



Lending Case Study

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Agenda

- **Problem Statement**
- **Lending Club Case Study**
- **Python Code**
- **Plots**
- **Observations and Analysis**



Problem Statement



Problem Statement

- **Company wants to understand the driving factors (or driver variables) behind loan default, i.e. the variables which are strong indicators of default. We need to find the risky loan applicants**





Python Code

GitHub Link:

<https://github.com/Bikash3/LendingClubCaseStudy>

Column Considered and Transformations Done

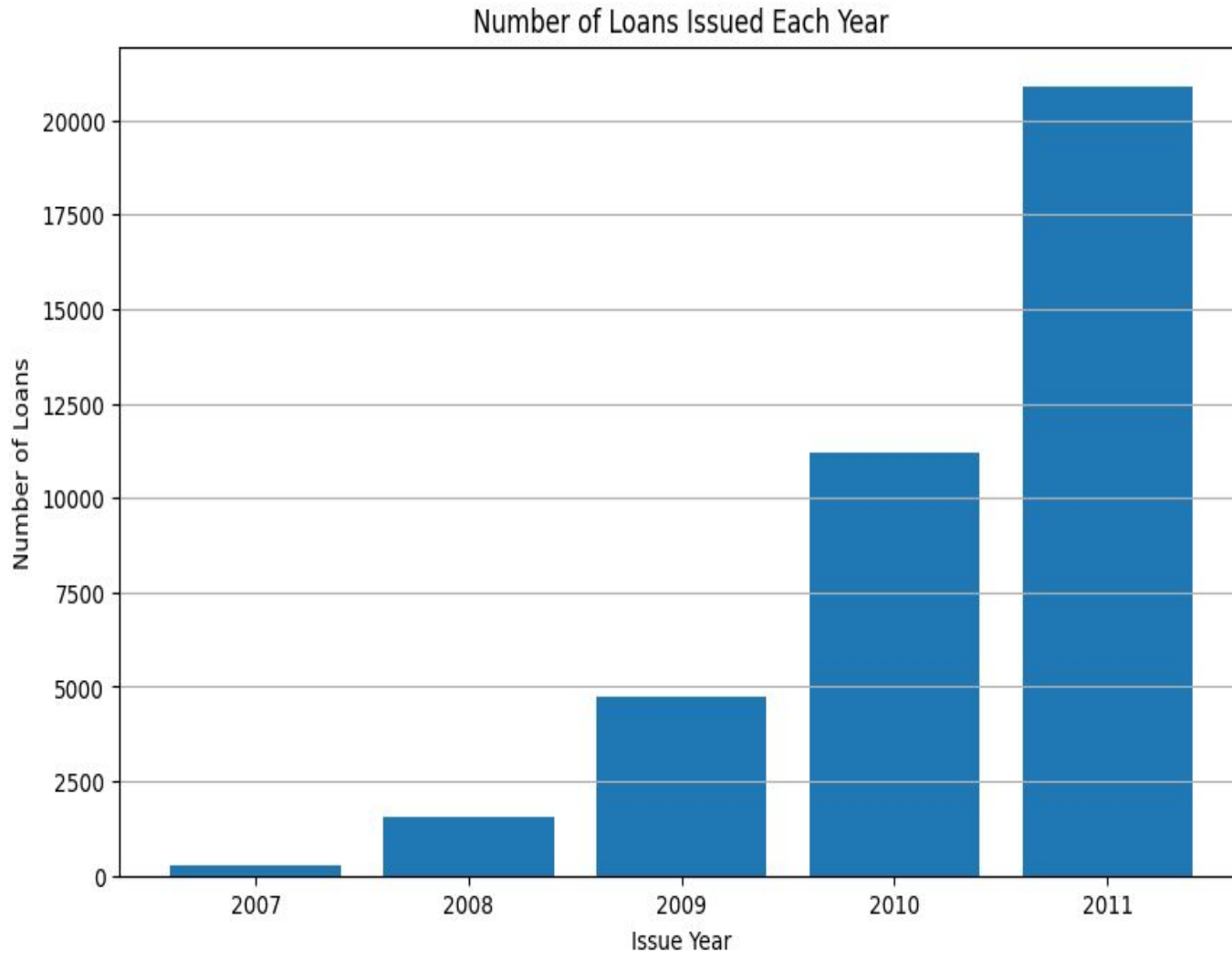
1. id
2. loan_amnt
3. verification_status
4. home_ownership
5. int_rate
6. term
7. purpose
8. issue_year
9. issue_month
10. emp_length
11. annual_inc
12. dti
13. grade
14. installment
15. addr_state
16. loan_status
17. delinq_2yrs



Plots

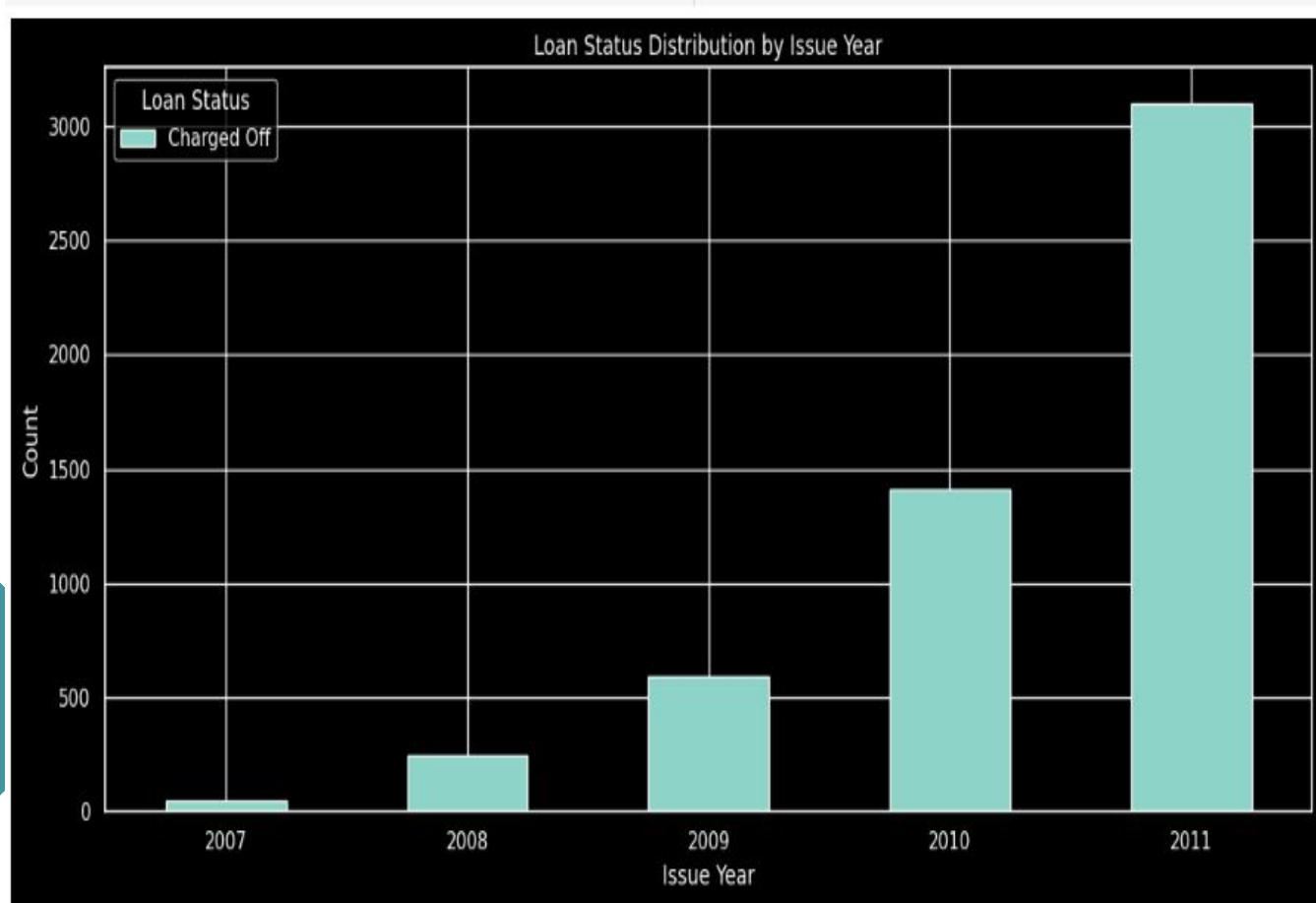


Year wise Loan Count



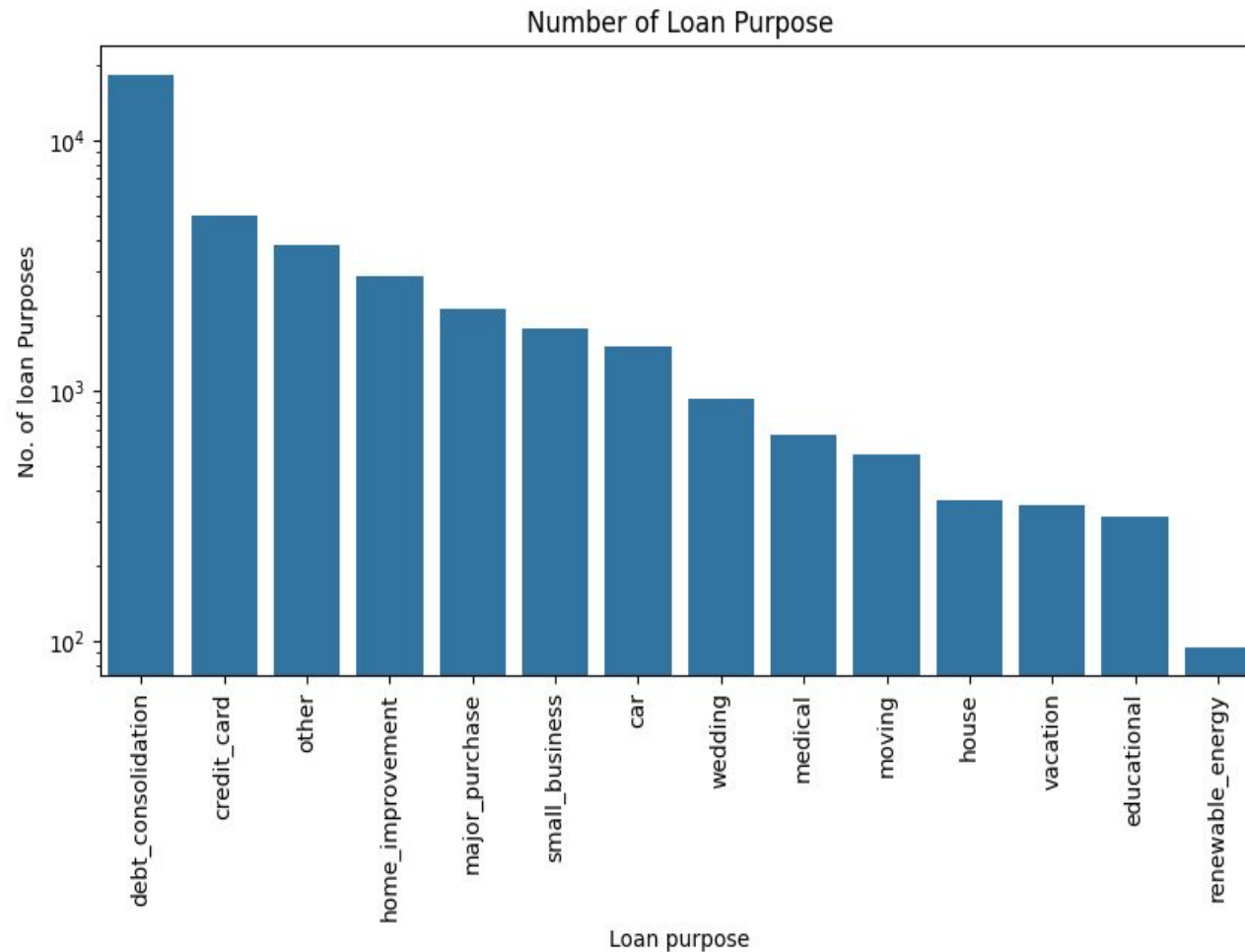
There was a significant increase in the number of loan applicants between 2007 and 2011.

Charged-Off Distribution by Issue Year



Substantial growth between 2007-2011 in the number of charged off loans can be observed.

Purpose of Loan vs Interest Rate

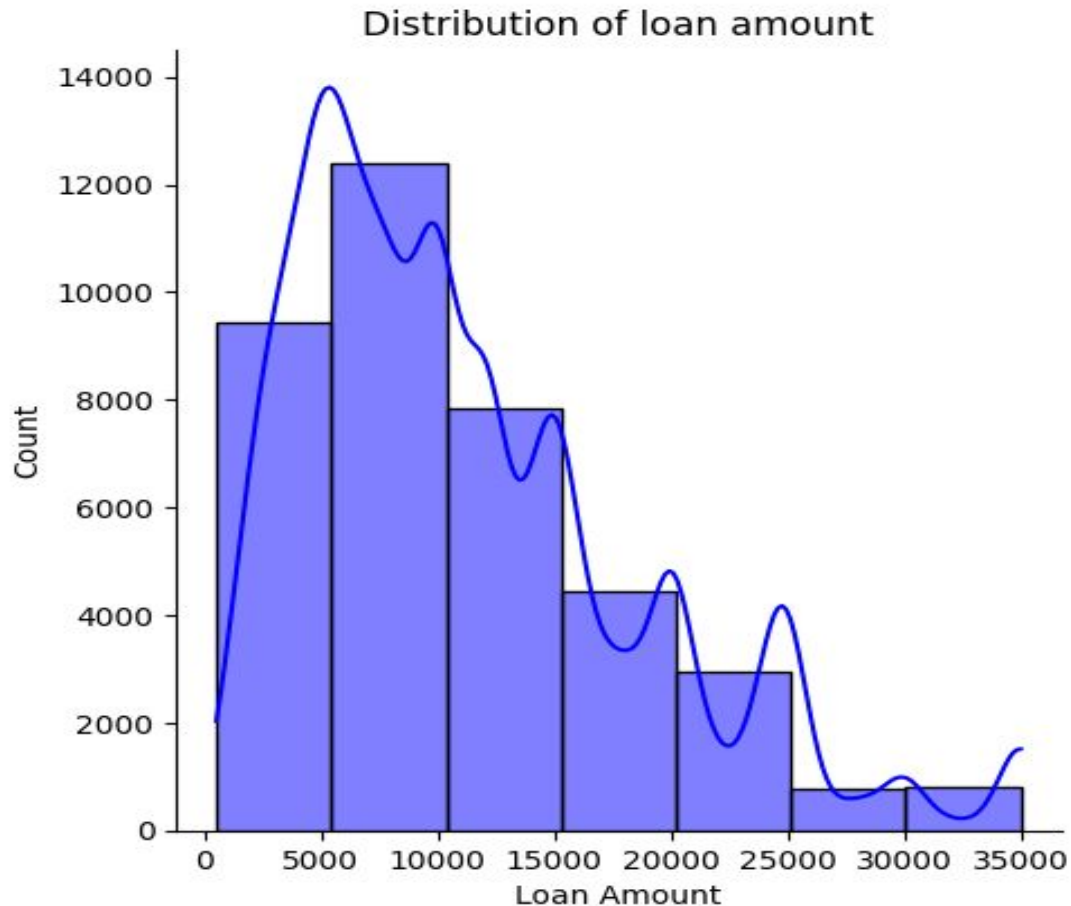


The above charts shows five major purposes of Loan applications are - debt_consolidation , credit_card , other , home_improvement & major_purchase

where ****debt_consolidation**** is the highest loan purpose.

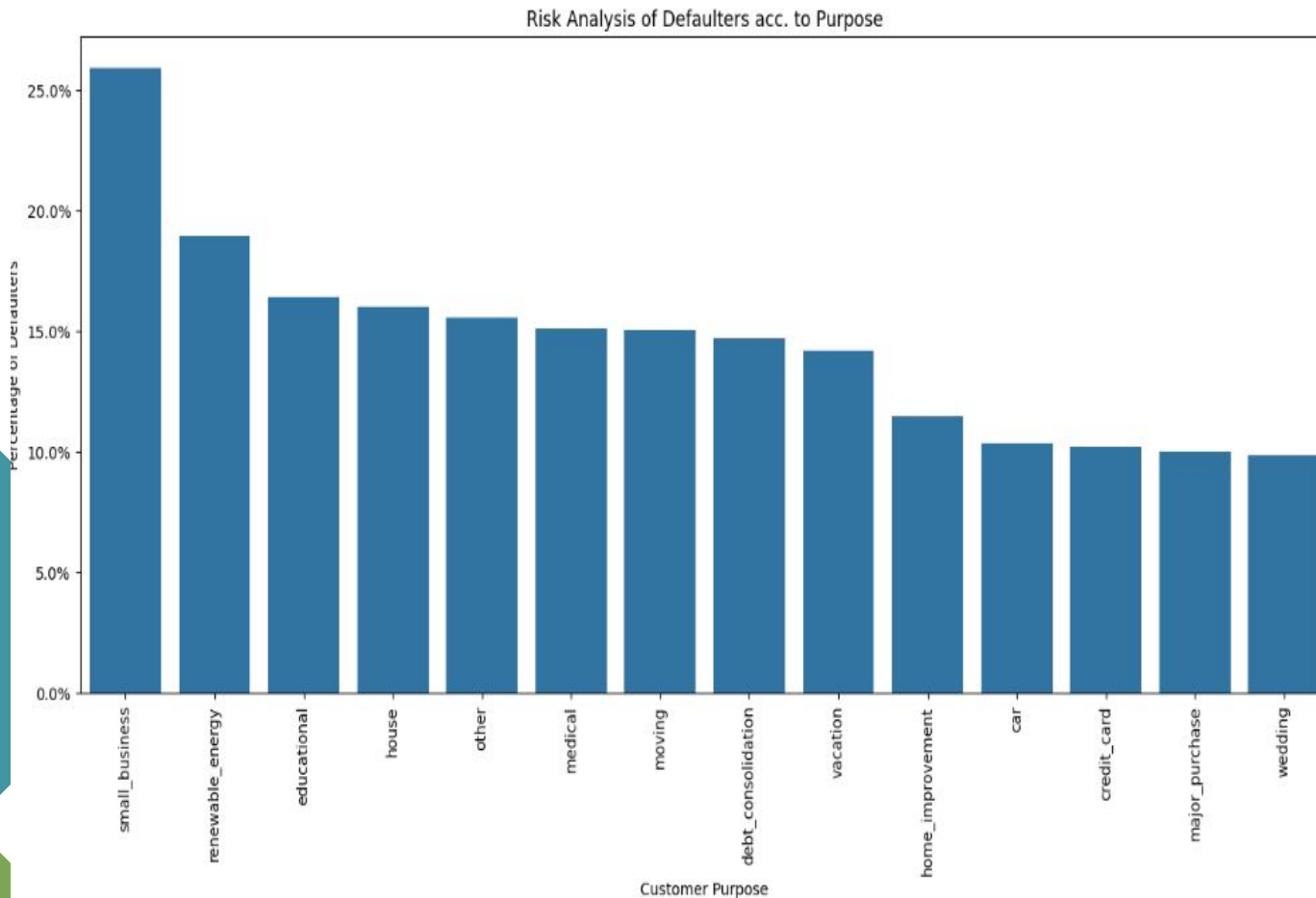
Loan Distribution vs Loan amount

<Figure size 1600x700 with 0 Axes>



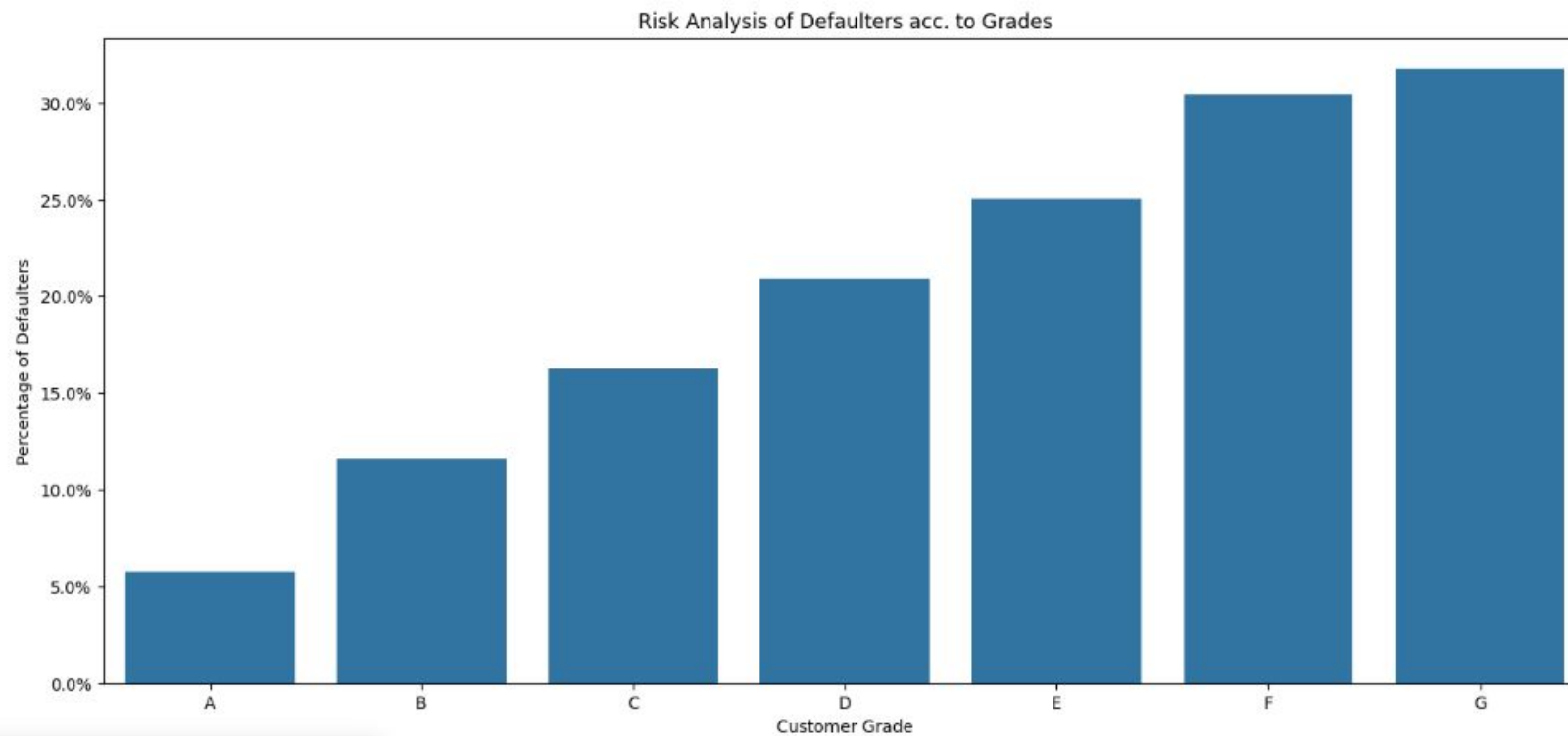
The distribution of loan amount can be visualized from the above plot. It has been observed that the maximum loan range amount is between 5000-10000.

Calculate the percentage of loan defaulters according to loan purpose



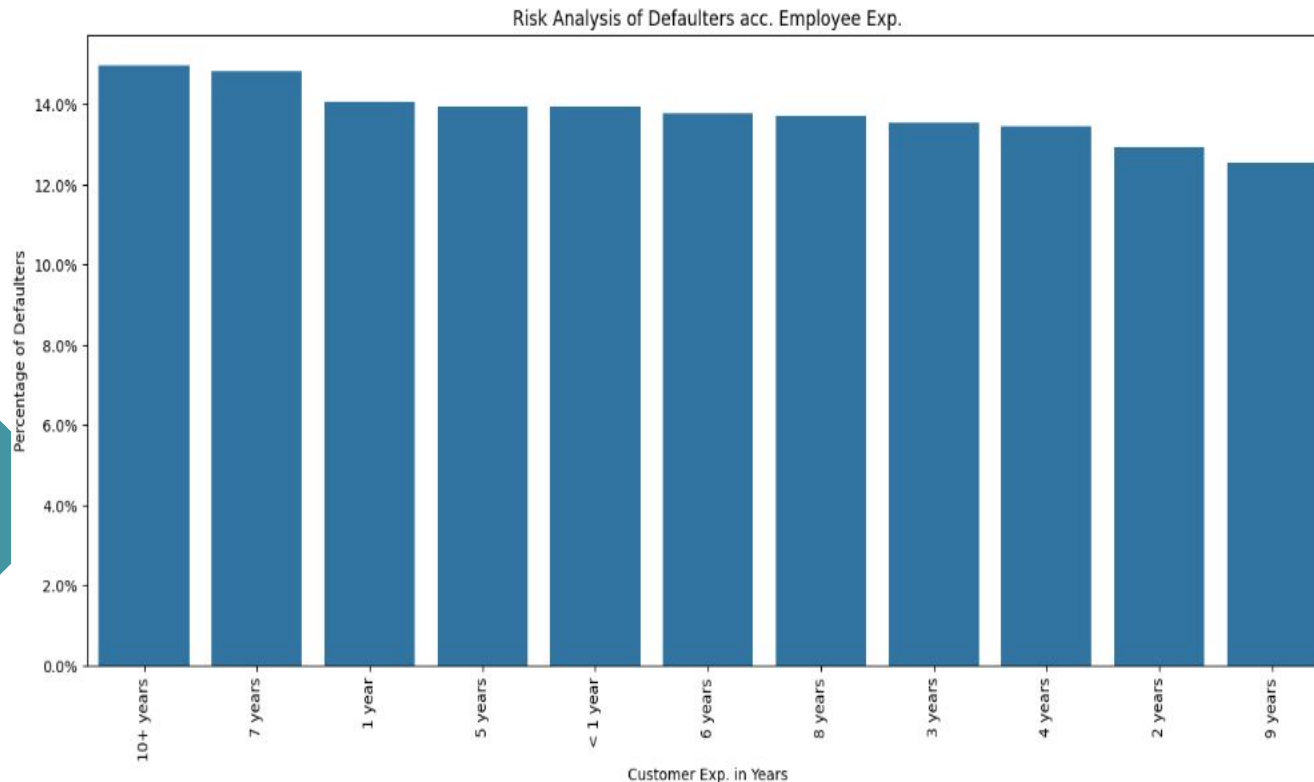
Customer Purpose with small_businesses has higher percentage of defaulters.

Calculate the percentage of loan defaulters according to grade



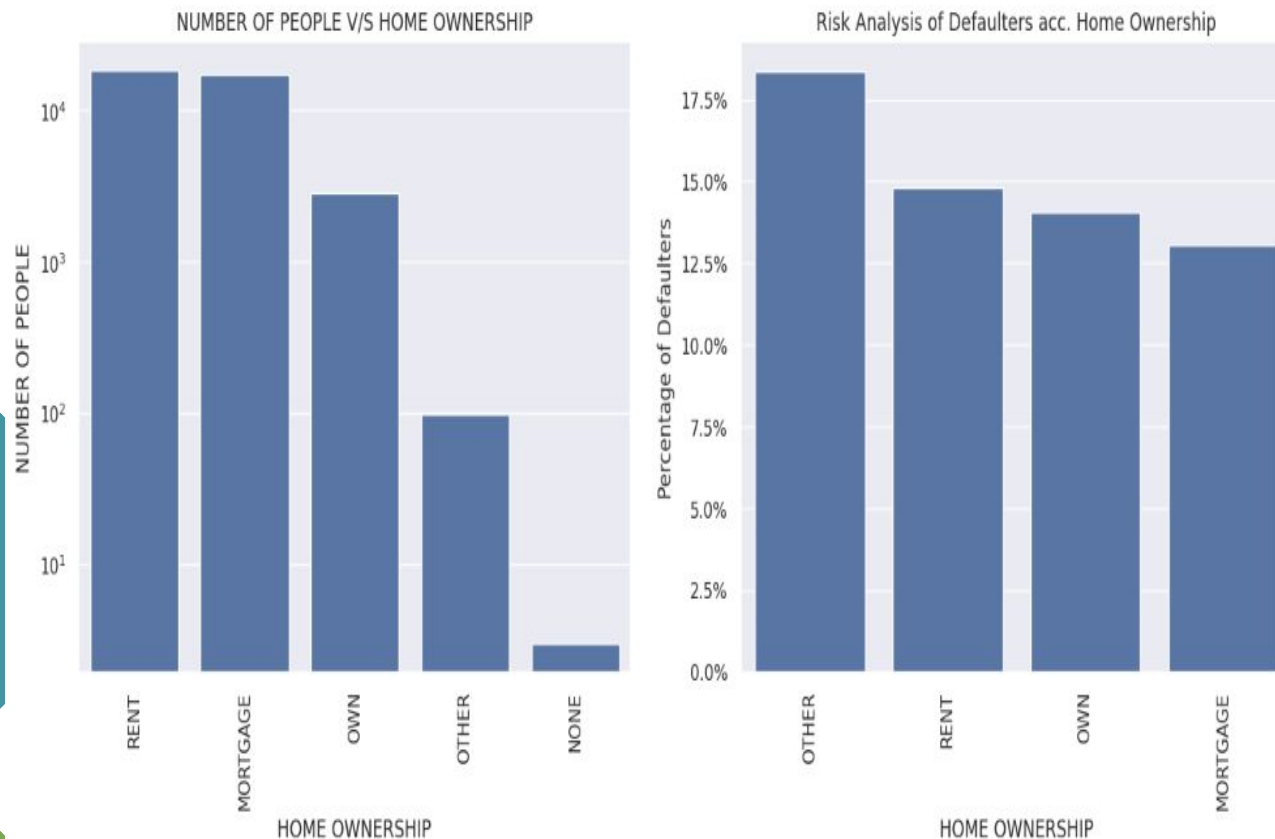
The lower customer Grade has higher percentage of defaulters.

Calculate the percentage of loan defaulters according to Employee experience



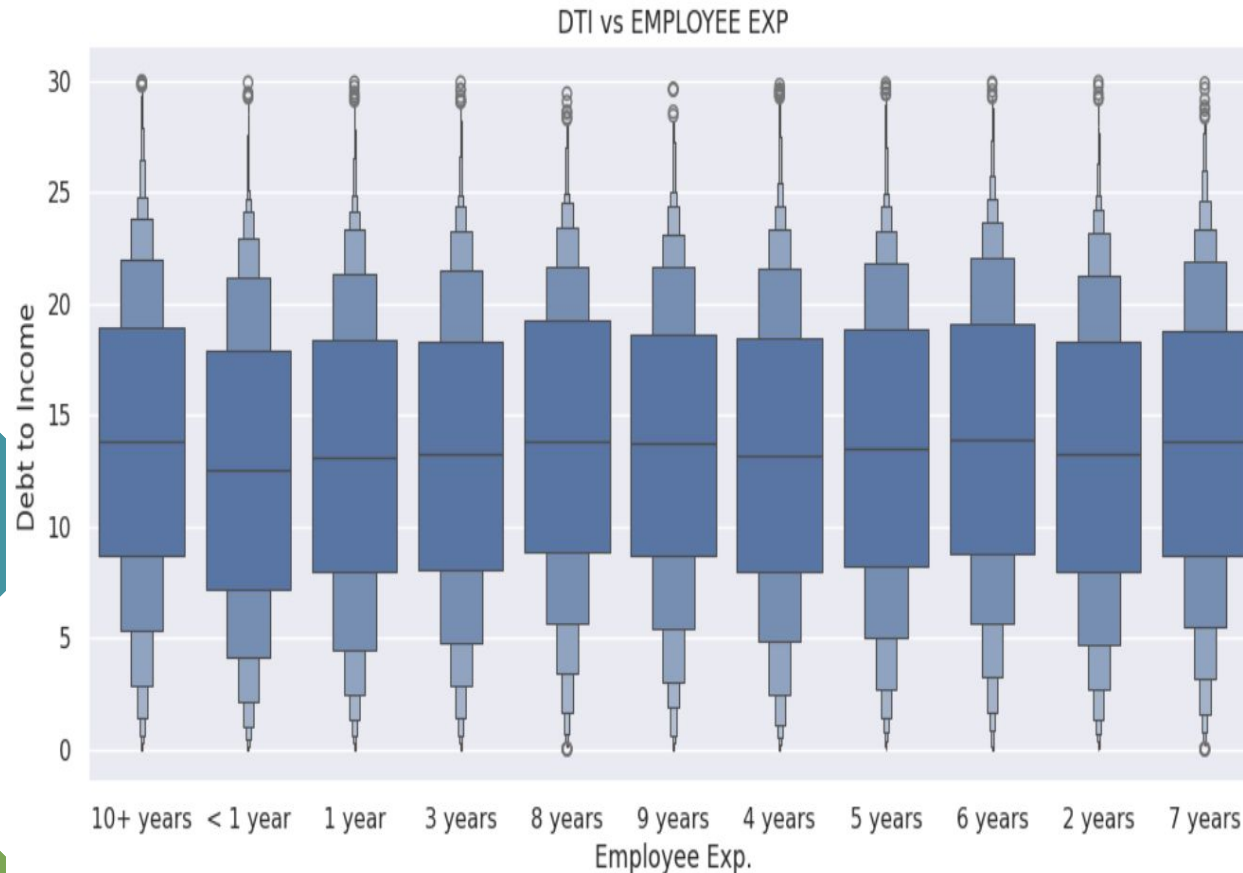
Customer with higher Customer exp. has higher percentage of defaulters.

NUMBER OF PEOPLE V/S HOME OWNERSHIP AND Risk Analysis of Defaulters acc. Home Ownership



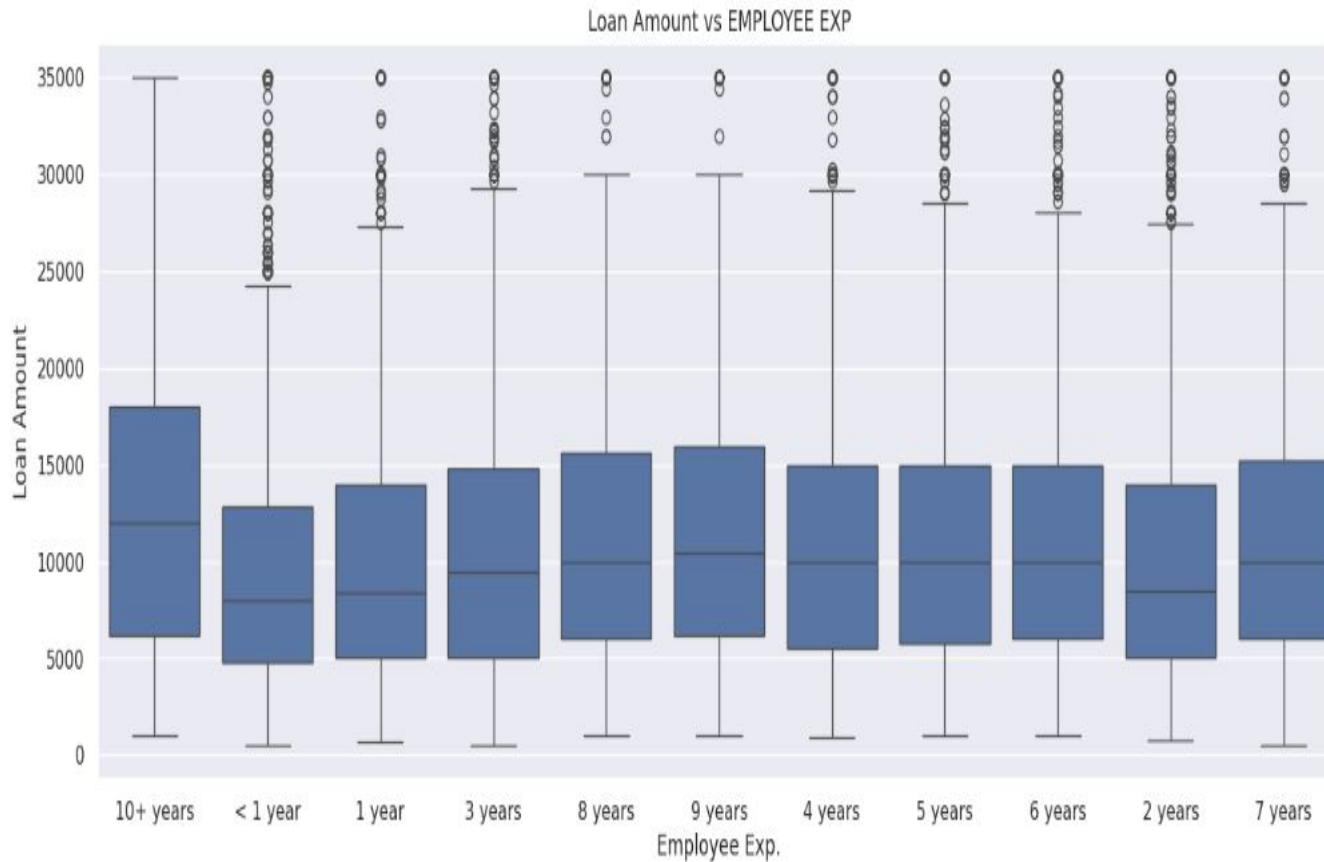
1. The highest number of people are in ****Rent**** home ownership.
2. The highest percentage of defaulter is under ****Other**** home ownership and is followed by Rent and Own and Mortgage.

Debt to Income vs Employee Experience



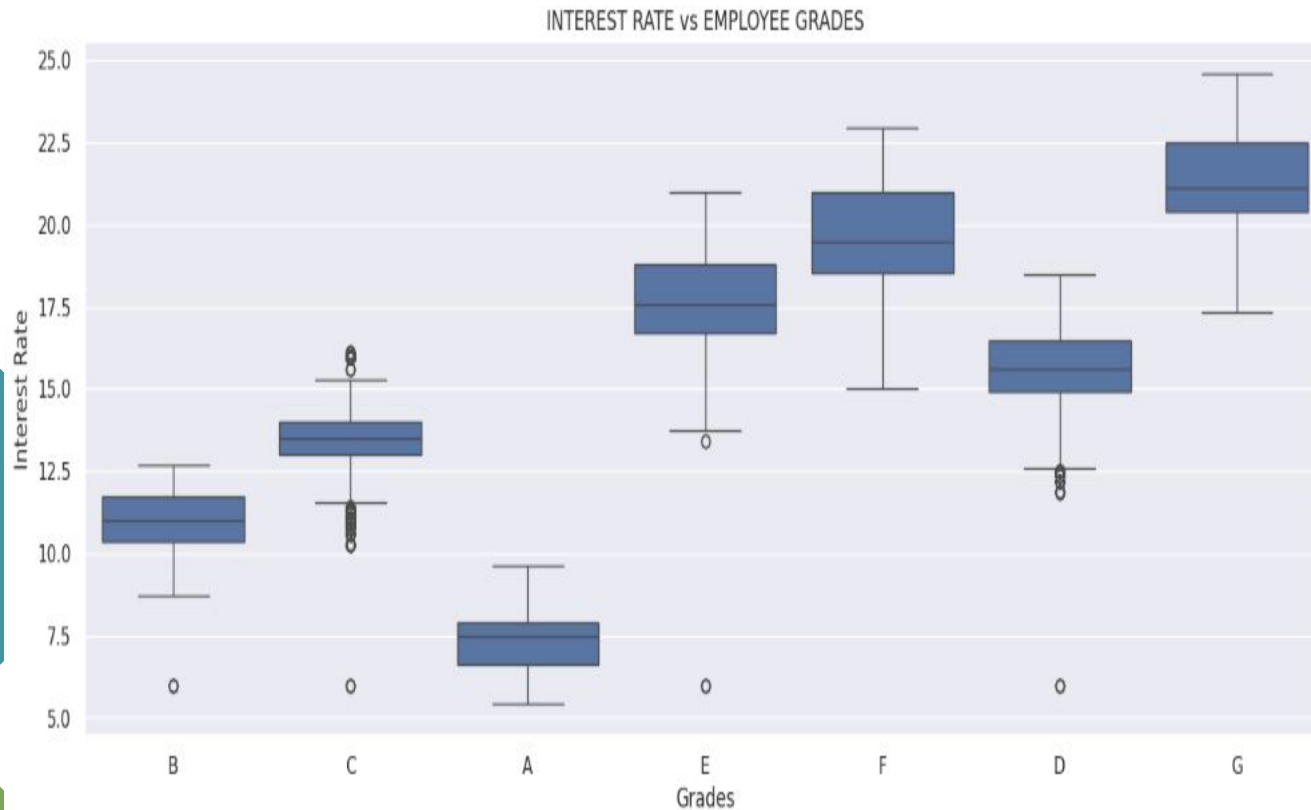
In the bivariate analysis it has been observed that employees with 10+ years of exp. is having a debt to income in the maximum range apart from that rest year of employee exp. are more or less in the same range.

Loan Amount vs Employee Experience



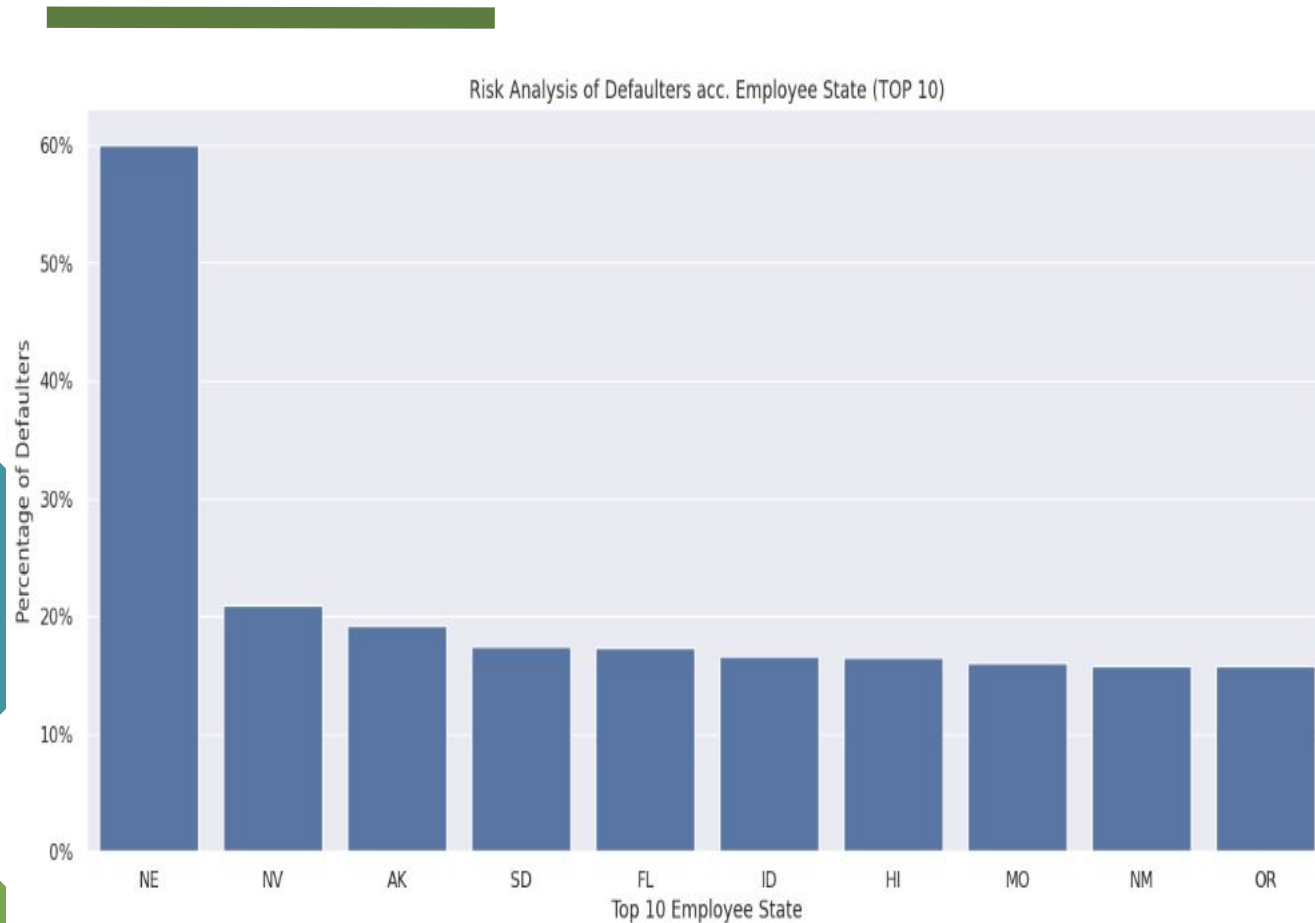
In the above bivariate analysis it has been observed that 10+ years of employee exp. is taking more loans then the other categories.

Interest Rate vs Employee Grades



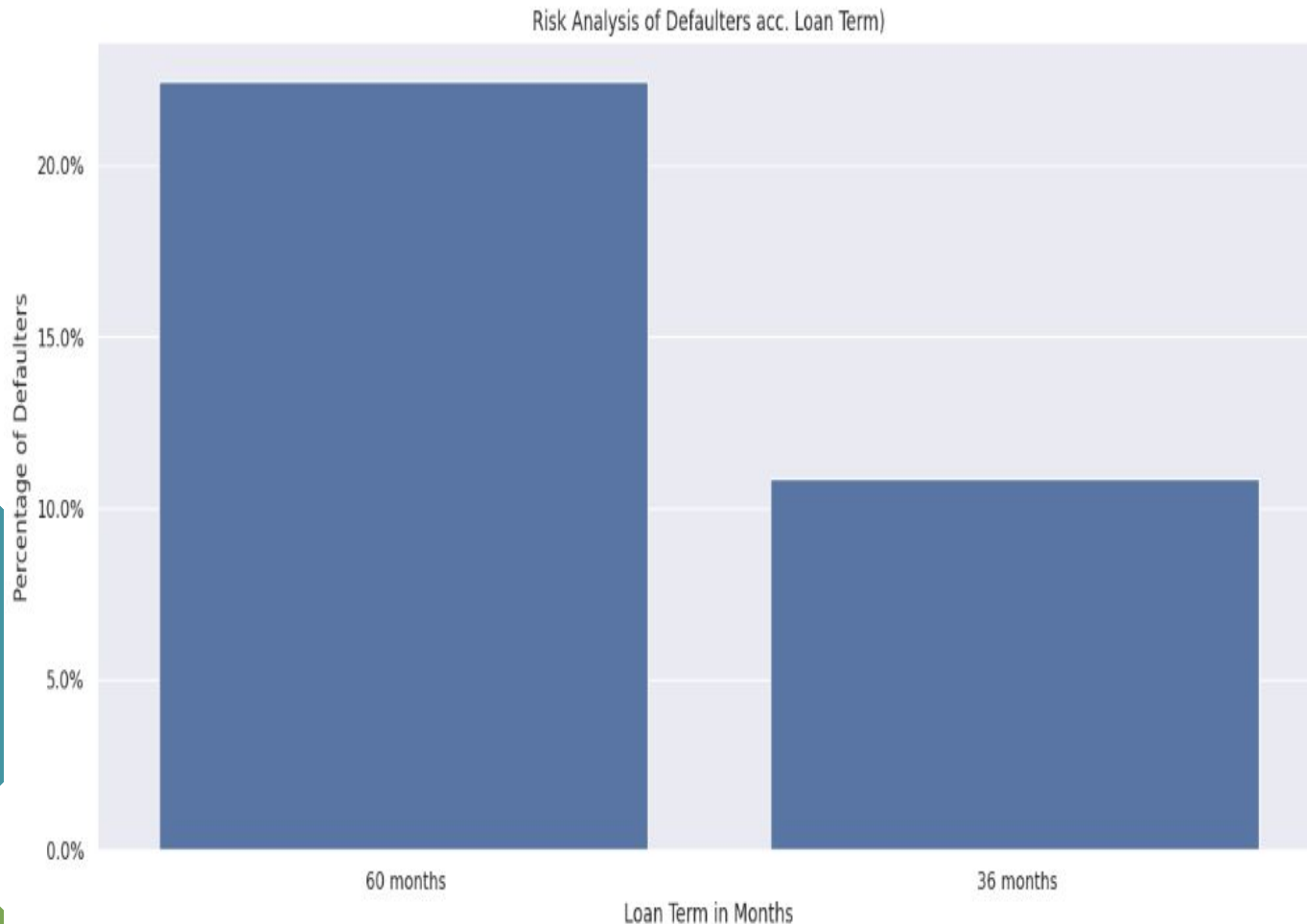
By observing the above plot it has been observed that interest rates are increasing with the decrease in Grades, where A has lowest interest and G has highest.

Calculate the percentage of loan defaulters according to address of a state



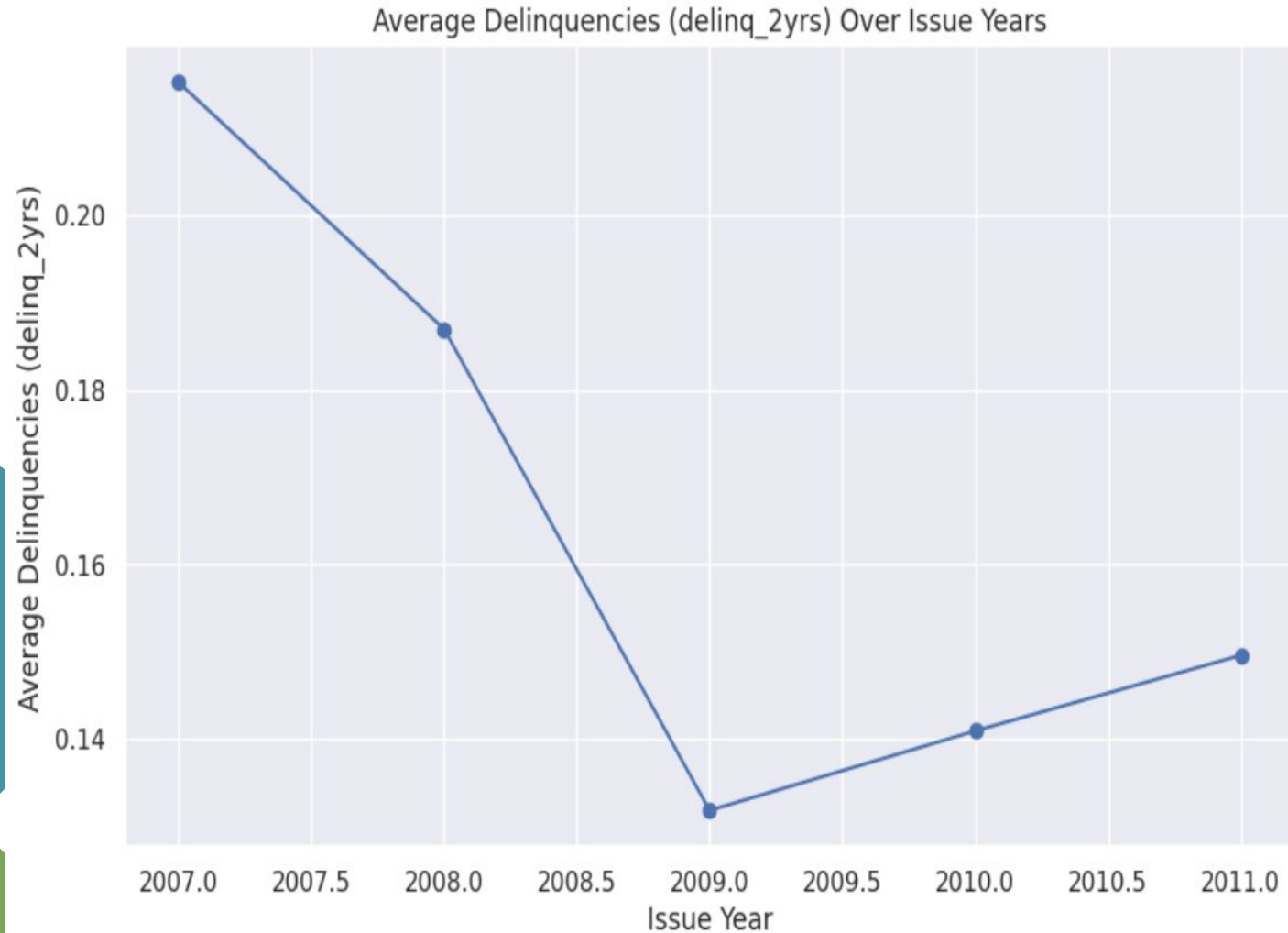
The above plot shows that NE state has highest percentage of Defaulters.

The percentage of Defaulters is much higher in 60 months term then 36 months



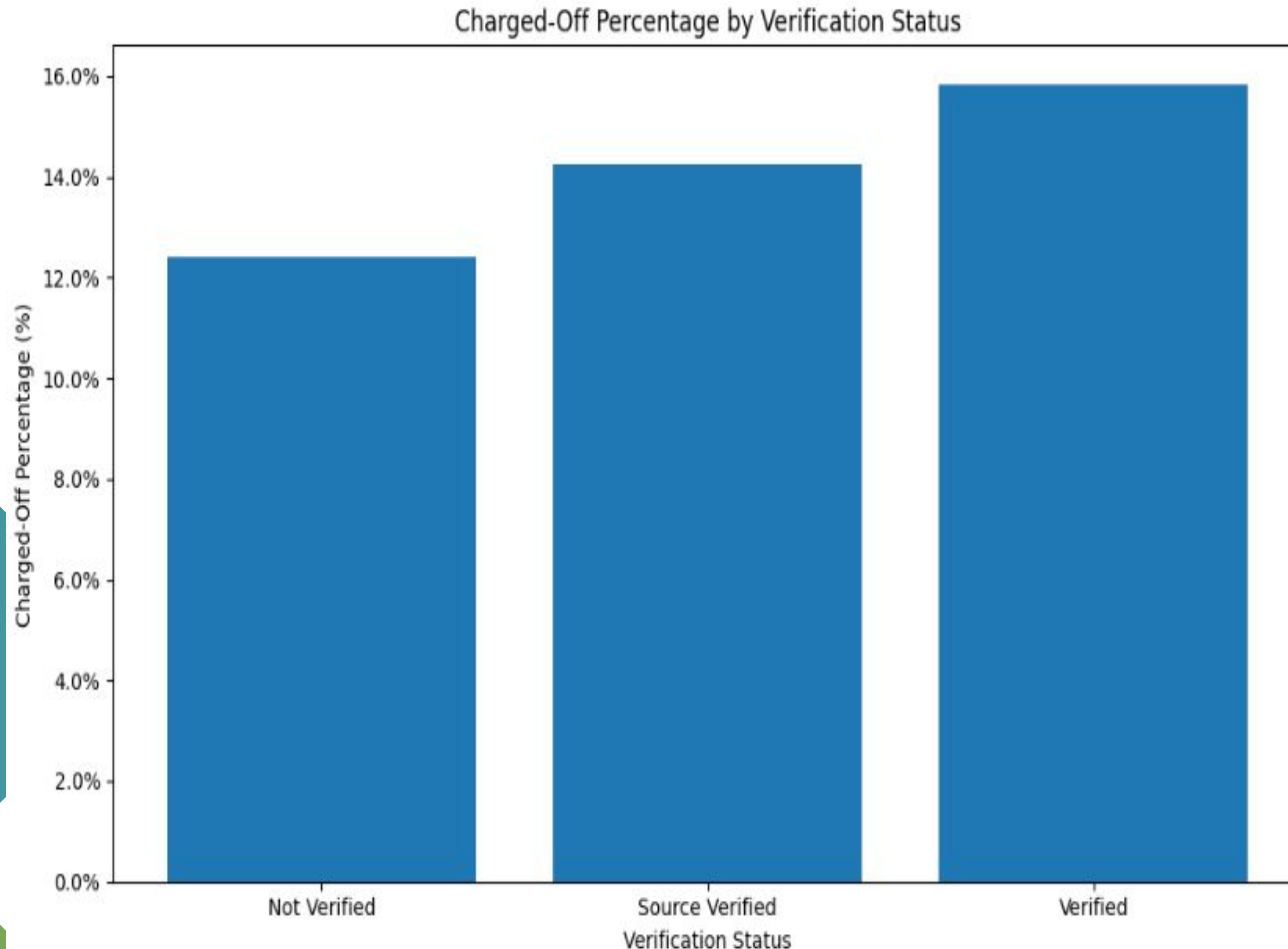
The percentage of Defaulters is much higher in 60 months term then 36 months.

Delinquency Incidences Distribution by Issue Year



Line plot reveals a general increase in delinquency rates over the years, which could indicate that the quality of the loans issued has deteriorated over time, resulting in more defaults. However, it is important to keep in mind that other factors, such as changes in the broader economic environment, variations

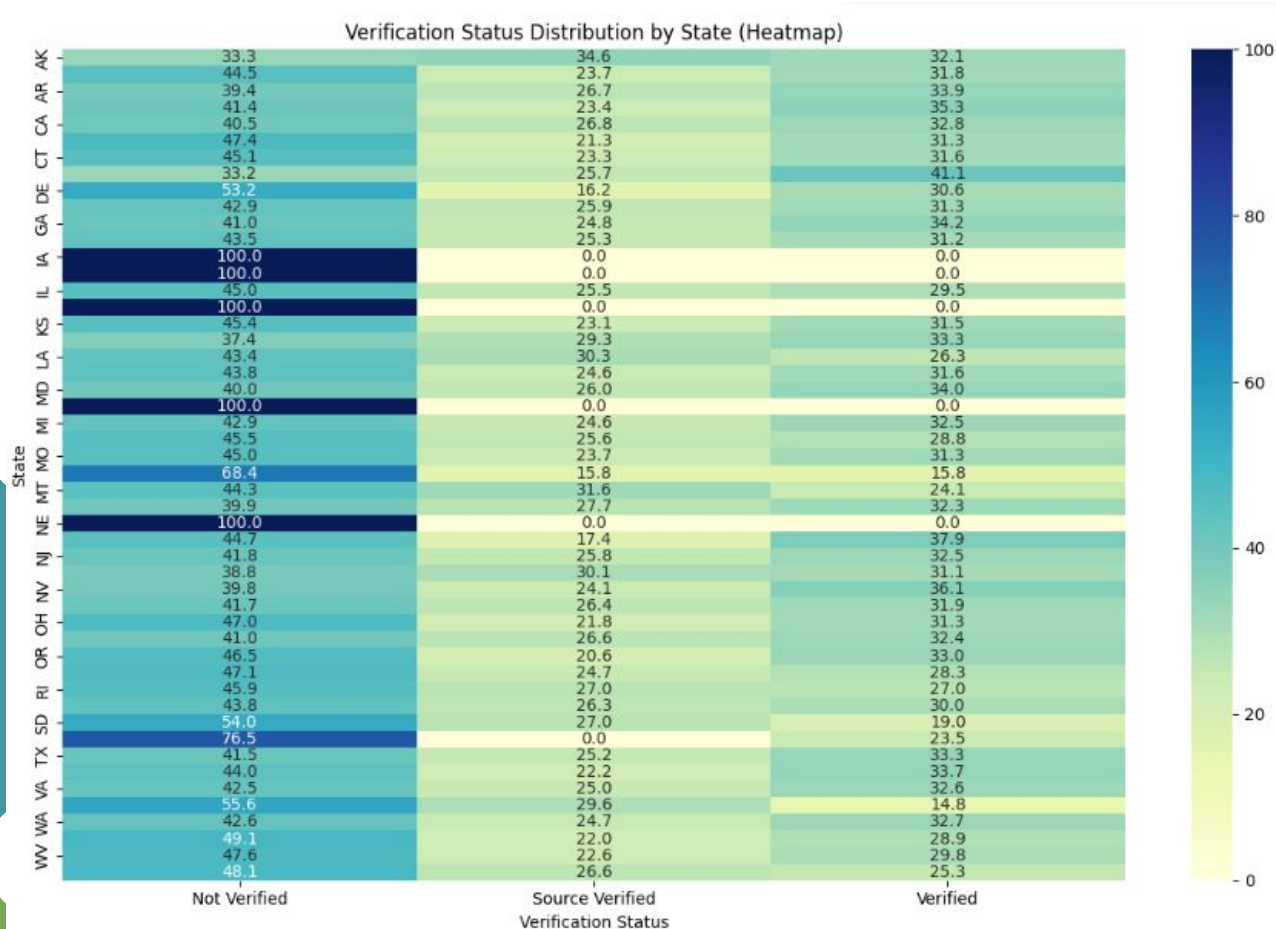
Loan Status Distribution by Verification Status



Most of the defaulters are coming under Verified Customers

States with a larger "Verified" segment tend to have more stringent income verification practices, while states with a larger "Not Verified" segment might have more relaxed requirements. This information can be useful in understanding regional lending patterns and potential risk factors associated with different states.

Verification status by State



States with a larger "Verified" segment tend to have more stringent income verification practices, while state with a larger "Not Verified" segment might have more relaxed requirements. This information can be useful in understanding regional lending patterns and potential risk factors associated with different states.

States like IA,KS,NE etc most of the loan is Not verified

Observations and Analysis





Loan Request coming under these categories are most likely to be a Defaulter

1 From state NE, IA, KS

2 Verified Customers

3 Loan purpose for them are Small Business

4 Customer Grade is Lower Grade (G) and they are charging more interest rate too

5 Customer having higher experience coming under this category

Highest percentage of defaulter is under ****Other**** home ownership and is followed by Rent and Own and
6 Mortgage

7 The percentage of Defaulters is much higher in 60 months term then 36 month

8 Defaulters are mostly seen in the year 2011



Common Findings

- 1 Loan applicants are increasing every year
- 2 Debt Consolidation is the highest loan purpose, other uses are credit_card , other , home_improvement & major_purchase
- 3 the maximum loan range amount is between 5000-10000
- 4 The highest percentage of defaulter is under **Other** home ownership and is followed by Rent and Own and Mortgage
- 5 10+ years of employee exp. is having debt to income in maximum range apart from that rest year of employee exp. are more or less in same range.
- 6 been observed that interest rates are increasing with the decrease in Grades, where A has lowest interest and G has highest
- 7 Rising Delinquency Rates: If delinquency incidences are increasing in recent years, this could point to worsening borrower financial health, lending policy changes, or macroeconomic conditions influencing repayment behavior
- 8 Improvement in Repayment: If the delinquency incidences are decreasing, it may reflect improvements in borrower financial stability, better loan management, or stricter lending standards
- 9 Year-to-Year Volatility: If the error bars are large, it suggests that there are significant fluctuations in delinquency rates from year to year. This could be indicative of changing external factors, such as the economy or lending
- 10 States with a larger "Verified" segment tend to have more stringent income verification practices, while states with a larger "Not Verified" segment might have more relaxed requirements. This information can be useful in understanding regional lending patterns and potential risk factors associated with different states.

Thank you

