Lending Club Case Study

Authors:
Pranay Iyer
Prasanth Amarala

Problem Statement

- The company, specializing in consumer finance, focuses on offering various loan products to urban customers. When a loan application is received, the company must decide whether to approve it based on the applicant's profile. Two key risks are associated with this decision:
  - **Lost Business Opportunity:** If the applicant is likely to repay the loan, rejecting the application results in a missed opportunity.
  - **Financial Loss:** If the applicant is unlikely to repay (i.e., likely to default), approving the loan could lead to a financial loss for the company.

Goal and Objective

- The goal is to identify the **key factors** that contribute to loan defaults, i.e., the variables that serve as strong indicators of default risk. This insight will support the company's portfolio and risk management processes.
- The objective is to identify **high-risk loan applicants**. Reducing the approval of such loans will minimize credit losses. This case study aims to achieve this objective using exploratory data analysis (EDA).

Risk Analysis Approach

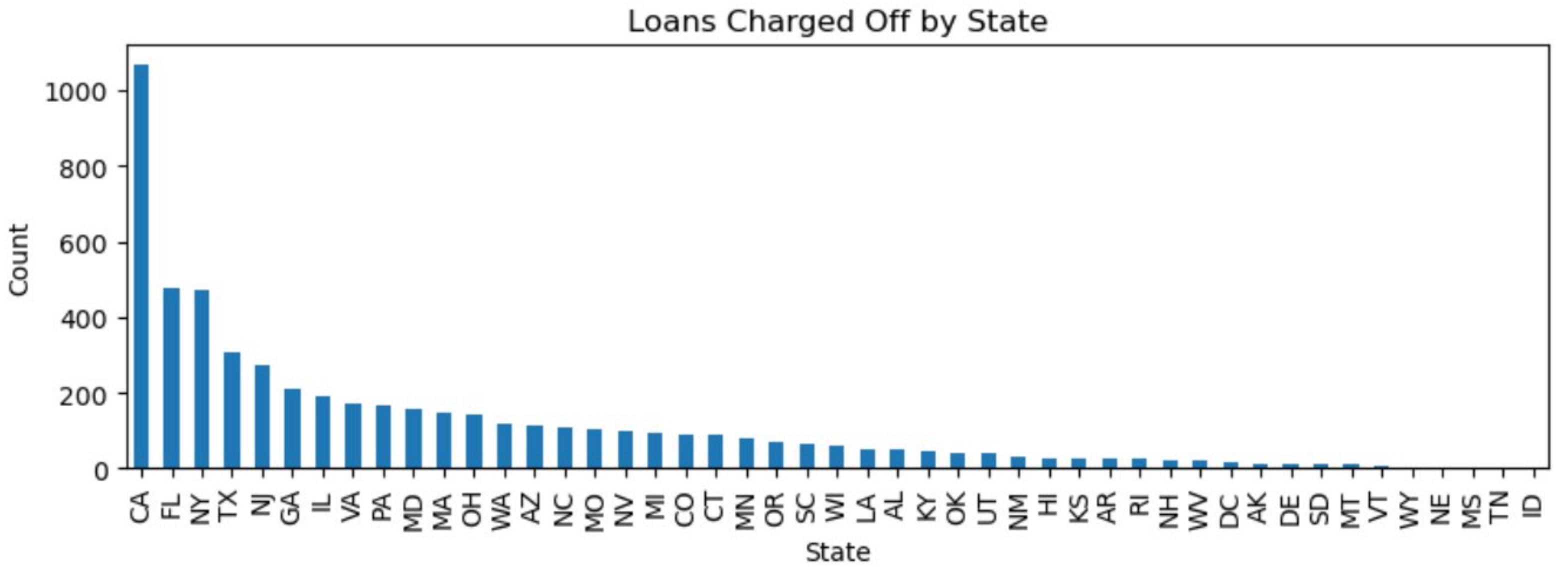
- **Data Understanding:**
  Using the data dictionary, explore the dataset and its variables to develop an understanding of the information.

- **Data Cleaning and Manipulation:**
  Address data quality issues by:
  - Removing columns with significant missing data.
  - Eliminating duplicate records.

- **Data Analysis:**
  - **Univariate Analysis:** Focus on analyzing individual variables.
  - **Bivariate Analysis:** Study relationships between pairs of variables.

- **Business Recommendations:**
  Derive actionable insights from the analysis to inform business decisions.

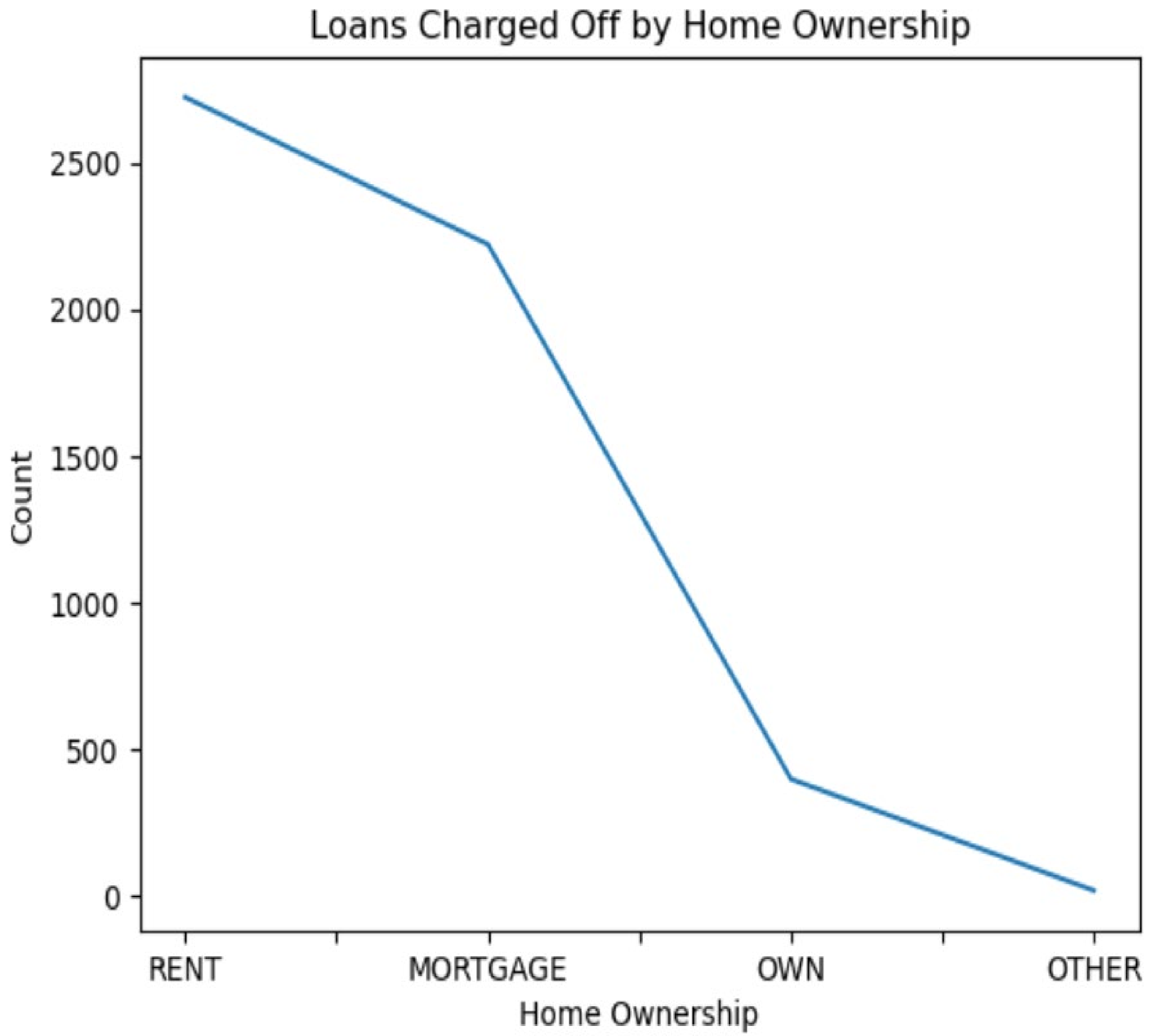
Univariate Analysis - State-wise Defaults



- California leads the list of states with the highest number of loan defaults.
- The number of defaults in California is more than double that of the second and third states, Florida and New York.
- The company should exercise caution when lending to borrowers in California.

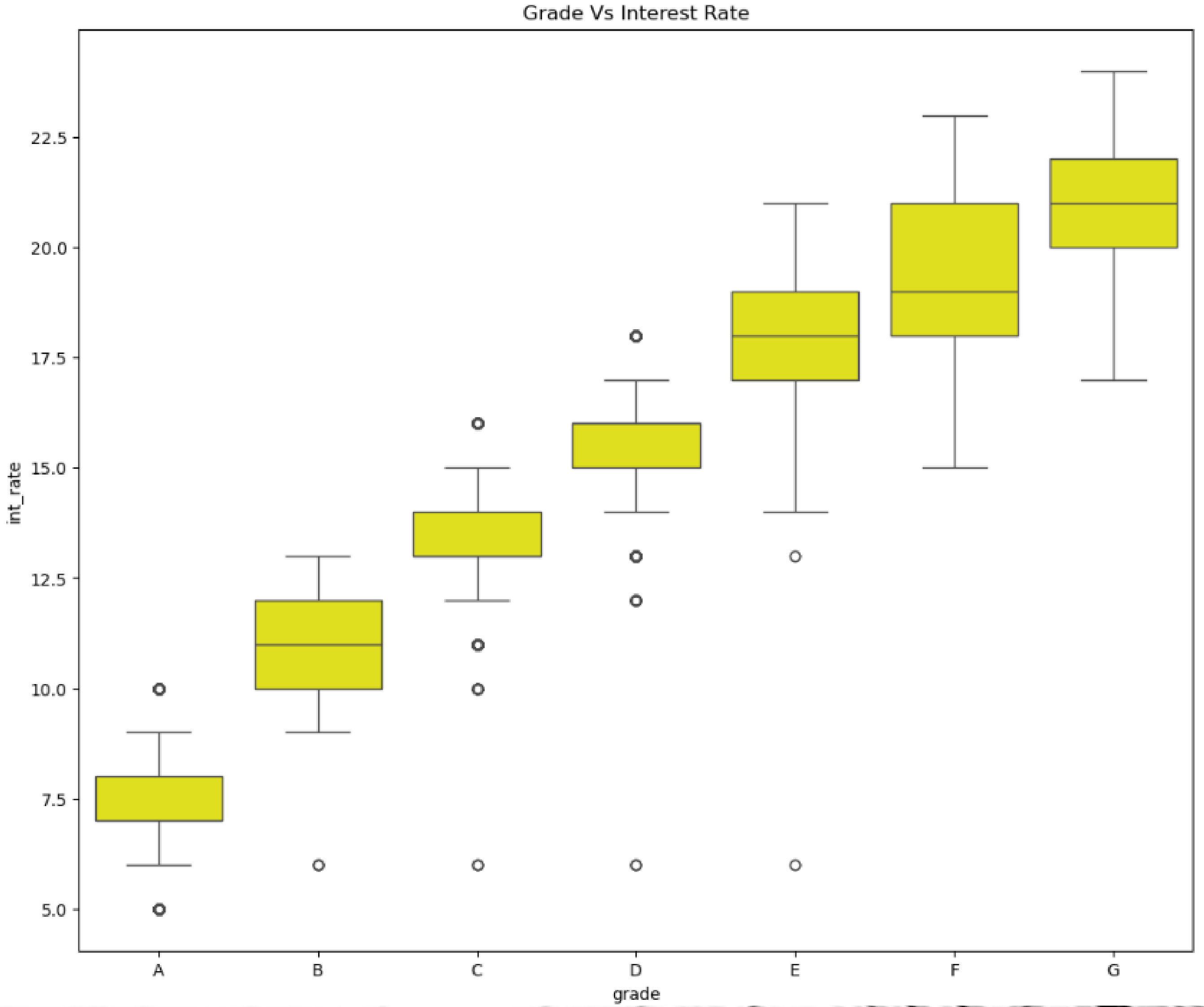
Univariate Analysis - Home Ownership

- Applicants living in rented accommodations are the most likely to default on loans, followed by those with mortgaged homes.
- Applicants who own their homes are significantly less likely to default.



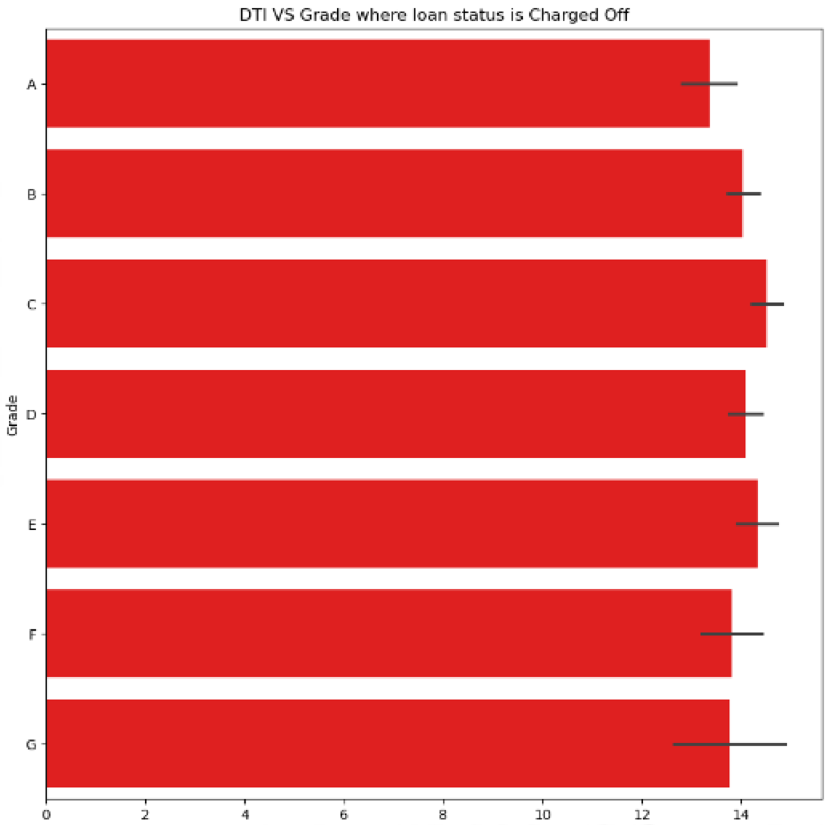
Bivariate Analysis - Grade Vs Interest Rate

- The box plot illustrates an upward trend between credit grades (A to G) and interest rates, reflecting the principle that lower creditworthiness correlates with higher lending rates. This strategy minimizes the lender's risk of financial loss from potential defaults.
- By applying higher interest rates to lower-grade borrowers, the lending company can recover more from the initial installments, thereby reducing potential losses in the event of a default.



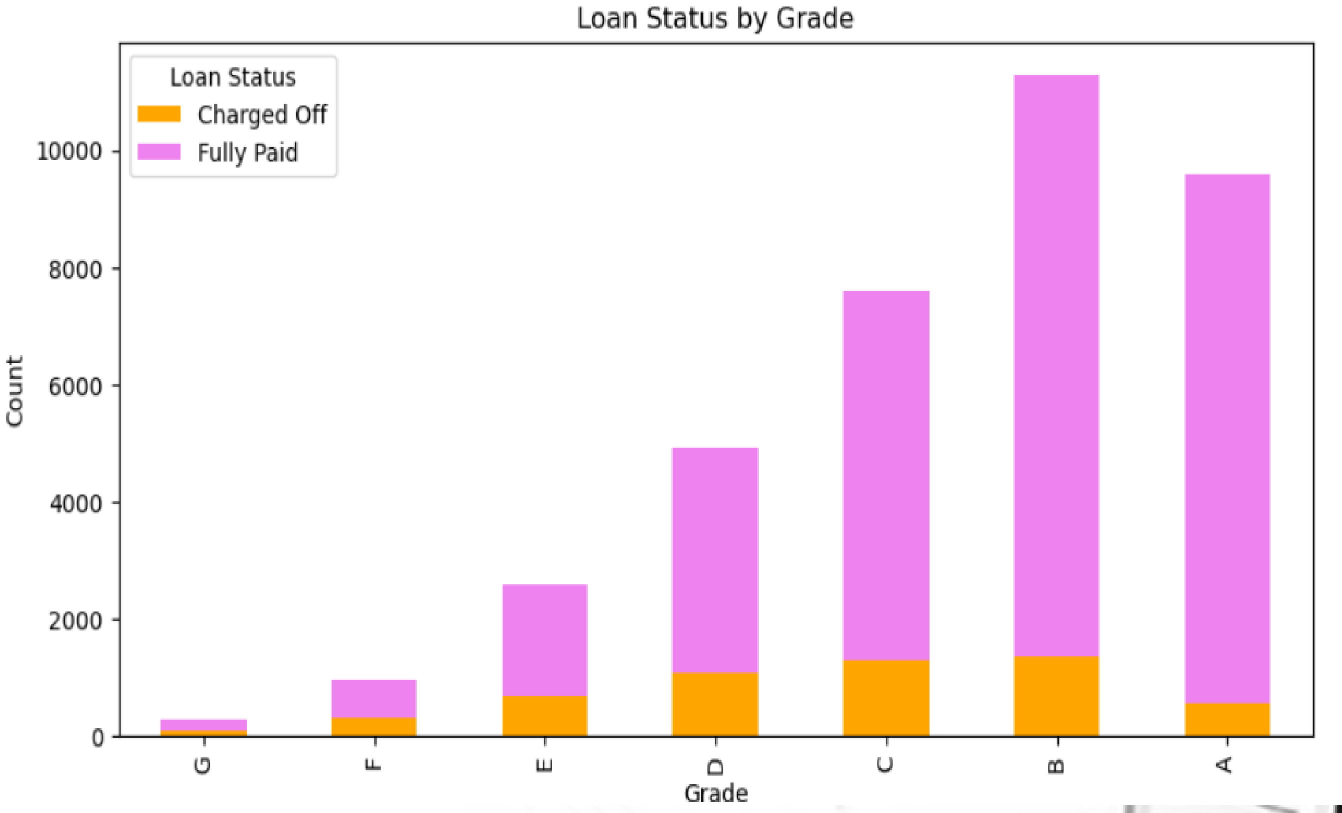
Bivariate Analysis - DTI VS Grade where loan status is Charged Off

- Regardless of the credit grade, a high Debt-to-Income (DTI) ratio increases the likelihood of default due to the limited availability of funds for loan repayment.



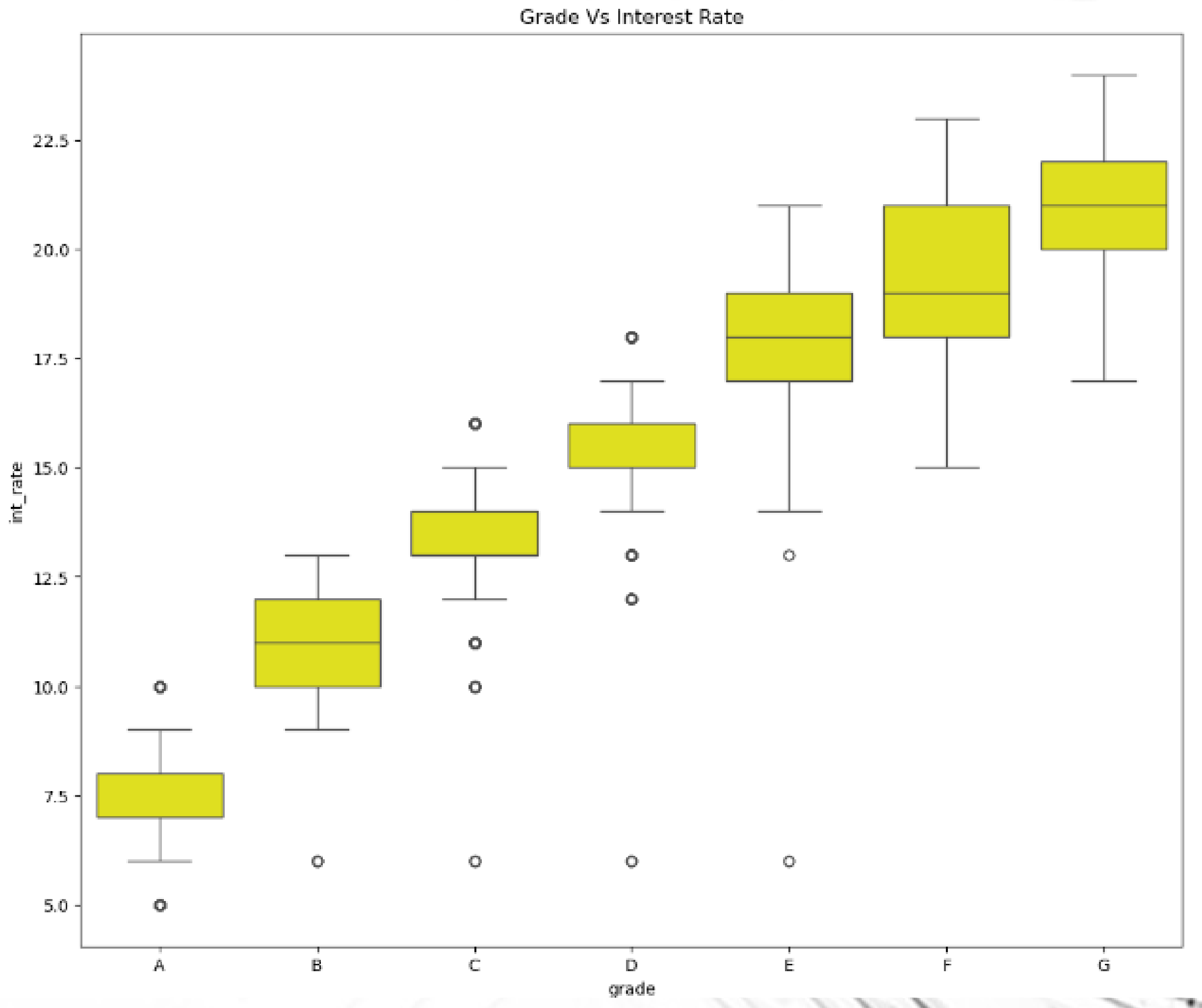
Bivariate Analysis - Loan Status by Grade

- The percentage of applicants defaulting rises as credit scores or grades decrease. Additionally, the dat shows that a greater number of loans are issued to applicants with higher credit grades, highlighting the importance of prioritizing creditworthiness in lending decisions to promote better business outcomes and minimize potential losses for the lending firm.



Bivariate Analysis - Grade Vs Interest Rate

- The box plot reveals an upward trend between credit grades (A to G) and interest rates, following the principle that lower creditworthiness leads to higher interest rates. This strategy helps mitigate the lender's risk of financial loss from bad loans.
- By applying higher interest rates to lower-grade borrowers, the lending company can recover more from the initial installments, reducing potential losses in the event of a default.



Recommendation

- Lending is a complex and high-risk business. Lending companies must carefully consider various risk factors, including Debt-to-Income (DTI) ratio, credit grades, income source, and home ownership status, among others, before approving a loan.
- If an applicant has a lower credit grade, falls into a higher DTI category, but demonstrates the capacity to repay, the loan may be approved at a higher interest rate to mitigate risk and ensure greater recovery in the initial term.
- However, if the applicant has a lower grade, a higher DTI, and lacks the capacity to repay, the loan should be declined.
- For applicants with higher credit grades, lower DTI, and a solid payment history, loans can be offered at lower interest rates to reflect their reduced risk.