



# RMIT BUSINESS ANALYTICS CHAMPION

## SEASON 5

# ROUND 3 CASE STUDY



# TABLE OF CONTENTS



-  Business Understanding
-  Data Preparation
-  Company Overview
-  Matrix calculation
-  Modeling & Evaluation
-  Recommendation



# 1. BUSINESS UNDERSTANDING

This section addresses the 5W1H framework (Who, What, When, Where, Why, and How) to provide a clear understanding of the mission and business objectives.

# SHBFINANCE CASE STUDY OVERVIEW

## 01 WHAT

SHBFinance requires an in-depth analysis of payment behaviors and delinquency risks, including key metrics, predictive models, and multidimensional risk assessment to enhance proactive management.

## 02 WHY

The goal is to enhance SHBFinance's risk management framework, followed by providing suitable recommendations to reduce financial risk, improve portfolio stability, and ensure regulatory compliance.

## 03 WHO

The analysis targets SHBFinance's unsecured lending portfolio, particularly focusing on low to middle-income borrowers who are more prone to delinquency risks.

## 04 WHERE

Data for the analysis is provided by SHBFinance, consumer finance institution in Vietnam.

## 05 WHEN

The data spans 2022 to 2024, focusing on loans, demographics, payment behaviors, and delinquency trends.

## 06 HOW

The analysis will be carried out in the following steps:

- Data Preparation:** Clean and organize the data to ensure accuracy and consistency for analysis.
- Company Overview:** Provide a broad view of SHBFinance's loan portfolio, repayment trends and evaluating the market.
- Matrix Calculation:** Compute key matrix (delinquency movement, vintage analysis, and roll rates) for the B0 bucket.
- Modeling & Evaluation:** Develop models to predict the probability of contracts rolling into higher risk buckets and classify them into 9 score bands with performance evaluation
- Customer Segmentation:** Segment customers into groups based on repayment behavior, income, and risk levels to target appropriate campaigns.
- Recommendations:** Provide actionable strategies to mitigate risks and improve portfolio stability.

## 2. DATA PREPARATION

This section covers an overview of data issues, cleaning processes, and transformations to prepare the dataset for analysis effectively.



# DATA PREPARATION

## OVERVIEW

Table Name	Description	Missing Values	General characteristics
Democracy	Demographic data of customers	17.2%	The primary key column has missing data, one column has up to 29% missing, and most data is encoded.
Loan Origin	Loan origination data	15%	Most columns have 15% missing values. One column is incorrect format and one was not encoded
Repayment	Loan Repayment Behavior	3%	Most of the values in the first row of each contract_no are null because it was the first day of data collection

## DATA PREPARATION

### Merge Three Tables

Because 3 tables have same columns CONTRACT\_NO which can consider as be Primary key, we merge 3 tables by CONTRACT\_NO

### Transformation

- Extract month and year from DISBURSEMENT\_DATE, SYS\_RUN\_DATE
- Encode column HAS\_INSURANCE.

### Handling Missing Values

- Using Economic Knowledge and Business Understanding to fill nulls.
- Utilize contextual information to fill.
- Applied forward fill method for columns with no clear clues to maintain data integrity.

### Drop Unnecessary Columns

- Drop Columns which created for preprocessing
- Drop the DISBURSEMENT\_DATE column as it is replaced by the month and year columns.

# ABOUT THE DATASET

The dataset contains over 1,000,000 records with 50 data fields, including:

Primary Key

Contract\_No

Loan Repayment  
Behavior

Due\_Date\_Of\_Mon, Outstanding, Over\_Due\_Days\_Ld, Last\_Payment\_Date,  
Last\_Payment\_Amount, Total\_Overdue\_Period, Max\_Dpd\_History, Month\_On\_Book, etc

Demographic data  
of customers

Labour\_Contract\_Type, Number\_Of\_Dependants, Permanent\_Address\_Province, Industry, Job,  
Company\_Address\_Province, Education, Customer\_Income, Creditibility, Date\_Of\_Birth, Working\_In\_Year,

Loan Origination data

Disbursement\_Channel, Liquidity, Insurance\_Company, Insurance\_Rate, Rate, Has\_Insurance,  
Product\_Category, Loan\_Term, Month\_Interest, Loan\_Purpose, Business\_Line, Loan\_Amount

New Variables

Dpd\_Bucket, Next\_Month\_Dpd , Is\_Roll\_Up, Month, Year, Weekday, Is\_Weekend, Is\_1-3\_Lunar\_day

# SHBFinance

TÀI CHÍNH TIÊU DÙNG



## 3. COMPANY OVERVIEW

This section analyzes SHBFinance's loan portfolio, focusing on customer demographics, risk distribution, and delinquency trends. Key insights identify critical buckets and optimal intervention periods to improve risk management.

# COMPANY OVERVIEW

Sources: Tobi.vn

**SHBFinance**, established in **2016** with charter capital of **VND 1,000 billion**, is **50%** owned by **SHB** and **50%** by Thailand's **Krungsri Bank**. In **8 years**, it has become a **top 8 consumer finance company** in Vietnam, serving over **700,000 households** and receiving nearly **3 million loan applications**. Operating in **54 provinces**, **SHBFinance** offers convenient financial services nationwide.

Currently, SHBFinance's financial products are quite diverse, including: **Online cash loans, credit card loans, savings deposits, motorbike insurance, health insurance**.

For cash loan products, the interest rate is from **2.4%/month** (28.8%/year) with a loan limit of **10 - 70 million**, maximum loan term of **36 months**. Customers can register online on the website or download SHBFinance's app to register for a loan and receive disbursement within the day.

**2016**

**Established year**

**1T**

**Charter Capital**

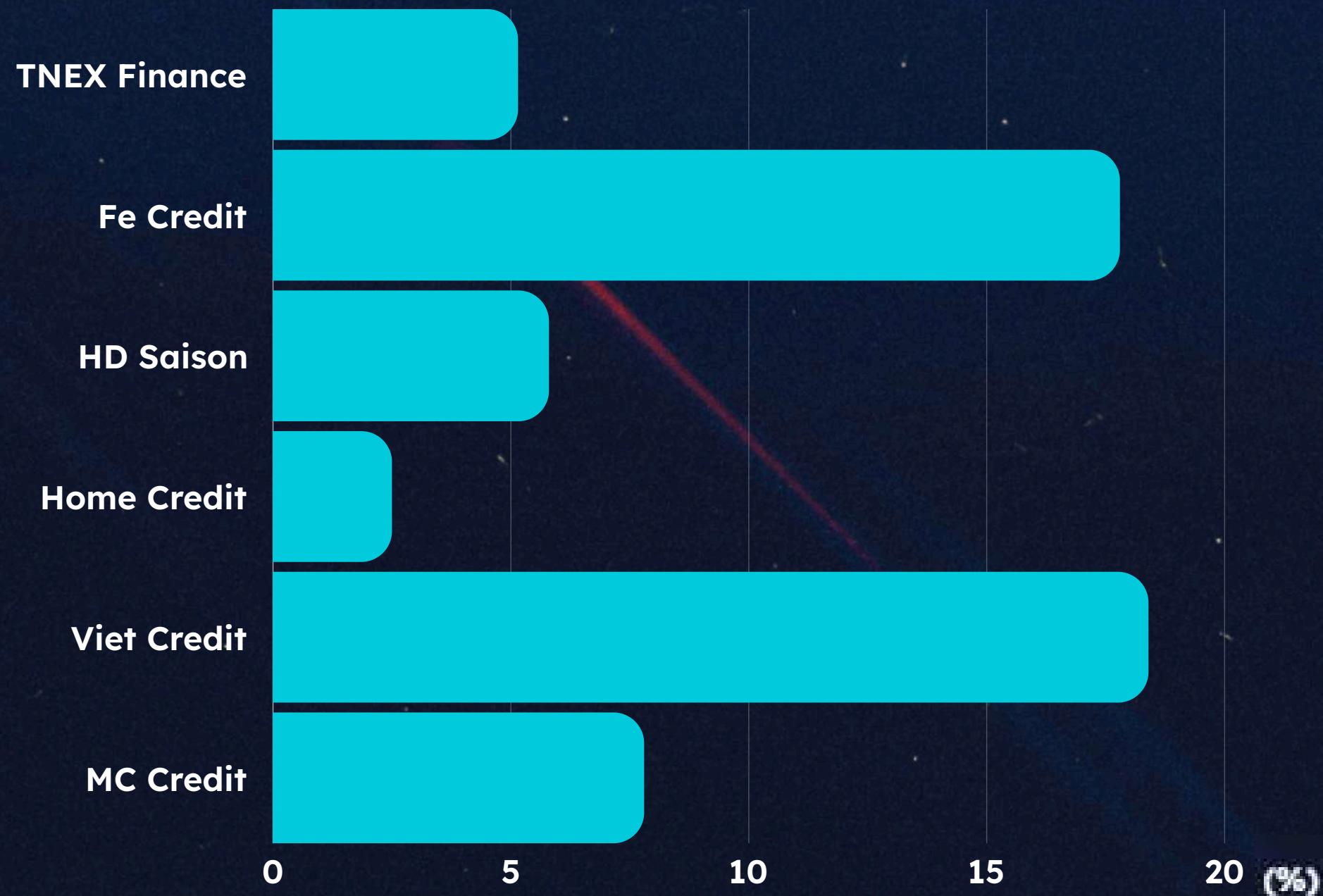
**36**

**Maximum Loan Term (Mo)**

# MARKET EVALUATION

## CHANCE AND RISK

### NON-PERFORMING LOAN RATIO (2023)



### CURRENT STATE

"Non-performing loans (NPLs) of financial companies have now reached 8-10%, with some companies experiencing NPLs as high as 20%. Many companies are facing difficulties, even losses, due to the need for increased provisioning for bad debt risks" said Mr. Nguyễn Quốc Hùng, Secretary General of the Vietnam Banks Association (VNBA).

Sources: Vietnambiz

### FUTURE OUTLOOK AND RISKS

- **Outlook:** NPL ratios may stabilize if economic recovery strengthens, supported by regulatory measures and improved risk management.
- **Risks:** Persistent inflation, economic downturns, or high interest rates could lead to further deterioration. Rising provisioning costs might pressure profitability, and regulatory tightening could impact lending operations.

# OVERVIEW OF THE DATASET

## IMPRESSIVE NUMBERS

**100 K**

Over 1 hundred  
thousands contracts

**7.4 B**

Total loan amount  
reached over 7.4  
billion VND

**45.4%**

More than 45% of  
contracts have been  
penalized

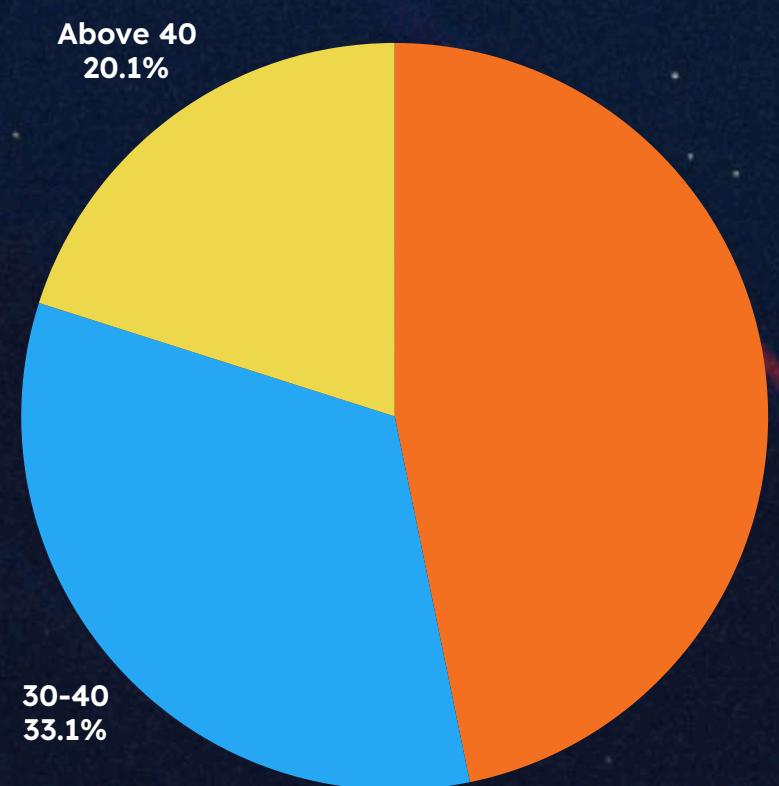
**145 M**

Over 145 million in  
penalties due to the  
amount of penalty

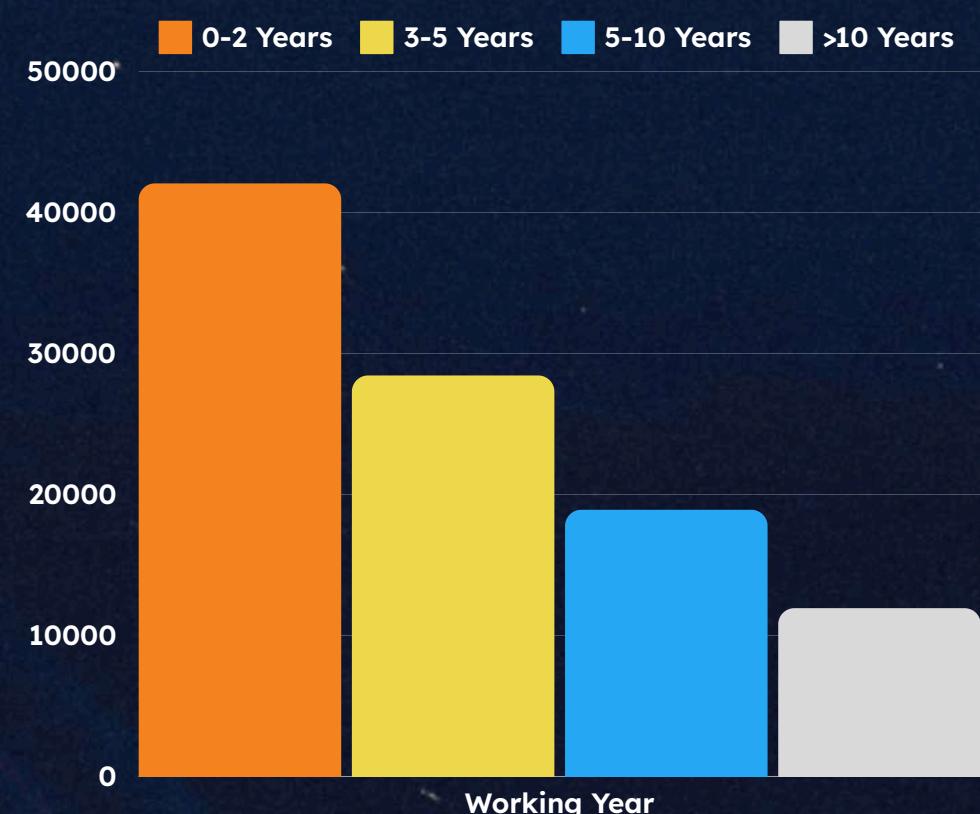
# CUSTOMER CHARACTERISTIC

YOUNG AND AMBITIOUS

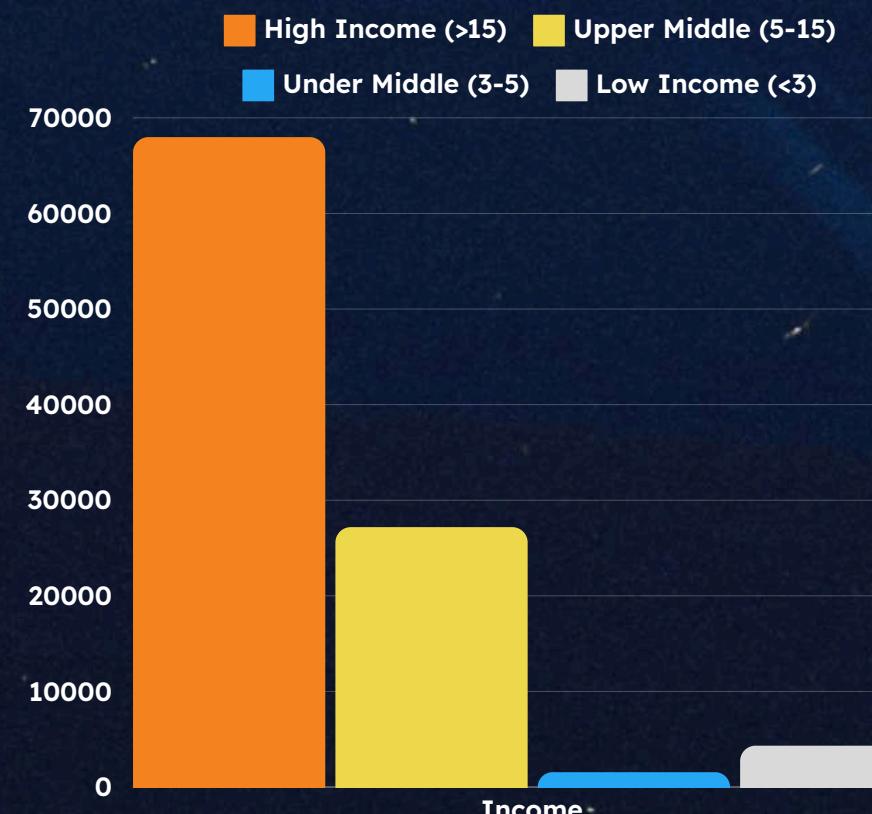
## AGE



## WORKING YEARS



## INCOME



The company's primary customer base is **younger, early-career professionals**. The company appeals most to financially capable individuals, with a strong presence in the **high and upper-middle income segments**, reflecting a focus on **premium and value-driven service**.

# LOAN CHARACTERISTIC

## SHORT-TO-MEDIUMS

### LOAN TERM



### LOAN PURPOSE



Most loans are for 12-24 months, followed by the longest term 24-36 months, primarily used for shopping. The maximum term offered by the company is 36 months, reflecting a focus on short-to-medium-term options.

# MONTHLY INTEREST

## COMPETITIVE INTEREST RATES

2.02%

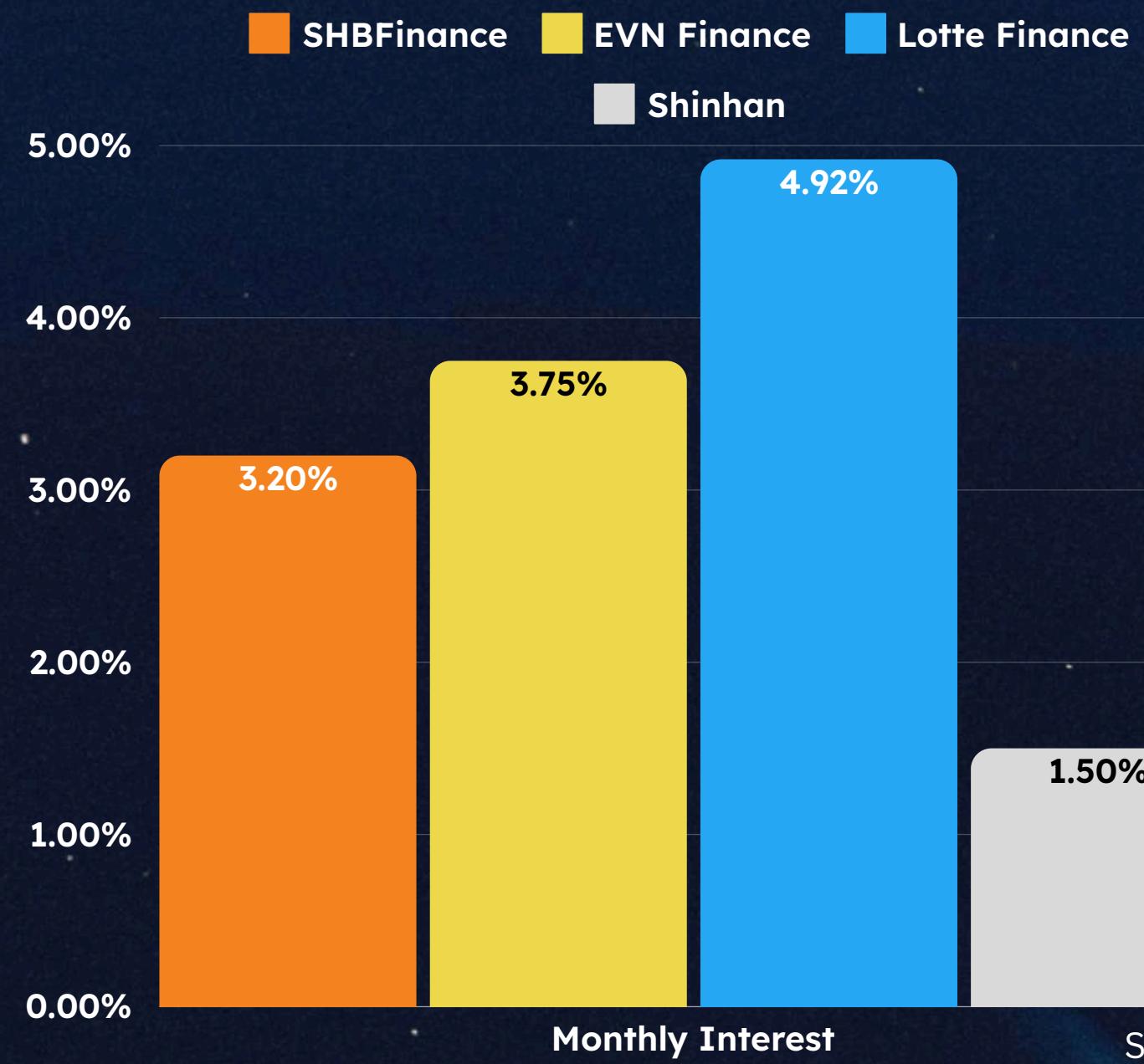
Average Monthly Interest

3.20%

Maximum Monthly Interest

- SHBFinance's interest rate is **competitive**, positioned between monthly rate of other company, appealing to a broad customer base.
- Its balance of affordability and competitiveness suggests a strategy focused on **accessibility** and **market share growth**.

## UNSECURED LOAN INTEREST RATE



Sources: Topi.com

# REPAYMENT

## DELIQUENCY CONCERN

**51.3%**

Ratio of BO in  
Month on book 12

**29.7%**

180 days overdue  
rate in Month on  
book 12

Over half of the customers (51.3%) repaid their debts on time by the 12th month post-disbursement. However, 29.7% of contracts exceeded 180 days overdue, highlighting a growing concern with overdue debt that requires careful attention.

## RECOMMENDATION

This underscores the importance of identifying the **threshold** for transitioning into **bad debt** based on **overdue days** to pinpoint key risk targets. Additionally, determining the **optimal time since disbursement** is crucial for allocating resources efficiently in **risk management**.



## 4. MATRIX CALCULATION

This section analyzes key metrics, including roll rates, vintage analysis, flow rates, and monthly roll rates, to track delinquency transitions and identify bad debt thresholds. These insights support targeted actions to optimize risk management and reduce bad debt.

## 4. MATRIX CALCULATION

### DELIQUENCY BUCKET

B0	DPD = 0
B1	$1 \leq DPD \leq 9$
B2	$10 \leq DPD \leq 30$
B3	$31 \leq DPD \leq 60$
B4	$61 \leq DPD \leq 90$
B5	$91 \leq DPD \leq 120$
B6	$121 \leq DPD \leq 150$
B7	$151 \leq DPD \leq 180$

B8	$181 \leq DPD \leq 210$
B9	$211 \leq DPD \leq 240$
B10	$241 \leq DPD \leq 270$
B11	$271 \leq DPD \leq 300$
B12	$301 \leq DPD \leq 330$
B13	$331 \leq DPD \leq 360$
B14	$DPD \geq 361$

## 4.1. DELIQUENCY MOVING MATRIX ROLL RATE MATRIX



# ROLL RATE METRIC

AFTER 12 MONTHS

	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	71.91%	0.46%	5.52%	4.54%	4.45%	4.42%	4.29%	4.10%	0.31%	0.00%	0.00%	0.00%		28%
B1	7.62%	4.35%	6.53%	4.35%	6.17%	8.10%	9.07%	11.85%	41.96%	0.00%	0.00%	0.00%	8%	88%
B2	3.40%	0.33%	5.58%	3.84%	4.70%	5.09%	7.93%	10.75%	54.58%	3.79%	0.00%	0.00%	4%	91%
B3	0.91%	0.05%	0.86%	1.06%	1.76%	2.10%	3.40%	3.66%	6.51%	73.55%	6.14%	0.00%	2%	97%
B4	0.30%	0.00%	0.08%	0.18%	0.64%	0.85%	1.33%	1.05%	2.43%	3.93%	83.38%	5.83%	0%	99%
B5	0.13%	0.00%	0.02%	0.07%	0.04%	0.24%	0.66%	0.33%	0.33%	1.01%	2.52%	94.64%	0%	99%
B6	0.02%	0.00%	0.02%	0.00%	0.02%	0.05%	0.14%	0.05%	0.09%	0.05%	0.21%	99.35%	0%	100%
B7	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	99.92%	0%	100%
B8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0%	100%

AFTER 6  
MONTHS

## OVERVIEW

This roll rate matrix illustrates the **movement of buckets** for each contract over the period from Month 6 to Month 12.

Reason for Selecting Two Time Points (6-12):

- Data Suitability:** All contracts span **13 months** (from month 0 to 12). Six months provide sufficient time to observe the initial signs of loan performance.
- Balanced Perspective:** It strikes a balance between **short-term monitoring** and **long-term trends**.

# ROLL RATE MATRIX INSIGHTS

## CHARACTERISTICS

### 1. Stability in the First Buckets (B0)

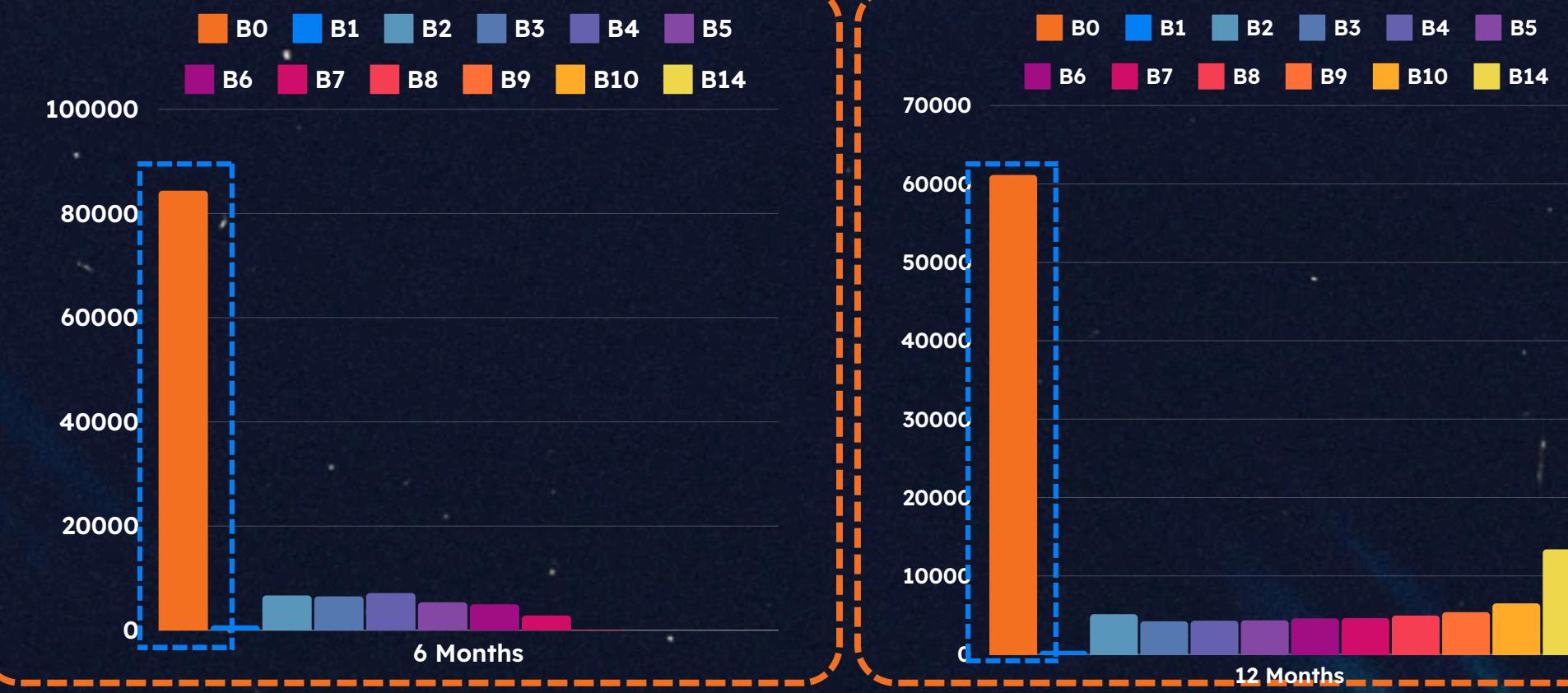
- The B0 bucket (non-expired contracts) represents the largest proportion during the first 6 and 12 months and is also the most stable bucket.
- Approximately 72% of contracts in B0 remain in the same bucket after six months, from Month 6 to Month 12.

### 2. Contracts transferred to slightly overdue buckets (B1, B2)

- With the ability to Roll Back in 3% and 7%, B1 and B2 represent critical points for intervention. While recovery is still feasible, the likelihood of default escalates rapidly beyond this stage.
- Proactive measures are essential to prevent progression, as most accounts moving beyond B2 are on a trajectory toward severe delinquency or default.

	AFTER 12 MONTHS													
	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	71.91%	0.46%	5.52%	4.54%	4.45%	4.42%	4.29%	4.10%	0.31%	0.00%	0.00%	0.00%	28%	
B1	7.62%	4.35%	6.53%	4.35%	6.17%	8.10%	9.07%	11.85%	41.96%	0.00%	0.00%	0.00%	8%	88%
B2	3.40%	0.33%	5.58%	3.84%	4.70%	5.09%	7.93%	10.75%	54.58%	3.79%	0.00%	0.00%	4%	91%
B3	0.91%	0.05%	0.86%	1.06%	1.76%	2.10%	3.40%	3.66%	6.51%	73.55%	6.14%	0.00%	2%	97%
B4	0.30%	0.00%	0.08%	0.18%	0.64%	0.85%	1.33%	1.05%	2.43%	3.93%	83.38%	5.83%	0%	99%
B5	0.13%	0.00%	0.02%	0.07%	0.04%	0.24%	0.66%	0.33%	0.33%	1.01%	2.52%	94.64%	0%	99%
B6	0.02%	0.00%	0.02%	0.00%	0.02%	0.05%	0.14%	0.05%	0.09%	0.05%	0.21%	99.35%	0%	100%
B7	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	99.92%	0%	100%
B8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0%	100%

AFTER 6 MONTHS



# ROLL RATE MATRIX INSIGHTS

## CHARACTERISTICS

### 3. Buckets with High Overdue Debts (B3, B4)

- Once accounts transition to the B3, B4 bucket, around 1% remain stable, while 97%-99% progress to worse buckets (>B5) within six months.
- Rollback is minimal at 2%, indicating these contracts are almost beyond recovery.

### 4. Buckets fall into serious and irrecoverable debt

- Contracts in bucket B5 are classified as bad debts, with 94-100% progressing to B14 (>361 days overdue) within 6 months.
- Recovery or rollback is no longer possible, eliminating any chance of returning to non-overdue or slightly overdue statuses.



B5	0.13%	0.00%	0.02%	0.07%	0.04%	0.24%	0.66%	0.33%	0.33%	1.01%	2.52%	94.64%
B6	0.02%	0.00%	0.02%	0.00%	0.02%	0.05%	0.14%	0.05%	0.09%	0.05%	0.21%	99.35%
B7	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	0.00%	99.92%
B8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%

AFTER 12 MONTHS														
	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	71.91%	0.46%	5.52%	4.54%	4.45%	4.42%	4.29%	4.10%	0.31%	0.00%	0.00%	0.00%	28%	
B1	7.62%	4.35%	6.53%	4.35%	6.17%	8.10%	9.07%	11.85%	41.96%	0.00%	0.00%	0.00%	8%	88%
B2	3.40%	0.33%	5.58%	3.84%	4.70%	5.09%	7.93%	10.75%	54.58%	3.79%	0.00%	0.00%	4%	91%
B3	0.91%	0.05%	0.86%	1.06%	1.76%	2.10%	3.40%	3.66%	6.51%	73.55%	6.14%	0.00%	2%	97%
B4	0.30%	0.00%	0.08%	0.18%	0.64%	0.85%	1.33%	1.05%	2.43%	3.93%	83.38%	5.83%	0%	99%
B5	0.13%	0.00%	0.02%	0.07%	0.04%	0.24%	0.66%	0.33%	0.33%	1.01%	2.52%	94.64%	0%	99%
B6	0.02%	0.00%	0.02%	0.00%	0.02%	0.05%	0.14%	0.05%	0.09%	0.05%	0.21%	99.35%	0%	100%
B7	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	99.92%	0%	100%
B8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0%	100%

## 'BAD' DEFINITION

Use 90 DPD (B5) as the threshold for identifying "bad" customers. This level balances early detection with accuracy, as significant roll-forward rates begin at this point, and rollback rates are low, indicating limited recovery potential. It provides an effective trade-off between catching high-risk customers early and avoiding excessive flagging.



## 4.1. DELIQUENCY MOVING MATRIX TRANSACTION MATRIX

# TRANSACTION METRIC

	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	94%	1%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%		6%
B1	7%	24%	12%	57%	0%	0%	0%	0%	0%	0%	0%	0%	7%	70%
B2	4%	1%	22%	71%	1%	0%	0%	0%	0%	0%	0%	0%	6%	72%
B3	1%	0%	2%	8%	88%	1%	0%	0%	0%	0%	0%	0%	3%	89%
B4	0%	0%	0%	1%	8%	89%	2%	0%	0%	0%	0%	0%	1%	91%
B5	0%	0%	0%	0%	0%	5%	92%	2%	0%	0%	0%	0%	1%	94%
B6	0%	0%	0%	0%	0%	0%	4%	95%	1%	0%	0%	0%	0%	96%
B7	0%	0%	0%	0%	0%	0%	0%	1%	98%	1%	0%	0%	0%	99%
B8	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%	0%	0%	100%
B9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%	0%	100%
B10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	100%
B14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	

This matrix highlights customer movement across DPD buckets within a 1-month period, reflecting the rate of transition between buckets in the dataset.

The structure of matrix is:

- Rows represent the initial month. Columns represent the next month from the dataset and the values in the cells represent the proportion of outstanding transitioning between stages.

## OVERVIEW

# TRANSACTION METRIC

	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	94%	1%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%		6%
B1	7%	24%	12%	57%	0%	0%	0%	0%	0%	0%	0%	0%	7%	70%
B2	4%	1%	22%	71%	1%	0%	0%	0%	0%	0%	0%	0%	6%	72%
B3	1%	0%	2%	8%	88%	1%	0%	0%	0%	0%	0%	0%	3%	89%
B4	0%	0%	0%	1%	8%	89%	2%	0%	0%	0%	0%	0%	1%	91%
B5	0%	0%	0%	0%	0%	5%	92%	2%	0%	0%	0%	0%	1%	94%
B6	0%	0%	0%	0%	0%	0%	4%	95%	1%	0%	0%	0%	0%	96%
B7	0%	0%	0%	0%	0%	0%	0%	1%	98%	1%	0%	0%	0%	99%
B8	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%	0%	0%	0%	100%
B9	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%	0%	0%	100%
B10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%
B14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	

## 'BAD' DEFINITION

Set the threshold for identifying **bad customers** at **90 days (B5)**. At this stage, recovery likelihood is extremely low (1%), and 94% of customers transition to more severe buckets, causing substantial losses. This threshold ensures **timely risk identification** while minimizing the misclassification of recoverable customers.

## CHARACTERISTIC

### Customer Classification by Risk Level:

- Low-risk customers:** B0 (On-time): 94% stay on-time, 6% move to debt buckets.
- Medium-risk customers:** Intervention is critical at the B1-B2 stages, where progression risks are high, but recovery potential still exists.
- High-risk customers:** The roll forward ratio spikes to 90% in phase B3-B4, indicating this as the critical stage where bad debt emerges.
- Serious bad debt customers:** From B5 onward, recovery becomes nearly impossible, making this a crucial threshold for identifying bad debt.

# DELIQUENCY MOVING MATRIX

**ROLL RATE METRIC**

	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	71.91%	0.46%	5.52%	4.54%	4.45%	4.42%	4.29%	4.10%	0.31%	0.00%	0.00%	0.00%		28%
B1	7.62%	4.35%	6.53%	4.35%	6.17%	8.10%	9.07%	11.85%	41.96%	0.00%	0.00%	0.00%	8%	88%
B2	3.40%	0.33%	5.58%	3.84%	4.70%	5.09%	7.93%	10.75%	54.58%	3.79%	0.00%	0.00%	4%	91%
B3	0.91%	0.05%	0.86%	1.06%	1.76%	2.10%	3.40%	3.66%	6.51%	73.55%	6.14%	0.00%	2%	97%
B4	0.30%	0.00%	0.08%	0.18%	0.64%	0.85%	1.33%	1.05%	2.43%	3.93%	83.38%	5.83%	0%	99%
B5	0.13%	0.00%	0.02%	0.07%	0.04%	0.24%	0.66%	0.33%	0.33%	1.01%	2.52%	94.64%	0%	99%
B6	0.02%	0.00%	0.02%	0.00%	0.02%	0.05%	0.14%	0.05%	0.09%	0.05%	0.21%	99.35%	0%	100%
B7	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.00%	0.00%	99.92%	0%	100%
B8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0%	100%

**TRANSACTION METRIC**

	B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B14	Roll Back	Roll Forward
B0	94%	1%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%		6%
B1	7%	24%	12%	57%	0%	0%	0%	0%	0%	0%	0%	0%	7%	70%
B2	4%	1%	22%	71%	1%	0%	0%	0%	0%	0%	0%	0%	6%	72%
B3	1%	0%	2%	8%	88%	1%	0%	0%	0%	0%	0%	0%	3%	89%
B4	0%	0%	0%	1%	8%	89%	2%	0%	0%	0%	0%	0%	1%	91%
B5	0%	0%	0%	0%	0%	5%	92%	2%	0%	0%	0%	0%	1%	94%
B6	0%	0%	0%	0%	0%	0%	4%	95%	1%	0%	0%	0%	0%	96%
B7	0%	0%	0%	0%	0%	0%	0%	1%	98%	1%	0%	0%	0%	99%
B8	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%	0%	0%	100%
B9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	98%	2%	0%	100%
B10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	100%
B14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	

## CONCLUSION

From both matrices, we can conclude that **90 days DPD (B5)** is the most reasonable threshold for identifying bad debt. It also effectively flags risky customers early while minimizing unnecessary classifications.

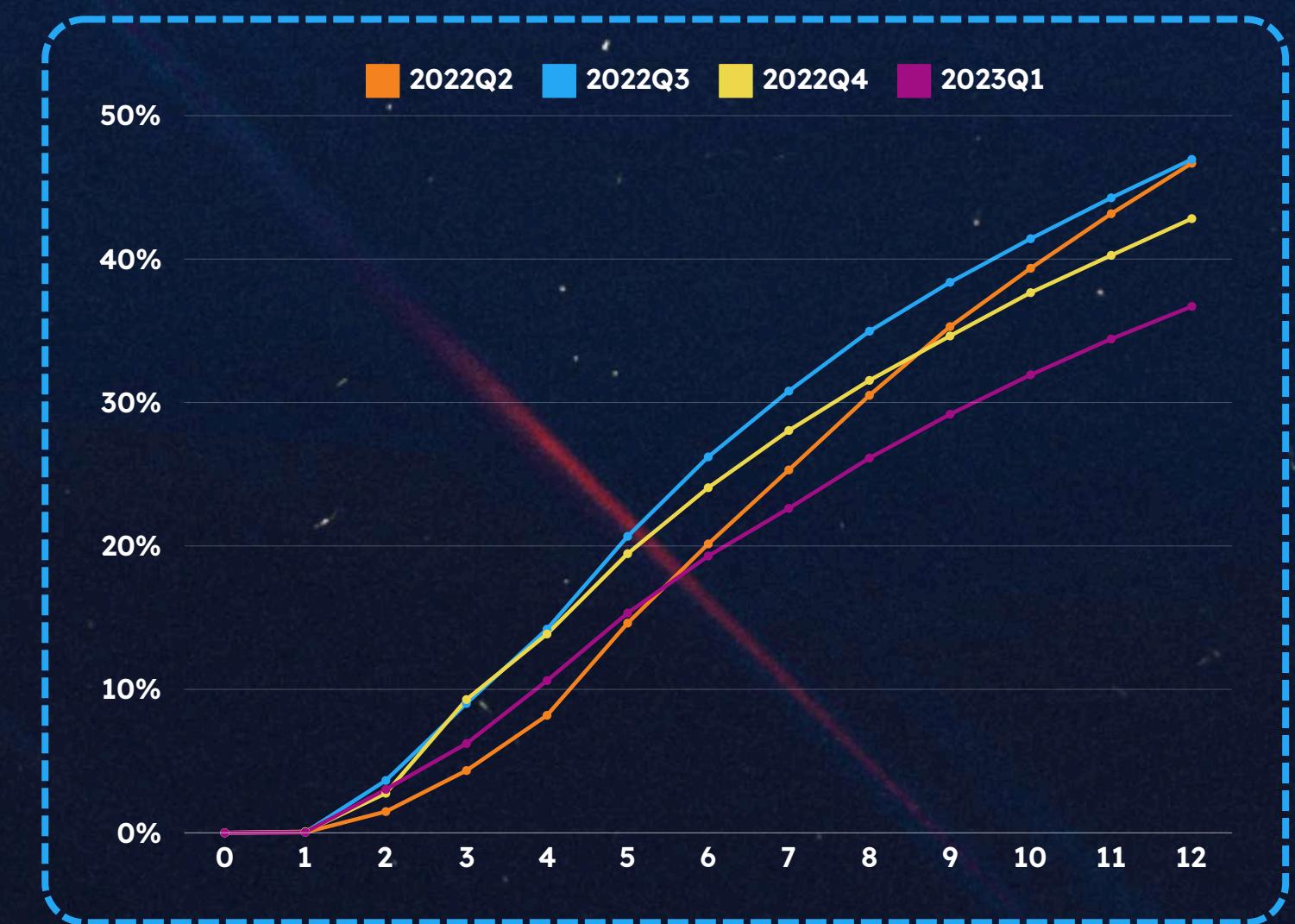
## 4.2. VINTAGE MATRIX

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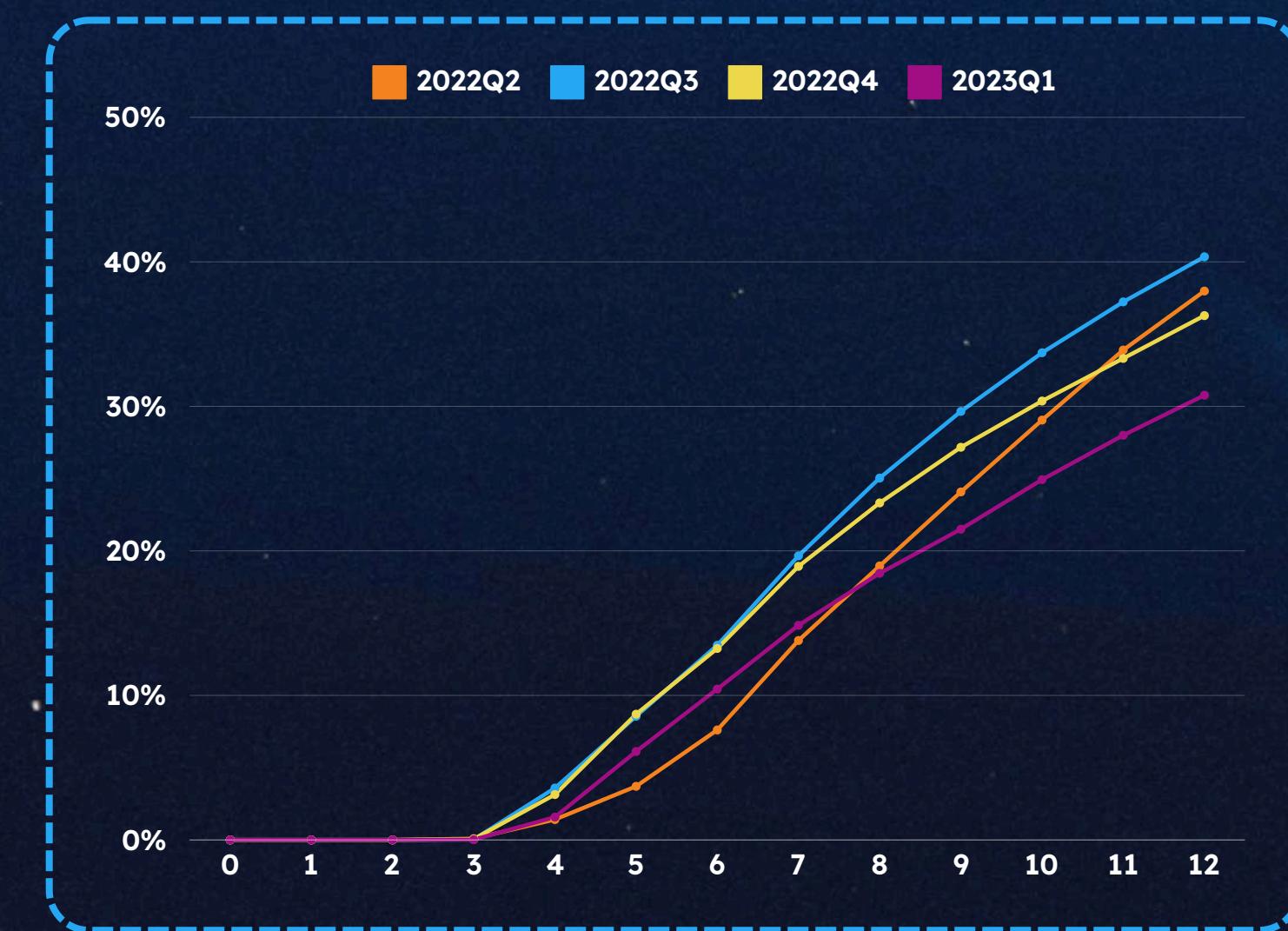


# VINTAGE MATRIX

## 30 DPD



## 90 DPD

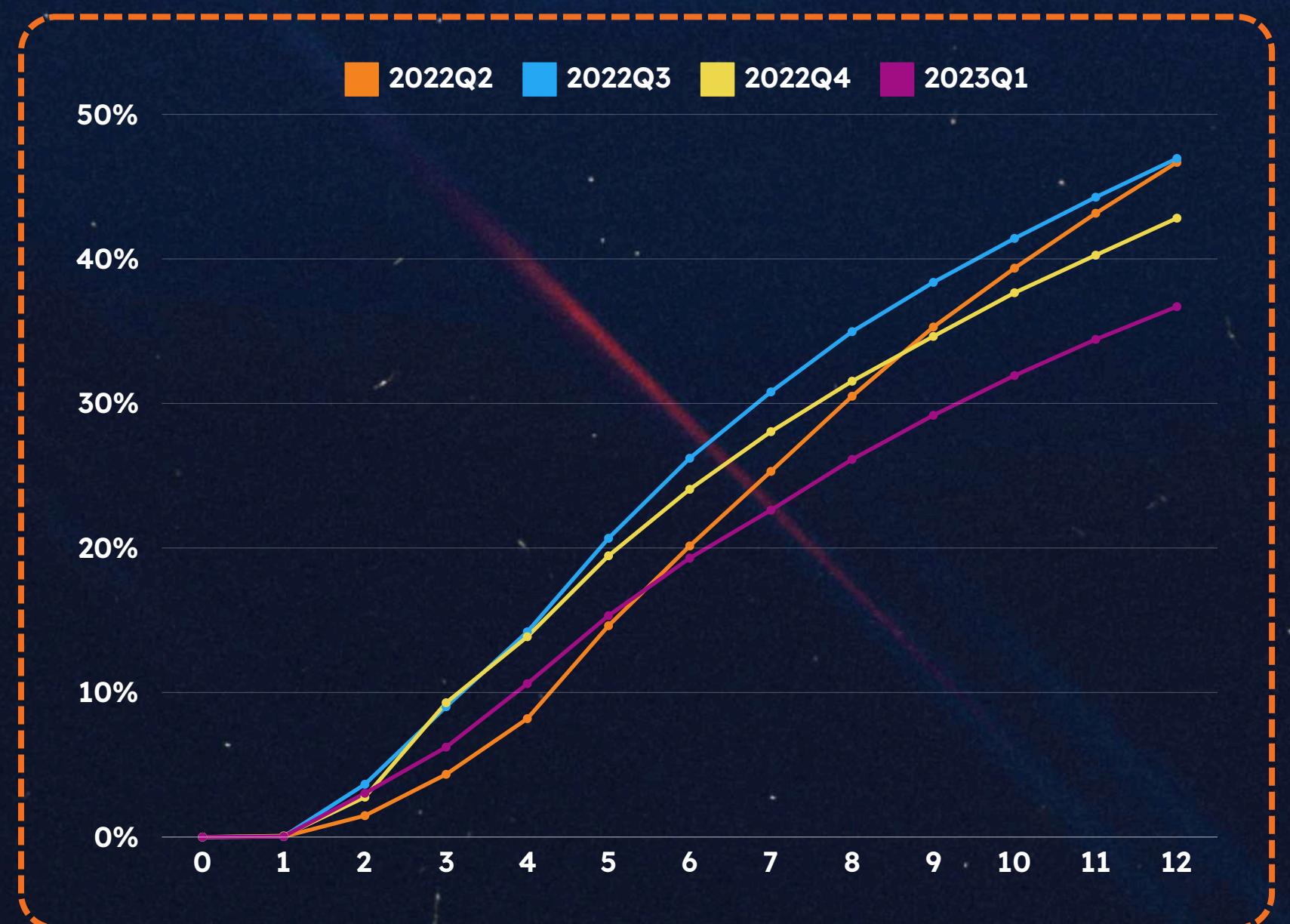


## OVERVIEW

The vintage analysis matrix tracks the **cumulative delinquency rates** of accounts opened in **different quarters** (e.g., 2022Q2, 2022Q3, etc.) over a **12-month** period. Each row corresponds to a **cohort** (accounts opened in a specific quarter), and each column represents the **cumulative delinquency rate (30 - 90 DPD)** at the end of a given month.

# VINTAGE MATRIX

## 30 DPD



### TREND

Delinquency rates start **low** in the **first few months** and increase progressively as **accounts age**. Rates tend to stabilize after **6-9 months** for most cohorts.

### INSIGHT

- Cohorts from 2022Q2 and 2022Q3 show **higher** delinquency rates at all time points, ending around **46.65%-46.87%** by Month 12.
- Newer cohorts**, such as 2023Q1, show **lower cumulative delinquency** (**36.93%** at Month 12), indicating better portfolio performance.

# VINTAGE MATRIX

## TREND

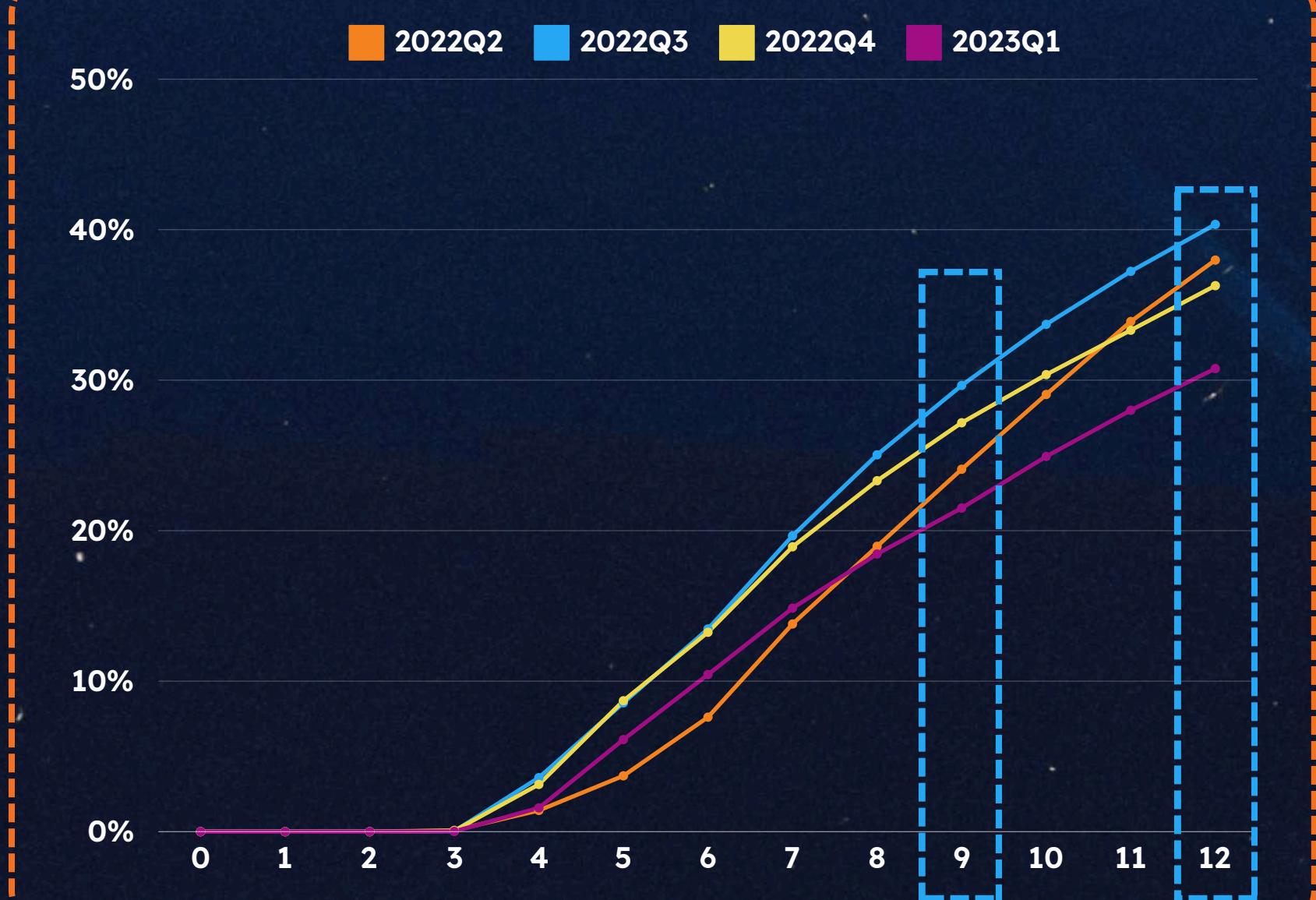
There are visible differences in delinquency behavior between the cohorts, with 2022Q3 showing the highest delinquency at Month 12 (40.21%) and 2023Q1 the lowest (30.93%).

The rates tend to stabilize after the 9th month.

## INSIGHT

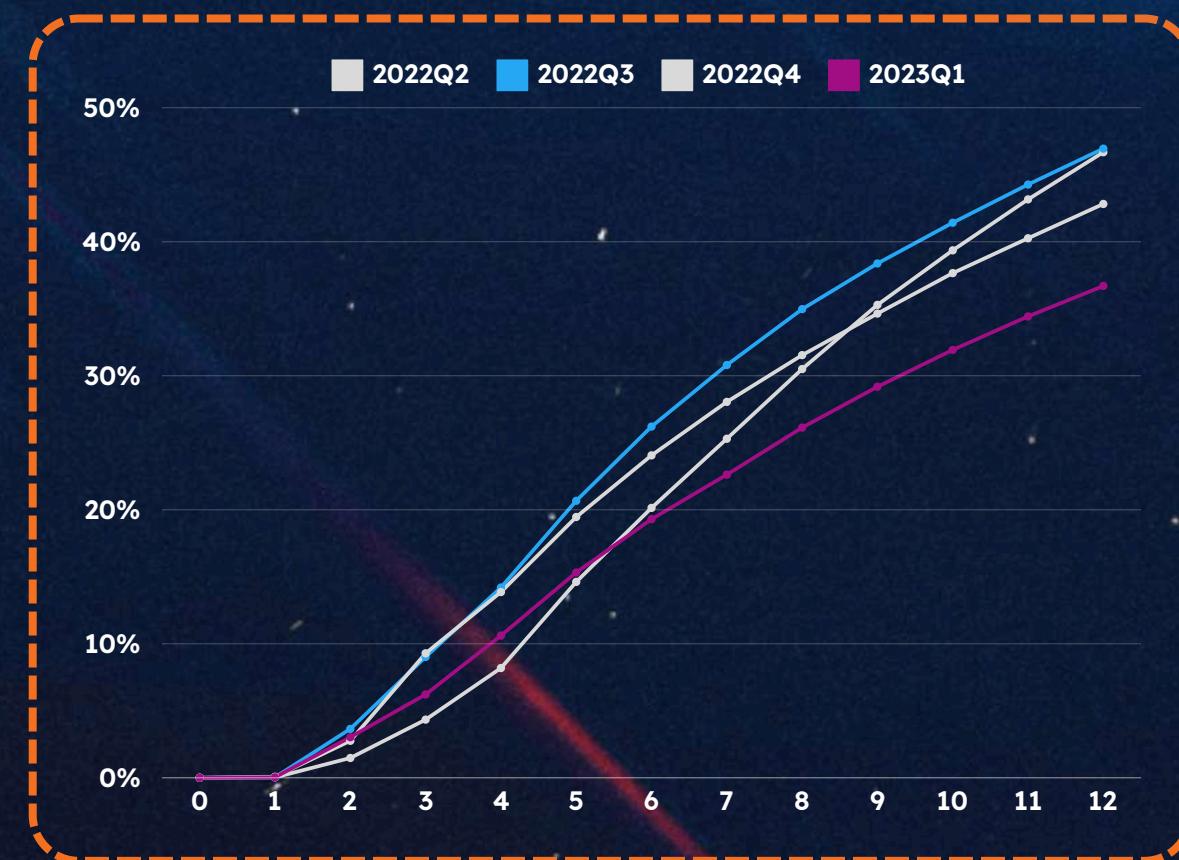
- The curves for 2022Q2, 2022Q3, and 2022Q4 are closely aligned, suggesting similar patterns in this metric for those quarters.
- The curve for 2023Q1 is notably lower than the others, indicating slower progression or a reduced rate compared to previous quarters.

## 90 DPD



# VINTAGE MATRIX

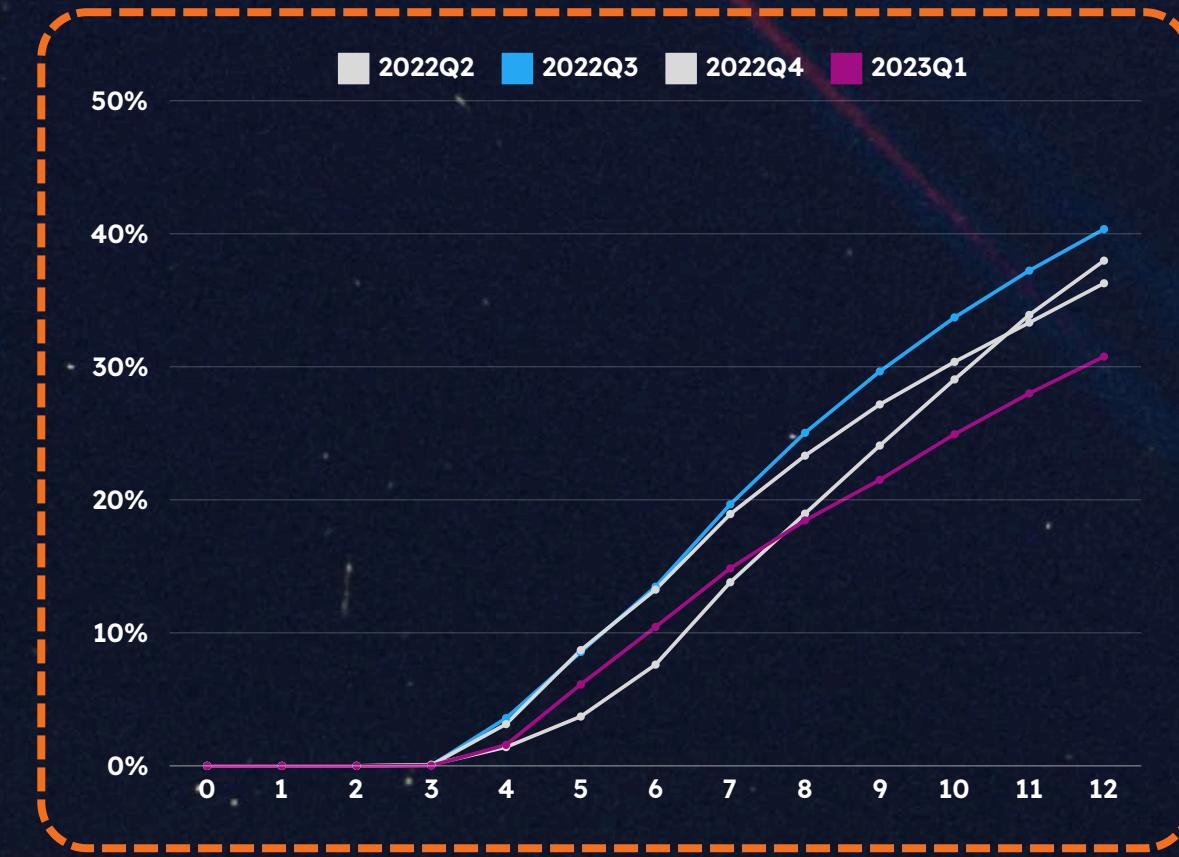
30 DPD



## COMPARING COHORTS

- From the two tables, it is evident that 2022Q3 represents the **riskiest cohort** likely due to weaker underwriting standards or adverse economic conditions during that period.
- While the newest cohort, 2023Q1, demonstrates the **best performance**. Improvements in **credit policies** or favorable **conditions** have reduced risks for accounts opened in 2023Q1.

90 DPD



## DELINQUENCY TIMING

- 30DPD Timing: Delinquency rates **rise rapidly** in the first 6 months, especially for 2022Q3 and 2022Q2, and **stabilize** by Month 9.
- 90DPD Timing: Growth starts around **Month 5-6**, the total rise reaches around **50%** by **Month 12**, indicating a consistent **upward trend**.
- The fastest rise occurs from **Months 5 to 8**, marking it as the key **delinquency period**. Early analysis in **Month 3** is ideal to identify high-risk contracts and **implement timely interventions** to prevent escalation.

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## 4.3. FLOW RATE MATRIX

# FLOW RATE MATRIX

6-12 MONTHS PERIOD

	Cure	Stay	Roll
B0		72,00%	28,00%
B1	7,48%	4,00%	88,51%
B2	3,78%	5,64%	90,58%
B3	1,92%	1,03%	97,05%
B4	0,60%	0,66%	98,74%
B5	0,26%	0,24%	99,50%
B6	0,10%	0,12%	99,78%
B7	0,04%	0,00%	99,96%
B8	0,00%	0,00%	100,00%

OVERVIEW

## Group B0:

- 72% of customers in this group maintain their current status (Stay), while 28% worsen (Roll).
- There is no Cure percentage because this is already the best group.
- Efforts should focus on minimizing the Roll percentage to retain customers in this good credit group.

## Trends from B1 to B8:

- Cure sharply declines as risk increases:
  - From 7.48% in B1 to 0% in B8, customers in higher-risk groups have virtually no chance of improving their credit status.
- Stay decreases significantly in higher-risk groups:
  - From 4% in B1 to 0% in B8, indicating escalating risks for delinquent customers.
- Roll increases drastically with higher-risk groups:
  - From 88.51% in B1 to 100% in B8, meaning customers in high-risk groups almost inevitably move to worse statuses.

# 4.4. MONTHLY ROLLRATE MATRIX

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# MONTHLY ROLLRATE FOR THE B0 BUCKET

## ANALYSIS

### Overview:

- The monthly roll rate for the B0 bucket ranges from 3-9%, with an average of approximately 4-6%.

### Trend Observations:

- Fluctuations:** Roll rates vary significantly over time, with a peak of 9% (2023-01) and a steady decline to 3-4% (mid-2022 and late 2023).
- Seasonality:** Spikes align with economic conditions or financial pressure periods (e.g., **post-holiday** in January; **tax season** in March, April)



## RISK AND PERFORMANCE DYNAMICS

- High-Risk Months:** Higher roll rates (Q1, >7%) suggest more accounts moving from B0 to delinquency => requiring stronger intervention strategies: Prioritize monitoring and customer engagement
- Low Roll Rates:** Months with lower roll rates (3-4%) reflect better customer repayment or successful collection efforts/tactics

# MONTHLY ROLLRATE FOR THE BO BUCKET

## KEY OBSERVATIONS

### Dominance of B2 Transitions:

- The highest roll rate consistently transitions to B2, peaking at ~6% in high-risk months such as [January and April 2023](#).
- => require [targeted strategies](#) for this area

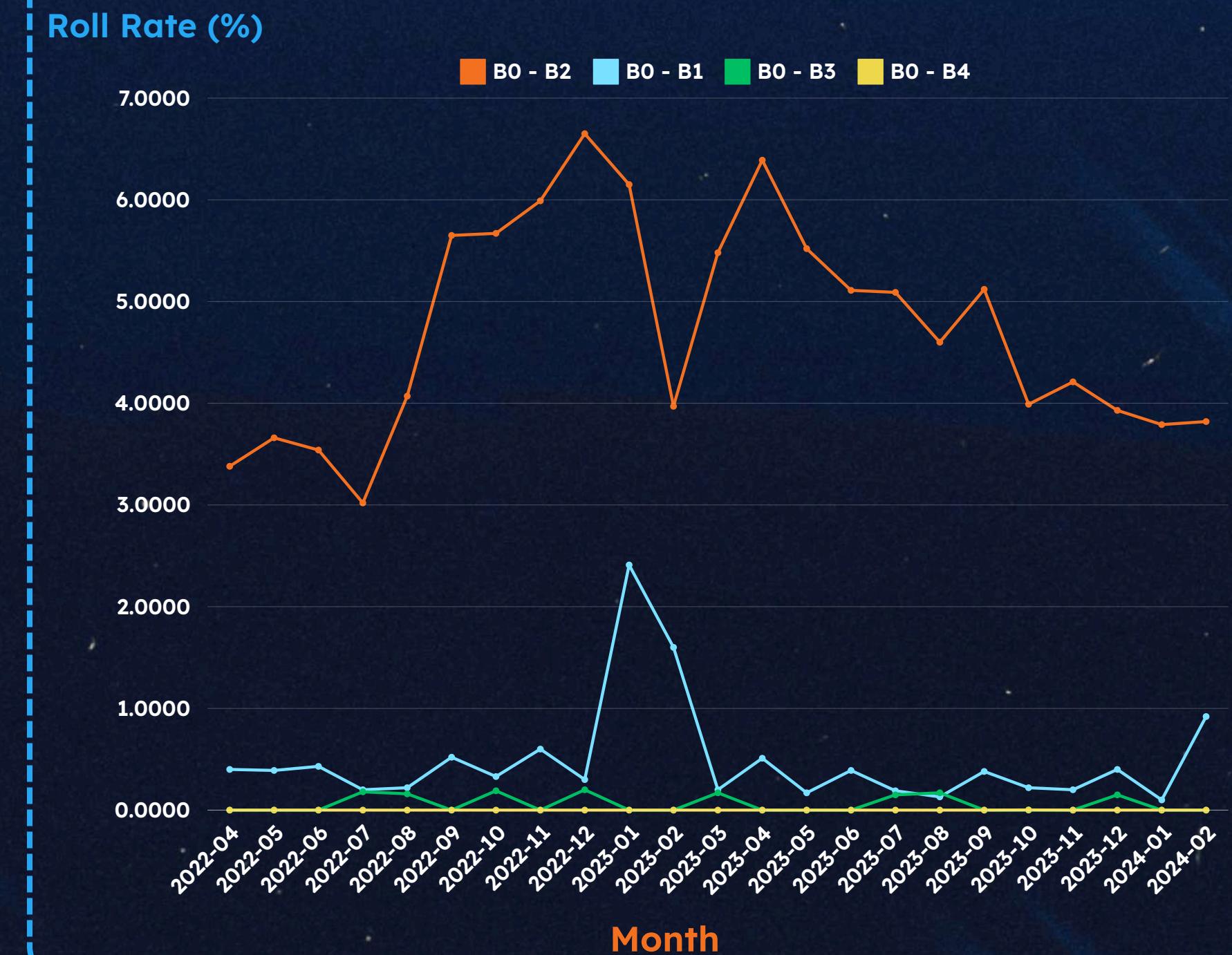
### Moderate B1 Transitions:

- Roll rates to [B1](#) are stable over time, ranging between 0.5-1%, indicating effective handling of minor delinquencies.

### Negligible Transitions to Severe Buckets:

- Transitions to [B3](#) and [B4](#) are consistently below 0.5%, with no observed transitions to [B5-B14](#).
  - indicate [strong performance](#) in managing early delinquencies.
  - Long-Term Monitoring:** While no immediate risk is observed for higher buckets ([B5-B14](#)), ongoing monitoring is necessary to prevent escalation over time.

## DETAILED TRANSITIONS



# MATRIC CALCULATION

**B5**

‘Bad’  
Definition

**3**

‘Focus’  
Month

**B0-B2**

Highest  
transition

## RECOMMENDATION

- On **B1** and **B2**: Implement **proactive intervention** strategies, as **recovery** is still possible at this stage. Prioritize **monitoring and offering repayment solutions** to prevent progression.
- Enhance **recovery measures** for **B3** and **B4**: Develop aggressive **recovery strategies** for accounts in **B3** and **B4**, where **rollback is minimal but still feasible, to minimize losses**.
- **Streamline bad debt handling** for **B5**: Expedite provisioning and debt resolution processes for accounts in **B5 or worse**, as **recovery is no longer viable, to optimize resource allocation and reduce risk exposure**.
- **Strengthen early warning systems**: Identify high-risk accounts transitioning from **B0** and **B1** to **B2 or worse**. Use **predictive analytics** to flag these accounts for targeted action.

# 5. MODELING & EVALUATION

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# OBJECTIVES

Predict probability of a contract rolling to higher bucket in the next month



Divide contracts into 9 score band for credit ratings, from AAA, AA to C.

## WHAT DATA WE WILL USE ?

From the original dataset, we will extract contracts in the B0 bucket with a “MONTH\_ON\_BOOK” greater than or equal to 3

## WHY WE CHOSE THAT ?

From the analysis, it is clear that the delinquency rate rises significantly from Month 5. Conducting early analysis in Month 3 is both optimal and timely.

# TARGET VARIABLE: IS\_ROLL\_UP

## “IS\_ROLL\_UP” EXPLANATION

The target variable **IS\_ROLL\_UP** represents whether a contract's delinquency status worsens or not in the following month.

- **Label 1:** Indicates that the contract “rolls up” into a higher delinquency bucket (Next month bucket > current bucket).
- **Label 0:** Indicates that the contract either: **Stays** in the same delinquency bucket or, improves by **moving to a lower delinquency bucket** (Next month bucket  $\leq$  Current bucket).

Current bucket DPD	Next month bucket DPD	IS_ROLL_UP
B0	B1	1
B1	B0	0
B0	B0	0

# MODELING - PREDICTION

FOR MODELING

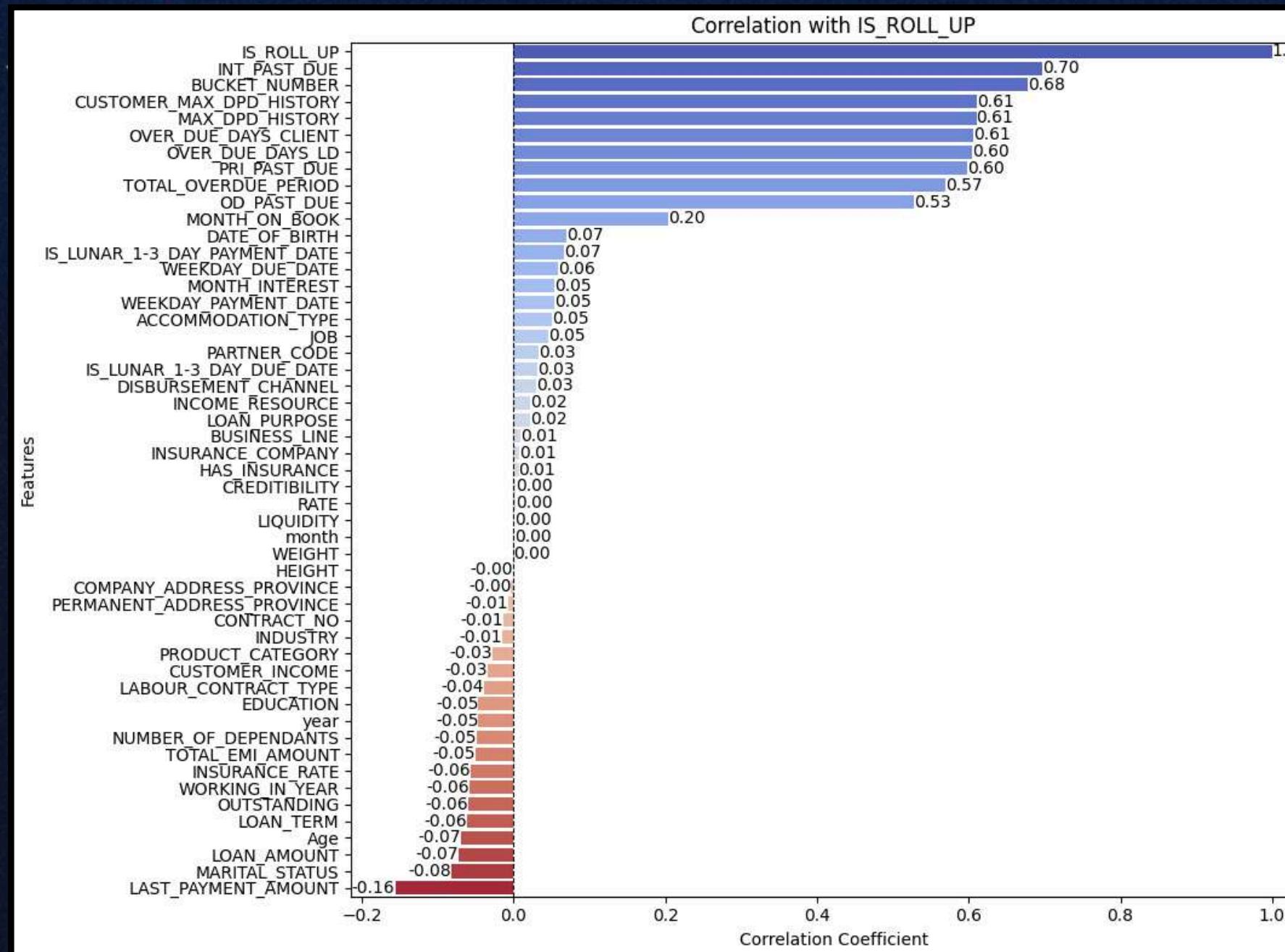
Contracts in the BO bucket  
with a “MONTH\_ON\_BOOK”  
greater than or equal to 3

Contracts in the BO bucket  
with a “MONTH\_ON\_BOOK”  
from 3 to 11

FOR PREDICTION

Contracts with a  
“MONTH\_ON\_BOOK” equal  
to 12

# FEATURE SELECTION



## CORRELATION BETWEEN INPUT VARIABLES WITH TARGET VARIABLE

- Most variables show a weak relationship with the target variable (<0.1)
- Strong Impact (>0.5): Variables like **INT PAST DUE**, **BUCKET\_NUMBER**, and **MAX\_DPD\_HISTORY** have significant effects on the target variable.
- Moderate Impact (between 0.1 and 0.5): Variables such as **TOTAL\_OVERDUE\_PERIOD** and **OD\_PAST\_DUE** have a noticeable influence.

# FEATURE SELECTION

## VARIABLES RELATING TO LOAN REPAYMENT

Variable	Description
MONTH_ON_BOOK	The number of full calendar months since the disbursement date (0-12)
TOTAL_EMI_AMOUNT	The amount of money must be collected every month (VND)
OUTSTANDING	The remaining balance on a loan that has not been fully repaid yet (VND)
PRI_PAST_DUE	The amount of original loan that is overdue for payment (VND)
INT_PAST_DUE	The amount of interest that is overdue for payment (%)
OVER_DUE_DAYS_LD	Number of overdue days per contract Number of days past the repayment date per contract
LAST_PAYMENT_AMOUNT	Amount of the last payment
TOTAL_OVERDUE_PERIOD	Number of months when the payment was late

These variables have moderate to high correlation with the target variable **IS\_ROLL\_UP**.

However, some are not selected because they highly correlated with other variables so we only choose 1 of them (Using VIF to detect).

# FEATURE SELECTION

## OTHER SELECTED VARIABLES

Type	Variable	Description
DEMOGRAPHIC	MARITAL_STATUS	Marital Status (0,1,2,3,4)
	AGE	Age
	NUMBER_OF_DEPENDANTS	Number of dependants
	CUSTOMER_INCOME	Customer's income (VND)
	INCOME_RESOURCE	Main source of income
	WORKING_IN_YEAR	Working experience
LOAN ORIGIN	LOAN_AMOUNT	Amount of loan (VND)
	LOAN_TERM	Loan term (in months)
	MONTH_INTEREST	Monthly interest (%)
	PRODUCT_CATEGORY	Loan/product category
BEHAVIOR	WEEKDAY_DUE_DATE	Due date on weekdays (Monday = 1, Sunday = 7)
	WEEKDAY_PAYMENT_DATE	Payment date on weekdays (Monday = 1, Sunday = 7)
	IS_LUNAR_1-3_DAY_DUE_DATE	Due date on 1-3 Lunar day (abstain day)
	IS_LUNAR_1-3_DAY_PAYMENT_DATE	Payment date on 1-3 Lunar day (abstain day)

These variables show a low correlation with the target variable, IS\_ROLL\_UP, but they may still provide value in certain contexts or interactions within the model.



# DATA PREPROCESSING

## ADDRESS IMBALANCE DATA

### OVERSAMPLING

Artificially increases the number of samples in the minority class by duplicating data points or creating synthetic ones  
=> Prevent bias in predictive models and improve ability to detect high-risk cases

## SCALE DATA

### STANDARD SCALER

Removing the mean and scaling them to unit variance  
=> Ensures all features contribute equally to the model by putting them on the same scale, essential for algorithms sensitive to feature magnitude

# MODELING

## TUNNING HYPERPARAMETER

### RANDOMSEARCHCV

Searches for the best combination of parameters by sampling a fixed number of random combinations from a parameter grid  
=> Speeds up the parameter optimization process while still effectively improving model performance compared to exhaustive search methods

## CROSS VALIDATION

### MEAN CV SCORE

Provides a reliable estimate of model performance, reducing the risk of overfitting

## EVALUATION

### GINI, KS, PSI

**GINI:** Evaluate the model's effectiveness in distinguishing between high-risk and low-risk customers.

**KS:** Measure the maximum gap between the cumulative rate of bad customers and good customers across risk groups (score bands)

**PSI:** Measure the difference between 2 probability distributions (baseline and monitoring data)  
=> Monitoring the stability and performance of ranking models over time.

# RESULTS

Model	Mean CV AUC	AUC	GINI	KS	PSI
Logistic Regression	0.929104	0.916662	0.833324	0.746951	2.115179
Decision Tree	0.973865	0.938834	0.877668	0.767574	3.695292
XGBoost	0.982907	0.943147	0.886295	0.77506	4.778446
LightGBM	0.981645	0.938578	0.877156	0.76007	4.900286

## RESULTS ANALYSIS

XGBoost leads in overall performance but has higher PSI, suggesting potential sensitivity to data shifts.

In contrast, Logistic Regression has the lowest PSI, indicating it is the most stable model across different data distributions.

# LOGISTIC REGRESSION VS XGBOOST

PSI

Logistic Regression has the lowest PSI, indicating it is the most stable model but the performance is relatively poor compared to other models.

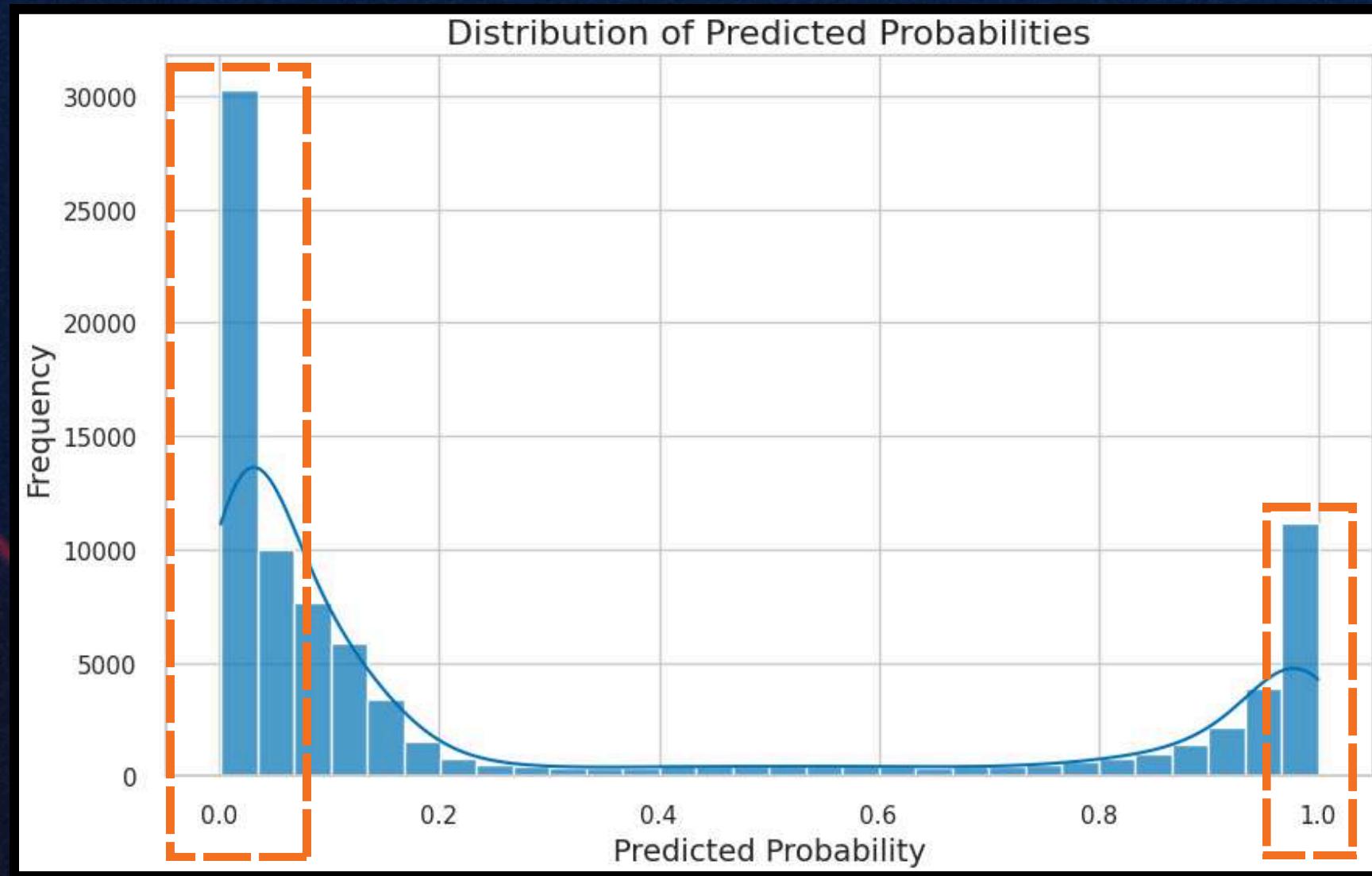
MEAN CV AUC,  
GINI, KS

XGBoost has higher result than Logistic Regression, but the difference is minimal. Our target is maximizing accuracy and operational efficiency.



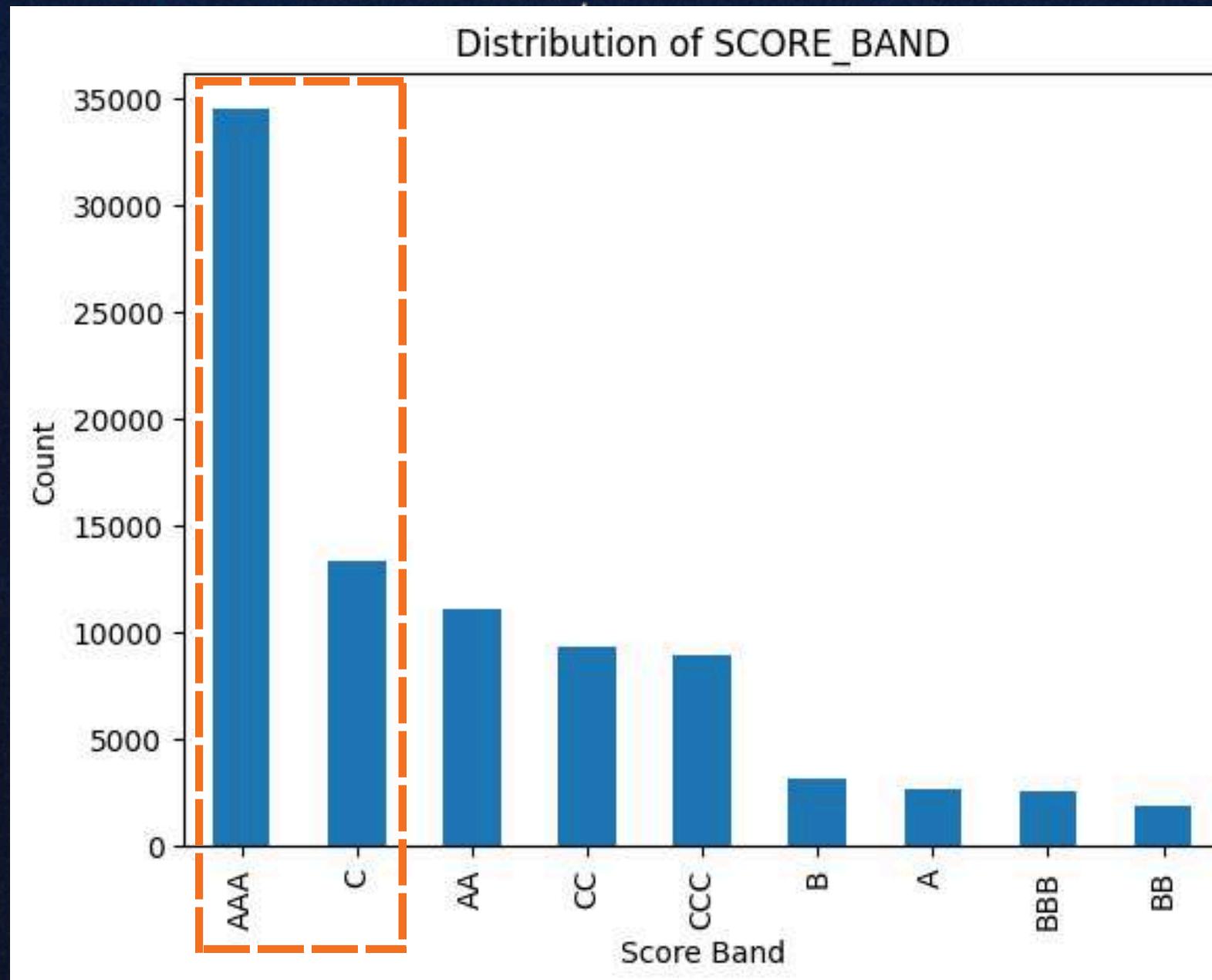
CHOOSE XGBOOST AS THE BEST MODEL

# PREDICTION RESULTS



Most accounts are concentrated in either **low-risk (near 0)** or **high-risk (near 1)** categories, with few moderate-risk cases  
=> showing a trend **skewed toward the two extremes**.

# SCOREBAND DIVISION



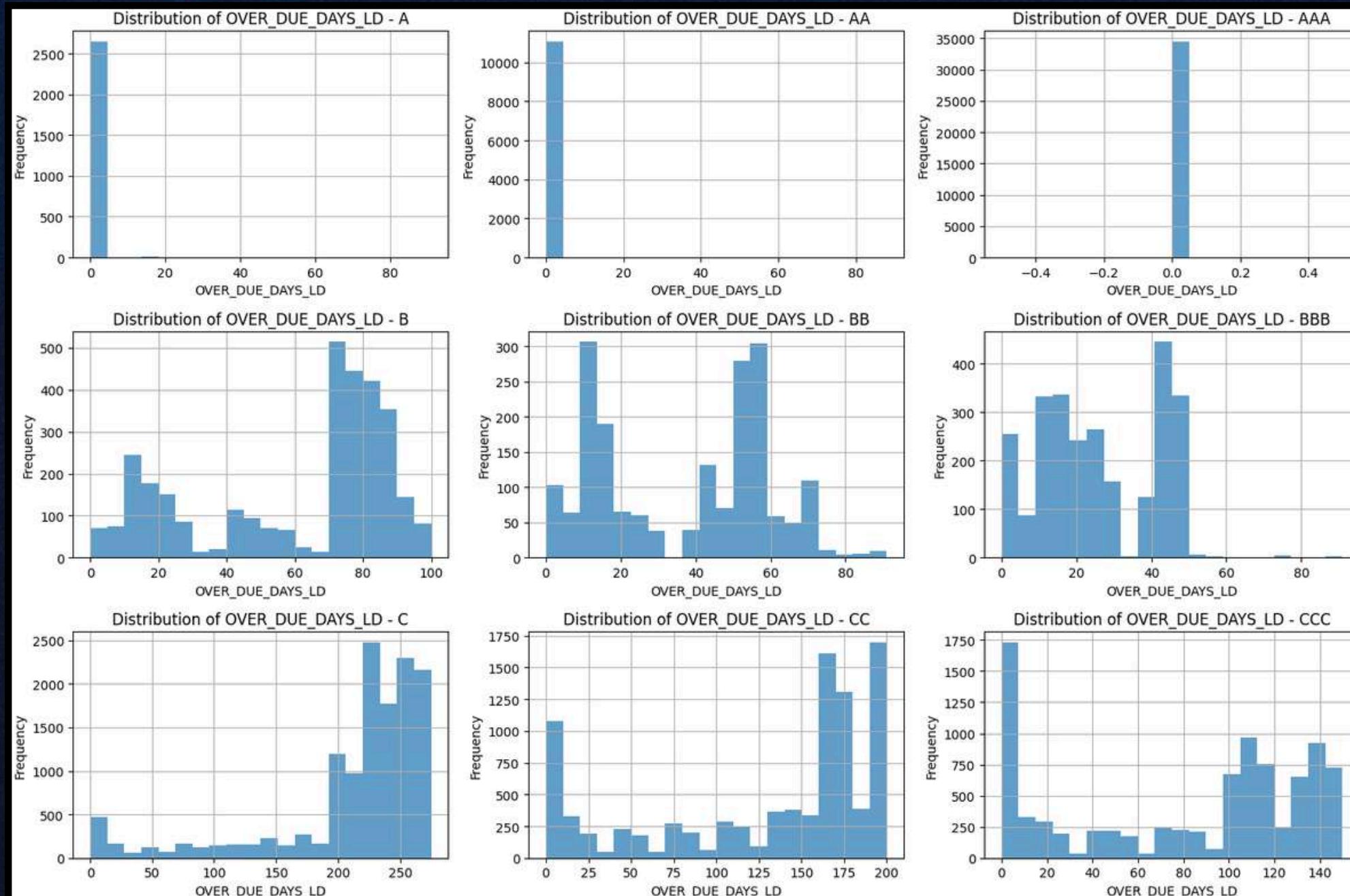
## SCOREBAND OVERVIEW

This score band uses K-Means clustering to determine the predicted probabilities, effectively segmenting accounts into distinct risk groups based on their likelihood of rolling forward.

## OVERVIEW

The chart shows the distribution of SCORE\_BAND, with AAA being the most common, followed by C, while lower bands like BB and B have significantly fewer accounts.

# SCOREBAND DIVISION

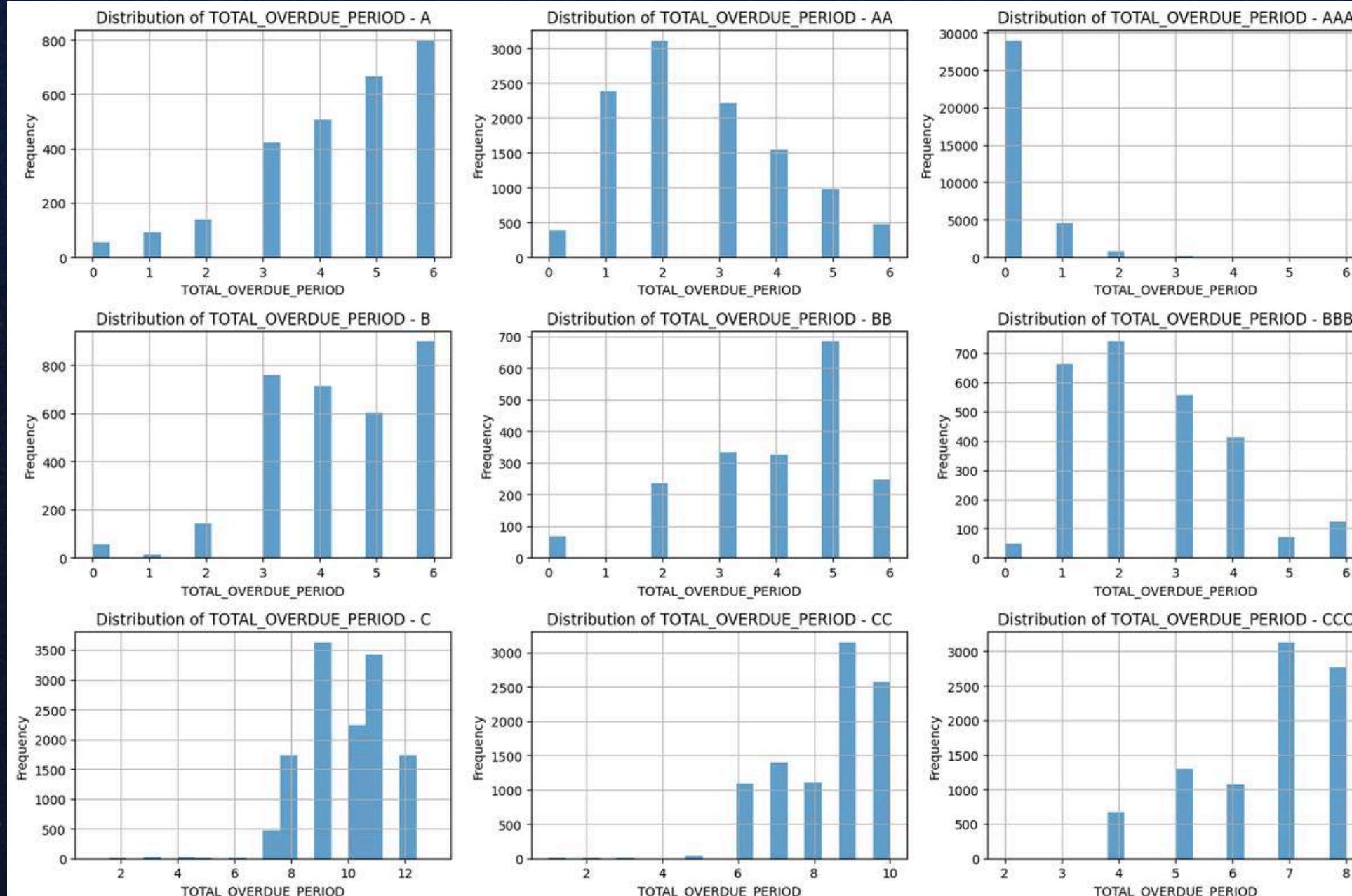


## DESCRIPTION

The charts show the distribution of **OVER\_DUE\_DAYS\_LD** across different credit score bands (AAA, AA, A, BBB, BB, B, C, CC, and CCC).

- **Low-risk groups (AAA, AA, A)** exhibit minimal or nonexistent overdue days, reflecting strong repayment behavior.
- In contrast, **moderate-risk groups (BBB, BB, B)** show more frequent and dispersed overdue days, indicating higher risk and inconsistent repayment patterns.
- **High-risk groups (C, CC, CCC)** have significantly higher and widely distributed overdue days, highlighting a greater likelihood of severe delinquency and default.

# SCOREBAND DIVISION

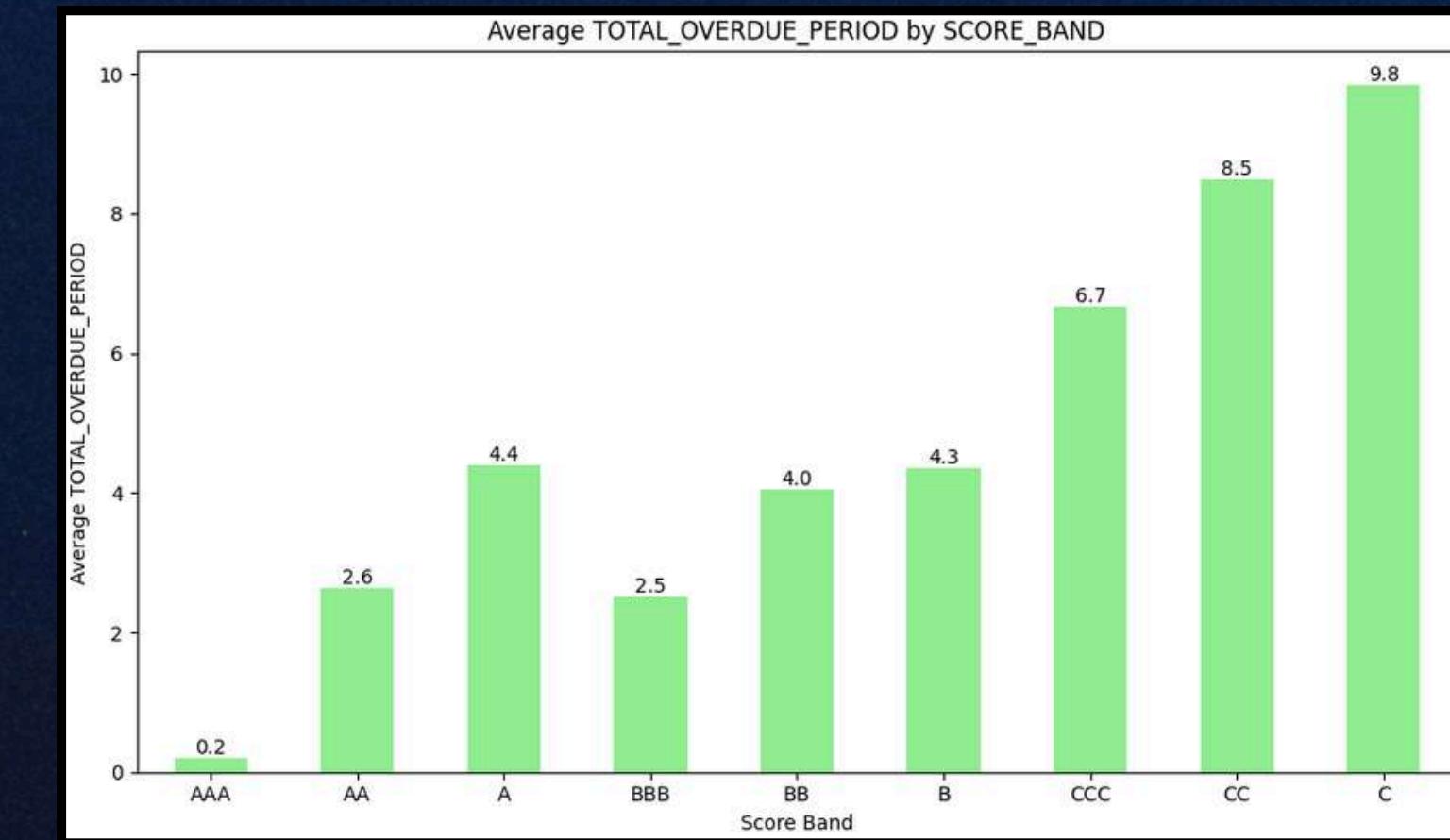
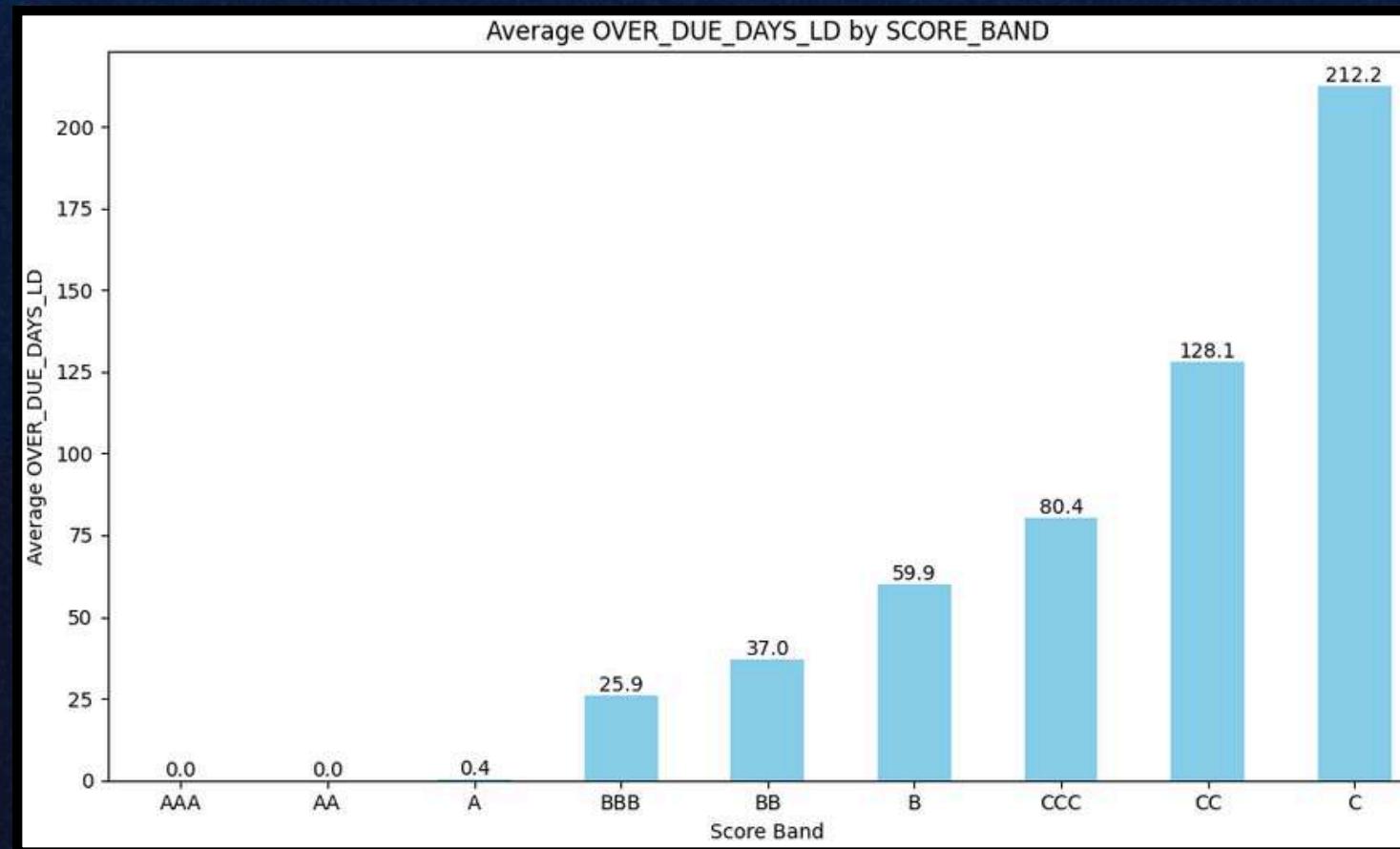


## DESCRIPTION

The charts show the distribution of **TOTAL\_OVERDUE\_PERIOD** across different credit score bands (AAA to C).

- **High-credit groups (AAA, AA, A):** Minimal overdue periods indicate **strong repayment reliability**.
- **Moderate-credit groups (BBB, BB, B):** Overdue periods are **more frequent**, signaling growing **repayment challenges**.
- **Low-credit groups (C, CC, CCC):** Longer overdue periods highlight **severe repayment issues** and **higher default risks**.

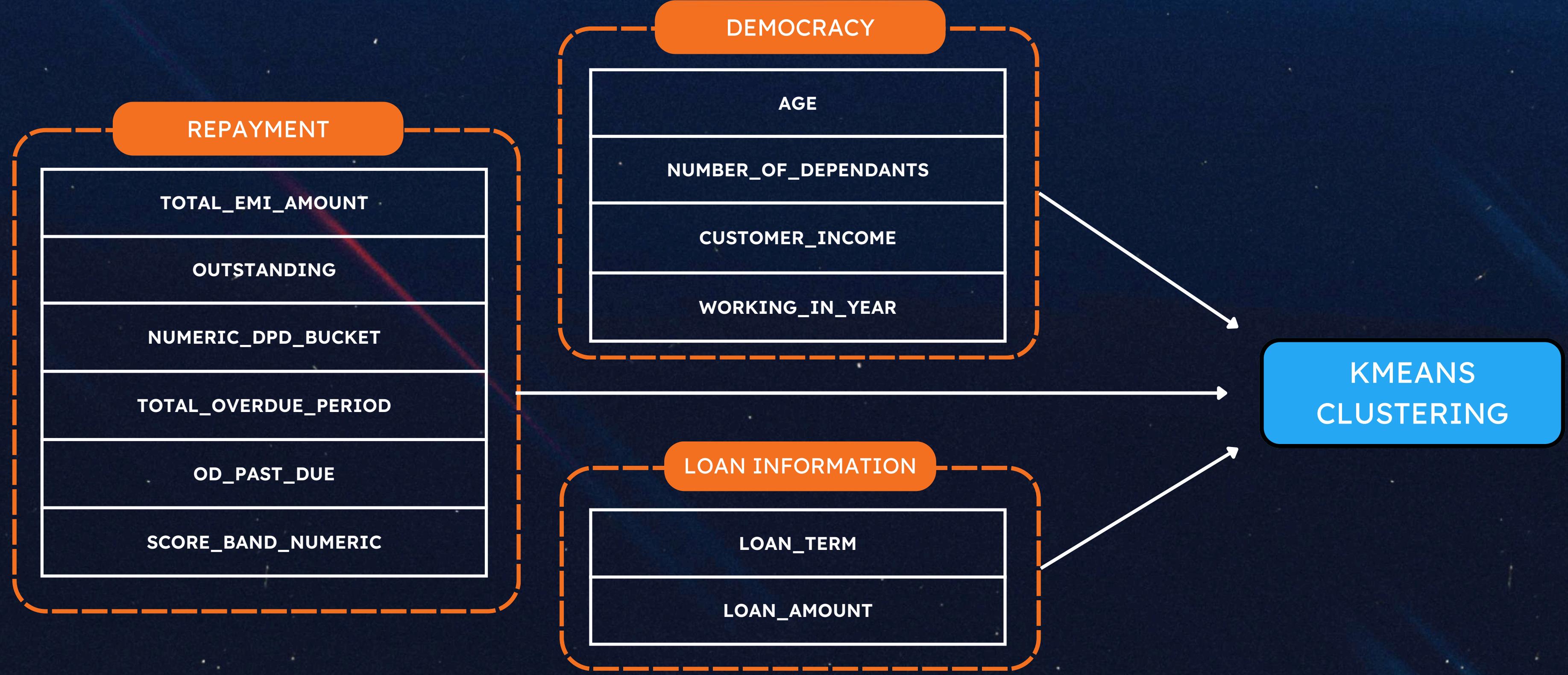
# SCOREBAND DIVISION



## DESCRIPTION

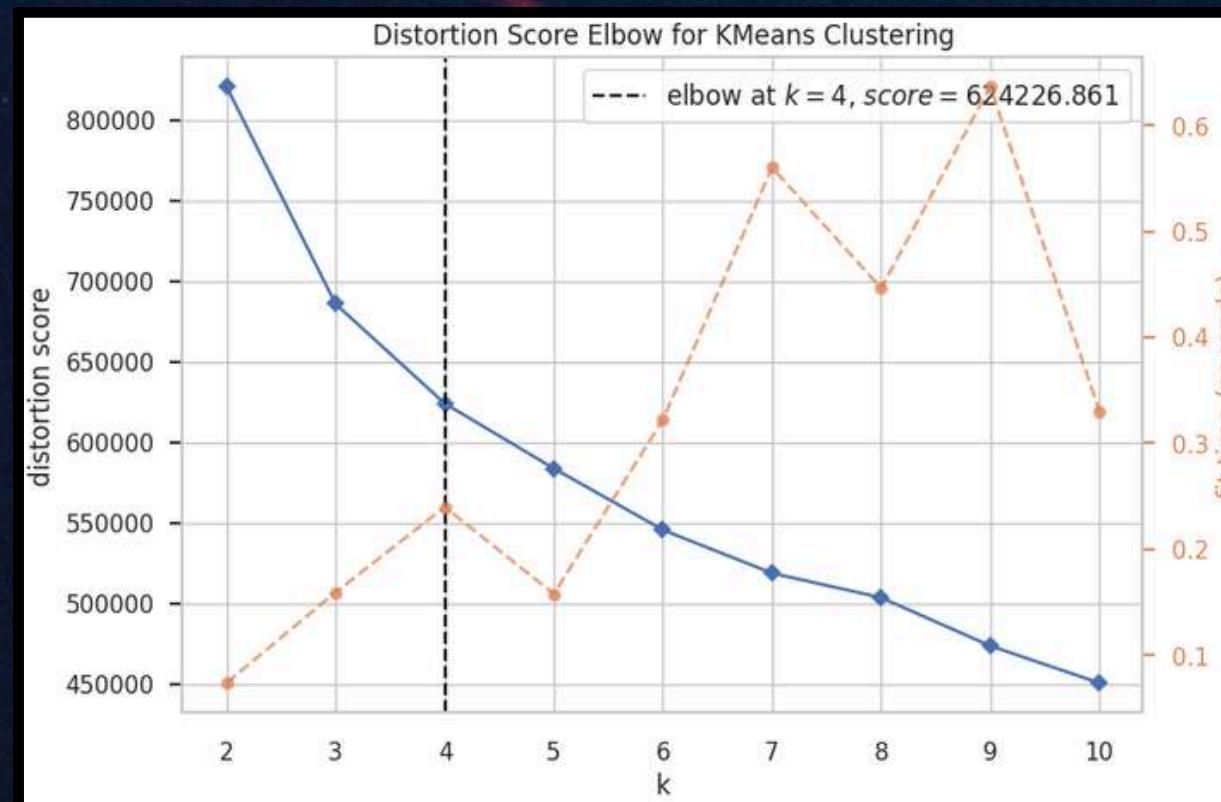
The left chart illustrates a significant increase in the average `OVER_DUE_DAYS_LD` as credit score bands deteriorate from AAA to C. Similarly, the right chart highlights a corresponding rise in the average `TOTAL_OVERDUE_PERIOD`, with lower credit score bands exhibiting substantially higher values. High-credit score bands (AAA, AA, A) have minimal overdue days and periods, reflecting strong repayment behavior. Lower score bands (B, CCC, CC, C) exhibit much higher averages, indicating increased delinquency and default risks, requiring stricter monitoring and intervention strategies.

# FEATURE SELECTION FOR CLUSTERING

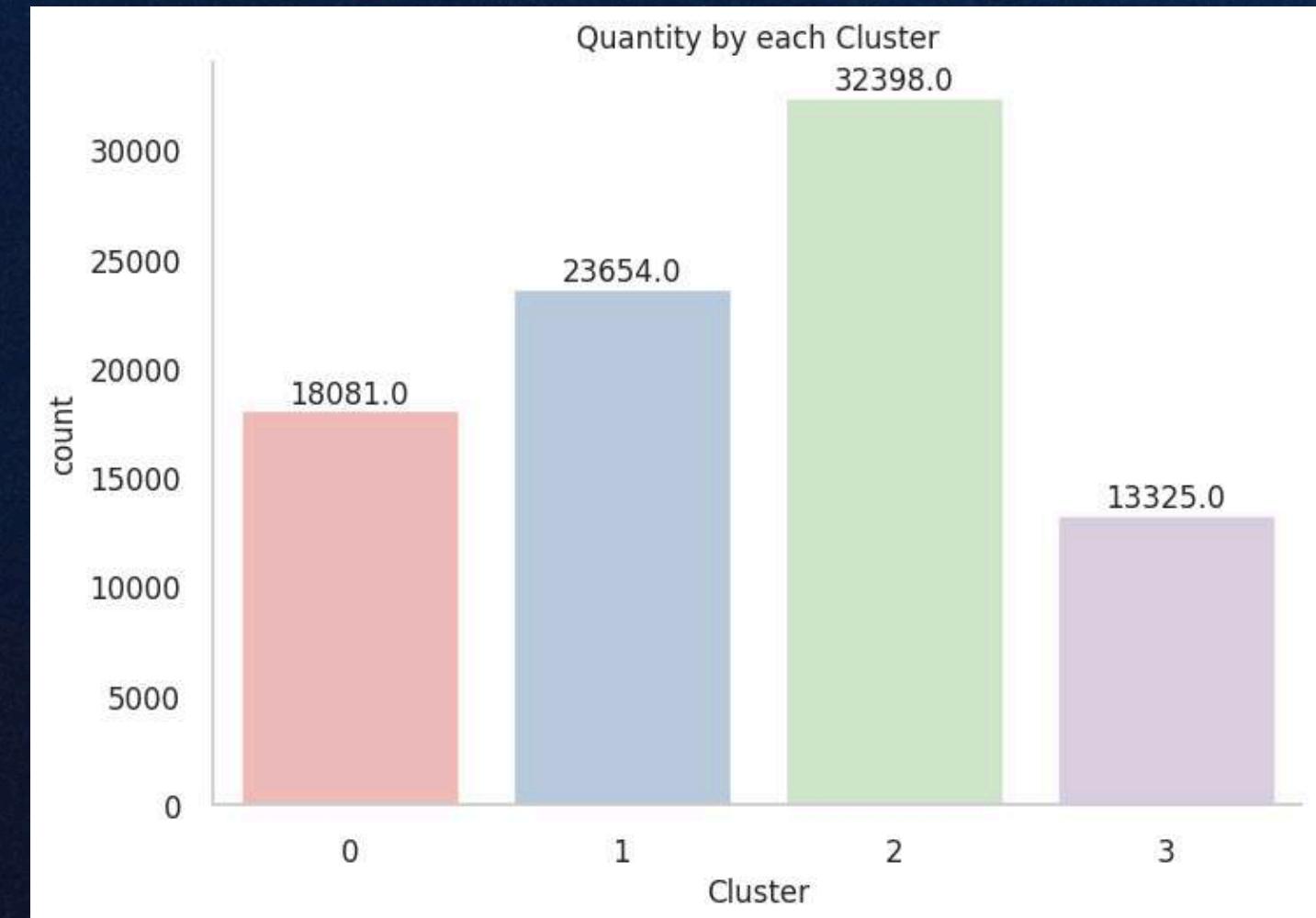


# CUSTOMER SEGMENTATION

We selected relevant numerical features for K-means clustering. Then, we scale the data to ensure all features contribute equally to the distance calculations, which improves the accuracy and interpretability of the clustering results.



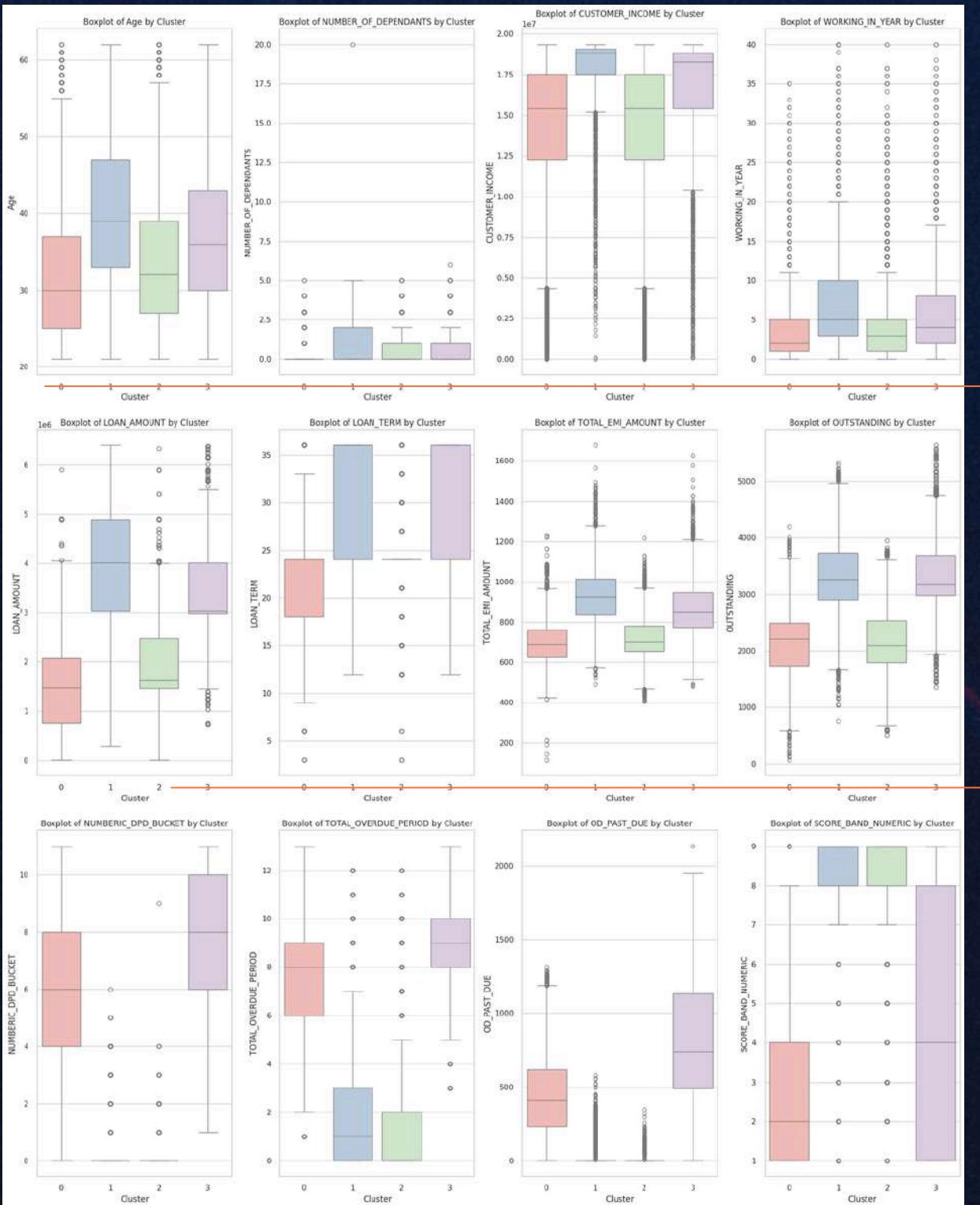
The Elbow Distortion Score suggests that **k = 4** is the optimal number of clusters for this dataset."



The clusters are unevenly distributed. Cluster 2 has the highest quantity with 32,398 entries, followed by Cluster 1 and Cluster 0 . Cluster 3 has the lowest count, indicating varying group sizes across the clusters.

# CUSTOMER SEGMENTATION

## SUMMARY OF CUSTOMER CHARACTERISTIC



	Customers 'age	Income	Work Experience	Dependents	Loan amounts	Loan terms	Analysis
Cluster 0	Young	Low	Minimal	Very few	Smallest	Short	High risk due to high DPD bucket and overdue periods.
Cluster 1	Older	Highest	Longest	Moderate	Largest	Longest	Reliable customers with low DPD bucket and overdue periods.
Cluster 2	Mid_age	Moderate	Minimal	Very few	Moderate	Moderate	The most reliable cluster with the lowest overdue periods and DPD buckets.
Cluster 3	Mid-age	High	Moderate	Few	High	Long	High risk due to the highest overdue periods, DPD buckets, and outstanding balances.



# 6. RECOMMENDATION

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# STRATEGIC INTERVENTIONS FOR FINANCIAL PERFORMANCE

CRITERIA	SHORT TERM	LONG TERM
<b>Interest Rate Strategy</b>	<p>Maintain the current interest rate to continue attracting customers in the mid-tier segment.</p>	<p>Develop tailored <b>interest rate plans</b> suited to different customer segments based on creditworthiness.</p>
<b>Bad Debt Management</b>	<p>Focus on aggressive <b>collection strategies</b> and <b>targeted interventions</b> for high-risk and serious bad debt customers (<b>B3+</b>).</p>	<p>Build a comprehensive <b>bad-debt prevention framework</b>, strengthening credit risk management and reducing default rates.</p>
<b>Customer Retention &amp; Intervention</b>	<p>Proactively intervene with <b>personalized plans</b> (e.g., temporary rate adjustments, debt restructuring) for <b>low-risk customers</b> (<b>B0-B1</b>).</p>	<p>Invest in <b>customer segmentation</b> and <b>monitoring systems</b> to better identify at-risk customers early, reducing the chance of progression to bad debt.</p>

# GENERAL RECOMMENDATIONS ACROSS CLUSTERS

## SHORT-TERM

### 1. Early Intervention for High-Risk Clusters (0 & 3):

- Implement **targeted follow-ups** (e.g., phone calls, SMS reminders) to ensure **timely repayments**.
- Offer **partial repayment plans** to reduce outstanding amounts incrementally.
- Provide clear communication on **penalties** for further delays.

### 2. Loan Restructuring:

- For **customers struggling** with repayment, propose loan restructuring options such as **extending loan terms** or **reducing monthly installment amounts**.
- Introduce a **one-time settlement** option with **discounted interest** for overdue customers to clear debt quickly.

### 3. Customer Segmentation-Based Actions:

- **Cluster 0 & 3 (High-Risk):** Monitor these clusters closely using **predictive analytics** to flag contracts that might roll into **higher delinquency buckets**.
- **Cluster 1 & 2 (Low/Moderate Risk):** Offer **incentives** like **interest rate reductions** for **early repayments** to encourage clearing debt.

# GENERAL RECOMMENDATIONS ACROSS CLUSTERS

## LONG-TERM

### 1. Credit Behavior Improvement Programs:

- Develop **financial education** workshops or **digital content** on budgeting and managing debt.
- Introduce **gamified credit score improvement plans** (e.g., **rewards for consistent repayments**).

### 2. Enhanced Risk Assessment:

- Refine the loan approval process by factoring in repayment behaviors and outstanding balances at Month-on-Book = 12.
- Use the insights from these clusters to improve future risk scoring models.

### 3. Product Adjustments for Long-Term Borrowers:

- Offer **longer-term, lower-interest** loan products tailored for customers in **Clusters 0 and 3**, reducing the pressure of high monthly installments.
- Create **flexible repayment plans** with milestone-based reductions for customers showing **consistent repayment behavior**.

# CLUSTER 0 - YOUNG & HIGH-RISK BORROWERS

## CHARACTERISTICS

Young customers with low income, minimal work experience, very few dependents, and the smallest loan amounts with short loan terms. High risk due to high DPD bucket and overdue periods.

## RECOMMENDATIONS

### 1. Short-term:

- **Proactive Monitoring:**
  - Establish a risk alert system to flag early signs of delinquency.
  - Use automated reminders for upcoming repayment deadlines.
- **Targeted Collection Strategies:**
  - Segment overdue customers for personalized repayment plans (e.g., smaller installments over an extended period).
  - Offer partial debt forgiveness for one-time settlements to reduce long-term risk.
- **Financial Literacy Campaign:**
  - Provide basic financial management workshops (online or in-app) targeting young borrowers.
  - Introduce credit score improvement programs linked to timely repayments.

### 2. Long-term:

- **Graduated Loan Products:**
  - Create low-risk loan products with smaller initial limits, increasing gradually as repayment behavior improves.
- **Behavior-based Credit Scoring:**
  - Develop predictive models to reassess creditworthiness dynamically as young customers build repayment history.

## KEY FOCUS

Manage high risk by improving repayment behavior and financial literacy.

## HIGH PRIORITY

# CLUSTER 1 - MID-AGE, RELIABLE CUSTOMERS

## CHARACTERISTICS

Older customers with the highest income, longest work experience, moderate dependents, and the largest loan amounts with the longest loan terms. Reliable customers with low DPD bucket and overdue periods.

## KEY FOCUS

Retain and reward these low-risk, high-income customers

## MODERATE PRIORITY

## RECOMMENDATIONS

### 1. Short-term:

- Loyalty Rewards:
  - Offer interest rate discounts or cash-back incentives for early or on-time repayment.
  - Create a "Preferred Customer" program with exclusive benefits (e.g., fee waivers, faster loan approvals).
- Cross-Selling Opportunities:
  - Promote savings accounts, investment products, or insurance plans tailored to their financial needs.
- Periodic Engagement:
  - Conduct personalized financial reviews to identify opportunities for additional loans or financial products.

### 2. Long-term:

- Lifetime Customer Value Optimization:
  - Build long-term financial solutions like retirement accounts or investment portfolios.
  - Use predictive analytics to anticipate future financial needs (e.g., education loans, home loans).
- Exclusive Benefits:
  - Provide customized loan structures (e.g., flexible terms or revolving credit lines).
  - Introduce high-value investment-linked loan products

# CLUSTER 2 - RELIABLE MID-CAREER BORROWERS

## CHARACTERISTICS

Mid-age customers with moderate income, minimal work experience, very few dependents, and moderate loan amounts with medium loan terms. The most reliable cluster with the lowest overdue periods and DPD buckets.

## RECOMMENDATIONS

### 1. Short-term:

- Premium Loan Offers:
  - Offer lower interest rates or top-up loans to encourage repeat borrowing.
  - Provide fast-tracked approvals for this cluster due to their reliable repayment history.
- Customer Engagement Campaigns:
  - Develop regular check-ins to review their financial progress and recommend additional services.
  - Highlight their good standing and encourage referrals for similar low-risk customers.
- Credit Limit Adjustments:
  - Gradually increase credit limits for customers with consistent repayment behavior.
- 2. Long-term:
- Long-Term Engagement Plans:
  - Introduce wealth management products to deepen customer relationships.
  - Offer tailored loan restructuring options for major life events (e.g., buying a home, education needs).
- Data-Driven Retention Models:
  - Leverage their data to refine risk prediction models and build new products that meet the needs of low-risk customers.

## KEY FOCUS

Maximize engagement while maintaining minimal risk

## LOW PRIORITY

# CLUSTER 3 - OLDER CUSTOMERS WITH HIGH RISK

## CHARACTERISTICS

Mid-age customers with moderate income, minimal work experience, very few dependents, and moderate loan amounts with medium loan terms. The most reliable cluster with the lowest overdue periods and DPD buckets.

## RECOMMENDATIONS

### 1. Short-term:

- **Intensive Collection Strategies:**
  - Prioritize debt restructuring for customers with overdue loans, offering longer repayment terms or lower monthly payments.
  - Conduct follow-ups via multiple channels (calls, visits, email) to maintain urgency.
- **Immediate Risk Reduction:**
  - Freeze new loan approvals for customers in this cluster until overdue balances are cleared.
  - Focus on settlement offers to reduce exposure to long-term defaults.
- **Penalty Revisions:**
  - Offer temporary interest rate freezes or reduced penalties for customers who commit to a structured repayment plan.

### 2. Long-term:

- **Secured Loan Options:**
  - Transition to secured loans (e.g., collateral-based products) to reduce future risk exposure
- **Risk-Based Pricing Models:**
  - Develop dynamic pricing that adjusts interest rates based on repayment performance
- **Behavioral Interventions:**
  - Provide ongoing financial counseling to help these customers rebuild creditworthiness.
  - Encourage co-borrower or guarantor requirements for high-risk loans.

## KEY FOCUS

Reduce outstanding balances and manage default risk

## HIGHEST PRIORITY



RMIT  
STUDENT  
CLUB  
ANALYTICS CLUB



Masan consumer SHBFinance  
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# THANK YOU

FOR TAKING YOUR PRECIOUS TIME TO  
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TOMORROW  
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