Loss Given Default Deep Dive

Open Analytics Credit Risk and Data Science Services

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Open Analytics

Topics Covered

- Underlying components of LGD (cure rates, collateral recoveries, residual recoveries)
- Loan security - collateral versus “controls” (caveats, GSAs, guarantees)
- How collateral and controls influence LGD
- Collateral haircuts and “Recovery to Valuation Ratios”
- What Influences LGD by asset class

Topics that didn’t make the cut (maybe covered in another webinar later in the year)

- Subordinated debt and capital structure effects (second mortgages and structured finance)
- Corporate and institutional lending LGD
- Insurance

Loss Given Default – Our Experience

Open Analytics has a lot of experience with LGD…

- Our industry LGD model is used by a significant pool of non bank lenders and second tier banks as part of our hosted provisioning service
- Three of the big-4 are using our LGD models and/or methodology
    - Built LGD models used for capital and provisioning for 2 of the big-4 banks including commercial and retail portfolios
    - Methodology consulting for secured LGD for a third big-4 bank for secured lending
- We do credit ratings for private credit funds in Australia and USA for securitization and structured finance which involve LGD estimation

What is Loss Given Default

Loss Given Default (LGD) is the proportion of credit exposure lost (written-off) on credit instruments that default.
LGD is typically expressed as a percentage of Exposure at Default (EAD) which is simply the outstanding balance at the time the facility enters default.

Intuitive laypersons definition:

$$LGD = \frac{Net\ Loss}{Outstanding\ Balance\ at\ Default} = 1 - Recovery\ Rate$$

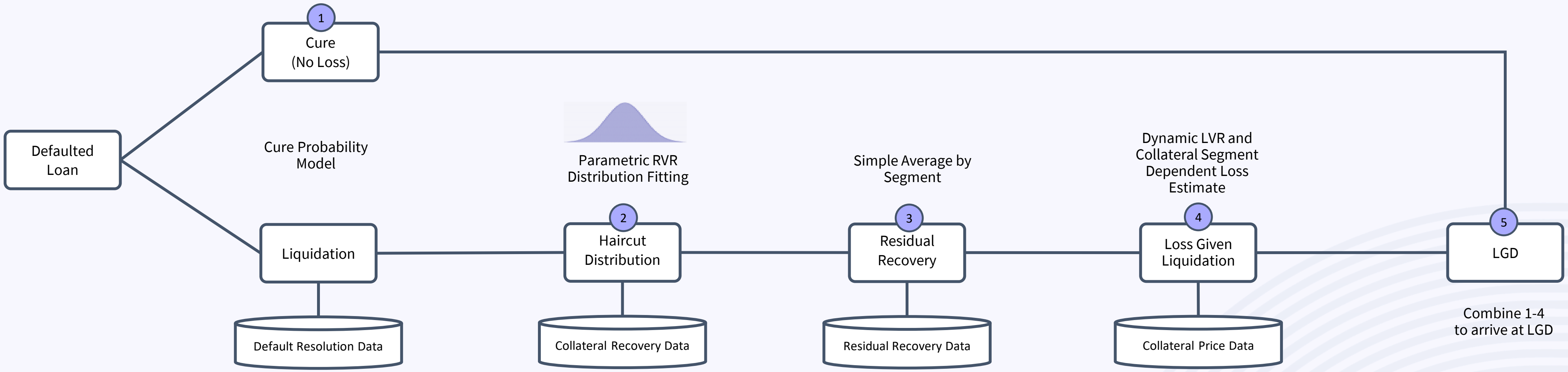
Technical definition:

$$LGD = \frac{EAD - PV(Post\ Default\ Cashflows)}{EAD} = 1 - \frac{\sum_{n=1}^{N} R_n \times (1+r)^{-t_n}}{EAD}$$

N = number distinct recovery cashflows
$R_n = recovery\ n$ (n= 1,2,...N)
t_n = time since default recovery n occurs
r = product interest rate (or other time value of money discount rate)
EAD = Exposure at Default

Collateral Haircut Models (Components of LGD)

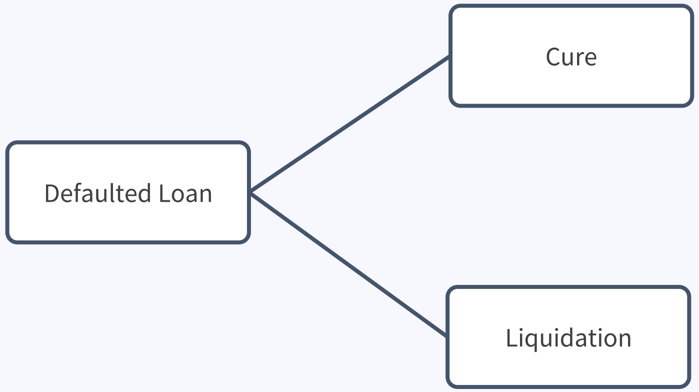
Collateral haircut models can be applied to portfolios with tangible assets securing loans and relatively high volumes of data. This approach has the advantage over “top down” approaches in its ability to directly link recoveries to collateral drivers and external collateral price indices. This is particularly advantageous for calibrating downturn estimates and gaining a clearer intuitive understanding of drivers of LGD as asset prices change.



Secured-LGD models are relatively rare since very few lenders have enough data to estimate LGD for secured portfolios.

Components of LGD – Cure Versus Liquidation

A proportion of defaults return to performing as the borrower repays all arrears and continues on normal payment schedule.



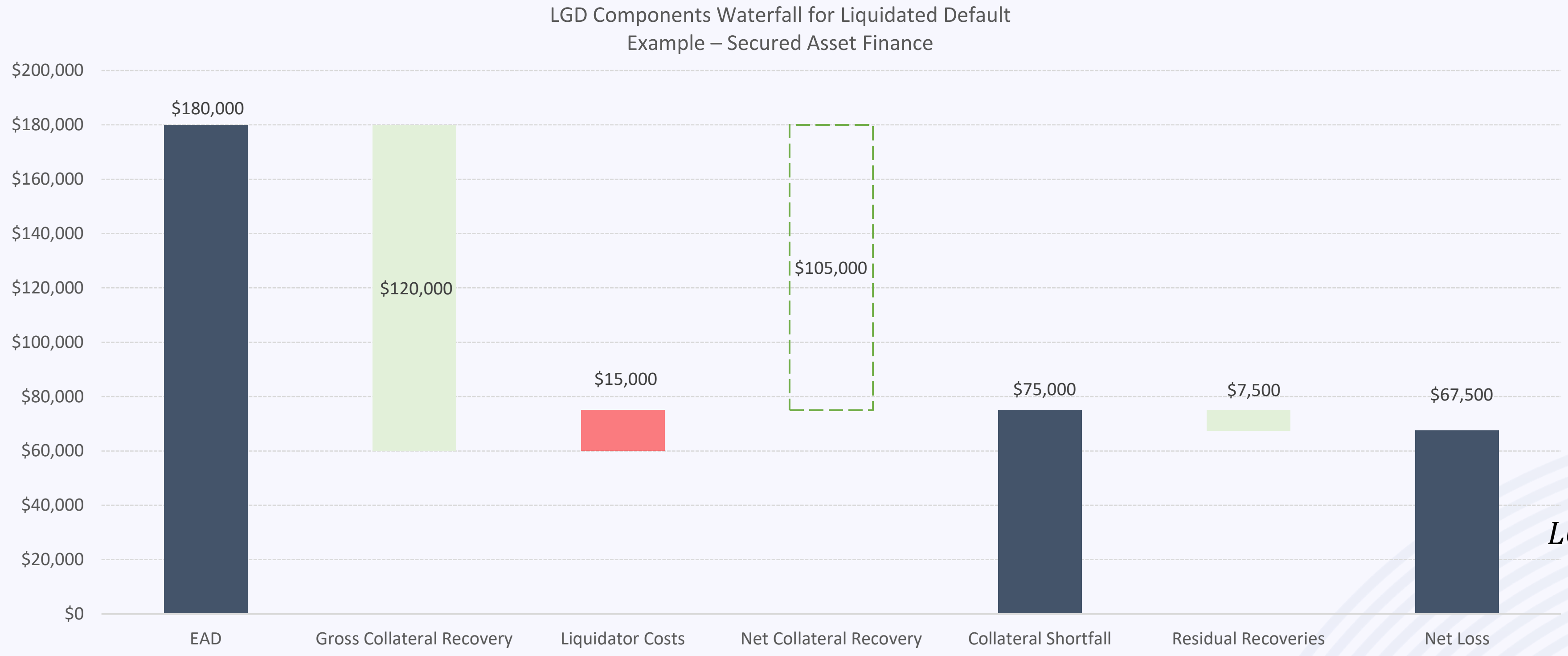
Borrower repays all arrears and returns to contractual terms (no loss).

Enforcements or liquidation of assets required to recover outstandings (potential loss)

Cure rates are influenced by interest rate on facility (higher interest lower cure rate), level of security (secured vs unsecured and LVR), lender controls and complexity of the borrower (larger more complex business entities have lower cure rates).

Components of LGD – Liquidated Defaults, Secured

There are a number of sub-components that influence LGD…



$$LGD = \frac{\$67,500}{\$180,000} = 37.5\%$$

Proceeds from sale of collateral

Cost to recover (liquidator fees)

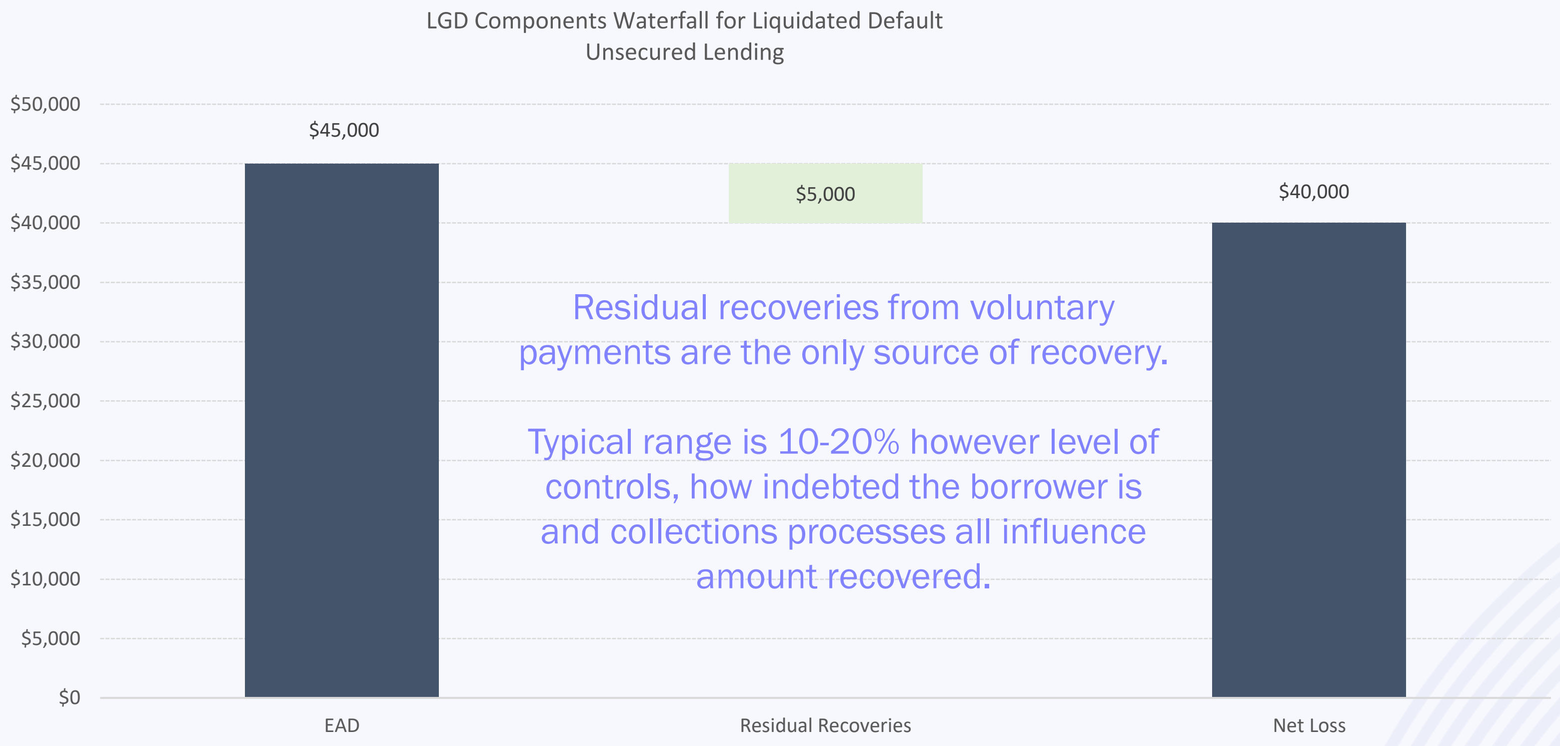
Recovery realised by lender

Outstandings after collateral recovery

Residual recoveries from any voluntary payments

Components of LGD – Liquidated Defaults, Unsecured

Unsecured lending (lending with no tangible collateral) is much simpler



$$LGD = \frac{\$40{,}000}{\$45{,}000} = 89\%$$

Loan Security - Collateral vs Controls

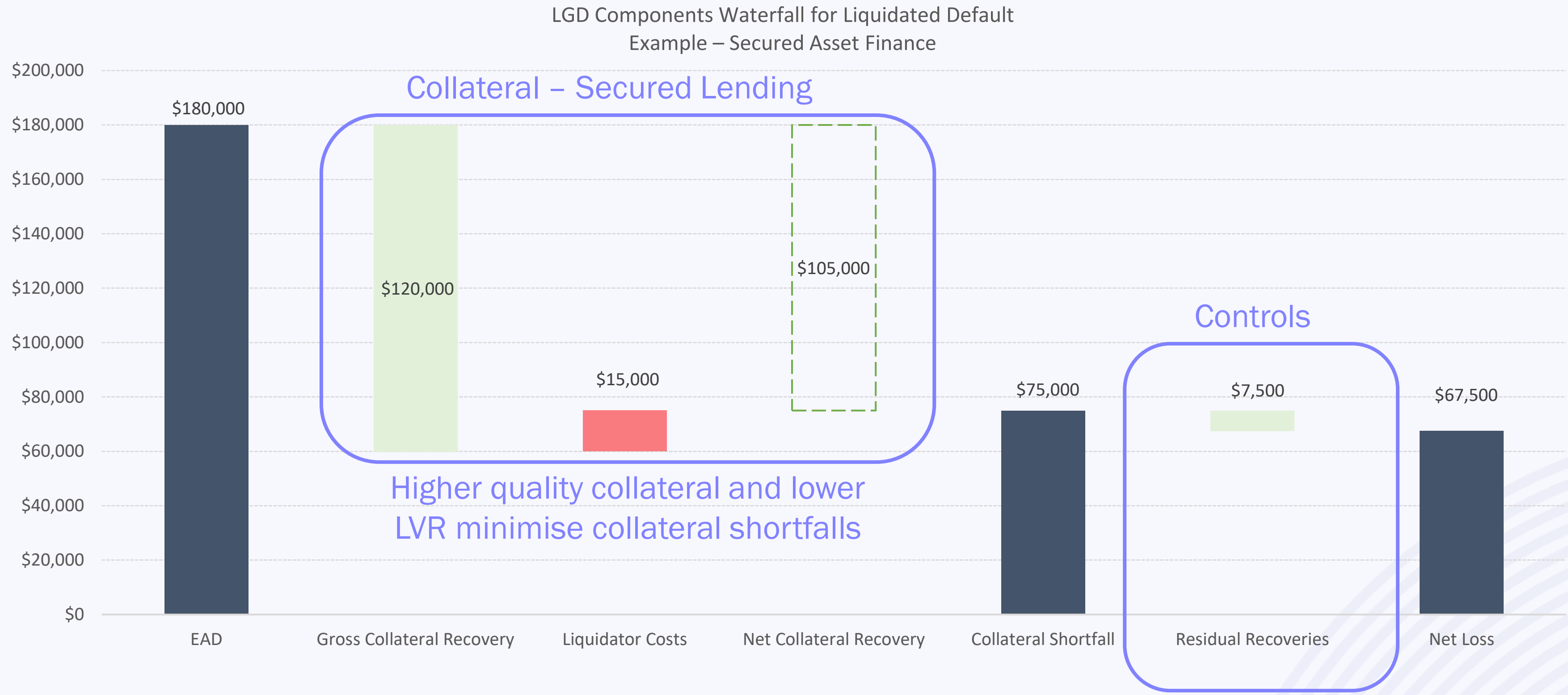
What does it mean for a loan to be “secured”?

Collateral	Controls
Lender has legal recourse to <u>repossess</u> and <u>sell</u> asset securing a loan. • Property (residential or commercial) • Vehicles • Receivables • Business equipment • Specific Security Agreement (SSAs) • General Security Agreement (GSAs)?	Clauses in loan contracts that allow lender to <u>exercise control</u> over individual or business without recourse to collateral. • Caveats (injunction to prevent sale of personal assets) • Directors guarantees (personal guarantees) • General Security Agreement (GSAs)? Controls allow the lender to “cause pain” to borrower resulting in a higher incentive to repay arrears. Controls influence LGD though to a lesser extent than recourse to loan collateral.

Is a GSA collateral or a control?

GSAs are collateral as the lender has a charge over the business and recourse to all business assets and the business itself. However, in practice they sometimes used more like a control as some lenders don’t value any business assets under the GSA and operationally don’t have processes in place to take over business or seize business assets such as stock and inventory. Recoveries linked to GSAs typically occur for lenders who do a valuation of business assets that fall under the GSA and are able to seize assets.

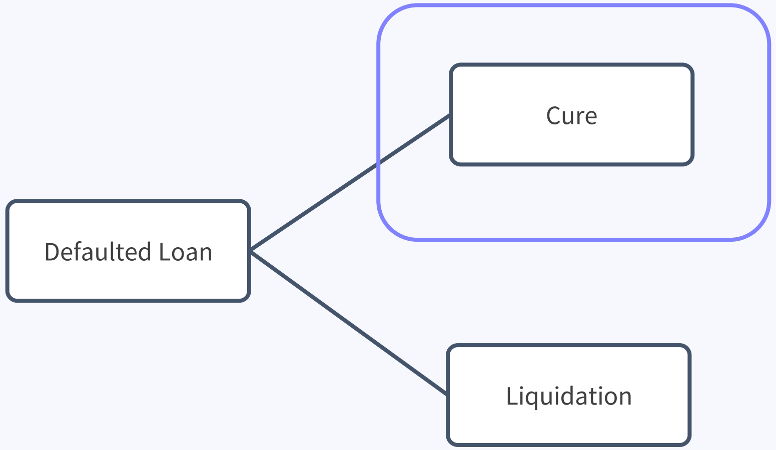
Loan Security - Collateral vs Controls Influence on LGD



Higher quality collateral and lower LVR minimise collateral shortfalls

More controls and better collections processes maximise residual recoveries for both secured and unsecured lending.

Loan Security - Collateral vs Controls Influence on LGD



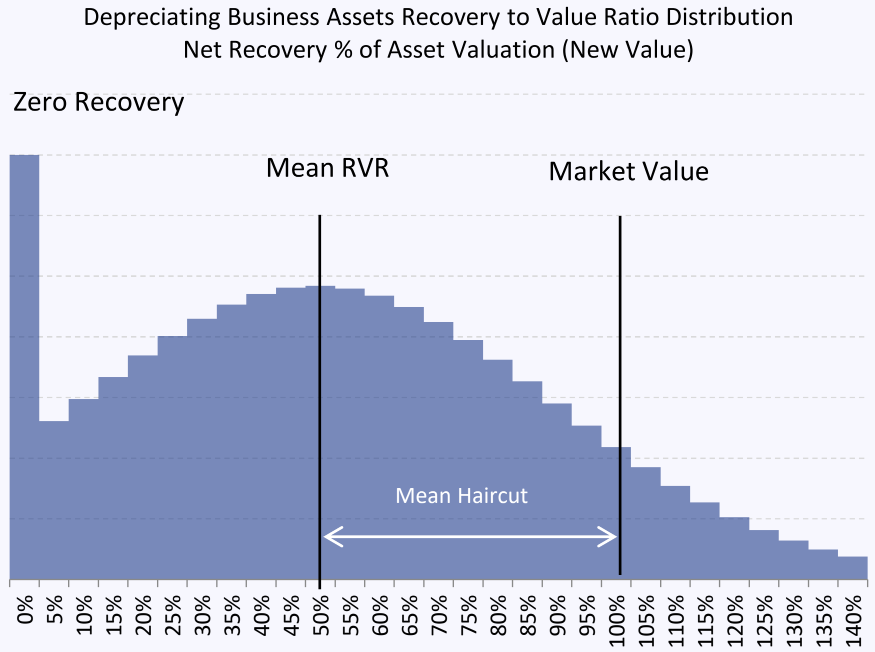
Both collateral and controls influence cure rates.

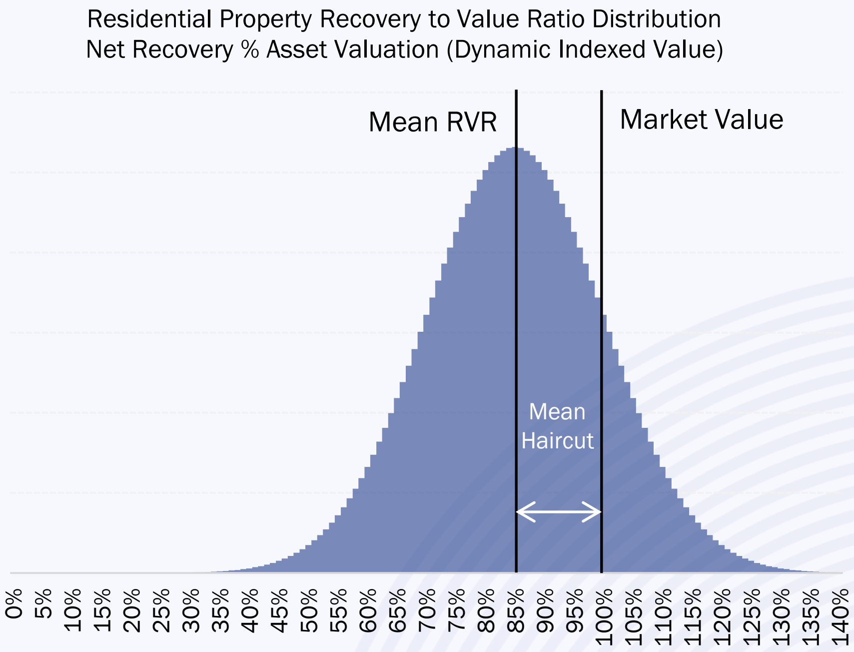
Well-secured and low LVR loans have higher cure rates whilst controls such as caveats and guarantees can also increase cure rates.

Recovery to Valuation Ratio

For tangible assets recoveries relative to asset valuation vary significantly. For business assets RVR ranges from zero (unrecoverable) to over 100% with an average of between 40-60%. For property average RVR is 85-90% (in most regions) with full losses being rare. Examples of Recovery to Valuation Ratio (RVR) distributions are shown below.

$$Recovery\ to\ Valuation\ Ratio\ (RVR) = \frac{Asset\ Recovery\ Net\ of\ Liquidation\ Costs}{Fair\ Market\ Value\ of\ Asset}$$





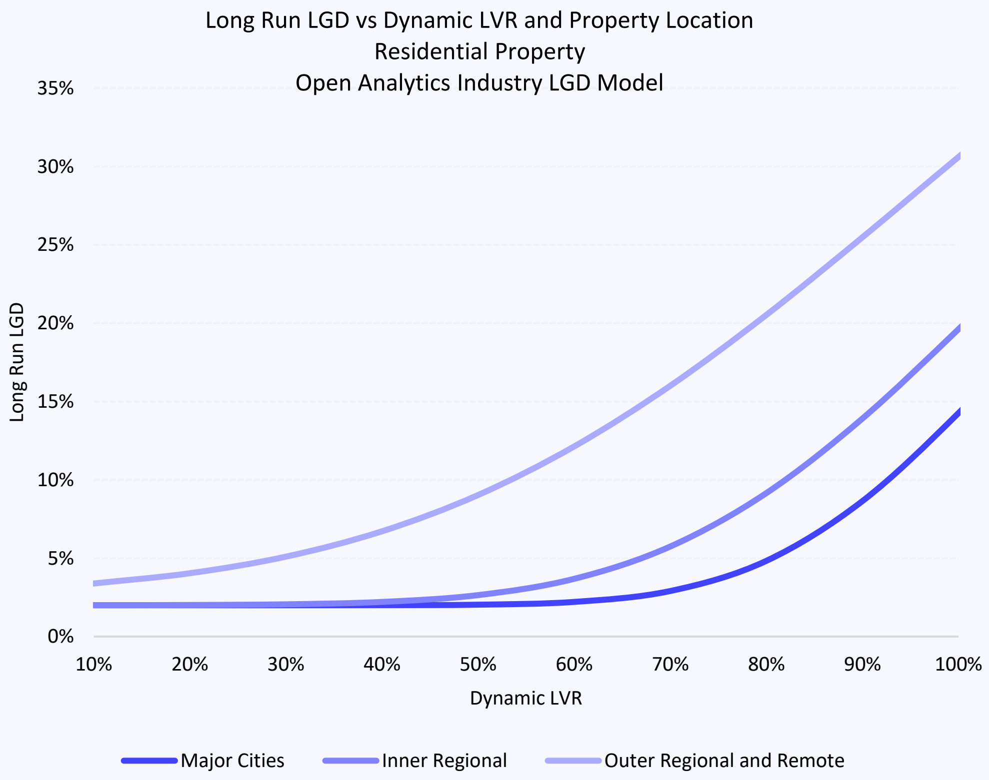
Both the <u>average</u> and <u>variance</u> in RVR drive average LGD – collateral types with “fatter” distributions and lower means result in higher LGDs.

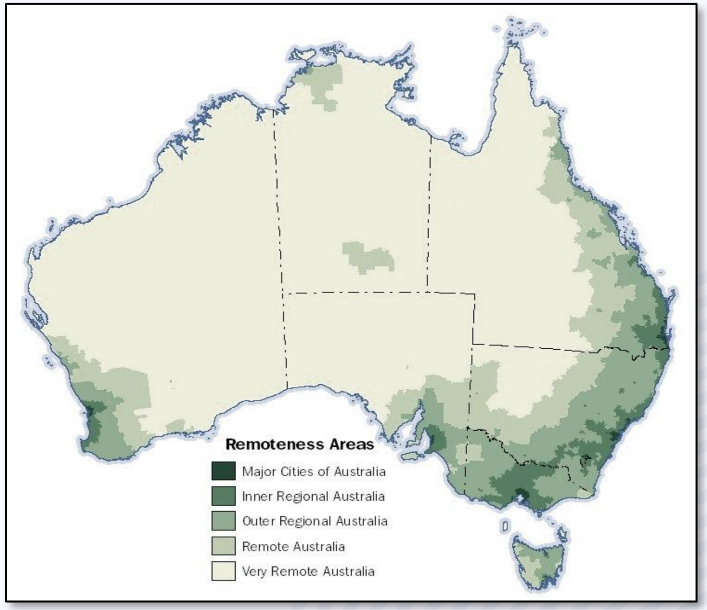
LGDs by Asset Class – Rough Guide

Asset Category	Criteria	Average Long Run LGD
Residential Property – Mid Range LVR	Mortgages or business loans secured by resi property at an average LVR (70-80% LVR)	4-5%
Commercial Property – Mid Range LVR	Business loans secured by commercial property in an average LVR range (60-70% LVR)	10%
Livestock Finance	Loans secured by cattle, typically funded at 90% LVR relative to value of calves for a 12-month term. Asset is appreciating and LVR at end of term is typically 60% or less.	5-10%
Receivables (Invoice Finance)	Trade receivables securing invoice finance facilities. Defaults are typically very low and losses primarily come from fraud events rather than credit losses.	10-15%
Asset Finance - Primary and Auto	Primary Assets have a deep established cross-industry resale market that is stable through the economic cycle. Typically wheels, e.g. cars, utes, trucks. Includes consumer auto.	30%
Asset Finance - Secondary	Secondary Assets have an established resale market that is specialised (industry specific) and subject to some variability through the economic cycle.	35%
Asset Finance - Tertiary	Tertiary Assets have a limited resale market or high depreciation or have high recovery costs with significant likelihood of the asset being unrecoverable.	55%
GSA Secured Loans - With Valuation	GSA-secured where lender has valued business assets and value exceeds total lending of the borrower (LVR < 100%).	55-65%
Unsecured - Consumer Low Interest	Unsecured consumer lending at lowest interest rates in market, typically banks and credit unions.	60%
Unsecured - High Interest, Strong Controls	Unsecured business loans with caveats and/or directors guarantees or GSA with no valuation (used for control only). Typically found in non-bank sector.	70%
Unsecured - High Interest, No Controls	Unsecured loans without directors guarantees, caveats or GSAs. These are typically also high interest loans to small business or high interest SACC and MACC consumer	80% (or greater)

Property Secured LGD

Location, property type and LVR are the main drivers of LGD for property secured lending.
Collateral recoveries correlate to population density since major population centers have a more liquid property markets. ABS classification of postcodes by ‘remoteness’ provides a good segmentation for collateral haircut models. State differences can also be considered, for example Western Australia and Queensland tend to have a more volatile property markets due to dependence on boom-and-bust mining industry.

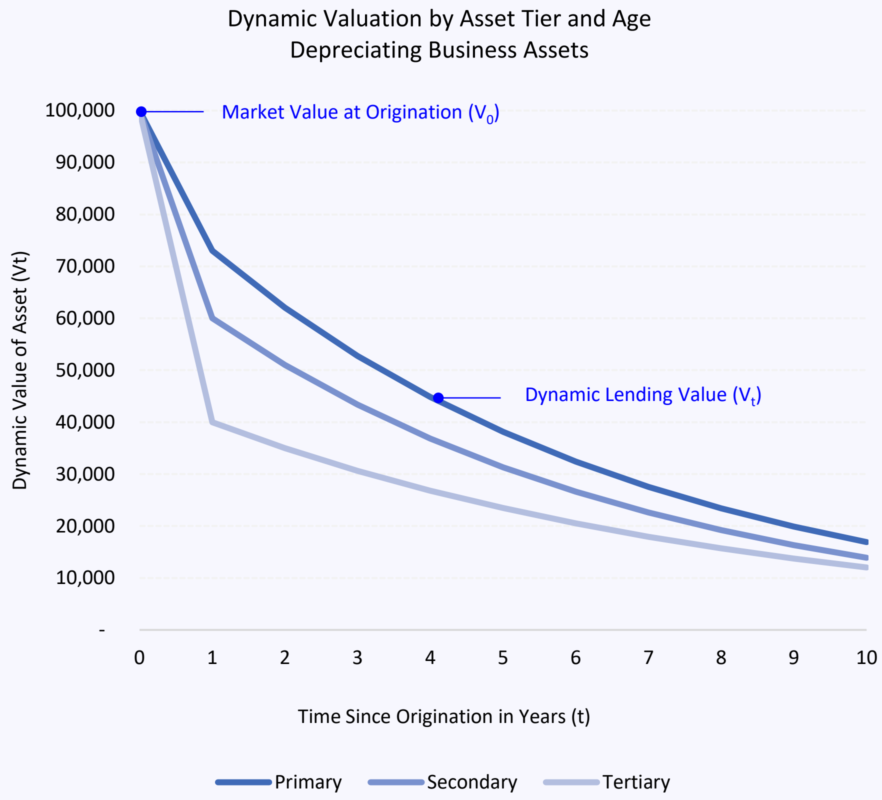


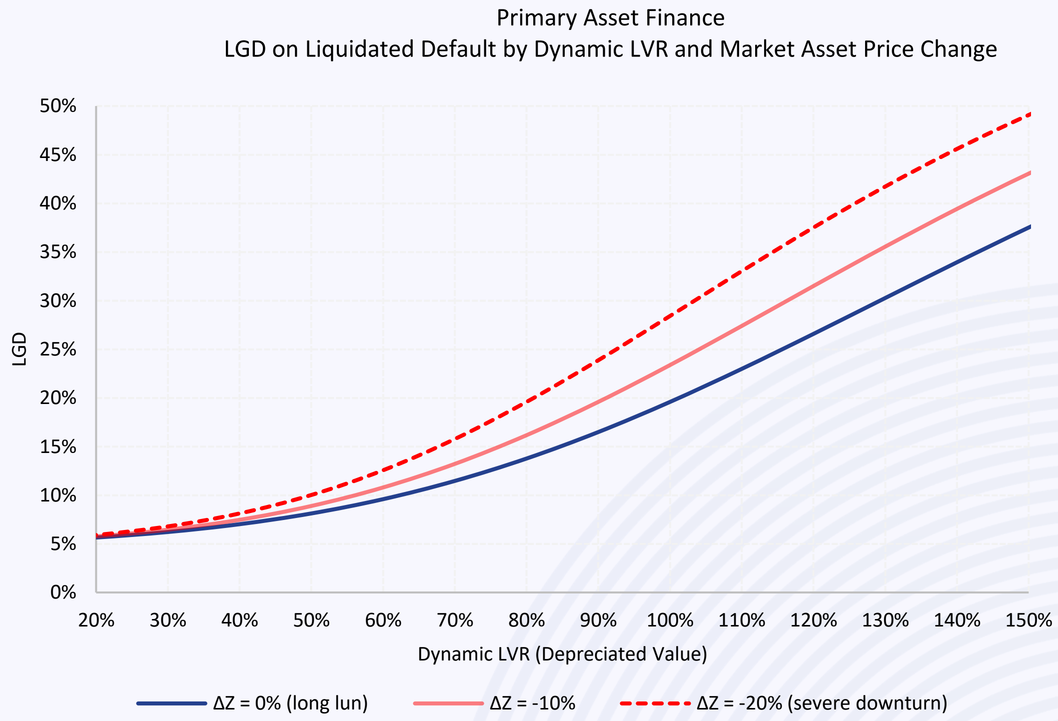


Asset Finance and Auto LGD

For Asset Finance lending, the drivers of LGD are Collateral Type and Loan to Value Ratio.

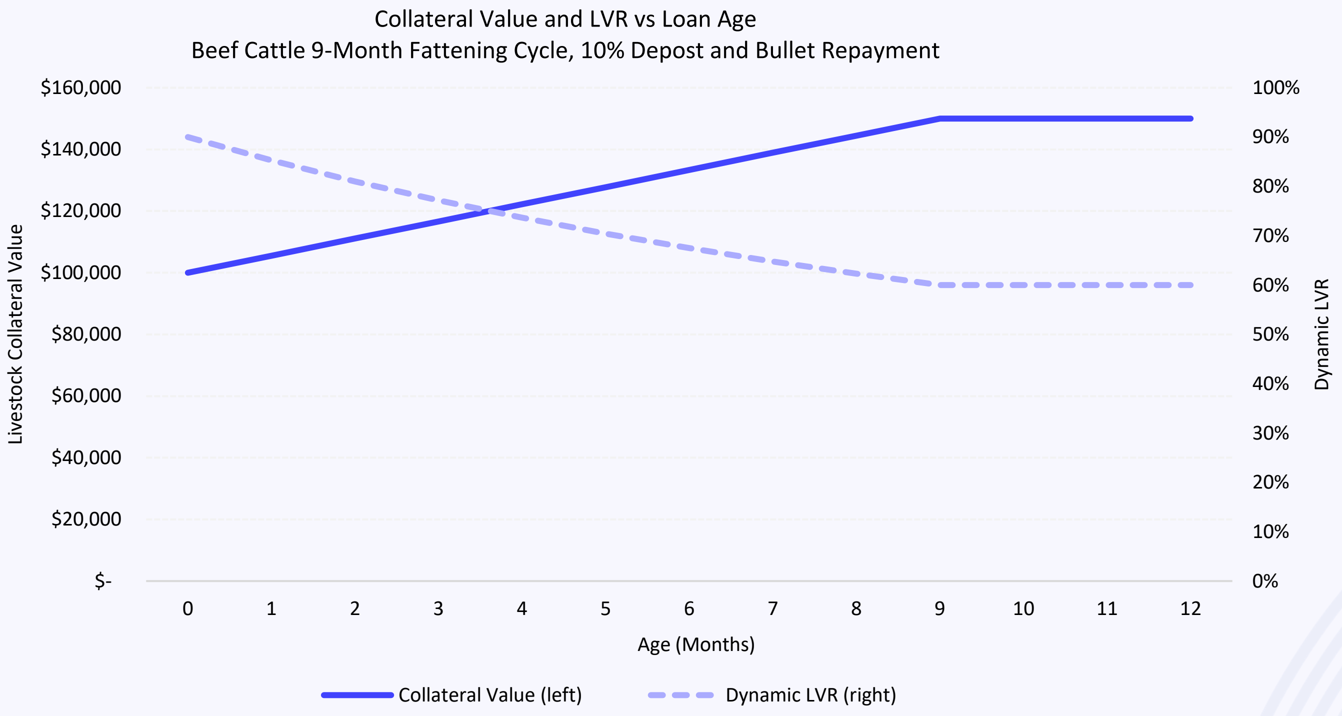
Depreciating assets LGD is significantly less cycle-sensitive than appreciating assets such as property. Unlike property secured lending where changes in property values can have major impacts on recoveries and LGD, depreciation effects are much greater than external market effects, even in major downturns.





Livestock Finance LGD

Livestock finance differs from traditional asset finance due to the underlying asset increasing in value over the life of the loan. DLVR remains below 100% for the life of the loan. LGDs are surprisingly low, comparable to commercial property secured and invoice finance, however there is potential for higher losses if stock are not insured against natural disasters (droughts and floods).



Invoice Finance

Invoice finance LGD is very tricky to quantify and model.

- Average realized LGDs are low, very often zero in most cases
- Loss are almost entirely fraud events that hit lenders with 100% LGDs (the invoices weren’t real)
- What drives differences in losses on invoice finance is operational controls rather than anything to do with “normal” risk predictors
- Independent verification of invoices by lender and control over invoice payments (lock-box accounts) are critical to reducing fraud losses
- Avoiding higher concentrations in individual borrowers and individual borrower’s debtors reduces risk of large losses

GSA-Secured

GSA-secured lending has a wide range of outcomes depending on a number of factors.

- At their best, GSAs can result in recoveries and LGDs comparable to tertiary asset finance.
- Recoveries depend on industry and nature of the business (i.e. whether the business has tangible assets of value)
- Recoveries are typically much higher when assets are valued and exceed the borrowers total lending
- GSAs for business with limited or no tangible assets or where the lender has no process for selling assets are similar to unsecured lending
- Even GSAs with no real tangible assets behind them still act as a control and influence LGDs (similar effect to caveats and guarantees)

Unsecured

Unsecured lending LGD is primarily driven by the level of controls and interest rate of the loans.

- Caveats and personal guarantees provide a higher incentive to repay (if the borrower is able) and influence cure rates and residual recoveries
- Higher interest loans to both individuals and businesses have lower cure rates and lower residual recoveries, regardless of controls
- Early collections actions and enforcement can be the best way to maximize residual recoveries (get in first before other creditors)
- Have realistic expectations, for most unsecured lending outside low-interest bank loans LGDs are at best 70%

Open Analytics combines deep expertise in credit risk and data science to help clients achieve their objectives. Our unique blend of traditional credit risk management and advanced technical modelling capabilities sets us apart, enabling us to develop industry-leading credit models and automated, data- driven credit processes. We have a unique skillset in designing the complete pipeline to manage all aspects of building, implementing and managing predictive models, from data sourcing and preparation to quality control, feature engineering, model development, validation and model monitoring.

Contact us

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Open Analytics

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 optimised risk-reward outcomes.

Credit Data Architecture

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

Credit Risk Modelling

Specialised expertise 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 Risk Management

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

Our Clients

Open Analytics provides support to financial institutions and creditors of all shapes and sizes, ranging from online FinTechs to big-4 banks.

Banks and Bureaus

Non-Bank Creditors and Fintechs

Private Credit Funds

Flexible Model Deployment

We offer flexible model deployment and model management solutions that range from fully hosted to in-house maintained (and options in between).

Externally Managed	Co Managed	Self Managed
Low Internal Capacity		High Internal Capacity
Hosted Models	Model Monitoring & Analytical Support	In House Solutions
We manage everything including development, deployment, ongoing model monitoring and maintenance within Open Analytics infrastructure.	We provide a model monitoring service and annual model recalibration for models deployed within your infrastructure. Ideal for those with competing priorities and capacity constraints. Free up internal resources for more value-added tasks and let us take care of maintenance and monitoring of your credit models.	We develop models for deployment in your infrastructure. You manage all aspects of the model ongoing with your internal credit modelling team.

Core Products and Services

Hosted Products (Externally Managed)

- Credit Portfolio Manager
- Hosted Behavioural Scoring
- Hosted Model Monitoring

Hosted solutions include a credit scoring, model monitoring, portfolio monitoring and provisioning solutions. Open Analytics Credit Portfolio Manager (CPM) is our most popular product covering core risk estimates, portfolio monitoring and IFRS-9 compliant provisioning.

Credit Rating Services

- Credit Ratings
- Funder Rapid Deal Assessment

We offer a range of credit rating services for private credit funds and asset managers.

In House Solutions (Self Managed)

Application Scoring	Behavioural Scoring
Collections Models	Basel Capital Models
Serviceability Models	IFRS-9 Provisioning
Financial Rating Models	Risk Based Pricing
Analytics Data Layers	Credit Frameworks

We develop a wide range of credit models and automated decisioning solutions to facilitate automated credit processes, capital management, provisioning and credit risk management.