



RMO Valuation Model

User Guide

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Excel files

Please find below links to the RMO Valuation Model, the loan-level data template and the mid-transaction template. Additional detail on the fields in each template is available in the Appendices.

[RMO Valuation Model \(XLSM 627KB\)](#)

[Loan Level Data Template \(XLSX 11KB\)](#)

[Input File Template \(XLSX 13KB\)](#)

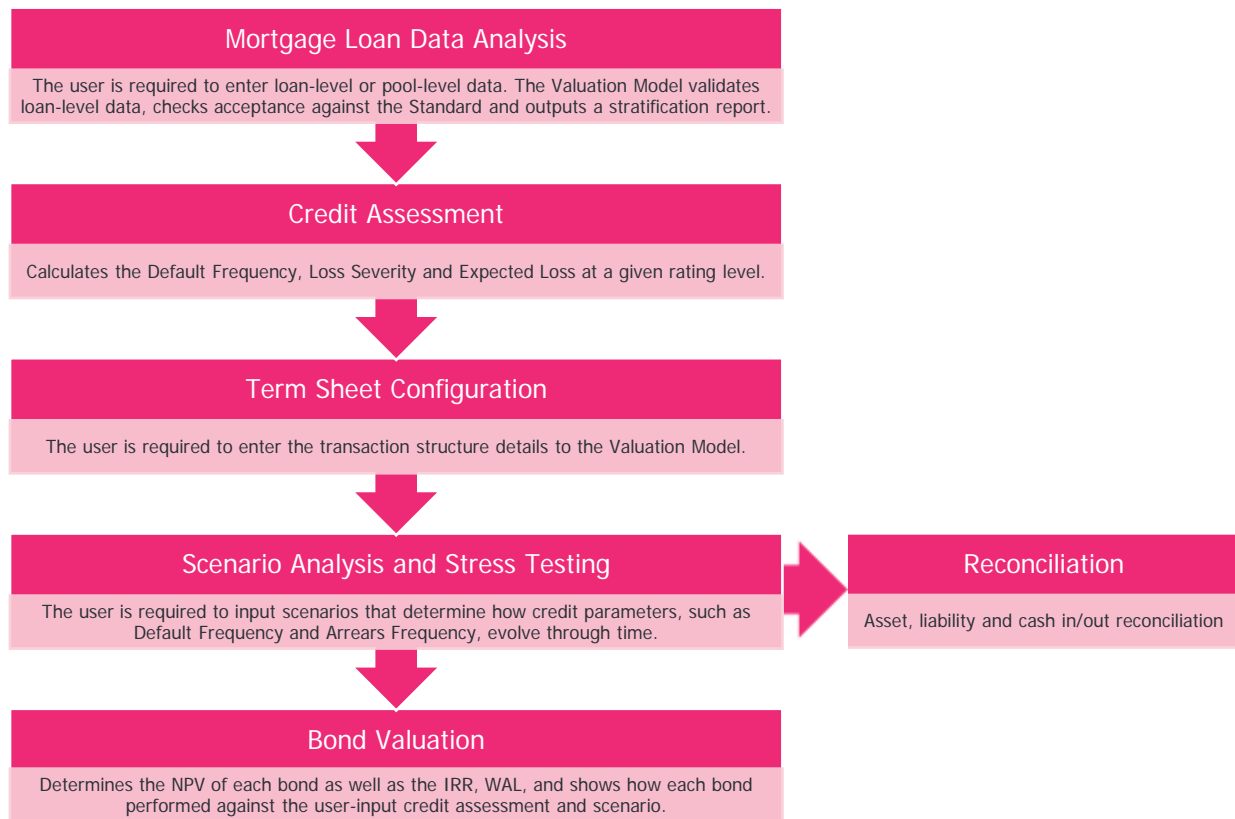
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Overview

Introduction

The RMO Valuation Model ('Valuation Model') is used to value bonds issued under the RMO Standard ('Standard'). The Valuation Model is an expected loss model and does not calculate unexpected loss. The Valuation Model is comprised of the following modules:



Key User Notes

- Run the modules in sequential order to avoid errors
- Run the Valuation Model in Excel 2013 or newer to avoid VBA library errors. For optimal performance, run the Valuation Model in a separate instance of excel.
- The Valuation Model provides the user with the ability to run analysis at the commencement of a transaction, as well as part-way through the life of the transaction.
- RBNZ Collateral Management will maintain the Valuation Model and manage version control, but does not accept any liability for the correctness of the Valuation Model.

- The user must ensure they always use the most current version of the Valuation Model. Version information is available on the 'Welcome' sheet of the Valuation Model.

Colour Representations

Tab Colour	Module
Yellow	Welcome and Home
Blue	Data import and assessment
Light Orange	Credit Module
Red	Scenario Analysis, Valuation and Reconciliation Module
Green	Maintenance

Cell Colour	Description
Yellow cells	User input
Clear / white cells	Formula- or information-only cell (cannot be over-written)

Maintenance

Most user-enabled changes to the model can be done through the Maintenance tab, which can be navigated to via the 'Maintenance' button on the Home page.

Maintenance Buttons	Description
Postcode Lookup	This tab contains a list of all valid postcodes and their regional mapping. The source is New Zealand Post.
Swap Curve	The user should update market quotes for the NZ swap curve here.
Default Frequency ("DF") and Market Value Decline ("MVD") Inputs	Default inputs are included in the Valuation Model. These inputs affect the credit analysis for each implied rating level. The inputs consist of: <ul style="list-style-type: none"> • Benchmark values at each implied rating level • Multiples that adjust the benchmark DF • Multiples that adjust the benchmark MVD
Scenario Lookups	Default scenarios are included in the Valuation Model. The scenario options include: <ul style="list-style-type: none"> • Timing of defaults • Timing of arrears

	<ul style="list-style-type: none">• Volume of prepayments• Volume and direction of interest rate stress
Reset to Default Values	<p>Resets the following to the default values:</p> <ul style="list-style-type: none">• Benchmark values in the BM tab• DF multiples, MVD multiples and PD Scaler in the Loan Multiples tab• DF multiples in the Pool Multiples tab• RBNZ limits in the RBNZ Limits Check tab• Sample scenario inputs in the Scenario Parameters tab• Scenario lookups• Default Recovery Periods in the Term Sheet tab

Valuation Model

1. Mortgage Loan Data Module

User Input

The user is required to import loan-level data or manually input pool-level data.

Importing Loan-Level Data

The user can import loan-level data using the loan-level data template in Appendix A.

To import loan-level data:

1. Select Loan Level Data on the Home tab, then click on the 'Loan Data Import' button.
2. Click on the "Import Loan Level Data" button in the Import Loan Data tab, and select the Loan Level Data file from your directory.
 - o Note: the yellow cell under Pool Cut File Location can be populated with the directory of the import file to make the load process more efficient.
 - o If there are any warnings or errors, they will be displayed as a summary in the Import Loan Data tab and are detailed on the Validation Errors tab.
 - o See below section Loan-Level Data Validation Tests for assistance with addressing any errors in the import file.
 - o The loan-level data will be displayed on the Loan Level Data tab

The user can consolidate the loan level data to obligor level data by clicking on to the "Create Obligor Level Data" button located in the Import Loan Data tab. The obligor-level data will be displayed on the Obligor Level Data tab

Loan-Level Data Validation Tests

The Valuation Model validates the loan-level data file by performing a series of checks. Required fields that are missing or incorrect will be identified as FAIL in the Data Validation Checks table.

For fields that are not identified as a required field, a WARNING status will be given. Please note that certain missing / incorrect fields will attract a higher penalty in the credit analysis.

Data Item	Checks Performed	Required Fields (WARNING or FAIL)
Pool Cut Date	Non-Blank & Correct Date Format on first row Same for each subsequent row	FAIL
Borrower ID	Non-Blank	FAIL
Loan ID	Non-Blank	WARNING
Borrower Group ID	Non-Blank	WARNING
Security Property ID	Non-Blank	FAIL
Settlement Date	Non-Blank, Correct Date Format & Date Before Pool Cut Date	FAIL
Maturity Date	Non-Blank, Correct Date Format & Date After Pool Cut Date	FAIL
Original Loan Balance	Non-Blank & Positive Number	FAIL
Current Loan Balance	Non-Blank & Positive Number	FAIL
Original Security Property Valuation	Non-Blank & Positive Number	FAIL
Current Security Property Valuation	Non-Blank & Positive Number	FAIL
Security Property Postcode	Non-Blank & Valid Postcode (part of lookup table)	WARNING
Residency	"NZ" or "Other"	FAIL
Security Rank	1,2,3	WARNING
Employment Type	"PAYE FullTime", "PAYE PartTime", "PAYE Casual", "Self Employed" or "Unemployed / Pensioner"	WARNING
Loan Documentation Type	"Full" or "Other"	FAIL
Loan Amortisation Type	"Interest Only" or "Principal and Interest"	FAIL
Interest Rate	Non-Blank & Value between 0 and 15	FAIL
Interest Rate Type	"Fixed" or "Variable"	FAIL
Interest Only Loan End Date	If the loan is "Interest Only" then Non-Blank, Correct Date Format & Date After Pool Cut Date	FAIL
Fixed Rate End Date	If the loan is "Fixed" then Non-Blank, Correct Date Format & Date After Pool Cut Date	FAIL
Days In Arrears	Non-Blank & Positive Integer	FAIL
Occupancy Type	"Owner Occupied" or "Investment"	WARNING
Foreclosure Process	If Foreclosure Process Started is Yes, then Foreclosure Process Start Date has Correct Date Format & Date	FAIL

Inputting Pool-Level Data

Loan-level data enables a granular credit analysis of the mortgage pool. However, if loan-level data is not available the user can input pool-level data into the Valuation Model.

To enter pool-level data:

1. Select Pool Level Data in the Home tab, then click on the “Manual Pool Inputs” button.
2. Enter manually in the yellow cells the pool characteristics

Stratification Tables and the Standard Limits Check

If loan-level data has been imported, Stratification Tables can be generated for both loan-level data and obligor-level data by clicking the ‘Run Stratification Report’ button in the Import Loan Data tab. The output will contain the stratification tables and graphical representations of the stratification tables.

The Standard’s limit check can be run on loan-level data, obligor-level data or pool-level data. Click on the “Check RBNZ Limits” button on the Import Loan Data tab or Manual Pool Inputs tab to generate the comparisons on the RBNZ Limits Check tab. The limits used here should match the Standard, however yellow, overriding cells are available for where adjustments are needed.

2. Credit Module

The credit module performs the credit assessment. It calculates default frequency, loss severity and expected loss for the user-selected implied rating.

Calculate Credit Parameters

The user can calculate credit parameters by;

1. Clicking on the ‘Home’ button to return to the Home tab
2. Click on the ‘Credit Assessment’ button
3. In the Credit Parameters tab, click on the ‘Calculate Credit Parameters’ button. If loan-level data is provided, the user will be asked to choose whether credit parameters will be calculated based on loan-level or obligor-level data. The following implied ratings are available for selection:

Implied Ratings			
• AAA	• A+	• BBB	• BB-
• AA+	• A	• BBB-	• B+
• AA	• A-	• BB+	• B
• AA-	• BBB+	• BB	• B-

The credit module uses benchmark DFs and MVDs, and applies penalties or benefits to those benchmarks, dependent on how the characteristics of each loan vary from these benchmarks. Once the credit module has run, the user can see these weighted-average DF multiples on the 'Credit Parameters' tab. If the multiplier is greater than one, the portfolio has higher risk than the benchmark. Note that for pool-level data, the credit parameter calculations can be found on the 'Pool Multiples' sheet, which is accessed by clicking on the 'Show Calculation' button on the 'Credit Parameters' tab.

Other relevant credit factors in the credit module include recovery period costs, selling costs, and swap break costs. Furthermore, a PD scaler is also available for the user to include a penalty to the pool manually.

The implied ratings benchmarks and loan multiples are maintained via the Maintenance tab. This gives users an option to configure to individual risk appetite / internal PD benchmarks. See Maintenance section on page 4 for further information. Note that users can always reset the credit parameter values to default by using the Reset to Default Values button after clicking the 'Maintenance' button on the Home tab.

3. Term Sheet Configuration Module

The user must input the Term Sheet / transaction information in the Term Sheet tab by;

1. Clicking on the 'Home' button to return to the Home tab
2. Click on the 'Scenario Analysis' button
3. Select the Term Sheet tab to input Term Sheet details in the yellow cells.

Date Specifications

Input the relevant dates from the offering circular and transaction documents, such as closing date and first payment date. Ensure consistency between dates in offering circulars versus dates provided in legal documents.

Capital Structure

Input the notional principal and coupon rate for each bond.

The B Note provides the user with modelling flexibility, to include a note that ranks below the AB-note, but above the Capital-note. Notional can be set to zero to match the proposed Standard.

Liquidity & Capital Reserves

Input the liquidity reserve size and the maximum allowed balance of the Capital Reserve.

Call Options

Specify the notional- and date-based call options. Note that valuation can be run either with or without one or both of these call options.

Default Recovery Period

Specify the recovery period you think is needed to sell the security property in case of a loan default. Default setting is four quarters, implying a year is required to recover a claim.

4. Scenario Module

The scenario module allows a user to run more specific tests for the risk of each tranche within the capital structure. Each tranche size is defined through its attachment point to the next lower tranche (if any). Starting with the most junior tranche, the tranche size (thickness) determines its capacity to absorb losses before these are being allocated to the next more senior tranche. Applying all functions of the Scenario Module, a user can iteratively test the robustness of a tranche against any variations in credit parameters or assumptions settings.

The net present value of cash flows that can be received at a tranche level depends on the seniority (rank) of each tranche. The waterfall specified in the transaction documents defines which tranche participates in interest and principal payments, recoveries or lump sum payments if a transaction is terminated.

The key drivers that can influence the value of a tranche within the capital structure throughout the expected life of a transaction or tranche are defined through the specification of scenarios:

- Prepayment scenario (speed at which a pool amortises through principal payments)
- Arrears scenario (expected allocation of arrears over the life of the transaction)
- Default scenario (expected allocation of defaults over the life of the transaction)
- Interest Scenario (expected variation in margins over the life of the transaction)

It is therefore important to specify these scenarios according to the individual risk view a user might have and compare this to historic data being made available as part of the transaction documents or as available from other information sources.

Scenario Parameters

After inputting Term Sheet information, the user is required to update the static values in the Scenario Parameters tab;

1. Select the Scenario Parameters tab
2. Enter the following static values in the Scenario Parameters tab;

Field	Description
CPR	The Constant Prepayment Rate (CPR) reflects the ratio of annual scheduled principal payments and pre-payments as % of the pool. It is possible to use the default setting input or vary via the "Input" drop down to test against Prepayment Scenarios.
Valuation Margin	The valuation Margin represents the spread applied to the discount rate that is used to calculate the present value of the bonds. It reflects a benchmark for the expected return that could be achieved from an alternative investment.
Deposit Rate	The mortgage trust accumulates reserves which can be re-invested. The deposit rate reflects the interest rate applied to the Capital Reserve, Liquidity Reserve and Principal Accounts. The interest earned is added to the respective reserve balances.
Arrears v Default Ratio	This ratio defines the proportion of loans that become past due before curing (including paying penalty interest). The ratio is applied to the total defaults calculated for the selected implied rating. The assumed value of 0.5 means that half as many loans go past due as default.
Arrears Cure Periods	The number of quarters needed to cure the arrears.
Notional Call Trigger	The user can turn the notional-based call ON/OFF for the scenario run. The Notional Call Percentage is set in the Term Sheet tab.
Date Based Call Trigger	The user can turn the date-based call ON/OFF for the scenario run. The call date is set in the Term Sheet tab.
Float Leg Margin	The floating leg margin represents the margin added to the floating leg of the Interest Rate Swap. The user can input this margin, or click on the 'Calculate Margins' button to calculate this margin from loan-level data.

Fixed Rate Margin	The Fixed Rate Margin is added to the prevailing swap rate every 8 periods (2 years) to simulate the re-fixing of the fixed rate loans in the pool. The user can input this margin, or click on the 'Calculate Margins' button to calculate this margin from loan-level data.
Variable Rate Margin	The Variable Rate Margin is added to the swap curve every 2 periods (6 months) to simulate the impact of changes in the swap curve on variable mortgage rates.
Fee Breakdown	Senior fees charged in the structure

Stress Test Configuration

The below table shows four stress scenarios that can be used in any combinations. Each selection (except Input) is driven by predetermined scenarios in the Scenario Lookups tab. Refer to Maintenance section on page 4 for instructions on how to alter those pre-determined scenarios.

Scenario	Selections
Prepayment Scenario	<ul style="list-style-type: none"> <input type="radio"/> Input * <input type="radio"/> Normal <input type="radio"/> Low <input type="radio"/> High
Arrears Scenario	<ul style="list-style-type: none"> <input type="radio"/> Normal <input type="radio"/> Front End <input type="radio"/> Back End
Default Scenario	<ul style="list-style-type: none"> <input type="radio"/> Normal <input type="radio"/> Front End <input type="radio"/> Back End
Interest Rate Scenario	<ul style="list-style-type: none"> <input type="radio"/> None <input type="radio"/> Up <input type="radio"/> Down <input type="radio"/> Up Down <input type="radio"/> Down Up

* Input is driven by cell B7 in the Scenario Parameters tab

Running a Stress Scenario

The scenarios can be run from the start of the transaction or from mid-transaction.

→ To run a scenario from the start of the transaction (i.e. from the Closing Date entered in the Term Sheet tab);

1. Click on the "Run Scenario from Closing Date" button on the Scenario Parameters tab

2. Select the stress scenarios in the desired combination, then select OK
 - The model will run the scenario, valuation and reconciliation calculations

The Scenario Report tab and Valuation tab will hold results generated for the scenario chosen.

- To run a scenario mid-transaction, the user will need to import 2 files:
- the loan-level data template which provides mortgage loan data for credit analysis; and
 - the Input File, which provides the cash flow structure data at the starting point for the scenario run. The Input File needs to contain data as at the Valuation Date the user wishes to run. Note that the Valuation Date must be a Payment Date. The Input File template is provided in Appendix B.

1. Click on the “Run Scenario mid Transaction” button
2. Select the stress scenarios in the desired combination, then select OK
 - The model will run the scenario, valuation and reconciliation calculations

The Scenario Report tab and Valuation tab will hold results generated for the scenario chosen.

Highest Implied Ratings for each Note Class

The Valuation Model will be able to calculate the highest implied rating for each class of RMO notes for a selected scenario. The model will start at AAA and cycle down through each set of credit parameters until a credit scenario is found where all interest is paid on time and principal is fully repaid:

1. Click on the “Find Implied Ratings from Closing Date” button on the Scenario Parameters tab
2. Select the stress scenarios in the desired combination, then select OK
3. The Implied Ratings tab will show the highest rating for each security
 - NR means Not Rated, or no rating achieved for that security.

Note: if the user runs the highest implied ratings option, the stress scenario run will be cleared. Therefore, you will need to re-run the desired scenario.

5. Bond Valuation

The Valuation Model will automatically calculate the following valuation metrics for each bond and display them on the Valuation tab:

- Net present value
- Dirty price per 100

- Internal rate of return
- Bond factor
- Weighted average life (WAL) based on principal cashflows
- Expected paydown date (the date the note-holder receives the last cashflow)

Also shown on the Valuation tab is information on whether cashflows were received on time and in full, as well as the actual and discounted cashflows paid.

The Scenario Report tab summarises the scenario that has been run and provides graphs highlighting the performance of each note and of the mortgage pool.

6. Reconciliation

The Valuation Model reconciles each cashflow period in the Reconciliation tab, and can produce a Reconciliation Report and a Cashflow Report for a single period.

This module will reconcile the transaction's assets and liabilities, coverage of loan write-offs, interest received versus paid, principal received versus paid, bond balances and reserve balances. To run the reconciliation:

1. Go to the Reconciliations tab
2. Double click on any Payment Date in column A to generate the Reconciliation Report and Cashflow Report for that Payment Date.
 - The output will be in the Reconciliation Report tab and CF Report tab

All reports are in a printer friendly format.

Appendices

Appendix A: Loan-level data template

The loan-level data template provides a template for user to import loan-level data into the Valuation Model.

The recommended format for each Loan Level Data field;

Field	Data Type	Data Label Options
Pool Cut Date	Date	
Borrower ID	Alphanumeric	
Loan ID	Alphanumeric	
Borrower Group ID	Alphanumeric	
Settlement Date	Date	
Maturity Date	Date	
Original Loan Balance	Positive Double	
Current Loan Balance	Positive Double	
Security Property 1 ID	Alphanumeric	
Original Security Property 1 Valuation	Positive Double	
Current Security Property 1 Valuation	Positive Double	
Security Property 1 Postcode	Positive Integer	
Security Property 2 ID	Alphanumeric	
Original Security Property 2 Valuation	Positive Double	
Current Security Property 2 Valuation	Positive Double	
Security Property 2 Postcode	Positive Integer	
Security Property 3 ID	Alphanumeric	
Original Security Property 3 Valuation	Positive Double	
Current Security Property 3 Valuation	Positive Double	
Security Property 3 Postcode	Positive Integer	
Security Property 4 ID	Alphanumeric	
Original Security Property 4	Positive Double	

Valuation		
Current Security Property 4 Valuation	Positive Double	
Security Property 4 Postcode	Positive Integer	
Security Property 5 ID	Alphanumeric	
Original Security Property 5 Valuation	Positive Double	
Current Security Property 5 Valuation	Positive Double	
Security Property 5 Postcode	Positive Integer	
Residency Status	String	- NZ - Other
Employment Type	String	- PAYE FullTime - PAYE PartTime - PAYE Casual - Self Employed
Loan Documentation Type	String	- Full - Other
Loan Amortisation Type	String	- Principal and Interest - Interest Only
Interest Rate	Double	
Interest Rate Type	String	- Fixed - Variable
Interest Only Loan End Date	Date	
Fixed Rate Maturity	Date	
Days In Arrears	Integer	
Occupancy Type	String	- Owner Occupied - Investment
Originator	String	
Security Rank	Positive Integer	
Underwriting Standard	String	- Conforming - NonConforming
Restructured Loan	Boolean	- Yes - No
Foreclosure Process Started	Date	
Date Foreclosure Process Started	Boolean	- Yes - No
Date Recovered Amount Received	Positive Double	
Recovered Amount	Positive Double	

Appendix B: Input file template

The Input File is required for mid transaction scenario analysis and valuation.

Field	Data Type
Payment Date	Date
3M OIS	Percentage
Previous Payment Date	Date
Fixed Rate Swap Net Amount	Double
Liquidity Reserve Opening Balance	Positive Double
Principal Draw Outstanding	Positive Double
Capital Reserve Opening Balance	Positive Double
Principal Account Opening Balance	Positive Double
Scheduled Interest Collections	Positive Double
Other Income	Double
Scheduled Principal Collections	Positive Double
Prepayments	Positive Double
Recoveries	Positive Double
Loan Write Offs	Positive Double
Senior Fees Expenses	Positive Double
Loans Outstanding Opening Balance	Positive Double
Loans Outstanding Closing Balance	Positive Double
Class AA Principal Outstanding	Positive Double
Class AB Principal Outstanding	Positive Double
Class B Principal Outstanding	Positive Double
Class C Principal Outstanding	Positive Double
Class AA Carry Over Charge Offs	Positive Double
Class AB Carry Over Charge Offs	Positive Double
Class B Carry Over Charge Offs	Positive Double
Class C Carry Over Charge Offs	Positive Double
Class AA Unpaid Interest	Positive Double
Class AB Unpaid Interest	Positive Double
Class B Unpaid Interest	Positive Double

Class C Unpaid Interest	Positive Double
Termination Event	Boolean