models. The vast majority of small banks use vendor models for IRR, so this paper focuses on that process. Whether banks run the vendor models themselves or outsource the entire modeling function, the validation steps are similar. Where necessary, I have differentiated between bank run and vendor run models. Banks that are relying on an internally built IRR model will most likely need to engage a third party for model validation.

“model validation.” The definition as stated in the regulatory guidance on model risk:

“Model validation is the set of processes and activities intended to verify that models are performing as expected, in line with their design objectives and business uses.”

So, model validation is in essence a test of how well our models are performing relative to our intention. In order for this process to be both credible and effective, it must meet two basic requirements. First, the validation (or test) needs to be independent of the modeling process and the individuals responsible for the modeling. Second, the process needs to meet all of the requirements spelled out in the various regulatory guidance. Of course, as always, the process should be commensurate with the institution’s size, complexity, and levels of risk. Larger and more complex banks (and those with internally built models) will need a more robust process than the one described in this paper. However, for the majority of smaller financial institutions, this guide should assist in creating a credible validation process at a far lower cost than hiring a third party. In addition, the process will serve to enhance the modeling process and ensure that the bank is not going by a clock that is wrong.

Independence

Creating independence is the issue that most community institutions struggle with, as having staff with both the time and the requisite skill set needed to independently validate a model is a rarity. At many of these smaller institutions, the only staff members with general modeling skills (and/or software specific knowledge) are those that are directly involved with running the model. So how can institutions achieve the necessary independence without having to pay a third party? The key is a disciplined process with clear limits, controls, and division of duties. If designed properly, bank staff with very little technical knowledge can check up on those handling the model design and use.

The common perception among bankers (and of course vendors that sell validations) is that establishing independence is insurmountable in small banks. However, the guidance tells us that establishing independence may not even require separation of reporting lines. Independence, instead, is based on actions, outcomes, and a general unbiased critical review. The staff responsible for the validation must:

- Be familiar with the model’s intended use;
- Have the requisite skills and expertise to perform the technical aspects of the validation;
- Have explicit authority to challenge model developers and to elevate findings;
- Have sufficient influence and stature (either directly or through reporting lines) to ensure that issues are heard and adequately corrected.

So, where can this process reside in community banks? The practical answer is that the bank's Asset Liability Committee (ALCO) can meet each of the four prerequisites listed above, define an appropriate procedure, set acceptable ranges of model error, and delegate regularly scheduled tasks to execute the various components. The guidance dictates the specifics of those tasks (described in detail later), but the committee can achieve independence by following this checklist:

1. Create a document that describes the model's intended use, including what risks are being measured and how the committee expects to use the information that is provided. This document will establish that the committee is familiar with the intended use, and gives clear expectations to model developers and the staff performing any validation tasks. The document should be shared with the entire committee, and should be included as an exhibit with the meeting minutes that go to the board.
2. Design a set of recurring reports that will measure all of the model's major technical aspects that are being validated. These reports will do the majority of the "heavy lifting" in meeting the "requisite skills and expertise" stipulation above, as the committee can determine what factors are most important to accurate modeling, and all of the calculations measuring accuracy can be automated (relevant reports described later).
3. Create a tolerance for the difference between model forecasts and actual results in both the forecasted net interest income and in the model's most significant assumptions. Along with these limits, the committee should set clear criteria for reporting and elevating any exceptions to the limits. With prepared reports and clear limits, the actual task of "checking the results" can be handled by nearly any employee (as long as they are independent of the ALM process) as part of the bank's regular balancing and reconciling procedures. The reports should be checked on a recurring basis (at least annually), with the results reported to the ALCO. The committee can note that the model results are within the established tolerance, or can discuss any specific areas of weakness identified by being outside of that tolerance. This reporting and discussion again needs to be recorded in the minutes.
4. Since the ALCO is given authority directly by the board of directors, and the validation limits and results are recorded in the minutes that go to the board, the last criterion (sufficient authority and influence) is met regardless of who (individual, title, or department) is responsible for the model development and ongoing use.

The key to this process is for the ALCO to be disciplined and to follow the program they create. The recurring tasks need to be completed in a timely manner, and action needs to be taken when the data is saying that the model needs to be adjusted. The guidance states that the appropriate independence

and vigor of the validation process is confirmed by action, meaning that if there is evidence that the committee is reviewing the model's results and suggesting changes where appropriate, the validation will be just as credible (if not more so) than one commissioned by a third party vendor.

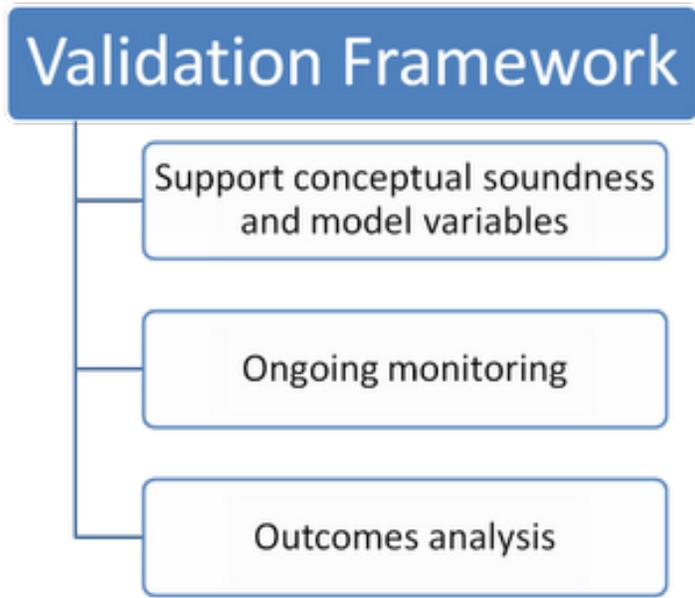
Regulatory requirements

After establishing independence, the second requirement is for the institution to follow the basic regulatory guidance on model validation. While the modeling process gets plenty of attention in various regulations and financial institution letters, two recent sources provide much more clarity than previous guidance. First is an "Interagency Advisory on Interest rate Risk Management Frequently Asked Questions" that was issued in January of 2012. As the title says, this advisory is in a FAQ format, and seeks to clarify and expand on the prior interagency guidance from 2010. One of the FAQ specifically addresses model validation, highlighting the importance of the issue:

"Most institutions use third-party tools to measure IRR. Can independent certifications/validations commissioned by model vendors satisfy supervisory expectations for model validations?"

Answer: No. Financial regulators expect each financial institution to ensure that the selected model is appropriate for its IRR profile by conducting an independent review and validation and performing ongoing monitoring and back-testing to confirm model appropriateness. Although a useful tool, model certifications/validations commissioned by vendors would likely not completely satisfy supervisory expectations regarding validation of the use of vendor products."

So, while vendors can provide you with certifications, documentation, and data for back-tests, the bank is still fully responsible for an independent validation. What does this entail? The advisory goes on to summarize the needed steps, which are laid out in more detail in "Supervisory Guidance on Model Risk Management from April of 2011." The guidance on model risk describes a sound validation framework as having three key elements:



Each of the three elements must be managed on a recurring basis, and each must be documented (including specific mentions in meeting minutes). Here is a description of each of the three elements:

Conceptual soundness

Conceptual soundness refers generally to the quality of model design and construction, including the mathematical integrity of the model and all of the model variables. The majority of the requirements included in this element can be covered by a model certification from your model vendor. All vendors, as a minimum requirement, should commission a third party to certify the interest rate risk analysis related capabilities of their model. These certifications are fairly standard, and test the model's theoretical capability, technical specifications, basic functionality, and mathematical integrity. The vendor should be able to provide a summary copy of the certification, which allows the bank to meet the guidance requirements without getting access to the vendor's proprietary code and model infrastructure.

In addition to the basic model integrity, conceptual soundness also refers to ensuring that the institution has an understanding of the model limitations and assumptions. In order to easily satisfy these elements, the institution should develop a document that lists all major assumptions, settings, and model limitations. Again, your vendor should either already have this document

available or be able to assist you in creating it. Vendors often balk at listing model limitations, but financial models, by nature, ALL have limitations. Being aware of those limitations is key to determining that the model is appropriate for the institution, as the weaknesses should be compared to the risks and accounts types in the institution. If the model is weak in an area where the bank has a meaningful exposure, then that model is likely not the appropriate choice.

Ongoing monitoring

Monitoring consists of confirming that the model adequately captures and measures the specific risks to which the bank is exposed. This would entail a review of the types of assets and liabilities the bank holds on its balance sheet with verification that the model is both capable of handling all instruments and is currently configured to handle them properly. The requirement can be met by following these steps:

1. On an annual basis, the ALCO needs to formally compare the model's "intended use" and modeling capabilities to the bank's balance sheet. Does the model capture the risk that the bank is taking? Are all of the holdings on the bank's balance sheet (including new account types) handled properly by the model? The discussion should be documented in meeting minutes.
2. On an annual basis, the ALCO should verify that any applicable new regulations have been accounted for in the modeling and reporting process.
3. As part of the automated reports for validation mentioned earlier, the bank should create a basic general ledger reconciliation, which will help verify that accurate data is being loaded into the model. This "data proof" compares the totals from the data files containing individual account information to the totals from the corresponding general ledger accounts. Any significant discrepancies should be investigated and explained, with recurring issues corrected.
4. The bank should require the model developer to provide a change log for any significant changes to model assumptions as well as a list of all manual overrides. Any unusual or recurring overrides could be a sign of model weakness.
5. The bank should benchmark the model's vital assumptions (prepay speeds, pricing betas, and non-maturing deposit lives) to industry or peer standards. Any assumption that is significantly different than a benchmark may require documentation explaining the discrepancy.

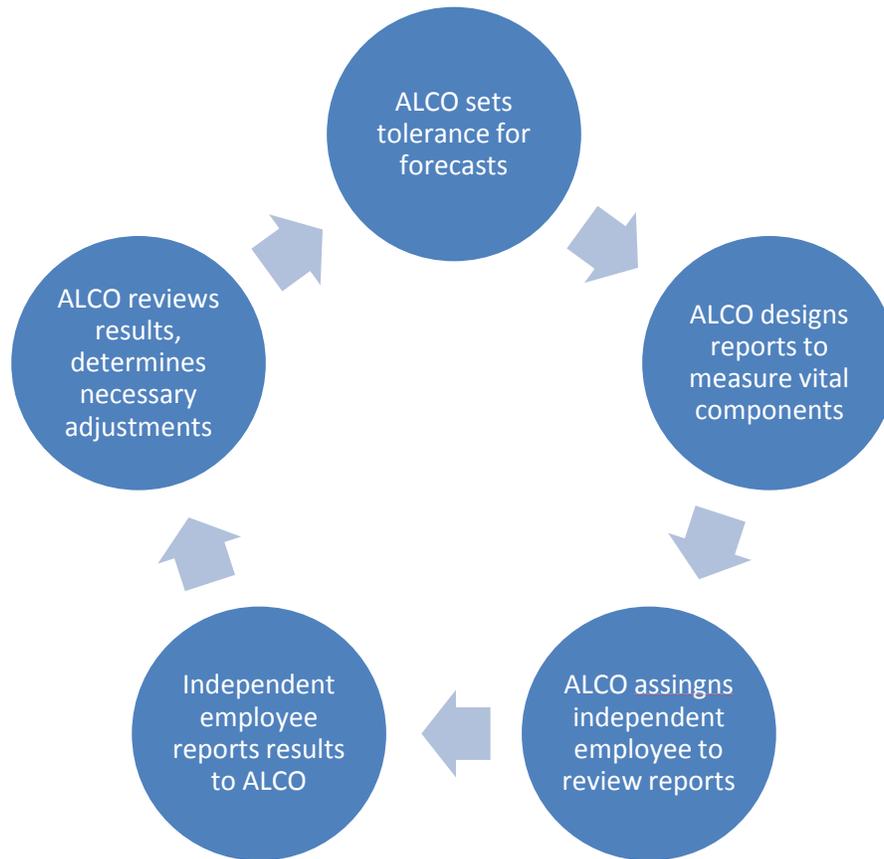
Outcome analysis

The final element is the one that institutions are most familiar with, which is outcome analysis, or back-testing. Again, the vendor or modeler can provide the

calculations, but the back-testing itself is the responsibility of the institution and must be a part of the independent validation. For most small institutions, measuring and setting tolerance levels for a relatively small number of model components will satisfy the requirement. Outcome analysis should be completed for these items:

1. Forecasted interest income/expense for each major balance sheet category, including a measurement that separates the effect of volume and mix changes from the effect of rate variations. This report should be reviewed at least annually, and should compare the forecasted values from the prior year for the rate scenario that actually transpired. After separating the rate and volume impacts, the staff member performing the validation can compare the rate driven variation to the tolerance level set by the ALCO, elevating exceptions as necessary.
2. Prepayment speeds for relevant loans and securities. The bank should design reports that capture all principal paydowns, either directly or by subtracting the prior period balance and new production from the current period balance. This rate of prepayment should periodically (at least annually) be compared to projected prepay speeds, again relative to a tolerance level set by ALCO. The committee should keep in mind the prepay speeds are often quite volatile, and in small banks can be skewed by larger loans in comparatively small balance categories. The tolerance range should be fairly wide, and discrepancies should have to show a visible error pattern or bias before adjustments are made to assumptions.
3. Pricing betas. As part of developing model assumptions, the bank's rates should be compared to market interest rates to determine a beta or correlation to be applied to future rate scenarios. If this calculation is automated, then the bank can measure the statistical significance of the correlation of each account type. In this manner any account that does not have a sufficient correlation can be reported to the committee, and can use an alternative beta for forecasting purposes.
4. Lives of non-maturing deposits. The bank should be comparing recent account activity (new accounts opened and closed accounts) to ensure that the assumptions for lives (or decay rates) are accurate. The easiest solution is to make this another dynamic calculation, where recent activity is incorporated into the model assumptions. If that is not feasible, then the bank can have the employee handling the validation compare account openings and closings to historical patterns. Any activity that is outside of the normal pattern can be reported to ALCO so that the assumption can be updated if necessary.

The following diagram summarizes the actions needed to cover all three elements of the ongoing validation process:



The following table lists the materials that will be needed by the independent employee to complete the review:

Item	Frequency	Review
Model Certification	Annually	Is it current? Does the model meet the standards?
Defined Model Objective	Annually	Does the model objective match ALCO's?
List of Assumptions	Annually	Are they bank specific where possible? Current data?
List of Weaknesses	Annually	Are weak areas problem for bank?
List of Settings	Annually	Have they changed?
Back-test Interest Inc/Exp	Annually	Is rate based error within tolerance?
Prepay Speeds Report	Annually	Are actual speeds close to forecasted speeds?
Pricing Beta Report	Quarterly	Is the correlation statistically significant?
Accounts Opened/Closed Report	Annually	Is the trend changing?
Override Report	Quarterly	Are there recurring items? Too many overrides?
GL/Data File Balance	Quarterly	Are there meaningful differences in balances?
Meeting Minutes	Quarterly	Is all validation activity mentioned?

Keep in mind that the employee doing the review does not necessarily need to make decisions on the appropriateness of any item. They simply need to find exceptions and elevate them to the committee.

Conclusion

Smaller financial institutions are being squeezed from multiple directions, as they face compressing margins, declining fee income, and a growing regulatory burden. Given the problems in the industry over the last several years and the

unique economic environment, institutions of all sizes must be more sophisticated in their risk management techniques. This obviously includes the management of interest rate risk models and their potential flaws. However, a well designed validation process can not only save crucial overhead expense, it can improve the asset liability management function, and improve returns in the years ahead.

About the author

Dallas Wells is Vice President at Asset Management Group, Inc. He has more than a decade of banking experiencing, working in both large regional banks and community banks in a variety of roles. Mr. Wells has a degree in finance from Washington University in St. Louis, and is a graduate of the Southwestern Graduate School of Banking. He can be reached at dwells@countryclubbank.com, or via Asset Management Group's website at <http://www.bancpath.com/>.

About Asset Management Group, Inc.

Asset Management Group, Inc. (AMG) is a wholly owned subsidiary of Country Club Bank in Kansas City, and has been serving community banks since 1995 with their BancPath Asset Liability Management Service and asset liability management consulting.

AMG's staff is made up of professionals with years of experience in managing interest rate risk, liquidity risk, and net interest margins in and for community banks. AMG is owned by a community bank that uses the service, and has designed the proprietary model with community banks and their management teams in mind. To learn more, visit <http://www.bancpath.com/>.

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