

## A/LM Modeling

**NEV and NII Assumptions: Things to Consider**

By c. myers corporation

Market interest rates have been sitting at or near record low levels for almost five years. As a result, credit unions are booking assets at very low rates and, in many cases, lengthening their balance sheet to slow the decline in yield. From a business perspective, it makes sense for credit unions to be especially focused on their asset/liability management (A/LM) position and their understanding of risk.

In addition, the added level of interest rate risk undertaken by some institutions has not gone unnoticed from a regulatory perspective. The NCUA and state regulators have become increasingly concerned about the composition of credit union balance sheets. **Interest rate risk is the most significant risk the industry faces right now**, according to NCUA's Letter to Credit Unions 14-CU-02 (Supervisory Focus for 2014). Higher levels of interest rate risk, along with increased focus, put more pressure on understanding model methodologies and assumptions.

**The focus here is on certain key assumptions that can greatly impact the results of some traditional methodologies.**

In 2012, the NCUA implemented the *Interest Rate Risk Policy and Program* that spelled out the requirements for a credit union's interest rate risk program. Some of the key requirements deal directly with the assumptions that are used in simulations. The regulation states that assumptions should be reasonable, supportable, understood by management and ALCO, and updated as appropriate.

#### Can You See the Assumptions That Are Used?

It is critical that credit unions understand the assumptions used in their risk modeling. The *Interest Rate Risk Policy and Program* states that there needs to be "transparency of changes in assumptions, methods and IRR tests." Based on our experience of performing validations of A/LM modeling, we have discovered that there are products and processes that make this fairly easy, and others that make it nearly impossible to understand what is happening in the model. We recommend that you look at your A/LM model or discuss each of the key assumptions with your A/LM provider to ensure that you can see each of the key assumptions in the model.

If you cannot see the key assumptions, then you don't know what assumptions are being used. How, then, would you know when they have changed or if they are reasonable?

#### Are the Right Assumptions Synced?

The following paragraphs will address two key questions:

1. When should assumptions used in Net Economic Value (NEV) and Net Interest Income (NII) sync up?
2. Are there circumstances in which it makes sense for them to be different?

Many assumptions used to calculate NEV and NII are independent of each other. For example, discount indices used in an NEV simulation are not relevant in an income simulation. However, there are several key assumptions that should line up between the two simulations. Deposit pricing and loan prepayments are two examples.

Deposit pricing assumptions impact both NEV and NII simulations. Deposit pricing assumptions outline how the credit union believes it will price deposits if rates increase

or decrease. This assumption can reasonably be based on prior experience, as data is available for rate increases as high as +500 (which last occurred in 2007).

Credit unions should minimally use history as a guide for the pricing of deposits in NEV and NII simulations, and may want to use even more conservative assumptions given there is no precedent for how members might behave when rates increase from such a prolonged low environment after a material flight to safety.

Loan and investment prepayments are another set of assumptions that should sync up between NEV and income simulations. Prepayment assumptions are critical to the process of discounting cash flows and impact income simulations by influencing how quickly existing business will pay down. **When possible, credit unions should use observable data as a starting point** to adjust and refine prepayment assumptions used in NEV and NII simulations. Simply using actual experience may not always be reasonable. For example, the level of mortgage prepayments seen over the last couple of years may be much higher than future expectations.

Some A/LM providers will use two different models to calculate NEV and NII. If this is the case for your credit union, check to see if the prepayment speeds used for calculating value are the same

as the prepayment speeds used in your income simulation.

In performing model validations, we have seen many cases where the prepayment speeds are not the same when comparing methodologies. When discussing this with credit union management they often did not realize that two different sets of assumptions were being used. If you find yourself in this situation, ask yourself, “How would I reasonably explain that the prepayment speeds for my 30-year mortgages are assumed to be one set of numbers in the income simulation and a different set of numbers for calculating the value?” **If there are two different assumptions for an account, it guarantees that, at minimum, one of them is wrong.**

When dealing with assumptions, there is no way to know what *will* happen, which is why testing various assumptions in “what-ifs” and stress tests is prudent. However, having conflicting assumptions in a base case does not help the objective of testing various assumptions.

Additionally, in some cases, deposit values may come out of a different model. Similar to the issues described for the loans, if the deposit values are calculated from an alternate model, are the assumptions between the two different sources in line?

For example, both earnings and NEV simulations typically

need deposit pricing assumptions. If the deposit pricing assumptions used for NII are different than those used for NEV, this should raise a flag.

If there are two different sets of assumptions in a base case, there are challenges beyond the flags described above. Consider if your process for documenting, understanding and tracking assumptions changes is designed to follow two paths for each base case. Clarity in this process can become more difficult in such a situation.

Should Assumptions Ever Be Different?

While some assumptions should sync up, sometimes it makes sense to use different assumptions between the NEV and income simulations. Take, for instance, loan discount assumptions used in an NEV analysis. Credit unions will often use offering rates to represent the rate of new business in an income simulation, and then those same offering rates as the discount rates in the NEV analysis. However, this approach can result in older loans being modeled at sizable gains. (More on this later.)

While using offering rates may make sense in an income simulation, it does not necessarily mean it is reasonable to use those same offering rates to discount loans in an NEV simulation. To address this, it can be helpful to reference NCUA’s definition of NEV. In Letter to

Credit Unions 99-CU-12, the NCUA says, “NEV equals the fair value of assets minus the fair value of liabilities.” What is the definition of fair value? According to 12CFR NCUA, Section 703.2, fair value is defined as “the amount at which an instrument could be exchanged in a current, arms-length transaction between willing parties.” Ask yourself, are there likely to be willing parties to buy a 105% LTV mortgage made in 2007 at a premium today?

In performing simulations of risks to earnings and net worth we encourage credit unions to stratify mortgages by coupon rate (to allow for refinement of prepayments, discount rates and to aid in tracking balances). In this process it is not uncommon to see sizable pools of mortgage loans held at coupon rates above 5%.

	% of Portfolio	Average Yield
30 Year Mortgages - Fixed		
30 Year Mortgages <=3.99%	43%	3.78%
30 Year Mortgages 4-4.99%	31%	4.46%
30 Year Mortgages >=5.00%	26%	5.34%
<b>Total 30 Year Mortgages - Fixed</b>	<b>100%</b>	<b>4.40%</b>

In the above example, 26% of the 30 Year Fixed Mortgages are still paying over 5%. We see some institutions that have more, some have less. It is important for each credit union to understand its mix and how that might inform relevant modeling assumptions.

Note that there are many different reasons members still hold mortgages at higher rates. In some cases, refinancing is just not possible. The

collateral may not be adequate, credit scores may have deteriorated, or employment cannot be verified.

Beyond the credit issues, the loan documentation and underwriting used years ago may not be up to current standards. In addition, as loans age, third parties are less willing to purchase these seasoned loans (for many of the same reasons listed above). Even in the relatively liquid mortgage market it is more difficult to sell older loans.

If a credit union uses current offering rates to discount these loans, the higher coupon mortgages would be reflected at material gains. Considering the likely reasons the loan is still at a high coupon, modeling significant gains on these loans may not be reasonable.

Relevant factors that could impact market value should be evaluated when setting discount rates. Even the cleanest portfolio will have some loans that would be virtually impossible to sell without incurring a significant loss. One way to address this is to separate loans by coupon or current LTV and adjust the discount spread to recognize this reality. Discounting to offering rates is common, but that does not mean it is reasonable.

**Other Considerations**  
With all of the data and assumptions required to produce NEV and NII results, it can be easy to lose track of which assumptions impact both sets of analyses and which ones do not. Some differences are more obvious, such as the fact that discount rates do not impact NII. However, some differences are more subtle. For example, is your NII simulation incorporating the risk of deposits leaving?

A key part of asset/liability management is addressing risks to liabilities. ALCOs and boards should ensure that risk exposures due to liabilities, in this case non-maturity deposits, are being appropriately addressed. Therefore, consider the following question, “When we are looking at the A/LM results for policy, are we factoring in the risk of non-maturity deposits leaving?” How would you feel about answering that question with, “No, deposits never leave (static balance sheet NII simulation), **AND** yes, deposits are assumed to leave (NEV with decay).”

Note that the difference between answers is even more dramatic if NEV is modeled as shares at par, where conceptually all non-maturity deposits leave immediately. Given the confusion in the example answer above, what are the chances of decision makers being confused and losing confidence in the A/LM process? **One of the indicators of potential modeling risk is if changes**

**in your assumptions have a dramatic impact on the results.** This should cause you to question, “How reliable are the results upon which you are basing your decisions?”

If your credit union is utilizing a static balance sheet to simulate NII, by definition, the balance of each account never changes. Test and see. Is your income simulation including any decrease in non-maturity deposit balances if rates rise? Look over the length of your simulation and see if the balance of non-maturity deposits is the same when comparing the current and higher-rate environments.

As rates rise or investment alternatives change, there is a strong likelihood (and recent historical precedence) that member deposits will shift from lower-rate products (e.g., shares and checking) into higher-rate products, or shift out of the credit union into an alternative type of investment. This was discussed in a c. notes article from May 2013 <http://cmymers.com/cnotes/cmymersunderstandingirrisnotastaticissue.pdf>.

Consider taking a look at your cost of funds in 2007. If you simulated a +500 rate environment today (which would take short-term rates back to 2007 levels), does the income simulation show cost of funds minimally getting back to where it was in 2007? If not, you could be understating your risk. Credit unions’ income simulations should address this issue. Once your base income simulation’s cost

of funds minimally reflects history, it would also be a good idea to run additional stress tests. There could be a lot of pent up demand for yield if rates rise, and members may be more rate sensitive than they have demonstrated in the past.

What about the Bottom Line? Finally, note that neither NEV nor NII simulations take into account net operating expense. These modeling methodologies do not help decision makers understand if the credit union will make or lose money. This can cause decision makers to not understand threats to net worth.

**After more than two decades of working with credit union managements and boards in the area of asset/liability management, forecasting, and strategic planning, we have found most decision makers want to know if they will be positioned to make or lose money.** And, if there is risk of negative earnings, does the credit union have enough net worth to absorb losses and remain safe and sound? Understanding this risk could help decision makers to determine what steps could be taken to reduce the risk of loss.

**If you are relying on NEV and NII simulations to measure risk, recognize the limitations from a decision-making perspective.**

**If you only remember 2 things from this article, remember...**

1. The heat is on, it’s more important than ever to understand the assumptions that go into your risk simulations.
2. If you have conflicting assumptions, decide if they make sense, and if not, make it a priority to change the conflict!

We recognize that things are getting more complex and time consuming. We would be happy to answer any questions you might have. Please feel free to contact one of our principals at 800.238.7475 or [www.cmymers.com/contact/](http://www.cmymers.com/contact/).

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