Lending Club Case Study

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Problem

About the Company

Lending Club is an online loan facilitator providing personal loans, business loans, and financing of medical policy.

Borrowers can easily avail loans quickly through its online portal at a lesser interest rate.

Background

Lending Club seeks to gain insight into the drivers of loan default, namely the driver variables, which are potent indicators of default.

This information can be used by the company to inform its portfolio management and risk assessment.

Problem Statement

As a Lending Club data analyst, I analyze the dataset containing information about past loan applications using EDA to understand how consumer attributes and loan attributes influence the trend of default.

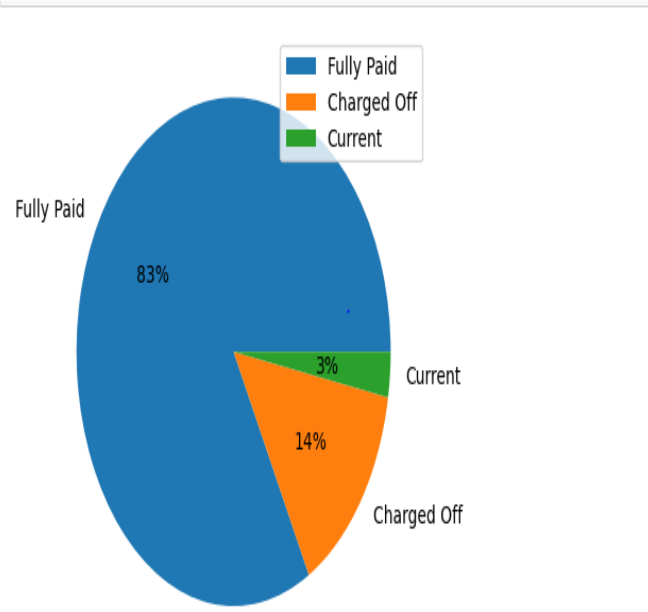
Approach

STEPS	DESCRIPTION	DETAILS
STEP 1	CLEANING THE DATA	Drop columns with null values, all random values or single category value. Convert values to proper int, float, date representations.
STEP 2	UNIVARIATE ANALYSIS	Check distributions and frequencies of various numerical and categorical variables.
STEP 3	SEGMENTED UNIVARIATE ANALYSIS	Analyze variables against segments of other variables.
STEP 4	BIVARIATE ANALYSIS	Perform correlation analysis. Understand how two variables affect each other or a third variable . Analyze joint distributions.
STEP 5	SUMMARY OF RESULTS	Provide insights and observations.

Overall Loan Status

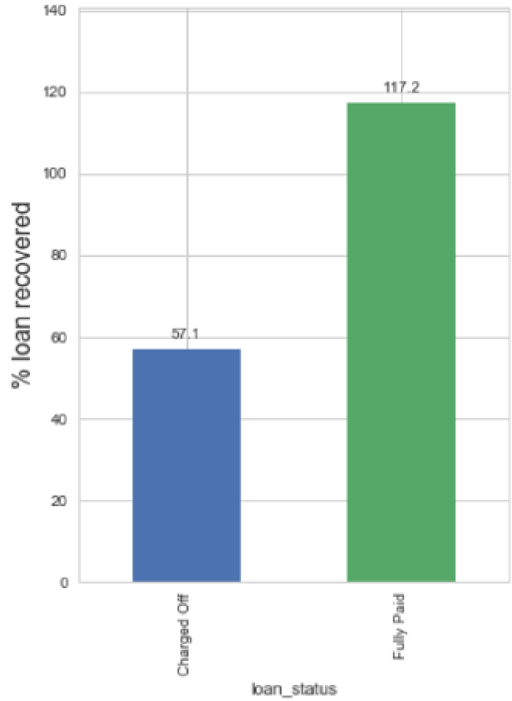
Approximately 14% of loans are defaulted.

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

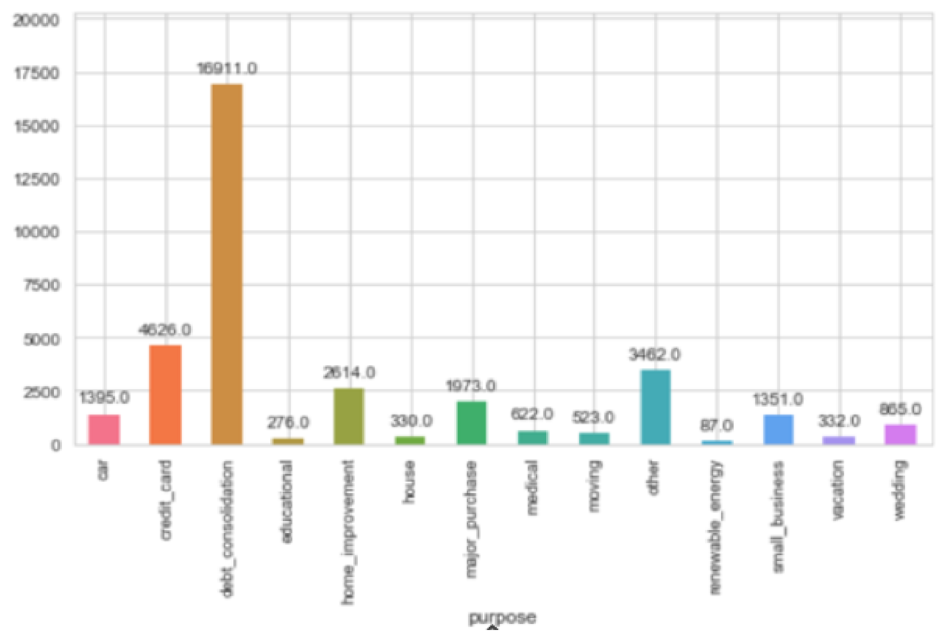


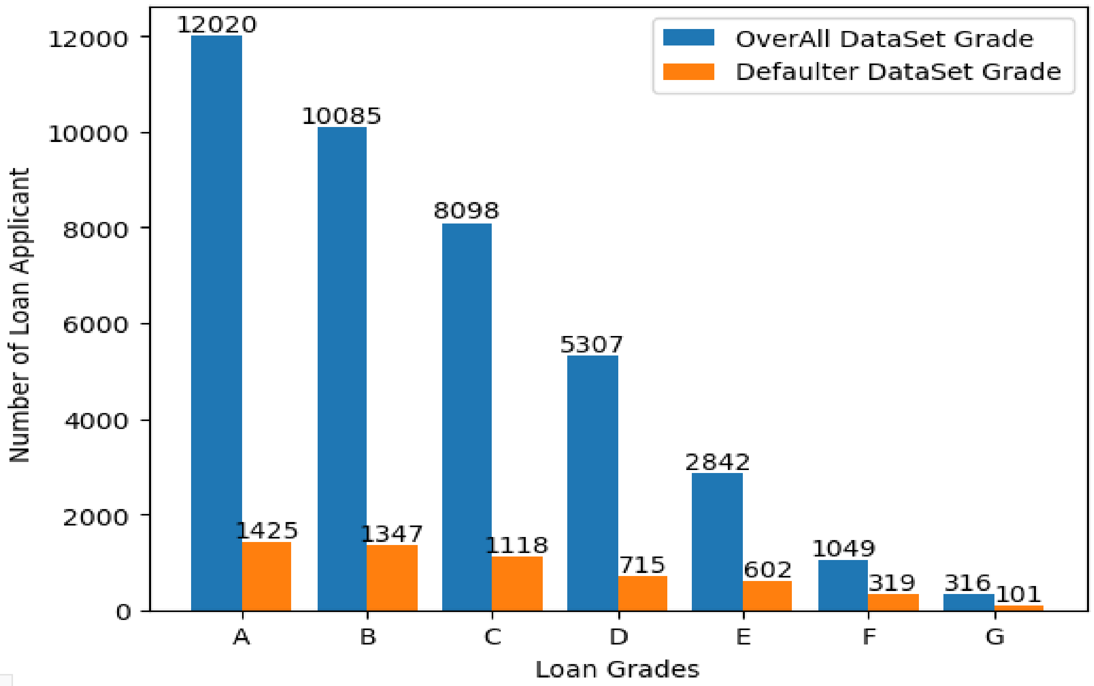
Lending Club only recovers 57% of the
loan amount when
loans are defaulted.

On fully paid-up loans, the company makes 17% profit.



Understanding Loans



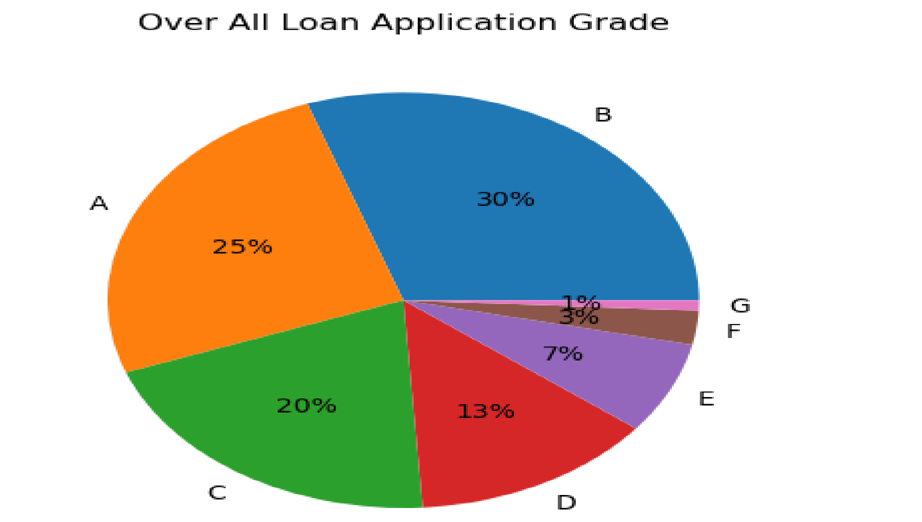


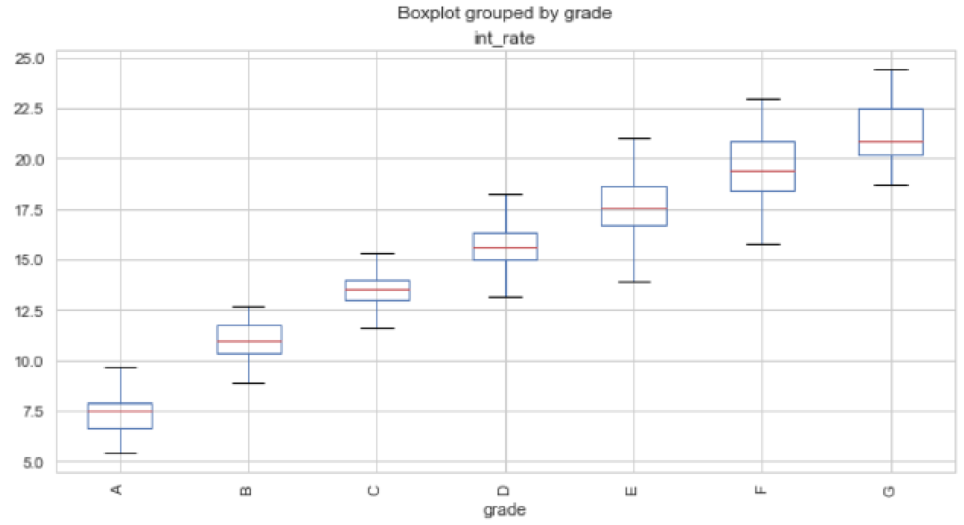
Maximum number of loans are for debt consolidation, followed by credit card

Most loans are high quality, with a grade of A or B

Understanding Loans Continued..

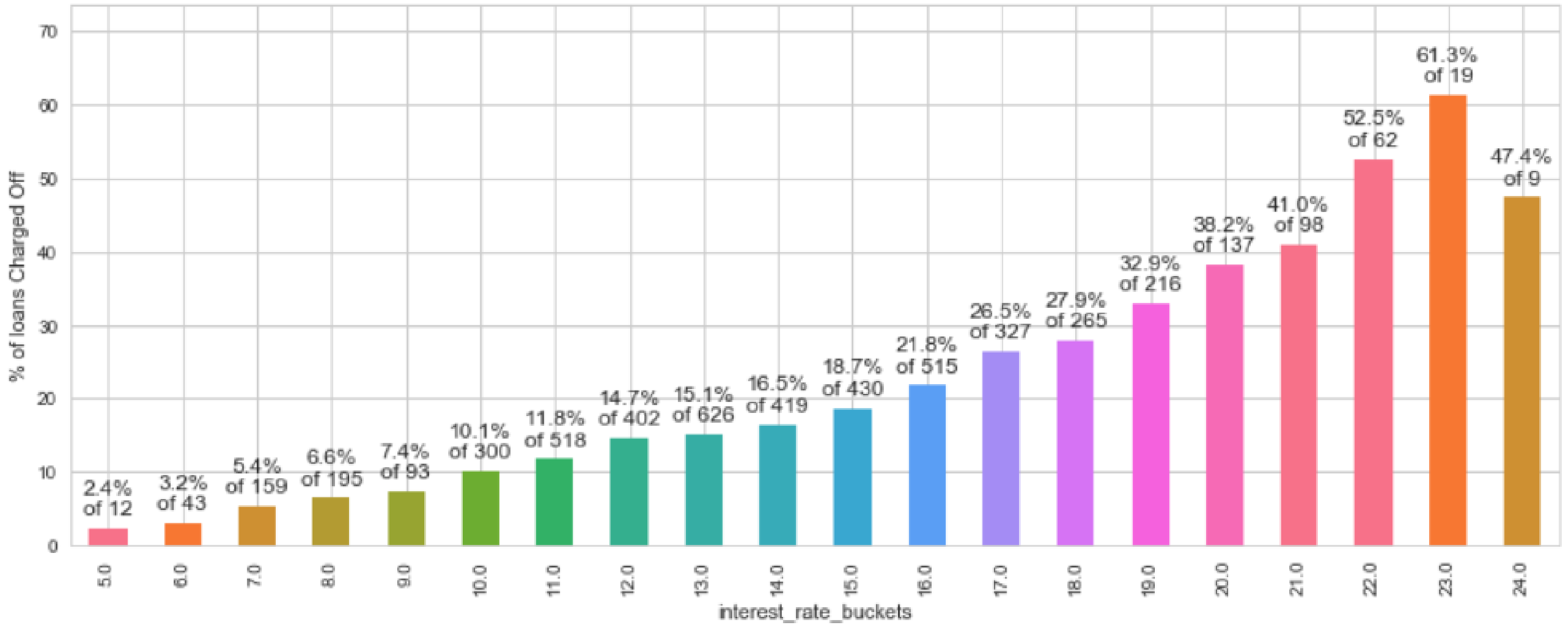
Lower grades have a higher incidence of defaults on loans.
This shows that the grading system is working.





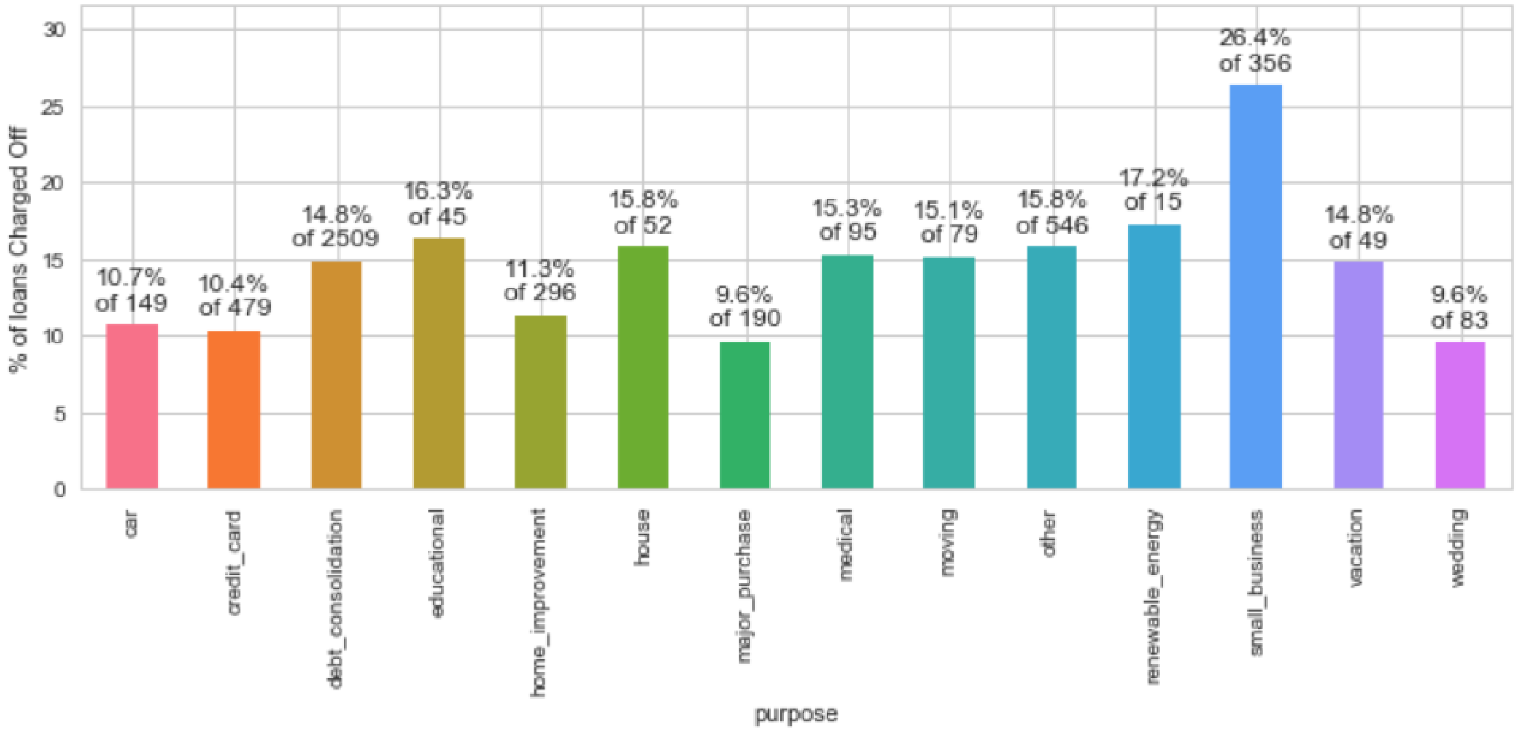
Lending Club charges higher interest rates as the grade of a loan becomes worse. However, as we will see on the next slide - the driving variable for defaults is the higher interest rate.

Defaults – By Interest Rate



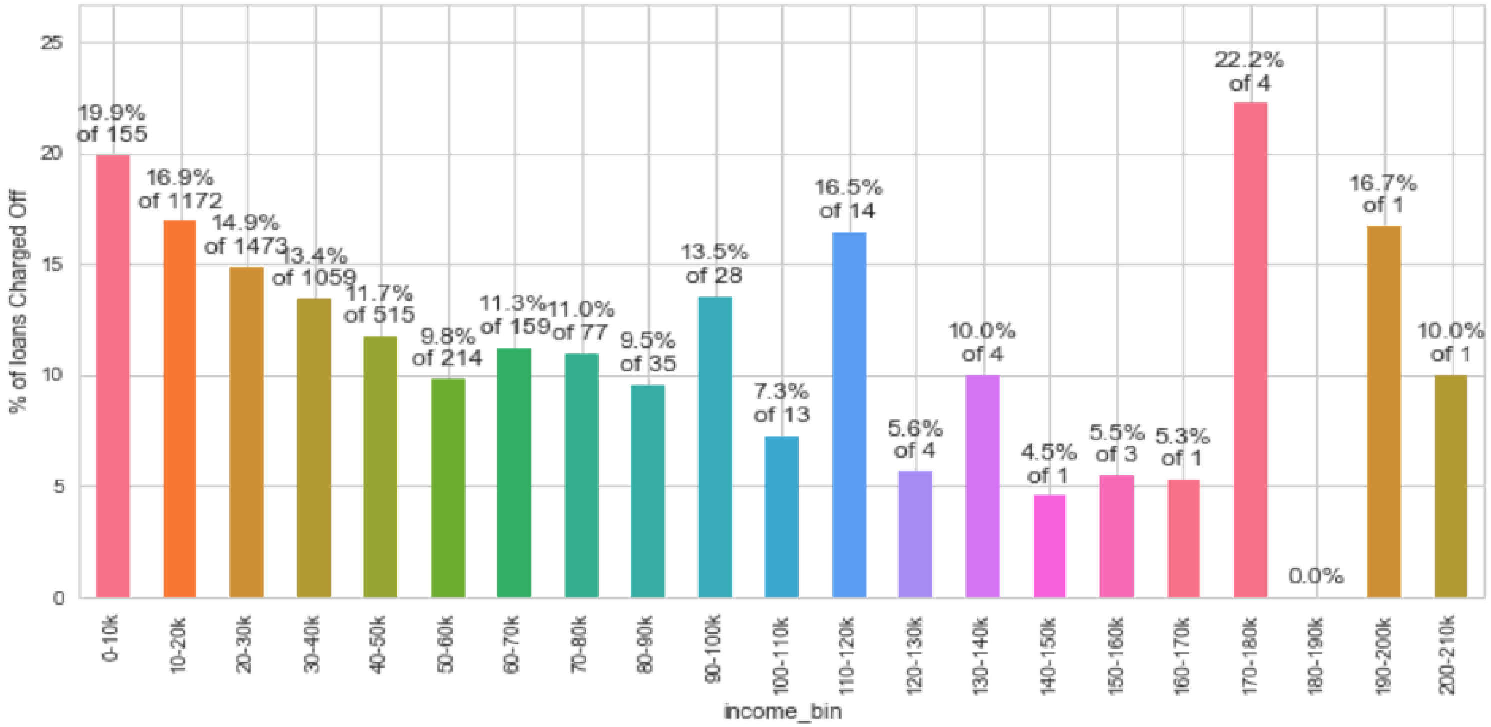
Percentage of Defaults increases monotonically with higher interest rates.
At rates of 19% and above, more than 33% of loans are Charged Off.

Defaults – By Loan Purpose



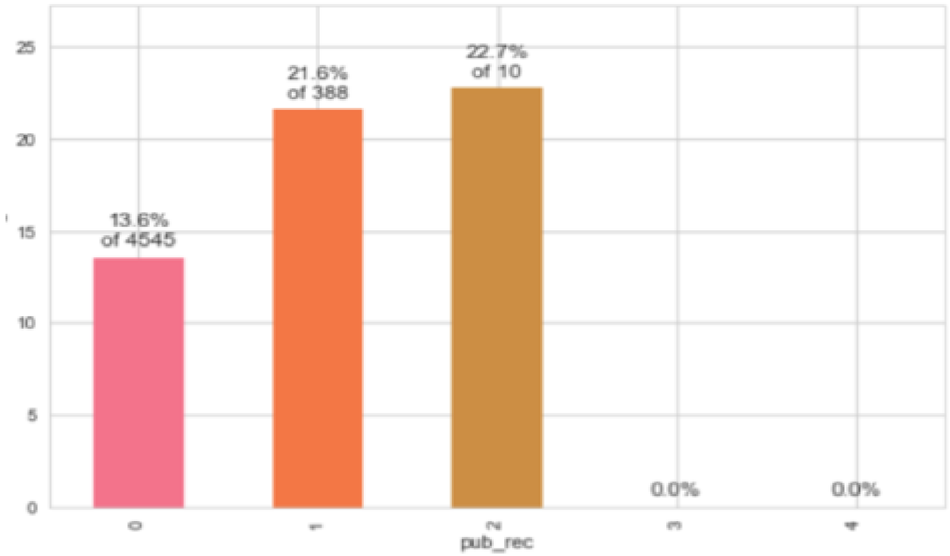
More than a quarter of loans are taken for the purpose of running a small business see defaults.

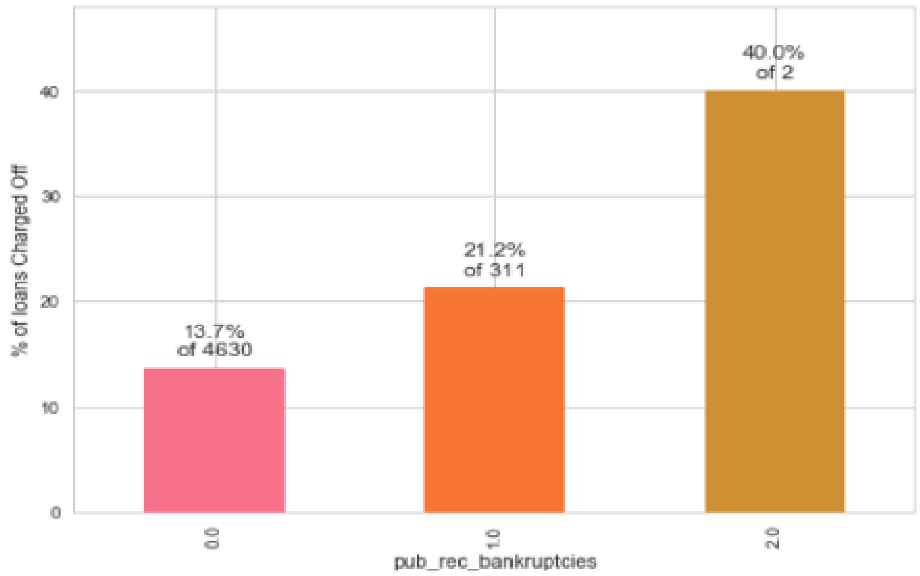
Defaults – By Income Of Borrower



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 the next slide – the ratio of amount to income is more important.

Defaults – By Prior Bad Record





94% have no Public derogatory records.

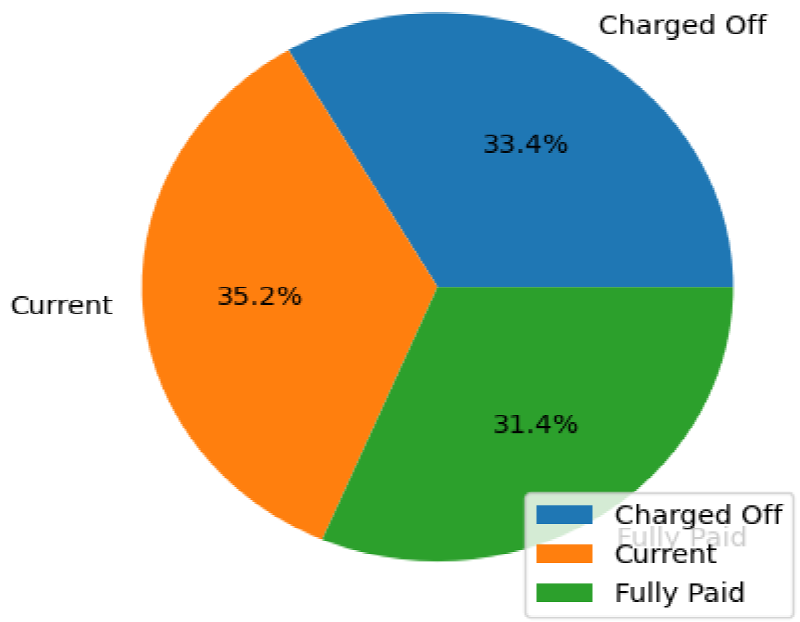
Having even 1 derogatory record increases the chances of Charge Off significantly.

96% have no bankruptcy record. Having even 1 bankruptcy record increases the chances of Charge Off significantly.

Public Derogatory Records and Public Bankruptcy records have an 83% correlation.

Defaults – By Debt To Income Ratio

loan_status	annual_inc	dti	int_rate	loan_amnt
Charged Off	62427.298034	14.000624	13.820432	12104.385108
Current	75430.665105	14.750009	15.031465	17053.991228
Fully Paid	69862.503328	13.148421	11.609761	10866.455994



Percentage of default rises with dti ratio.
As the DTI ratio rises above 14, the loans become risky.
Higher interest rates should be charged for higher dti, but we see a spread across all values

Recommendations

Stop – approving loans where the amount/income is higher than 30%

Reduce – the number of approvals where the purpose is a small business

Stop – approving high-value loans when the revolving line utilization rate is greater than 75%

Stop – approving loans to people with prior bad records. Or at least stop approving high-value loans

Start – charging higher interest rates for loans with DTI greater than 14