

Credit Risk – Dependent versus Independent Variables

1. Probability of Default (PD) Model

- Purpose: Estimates the likelihood that a borrower will default within a given timeframe (e.g. 12 months).

Dependent Variable [**the Target**]

- Default Indicator (Binary: 0 or 1)
 - 1 → Borrower defaulted
 - 0 → Borrower did no default
- these are the only output values of a PD Model

Independent Variables [**the Predictors**]

- Borrower Characteristics
 - Age, Income, Employment type, Credit history
- Loan Features
 - Loan amount, Interest rate, Tenure
- Behavioral Variables
 - Missed payments, Credit utilization, Recent inquiries
- Macroeconomic Factors
 - GDP growth, Inflation, Unemployment rate

2. Loss Given Default (LGD) Model

- Purpose: Estimates the percentage of the loan that will be lost if the borrower defaults.

Dependent Variable [**the Target**]

- $\text{LGD (\%)} = \text{Loss after Recovery} / \text{Exposure at Default}$
 - Values range from 0 to 100%

Independent Variables [**the Predictors**]

- Collateral Information
 - Type of collateral, Loan-to-value (LTV) ratio
- Loan Characteristics
 - Secured versus Unsecured, Loan amount, Interest rate
- Borrower Characteristics
 - Credit score, Financial health indicators
- Macroeconomic Conditions
 - Housing market trends, Recovery rates

3. Exposure at Default (EAD) Model

- Purpose: Estimate the total exposure a bank will have at the time of default

Dependent Variable [**the Target**]

- EAD (Monetary Value)
 - The Outstanding balance + Potential future drawdowns

Independent Variables [**the Predictors**]

- Loan and Credit Features
 - Credit limit, Utilization rate, Loan type
- Borrower Behavior
 - Past usage patterns, Repayment behavior
- Macroeconomic Factors
 - Interest rate trends, Economic downturn risk

Summary

Model	Dependent Variable	Key Independent Variables
PD Model	Default (0 or 1)	Credit score, Loan amount, Missed payments, Economic conditions
LGD Model	% Loss Given Default	Collateral types, LTV ratio, Recovery rate, Loan Features
EAD Model	Amount at Default	Credit limit, Utilization rate, Repayment history