

# GRAMENER CASE STUDY SUBMISSION

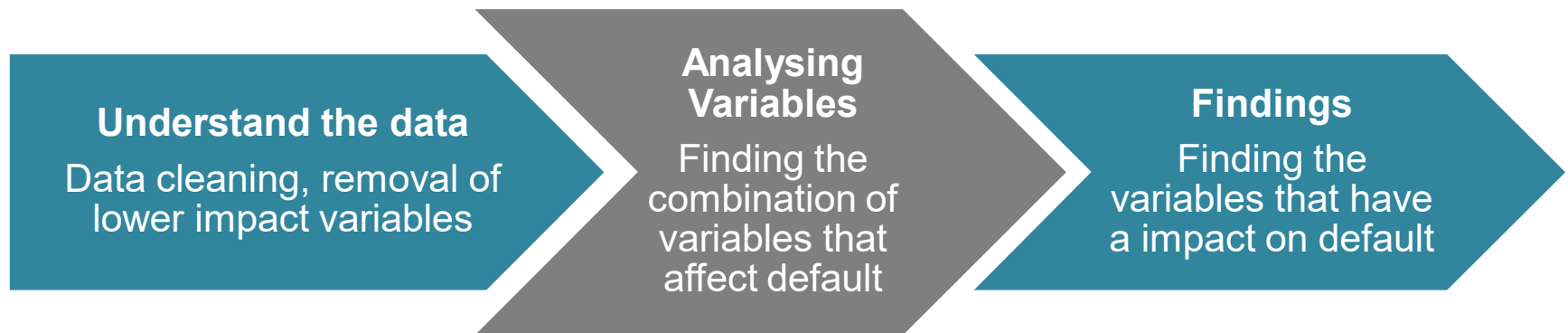
**Group Name:**

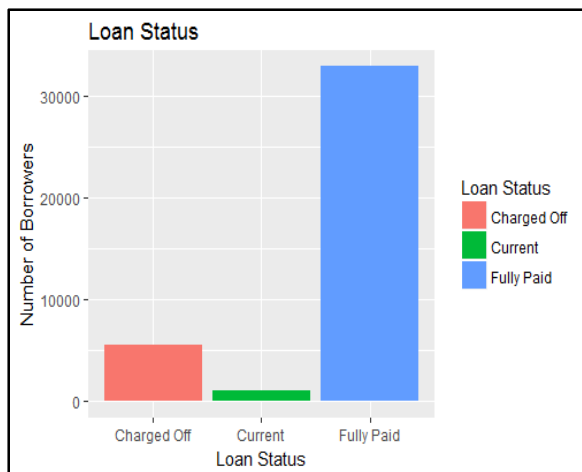
1. **Prasoon Dayal**
2. **Nitin Srivastava**
3. **Satya Mishra**

## Lending Club Requirement Summary

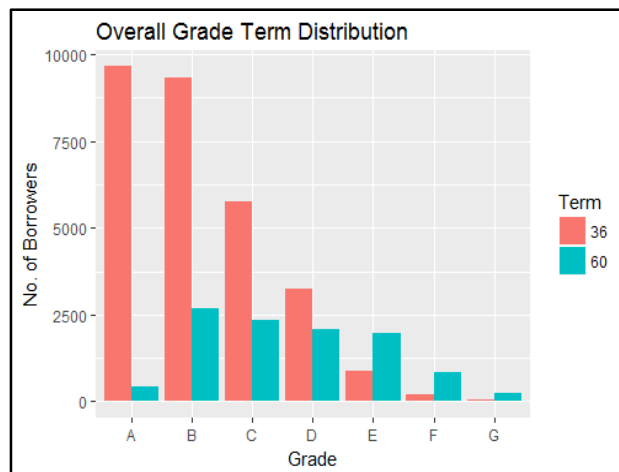
1. Lending Club is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures.
2. Borrowers who **default** cause the largest amount of loss to the lenders hence labeled as charged off customers.
3. Lending one wants to identify these risky loan applicants, so that the amount of credit loss can be minimized.

## Approach

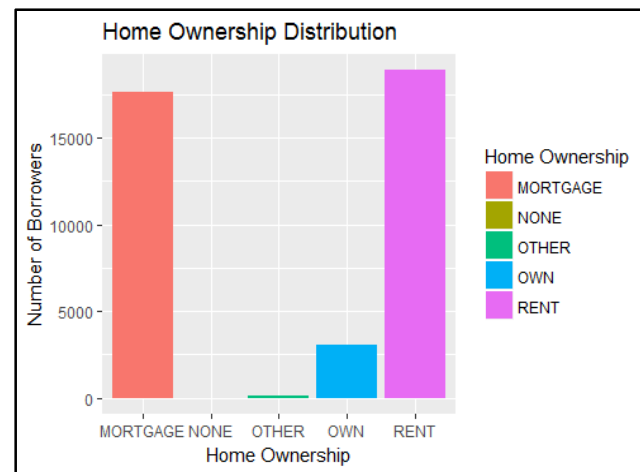




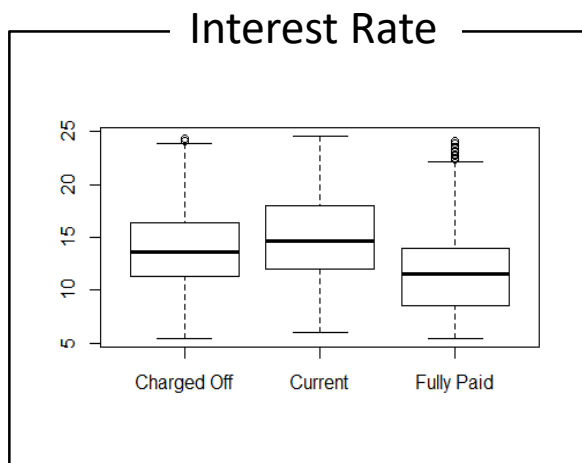
Majority of loans are fully paid, followed by charged off.



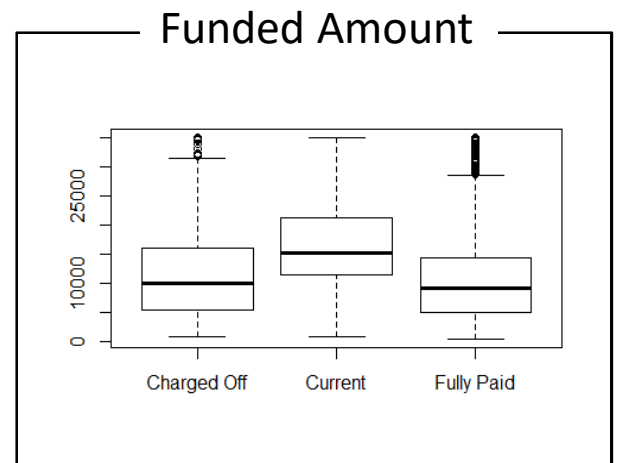
1. Grade B has the highest number of borrowers followed by A & C.
2. Grade A has the highest numbers of borrowers for 36 month term whereas B has the highest numbers of borrowers for 60 month term.



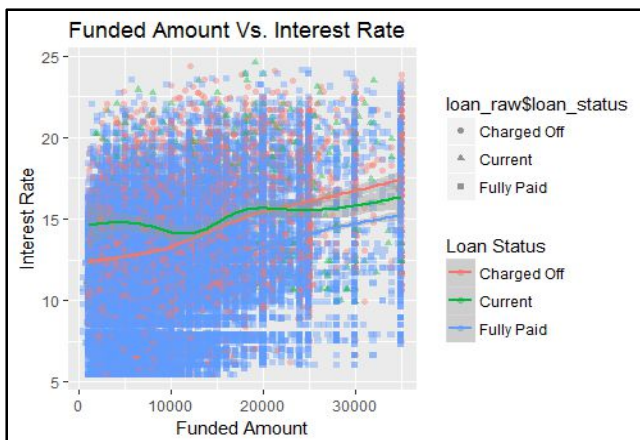
Home ownership mainly comprises of rental property followed by mortgage.



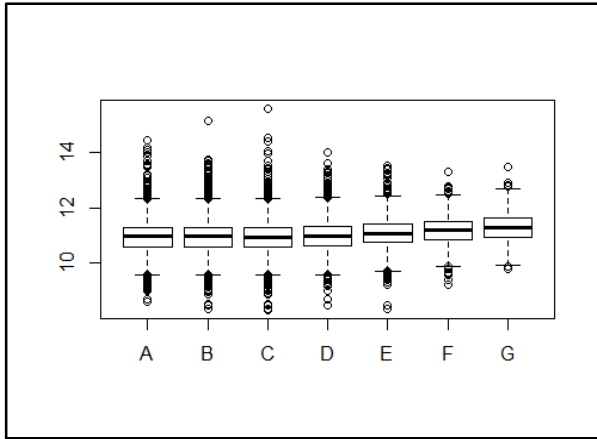
1. Interest rates for borrowers that defaulted is more than the people who paid their dues.
2. Interest Rate will have an impact if the borrower will default.



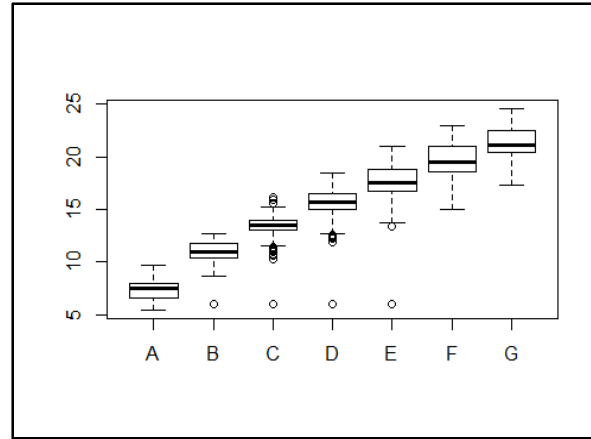
1. There is negligible difference in funded amount for Charged Off and Fully Paid.
2. Funded Amount alone can't decide if the borrower will default.



For Charged off and Full Paid, interest rate kept on increasing rapidly compared to current loan status.

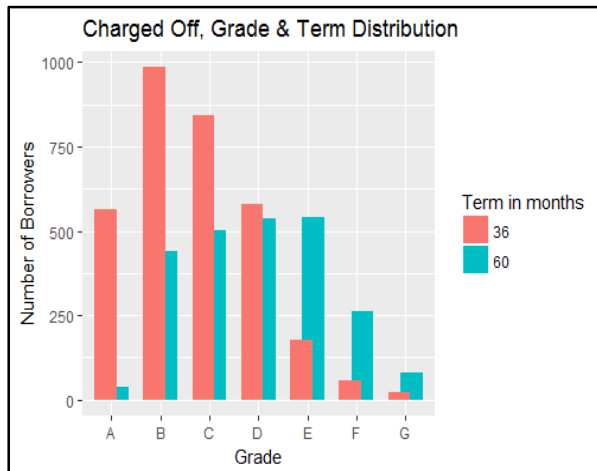


Impact of annual income is negligible on different grade of borrowers.

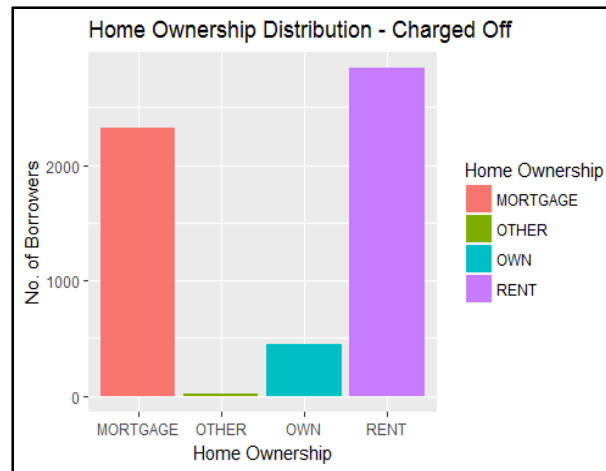


Interest rate shows an increasing trend when seen from grade A to grade G.

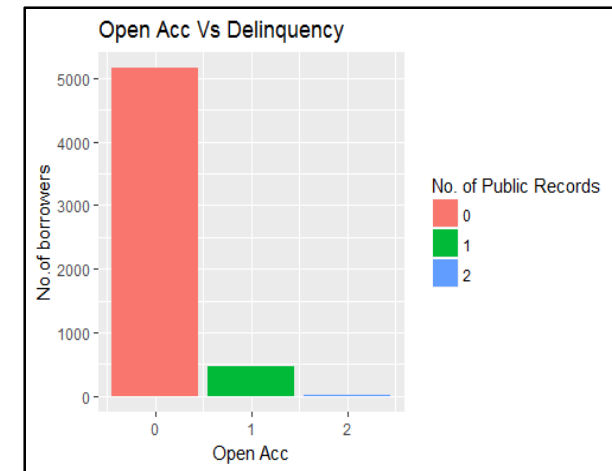
## SEGMENTED ANALYSIS ON CHARGED OFF



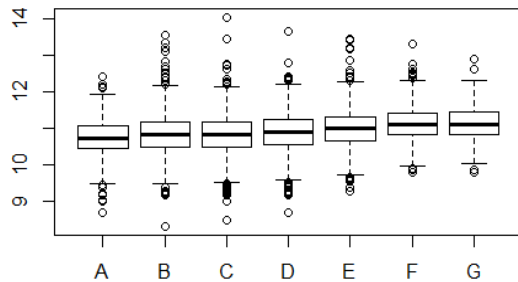
1. Grade B has the most number of defaults for 36 months, followed by C & D.
2. For 60 months Grade D & E have the most number of defaulters.



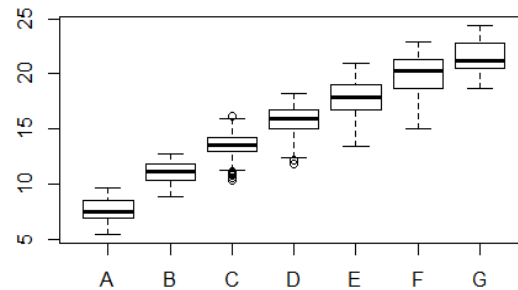
Number of borrowers who defaulted have mainly property on RENT followed by Mortgaged.



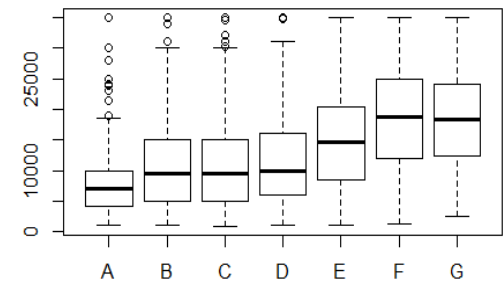
Default borrowers with no public records are given loans most.



For defaulter population's annual income remain same for all grades, but there are outliers.



Interest rates for charged off bucket keeps on increasing from grade A to grade G.

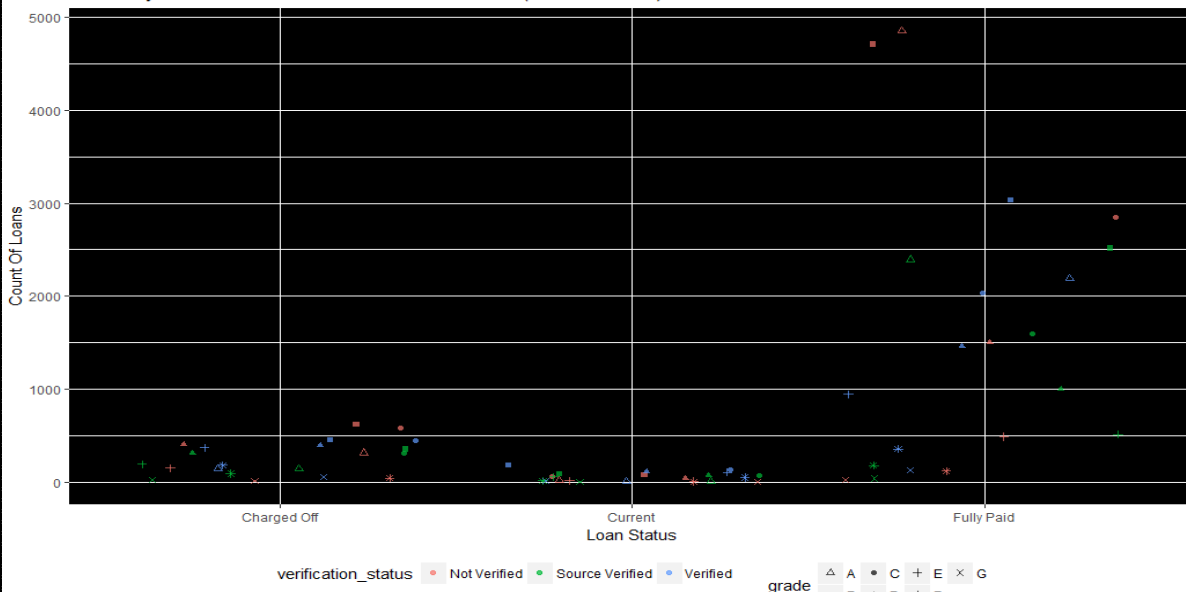


Funded Amount for charged off bucket keeps on increasing from grade A to grade G.

1. We have looked into the different variable that compromise of both categorical and quantative types but did not find any unusual patterns.
2. There are no such variable that single handedly influence the default factor.
3. We understand that lending club gives most of its loans to Grade B, C & D customers.
4. The interest rate for current loan status is the highest.
5. Type of home ownership does not have a significant impact on default.
6. The trends that follow for overall data is also same for segmented analysis on charged off.

Hence let us now move into understanding impact of multiple variables on default on overall data.

Summary of Verification & Loan Status on Grade (COUNTWISE)

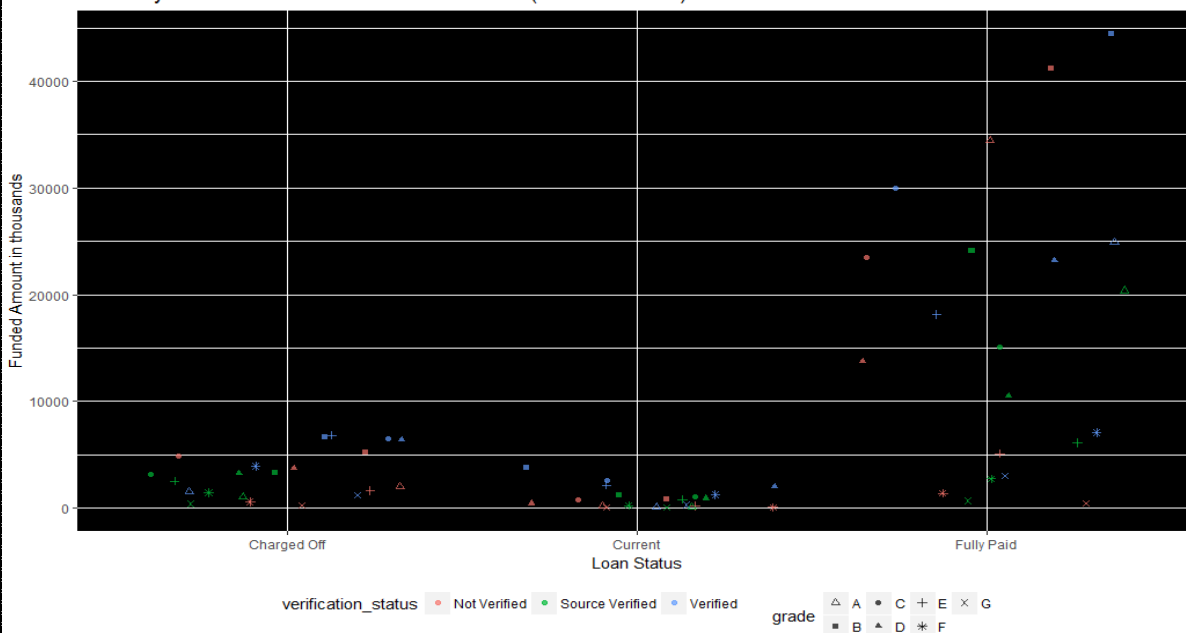


Shows the summary of different grades, taking into consideration loan and verification status on count of loans (in thousands).

We see that verification status does not play a significant role in people defaulting as there are a lot of loans that fall in fully paid bucket and their income status was not verified.

Hence we cannot conclude that verification of income plays a role in people defaulting.

Summary of Verification & Loan Status on Grade (AMOUNTWISE)

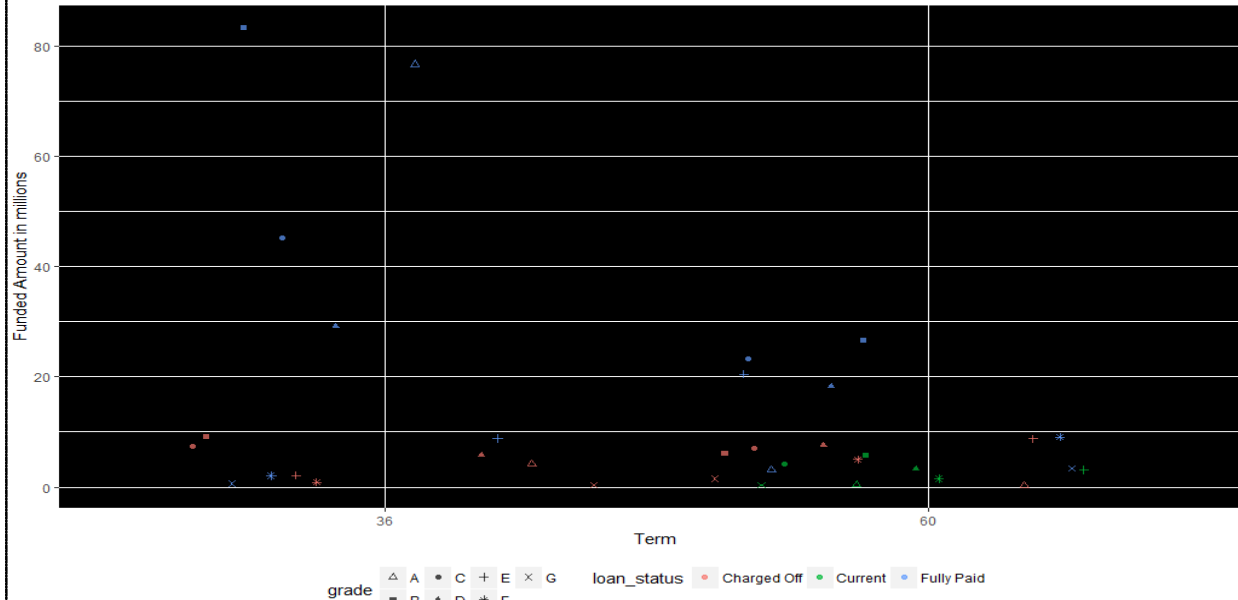


Shows the summary of different grades, taking into consideration loan and verification status on amount of loans (in thousands).

We see that verification status does not play a significant role in people defaulting as there are a lot of loans that fall in fully paid bucket and their income status was not verified.

Hence we cannot conclude that verification of income plays a role in people defaulting

Summary of Term & Loan Status on Grade (AMOUNTWISE)

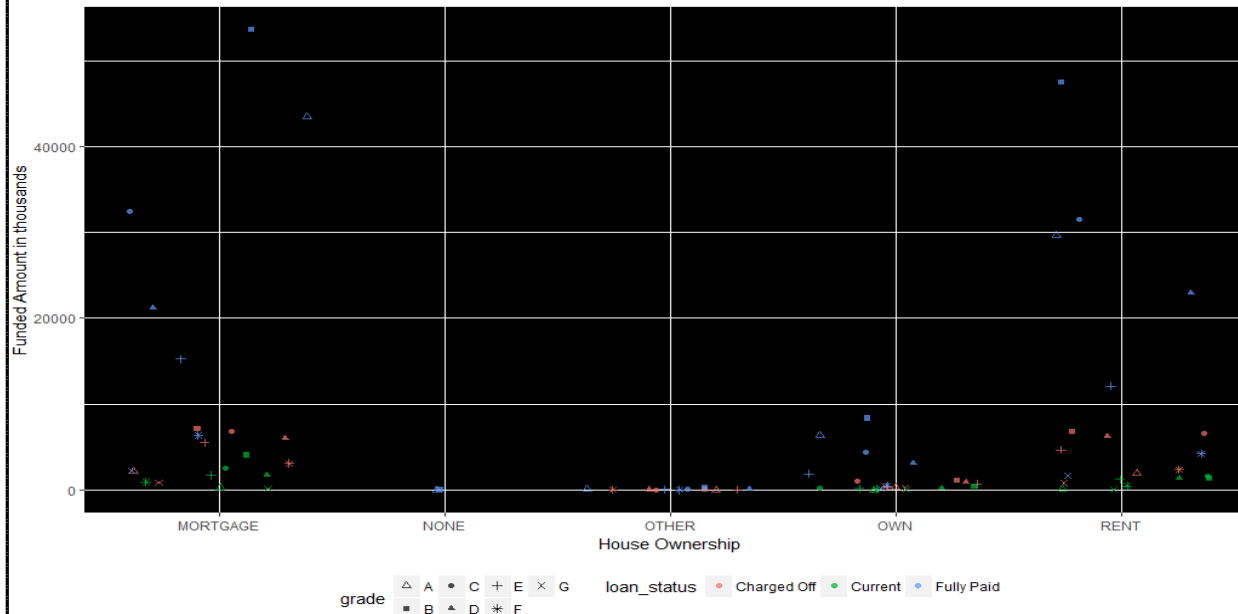


Shows the summary of different grades, taking into consideration term and loan status on amount in loans (in millions).

We see that term does not play a significant role in people defaulting as the amount in loans that fall in fully paid bucket are much higher than what falls in the charged off bucket.

Hence we cannot conclude that term of any type plays a role in people defaulting.

Summary of House Ownership & Loan Status on Grade (AMOUNTWISE)

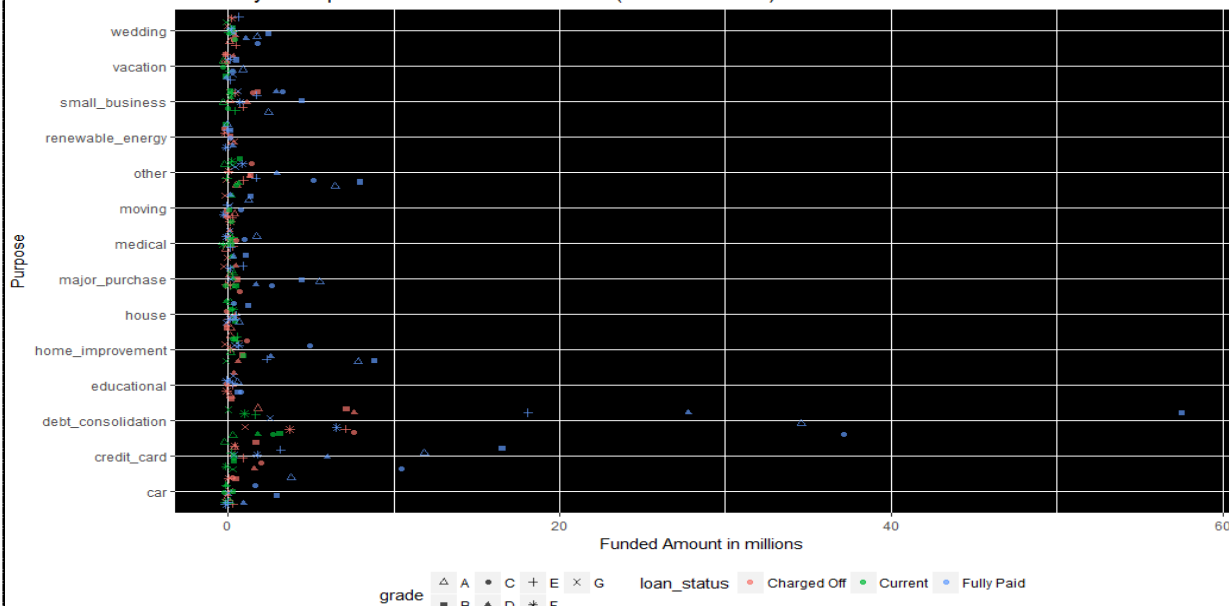


Shows the summary of different grades, taking into consideration home ownership and loan status on amount in loans (in thousands).

We see that home ownership does not play a significant role in people defaulting as the amount in loans that fall in fully paid bucket are much higher than the charged off bucket.

Hence we cannot conclude that home ownership of any type plays a role in people defaulting.

Summary of Purpose & Loan Status on Grade (AMOUNTWISE)

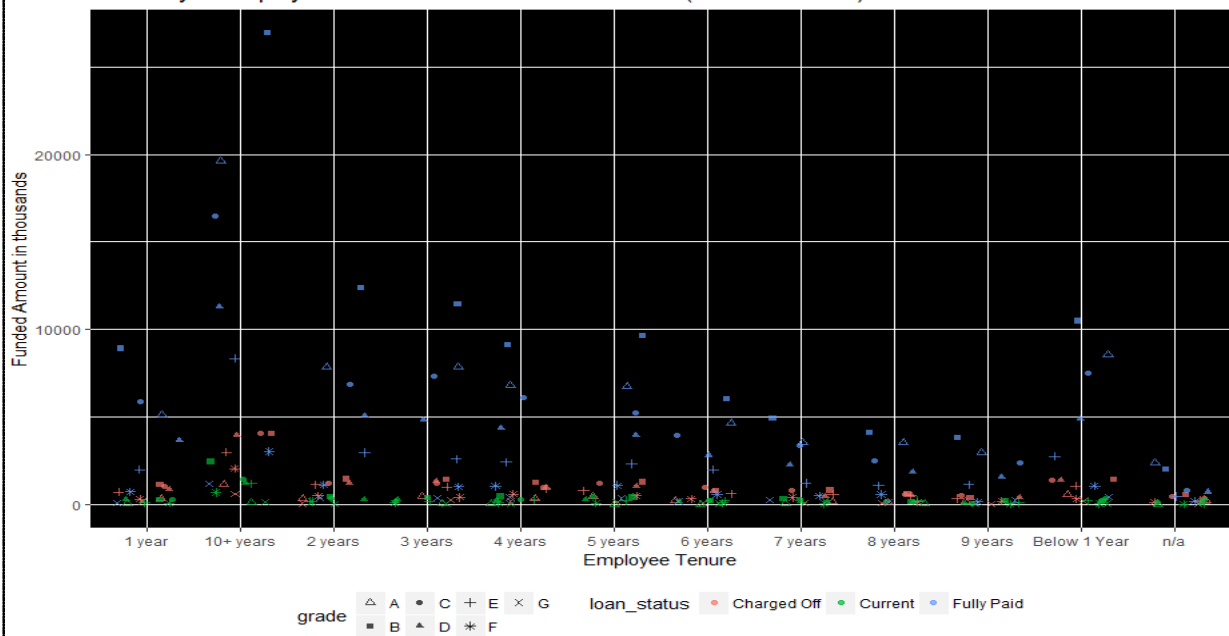


Shows the summary of different grades, taking into consideration purpose of loan and loan status on amount in loans (in millions).

We see that debt consolidation does play a significant role in people defaulting as the amount in loans that fall in debt consolidation bucket is much higher than what falls in rest of the purpose for loans.

Hence we cannot substantially conclude that debt consolidation plays a role in people defaulting as the amount of loan that is attached to fully paid in debt consolidation is quite high.

Summary of Employee Tenure & Loan Status on Grade (AMOUNTWISE)



Shows the summary of different grades, taking into consideration employment length and loan status on amount in loans (in thousands).

We see that +10 Years does play a significant role in people defaulting as the amount in loans that fall in +10 Years bucket is much higher than what falls in rest of the employment length.

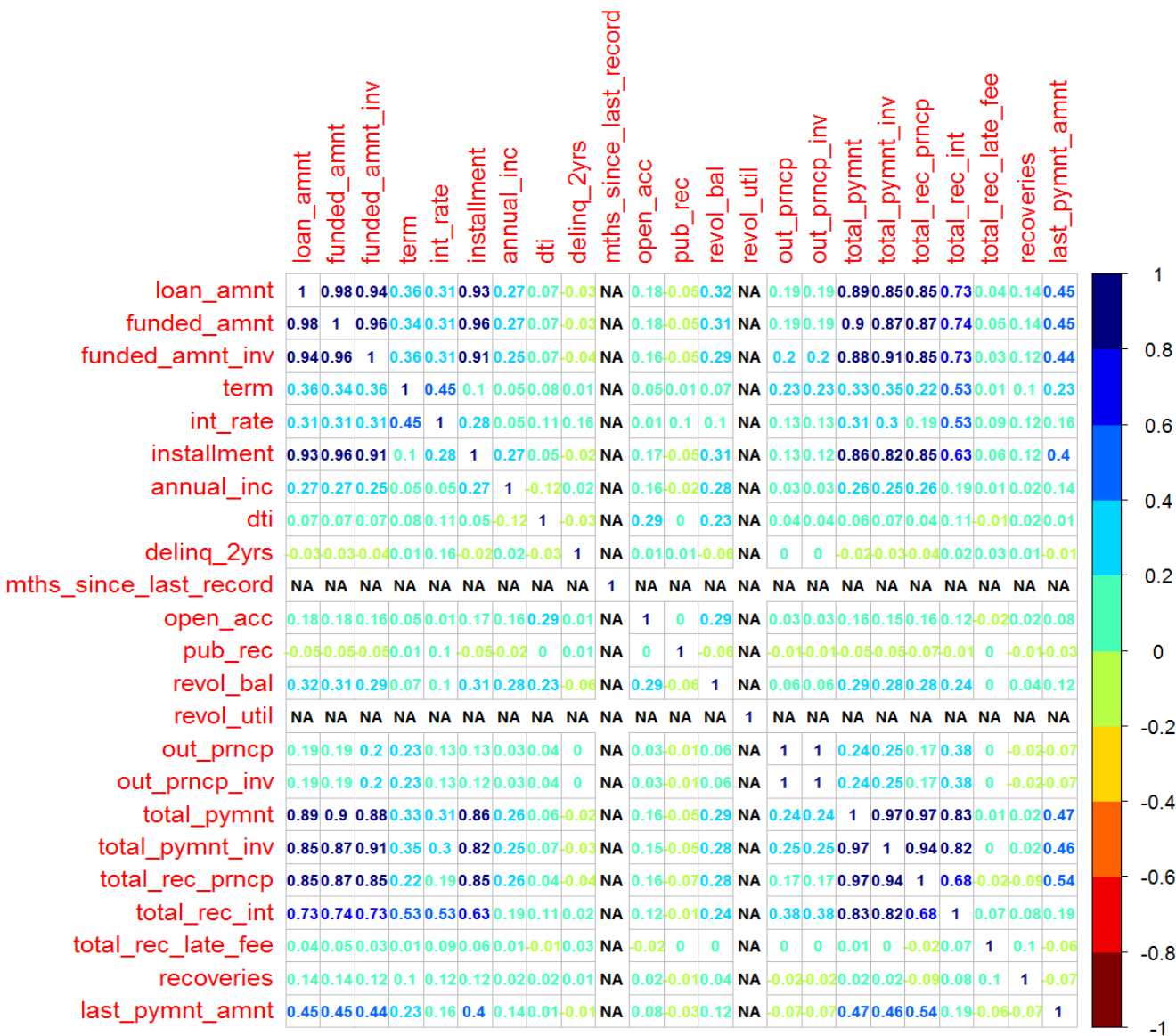
Hence we cannot substantially conclude that +10 Years plays a role in people defaulting as the amount of loan that is attached to fully paid in +10 Years is quite high.



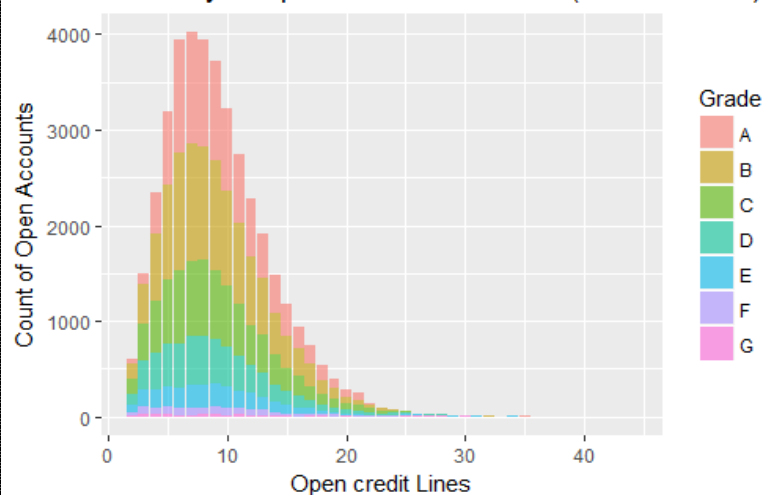
## Correlation Matrix

### Findings from Correlation Matrix:

- 1: Strong Positive Correlation between loan amount and total payment.
2. Strong Positive Correlation between loan amount and funded amount.
3. Strong Positive Correlation between loan amount and total payment invested
4. Negative correlation between public records and loan amount
5. No relation between DTI ratio and loan amount
6. Negative correlation between public record and delinquency

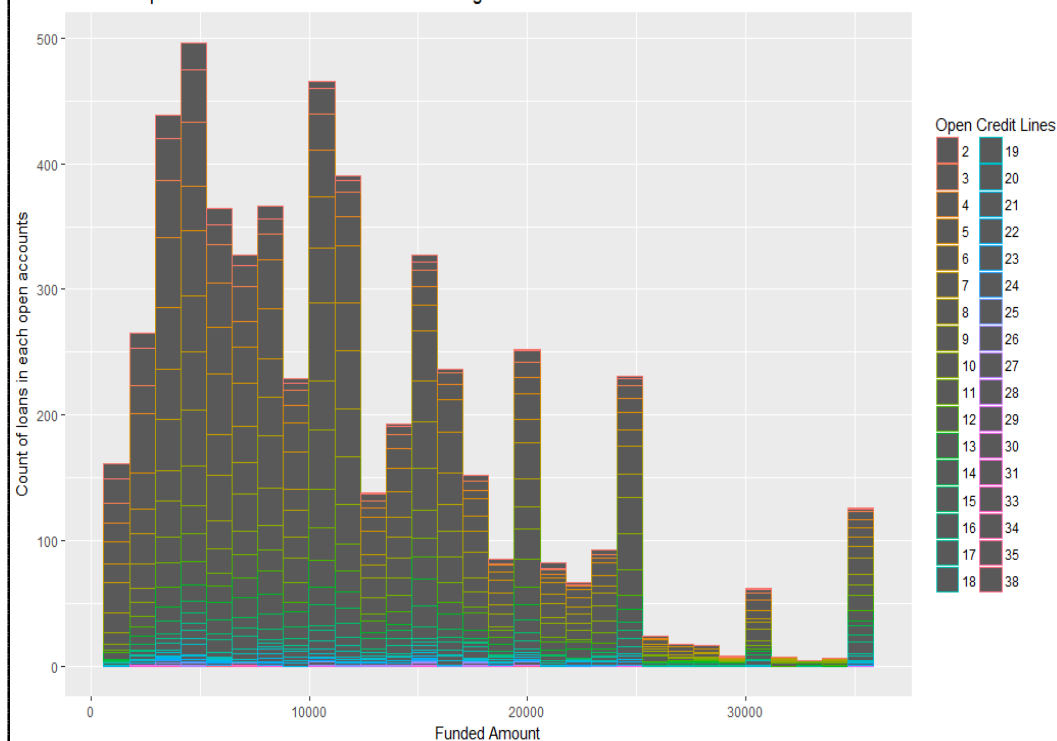


Summary of Open accounts & Grade (COUNTWISE)



1. We see that minimum credit line for eligibility is 2
2. As the number of credit line increases the number of loan decreases
3. Usually people having 8 to 10 open credit lines get loans easily

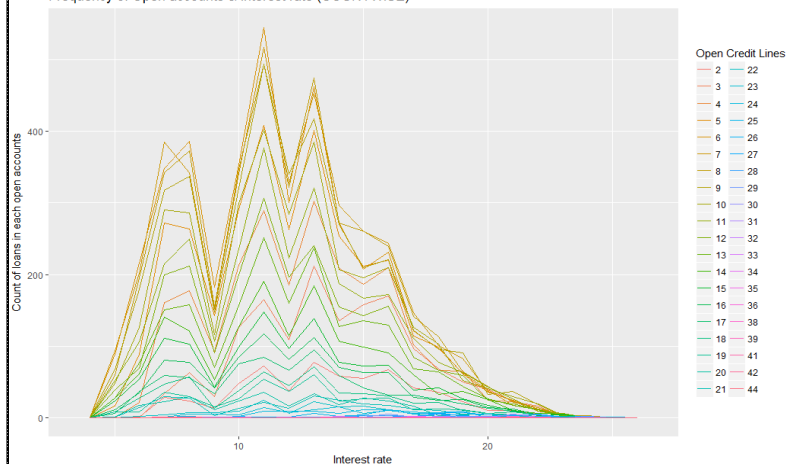
Share of open accounts in funded amount for charged off



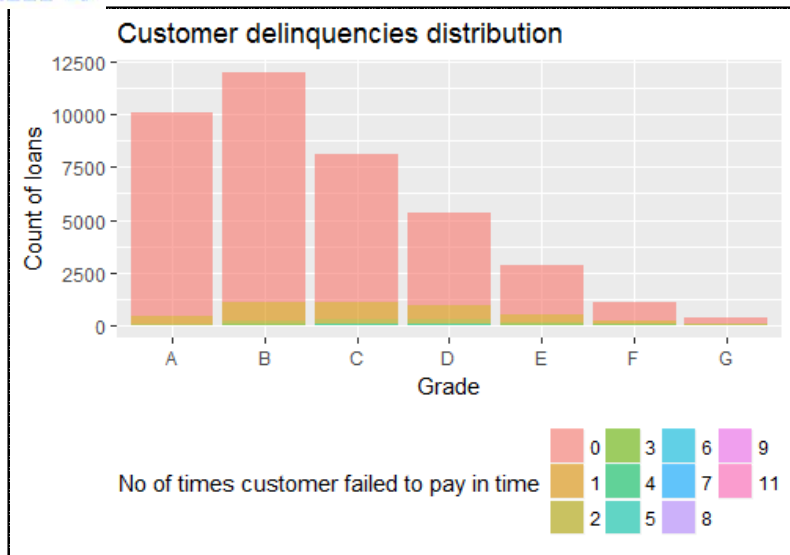
Looking at amount charged off in different open credit lines, we see that the stacks for open credit lines that fall between 2 to 6 open accounts have comparatively higher default amount attached to them.

Hence we can say that customers with 2 to 6 open credit lines are risky one's for lending club.

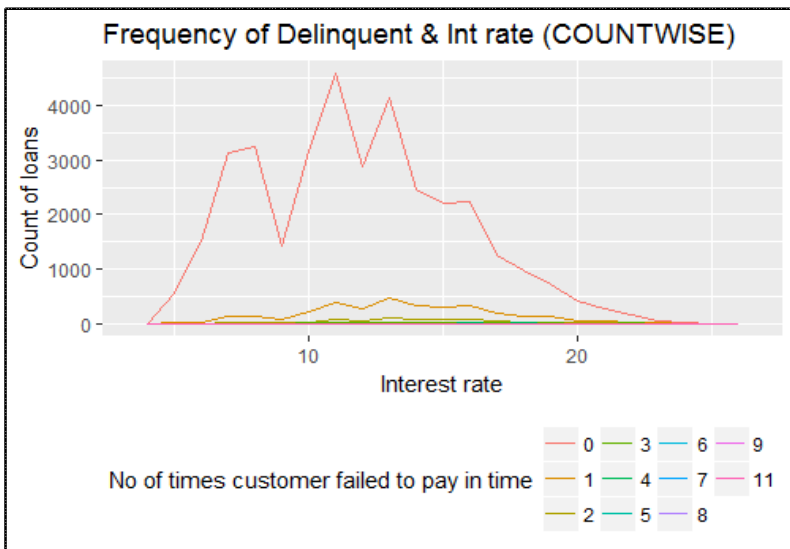
Frequency of Open accounts & Interest rate (COUNTWISE)



The above frequency chart says that the interest rate charged across all the open credit lines seems to follow the same pattern, hence number of open credit lines do not have any impact on interest rates

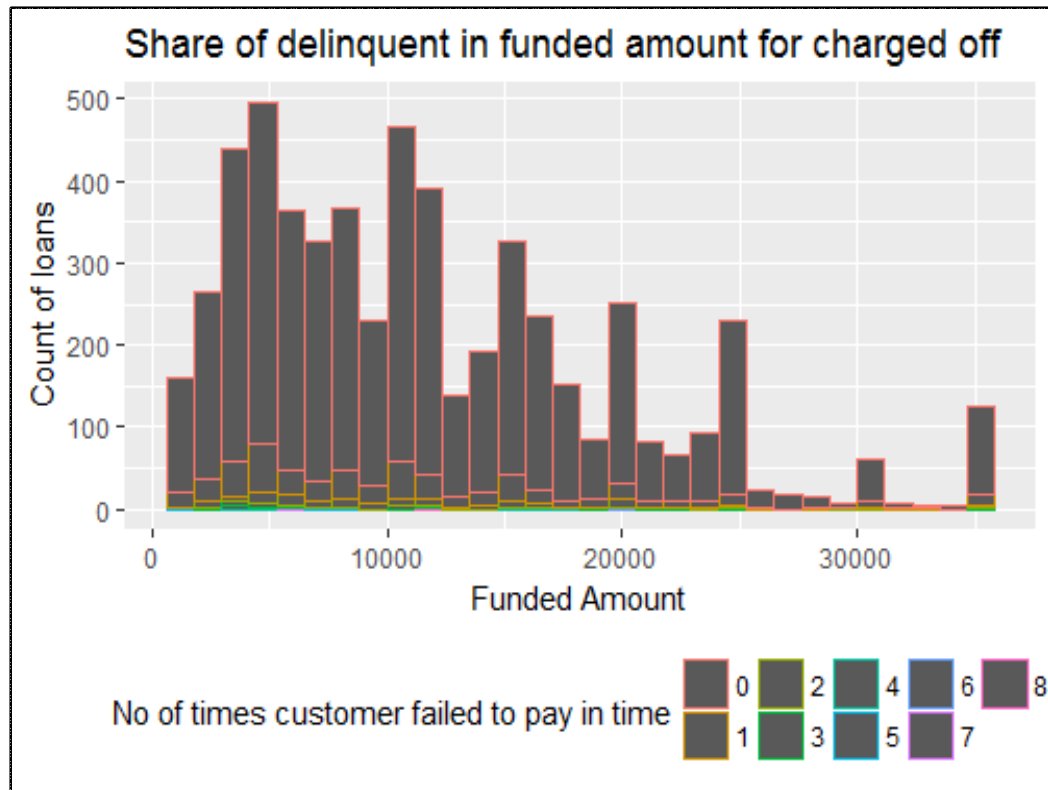


1. Looking at the above graph we see overall very few customers have failed to pay in time
2. Times 0 holds the maximum count in all grades



The above frequency chart says that the interest rate charged, across all the delinquencies seems to follow the same pattern.

Hence number of delinquencies do not have any impact on interest rates



Looking at amount charged off in different delinquencies, we see that the stacks for delinquencies that fall in 1 to 2 times have comparatively higher default amount attached to them.

Hence we can say that customers with 1 to 2 delinquencies are risky one's for lending club.

## Variables considered

Variable	Description
annual_inc	The self-reported annual income provided by the borrower during registration.
delinq_2yrs	The number of 30+ days past-due incidences of delinquency in the borrower's credit file for the past 2 years
emp_length	Employment length in years. Possible values are between 0 and 10 where 0 means less than one year and 10 means ten or more years.
funded_amnt	The total amount committed to that loan at that point in time.
grade	LC assigned loan grade
home_ownership	The home ownership status provided by the borrower during registration. Our values are: RENT, OWN, MORTGAGE, OTHER.
open_acc	The number of open credit lines in the borrower's credit file.
term	The number of payments on the loan. Values are in months and can be either 36 or 60.
verification_status	Indicates if income was verified by LC, not verified, or if the income source was verified

## Recommendation

- Lending club should not give loans to customers that have 2 to 6 open credit lines.**
- It should take people who have defaulted in payments once or twice as a sign of caution, they may not be risky as this type of negligence could have been caused due to laziness.**
- People with more that 10 years of experience do carry certain amount of risk but it solely depends on lending club's strategy, if they want to look at them as risky.**