

Static Pool Analysis: Evaluation of Loan Data and Projections of Performance March 2006

Introduction

This whitepaper provides examiners with a discussion on measuring and predicting the effect of vehicle loan performance on loan portfolio yield using a process developed by the NCUA (NCUA Static Pool Analysis Tool). Examiners may use this tool to review a credit union's static pool analysis for an indirect vehicle loan portfolio. Credit union staff can use static pool analysis to make informed decisions about whether to increase funding, continue at current levels, or curtail acquisitions of loans based on results of actual yields or an expected yield analysis. **This whitepaper is not intended to disregard other alternative approaches nor is it intended to be the only tool used by a credit union to validate strategic decisions regarding lending programs.**

Background

In June 2005, NCUA issued Risk Alert 05-RISK-01 (the Risk Alert), Subject: Specialized Lending Activities – Third-Party Subprime Indirect Lending and Participations, available on the website at <http://www.ncua.gov/letters/RiskAlert/2005/05-RISK-01.pdf>, to address increasing concern over the effectiveness of controls in place at credit unions to manage such programs. The Risk Alert highlights issues relating to a credit union's ability to not only control the activities of a third-party as it relates to underwriting and servicing loans, but also to adequately track overall performance of the loans in the program. Static pool analysis can be used to evaluate just about any type of loan pool performance, regardless of the underlying characteristics of the loans in the pool. The Risk Alert cited this type of analysis as the most effective method of evaluating the performance of a pool of auto loans.

Since the Risk Alert was issued, many credit unions engaged in third-party subprime indirect lending have taken steps to perform static pool analysis. Therefore, the NCUA developed this paper to assist examiner staff in understanding static pool analysis and to better prepare you for evaluating static pool analysis conducted by or on behalf of credit unions.

Discussion

Is the yield on a pool of loans the same as the loan rate?

A pool of loans with 18 percent loan rates doesn't necessarily return 18 percent. Several factors may reduce the yield below the average loan rate. Borrowers may fail to make timely or full payments. Borrowers in default make no interest payments. Or a lender may restructure loan terms, reducing the loan rate, to facilitate workout of troubled debt.

Proceeds from the sale of a repossessed car, including any insurance recovery, may be less than the principal amount due. Borrowers may file bankruptcy petitions. The bankruptcy court may reduce the loan principal amount and/or loan rate.

Finally, when a credit union pays fees to acquire loans, the yield will be less than the average loan rate because the credit union must recover the premium from the interest paid.

What affects the yield?

“Prepayments” may severely affect the overall yield of the portfolio. Prepayments include all early reductions of loan principal. Examples of prepayments include: early loan payoffs; insurance payoffs; and defaults due to bankruptcy and delinquencies.

To the extent there is less than total recovery of principal (including through repossession and resale, and any insurance) loss severity becomes an important characteristic of portfolio return.

What analysis should examiners expect credit unions to perform before investing in a pool of loans?

Before investing in a pool of loans, credit unions should analyze static loan pool data provided by the vendor, or perform appropriate alternative due diligence, to validate the underwriting criteria. It is appropriate to analyze how a fixed group of loans have performed, in order to reliably predict expected future performance. Once an initial assessment has been performed, credit unions should perform ongoing static pool analysis to monitor the performance of the loans in the pool.

Once the credit union has acquired loans, the credit union should use the actual cash flows and a range of expected cash flows to calculate a range of expected yields. For matured pools¹, compute the actual yield to maturity by computing the internal rate of return² on all cash flows. For pools that have not yet matured, compute an expected yield by making assumptions about future performance and computing the internal rate of return on all historical cash flows and expected future cash flows. Vary the assumptions to understand the sensitivity of the expected yield to changes in assumptions.

A static pool is comprised of loans originated with the same underwriting criteria during the same month, quarter, or year. Ideally, all loans originated in the same time period are included in the performance data.

A static pool covering loans originated in one calendar year is sometimes called a “vintage origination year” or “vintage data.” Vintage data is less “static” than shorter

¹ A “matured pool” means a pool of loans with all loans having reached maturity, and all cash flows associated with the particular pool are known.

² The internal rate of return (IRR) is the interest rate received for an investment consisting of payments and income that occur at regular periods.

time periods, since new loans are continually added to the portfolio over the course of that year's vintage.³

Why should examiners expect to see credit unions perform static pool analysis?

As outlined in the Risk Alert, the most effective method of evaluating the probable performance of a vendor's underwriting criteria is through an analysis of static loan pool data. Historically, new loans tend to perform better than older "seasoned" loans in a portfolio. Therefore, static loan pool analysis of a fully formed pool⁴ is not distorted by new loans entering the pool.

Static pool analysis can provide key measures affecting overall portfolio yield. NCUA's Yield Model requires the following three key inputs:

- Constant Prepayment Rate (CPR);
- Default Proportion; and
- Loss Severity.

Constant Prepayment Rate

We define prepayments as unscheduled reductions in principal outstanding in the pool of loans. We use CPR as the measure of the prepayment rate at which a loan is expected to prepay, expressed as an annual percentage of the remaining loan balance.

Default Proportion

The default proportion represents the part of prepayments that result from defaults. We include defaults in our definition of prepayments.

It is sufficient to compute the default proportion as the ratio of the dollar amount of defaults for a time period divided by the total prepayments for that time period.

Loss Severity

Where the payment of principal and interest is not fully guaranteed, part of the defaults will result in a loss. After a default, loss of principal results from uncollectible principal, such as a deficiency following repossession, as well as bankruptcy reductions of principal.

It is sufficient to compute the loss severity as the simple ratio of the dollar loss for a time period divided by the dollar amount of defaults for that time period. In other words, loss severity is that portion of the default amount not recovered.

Why isn't monthly return on average assets sufficient?

Static pool analysis keeps the focus on the expected return to maturity. The month-to-month performance of a small pool of loans may vary dramatically, with some months with a low or negative return on average assets, and other months with a high return.

³ See, Securities and Exchange Commission (SEC) Release No. 33-8518, "Asset-Backed Securities" (Dec. 2, 2004) [70 FR 1506, at 1540 (Jan. 7, 2005)].

⁴ When a static pool is "fully formed," no additional loans are added to the pool.

These monthly fluctuations do not provide the long-term perspective available through static pool analysis.

In addition, monthly return on average assets will not highlight the return on separate pools of loans. When new loans continue to be added to a balance sheet, the initial performance of the new loans can mask the performance of the older loans.

What data is needed for static pool analysis?

Static pool analysis is based on the actual cash flows of a pool of loans. All cash outflows and cash inflows associated with the pool of loans should be recorded. Recording cash flows in the month of occurrence generally should provide sufficient accuracy for evaluating loan performance.

Examples of Cash Outflows:

Amount of loans
Origination fees to third parties (including any insurance premium)
Servicing fees
Repossession/reconditioning/remarketing expenses
Other costs paid to administer a program⁵

Examples of Cash Inflows:

Regularly scheduled loan payments (interest and scheduled principal repayments)
Prepayments of principal (e.g., as a result of cash payoff, trade-in, or refinancing)
Proceeds of repossession sales
Insurance recoveries (e.g., skip insurance, lien holder's credit insurance)
Rebates received

Static pool data also includes reductions of principal because of default write-offs or bankruptcy reductions, which do not entail cash flow. This loss data is used in preparing prepayment rates, default proportions, and loss severities.

Static pool data should include at least 24 months of history, at a minimum.⁶ However, some view even 36 months of data as insufficient, since the amount of pool experience necessary for a meaningful evaluation of trends varies by asset type.⁷ SEC rules for asset-backed securities require disclosure of information, to the extent material, for a minimum of five years.⁸

Delinquency data, another non-cash item, can be useful in trend spotting and forecasting future defaults. Thus, it is helpful if static pool data also includes delinquency data.

⁵ Other costs may include any expenses incurred to administer the loan program (e.g., data processing costs, consulting fees, or additional staff).

⁶ NCUA Risk Alert No. 05-RISK-01 (June 2005), at 4.

⁷ SEC Asset-Backed Securities, at 1540, referencing comments of the American Securitization Forum, of the Bond Market Association, and the Metropolitan Life Insurance Company.

⁸ See SEC Regulation AB, 17 CFR 229.1105(a)(3)(i).

How is static pool data reported?

Static pool data is generally displayed in columns and rows. Each row represents one static pool (for example, one month of loan originations). Each column represents one month of performance. Data can be presented in dollars in one table, and percentages in another. Monthly (that is, periodic or non-cumulative) and cumulative performance statistics can be presented in tables.

What static pool data is tracked by most institutional investors?

Useful static pool data includes delinquencies, defaults, gross losses, net losses, and actual prepayment amounts and rates. Examples of static pool data for asset-backed securities, disclosed under SEC Regulation AB, are available by searching the web for static pool data.

Most investors in asset-backed securities track cumulative credit loss rates throughout the duration of the pool of loans. This is a key factor in monitoring credit exposure of the asset-backed security versus the available credit enhancements (i.e., the loss mitigators such as insurance).

Lenders may benefit from graphing cumulative credit loss experience over time. This is often referred to as a “credit loss curve.” Credit loss data can be stratified and analyzed by almost any characteristic. Lenders can use static pool data to identify opportunities for improvement in underwriting. For example, by tracking delinquencies and losses by car dealer, credit unions can identify weak originators.

Should examiners expect to see credit unions work cooperatively to prepare an analysis?

When considering purchase of loans from a common originator, credit unions should consider combining their efforts in performing static pool analysis. Credit unions should be able to demonstrate a reasonable basis to rely upon static pool data from another credit union or vendor in evaluating their own loans.

Should examiners expect credit unions to use all available data?

Static pool analysis should include all of an originator’s data that is available, reasonably reliable, and relevant. Caution is warranted if analysis is based on incomplete or select data unless the originator can demonstrate the excluded data is not relevant to the loans under consideration.

How do credit unions make assumptions about future performance?

Credit unions should use historical performance as part of the basis to project future payments and recoveries. Historical performance includes the actual payments, delinquencies, defaults, and recoveries. We recognize there will be judgment involved in making assumptions about future performance. Credit unions should document and disclose assumptions they make.

How can credit unions estimate historic prepayment rates?

When credit unions do not have actual prepayment data, management can estimate historical prepayment speeds using the NCUA Prepayment Model, embedded below. The spreadsheet computes an estimate of prepayments by approximating the scheduled principal payment each month.

When making CPR calculations using the NCUA Prepayment Model, credit unions should start with a fully formed static pool. If loans are still being added to the pool, the spreadsheet will compute a negative CPR. Negative CPRs don't make sense for most vehicle loan pools, since the balance on an individual loan that is performing should be declining each month. However, examiners may see a negative CPR in the first month of a fully formed pool, as a result of scheduled delays in first payments on loans.

The NCUA Prepayment Model computes estimates of historic average CPRs for different time periods, such as one month, three months, six months, and twelve months. If credit unions observe patterns in prepayment rates over different time periods as loans age, they can use this information in projecting future performance. The NCUA Yield Model, discussed below, can accept different CPRs for each month.

When using the NCUA Yield Model, the yield on a pool of loans purchased at a premium over a period that is longer than one month will not be accurate if negative CPRs are used to simulate multi-month periods. This is because the model will use the purchase premium only for loans acquired initially. The negative CPR will compute an addition to the principal balance after the initial acquisition, but the model will not include a purchase premium on the additional loans. Credit unions must modify the model to input premium paid on loans acquired after the initial input.

Example Computation of Prepayment

The embedded NCUA Prepayment Model, in an Excel™ workbook, below provides an example computation of CPR based on the outstanding balance at the beginning of each month. Simplifying assumptions are noted on the first sheet, along with a summary. For illustrative purposes, the sample workbook contains fictional data.



NCUA_Prepayment_
Model_March_2006.x

What factors should examiners expect credit unions to consider when projecting performance?

Macroeconomic variables can affect future performance. Credit unions should consider the economic environment during the static pool period. When forecasting future performance, management should consider whether the economic environment is likely to change. For example, rising unemployment may be positively correlated with rising delinquencies and defaults. Thus, credit unions should use a range of assumptions about future performance to compute a range of estimated returns.

Another approach to assessing sensitivity is to set an absolute level of change in one or more assumptions. For example, one way to vary the inputs for portfolio statistics is to increase CPR (both up and down) by a factor of 50 percent.

Alternatively, management may be interested in how high CPR (or other variables) must increase before the Bond Equivalent Yield (BEY)⁹ will fall below a desired minimum return.

What is the NCUA Yield Model?

The NCUA Yield Model is an Excel™ spreadsheet that contains multiple Tabs that are designed to follow a logical pattern of completing a Static Pool Analysis. See Tab 1 in the NCUA Yield Model for a graphical overview of the NCUA Yield Model.

Before using the NCUA Yield Model, individuals should have a clear understanding of a few terms and how they are used in the model:

- ✓ Weighted-Average Coupon (WAC) is the arithmetic mean (dollar-weighted) of the coupon rate of the underlying loans in a pool. See Tab 2 in the NCUA Yield Model for a sample calculation of WAC for a pool of loans.
- ✓ Weighted Average Maturity (WAM) applies the same concept of “weighting” to the maturity of a loan pool based on the maturity of the individual loans in the pool. See Tab 3 in the NCUA Yield Model for a sample calculation of WAM for a pool of loans.
- ✓ Single Monthly Mortality (SMM) is a measure of the prepayment rate of a loan pool. Important Note: The NCUA Yield Model uses the term “prepayment” to describe any unexpected reductions of principal in the loan pool. This includes defaults or early payoffs. As the name implies, the pool is “dying-off” faster than scheduled. In order to calculate a SMM for a given historical period, there must be associated prepayment for that period – no prepayment, no SMM. See the NCUA Prepayment Model for a sample calculation of SMM for a pool of loans.

⁹ A measure of the return over the life of an investment or loan, assuming the return is computed using a semi-annual interest formula and an actual day year. We use bond-equivalent yield to make comparisons between different investments using a consistent measure of return.

- ✓ Constant Prepayment Rate (CPR) is essentially an annualized representation of the SMM. CPR is used to measure the prepayment rate at which a loan is expected to repay (ahead of schedule), expressed as an annual percentage of the remaining loan balance. See the NCUA Prepayment Model for a sample calculation of a CPR for a pool of loans.
- ✓ Default Proportion represents the part of prepayments resulting from defaults. So as prepayments are received, the portion associated with defaults should be tracked and maintained. Default proportion is computed as the dollars in defaults for a period of time divided by the total prepayments for that same time period.
- ✓ Loss Severity is the ultimate loss of a defaulted loan after any funds from the sale of collateral or insurance proceeds are applied to the loan balance. Loss of principal can result from any uncollected principal or bankruptcy reductions of principal. Loss severity is computed by dividing the dollar loss for a time period by the dollar amount of defaults for that same time period.
- ✓ Bond Equivalent Yield is a measure of the return over the life of a pool of loans. This method of measuring yield is used in the NCUA Yield Model. It allows the yield of different “investments” with different payment frequencies to be compared equally on a semi-annual basis.

What assumptions are in the NCUA Yield Model?

The NCUA Yield Model gives examiners a simple tool to review and test credit union assumptions and yield calculations. Examiners should be aware of some simplifying assumptions in the model that impacts its accuracy. These assumptions can be modified by any user of the model, since the workbook is not password protected.

Assumption Regarding Weighted Average Coupon (WAC)

Once the initial weighted average coupon is calculated, the NCUA modeling process assumes the WAC remains constant throughout the life of the pool. Ideally, the actual interest cash flows from the historical period will be used to compute yield. If historical cash flows are not available, the NCUA Yield Model estimates the interest cash flows using the input WAC. If the coupon rates on the loans in the pool vary, the model’s estimated interest may not be very accurate, since prepayments will cause the actual WAC to change. When the coupons vary substantially, credit unions should be encouraged to use actual interest cash flows in computing yield. On the other hand, if the coupon rates for the loans in the pool are relatively close together, then using the initial WAC is acceptable.

The NCUA Yield Model uses the WAC to estimate scheduled principal reductions.

Assumption Regarding Weighted Average Maturity (WAM)

Once the initial weighted average maturity is calculated and input for a given pool of loans, the NCUA Yield Model assumes that the WAM declines by one month each month. For example, if the original WAM is 66 months, after one month the model will assume the remaining WAM is 65 months. Ideally, the actual remaining WAM will be used to compute estimated future cash flows. When the remaining WAM varies from the original WAM significantly, the model will not produce accurate estimates of future cash flows. On the other hand, if the maturity dates for the loans in the pool are relatively close together, then using the actual remaining WAM is not necessary.

The NCUA Yield Model also uses the WAM to estimate scheduled principal reductions.

Assumption Regarding Estimated Scheduled Principal Reduction

The NCUA Prepayment Model and the NCUA Yield Model assume that the scheduled principal payment for each loan in the pool is based on the WAM of the entire pool, and not the actual maturity of each individual loan in the pool. For example, if there are two loans in a pool, one with a five year maturity and one with a six year maturity, and the WAM is 5.5 years, the NCUA Yield Model will compute scheduled principal so the loans payoff in 5.5 years.

It is not appropriate to use the scheduled principal for all loans to override the estimated scheduled principal amounts. When projecting future principal payments, the NCUA Yield Model uses the prepayment rates to reduce the principal outstanding. The contractual scheduled principal amounts will not reflect the projected prepayments.

Assumption Regarding Estimated Interest Cash Flows

The NCUA Yield Model assumes all the interest is paid if the principal is outstanding until the date of default. This assumption will overstate the yield. For the historical period, it is better to use the actual historical interest cash flows to calculate yield.

Use of accounting interest accruals to estimate interest cash flows will also tend to overstate the yield. Accounting accruals that recognize interest in earlier periods and reverse the interest when the loan is deemed in default will cause this overstated yield.

How do credit unions compute the yield on a matured pool of loans?

Here are the steps in performing simple static pool analysis on a pool of matured loans using the NCUA Yield Model:¹⁰

1. Gather a sample of loans issued in the past (a month, quarter or year), along with reliable data about the source, timing and amounts of actual cash flows. It is easiest to perform this analysis on loans originated in a single month.
2. Compute historic prepayment speeds. If the actual prepayment data is not available, use the NCUA Prepayment Model to estimate historical CPR. The static pool data needed for this step is the ending principal balance of the loans each month, the weighted average coupon, and the weighted average maturity.
3. Determine default proportion based on static pool data. The default proportion is the loan balance in default as a percentage of the loan prepayments.
4. Determine loss severity based on static pool data. The loss severity is the principal balance not recovered as a percentage of the loan balance in default.
5. Input each of these performance statistics into the NCUA Yield Model, along with other characteristics (servicing fee, other costs) to compute the bond-equivalent yield (BEY).
6. Vary the inputs for the performance statistics to determine how sensitive the BEY is to changes in the variables.

How do credit unions compute the expected yield on a pool of active loans?

Here are the steps in performing simple static pool analysis on a pool of loans that have not matured (same as above, with **extra steps** noted), using the NCUA Yield Model:

1. Gather a sample of loans issued in the past (a month, quarter or year), along with reliable data about the source, timing and amounts of actual cash flows. It is easiest to perform this analysis on loans originated in a single month.
2. Compute historic prepayment speeds. If the actual prepayment data is not available, use the NCUA Prepayment Model to estimate historical CPR. The static pool data needed for this step is the ending principal balance of the loans each month, the weighted average coupon, and the weighted average maturity.
3. Determine default proportion based on static pool performance. The default proportion is the loan balance in default as a percentage of the loan prepayments. **Extra step:** *Since not all loans have matured, determine a consistent way to categorize loans as “default” (that is, defaulted already or likely to default). For example, all defaulted loans and all loans over 90 days past due could be added.*

¹⁰ Of course, if credit unions have the data available, they should compute the actual yield on a pool of matured loans by calculating the internal rate of return on all of the actual cash flows.

4. Determine loss severity based on static pool performance. The loss severity is the principal balance not recovered as a percentage of the loan balance in default. ***Extra step:*** *Since all loans in the default category have not been fully processed (repossessed, resold, and any insurance recovery received), determine a consistent way to estimate the percentage of loans in default that will not be recovered. For example, apply the loss severity from a matured portfolio to the loans in process of collection.*
5. ***Extra step:*** *Use each of these performance statistics, along with performance statistics from matured loan portfolios, to project expected CPR, default proportion, and loss severity to maturity.*
6. Input each of these performance statistics (***extra step:*** *as well as the projected statistics*) into the NCUA Yield Model, along with other characteristics (servicing fee, other costs) to compute the bond equivalent yield (BEY).¹¹
7. Vary the inputs for the performance statistics to determine how sensitive the BEY is to changes in the variables.

What is the exact yield to maturity on a pool of loans?

Because there is uncertainty about future cash flows before all loans in a pool have matured, an exact yield cannot be calculated. A range of expected returns by varying the inputs should be calculated. The NCUA Yield Model allows both actual cash flows and projections of future payments and recoveries to calculate BEY.

The exact portfolio yield for a pool of matured loans is calculated as the internal rate of return, using all the actual cash flows. The NCUA Yield Model simplifies the process, using a number of assumptions likely to overstate the actual BEY. For example, the model assumes all loans with principal outstanding make timely payment of principal and interest. This means each borrower is modeled to make all principal and interest payments up to the time of default. Since defaults may not be recognized for a period of a couple months, the model overstates the interest income and, therefore, overstates the expected yield.

NCUA Yield Model

Embedded below is a version of the NCUA Yield Model that permits time varying inputs for prepayments, default proportion, and loss severity.



NCUA_Yield_Model_
March_2006.xls

¹¹ The NCUA Yield Model computes both the monthly yield and the BEY. BEY, based on semi-annual compounding, can be directly compared to bond-equivalent yields on investments.

Conclusion

Static pool analysis is a useful tool to enable credit union managers to make informed decisions regarding lending programs based on actual and expected performance of the loans. The process discussed in this paper is one method for examiners to review such an analysis. Examiners are not expected to complete this model for credit unions, but can use it to vary assumptions as deemed necessary to validate assumptions made by credit unions.

This tool is not intended to replace management's due diligence, but is meant to augment existing practices. Use of this model by a credit union does not in and of itself constitute successful due diligence of static pool analysis referenced in the Risk Alert. Examiner staff with questions about this paper or using the model should contact their regional office.