Lending Case Study

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PROBLEM STATEMENT

The aim of this case study is to find Credit worthiness trends based on the past approved loans' payment data

We have the dataset of all approved loans and those customers' transaction, demographics, employment, etc.

Based on that data, we have to determine, what is the trend when a customer defaults(charged-off), such that Lending Club can decide whether to approve/ reject loans to future customers.

PLAN

Data Cleansing and Transformation

- Remove unwanted columns
- Remove Outliers
- Remove/replace Null/ NaN values
- Data type change (type casting)
- Derived metrics

Univariate Analysis

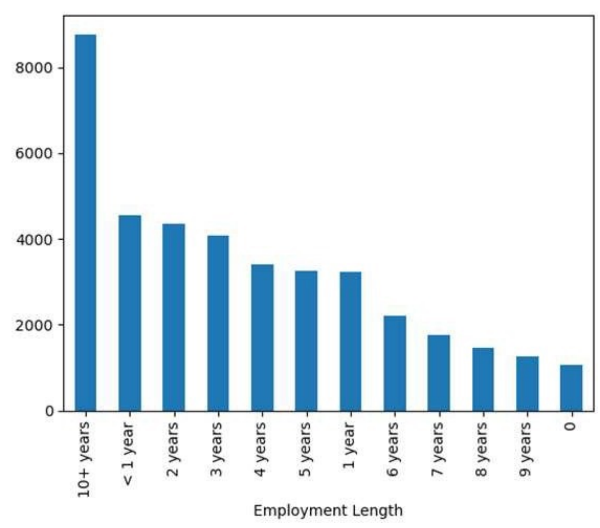
Bivariate Analysis

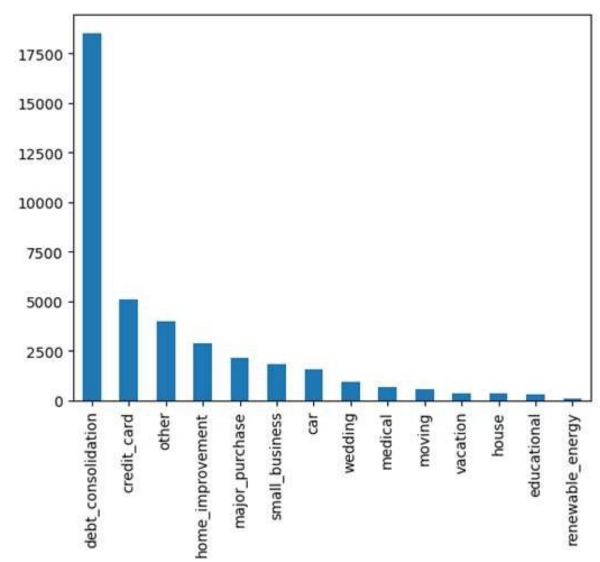
Multivariate Analysis

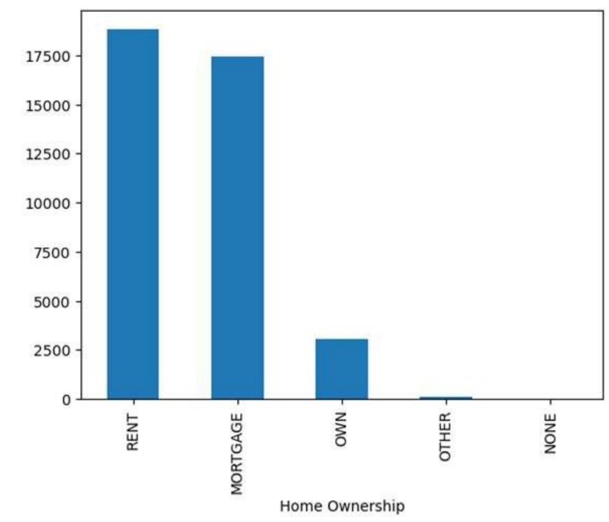
Conclusion

DATA CLEANSING

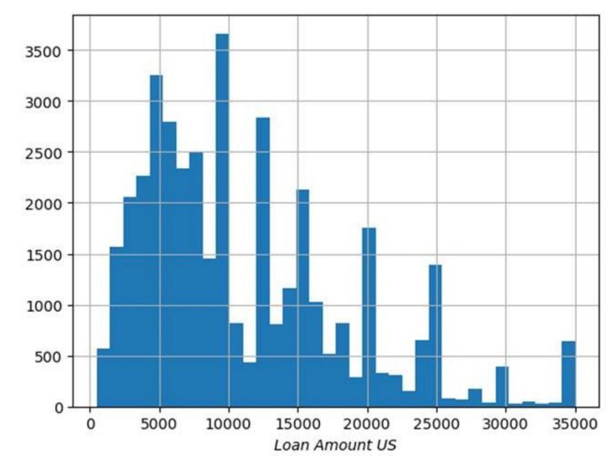
- Only kept columns that are to be used for Analysis- as the number of columns to be kept was small, so built a new data frame with selected columns
- Removed columns with high percentage of null values
- Replaced Null values
- Removed outliers
- Changed data type of fields like term, interest rate, etc
- As we are interested in who is most likely to default, introduced a new column named default(Derived Metrics)- that would store value Defaulted for Charged off loans. All others are not defaulted
- Also, new columns added that show % of total monthly income going into loan installment. Also, loan amount as % of annual income
- Also, categorized above 2 into buckets as 2 new columns for ease of plotting.

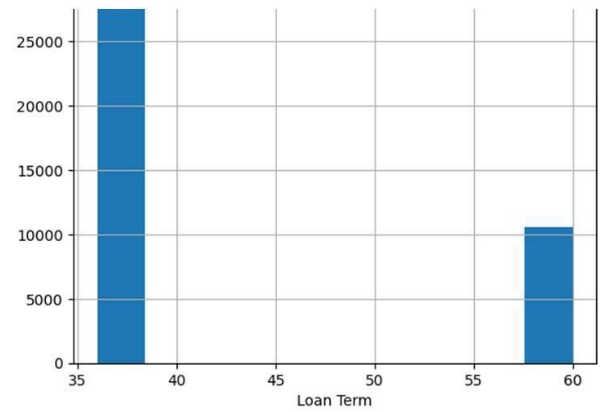


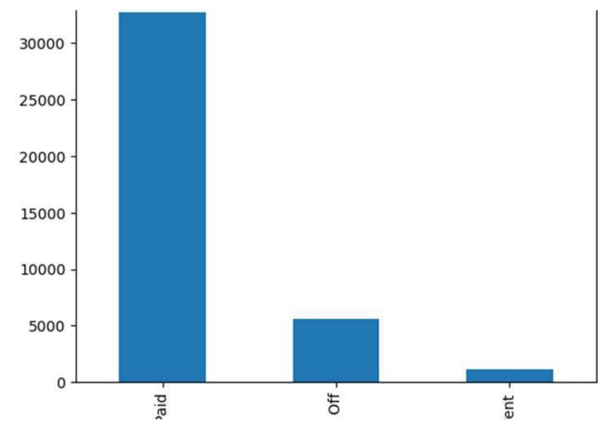


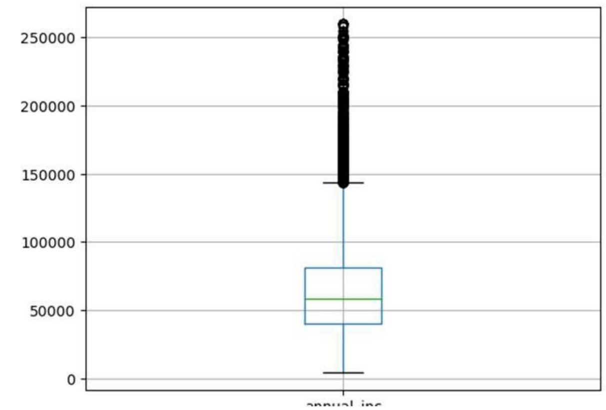


UNIVARIATE ANALYSIS

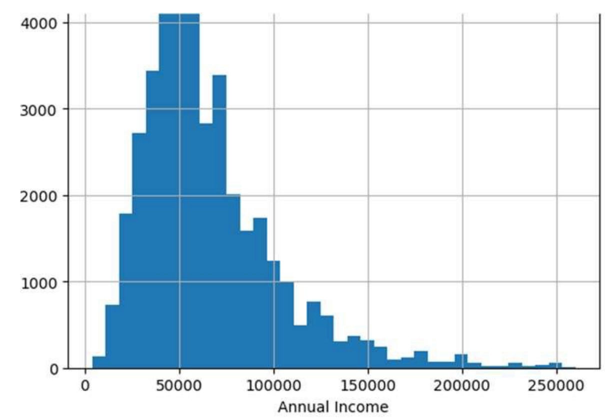








UNIVARIATE ANALYSIS



UNIVARIATE ANALYSIS- OBSERVATIONS

People who have been working for more than 10 years are applying for loans more than those who have worked for fewer years.

If you've been employed for 1 to 9 years, the fewer years you've worked, the less likely you are to apply for a loan.

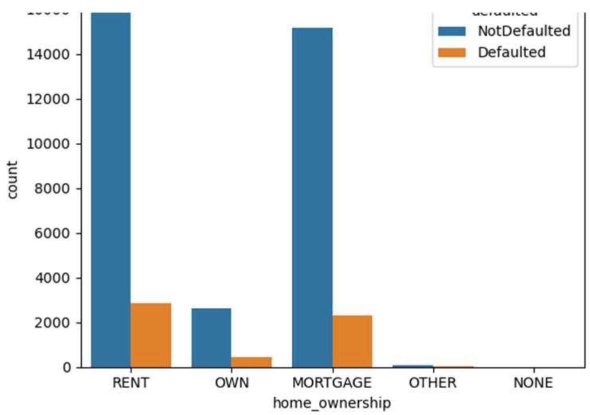
Homeowners are applying for loans less often than renters or people with mortgages.

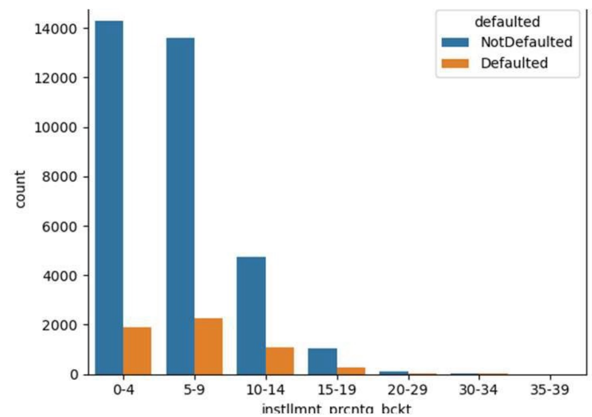
Most people applying for loans want to use the money to combine or pay off other debts.

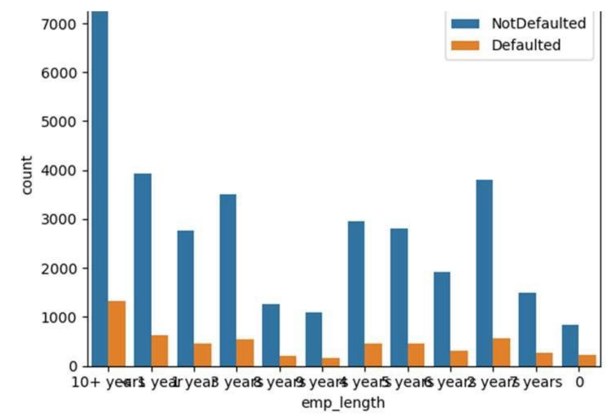
Most people who apply for loans are able to pay them back.

About half of the people applying for loans make between 40,000 and 80,000 each year.

About half of the loan applicants are asking for loan amounts between 5,500 and 15,000.







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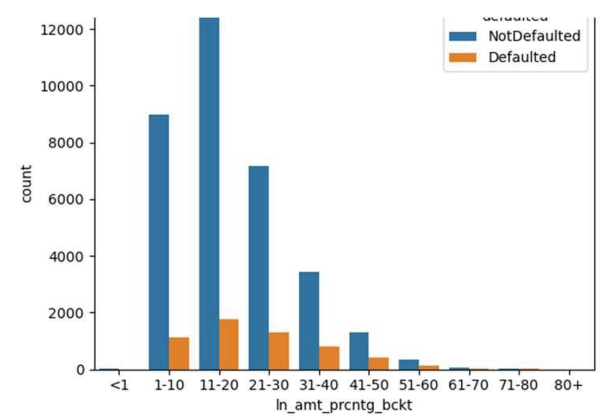
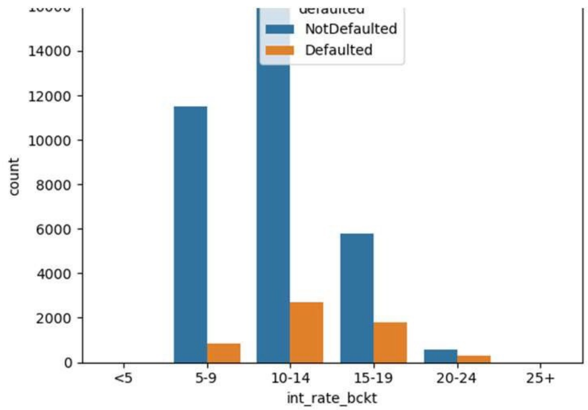
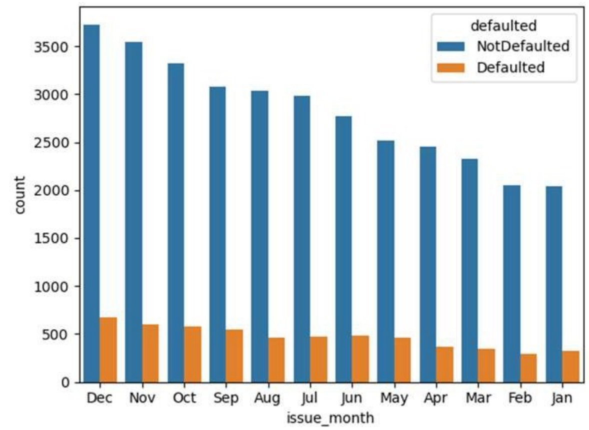
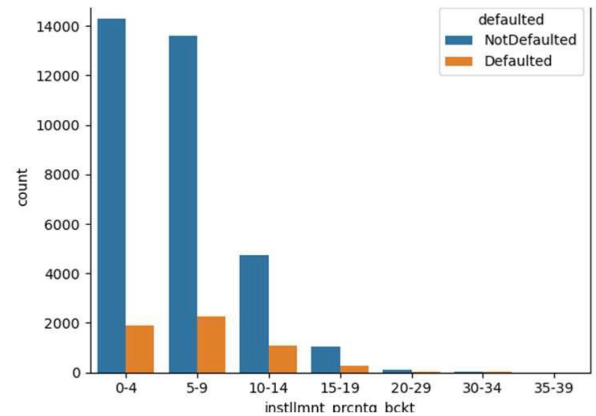
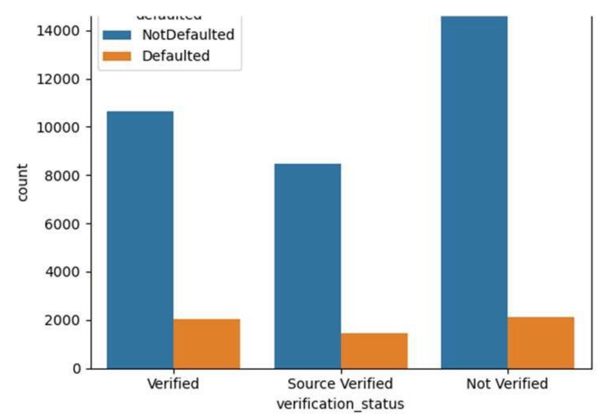








BIVARIATE ANALYSIS



Loan applicants who do not own a house(either rent or mortgage) are more likely to default.

Loan applicant’s whose loan amount is between 10 to 15 % of their annual income are most likely to default

Loan applicant’s with more than 10 years of experience are more likely to default

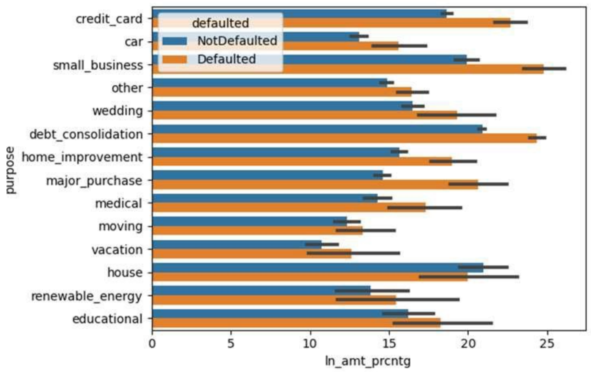
Loan applicants, who pay 5 to 10% of their monthly income as installment are most likely to default

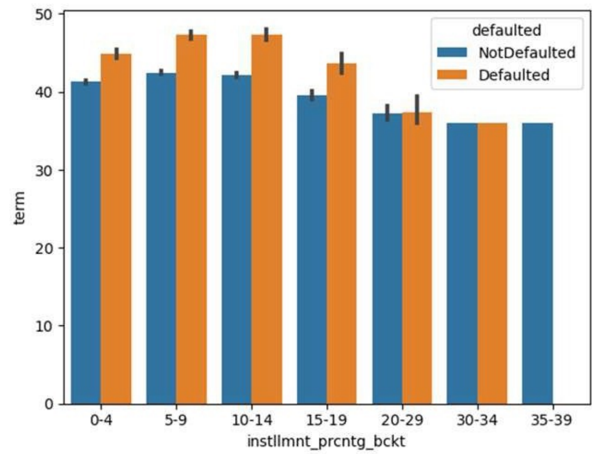
Higher interest rate tend to increase the default rate

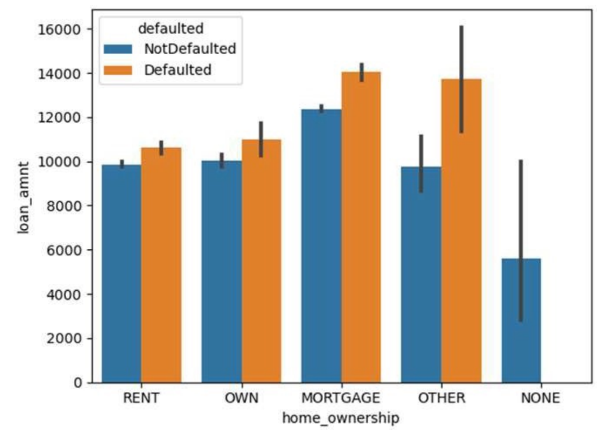
Non verified employment status tend to default

Loan taken toward end of year tend to default

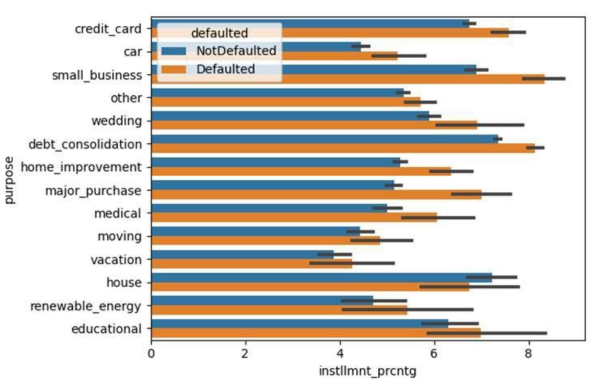
BIVARIATE ANALYSIS OBSERVATIONS

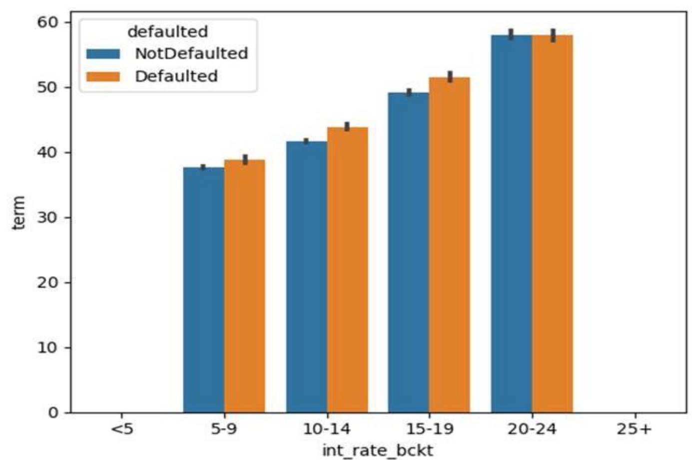






MULTIVARIATE ANALYSIS

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Defaulted
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10-14
15-19
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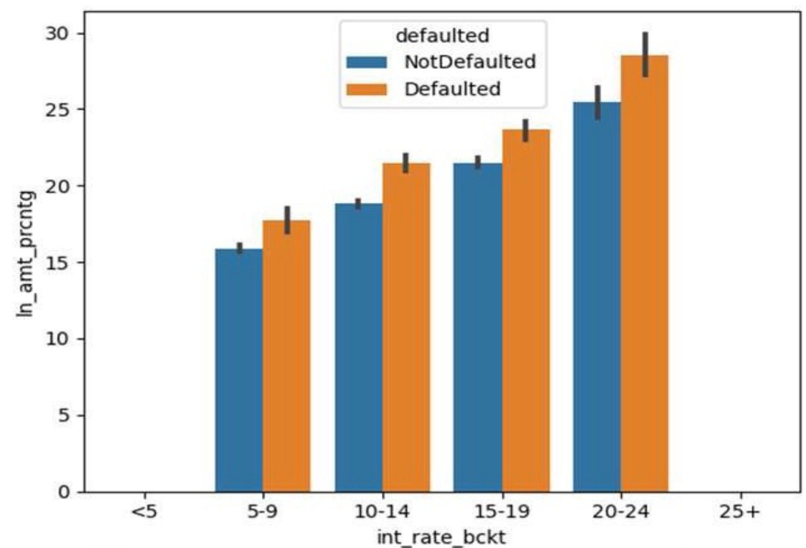
30
40
50
60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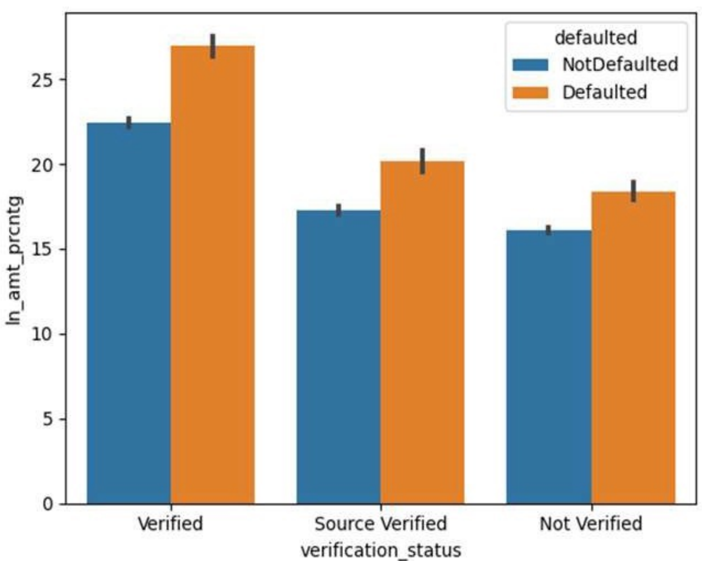
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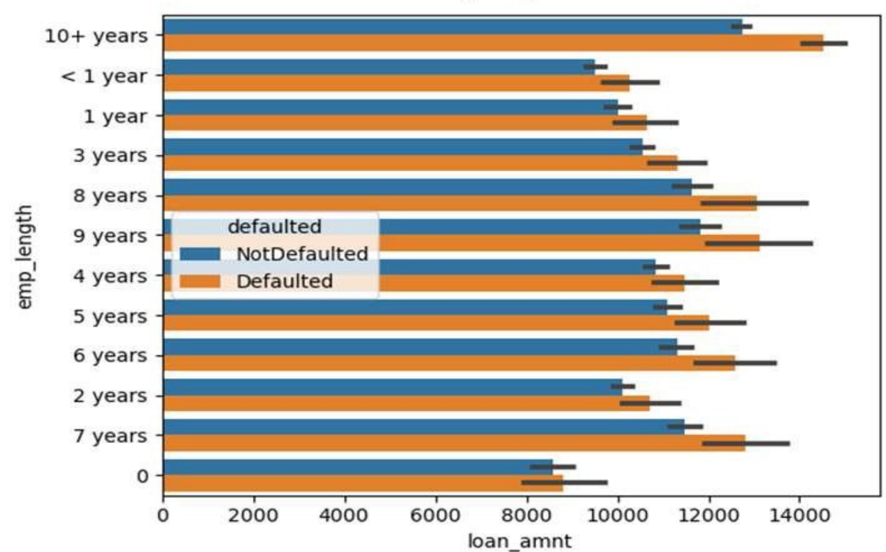
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Defaulted
emp_length
loan_amnt
10+ years
< 1 year
1 year
3 years
8 years
9 years
4 years
5 years
6 years
2 years
7 years
0
0
2000
4000
6000
8000
10000
12000
14000

MULTIVARIATE ANALYSIS- OBSERVATIONS

- Loan applicants who do not own a house(either rent or mortgage), and loan amount is greater than 10000, are more likely to default.
- Loan applicant's whose loan amount is between 10 to 15% of their annual income, and taken loan for small business, debt consolidation or credit card are most likely to default
- Loan applicant's with more than 10 years of experience, and loan amount more than 12000 are more likely to default
- Loan applicants, who pay 5 to 10% of their monthly income as installment, and higher term are most likely to default
- Loan applicants, who pay 5 to 10% of their monthly income as installment, and taken loan for small business, debt consolidation or credit card are most likely to default are most likely to default
- High interest rate with higher term tend to default more
- Applicants with verified employment status and more than 22% loan amount would most likely default
- Applicants who have taken more loan compared to their annual income and has high interest rate are most likely to default

CONCLUSION

Loan applicants who either rent a house or mortgage, loan amount of mor than 10000 has a high chance of default

Applicants whose loan amount is between 10 to 15% of their total annual income and have taken loan for small business are most likely to default. This is followed by applicants who take loan for debt consolidation and credit cards.

Applicants taking loan for small business , debt consolidation and credit cards, and have 5 to 10% of their monthly income as their monthly installment are more likely to default .

Applicants applying for loans in later part of the year has high default rate.

Applicants with higher interest rates are more likely to default.

Homeowners are less likely to default- so they are not a risk to the lender

Loan applicants who pay less interest rate are less likely to default

Applicants applying for loan for vacation, renewable energy, car are less likely to default