Interest Rate Risk: Modeling Dynamic Cash Flows

Overview:

It is well known that regulators are increasing their focus on interest rate risk (IRR) in the current environment. The FDIC, for example, recently published an article which underscores the importance of sound processes for IRR management at their member institutions. For many banks, this is a good time to assess the adequacy of their asset / liability management model and in particular whether their model produces dynamic cash flows for analysis of risk to earnings and capital.

Every banker knows that liquidity has a tendency to ebb and flow with changing market conditions. As a rule, liquidity rises and falls inversely with the general trend and direction of interest rates. The ability to reasonably project the behavior of balance sheet cash flows, and therefore liquidity, is critical to sound asset / liability management processes. Some banks have relatively simple balance sheets that experience very little cash flow volatility. Other institutions are much more active and dynamic, including off-balance sheet transactions, and financial instruments with high degrees of optionality or cash-flow uncertainty. In general, it is the magnitude of this cash flow volatility that can result in undesirable levels of liquidity risk and financial performance. Among other things, extreme variation in balance sheet cash flows can result in volatile measures of economic value of equity (EVE).

Identifying the Need:

There are three points of focus that help to determine the degree to which institutions should have access to cash-flow level interest rate risk reports and simulation analysis: wholesale funding, off-balance sheet commitments, and options risk. Banks that make heavy use of wholesale funding sources including brokered deposits or advances, for example, and those that have a high percentage of “non-core” funding generally are certainly candidates for robust cash flow analysis and reporting. Also, off-balance sheet funding commitments would trigger a need for such tools.

Perhaps the most notable characteristic which would call forth a need for such cash flow analysis is a high degree of options risk, particularly in assets. Options risk entails uncertainty with respect to cash flow. Cash flow projections and therefore liquidity forecasts become more difficult since you cannot know precisely when principal will return to the balance sheet for reinvestment or redeployment. In short, bank balance sheets that contain a high level of options risk should make a greater effort to analyze and monitor those cash flows.

Measuring and Reporting:

A critical aspect of dynamic cash flow analysis is the development and modeling of assumptions. The analysis must project the response or behavior of cash flows to a variety of influences. Here the bank must make assumptions about future events. For the risk measurement system to be reliable, these assumptions must be reasonable given the characteristics of the bank and its balance sheet. The OCC identifies some common problems with regard to development of assumptions in the risk measurement process. These include:

- Failing to address potential risk exposures over a sufficiently wide range of interest rate movements to identify vulnerabilities and stress points.
- Failing to adequately modify or vary assumptions for products with embedded options to be consistent with individual rate scenarios.
- Basing assumptions solely on past customer behavior and performance without considering how the bank’s competitive market and customer base may change in the future.
- Failing to periodically reassess the reasonableness and accuracy of assumptions.
We should add to this list the failure to model non-parallel changes in the yield curve since some instruments have cash flows that are driven by changes in short-term rates, while others are sensitive to changes in the long end. In any case, it is imperative to have a comprehensive set of reasonable assumptions built into any model that projects scenario cash flow dynamics.

Once we have meaningful cash flow projections, we can simulate with more precision the effect on earnings of different interest rate environments. This is more valuable than, for example, a call-report based system which must rely on broad categories and average balances rather than actual dollars of reinvesting and/or re-pricing cash flows. Again, banks with very simple balance sheets may not need the highest degree of precision, but they will want to assess the adequacy of their system in any case.

**Conclusion:**

There are many considerations involved in the modeling of a bank’s interest rate risk exposures. The regulatory authorities have told us in no uncertain terms that bank management must be vigilant in their efforts to define measure and manage those exposures. FFIEC has specified that banks should assess the risk impact for rate shifts of greater magnitude (400bps) and for non-parallel curve shifts. In order to do this properly, we must look at the behavior of cash flows. The dynamics of re-pricing balances and changing interest rates create a good deal of uncertainty with respect to future earnings unless there is some meaningful way to model those dynamics. For banks who seek to upgrade and optimize their IRR processes, a good start is to review and assess the adequacy of their asset / liability reporting system.