Lending Club Case Study

Group Members:

Vivek Mishra

Chittaranjan Patra

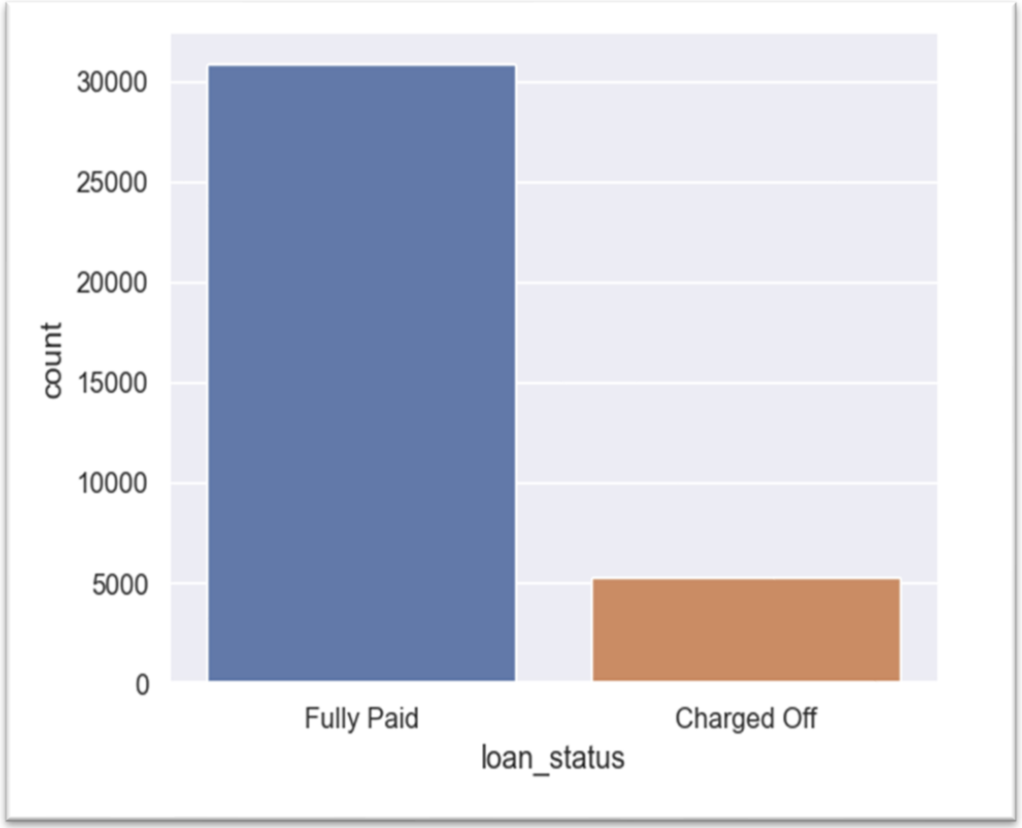
Abstract

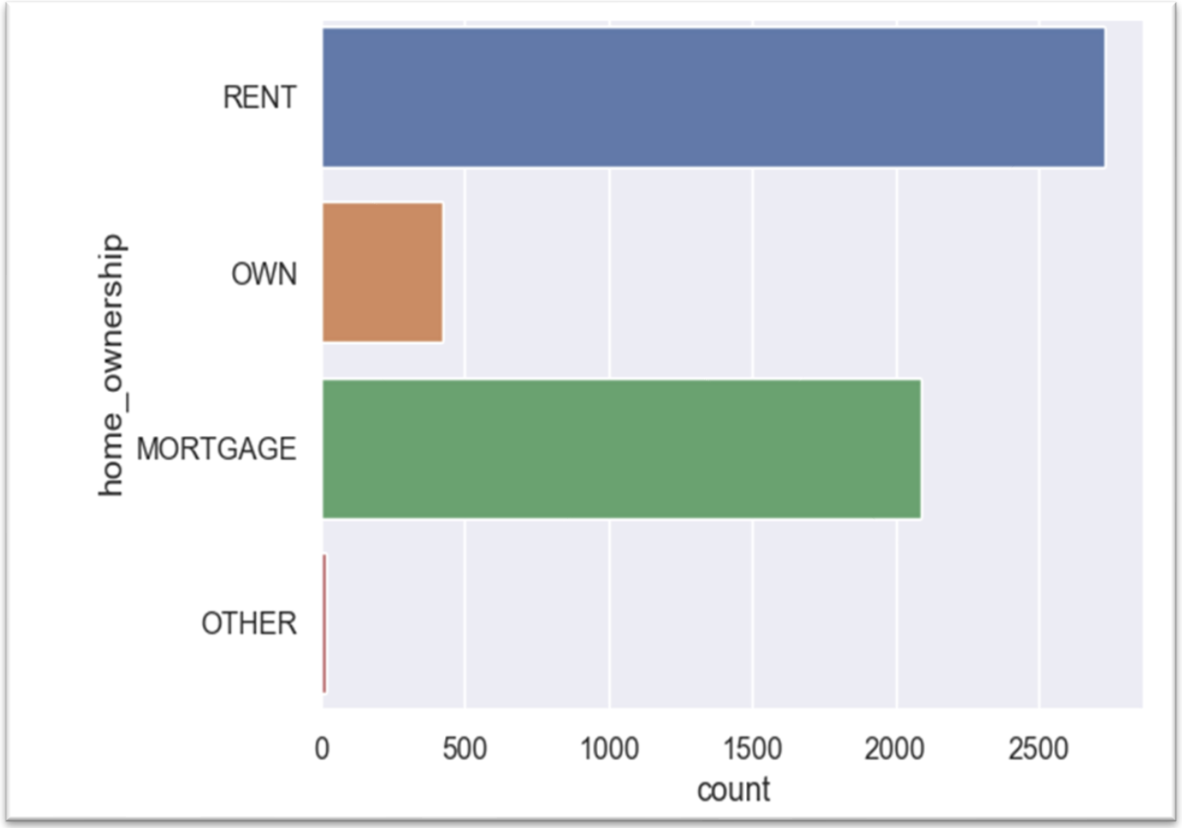
- Lending Club, the largest online loan marketplace, offers personal loans, business loans, and medical procedure financing.
- Borrowers enjoy easy access to low-interest rate loans through a user-friendly online platform.
- The analysis aims to determine if past loan applicants "defaulted" or not, using historical applicant information.

Problem solving methodology

- **Steps in the Analysis:**
- **Step 1: Data Cleaning**
- In this step, we'll clean and prepare the data, ensuring it's accurate and ready for analysis.
- **Step 2: Univariate Analysis**
- We will examine individual variables to understand their characteristics and identify any outliers or unusual patterns.
- **Step 3: Bivariate/Multivariate Analysis**
- We'll explore the relationships between various variables to uncover strong indicators of loan defaults. This step involves looking at how different factors interact with each other.
- **Step 4: Results**
- Finally, we'll summarize our findings and conclusions from the analysis, providing valuable insights that can help the company make informed decisions regarding its lending practices and risk management.

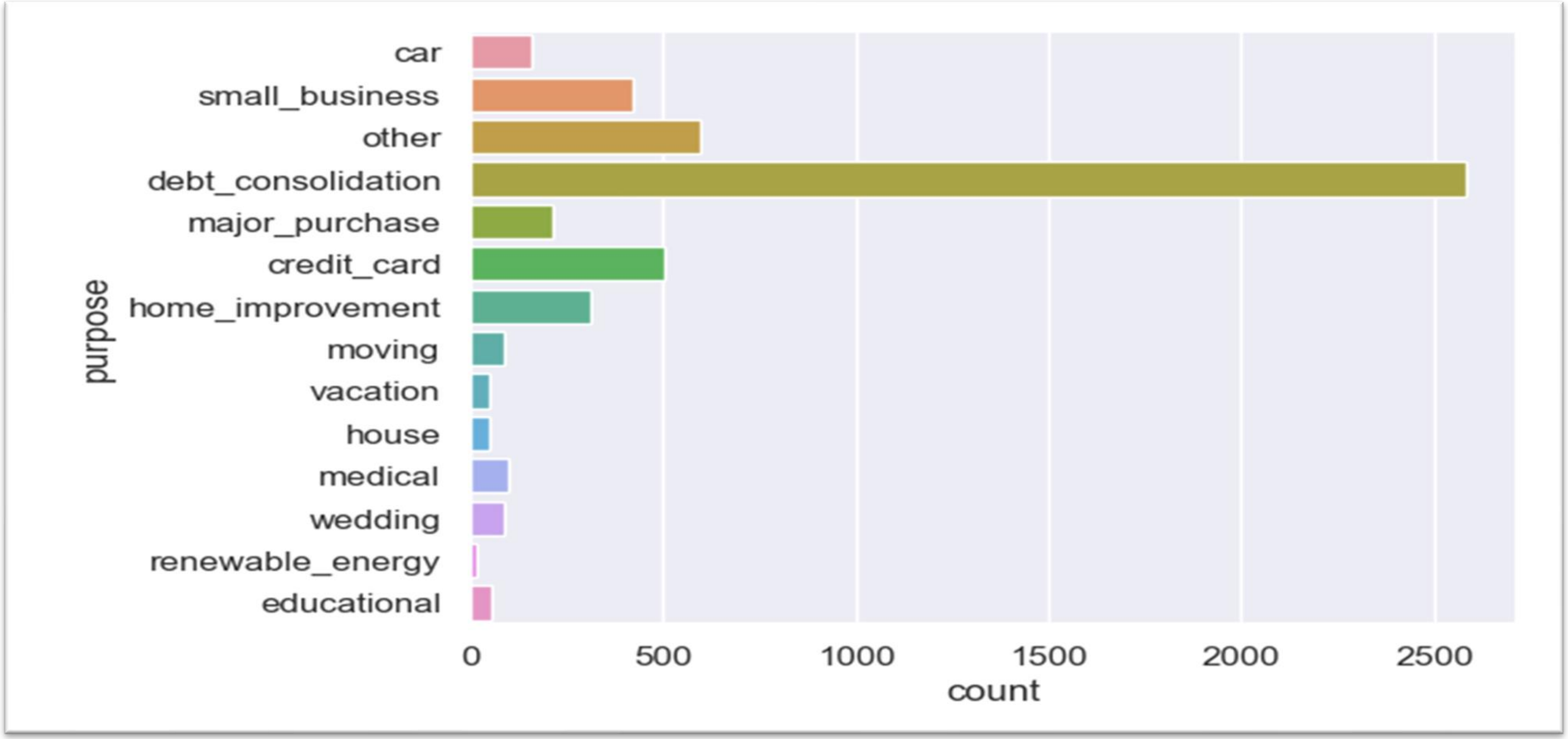
Univariate Analysis





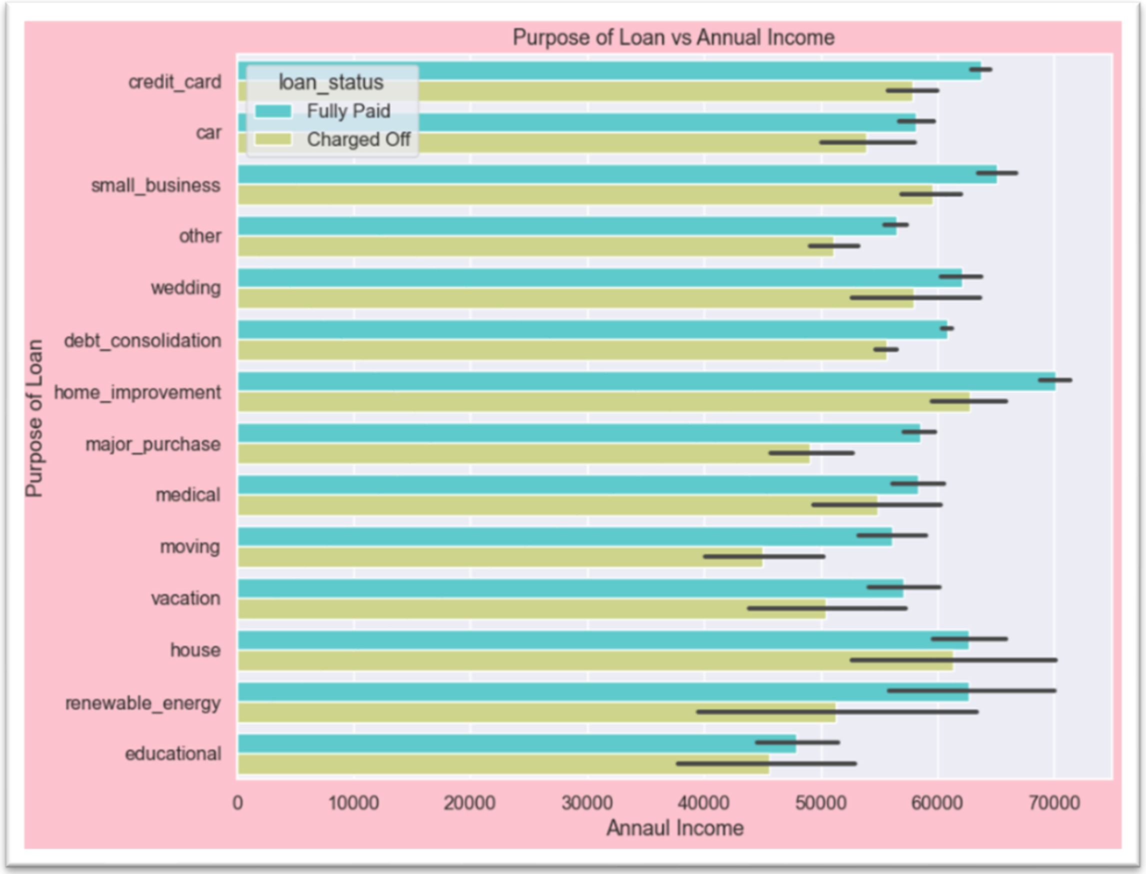
Observation: The Analysis of Loan Status column shows that majority of people have fully paid their loan with respect to people who defaulted.

Observation: Individuals who are living in rented properties have the highest default rate.



Observation: Borrowers with the loan purpose of 'debt consolidation' have the highest default rate.

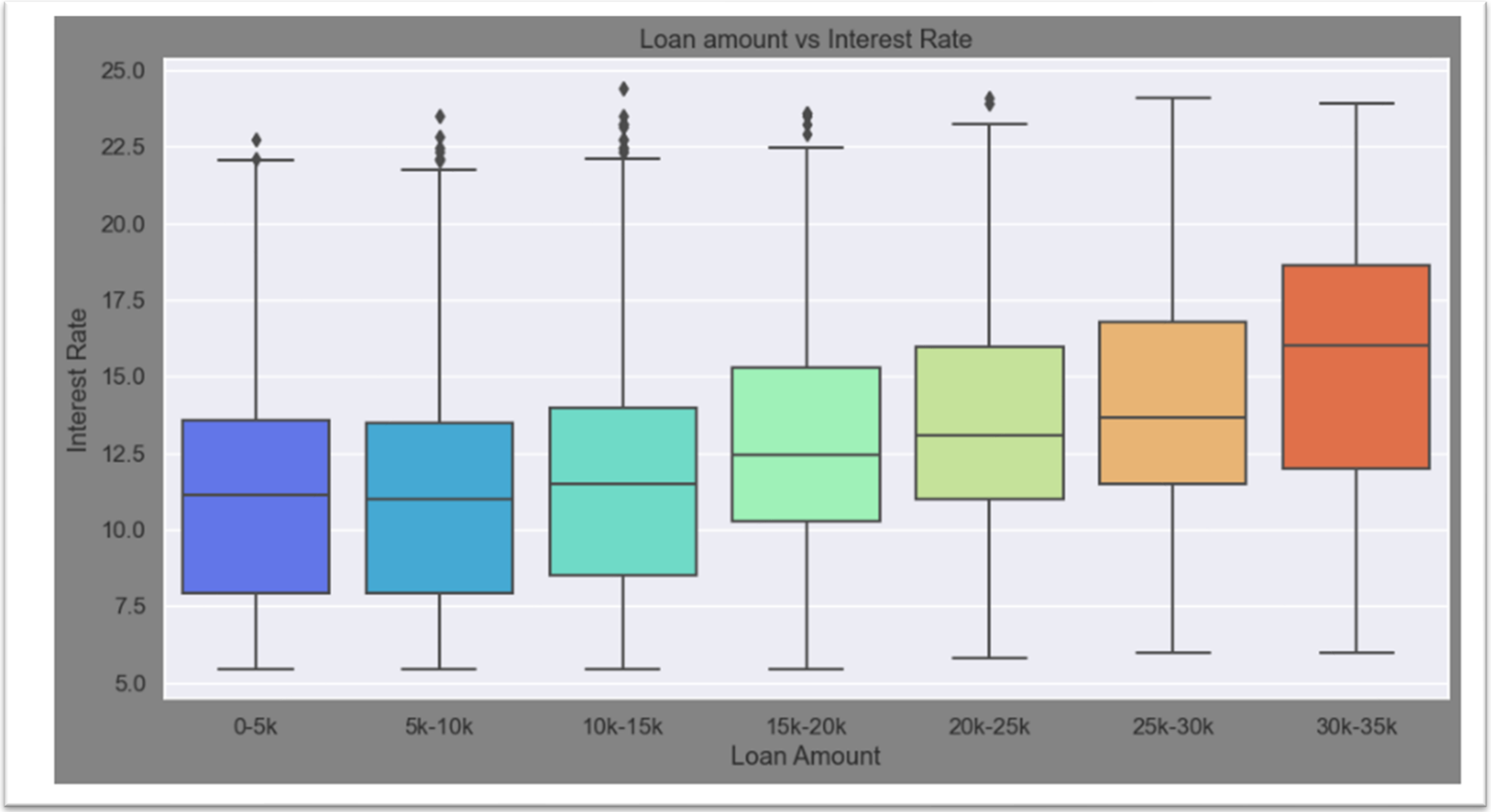
Bivariate Analysis



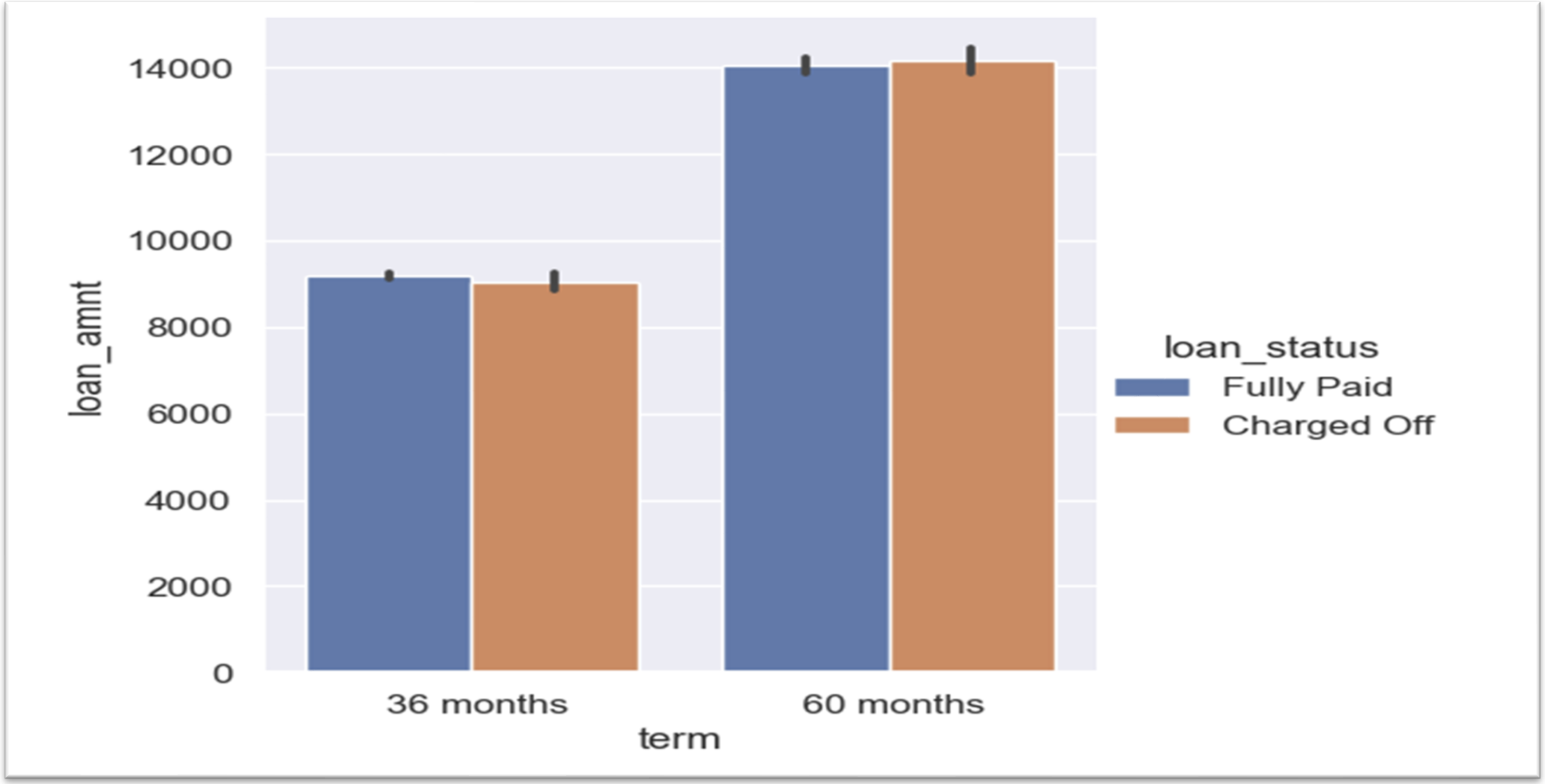
Observation:

Applicants with Higher Salaries: They primarily apply for loans related to "home_improvement," "house," "renewable_energy," and "small_businesses."

Standardization and Visualization: To conduct further analysis, it's essential to group and standardize column variables to simplify and enhance visualization.

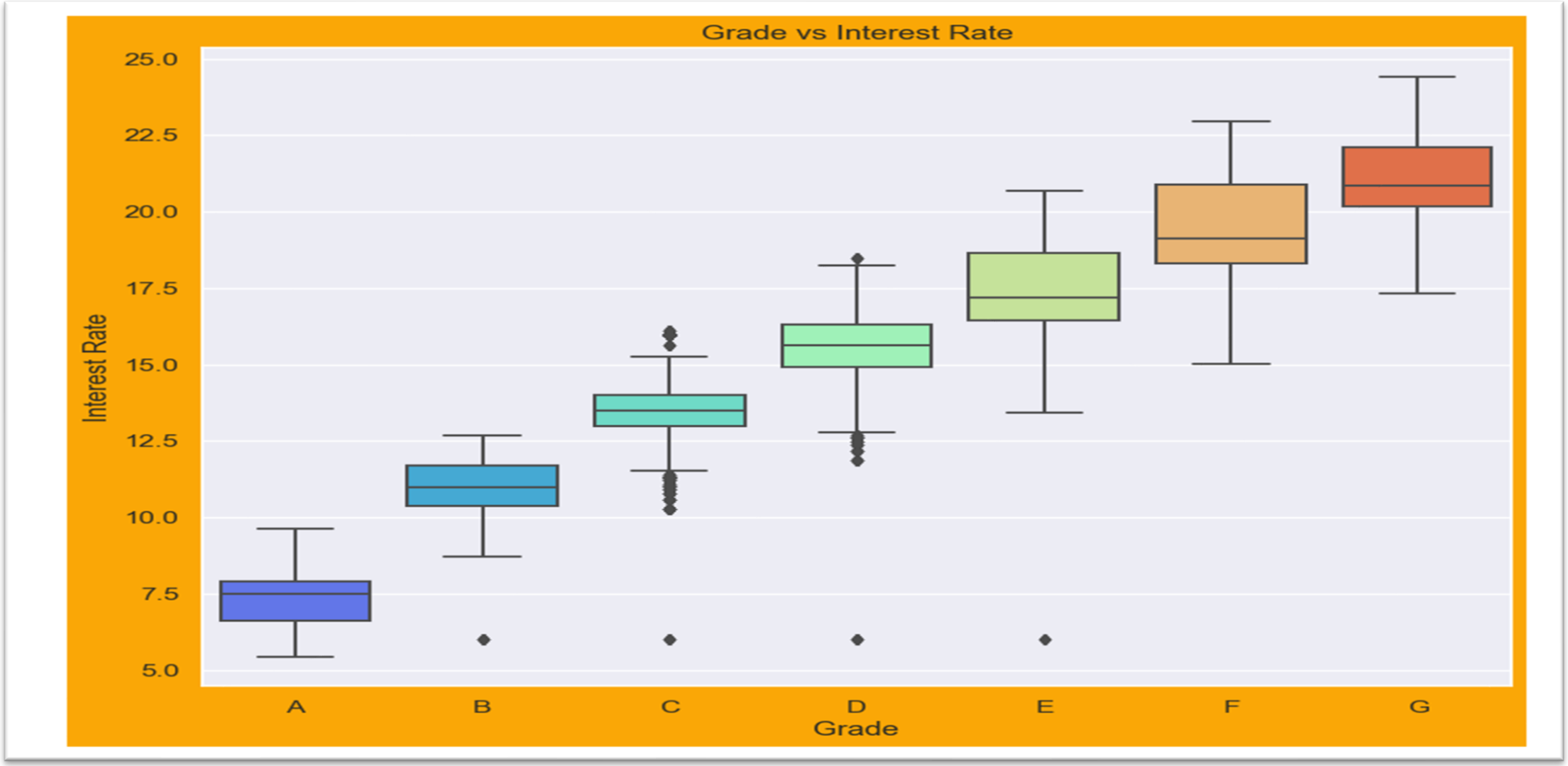


- Interest rates tend to rise as the loan amount increases.
- Larger loan amounts are often associated with longer loan terms, which can contribute to higher interest rates.

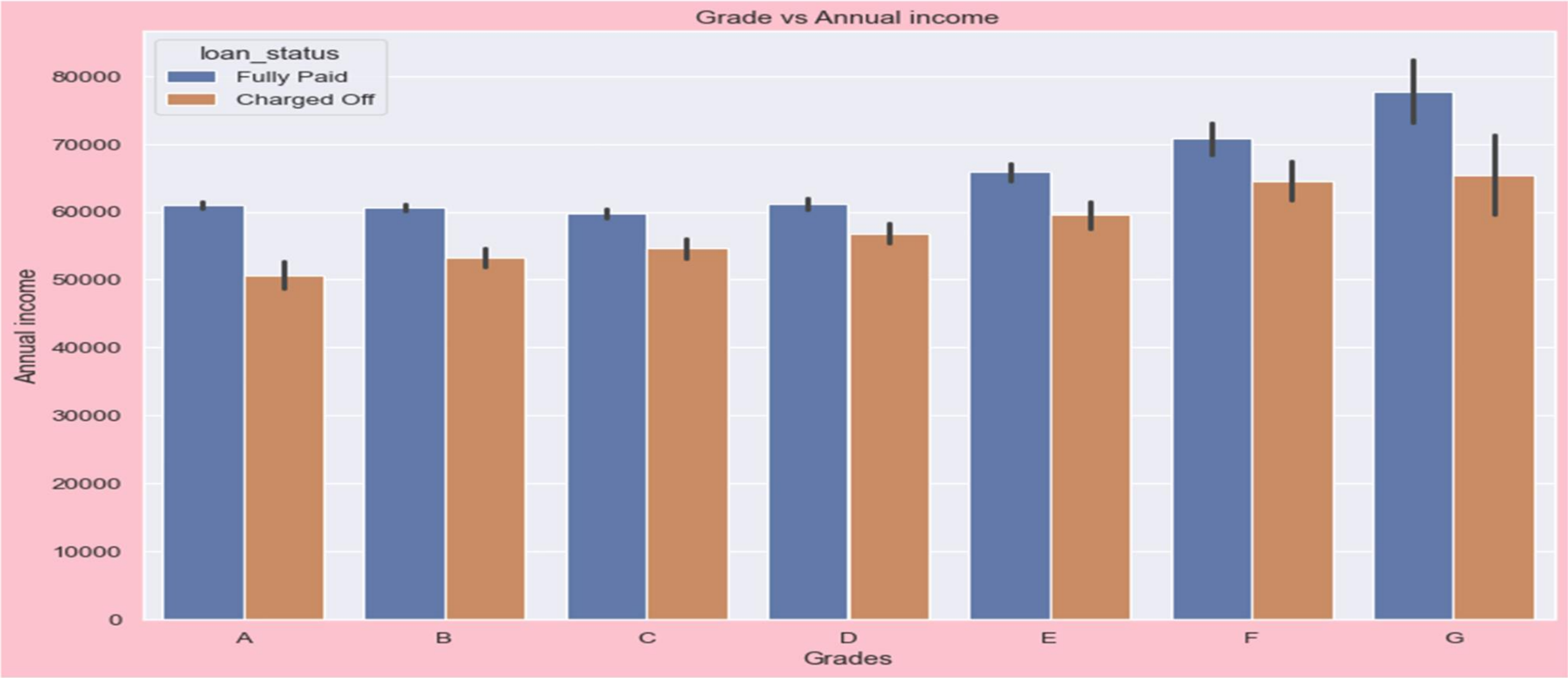


Observation:

Longer Loan Term, Larger Loan Amount: People who choose longer loan terms tend to apply for larger loan amounts.

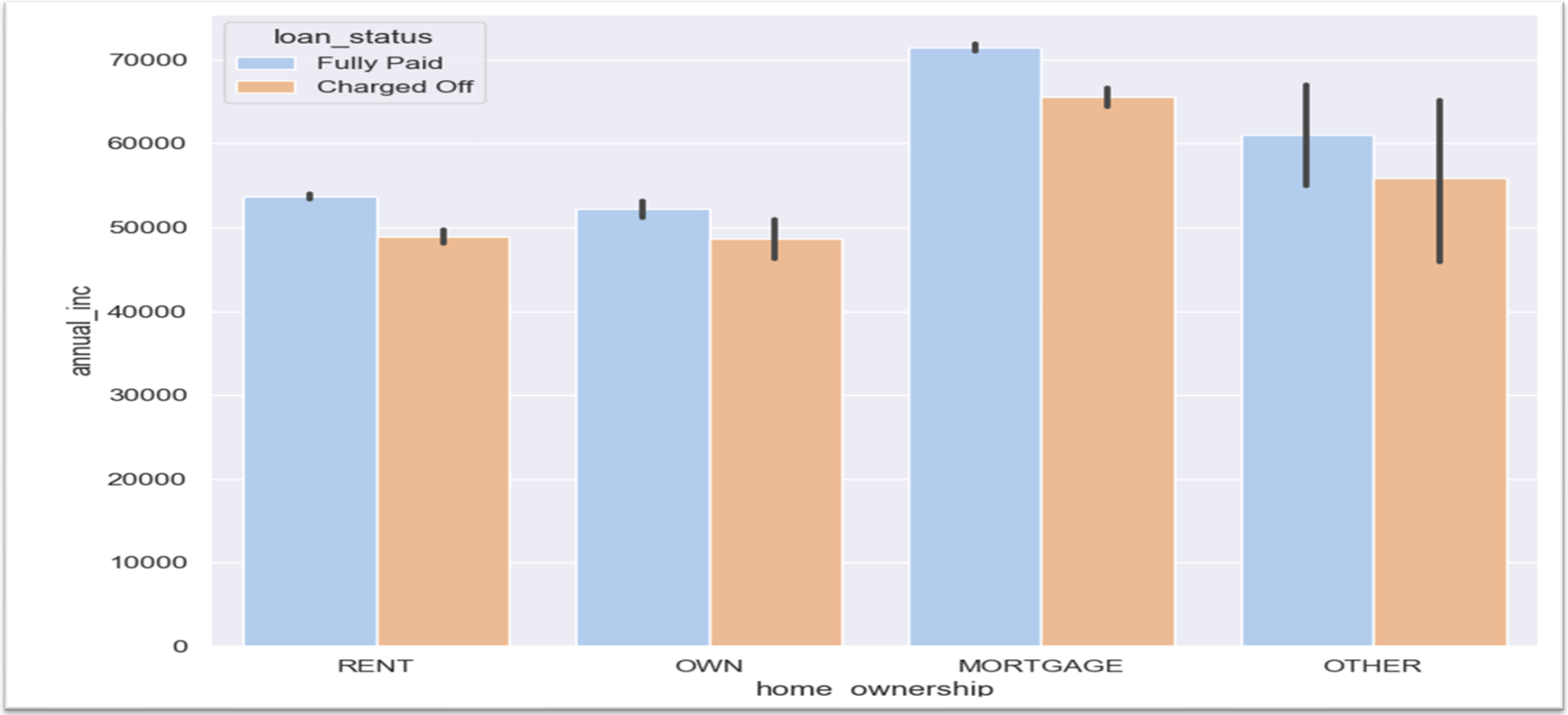


- As the credit grade moves from A to F, indicating a decline in borrower creditworthiness, there is a clear trend of increasing interest rates.
- The annual income of borrowers may also influence their assigned credit grade, with higher incomes often associated with better credit grades.



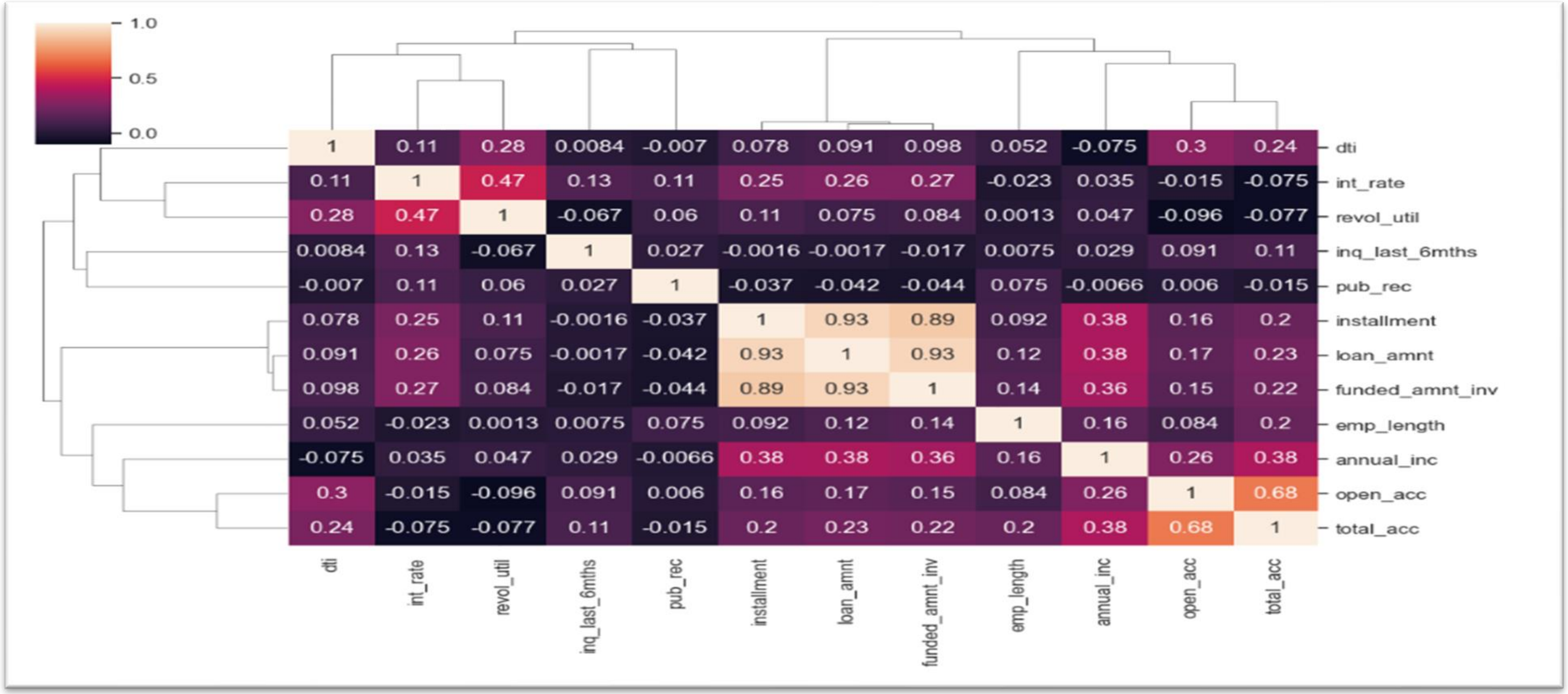
•Those labelled as "charged off" tend to have lower annual incomes compared to those who have "paid fully," especially within the same interest range.

•Home ownership status may influence loan repayment, with some differences observed in default rates based on ownership type.

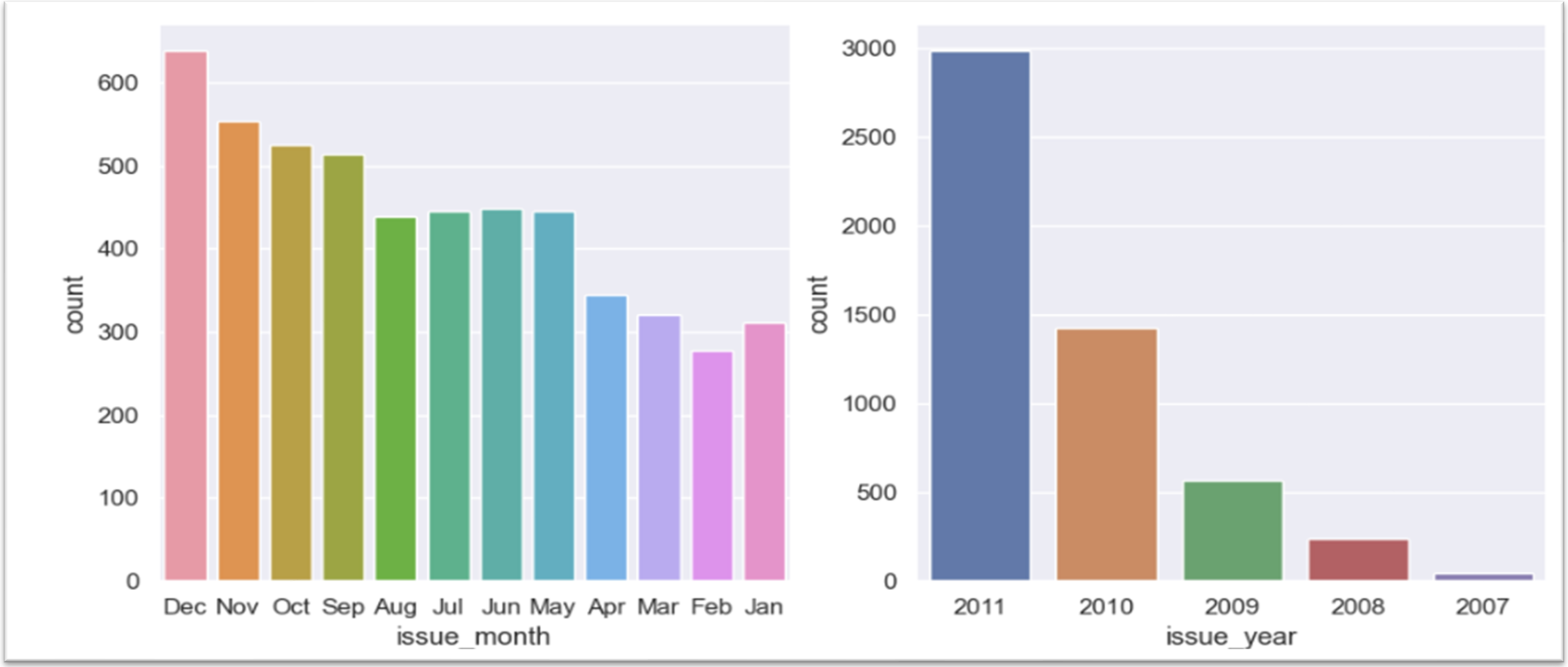


Observation: People whose homeownership status is "MORTGAGE" had the highest default rate among different ownership types.

Correlation Matrix - Quantitative Variables



Observation:
Loan Amount, Investor Amount, Funding Amount: Strong positive correlation among these financial variables, indicating they move together.
Debt-to-Income Ratio (DTI): Inverse relationship with annual income; low income leads to high DTI, and vice versa.
Annual Income and Employment Years: Positive correlation; income tends to increase with more work experience.

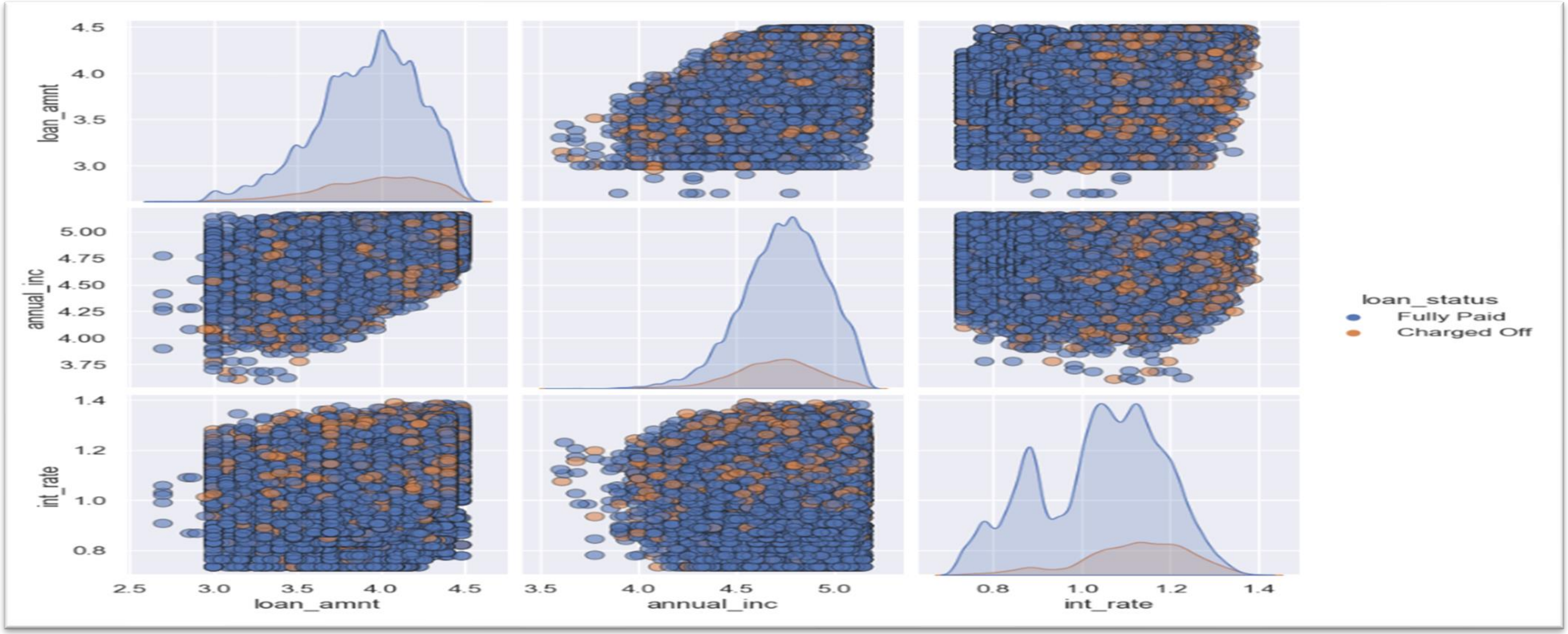


Observation:

Maximum Defaults in December: The highest number of defaults occurred when loans were sanctioned in December, indicating a potential seasonal pattern.

Higher Defaults in 2011: Loans issued in the year 2011 had a higher number of defaults compared to other years, suggesting a specific trend for that year

Multivariate Analysis - Pair Plots



Observation:
Interest Rate and Charged-Off Ratio: There's a positive correlation; higher interest rates tend to result in a higher charged-off (default) ratio.
Annual Income and Loan Amount: There's a slight positive correlation; as annual income increases, loan amounts also tend to increase.
Increase in Defaults with Years: The number of defaults (charged-offs) tends to increase as the number of years progresses.
Interest Rate and Loan Amount: Interest rates generally increase as loan amounts increase.

Conclusions

Renters Default More: Renters have a higher loan default rate, indicating potential financial instability compared to homeowners.

Debt Consolidation Leads to Defaults: Loans for debt consolidation purposes have a higher default rate, suggesting financial challenges for those consolidating debts.

Higher Incomes, Specific Loan Purposes: Applicants with higher salaries often choose loans for home improvement, house purchases, renewable energy, or small businesses, indicating investment preferences.

Interest Rates Rise with Loan Amounts: There's a positive correlation between loan amounts and interest rates, meaning larger loans generally incur higher interest charges.

Homeownership May Indicate Lower Default Risk: Homeowners may have a lower risk of loan default, potentially due to greater financial stability associated with owning property.