Lending club case study

Group members

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Problem statement & Data

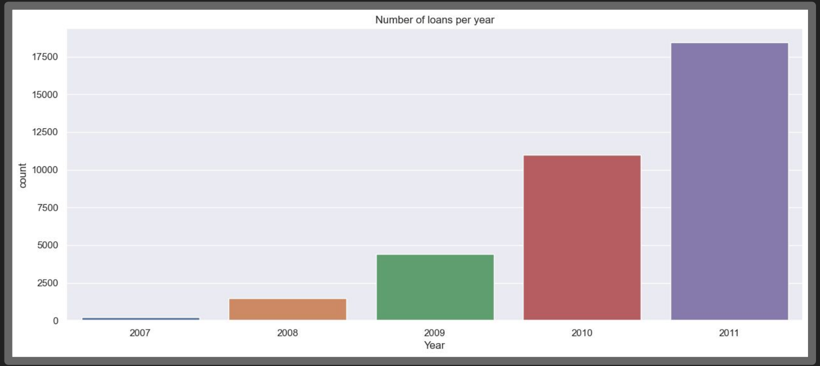
Lending club is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures. Borrowers can easily access lower interest rate loans through a fast online interface. From the data we can see that the number of loans issues are roughly doubling every year from 2007 to 2011

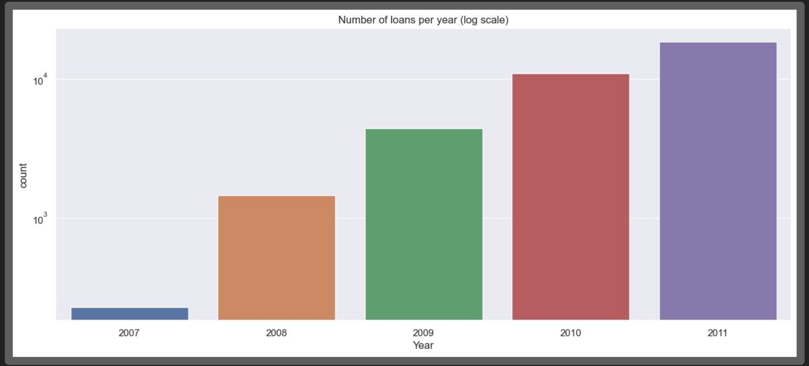
Problem statement

The goal is to reduce default rate as much as possible to reduce risk of losing investment while not turning away potential good borrowers

Data provided

The data is provided as csv file with loans given between 2007 and 2011, there are roughly 40,000 loans / rows listed in the file with 111 unique data points / columns





Problem solving methodology

Data Cleaning

Finding unusable rows and columns in the dataset by looking for null and non unique columns

Data Understanding

Understanding the distribution of major data attributes and removing outliers

Data Analysis

Applying various methods like univariate (quantitative, categorical and segmented) and bivariate analysis to find driving factors for loan default

Recommendations

Suggesting recommendations based on the analysis to reduce risk of default and improve company economics

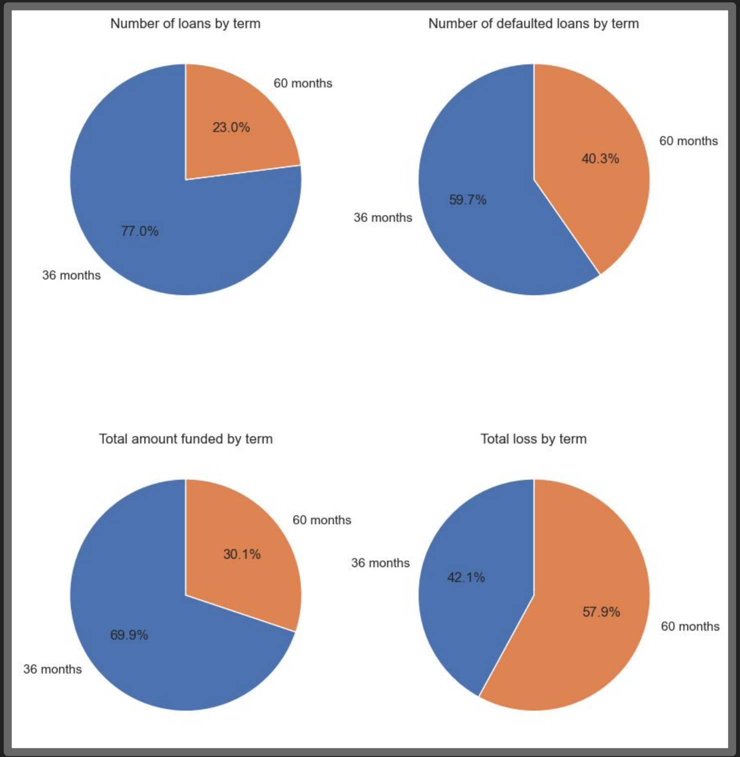
Driving factors

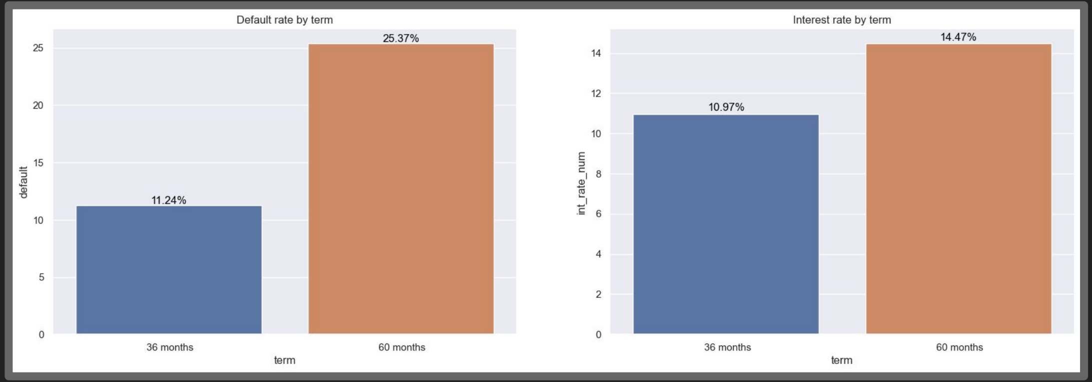
Following driving factors are identified which impact loan default rate, we shall see how they impact default rate over the next few slides

1. Term size
2. Income of the borrower
3. Debt to income ratio
4. Revolving credit utilization
5. Public records of the borrower
6. Past delinquencies
7. Credit history
8. Loan Inquiries
9. Loan amount
10. Purpose of the loan
11. State of loan borrower

Term size

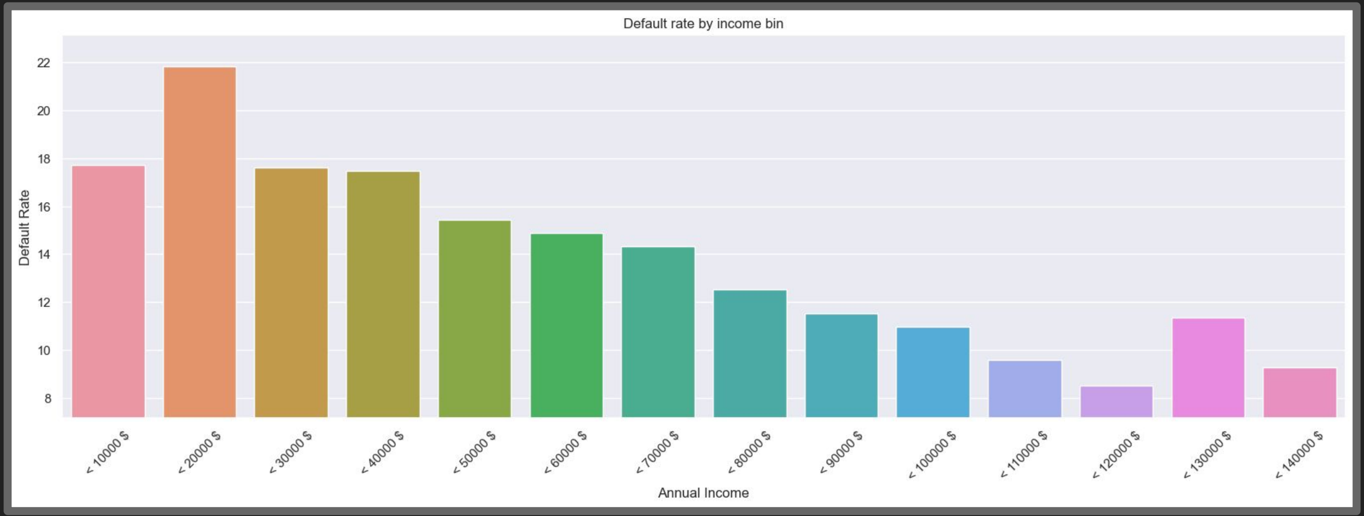
- Default rate is considerably higher for long term loans (60 months)
  - It is higher by a factor of 2.2 compared to 36 month term loans
- Short term loans are much more common taking up 77% of the total loans given
- Long term loans have much higher loan amount (as large loans require longer time to repay) as the total funded amount is 30% of the cumulative loans funded amount even though they are just 23% in count
- Long term loans are contributing to 58% of the total losses on the platform due this combination of large loan sizes and higher default rates
- This could be due to the fact that borrower is more likely to have a change in financial situation in such long term.





Income of the borrower

Default rate gradually decreases as the annual income of the borrower increases, while the risk is at almost 20% for lower income groups (less than 20,000$) it falls to as low as 9% for high income groups (more than 100,000$)



Debt to income ratio & Revolving credit utilisation

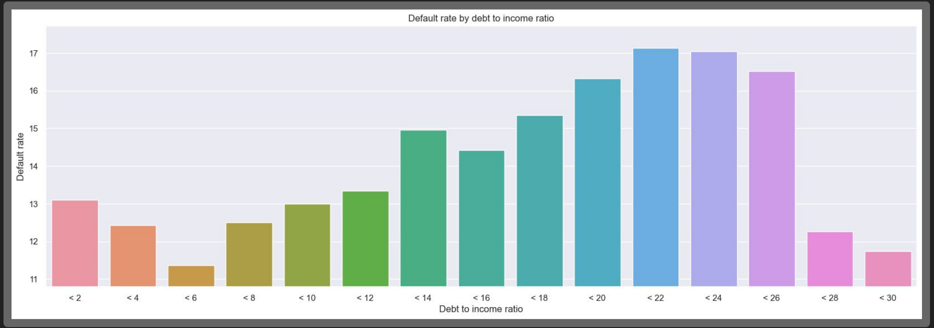
Debt to income ratio is a ratio calculated by dividing total recurring monthly debt by gross monthly income

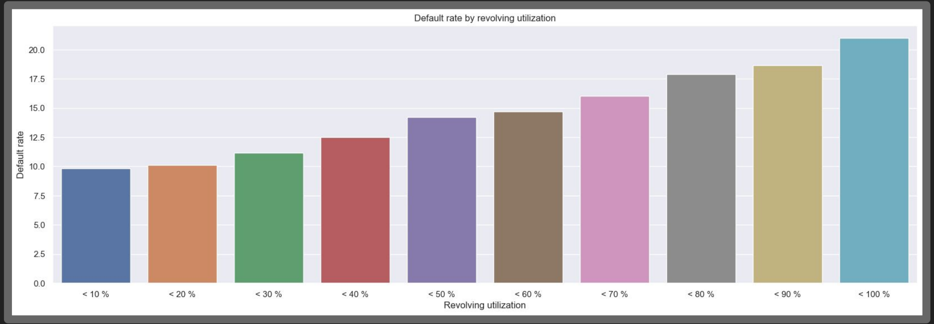
Revolving credit utilization is the amount of credit that you are currently using divided by the total amount of revolving credit you have available.

Both indicate the amount of debt a borrower is in relation to their income, the higher this is the less margin the borrower has left in his income to spend on items other than debt

So the higher the values in these metrics the more prone the user to to default as shown in the graphs below (ignore the last 2 bins in the det to income ratio graph as there is too few data points)

Borrowers with more than 90% revolving credit utilisation are almost at a 20% chance of default



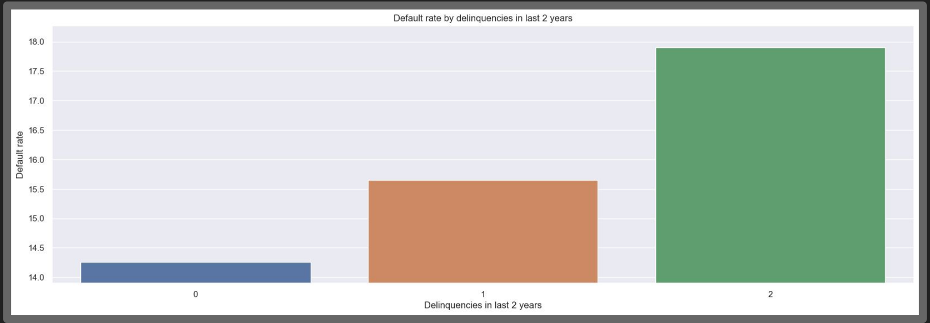


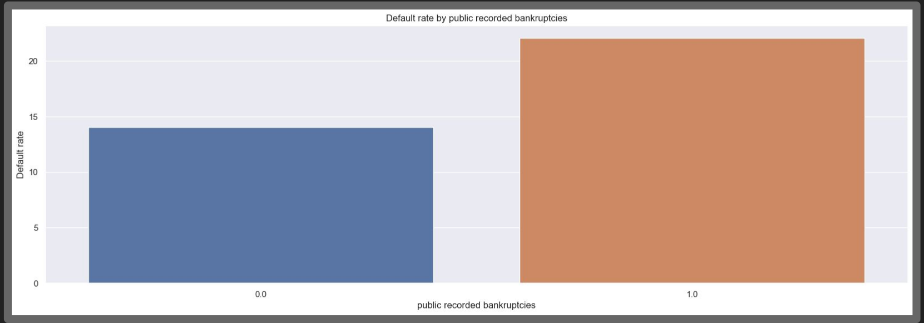
Public records and past delinquencies

Default rate shoots up very dramatically for borrowers with any public records (borrowers with 2 public records is ignore as there were just 4 such occurrences)

Default rate is also quite high for borrowers with any past delinquencies in the last 2 years

Which indicates that the past records are a very strong indicator for loan default

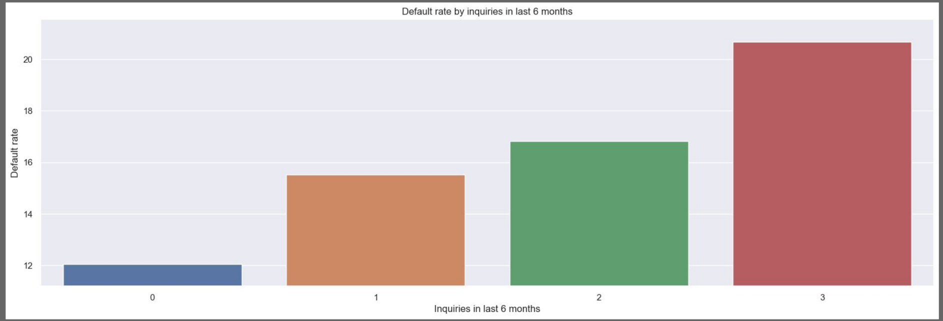


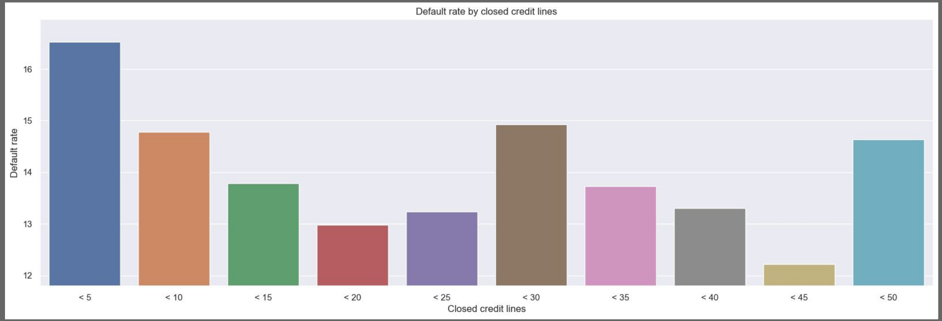


Credit history & loan inquiries

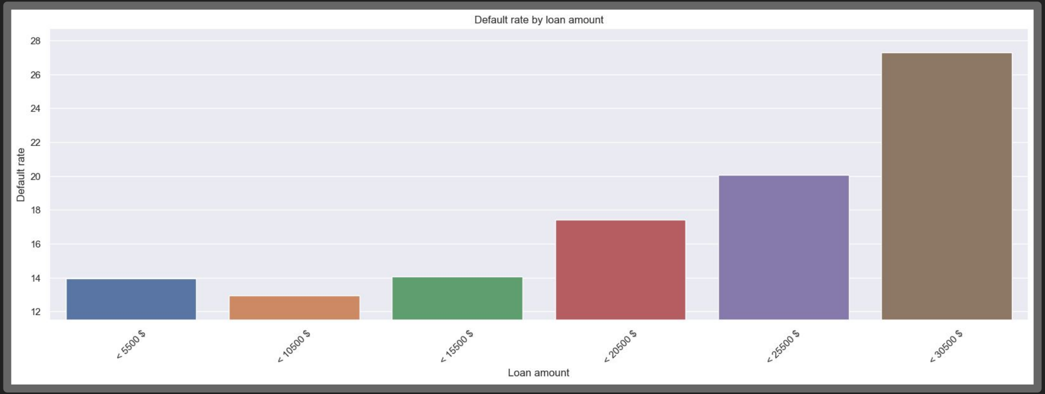
Default rate is higher for borrowers with more loan inquiries in the last 6 months, as this could indicate that the borrower needs more debt to keep themselves afloat or they are making risky purchases and investments

Borrowers with more credit history / previously closed credit lines (“total_acc” - “open_acc”) have more chances of paying back the loan as compared to borrowers with less credit history.



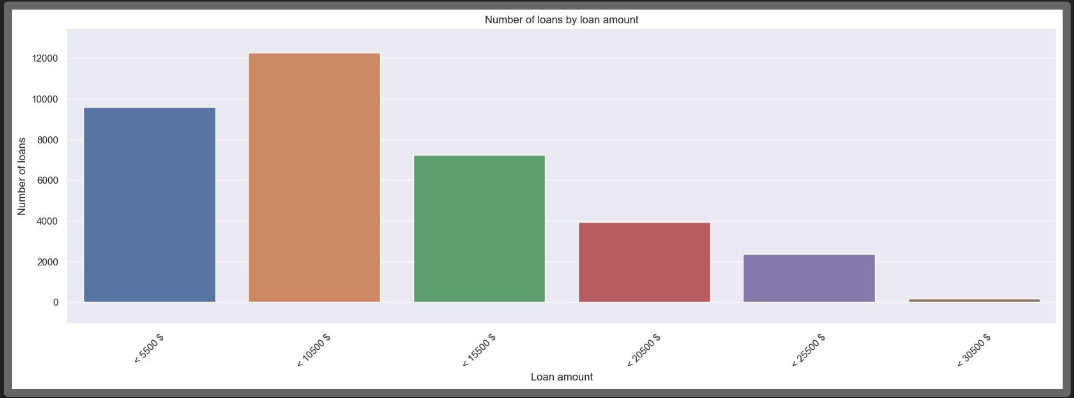


Loan amount



Default rate increases as the loan amount increases this also related to the fact that long term loans have higher default rates and long term loans usually have higher loan amounts

Also loans with higher amounts are quite uncommon which is a good thing

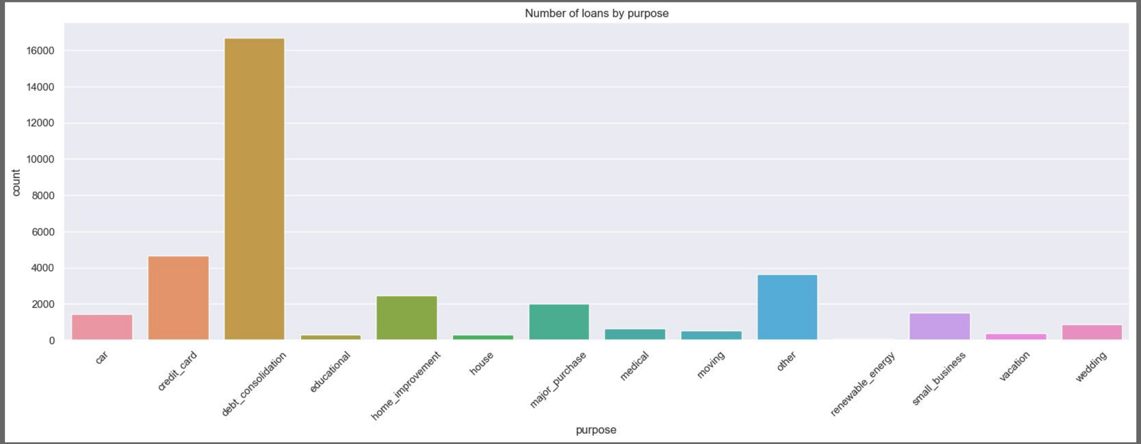


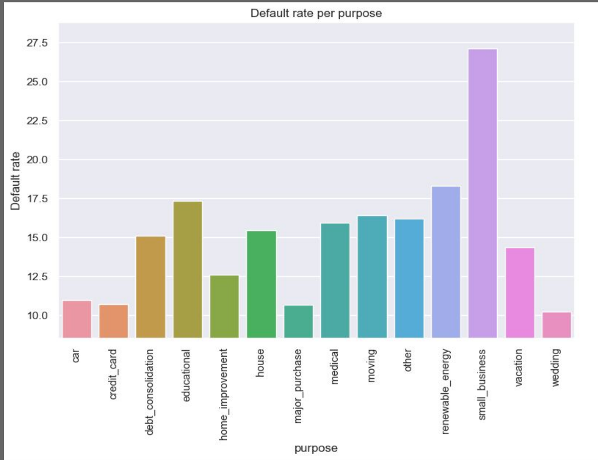
Purpose

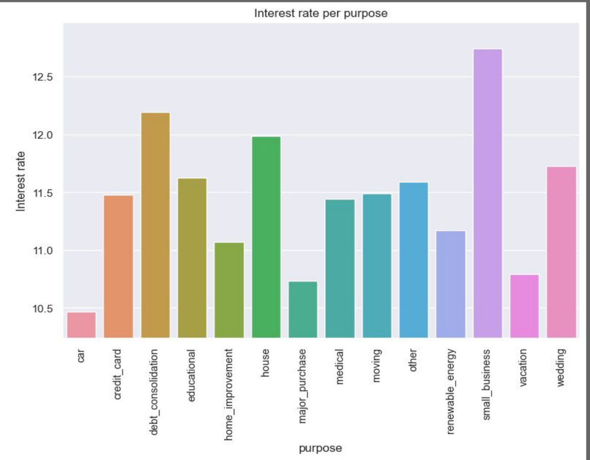
Most of the loans on the platform are for debt consolidation.

Small businesses, renewable energy and education have the highest default rate (15% - 20%)

While Car, credit card, major purchase and wedding have the lowest default rate (about 10%)







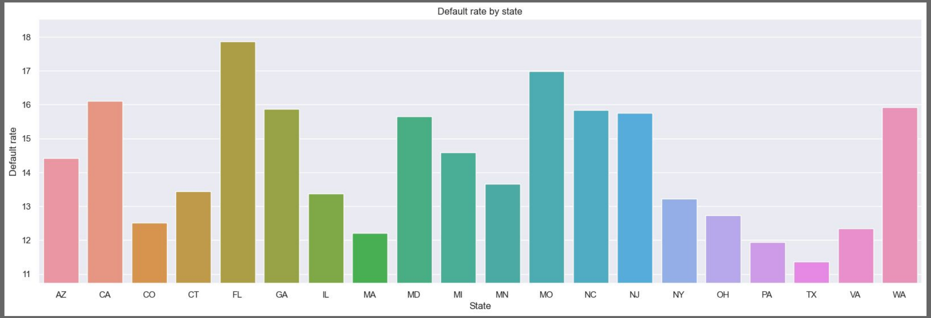
State of the loan borrower

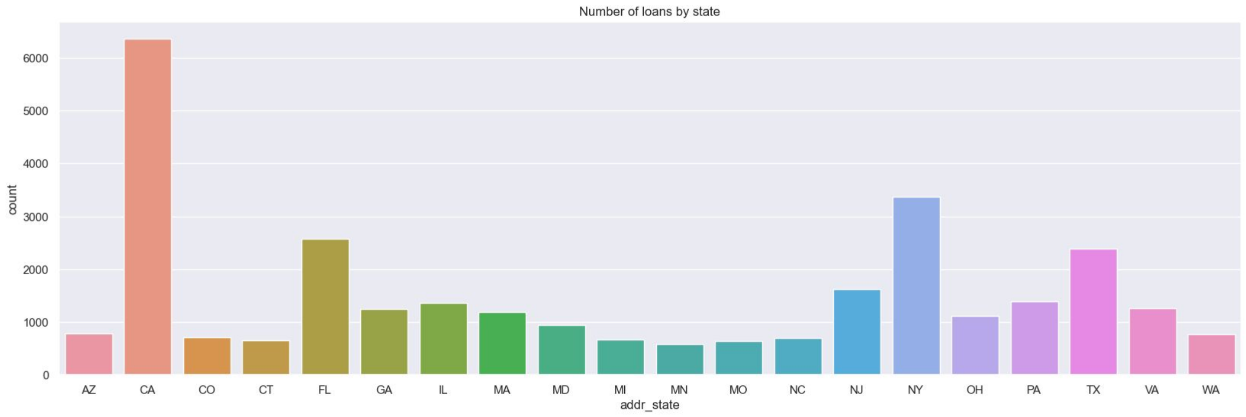
Lending club is heavily used in California, Texas, New York and Florida.

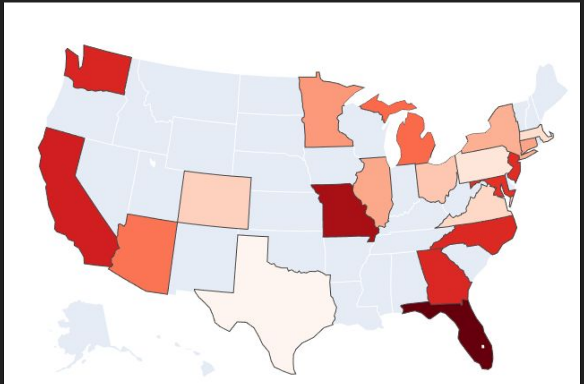
Florida has the highest default rate (more than 17.5%) while Texas has the lowest default rate (less than 12%)

But the interest rate is not higher for states with higher default rate.

Please note that we ignored states with less than 500 borrowers







Recommendations

- Lending club should reduce the number of loans given for long term (60 months)
- Lending club should reduce loans with higher amounts
- Lending club should target higher income borrowers more (borrowers with more than 80,000$ income per annum)
- Borrowers with high credit utilisation and high debt to income ratio should be avoided (borrowers with more than 80% revolving credit utilisation)
- Borrowers with public records and more than 1 delinquency in the last 2 years should be avoided completely
- Borrowers with very less credit history should be reduced
- Borrowers with more than 2 loan inquiries in the past 6 months should be avoided
- Lending club should prioritise loans for Car, credit card, major purchase and wedding while reducing loans given to Small businesses, renewable energy and education