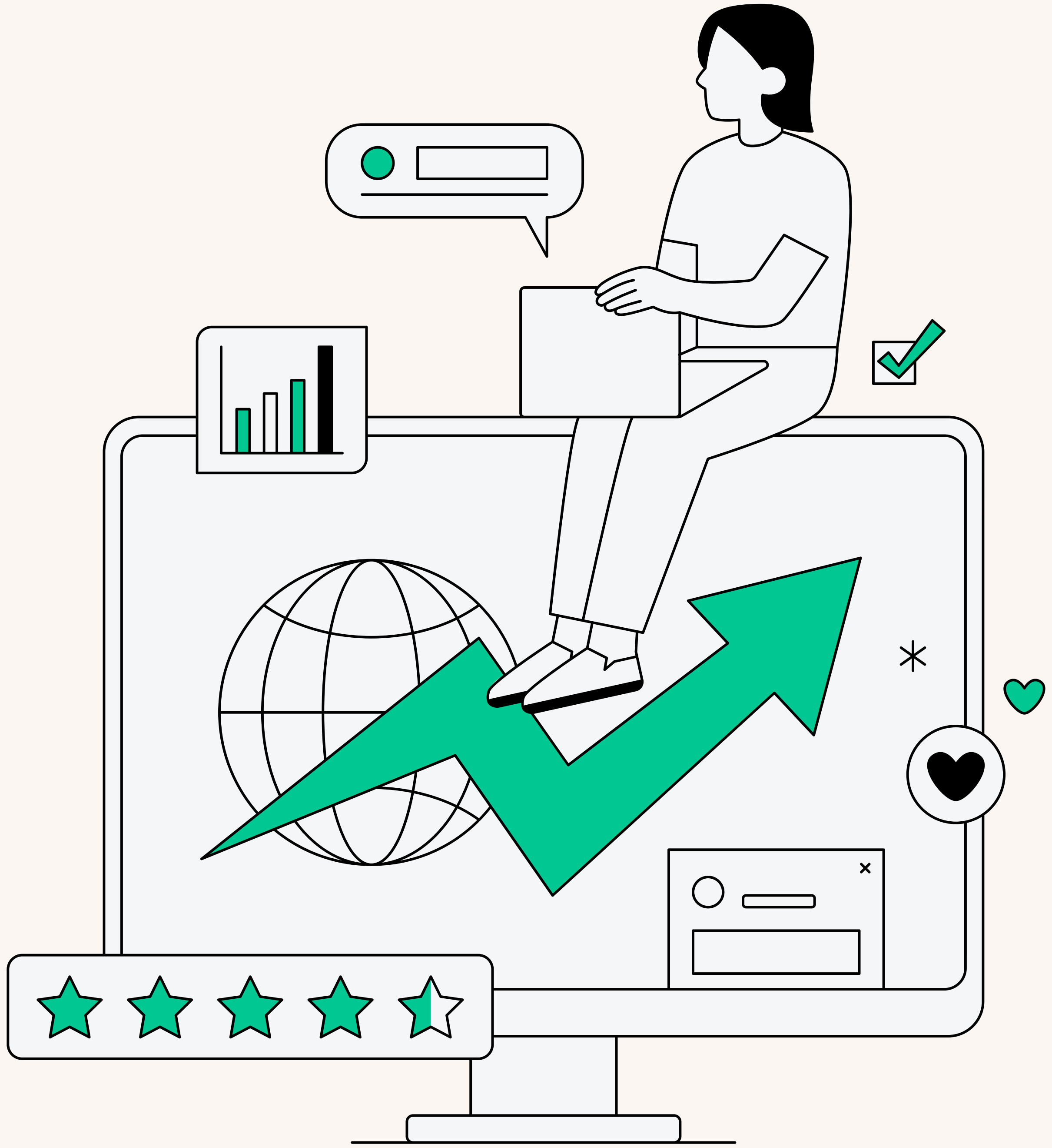
Lending Case Study

Upgrad Assignment -1

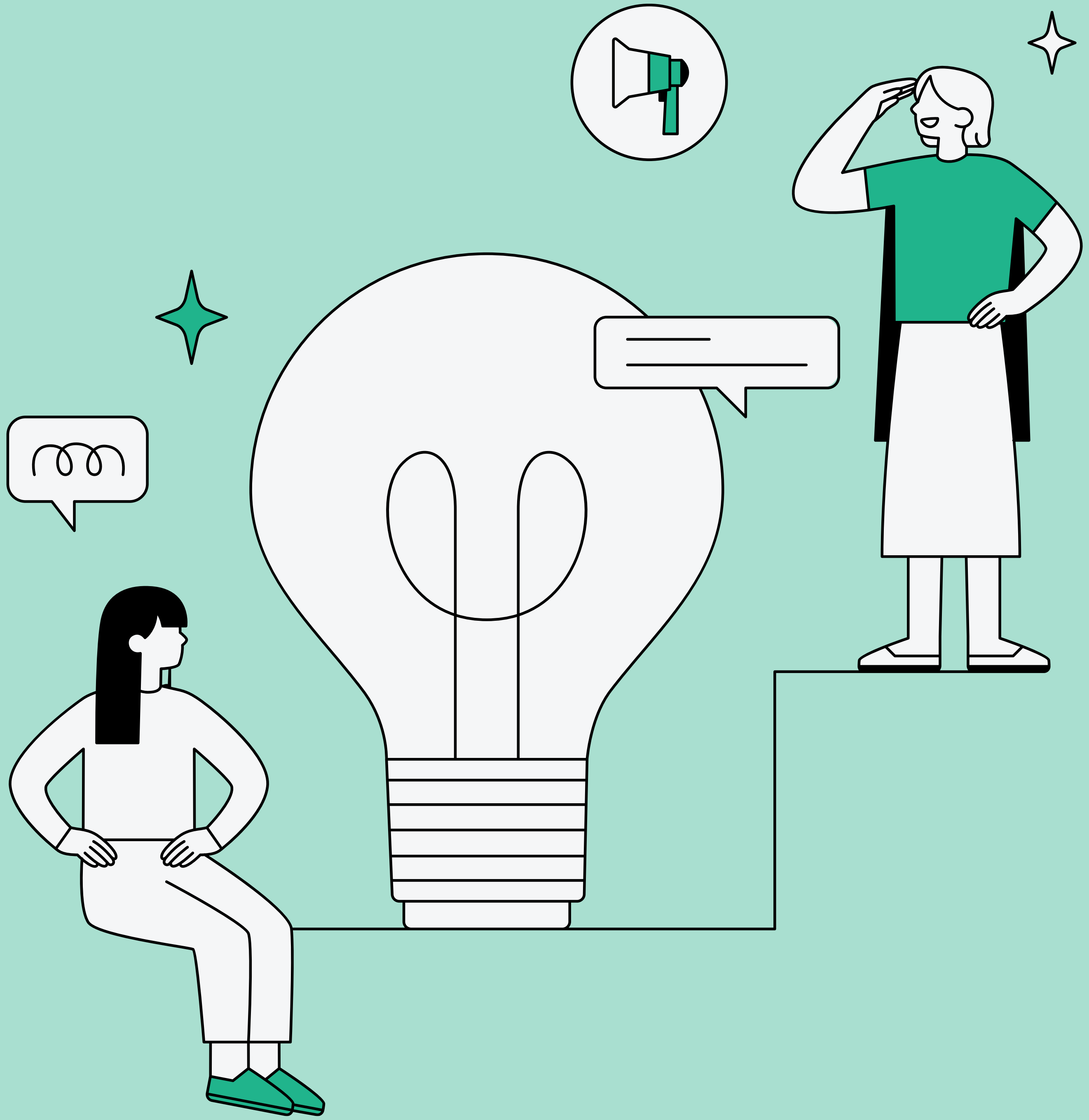
By – Nitish Narayanan & Saloni K



Purpose of Case Study

This case study is about a Lending Company who wants to analyze pattern of lending among the data set and then make the decision whether there will be :

1. Business Loss
2. Financial Loss



Methodology used in the analysis

- Loaded data from csv file
- Verified the additional rows like head and tails are not present
- All the columns with null values greater than 30% was removed from data-set. Removed column which has same values in all the rows
- Removed additional strings and converted the data types
- Imputed values in columns with lower percentage of null values
- Removed the outliers present

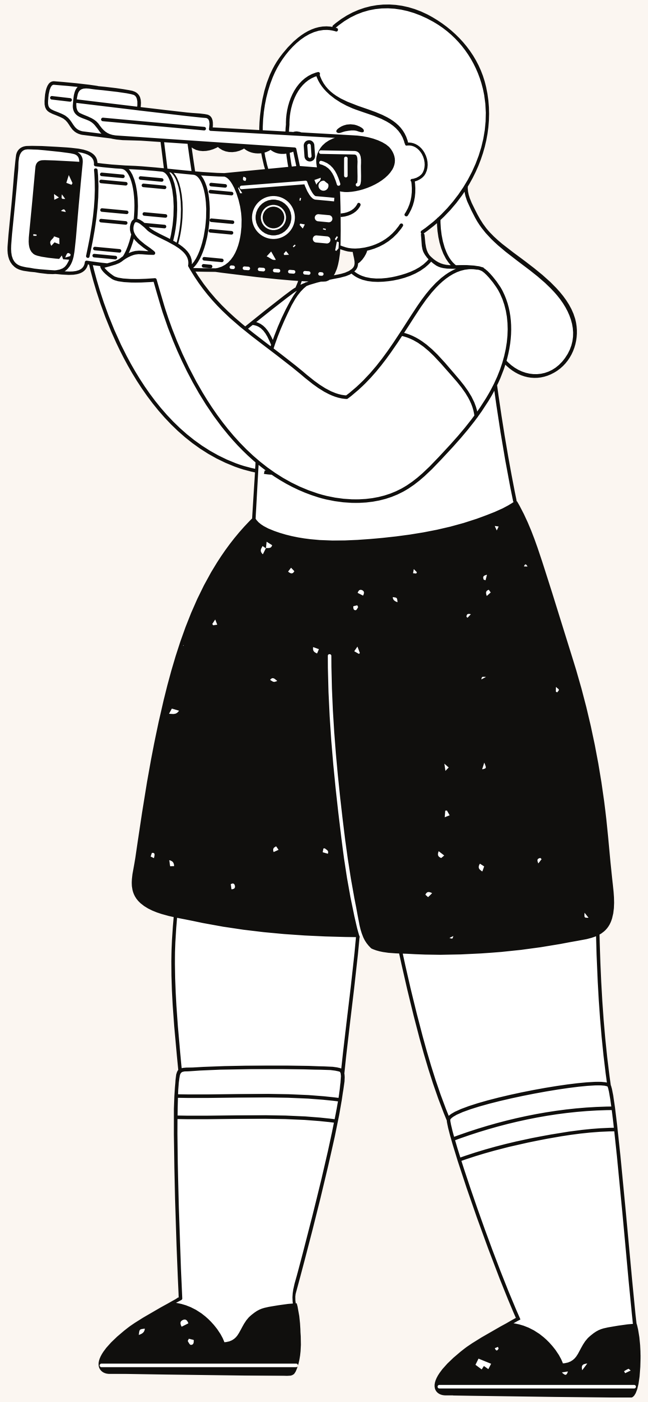
Analysis used

Univariate Analysis – Ordered categorical variable

Grades
Term
Employment length
Issue year
Issue Month

Univariate Analysis – Un-Ordered categorical variable

Purpose
Loan status
Home ownership
Address state



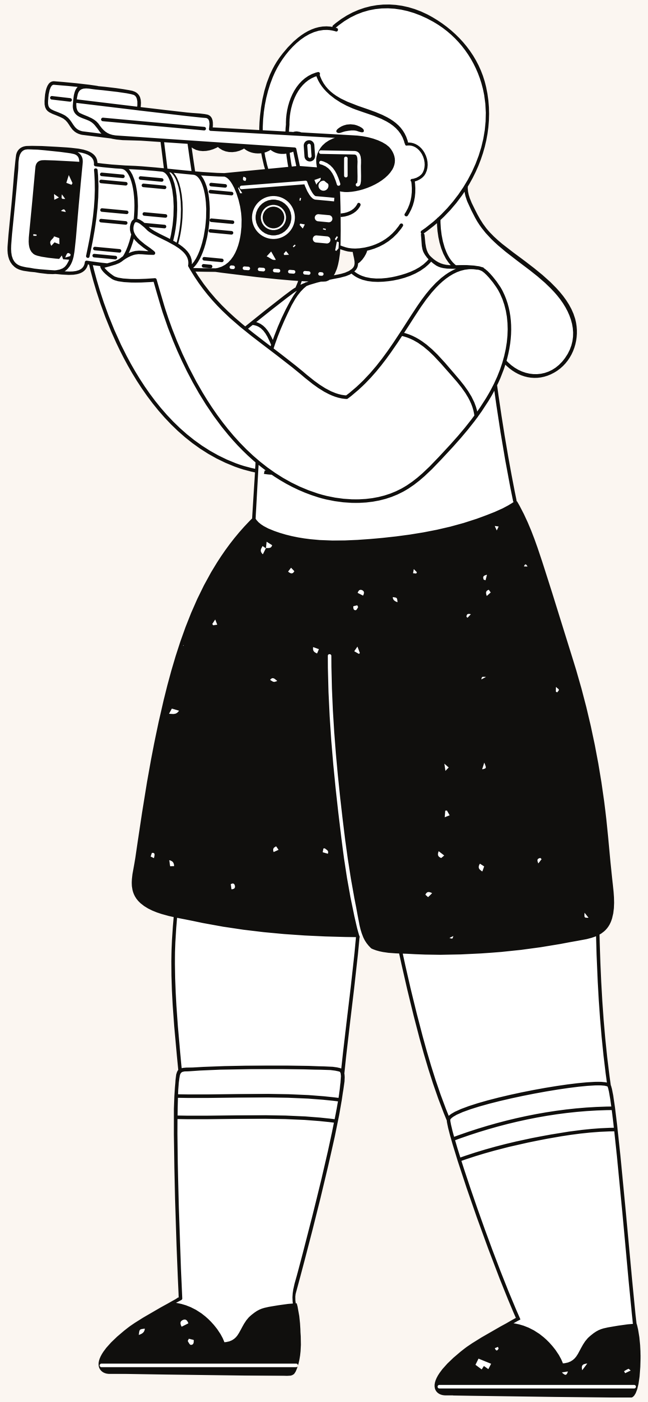
Analysis used

Univariate Analysis – Quantitative variable

- Loan Amount Range
- Funded Amount Range
- Interest rate range
- Annual Income Range
- DTI

Bivariate Analysis – Ordered categorical variable

- Grade
- Term
- Employment Length
- Issue Year
- Issue Month



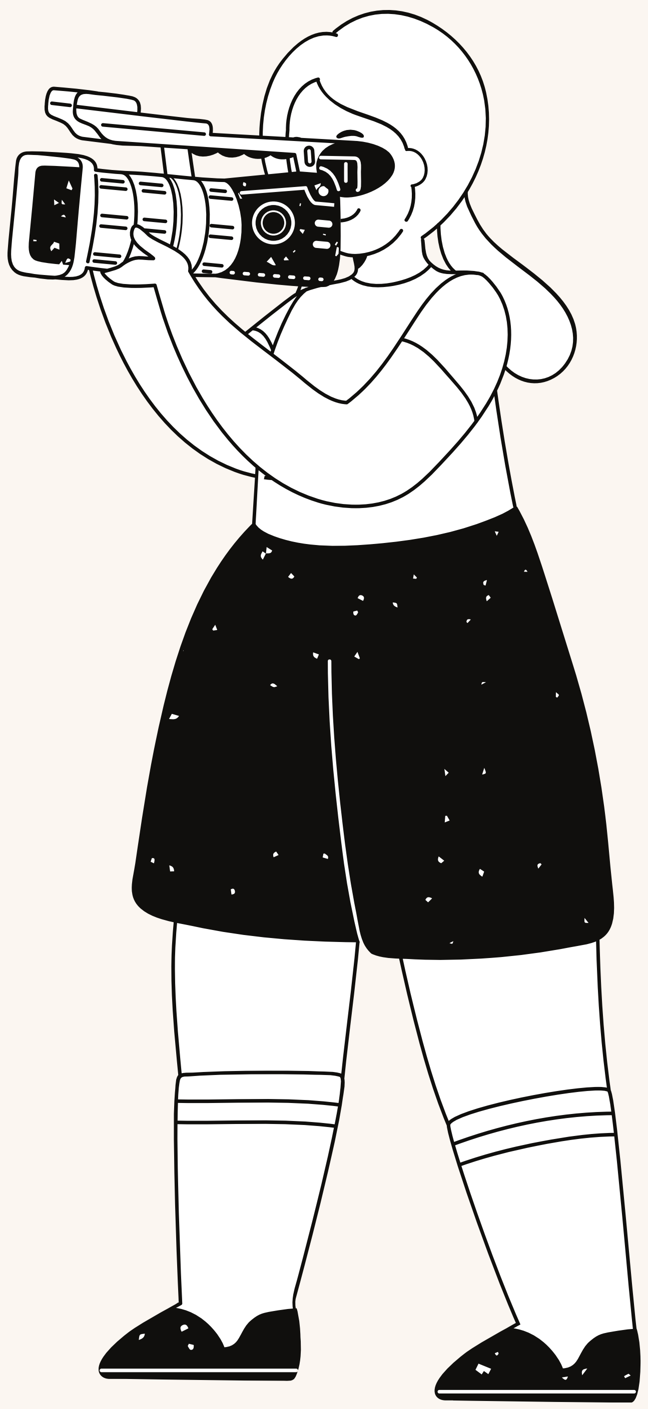
Analysis used

Bivariate Analysis – Unordered categorical variable

Purpose
Home Ownership
Address state

Bivariate Analysis – Quantitative Variable

Loan Amount Range
Funded Amount Range
Interest rate range
Annual Income Range
DTI

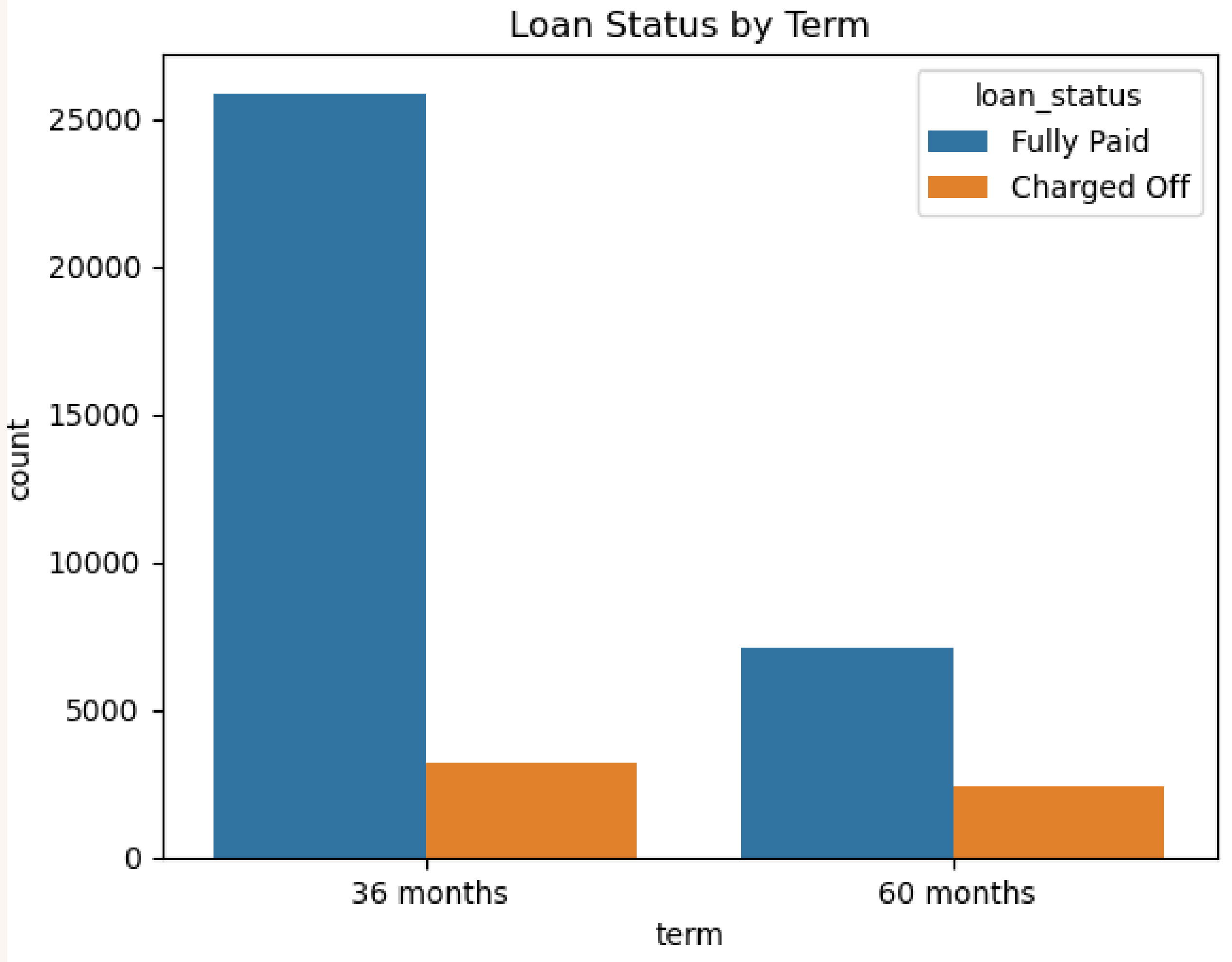


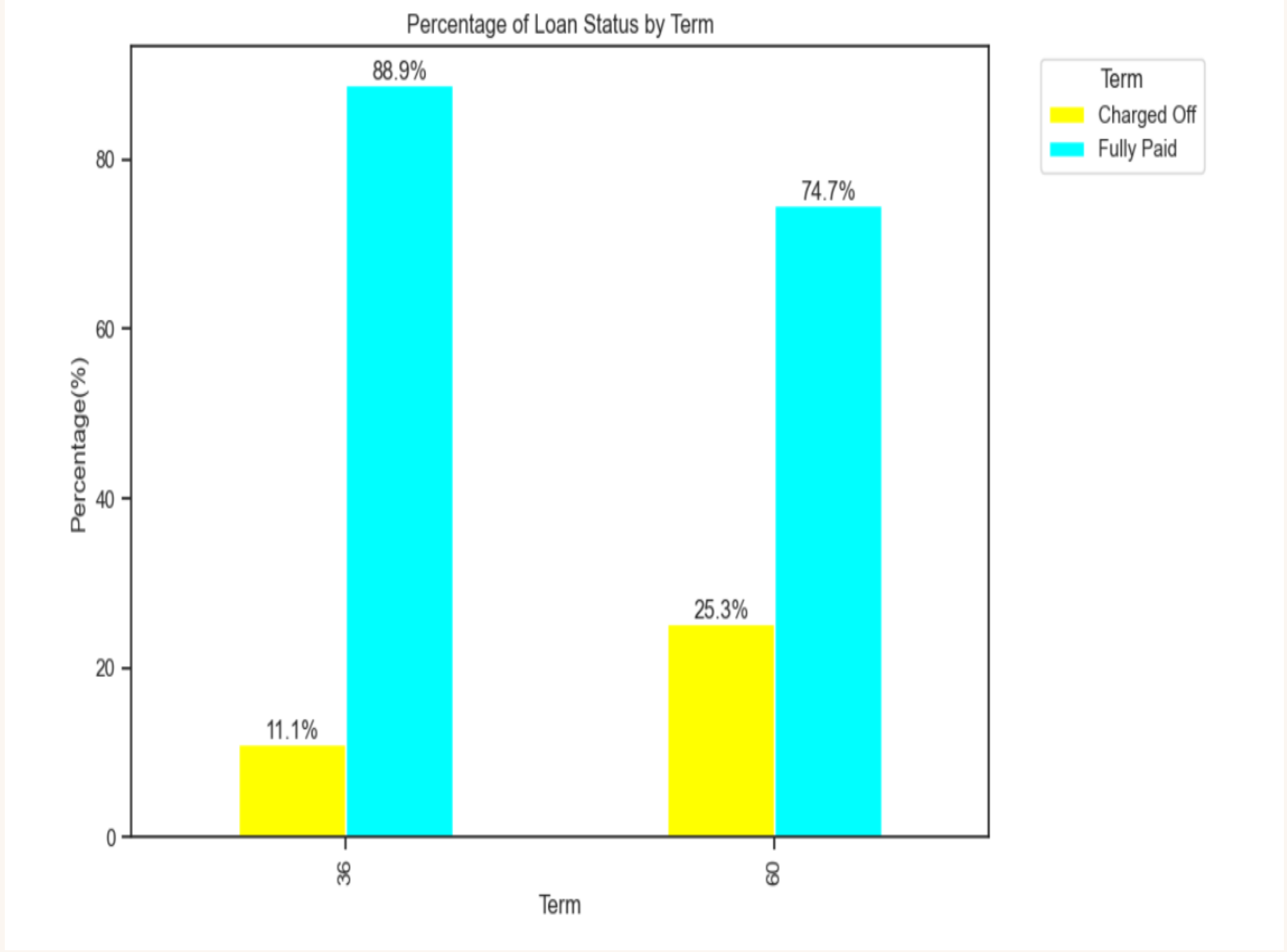
Loan Status Analysis

Loan Status by Term

From the graph we can conclude that most of the loans are taken for 36 months have higher repayment rate

Also, from the second graph it can be pointed out that if the loan term is longer then default also increases , where as the lower the term lesser is the default percentage



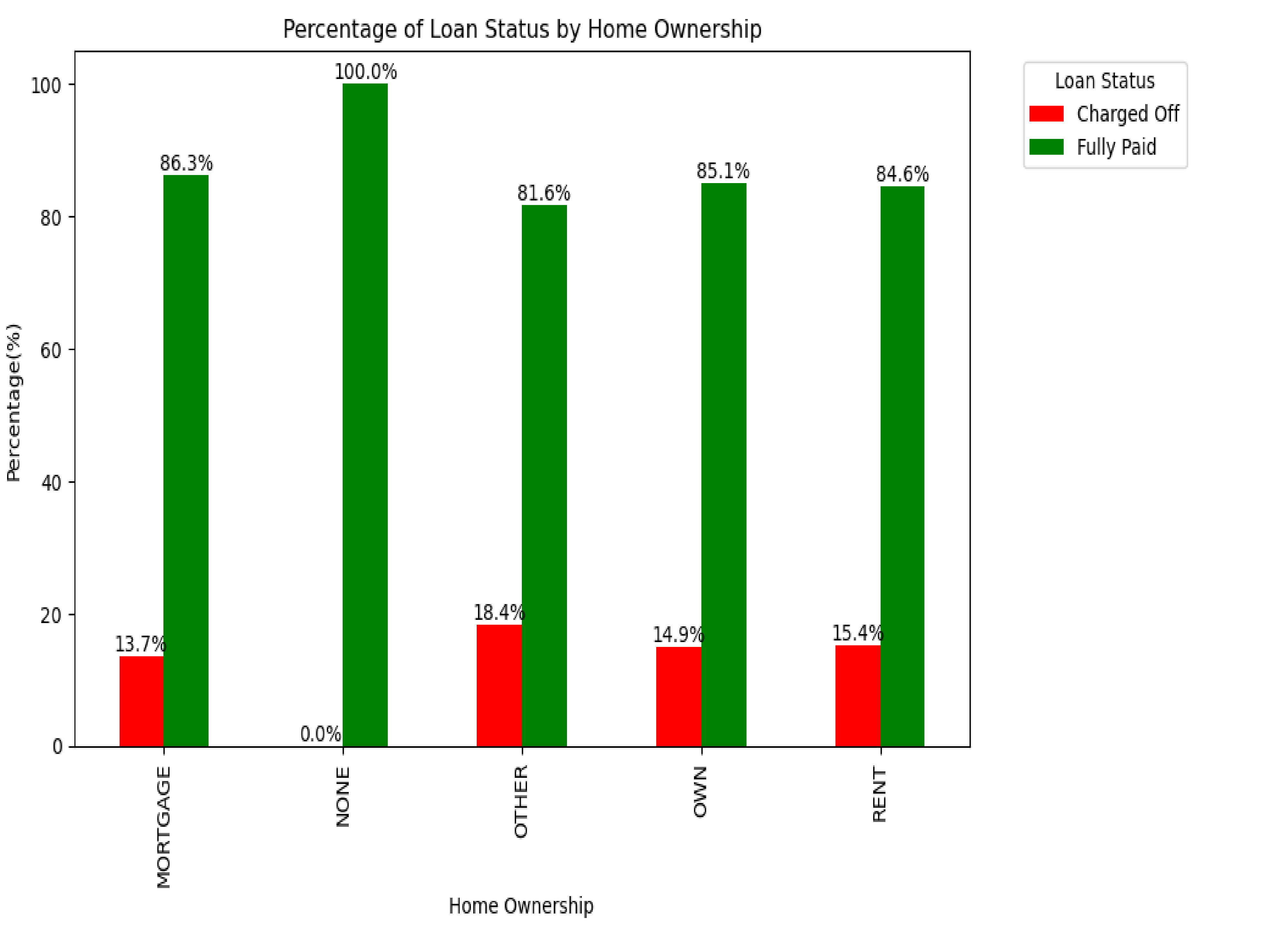


Whether Homeownership effects the loan disbursal?

Home Ownership trend

- From the graph we can conclude that where homeownership is **“NONE”** the chances of them repaying back the loan is 100% where as where homeownership is “**Mortgage”** stands second in paying back the loan and people who “**Own”** their home are third.

- Where as the charged off is higher where the ownership is “**OTHER”** and where Homeownership is “**Rented”** comes second.



Purpose of loan vs loan status analysis

Purpose of loan and loan repayment analysis

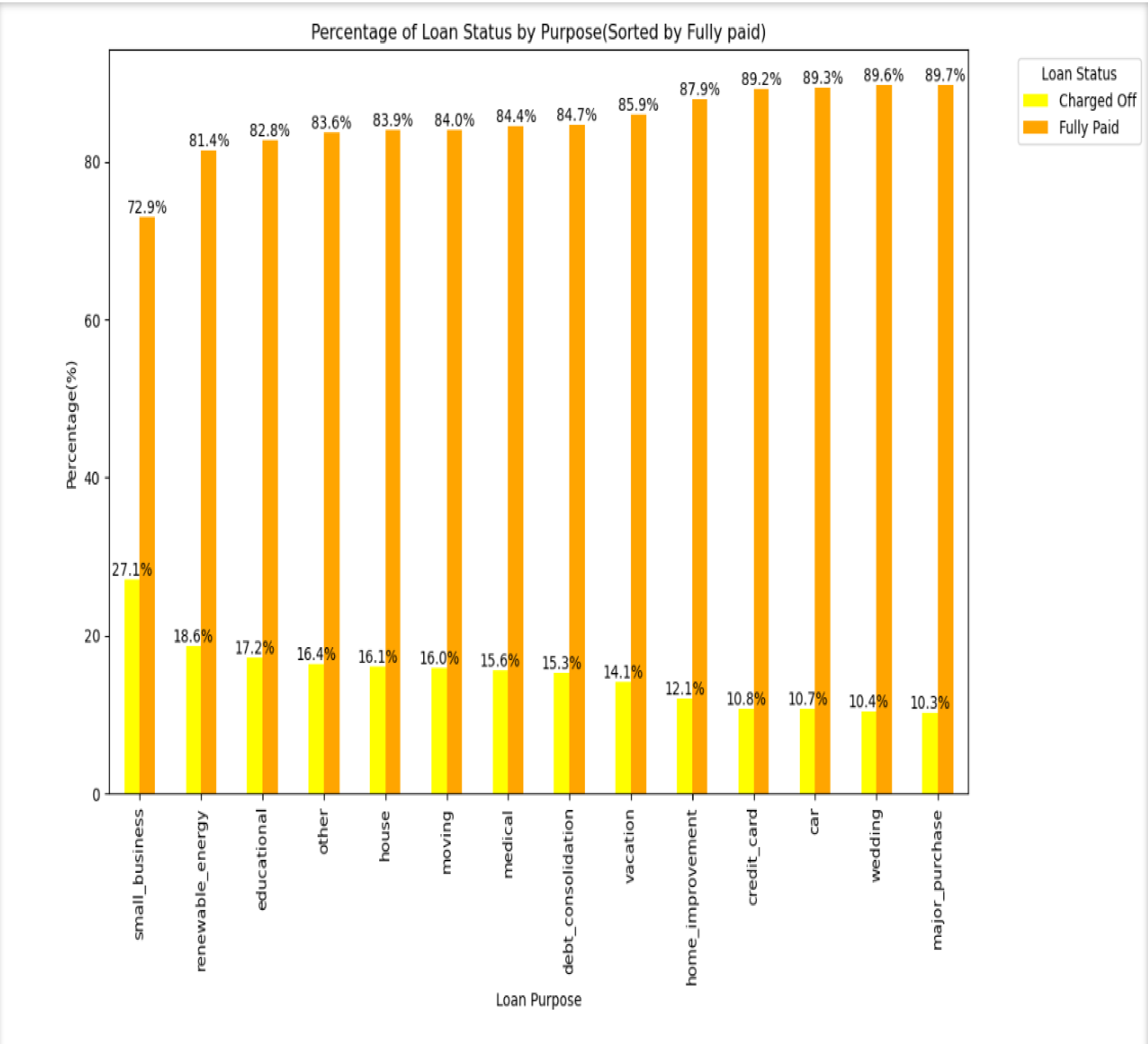
- The analysis shows that percentage of debt consolidation is highest and renewable energy is the lowest

- How this looks in terms of Fully paid vs charged off let’s understand that.

```
purpose
debt_consolidation    46.80
credit_card           13.03
other                 10.02
home_improvement       7.45
major_purchase         5.57
small_business         4.55
car                    3.89
wedding                2.40
medical                1.77
moving                 1.49
vacation               0.97
house                  0.95
educational            0.84
renewable_energy       0.26
Name: proportion, dtype: float64
```

Purpose vs loan repayment

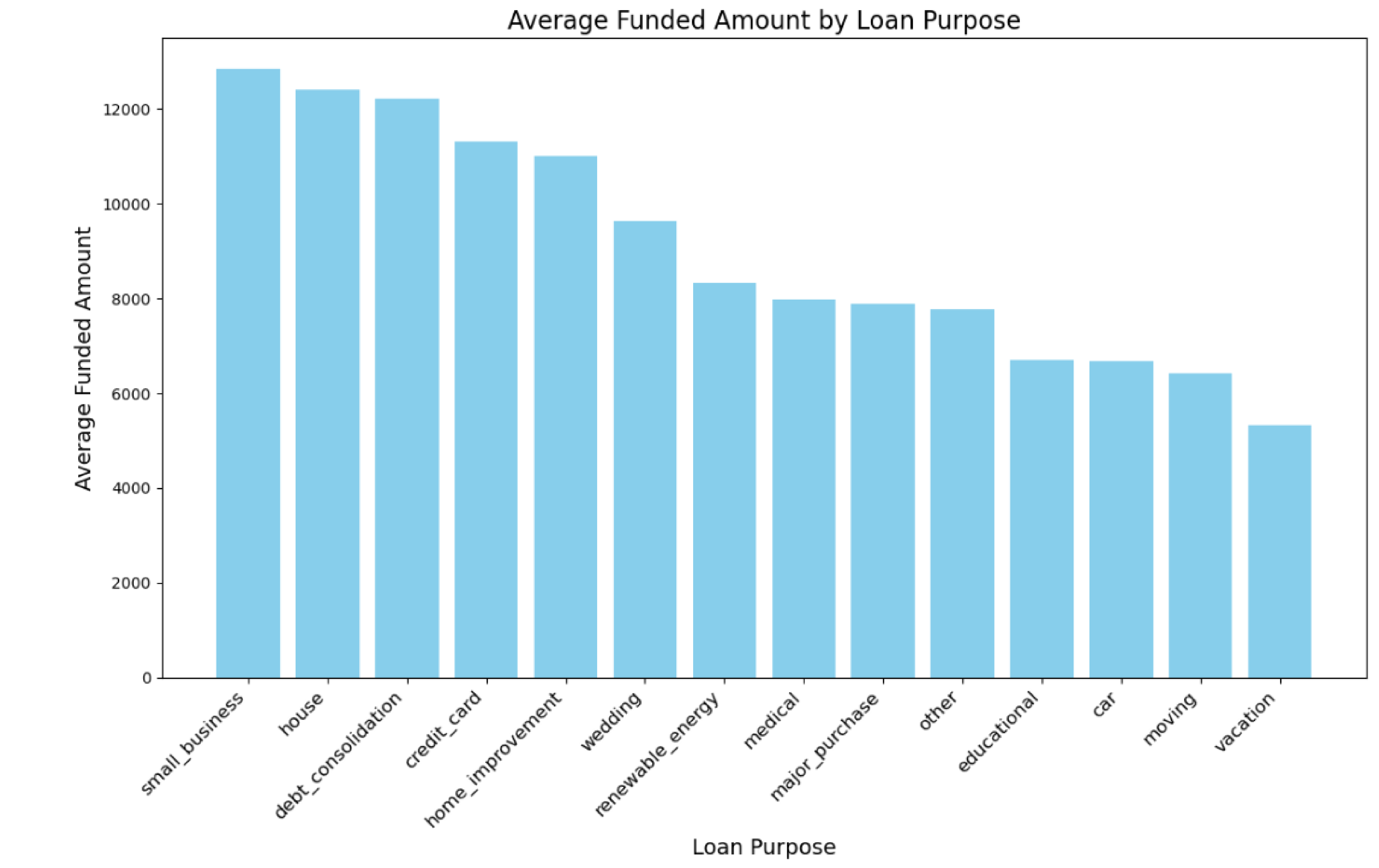
- From the graph, we can conclude that chances of repayment is high for **“Major purchases”** compared to others and default of “**small business”** is higher.



How is the trend of loan funded as per the purpose ?

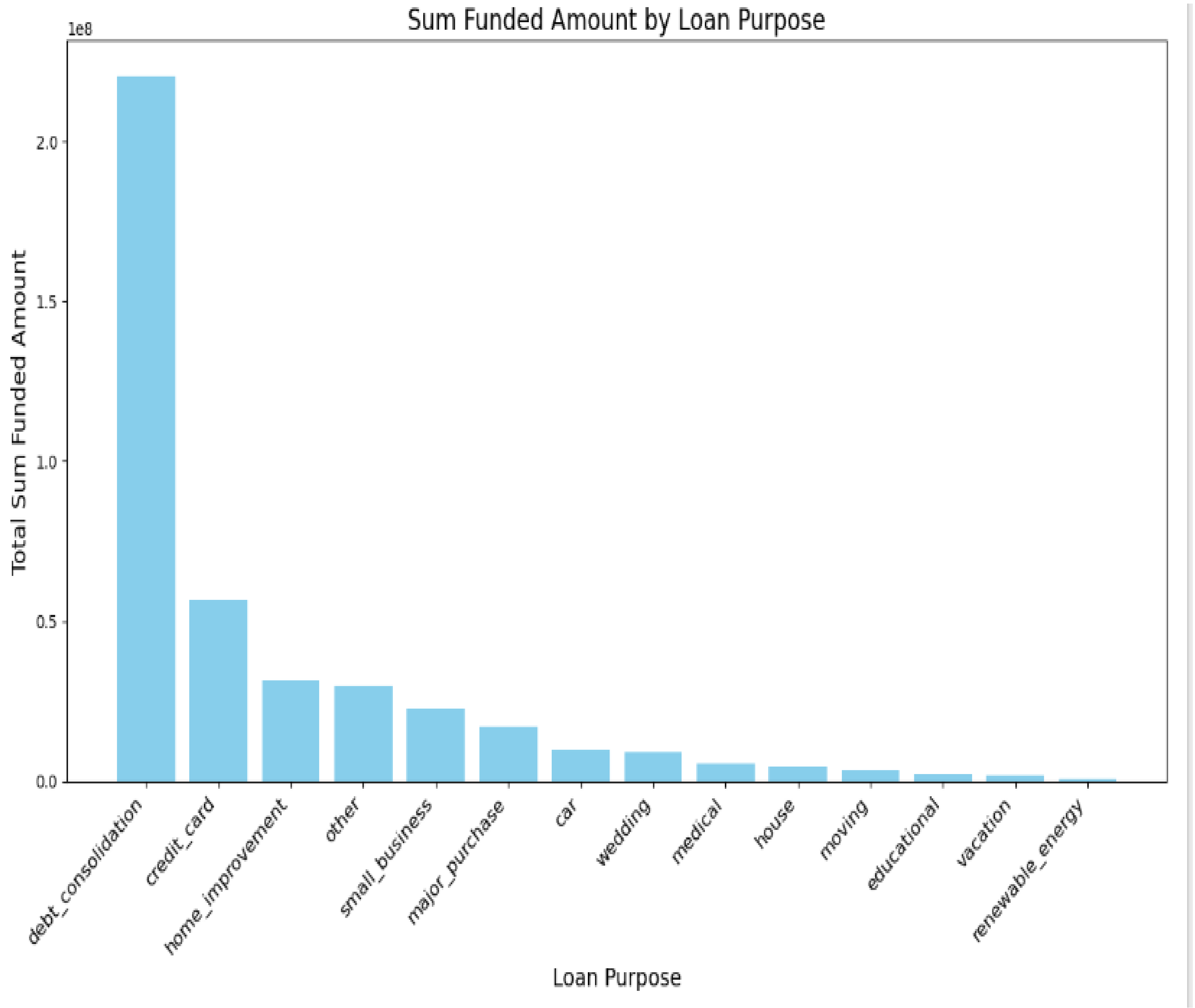
Average Funded amount by Loan Purpose

- From the graph, we can conclude that in average funded amount small business loan is the highest, and vacation is the lowest, lets understand how this trend changes when we do sum.



Sum of Funded amount by Loan Purpose

From the graph, we can conclude that if sum of funded amount is taken vs loan purpose, debt consolidation is the highest and renewable energy is the lowest.



Funded amount vs Loan purpose

Debt Consolidation Dominates in Total Funded Amount:

- When you calculate the sum of funded amounts, debt consolidation comes out on top because it has the largest number of loans. This indicates that debt consolidation loans are the most common purpose among borrowers. Small Business Dominates in Average Funded Amount:

- When you calculate the average, small business has the highest funded amount because these loans tend to be larger on an individual basis, even though the number of small business loans is much smaller compared to debt consolidation loans.

Volume vs. Value:

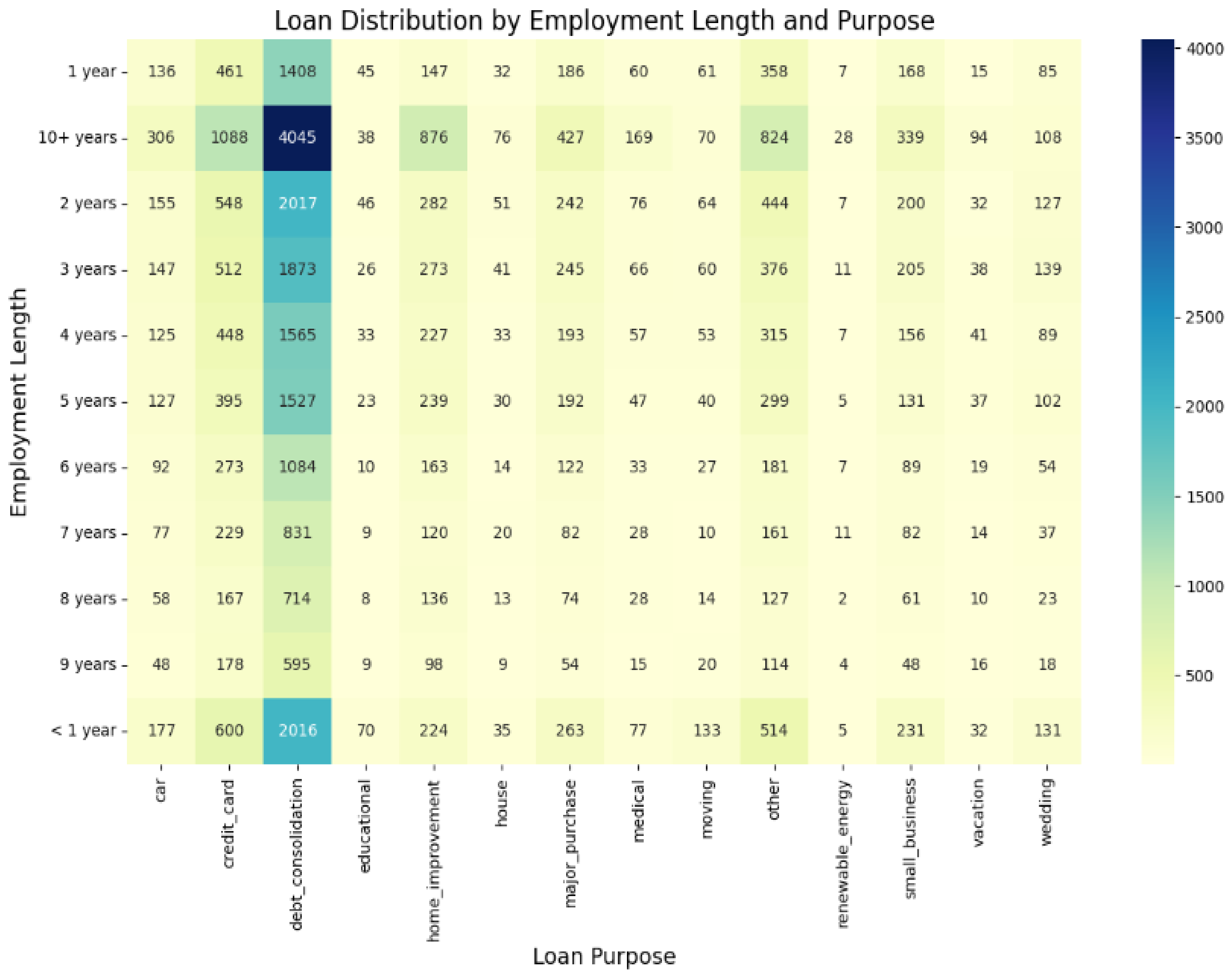
- Debt Consolidation: High volume of smaller loans. Small Business: Fewer loans, but individually larger in size.

Borrower Profile:

- Borrowers seeking small business loans may represent higher-value, targeted funding needs. Borrowers opting for debt consolidation likely need smaller amounts for managing existing debts.

Employment length and Loan Status?

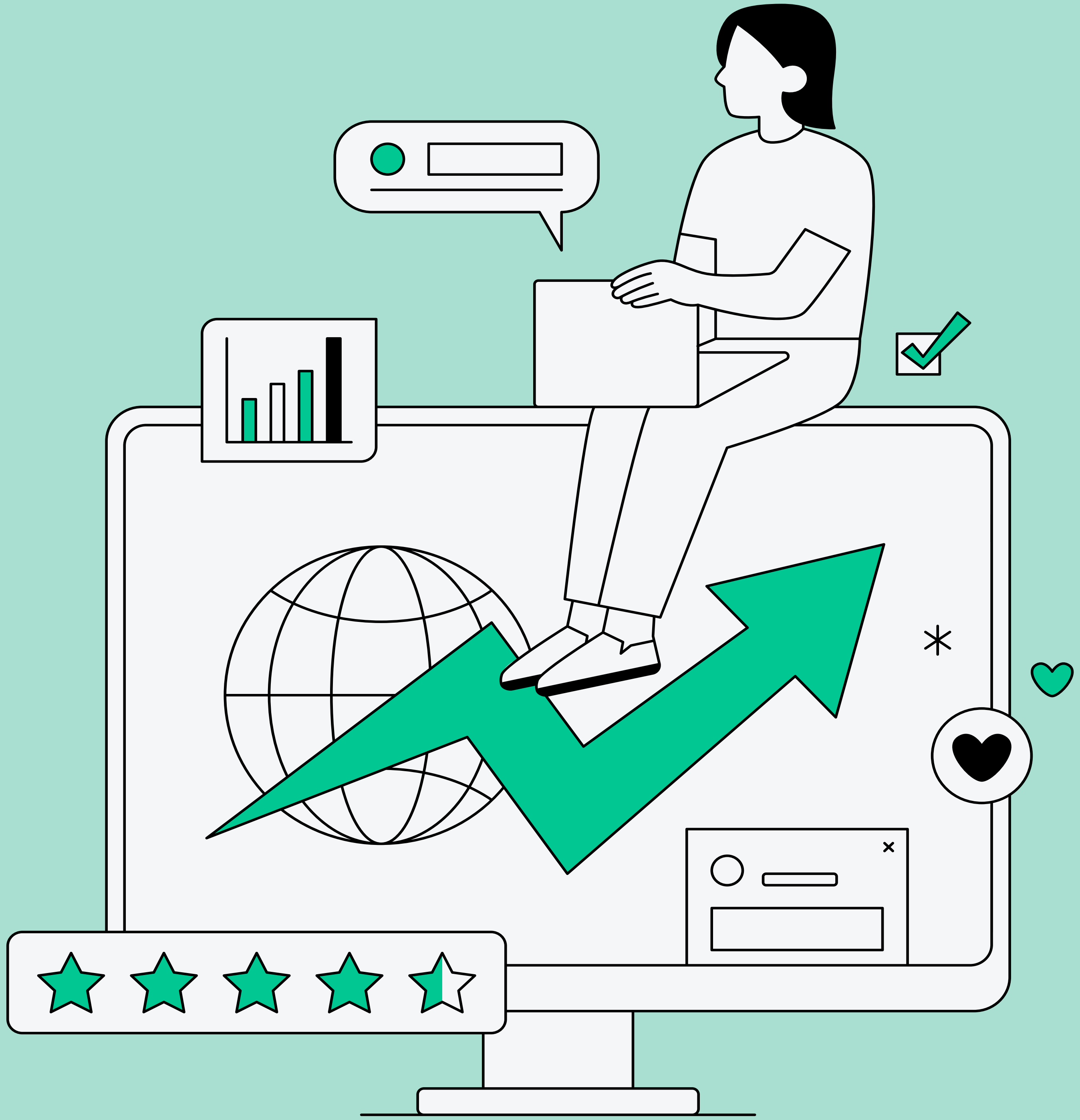
How Employment length plays role in loan status?



- Borrowers with shorter employment lengths (< 1 year, 1 year) show a higher likelihood of defaults.

- Borrowers with longer employment lengths (10+ years) are more reliable in repaying loans.

Grade vs loan status



Loan Status proportions by Grade

- From the graph it is clearly visible that those who are having proportion of 0.94 are categorized as Grade and rest follows the pattern as shown in the graph above

- Higher grades (A& B) have significantly higher proportions of Fully paid loans and lower grades are associated with higher default rates

Conclusions

Loan Term and Loan Status

Findings:

- Loans with longer terms (e.g., 60 months) tend to have higher default rates (Charged Off) compared to shorter-term loans (e.g., 36 months). Offer incentives for shorten loans, such as lower interest rates or easier approvals to reduce the risk of defaults

Loan Purpose and Borrower Behavior

Findings:

- For debt consolidation and credit card loans:
  - These are high-volume, lower-risk categories.
- For small business and educational loans:
  - Evaluate borrower profiles carefully (e.g., income, employment length).
  - Introduce stricter criteria or require collateral for high-value loans.

Conclusions

Borrower Grade and Loan Status

Findings:

- Limit lending to borrowers in lower grades or compensate for higher risk by:
  - Charging higher interest rates for low-grade borrowers.
  - Introducing stricter approval conditions for loans in lower grades.

Employment Length and Loan Status

Findings:

- Give preference to borrowers with stable employment histories (e.g., 5+ years of employment).
- For borrowers with shorter employment histories, reduce the loan amount or introduce stricter lending criteria

Factors that lending company can consider

01. Business Loss that lending company can avoid

- There has to be diversification of the loan disbursement, like debt Resolution has 46.8% and this can be a reason for Business loss as well in future
- Automating loan processing for low-risk categories

02. Financial loss that lending company can avoid

- Loans with longer terms (60 months) or lower grades (E, F, G) show higher default rates.
- Setting right collateral for loans like small business or educational

Thank you very much!