



The GARP Risk Series

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# CREDIT RISK MANAGEMENT

Chapter 1 | Credit Risk Assessment

## Chapter Focus

- Distinguishing credit risk from market risk
- Credit policy and credit risk
- Credit risk assessment framework
- Inputs to credit models

### Credit risk definition

- The potential for loss due to failure of a borrower to meet its contractual obligation to repay a debt in accordance with the agreed terms
- Example: A homeowner stops making mortgage payments
- Commonly also referred to as default risk
- Credit events include bankruptcy, failure to pay, loan restructuring, loan moratorium, accelerated loan payments
- For banks, credit risk typically resides in the assets in its banking book (loans and bonds held to maturity)
- Credit risk can arise in the trading book as counterparty credit risk

# Credit Risk vs. Market Risk

- Market risk is the potential loss due to changes in market prices or values
  - Assessment time horizon: typically one day
- Credit risk is the potential loss due to the nonperformance of a financial contract, or financial aspects of nonperformance in any contract
  - Assessment time horizon: typically one year
  - Credit risk is generally more important than market risk for banks
  - Many credit risk drivers relate to market risk drivers, such as the impact of market conditions on default probabilities.
  - Differs from market risk due to obligor behavior considerations
    - The five “C’s” of Credit — Capital, Capacity, Conditions, Collateral, and Character
- Both credit and market risk models use historical data, forward looking models and behavioral models to assess risks

# Credit Products — Loans vs. Bonds

- Loans

- A contractual agreement that outlines the payment obligation from the borrower to the bank
  - May be secured with either collateral or payment guarantees to ensure a reliable source of secondary repayment in case the borrower defaults
  - Often written with covenants that require the loan to be repaid immediately if certain adverse conditions exist, such as a drop in income or capital
- Generally reside in the bank's banking book or credit portfolio
  - Although banks may sell loans another bank or entity investing in loans

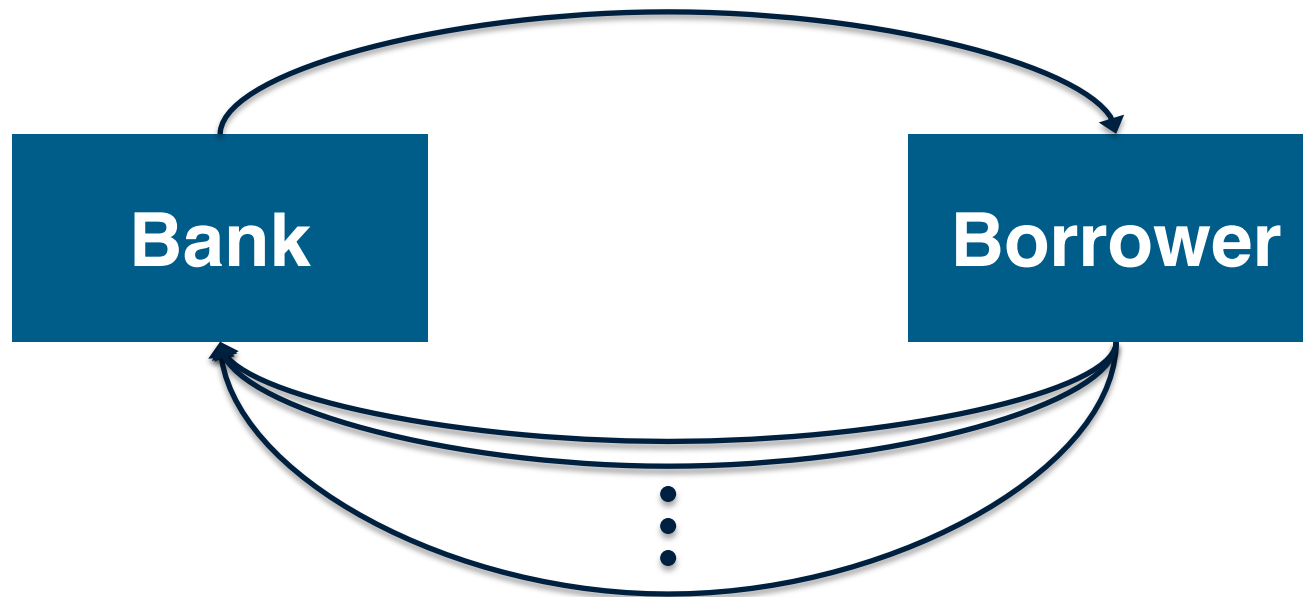
- Bonds

- A publicly traded loan — an agreement between the issuer and the purchasers
  - Collateral support, payment guarantees, or secondary sources of repayment may all support certain types of bonds
    - Structuring characteristics that determine a bond investor's potential recovery in default
- Generally reside in the bank's trading book

# Understanding Credit Risk — A Simple Loan

Contractually, how a loan should work:

1. Bank loans borrower  $\$V$

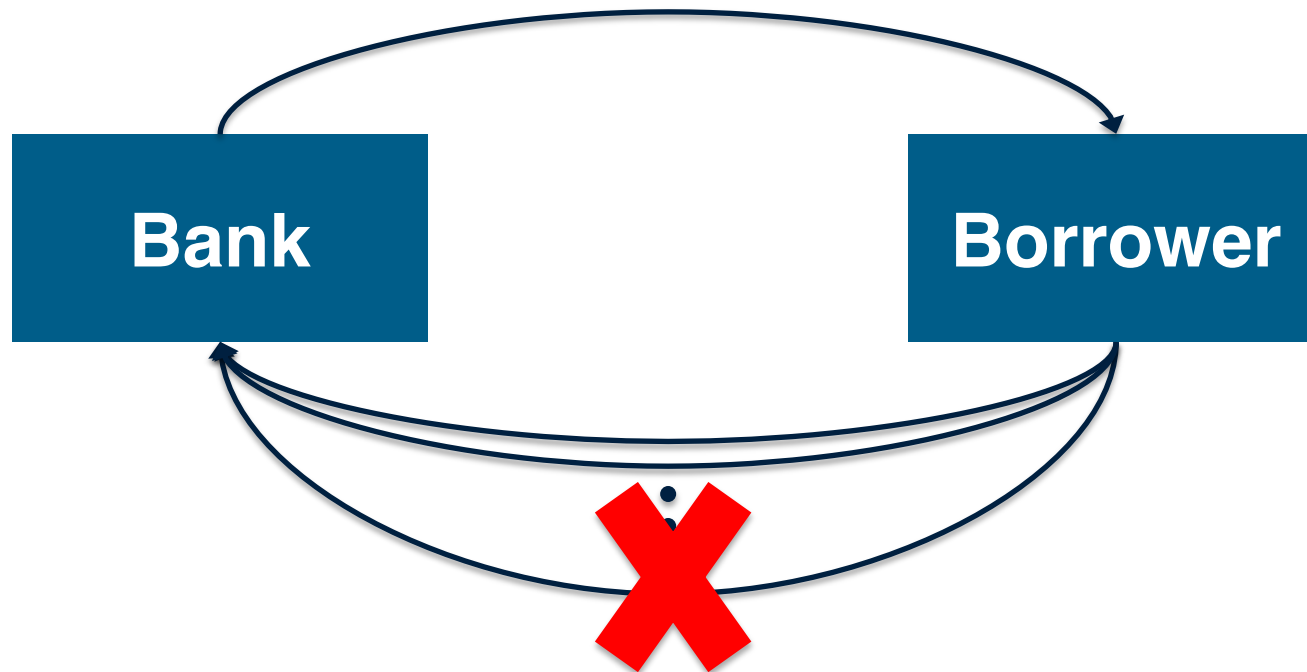


2. Borrower repays loan across time with periodic payments

## Understanding Credit Risk — A Simple Loan

Credit risk arises because there is the possibility that the borrower will not repay the loan as obligated

1. Bank loans borrower \$V



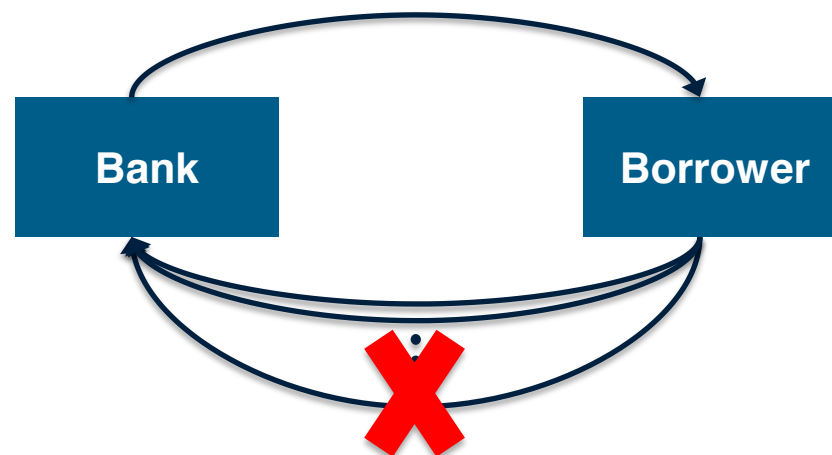
2. Borrow fails to repay loan across time with periodic payments

# Estimating Credit Losses

- Most familiar risk metric is often the adequacy of general and specific loan loss provisions and the size of the general and specific loan loss reserve in relationship to the total exposures of the bank
  - Allowance for loan losses creates a cushion of credit losses in the bank's credit portfolio
    - Primarily intended to absorb the bank's expected loan losses
- Historically credit decisions were made in a case by case basis
- Growing sophistication and automation of lending and the increasing complexity of credit products have spawned the development of computational approaches to credit assessment and evaluation of individual retail and commercial borrowers
  - Introduction of bank-wide credit risk software has accelerated
    - In part driven by regulatory pressures, as regulators demanded improved analysis and oversight of the risk assessment process

# Estimating Credit Losses — Common Measures

- **Probability of Default (PD)**
  - The likelihood that the borrower will fail to make full and timely repayment of its financial obligations
- **Exposure At Default (EAD)**
  - The expected value of the loan at the time of default
- **Loss Given Default (LGD)**
  - The amount of the loss if there is a default, expressed as a percentage of the EAD
- **Recovery Rate (RR)**
  - The proportion of the EAD the bank recovers





## Estimating Credit Losses — Expected Loss

- Banks are expected to hold reserves against expected credit losses which are considered a cost of doing business
- The most basic model of expected loss considers two outcomes: default and non-default.
  - In the event of non-default, the credit loss is 0.
  - In the event of default, the loss is loss given default (LGD) times the current exposure (EAD)

<u>Event</u>	<u>Loss</u>	<u>Probability</u>
No default	0	1 - PD
Default	LGD x EAD	PD

$$\text{Expected Loss} = (1 - \text{PD}) \times 0 + \text{PD} \times \text{LGD} \times \text{EAD} = \text{PD} \times \text{LGD} \times \text{EAD}$$

## Estimating Credit Losses — Unexpected Loss

- Statistical approaches are used to estimate the distribution of possible loss values
  - For individual products in default, loss amounts are not deterministic due to uncertainty about LGD and collateral value
  - For a portfolio of credit products with defaults, loss amounts are also uncertain due to correlation of defaults between products
  - Credit loss distributions tend to be largely skewed as the likelihood of significant losses is lower than the likelihood of average losses or no losses
- Active loan portfolio management embracing diversification of exposures across industries and geographic areas can reduce the variability of losses around the mean
- Unexpected loss represents the minimum loss level for a given confidence level  $\alpha$  →  $UL(\alpha)$  is the maximum loss a bank will suffer  $\alpha\%$  of the time.