Hosted Credit Portfolio Risk

Open Analytics

open-analytics.com.au

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Introduction

Open Analytics' hosted Credit Portfolio Risk solution provides core risk measurement, collective provisions and portfolio quality monitoring for banks and credit providers. The service provides a foundation for credit portfolio management by taking care of risk estimation and model management for you, including running models, annual recalibration, support through financial audits and all-important portfolio risk profile monitoring.
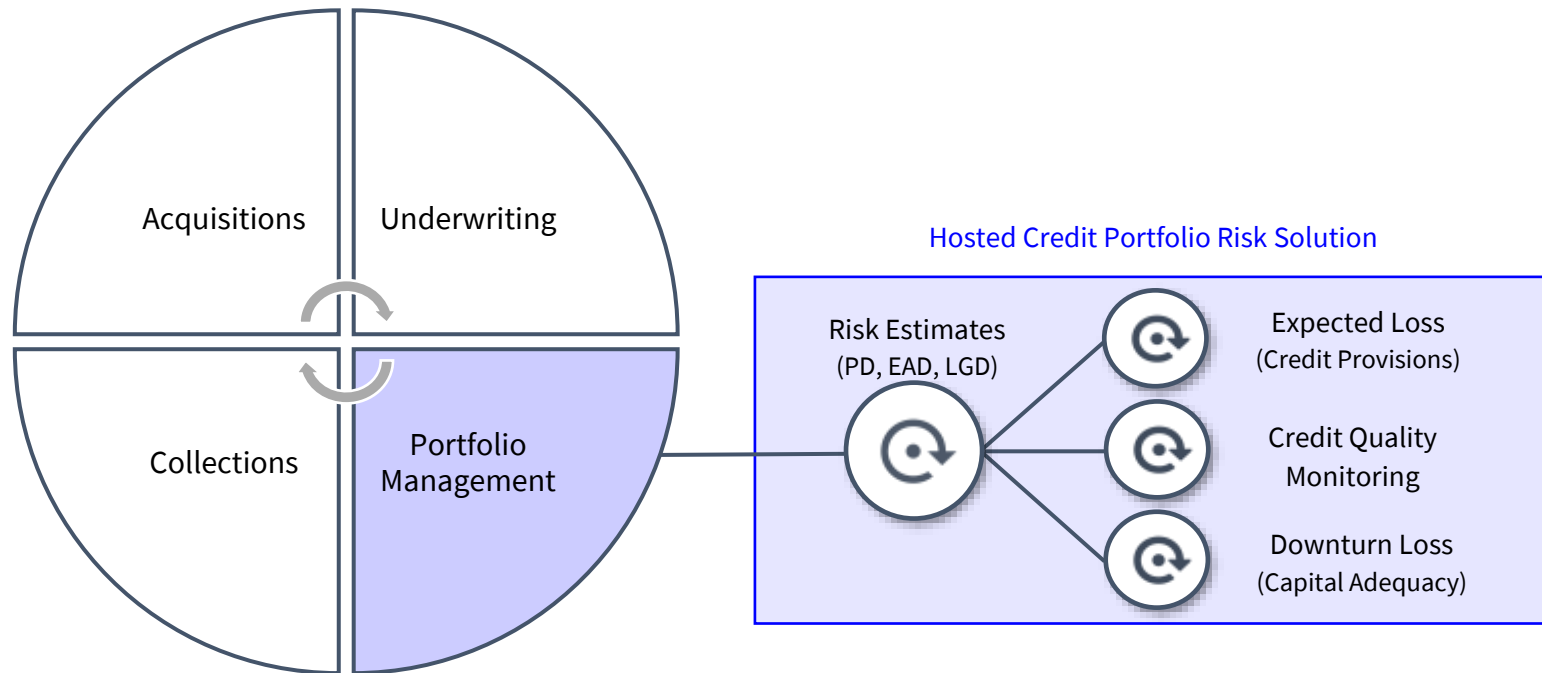
The solution is adaptable to any portfolio type and any level of data maturity. For established lenders with significant data assets, risk estimates are calibrated to internal performance data to best reflect your customer base and risk profile. For startups or lenders with limited data, customers can take advantage of Open Analytics' industry benchmark models, fine-tuned with decades of experience developing and managing risk estimate models for the full spectrum of credit providers in Australia and New Zealand. Our industry benchmark models provide a sound foundation for credit risk estimates and provisions for new lenders which evolves as your data assets grow.

Benchmarks vs Internally Calibrated Risk Estimates

All lenders risk estimation requires some external data points and benchmarking. Even the largest banks in the world draw on global databases and industry benchmark models for aspects of credit risk quantification. As a lender's portfolio and data assets grows, the mix of internally calibrated versus benchmarks typically evolves. Where do you fit on the scale below for Australian lenders?

Maturity, Size and Data Available			Source of Risk Estimation					
Organization Type	Age of Portfolio	Defaults Recorded	Long Run PD	Long Run EAD (CCF)	Long Run Cure Rate	Collateral Haircuts and Dynamic LVR	Economic Effects (Point in Time)	Tail Risk (VaR Capital)
Start-Up	0 to 3 Years	Under 100	Industry Benchmark Model	Industry Benchmark Model	Industry Benchmark Model	Industry Benchmark Model	Industry Model + Judgement	Industry Model Or None
Emerging	3 to 7 years	100 to 500	Mix Internal + Benchmarks	Mix Internal + Benchmarks	Mix Internal + Benchmarks	Industry Benchmark Model	Industry Model + Judgement	Industry Model Or None
Established	8+ Years	500 to 2,000	Internal Data	Internal Data	Internal Data	Industry Benchmark Model	Industry Model + Judgement	Industry Model Or None
Large 2nd Tier	20+ Years	2,000 to 10,000	Internal Data	Internal Data	Internal Data	Mix Internal + Benchmarks	Industry Model + Judgement	Industry Model (F-IRB)
A-IRB Bank	50+ Years	10,000 - 100,000	Internal Data	Internal Data	Internal Data	Internal Data	Mix Internal Model + Industry Model + Judgement	Industry Model (A-IRB)

Long run average Probability of Default (PD), Exposure at Default (EAD) and Cure Rates are the first risk estimates that can be robustly calibrated to internal data. For secured lending, Loss Given Default (LGD) estimates are driven by dynamic collateral values and collateral haircuts which require very large datasets to model, typically 5000+ collateral sales from liquidated defaults. Internal calibration of secured LGDs is generally confined to A-IRB banks largest secured portfolios. No lender can rely entirely on their own data assets to reliably estimate economic effects and tail risk losses in severe downturn scenarios.

Open Analytics Hosted Credit Portfolio Risk

How it Works

The solution implementation occurs in 5 stages, summarised below. The implementation typically takes 4-8 weeks depending on the complexity of the lender's portfolio (number of products) and nature of the organisation.

Data Assessment → Model Calibration → Solution Deployment → Ongoing Monitoring → Model Validation

1. Data Assessment: We assess your internal data to determine the optimal combination of internal versus external data sources to use for model parameter calibration. At the end of this process your data is structured to facilitate both model calibration and integration into our risk estimate implementation framework for deployment.
2. Model Calibration: Following the data assessment, risk estimate models are calibrated based on data available and your design preferences. For most lenders, the models contain a blend of parameters calibrated to internal data and our external benchmarks where internal data is insufficient.
3. Solution Deployment: Once the model calibration is completed, we deploy the models and portfolio monitoring solution into Open Analytics' secure infrastructure. The models operate on a quarterly or monthly cycle, requiring a single portfolio dataset and key judgemental parameters (economic scenario weights) provided by the lender each reporting cycle.
4. Ongoing Monitoring: Having operationalised the solution, we provide a quarterly refresh (monthly for premium customers), producing updated risk estimates and provisions returned at a facility level, along with a portfolio collectively assessed credit provision summary, credit quality monitoring and back testing. We also provide a model recalibration on an annual cycle including a refresh of underlying PD, EAD and LGD model parameters.
5. Model Validation: We provide full support through internal risk estimate approval and validation by your financial auditors for compliance with AASB-9. Validation support is provided both upon implementation and for subsequent annual or bi-annual financial audits.

Open Analytics Hosted Credit Portfolio Risk

Product Feature Summary

Product Feature	Standard Hosted CPR Solution	Premium Hosted CPR Solution
Assets under management	Less Than $1b (Resi Mortgage Portfolios $5b)	$1b OR Greater (Resi Mortgage Portfolios $5b)
Maximum number of product segments	3	6
Reporting cycle frequency	Quarterly	Monthly
Expected Credit Loss: Estimated credit losses for AASB-9 compliant credit provisions refreshed on a quarterly or monthly reporting cycle	Y	Y
Probability of Default: Estimated likelihood of a facility entering default (90 days or more in arrears) in the future	Y	Y
Exposure at Default: Estimated outstanding balance at time of default, should a credit facility enter default	Y	Y
Loss Given Default: Estimated loss as a percentage of exposure at default, should a credit facility enter default	Y	Y
Downturn Credit Loss: Estimated credit losses under severely stressed economic conditions, suitable for stress testing and capital adequacy	Y	Y
Geographic Risk Model: Location risk classifying risk associated with the borrower's postcode	Y	Y
Portfolio Credit Quality Monitoring: Comprehensive monitoring including distribution by key segments, migrations and portfolio concentrations	Y	Y
Back Testing: Risk estimates and portfolio performance monitoring provided on a quarterly or monthly cycle	Y	Y
Peer Benchmarking: Portfolio PD, EAD, LGD and ECL benchmarks including non-bank lending and banking peer comparison	Y	Y
Models are calibrated to your internal performance data (where available) including arrears roll-rates (for PD) and cure rates (for LGD)	Y	Y
Client selects their own scenario probability weights and has flexibility to adjust downturn scenario severity each reporting cycle	Y	Y
Annual model recalibration	Y	Y
Audit support (support through annual reviews by financial auditors)	Y	Y
Option for customisation of reports and additional analytical customer support		Y

Open Analytics Hosted Credit Portfolio Risk

Expected Credit Loss

Our expected credit loss (ECL) model combines Point-In-Time (forward-looking) risk estimate models to derive expected loss under a range of economic scenarios. Underlying PD, EAD and LGD models produce estimates over a 1-year horizon for stage 1 (performing) exposures and over the remaining term of the facility for stage 2 and 3 (non-performing) exposures.

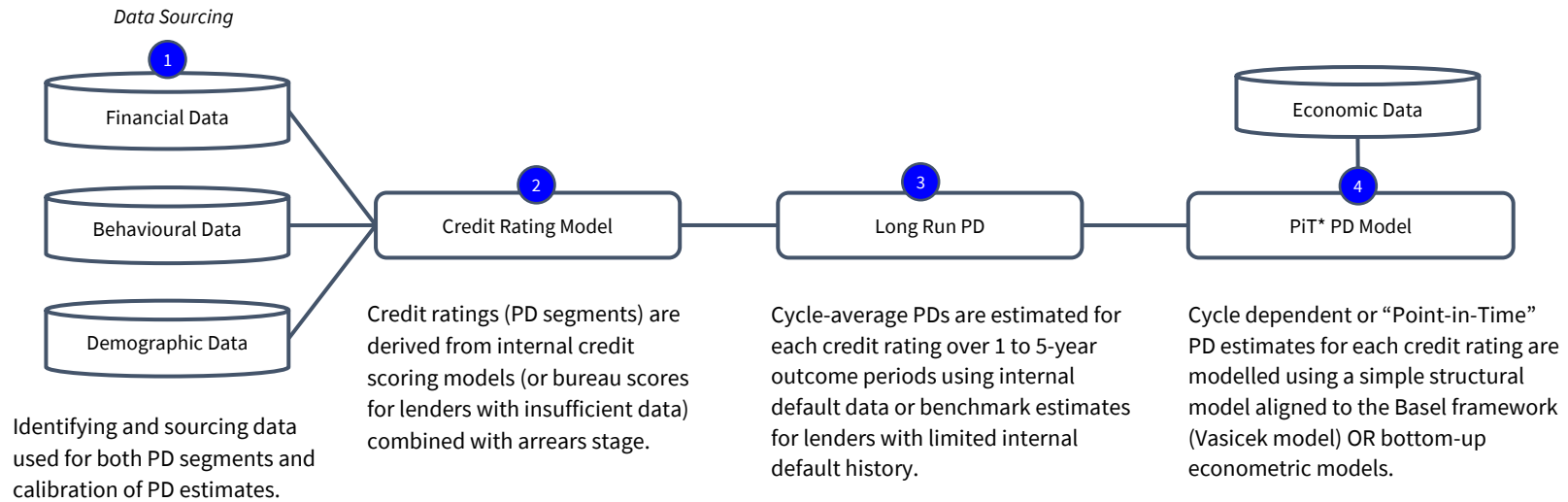$$ECL_t^N = Exposure_t \times \sum_{n=1}^{N} \boxed{PD_t^n(Z) \times EAD_t^n \times LGD_t^n(Z^*)} \times (1 + EIR)^{-n}$$

Remaining Term **(N)**

State of the Cycle **(Z)**

Price Index **(Z*)**

Facility Effective Interest Rate

Core Risk Estimates

Probability of Default

Exposure At Default

Loss Given Default

Our benchmark industry models allow the flexibility to include each individual lender's available data to calibrate roll rates, default rates by PD segments, credit conversion factors and collateral recoveries. Our ECL framework also allows a range of design choices for PD, EAD and LGD segmentation and other components of the models.

Open Analytics Hosted Credit Portfolio Risk

Probability of Default

Probability of default is the estimated likelihood of a facility entering default (90 days or more in arrears) in the future. Our PD model is derived in four stages as depicted in the diagram below.

Data Sourcing

1 Financial Data

Behavioural Data

Demographic Data

Identifying and sourcing data used for both PD segments and calibration of PD estimates.

2 Credit Rating Model

Credit ratings (PD segments) are derived from internal credit scoring models (or bureau scores for lenders with insufficient data) combined with arrears stage.

3 Long Run PD

Cycle-average PDs are estimated for each credit rating over 1 to 5-year outcome periods using internal default data or benchmark estimates for lenders with limited internal default history.

Economic Data

4 PiT* PD Model

Cycle dependent or "Point-in-Time" PD estimates for each credit rating are modelled using a simple structural model aligned to the Basel framework (Vasicek model) OR bottom-up econometric models.

Our PD model design allows flexibility for a range of data sources and credit rating model design options including internal multi-factor credit scoring models, our 5-point financial rating model (for business lending) or external credit ratings and bureau scores for those with limited internal data.

Open Analytics Hosted Credit Portfolio Risk

Exposure at Default

Exposure at Default (EAD) is an estimate of the outstanding balance for a facility at the time of default, should the facility reach a default status in the future. EAD is defined as a function of the outstanding balance and a 'Credit Conversion Factor' (CCF) applied to the undrawn proportion of the limit.

$$EAD = Balance + CCF \times Undrawn$$
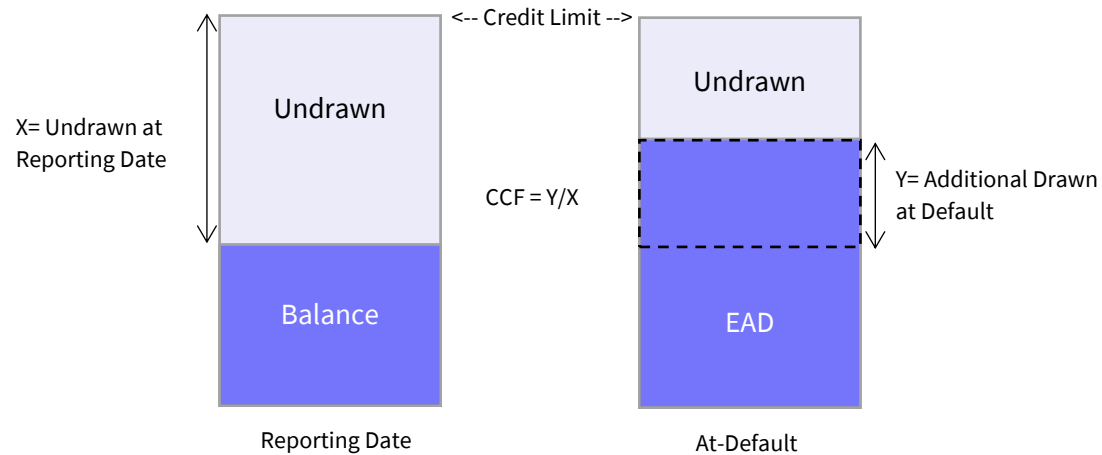
EAD is generally the simplest component of expected credit loss and varies by broad product type (term lending versus revolving) and credit utilization (percentage of limit drawn) for revolving facilities. For those with insufficient default experience or new credit products we provide industry benchmark CCFs based on our experience with major bank lending portfolio performance.

Open Analytics Hosted Credit Portfolio Risk

Loss Given Default

Open Analytics' Industry Loss Given Default model has been developed through decades of hands-on experience working with Australian major bank's commercial lending, asset finance and residential mortgage portfolios. Collateral haircut models can be applied to portfolios with tangible assets securing loans and relatively high volumes of data. This method estimates LGD by applying the following steps.

1. Separating a default sample into those that cure (return to performing) and those that resolve through liquidation (collateral enforcement).
2. Modelling cure probability as a function of collateral coverage and other drivers.
3. Sourcing collateral sale data from default liquidation and collateral enforcements.
4. Segmenting collateral into common types (residential property, commercial property, vehicles, business assets) age and location.
5. Modelling collateral "haircuts" (difference between distressed asset sale and market value) or recovery to value ratio (RVR) by segment.
6. Modelling Loss Given Liquidation based on Dynamic Loan to Value Ratio, collateral haircut distributions and collateral price indices.
7. Combining Loss Given Liquidation and Cure Probability to derive LGD estimates.
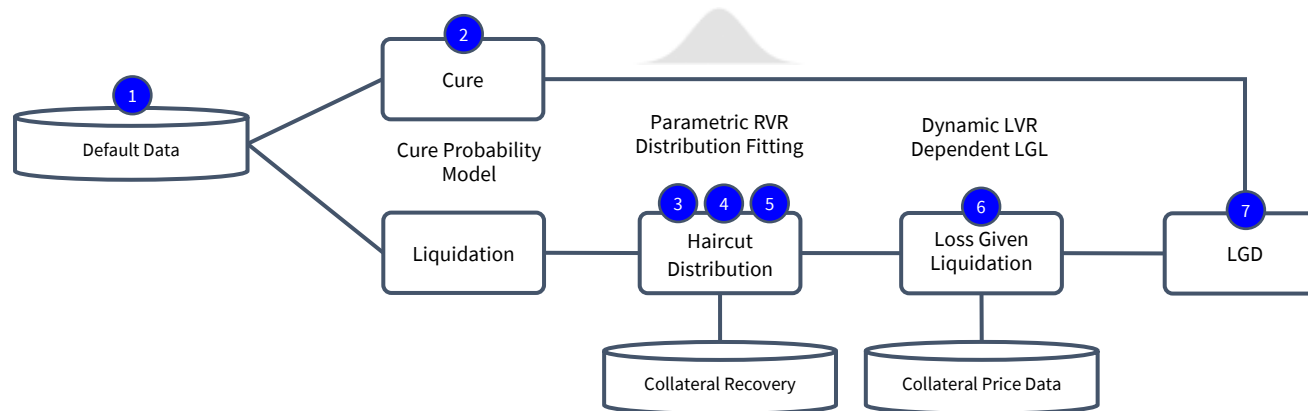
Whilst this approach is the most involved from a data and model design perspective, it has the advantage over "top down" approaches in its ability to directly link recoveries to collateral drivers and external collateral price indices. Lenders with insufficient collateral recovery data can take advantage of Open Analytics' benchmark secured LGD model informed by experience developing LGD models at Australia's largest secured lenders. For unsecured portfolios, LGD is derived from cure probabilities, average recovery costs and debt sale price if debt is sold to 3rd party debt collectors.

Open Analytics Hosted Credit Portfolio Risk

Downturn Credit Loss

Our hosted Credit Portfolio Risk solution includes PD, LGD and ECL estimates under severe stress scenarios, including major property market downturns, business asset value reductions and significant contractions in national GDP.

PD by Credit Rating and State of the Cycle (Z)

LGD by Dynamic LVR and Change in Collateral Price Index
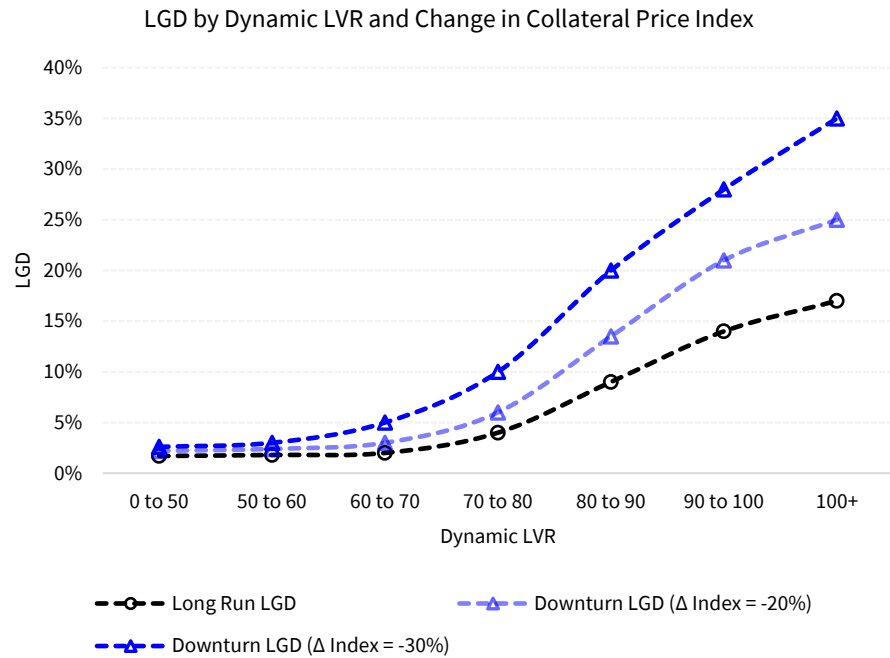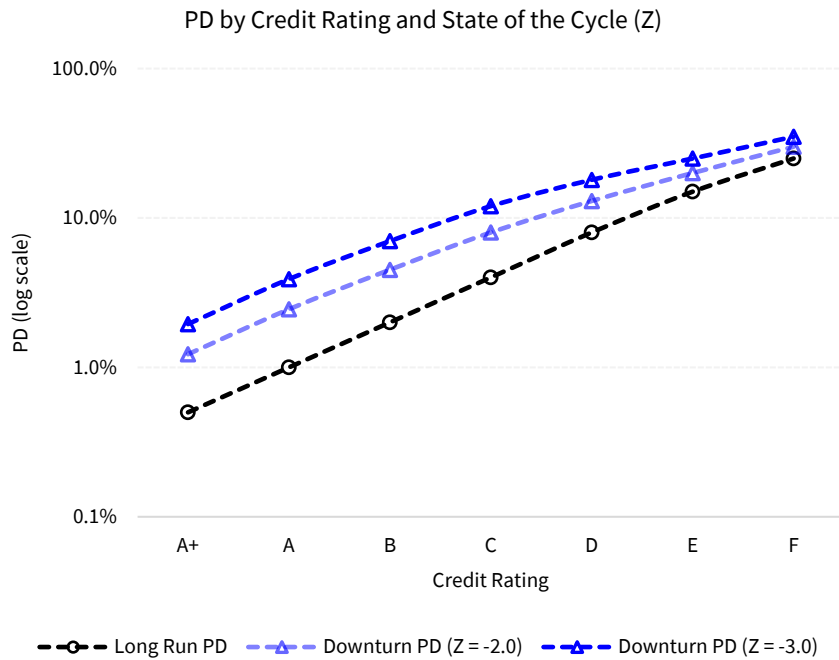
Downturn estimates are used to inform probability weighted expected loss estimates for credit provisions and also can be used to assess tail risk and capital adequacy under stressed market conditions.

Geographic Risk Model

We provide our geographic risk model free of charge with our hosted risk estimates and provisioning solution. This product provides a breakdown of your portfolio by relative location risk and also provides underlying geodemographic data behind the model including local unemployment, relative wealth and income, socio-economic indicators, cost of living and bankruptcy rates.
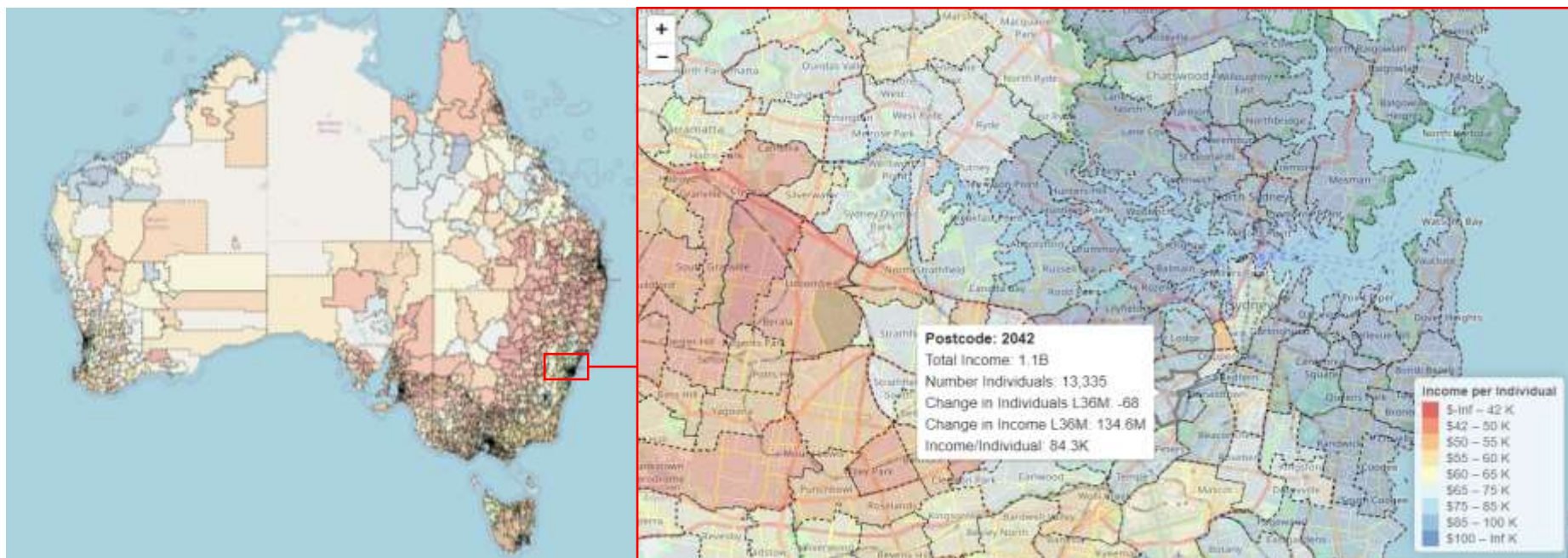

Understanding your geographic risk profile and geographic risk concentrations is an important tool for portfolio management and can also inform underwriting and acquisitions strategy.

Open Analytics Hosted Credit Portfolio Risk

Portfolio Credit Quality Monitoring

As part of the hosted Credit Portfolio Risk service, we provide extensive portfolio credit quality monitoring. Monitoring covers industry, geographic risk, dynamic LVR and portfolio concentrations.
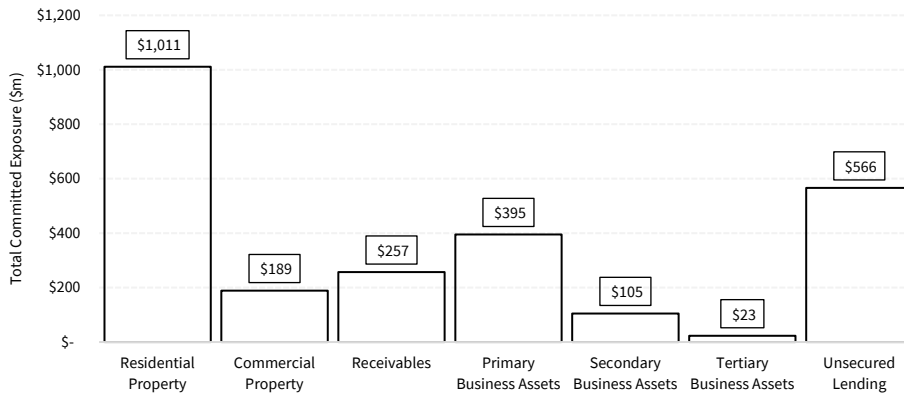

Distribution of Accounts by Exposure Bracket - December 2023
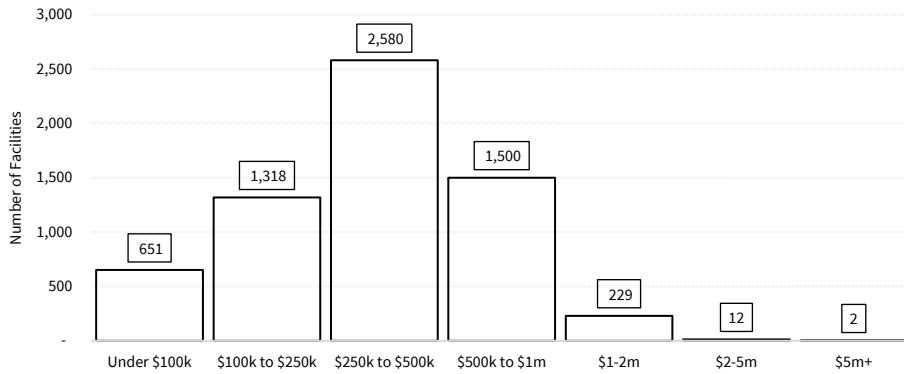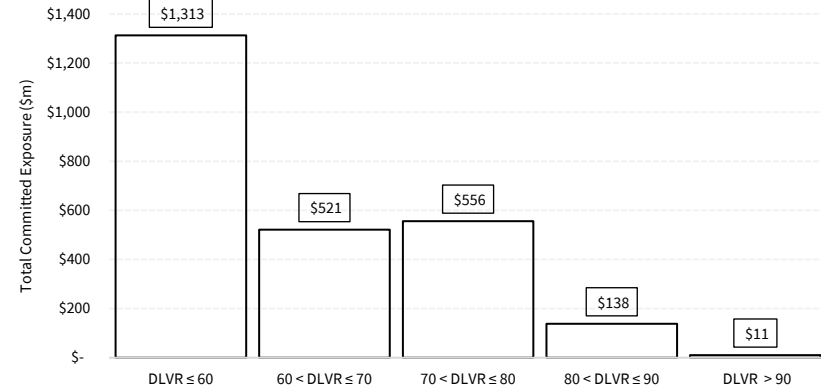

Exposure by Arrears Stage - December 2023
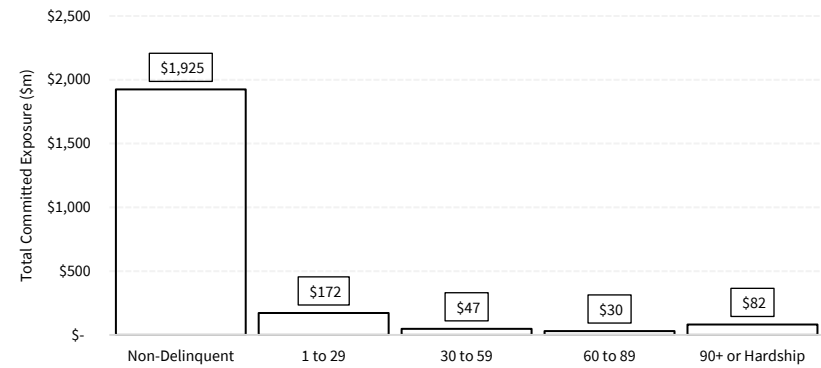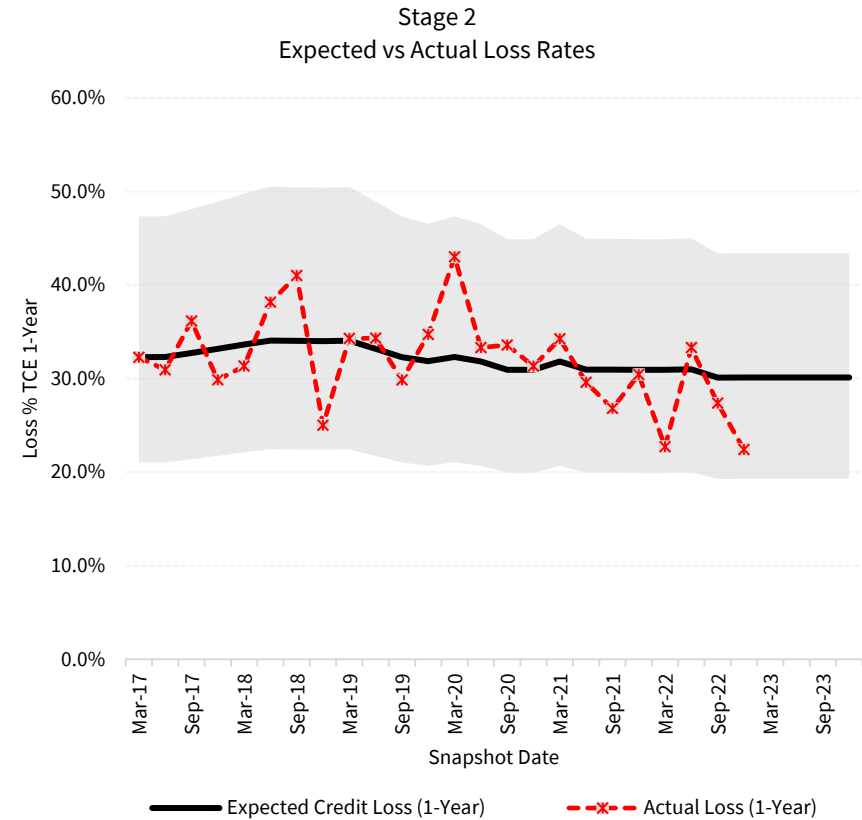

Exposure by Collateral Type - December 2023

Secured Loans Exposure by Dynamic LVR - December 2023

Open Analytics Hosted Credit Portfolio Risk

Back Testing

To ensure risk estimates are appropriately calibrated to your portfolio, we provide extensive risk estimate back testing. This service includes observed PD, EAD, LGD and ECL by key segments and segment migrations.

Stage 1
Expected vs Actual Loss Rates

Stage 2
Expected vs Actual Loss Rates

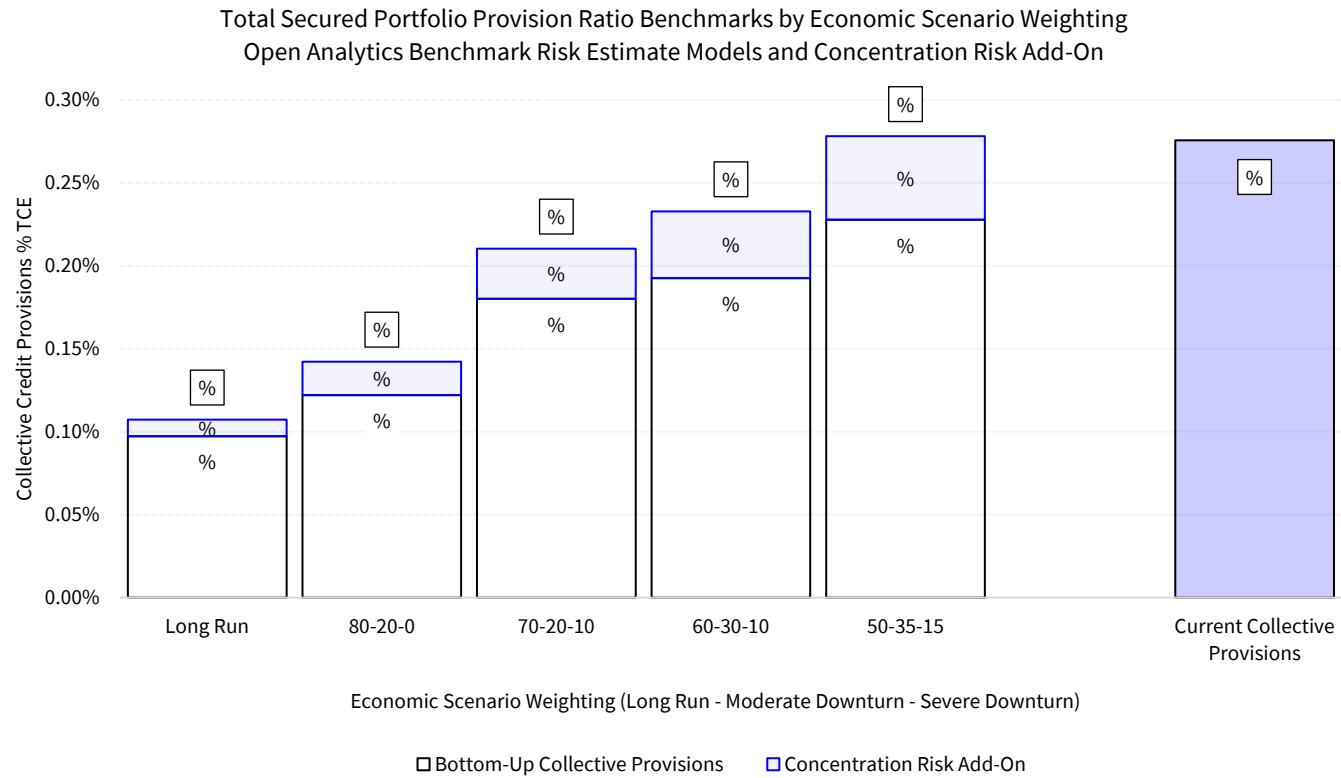Open Analytics Hosted Credit Portfolio Risk
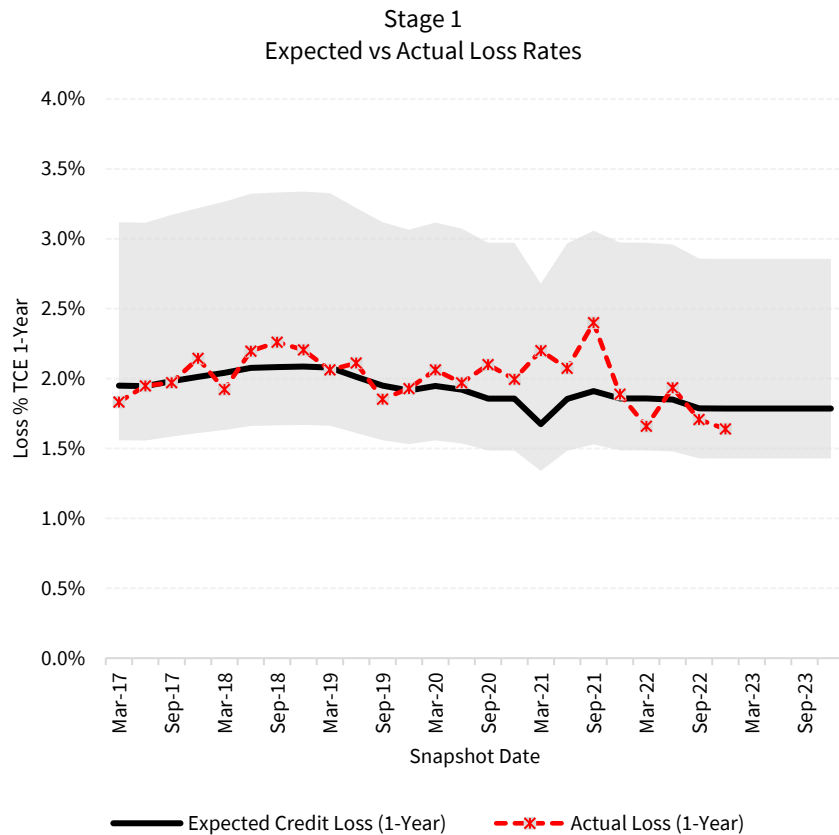
Peer Benchmarking

We provide benchmarking of your portfolio's observed default rates and observed Loss Given Default to industry averages. Benchmarking allows lenders to understand their risk profile and performance relative to competitors offering similar credit products.

SME Lending
LGD Midpoint Benchmarks

Open Analytics Hosted Credit Portfolio Risk
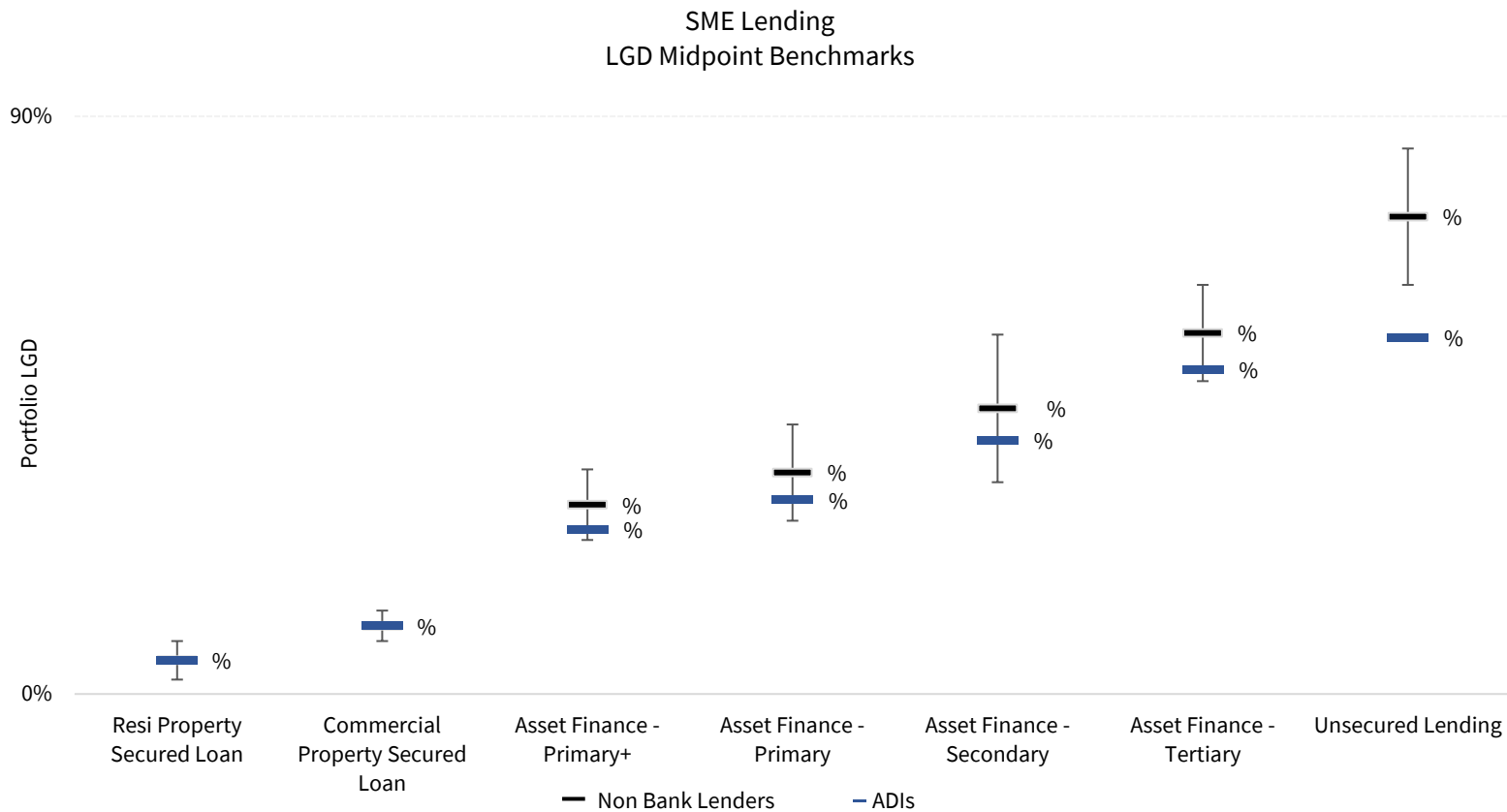
One-Off Benchmarking Risk Estimates & Credit Provisions

Open Analytics also offers one-off benchmarking of PD, EAD, LGD and ECL using our industry models and data. This service is designed for creditors interested in comparison to peers or seeking assurance on adequacy of credit provisions.

Total Secured Portfolio Provision Ratio Benchmarks by Economic Scenario Weighting
Open Analytics Benchmark Risk Estimate Models and Concentration Risk Add-On

Economic Scenario Weighting (Long Run - Moderate Downturn - Severe Downturn)

☐ Bottom-Up Collective Provisions   ☐ Concentration Risk Add-On

Benchmarking includes collective provisions, underlying PD, EAD and LGD estimates and detailed portfolio risk profile analysis including collateral coverage, geographic risk, delinquency profile and concentration risk.

Pricing

Pricing for our hosted Credit Portfolio Risk solution is provided below. All prices are in Australian dollars and exclusive of GST. Implementation costs are a one-off fee paid on completion of solution deployment whilst the annual subscription is payable in quarterly instalments.

Product Segment	Implementation Cost	Annual Subscription Fee	Quarterly Payment
Standard Solution - Unsecured Lending	30,000	55,000	12,500
Standard Solution - Secured Lending	40,000	65,000	16,250
Premium Solution - Unsecured Lending	40,000	105,000	26,250
Premium Solution - Secured Lending	50,000	115,000	28,750
Benchmarking - Unsecured Lending (One-Off Fee)	35,000		
Benchmarking - Secured Lending (One-Off Fee)	45,000		

Lenders with a mixture of secured and unsecured lending are priced as a secured portfolio and do not incur secured and unsecured fees separately.

Customised on-premise models

In addition to hosted risk estimates and provisioning solution, we also offer customised risk estimate and credit provisioning models implemented within your infrastructure and operated internally. Customised models are priced on an individual basis.

About Open Analytics

Open Analytics is an Australian financial services consulting company founded on a vision to modernise and strengthen underwriting, risk management and customer engagement for banks and credit providers. We offer a unique design methodology and holistic approach to implementing pro-active, efficient and ethical decisioning processes with a strong emphasis on long-term sustainability and optimized risk-reward outcomes.

Credit Risk Management
Credit policy and automated decisioning process design including acquisitions strategy, underwriting policy, marketing, credit line management, risk-based pricing and collections.

Machine Learning and Predictive Modelling
Specialised in advanced predictive modelling and machine learning methods which maximize the use of a broad range of data types to predict and mitigate credit risk.

Credit Data Architecture and Data Enrichment
Expertise in structured data-model implementation, designed to enrich the value of lender's data assets by increasing the range, interpretability, traceability and consistency of data.

Open Analytics provides support to financial institutions and creditors of all shapes and sizes, ranging from FinTech non-bank lenders to big-4 banks.

Contact

For any questions regarding our hosted risk estimates and provisioning solution, please contact James O'Donnell, Managing Director Open Analytics.

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For general enquiries please contact our support team by emailing us on contact@open-analytics.com.au