



NCUA
National Credit Union Administration

Simplified CECL Tool

Model Development Documentation

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Background

In response to the financial institution failures exposed in the 2008 financial crisis, regulators and external auditors began revisiting the incurred loss method for determining the allowance for loan and lease losses. In response to the shortcomings exposed under the allowance for loan and lease losses process, such as a delayed recognition of credit losses, the Financial Accounting Standards Board (FASB) issued Accounting Standards Codification 326 *Financial Instruments – Credit Losses*,¹ commonly referred to as Current Expected Credit Loss (CECL).

Under the revised accounting standard, entities must account for the current expected credit loss over the estimated life of their loan portfolios. This is a significant change to the former standard of recording only incurred losses that are probable and can be reasonably estimated. The greatest driver of change is the use of the life-of-loan concept under CECL to estimate credit losses, as compared to the incurred loss method where credit losses are estimated on a loss emergence period concept. Additionally, financial institutions are required to incorporate reasonable and supportable forecasts, which will adjust the credit loss estimate based on management's views of the future credit environment.

Purpose and Use of Model

The NCUA developed the Simplified CECL Tool (CECL Tool) to help smaller credit unions develop their allowance for credit losses (ACL) on loans and leases as required under the CECL accounting standard.

The CECL Tool is designed for credit unions with under \$100 million in assets, although it could be used by larger credit unions based on the discretion of their management and auditors.² Because not all credit unions are the same, the CECL Tool includes functionality for a credit union to calibrate assumptions to its circumstances.

The CECL Tool organizes the various components necessary to estimate a credit union's ACL for its entire loan portfolio. It also enables credit unions to estimate and aggregate their losses for pooled loans and individually evaluated loans. Users of the CECL Tool must assess the appropriateness of the inputs, assumptions, adjustments, and output based on entity-specific

¹ Accounting Standards Update 2016-13 Page 1

² The peer data used for calculating Weighted Average Remaining Maturity factors is from credit unions under \$100 million in assets; this peer data may not be relevant for credit unions with a larger asset size.



facts and circumstances. A credit union will still need to prepare documentation to support these conclusions as part of maintaining accurate books and records.

Model Considerations

This section discusses the main considerations and motivations when developing the CECL Tool.

3.1 FASB CECL Requirements

The CECL accounting standard requires institutions to reserve for lifetime expected credit losses on their held-for-investment loan portfolios. To achieve this lifetime expected credit losses estimate, CECL includes several requirements, notably:

- The basis of the estimate should be an institution's historical loss experience (internal or external).³
- Historical loss experience should be pooled across financial instruments with similar risk characteristics.⁴
- Historical loss experience should be adjusted for reasonable and supportable forecasts;⁵ and
- The estimate should cover the instruments' contractual life net of prepayments.⁶

3.2 Qualitative Considerations

In general, the benefit of increased model complexity must be weighed against the cost of managing the associated model risks. The methods employed by the CECL Tool must be sophisticated enough to generate precise forecasts; however, the complexity of the models should be consistent with the capabilities of the credit union for estimating model parameters, evaluating model assumptions, and diagnosing potential problems.

The qualitative requirements for the CECL Tool included:

- **Accessibility**—Credit unions with limited credit modeling experience can effectively estimate their overall ACL using the CECL Tool.

³ FASB Accounting Standards Update No. 2016-13. Paragraph 326-20-55-3.

⁴ FASB Accounting Standards Update No. 2016-13. Paragraph 326-20-30-2.

⁵ FASB Accounting Standards Update No. 2016-13. Paragraph 326-20-55-4.

⁶ FASB Accounting Standards Update No. 2016-13. June 2016. Page 3-4.



- **Transparency**—End users can understand and evaluate the ACL estimate generated by the CECL Tool.
- **Accuracy**—The CECL Tool generates an accurate ACL estimate for smaller credit unions with less complex loan portfolios.

3.3 Data Considerations

From a data perspective, the NCUA designed the CECL Tool to meet the following criteria:

- It must use input data that is readily available to all credit unions.
- It must use data that comes in a standardized format and is available on a quarterly basis.
- It must generate output that is detailed enough to enable credit unions to populate their quarterly Call Reports easily.

Model Selection

Based on the considerations noted above, the NCUA selected a Microsoft Excel-based model as the basis for the CECL Tool. Microsoft Excel addresses the requirements for ACL estimation and suits the modeling capabilities of small credit unions. The use of Microsoft Excel-based modeling is widespread in the financial services industry, making it the most appropriate software from a usability standpoint.

The NCUA chose the Weighted Average Remaining Maturity (WARM) method, under the expected loss rate approach, as the model to estimate credit losses on financial asset pools. The FASB represents that the WARM method is intended for use in estimating the ACL for less complex entities or those organizations with less complex financial asset pools. As stated in a FASB Q&A on the applicability of the WARM method:

“There is no expectation that a less complex entity should have to implement a sophisticated model to satisfy the requirements of [Accounting Standard] Update 2016-13. If an entity is using a loss rate-based method today, that entity may continue with a comparable method, including the WARM method.”⁷

In addition to its applicability under the FASB guidance, the NCUA selected the WARM method because it is advantageous for small to mid-sized credit unions. The most fundamental advantage of the WARM method is its simplicity compared to other methods.

⁷ [FASB Staff Q&A: TOPIC 326, NO. 1: Whether the Weighted-Average Remaining Maturity Method is an Acceptable Method to Estimate Expected Credit Losses](#)



The WARM method requires historical net charge-off (NCO) data at an aggregated level of segmentation instead of other methods like the probability of default and loss given default approach or the use of statistical modeling approaches that require loan-level data.

A single Microsoft Excel workbook can contain all the minimum data, calculations, and outputs. These factors streamline the process, reducing the risk of user error and making the workbook more user-friendly. The use of the WARM method reduces a credit union's need for in-house or contracted modeling expertise, making the approach particularly advantageous for smaller-sized credit unions.

Furthermore, the WARM method is highly transparent. Validation is straightforward with simple Excel formulas and a limited number of data sources and calculations. Finally, the use of a consistent method across all loan segments increases simplicity and is highly scalable compared to other modeling approaches.

Accordingly, the WARM method within the CECL Tool uses:

- Current balances;
- Historical, annualized charge-off rates over a specified lookback period; and
- The estimated remaining life (in other words, the WARM factor)

These three components for each loan portfolio segment, when multiplied together, estimate the ACL. Within this process, the charge-off rate and remaining life are subject to qualitative adjustments for current conditions and reasonable and supportable forecasts. In other words, qualitative adjustments tailor the charge-off rate and remaining life values to produce an ACL that best represent the credit union's loss expectations.

The ACL for individually evaluated loans is a separate calculation within the CECL Tool. The CECL Tool sums the ACL for both pooled loans and individually evaluated loans to calculate a credit union's total ACL. This ACL output is provided at both the portfolio segment and institution level.

To summarize, the selected design for the CECL Tool provides the following advantages:

- Meets the FASB CECL ACL modeling requirements;
- Supports the modeling capabilities of small credit unions;
- Requires a single Excel workbook;
- Relies on few data inputs; and
- Provides a high level of transparency into the calculations.



Model Theory, Framework, and Implementation

This section describes the framework, key assumptions, and model components of the CECL Tool.

5.1 Overview

The CECL Tool provides credit unions with a holistic estimate of the ACL for their entire portfolio of loans as of a given date (for example, the end of quarter). To do this, the CECL Tool aggregates ACL estimates from two categories of assets:

- Loans pooled based on shared risk characteristics; and
- Loans evaluated on an individual basis.

The CECL Tool calculates the ACL for these two groups of assets separately because CECL guidance requires that only loans that share risk characteristics should be pooled together for ACL estimation.⁸ Thus, the CECL Tool was designed to estimate ACL by isolating loans that differ in risk from other loans in a credit union's portfolio. Once the ACL is estimated for both portions of the portfolio, the CECL Tool sums the output to provide a single ACL estimate.

5.2 Pooled Loans

For each portfolio segment, the ACL estimate is comprised of two components:

- The quantitative reserve estimate; and
- The qualitative reserve estimate.

As described above, the CECL Tool estimates the quantitative reserve using the WARM method for each portfolio segment. The qualitative reserve estimate is the sum of the qualitative adjustments. Qualitative adjustments tailor the charge-off rate and remaining life values to produce an ACL that best represent the credit union's loss expectations.

The following sections describe:

- The portfolio segmentation method used by the CECL Tool;
- The expected loss rate method (and components) used to estimate the quantitative reserve; and
- The estimated qualitative reserve.

⁸ FASB Accounting Standards Update 2016-13. Page 109. Paragraph 326-20-30-2



Portfolio Segmentation

To balance precision and modeling efficiency, and to comply with the CECL guidance, the CECL Tool estimates ACL by pooling loans that share risk characteristics and by modeling each pool collectively.⁹

Each loan portfolio line is referred to as a “Call Report Code.” For example, new vehicle loans are Call Report Code 385. Each Call Report Code is used as the segmentation for estimating the ACL. The CECL Tool groups loans based on the Call Report code, which is a proxy for loan type. Loan type provides an effective means of pooling assets with similar risk structure.

The CECL Tool calculates the ACL on the following thirteen loan portfolio segments:

- Unsecured credit card loans
- Payday alternative loans
- Non-federally guaranteed student loans
- All other unsecured loans/lines of credit
- New vehicle loans
- Used vehicle loans
- Leases receivable
- All other secured non-real estate loans/lines of credit
- Secured by first lien on a single 1- to 4-family residential property
- Secured by junior lien on a single 1- to 4-family residential property
- All other (non-commercial) real estate loans/lines of credit
- Commercial loans/lines of credit real estate secured
- Commercial loans/lines of credit not real estate secured

To facilitate data entry, credit unions enter their current loan balances by the thirteen loan portfolio segments. The CECL Tool cross walks each portfolio segment balance to the related line item on other worksheets when estimating the ACL.

Quantitative Reserve

The expected loss rate approach to calculating the quantitative reserve has three primary components:

⁹ FASB Accounting Standards Update. Paragraph 326-20-50-3.



- The current loan balance as of the measurement date;
- An estimated annual NCO rate; and
- An estimated WARM factor.

Loan Balance—This is the outstanding loan balance of pooled loans, aggregated to the portfolio segment-level at each measurement date, such as quarter-end. These loan balances should agree to the value that will be reported in the Call Report as of the measurement date. This value represents the outstanding balances of financial assets held in the portfolio segment.

Average NCO Rate—This is the average, annualized NCO rate for each loan segment over the past three calendar years. This component provides the ACL estimate with historical data and is the basis for forecasting losses on current loans. The average NCO rate is labeled as the ‘Historical Loss Rate’ in the CECL Tool.

WARM Factor—This is the estimated remaining term to contractual maturity, adjusted for scheduled principal amortization and prepayments, for each loan segment. In other words, this is the remaining life. This component is estimated from industry-level data on specific loan segments and adjusts the ACL estimate for the expected duration of losses for each portfolio segment. The WARM factor is referred to as the ‘Peer Weighted Average Remaining Maturity’ in the CECL Tool.

Using the described inputs, the quantitative reserve calculation is illustrated in the equation below:

$$ACL_{Quant} = Loan_Bal * NCO_Rate * Warm_Factor$$

The processes for estimating the formulaic components of the quantitative reserve calculation are detailed in the sections below.

Net Charge-off Rate

The CECL Tool estimates the future annual NCO rate by taking the average of the NCO rates in the previous three annual Call Reports. The annual expected NCO rate for a given portfolio segment is represented by the following equation:

$$Average\ NCO\ Rate_t = (NCO_Rate_{t-1} + NCO_Rate_{t-2} + NCO_Rate_{t-3}) / 3$$

Where:

$$NCO\ Rate_t = (NCO_\$_t) / average(End_Loan_Bal_t, End_Loan_Bal_{t-1})$$

The CECL Tool provides the credit union’s NCO rate, which is calculated using a credit union’s historical Call Report data. Starting at the end of the last completed calendar year, the past four years (previous sixteen quarters) of Call Reports are pulled from the NCUA’s data



warehouse. The data fields containing credit union name, Call Report code, gross charge-offs, recoveries, and loan balances are extracted.

These data fields are used to calculate the NCO rate for the most recent three calendar years prior to the measurement date. Annual calendar year NCO rates are used to control for seasonality trends in charge-off reporting activity. Within the NCUA's data systems, gross charge-offs and recoveries are summed by calendar year. To calculate the annual NCO rate, the difference between the annual gross charge-offs and the recoveries is calculated. The NCO value for a given calendar year is then divided by the average loan balance in that calendar year to produce the annual NCO rate. The average loan balance for each NCO rate calculation is calculated as the simple average of the loan balance at the beginning and end of each calendar year (with the beginning amount represented by the ending amount in the fourth quarter of the prior calendar year). This is the reason that four years of Call Report data is pulled but there are only three annual NCO rates estimated. The annual NCO rate calculation is represented by the following equation:

$$NCO_Rate_{t-1} = NCO \$_{t-1} / [(LoanBal_{t-1} + LoanBal_{t-2}) / 2]$$

Where:

- NCO_Rate_{t-x} = the annual NCO rate for the full calendar year X years prior to Year T.
- $Net_Chargeoffs_{t-1}$ = the net charge-off total in Year T-1
- $LoanBal_{t-x}$ = the loan balance in the final quarter of year T-X.

The average of the three annual NCO rates is taken to generate the NCO rate for each portfolio segment. All the relevant outputs from these calculations are included into the CECL Tool's hidden *Data* tab. If a credit union does not have any charge-off history for a portfolio segment, the estimated NCO rate is zero. If the calculated NCO rate is negative (in other words, a recovery) the CECL Tool shows a negative rate. In the CECL Tool, negative NCO rates are highlighted in red to draw the user's attention. Users are expected to adjust a negative NCO rate to the applicable NCO rate with their qualitative adjustment, described below.

The NCUA selected a three-year lookback window to estimate the average NCO rate given its sensitivity to recent trends and the lower risk of data issues. A three-year lookback window allows for the annual NCO rate to be more responsive to recent trends in loan performance and economic conditions. Because Call Report segmentation is known to change periodically, a three-year lookback reduces the risk of data inconsistencies in the historical data.

WARM Estimation

The CECL Tool is pre-populated with WARM factors estimated by a third party using performance data obtained from a peer set of credit unions as well as prepayment rate estimates. The WARM factors are formulated at the Call Report code level. Each segment seen in the Portfolio Segmentation section has an individually calculated WARM factor.



The WARM factors are estimated at a loan level and aggregated outside of the CECL Tool. The WARM factors represent the remaining term to contractual maturity, adjusted for scheduled principal amortization and prepayments. The scheduled amortization is calculated based on individual loan's contractual maturity date and its amortization type (principal and interest, interest only). Prepayment rates are estimated using prepayment studies performed for credit unions in the peer set as well as market-based prepayment data. Due to data availability issues, the WARM factors for some portfolio segments may not be prepared with the same method.

Please see the Appendix for more detail.

WARM factors provide a simplified proxy for the life-of-loan estimates required by the CECL guidance, and they are calculated with credit union industry-specific loan data. By using industry-based WARM factors, individual credit unions can avoid the process of estimating loan duration, which requires specialized analytical skills and dynamic cash flow models. The process of formulating institution-specific WARM factors also requires acquiring, transforming, and manipulating large data sets of both internal and external loan performance history as well as market data.

See the Appendix for more details on the WARM factor development process.

Qualitative Reserve

The qualitative reserve is the secondary component of the ACL estimate for pooled loans. The qualitative reserve enables credit unions to adjust their quantitative reserve estimates based on historical NCO experience for the effect of current and future circumstances.¹⁰ The qualitative reserve represents a credit union's anticipated future losses that are not captured by the quantitative reserve. Missing or misrepresented risks are intended to be captured in the qualitative reserve through two elements:

- The NCO rate adjustment; and
- The WARM factor adjustment.

Credit union management estimates the driver for both estimates outside of the CECL Tool. The following sections detail the theory behind each section of the qualitative reserve as well as the calculation within the CECL Tool.

NCO Rate Adjustment

For each portfolio segment in the CECL Tool, a credit union should consider if an adjustment is necessary to its three-year average NCO rate. This adjustment should bridge the gap between the quantitative ACL estimate and the anticipated future ACL. While there is no

¹⁰ 326-20-55-4



prescribed method for NCO rate adjustments, below are typical factors considered in this process. The factors include, but are not limited to:

- Shifting trends in the nature or volume of financial assets;
- Existence and effect of any concentrations of credit;
- Volume and severity of past due financial assets;
- Changes in the value of underlying collateral;
- Changes in lending strategies—policies and procedures;
- Quality of credit review function;
- Experience, ability, and depth of lending staff;
- External factors—competition, technology, natural disasters;
- Changes to the general market conditions of a local area; and
- Changes to local business conditions.

Generally, credit unions should benchmark to:

- Prior loss rate adjustments;
- The quantitative reserve estimate; and
- Peer credit unions.

Please refer to the FAQ document for further detail on this process.

Once formulated, NCO rate adjustments for each portfolio segment are entered manually into the CECL Tool's Tab 4 – Adjustments, along with a justification for the adjustment. The CECL Tool then sums the NCO rate and the NCO rate adjustment to formulate the applicable NCO rate for each portfolio segment. The applicable NCO rate is used to calculate the ACL for pooled loans and is represented by the following equation:

$$\text{Applicable_NCO_Rate} = \text{NCO_Rate} + \text{NCO_Rate_Adjustment}$$

WARM Factor Adjustment

Like the NCO rate adjustment, the WARM adjustment for qualitative factors is estimated externally to the CECL Tool by credit union management. The WARM adjustment factor is intended to align the WARM factors to the credit union's expectations based on its unique circumstances.

Please refer to the FAQ document for further detail on this process.

Once formulated, the credit union manually enters the unique WARM adjustments for each portfolio segments into the CECL Tool's Tab 4 – Adjustments along with a justification for



the adjustment. The CECL Tool then sums the WARM factor and the WARM factor adjustment to formulate the applicable WARM factor for each portfolio segment. The applicable WARM factor is used to calculate the ACL for pooled loans and is represented by the following equation:

$$\text{Applicable_WARM_Factor} = \text{WARM_Factor} + \text{WARM_Factor_Adjustment}$$

Qualitative Reserve Calculation

The CECL Tool then estimates the total ACL for pooled loans by taking the product of the outstanding loan balance, the applicable NCO rate, and the applicable WARM factor.

$$\text{ACL}_{Pooled} = \text{Loan_Bal} * \text{Applicable_NCO_Rate} * \text{Applicable_WARM_Factor}$$

To isolate the Qualitative Reserve (ACL for qualitative adjustments), the CECL tool calculates difference between the total ACL and the quantitative ACL for pooled loans.

$$\text{ACL}_{Qual} = \text{ACL}_{Pooled} - \text{ACL}_{Quant}$$

5.3 Individually Evaluated Loans

Under CECL's guidance, credit unions estimate losses on assets with unique risk characteristics separately. Credit union management conducts this estimation of lifetime losses on these individually evaluated assets outside of the CECL Tool. For individually evaluated loans, the ACL is estimated using inputs sourced from the institution based on current loan balances and the amounts expected to be collected on a loan level basis, organized by segment. The ACL is estimated as the deficit (if any) between the expected amount to be collected and the current loan balance. Any potential gains are zeroed out in the ACL calculation.

The CECL Tool incorporates the losses associated with these individually evaluated loans into the overall ACL estimate. On the Tab 2 – Individual Basis, credit unions enter the outstanding balance and expected losses on each individually evaluated asset. The outstanding balances and expected losses are then aggregated to the portfolio segment level, based on the Call Report code associated with each individually evaluated loan. The sum of the expected losses for individually evaluated loan is equal to the ACL for all individually evaluated loans in a given portfolio segment.

5.4 Total ACL Calculation

Once the ACL values are estimated by portfolio segment for pooled and individually evaluated loans, the CECL Tool calculates the total ACL amount for each portfolio segment and the entire portfolio. The two components are summed to calculate the total ACL.

$$\text{ACL}_{Total} = \text{ACL}_{pooled} + \text{ACL}_{IE}$$



Upon calculating the total ACL values, the CECL Tool generates the Reserve Ratio for each portfolio segment and entire portfolio. The Reserve Ratio is formulated by dividing the total ACL by the current outstanding loan balance.

$$\text{Reserve Ratio} = \text{ACL}_{\text{Total}} / \text{Loan_Balance}$$

Data

This section documents the types of data used by the CECL Tool to calculate a credit union's ACL. A summary of the data is presented below.

- Internal data
- Call Report data
- WARM factors
- Data for adjustment factors (if applicable)

6.1 Internal Data

Credit unions need to provide current loan data on their portfolio as of the measurement date, the quarter-end. Outstanding loan balances by portfolio segment are a necessary starting point for the CECL Tool's ACL estimation method for pooled loans. For individually evaluated loans, the credit union needs current loan balances as well as the expected collection amount at the loan level.

6.2 Call Report Data

The CECL Tool calculates the NCO rates by using historical Call Reports to source the loan balance, gross charge-offs, and recoveries data.

6.3 WARM Factors

The WARM factors are provided in the CECL Tool and are estimated by a third party using several input data sources. See the Appendix for a more detailed description of the data sources used in the estimation of the WARM factors.

6.4 Data for Adjustment Factors

If adjustments to the NCO rates and WARM factors are applicable, the supporting data and justifications used in the estimation of these adjustments should be compiled and retained. While the adjustments themselves are the only data required in the CECL Tool, supporting data and justifications are required as part of the examination and financial reporting processes and are an expectation of maintaining accurate books and records.



Model Testing

This section describes certain procedures performed to test the accuracy of the loan level data, but users are responsible for determining whether the WARM factor assumptions are relevant and appropriate for their own ACL estimate

The NCUA conducted several tests on various components of the model to check the reasonability of the CECL Tool's ACL estimation method.

To validate the results of the NCO rate estimation process, a third party selected a random sample of individual credit unions to replicate the average NCO rate calculated by the CECL Tool. Using Call Report data from the NCUA, the third party replicated the NCO rate method used by the CECL Tool in a separate Excel workbook. The exercise revealed no or insignificant variances in average NCO rates across the portfolio segments.

An independent calculation of the portfolio segment WARM factors was executed to check the reasonability of the third party method. Using portfolio segment level averages of weighted average maturity (WAM) and annual conditional prepayment rates (CPR), approximate WARM factors were calculated using a discounted cash flow method. The exercise revealed insignificant variances between the provided WARM factors and the approximated WARM factors.

Model Limitations

Below are the primary limitations related to the method, assumptions, and outputs from the CECL Tool. The list below is not exhaustive and is intended to provide directional guidance to a user.

- The CECL Tool is a top-down model and does not have the same level of precision as a more detailed, bottom-up model framework, such as a model that includes loan level data. The model may not accurately capture the complex and interconnected forces that affect a credit union's ACL estimate.
- The segmentation used in the CECL Tool is limited by the breakout of loan types in the Call Report. Pooling loans by a single loan characteristic, like loan type, provides less granularity in estimating NCO rates than segmenting by multiple loan characteristics, such as segmenting loans by fixed rates and adjustable rates. It is therefore more difficult to pinpoint the exact drivers of loss in shifting NCO rate estimates, especially because loan performance tends to be driven by a variety of factors.
- The average NCO rate method is based on a specified period of historical data and may not be representative of future economic conditions.



- The WARM factors used by the CECL Tool are not institution specific. Therefore, individual credit unions may have historical prepayment rates or contractual terms that differ from industry averages. Additionally, the calculation method is not suited for all loan types. The WARM factors for loans without defined terms (credit cards and payday loans) must be assumed.

The FAQ document highlights additional limitations associated with the CECL Tool in greater detail. Please refer to that document for more detail and examples.



Reporting

The CECL Tool provides all pertinent output information for reporting of the total ACL in the CECL Tool's Tab 1 – Summary. The image of a table that follows illustrates the key model outputs. The ACL outputs are presented at the portfolio segment and aggregate institution level.

<i>Instructions -></i>	<i>From Tab 0 (Column C)</i>	<i>From Tab 2 (Column C)</i>	<i>From Tab 3 (Column Q)</i>	<i>Calculated</i>	<i>Calculated</i>
	A	B	C	D = B + C	E = D / A
Loan Portfolio Segment	Loan Balance	Loss Assessed on Individual Basis	Loss Assessed on Pooled Basis	Total Estimated Loss	Reserve Ratio
Unsecured Credit Card Loans ⁽¹⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Payday Alternative Loans ⁽²⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Non-Federally Guaranteed Student Loans ⁽³⁾	\$ -	\$ -	\$ -	\$ -	0.00%
All Other Unsecured Loans/Lines of Credit ⁽⁴⁾	\$ -	\$ -	\$ -	\$ -	0.00%
New Vehicle Loans ⁽⁵⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Used Vehicle Loans ⁽⁶⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Leases Receivable ⁽⁷⁾	\$ -	\$ -	\$ -	\$ -	0.00%
All Other Secured Non-Real Estate Loans/Lines of Credit ⁽⁸⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Secured by 1st Lien on a single 1- to 4-Family Residential Property ⁽⁹⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Secured by Junior Lien on a single 1- to 4-Family Residential Property ⁽¹⁰⁾	\$ -	\$ -	\$ -	\$ -	0.00%
All Other (Non-Commercial) Real Estate Loans/Lines of Credit ⁽¹¹⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Commercial Loans/Lines of Credit Real Estate Secured ⁽¹²⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Commercial Loans/Lines of Credit Not Real Estate Secured ⁽¹³⁾	\$ -	\$ -	\$ -	\$ -	0.00%
Total Loans and Leases ⁽¹⁴⁾	\$ -	\$ -	\$ -	\$ -	0.00%



Appendix

Third Party WARM Factors

A third party provided the WARM factors for use in the CECL Tool. The WARM factors are provided at the same level of segmentation used in the CECL Tool. In addition to the WARM factors, the third party provided additional metrics, such as the weighted average maturity, coupon, and CPR, at the segment level for considering potential adjustments to the provided WARM factors.

The loan portfolio segments are as follows:

- Unsecured credit card loans
- Payday alternative loans
- Non-federally guaranteed student loans
- All other unsecured loans/lines of credit
- New vehicle loans
- Used vehicle loans
- Leases receivable
- All other secured non-real estate loans/lines of credit
- Secured by first lien on a single 1- to 4-family residential property
- Secured by junior lien on a single 1- to 4-family residential property
- All other (non-commercial) real estate loans/lines of credit
- Commercial loans/lines of credit real estate secured
- Commercial loans/lines of credit not real estate secured

The peer data for the above loan portfolio segments comes from credit unions with under \$100 million in assets, except for the segments of Payday alternative loans, Leases receivable, Commercial loans/lines of credit real estate secured and Commercial loans/lines of credit not real estate secured. For these four segments, the population was expanded to credit unions with under \$125 million in assets to provide more observations.

Note: Users are expected to make qualitative adjustments in the CECL Tool, in Tab 4—Adjustments, to calculate the ACL applicable to each loan portfolio segment.



Proxy WARM Factor

With the September 2024 update of the CECL Tool, WARM factors were added for:

- Unsecured credit card loans
- Payday alternative loans
- Lease receivables

These three WARM factors were initially excluded from the CECL Tool due to abnormal ACL results or low volume of loan level data. Tab 5—WARM Data provides additional metrics for considering potential adjustments to the provided WARM factors. **The loan counts for Payday alternative loans and Leases receivable are low, meaning the risk is higher that the population may not provide statistical significance. Accordingly, qualitative adjustments are likely required to calibrate the provided WARM factors to the credit union’s loan portfolio segment.**

Qualitative adjustment for unsecured credit card loans

Unsecured credit card loans differ from other loans due to the behavioral differences between credit card holders who roll their balance to the next month (referred to as revolvers), and holders who pay off their balances every month (referred to as transactors). Tab 5—WARM Data provides the WARM factor to each type of holder.

A credit union’s ratio of revolvers to transactors may differ by more than 10 percent from the ratio of the provided WARM factor, requiring a qualitative adjustment. The WARM factor for each type of credit card holder should be weighted by the related current balance to the total current balance of all holders.

Example of adjusting WARM factor using values from the March 2025 Tool:

Type	Your Credit Union Balances	Ratio (A)	WARM From Tool (B)	Weighted Values (A x B)
Revolver credit card holders	\$2,000,000	$2,000,000 / 3,000,000 = 66.67\%$	29.78	19.85
Transactor credit card holders	1,000,000	$1,000,000 / 2,000,000 = 33.33\%$	1.00	0.33
Adjusted WARM	\$3,000,000			20.19

In the above example, weighting the Revolver and Transactor WARM factors (expressed in months) results in an Adjusted WARM factor of 20.19 months. Dividing by twelve (12) results in an Adjusted WARM in years of 1.68 ($20.19 / 12 = 1.68$).



Data Knowledge and Information:

The third party used several processes to provide the NCUA with the required data. They used a combination of historical data, forward-looking data, and industry knowledge to provide the WARM factors.

The following data sources were used in deriving the WARM factors:

- Use of the third party's database that holds loan-level data from their 20-year history of providing asset liability management reporting to the credit union industry.
- Use of the third party's database that holds loan-level data from their 15-year history of providing mortgage servicing rights valuation to the financial institution industry.
- Use of the third party's database that holds loan-level data from their 13-year history of providing merger valuation services to the credit union industry.
- Use of the third party's database that holds loan-level data from their loan prepayment speed analysis studies that are on a loan level basis over the past 8 years.

The following analytical backgrounds were used to evaluate the data in the correct context and backing:

- Industry professionals with day-to-day use of loan data.
- Industry professionals with day-to-day use of prepayment speed analysis and reporting.
- Industry professionals with day-to-day use of loan credit forecasting in loan contra accounts and CECL reporting.

Data

The third-party receives a significant amount of data from credit unions from all over the country and organizes the data into databases. These databases are designed to handle and store data securely. See below for a high-level process overview:

- 1) Data is received via a secure portal.
- 2) Data goes through an extraction, transform and load (ETL) process to place all data in a consistent format and order.
- 3) The data is tested and compared to client financials to check balances and accuracy.
- 4) The data is loaded into the database.

Once the data is loaded into the databases, it is stratified for use.



Application of Prepayment Speed:

A prepayment speed is applied to each loan on an individual loan level basis.

The prepayment speed is based on prepayment data that is assembled monthly. The prepayment speeds are derived from the following and other sources:

- Client prepayment studies;
- Federal National Mortgage Association;
- Federal Home Loan Mortgage Corporation;
- Various brokerage firms; and
- Investment securities.

Loan Aggregation:

The loans are aggregated by Call Report type. The data includes all loan attributes, including (and not limited to):

- Original amount;
- Current amount;
- Origination date;
- Maturity date;
- Coupon;
- Principal payment;
- Interest payment;
- Fixed versus float flag;
- Index and spread (if floating rate);
- Payment frequency;
- Balloon date;
- Loan type (mortgage, auto, etc.); and
- Prepayment speed.



Calculation of the WARM:

To calculate the WARM factors, a cash flow model is used that provides the resulting maturity date with prepayment speeds. The calculation is done as follows:

- 1) The calculation takes the individual loans and run a cash flow model that provides the contractual principal payments monthly for the life of the loan.
- 2) The prepayment speed is applied to the loan based on breaking the CPR into a single month mortality calculation. The single month mortality is applied to the loan and results in a monthly prepayment.
- 3) The combined monthly payment and prepayment result in a payoff date that is shorter than the maturity date. This data is the WARM factor.

Finally, the above loan level data is aggregated and weighted based on the outstanding principal balance of each loan.

Review and Testing

The output of the model and individual loan level data is reviewed and tested. The following lists of some of the testing.

Loan File Review

Loan data files are reviewed to verify that important attributes are present. Loan files are reviewed for outlying data, such as zero percent interest rates, \$0 balances, and any unexpected values.

All normalized data is given parameters for reasonableness. Below are examples of the parameters for normalizing the data.

- Open/rewrite dates must be less than or equal to the current report date
- Maturity/amortization date must be greater than the current report date
- Current active principal balance in “\$#,###.##” format (whole dollars)
- Current rate must be less than or equal to 18 percent (or 18.00 format)
- Type/product/purpose/security code is used to map back to source’s financials for balancing purposes. Any balancing differences must be less than or equal to one percent of the balance.



Data Comparison

The data is validated throughout the process. The totals of each loan category and the loan totals are compared to the source's financial statements. For example, summation of the source's loan balances is compared to the balance sheet total loans at the following stages:

- Pre ETL
- Post ETL
- After ingestion to the database
- After pulling the data from the data base and to the report being run, such as an asset liability management report

Data Audit

The data audit by an independent audit firm will track and validate the accuracy of client data through the entire process, from collection of raw data to producing the WARM factors and related data delivered to the NCUA.

Prepayment Reviews

All monthly prepayment data is reviewed to verify accuracy and reasonableness. The review includes looking at public data and private prepayment speed studies.

WARM Review

The calculated WARM terms are validated. The review includes comparison to:

- Individual clients;
- Other loan products; and
- Other loan terms.

Further, when completing the WARM factor review, previous period's estimates are reviewed to understand the changes with the current period. WARM factors tend to extend or contract due to the addition of new loan types and due to the slowing or speeding up of prepayment speeds.