Lending Club Case Study

– Report by Huynh Viet Cuong –

Agenda

1. Problem Statement
2. Business Objective
3. Analysis Approach
4. Analysis Conclusion

Problem Statement

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A consumer finance company specializes in lending various types of loans to urban customers and faces the challenge of making informed decisions regarding loan approvals. The company's primary concern is managing two types of risks associated with loan approvals:

1. Risk of Loss due to Non-Approval: If the applicant is likely to repay the loan, not approving the loan results in a loss of potential business for the company.

2. Risk of Default: If the applicant is not likely to repay the loan and is likely to default, approving the loan may lead to a financial loss for the company.

Business Objective

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The primary business objective is to use Exploratory Data Analysis (EDA) and risk analytics to identify patterns and variables that indicate the likelihood of loan default among loan applicants. This objective includes:

1. Identifying Risky Applicants: Detecting individuals who are likely to default on their loans and taking appropriate actions, such as denying loans, adjusting loan amounts, or offering loans at higher interest rates to mitigate potential losses.
2. Minimizing Credit Loss: Minimizing the financial losses associated with borrowers who default on loans, known as credit loss. By identifying defaulters, the company can take proactive measures to reduce credit loss.
3. Enhancing Risk Assessment: Utilizing data-driven insights to understand the key factors influencing loan defaults, which can improve portfolio management and risk assessment processes.

Analysis Approach

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Data Cleaning

- *Drop Current Rows in loan_status columns*
- *Drop columns with many null values*
- *Drop columns with only one values*
- *Drop unnecessary columns:* ***Use Correlation Matrix***
- *Transform data*
- *Fill NaN*

Univariate Analysis

- *Plot distributed and box (also support to drop outlier)*
- *Use bar plot for categorical data*
- *Use line plot for date data*

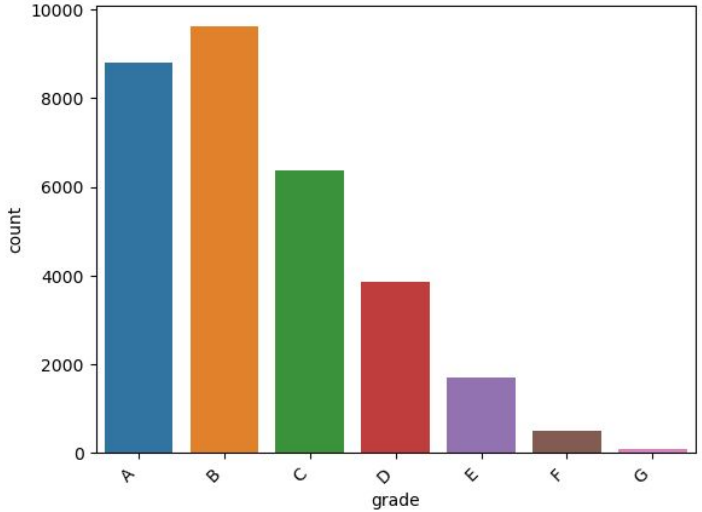
Bivariate Analysis

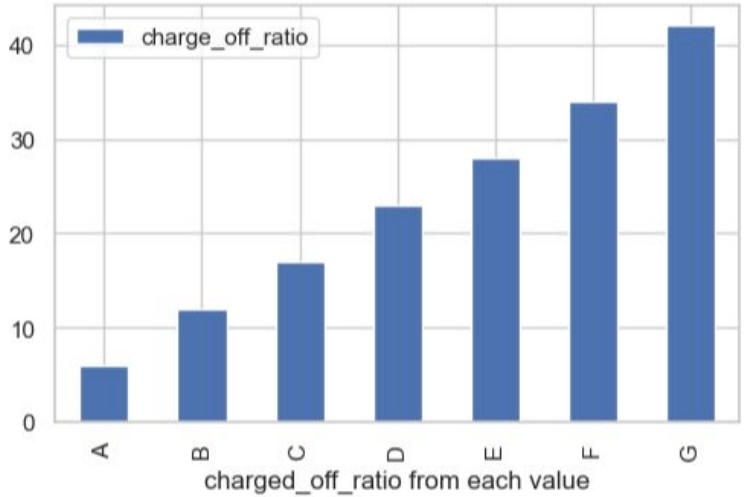
- The number of fully paid and charged-off customers over time by line plot
- *Bar plot on pair of variables*
- *Employment length in year analysis*
- *Time analysis*

Analysis Conclusion

Analysis - grade

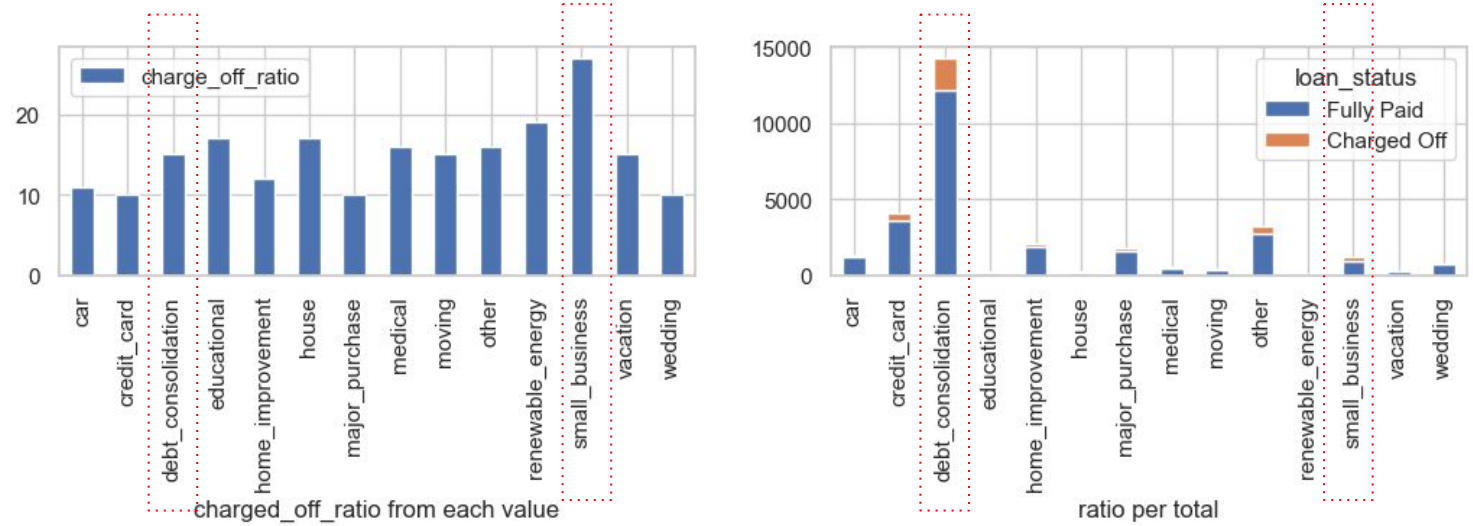
The majority of customers fall into high grade and Charge-Offs are more in lower grade segment.





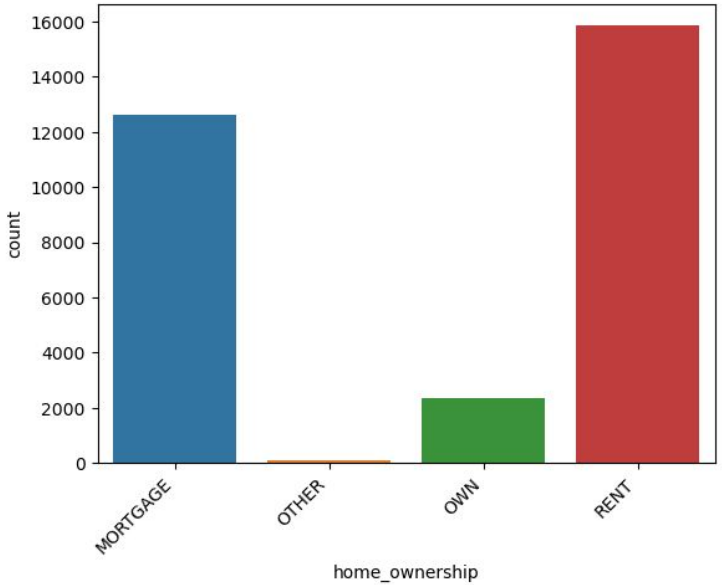
Analysis - purpose of loan

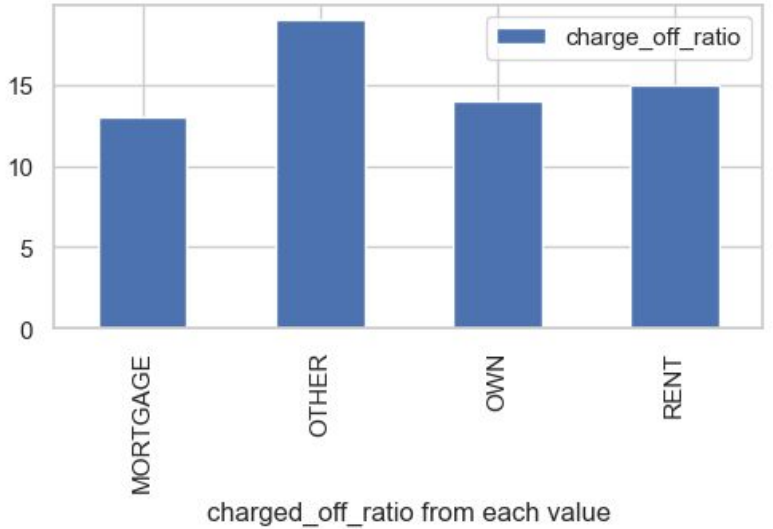
Many loans have debt consolidation purposes so they have many charge-off customers. Be careful with small business purposes, have a high charge-off ratio



Analysis - home ownership

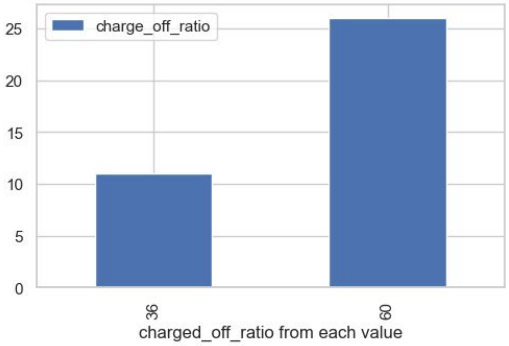
Home Ownership as own have less loans than mortgage and rent but the charge of ratio is similar. That's mean borrowers who are classified as 'Renters' or have 'Mortgages' are more likely to experience loan defaults.

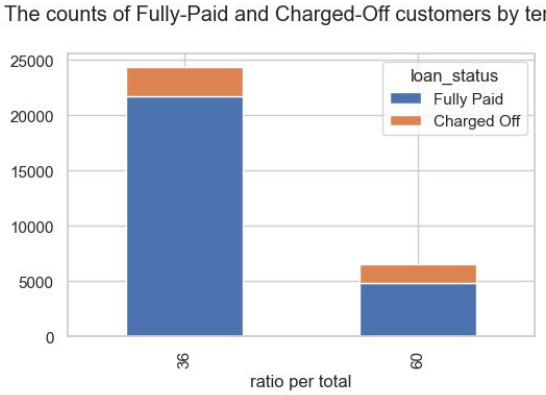


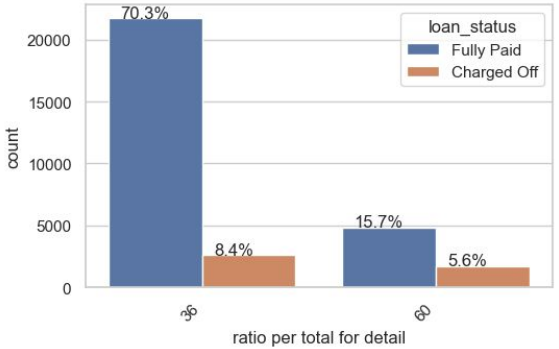


Analysis - the number of payments

The majority of customers have short-term loans, but long-term loans have a higher ratio of charged-off customers.

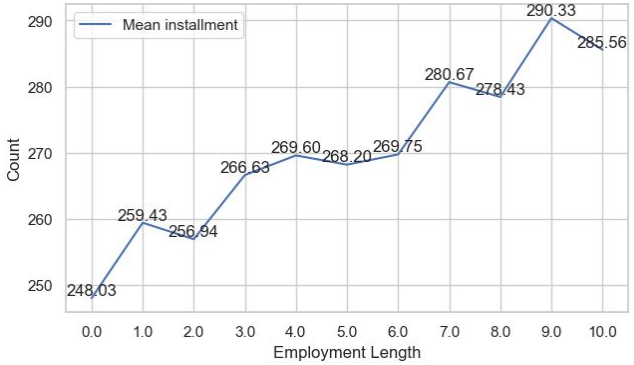


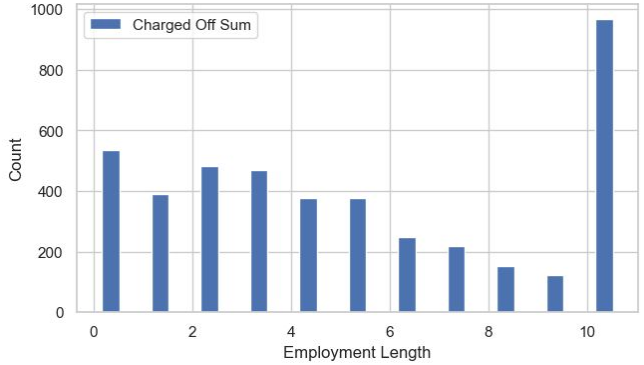


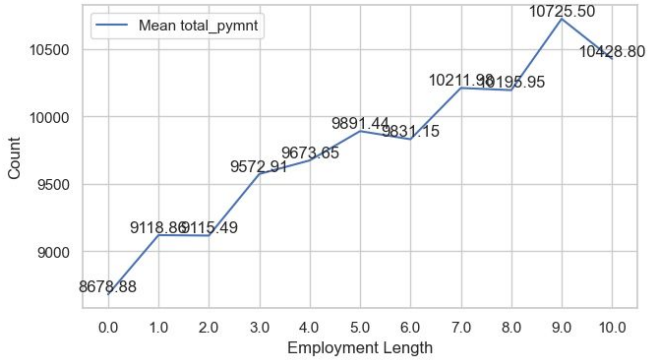


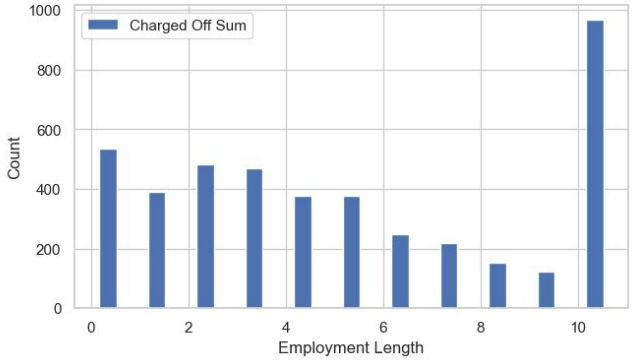
Analysis - Employment length in years

Monthly and total payments are on the rise, while charge-offs are decreasing, likely due to the solid financial standing of customers. Employment lengths of over ten years may be outliers, possibly because of a substantial number of customers with extensive work experience. So **a shorter employment length is associated with a higher level of risk**



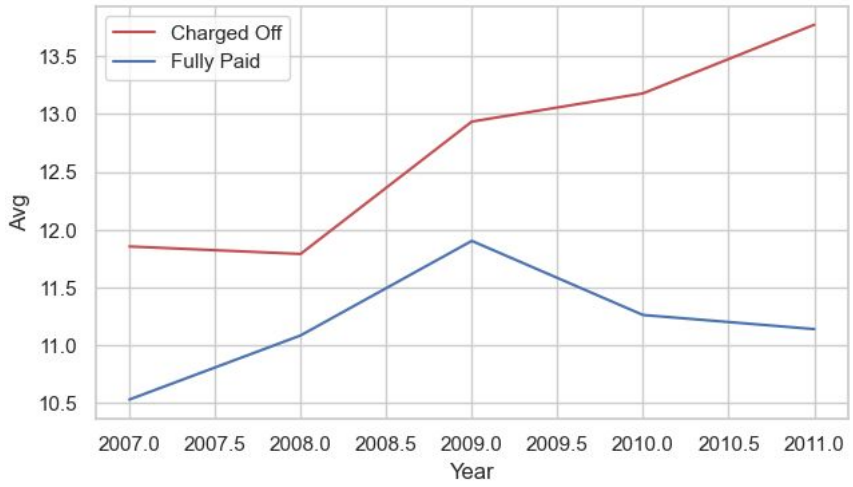




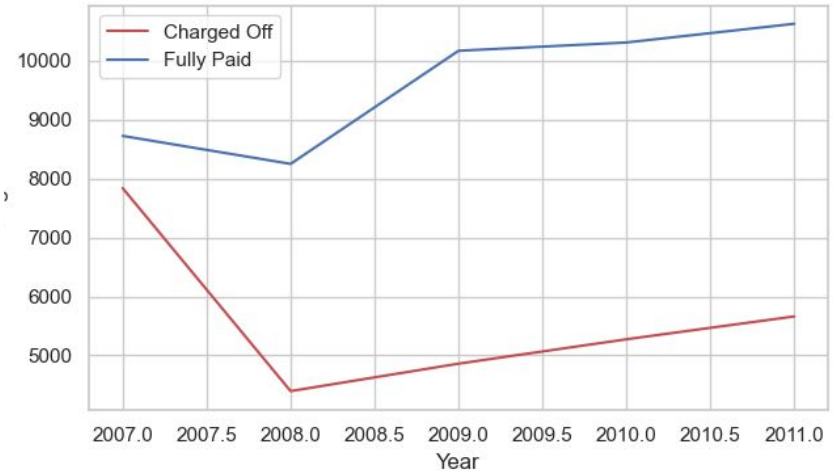


Analysis - Employment length in years

The charge-offs are subject to higher interest rates and lower total payments



The interest rate by year



Total payment by year