



# Lending Club Case Study

## Group Members:

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# The problem

## Company

Lending Club is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures.

Borrowers can easily access lower interest rate loans through a fast online interface.

## Context

Lending Club wants to understand the **driving factors** behind loan default, i.e. the **driver variables** which are strong indicators of default.

The company can utilise this knowledge for its portfolio and risk assessment.

## Problem statement

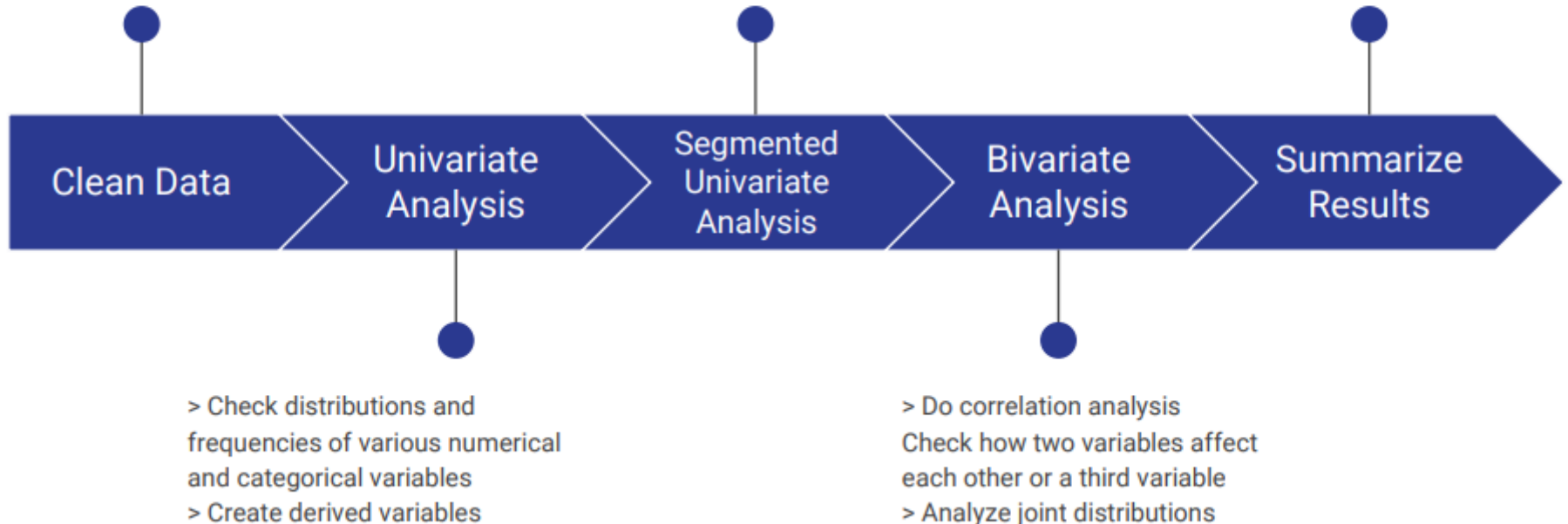
As a data scientist working for Lending Club analyze the dataset containing information about past loan applicants using EDA to understand how consumer attributes and loan attributes influence the tendency of default

# Analysis Approach

- > Drop columns with null values, all random values or single category value
- > Convert values to proper int, float, date representations

- > Analyze variables against segments of other variables
- > Create derived variables

Publish insights and observations

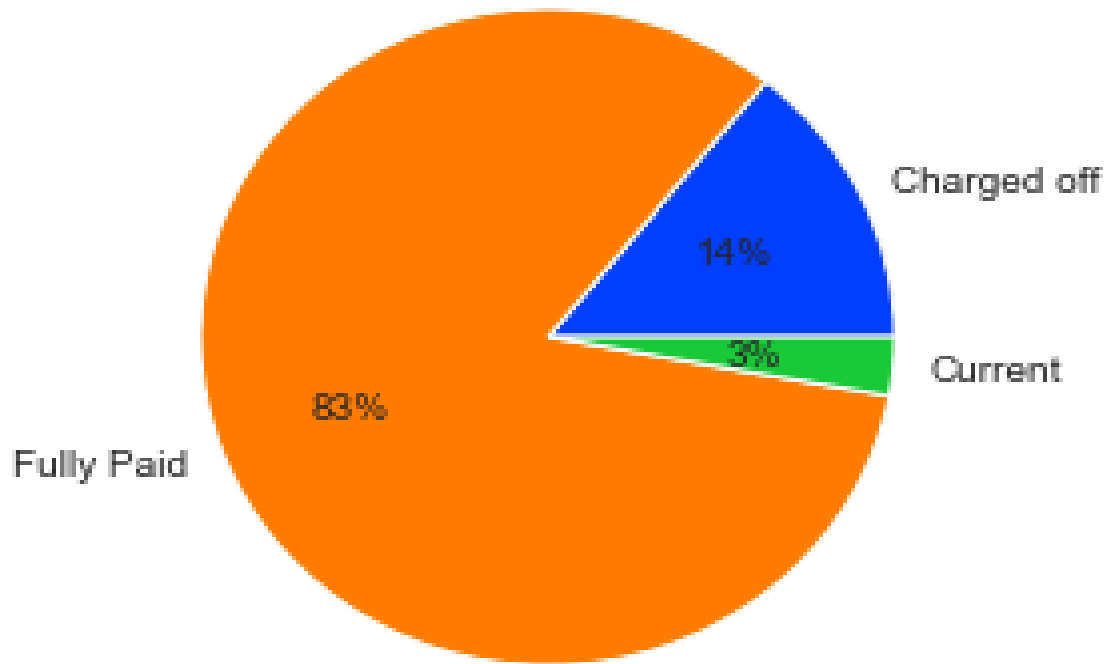


# Loan Status

## Observations:

- 14% loans were charged off out of total loan issued.

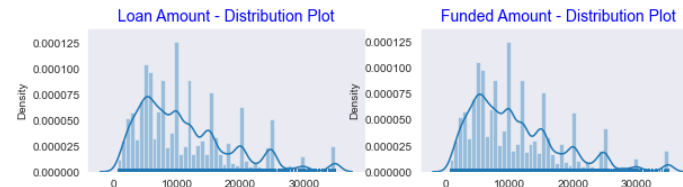
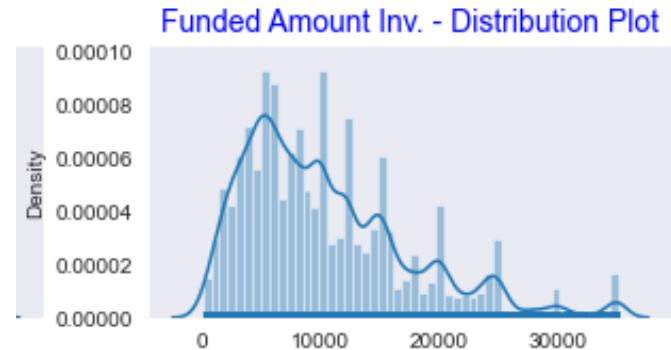
## Loan Status



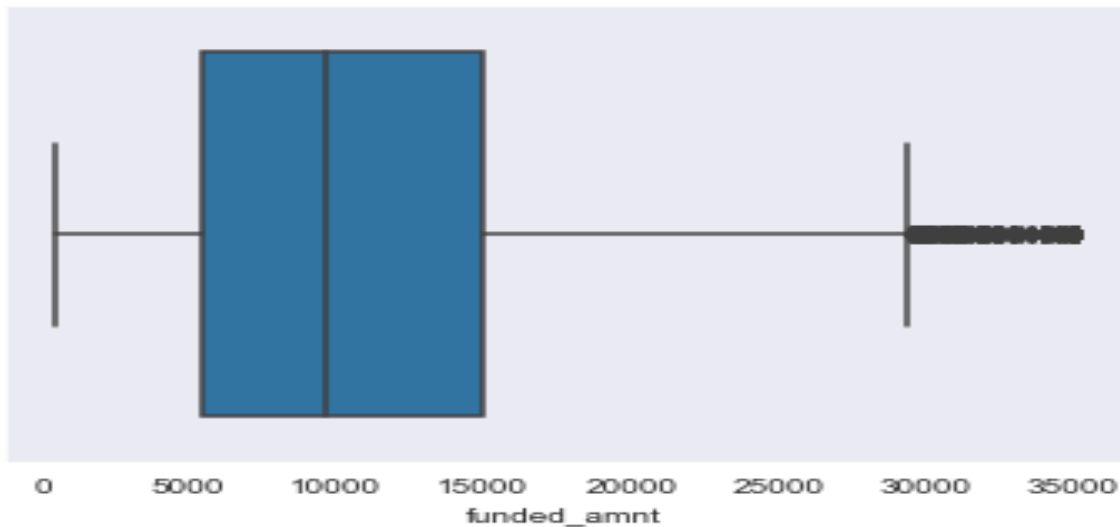
## Loan Amount, Funded Amount and Funded Amount Inv.

### Observation:

- Distribution of amounts for all three looks very much similar.
- We will work with only Funded Amount column for rest of our analysis. As it is final amount lend by club.



# Funded Amount Distribution



## Observations:

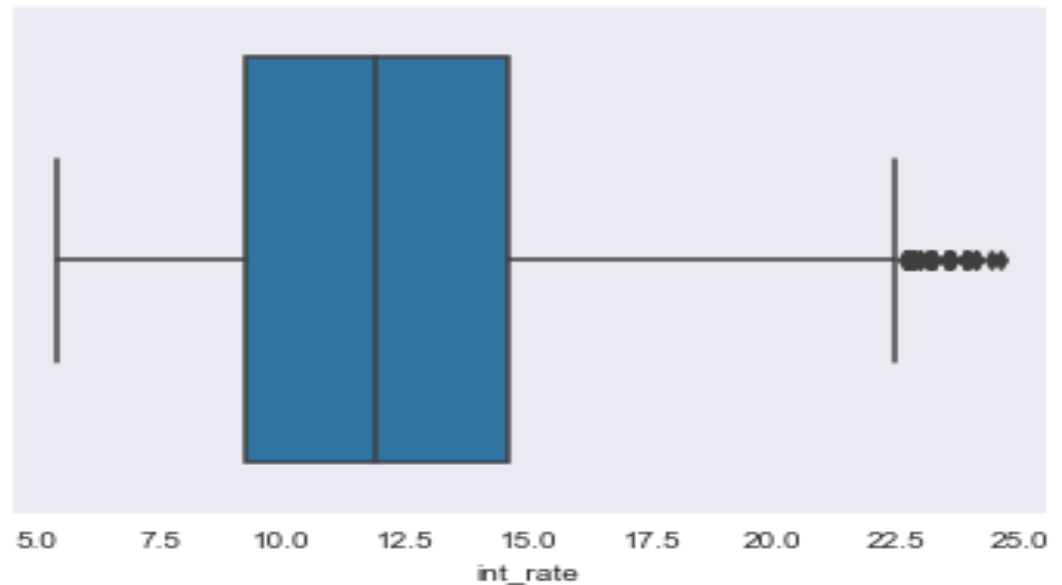
- Majority of loans funded are between \$5400 to \$15000 (IQR)
- Minimum funded amount is \$500
- Maximum funded amount is \$35000

# Interest Rate Distribution

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## Observations:

- Majority of loans given at interest rate from 9.25% to 14.59% (IQR)
- Minimum interest rate was 5.42%
- Maximum interest rate was 24.59%

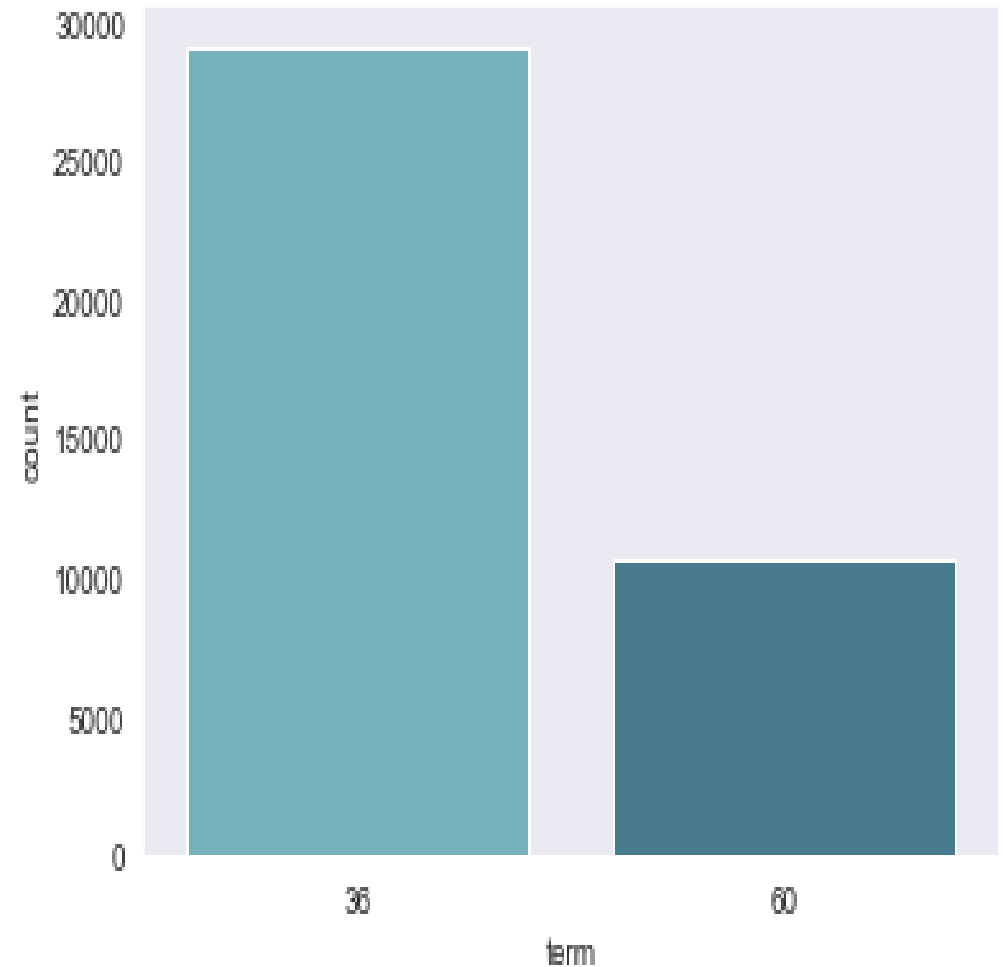


## Distribution of Loan Term given to borrower

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### Observations:

- Majority of loans given for period of 30 months

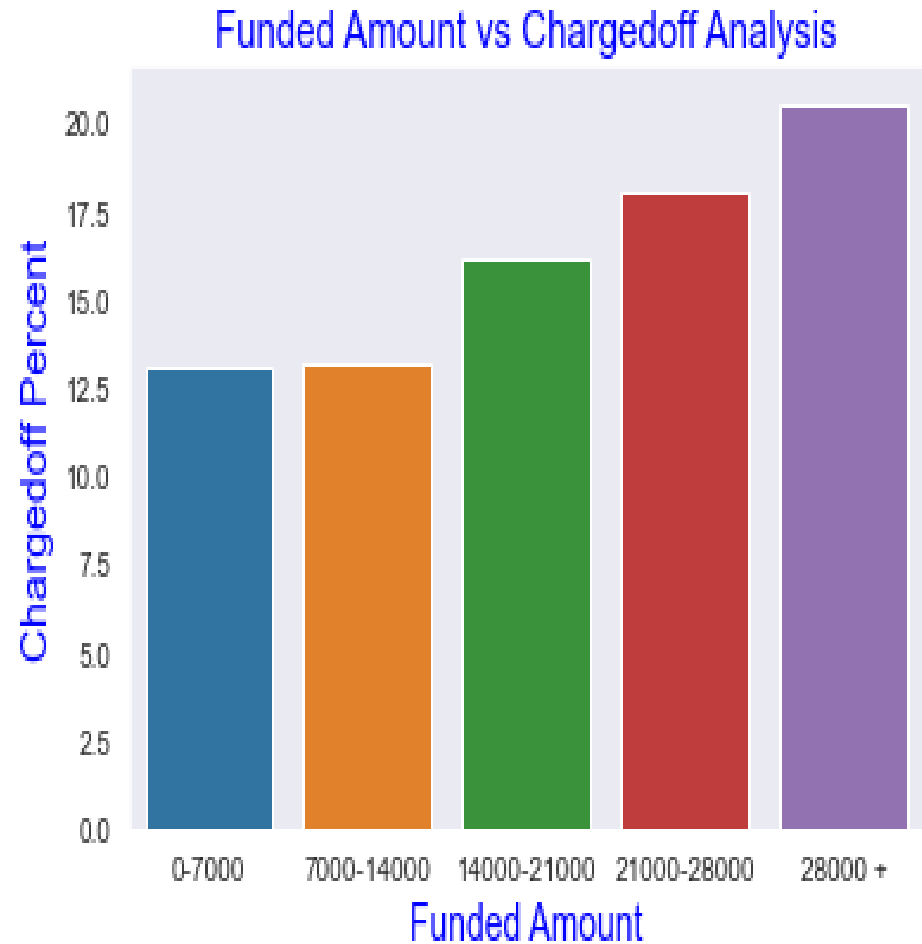




# Loan Status vs Funded Amount Categories

## Observations:

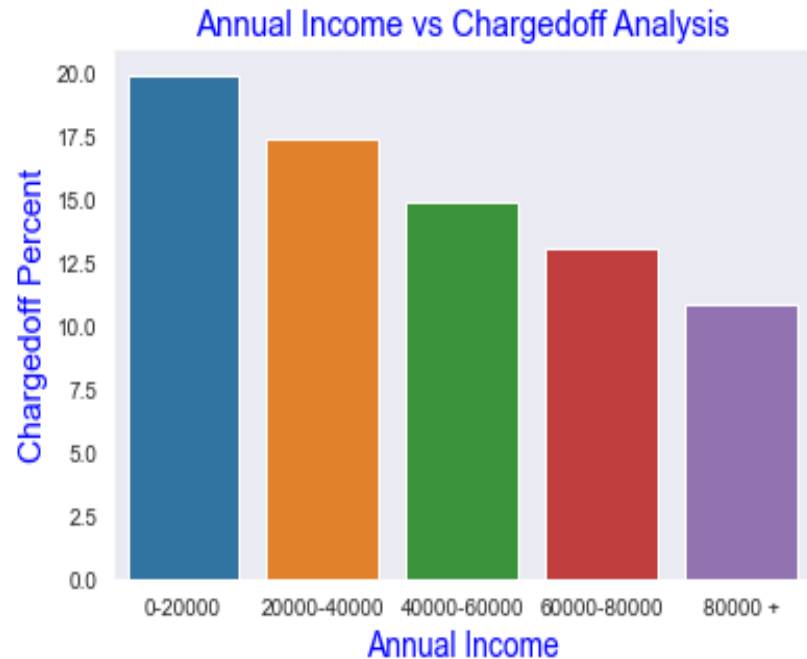
- Funded amount \$28000+ has more chances of being charged off.
- Funded amount below \$14000 has less chances of being charged off.
- Notice that with increase in Funded amount, charged off percentage got Increased.



# Loan Status vs Annual Income Categories

## Observations:

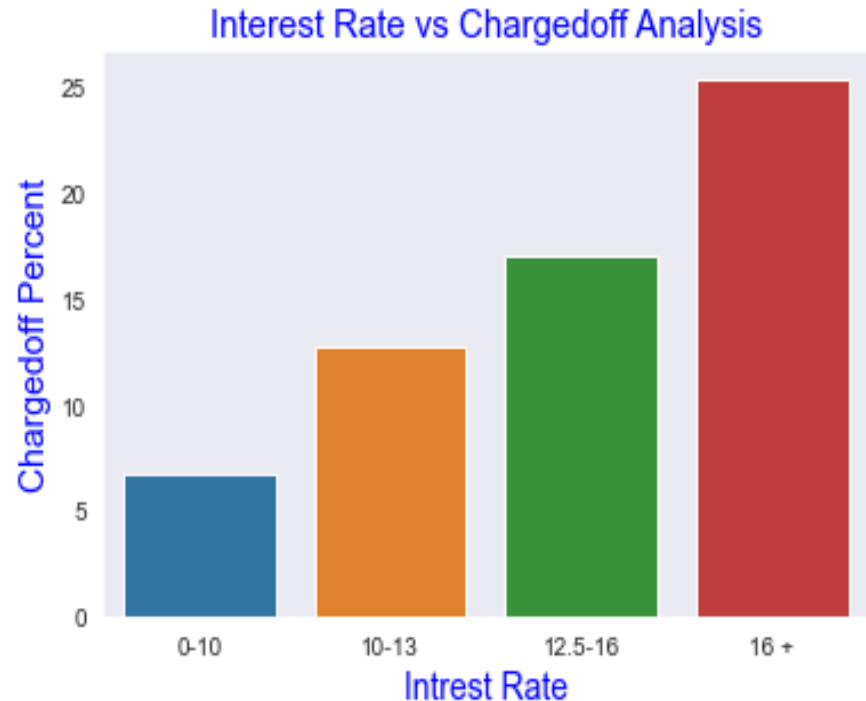
- loan given to Income range more than \$80000 has less chances of being charged off.
- Income range below 20000 has high chances of being charged off.
- Notice that with increase in annual income charged off proportion got decreased.



# Loan Status vs Interest Rate Category

## Observations:

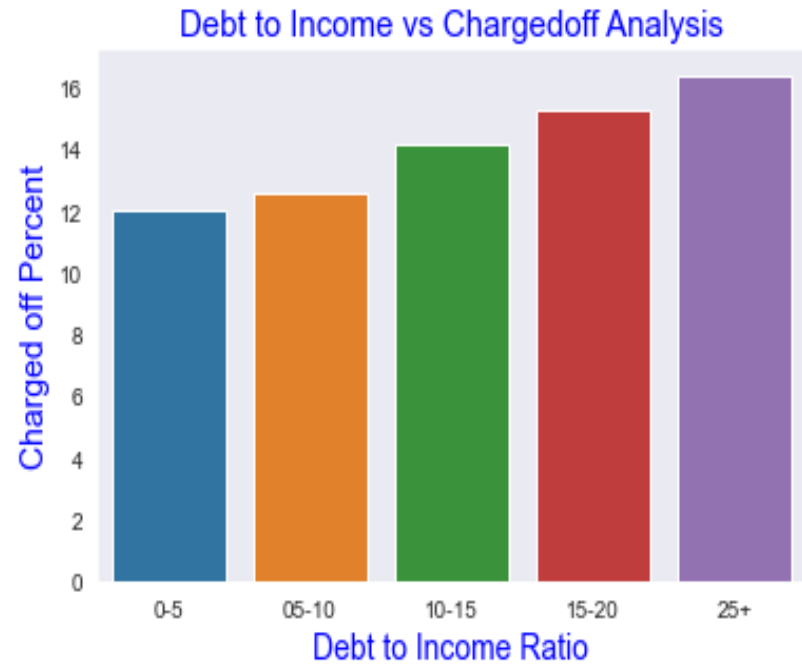
- With higher interest rate chances of being charged off increases



# Loan Status vs Debt to Income Categories

## Observations:

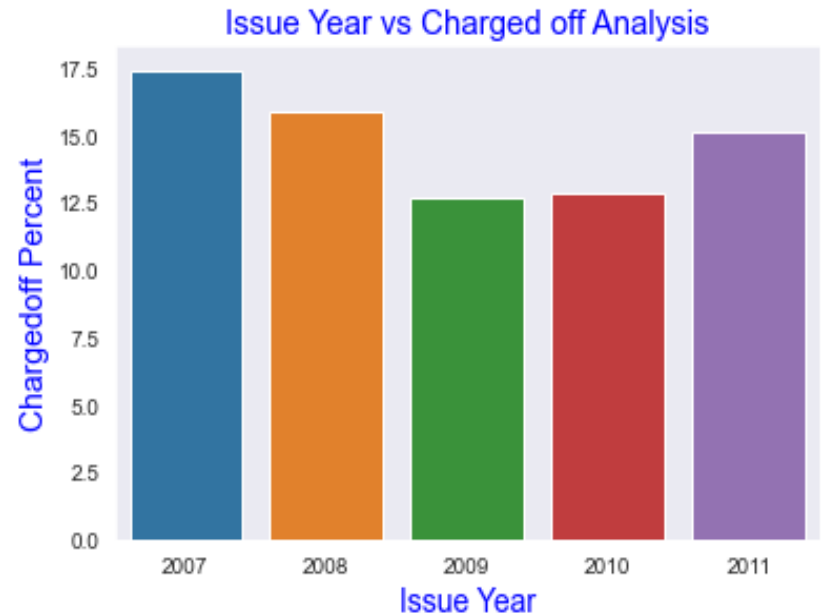
- With increase in debt-to-income ratio chances of being charged off increases

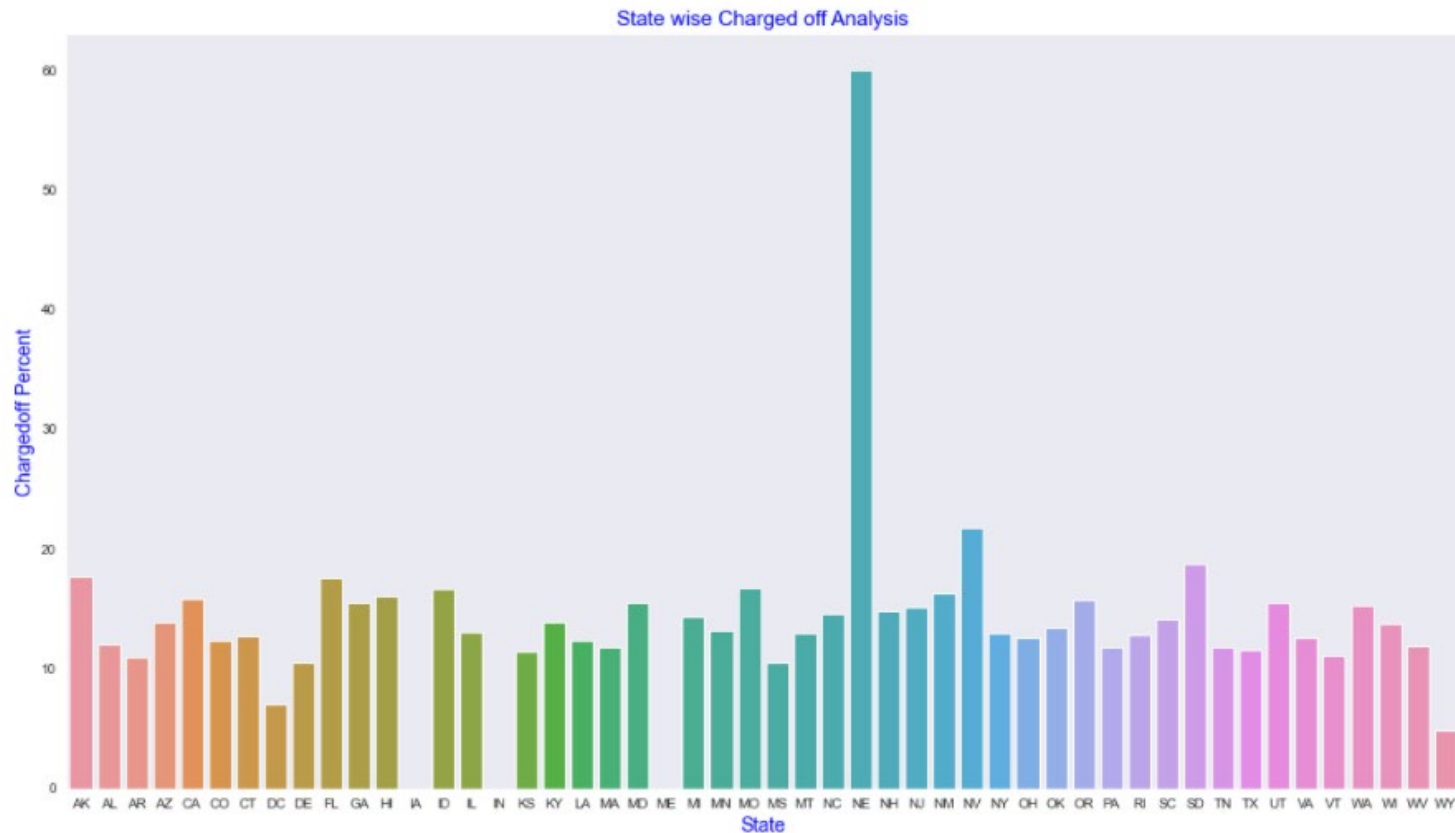


# Loan Status vs Issue year

## Observations:

- Loans issued in 2007 and 2008 had comparatively high charged off percentage.
- This may be due to financial crisis happened during that period.

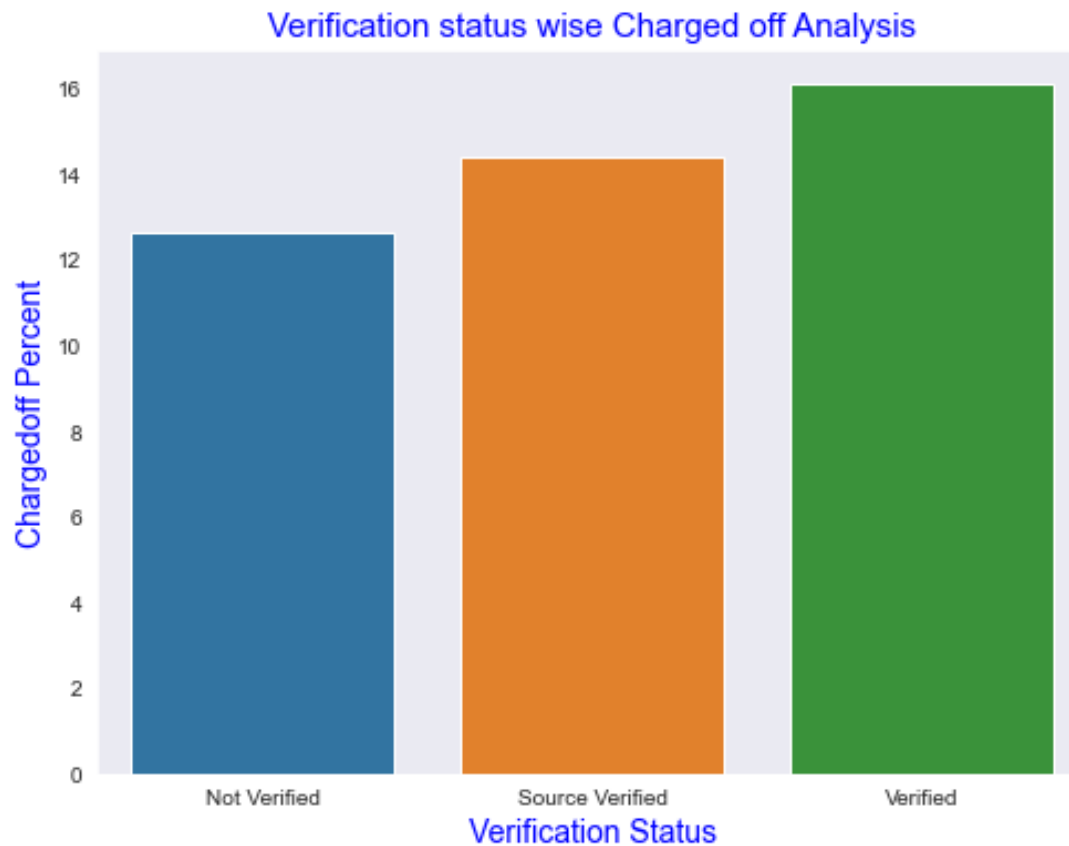




## Loan Status vs State

### Observations:

- State of Nebraska (NE) had high charged off percentage.
- This is due to state of Nebraska had a smaller number of loan and out of those 5 numbers 3 got chargedoff.
- We can not judge state of Nebraska with this analysis
- However NV,AK, SD and FL states showed comparatively high number of charged offs than others.



## Loan Status vs Verification Status

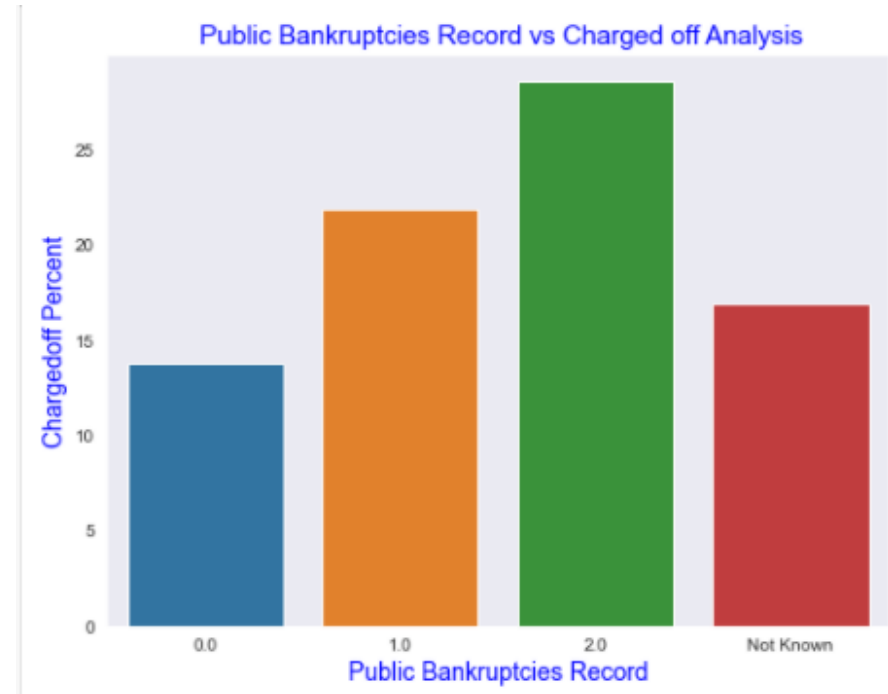
### Observations:

- This analysis shows that verified loans have more chances to get charged off which is not convincing.

# Loan Status vs Public Bankruptcies Record

## Observations:

- Those who had Public Bankruptcies Record, attracts higher chances of making charged off loans.

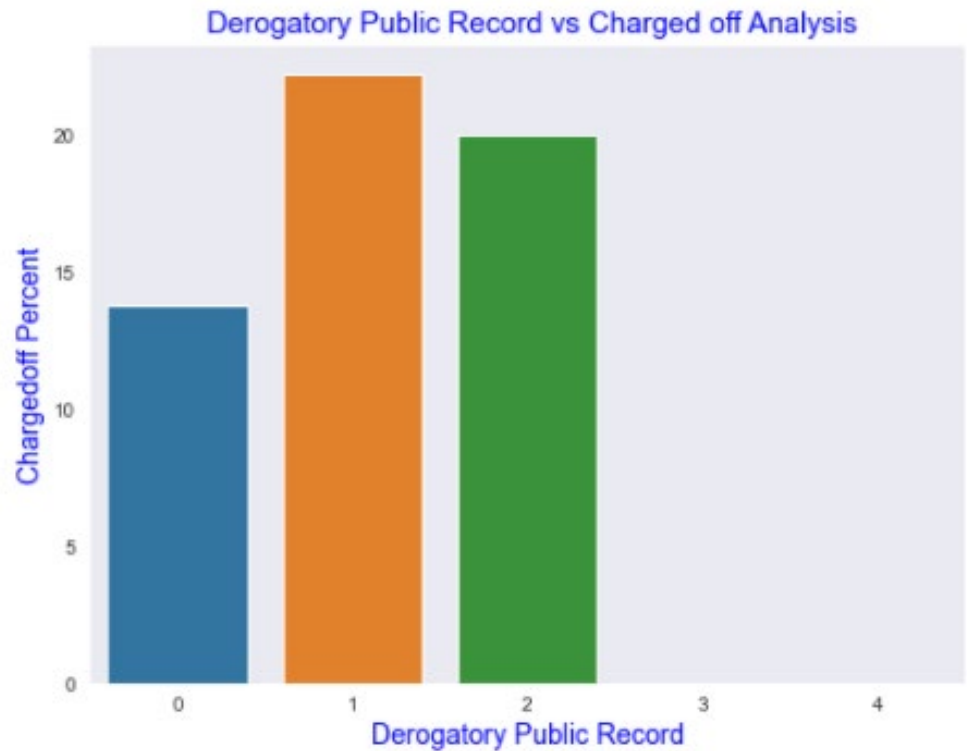




# Loan Status vs Derogatory Public Record

## Observations:

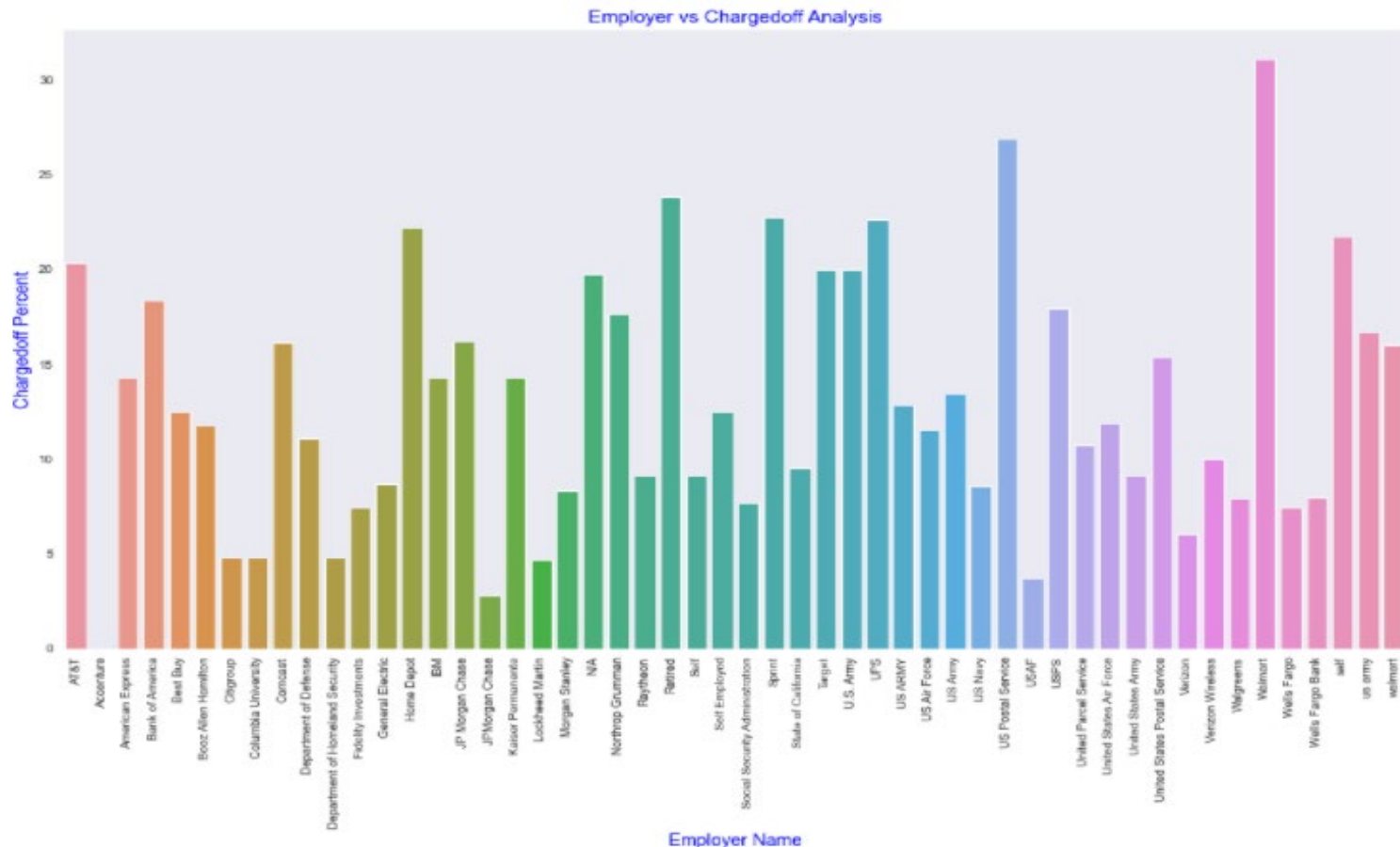
- Those who had 1 or 2 Derogatory public records have higher chances of getting charged off than those who don't have any Derogatory Public Record.

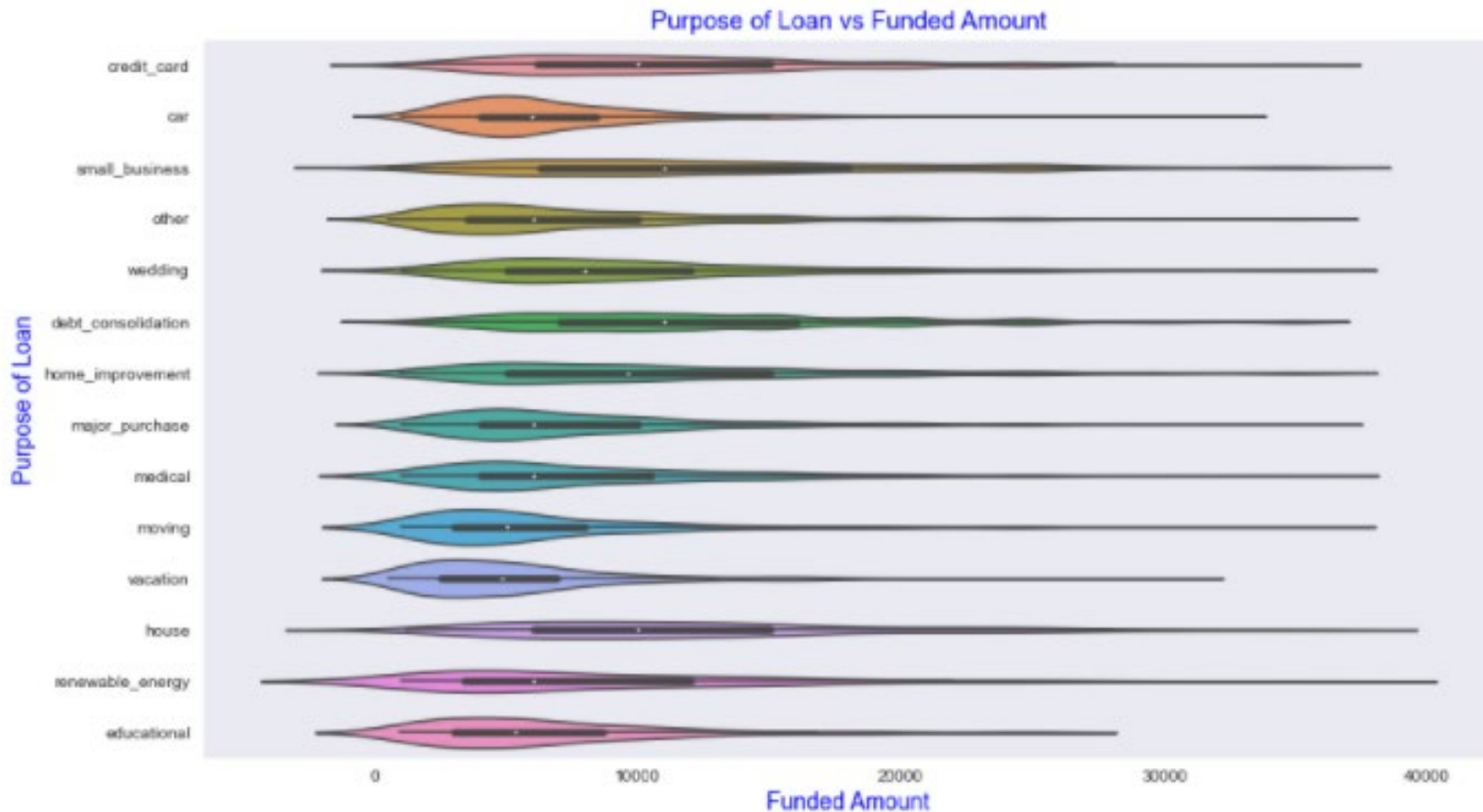


# Loan Status vs Employer Title

## Observations:

- Borrower Working in Accenture showed less chances for default
- Borrower Working in Walmart, US Postal Services, Retired etc. showed comparatively high chances for default

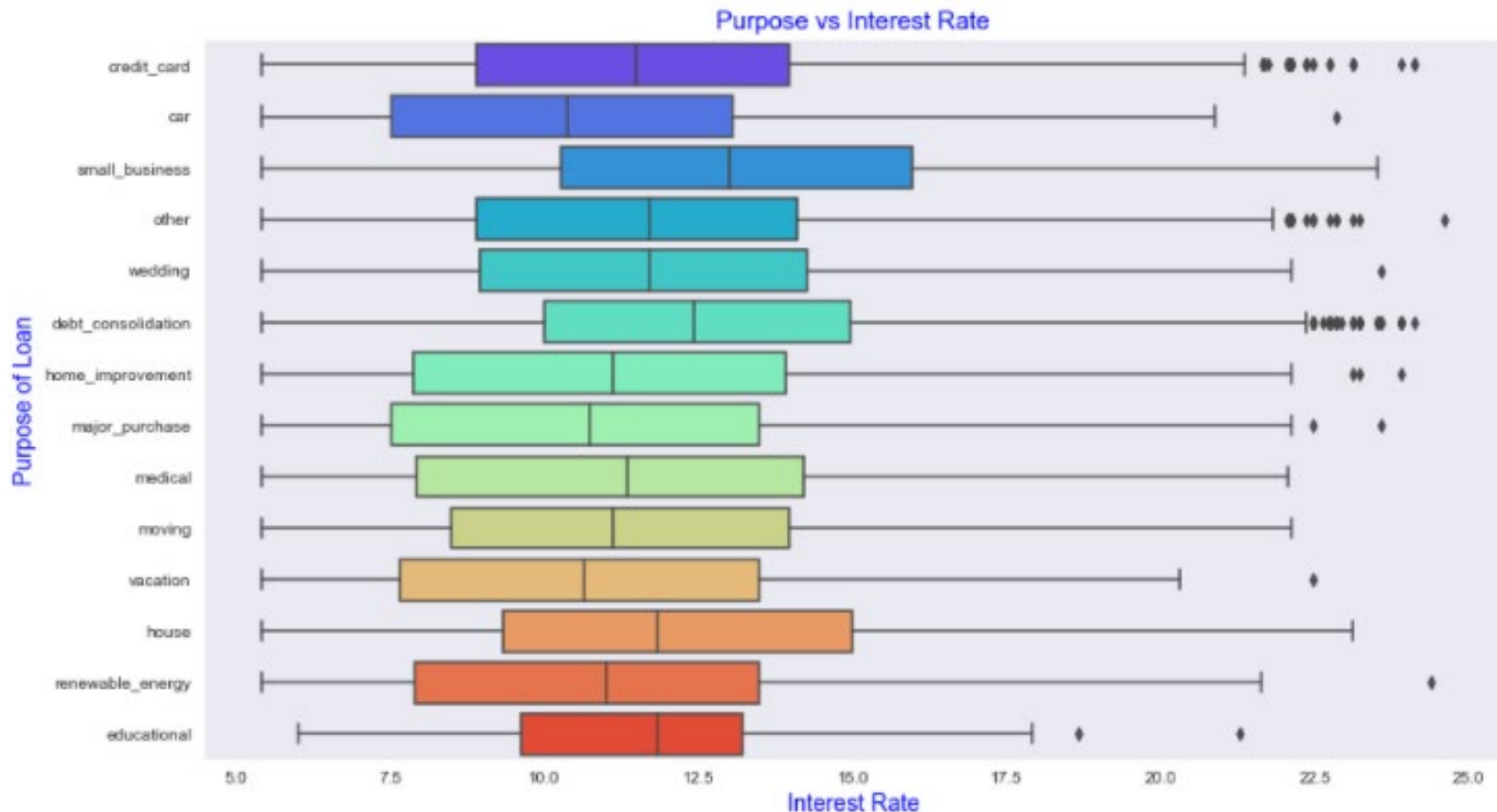




## Purpose of loan vs Funded Amount

### Observations:

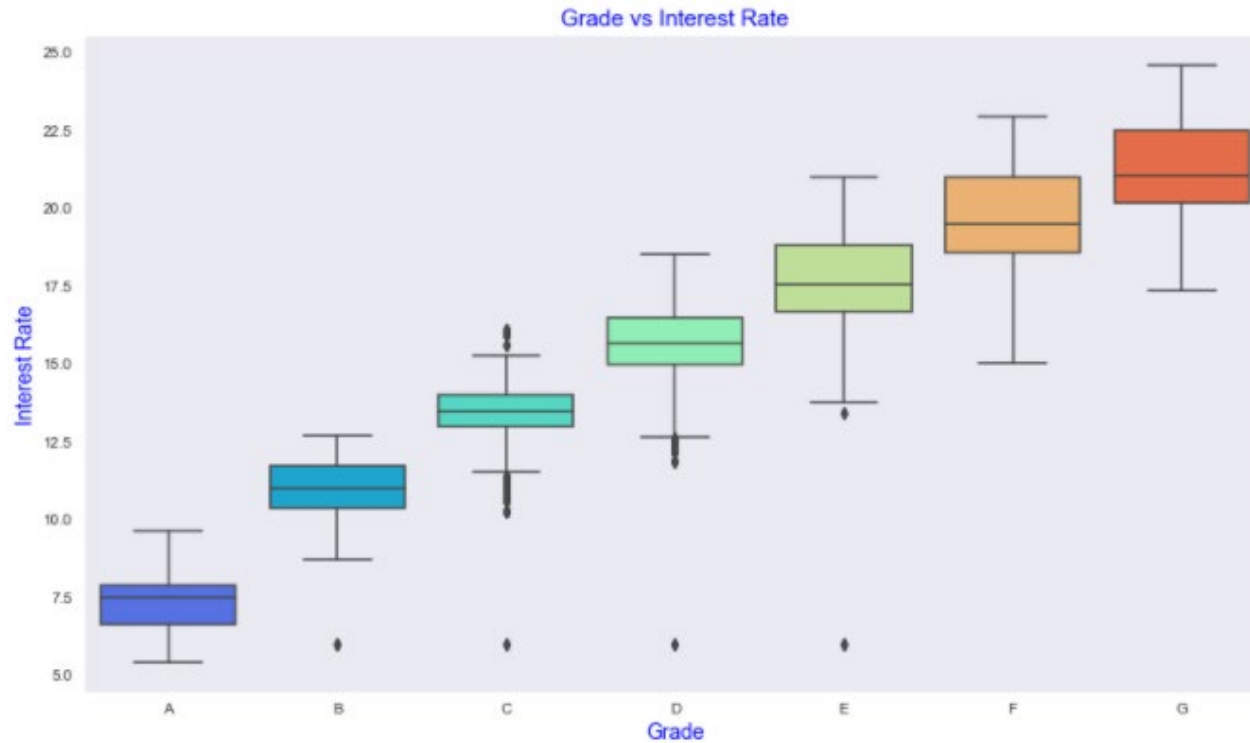
- Loan taken for small business purpose, Debt consolidation and Credit card are somewhat evenly distributed as compared to loan taken for other purposes.
- Car and vacation loans are mostly lower amount of loan.



## Purpose of loan vs Interest Rate

### Observations:

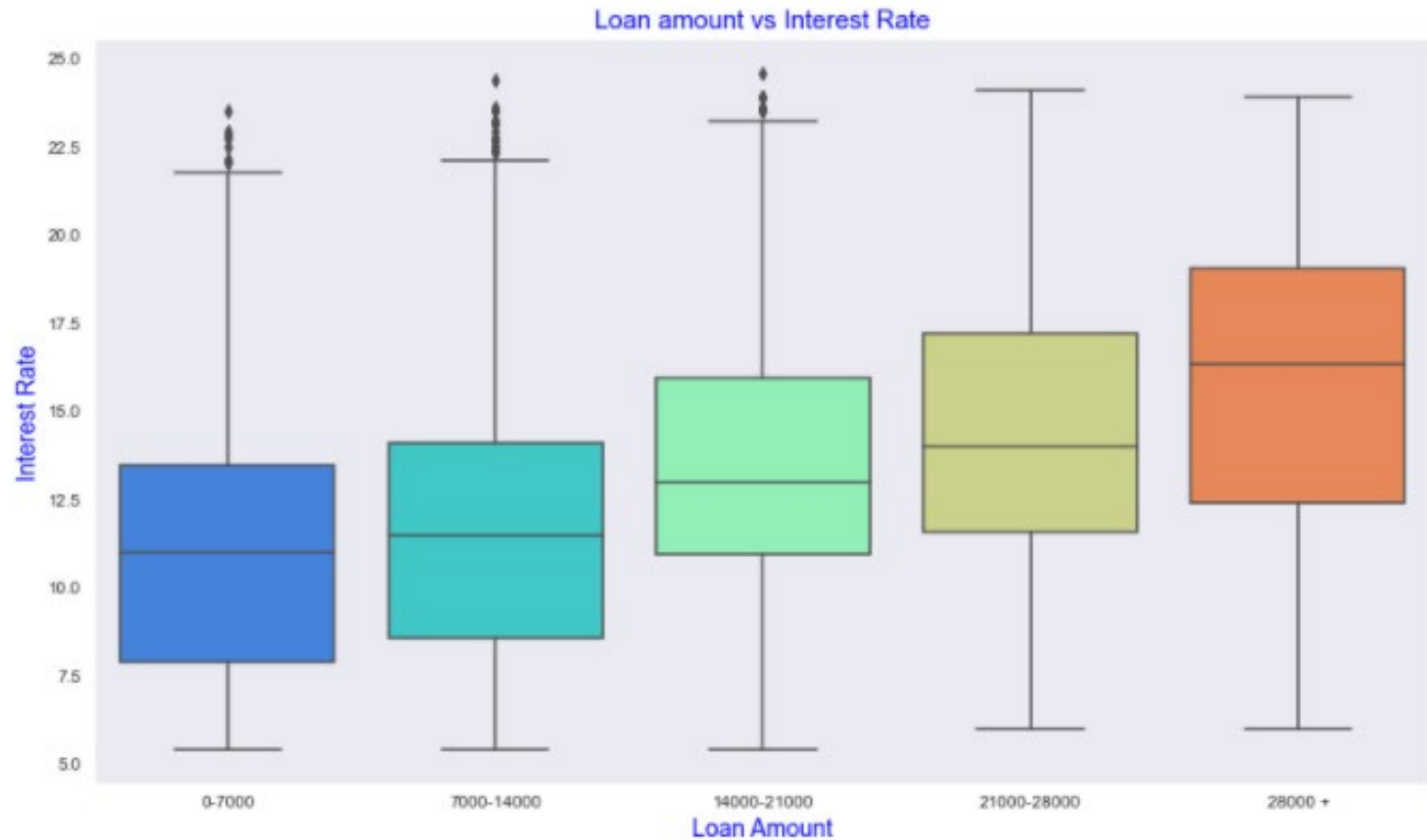
- It is clear that average interest rate is highest for small business purpose.
- Debt consolidation is 2nd where borrowers had to pay more interest rate.



# Grade vs Interest Rate

## Observations:

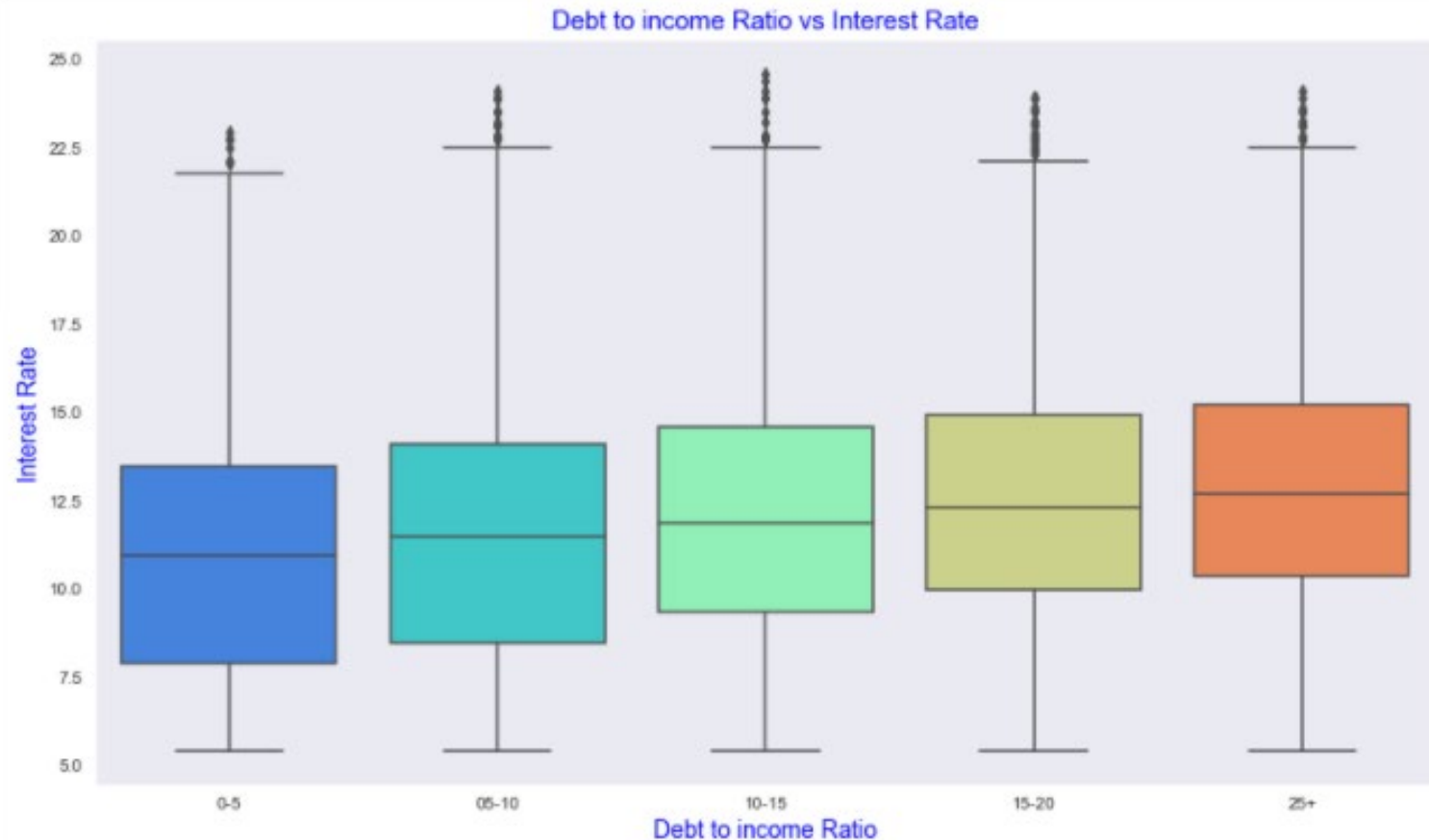
- The better the borrower's credit grade, the lower the interest rate offered to that borrower.
- It is clear that interest rate is increasing with grades moving from A to F.



## Funded Amount vs Interest Rate

### Observations:

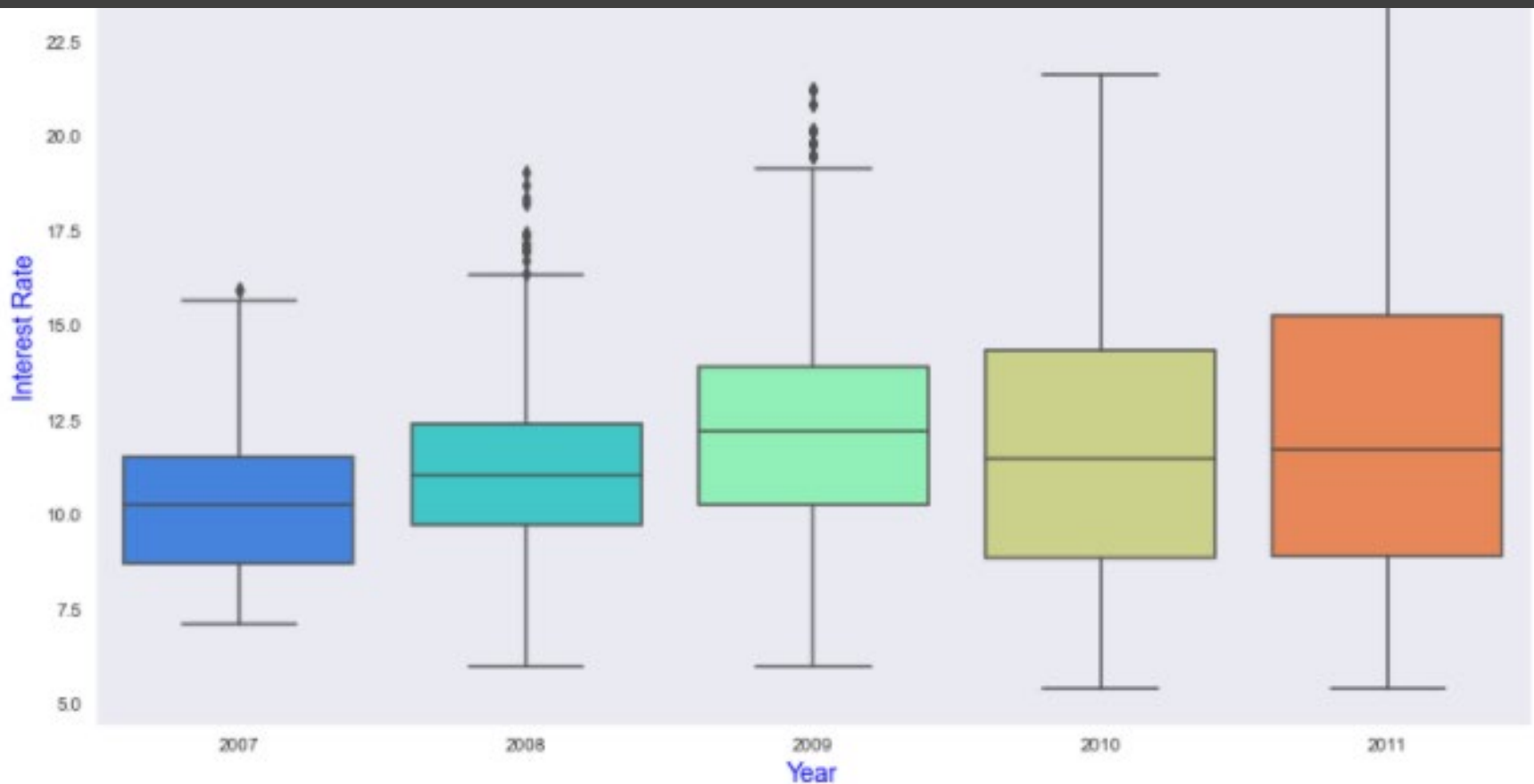
- It is clear that interest rate is increasing with increase in funded amount.



## Debt to Income vs Interest Rate

### Observations:

- If your DTI is low enough you may get a lower interest rate.
- There is slight increase in interest rate with increase in DTI.



## Loan Issue Year vs Interest Rate

### Observations:

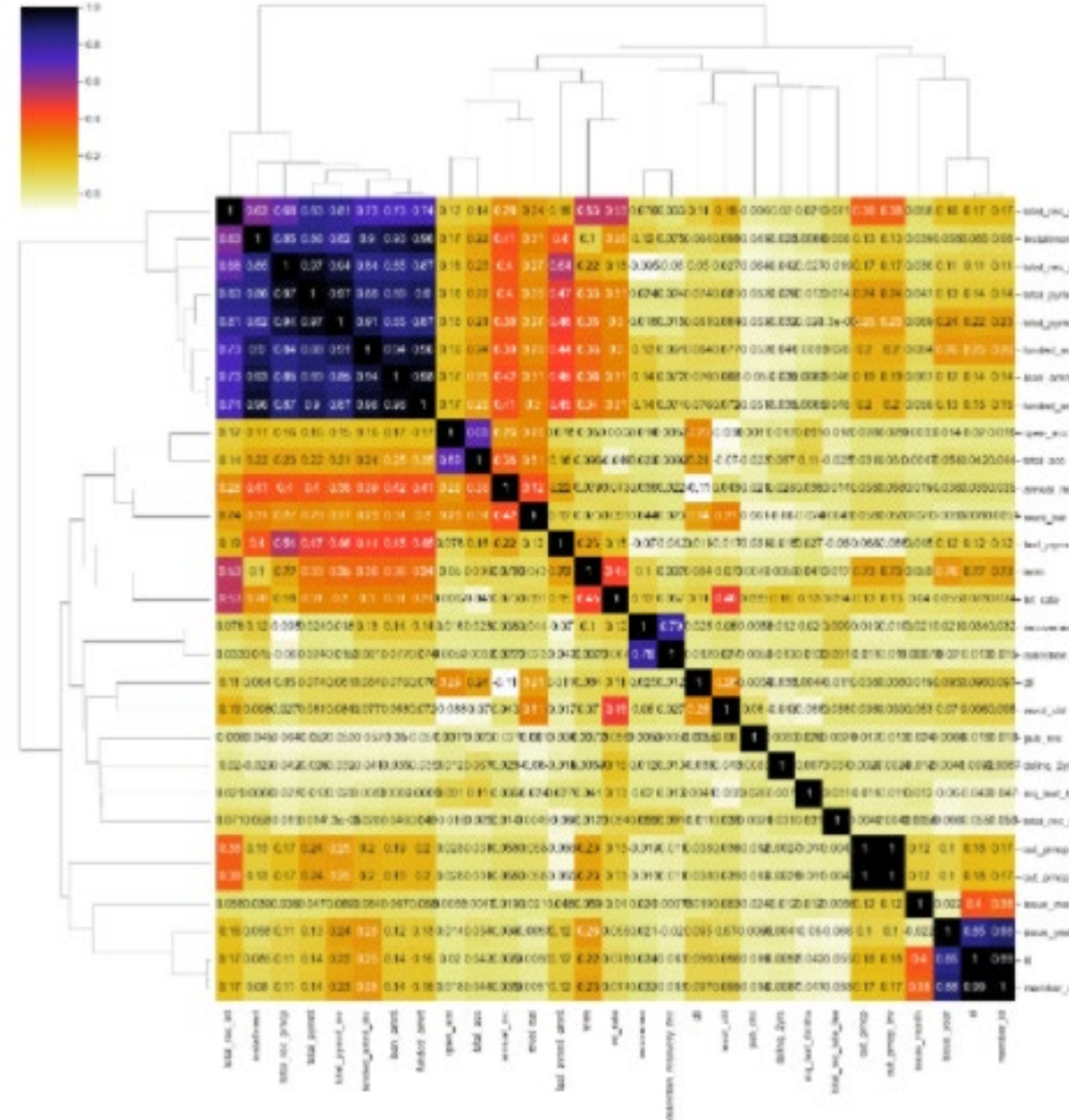
- Lending club had given loan at most varying interest rates to borrower in year 2011.
- From 2008 to 2011 Lending club had been consistently increasing range of interest rates offered to borrowers.



# Multivariate Analysis

## Observation

- Loan amount, investor amount, funding amount are strongly correlated.
  - Annual income with DTI (Debt-to-income ratio) is negatively correlated.
- With increase in annual income dti will certainly reduce.



Thank you

