GRAMENER CASE STUDY

SUBMISSION

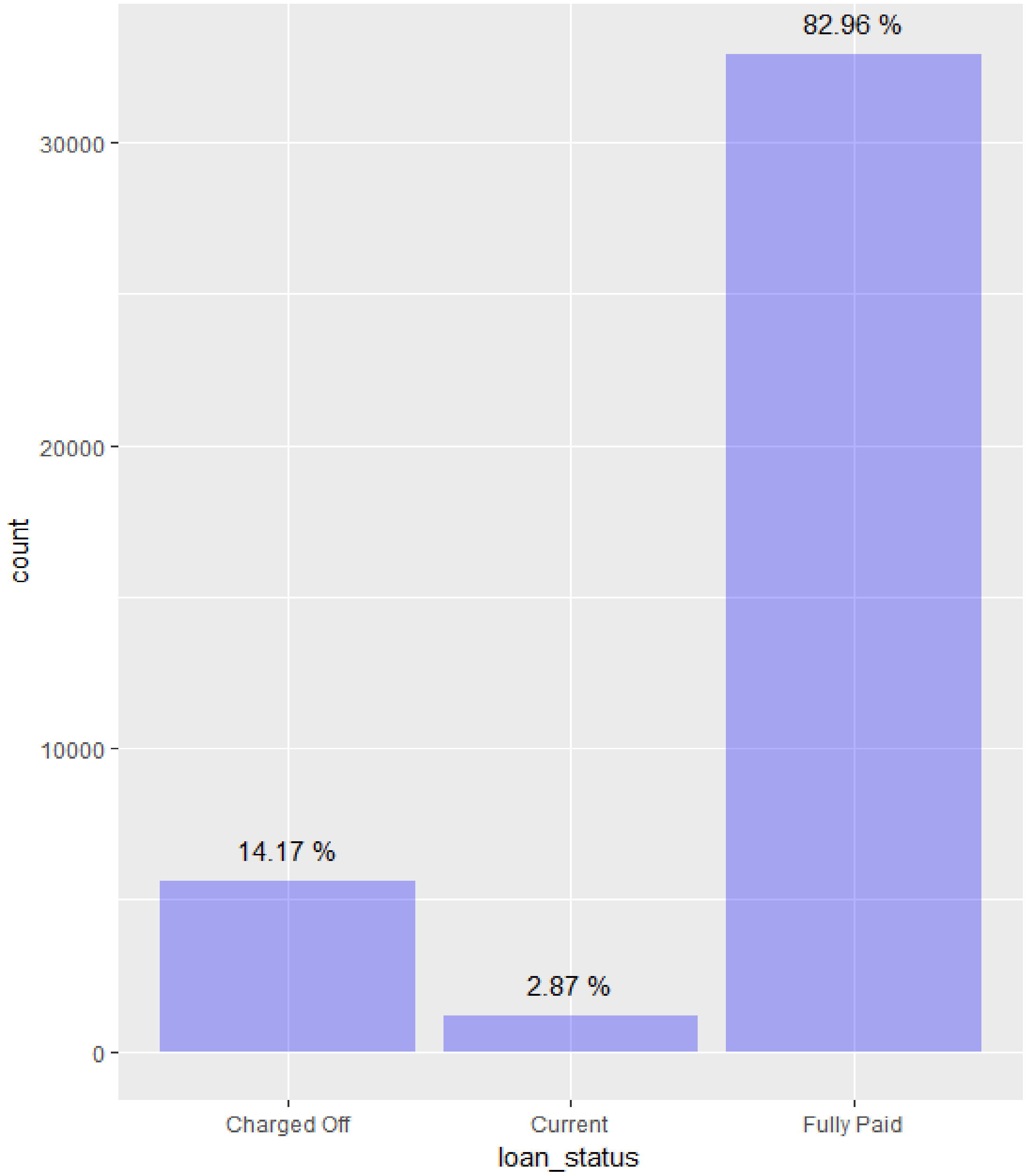
by :

Srikar Tadiparthi

Abstract

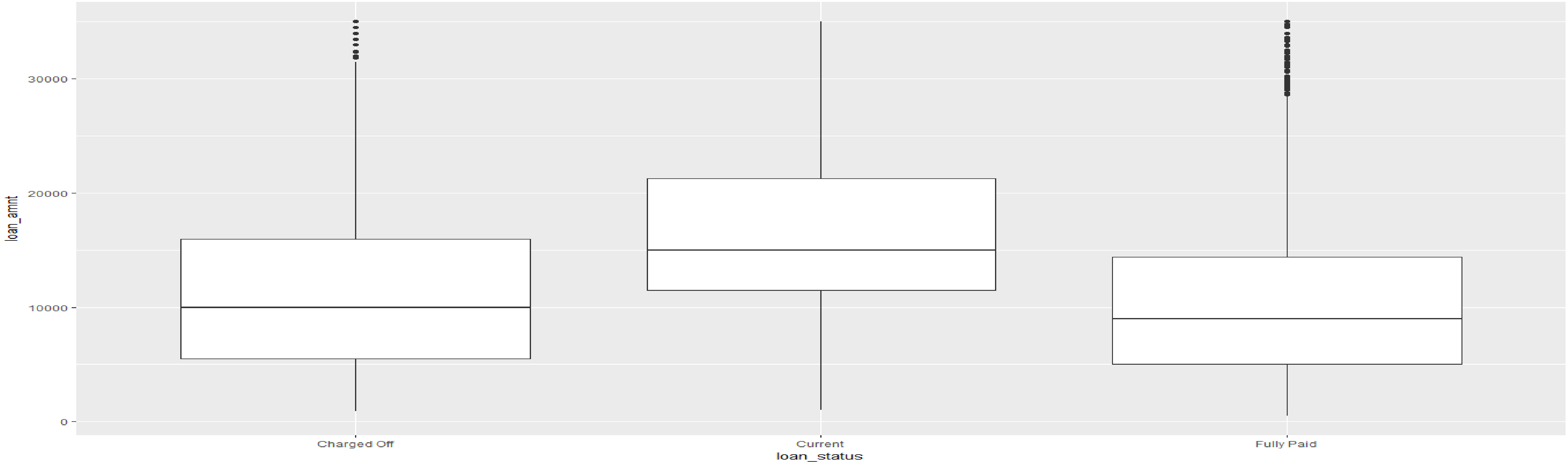
A consumer finance company specializes in lending various types of loans to customers. When the company receives a loan application, the company has to make a decision for loan approval based on the applicant's profile. The aim is to identify patterns which indicate if a person is *likely to default*, which may be used for taking actions such as denying the loan, reducing the amount of loan, lending (to risky applicants) at a higher interest rate, etc.

Here the chart displays the percentage of people who have completely paid the loan, those who are in the process of paying and those who have defaulted or charged off. Though it is clear that most number of people are paying the loan there are a significant number of people who are defaulting on their loans. It is because of these category of people the bank faces major loss of money.



Though only around 14% of people are defaulting on their loans, the average amount of defaulted amount is significantly higher when compared to those who have fully paid the loan.

	loan_status	avg
	<fct>	<dbl>
1	Charged Off	12104.
2	Current	17054.
3	Fully Paid	10866.



It is clear from the chart that the people who are more likely to default on their loans are having lower average annual income and higher average loan amount.

	loan_status	avg_annual_income	avg_loan
	<fct>	<dbl>	<dbl>
1	Charged Off	56700.	11831.
2	Current	66142.	16524.
3	Fully Paid	62079.	10516.

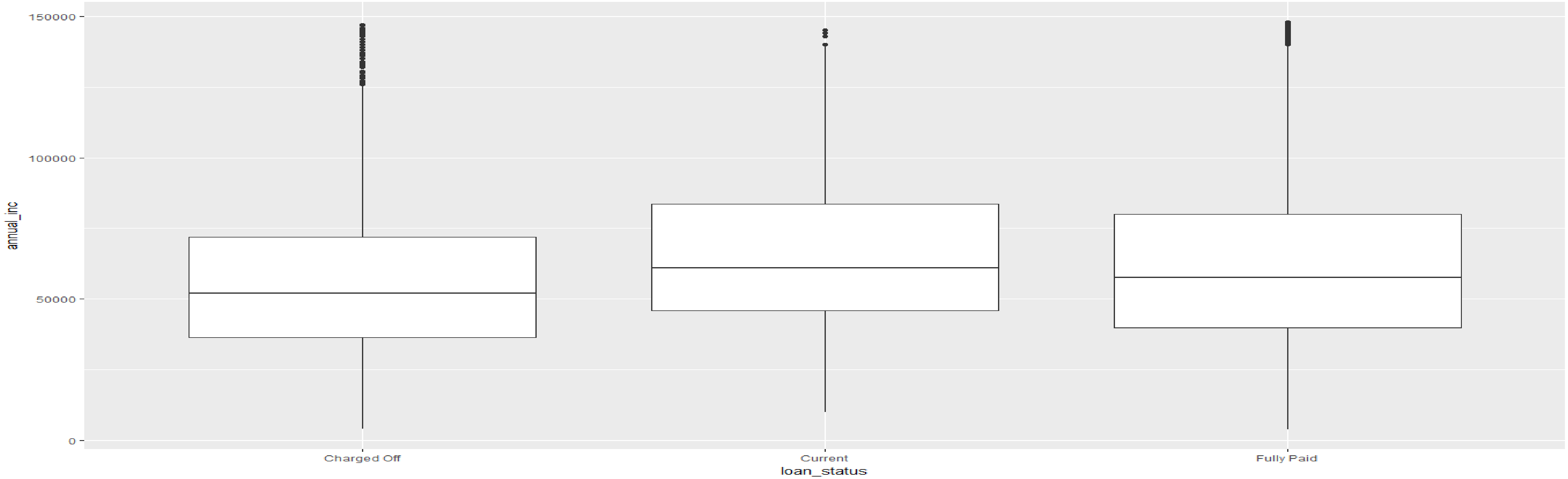
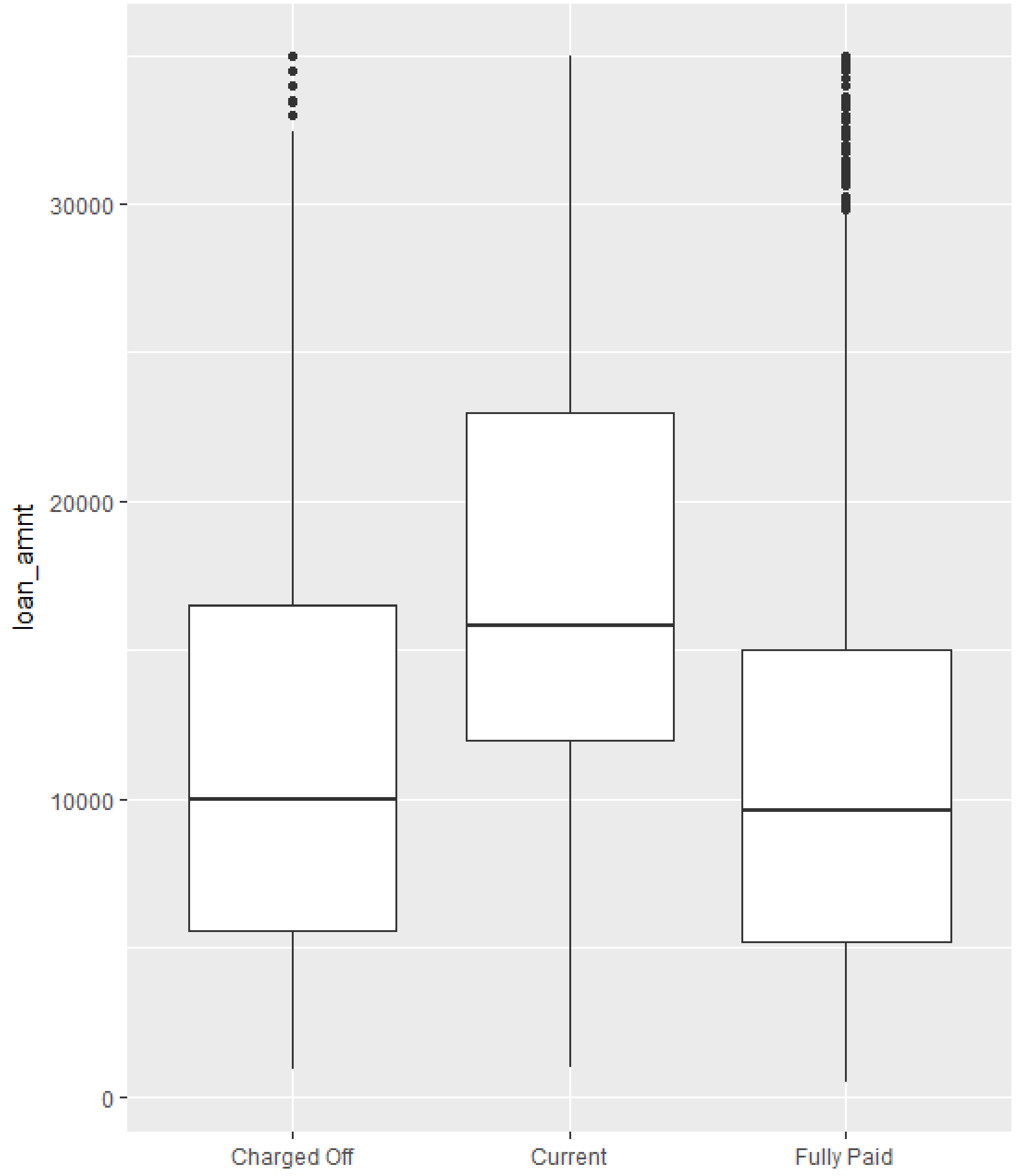
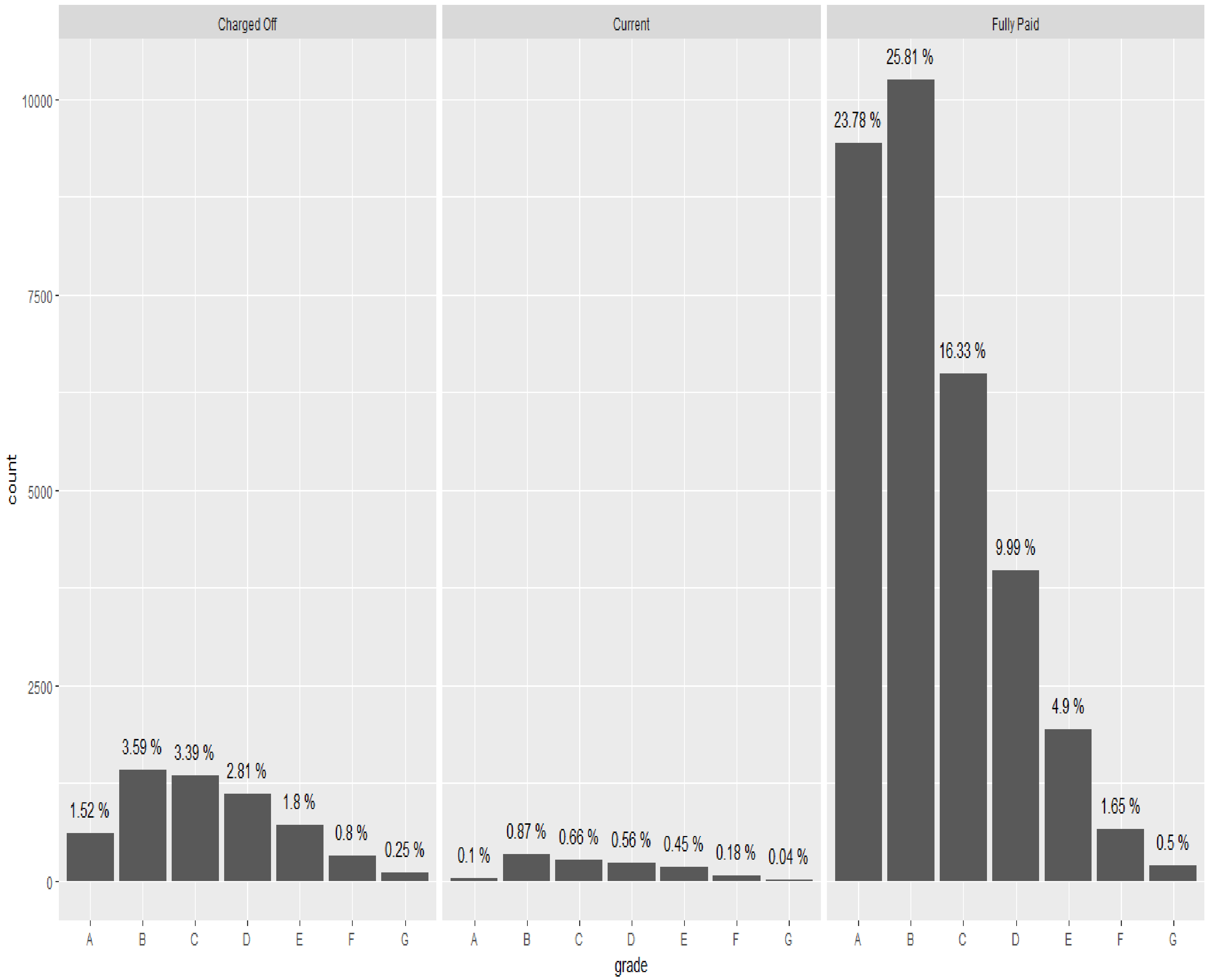


Chart showing the loan amounts taken by people segmented on loan status. It can be seen from the boxplots that the median amount is higher in case of people who have defaulted on their loan. Also it is to be noted that there are certain outliers in Fully paid and Charged Off categories meaning that certain people are given high amount of loans.

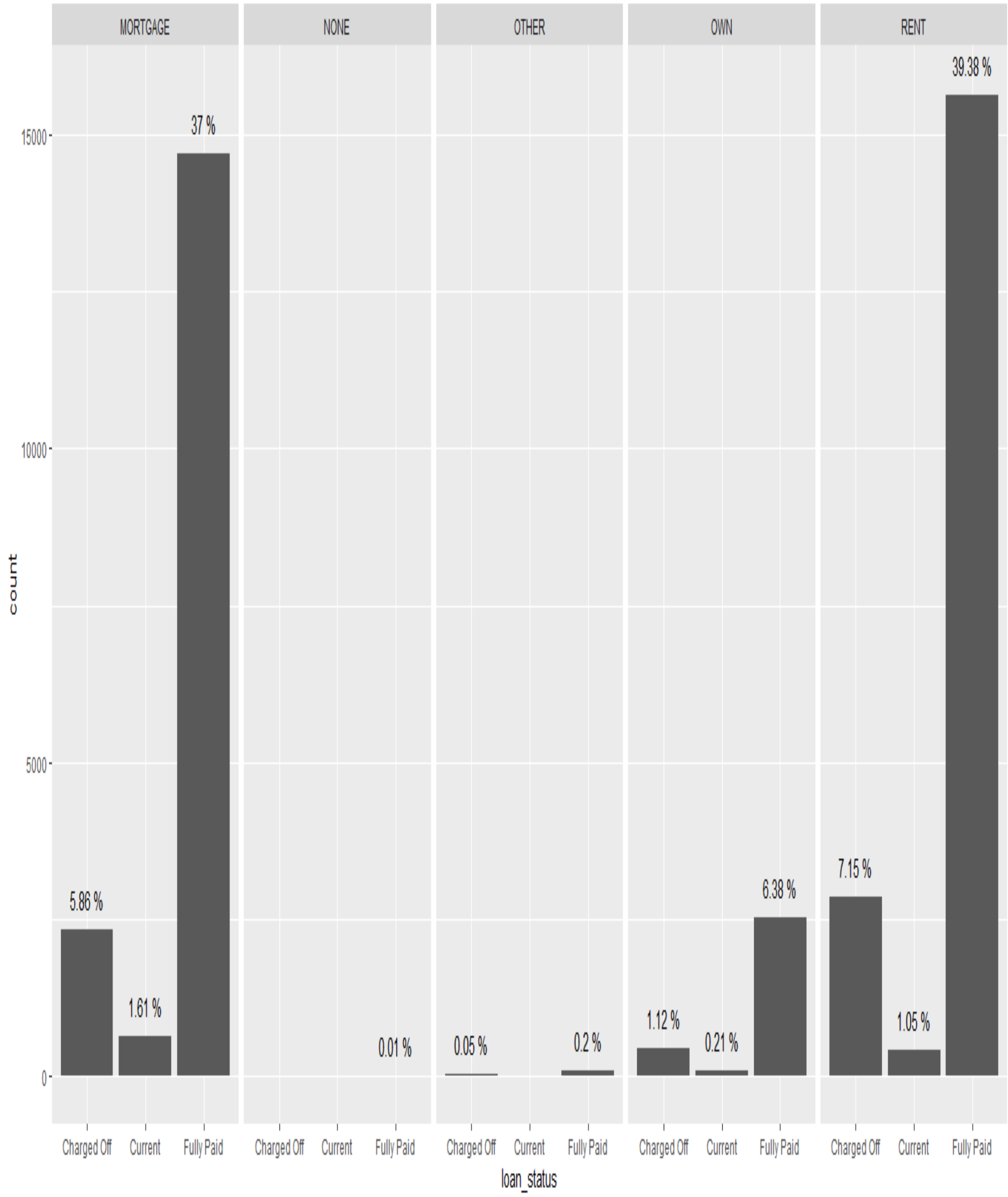


The chart shows the percentage of total number of applicants who are divided on the basis of grades assigned to their loan applications. It is further segmented on status of loans. It can be observed that people belonging to B, C, D grades are more likely to default on their loans.

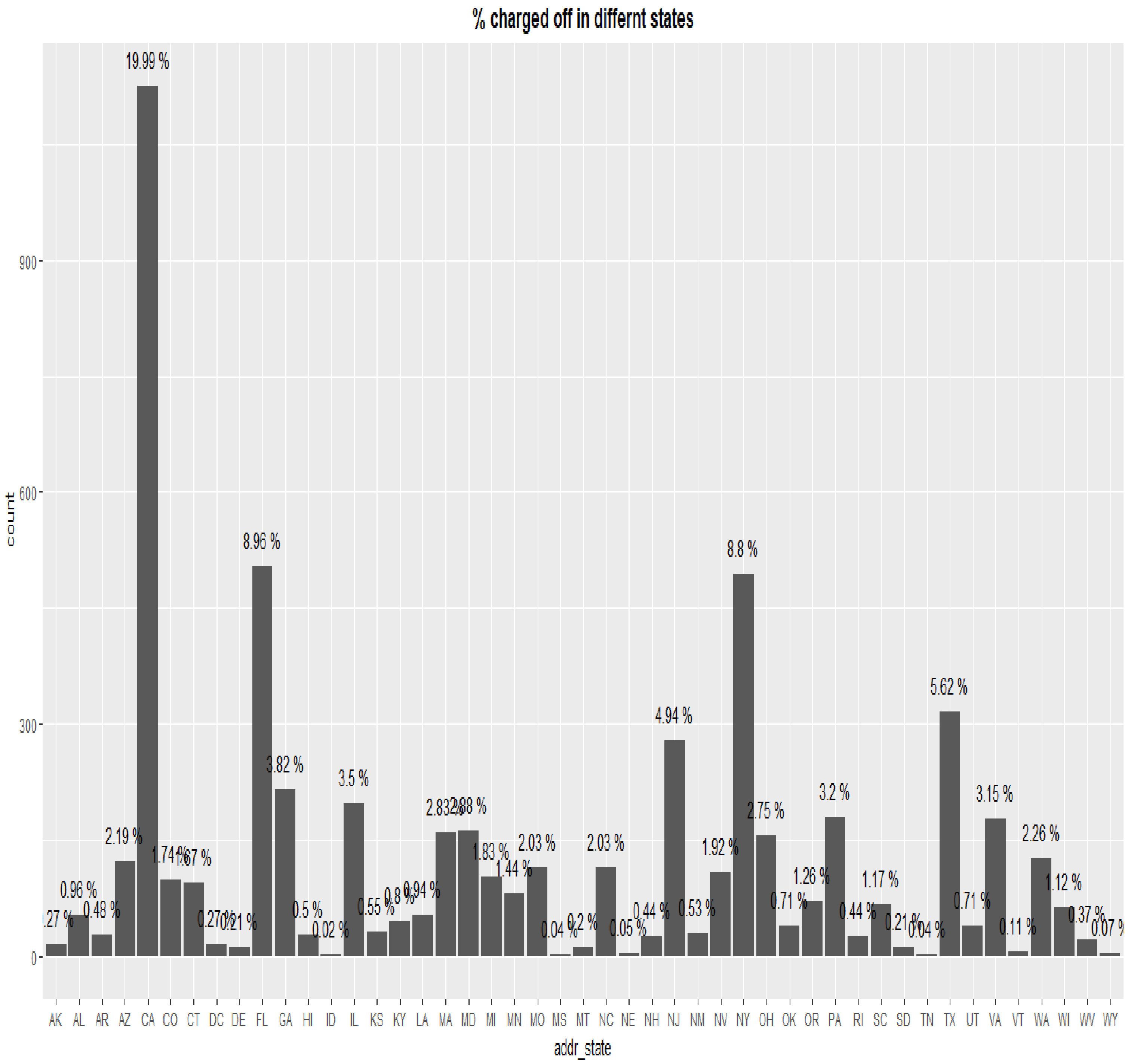


House Ownership VS loan status

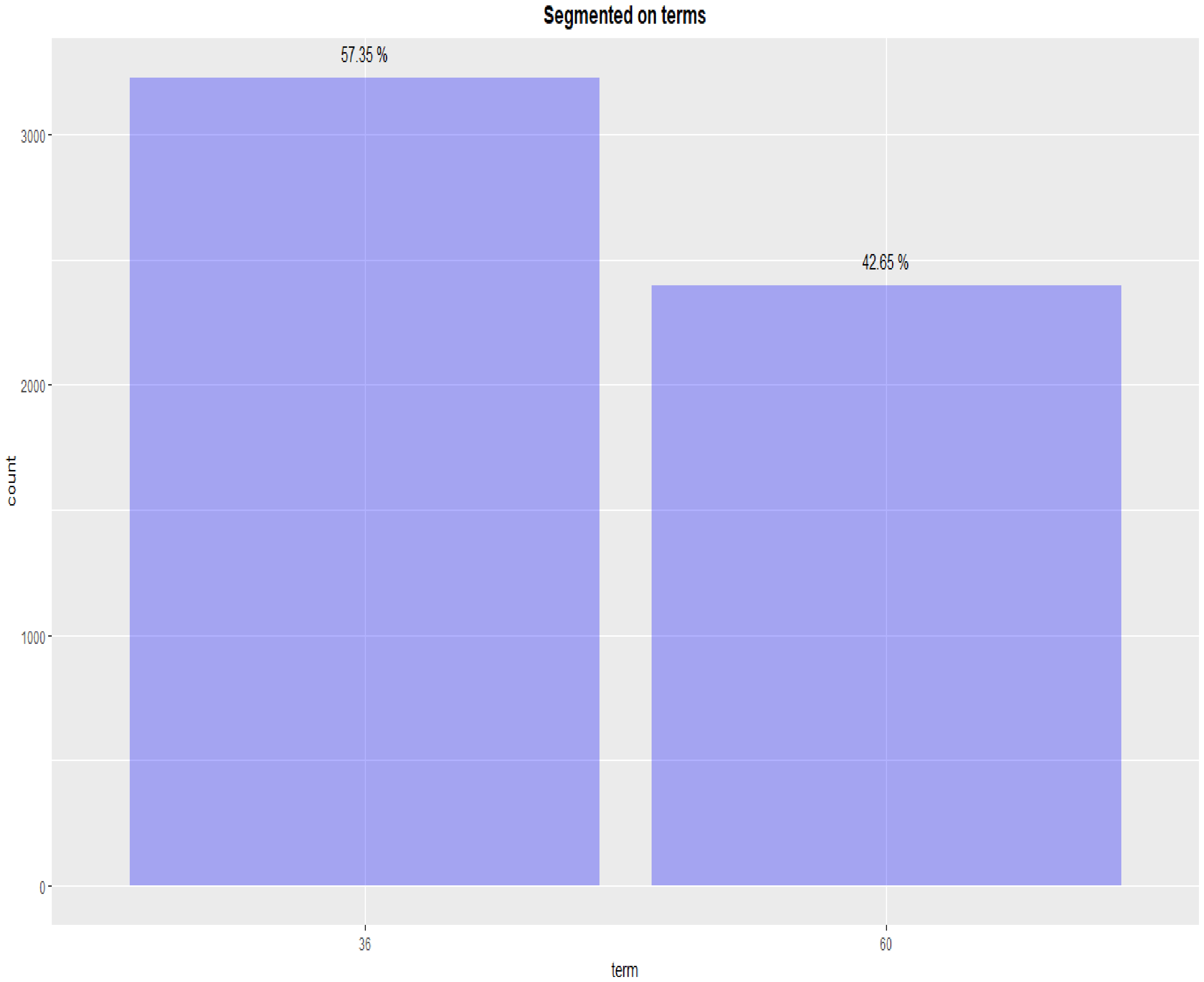
It is clear from the chart that more number of people that are likely to default are either living in rented homes or having their homes mortgaged. Also it can be noted that these two categories of people are likely to apply for loans compared to those belonging to other segments.



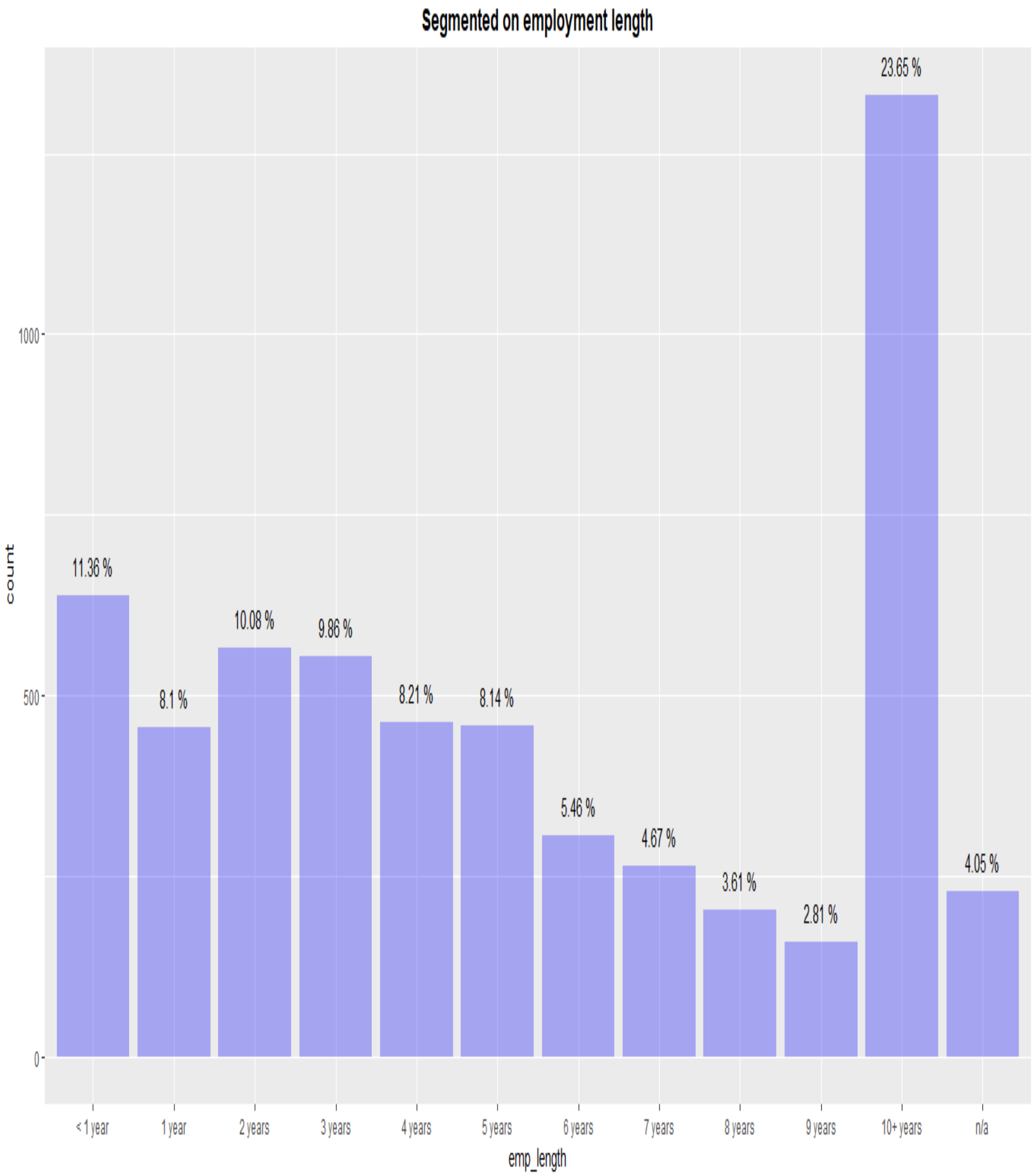
It is very clear from the chart that the people belonging to certain states are more likely to default on their loans. The state which the person is from is a likely indicator of whether the loan will be defaulted or paid off. People from CA, NY, FL states are more likely to default.



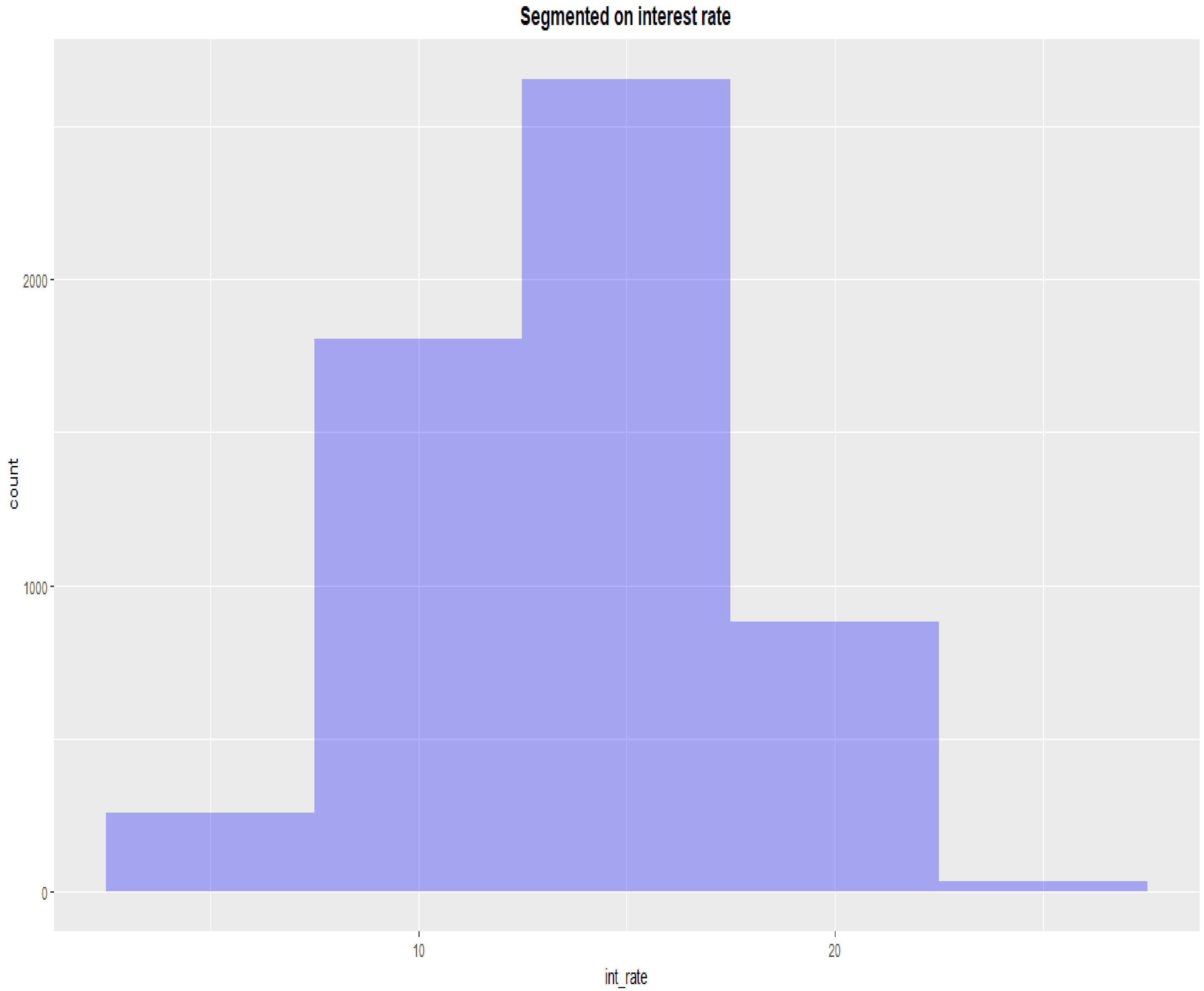
It is to be noted from the chart that the people who have short term loan of 36 months are likely to be defaulted than the people who have long term loan of 60 months.



There is a clear trend in the chart. As the employment length increases the lesser and lesser amount of people are defaulting on their loans. The trend breaks at people whose employment length is greater than 10 years. Also people with less than 1 year employment length(probably young people) are also likely to default.



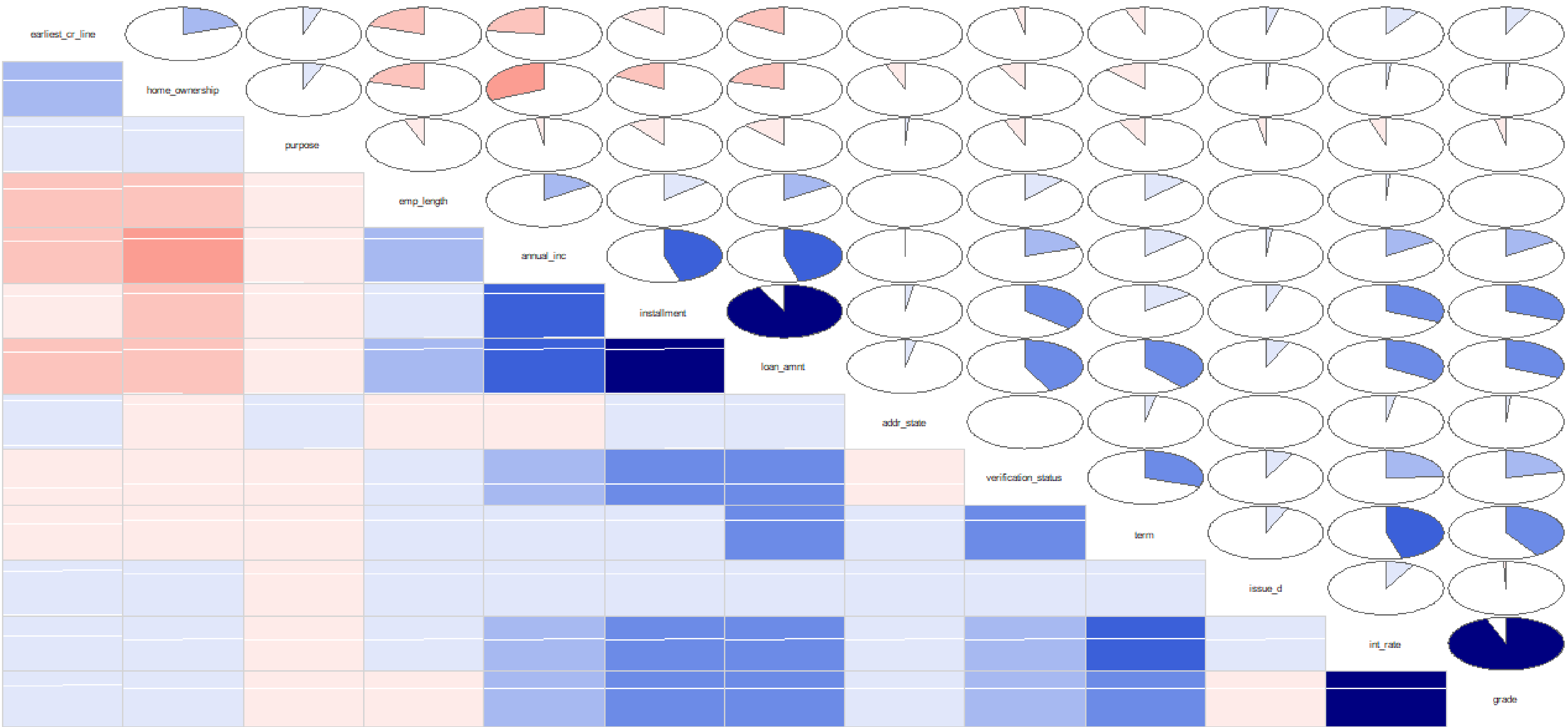
It is clear from the chart that people who pay a interest rate of 5% - 15% are more likely to charge off. It means that people who are considered not so risky (and hence low interest rate) are likely to default on their loans.



The analysis identified 5 important driver variables (i.e. variables strong indicators of default)

1. Home ownership
2. State
3. Term
4. Grade
5. Employment length

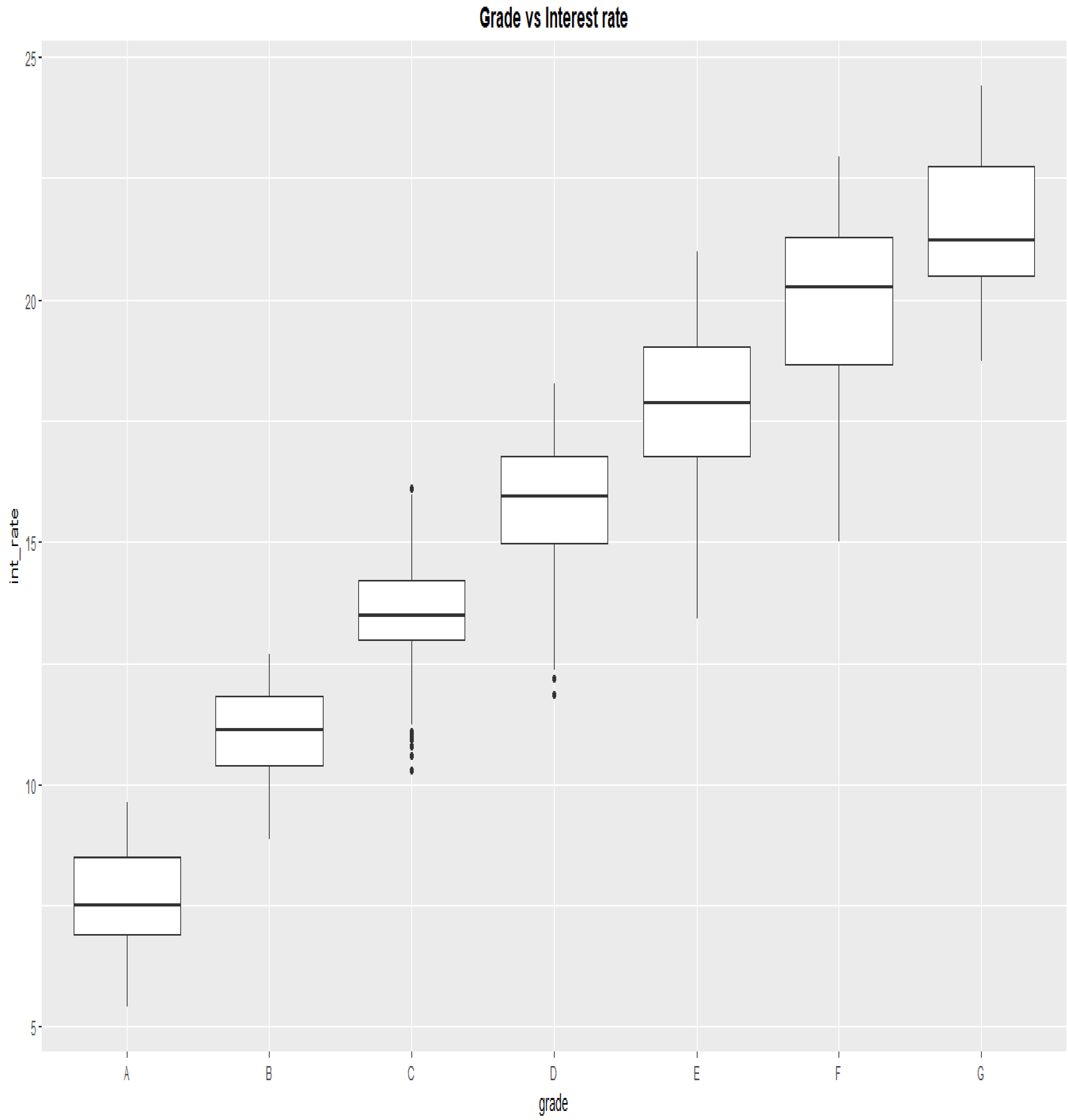
Correlogram of most important variable



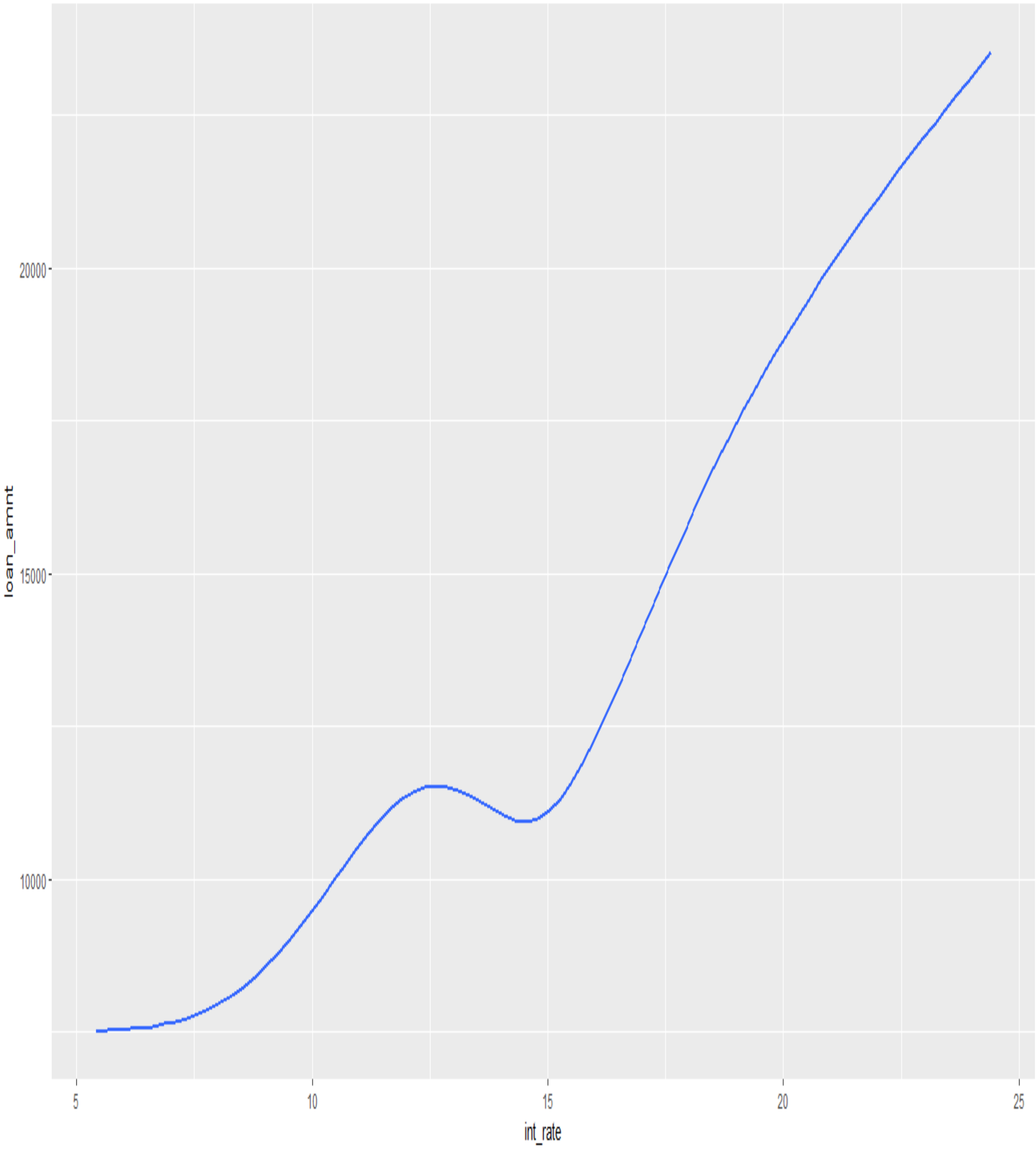
Correlogram of most important variable

The Correlogram in the previous slide show cases some very important relationships between various independent variables. Some of the relationships tells that grades are closely associated with interest ratio. This might be because higher grades means higher risk of default and hence higher interest ratio. At the same time it can be seen that installment and loan amount are highly correlated because higher the loan higher would be monthly installment. It can also be noted that people with higher annual income and loan amount are correlated telling that higher income people are usually opting for higher loan amounts.

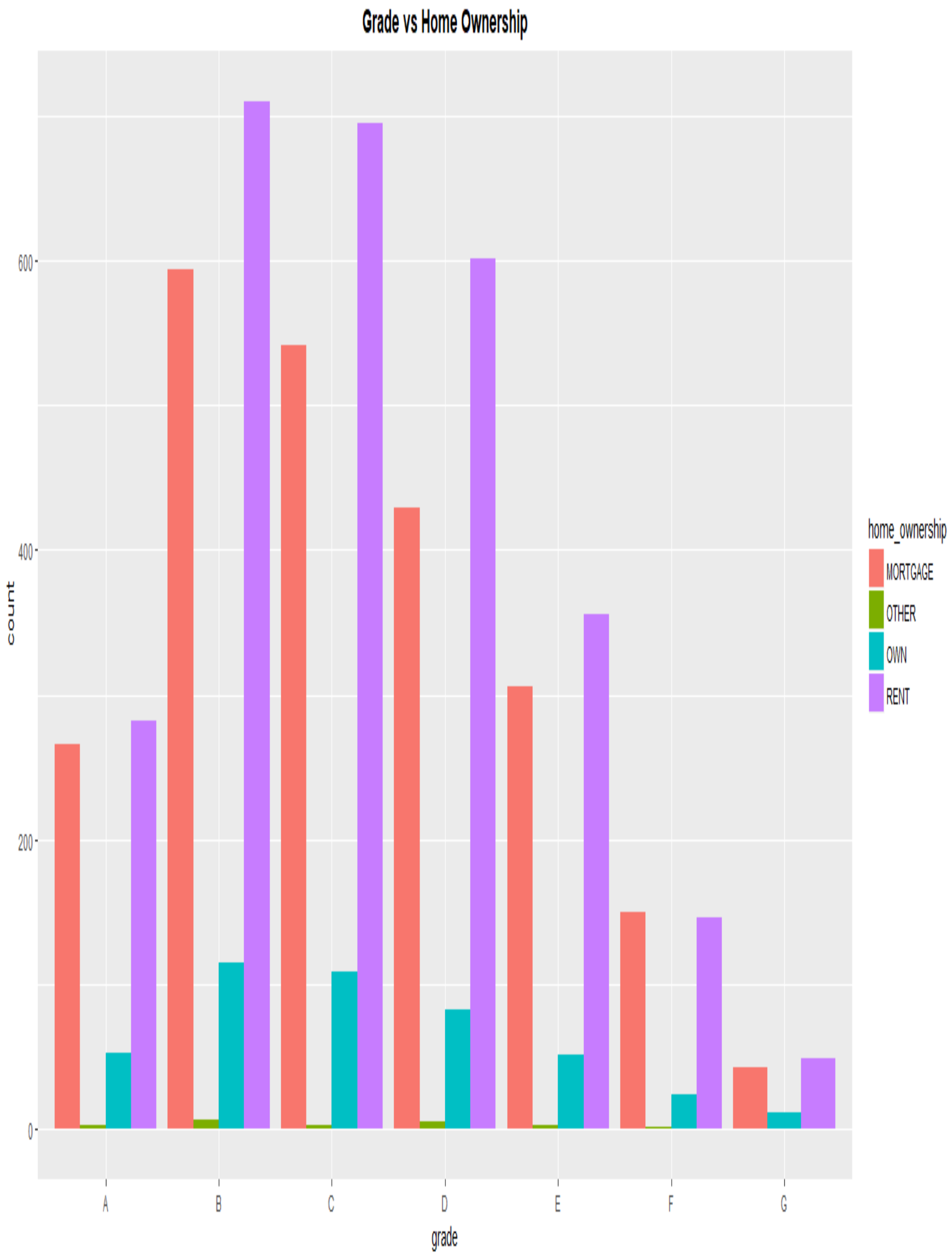
From the chart it is clear that higher grades are associated with higher interest rate. This is because higher grades imply that the applicant can be categorized as risky and hence the bank is charging higher interest rate.



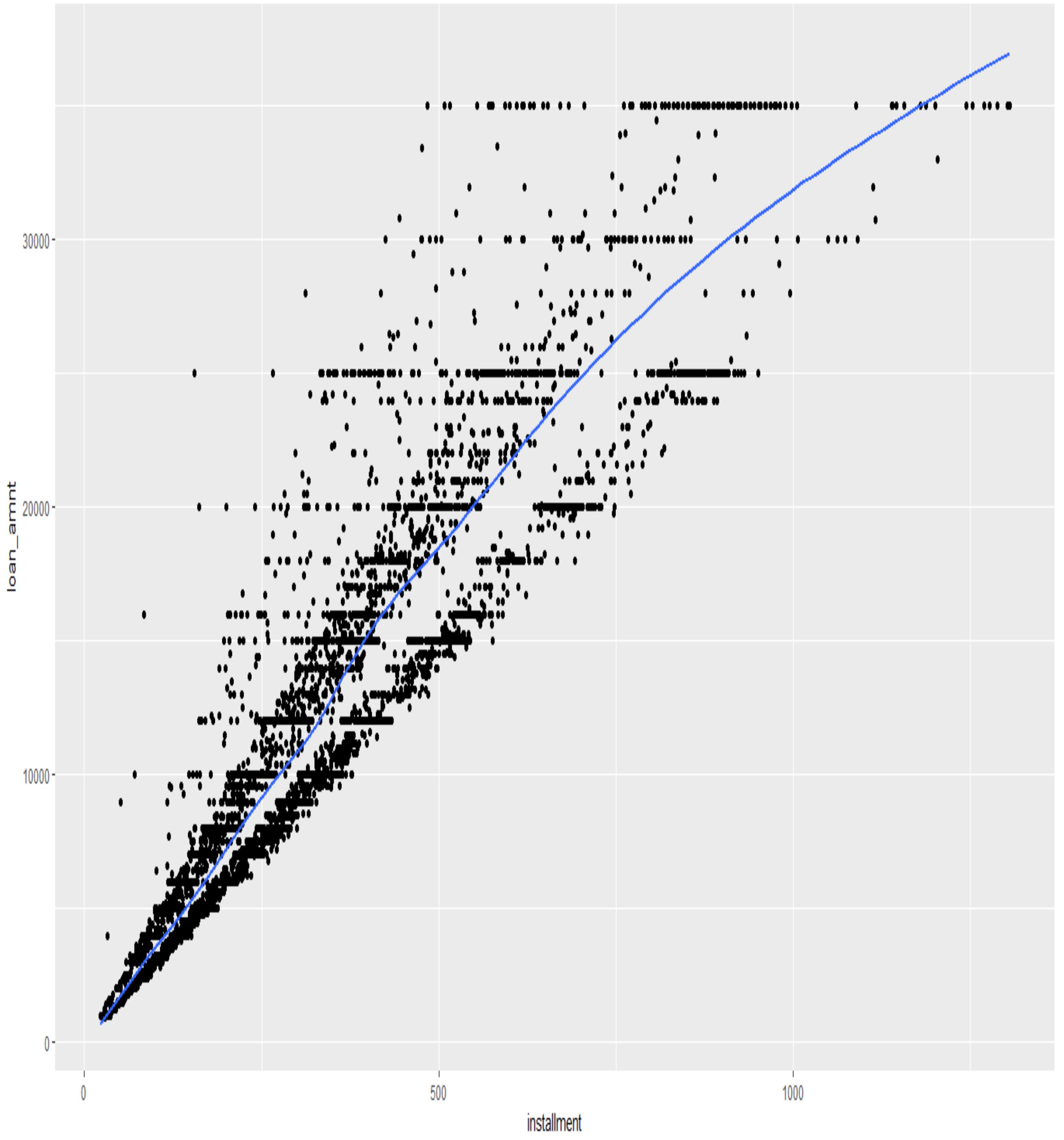
It is evident from the chart that as the loan amount increases so thus the interest rate. This is because as the loan amount increases the chances of defaulting on the loan increase and hence interest rate increases. (since we know that banks tend to charge higher interest rates for riskier loans)



In our previous analysis we figured out that applicants belonging to grades B, C, D are classified as risky. Among these applicants it can be seen that more people are living on rent followed by people living in mortgaged homes.



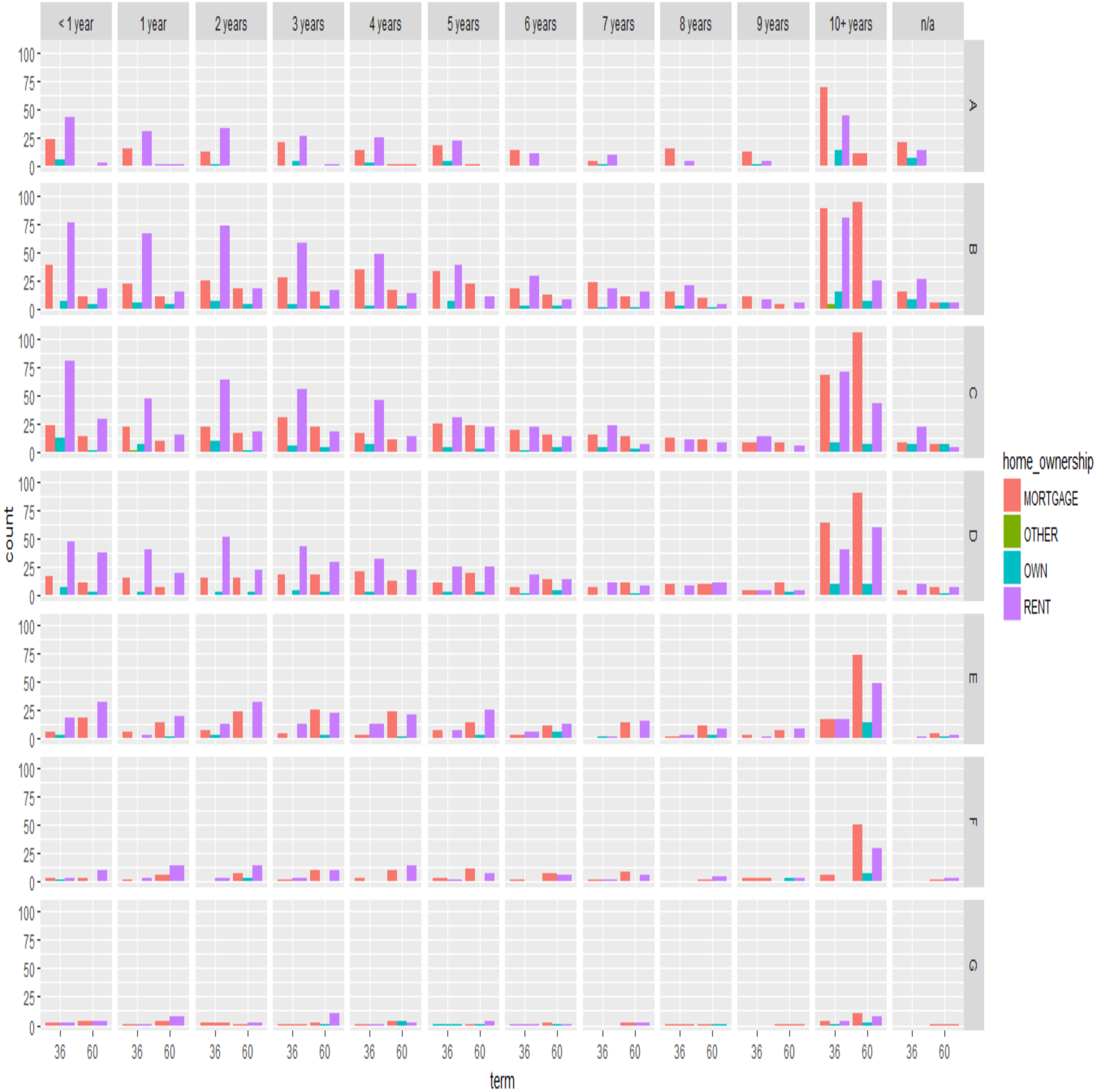
It is clear from the graph that there is a clear linear relationship between loan amount and installment amount. This is because more loan amount usually corresponds to higher monthly installments.



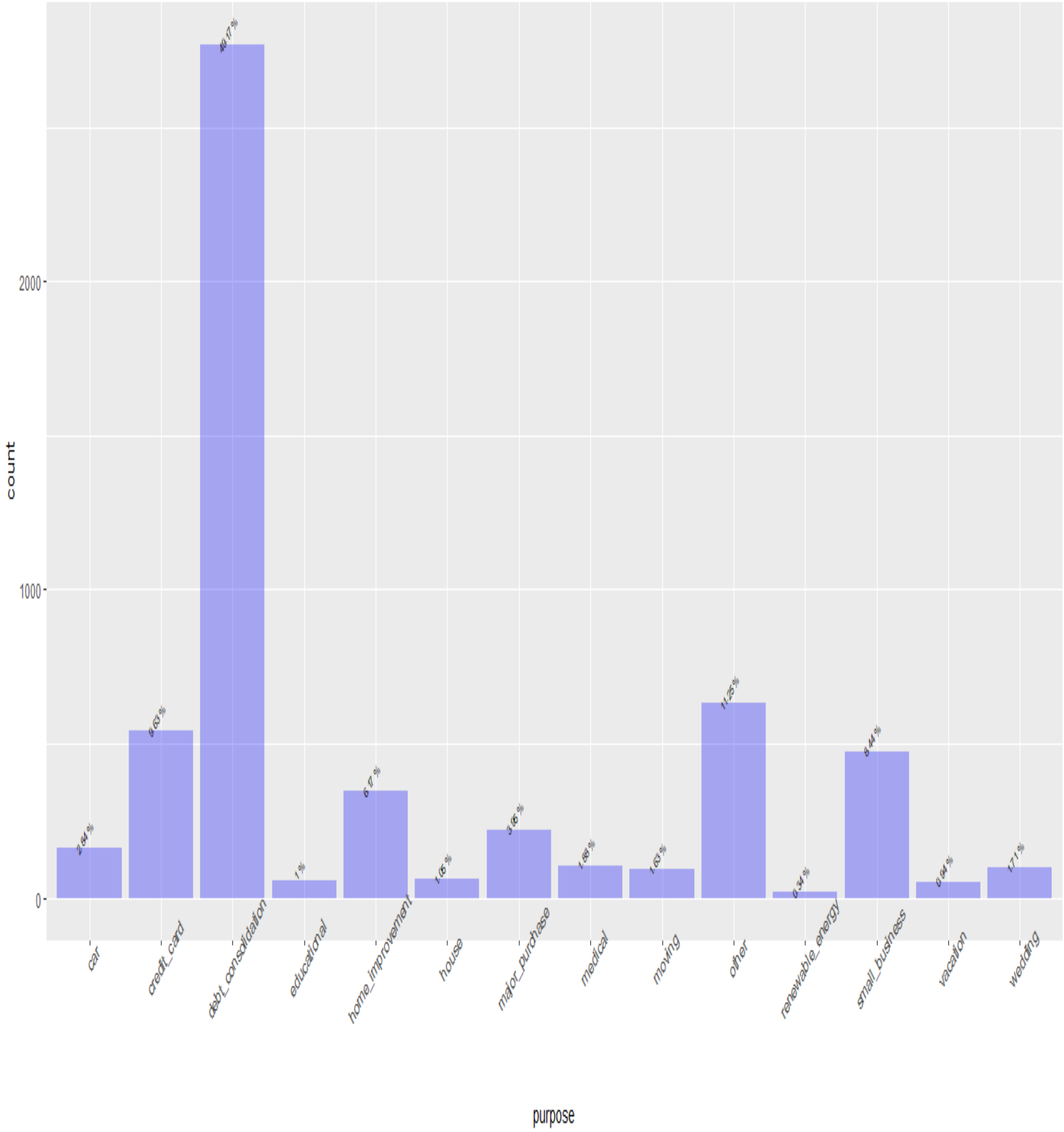
The sources which are not verified are more likely to be charged off or defaulted.

	Charged Off	Current	Fully Paid
Not Verified	2101	225	14227
Source Verified	1375	282	7828
Verified	1958	550	9355

It can be seen from the graph that the people with 10+ years of employment are more likely to default. Also it can be seen that more of these people living in mortgaged homes.



More people who have defaulted on their loan mentioned that debt consolidation as their purpose for applying for a loan.



Conclusions

A person with the following characteristics is like to default on loan

- Employed for 10+ years
- Lives in rented or mortgaged home
- Belongs to CA, NY, FL states
- Has a grade rating of B, C, D
- Applying for 36 months term loan