Lending Club Case Study

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About 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 utilize this knowledge for its portfolio and risk assessment.

Case Study Objective:

- Identification of Loan Applicant traits that tend to ‘default’ paying back
- Understand the ‘Driving Factors’ or ‘Driver Variables’ behind Loan Default phenomena
- Loan Lending Organizations may choose to utilize this knowledge for its portfolio and risk assessment of new loan applicants

Analysis Process:

Data Cleaning → Univariate Analysis and Segmented Univariate Analysis → Bivariate Analysis → Observations

Data Cleaning

- Drop Columns with null values or single category value.
- Convert values to proper int, float and date representations

Univariate Analysis and Segmented Univariate Analysis

- **Univariate Analysis** : Check distributions and frequencies of various numerical and categorical variables.
- **Segmented Univariate Analysis** : Analyse variable against segments of other variables

Bivariate Analysis

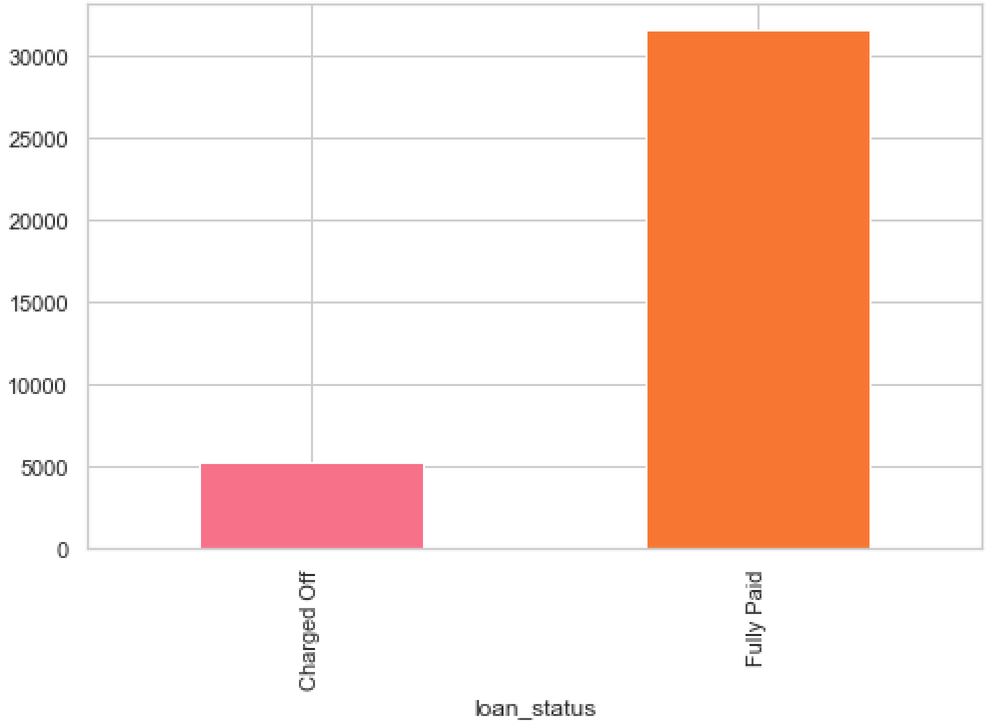
- Correlation analysis and check how two variables affect each other

Observations

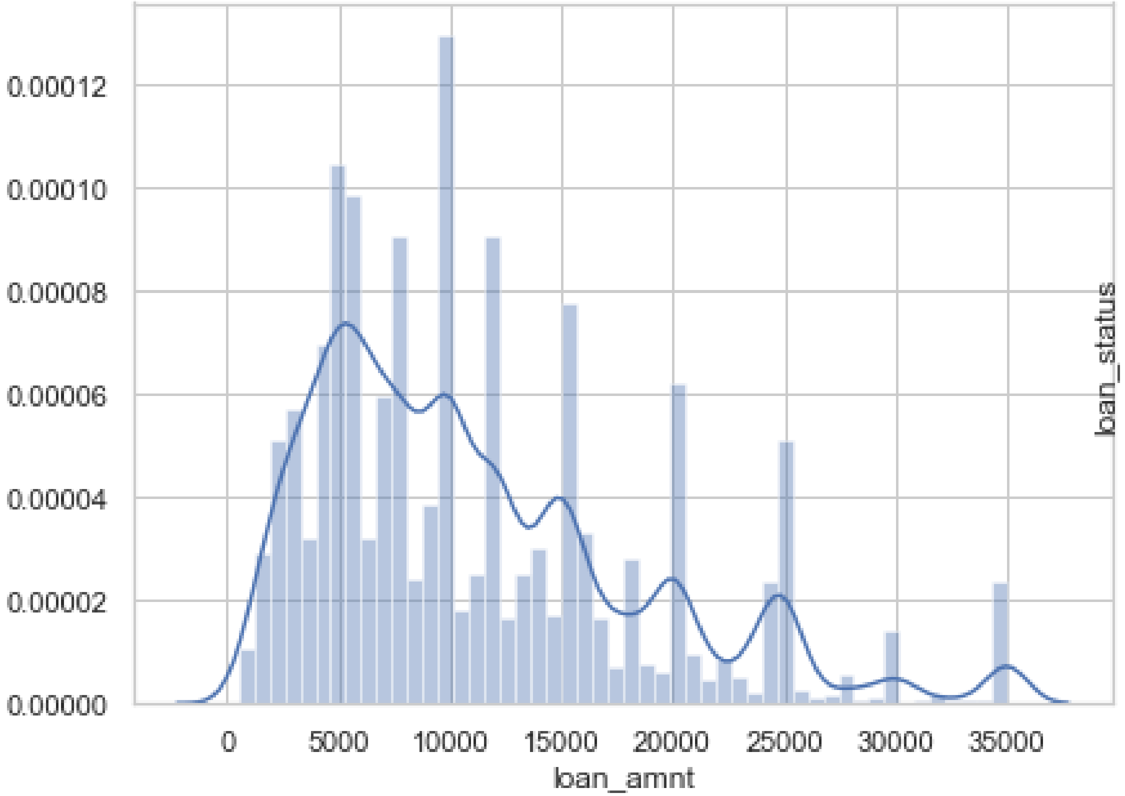
- Publishing and presenting observations

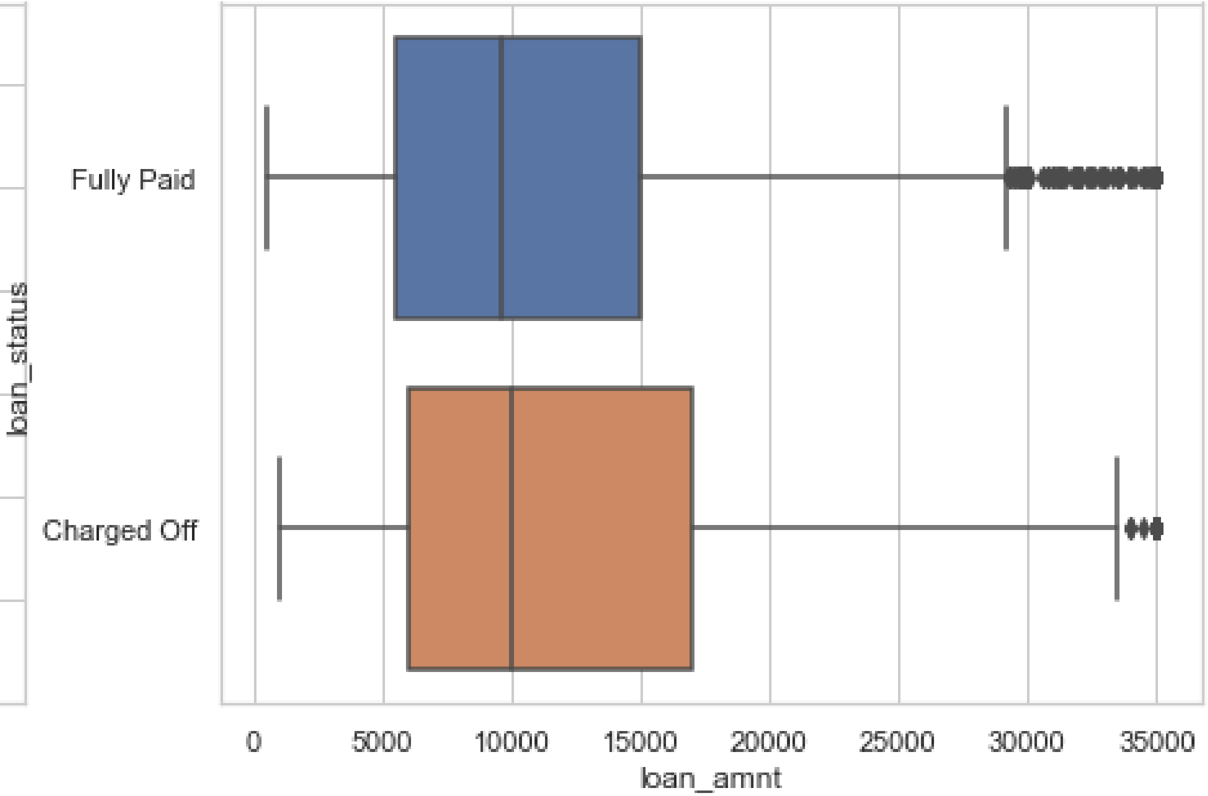
Analysis: Loan Status

- Out of total loans given, around **14%** loans are defaulted
- Only **57%** of loans are recovered in case of default.
- On fully paid loans, lending club makes **17%** profit.



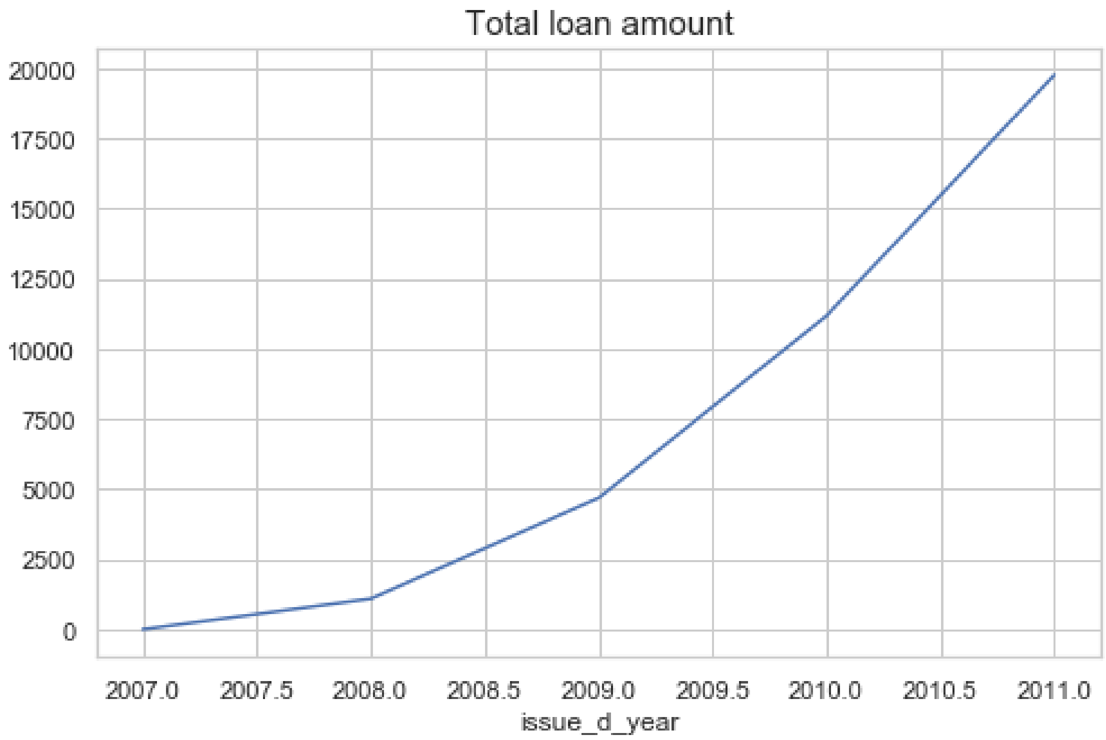
Analysis: Loan Amount

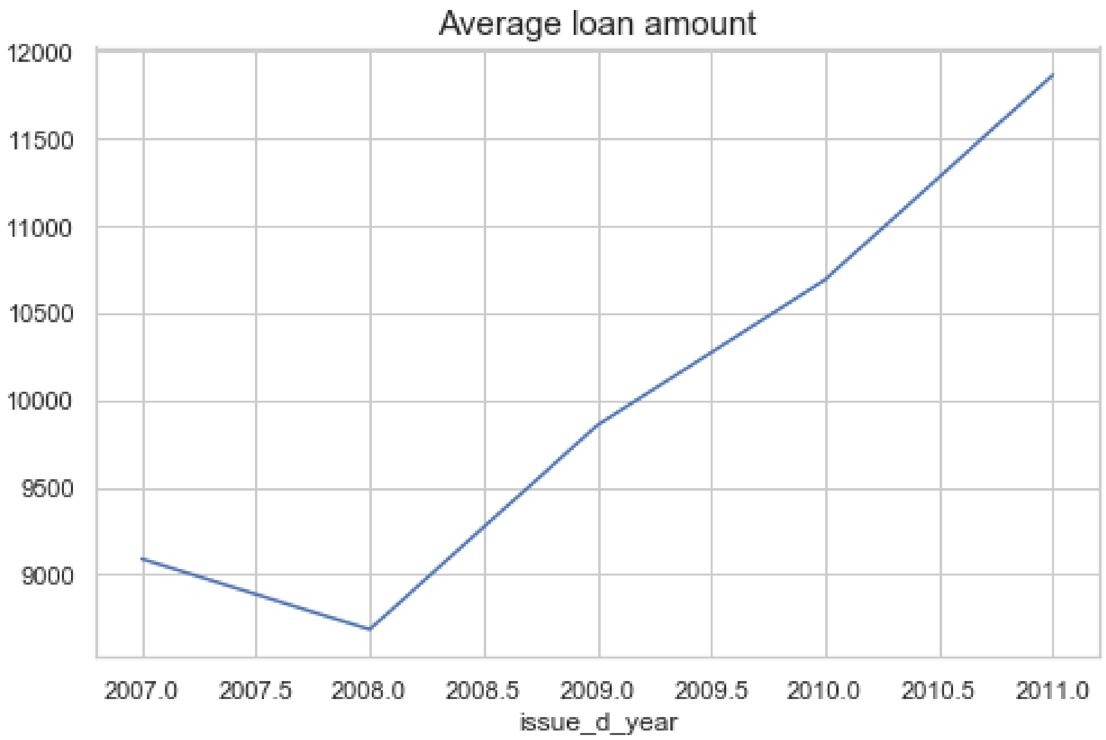




- Most of the loans are given below 15000
- Loan amount for defaulted loans are comparatively higher for fully paid loans

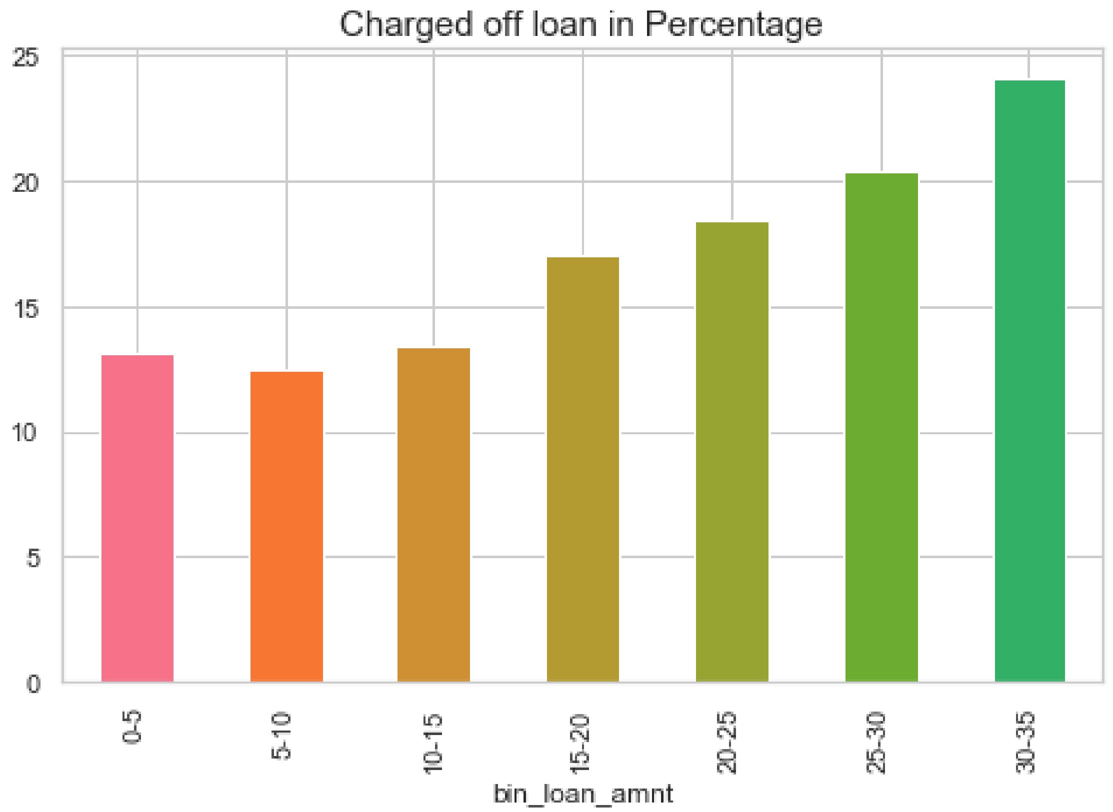
Analysis: Loan Amount





- Total Loan Amount increases every year as more and more applicants apply for loan
- But there was a dip in Average loan amount in 2008, this maybe because of the market crash that took place in the same year

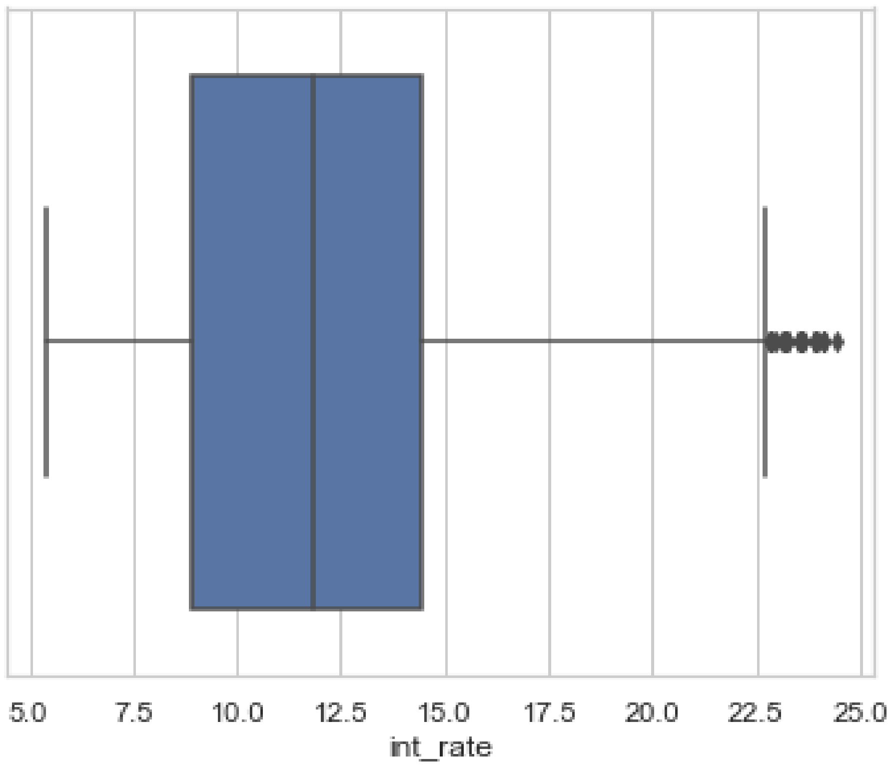
Analysis: Loan Amount

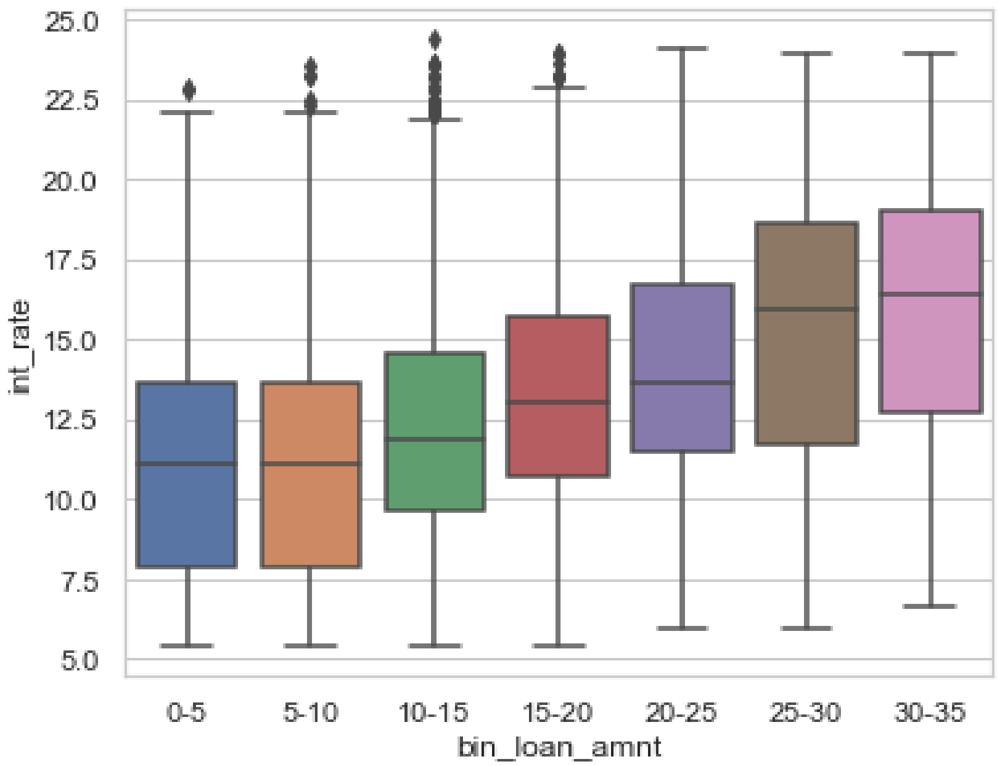


Loan Amount	Charged Off Percentage
0 – 5000	13%
5000 – 10000	12%
10000 – 15000	13%
15000 – 20000	17%
20000 – 25000	18%
25000 – 30000	20%
30000 - 35000	24%

- As loan amount increases, rate of default also increases
- For loan amount of 15000 - 20000, default rate increases by 4%
- Lending club should not consider high loan amount to risky applicants

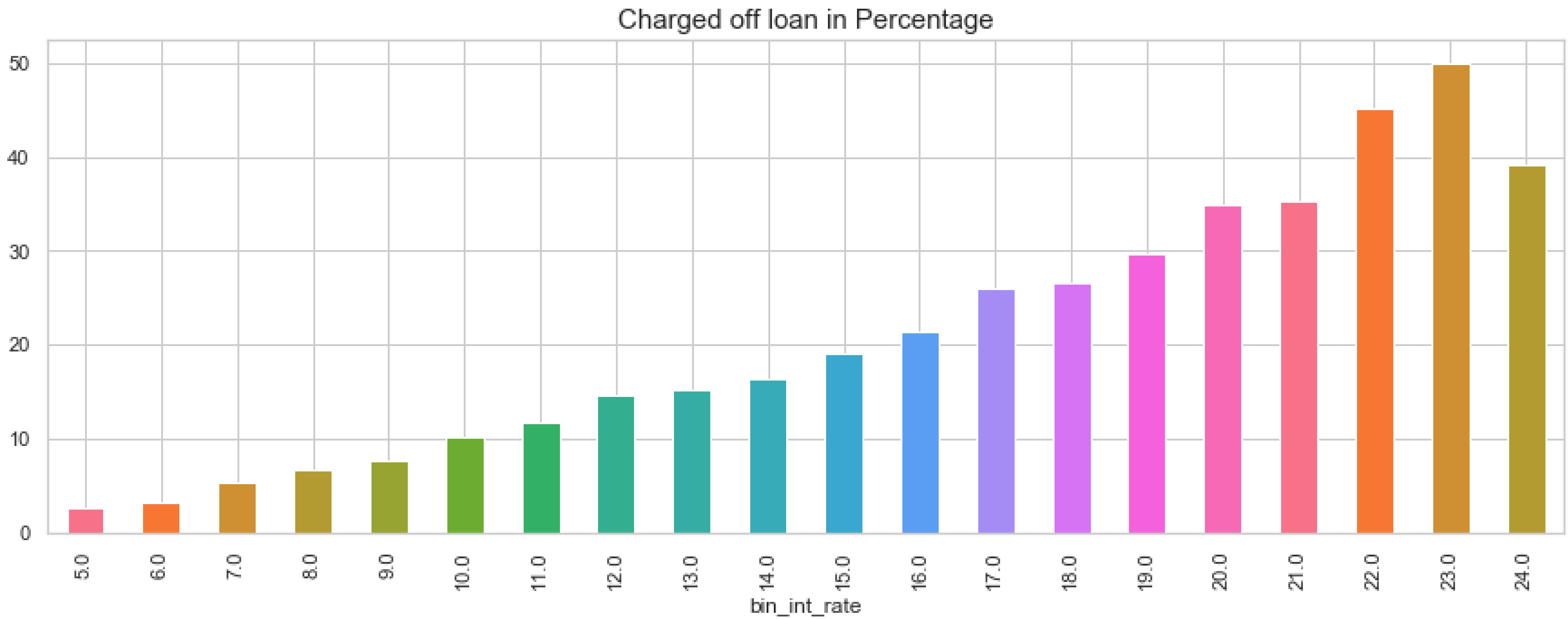
Analysis: Interest Rate





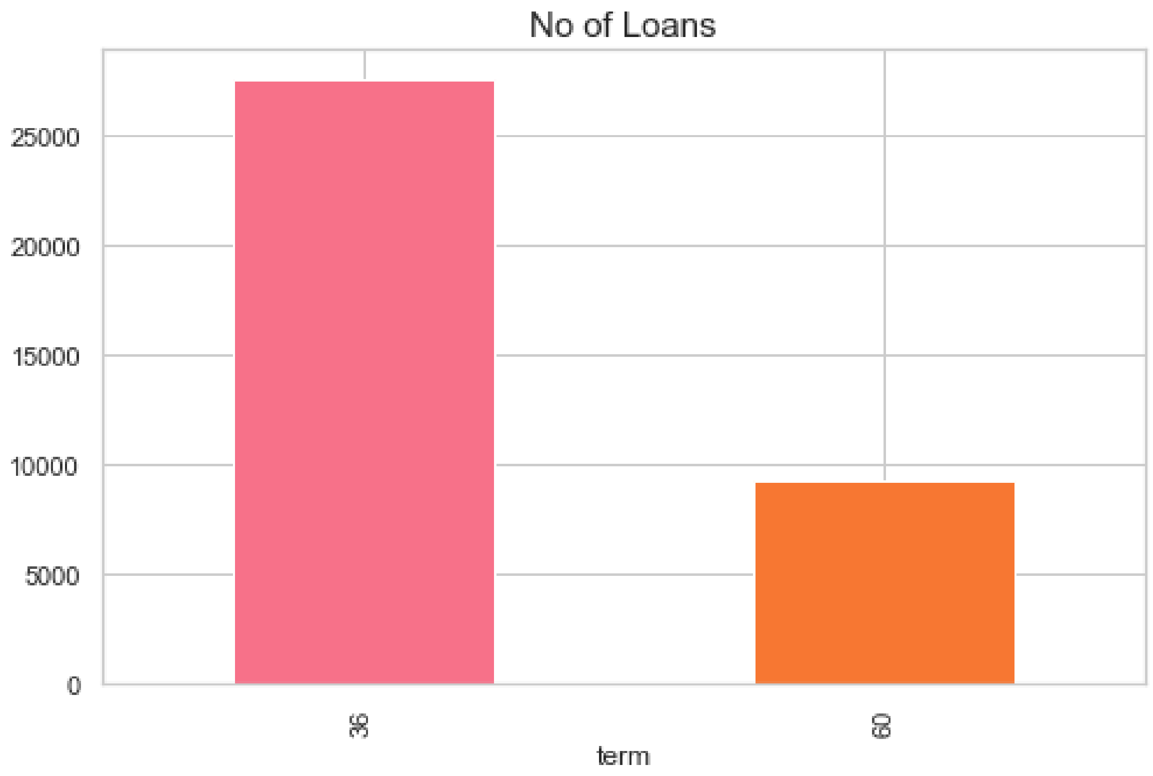
- Average interest rate is around 12%
- But as loan amount increases, interest rate also increases

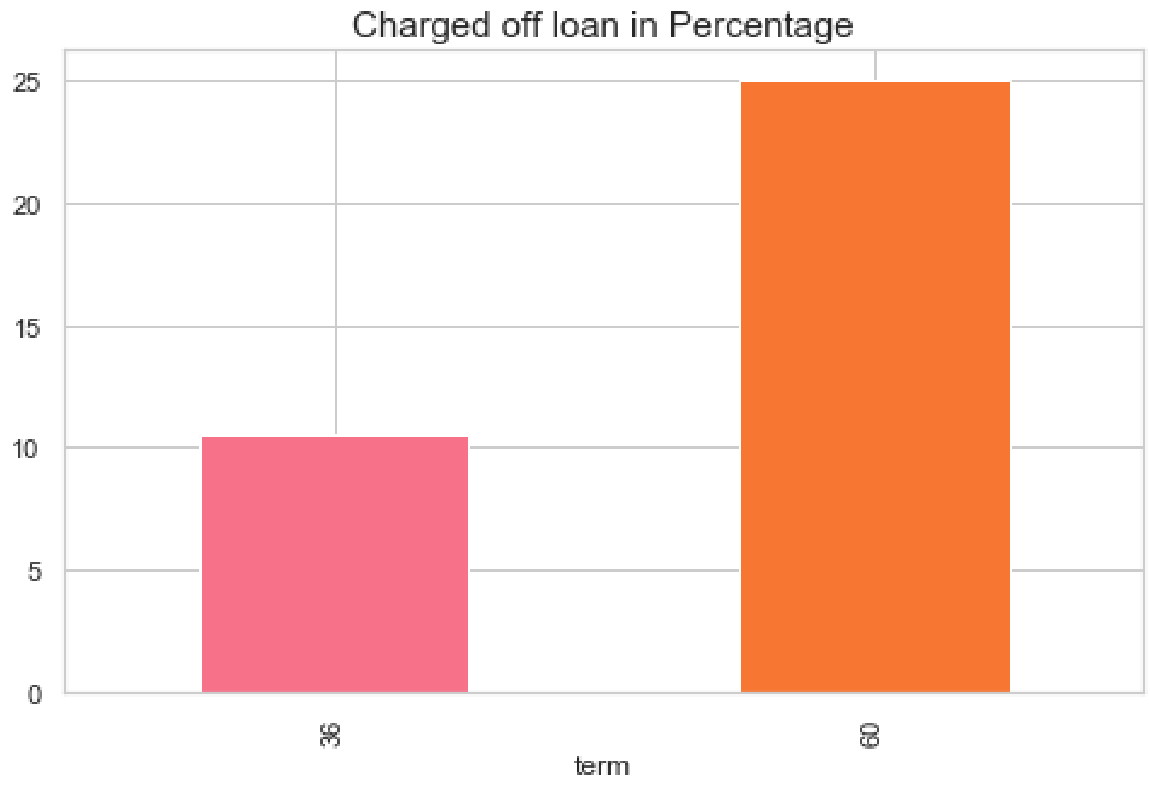
Analysis: Interest Rate



- Interest rate is a major driver of loan default
- As interest rate increases even by 1%, there's a drastic jump in default rate
- There's almost 50% default rate when interest rate is beyond 21%
- Lending club should consider not giving loans beyond 15% interest rate

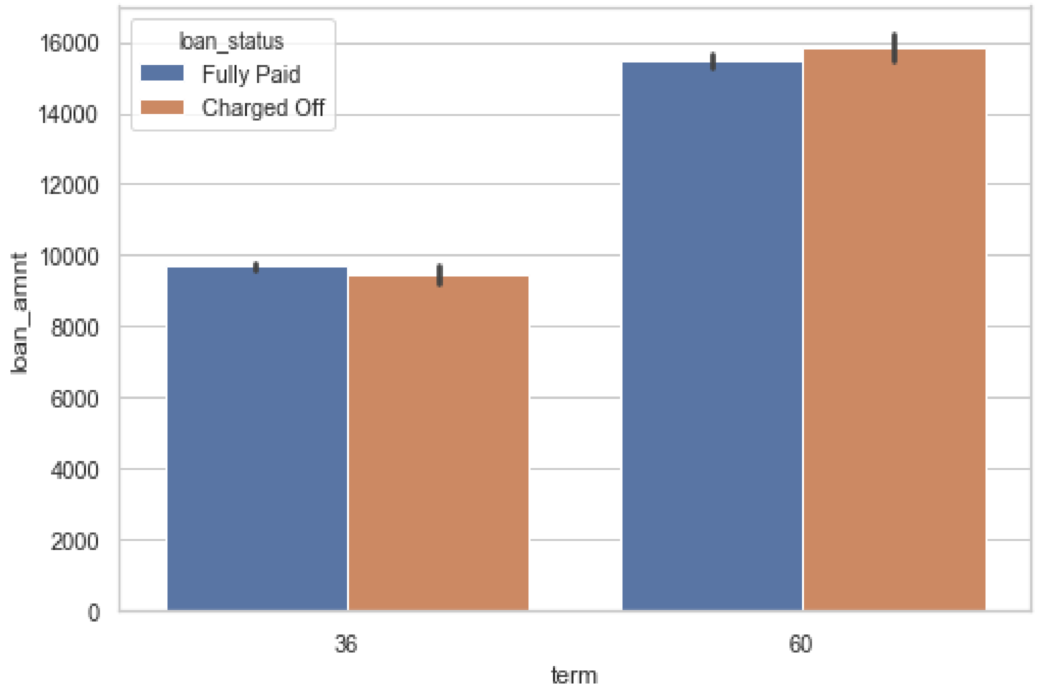
Analysis: Term

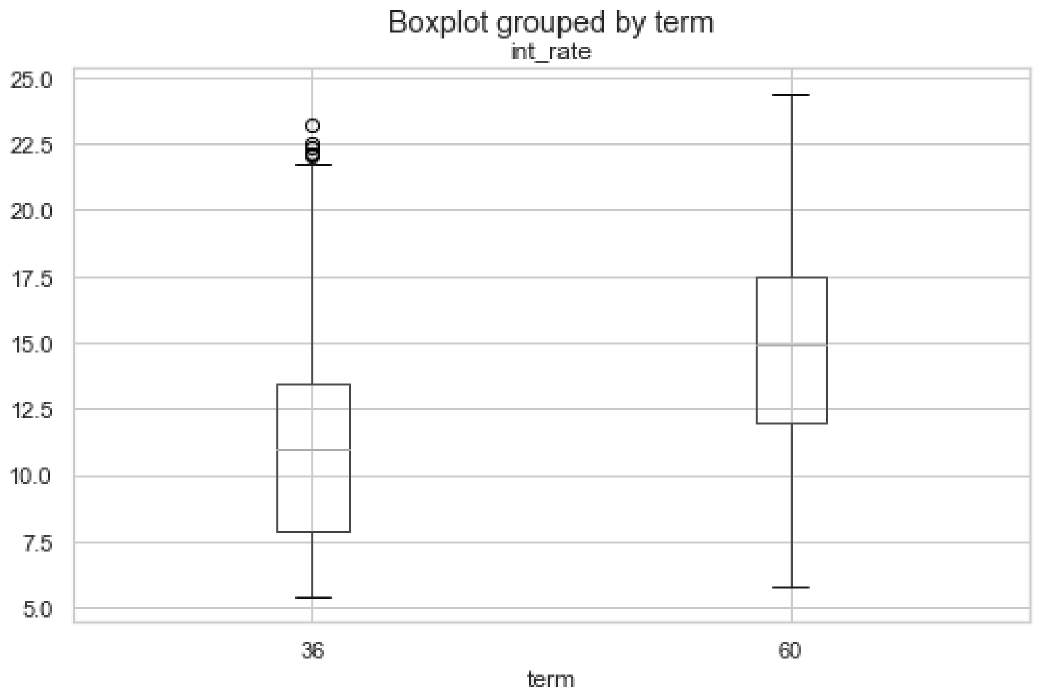




- Most people apply for loans for 36 months, but the rate of default is very high for loans with 60 months duration (25%), more than double of loans with 36 months duration (11%)

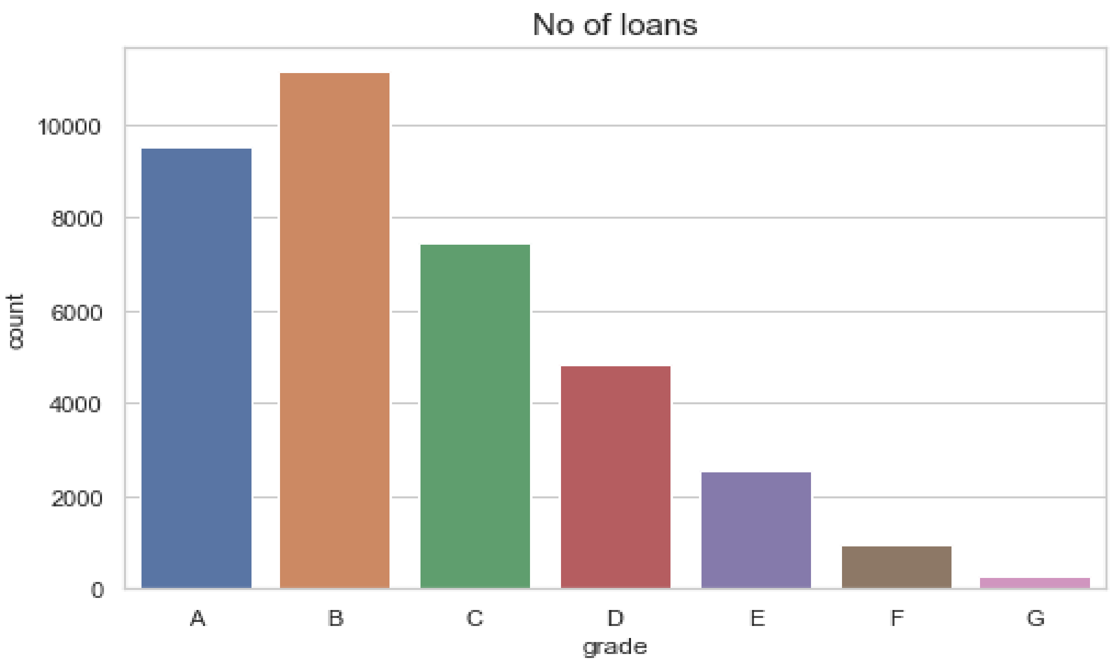
Analysis: Term

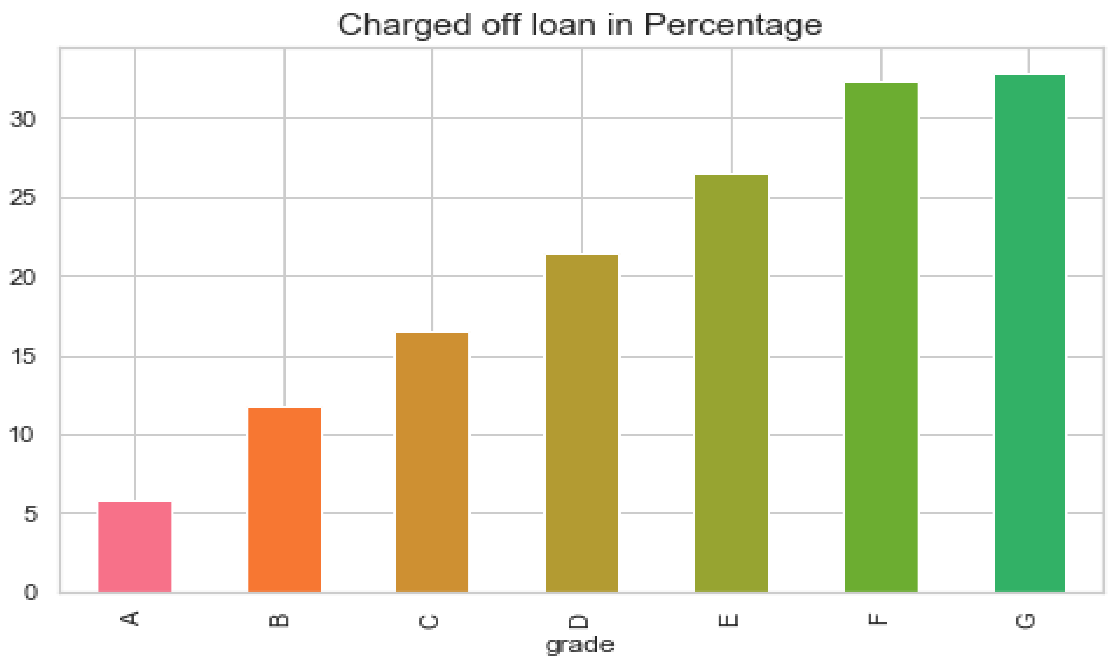




- Most people apply for loans for 36 months, but the rate of default is very high for loans with 60 months duration (25%), more than double of loans with 36 months duration (11%)

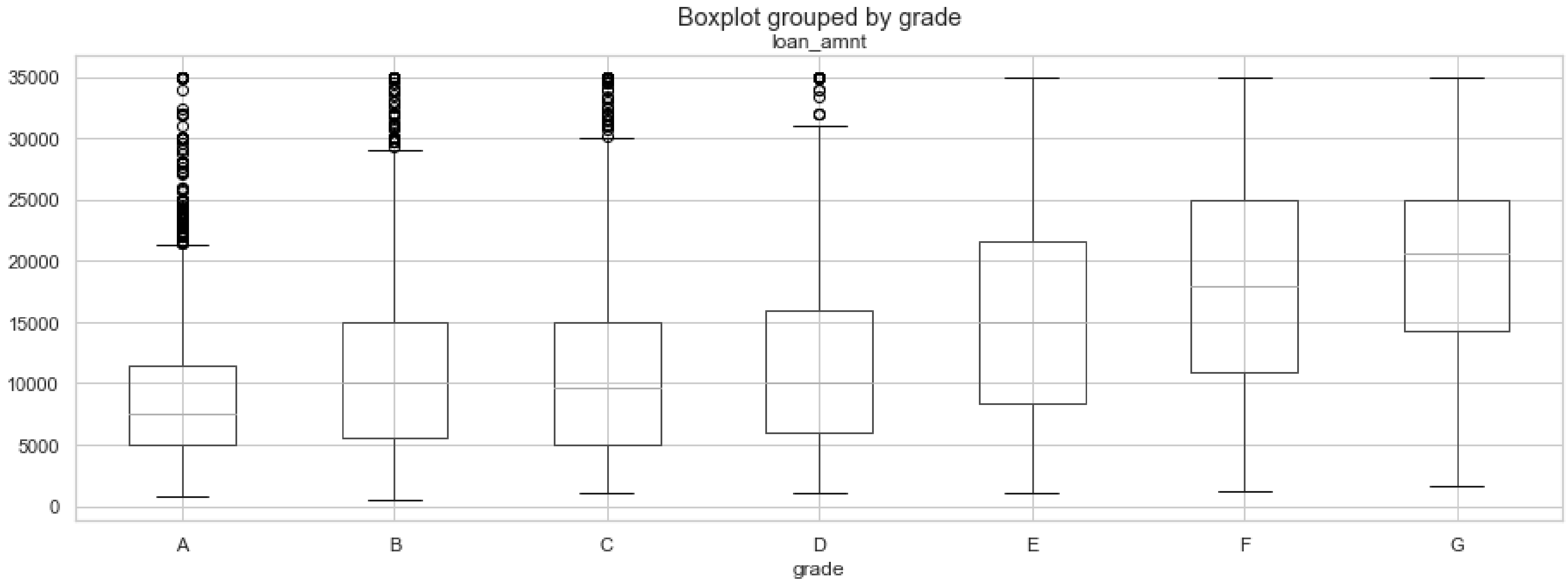
Analysis: Grade





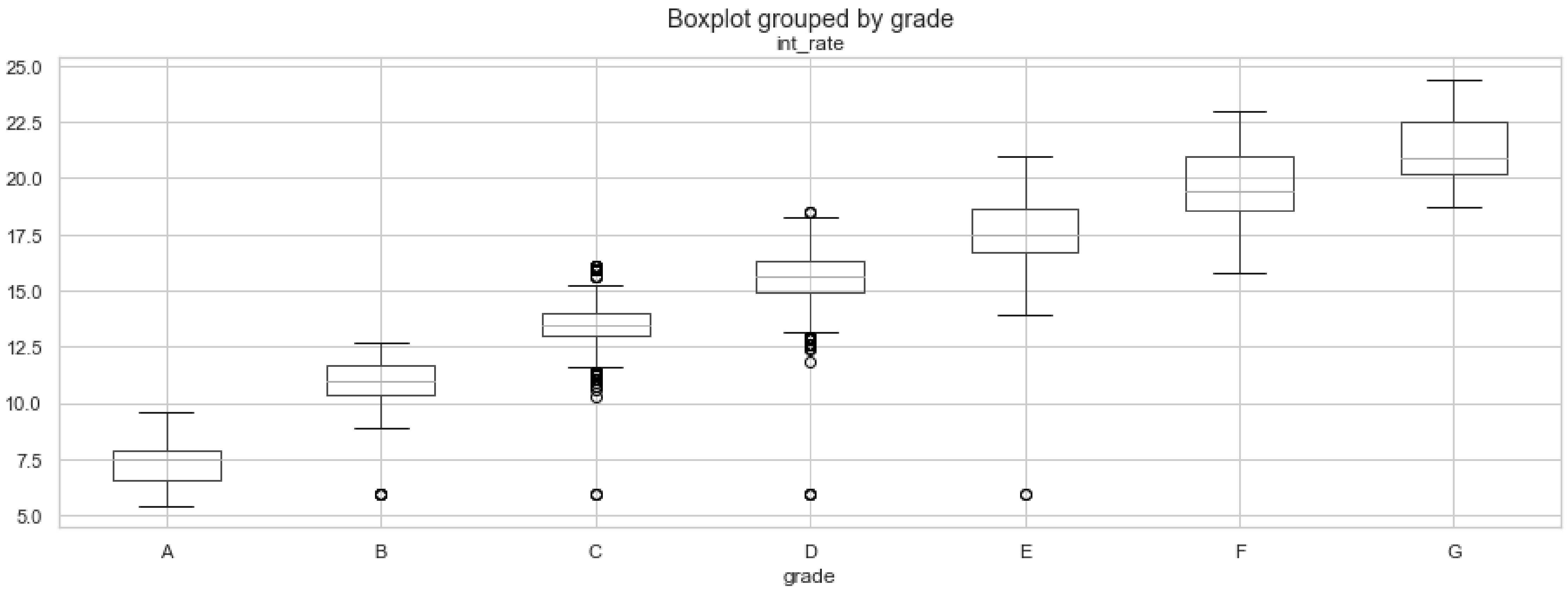
- Most loans are given for A or B grade
- As Grade goes high, no of loan approvals also decreases significantly
- Loan Default rate is high as grade goes up; Lending club should continue this practice.

Analysis: Grade



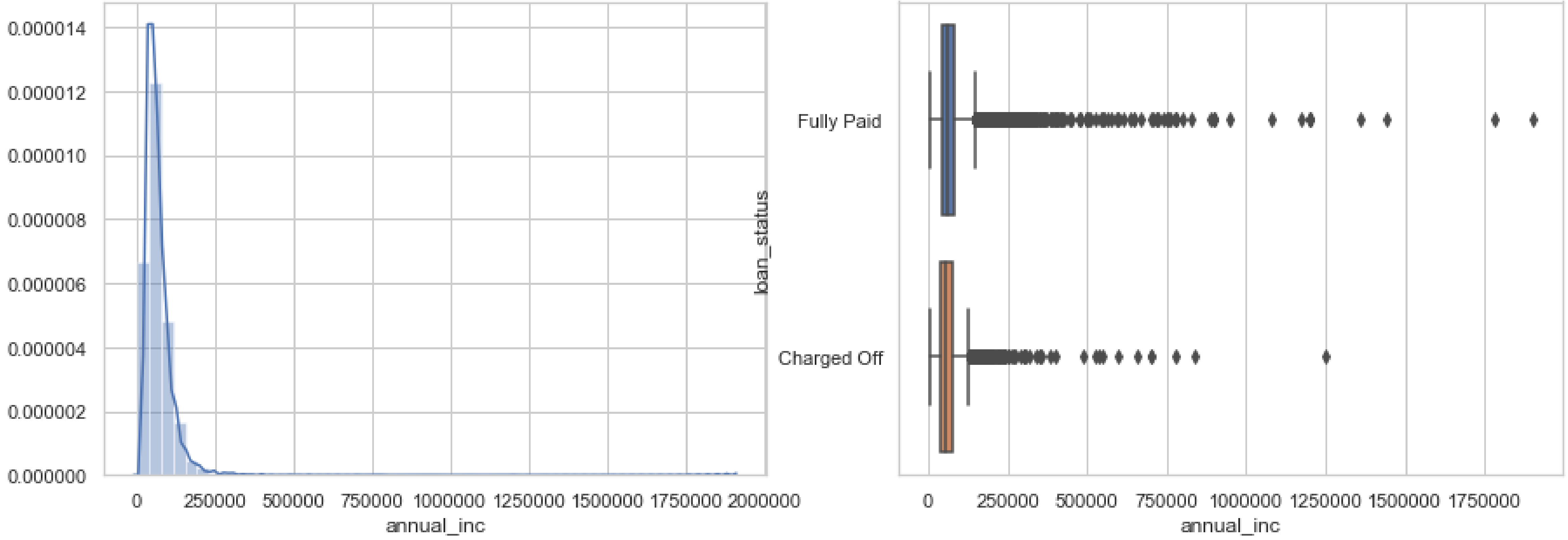
- Average loan amount is higher for higher grades, this shouldn’t be the case as there's high chance of default

Analysis: Grade



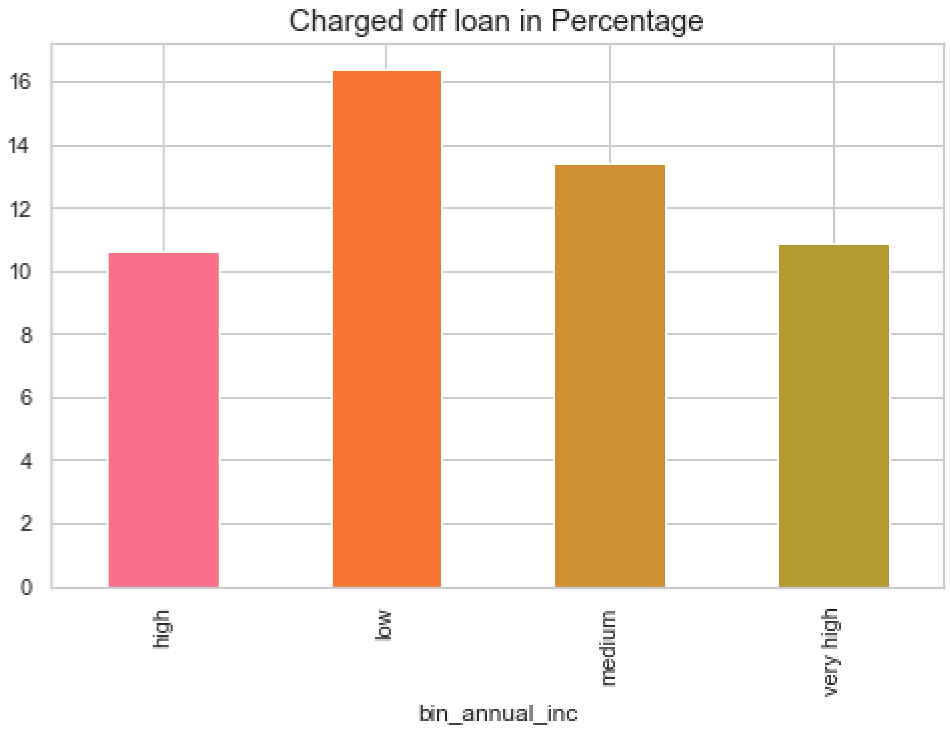
- Interest rate is also high for higher grades (Almost triple for G than A), as we saw in earlier slides, interest rate is a major driver of loan default
- Lending club should not be approving loans for applicants having grade more than D

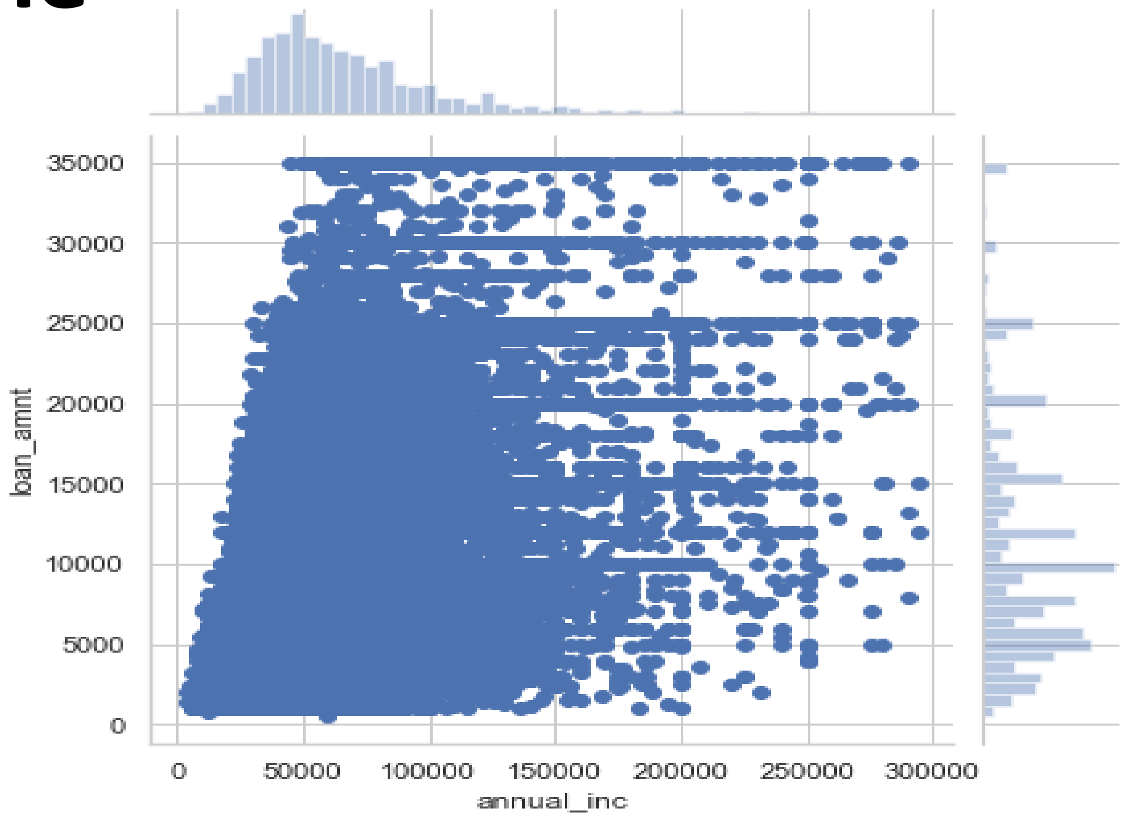
Analysis: Annual Income



- Most applicants have annual income less then 5,00,000
- Annual income of applicants who fully paid their loans is higher than applicants whose annual income is lower.

Analysis: Annual Income

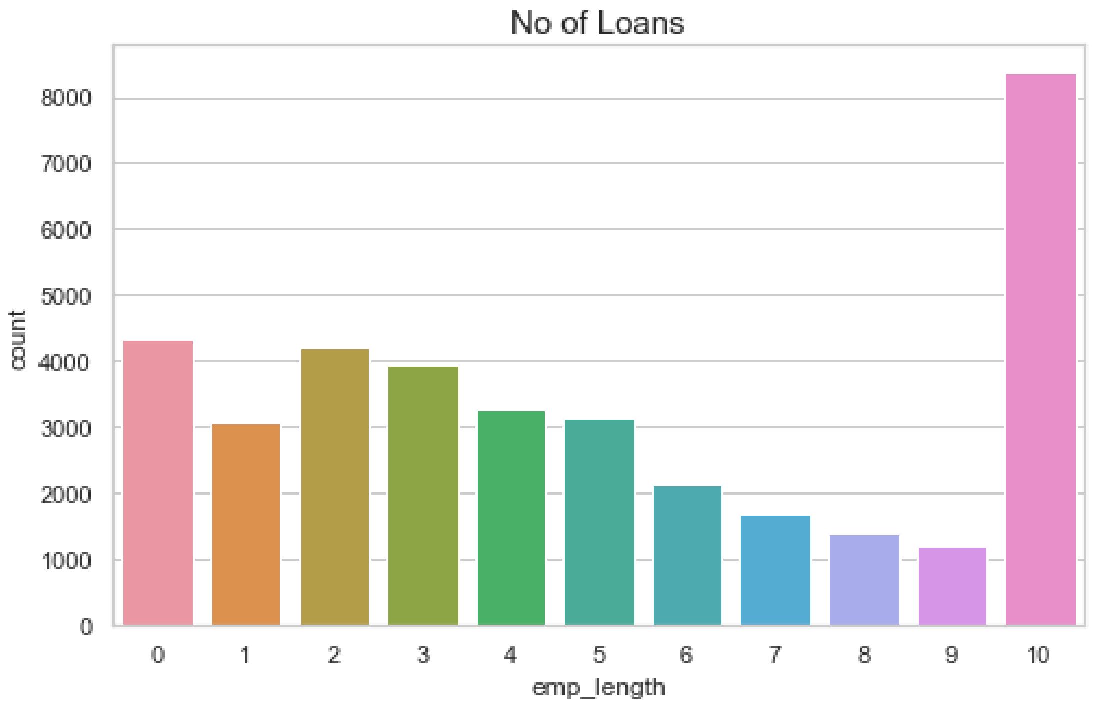


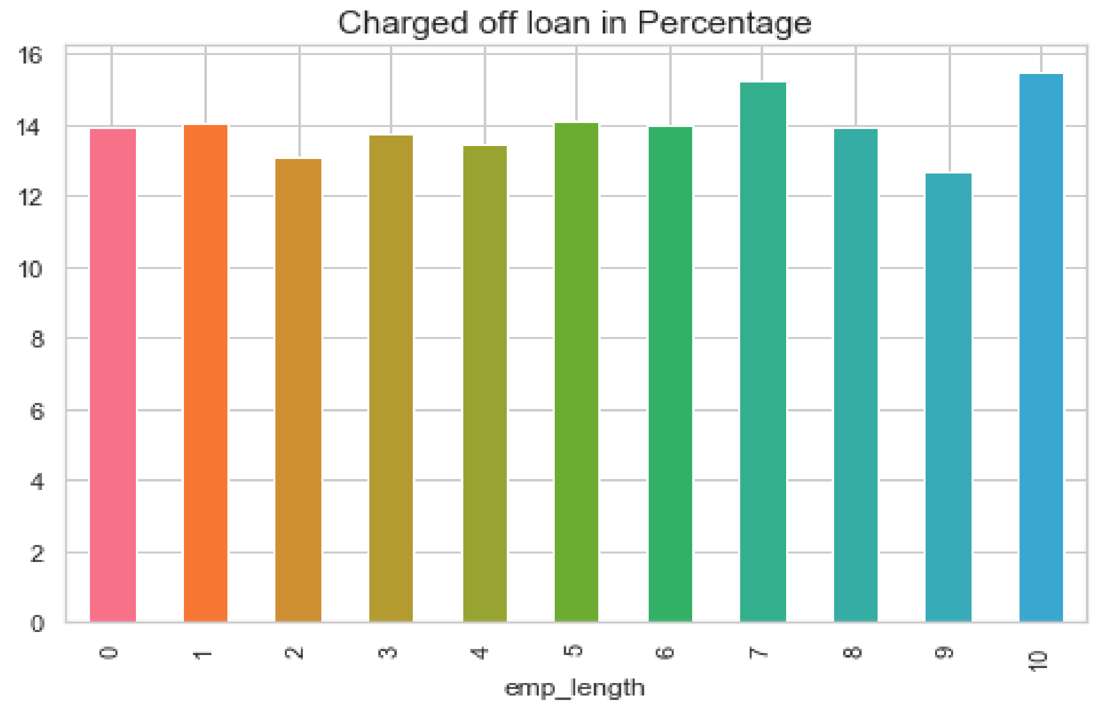


Annual Income	Category	Default Rate
< 50,000	Low	16%
50,000 – 1,00,000	Medium	13%
1,00,000 – 1,50,000	High	11%
> 1,50,000	Very High	11%

- Applicants having less annual income (<50,000), have high chance of default (16%)
- It is observed that people having annual income of less than 50,000 are approved loans of 25,000 and more

Analysis: Emp Length

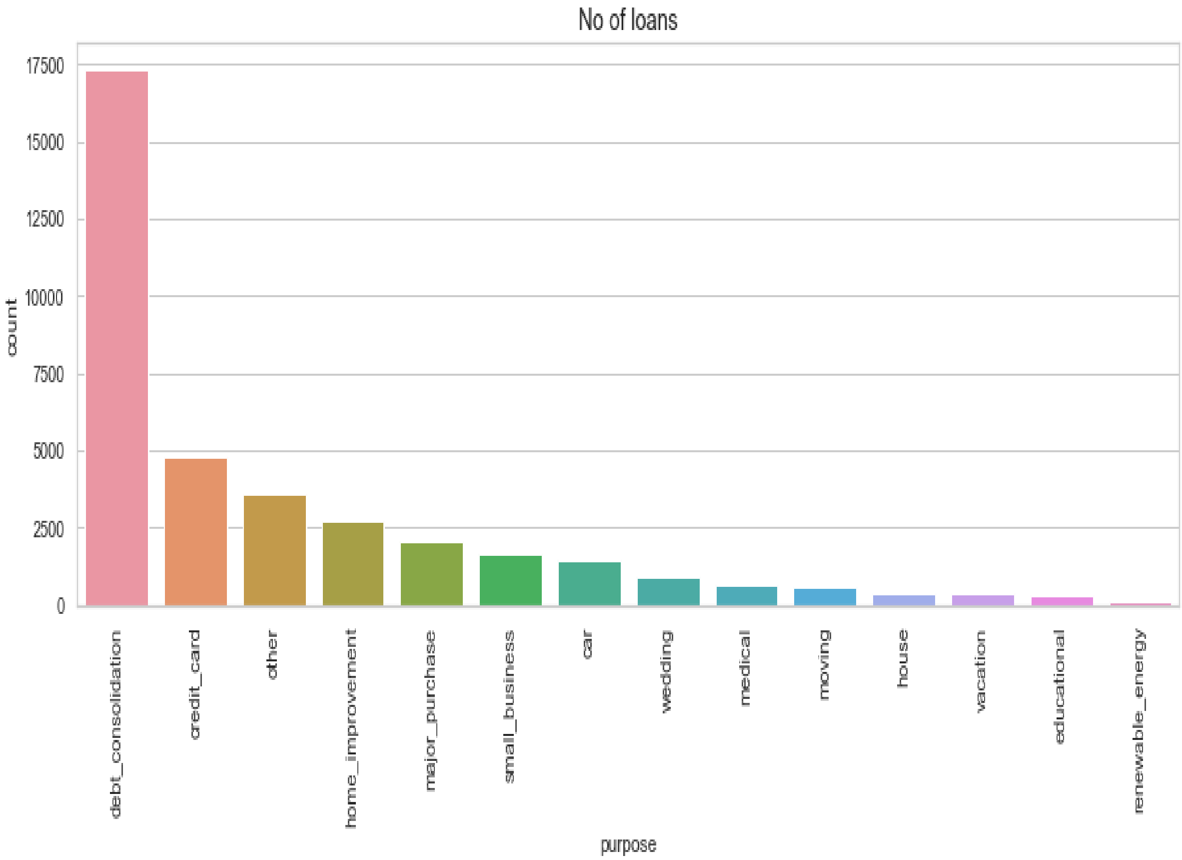


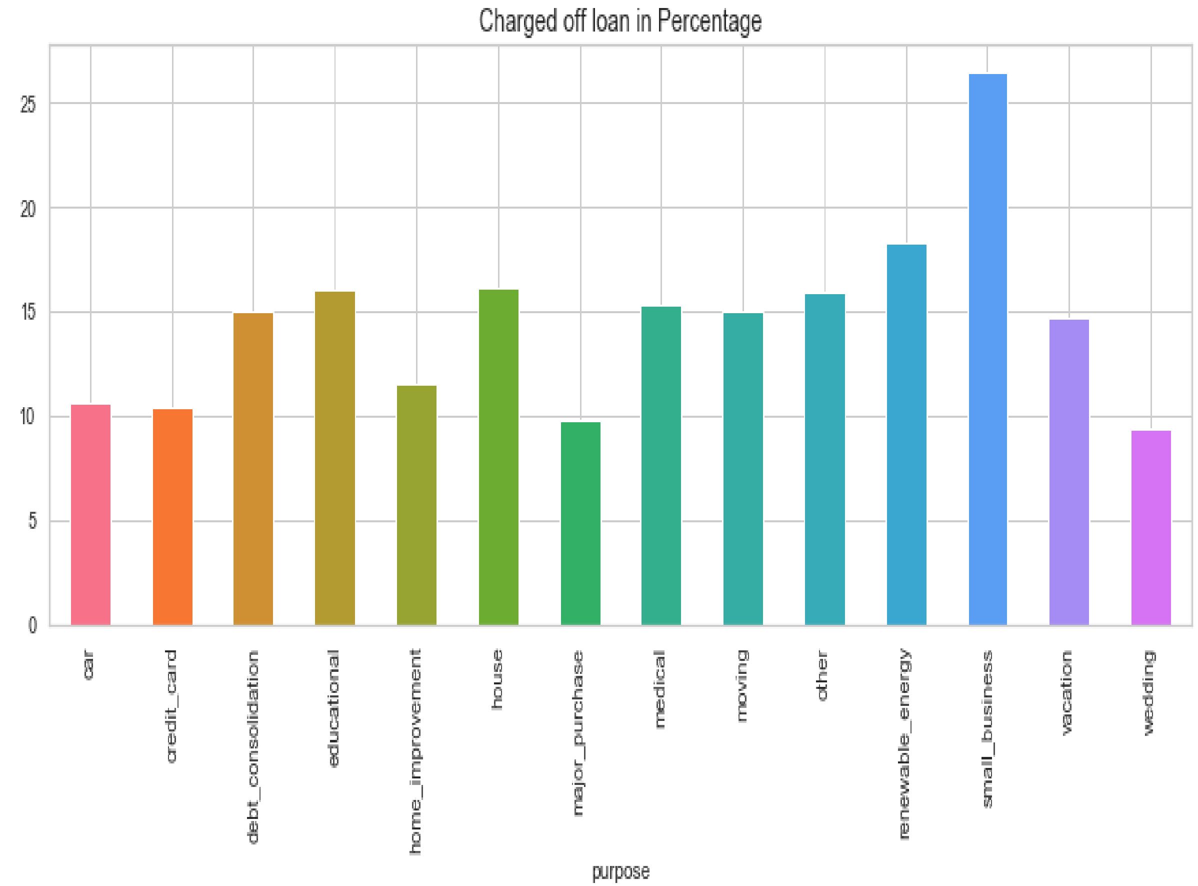


- Applicants having more than 10 years of experience have higher number of loan applications

- Default rate is same across all the employment lengths (~14%), employment length doesn't decide if applicant has higher chance of default or not

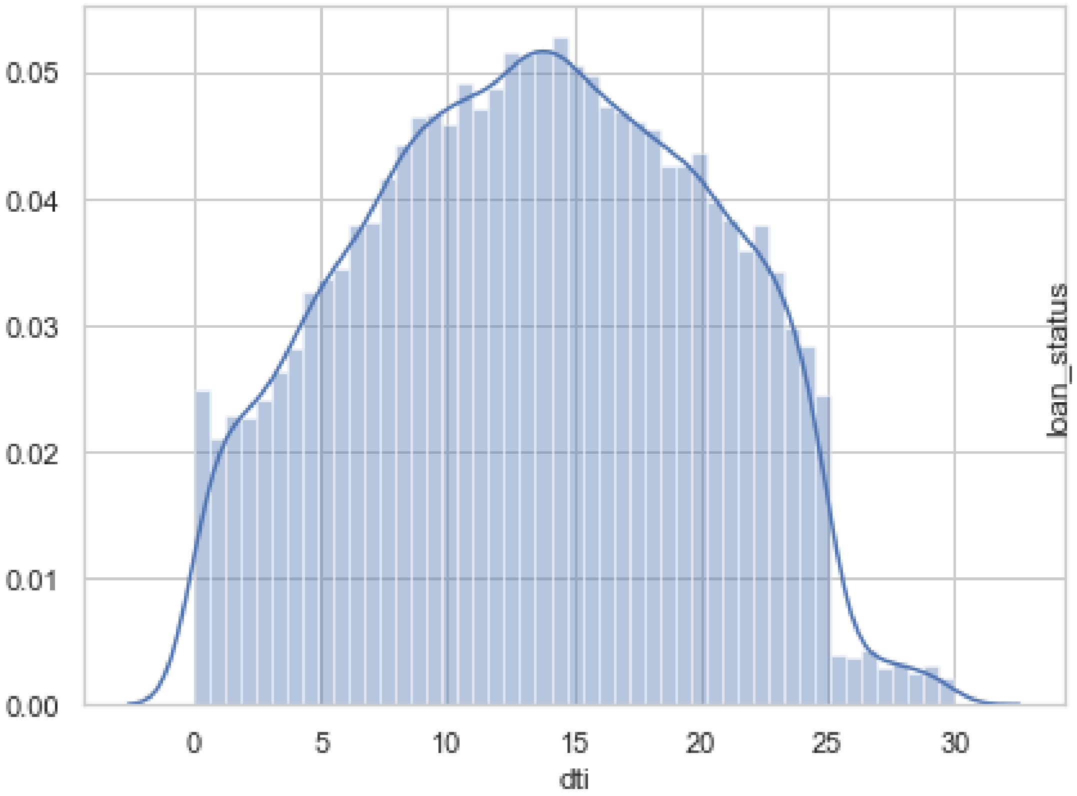
Analysis: Purpose

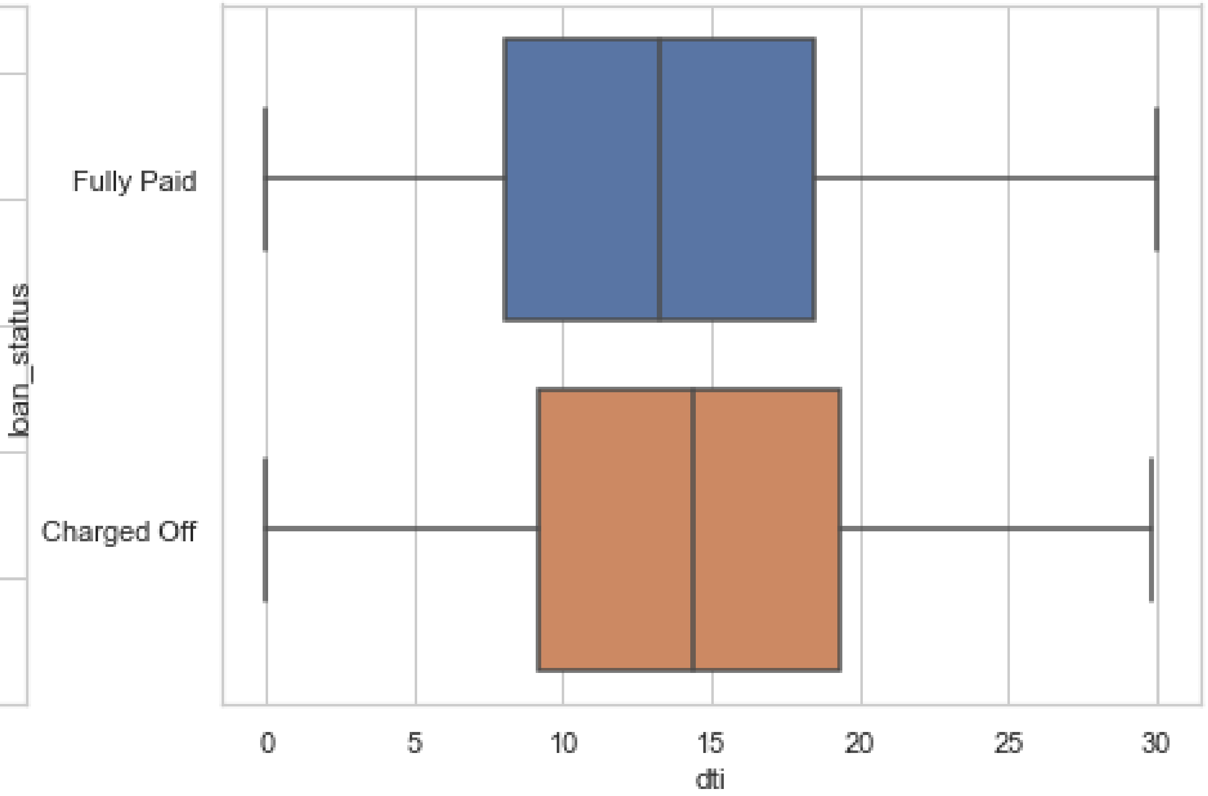




- Debt consolidation is a major reason why most people take loans for, followed by credit card payments and others
- Even though debt consolidation is a major purpose for loan, Loans taken for small business have a very high rate of default (27%)
- Lending club should do more verification before approving loans for small business

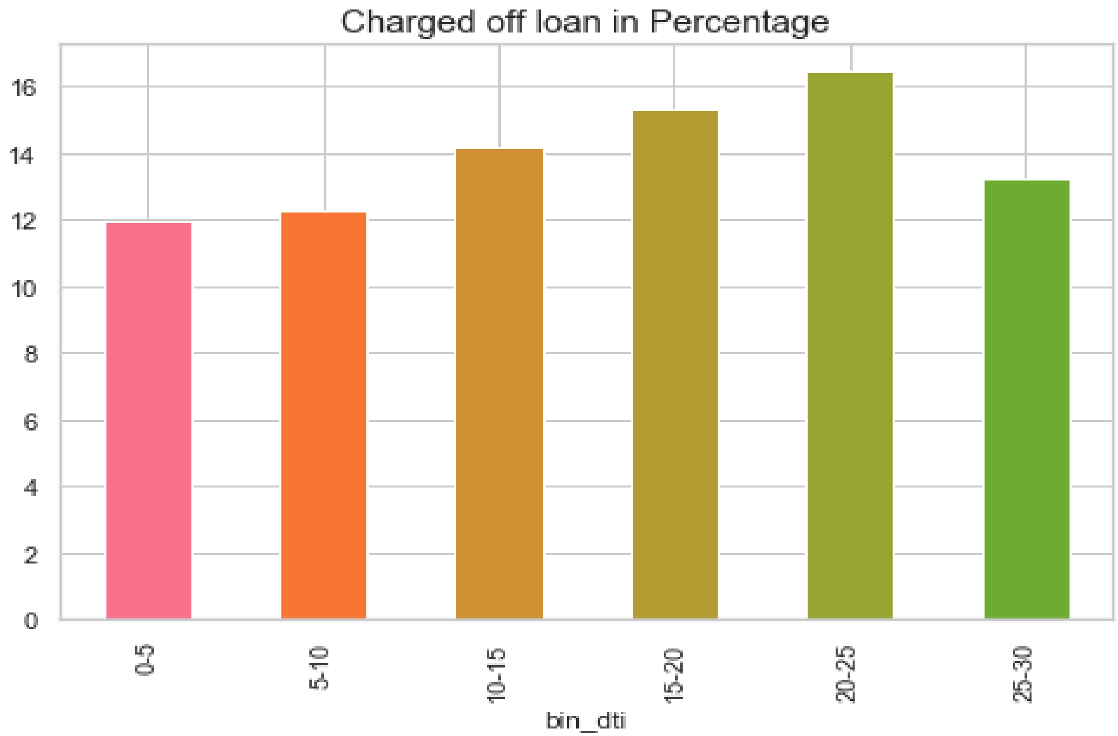
Analysis: Debt to Income Ratio





- Average debt to income ratio seen across dataset is around 15
- Although, for default loans, debt to income ratio is comparatively higher than fully paid loans

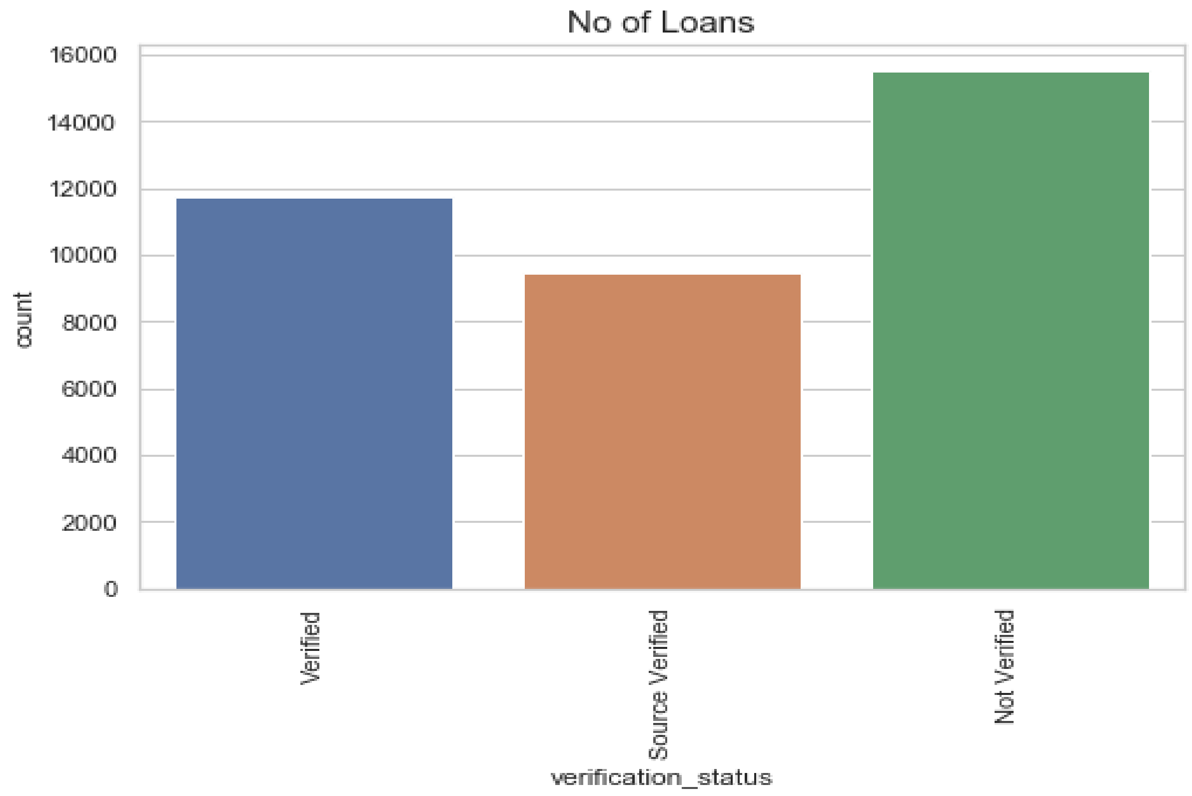
Analysis: Debt to Income Ratio

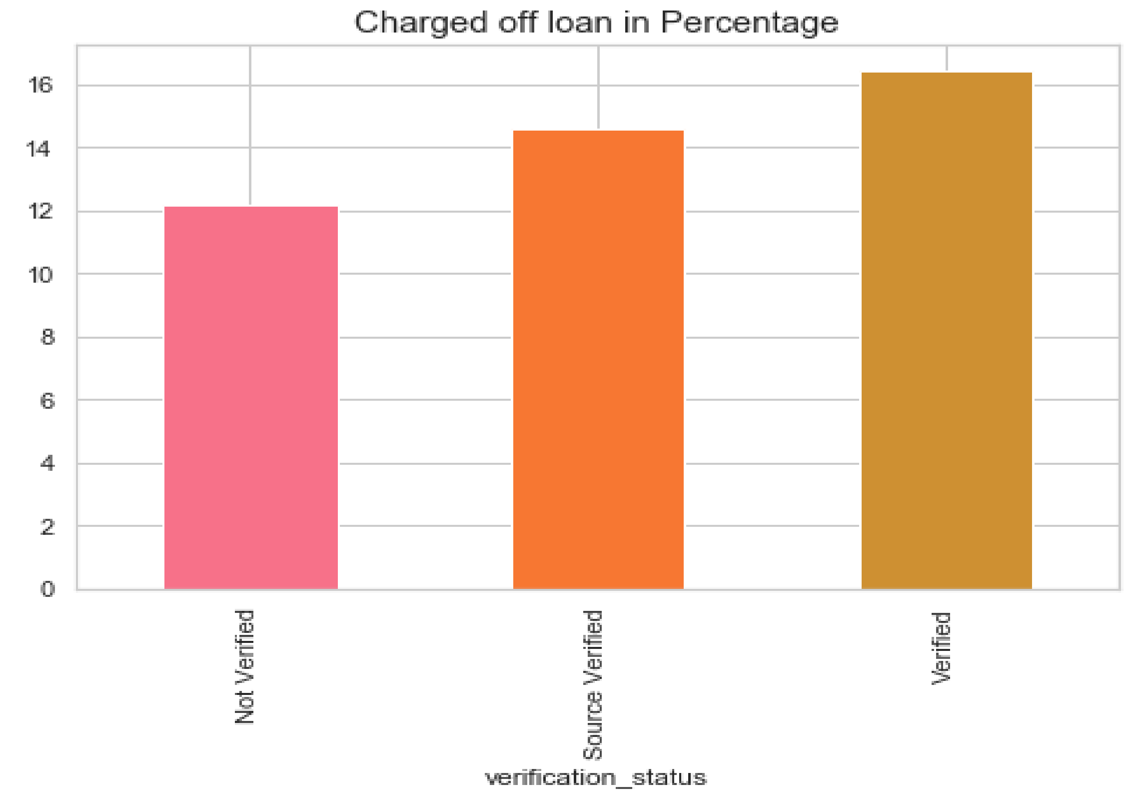


Loan Amount	Charged Off Percentage
0-5	12%
5-10	12%
10-15	14%
15-20	15%
20-25	16%
25-30	13%

- As dti ratio increases, default rate also increases
- Lending club should consider approving loans for applicants having more than 20 dti ratio

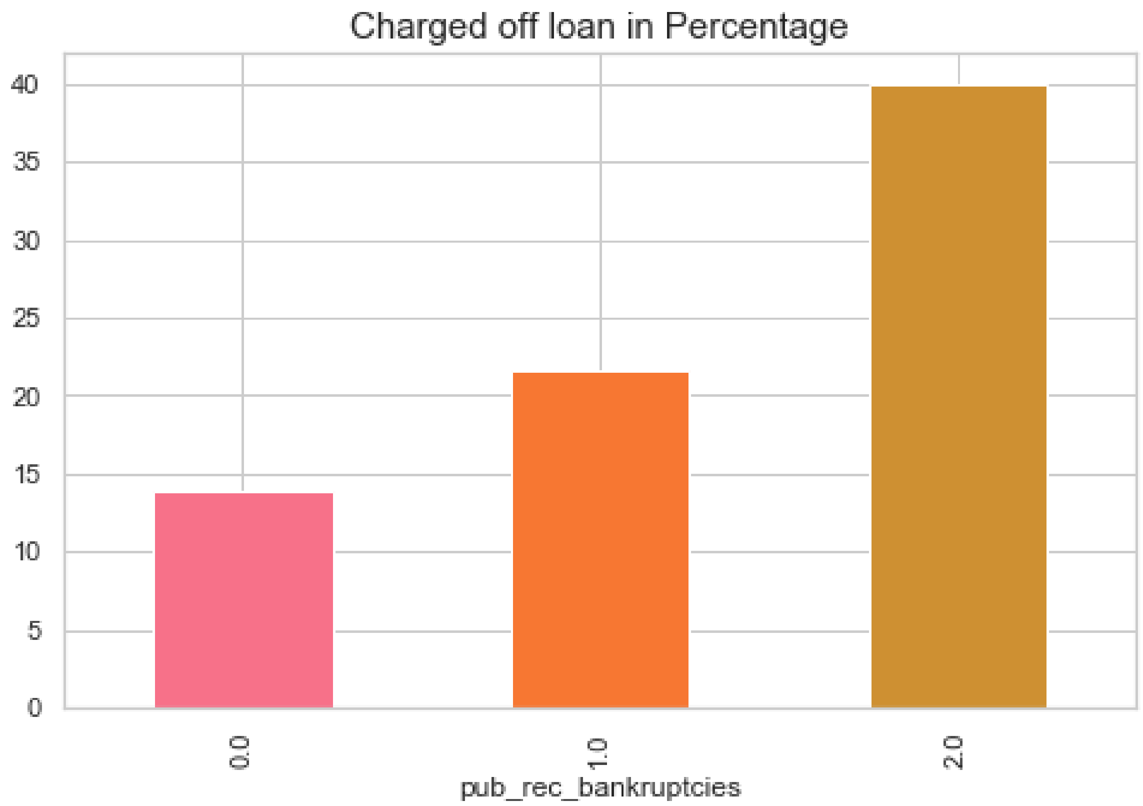
Analysis: Verification Status





- More number of loans are given to applicants without verifying their income source
- Also default rate is higher with applicants having verified income source than not verified income source
- Maybe Lending club needs to reframe their practices of verification

Analysis: Public Record Bankruptcies



- Applicants having more than 1 public record bankruptcies tend to default more
- There's only 60% chance of recovery on the loan given if applicant have 2 public record bankruptcies
- Lending club should not approve loans for applicant having more than 0 public record bankruptcies

Observations

- People having less annual income have higher rate of default.
- Lending club should not consider loans with interest rates more than 15% as no of defaulters increase significantly
- Lending club should not consider approving loans for applicant having DTI more than 20
- Loans with term of 60 months has higher chance of default (double than 36 months)
- Lending club should stop giving loans/do thorough verification before approving loans for small business because higher default rate is seen in loans taken for small business (27%)
- Lending club should not approve loans for applicant having even single record of bankruptcy