Lending Club Case Study

Group Members:
Delvaraj Fernando R & Sambit Kumar Das

The problem

COMPANY

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.

CONTEXT

Lending Club wants to understand the **driving factors** behind loan default, i.e. the **driver variables** which are strong indicators of default.
The company can utilise this knowledge for its portfolio and risk assessment.

PROBLEM STATEMENT

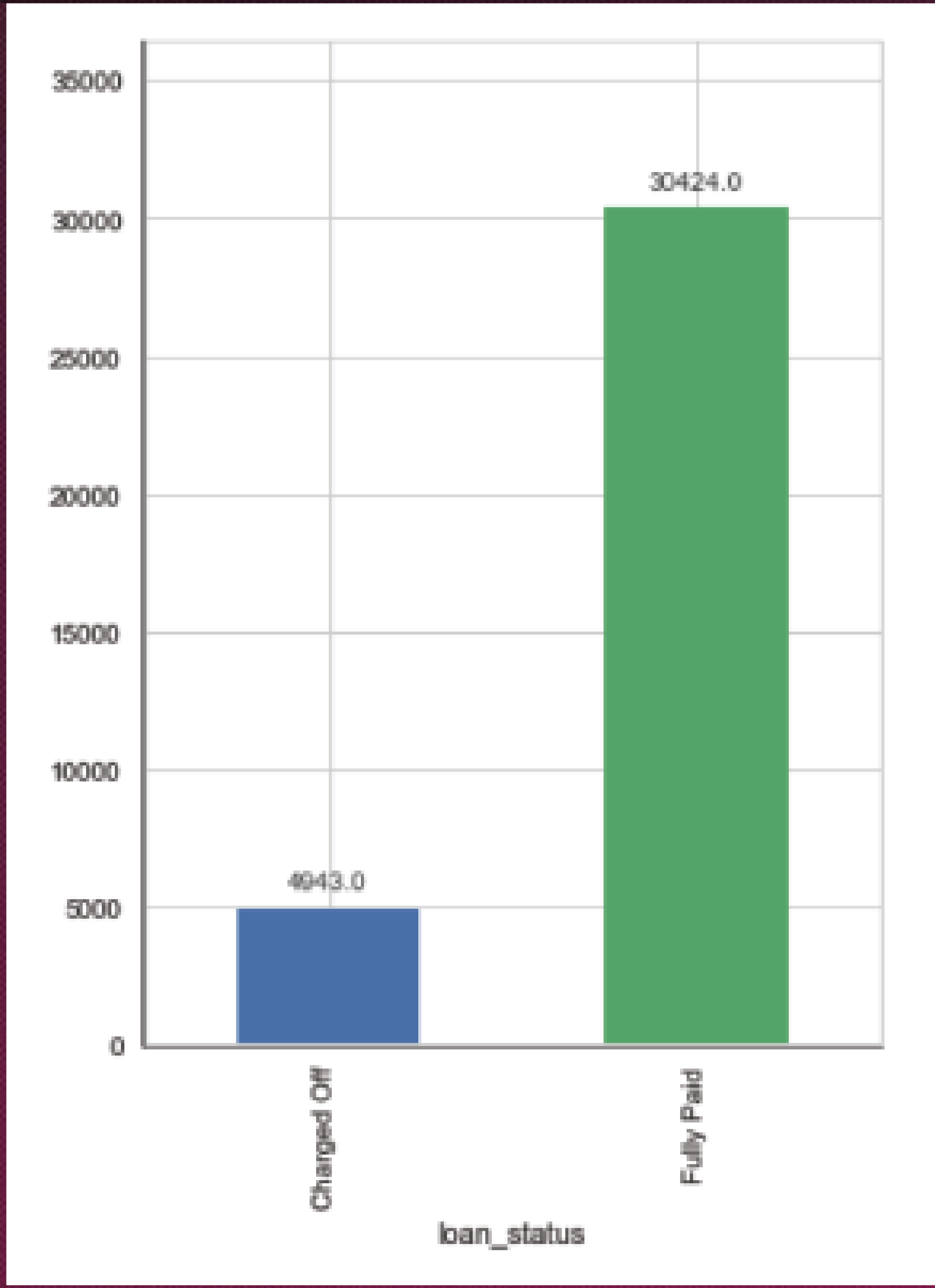
As a data scientist working for Lending Club analyze the dataset containing information about past loan applicants using EDA to understand how *consumer attributes* and *loan attributes* influence the tendency of default.

Approach

1. Clean Data
2. Univariate Analysis
3. Segmented Univariate
4. Bivariate Analysis
5. Summarize Results

Analysis - Overall loan status

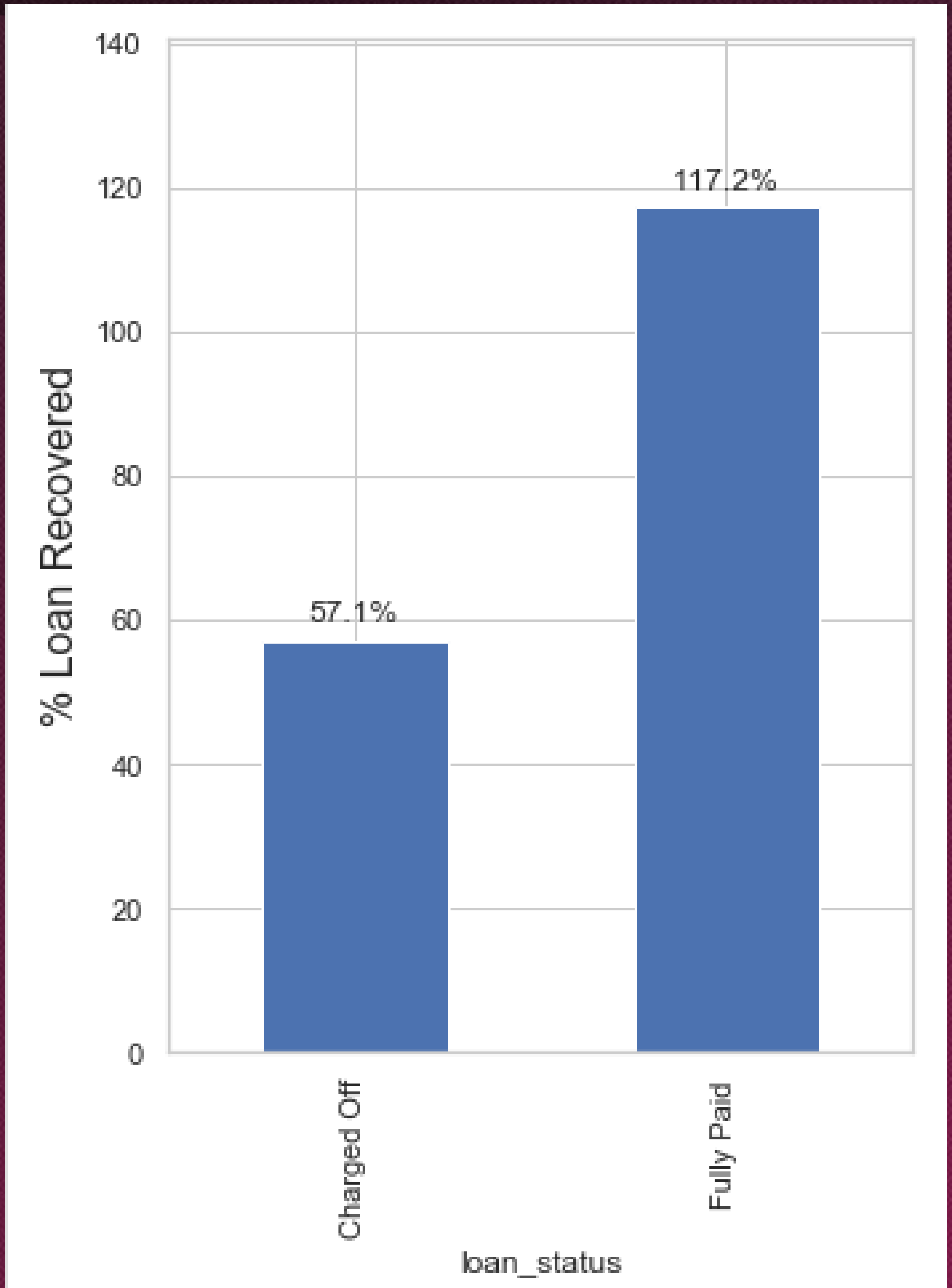
- Approximately, 14% of loans are defaulted.
- Any variable that increases the percentage of default to higher than 16.5% should be considered a business risk.



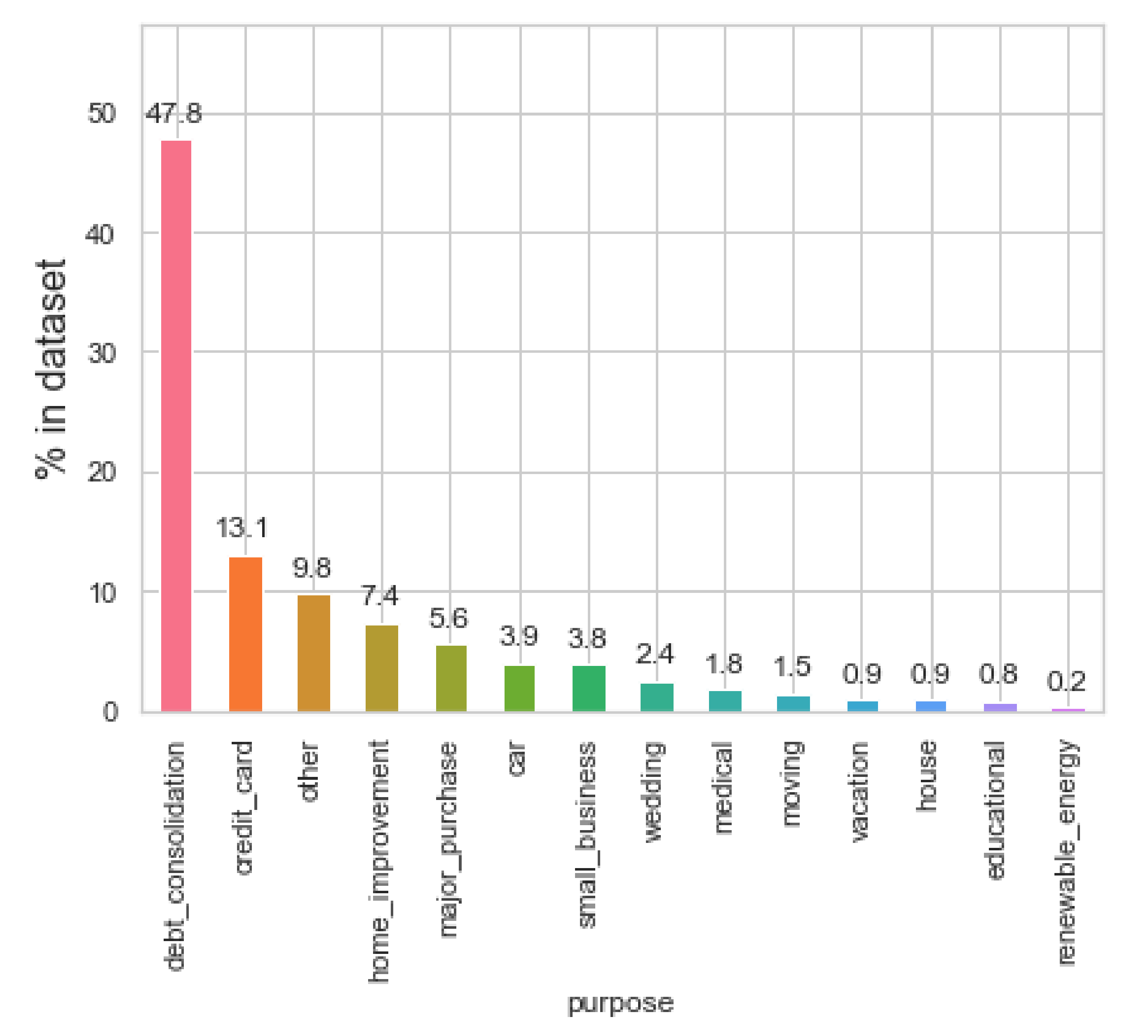
Analysis - Overall loan status

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

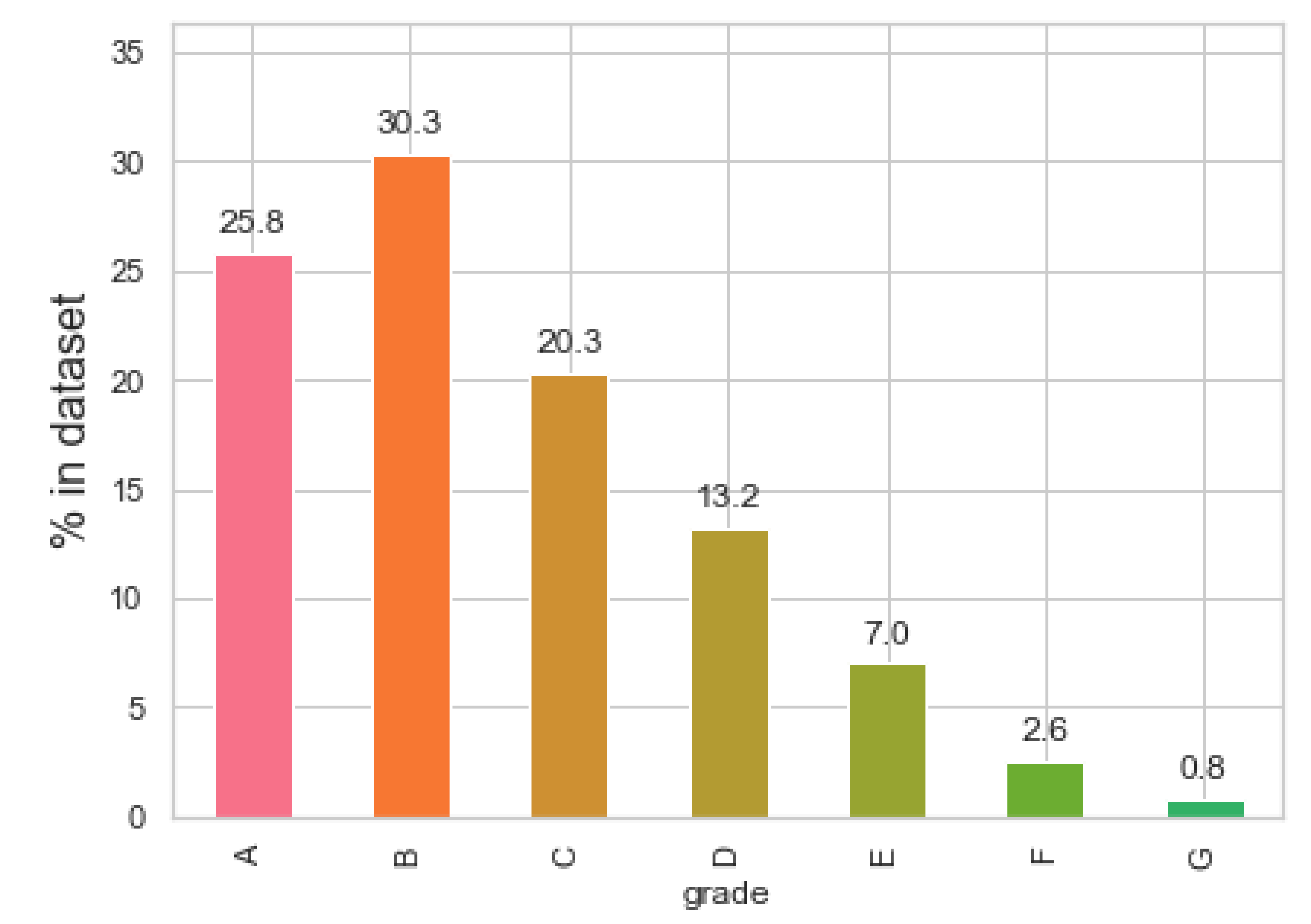
On fully paid up loans, the company makes a profit of approximately 17%.



Analysis – Type of Loans



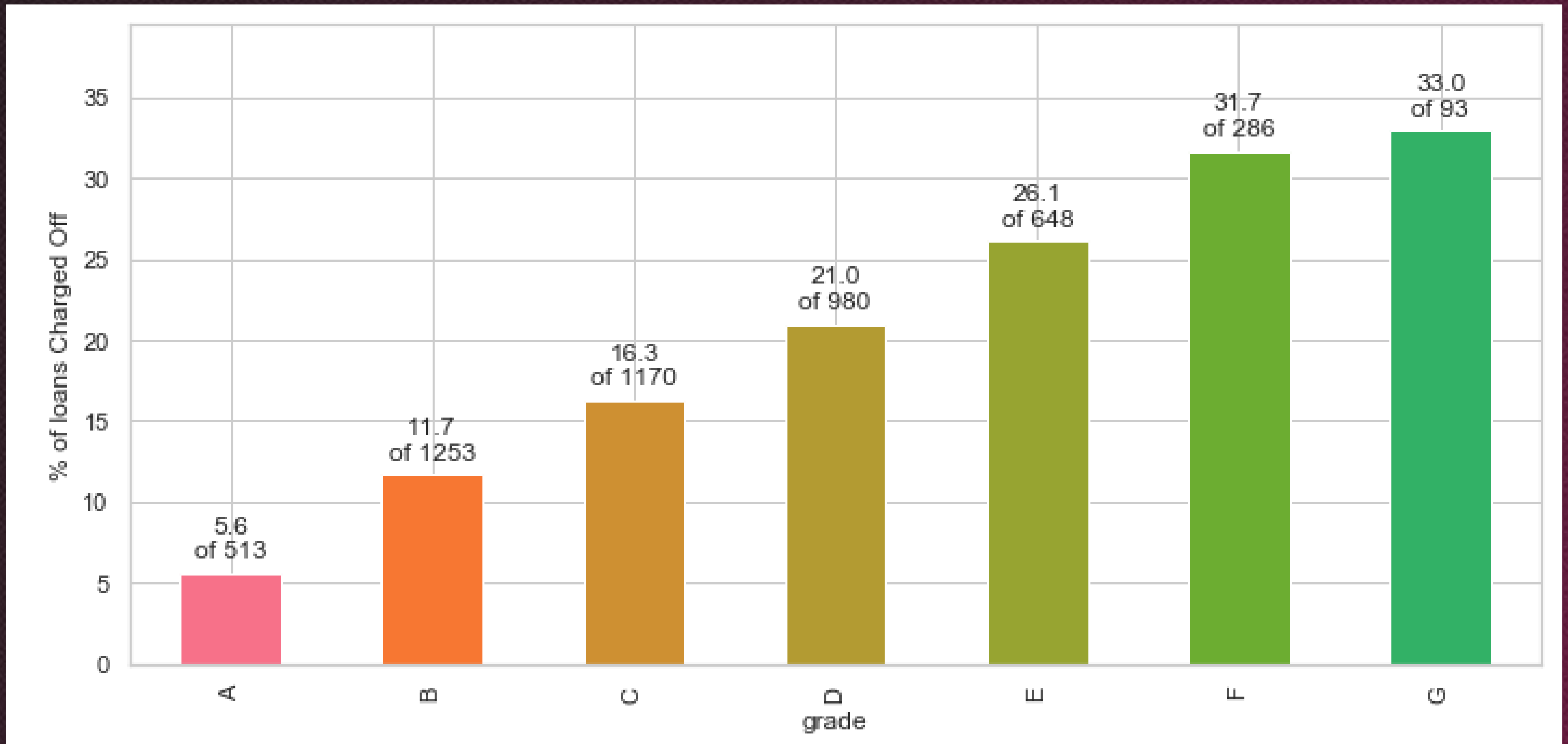
Maximum number of loans are for debt consolidation

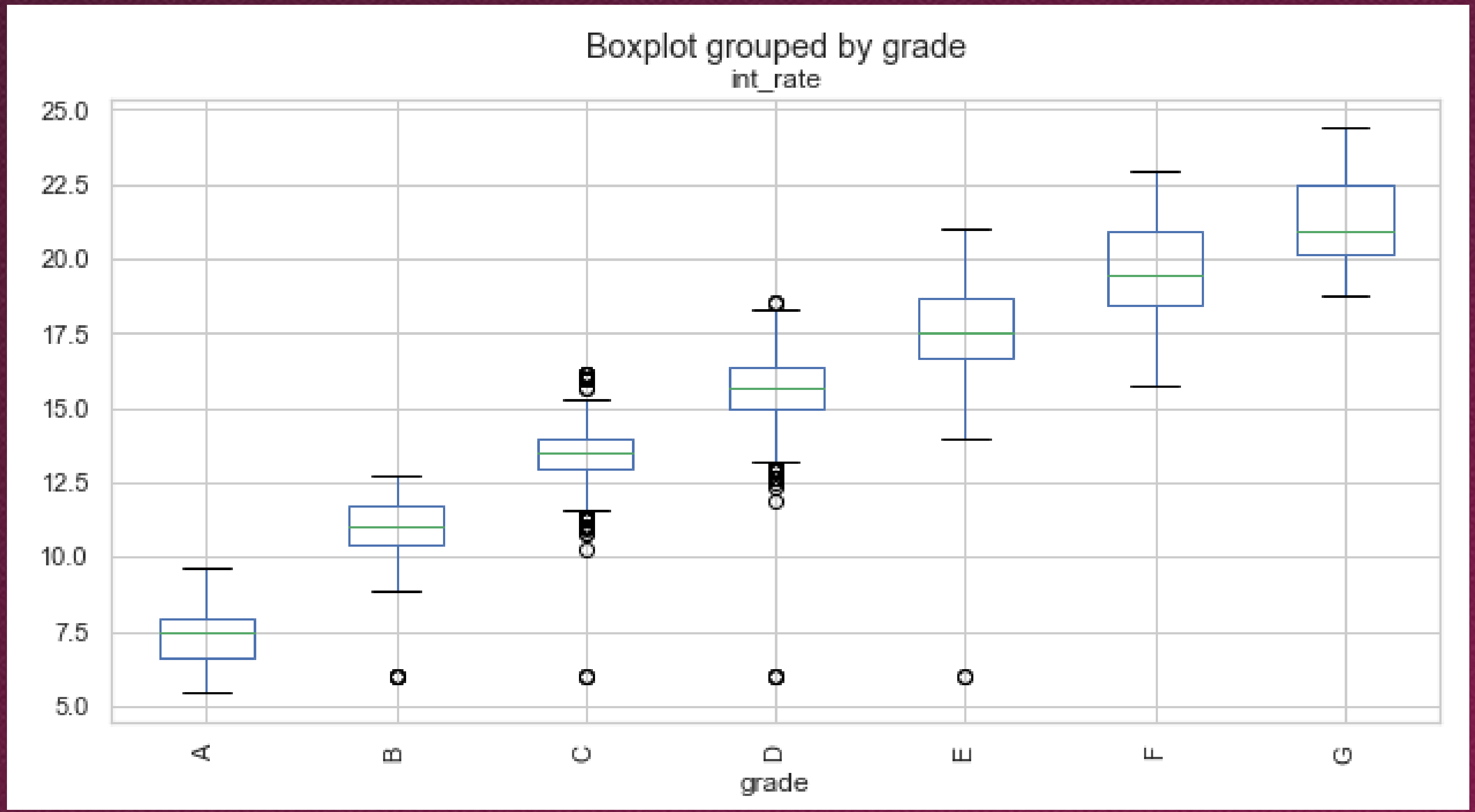


More than 55% of loans are of good grade (A and B)

Analysis – Understanding of Types of Loans

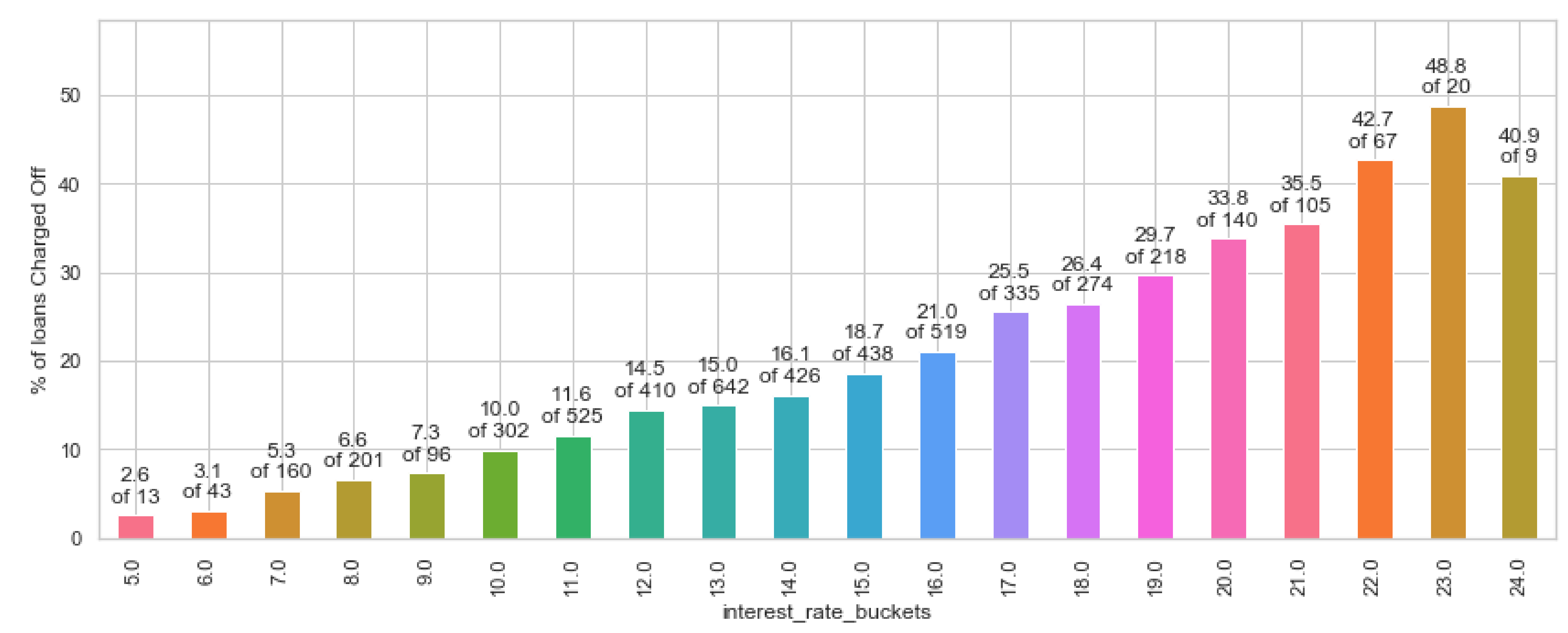
Lending Club charges higher interest rates as the grade of loan becomes worse.
However, as we will see on next slide - the driving variable for defaults is the higher interest rate.





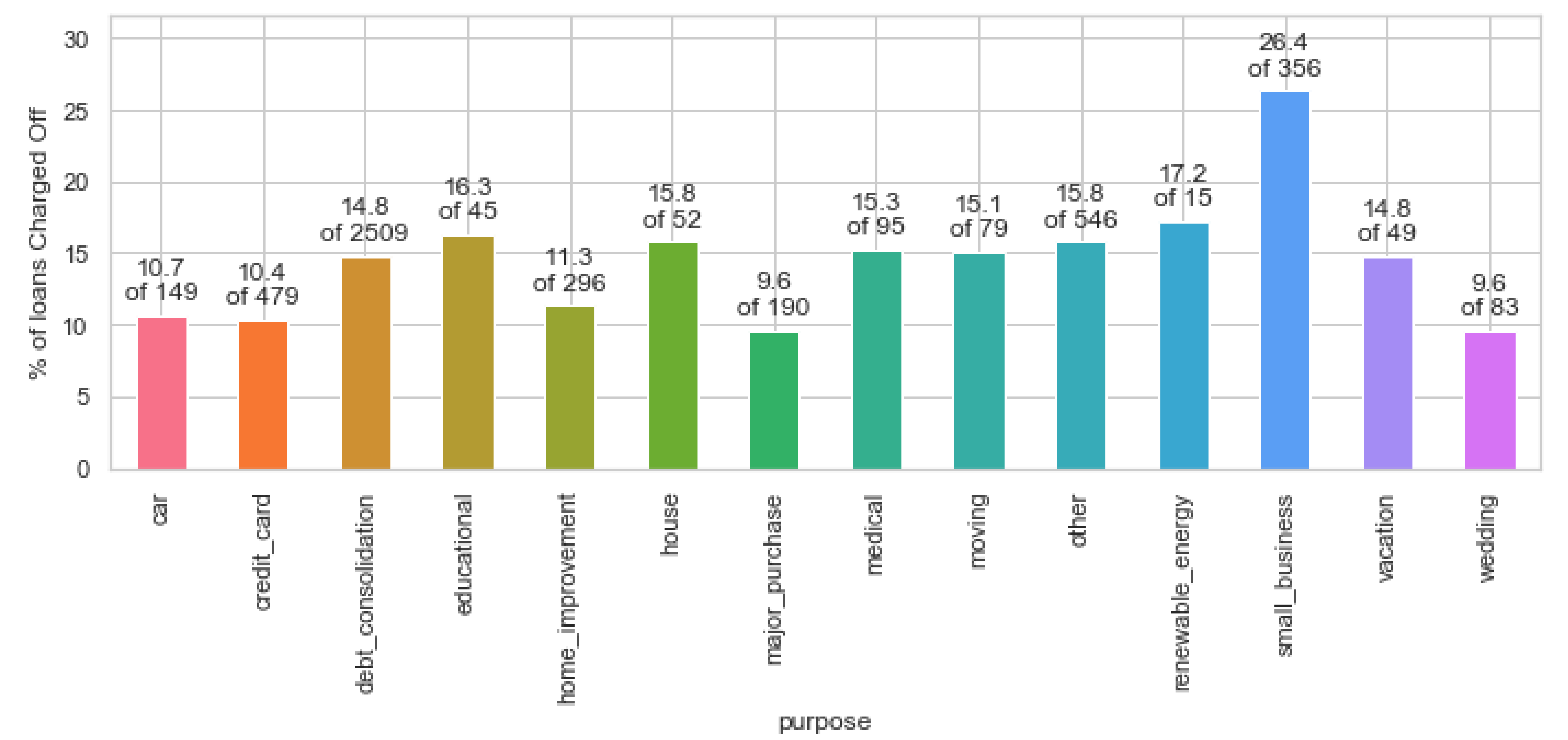
Analysis – Defaults by Interest Rate

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



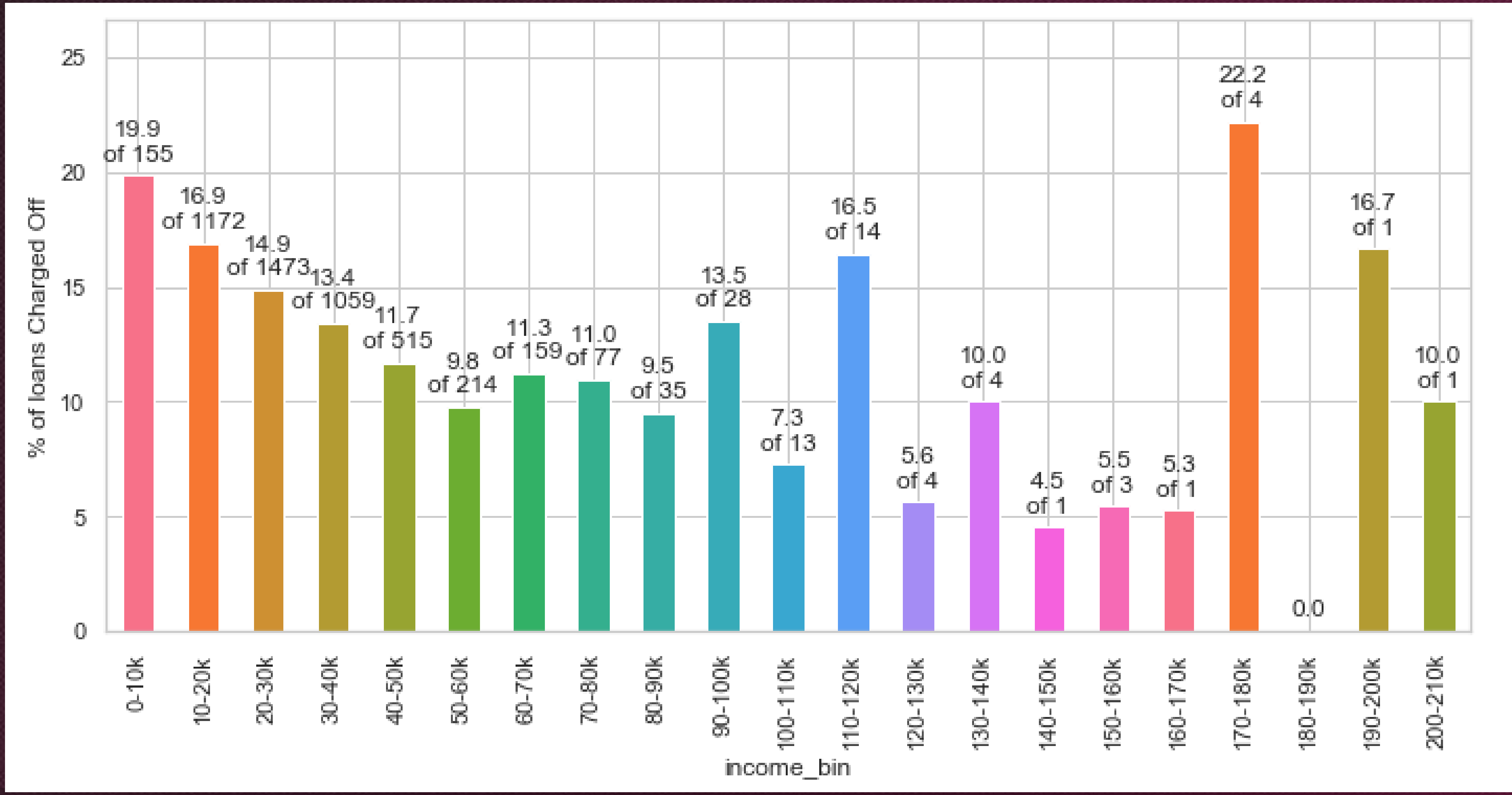
Analysis – Defaults by Loan Purpose

More than 25% of loans taken for the purpose of running a small business see defaults.



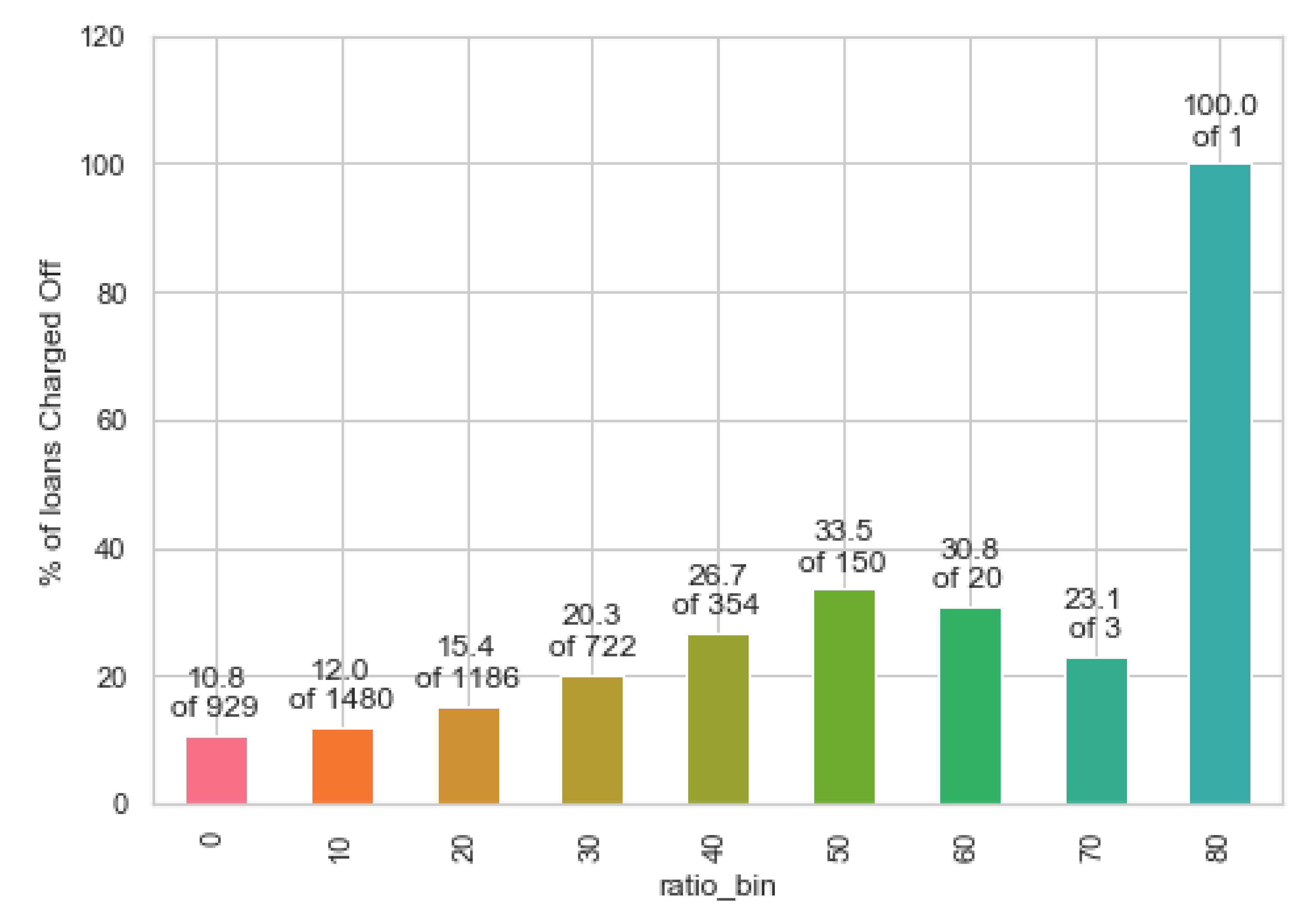
Analysis – Defaults by Borrowers' Income

Borrowers having annual income less than 20000 default on their loans at much higher rates. Loan default decreases with higher annual income. As we will see on next slide – the ratio of amount to income is more important.



Analysis – Defaults by ratio of amount to income

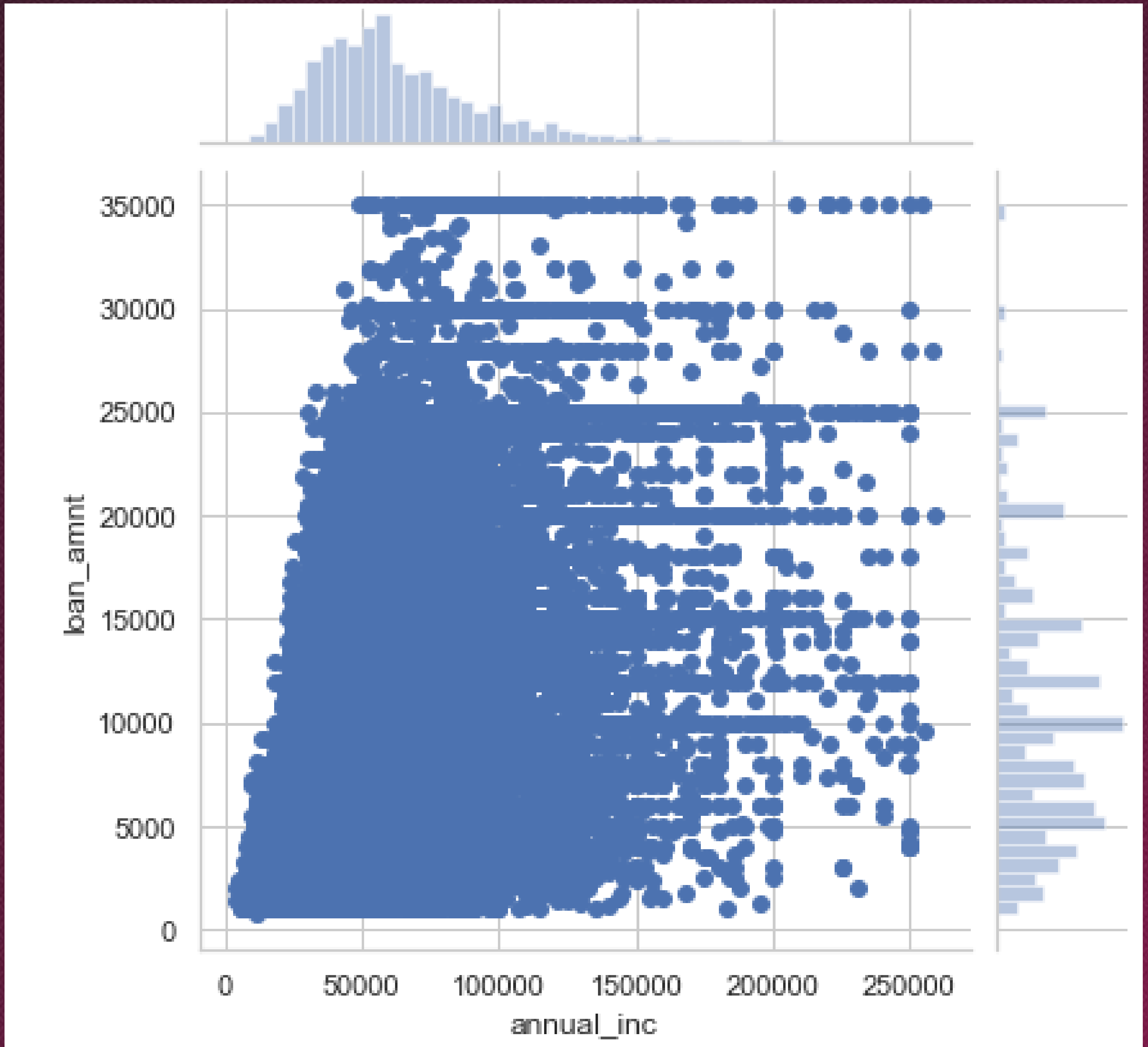
As long as loan amount is less than 20% of annual income, defaults are low.
Loan amounts of 30% of annual income or higher see a high rate of default.



X-axis is % of Loan vs Annual Income

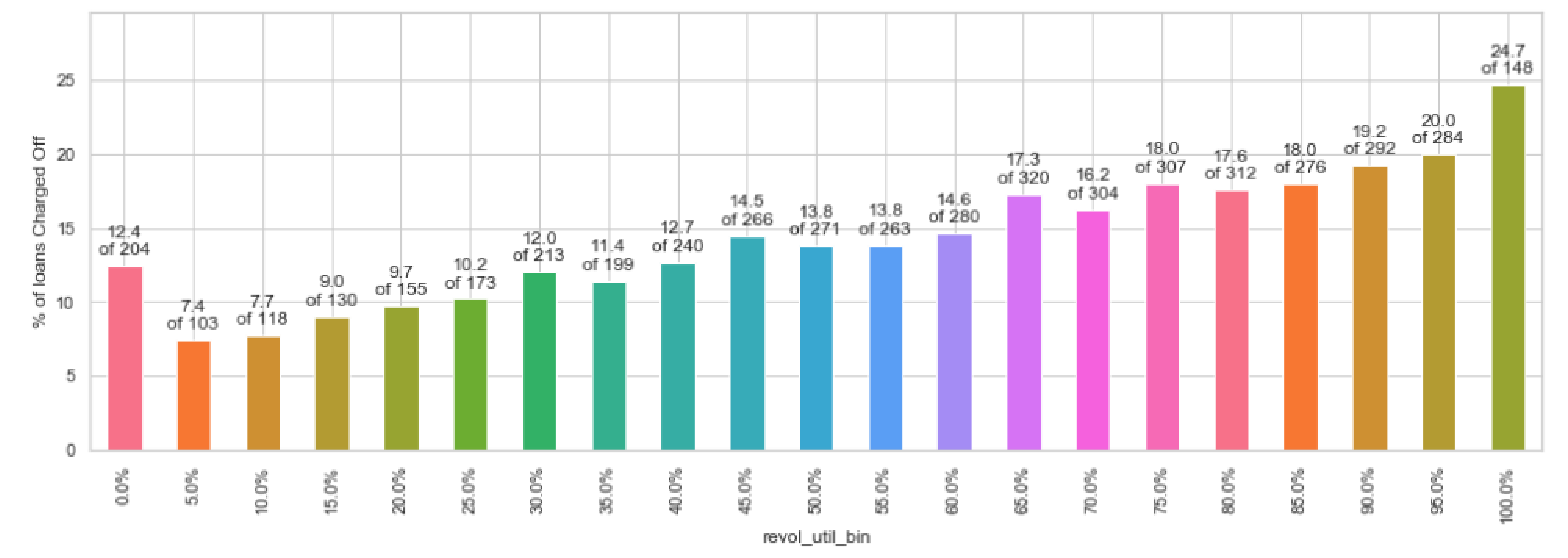
Analysis – Defaults by ratio of amount to income continued

We see here that Lending Club has extended high-value loans to people with low income.
There are many cases of people with income 50000 or less getting loans of 25000 or more.
This practice should be curtailed.



Analysis - Defaults by Revolving Line Util Rate

People with high utilization of Revolving Line of Credit at the time of taking loan default more.
Loans with utilization > 75% are risky.

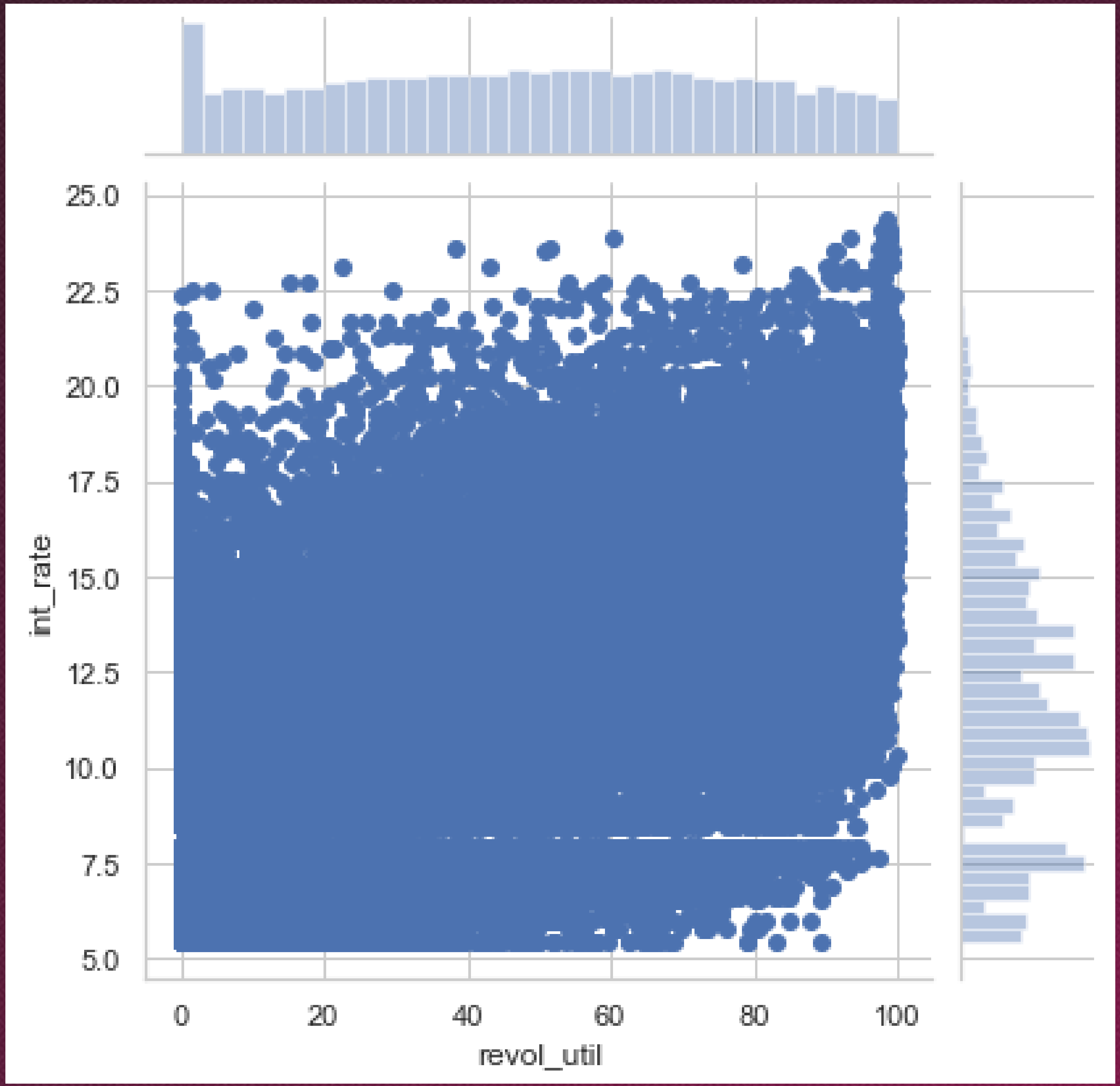


Analysis - Defaults by Revolving Line Util Rate Continued

There have been some high value loans extended to borrowers with revolving line utilization rate of higher than 75%.

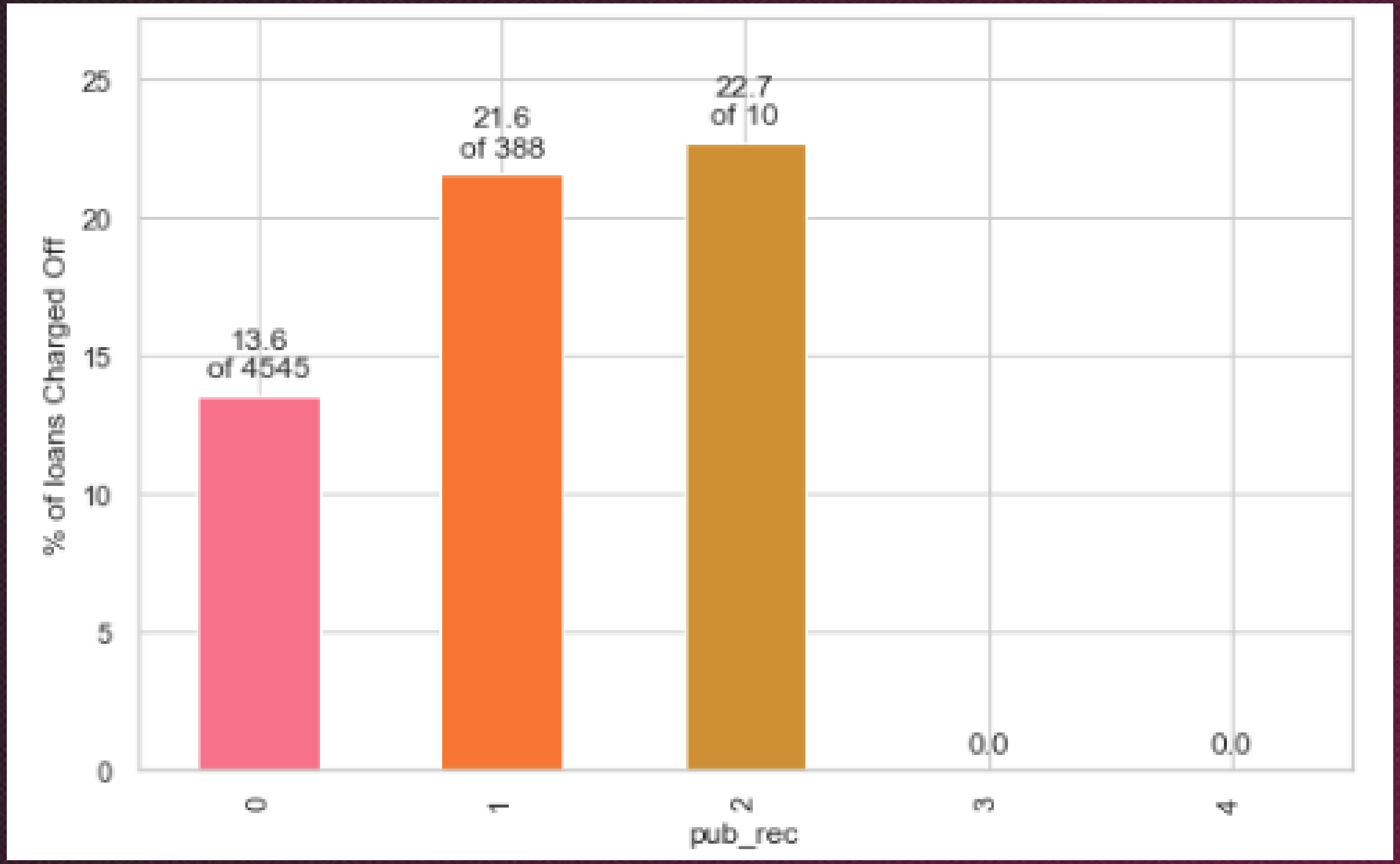
This practice should be stopped.

Density of low value loans is also high. They should be approved less often.

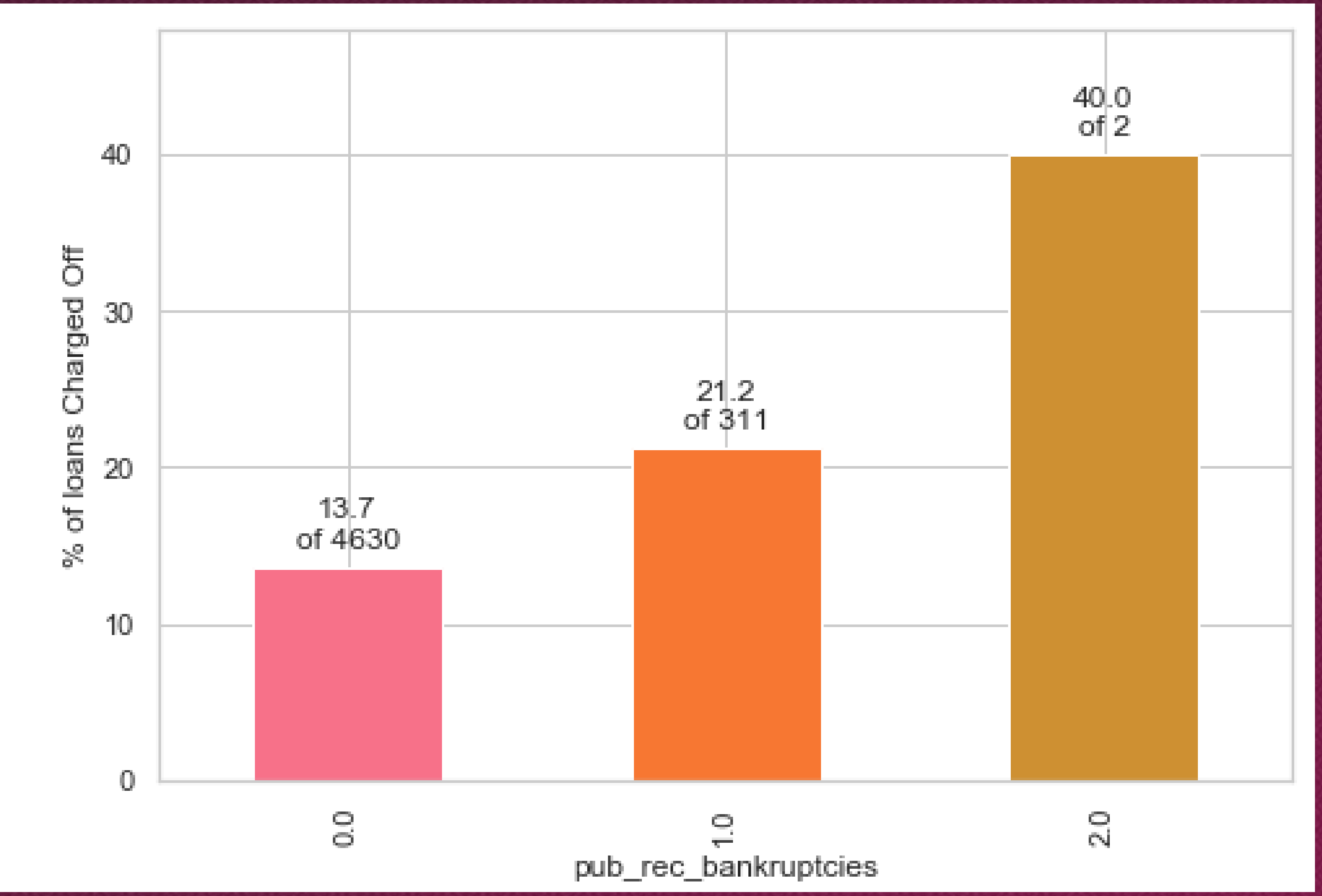


Analysis - Defaults by prior bad record

- 94% have no Public derogatory records.
- Having even 1 derogatory record increases the chances of Charge Off significantly.



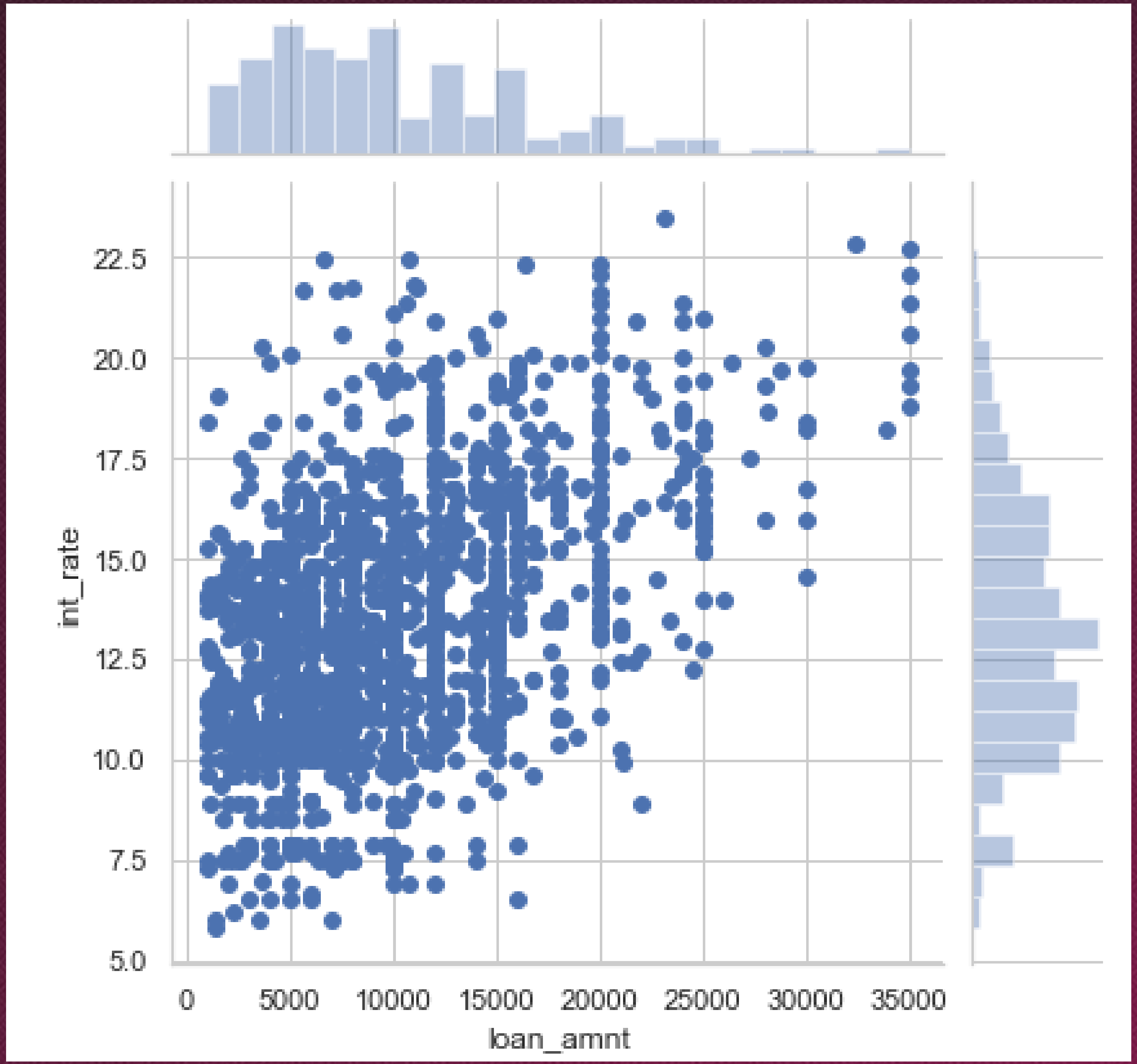
- 96% have no bankruptcy record.
- Having even 1 bankruptcy record increases the chances of Charge Off significantly.
- Public Derogatory Record and Public Bankruptcy records have 83% correlation. We can use any one.



Analysis - Defaults by prior bad record contd.

High value loans, as well as low interest loans have been extended to those with prior public derogatory records.

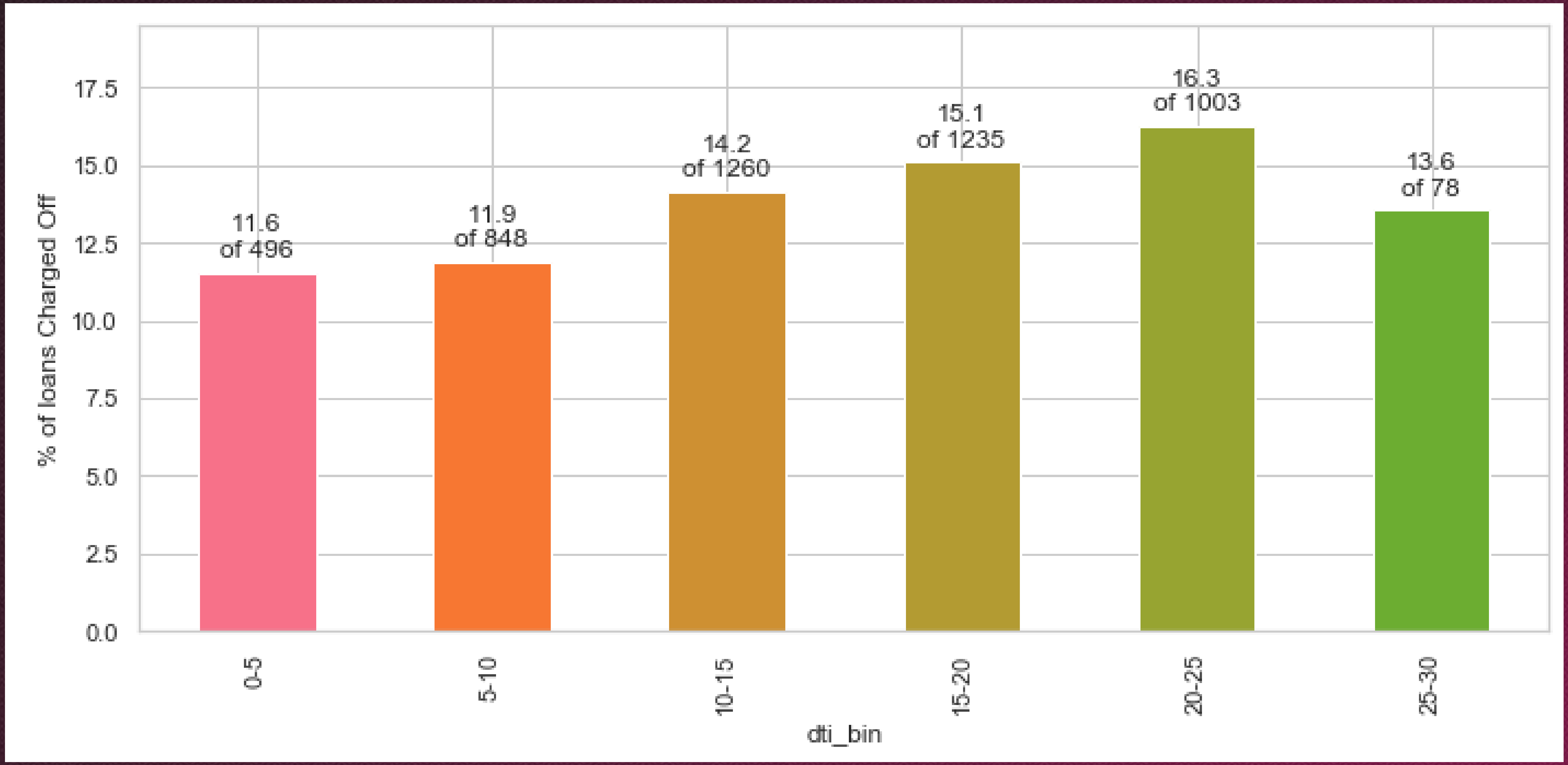
This practice can be stopped to improve business metrics.



Data for people with >0 bad record

Analysis - Defaults by Debt to Income Ratio

- Percentage of default rises with DTI ratio.
- As the DTI ratio rises above 20, the loans become risky.



Recommendations

- Stop approving loans where amount/income is higher than 30%
- Reduce number of approvals where purpose is small business
- Stop approving high-value loans when revolving line utilization rate greater than 75%
- Stop approving high value loans to people with prior bad record.
- Start charging higher interest rates for loans with debt to income ratio greater than 20

Thank you!