Lending Club Case Study

by:

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Lending Club : Loan Default Analysis

Lending Club stands out as the leading digital loan marketplace, catering to personal, business, and medical financing needs. With a streamlined online platform, borrowers can easily secure loans at competitive interest rates. However, akin to many other lending institutions, extending credit to high-risk applicants poses the greatest risk of financial loss. Credit loss, defined as the funds forfeited by the lender due to borrower non-payment or default, is primarily attributed to those categorized as 'charged-off' customers, indicating defaulters.

Business objective: The company aims to discern the primary factors influencing loan defaults, known as driver variables. Understanding these indicators is crucial for portfolio management and risk assessment. By identifying high-risk loan applicants through exploratory data analysis (EDA), the company can mitigate potential credit losses by reducing exposure to such applicants.

Problem solving methodology

Load the given loan data with proper encoding

Data cleaning : Removing columns with significant null values, or based on their unique value count, and the ones indicating customer behaviour

Convert values to proper data types & creating new columns as needed

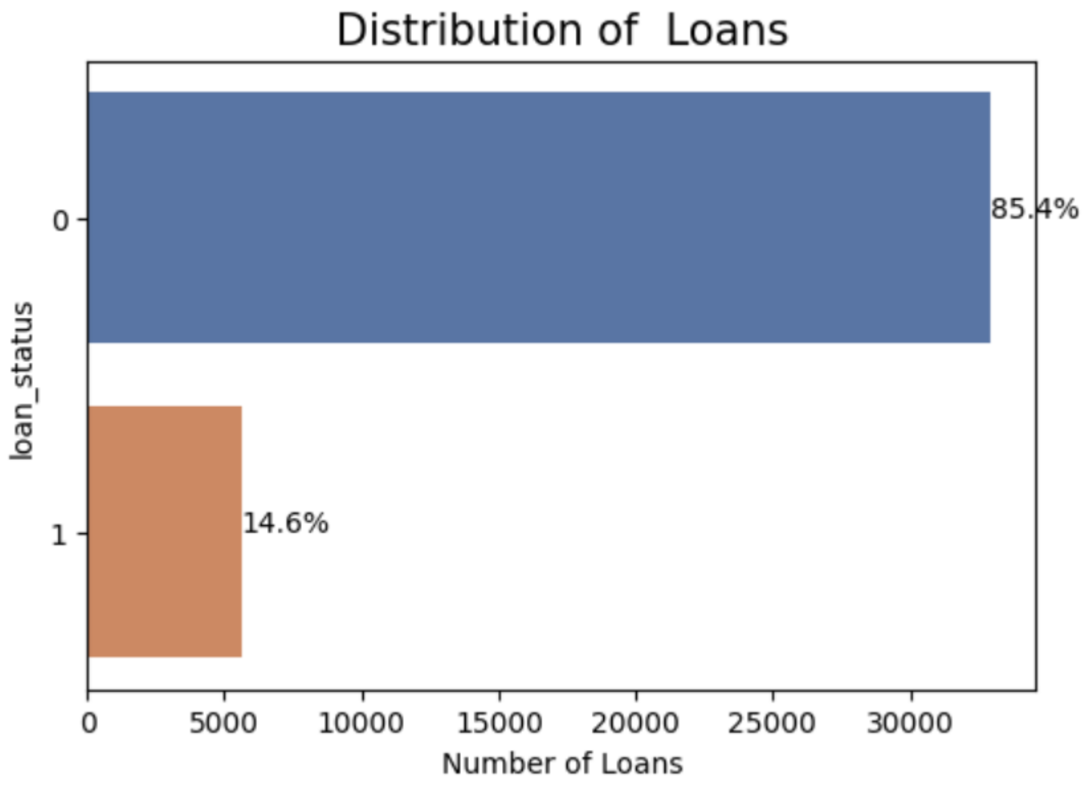
Univariate Analysis : Check the distribution and count of various variables like loan amount, term, grade, purpose etc.

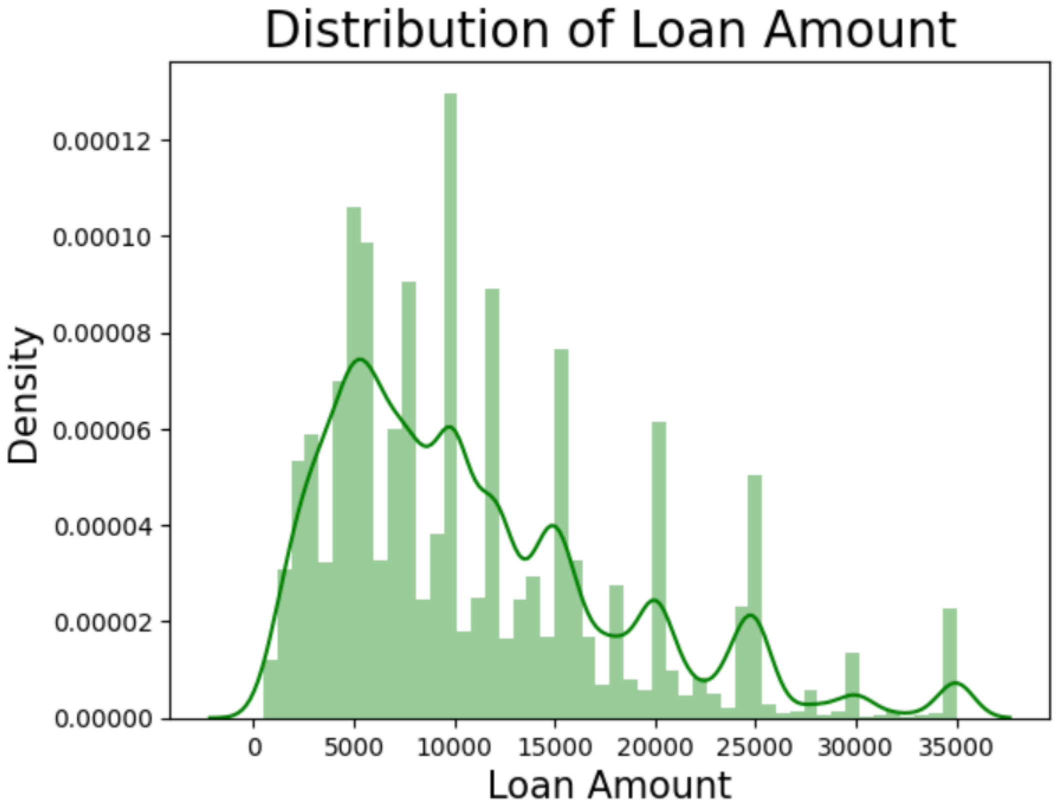
Segmented Univariate Analysis : Check the impact of various variables like loan term, grade etc on the likelihood of a loan being charged off.

Bivariate Analysis : Check the combined impact of two variables on the loan defaults using barplots, scatterplots, heatmap etc.

CONCLUSION : Observations about the variables which are driving factors for the loan defaults and Recommendations to the Lending Club

Overall Loan Distribution

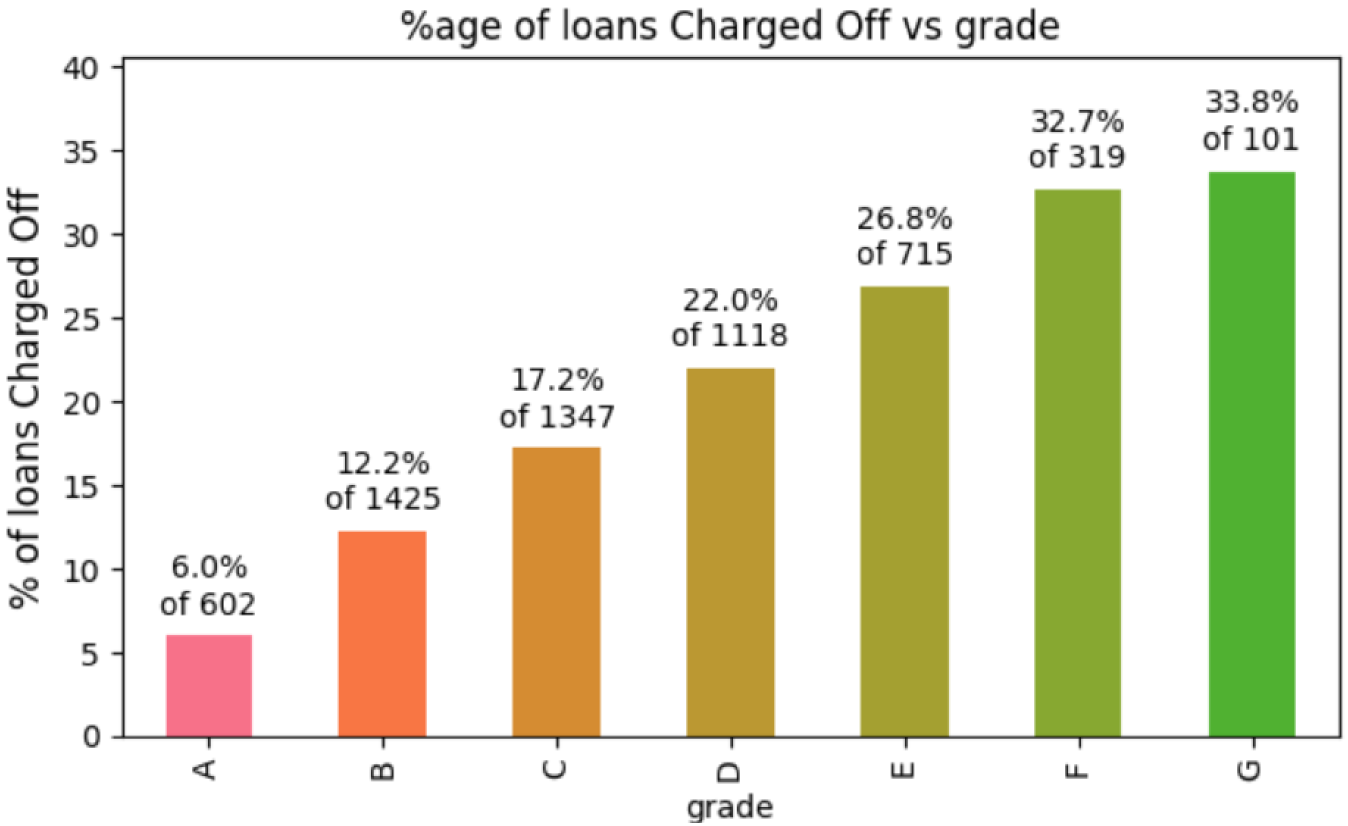




Observation : Around 15% of loans are defaulted. Any parameter increases the %age default of 20% can be risky. Loan amount distribution is left skewed with majority range of 5k-15k

Understanding Loans - Grade

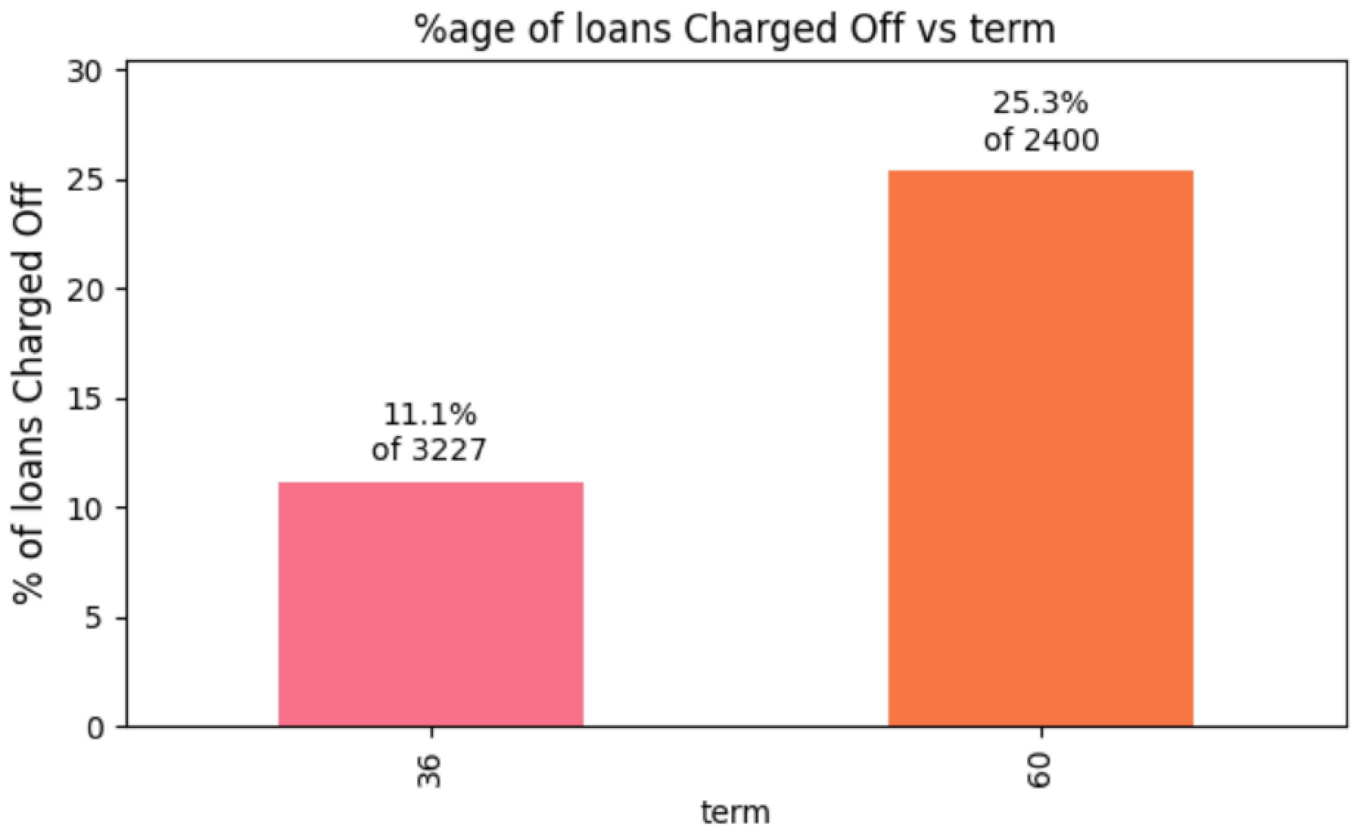
➢ **Objective :** To analyze the impact of Loan grade on the loan defaults.



➢ **Observation :** Better Loan grade has more chance of getting fully paid and less chance of being charged off. LC is doing good job in grading loans !

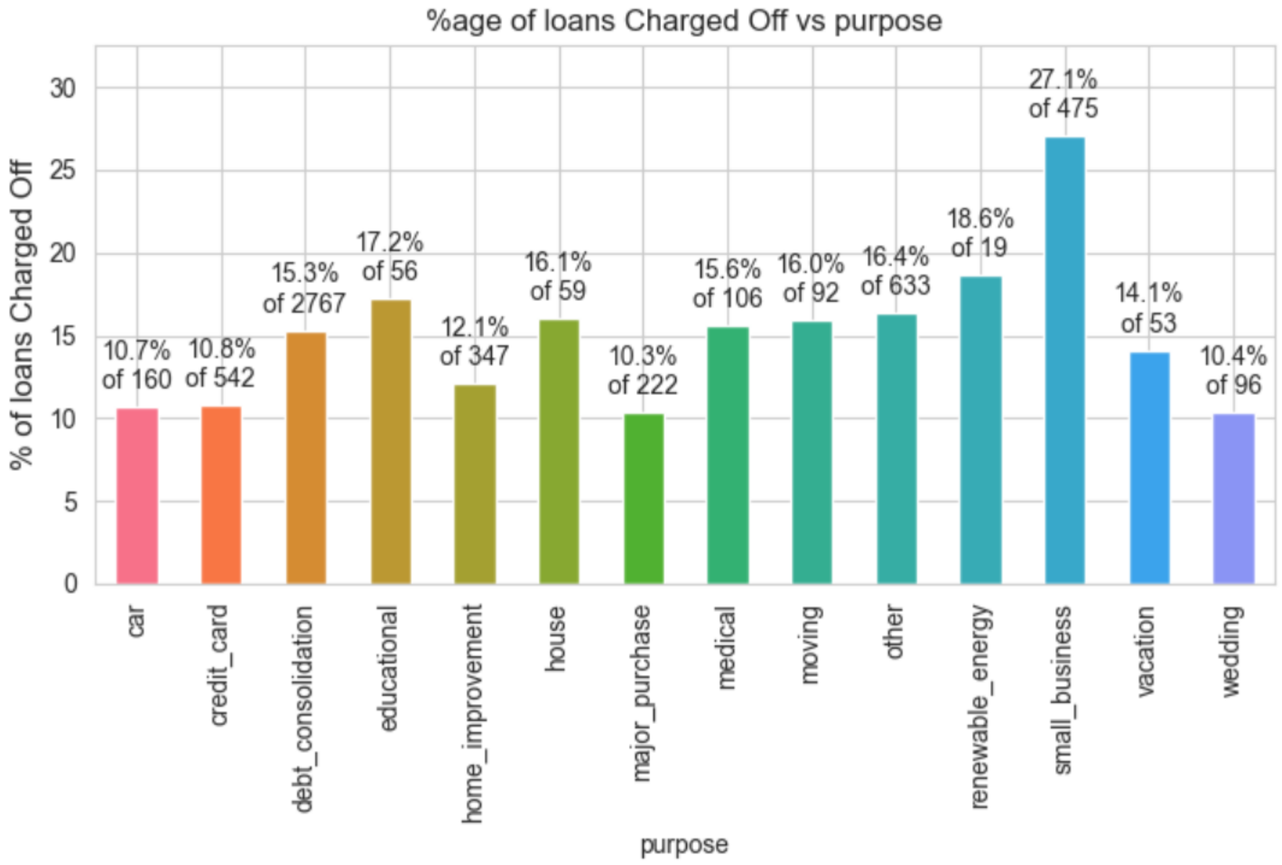
Understanding Loans – term

➢ **Objective :** To analyze the impact of Loan term on the loan defaults.



➢ **Observation :** Loan terms of 36 Months has better percentage of getting paid off.

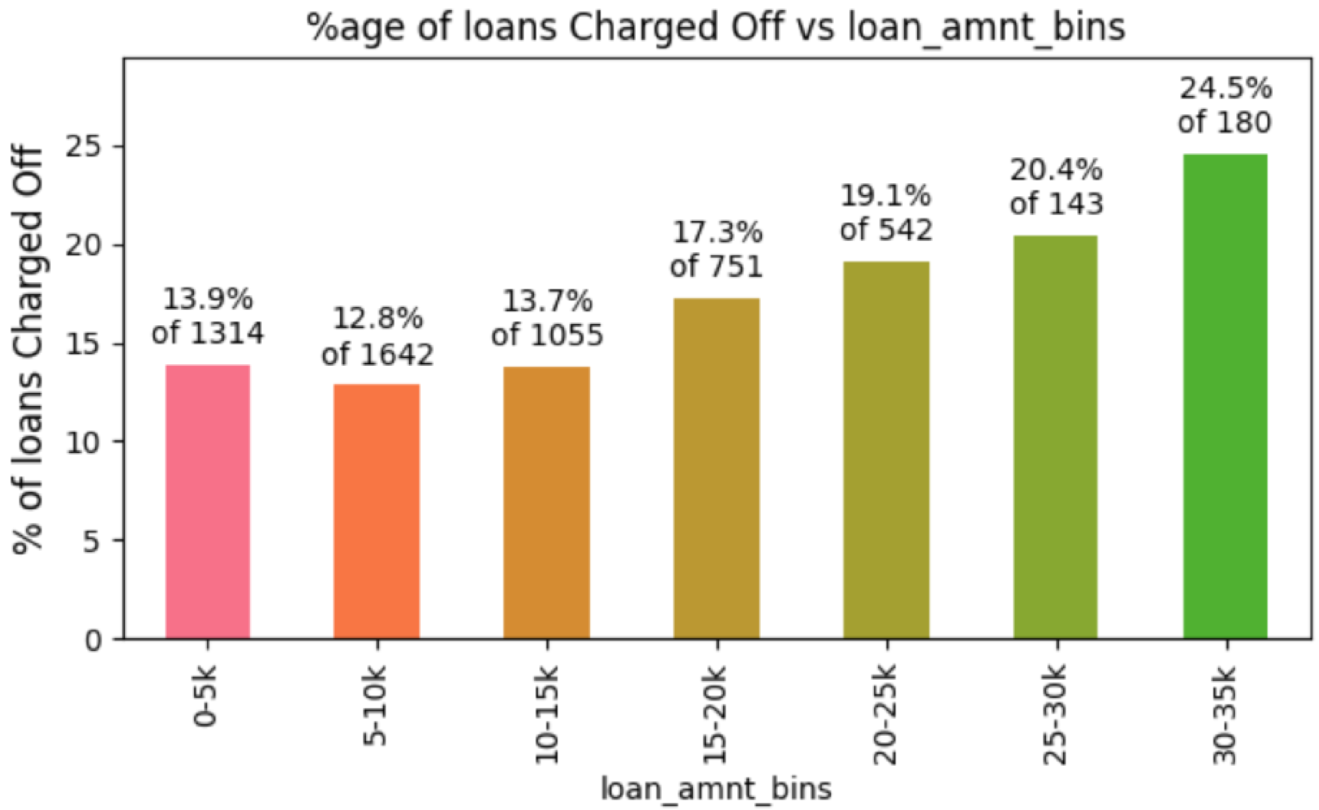
Understanding Loans – Purpose



➢ **Observation : Small business is risky , while debt consolidation is the primary reason of loan requests.**

Understanding Loan Amount

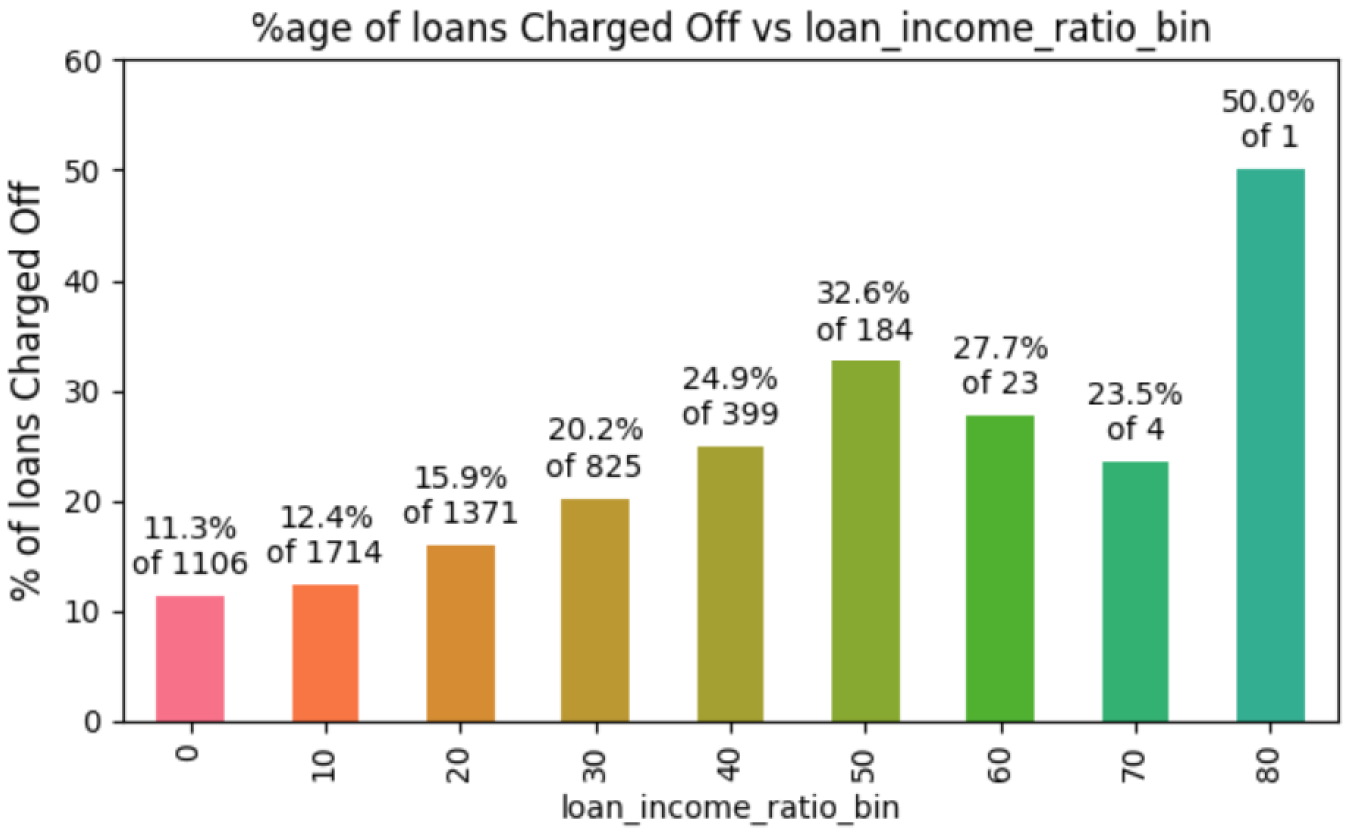
- **Objective :** To analyze the impact of Loan amount on the loan defaults.



- **Observation :** The higher loan amounts have a greater chance of being charged off.

Understanding Loans and Income

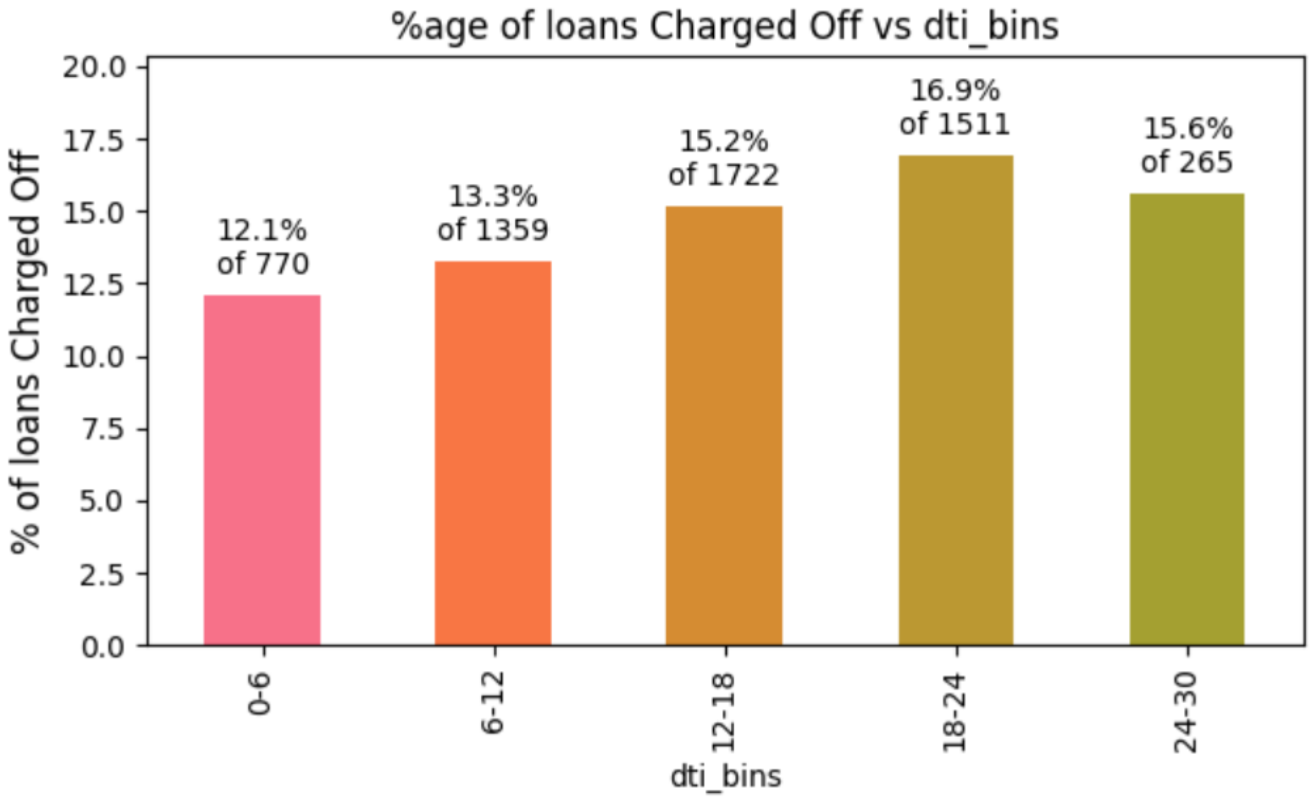
- **Objective :** To analyze the impact of loan amount to annual income ratio and defaults



- **Observation :** Higher the loan to annual income ration , higher is the chances of default

Understanding Debt to Income Ratio

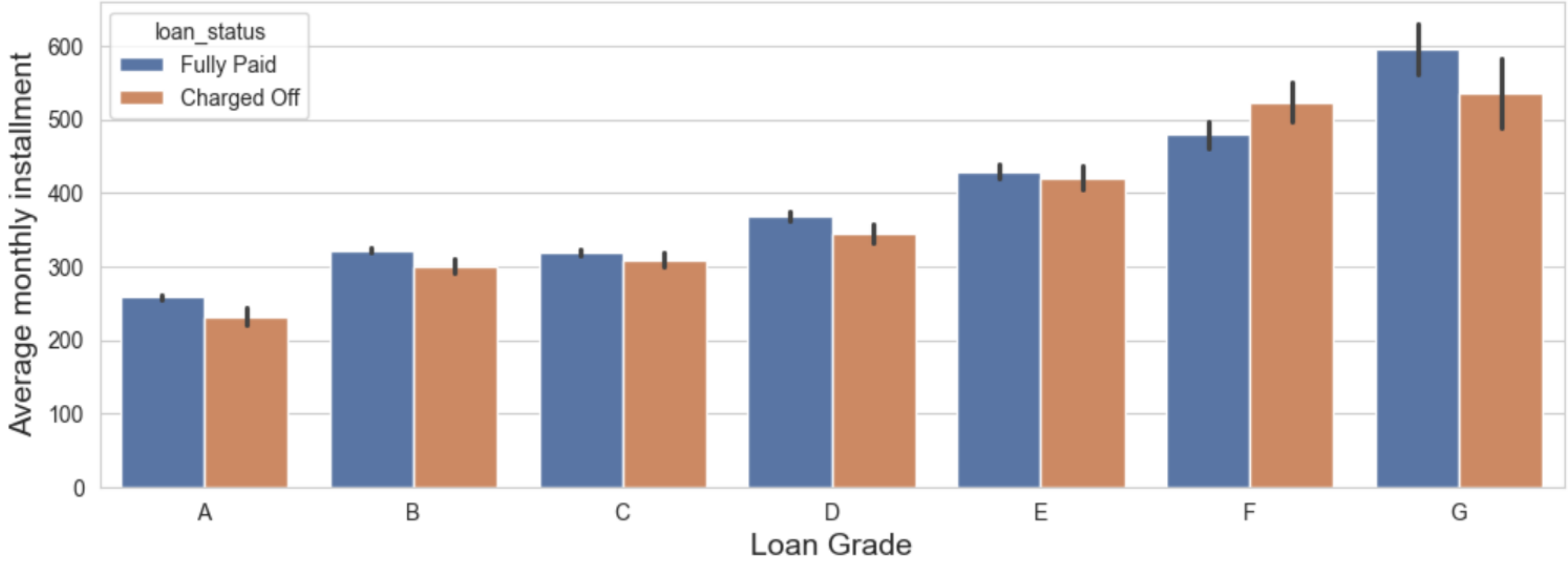
- **Objective :** To analyze the impact of DTI ratio on the loan defaults.



- **Observation :** We can see a general trend of loans being defaulted when dti ratio is higher.

Analysis - Loan Grade and Installment

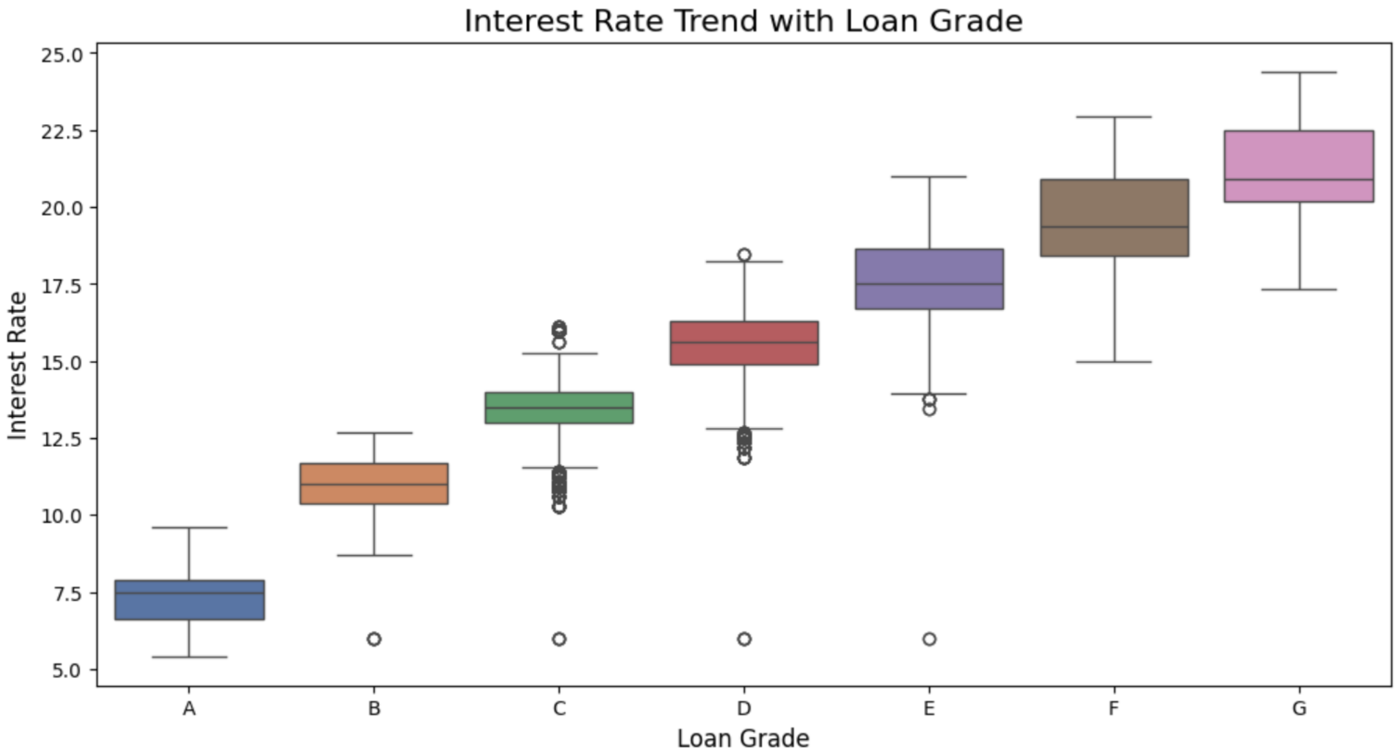
- **Objective :** To analyze the impact of Loan grade and installment on the loan defaults.



- **Observation :** Loans with lower grade have higher average monthly installment and thus more likely to be charged off.

Analysis - Interest Rate

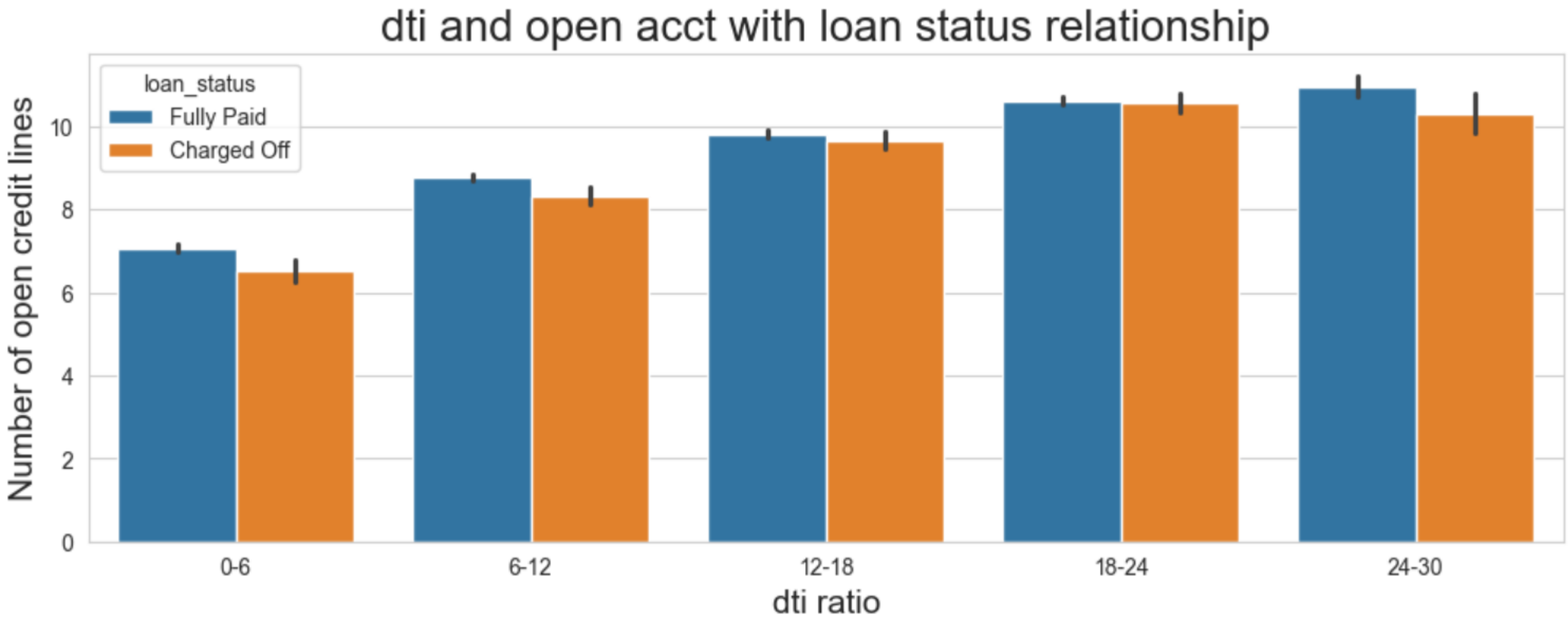
➢ **Objective :** To analyze the relation between Loan grades and interest rate.



➢ **Observation :** Interest rate is higher with bad Loan grades which are more likely to be charged off.

Analysis - Loan Grade and Installment

➢ **Objective :** To analyze the impact of DTI ratio and Num of open acct on the loan defaults.



➢ **Observation :** Higher number of open credits have more DTI ratio leading to higher chances of default.

Conclusions One pager

- LC assigns loan grades from A to G, with a higher likelihood of default as the grade descends. Grades F and G, in particular, see over 30% of loans being charged off.
- Loans with a 36-month term exhibit a better payoff percentage compared to those with a 60-month term, where defaulters are more common.
- Interest rates impact loan defaults, with higher rates correlating to increased charge-offs.
- Installment amounts are higher for charged-off loans.
- Debt consolidation is the most common loan purpose and also accounts for the highest number of defaults.
- Higher loan amounts are associated with a greater likelihood of charge-offs.
- Debt-to-income ratio (DTI) influences loan defaults, with higher DTIs indicating a greater chance of default.
- The loan-to-income ratio is positively correlated with loan default probability.
- For high values of 'dti' & 'installment', the probability of a charged-off loan is also comparatively high

Recommendations

- Stop approving loans to people with prior bad record or declared bankruptcies. At least stop approving high-value loans to them.
- Start increasing interest rate for loans with high DTI to minimize the loss
- Maintain the loan grading system – its very effective looking
- Scrutinize more for loans offered to small businesses – looks risky
- Prioritize loans with lesser term by offering lower interest rates to low income groups