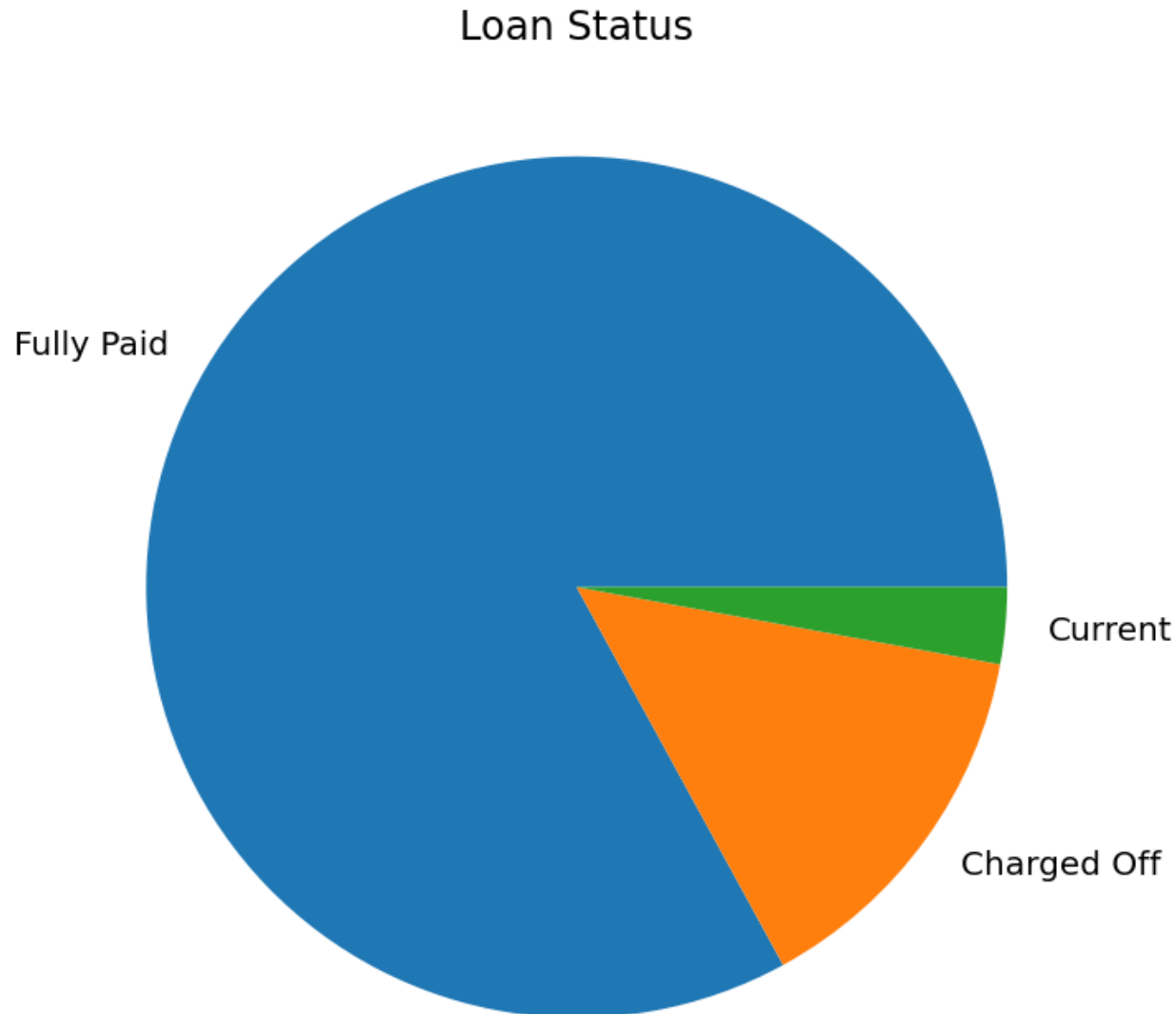


# **Lending Club Case Study**

**Student: Gert Agenbag**

**10 May 2022**

# Exploring the Dataset

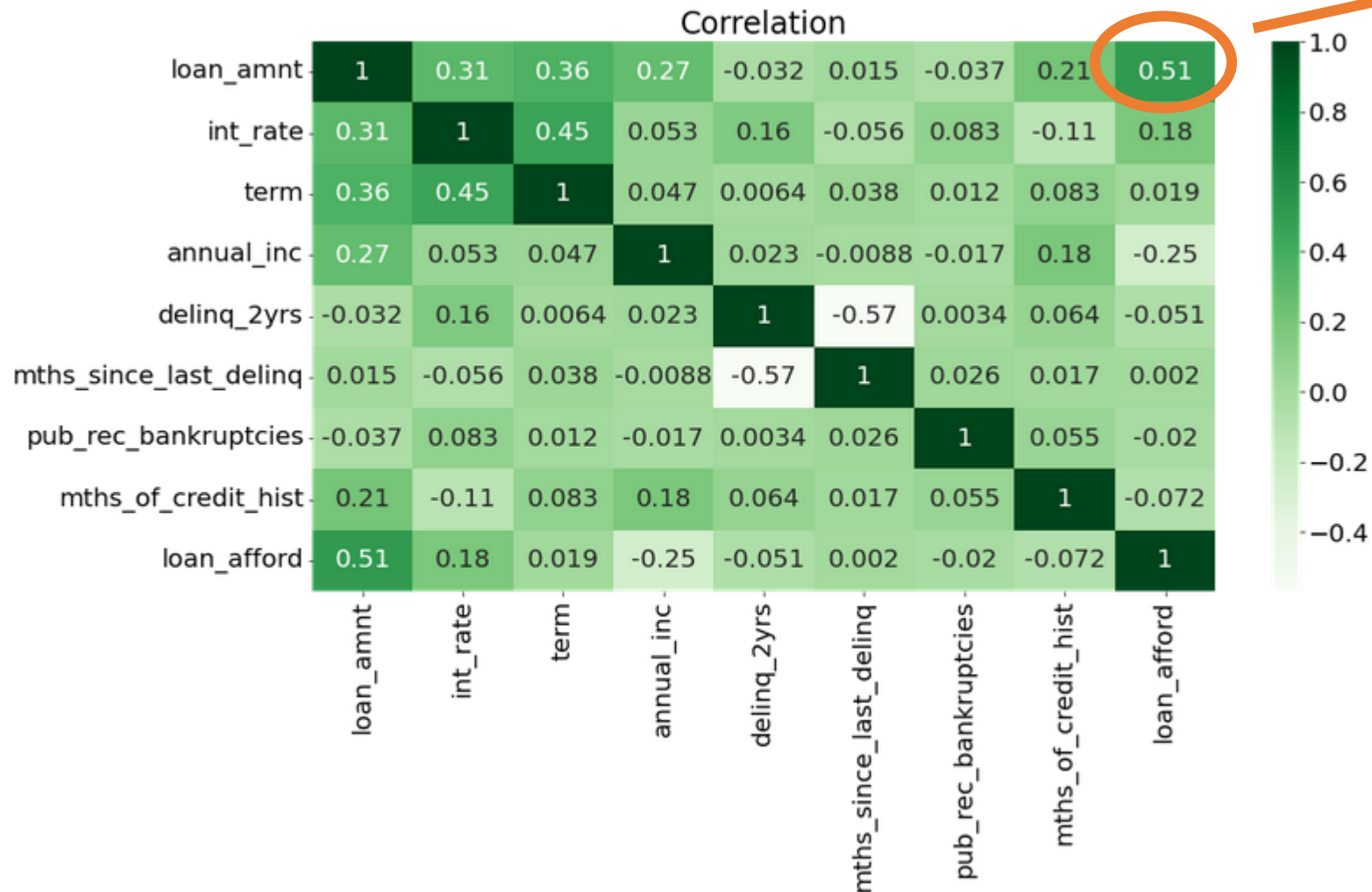


Number of records in dataset:

- Fully Paid: 32950
- Charged Off: 5627
- Current: 1140

Only completed loans were considered in the analysis

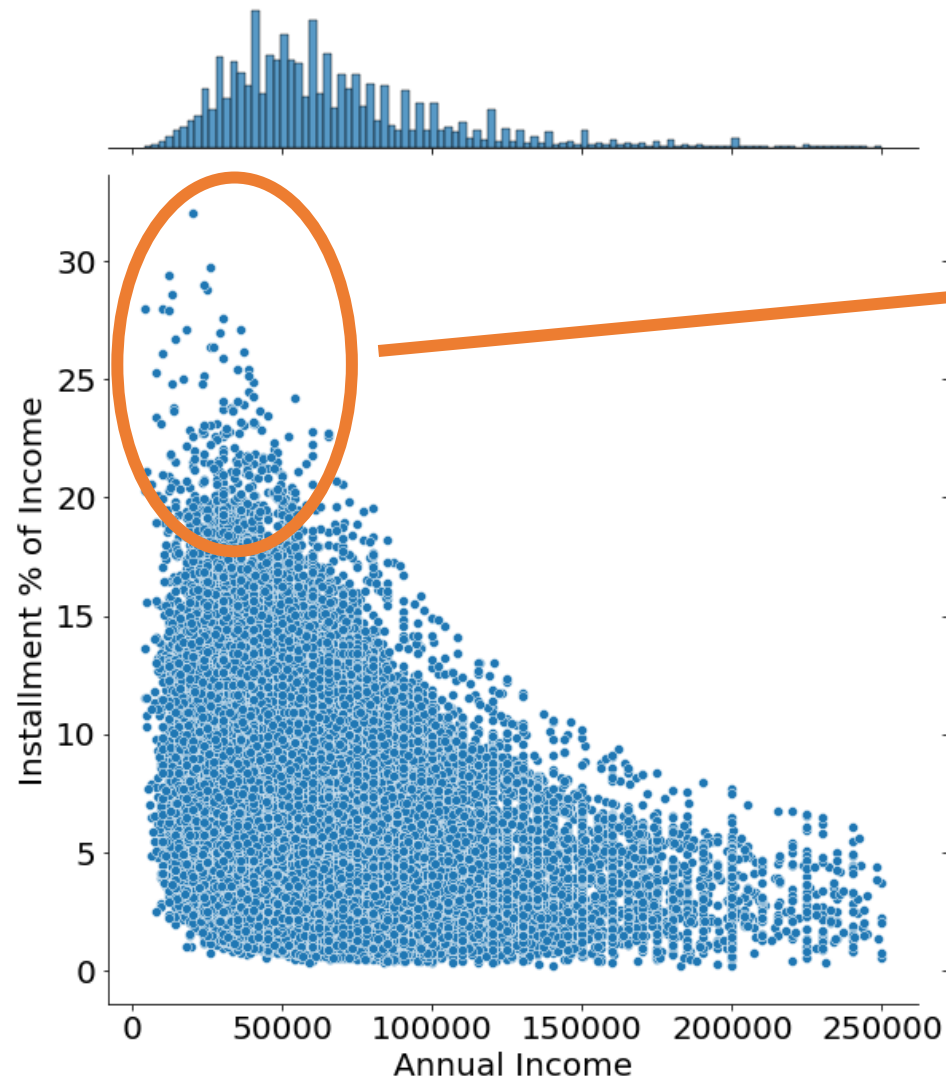
# Correlation Between Variables



‘loan\_afford’

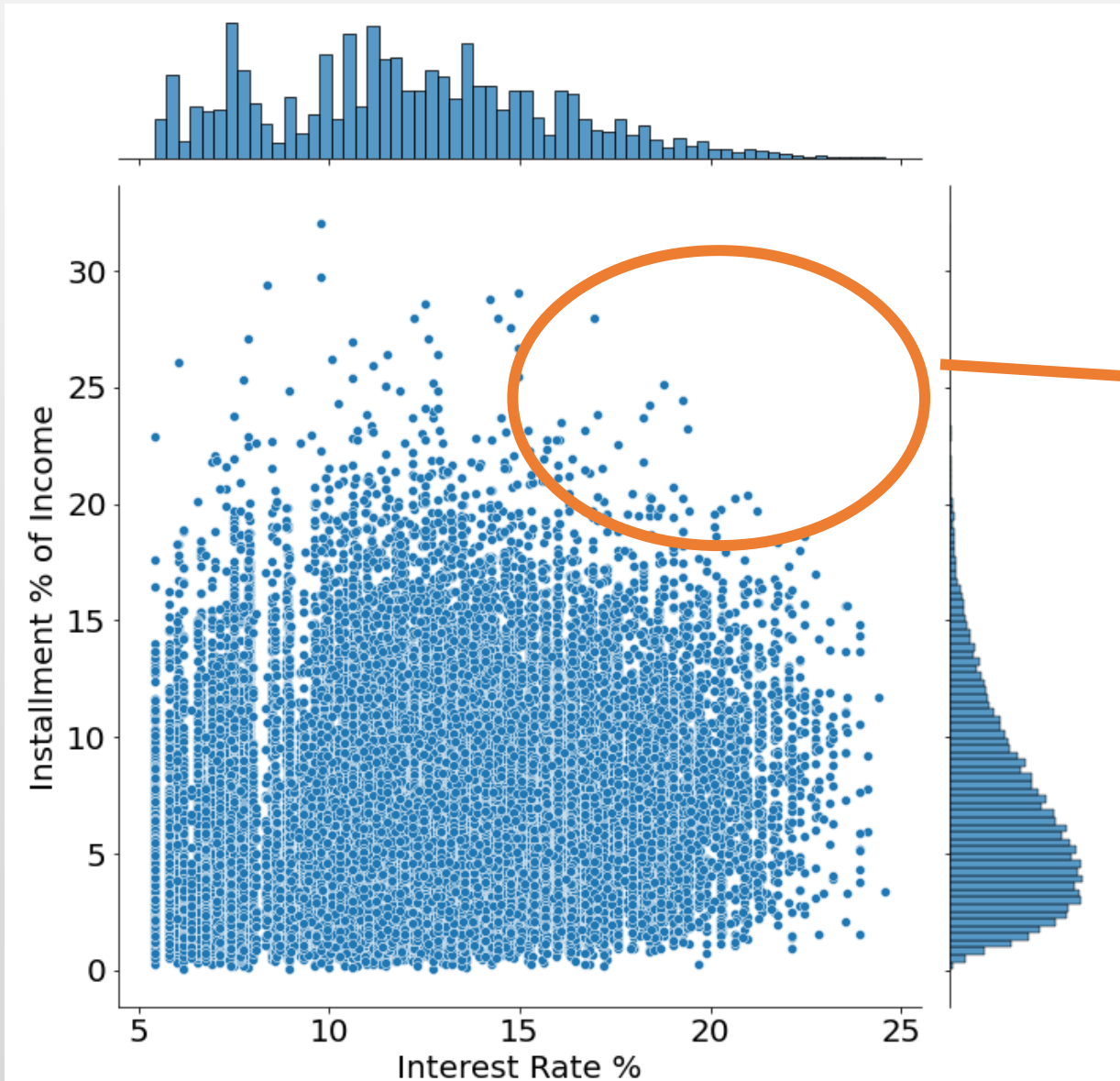
- Derived metric
- High correlation with loan amount
- Loan installment amount as a percentage of the applicant’s income
- Suggests that people who cannot afford loans take out larger loans

# Loan Affordability vs Income



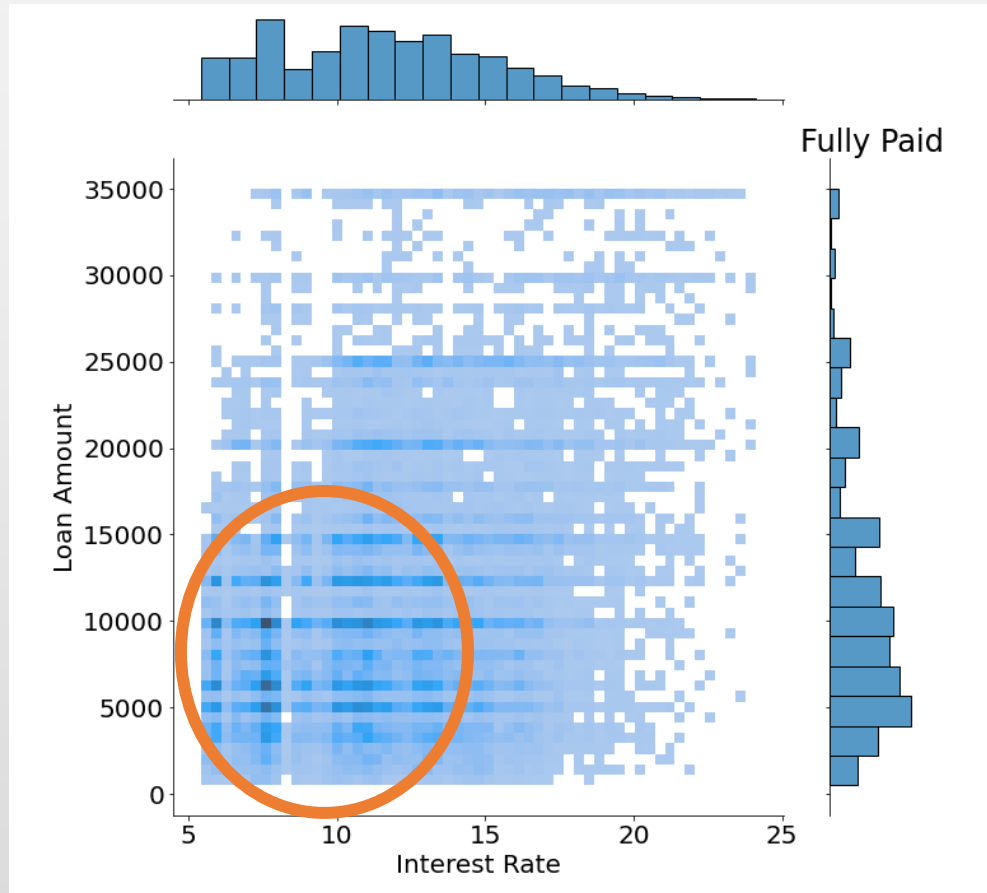
- People with lower incomes take out loans that require a large proportion of their income to service
- Suggests that they may not be able to afford these loans

# Loan Affordability vs Interest Rate



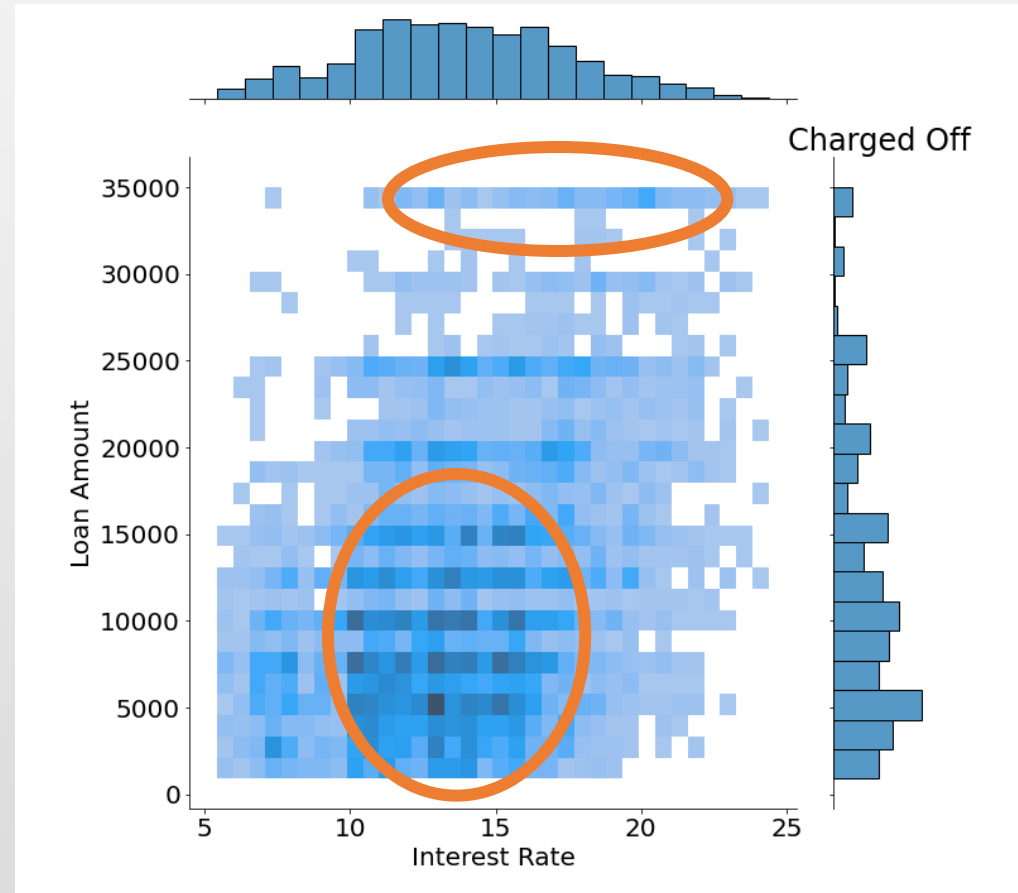
- Very small number of loans where applicants spend a large portion of their income on servicing interest

# Loan Amount vs Interest Rate



## Good loan cluster:

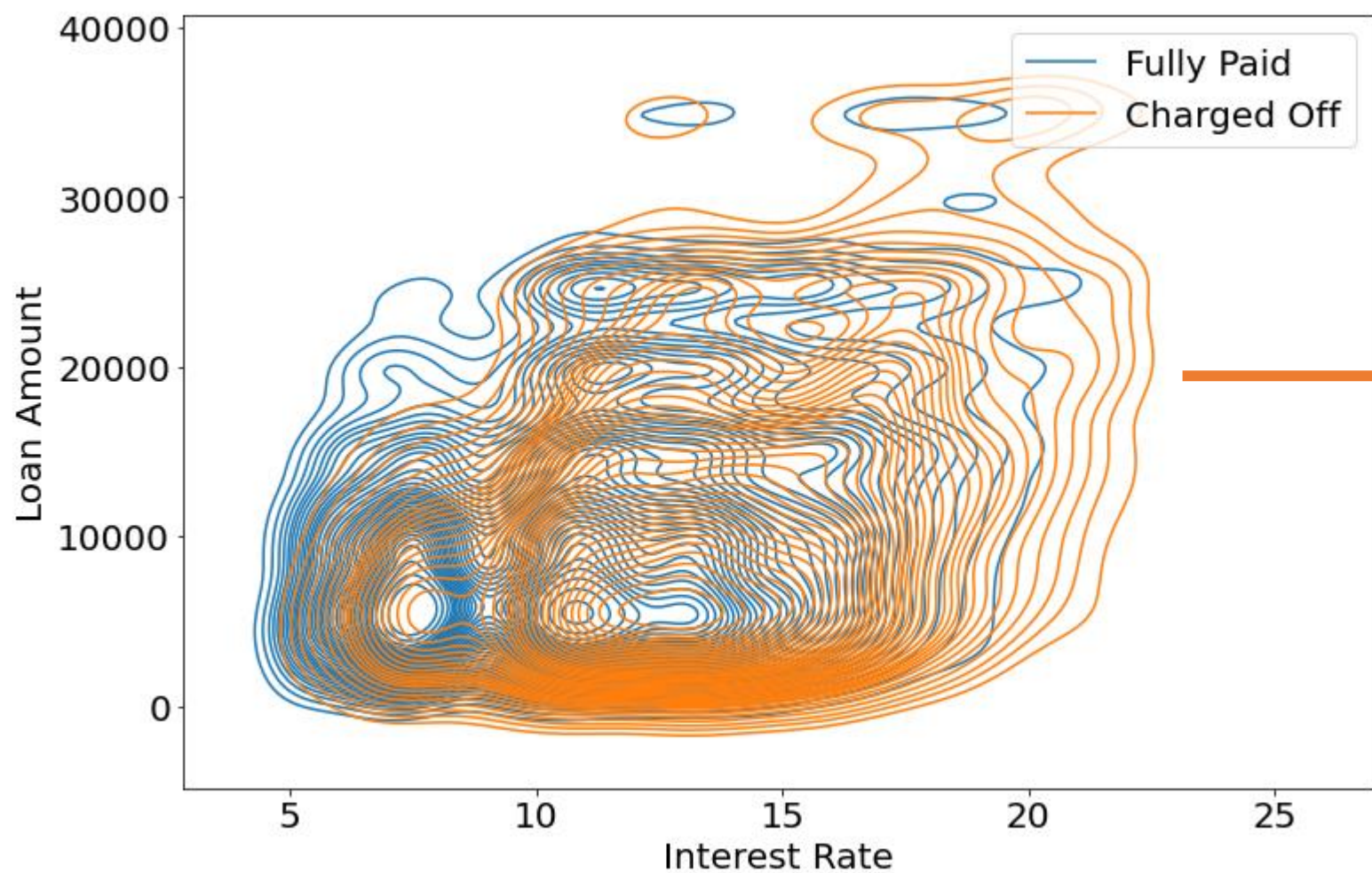
- Low amount and low interest rate (5-14%)



## Bad loan clusters:

- Higher interest rate (10-18%)
- High amount and high interest rate

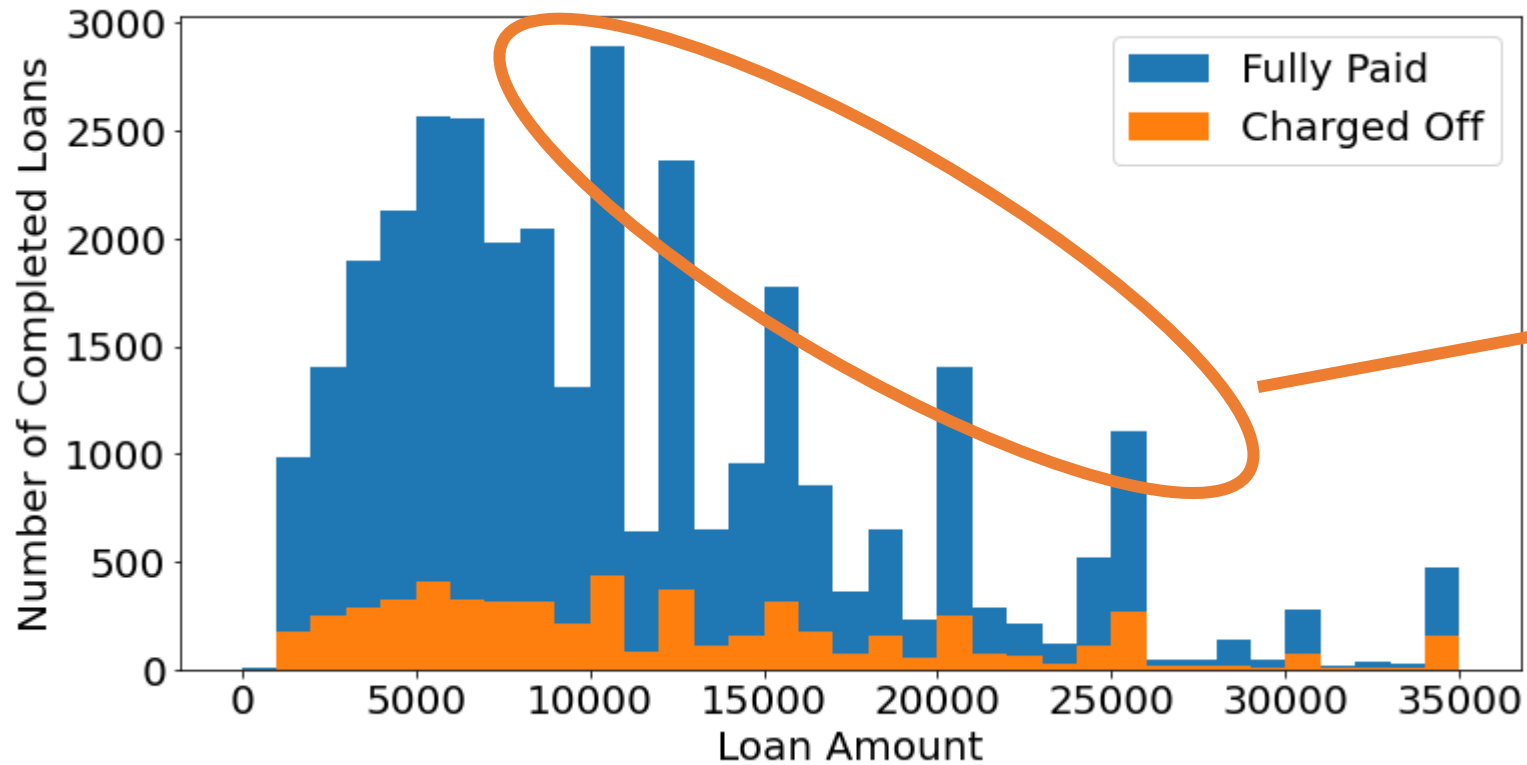
# Loan Amount vs Interest Rate



- Very few loans with interest rates above 20% are fully paid



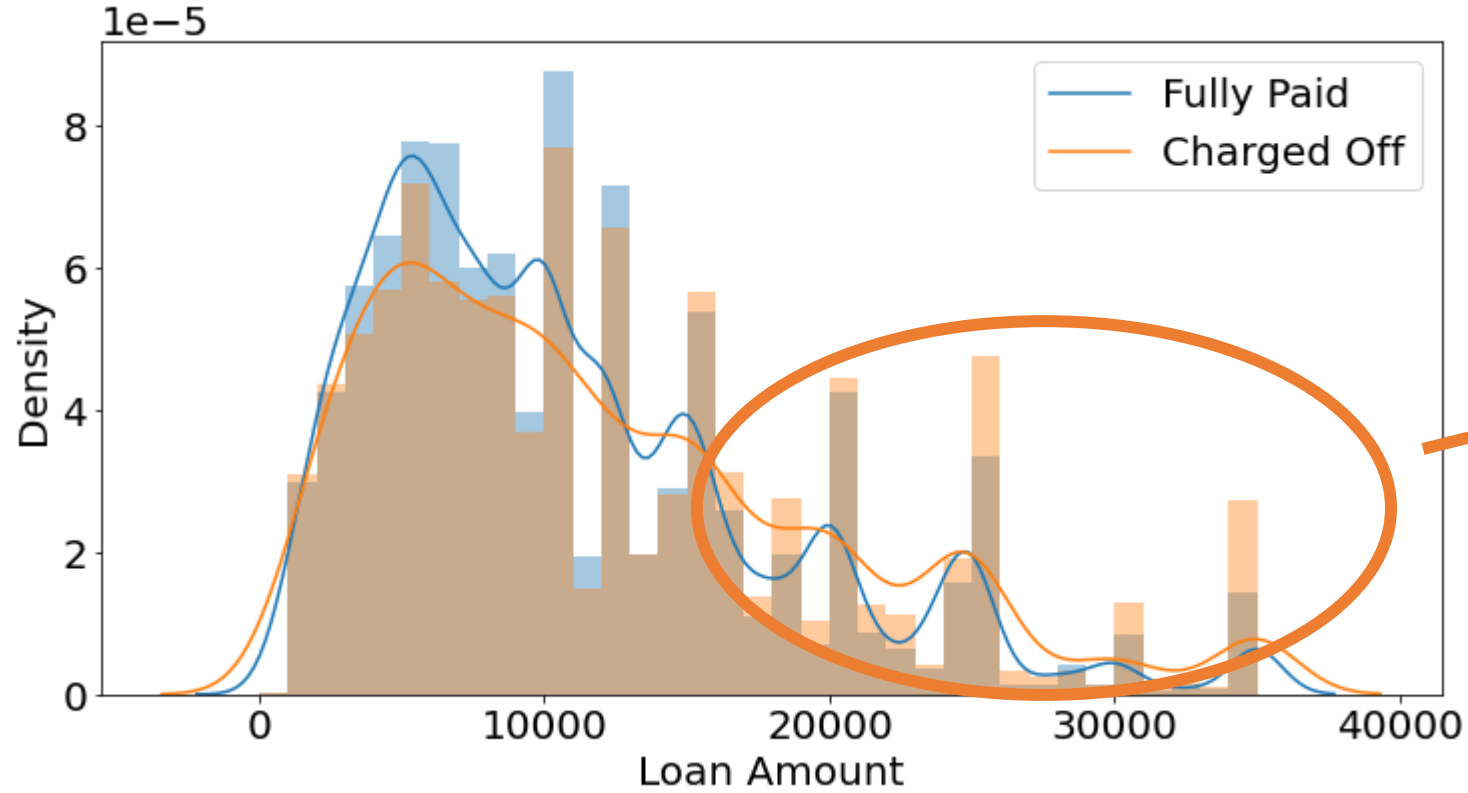
# Loan Amount



- Non-uniform distribution with spikes at multiples of \$5,000 suggest that people borrow more money than they need

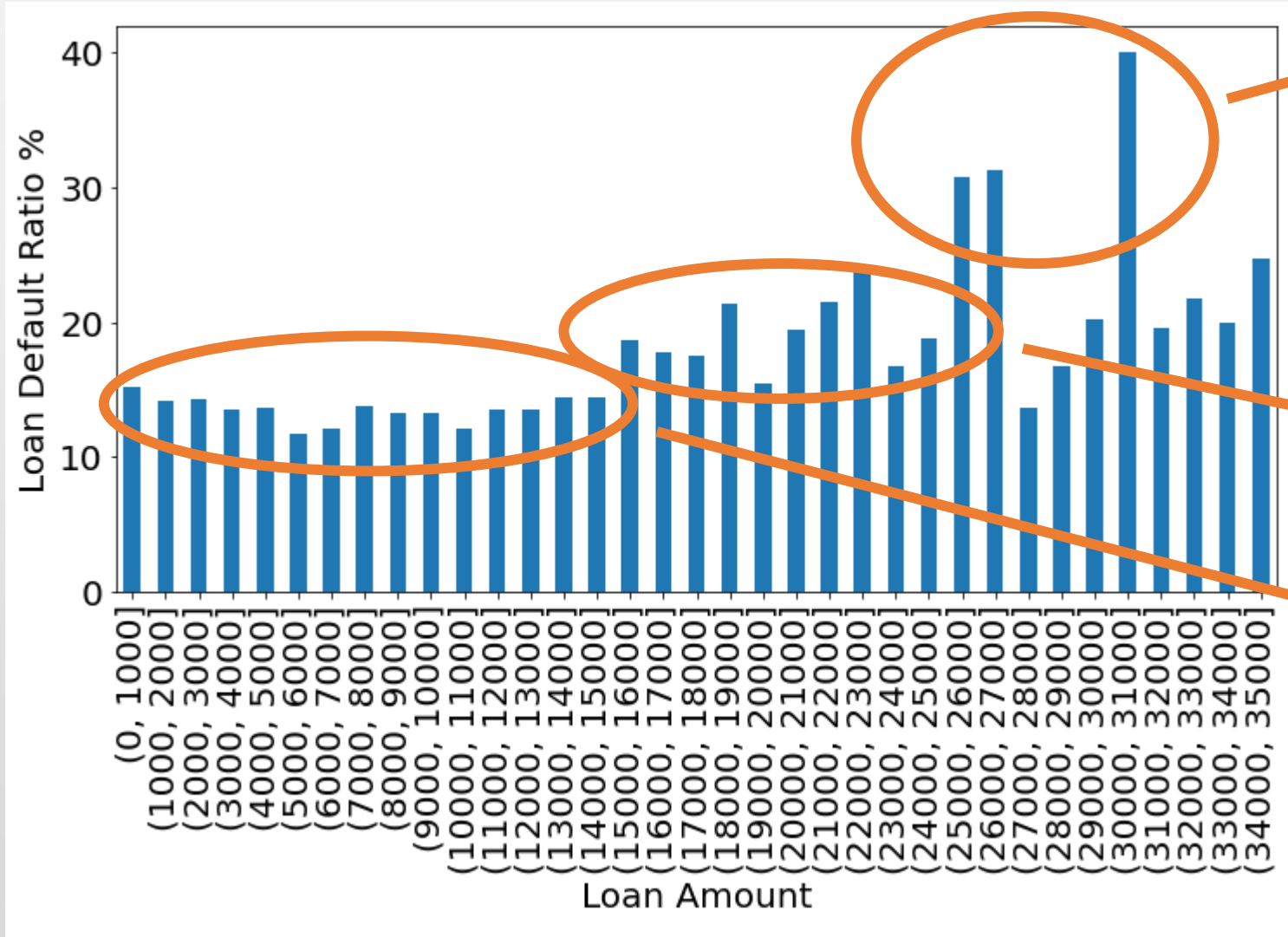


# Loan Amount



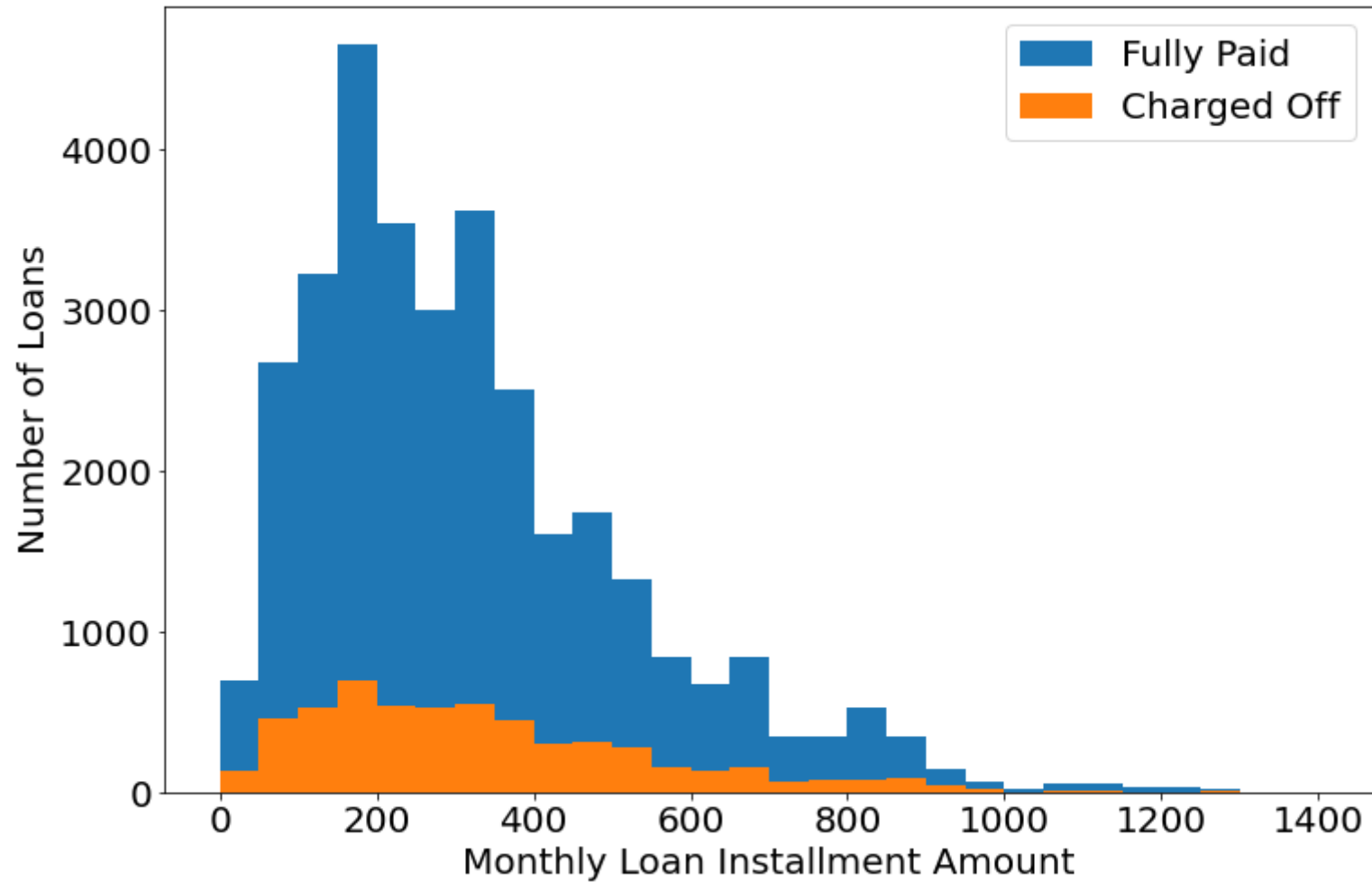
- High proportion of bad outcomes for large loan amounts

# Loan Amount



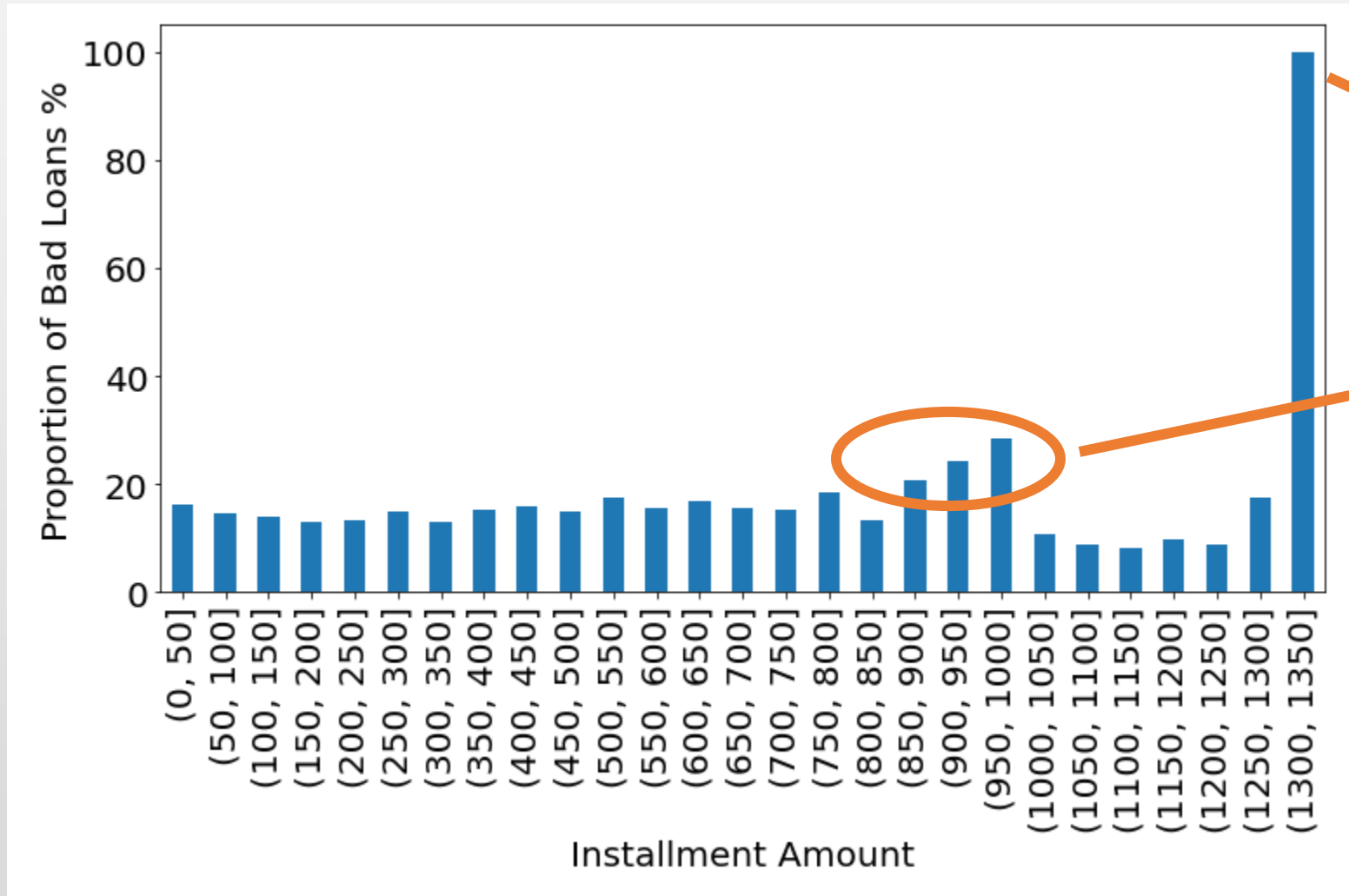
- High proportion of bad outcomes for large loan amounts:
  - \$25000.01 – \$27000.00
  - \$30000.01 – \$31000.00
- Jump in risk of default for loans above \$15000.01
- Similar default ratio for all loans of \$15000.00 and less

# Installment Amount



- Median loan amount: \$277.86

# Installment Amount

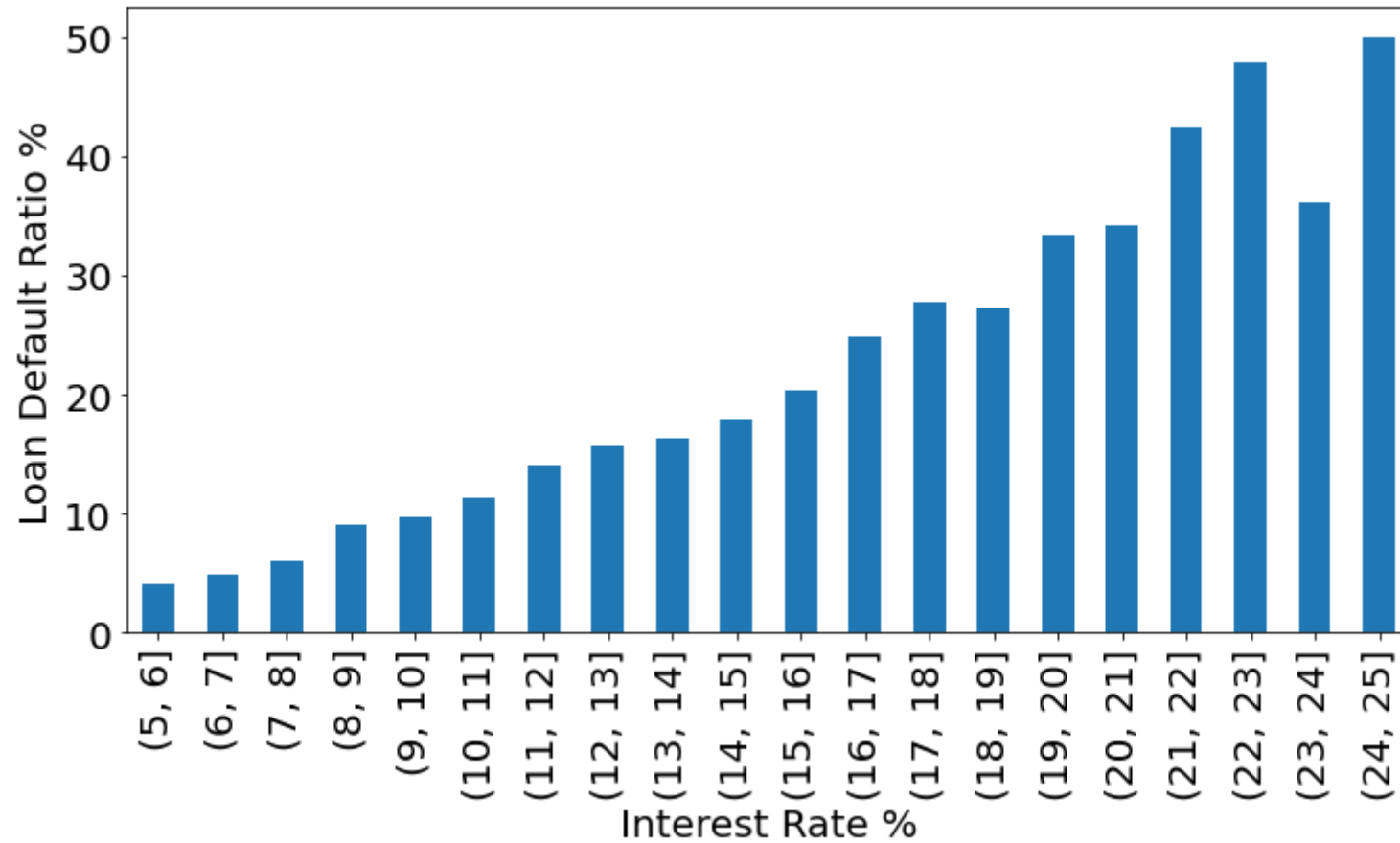


- Outliers – only two loans were issued in this repayment range

- Jump in risk just below \$1000.00 monthly repayment

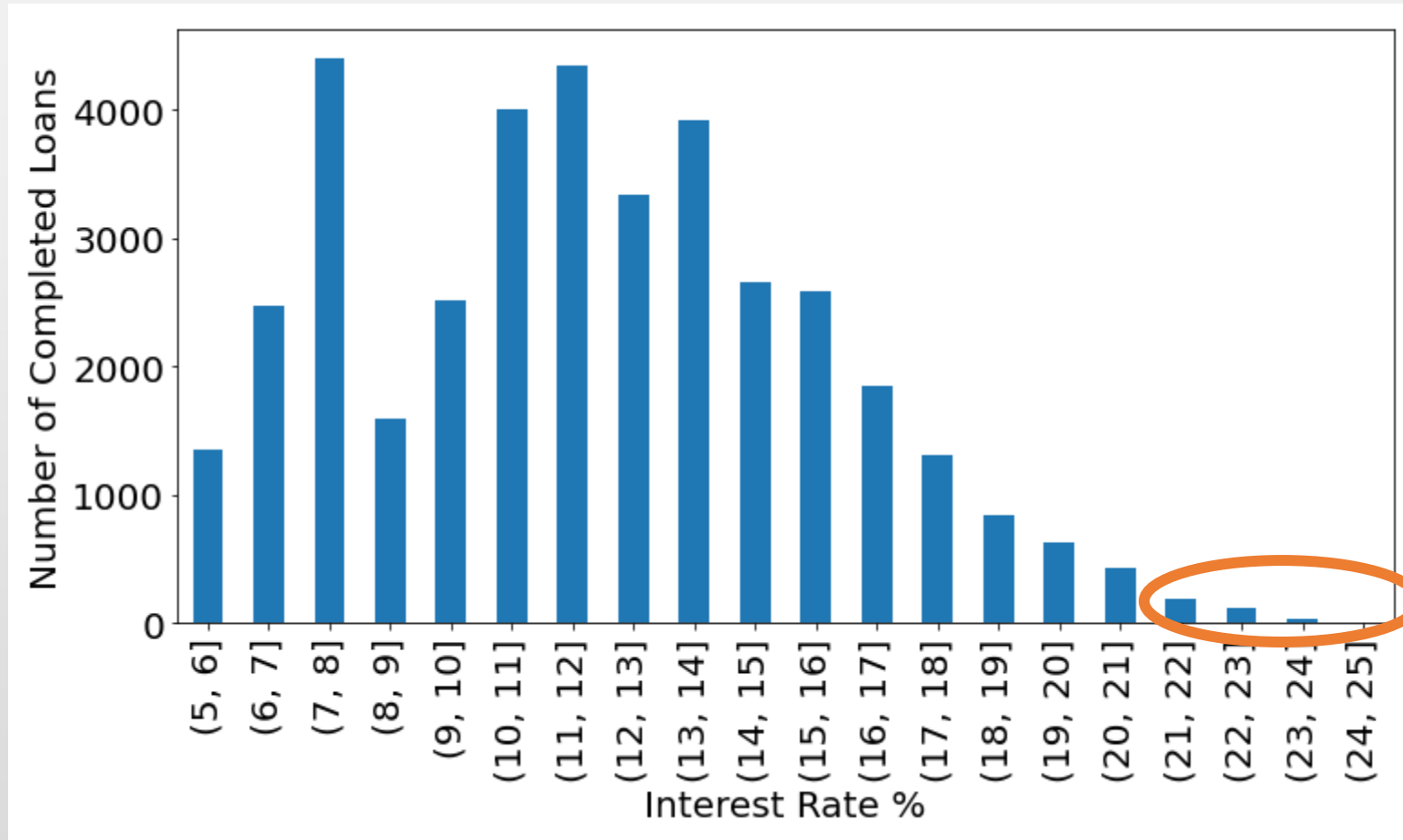
Could a psychological effect: people perceive the loan to be affordable if the repayment is less than \$1000.00

# Interest Rate



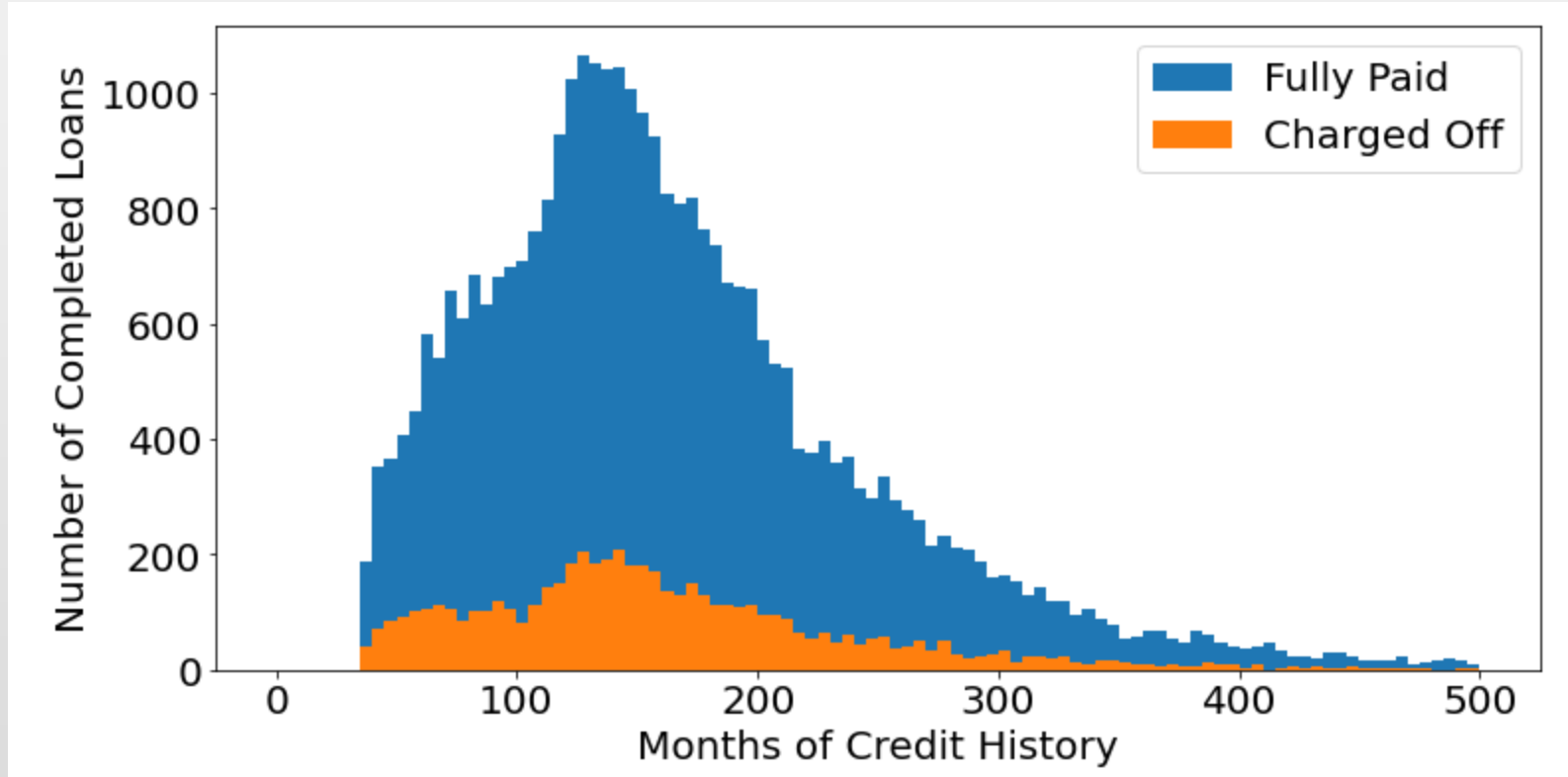
- Approximately linear relation between interest rate and probability of default
- Risk of default is an order of magnitude higher for loans with interest rates of 22 – 25% compared to interest rates of 5 – 6%.

# Interest Rate



• Very few high-interest rate loans are issued

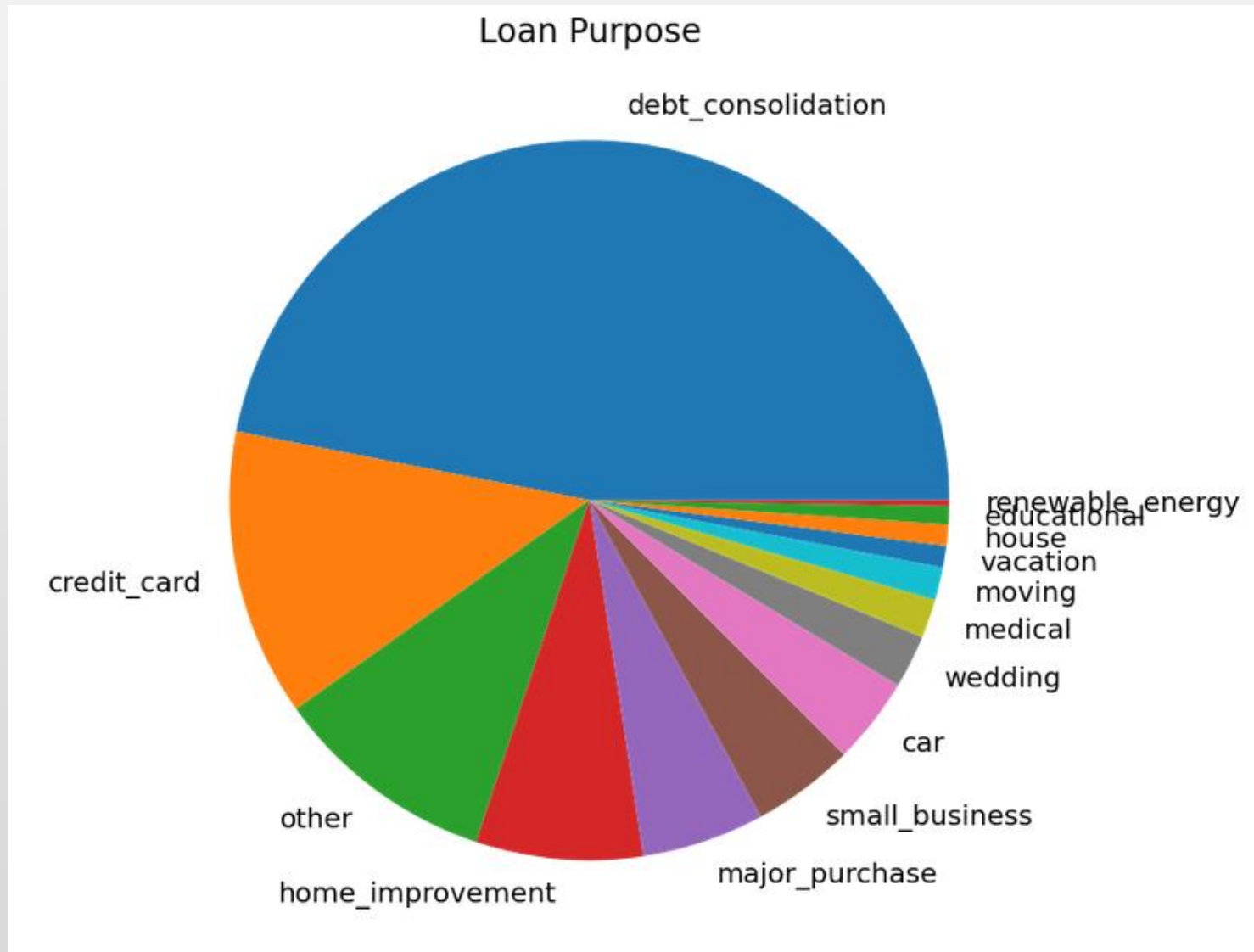
# Length of Credit History



- The length of an applicant's credit history is not a good predictor of the loan outcome

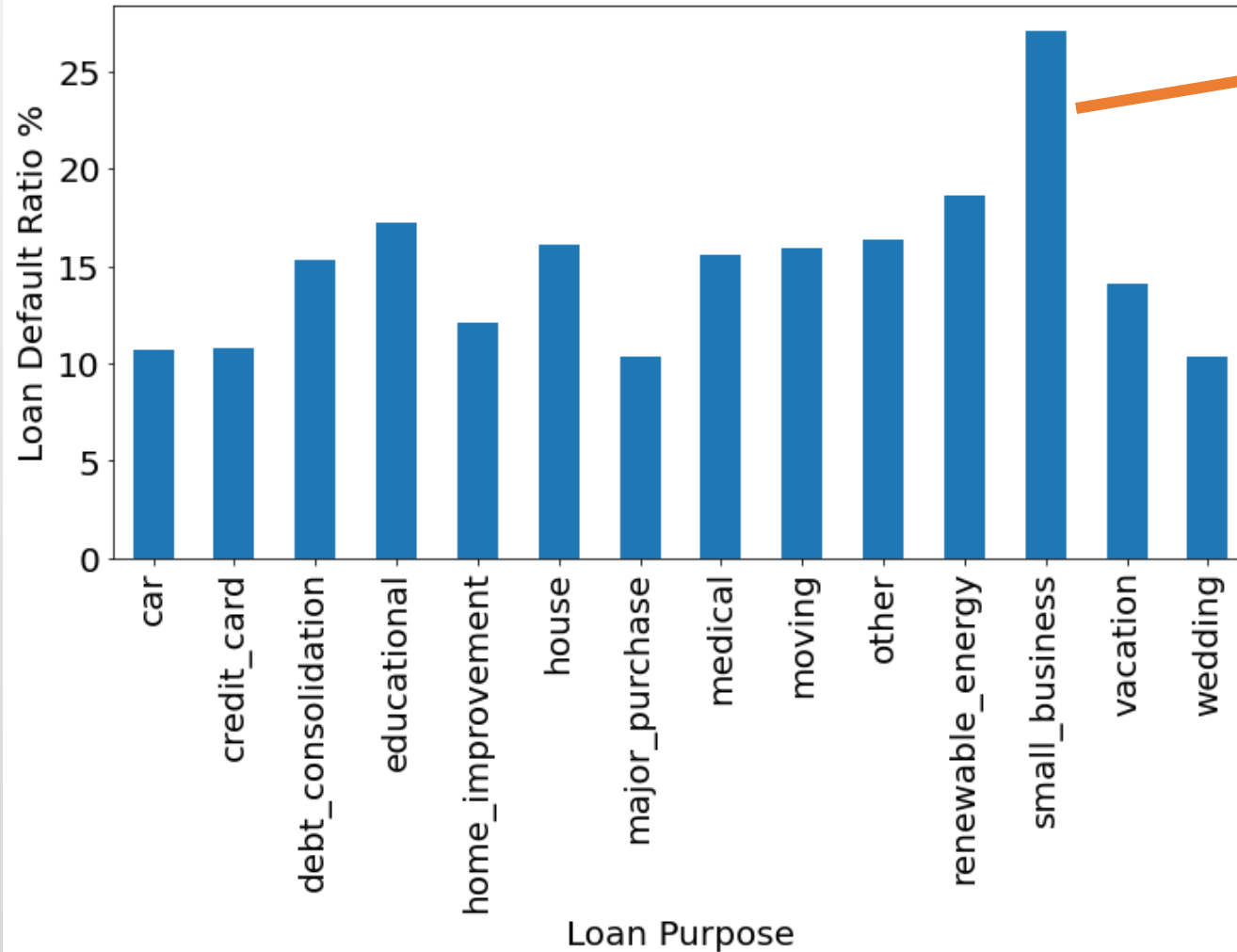


# Loan Purpose



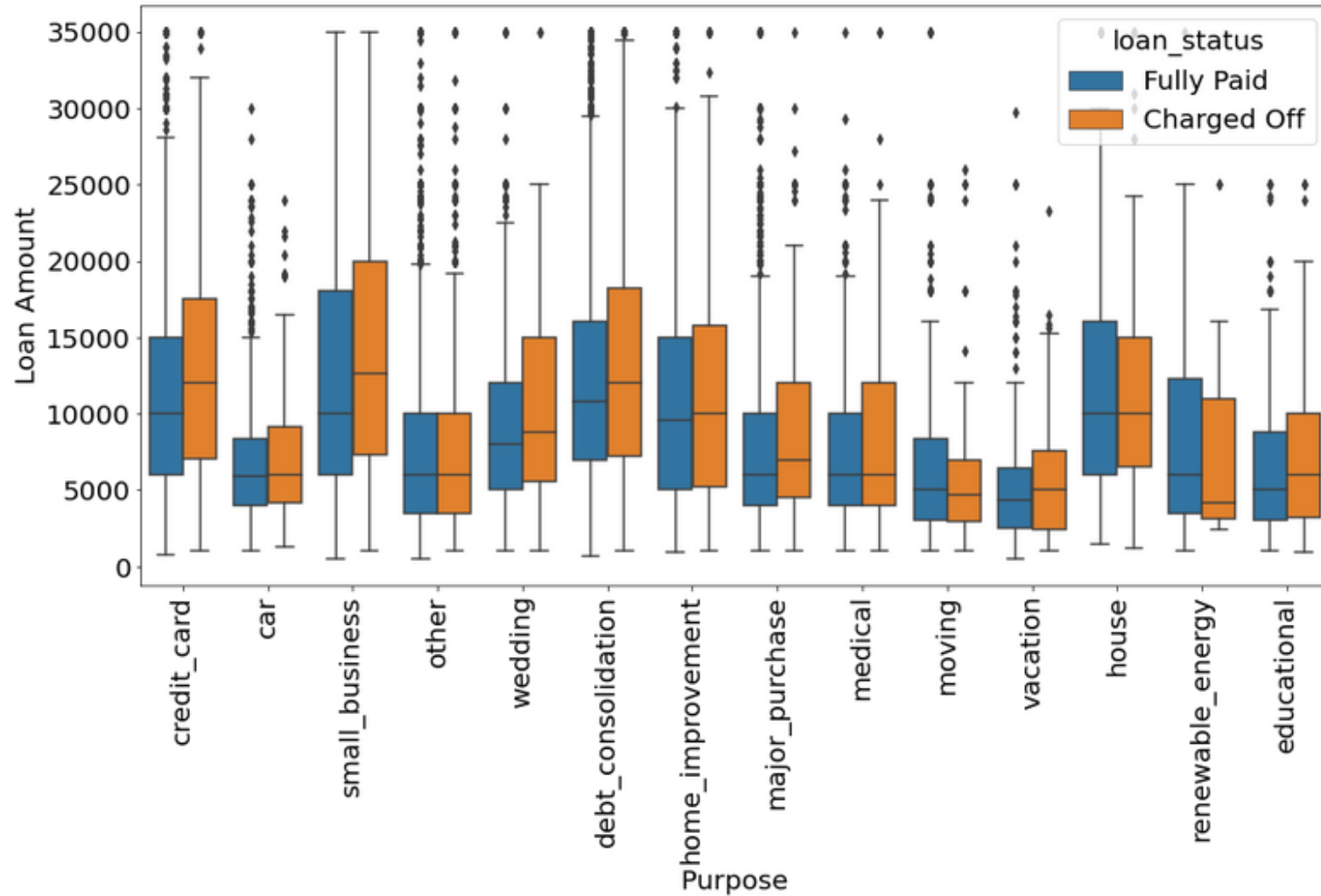
- Most loans are used for debt consolidation or paying of credit cards

# Loan Purpose



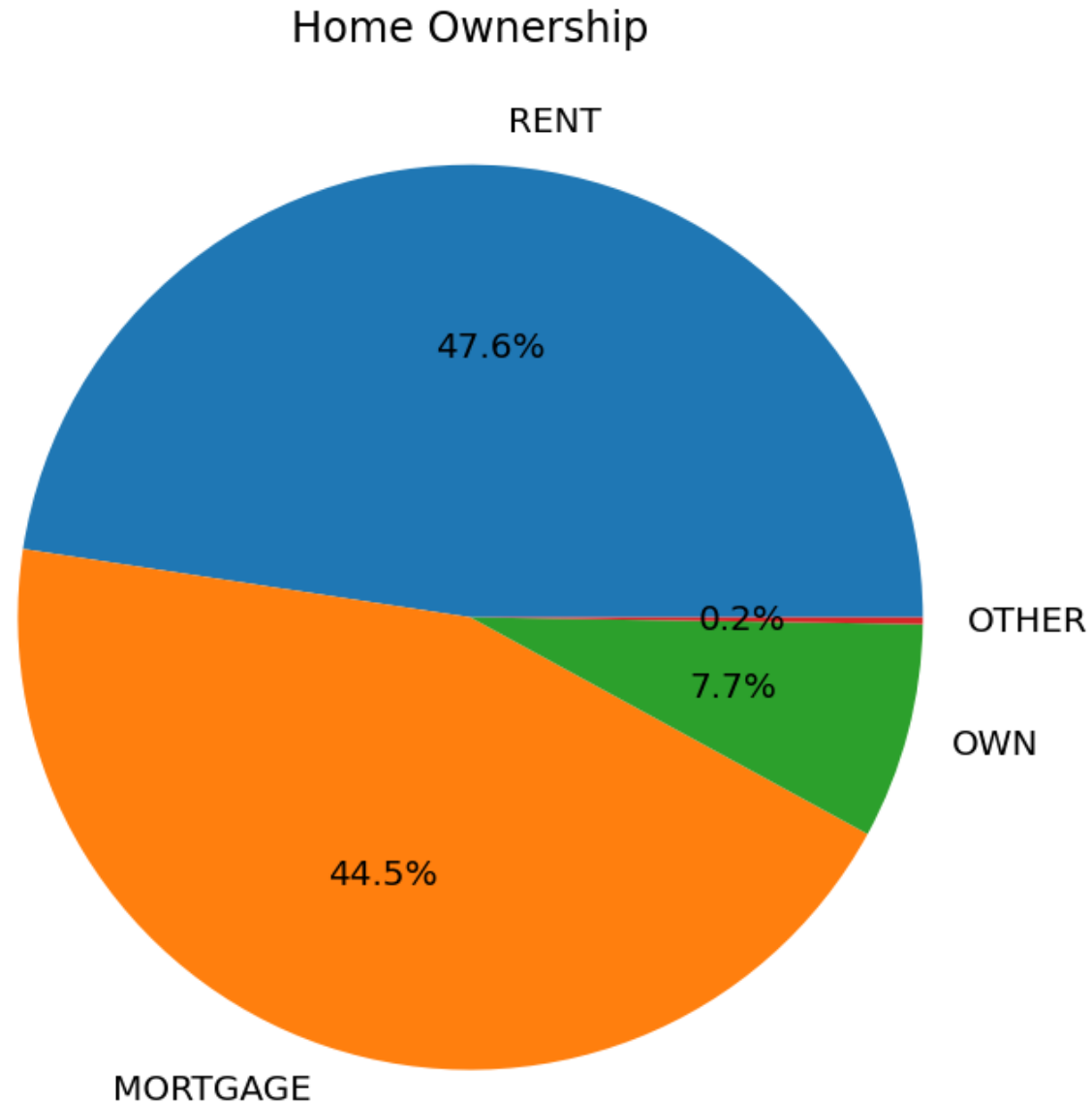
- Loans for small business purposes are very risky
- Loans for weddings, cars, credit cards, home improvements, and major purchases are less risky than average

# Loan Purpose



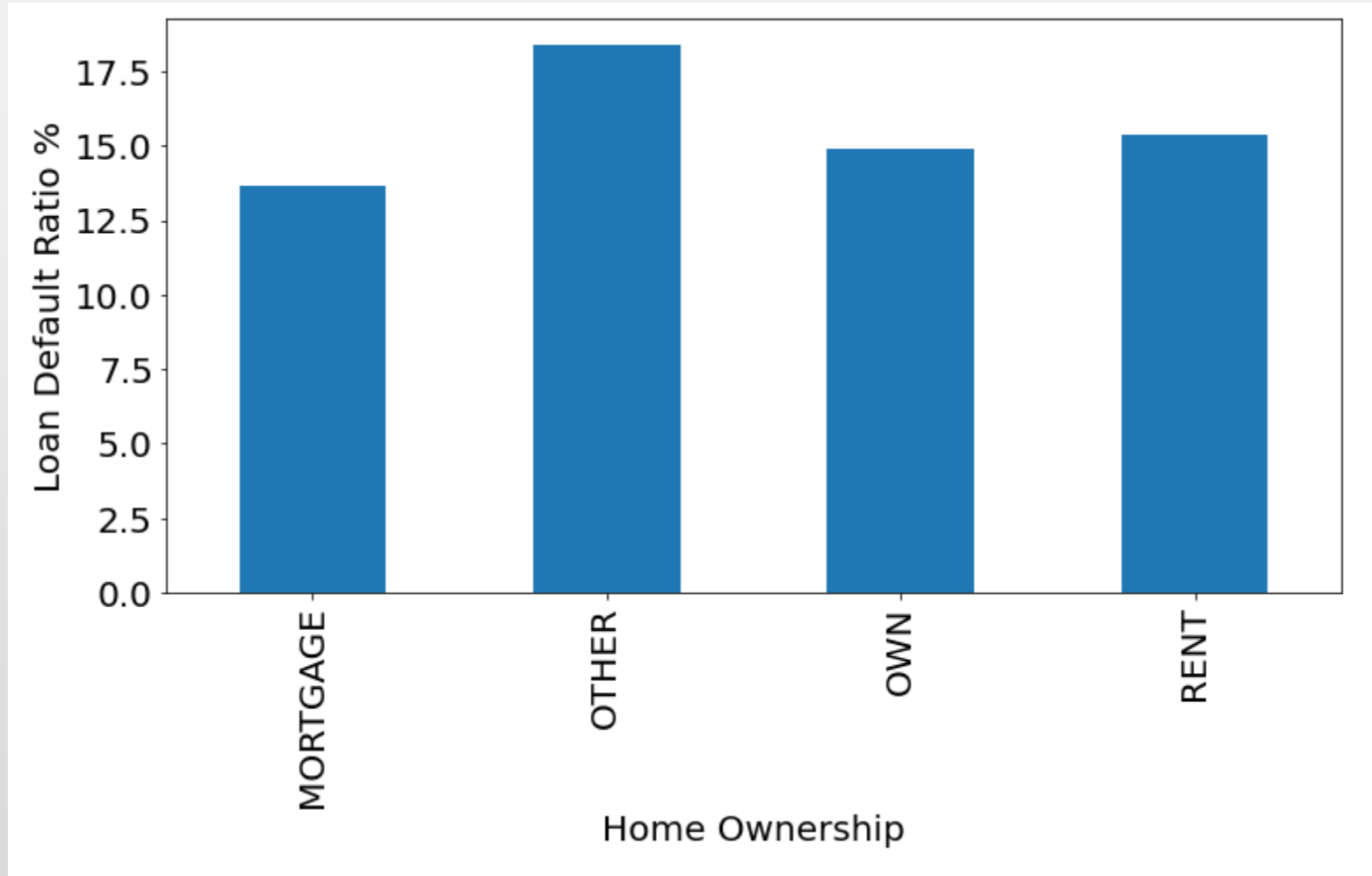
- **Bigger loans in these categories have higher risk of default:**
  - Small business purposes
  - Credit card
  - Wedding
  - Major purchase
  - Vacations

# Home Ownership



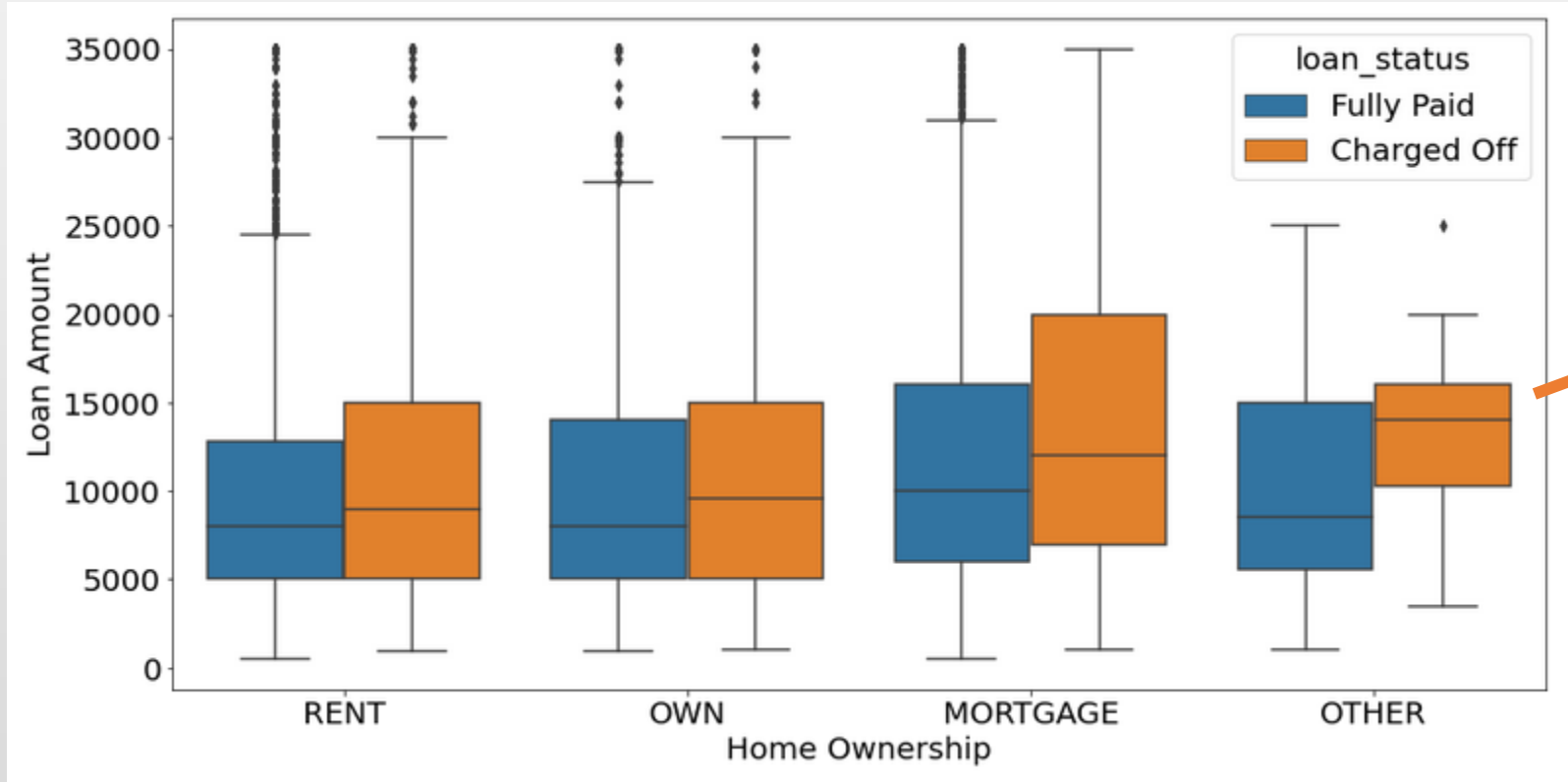
- Almost half of the customers rent their homes

# Home Ownership



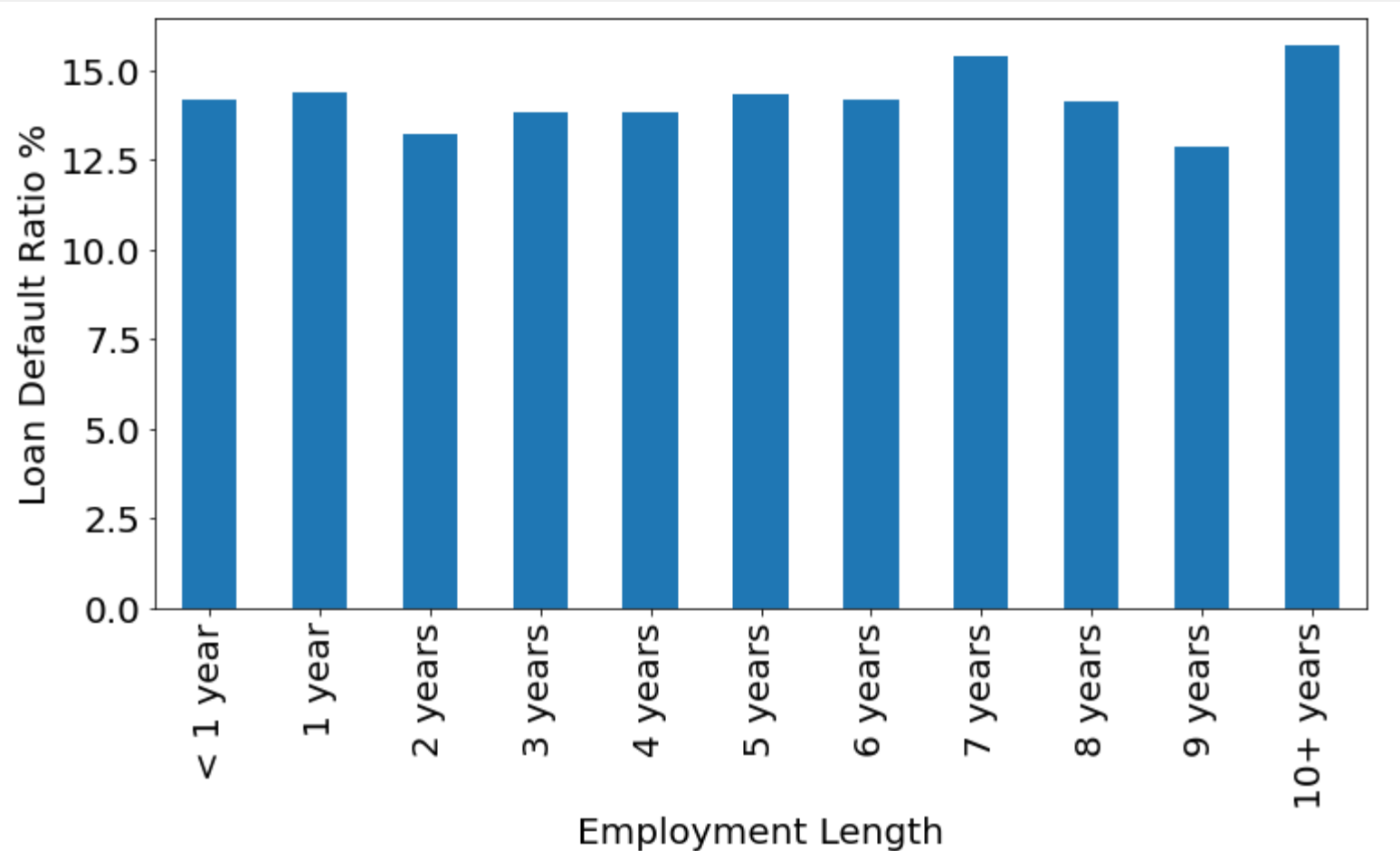
- The applicant's home ownership status does not appear to be a good predictor of the loan outcome

# Home Ownership



- But large loans are significantly more risky for applicants who describe their home ownership status as 'other'

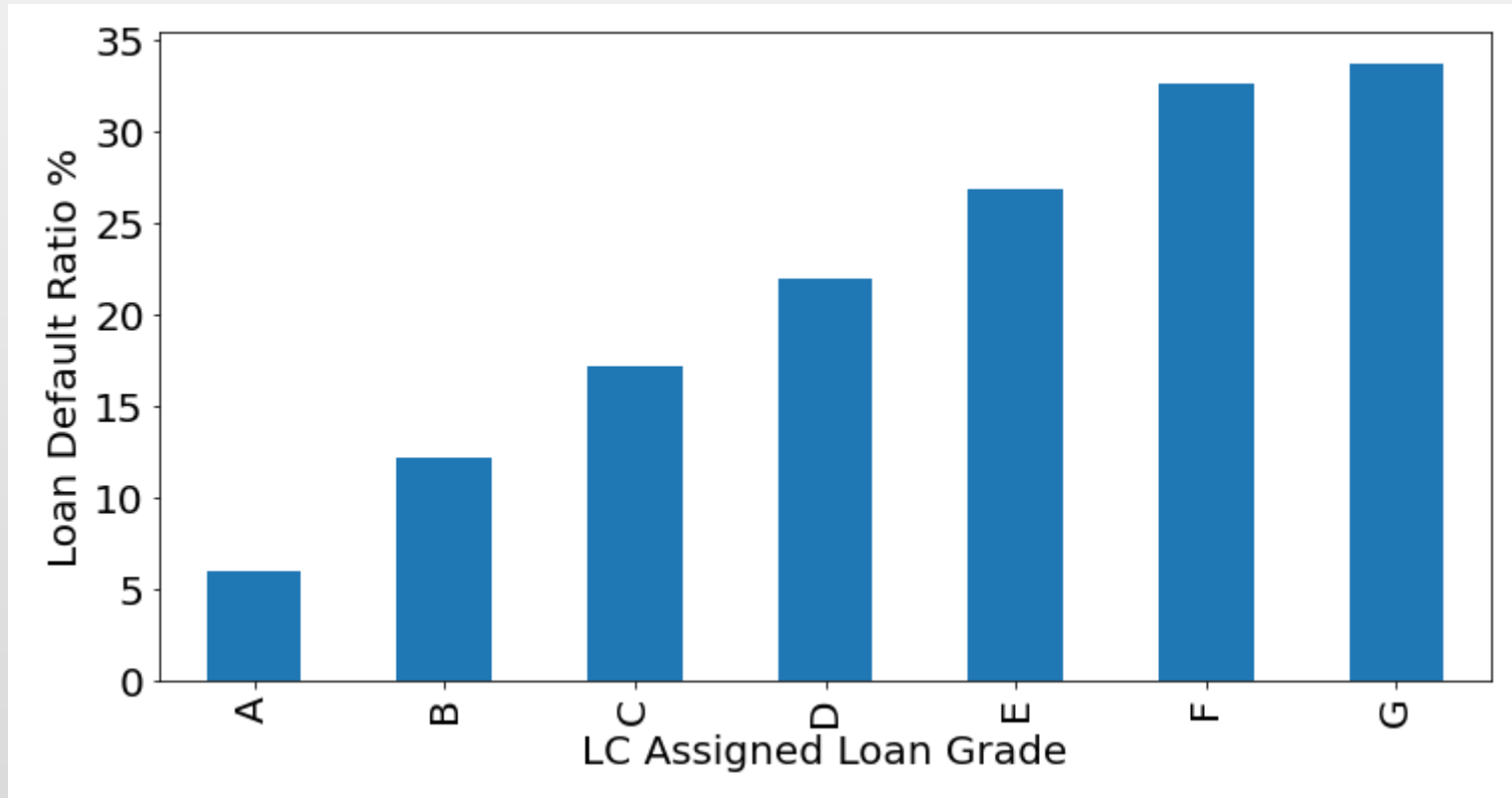
# Employment Length



- The applicant's employment length is not a good predictor of the loan outcome

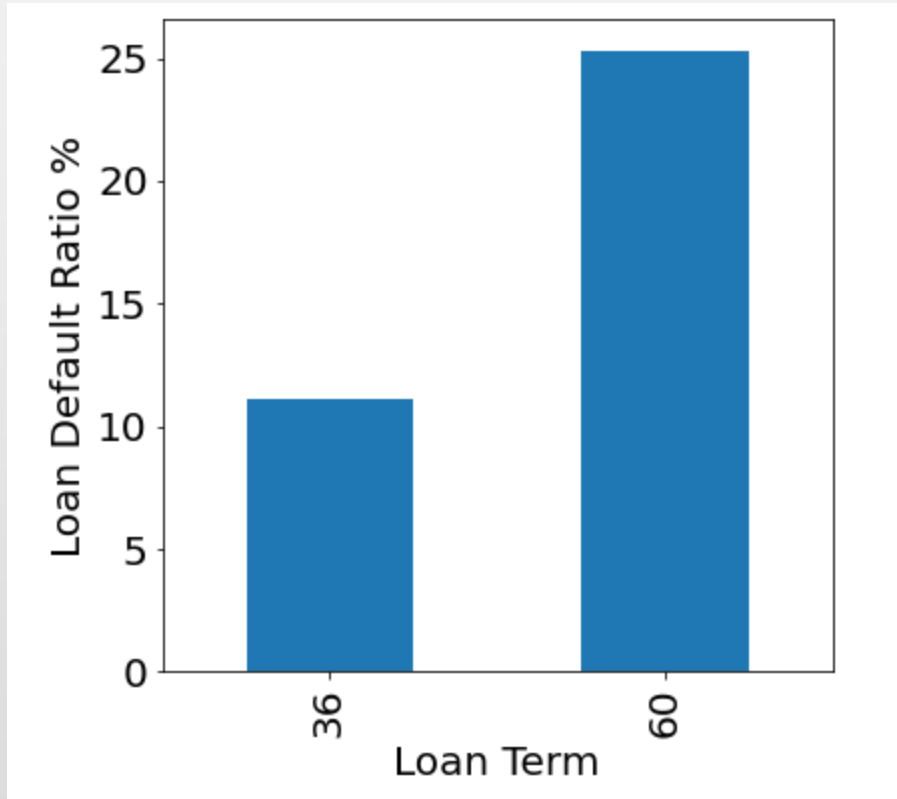


# Assigned Loan Grade



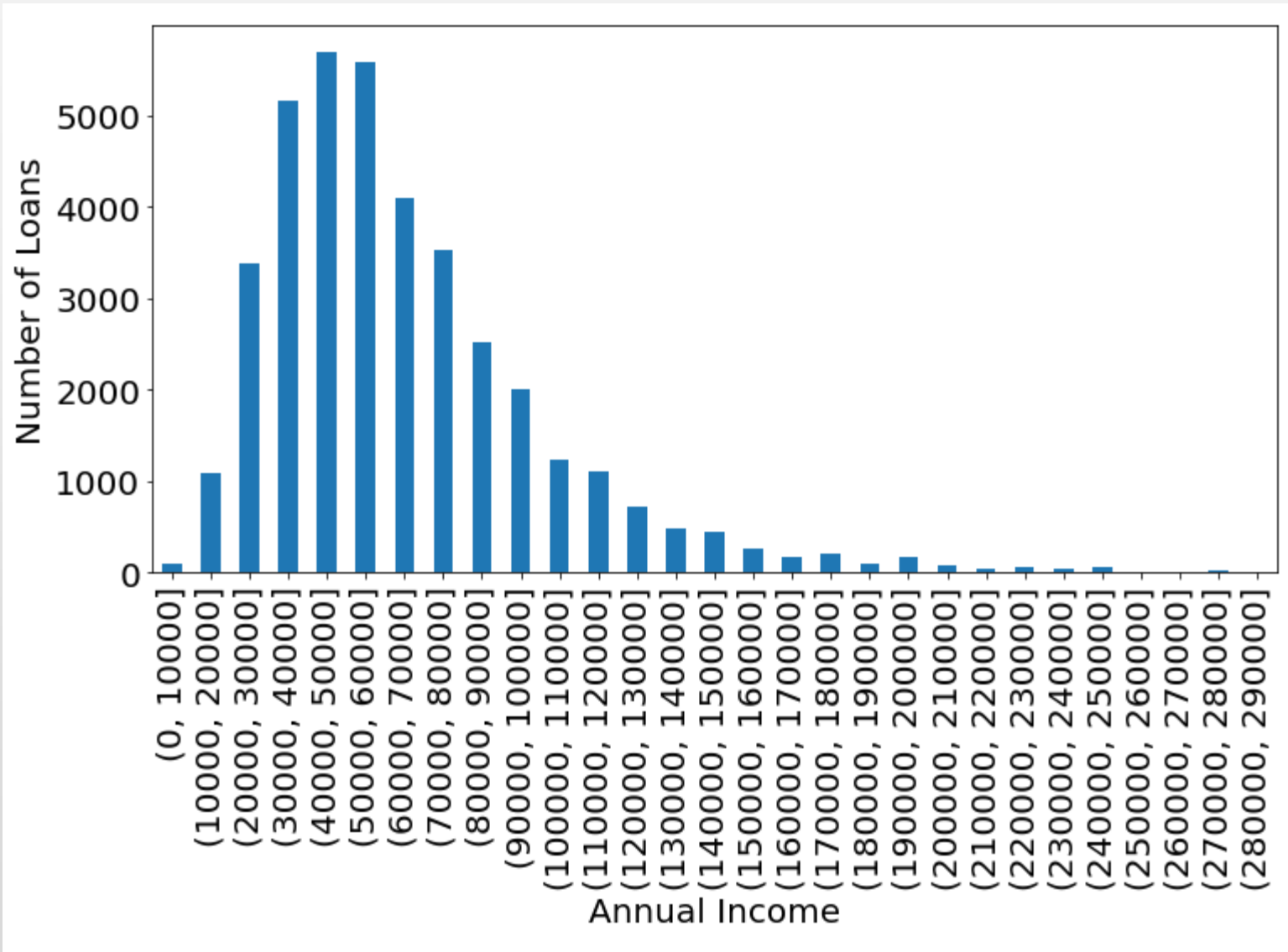
- Approximately linear relation between the assigned loan grade and probability of default

# Loan Term



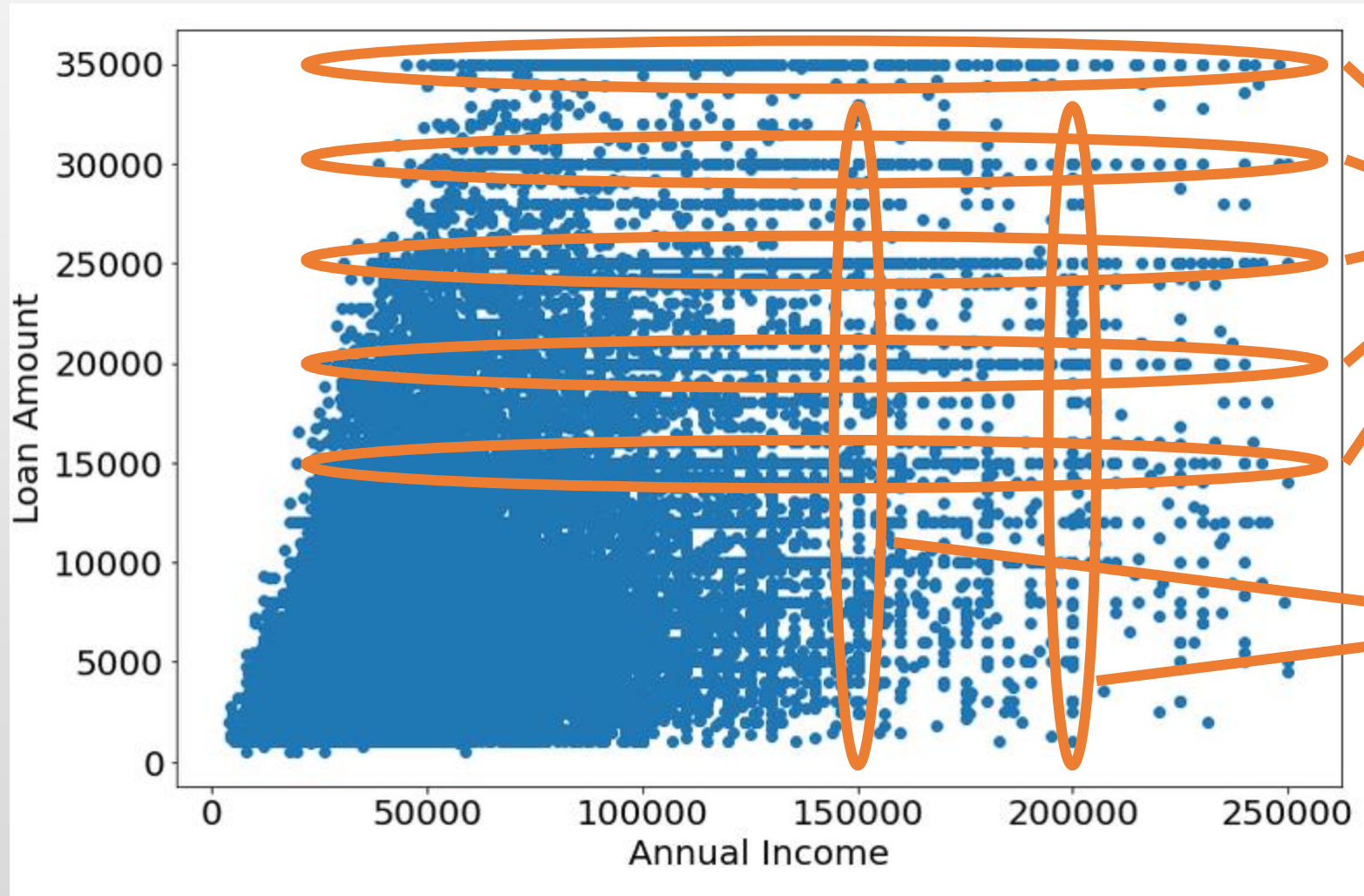
- The rate of default is double for loans of 60 months, compared to loans of 36 months

# Annual Income



- Median annual income: \$59000

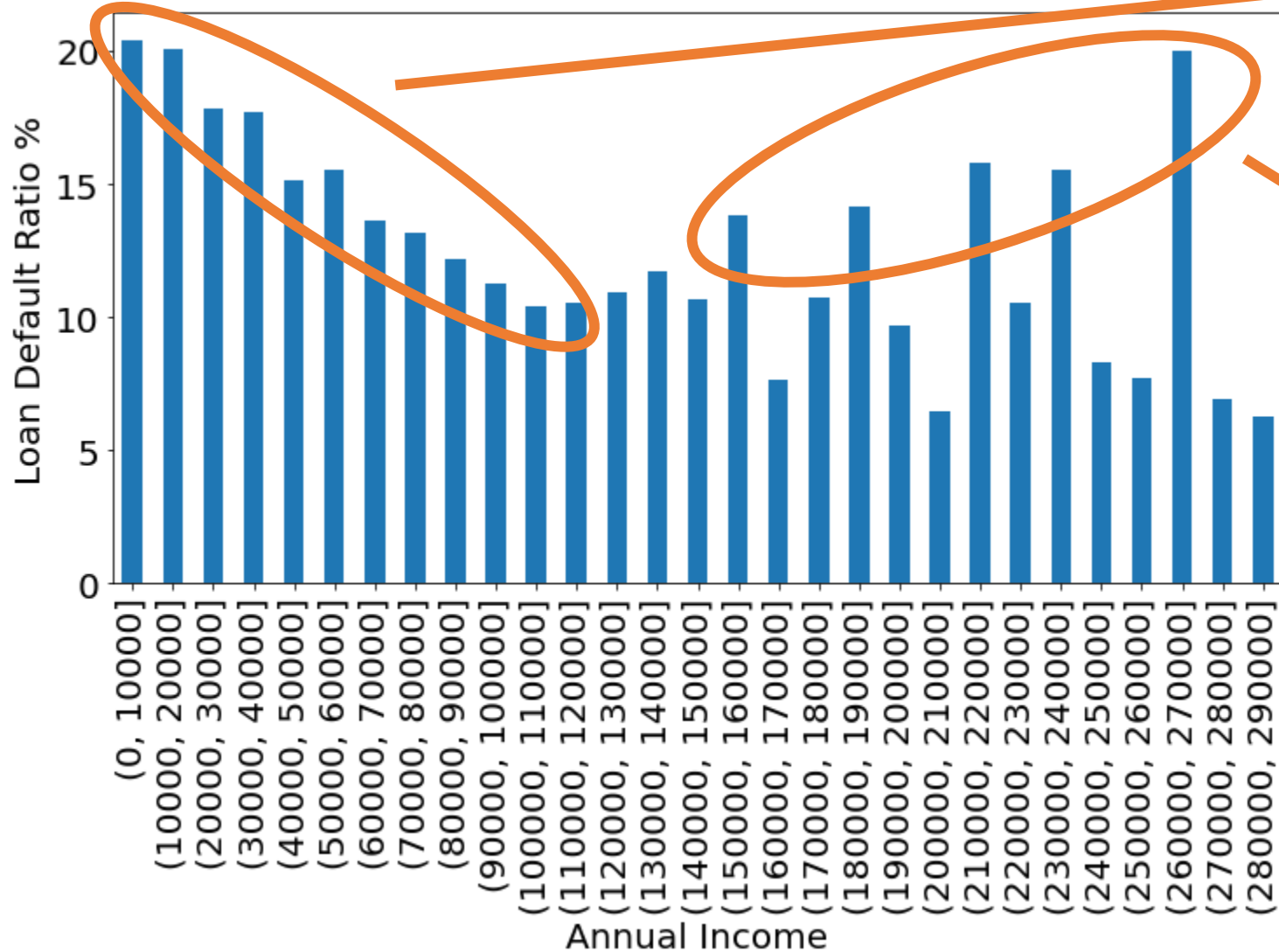
# Annual Income



- Applicants are taking out loans in amounts that are multiples of \$5k

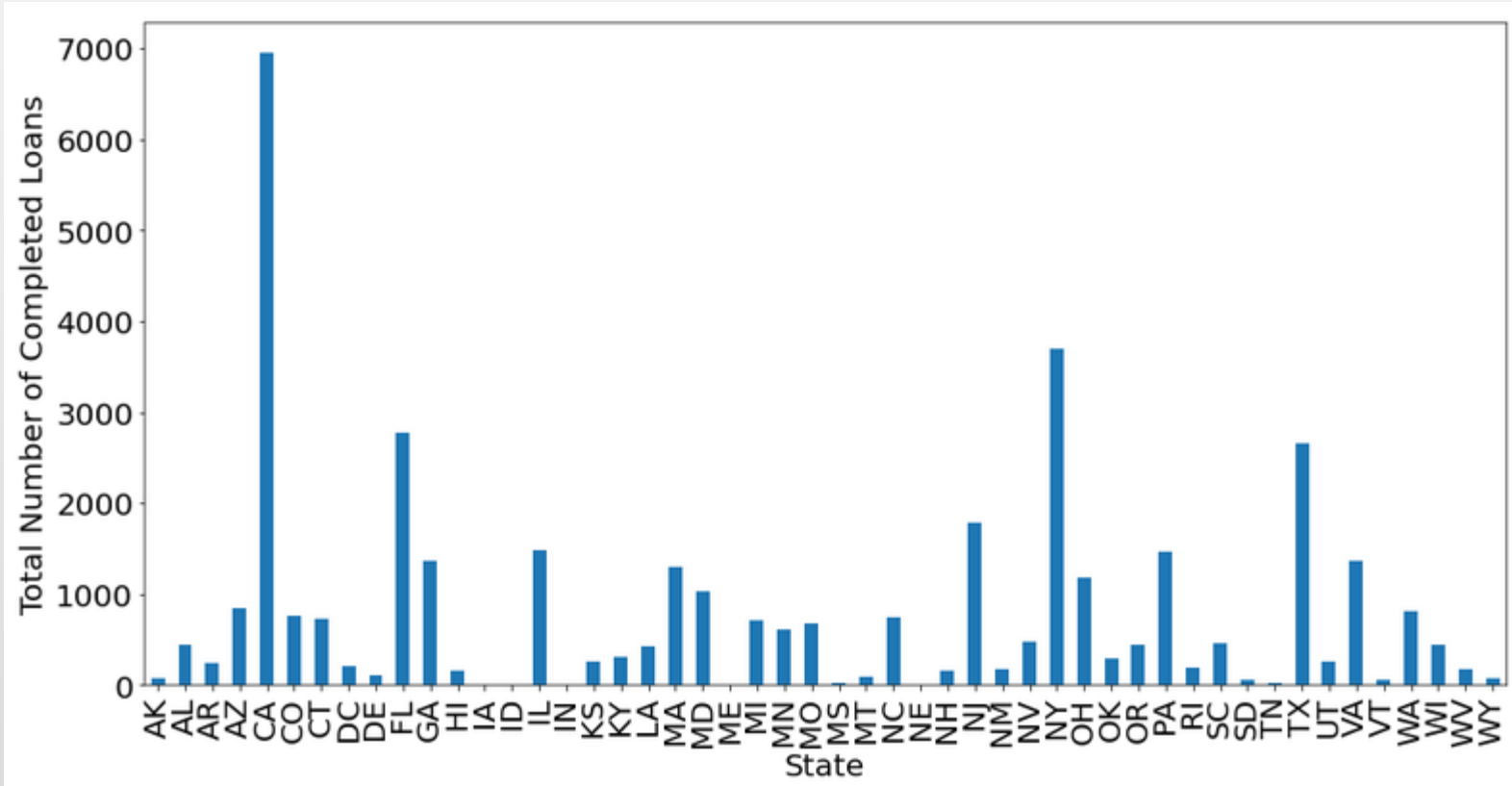
- Applicants are rounding off their stated annual income to the \$150k or \$200k

# Annual Income



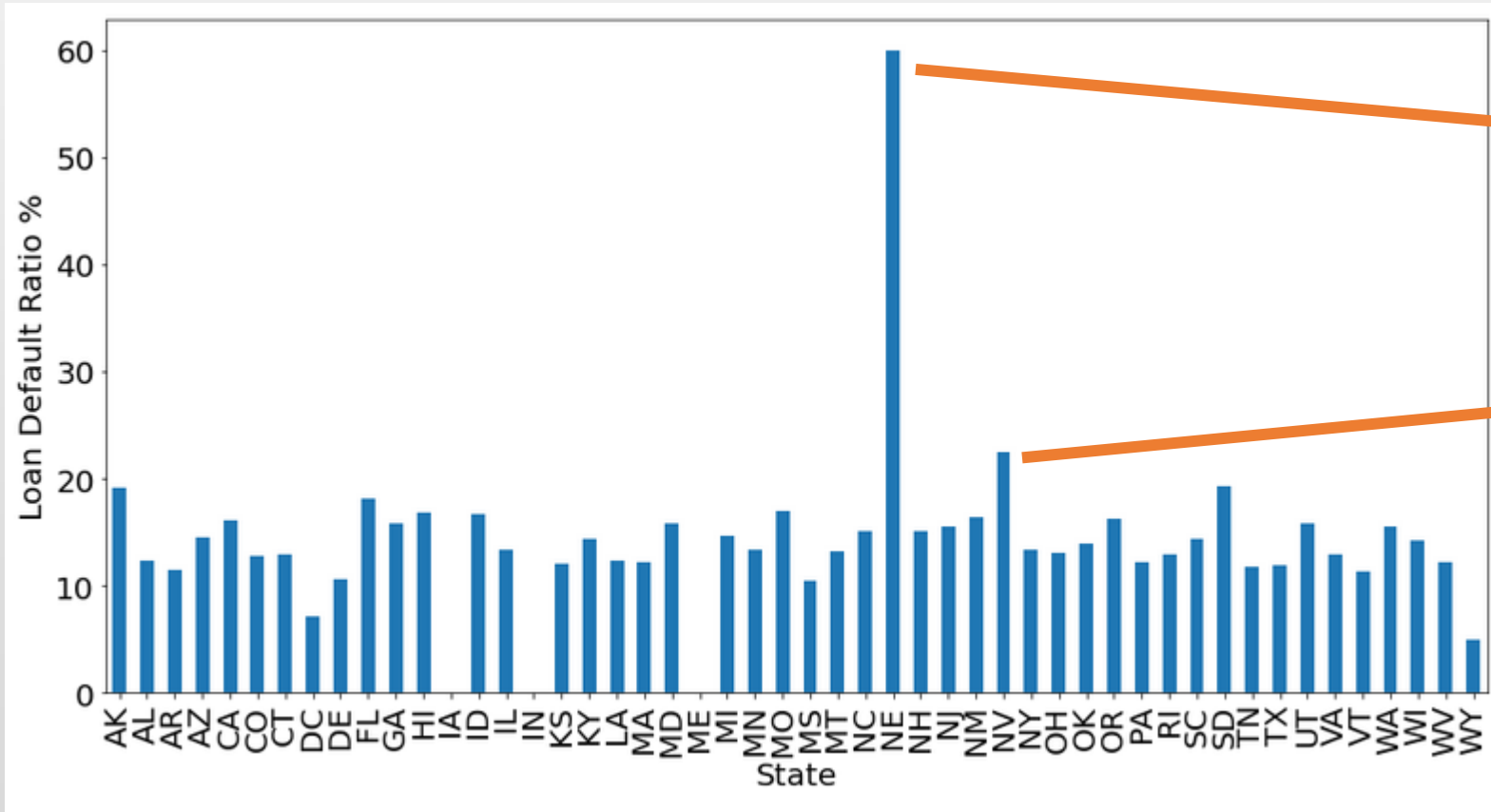
- Risk of default decreases linearly with income up to \$110000
- Some loans to high-income applicants are very risky

# Location



- Most loans are in:
  - California
  - New York
  - Texas

# Location

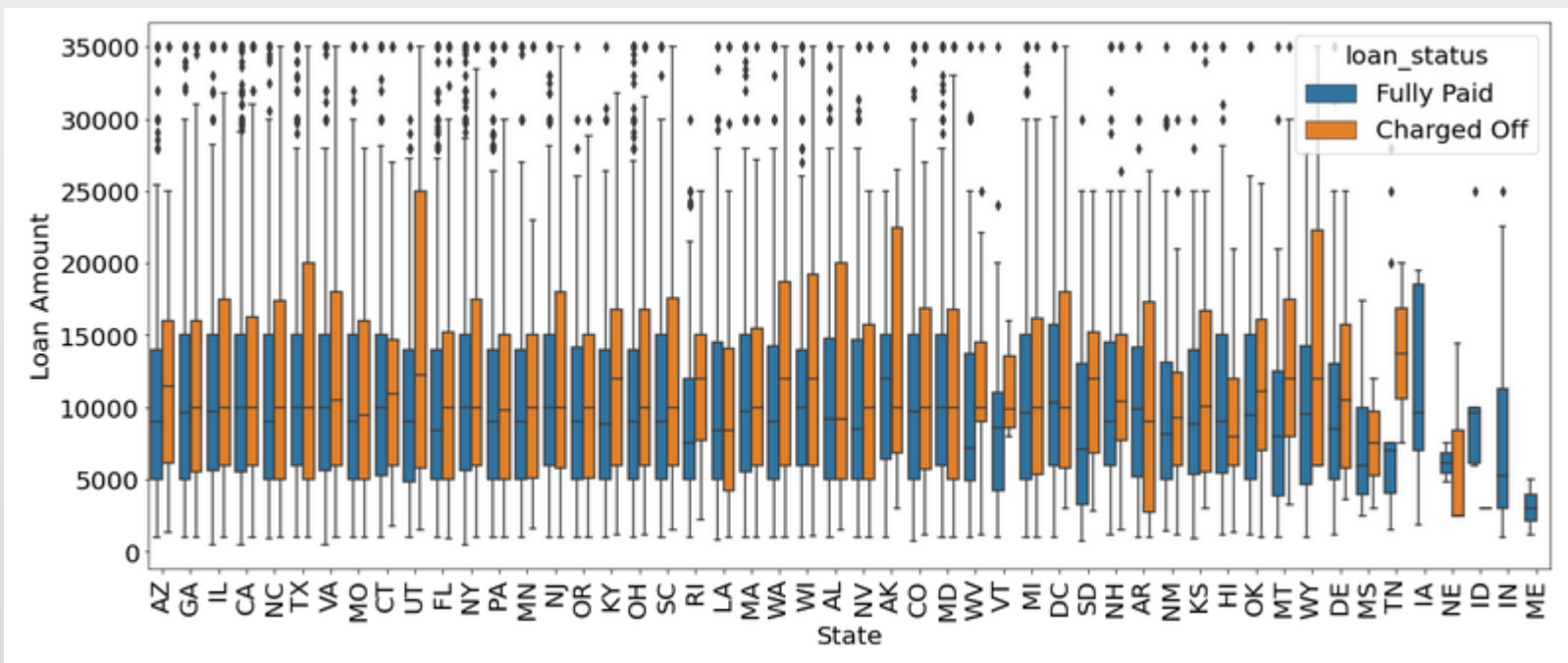


- Outlier: only five loans were issued in Nebraska
- Loans in Nevada are riskier



# Location

- Higher loan amounts are significantly more risky in the following states:



- AZ
- UT
- RI
- WA
- WI
- AK
- MT
- WY
- TN

# Conclusions

Loans with significantly higher risk of default:

- Loans issued for small business purposes
- Loans with high interest rates – above approximately 19%
- Assigned LC loan grades: D, E, F, G
- Loan terms of 60 months
- Loans to applicants with annual incomes of \$40k or less
- Loan amounts above \$25000; specifically:
  - \$25000.01 – \$27000.00
  - \$30000.01 – \$31000.00
- Large loans (more than \$10k) issued to applicants with home ownership status of 'other'
- Certain loans to issued applicants with annual incomes of more than \$160k

# Conclusions

Loans with somewhat higher risk of default:

- Loan amounts between \$15000.01 and \$25000.00
- Loans with repayment amounts between \$900.01 - \$1000.00
- Loans issued to residents of Nevada
- Loans for purposes of:
  - debt consolidation
  - education
  - medical
  - house
  - renewable energy
  - other

# Conclusions

Loans with low risk of default:

- Loan amounts of \$10000.00 and below
- Loans with interest rates below 8%
- Loans terms of 36 months
- Loans with LC assigned grade of A