Lending Club Case Study

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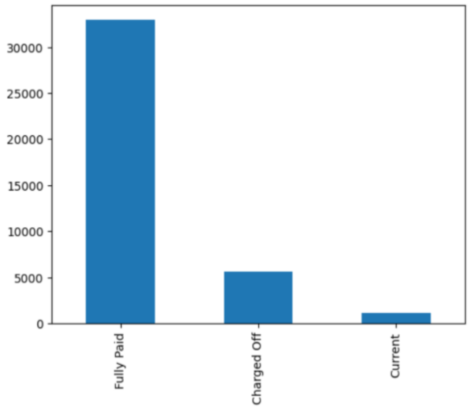
Walkthrough

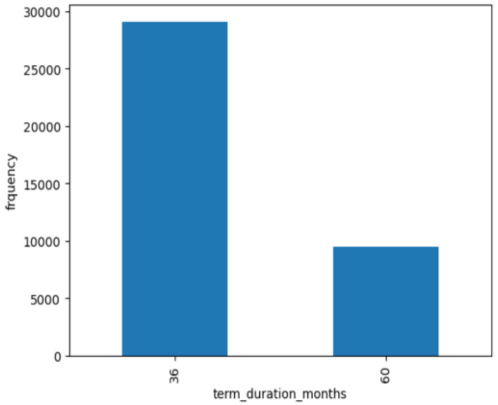
- The lending Club Case study gives you loan data of a lending company through the years 2007-2001
- The objective of the study is to find insights on potential loan defaulters and find insights on measures to be taken to avoid lending to such borrowers
- Insightful findings shall be explained and presented through plots and figures
- Outliers (Few values , Low values and High values) have been dealt with accordingly , if they were affecting the analysis

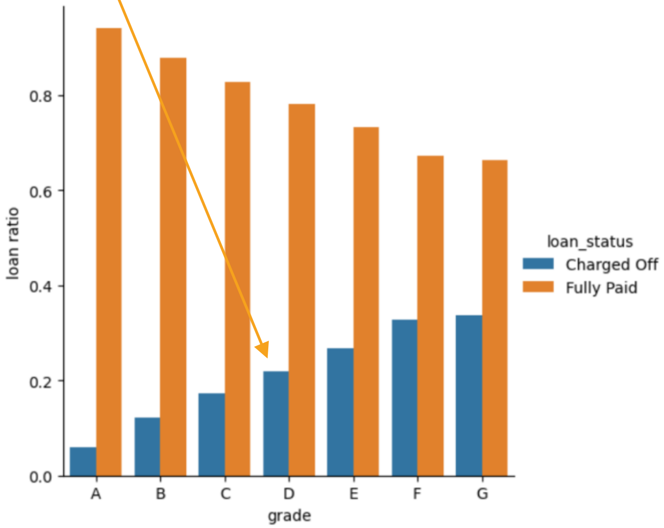
Observations-i

- There are basically 3 types of loan statuses
  - Fully Paid – Loan Closed
  - Charged Off – Defaulters
  - Current - Currently in the loan term
- There are 2 loan terms , i.e. 36 months and 60 months
  - The 36 month duration is preferred over the 60 month duration
- The loans given are divided into categories based on risk
  - The loans are categorized A through G
  - A represents the lowest risk , while G represents highest risk

The Default Rate increases as you go to high risk categories . It's the other way around for Loan Closure

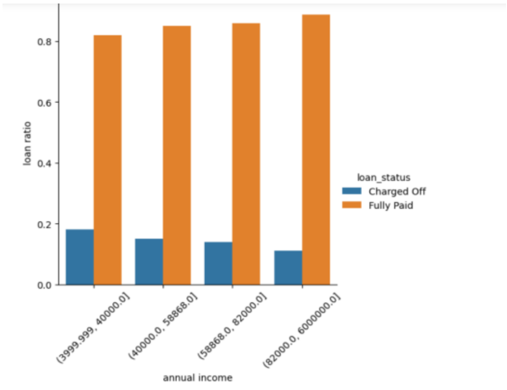


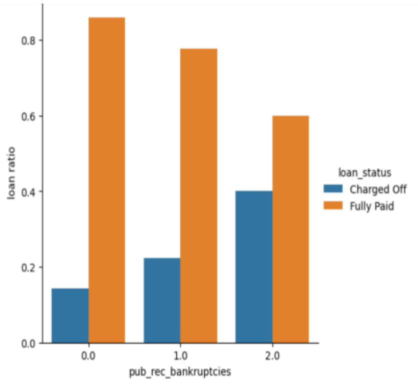


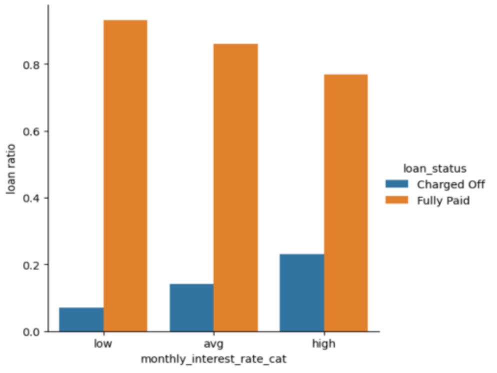


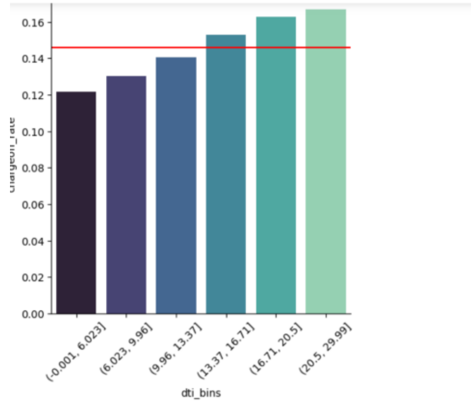
Observations-ii

- As the Annual Income increases , the default rate decreases
- There is similar behavior with records of public bankruptcy
- Similar behavior can also be observed in monthly interest rate
- As you dti(debt to income ratio) increase your default rate also increases







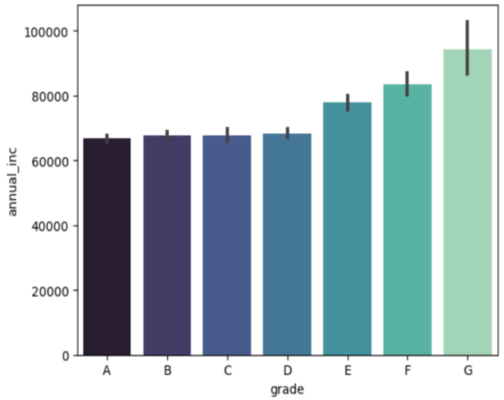


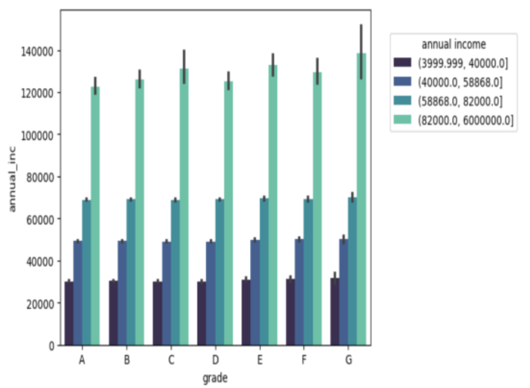
Observations-iii

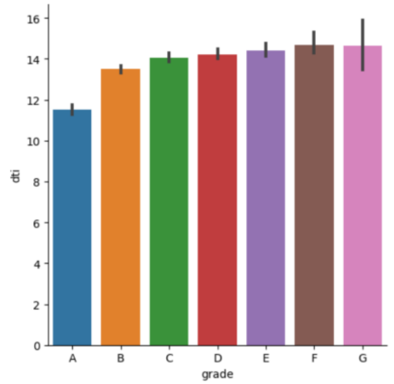
- As you move from low risk to high risk grade , mean annual income increases and so does mean interest rate .

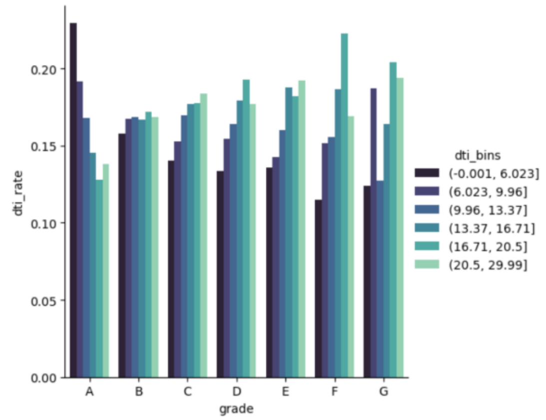
- On a more granular level it can be observed that although all the grades have all annual income categories , there is this arbitrary behavior that shows a higher mean annual income in the high income category(82,000-6,000,000) of the high risk region . This offsets the previous claim that as your income increases the default rate decreases

- On further analysis it was observed that this peculiar behavior is due to the dti ratio(debt to income ratio) . As seen in the plot , there is higher mean dti rate in high risk grades . It can be seen in the right most plot that although grade A seems to have higher dti rate it is to be noted that the dti ratio(dti bin) is on the smaller side . While on the other hand the higher risk grades have a higher dti rates in the higher dti ratio bins.



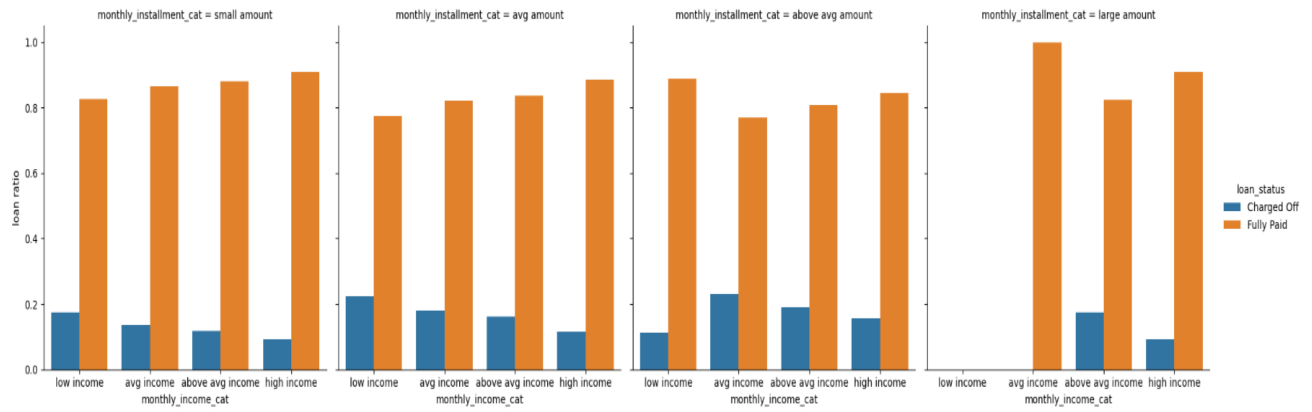


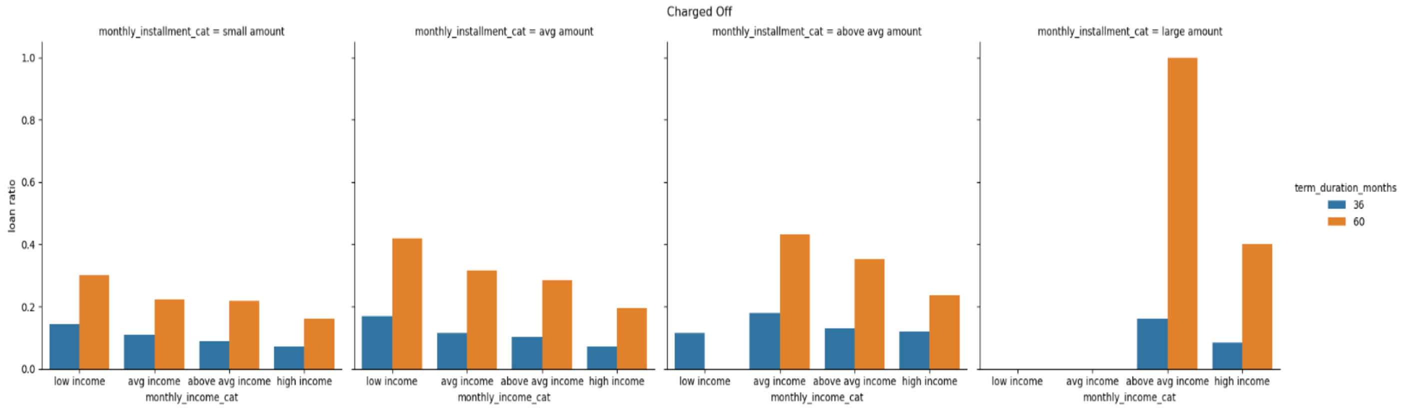




Additional Context

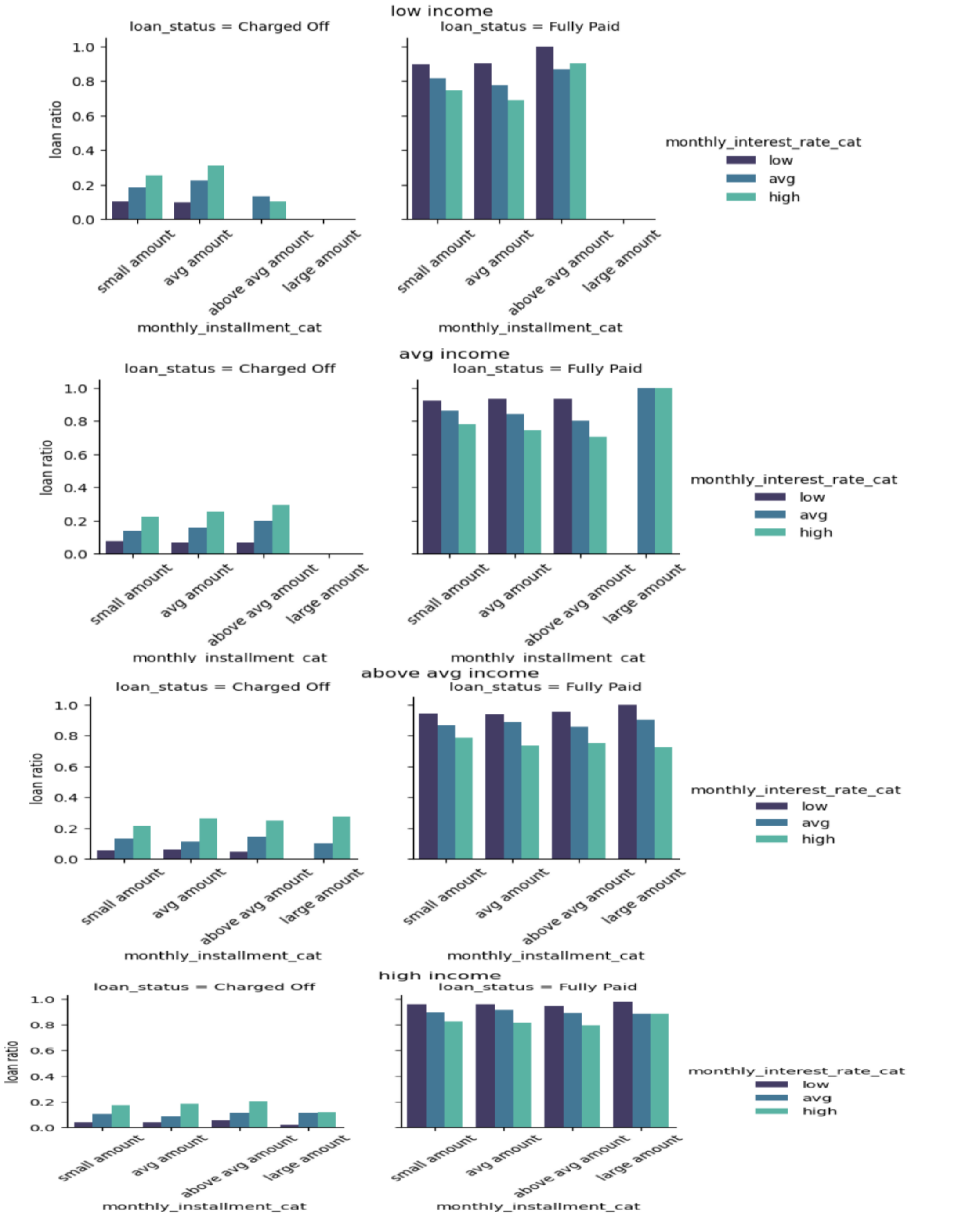
- Across all categories of monthly installment, it can be seen that default rate decreases as monthly income increases .
- Across monthly installments of all categories , it can be observed that the 36 months term has a lower default rate





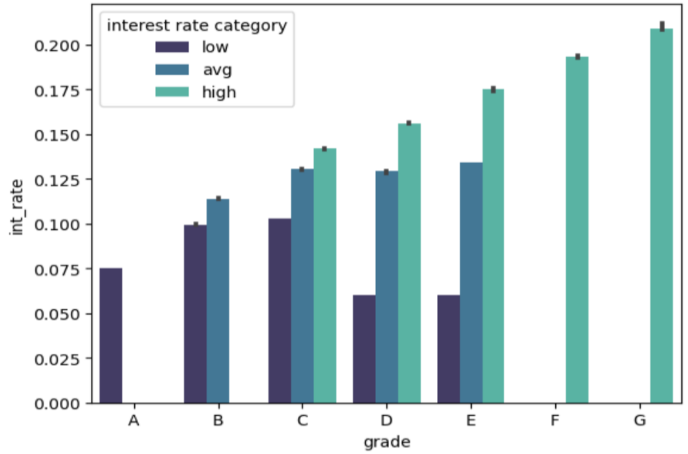
Additional Context-ii

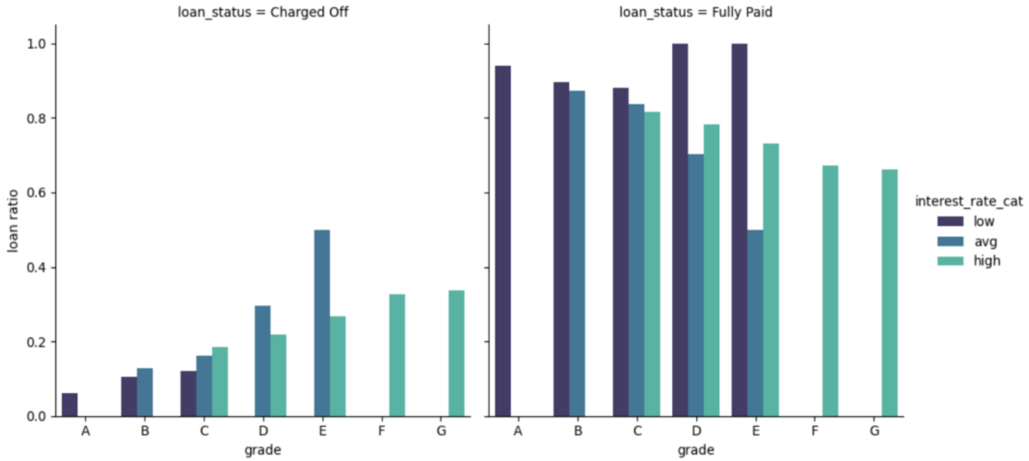
- It can be observed that across most combinations , a higher interest rate means a higher default rate
- Similarly a lower interest rate mean a higher closure rate



Observations-iv

- Additionally higher risk grades have higher interest rates , as compared to lower grades.
- It can be observed that high risk grades have a possibility of receiving higher interest rate loans.
- Higher risk categories have a higher chance of having high interest rates thereby higher default risk



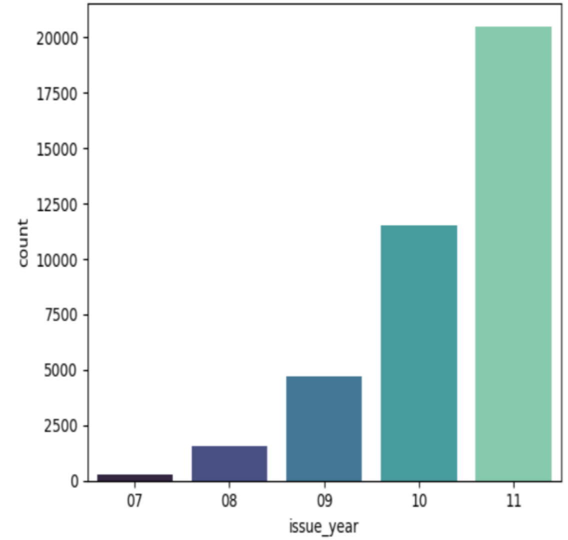


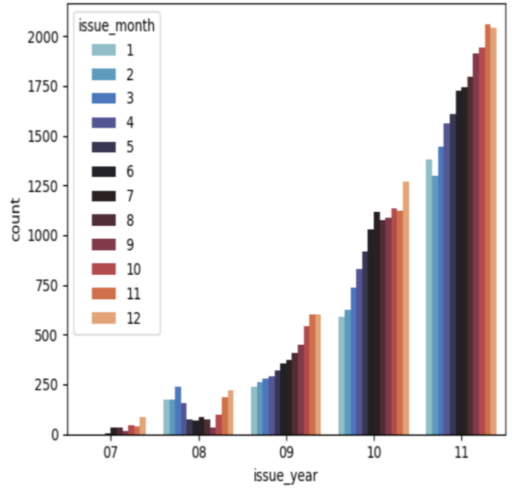
Observations-v

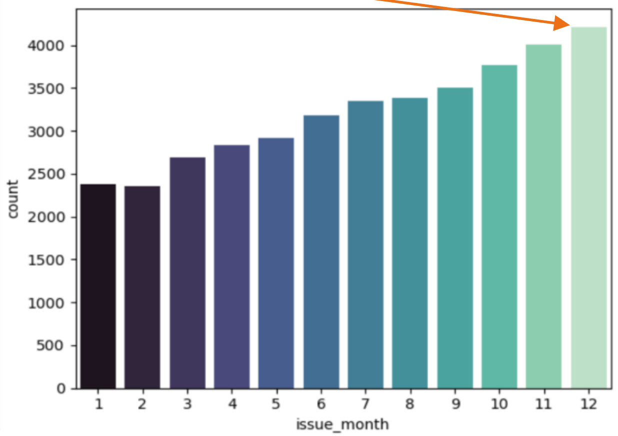
- No.of loans provided has increased over the years

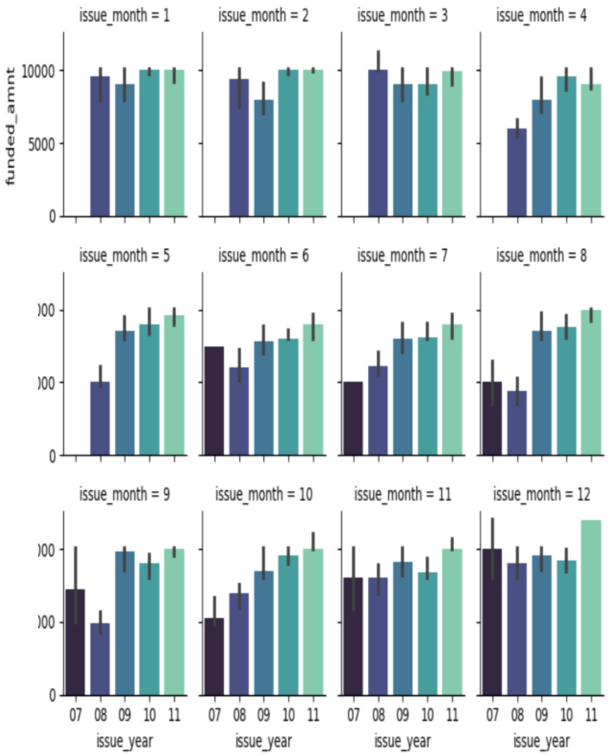
The plot gives insights on the median amount loan funded over the years on each month

The most popular month for loans seems to be December







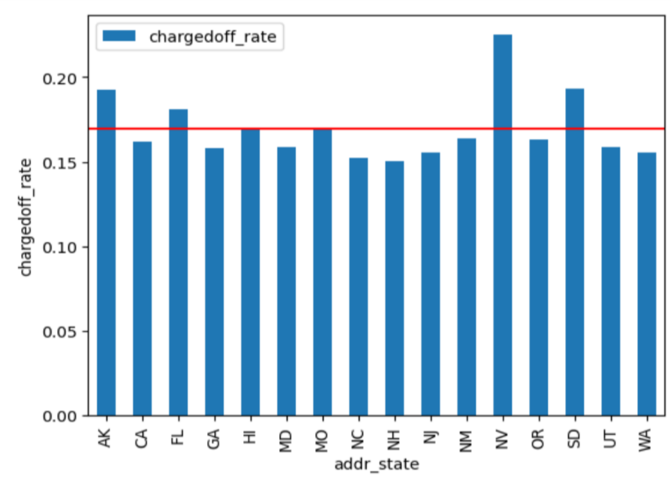


Observations-vi

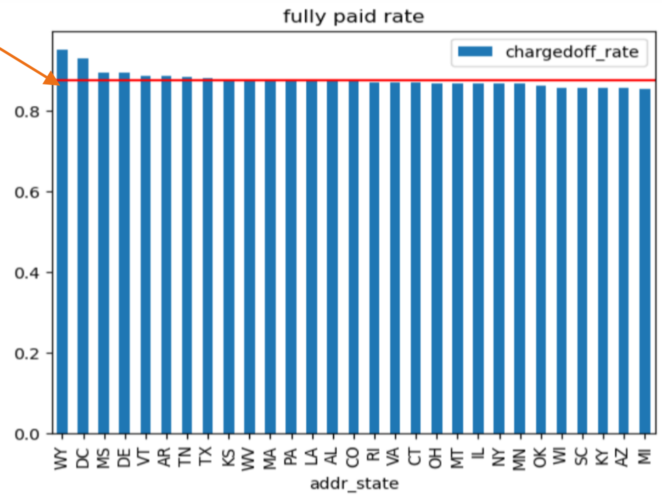
Note : The states which had very few loan entries and ones with comparatively lower chances were excluded in the plots . This was because there was this state with very few records that was coming on top of the default rate plot which is not correct

- The states NV,SD,AK,FL have the high default rates , well above the mean default rate
- The states WY,DC,DE,MS have higher loan closure rates

The mean closure rate

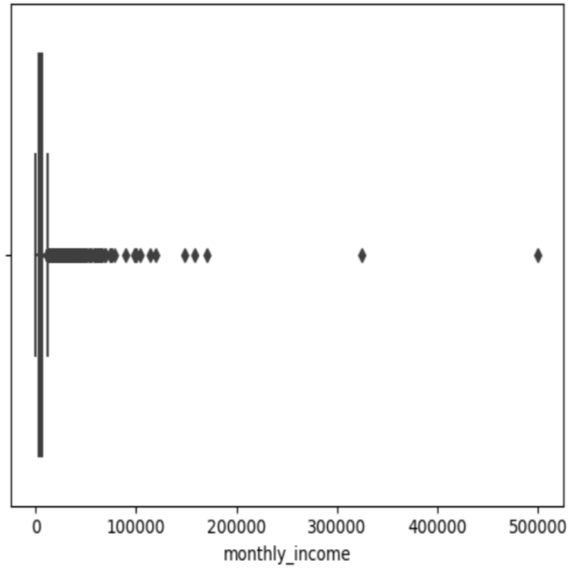


The mean default rate

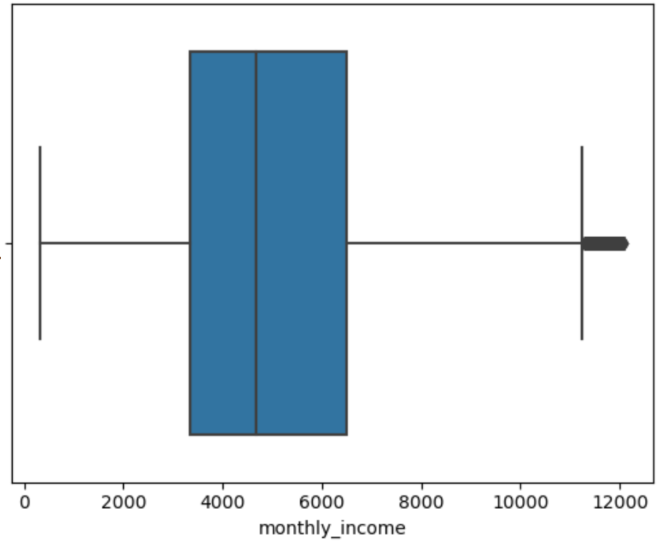


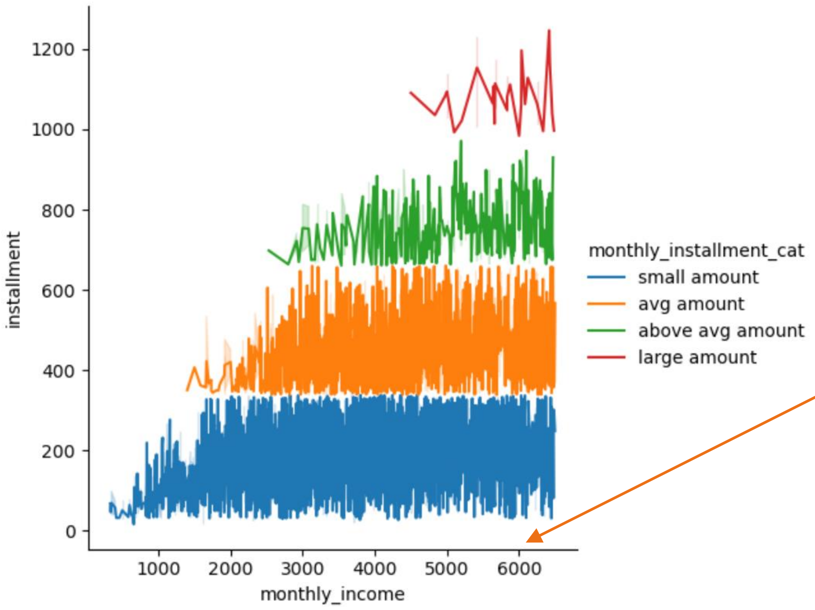
Additional Context iii - Monthly Income Distribution

- Outliers have been removed using IQR outlier detection.
- IQR here stands for “Inter Quartile Range “
- Higher the monthly income higher the installment , but this doesn't stop high income borrowers to opt for lower installments , while lower income borrowers don’t opt for high installments



After treat ment

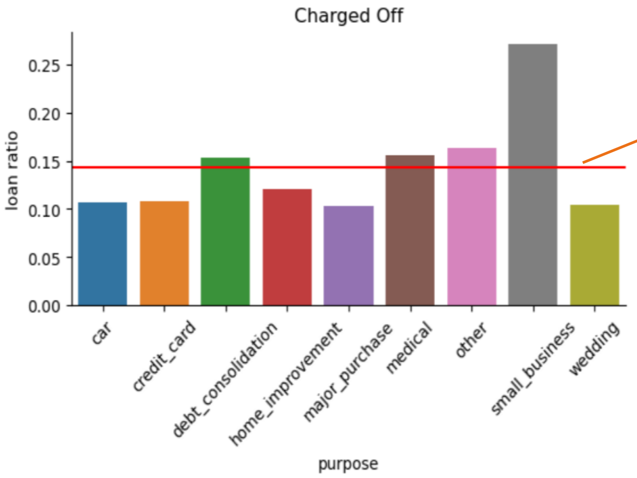




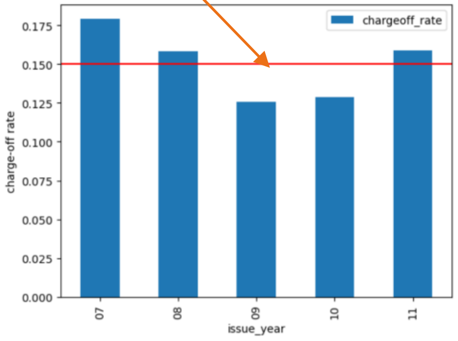
For better visualization income only below the 75th quantile(after IQR outlier removal) was considered for the plot

Additional Analysis

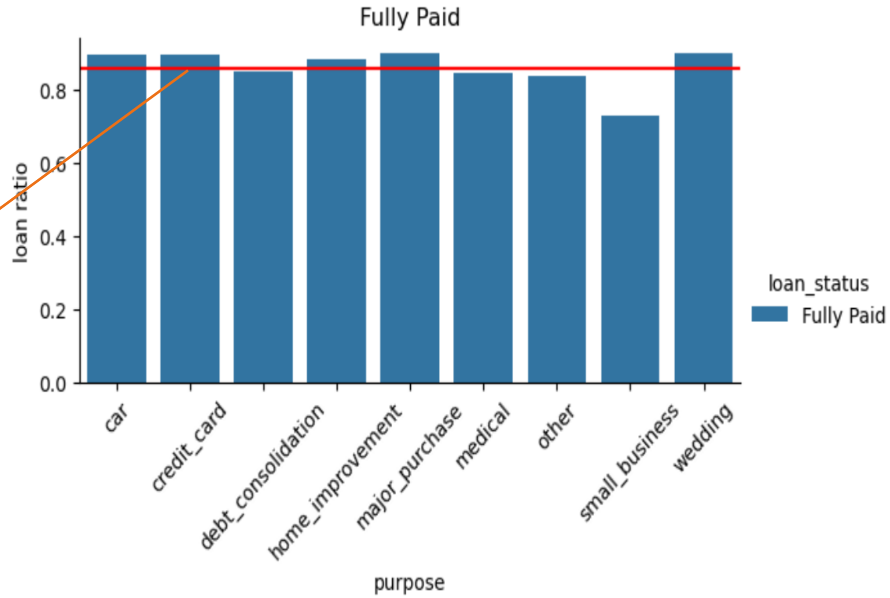
Small Business, Other , Medical ,Debt Consolidation are the categories with high default rates



2007 , ,2008 and 2011 are above mean default rate



Car , Credit Card ,Home Improvement and Wedding loans have a high closure rate



Recommendations

- Accept more grade A loans . Accept more lower risk grade loans and reduce no.of high risk grade loans
- Offer reasonable interest rates
- Bring in more borrowers with above avg income and higher . Also make sure the dti (debt to income) ratio is low.
- Provide more loans to borrowers with no bankruptcy records
- Provide more loans to the states WY,DC,DE,MS
- Decrease no.of loans provided to states NV,SD,AK,FL .
- Provide offers in the month of December as it is the most popular month for loans
- Offer more 36 month loans and reduce 60 month loans
- Increase the no.of car ,wedding , credit and home loans and decrease small business , debt consolidation , other category and medical loans