

Loan Lending Club Case Analysis

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- Problem Statement
- Business Understanding
- Risk
- Analysis Approach
- Univariate Analysis
- Bivariate Analysis
- Multivariate Analysis
- Factor whether an applicant will be Defaulter
- Decisive Factor whether an applicant will be Defaulter

- Lending Club is a marketplace for personal loans that matches borrowers who are seeking a loan with investors looking to lend money and make a return.

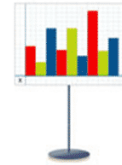
How Lending Club Works



Borrowers apply for loans.
Investors open an account.



Borrowers get funded.
Investors build a portfolio.



Borrowers repay automatically.
Investors earn & reinvest.

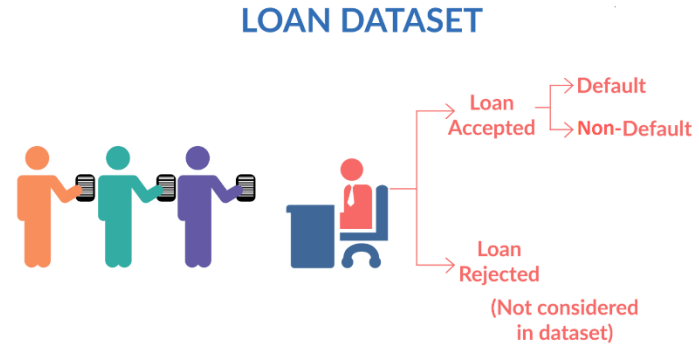
The company wants to understand the **driving factors (or driver variables)** behind loan default, i.e. the variables which are strong indicators of default. The company can utilize this knowledge for its portfolio and risk assessment.

- When a person applies for a loan, there are **two types of decisions** that could be taken by the company:

1.Loan accepted: If the company approve the loan, there are 3 possible scenarios described below:

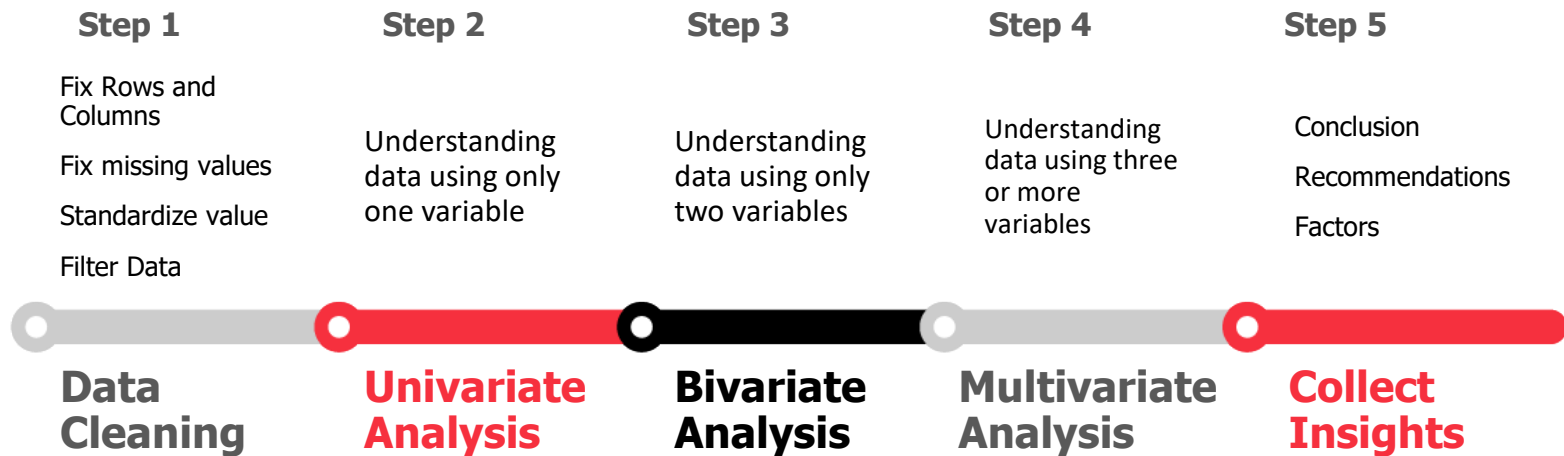
- Fully paid:
- Current:
- Charged-off:

2.Loan rejected: The company had rejected the loan (because the candidate does not meet their requirements etc.).



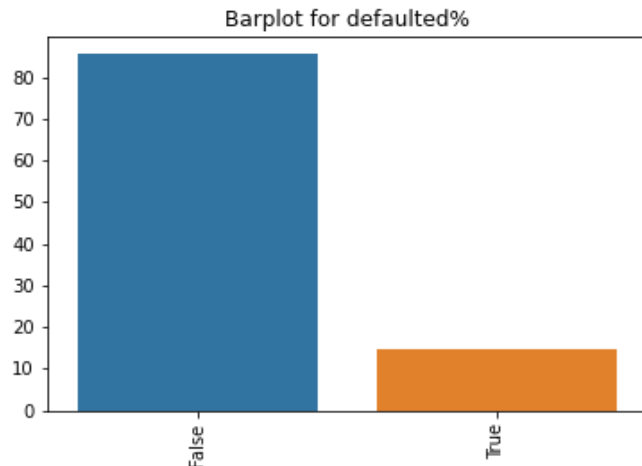
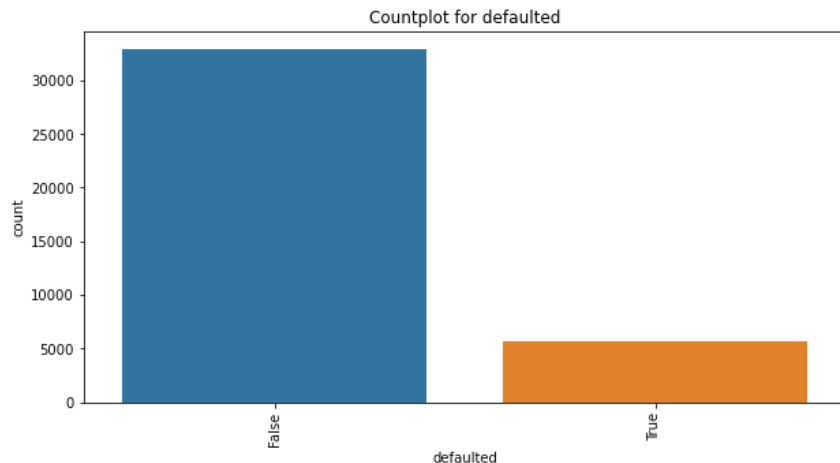
- When the company receives a loan application, the company has to make a decision for loan approval based on the applicant's profile. Two **types of risks** are associated with the bank's decision:
 1. If the applicant is **likely to repay the loan**, then not approving the loan results in a **loss of business** to the company
 2. If the applicant is **not likely to repay the loan**, i.e. he/she is likely to default, then approving the loan may lead to a **financial loss** for the company



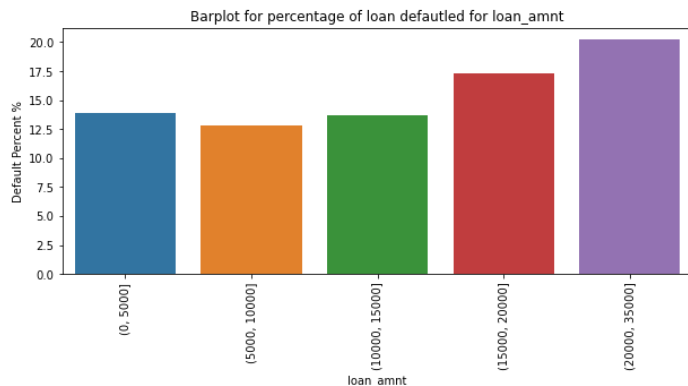
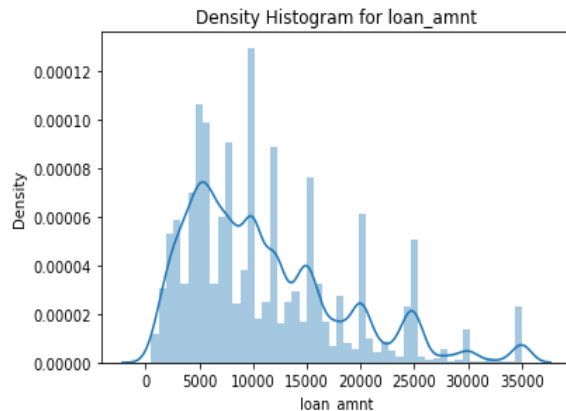
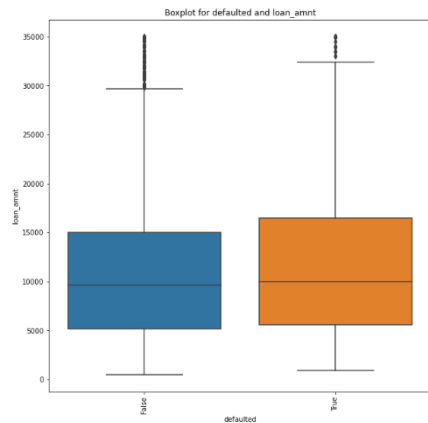


Analysis on Defaulted/Loan Status

- Defaulted Loan Percent - 14.58%
- Non Defaulted Loan Percent - 85.41%

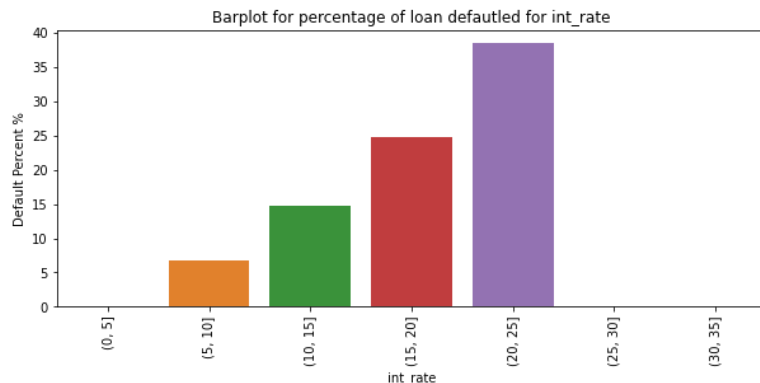
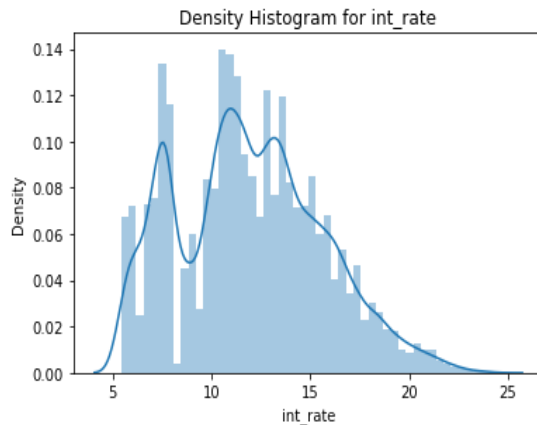
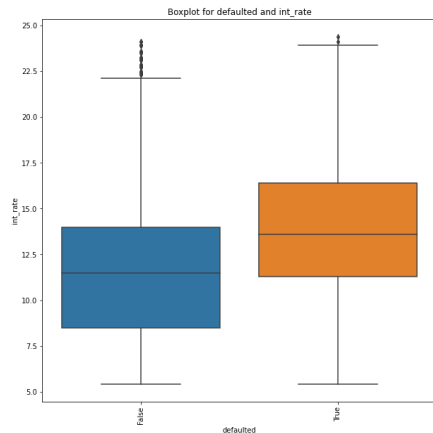


Analysis on Loan Amount



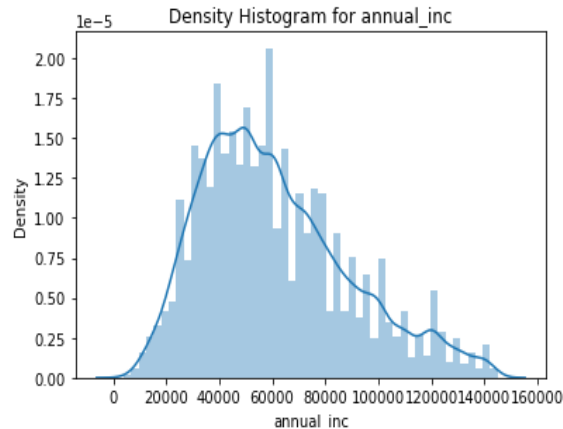
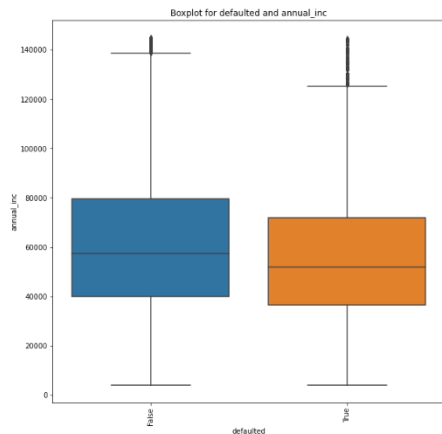
- There are unusual spike of loans for 10k,15k,20k,25k,30k and 35k.
- The loan default percent for loan amount 15k to 35k is higher than 0-15k and higher than overall defaulted Loan Percent 14.58%
- Similar trends have been noted for the funded amount and funded amount invested

Analysis on Interest rate

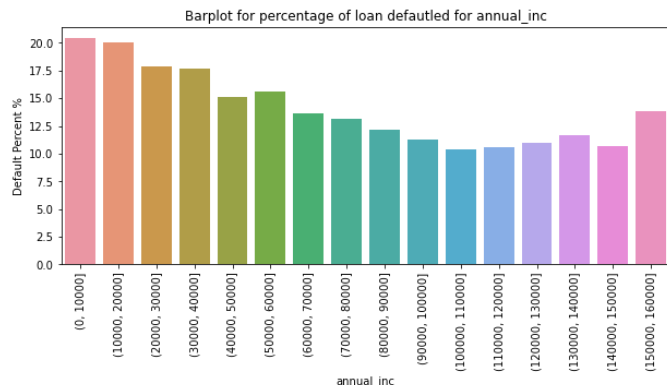


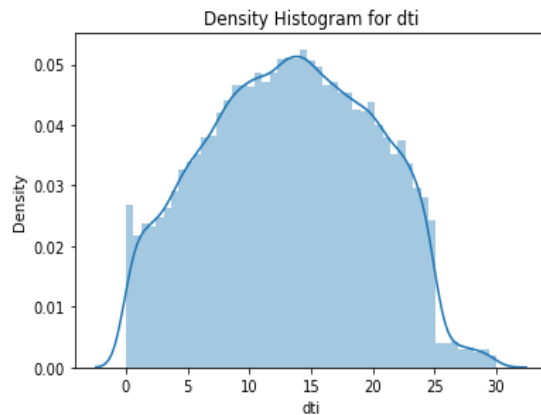
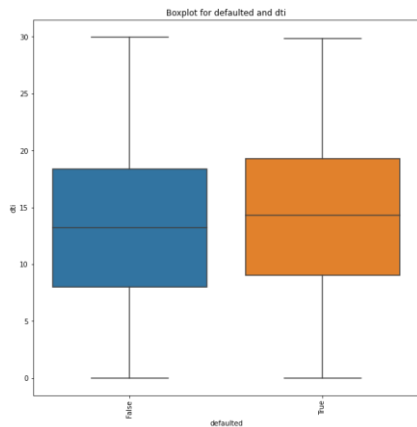
- There are unusual drop of loans for 8-10 Interest rate.
- The loan defaulted percent increase steeply with interest rate.
- The loan defaulted percent for 15-25% interest rate is higher than overall defaulted Loan Percent 14.58%

Analysis on Annual Income

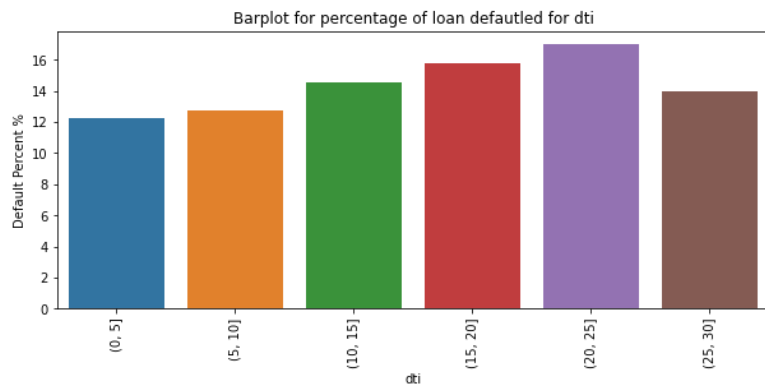


- The loan defaulted percent decrease gradually with Annual Income.
- The loan defaulted percent for 0-40000 annual income is higher than overall defaulted Loan Percent 14.58%

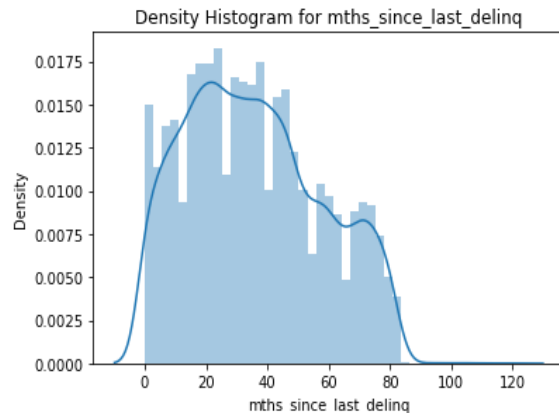
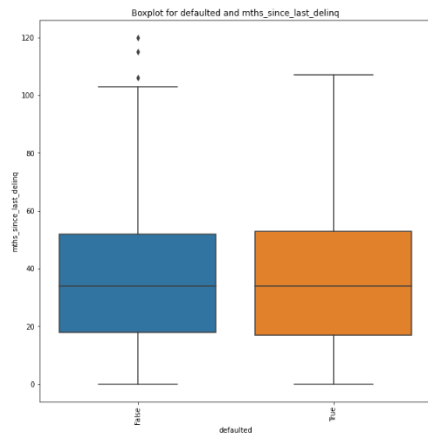




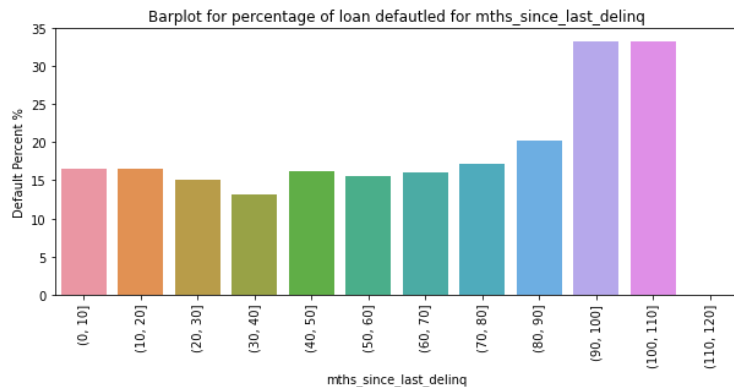
- The loan defaulted percent increase gradually with DTI.
- The loan defaulted percent for 15-25 DTI is higher than overall defaulted Loan Percent 14.58%

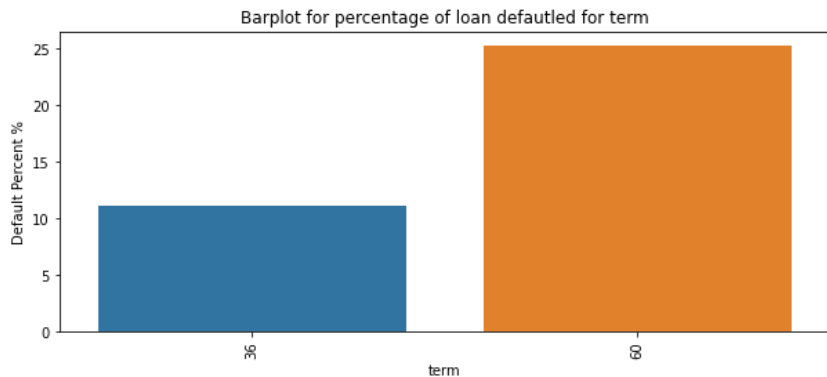
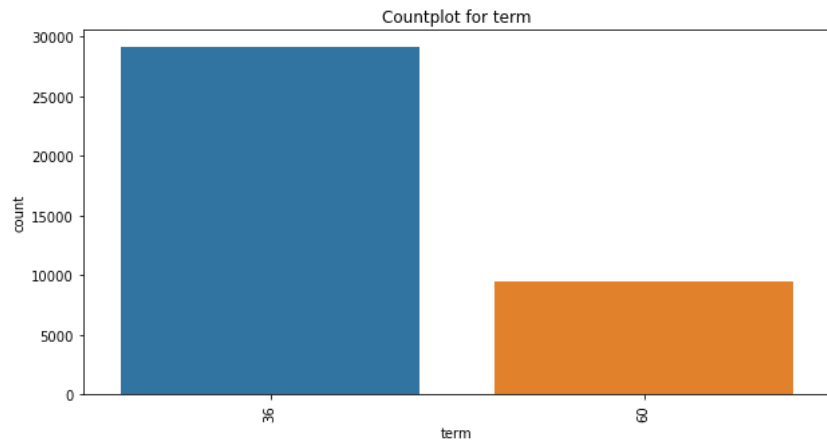


Analysis on Last Delinquent

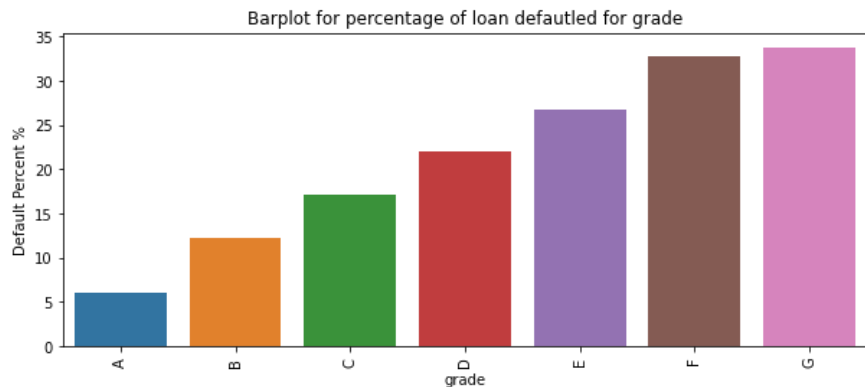
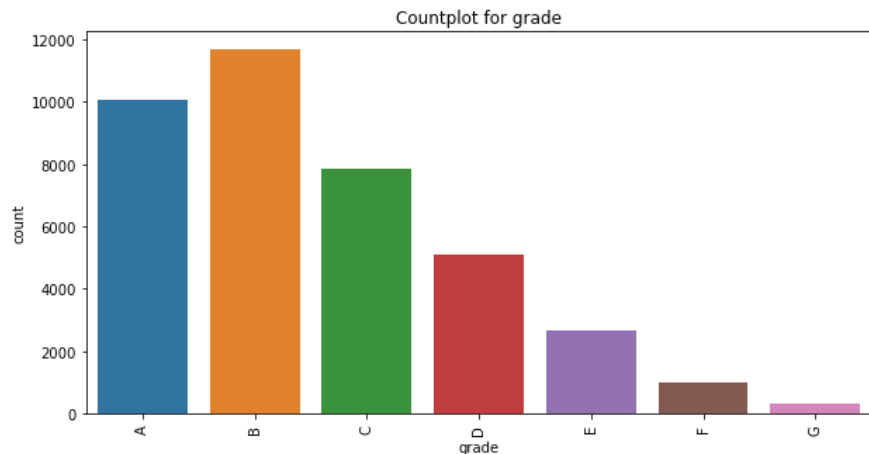


- The loan defaulted percent remains constant till 80 months.
- The loan defaulted percent for 80-110 months of borrowers crime is higher than overall defaulted Loan Percent 14.58%.



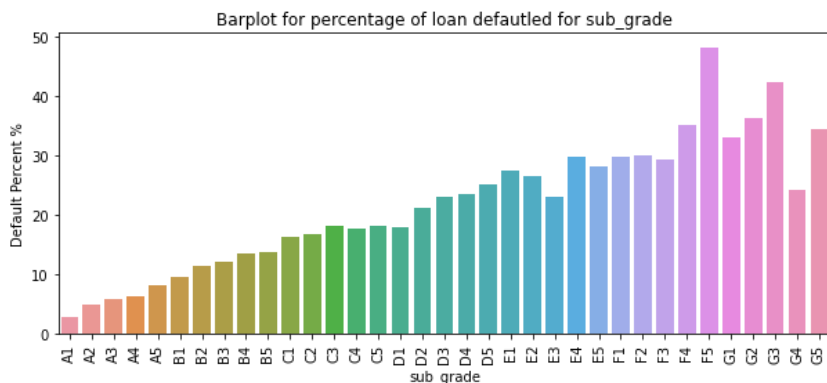
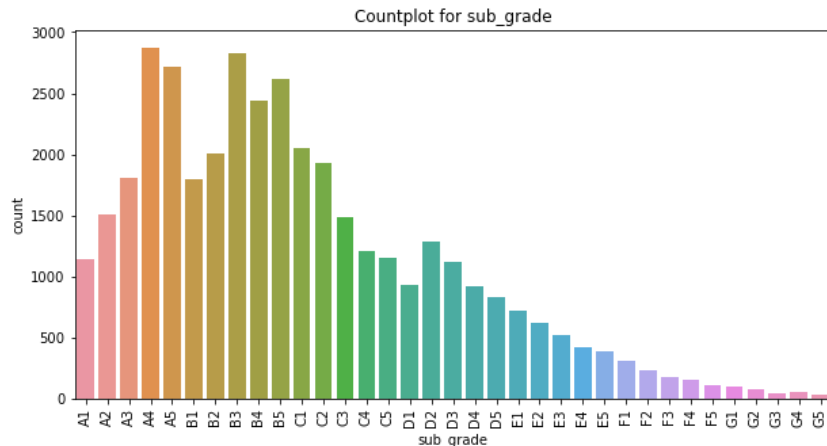


- The borrowers have taken more loans for 36 months term verses 60 months
- The loan defaulted percent for 60 months term is twice that of 36 months
- The loan defaulted percent for 60 months term is higher than overall defaulted Loan Percent 14.58%.

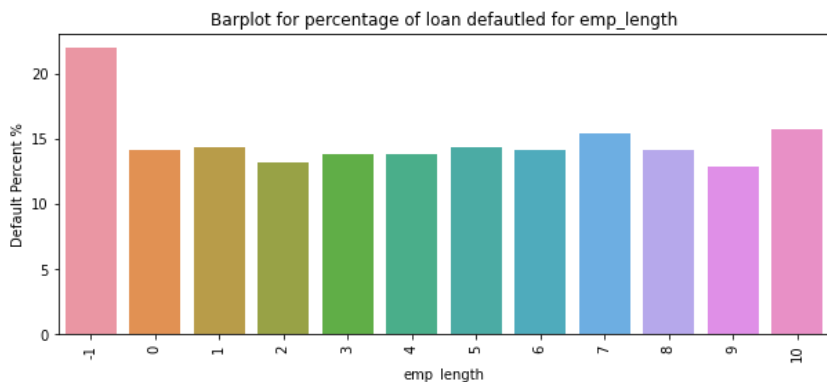
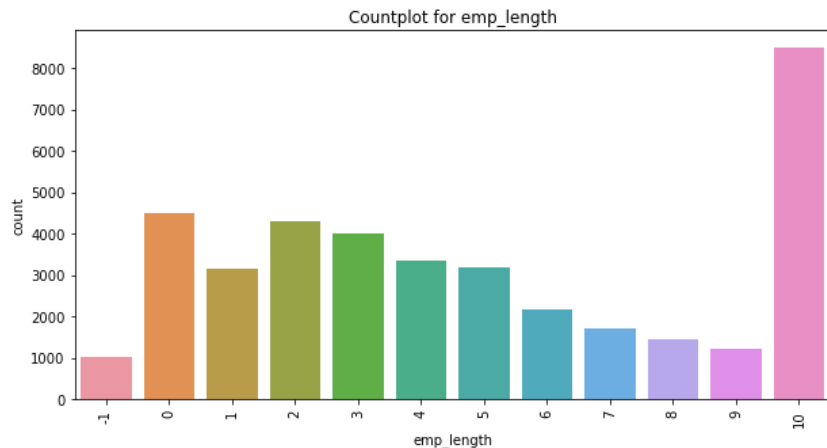


- The grade (A,B,C) have more number of loans.
- The loan defaulted percent increase with Grade from A - G
- The loan defaulted percent for (D,E,F,G) grade is higher than overall defaulted Loan Percent 14.58%.

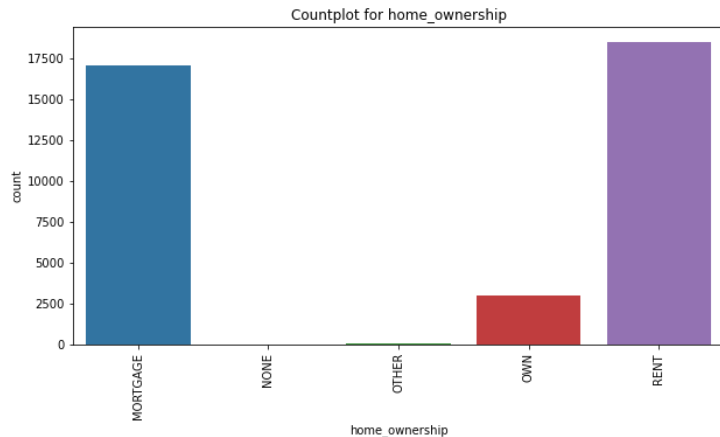
Analysis on Sub Grade



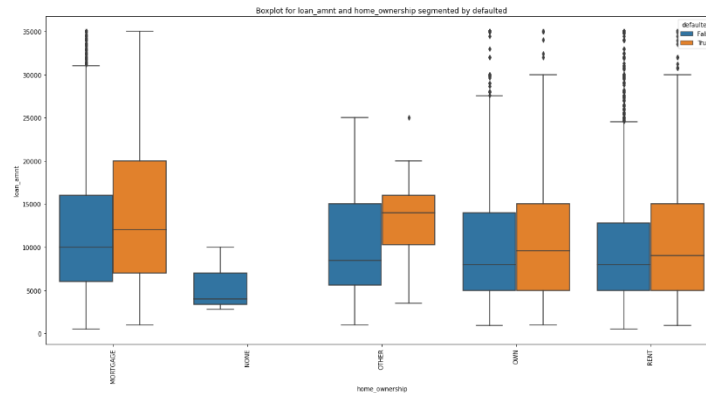
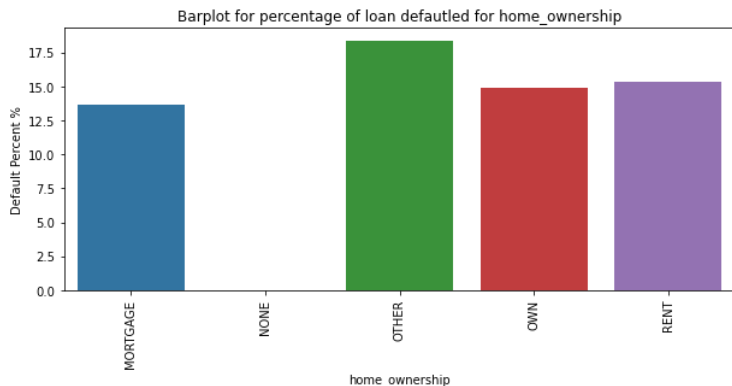
- The grade (A1 – C2) have more number of loans.
- The loan defaulted percent increase with Grade from A1 – G5
- The loan defaulted percent for (C2-G5) grade is higher than overall defaulted Loan Percent 14.58%.



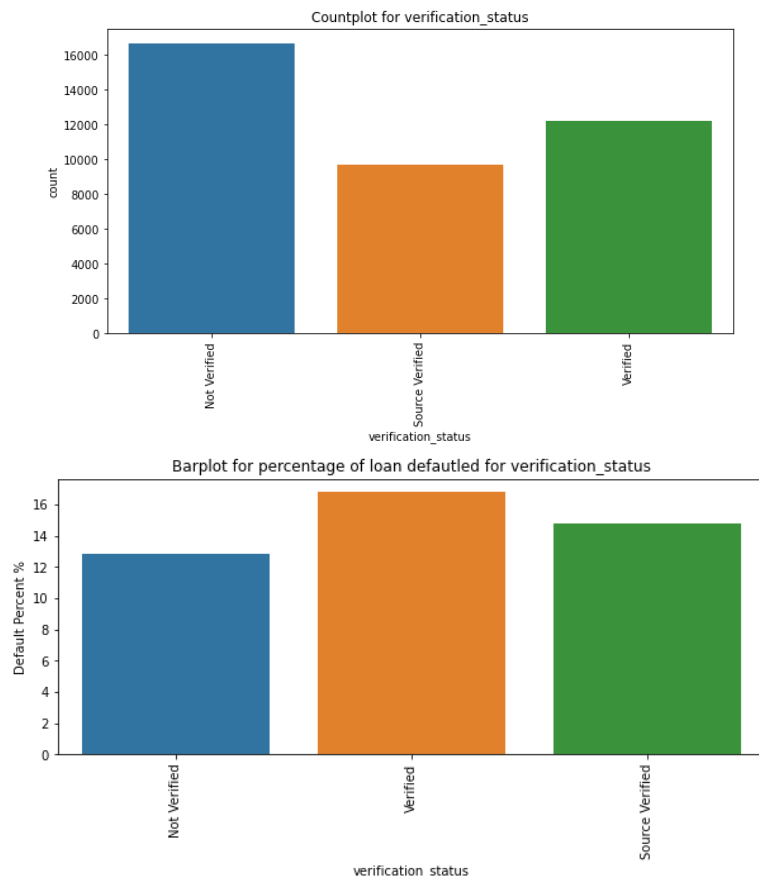
- The 10+ years of employment have the most number of loans.
- The loan defaulted percent remains constant throughout the employment years.
- Note : -1 denotes the missing values.

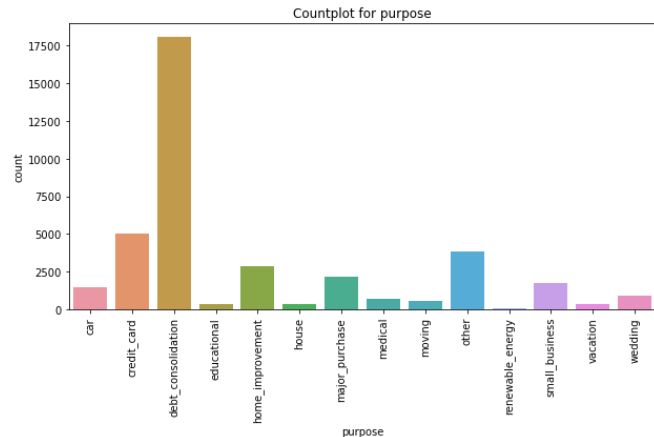


- Borrowers on rent and mortgage have most number of loans
- The loan defaulted percent remains constant for mortgage, own and rent
- For higher amount of loan the borrowers on mortgage the loan default spread is more.

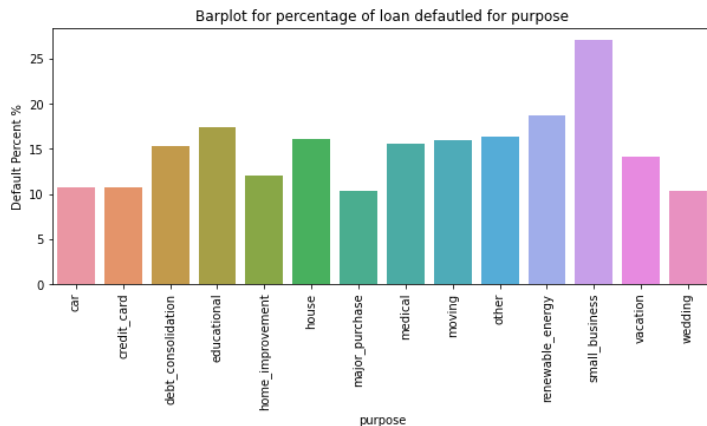


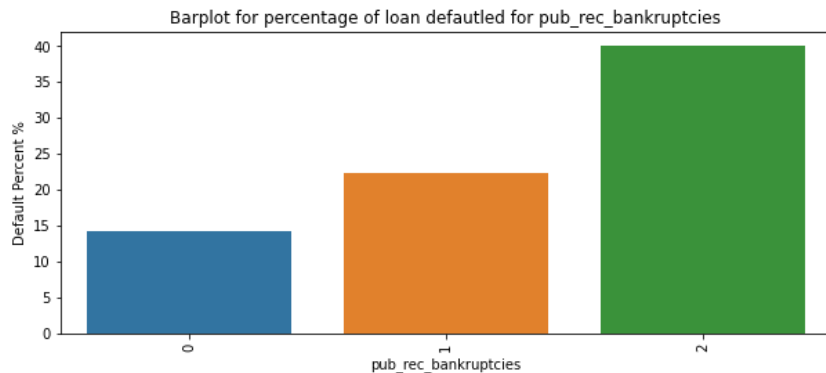
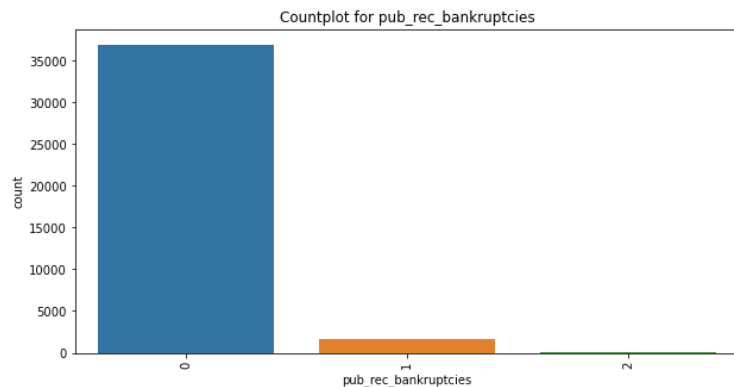
- The not verified borrowers have take more loans than verified and source verified.
- The loan defaulted percent for verified borrower is higher than overall defaulted Loan Percent 14.58%.



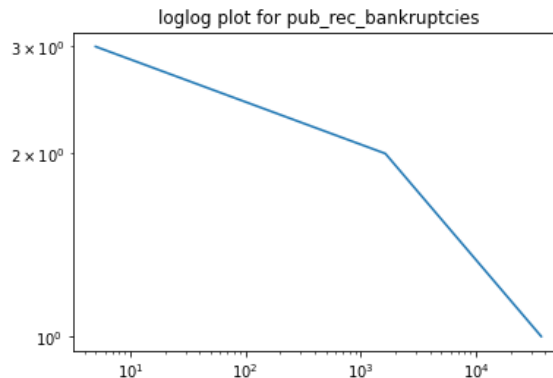


- The Debt consolidation and credit card borrowers have taken more loans than verified and source verified.
- The loan defaulted percent for small business and renewable energy borrowers is higher than the overall defaulted Loan Percent 14.58%.

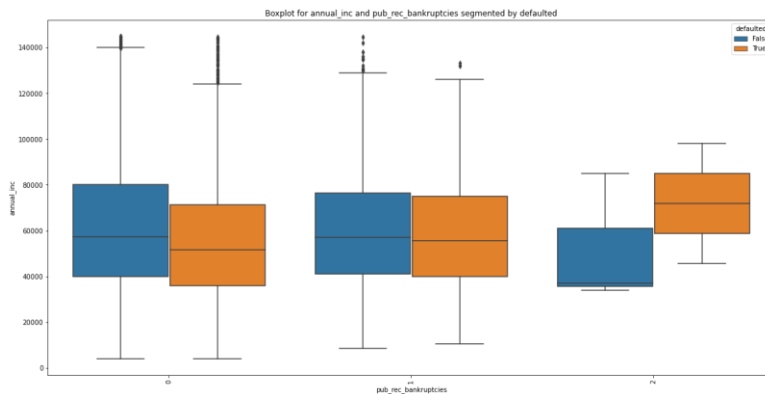
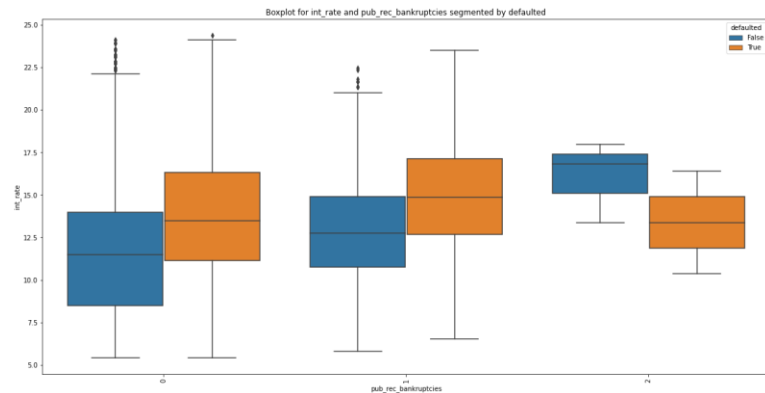




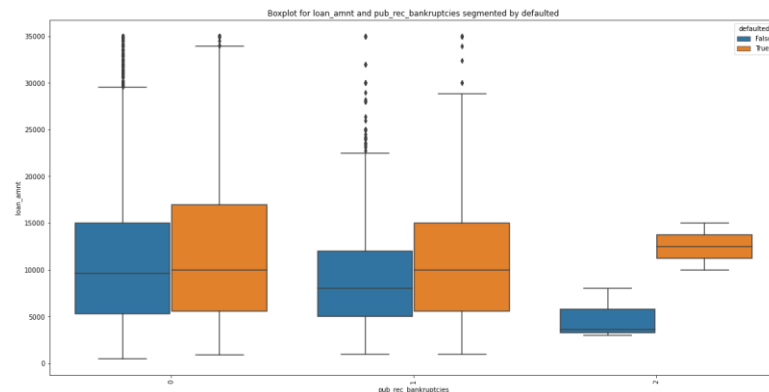
- Borrowers zero public bankruptcies have most number of loans
- The loan defaulted percent increases for one or more public bankruptcies record
- The loan defaulted percent for one or more bankruptcies is higher than overall defaulted Loan Percent 14.58%..

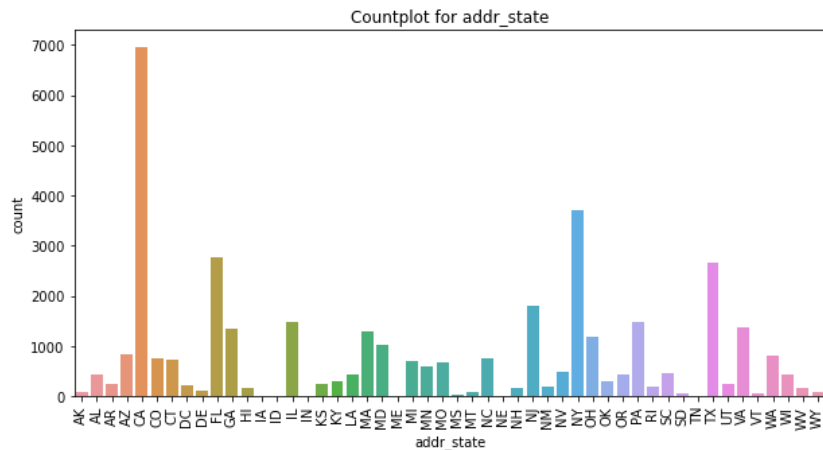


Analysis on Public Bankruptcies

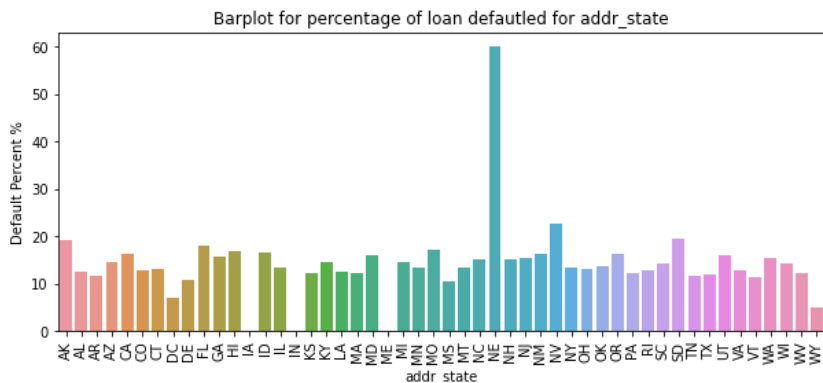


- **INTEREST RATE AND PUBLIC BANRUPTIES RECORD :**
Borrowers with lower interest rate and 2 public bankruptcies have defaulted
- **INSTALLMENT AND PUBLIC BANRUPTIES RECORD :**
Borrowers with higher installment and 2 public bankruptcies have defaulted
- **ANNUAL INCONE AND PUBLIC BANRUPTIES RECORD :**
Borrowers with higher Income and 2 public bankruptcies have defaulted



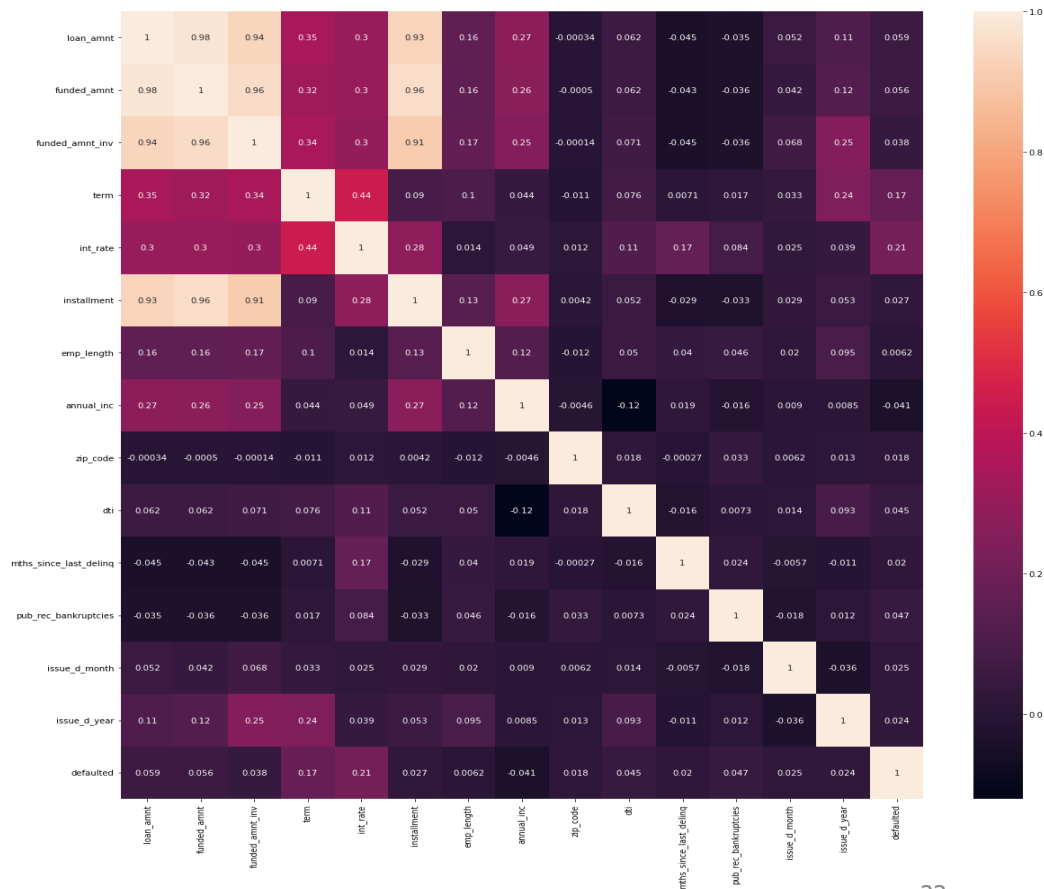


- We can see more number of loans from certain state like CA, FL, NY and NI
- Percent of loan defaulted is very high for state NE and high for NV and SD.



Correlation Matrix

- The loan defaulted percent remains constant till 80 months.
- The loan defaulted percent for 80-110 months of borrowers crime is higher than overall defaulted Loan Percent - 14.58%.



- **Continuous Variable:**

1. LOAN_AMOUNT : Loan amount greater than 15000 dollars have higher default rate
2. FUNDED_AMOUNT : Funded amount greater than 15000 dollars have higher default rate
3. FUNDED_AMOUNT_INVESTED : Funded amount invested greater than 15000 dollars have higher default rate
4. INTEREST_RATE : As Interest rate increases the default rate increases steeply
 1. (5, 10]-> 6.739748%
 2. (10, 15]-> 14.820089%
 3. (15, 20]-> 24.826918%
 4. (20, 25]-> 38.441558%
5. ANNUAL_INCOME : As the annual income increase the default rate decreases
6. DTI : As dti increase the default rate increases
7. MONTHS_SINCE_LAST_DELINQ : Crime committed between 90 to 110 days have higher default percent

• Categorical Variable:

1. TERM : 60 months term have a higher default rate than 36 months term
2. GRADE : As the Grade decreases (A B C D E F G) default rate increases
3. SUB_GRADE : As the Sub Grade decreases (A1 A2 B1 B2.....) default rate increases
4. VERIFICATION STATUS : Percent of loan defaulted is higher for verified borrowers
5. PURPOSE : Small business borrowers have high default rate
6. PUBLIC_BAKRUPTIES_RECORD : One or more public bankruptcies have higher default rate
7. STATE : Percent of loan defaulted is very high for state NE and high for NV and SD
8. EMPLOYEE TITLE : The following have the highest default rate among the top 20 title by frequency:
 1. walmart -> 25.242718%
 2. united parcel service -> 22.448980%
9. ZIP CODE : The following have the highest default rate among the top 20 zip code by frequency:
 1. 917xx -> 20.882353%
 2. 331xx -> 20.771513%

Decisive Factor whether an applicant will be Defaulter:

- FUNDED_AMOUNT_INVESTED
- INTEREST_RATE
- ANNUAL_INCOME
- DTI
- TERM
- GRADE
- SUB_GRADE
- PURPOSE
- PUBLIC_BAKRUPTIES_RECORD

Thank You

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