

Course: Machine Learning  
Module: Exploratory Data Analysis

# LENDING CLUB CASE STUDY

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# Lending Club : Problem Statement

## What is Lending Club?

Lending Club is a marketplace for personal loans that matches borrowers who are seeking a loan with investors looking to lend money and make a return.

### How Lending Club Works



Borrowers apply for loans.  
Investors open an account.



Borrowers get funded.  
Investors build a portfolio.

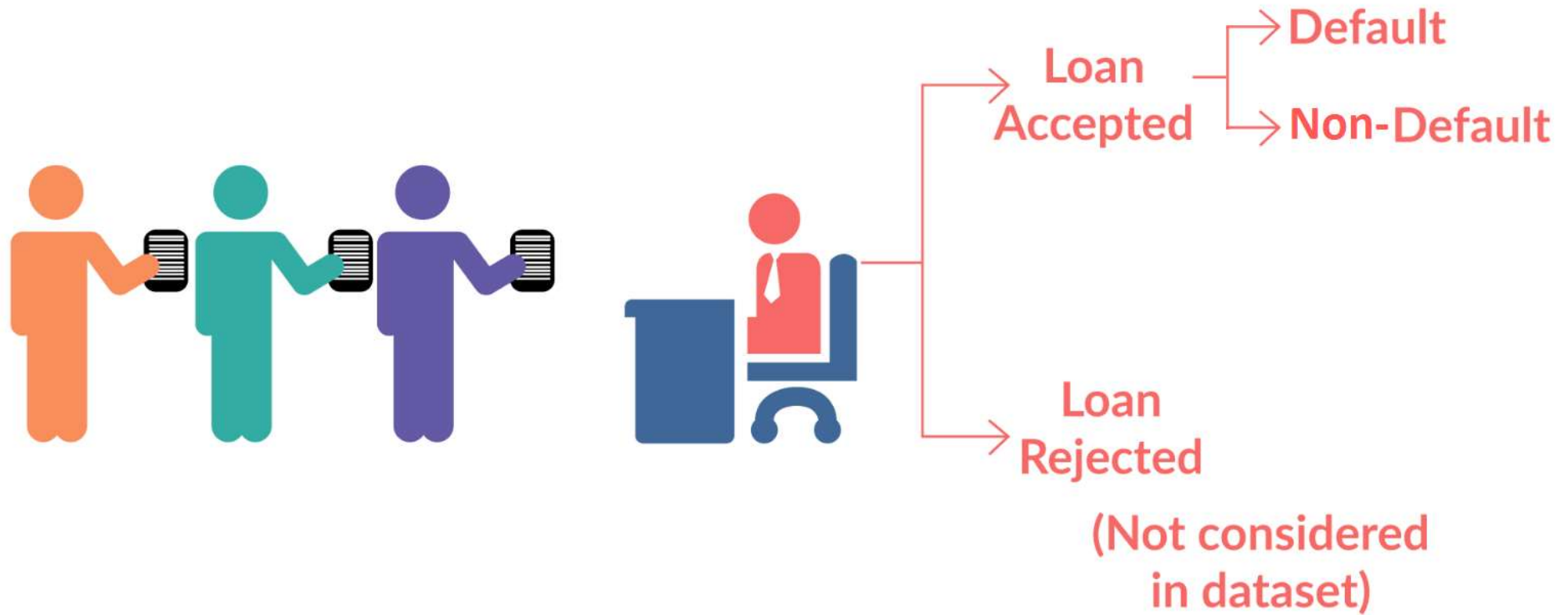


Borrowers repay automatically.  
Investors earn & reinvest.

When the company receives a loan application, the company has to make a decision for loan approval based on the applicant's profile. Two types of risks are associated with the bank's decision:

- If the applicant is likely to repay the loan, then not approving the loan results in a loss of business to the company
- If the applicant is not likely to repay the loan, i.e. he/she is likely to default, then approving the loan may lead to a financial loss for the company

# LOAN DATASET



Lenders look for 5C approach in order to consider a loan for acceptance or rejection. The main objective is to be able to identify these risky loan applicants, then such loans can be reduced thereby cutting down the amount of credit loss.

▶ **Character/Credit History**

Lenders will look at your reputation or “character” as a borrower. This is also referred to as credit history, or your track record of managing your debts. Payment history, types of credit and delinquent payments are checked into this

▶ **Capacity**

A lender will look at your cash flow and income, employment history and outstanding debts to determine if you can comfortably afford another loan payment. DTI payments come in this section

▶ **Collateral**

Collateral is an asset you agree to give up to the lender if you default on your loan. This is done using loan to value ratio, or LTV.

▶ **Capital**

This refers to a down payment but can include other types of personal assets or investments. the larger the down payment, the easier it may be to get a loan.

▶ **Conditions**

This basically refers to the purpose for a loan. If your stated purpose for a loan is something irresponsible or reckless, it will give lenders a reason not to approve your application

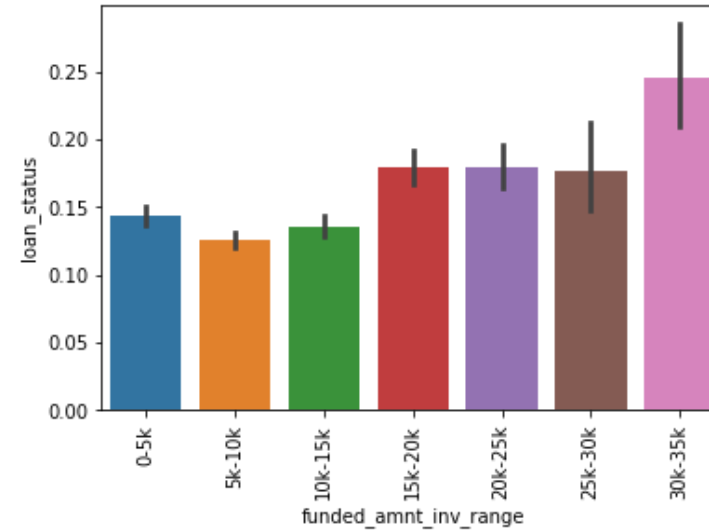
# WHAT LENDERS LOOK FOR (5C approach)



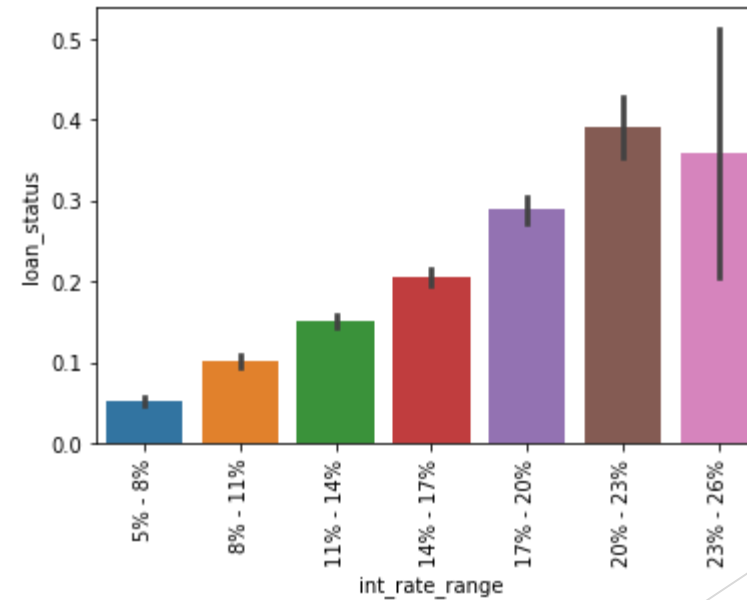
# STEPS OF DATA ANALYSIS

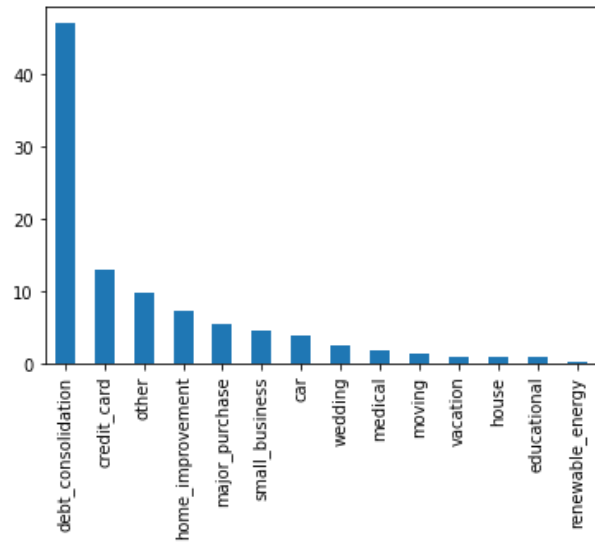
- ▶ Data Sourcing
- ▶ Data cleaning
- ▶ Univariate analysis
- ▶ Bivariate analysis
- ▶ Derived metrics

► We saw a huge increment in delinquency percentage as loan amount increases

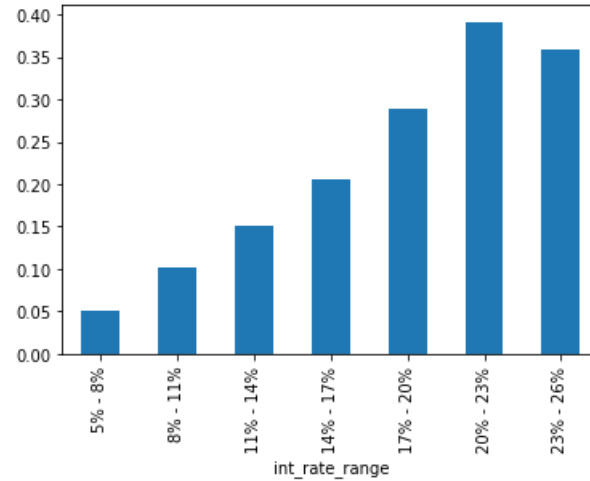


► We can see that with increase in interest rate, default rate increasing

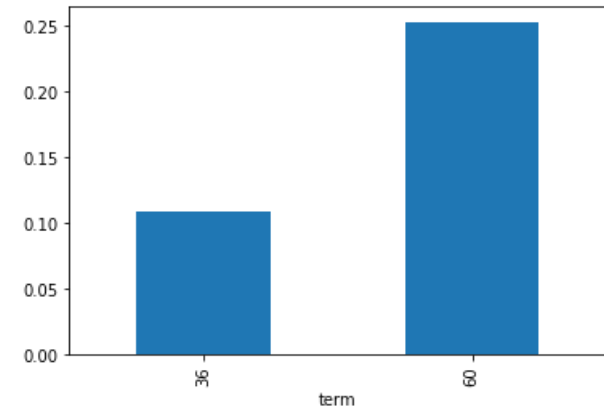




Maximum loans are taken for the purpose of debt consolidation



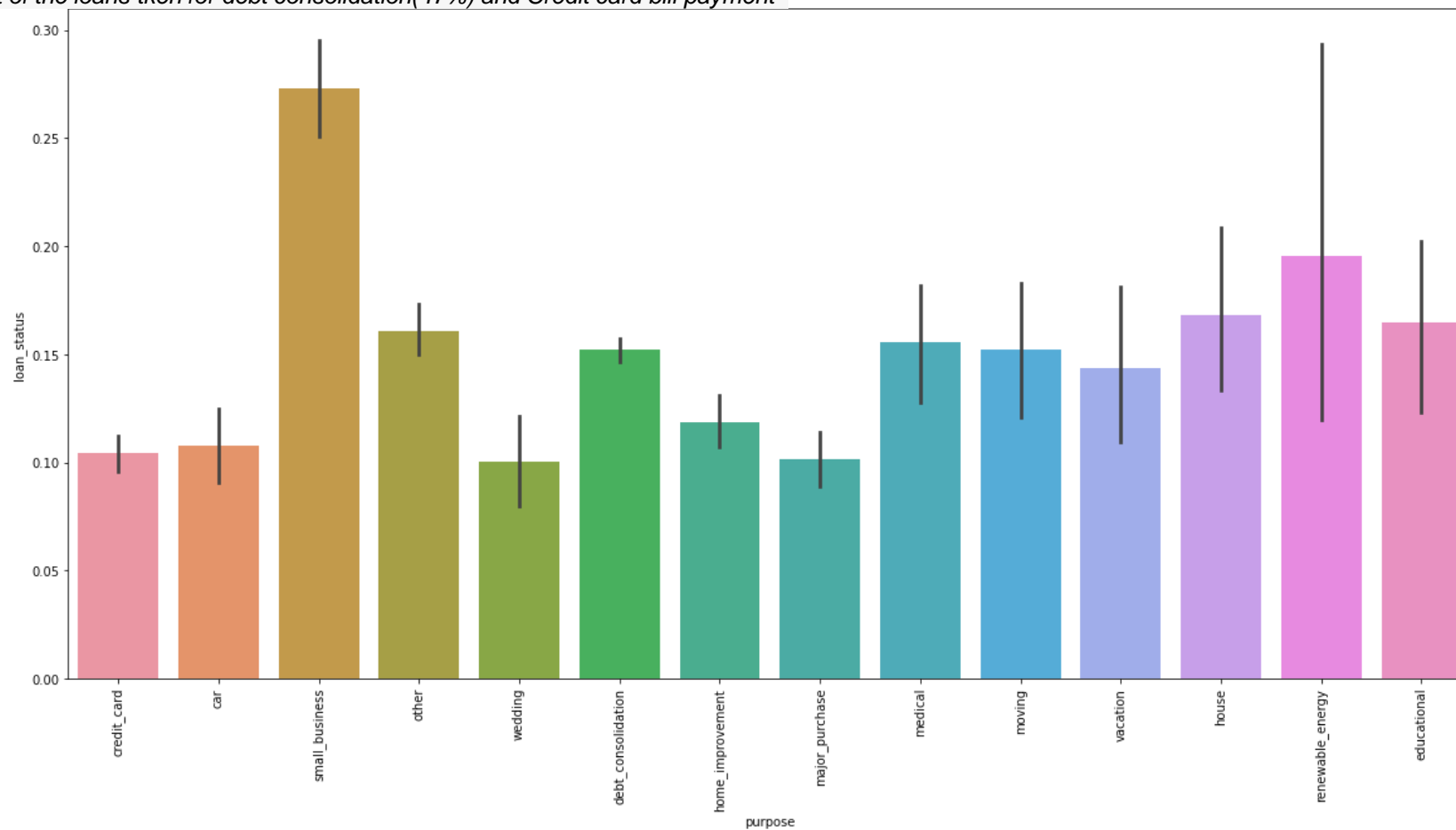
Higher the risk, leads to higher value of ROI rate of interest charged.  
graph is between Defaulter/Total and tenure



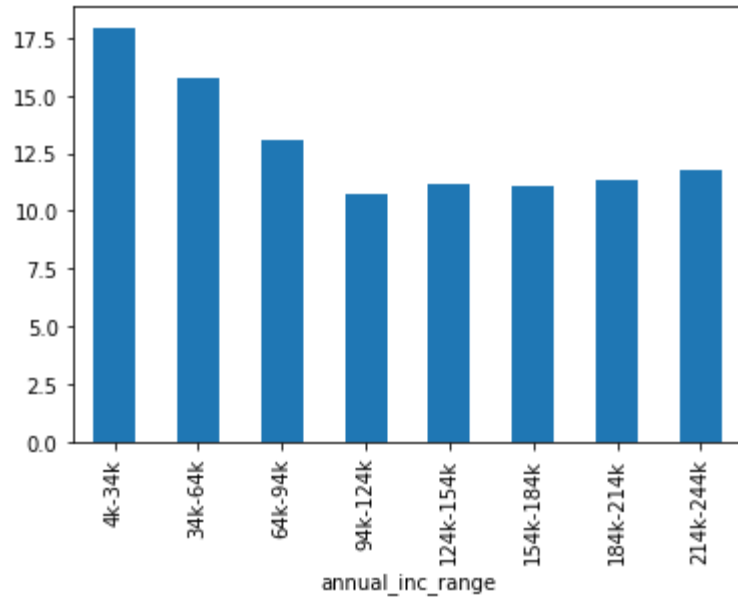
Increase in tenure leads to higher count of defaulter. The graph is between Defaulter/Total and tenure



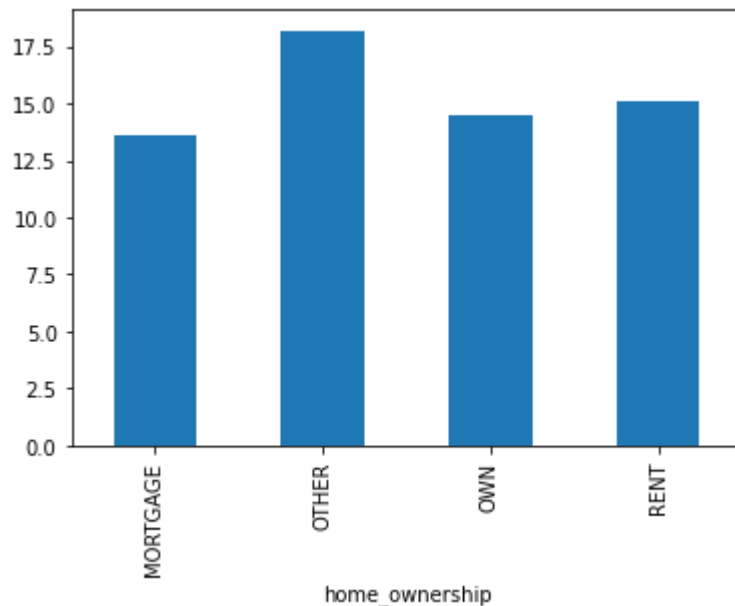
Most of the loans taken for debt consolidation(47%) and Credit card bill payment



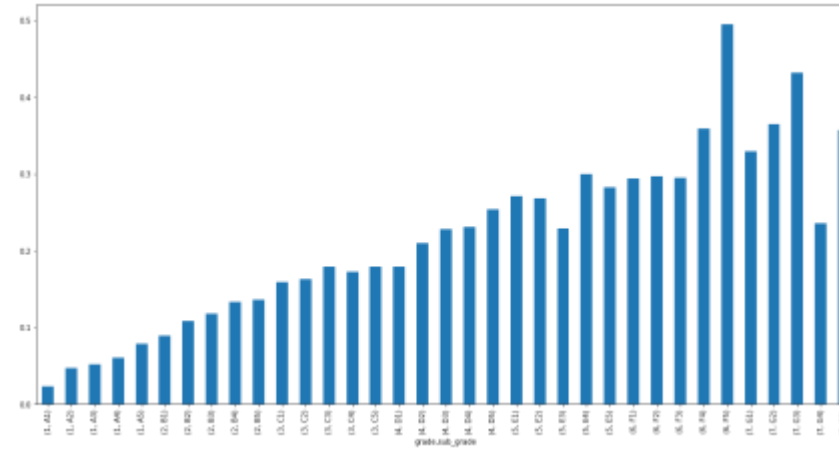
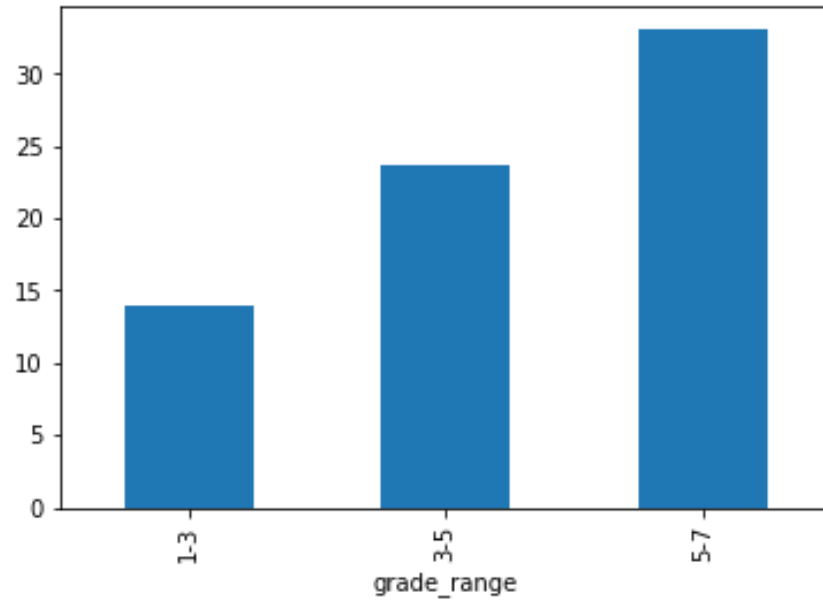
- Loans are provided based on the loan purpose. Most of the loans taken for debt consolidation( and Credit card bill payment
- We maximum number if defaulters for small business and renewable energy, we saw a higher count of Not verified business going in



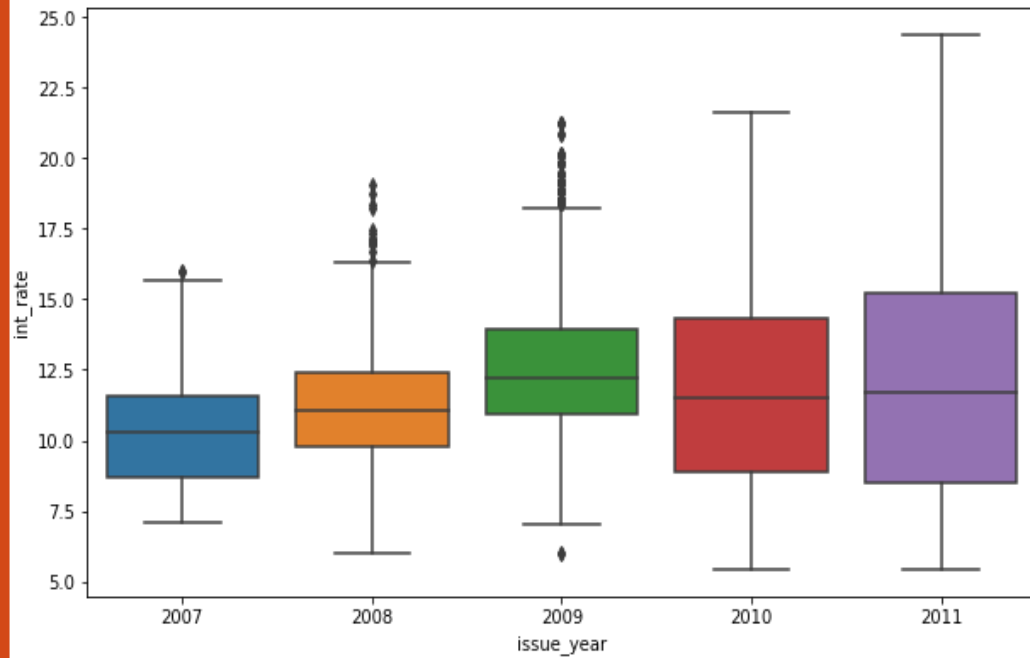
We saw the people having higher income range are taking lesser number of loans for smaller amounts. The graph describes the frequency of people taking loans.



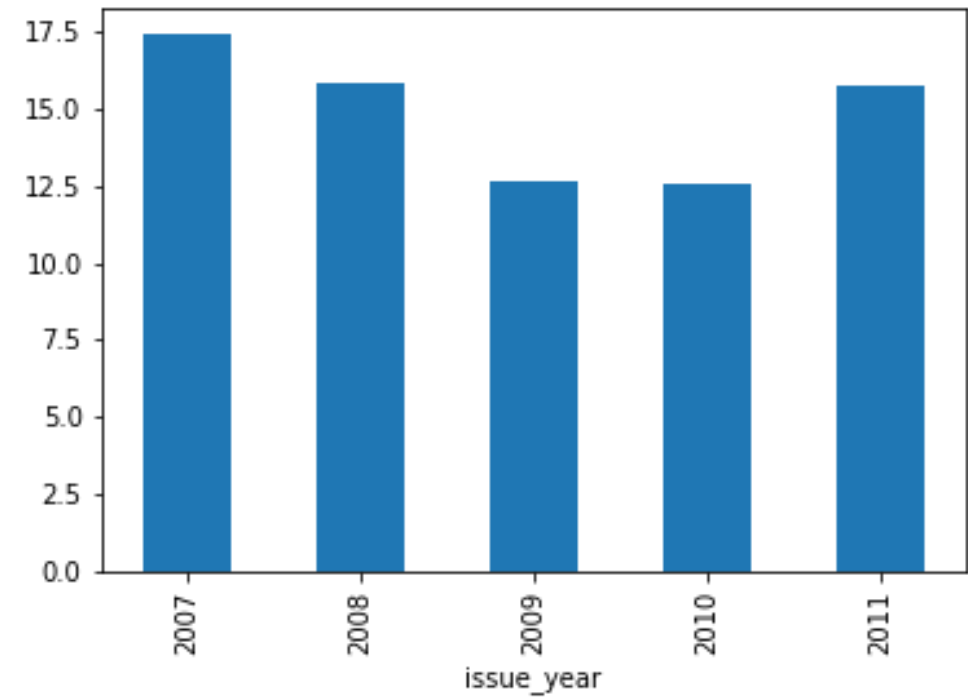
A borrower's position can also be judged based on their current condition, which also includes current Home ownership situation. Most of the defaulter have mentioned homeowner ship as others.



Higher the grade, increases the capacity to take larger amount of loans and less of which are defaulted

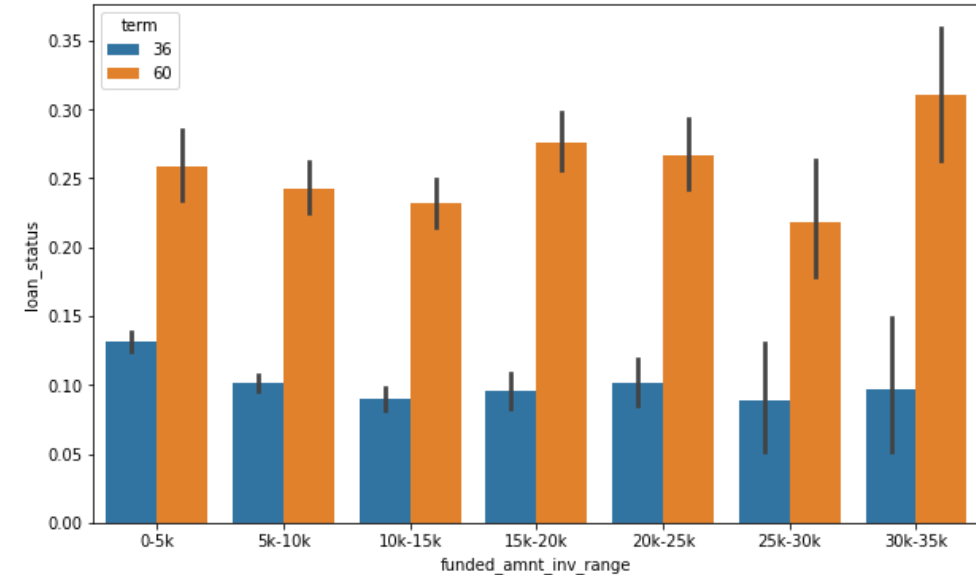


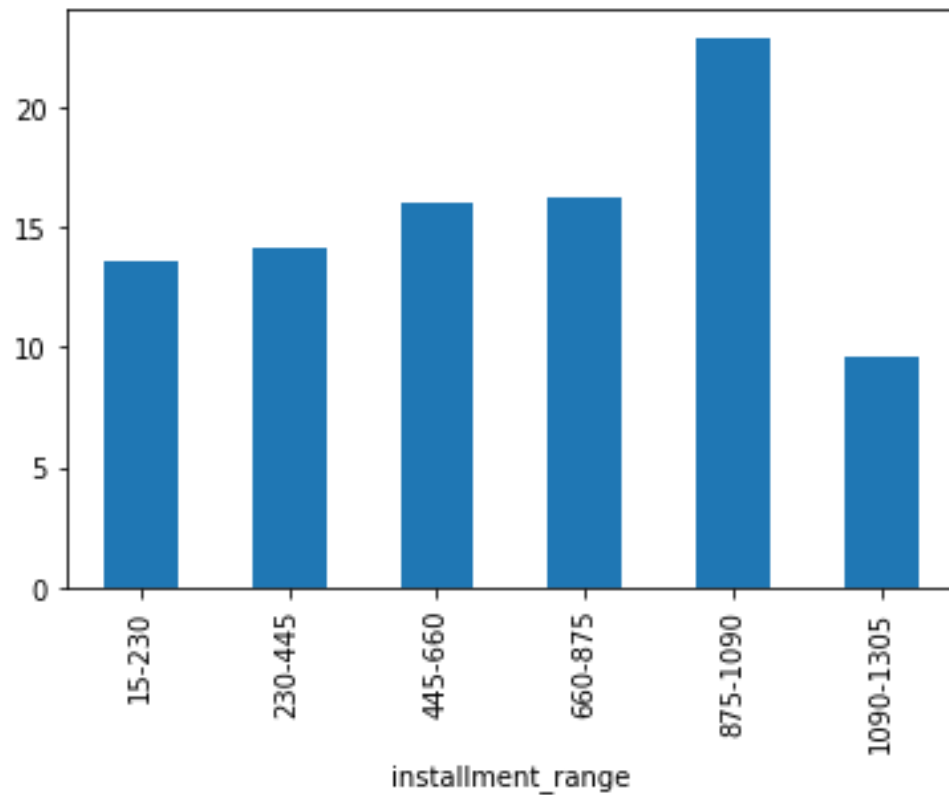
The similar but reverse was seen in terms of Rate of Interest during Economic downfall in 2008



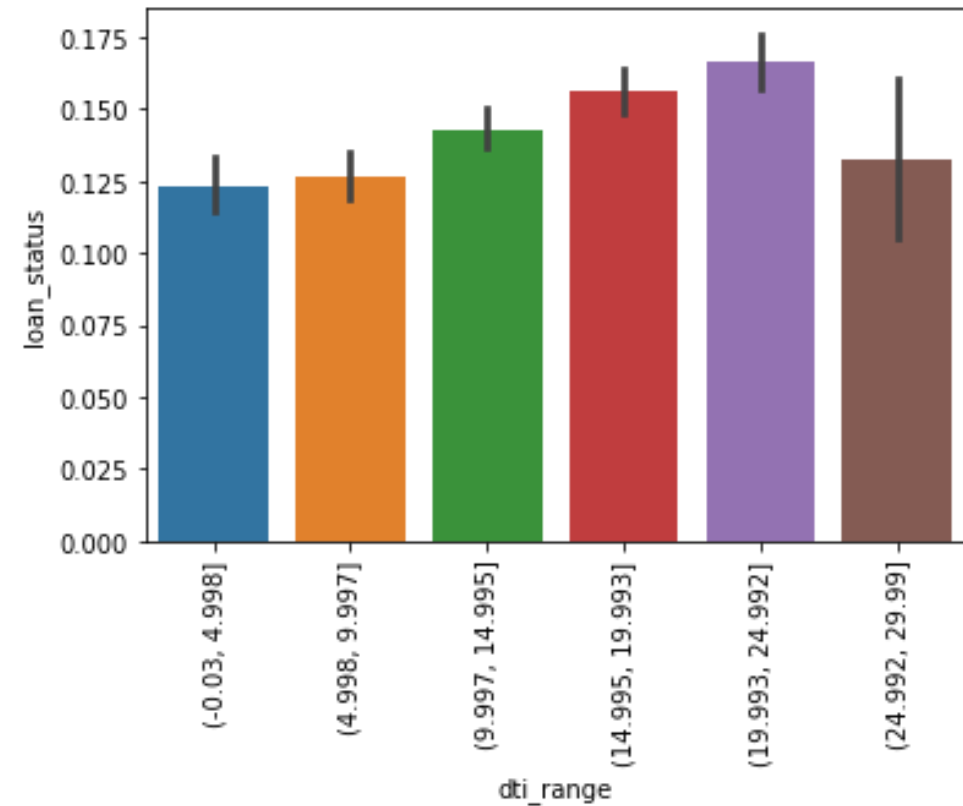
We noted a decrease in banks providing loans during the economic downfall and same grew post improvement

- With an increase in Tenure, we see increase in number of defaulters.
- It is noted that defaulters were higher in small loans which mostly incorporate lower income groups or higher amount of funded investments which mostly incorporate Small business
- Higher the tenure of loan the probability of loan default



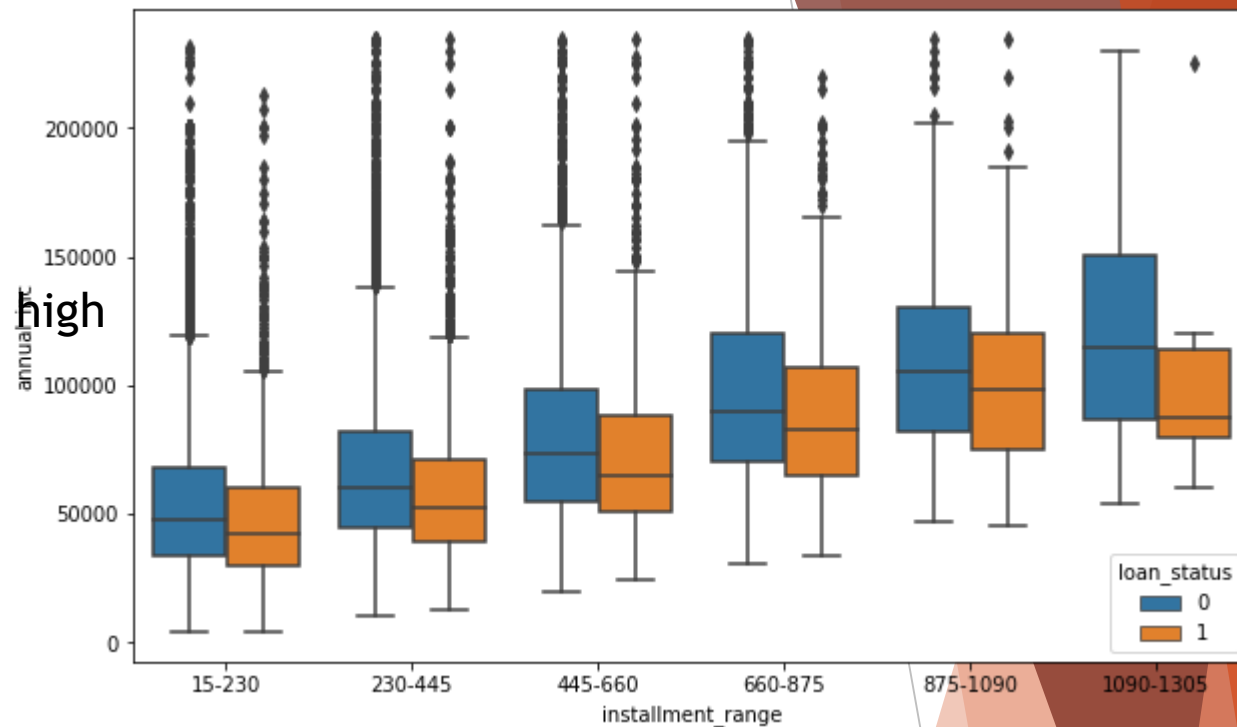


Higher amount of loans are in the installment range of 8750-1090

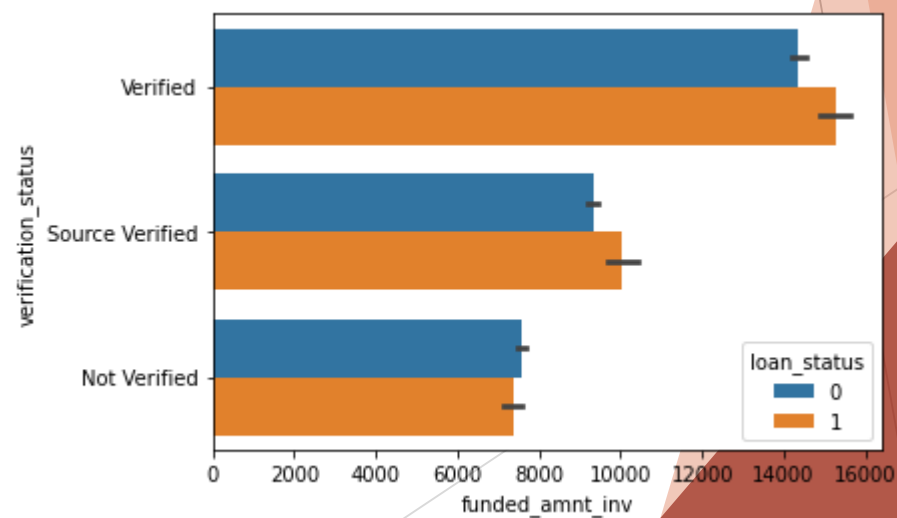


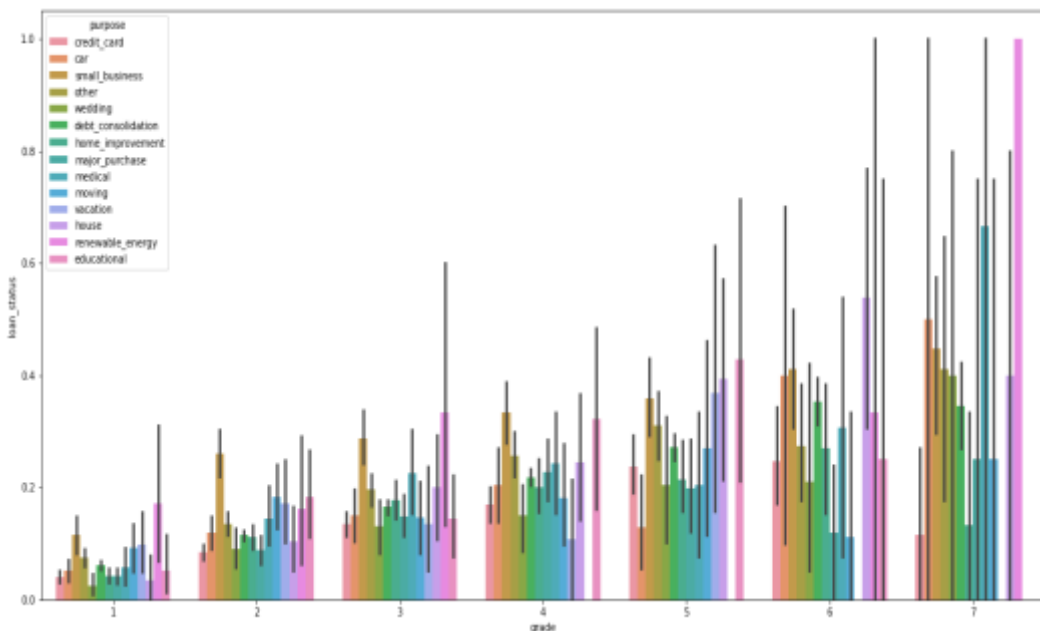
We see higher number of defaulters in the higher range of DTI

Borrowers with higher income range tend to take high EMI loans and end up going for default.



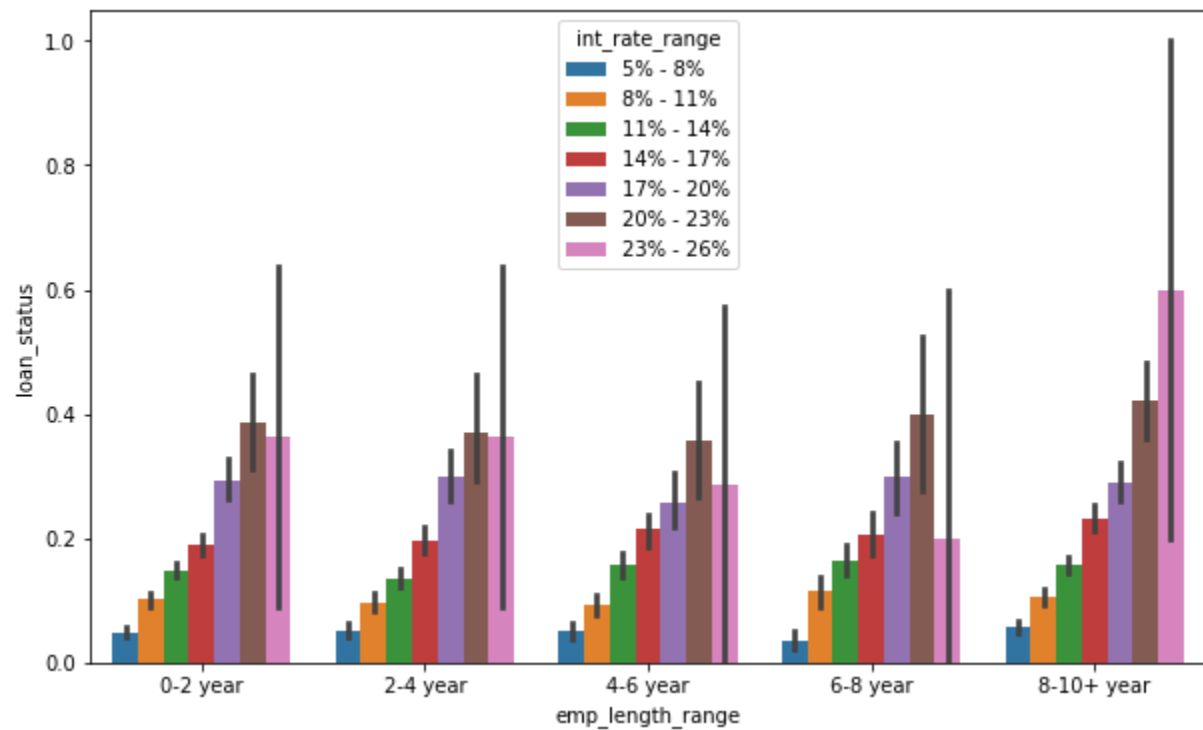
- We see higher count of defaulters in the Not verified range



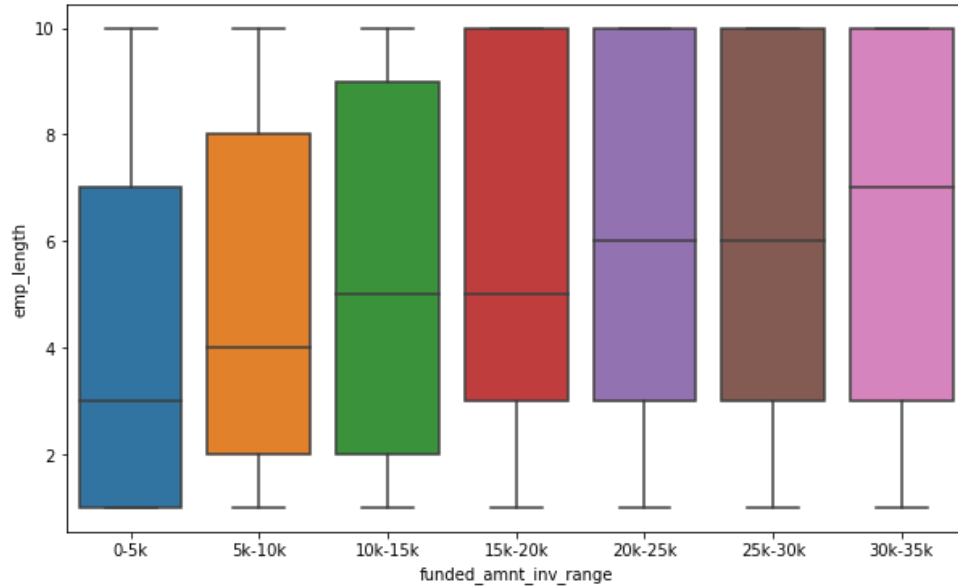


- ▶ Loan status is number of default divided by total number of loans ratio
- ▶ We see an increment in percentage of defaulters in terms of Grade.
- ▶ As grade increases (1 being the lowest and 6 highest), the number of loans increase, and number of defaults see an increment.

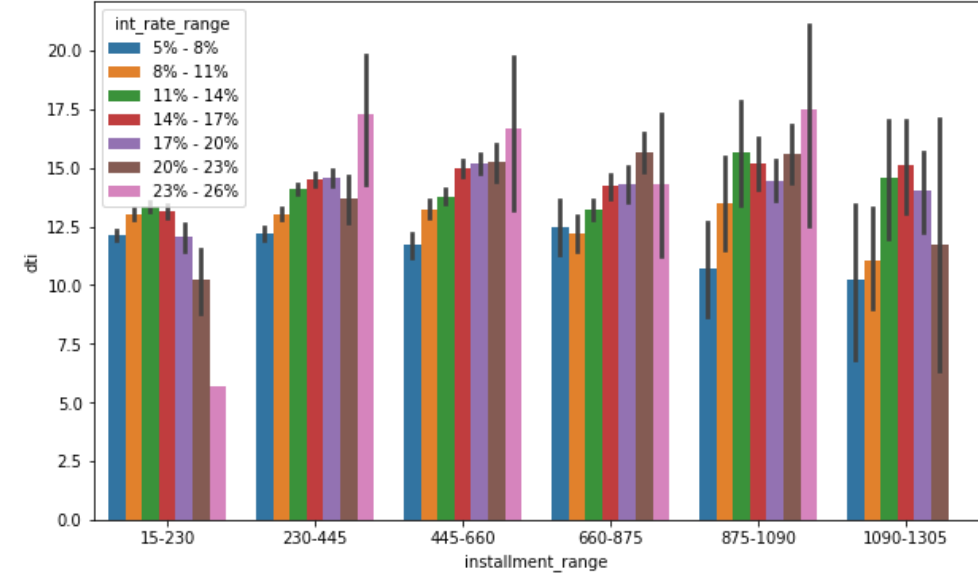




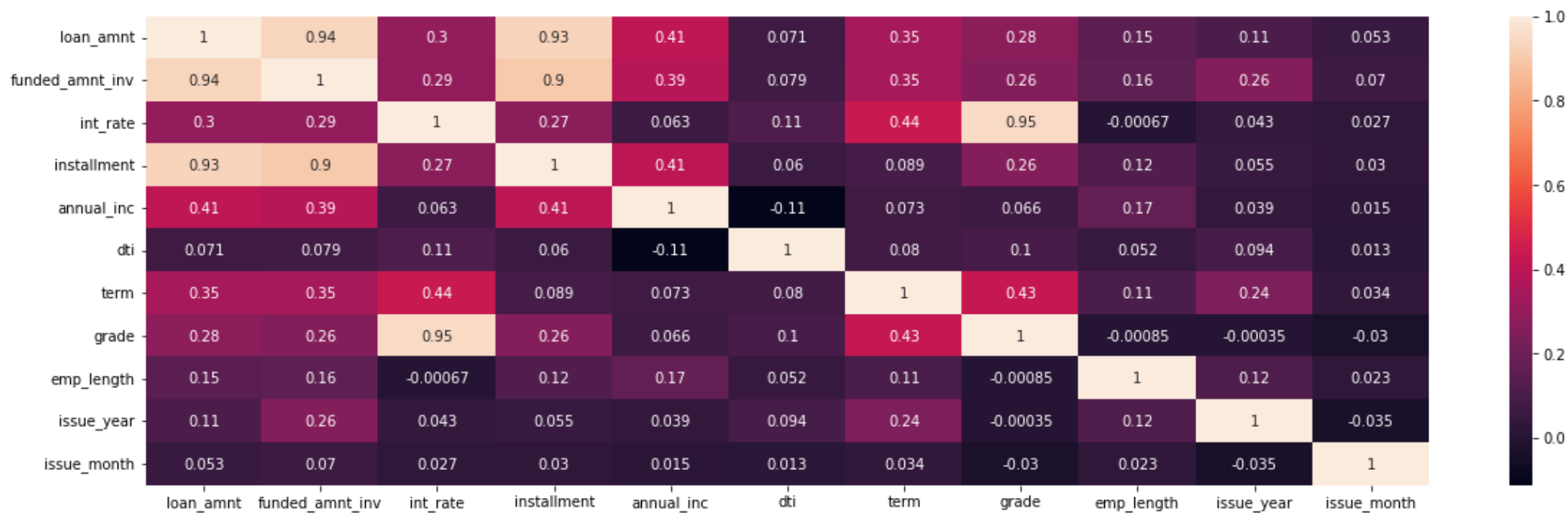
- Increment in Interest percentage is seen to contribute highly on default percentage.
- As interest rate increases, we see that unverified or source verified loans are causing higher number of defaults leading to a business loss



With increase in Employment length, we see the numbers for funded loan amount going up



Depending on the 5 C factors and data provided we have come up with the conclusion that most of the loans range around 12-15 %.



# CONCLUSION

## CHARATER/CREDIT HISTORY:

Borrowers with history of **delinquency on the past 2 years** or **delayed payments** are seen to default the loans, We also see that **unverified borrowers** tend to default higher than verified ones, specifically when it comes to Credit card or medical or Debt consolidated cases.

## CAPACITY:

**Higher grade and subgrade** employees (taking 6 minimum and 1 highest) and **high salary** take lesser number of loans, but of a higher amount and higher ROI. DTI is very helpful in calulating the capacity.

## COLLATERAL:

When people have collateral with LTV, they tend to pay back the loans. As of now, we did not find any deciding factors on this aspect. Collateral loans have higher chances of being paid back if LTV value is validated correctly

**CAPITAL:** The capital a person can provide as a deposit highly reduces the interest and installment.

**CONDITIONS:** The **purpose** for which borrower is taking loan, defines the acceptance and rejection of loans.

We see a decrement in dti with an increase in annual income

We see a decrement in int\_rate with increase in employment tenure

With an increase in employment tenure we see lower grade value (6 being highest)  
which is directly correlated

to rate of interest charged to customer

with an increase in grade, we saw an increase in interest rate

With an increase in loan amount, we saw increase in installment

With an increase in annual income, we saw increase in installment with a higher capacity to bear loans

With an increase in term, we saw an increase in interest rate

# BUSINESS SUGGESTION

There was a peak in loan approvals seen around December. We need to ask business reason on the same. It may be due to year end closure targets, agents start pushing their targets.

We need to improve on the verification perspective on the Credit card, Debt Risk, vacation or wedding loans. We saw a lot of loans in these cases are unverified.

There were multiple Debt loans taken for credit card loans, wherein borrowers were expecting to repay lower EMI to repay debt.

THANKYOU