LENDING CLUB CASE STUDY

SUBMISSION

Group Members: Divyam Kumar

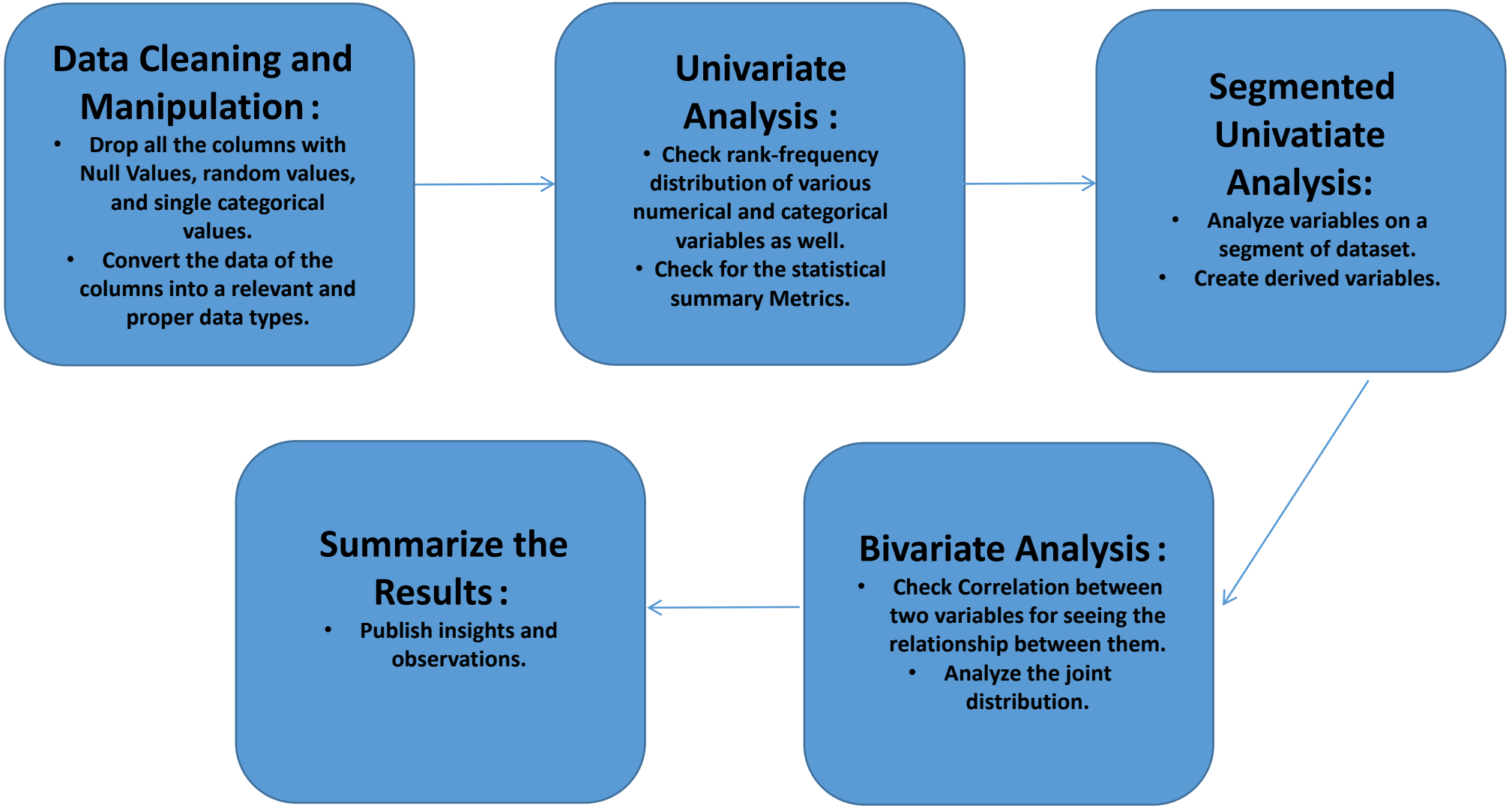
Abhishek Kumar

Abstract of Defaulter Analysis for Lending Club

- **Business Understanding:** We work for a consumer finance company which specializes in lending various types of loans to urban customers. When the company receives a loan application, the company has to make a decision for loan approval based on the applicant's profile.
- **Risk Associated:**
  - 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.
- **Decision taken by the company:** When a person applies for a loan, there are **two types of decisions** that could be taken by the company:
  - **Loan accepted:** If the company approves the loan, there are 3 possible scenarios described below:
    a. Fully paid : Applicant has fully paid the loan (the principal and the interest rate).
    b. Current : Applicant is in the process of paying the installments, i.e. the tenure of the loan is not yet completed. These candidates are not labeled as 'defaulted'.
    c. Charged-off : Applicant has not paid the installments in due time for a long period of time, i.e. he/she has defaulted on the loan.
  - **Loan rejected:** The company had rejected the loan (because the candidate does not meet their requirements etc.). Since the loan was rejected, there is no transactional history of those applicants with the company and so this data is not available with the company (and thus in the dataset).
- **Goals:** 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. In other words, the company wants to understand the **driving factors (or driver variables) behind loan default**, i.e. the variables which are strong indicators of default. The company can utilize this knowledge for its portfolio and risk assessment.
- **Data:** We have been provided with the Private Data of Lending Club. The complete loan data for all loans issued through the time period 2007 to 2011. We also have a data dictionary which describes the meaning of these variables.

Problem solving methodology

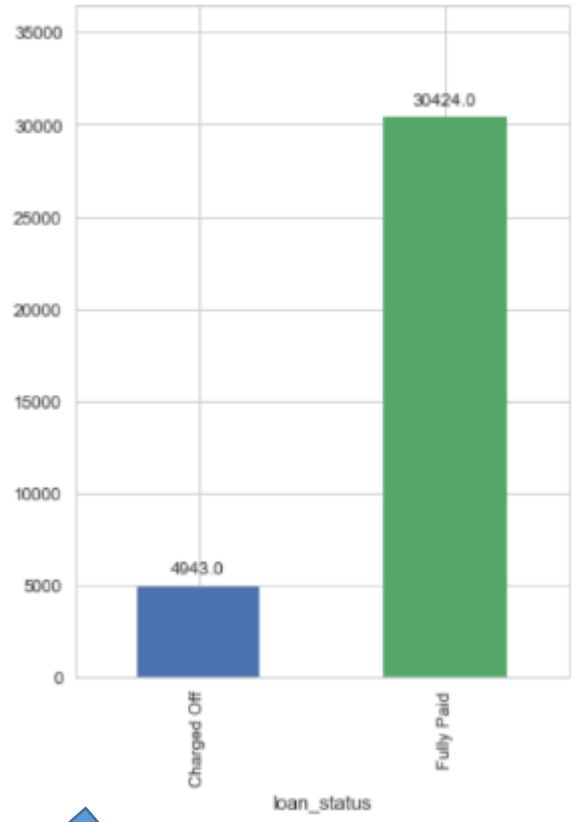
Flow Chart:

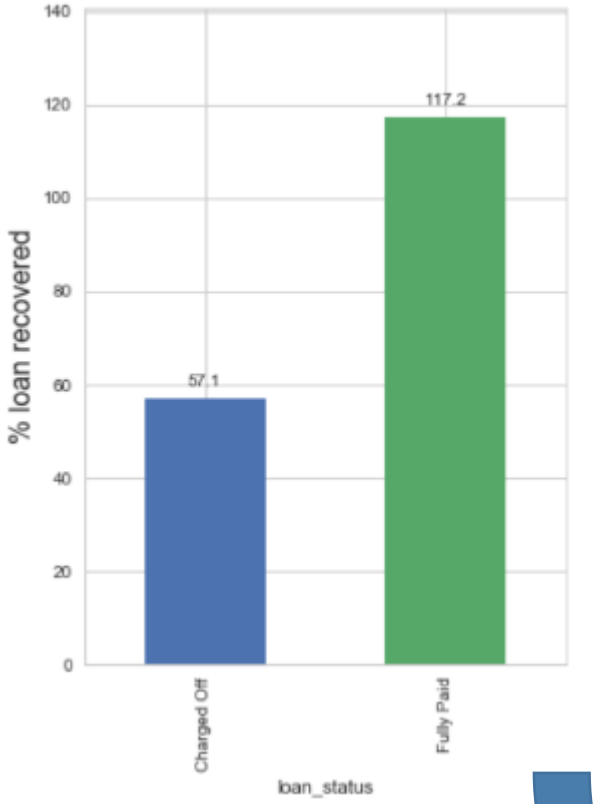


Analysis – Overall Loan Status

Approximately **14 %** of the Loans are defaulted

Any Variables that increases percentage of default to higher than **16.5 %** should be considered a business risk.

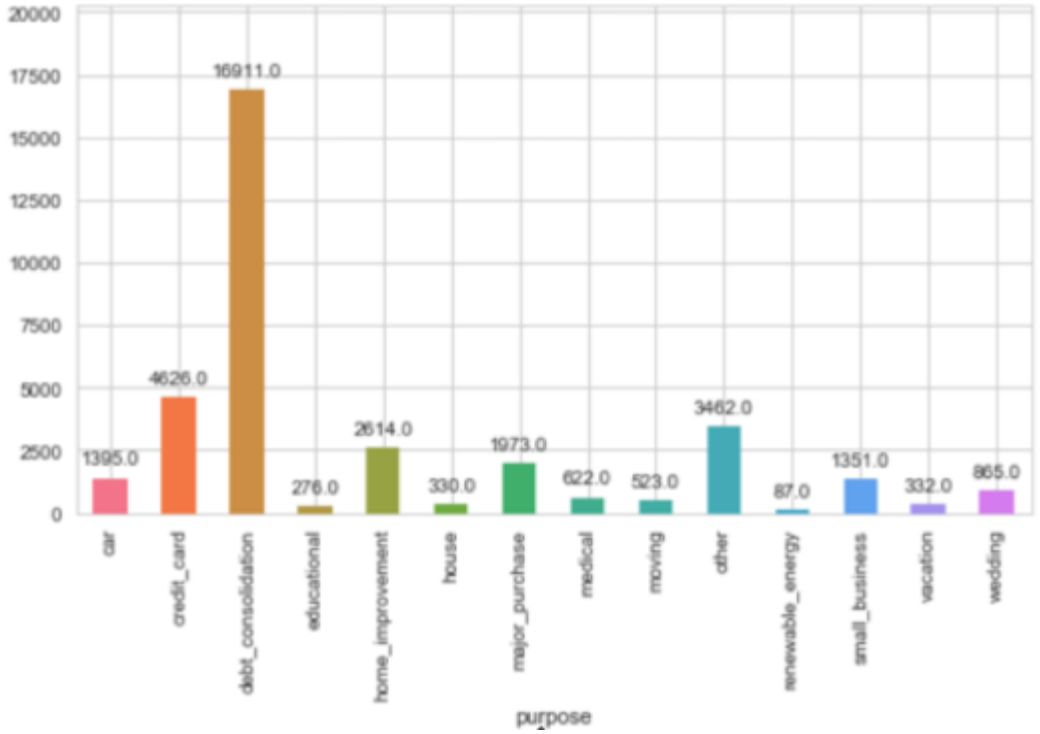




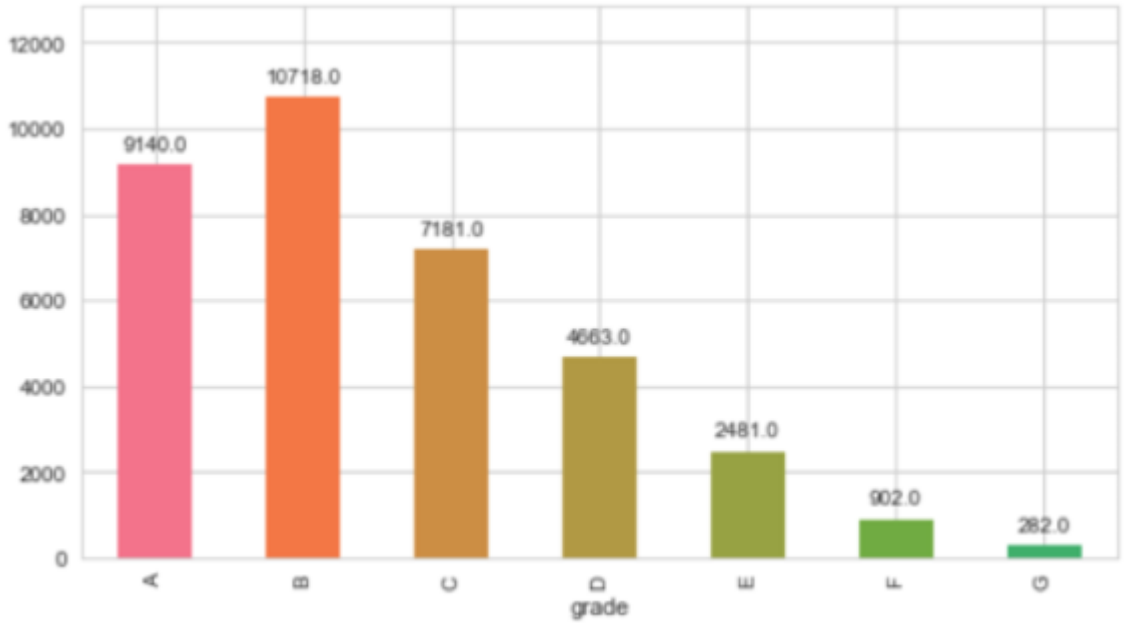
Lending Club only recovers **57%** of the loan amount when loans are defaulted.

On Fully Paid off loans the company makes **17%** profit.

Analysis – Understanding Loan

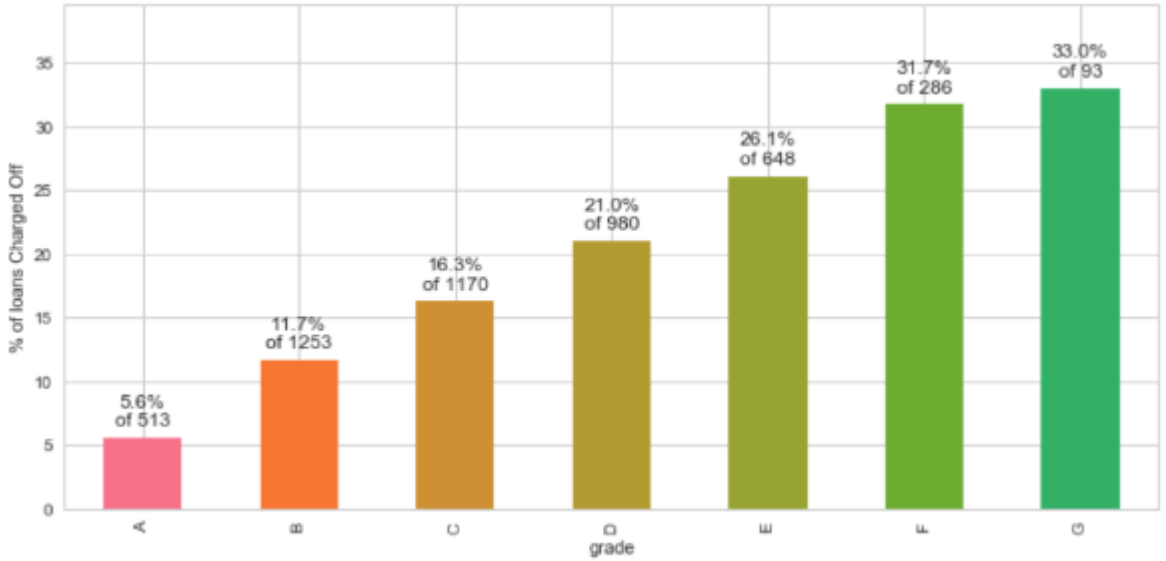


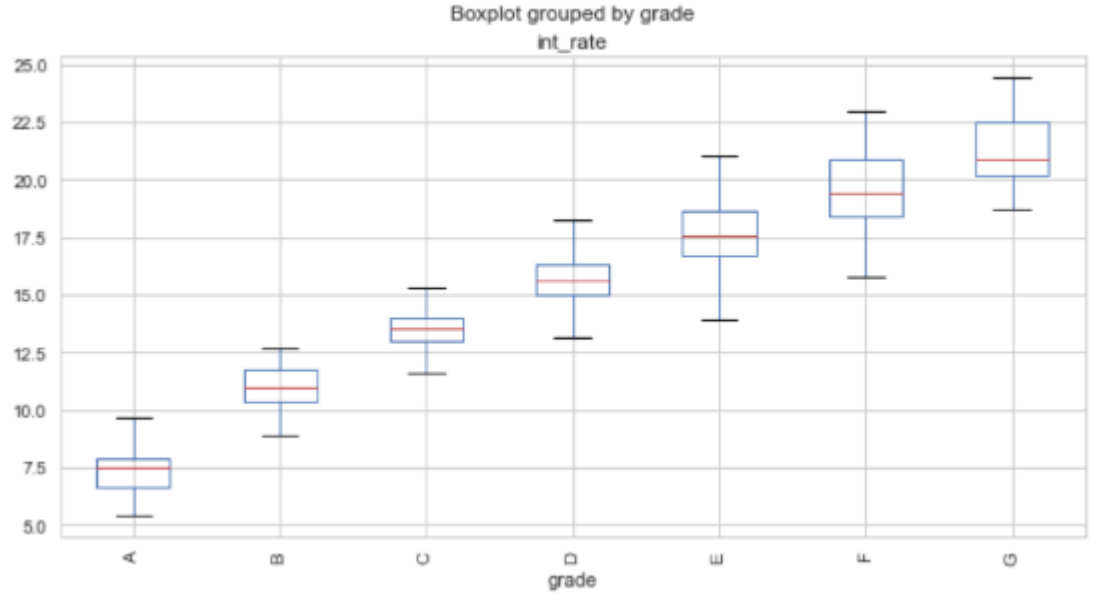
Maximum number of loans are for **debt Consolidation**



Most of the loans are of higher grades that are **Grade A** and **Grade B**

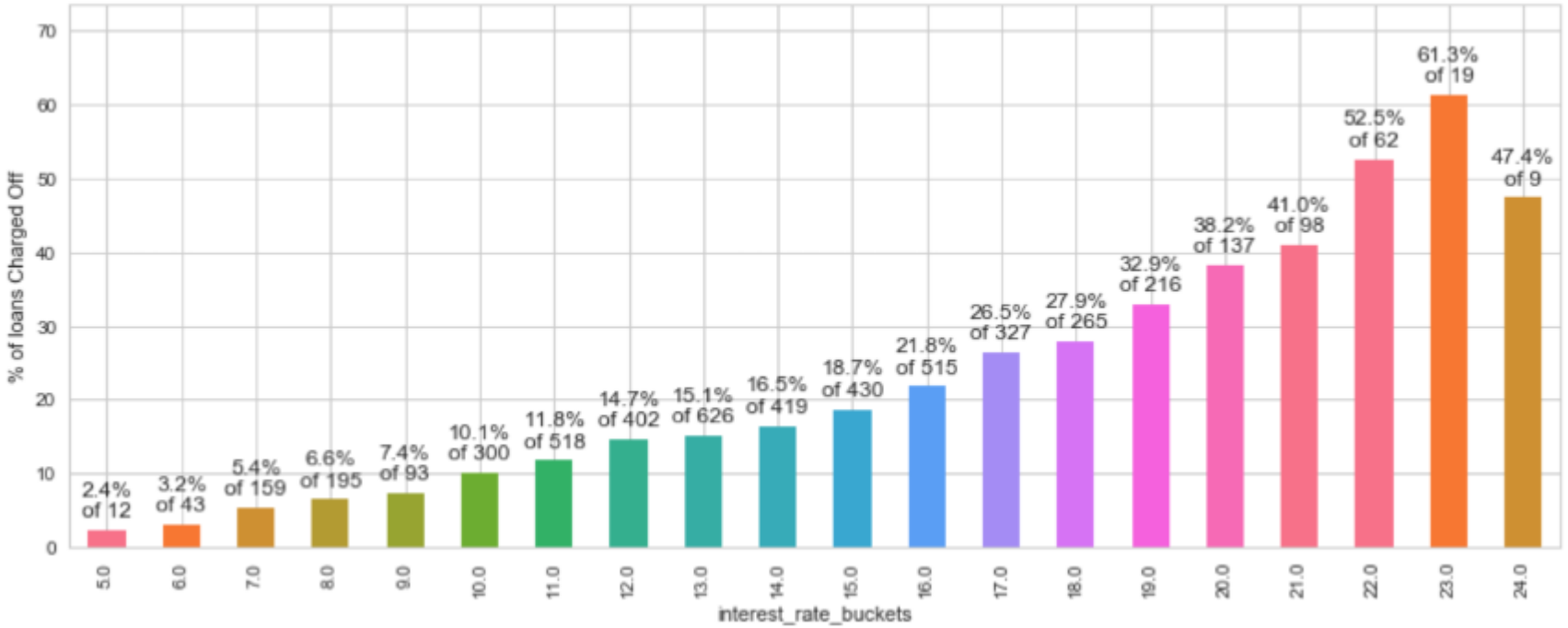
Analysis – Understanding Loan

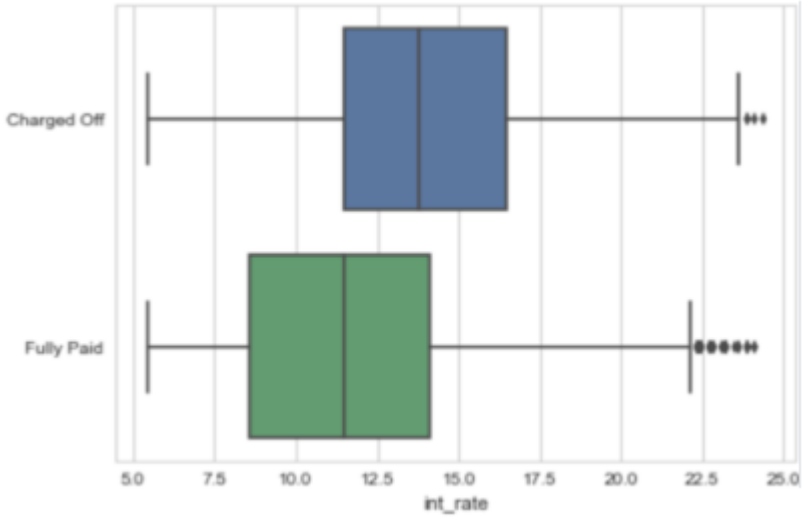




- **Lower grades** have higher incidence of **loan defaults**.
- **Higher interest rate** is being charged as **grades** are **decreasing.**

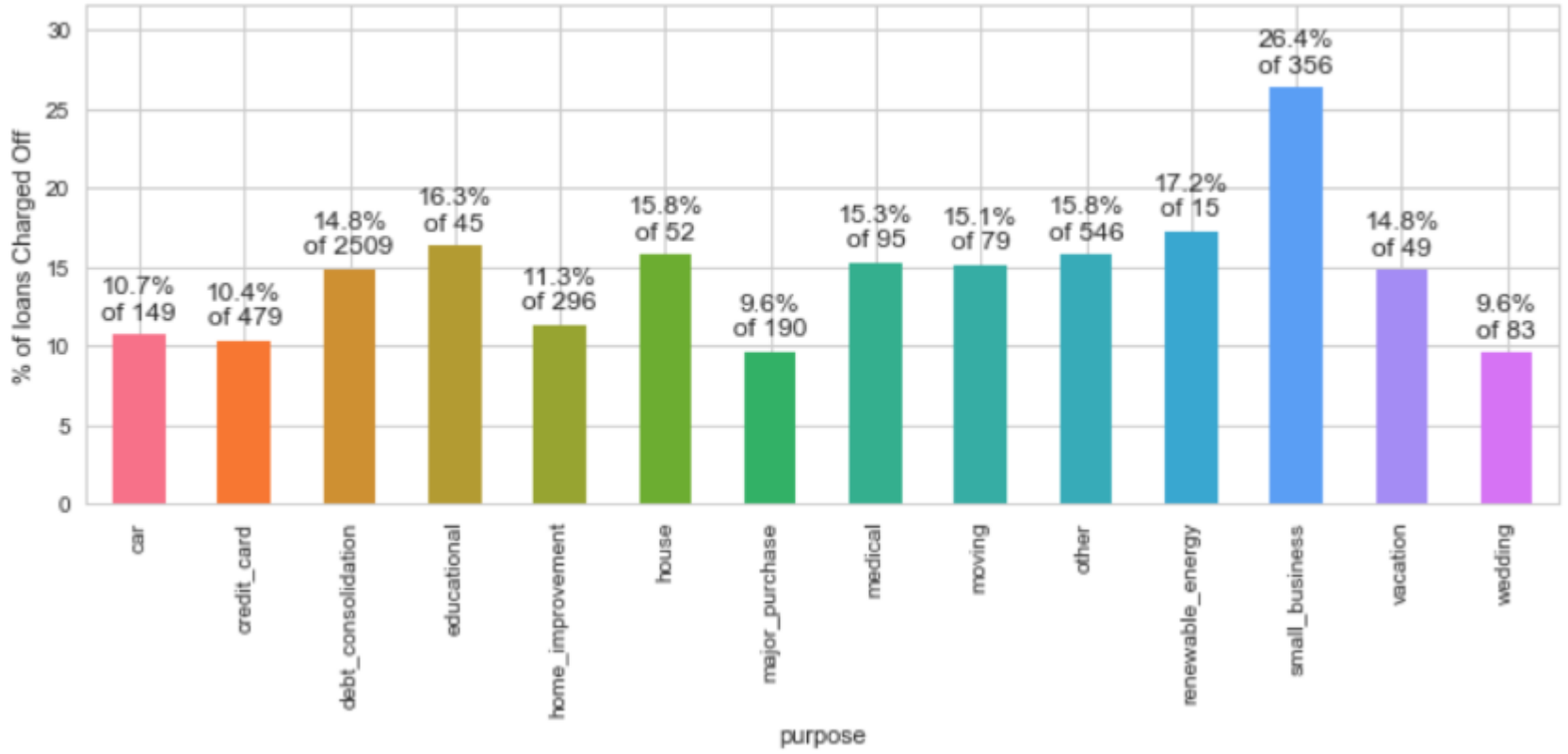
Analysis – Defaults by Interest Rate





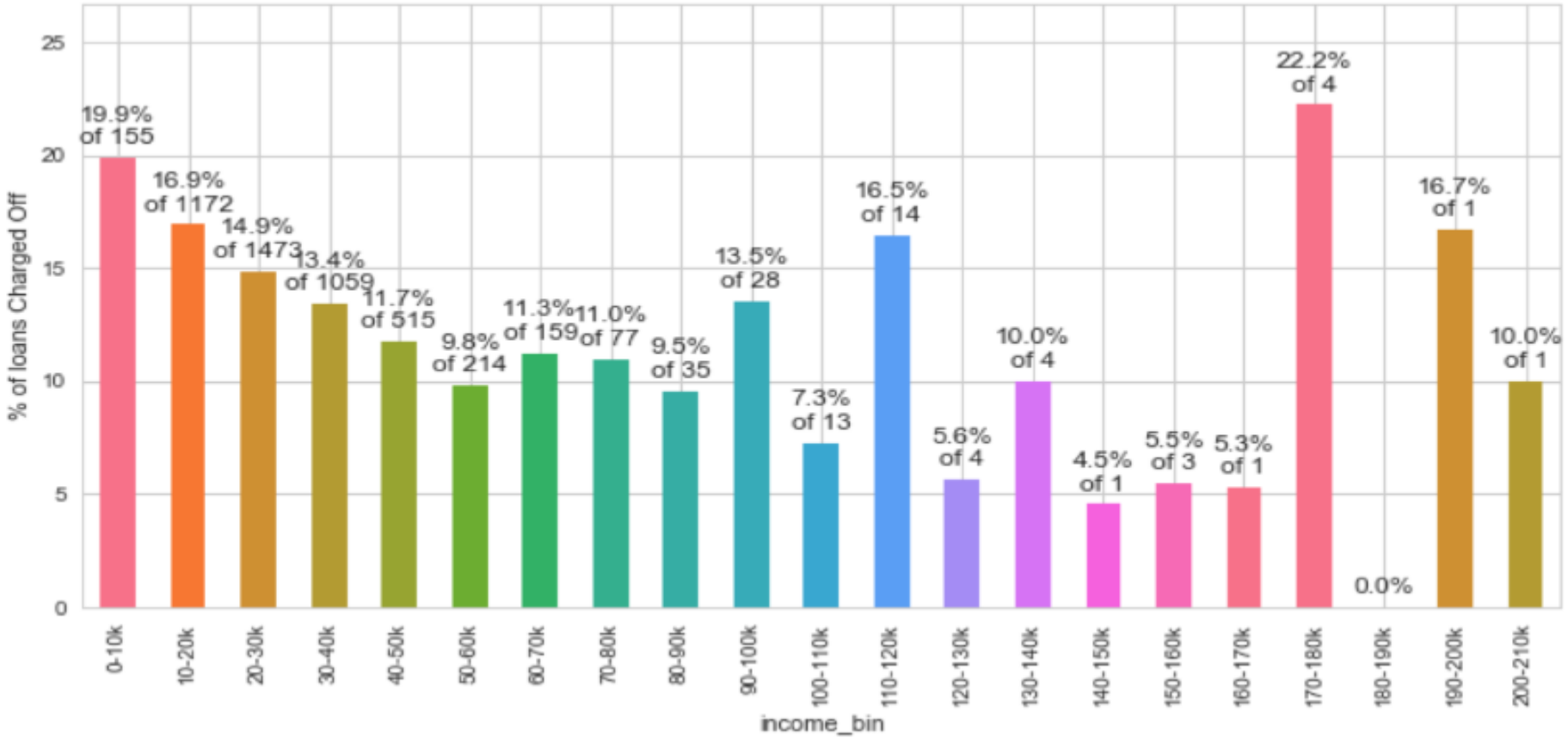
- Percentage of **defaulters increases** monotonically with **higher interest rates**. At rates of **19%** and above, more than **33%** of the loans are Charged Off.

Analysis – Defaults by Loan Purpose



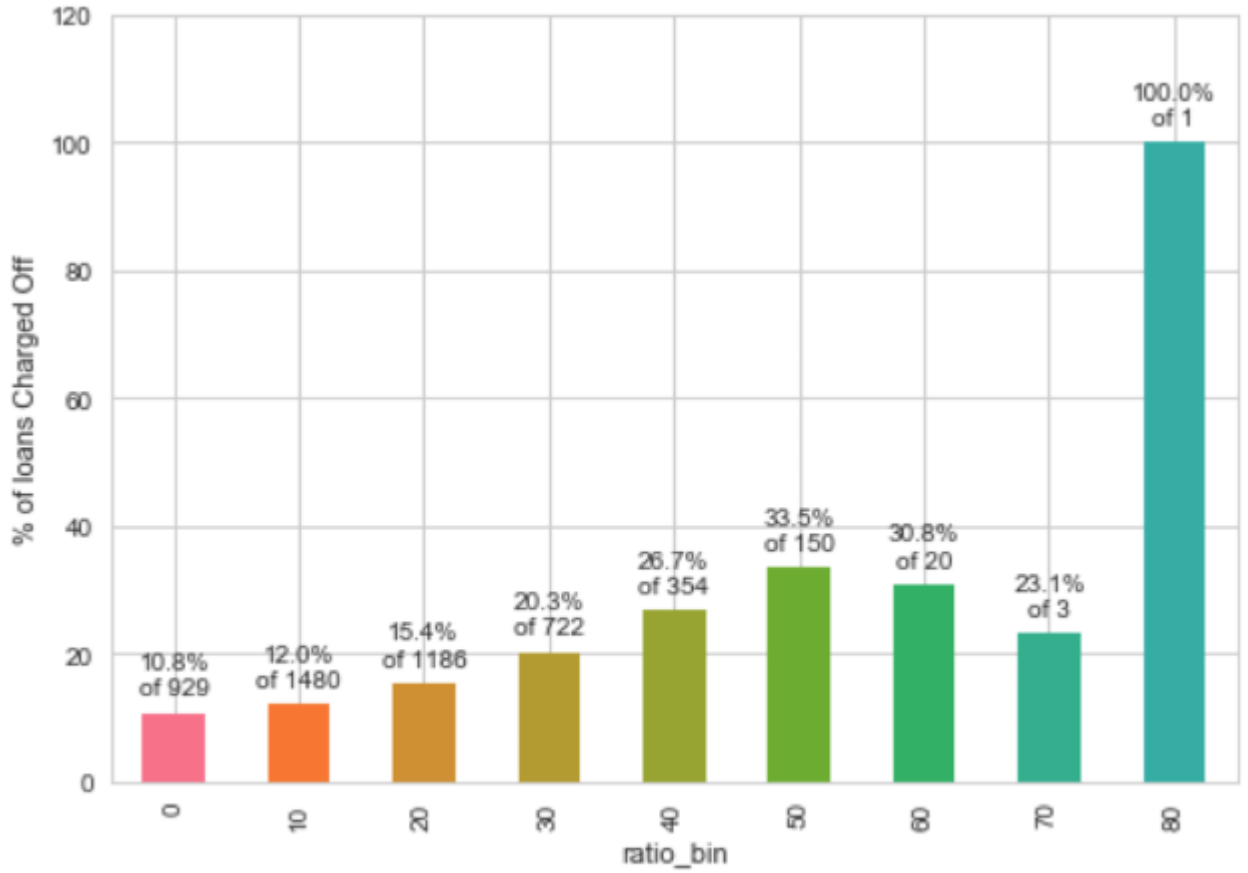
Almost more than a quarter of loan taken for the purpose of **small business** are having defaults.

Analysis : Defaults by Borrower's Income



- Borrowers having annual income less than **20k** default on the loans with very high rates.
- Loan default decreases with higher annual income.
- But we will see further that ratio of amount to income is more important.

Analysis – Defaults by ratio of Amount to Income

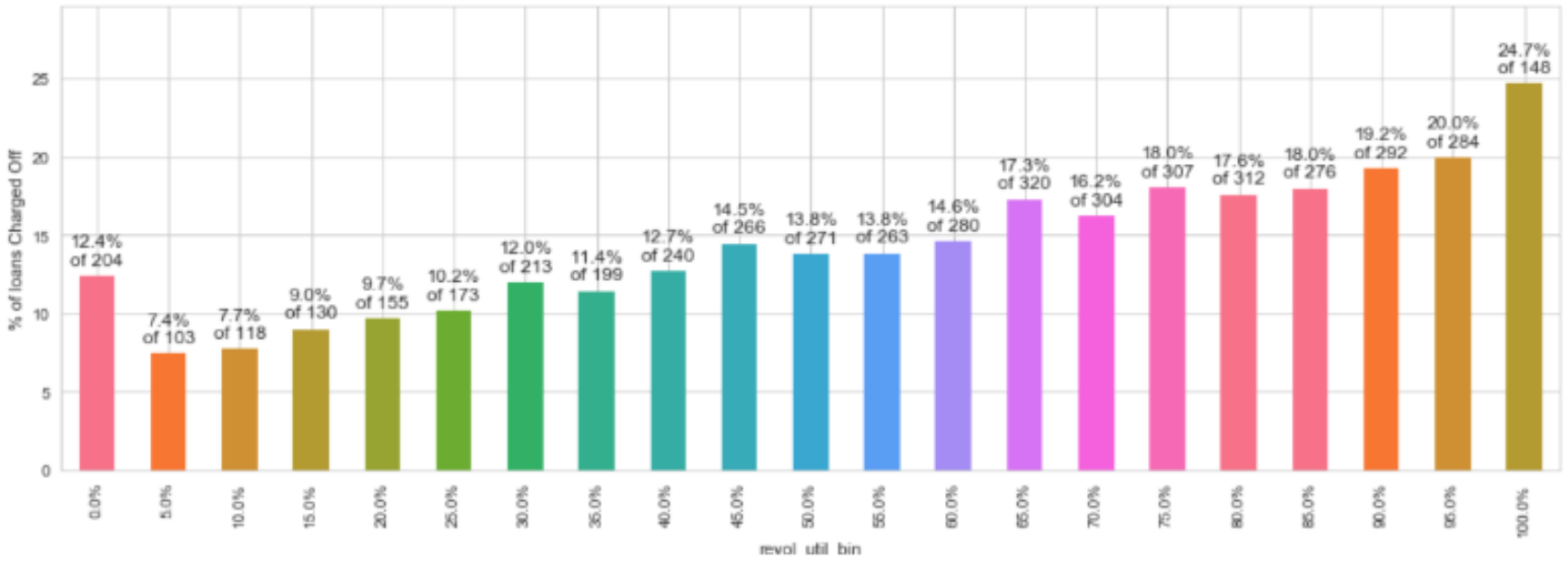


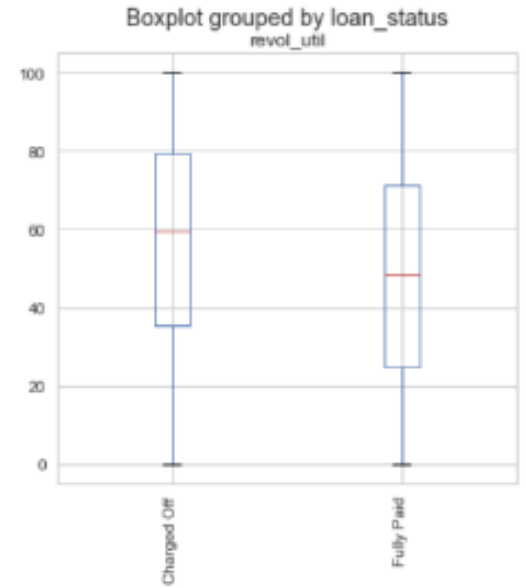
X-axis is the % of loan amount versus annual income

- For loan amount less than **20%** of annual income the defaults are low.

- Loan amounts of **30%** of annual income or higher see a higher rate of default.

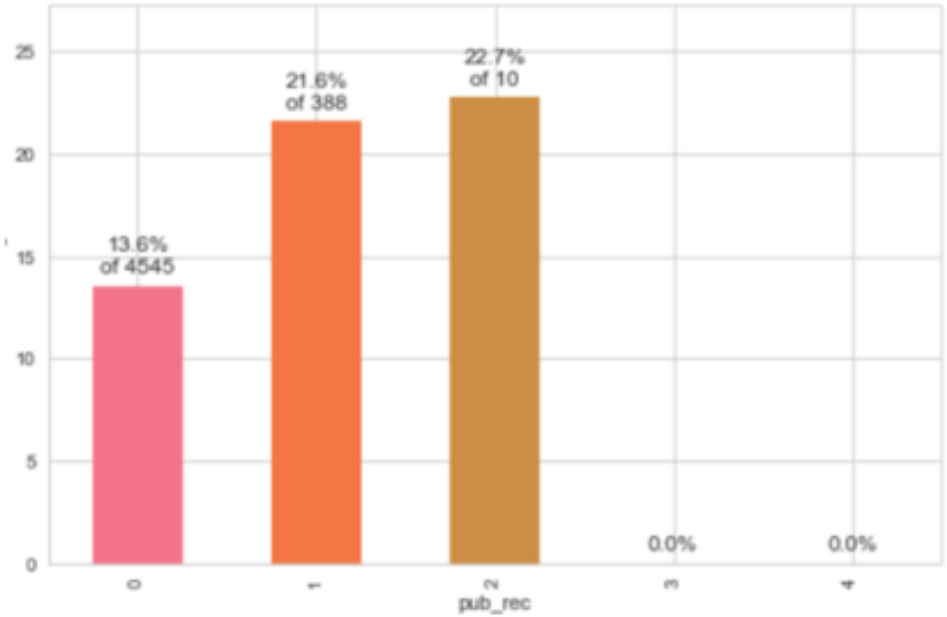
Analysis – Defaults by Revolving Line Util Rate

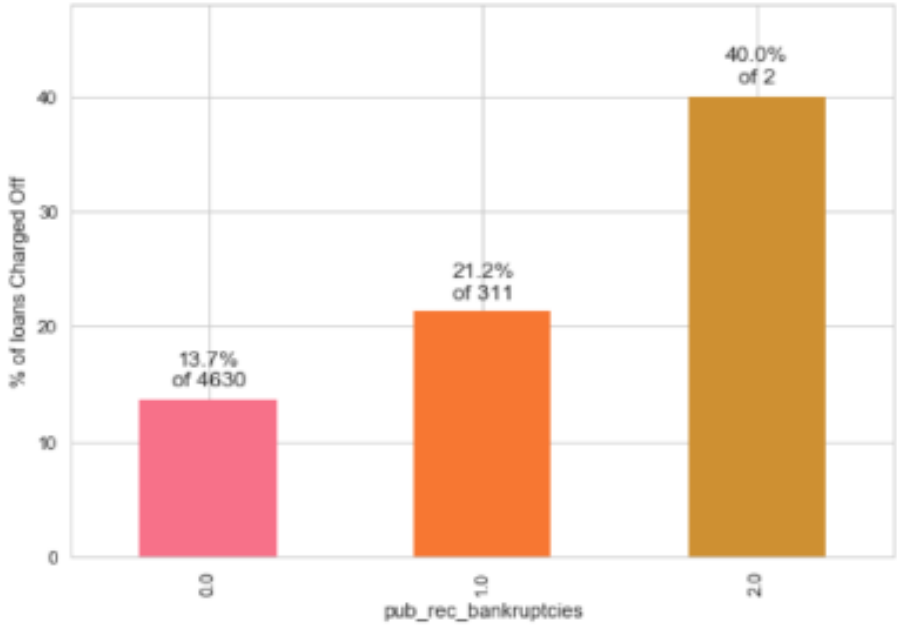




- People with **high utilization** of Revolving Line of Credit at the time of taking Loan **default** the more.
- Loans with **utilization > 70 %** are more **risky**.

Analysis – Defaults by Prior Records

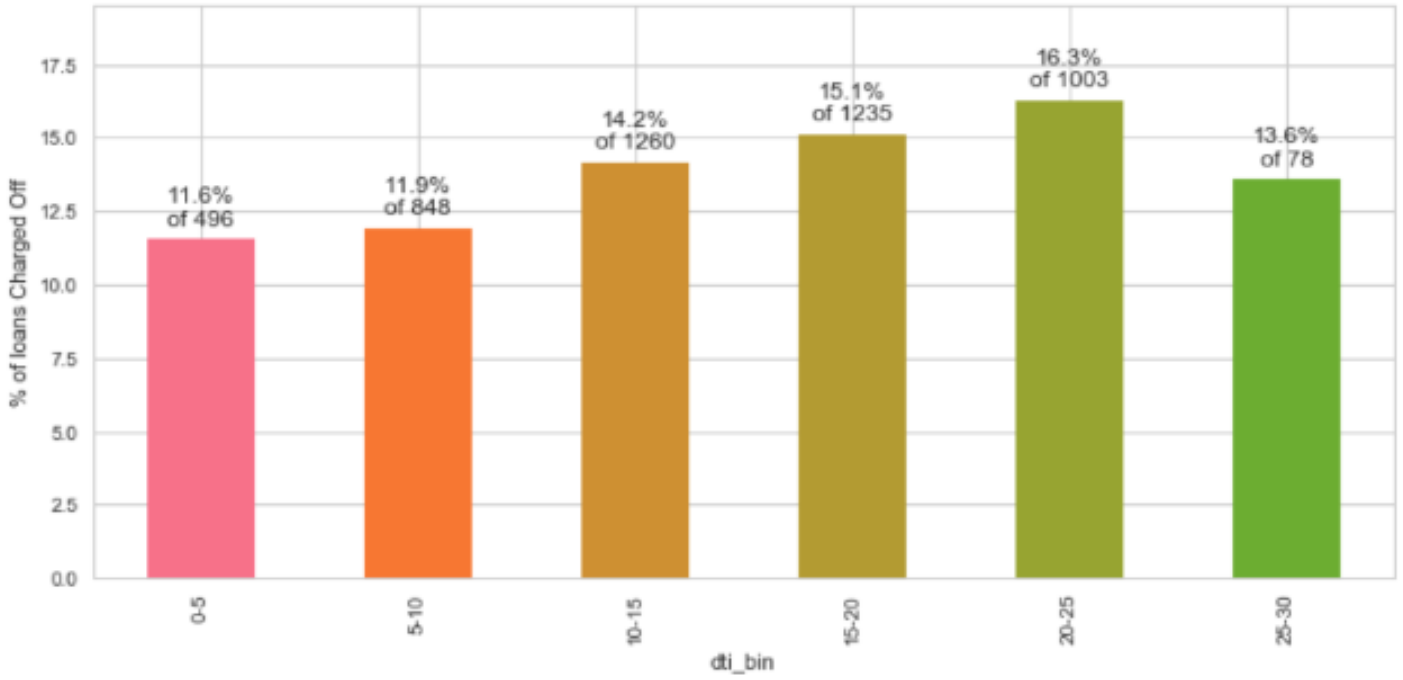


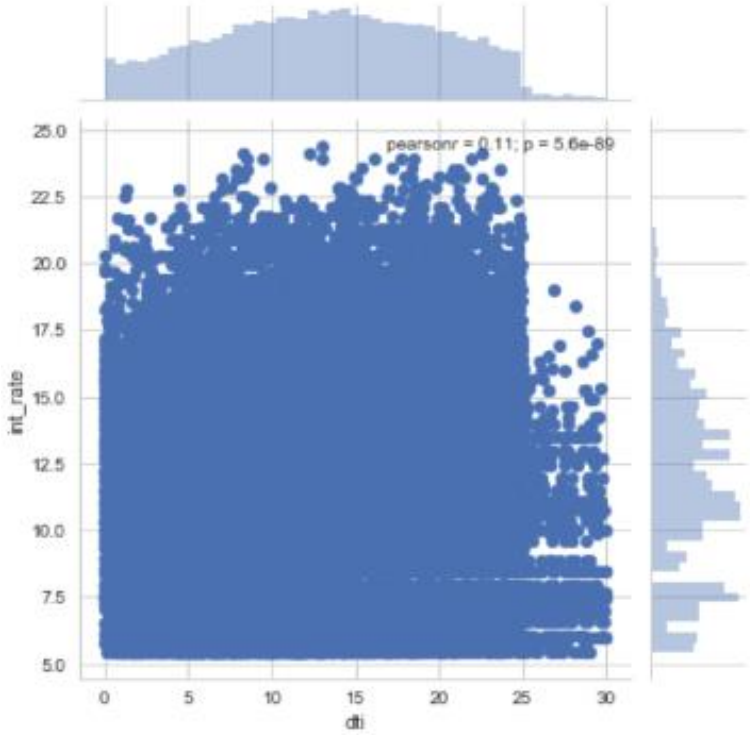


- **94%** have no public derogatory records.
- Having even 1 derogatory record increases the chance of default significantly.

- **96%** have no bankruptcy record.
- Having even 1 bankruptcy record increases the chance of default.
- Public derogatory record and public bankruptcy records have **83% correlation**. We can use any one of these.

Analysis – Defaults by Debt to Income Ratio

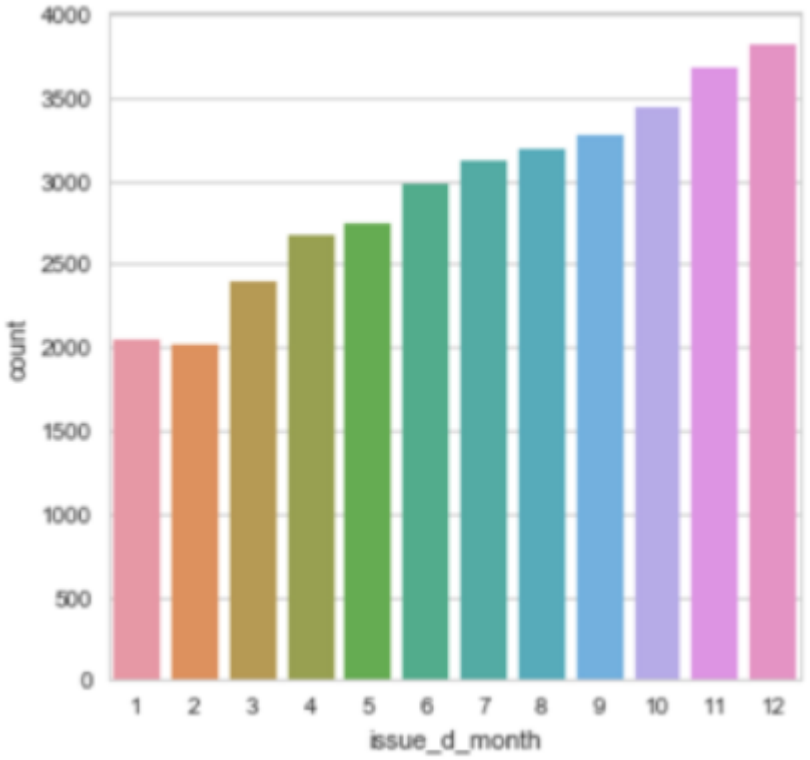




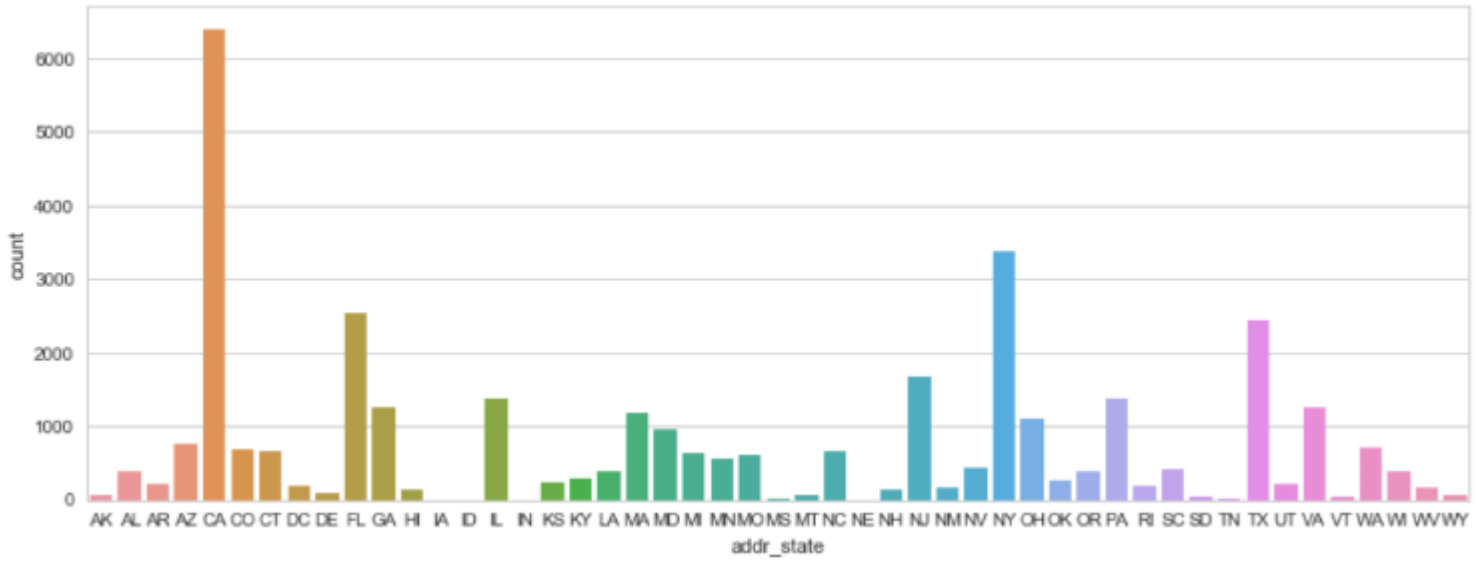
- Default percentage rises with the dti ratio.
- We can see that the above 20 dti ratio, the loans are risky.

- Higher interest rates should be charged for higher dti, but the spread is across all the values.

Some Facts :

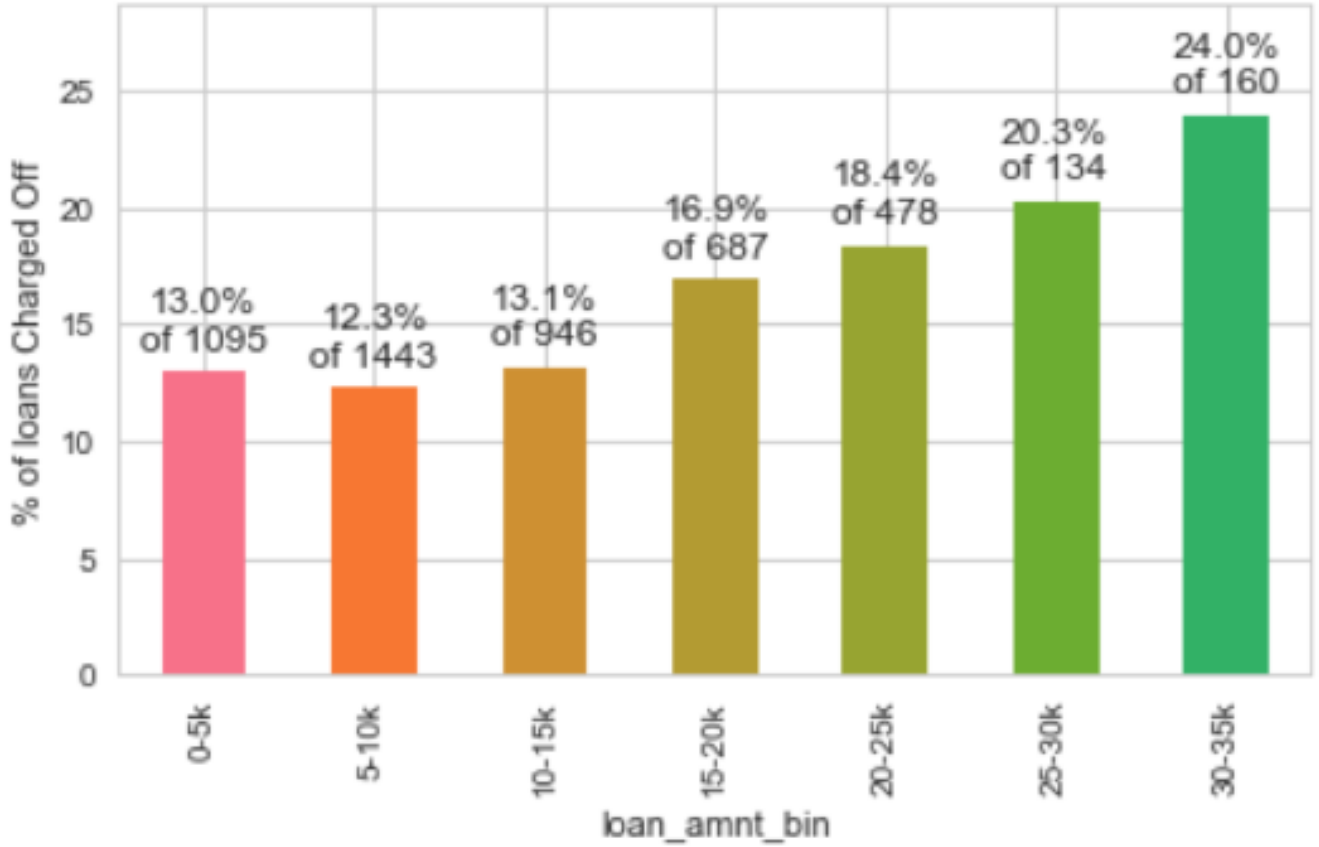


•Loans are **increasing** as the month gets closer to **year end**.



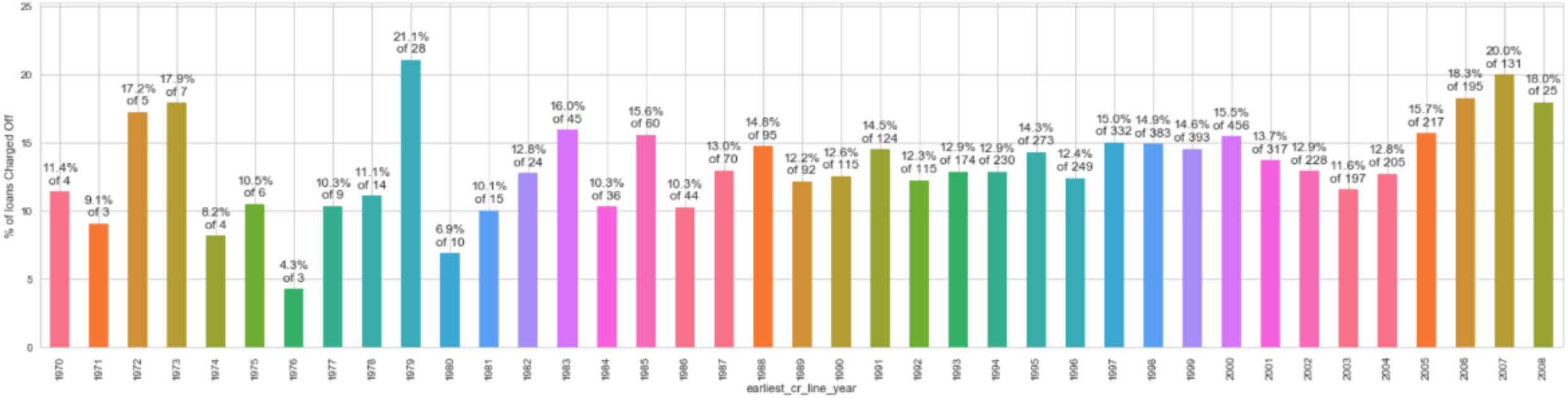
•Loans are maximum in some popular states like **California, Florida, New York, Texas**, etc

Some Facts - Continued



- As the **loan amount is increasing** the chances of **default is also increasing**.

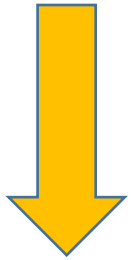
Some Facts – Continued



•People who took loan just before **economic crisis** like the one in 1980 and the **subprime crisis** like the one in 2008, **have higher rate of defaults**.

Conclusion

After the analysis below are the recommendations which can be concluded :



REDUCE :

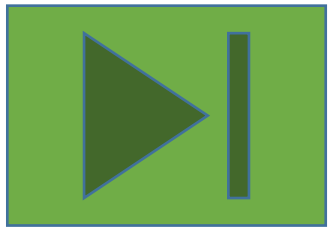
•Approval of loans with the purpose of small Business.

STOP :

• Approving Loans where the ratio of Amount by Income is higher than 30%.

• Approving high- value loans when revolving line utilization rate is greater than 75%.

• Approving loans to people with prior bad record or stop approving higher value loans to them.



START :

•Charging of higher interest rates for the loans with dti higher than 20