

Lending Club Case Study

Naman Kumar

Problem Statement

The Lending Club data given contains information about past loan applicants and whether they 'defaulted' or not. 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.

Variables Considered

- Loan Amount
- Loan Term
- Interest Tate
- Instalment Amount
- Employment Length
- Annual Income
- Home Ownership
- Income Verification Status
- Loan Purpose
- Debt to Income
- Earliest Credit Line
- Inquiries in the Last 6 Months
- Months Since Last Delinquency
- Total Principle Received

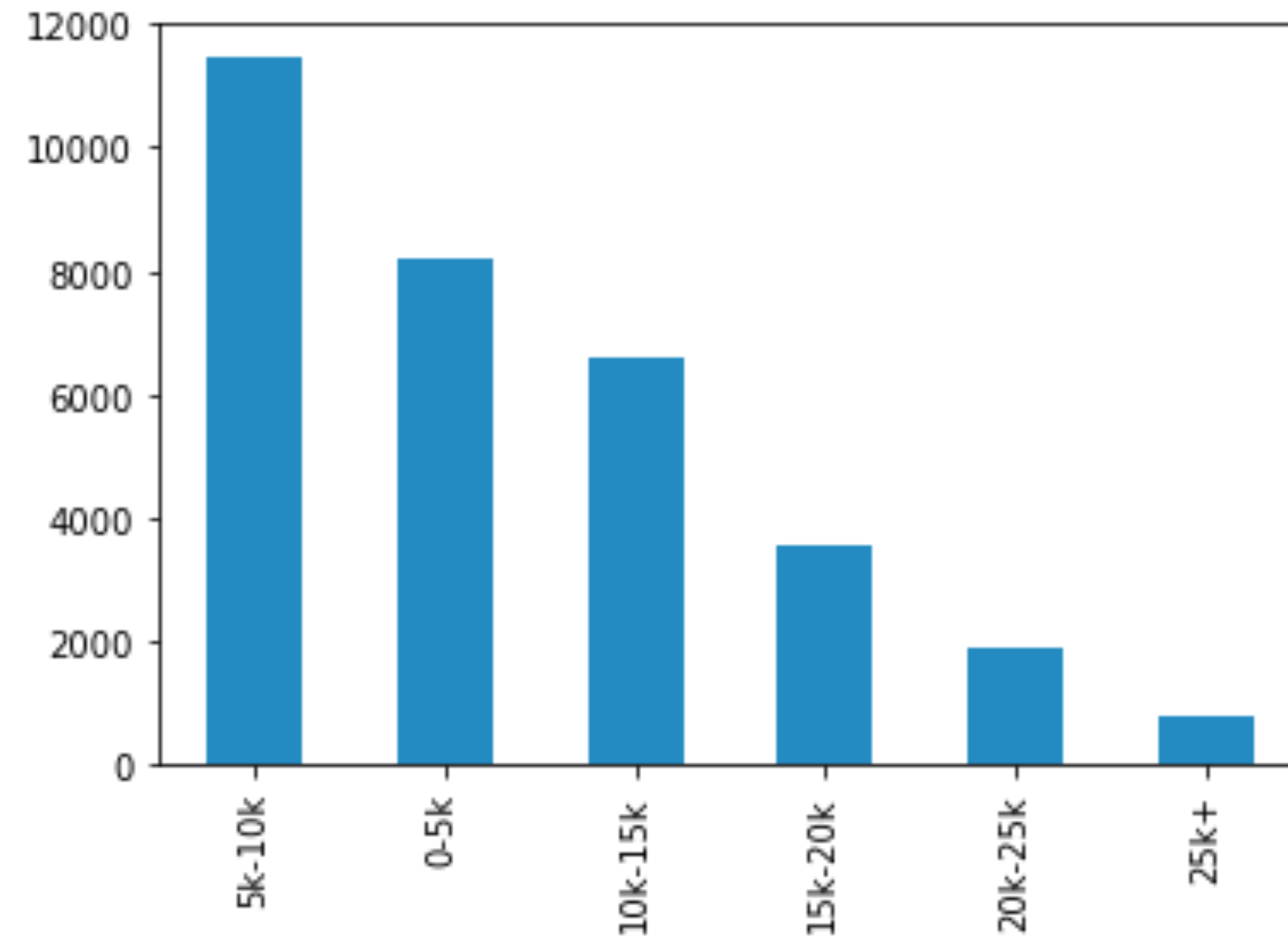
Assumptions

- Null values for the employment length variable are considered as 0 years of employment.
- 0 values of months since the last delinquency variable are considered as no delinquency history.
- Current running loans are not considered for analysis.

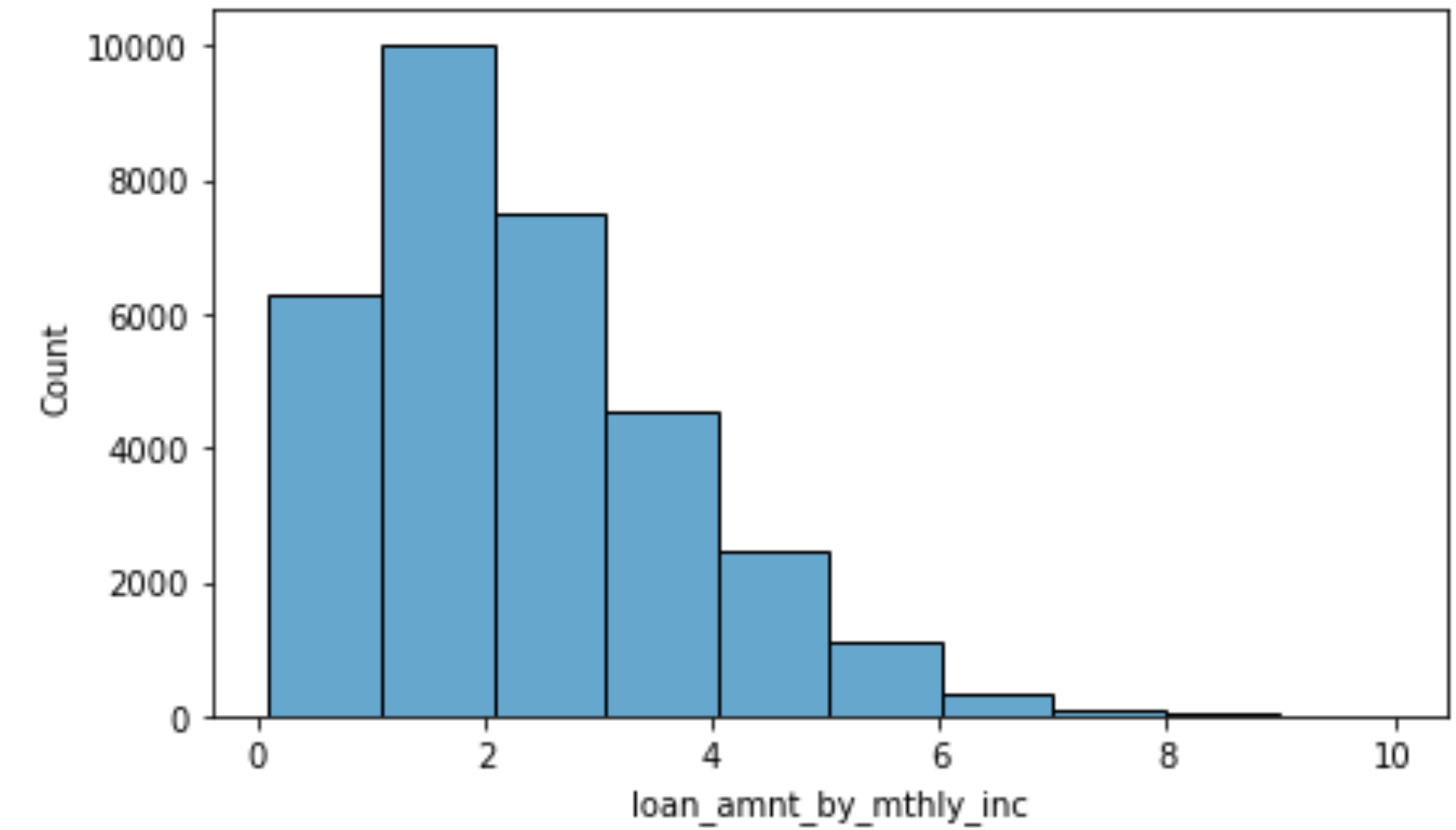
Loan Amount Analysis

- The higher the loan amount, the higher the charged-off loan percentage. Up to 27% for 25k+ loans.
- 75% of applications apply for loans amounting to < 15K
- Most of the borrowers take loans up to 1-3 months of their income. Loans amounting to > 6 months of borrower's income have a much higher charged-off loan percentage i.e. 32%.
- Most defaulters do not pay 50-85% of the loan principle amount.
- Strongly co-related with annual income. higher amounts are funded to people with higher annual income.

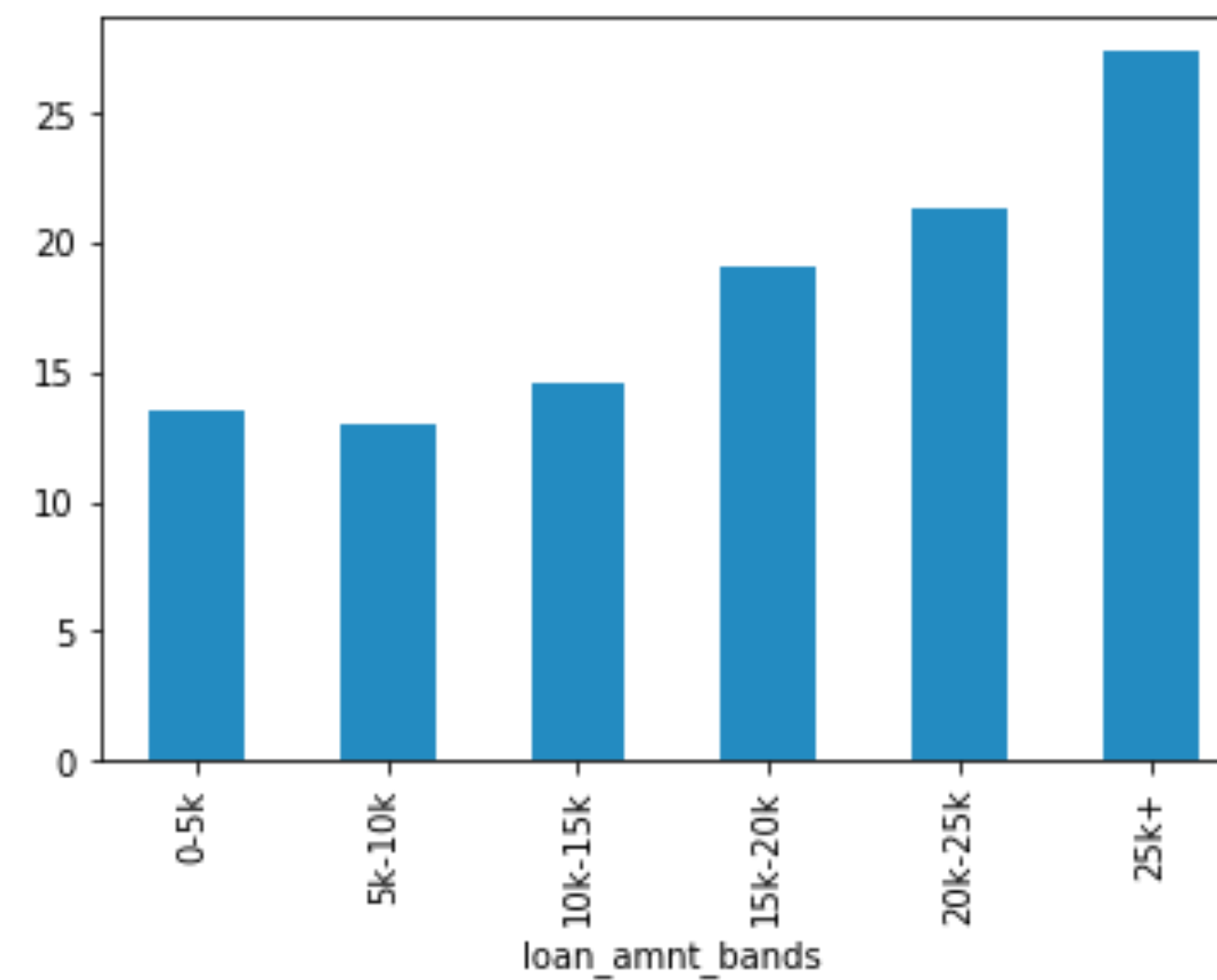
Loan Amount Frequency Bands



Loan Amount as Times of Monthly Income Bands



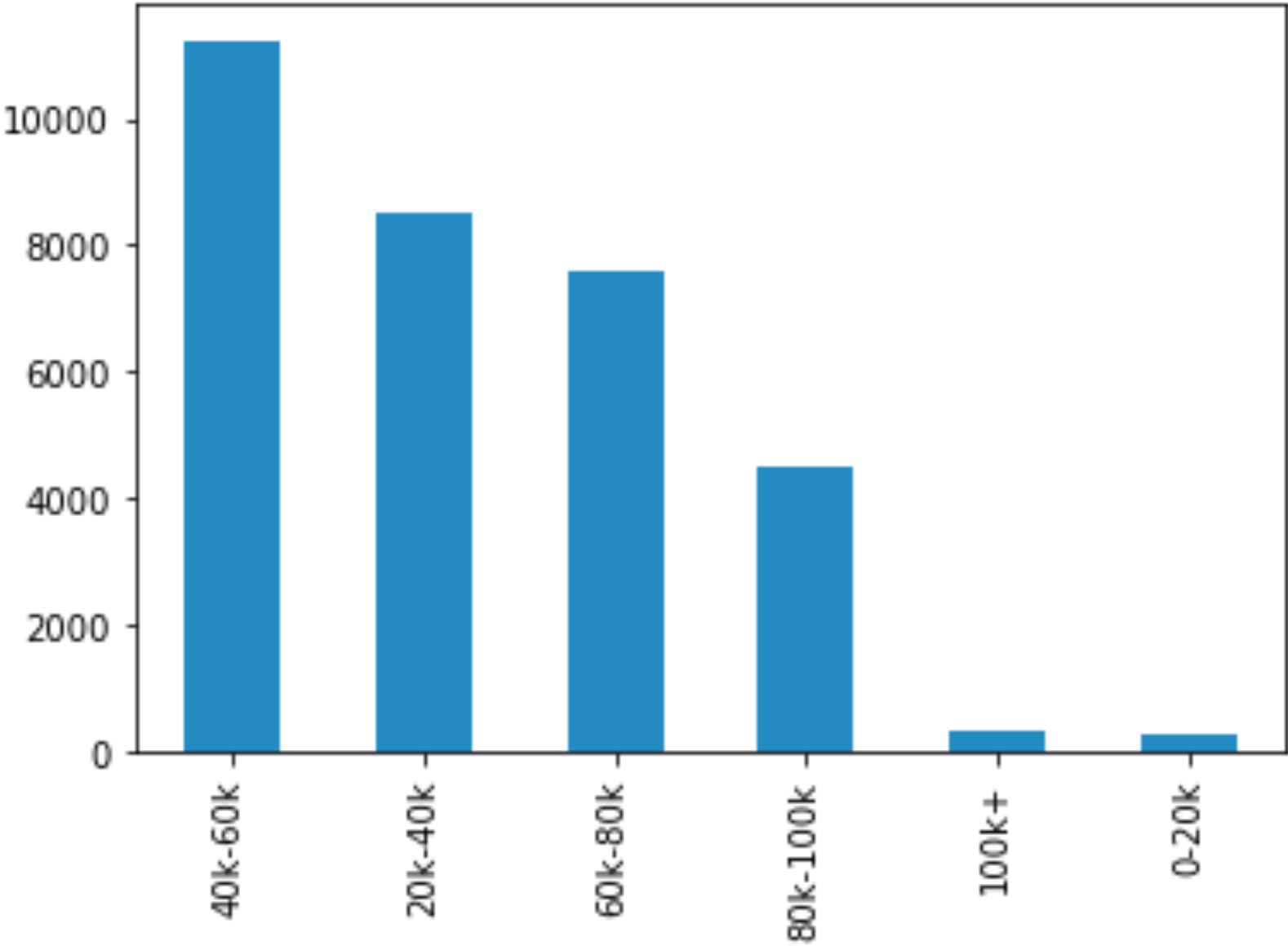
Loan Amount VS Defaulter Percentage



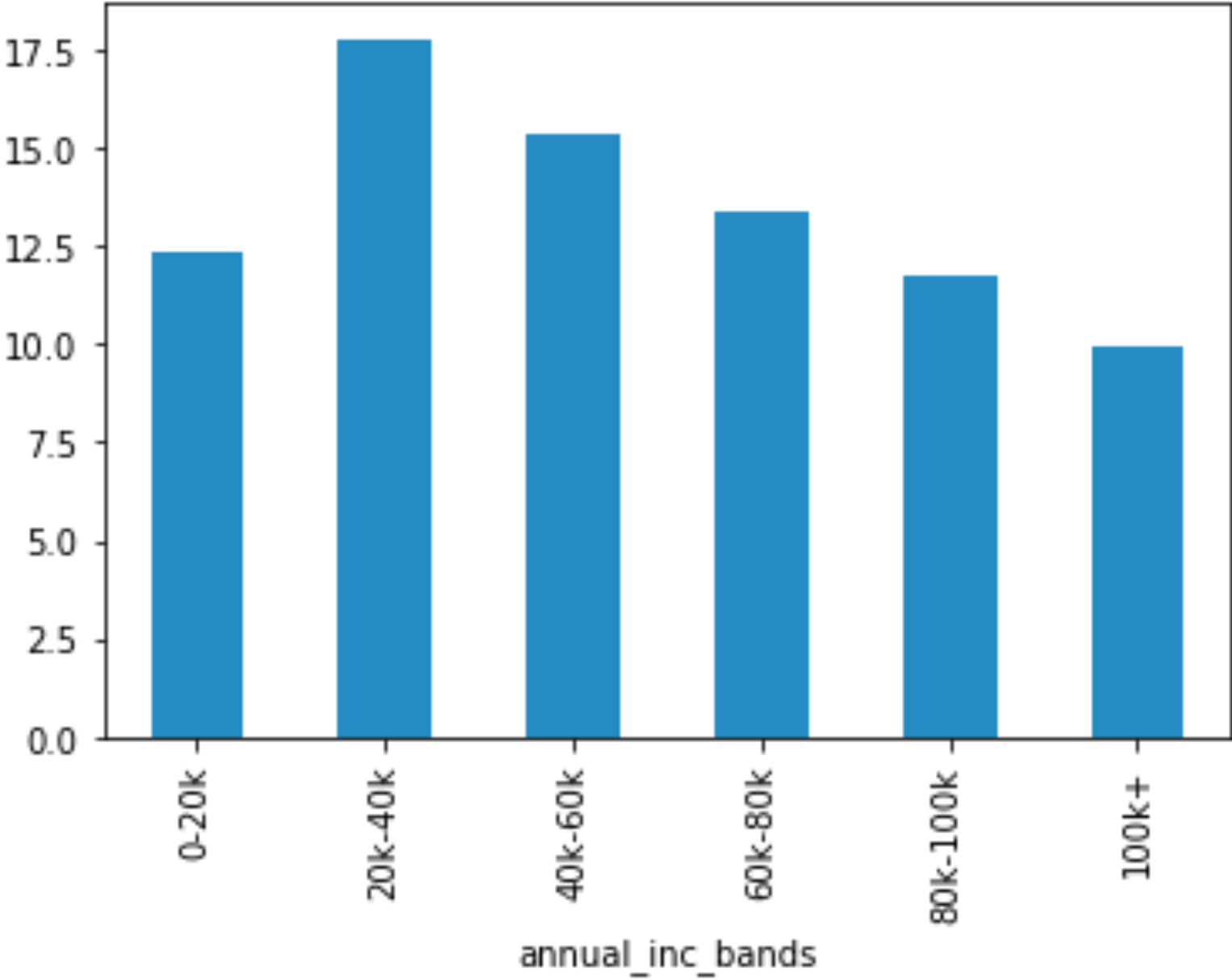
Annual Income Analysis

- Annual income in the range of 20K-40K has the most charged off loans percentage i.e. 17.75%.
- Most borrowers have income in the range of 40K-70K.
- It slightly co-relates with the employment length.
- A higher loan amount at a lower annual income has a higher charged-off loan percentage.

Annual Income Frequency Bands



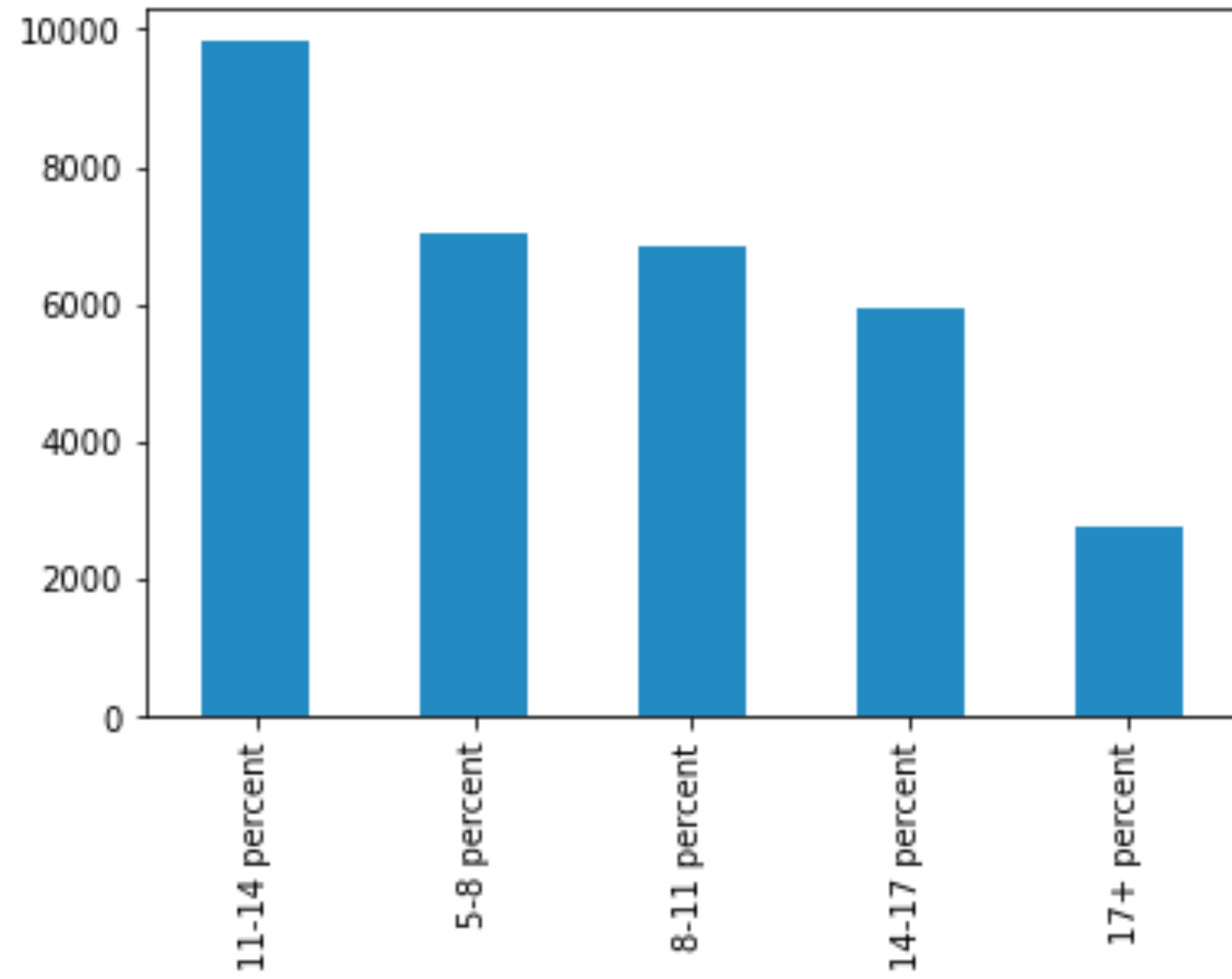
Annual Income VS Defaulter Percentage



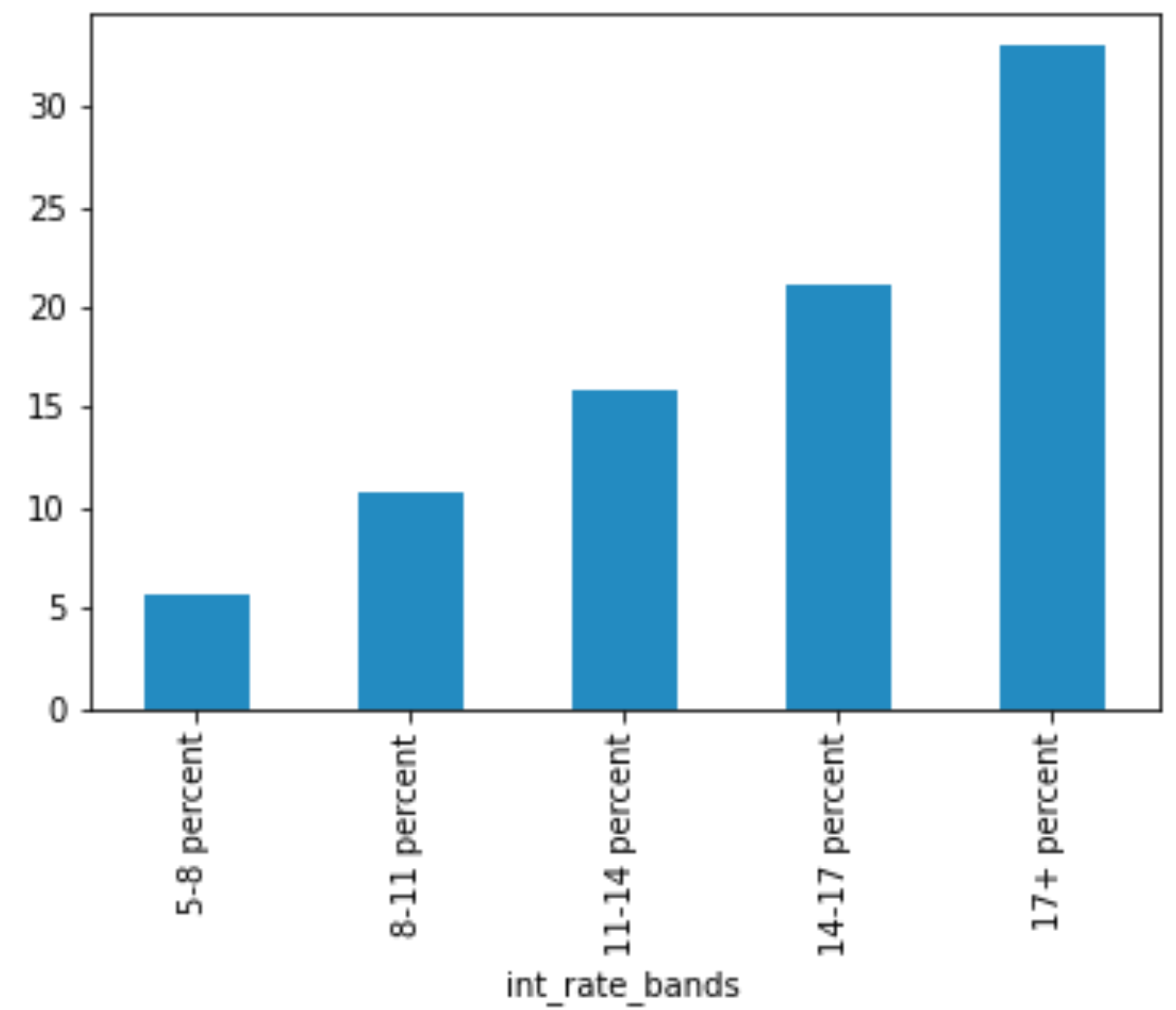
Interest Rate Analysis

- Charged-off loan percentage increases rapidly with an increase in interest rates. Loans with 17%+ interest rates have a 33% defaulter rate.
- Charged-off loan percentage at higher interest rates is high irrespective of all other factors.
- Most of the loans are funded at the interest rate of 8-14%, while the interest rate goes as high as 24%.
- Higher amount loans have higher interest rates.
- Educational, House, Car, Debt Consolidation, and Moving loans are highly risky when the interest rates are $> 17\%$.

Interest Rate Frequency Bands



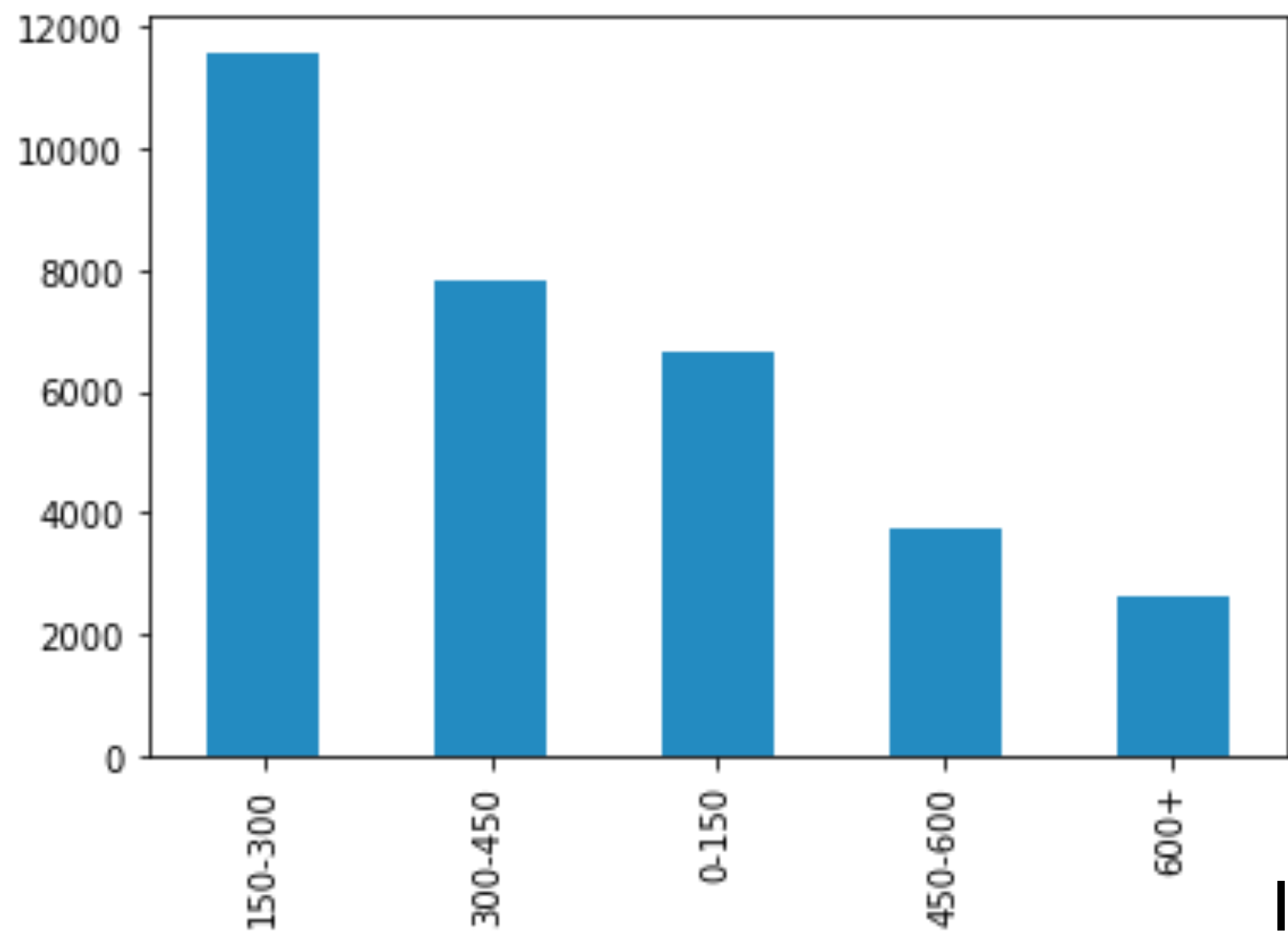
Interest Rate Defaulter Percentage



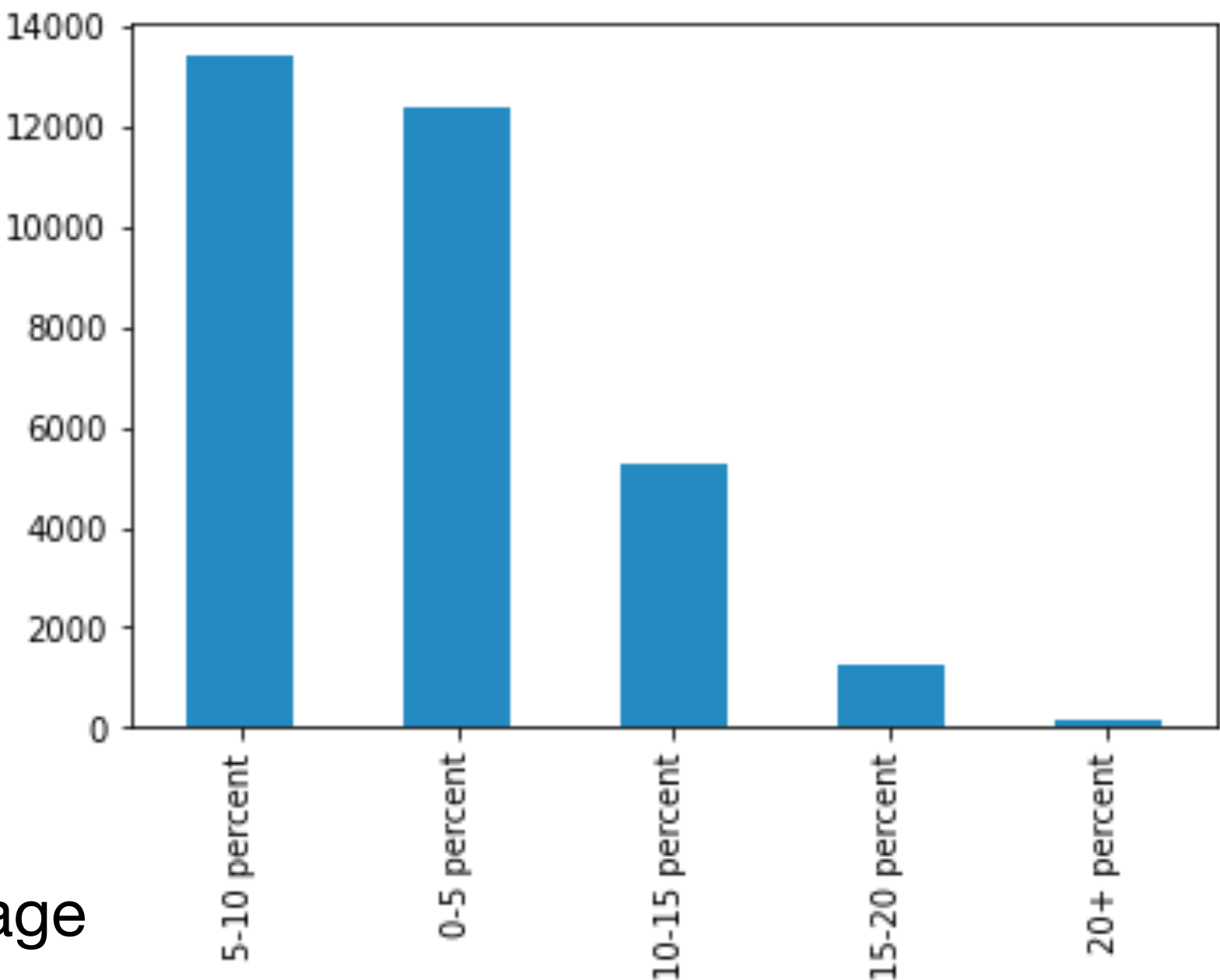
Instalment Amount Analysis

- For most people instalment amount is < 300 .
- Most people pay 4-9 per cent of their monthly income as instalments.
- Loans with monthly instalment amounts > 600 are at a higher risk of delinquency with the charged-off loan percentage being 18.88%.
- The charged-off loan percentage increases linearly with an increase in the monthly instalment amount.
- Borrowers paying 15-20 per cent of their monthly income as instalments are more likely to not be able to repay their loans with charged off loan percentage being 21.69%.

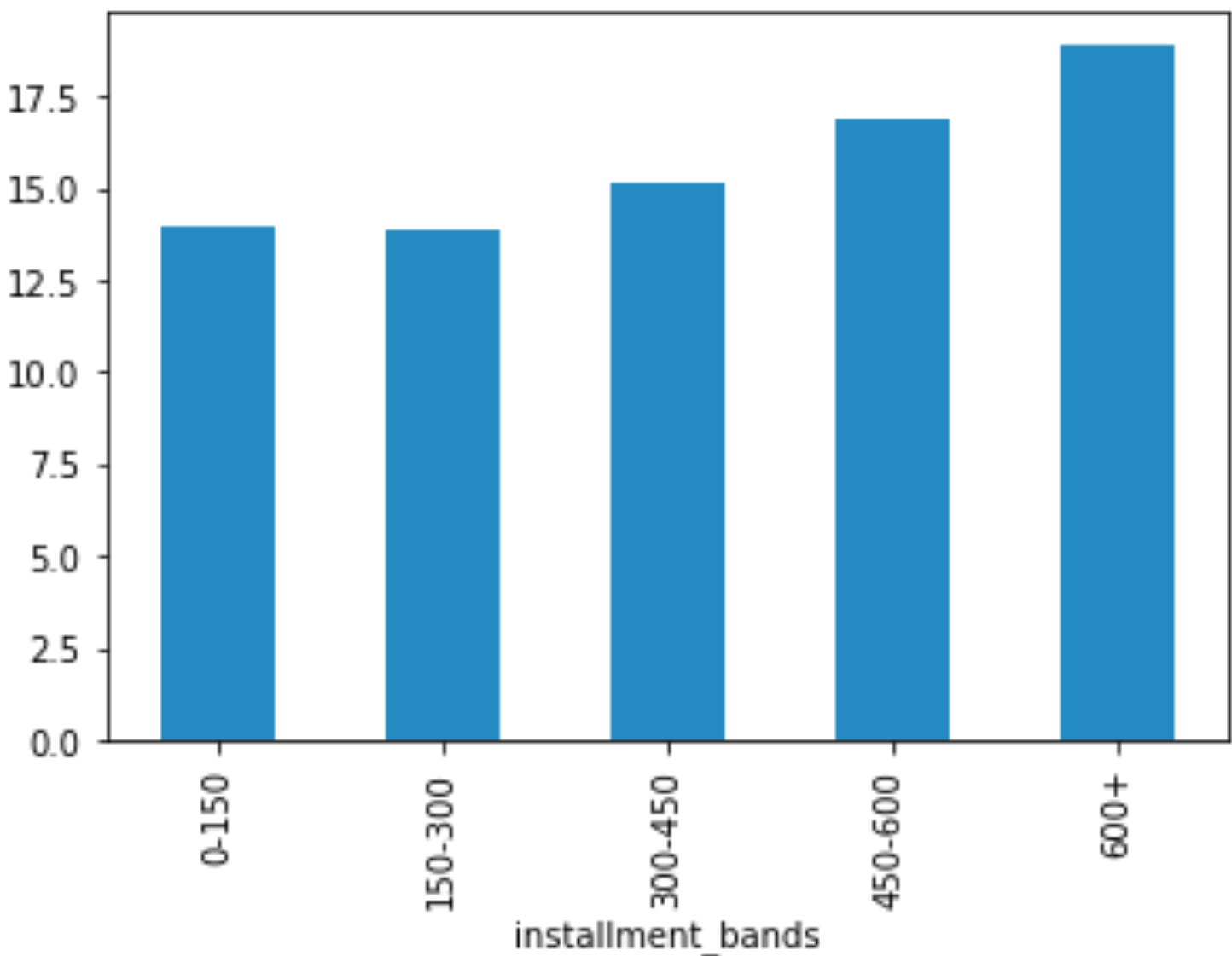
Instalment Amount Frequency Bands



Instalment Amount as Percentage of Monthly Income



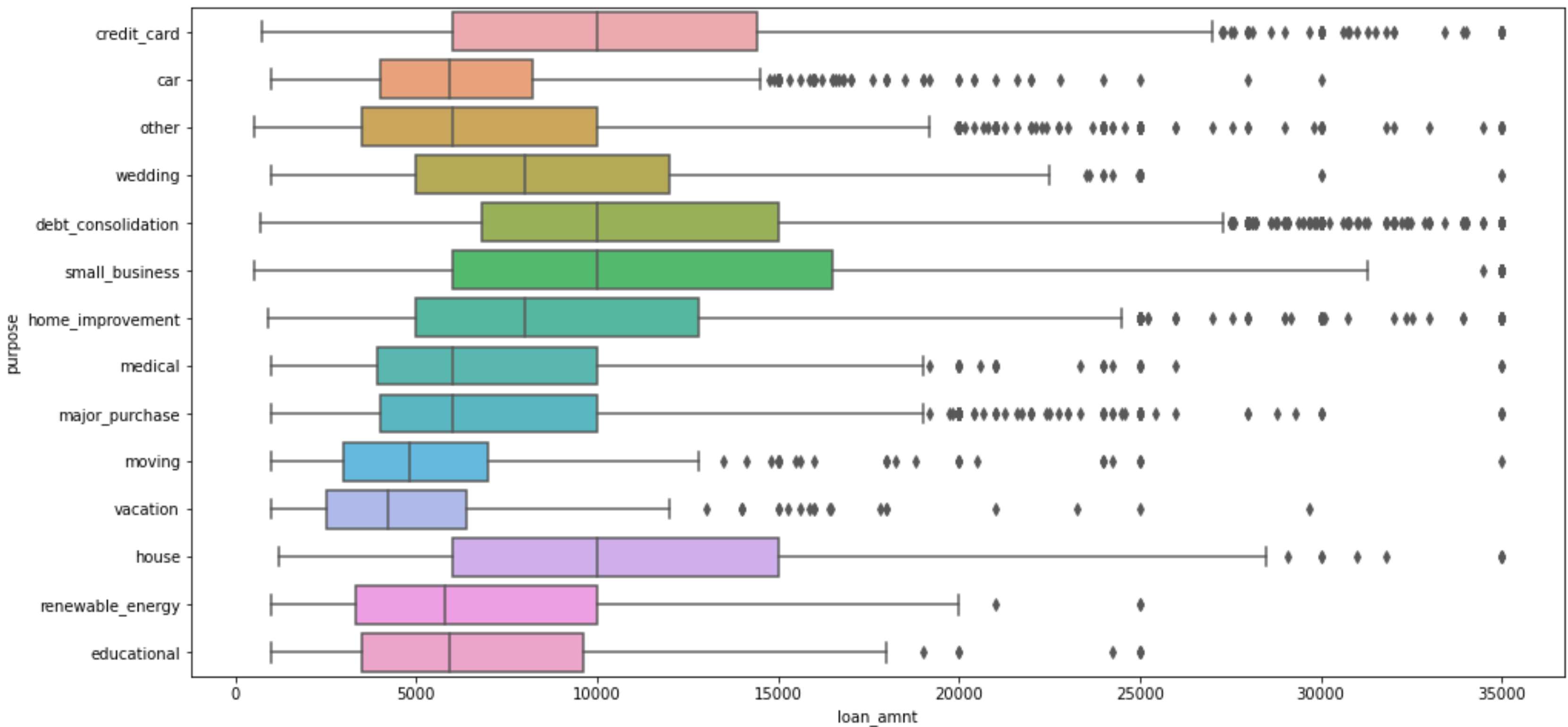
Instalment Amount VS Defaulter Percentage



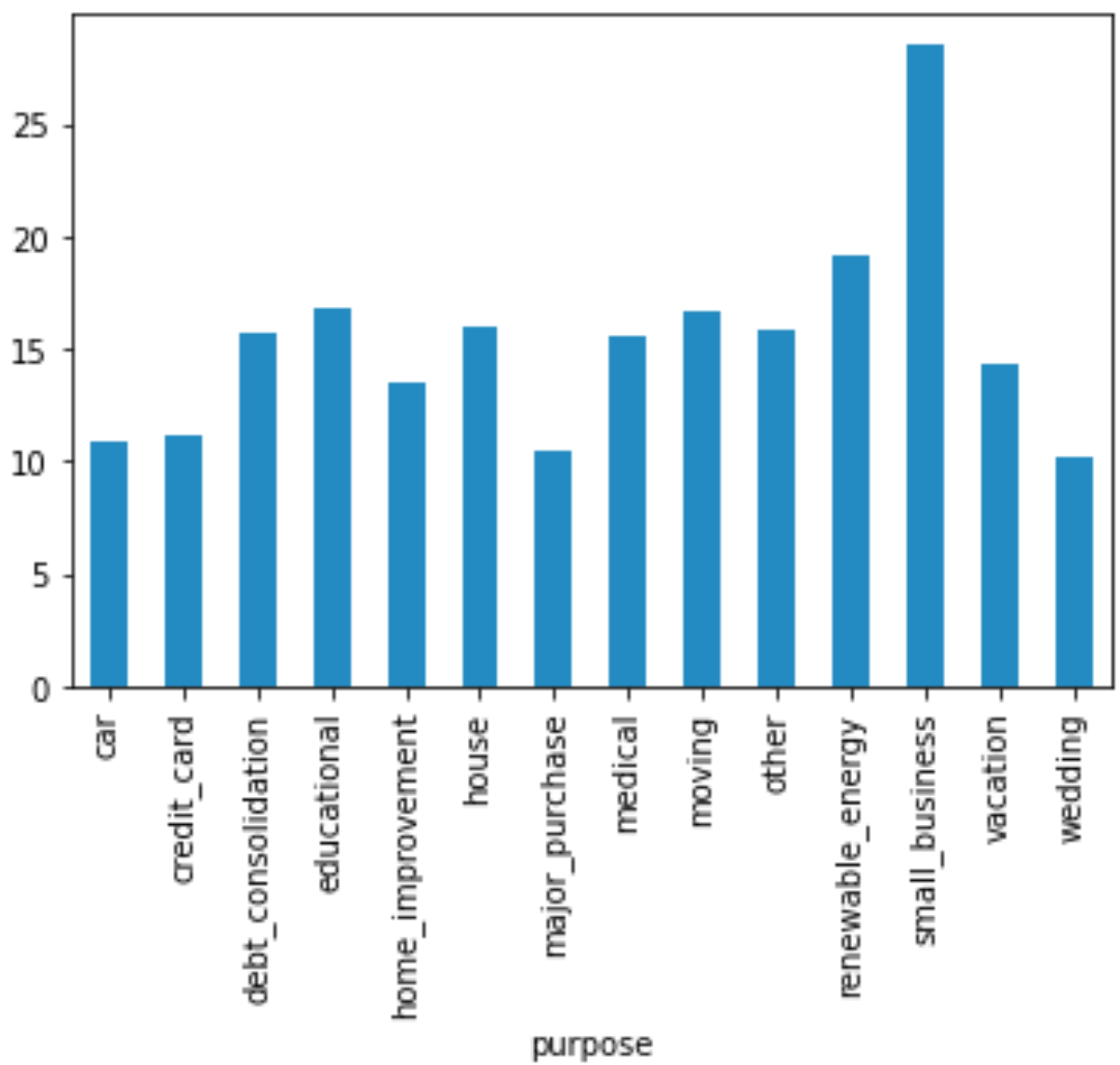
Loan Purpose Analysis

- Small business loans have the higher defaulter rate i.e. 28.5% irrespective of all other factors.
- For defaulted loans, house, small business and wedding loans have a higher percentage of the principal amount not paid back.
- Medical and educational loans are risky when the borrowers are already paying 20-30 per cent of monthly income on debt obligations other than the LC loan.
- The most popular purpose for loans is debt consolidation followed by credit cards. While small business, house, and debt consolidation loans have the highest average loan amount overall.

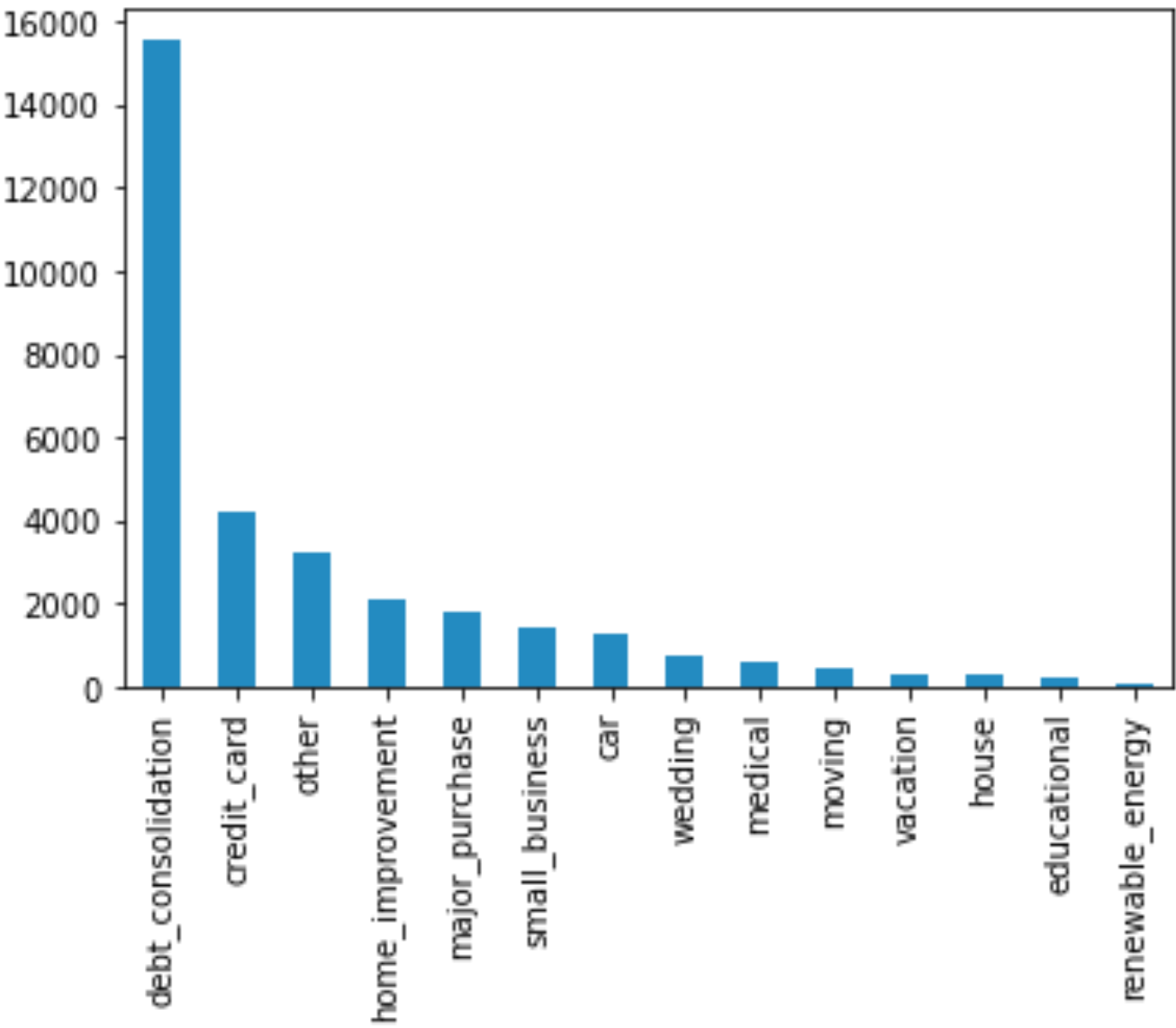
Loan Purpose VS Loan Amount



Loan Purpose vs Defaulter Percentage



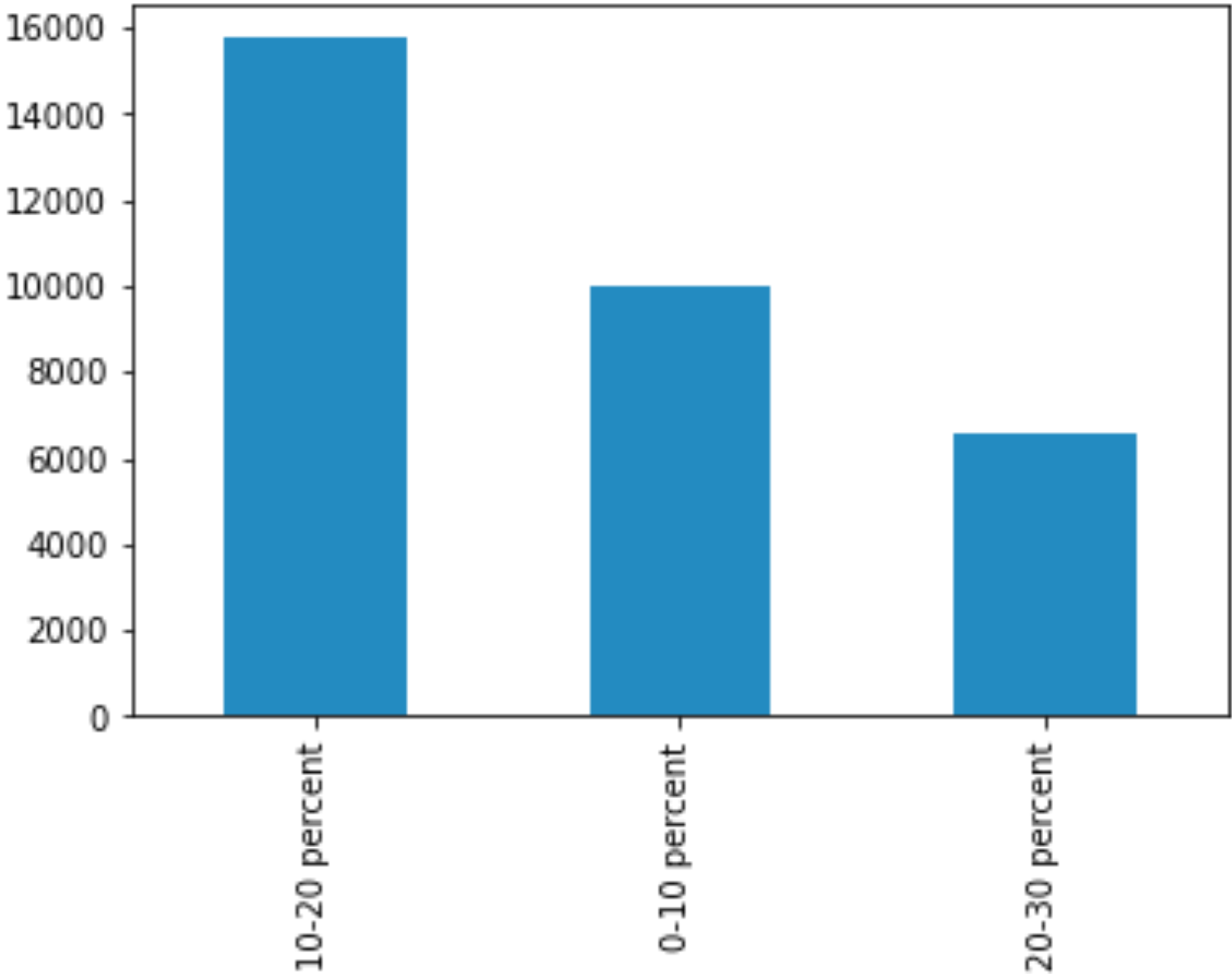
Loan Purpose Frequency



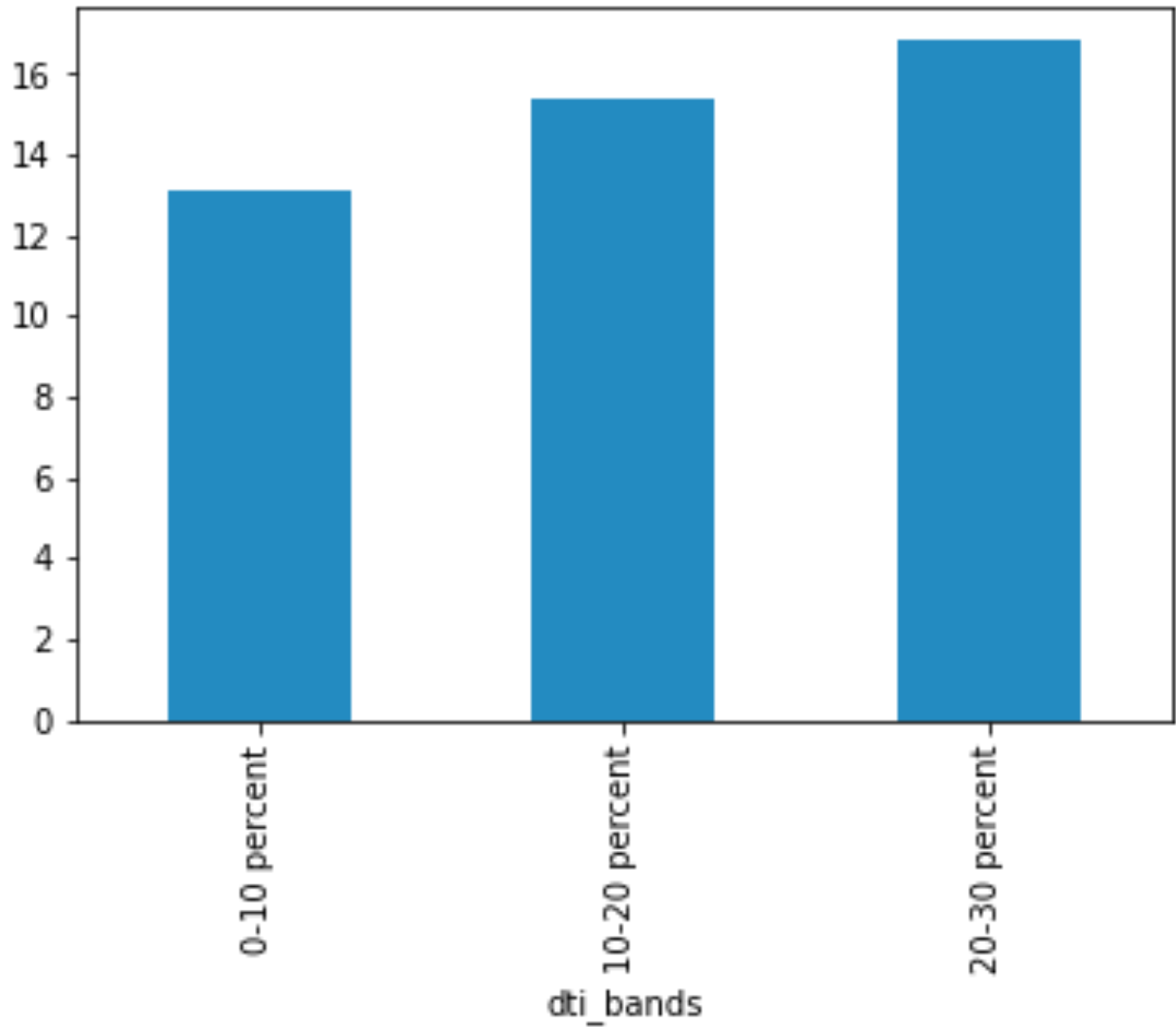
Debt to Income Analysis

- Most borrowers spend 8-18% of their monthly income on debt obligations other than the LC loan.
- Borrowers have already paid 20-30 per cent of their monthly income as other debt obligations are slightly at more risk of default.
- The charged-off loan percentage increases slightly with an increase in debt to income.
- People with higher debt to income take loans of a slightly higher amount.
- People who spend 30-40 per cent of their monthly income on debt obligations including LC loans are at high risk of delinquency.
- The higher loan amount at the higher debt-to-income ratio has the higher charged-off loan percentage.

Debt to Income Frequency Bands



Debt to Income VS Defaulter Percentage

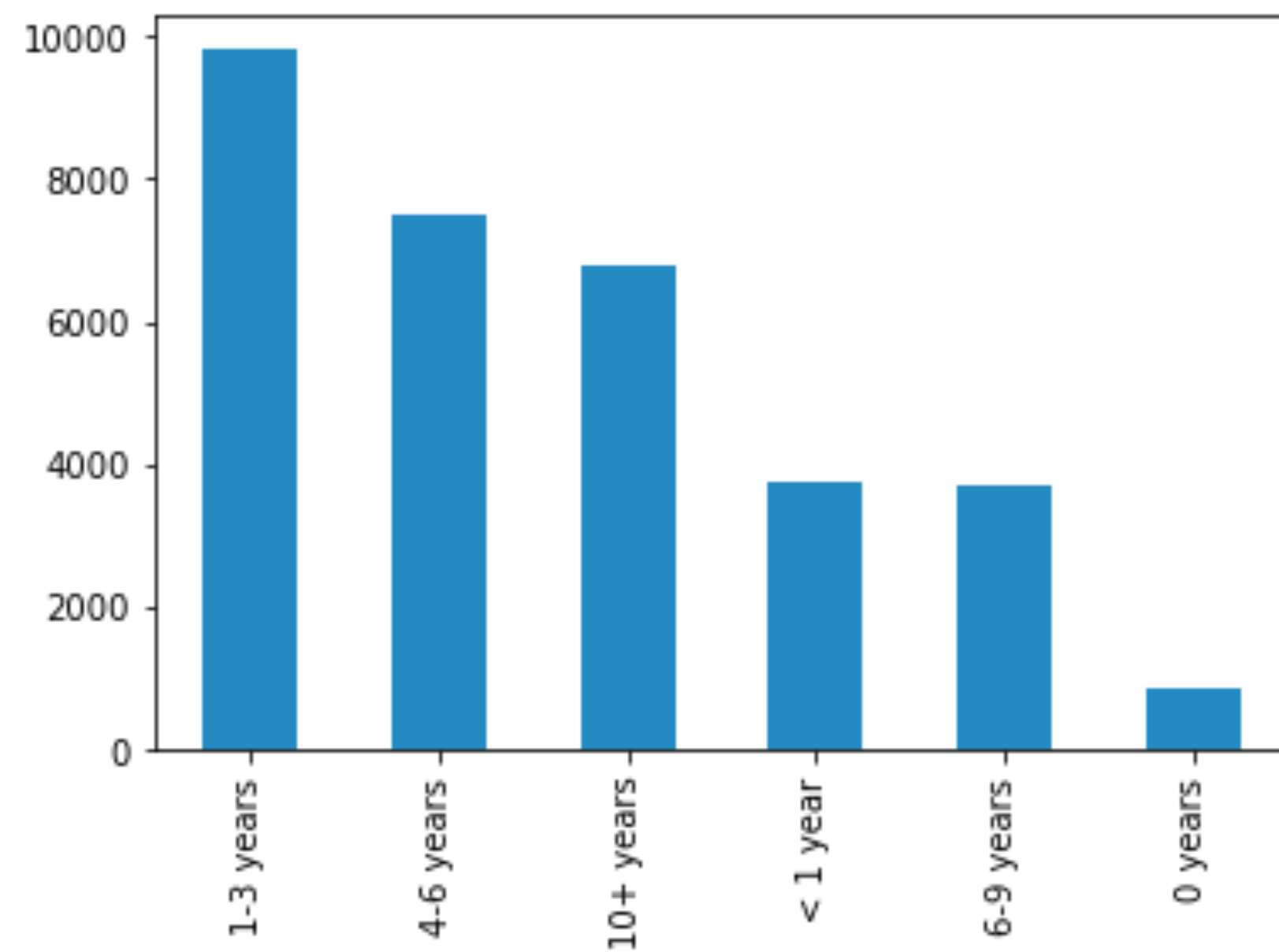


Employment Length Analysis

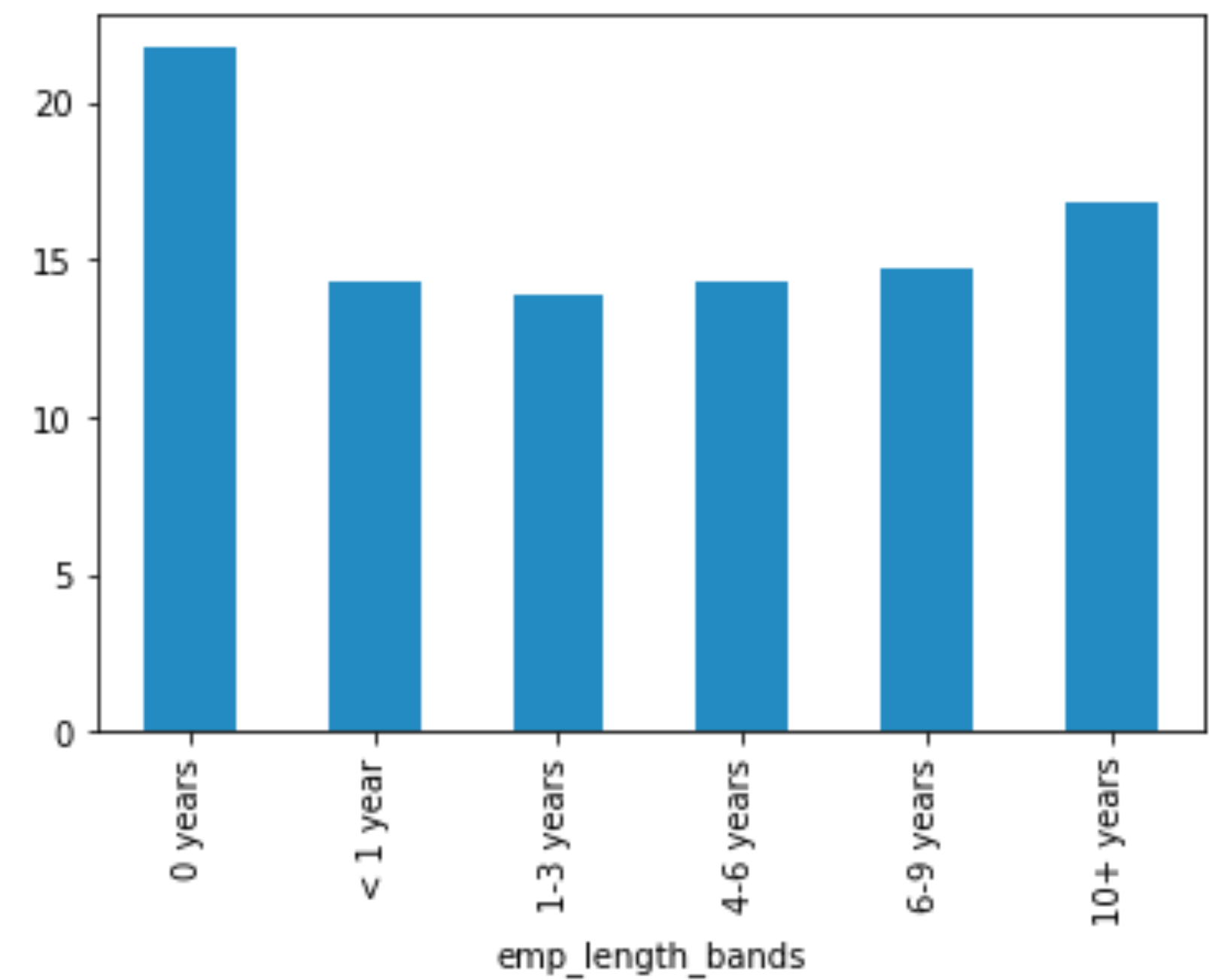
Assuming null records have 0 years of employment length

- Most borrowers have 1-3 years of employment length.
- Employment length slightly co-relates with annual income.
- People with 0 years of employment have the highest charged off loan rate i.e. 21.77%.
- Borrowers having no employment length record are known to be highly risky even when it can be seen that they are provided small amount loans at lower interest rates than others.
- Educational, credit card, wedding and debt_consolidation loans for borrowers having no or <1 year employment length record are highly risky.

Employment Length Frequency Bands



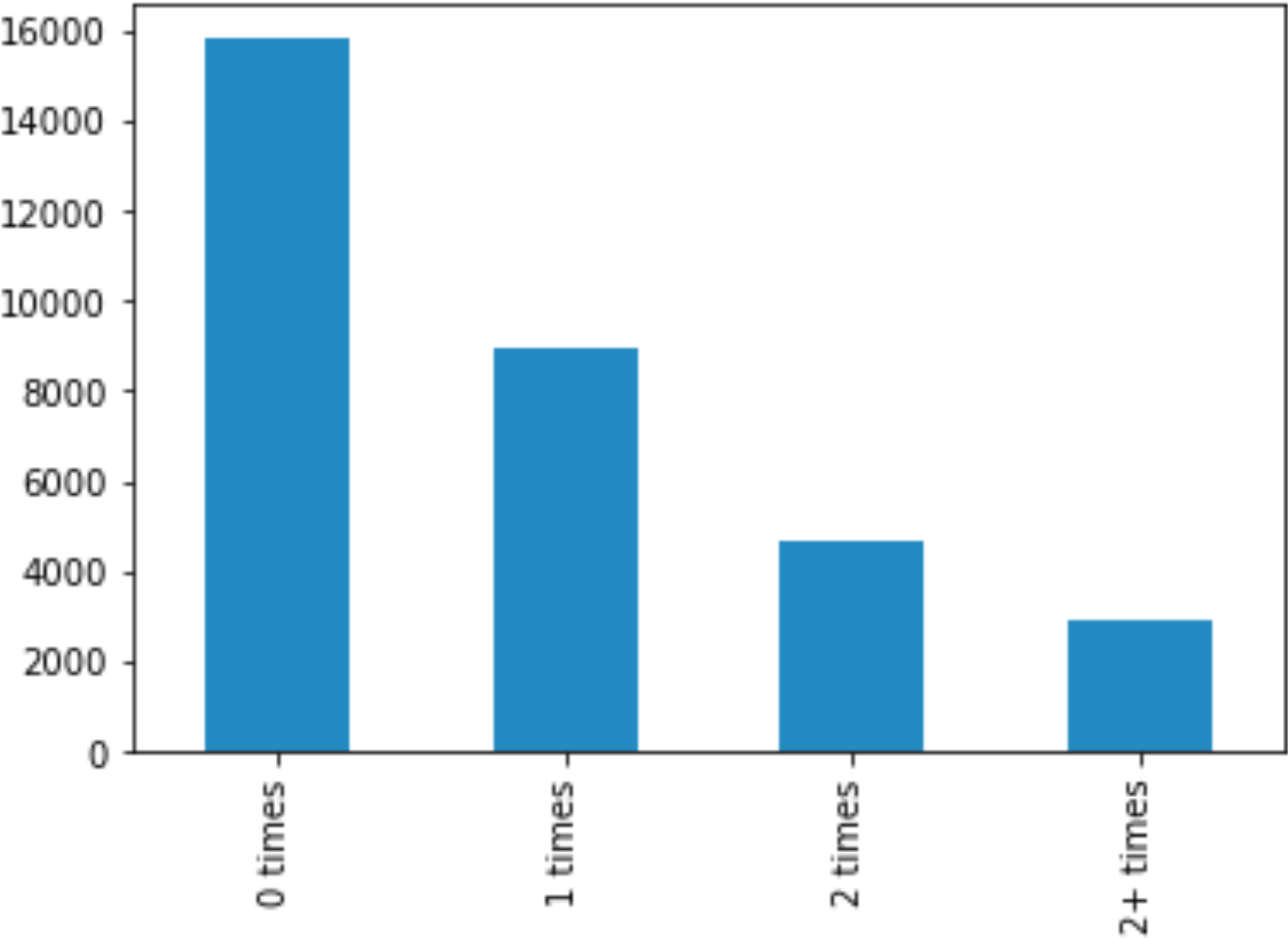
Employment Length VS Defaulter Percentage



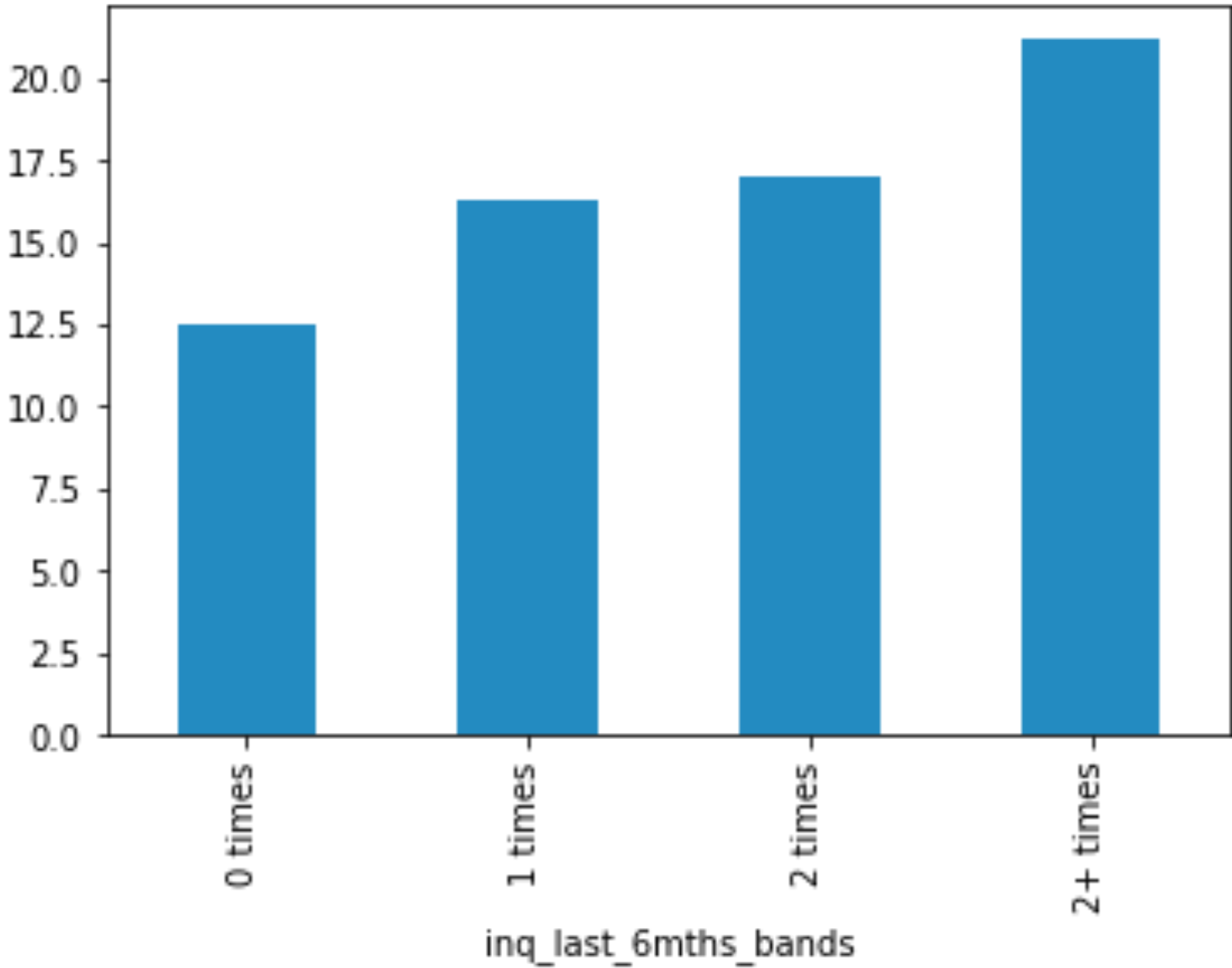
Inquiries in Last 6 Months Analysis

- Most people do 1 or fewer inquiries.
- People who do more than 2 inquiries have a much higher defaulter rate at 21%.

Inquiries in Last 6 Months Frequency Bands



Inquiries in Last 6 Months VS Defaulter Percentage



Recommendations

- Loan amounts greater than 6 months of borrower's income when their monthly income is more than 20K are highly risky. It is recommended not to provide such loans at all as the defaulter rate for such loans is up to 36%.
- - Small Business loans funded at an interest rate of more than 8% are highly risky. The ones given at 5-8% interest rate have a healthy defaulter rate. It is recommended to give business loans at lower rates so that borrowers can focus and grow their business and have the ability to repay the loans.
- - Educational loans where the total amount is more than 3 months of the borrower's monthly income are highly risky with a defaulter rate of 20%. It is recommended to fund smaller amounts of loans for education purposes.
- - Borrowers who have made 2+ times inquiries in the past for loans amounting to more than 20K are at high risk of not repaying the loan. It is recommended to give lower amounts of loans to such people.
- - When the debt to income for the borrowers is already 20-30 per cent, the loans amounting to 3+ months of borrowers' monthly income are highly risky as the defaulter rate goes up to 33.73%. It is recommended to only give small amounts of loans to such people.
- - Medical and educational loans are risky when the borrowers are already paying 20-30 per cent of monthly income on debt obligations other than the LC loan. It is recommended to give small loans in such cases.