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Late Loan’s, Our Analysis and Findings

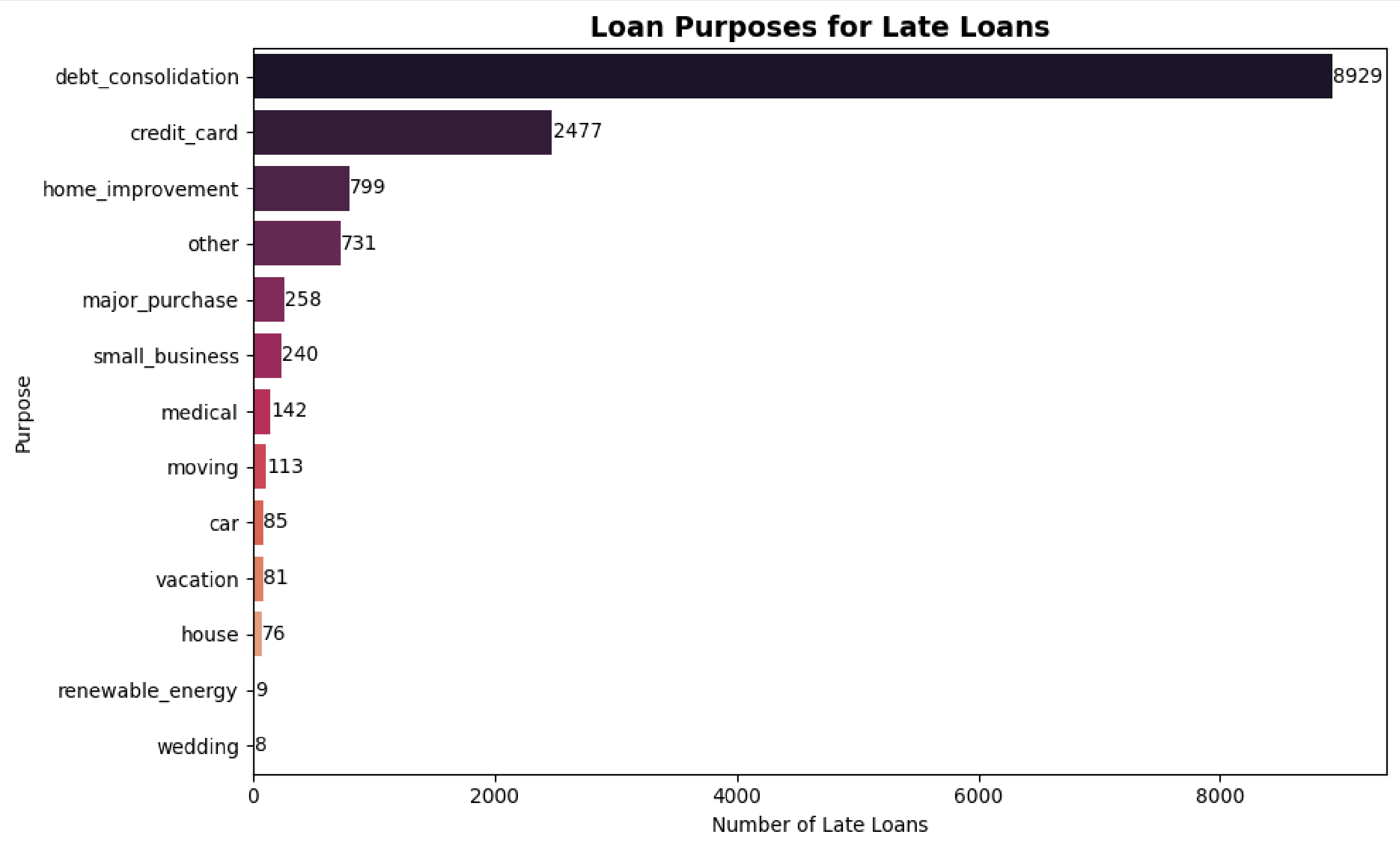
Presentation Overview:

1. Question One
   - Understanding and important findings
   - Scenario three: loans that are late
2. Question Two
   - Marketing department
   - Understanding the people who apply and those who are successful
   - How to market to individuals seeking a loan
3. Question Three
   - Which loans are successful, and which are not
4. Question Four
   - Other important findings and insights
   - Recommendations
5. Hypotheses

Question 1

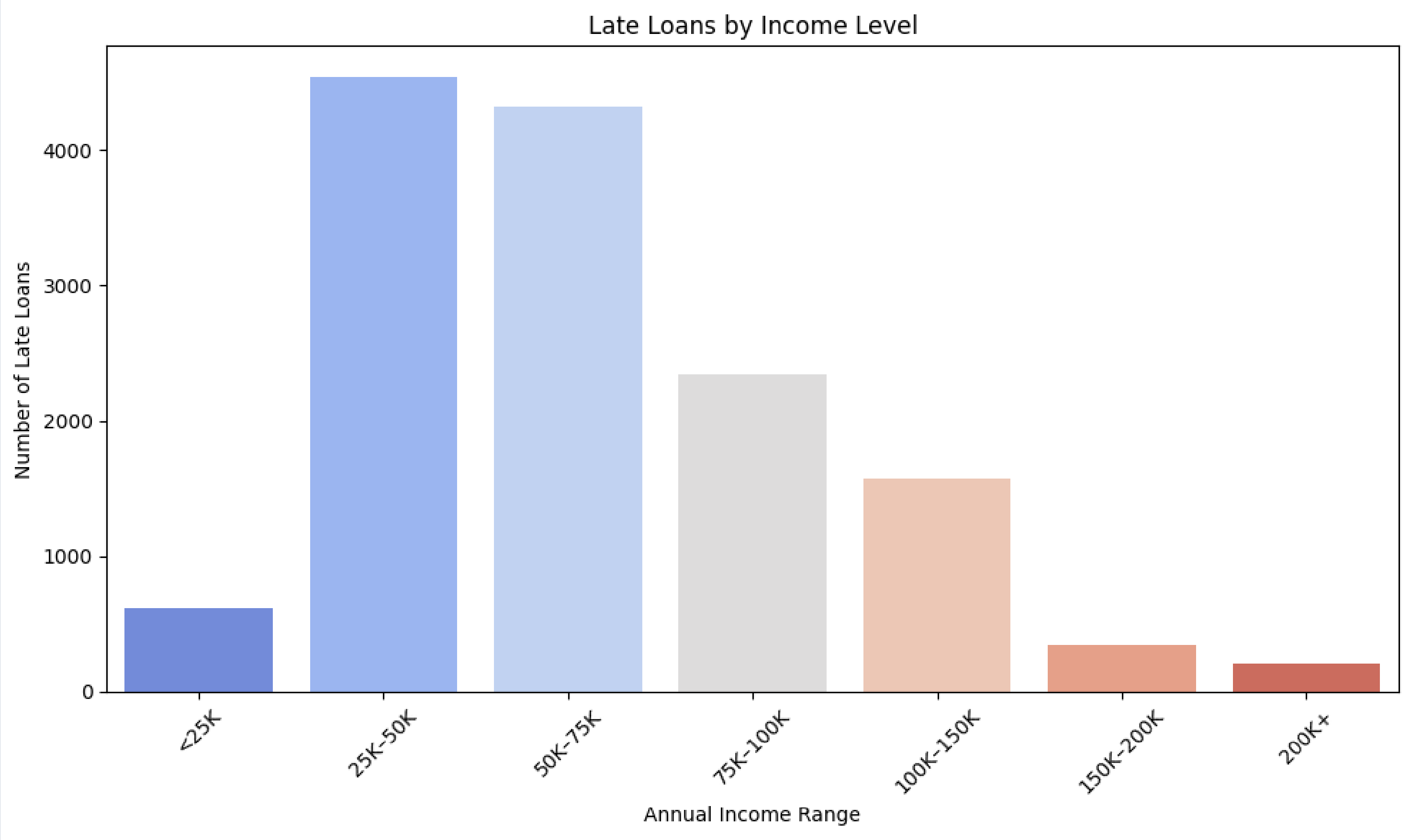
Loans that are currently late on payments (loan statue is "In Grace Period," "Late (16-30 days)," "Late (31- 120 days)"

Late Loans vs. Loan Purpose



- Debt consolidation is the highest amount of late loans
- Majority of the late loans come from credit card/ debt consolidation
- These loans are usually larger and long-term which are harder to pay increasing the chances of late payments

Late Loans vs Income Level

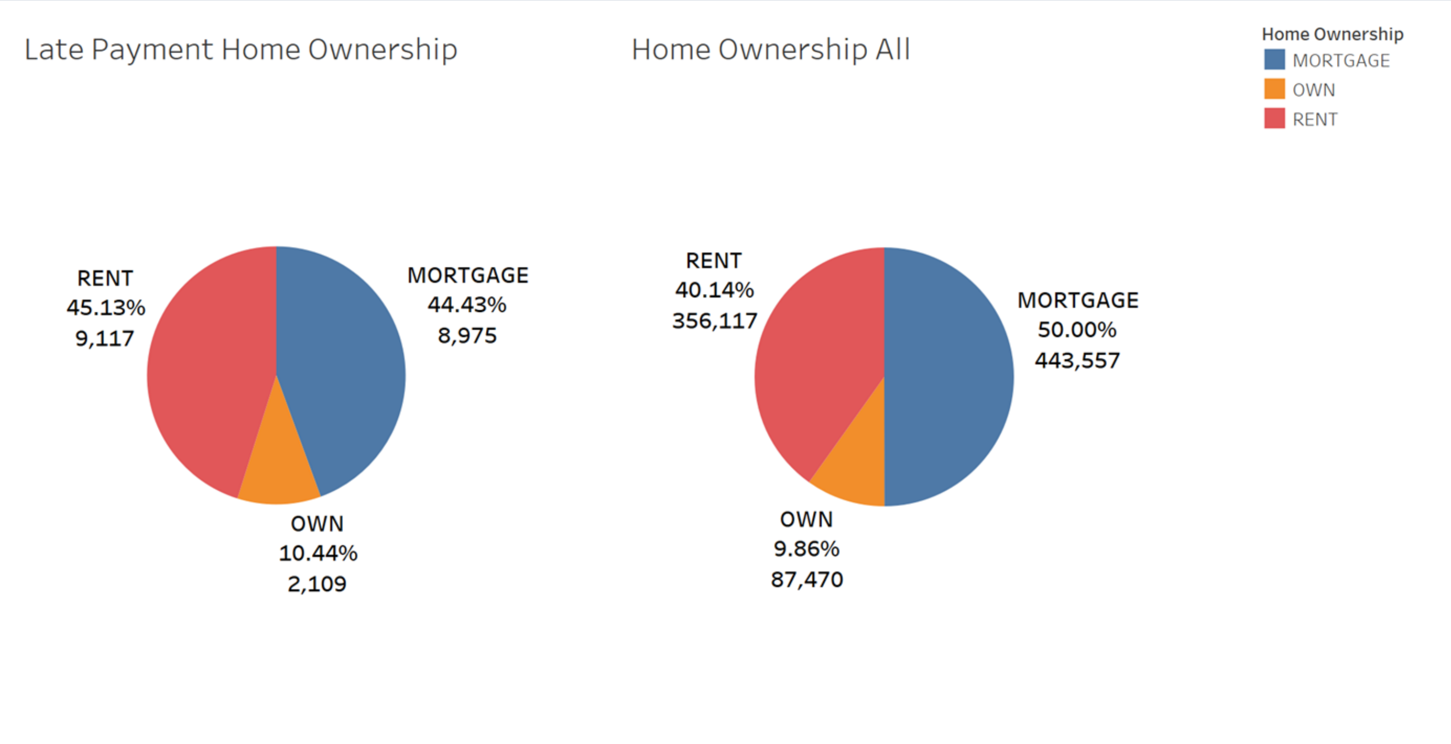


- The income range of 25-50K has the most amount of late loans

- Lower annual incomes result in late payments since they can't afford to pay on time

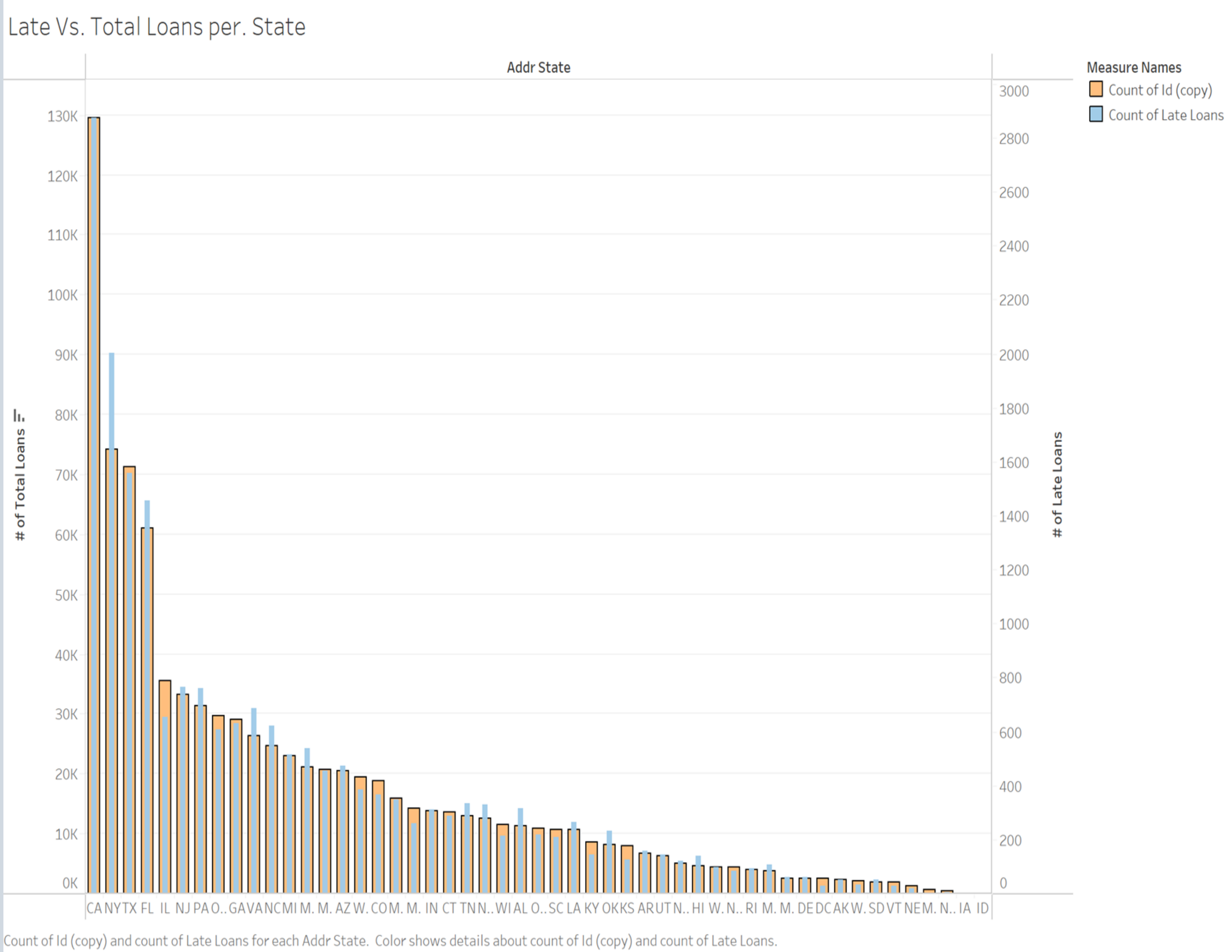
- People less than 25K annual income is lower most ~~likely to the fact they don't make~~ enough apply for a loan

- Higher annual income ranges are more reliable when it comes to payment



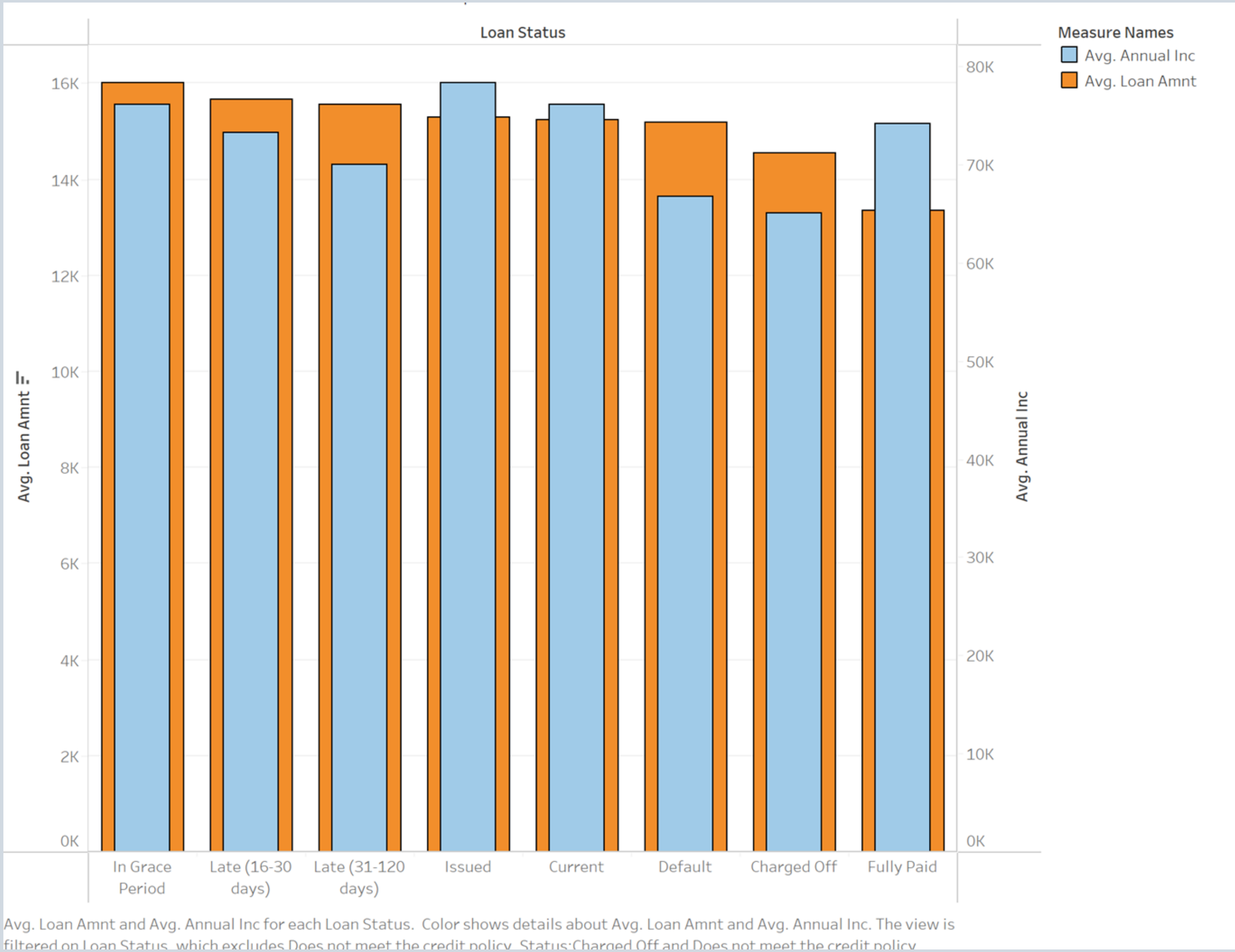
Living Status

- People who have late payments are Slightly more likely to rent their house while overall most people have a mortgage.
- It is about equally as likely for someone who has late payments to own a house vs. If they didn't.



Late Accounts Across the US

- The number of late loans seems to follow the trend of total loans for the most part.
- NY has more late accounts in relation to the state's total loans, but also a bigger sample for people to be late from.

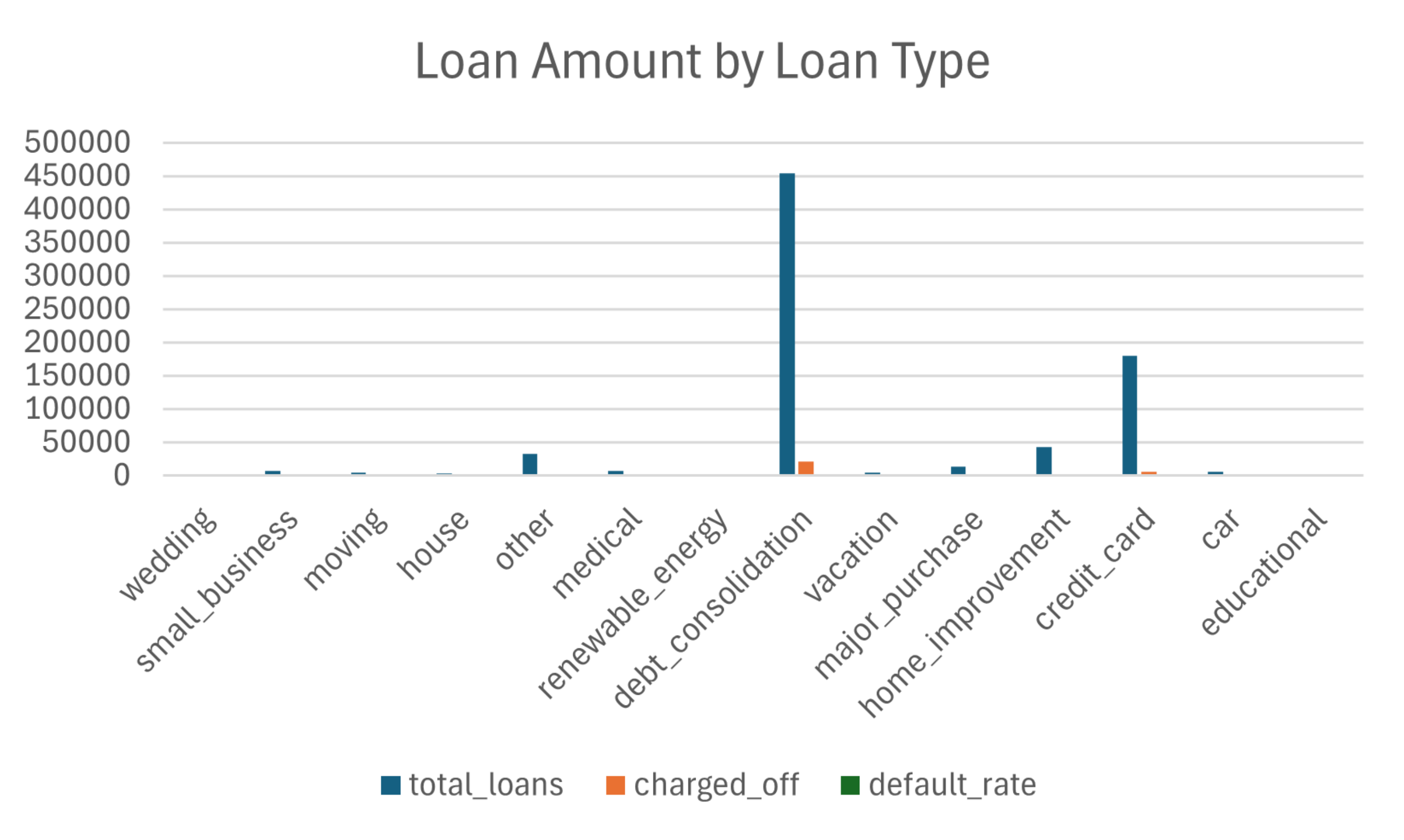


Avg. Loan Amount & it's Average Yearly Income

- The loans that cost the most are the ones in grace period and late.
- If someone has a late payment and fully pays off their loan its more likely to be a smaller loan size and their income also is more likely to be greater too.

Introduction | **Late Loans Overview** | Who's Applying? | Loan Variables | **Interesting Findings / Summary**

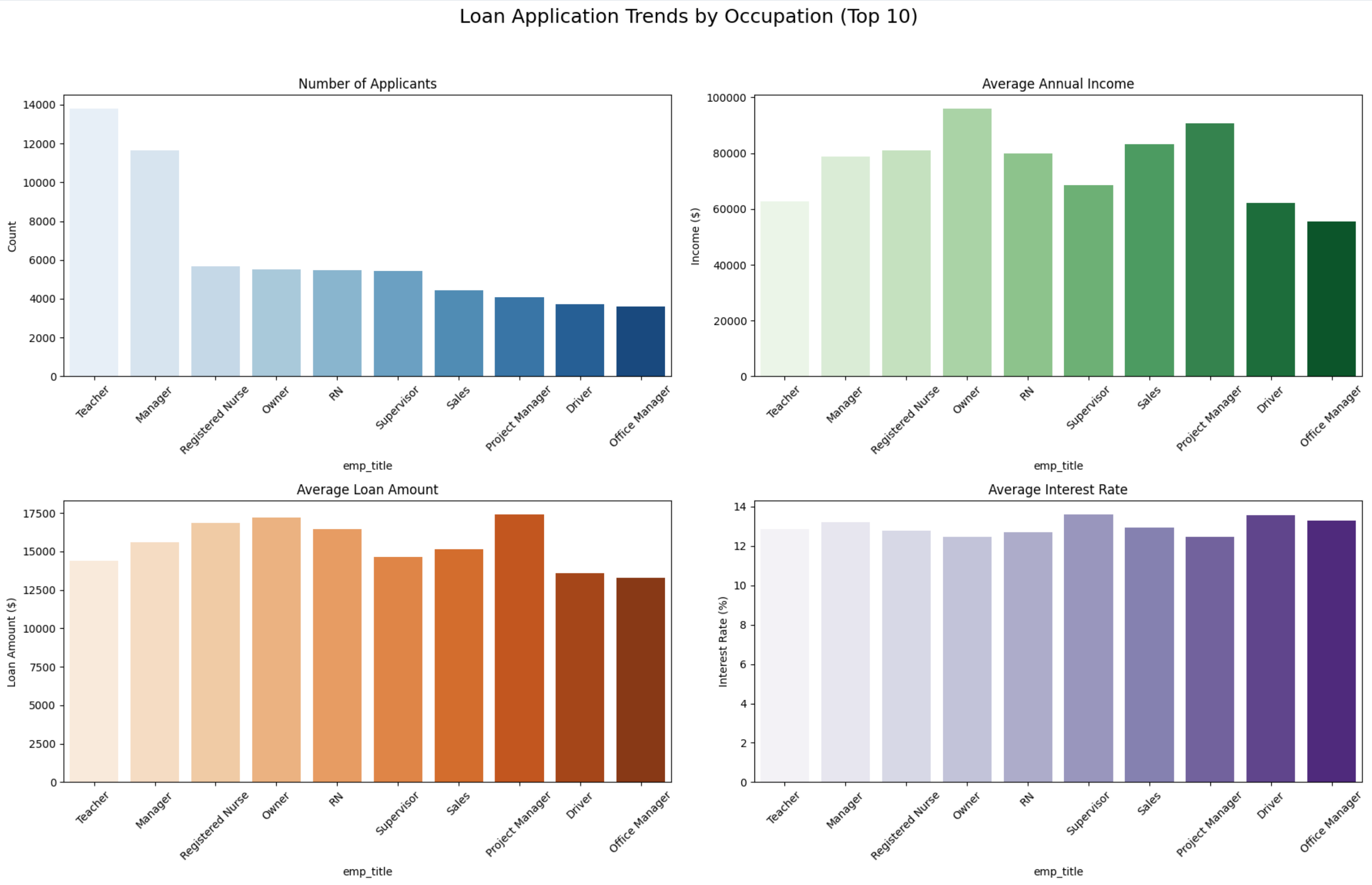
What Types of Loans



- The main reason that people get a loan is for debt consolidation, followed by credit cards.
- The data shows that debt consolidation alone accounts for 63% of all loans.
- Credit card loans account for another 25% of all loans.
- Together that’s 88% of every loan we have data on.

Question 2

CUSTOMER MARKETING DEPARTMENT: WHO ARE APPLYING FOR LOANS AND WHO IS SUCCESSFUL?



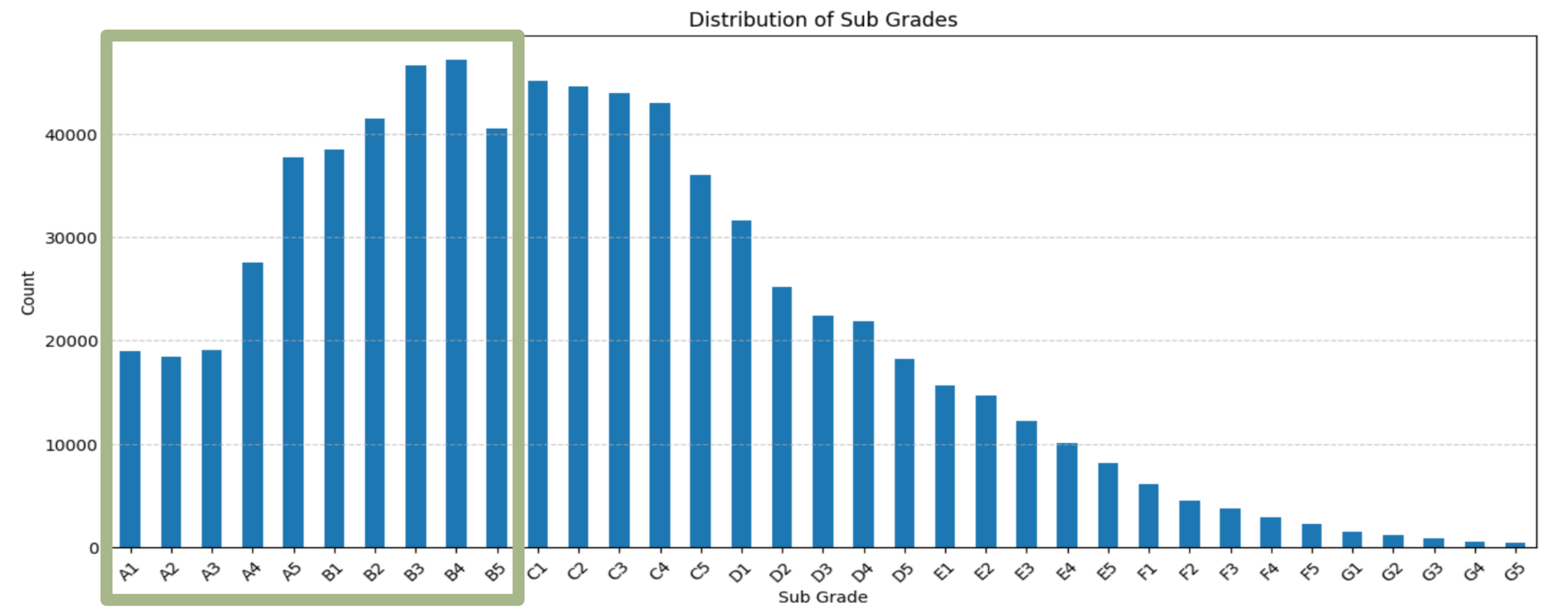
Who is applying for our loans?

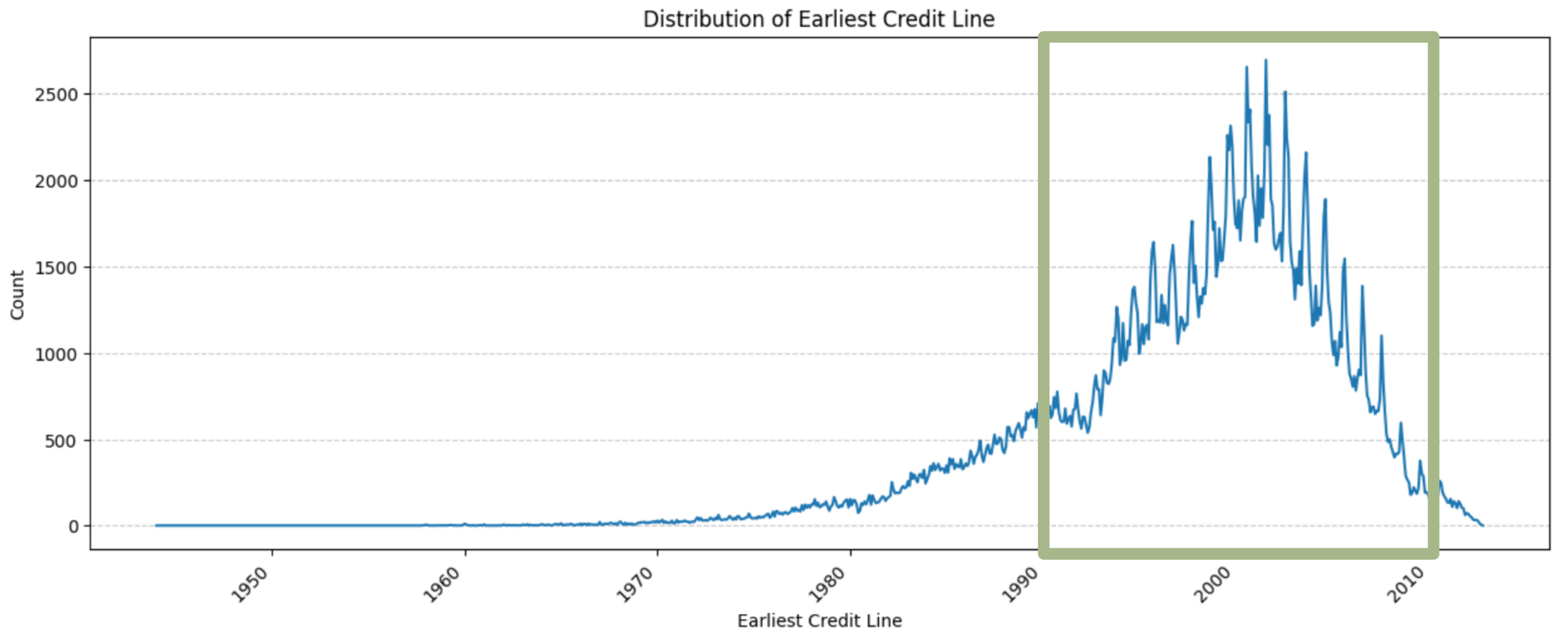
What trends of the people do we see that our applying for our loans?

- Occupational, loan amounts, number of applicant, and interest rate we took into consideration
- There is no linear correlation
- Higher annual incomes don’t take out as many loans as the lower incomes
- Seems that people with the higher incomes results in a larger amount in a loan but may not be as many loans

Who is successful?

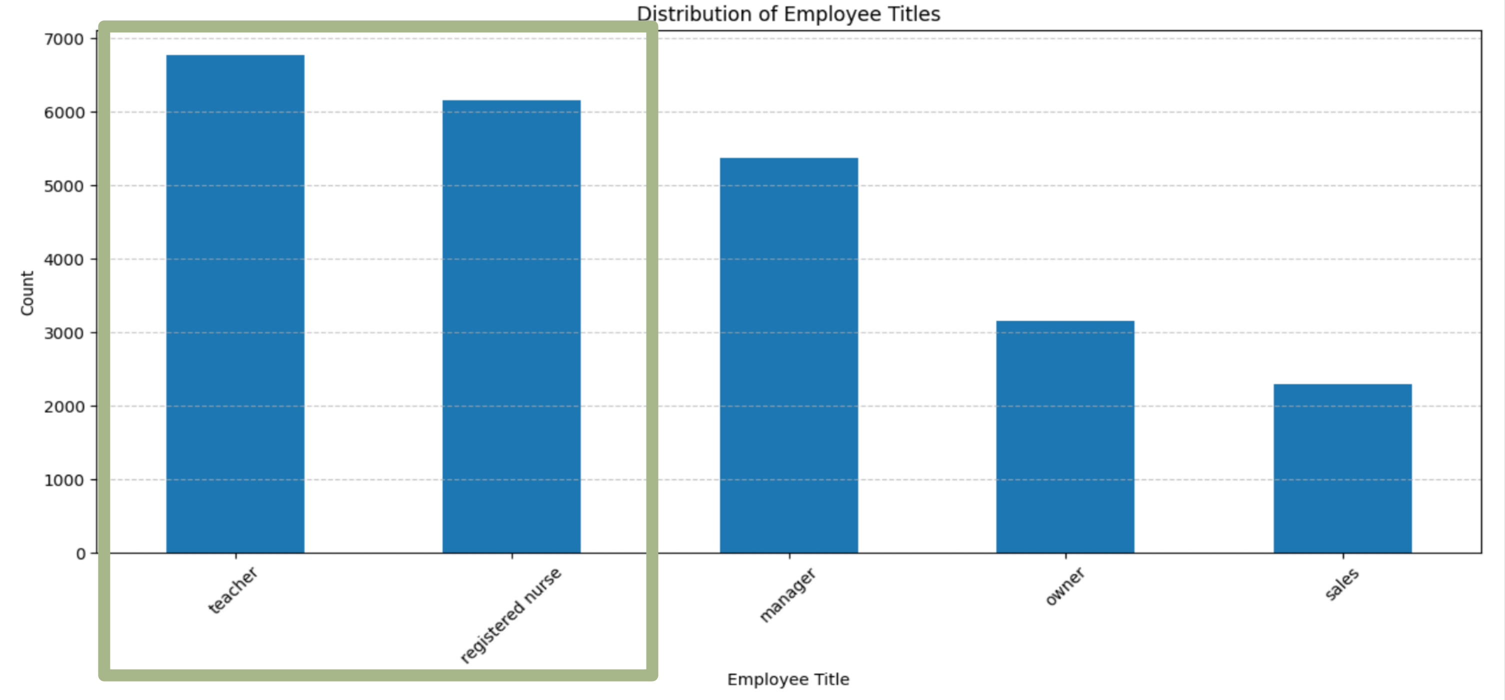
- How are we defining success?
  - Acceptance
  - Current on accounts
  - Subgrade
- The higher the grade the lower the interest rate and the better the credit history
  - As and Bs
  - Earliest line of credit
  - Silent Generation to Millennials





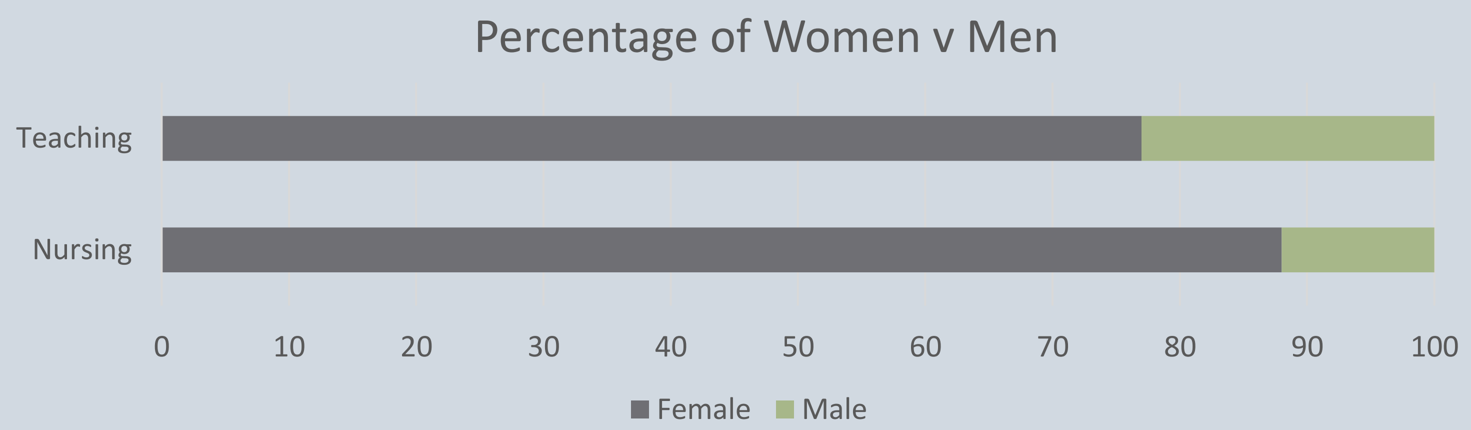
About Our Target Barrowers

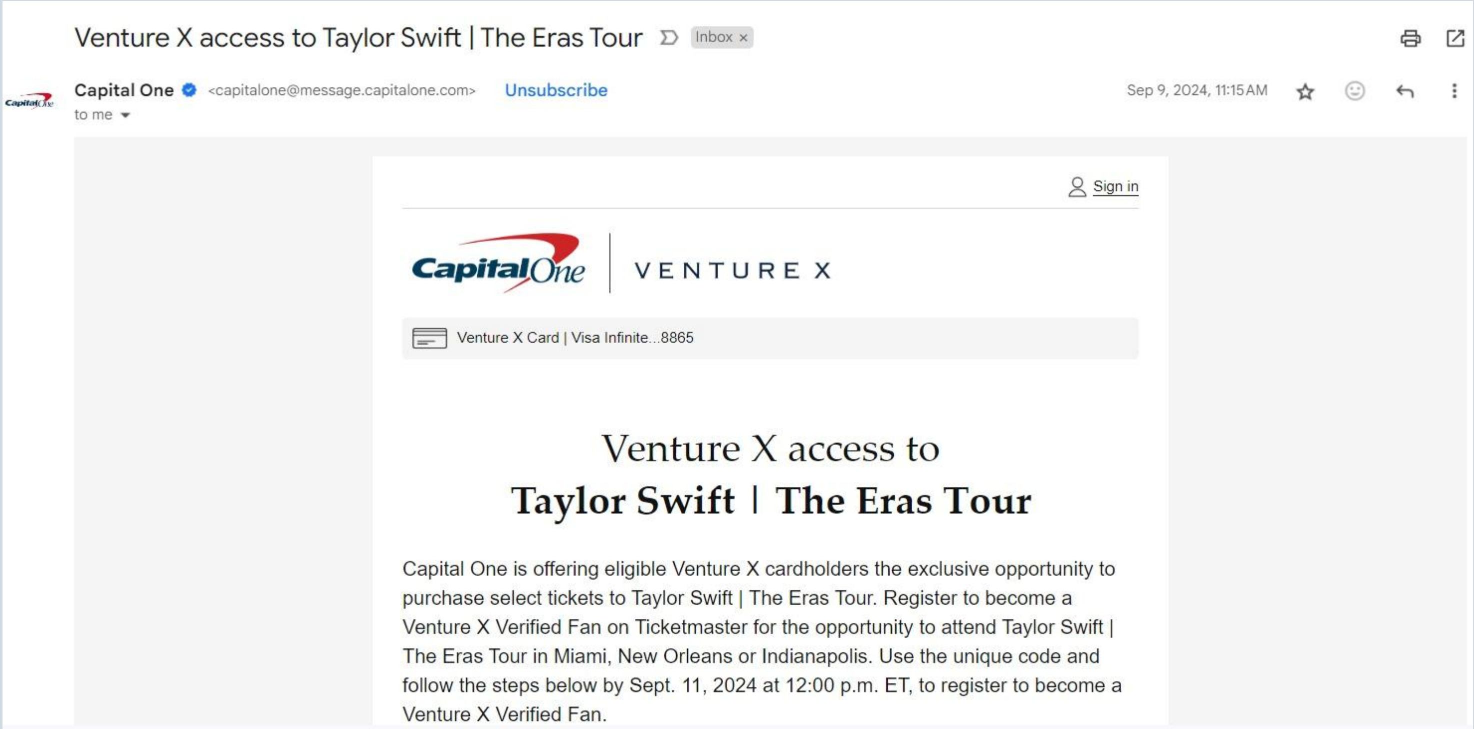
- Where?
  - California, New York, or Texas
- Mortgage
- Teachers and Nurses
- Strategy



Sources: US Bureau of Labor Statistics and National Center For Education Statistics

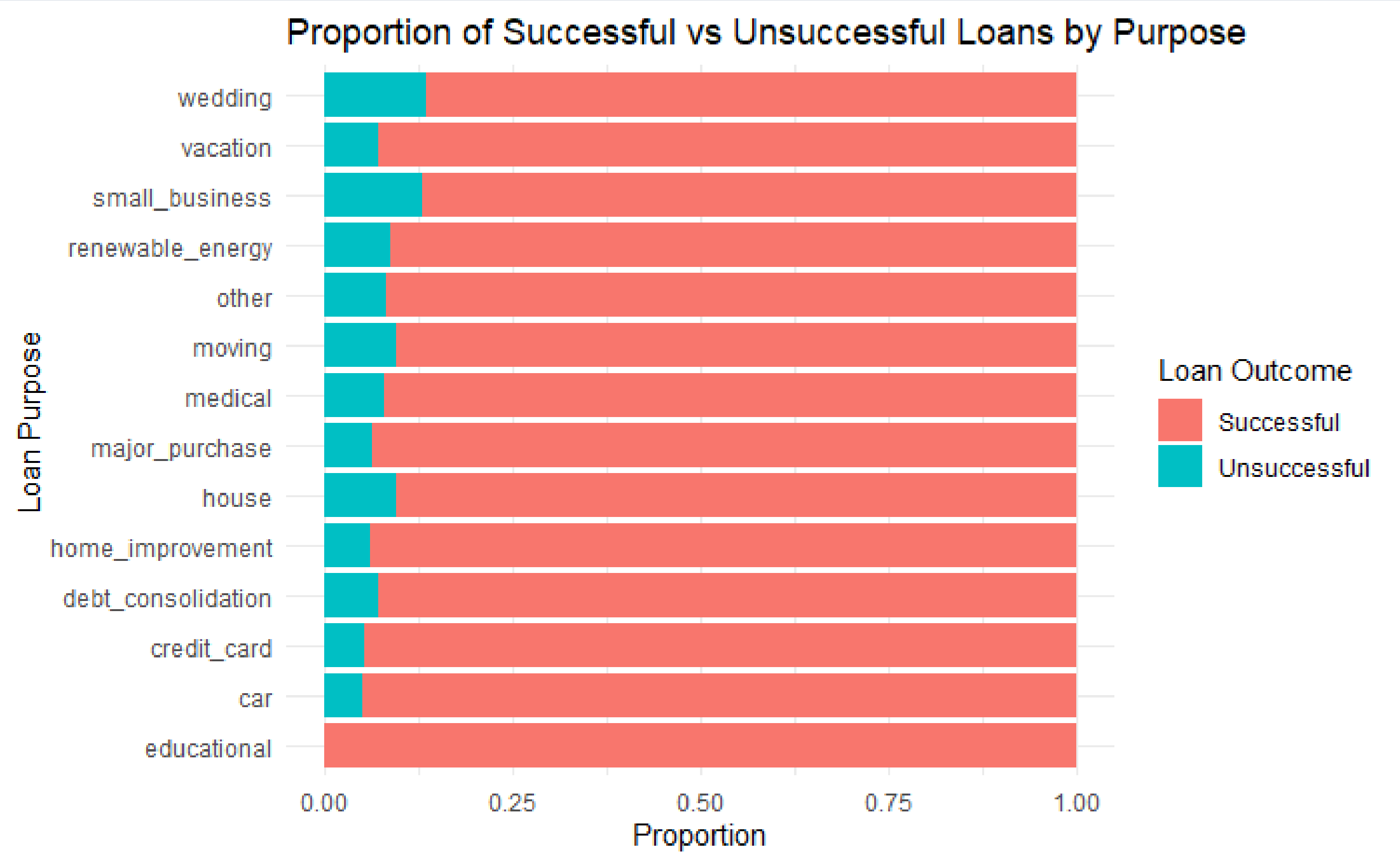
Marketing Strategy





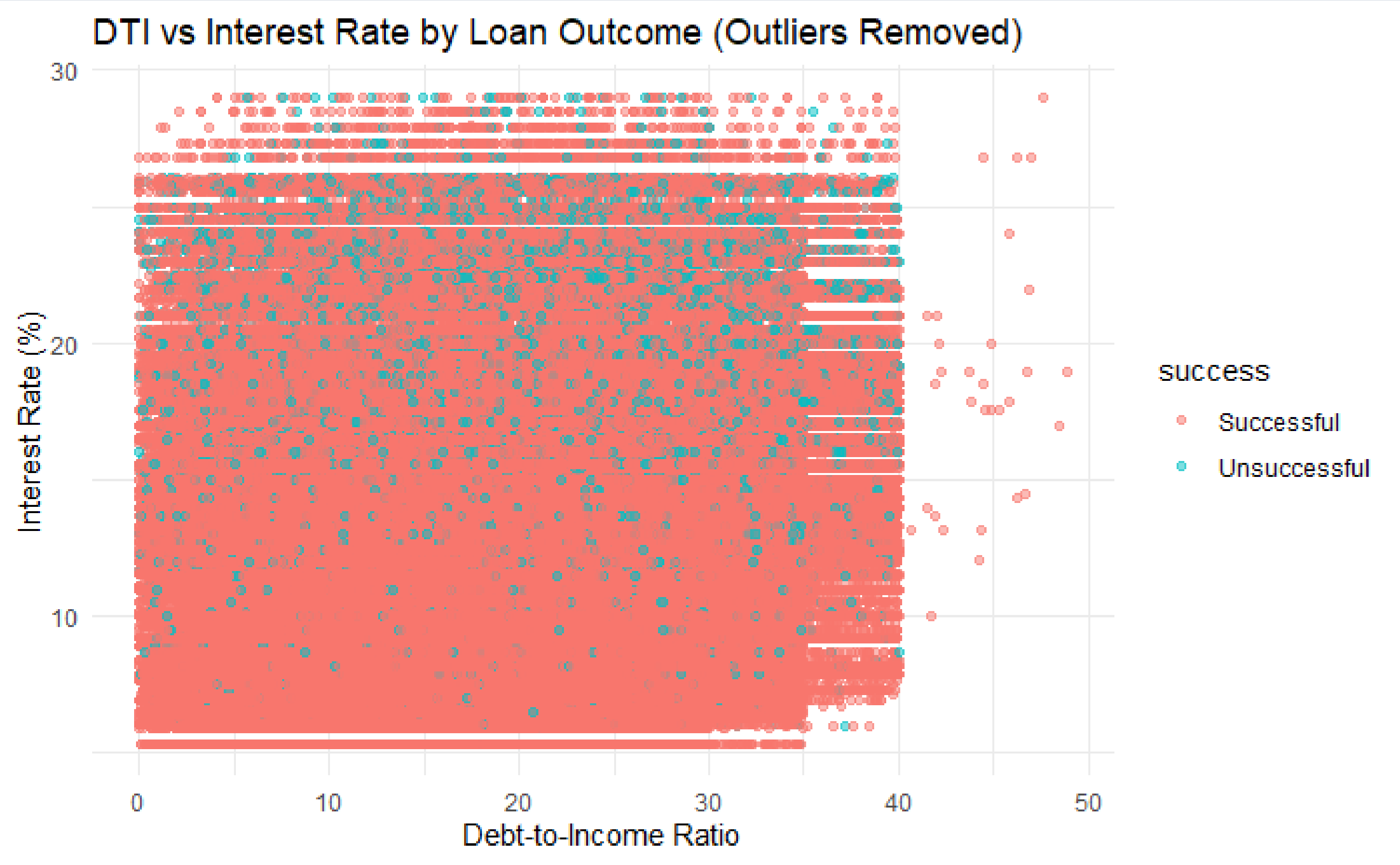
Question 3

LOAN VARIABLES: WHAT FACTORS MAKE A LOAN LATE OR SUCCESSFUL?



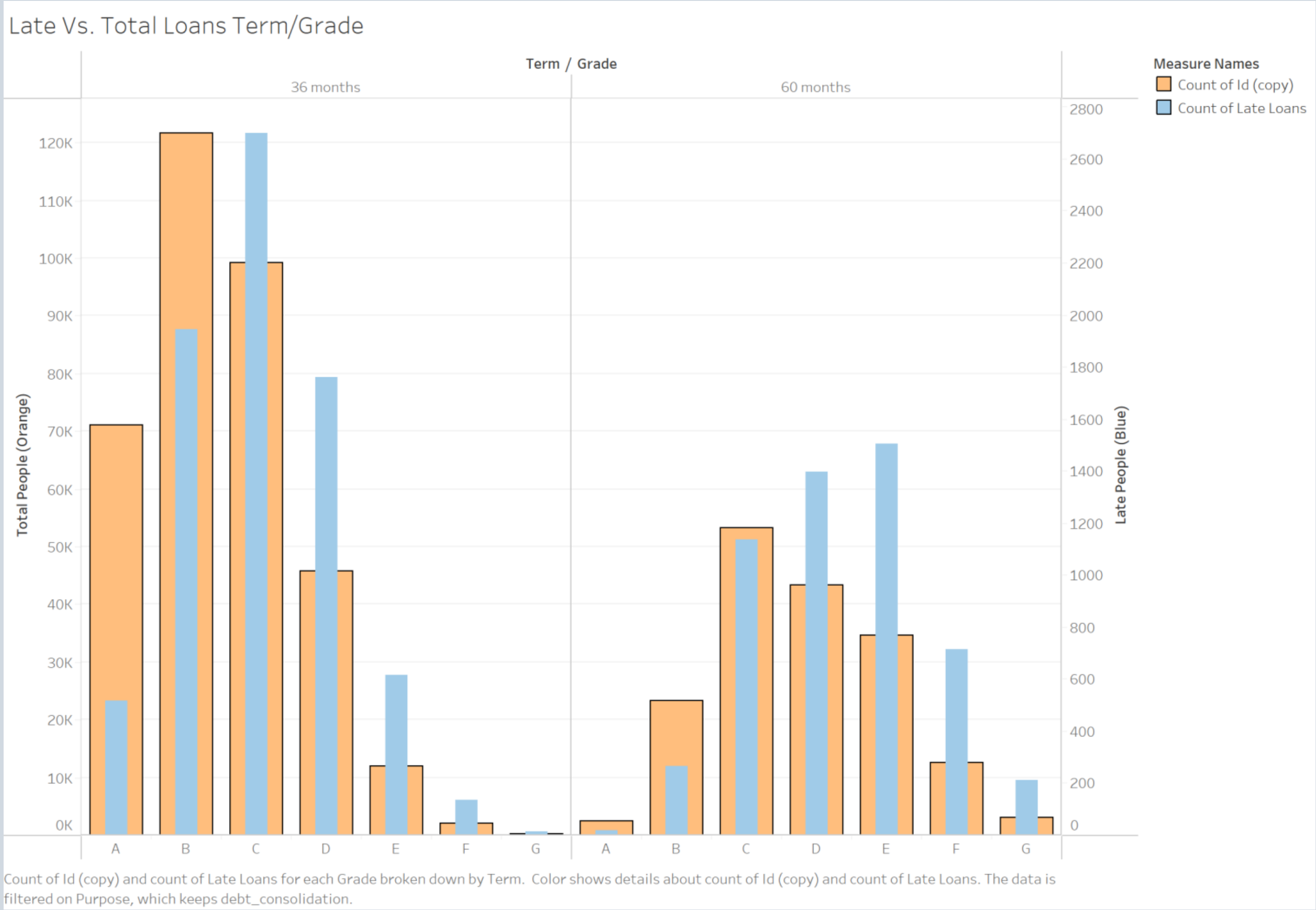
Which types of loans are successful, and which are not?

- Most successful
  - Educational
  - Credit Card
  - Car
- Least successful
  - Wedding
  - Small Business



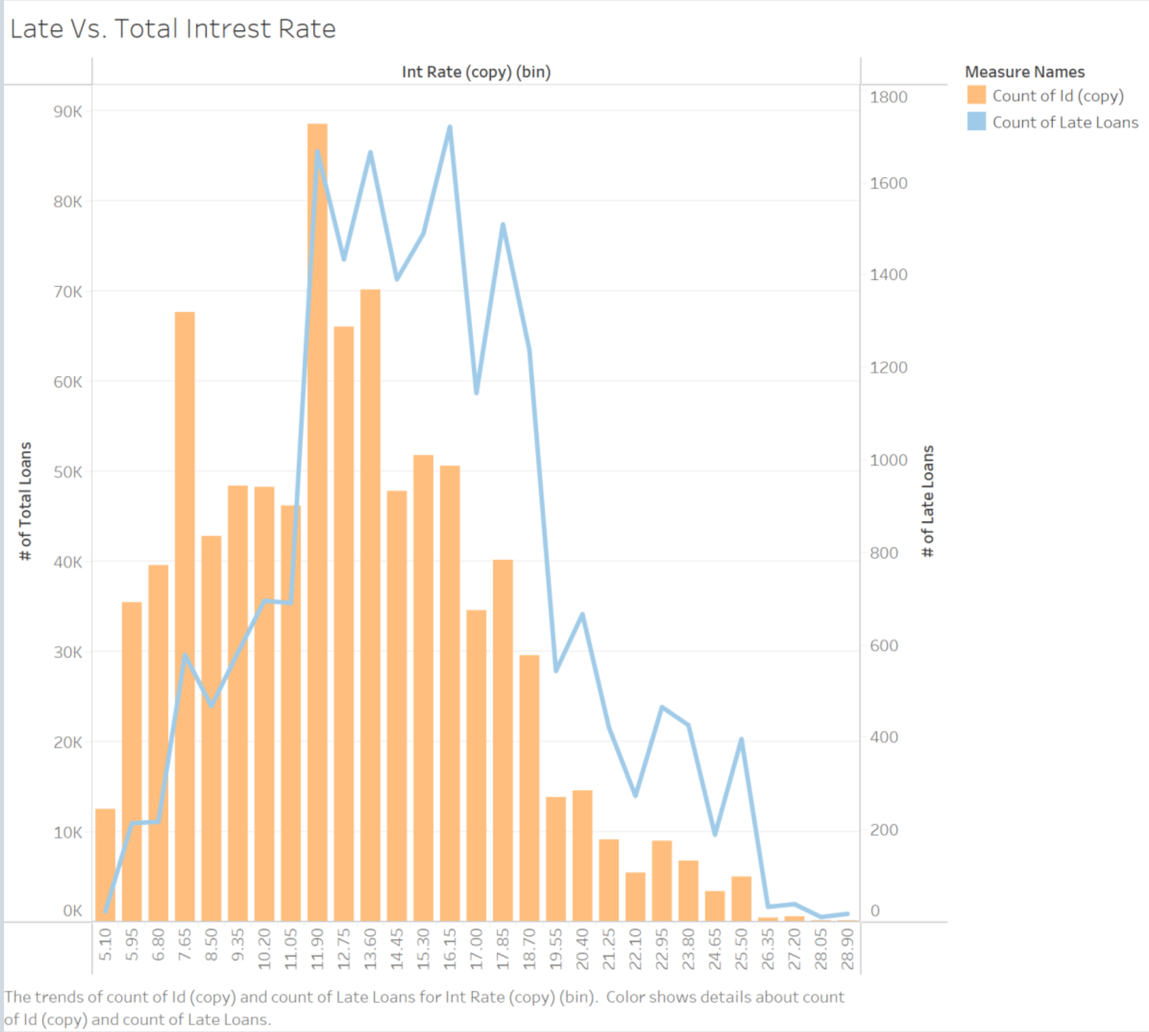
Success based on Debt-to-Income Ratio and Interest Rate

- As interest rate increases, we see more unsuccessful loans and less successful loans
- The DTI does not appear to affect the success



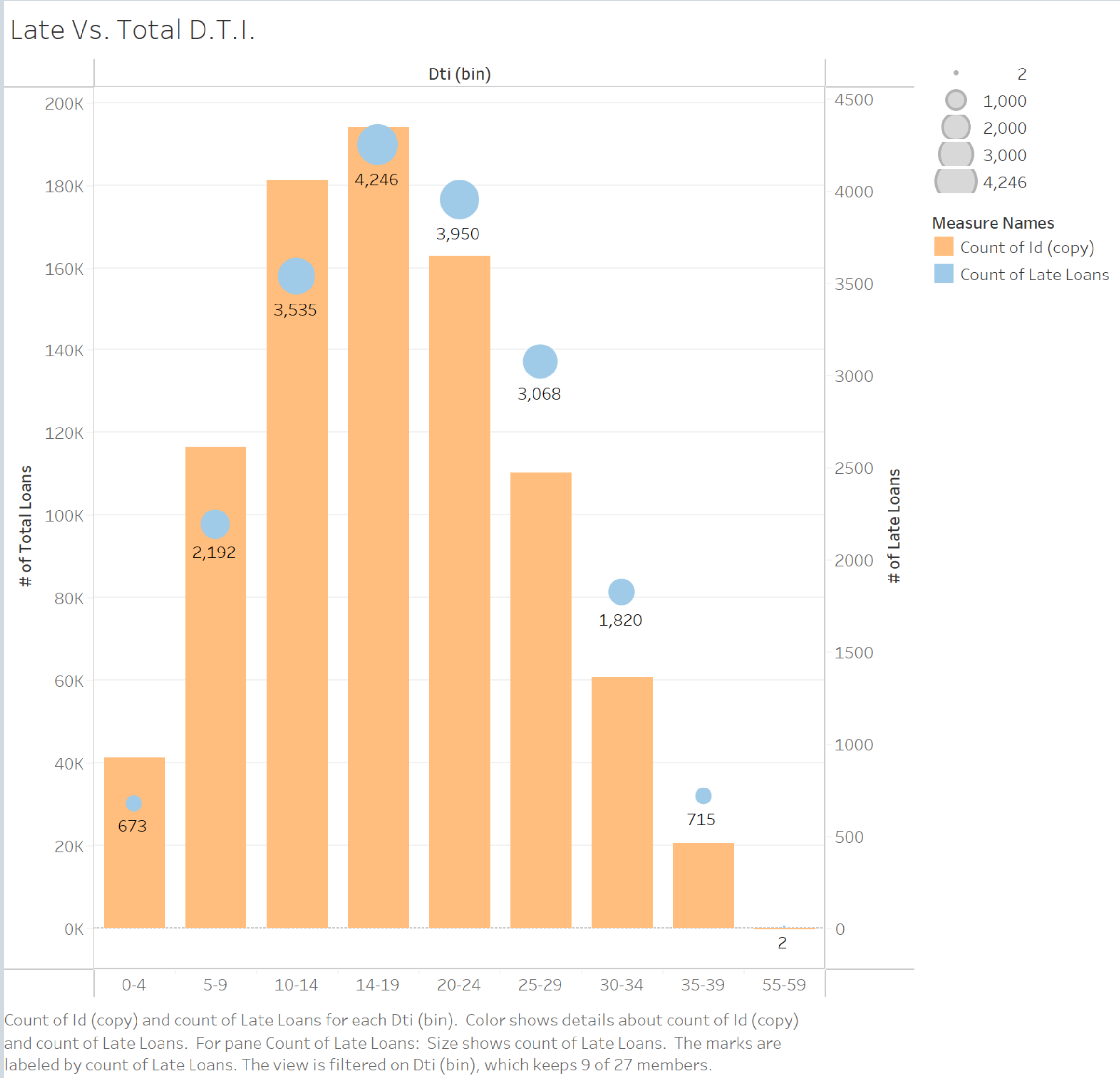
Loan Terms and Grades Effects on Late Payments

- We see what you would expect with the amount of late loans rising as the grade of the loan falls.
- For loans with a term of 60 months, there is a slightly more proportionate amount of late loans per grade than loans with a 36-month term.



Interest Rate's Effects on Late Accounts

- As the interest rate increased there were fewer total loans, but the amount of late loans increased.
- The interest rate with the highest amount of late loans was 16.50% with 1,720 late loans.

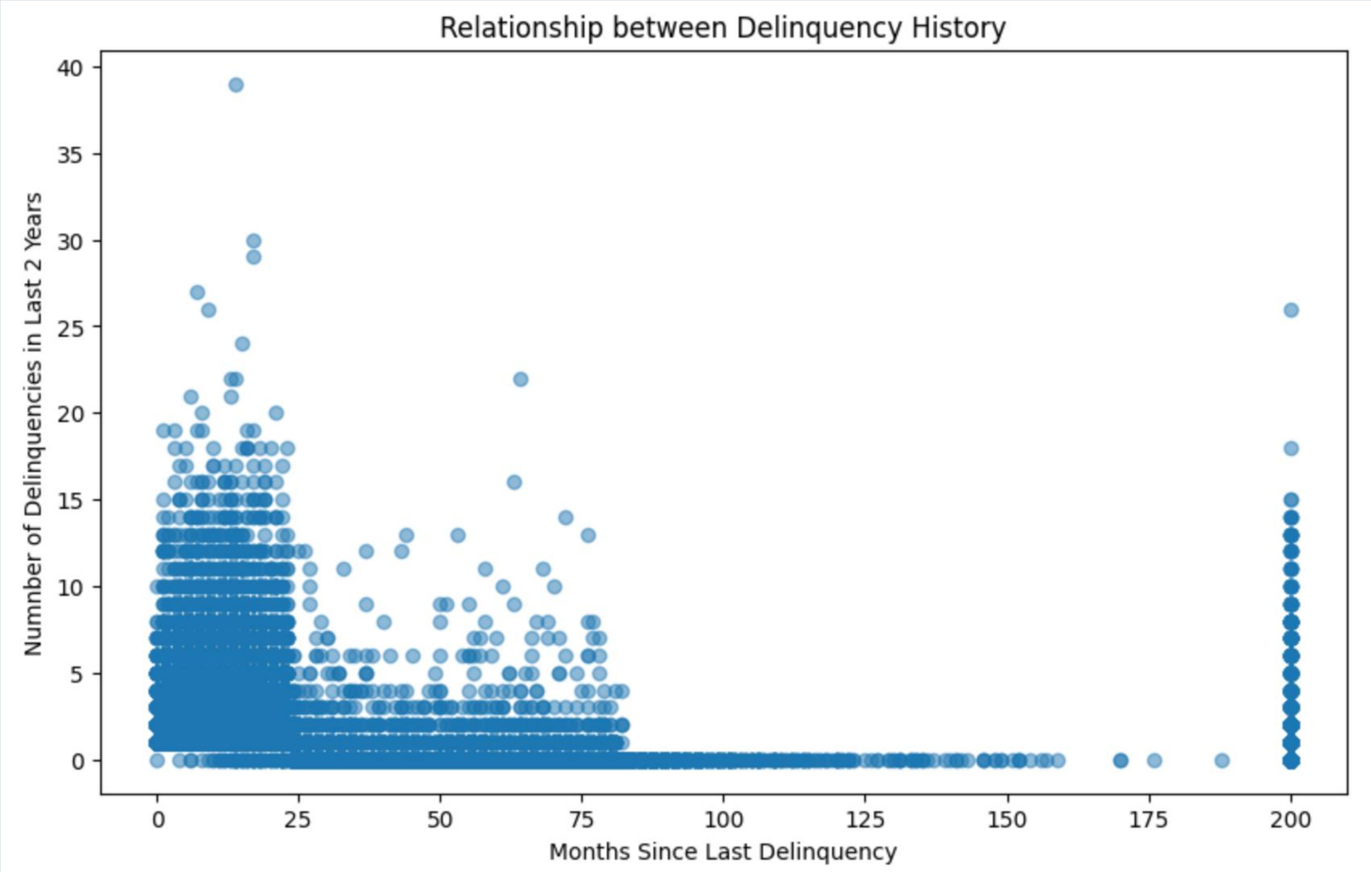


DTI's Effect on Late Loans

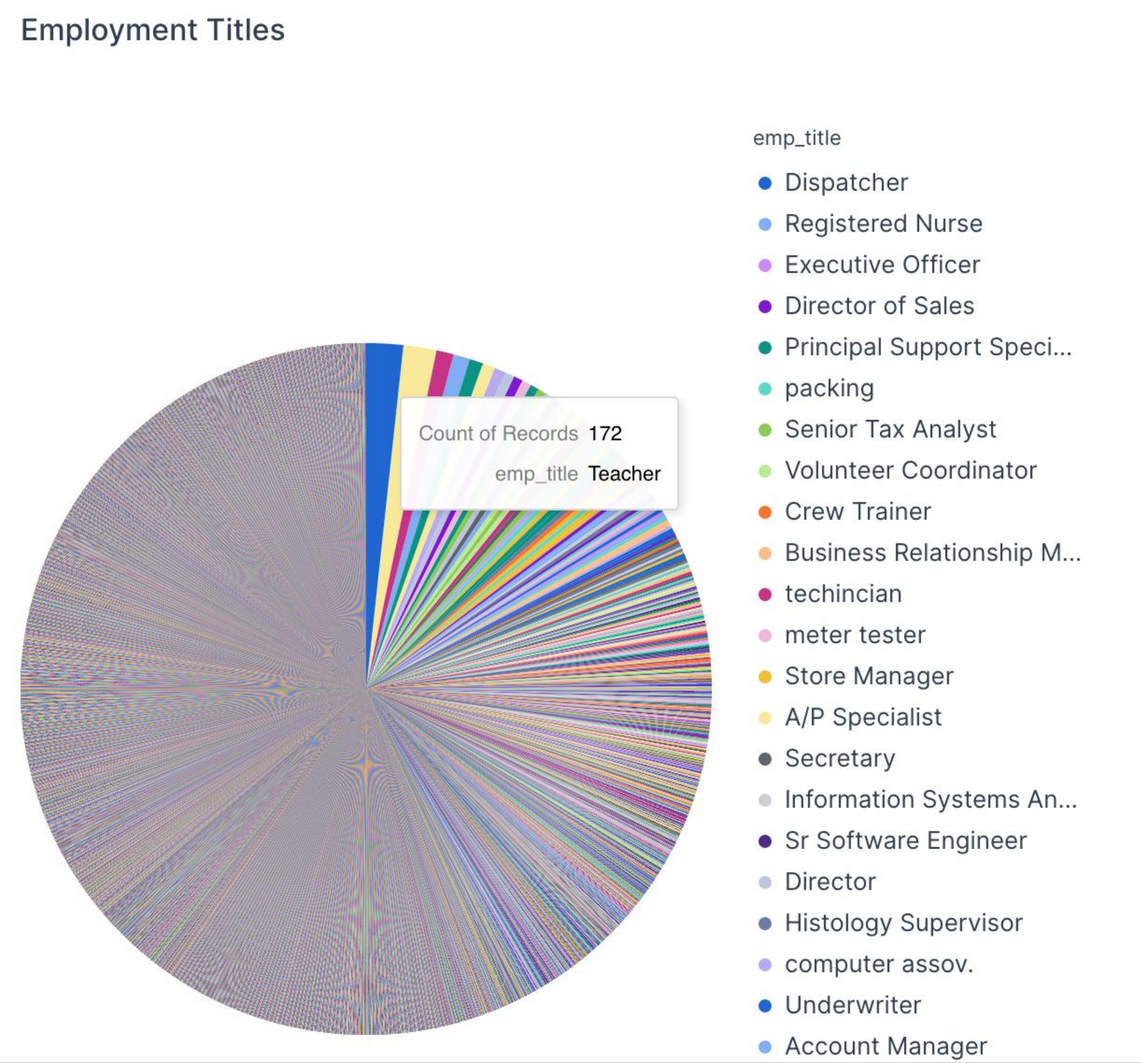
- DTI(Total Monthly Obligations ÷ Gross Monthly Income × 100) had an inverse effect on late payments.
- As the DTI went higher then 15, the total number of loans in the group fell and the number of late loans roes.

Question 4

Interesting findings

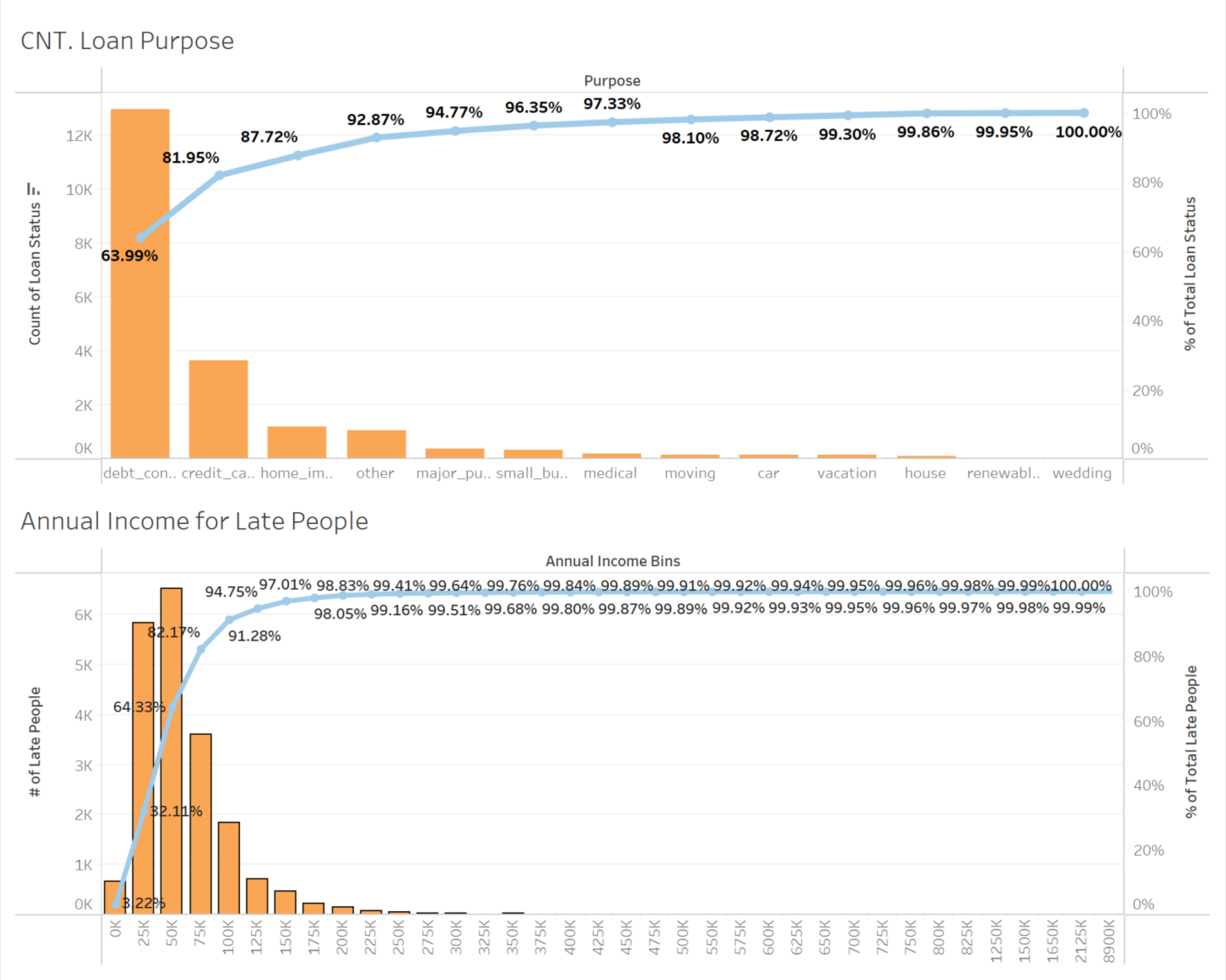


- Inconsistency in the data



Employment Titles
emp_title
Dispatcher
Registered Nurse
Executive Officer
Director of Sales
Principal Support Speci...
packing
Senior Tax Analyst
Volunteer Coordinator
Crew Trainer
Business Relationship M...
techincian
meter tester
Store Manager
A/P Specialist
Secretary
Information Systems An...
Sr Software Engineer
Director
Histology Supervisor
computer assov.
Underwriter
Account Manager
Count of Records 172
emp_title Teacher

Job titles

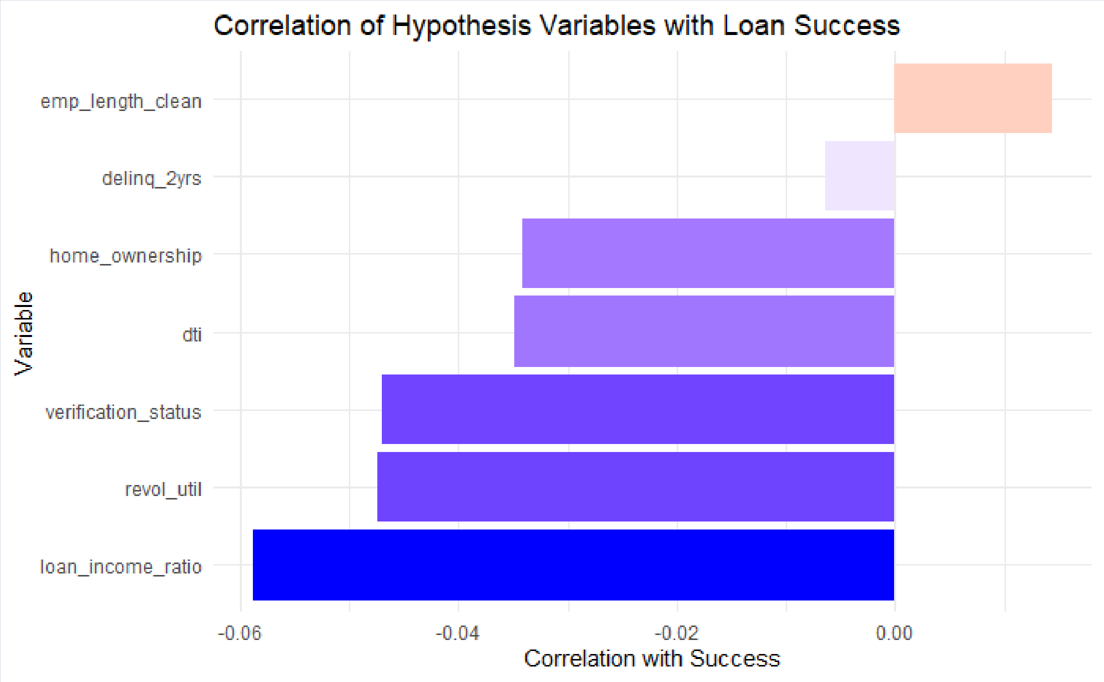


Interesting Findings

- 80% of our total loans are made up by Debt Consolidation and Credit Cards.
- 88% of the people we loan to have an income range between \$25K – \$100K, with 99% of our customers below a yearly income of \$250K.
- These two graphs show a good example of the pareto principal (80/20 rule) giving insight to where we should focus to maximize the impact.

Hypothesis # 1

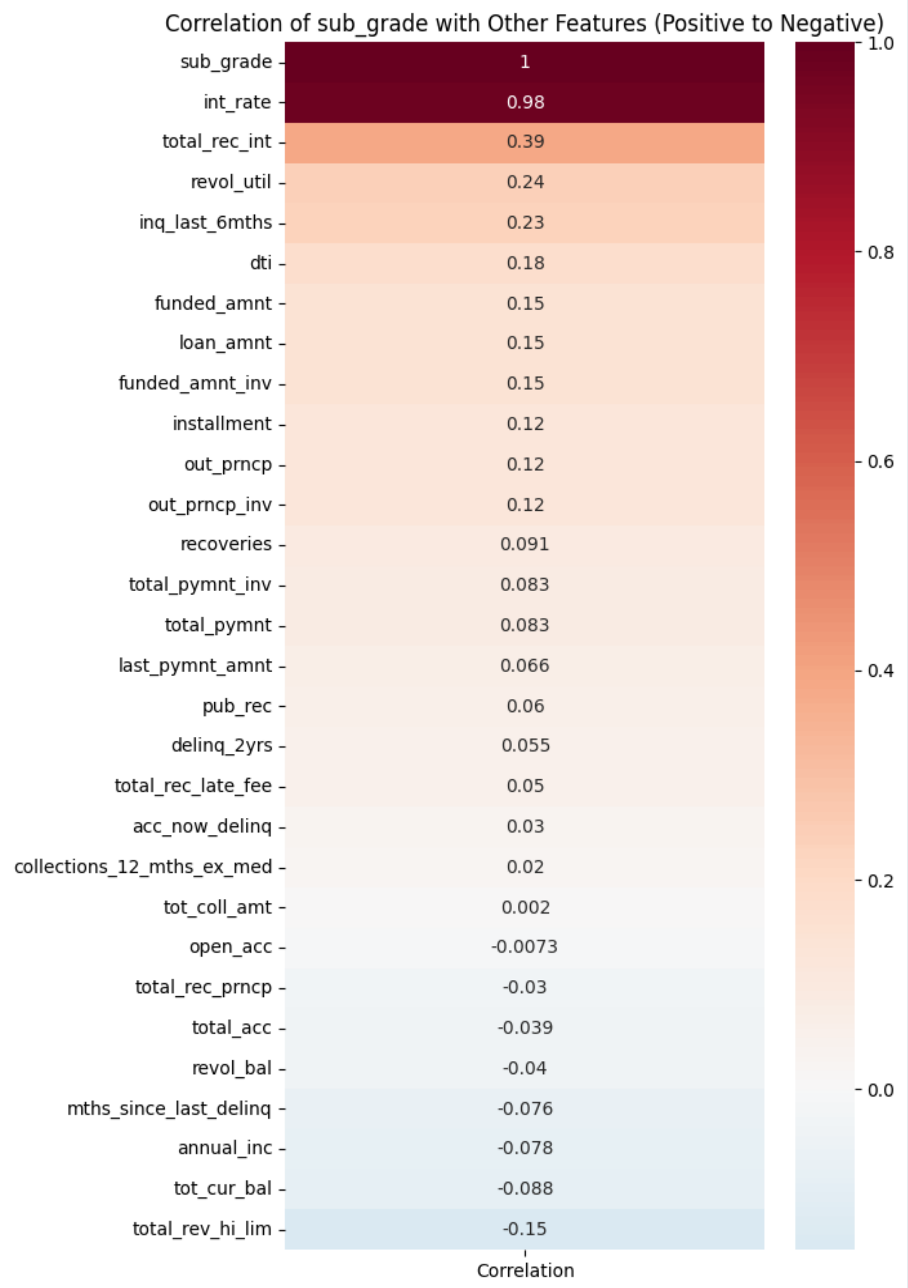
- The variables that contribute to a successful loan are the DTI (debt to income ratio), Employment Length, Loan Amount vs Income, Home Ownership Status, Number of Recent Delinquencies, Revolving Utilization Rate, and Verification Status of Income.
- How we investigated this:
  - Correlation analysis using visuals
- Was our hypothesis disproven?
  - Some variables didn't have much/if any effect on loan outcome that we expected would



Hypothesis # 2

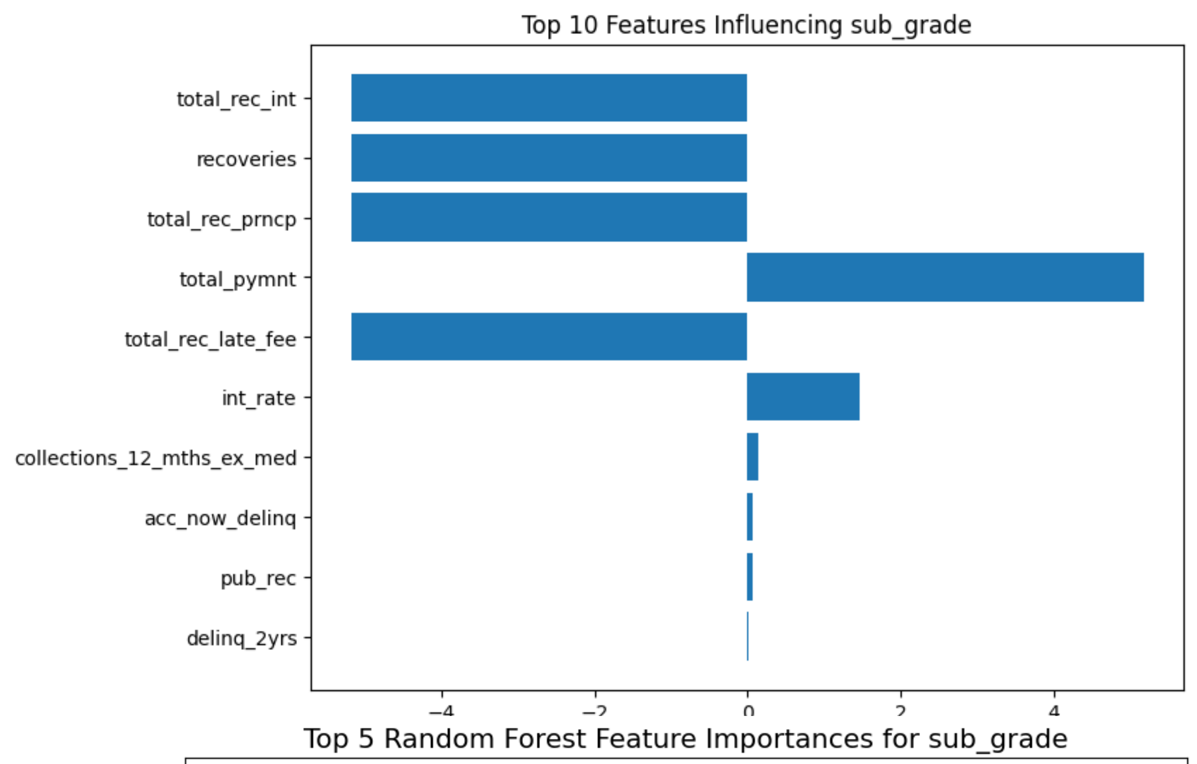
- Individuals with **lower revolving balances, higher credit limits, and fewer delinquent accounts** are more likely to be approved for a loan and successfully repay it in full.

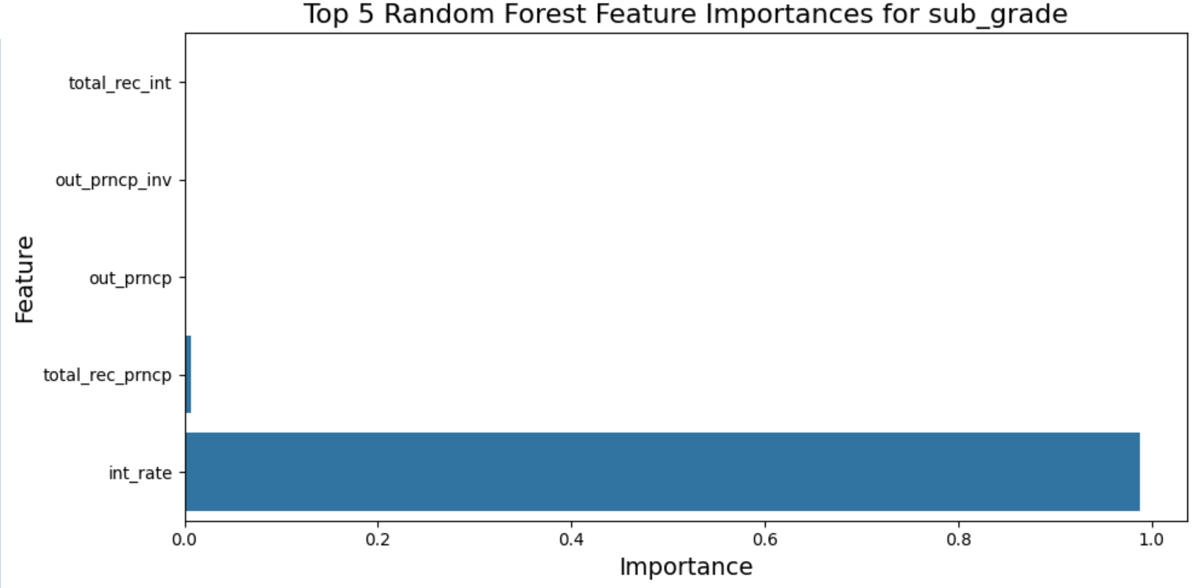
- How we investigated this:
  - Correlation Heatmap in seaborn, Linear Regression model, Random Forest



Hypothesis # 2

- Linear Regression Model:
  - R^2: 0.9784
- Random Forrest Model
  - R^2: 0.9960
    - Training and Tested for overfitting
- Was our hypothesis disproven?
  - Yes





Thank You