

CTC Risk Innovation Case Study

Background

You are an analytics professional tasked with evaluating the risk profile of a synthetic loan portfolio. The dataset contains 1,200 loans spanning multiple industries, geographies, ratings, maturities, and utilization rates. Embedded within are real-world risk patterns and concentrations. You will also receive some additional information relevant to risk assessment and modeling.

Assignment Overview

1. Data Exploration

- Conduct a deep dive into the loan portfolio to understand its structure, major characteristics, and areas of potential risk.
- Create two graphs that illustrate significant and relevant risk insights from the dataset, focusing on what would be most useful for risk managers.
- Identify and clearly describe two additional risk concerns or patterns from your analysis that could impact the portfolio, without the need for visualizations.

2. Portfolio Risk Estimation

- Using the dataset and the supplementary information provided, estimate the potential credit losses or provisions for the loan portfolio.
- Develop your own approach, clearly stating any assumptions you make.
- Summarize your reasoning and methodology as part of your summary

3. [Bonus!] Portfolio Risk Quantification

- Go a step further and quantify the overall portfolio risk using any method you believe is most appropriate. Justify your approach and discuss its strengths and limitations.

Submission Guidelines

Prepare a concise, two-page Word document report summarizing your approach and findings for this case study.

- **Page 1:** Present your key findings and insights using visuals (charts, tables, diagrams, etc.) to clearly communicate your analysis.
- **Page 2:** Provide a written explanation of your analytical approach, including your methodology for estimating credit losses, any additional insights you uncovered, and the rationale behind your choices.

Evaluation Criteria

Your analysis will help shape risk strategy and provisioning for the portfolio. Use your analytical skills, creativity, and judgment to deliver actionable insights.

We encourage you to leverage LLM applications to strengthen your analysis, especially for the Bonus task. While Python is highly recommended—as it closely reflects the daily workflow of our team—you are welcome to use any programming language or data analysis software you prefer.

You will be evaluated on clarity, depth of analysis, thoughtful communication, and innovative use of available tools.

Dataset Description and Additional Information

Dataset Background

This dataset contains 1,200 loan facilities issued by a financial institution, simulating real-world lending across diverse industries, locations, and credit ratings. Designed for educational analysis, it includes embedded patterns reflecting risk management scenarios and portfolio behaviors. The data is generated in-house, is clean and well-structured, so extensive data cleaning should not be necessary.

Column Descriptions

Client_ID	Unique identifier for each client (e.g., CL00001).
Client_Short_Name	Short, anonymized name for each client (e.g., Client_001).
Loan_Number	Unique identifier for each loan facility (e.g., LN100001).
Total_Loan_Amount	The total committed amount for the loan facility (in USD). Represents the maximum exposure.
Drawn_Amount	The amount currently drawn or utilized by the client (in USD). Indicates actual credit usage.
Client_Location	The primary country where the client is based (e.g., United States, China, India, etc.).
Client_Industry	The industry sector in which the client operates (e.g., Manufacturing, Finance, TMT, etc.).
Client_Internal_Rating	The credit rating assigned internally by the financial institution (e.g., AAA, AA, A-, BB).
Client_External_Rating	The credit rating assigned by external agencies or market consensus (e.g., AAA, BB, CCC).
Time_to_Maturity_Years	The remaining time to maturity for the loan facility, measured in years (e.g., 1.25).

Additional Information

Internal Rating	1-Year PD (%)
AAA	0.02%
AA	0.05%
A	0.10%
A–	0.20%
BBB	0.50%
BB	2.00%
B	6.00%
CCC	20.00%

This table contains a made up mapping of the internal ratings to their observed one-year default probabilities.

Industry	Avg Loss Given Default (%)
Manufacturing	50%
Automobile	55%
TMT	60%
Pharmacy	40%
Finance	45%
Insurance	35%

This table reflects typical post-default loss rates by sector, drawn from long-run corporate-loan recoveries. In your analysis, combine these severity estimates with your default likelihoods and exposure amounts to assess potential credit-impact scenarios.