Lending Club Case Study

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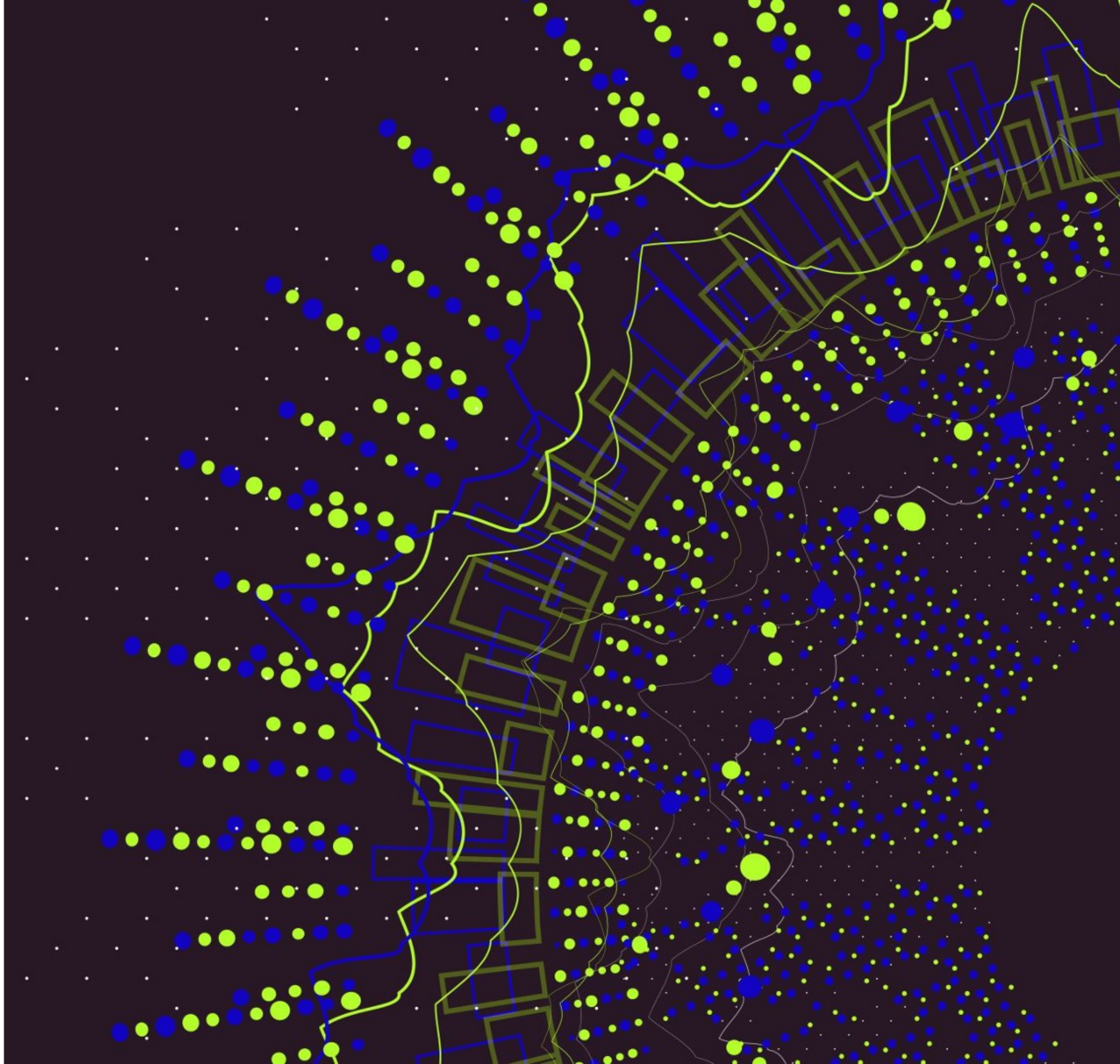


Problem Statement

Business Background

- This analysis is focussed on a consumer finance company which is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures.

- Lending loans to ‘risky’ applicants is the largest source of financial loss (called credit loss). Credit loss is the amount of money lost by the lender when the borrower refuses to pay or runs away with the money owed

Goal

- Understand the driving factors behind loan default, i.e. the variables which are strong indicators of default

- This analysis can help the company reduce risky loans, thereby cutting down the amount of credit loss

Analysis Approach

Data Understanding

- Customer Profile
  - Income, Purpose, Employment, etc
- Loan Attributes
  - Grade, Interest, Term, etc
- Redundant Data
  - Empty / NaN data
  - Non-useful data

Data Cleaning

- Removed columns having >90% empty/NaN data
- Removed redundant columns - member ID, url, title etc. (
- Fix rows with empty values
- Clean outliers on annual income
- Fix data formats (interest rate, employee length)

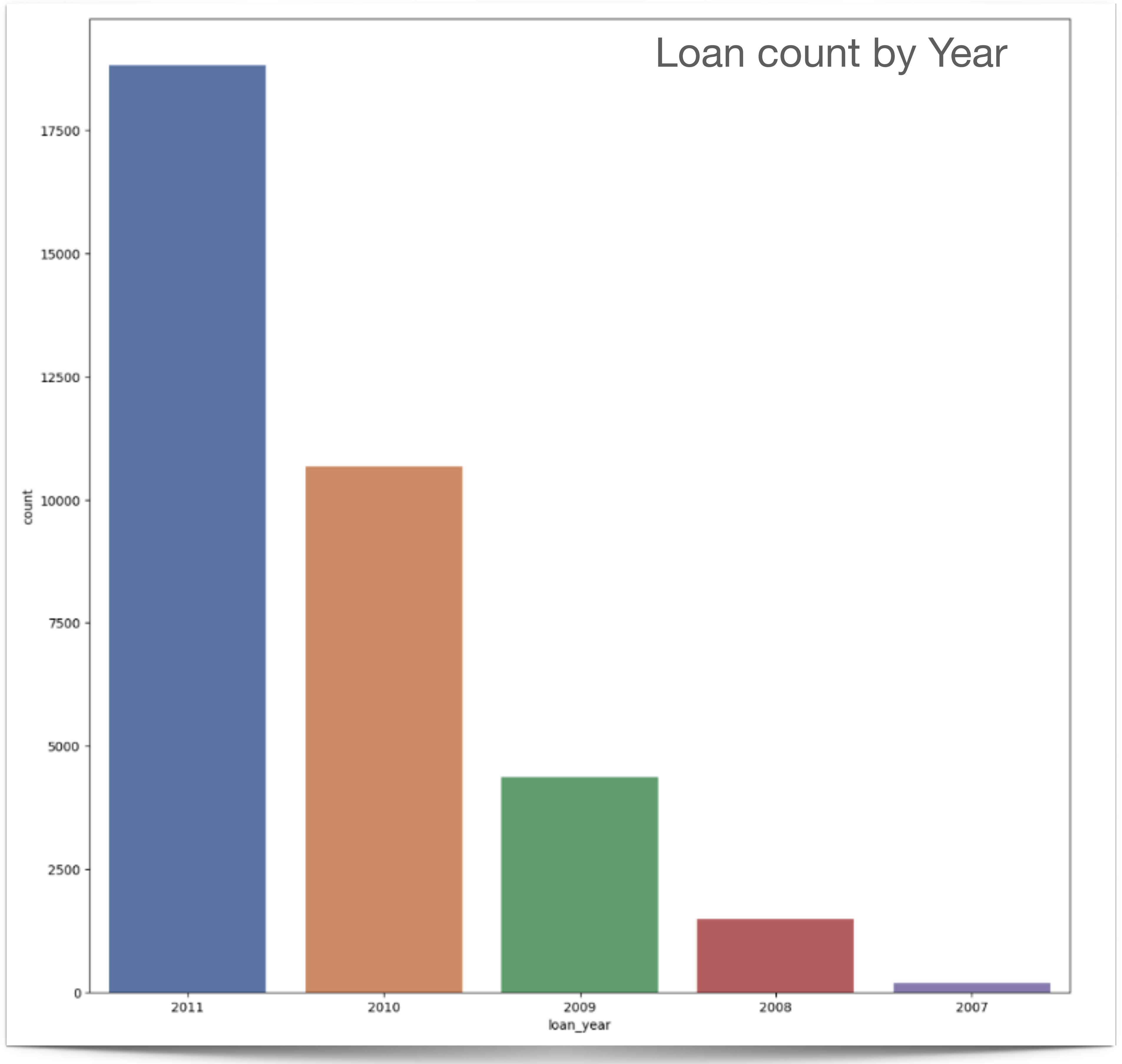
Derive Useful Data

- Data Driven attributes: Loan year, employment length and interest rate
- Type driven attributes: Loan status and verification status
- Business driven attributes : income to instalment ratio, categorisation of interest rates and annual income

Analysis

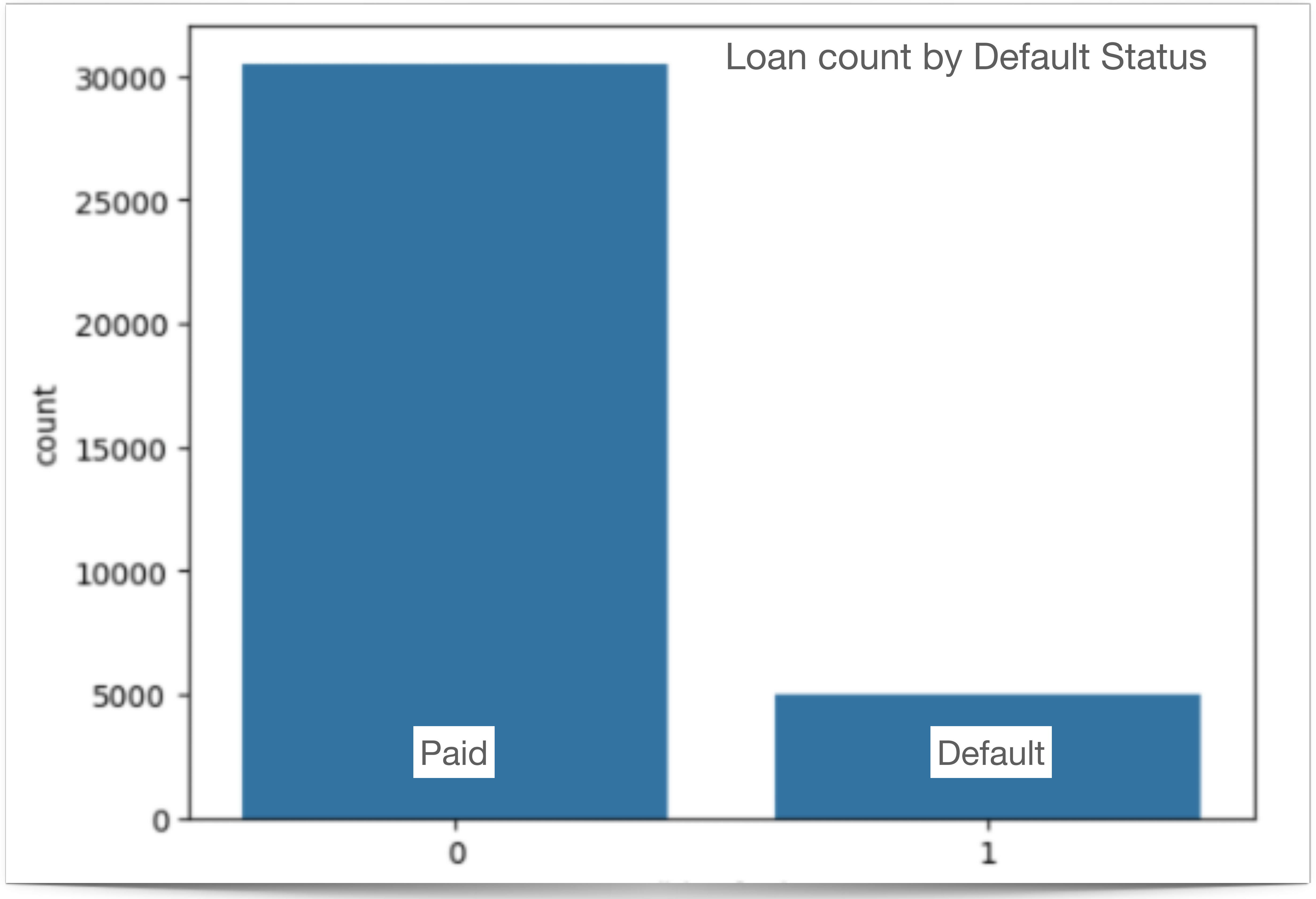
- Analysed the impact/trend of year, term, purpose, grades and rate of interest, DTI, income to instalment ration, home ownership status on the default rate
- Analysed the correlation between different variables
  - Loan amount & Interest rate against income, grade, purpose

Business Summary



Data Distribution by year

- Data available from 2007 to 2011
- Highest loans in 2011 with year on year increase ~50%

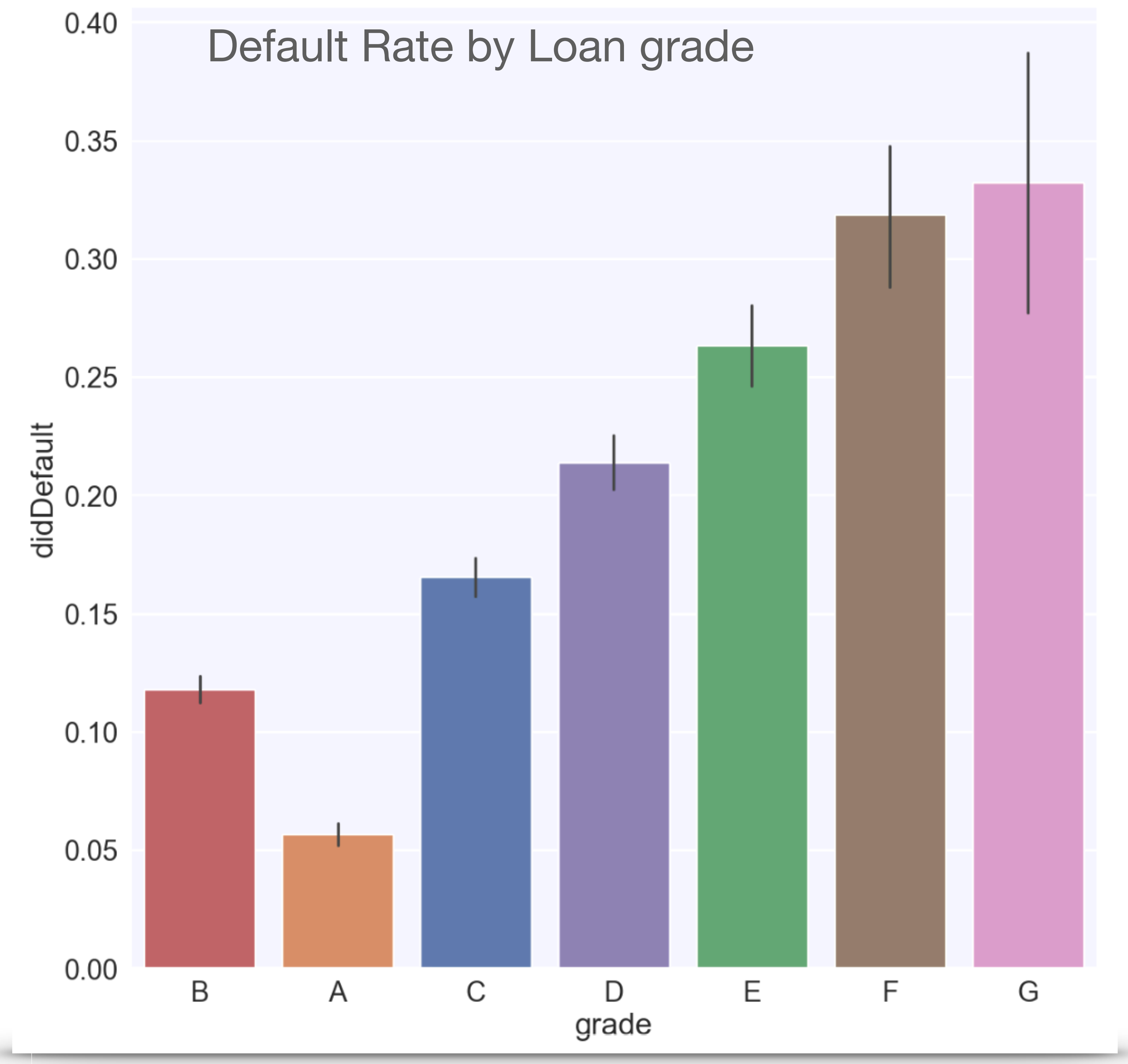


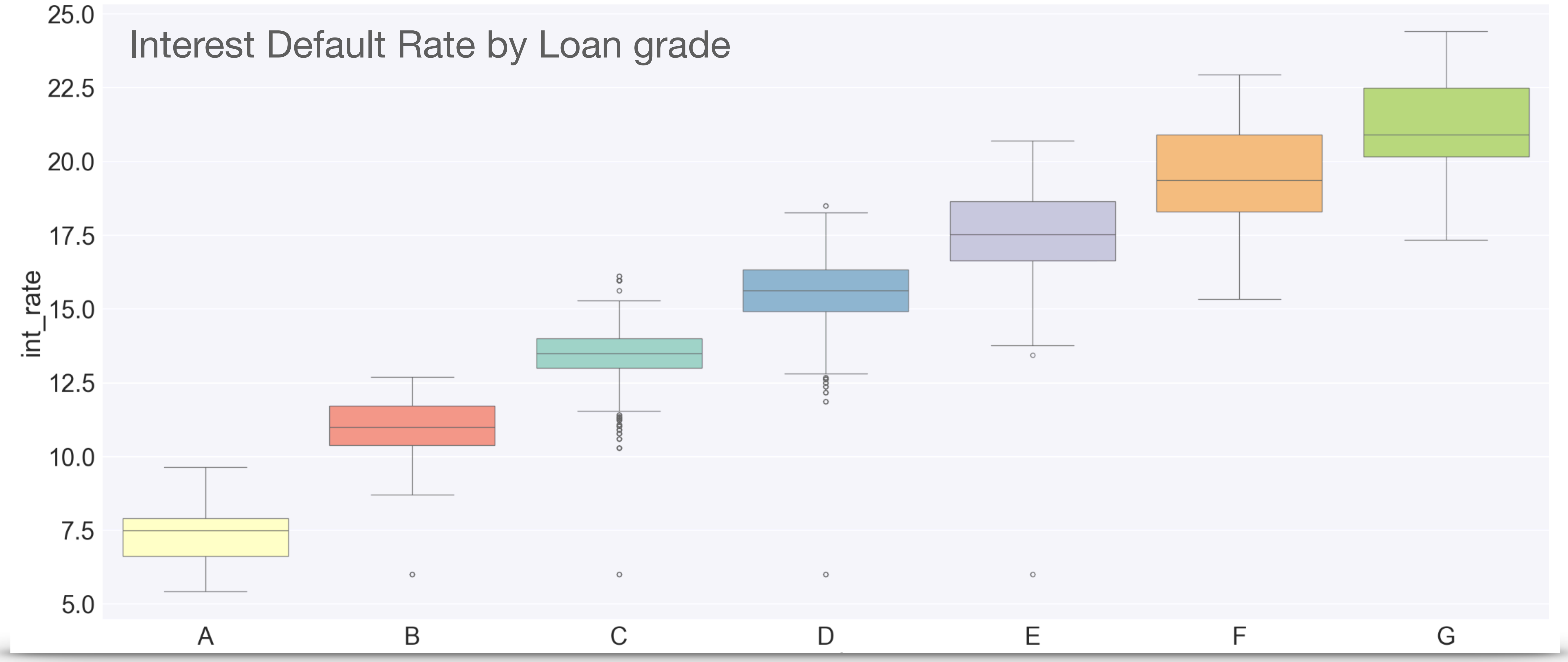
Loan Default Rate

- ~14% of the completed loans defaulted over 5 years

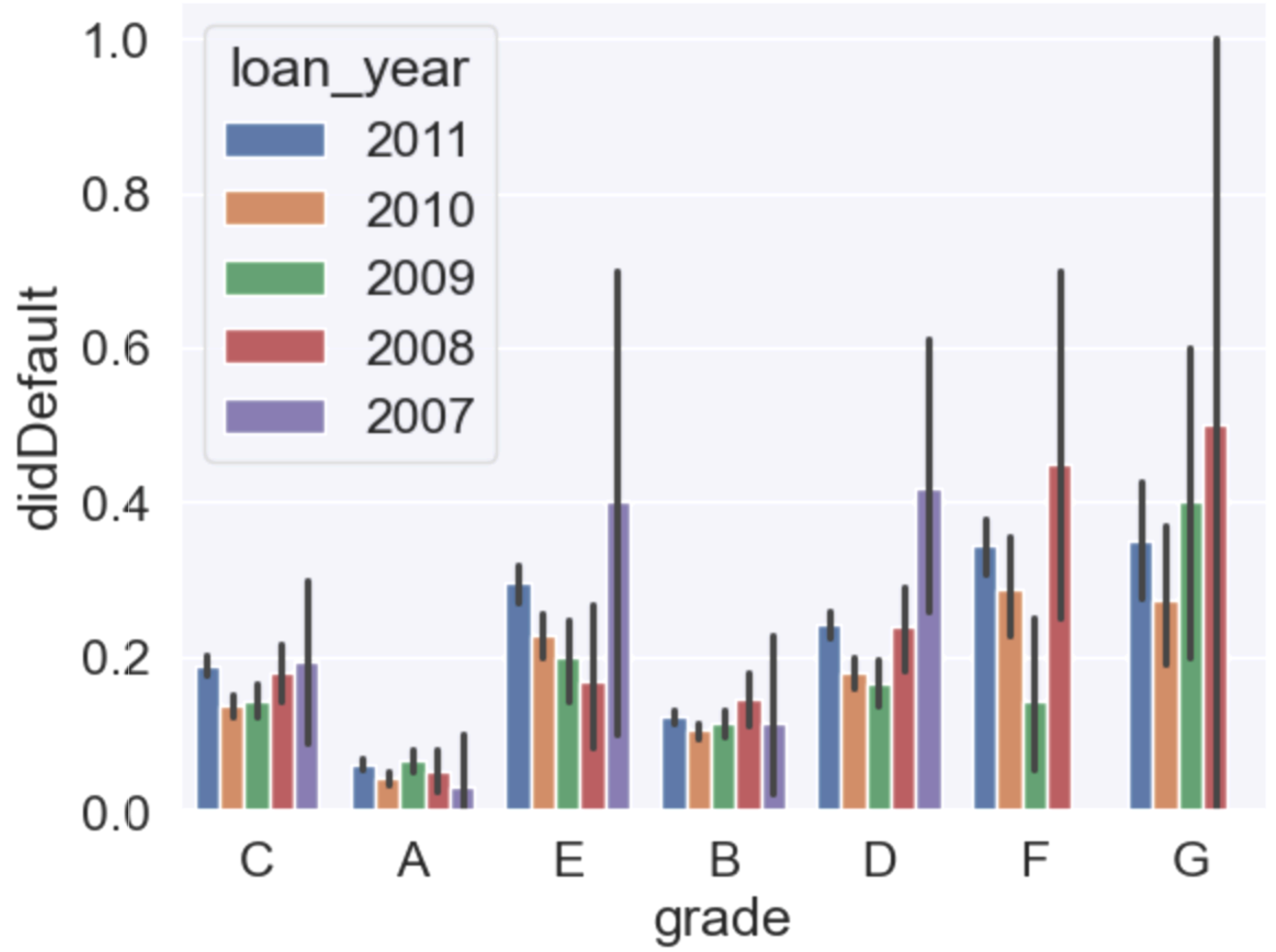
Factors to Identify Defaulters

Grade



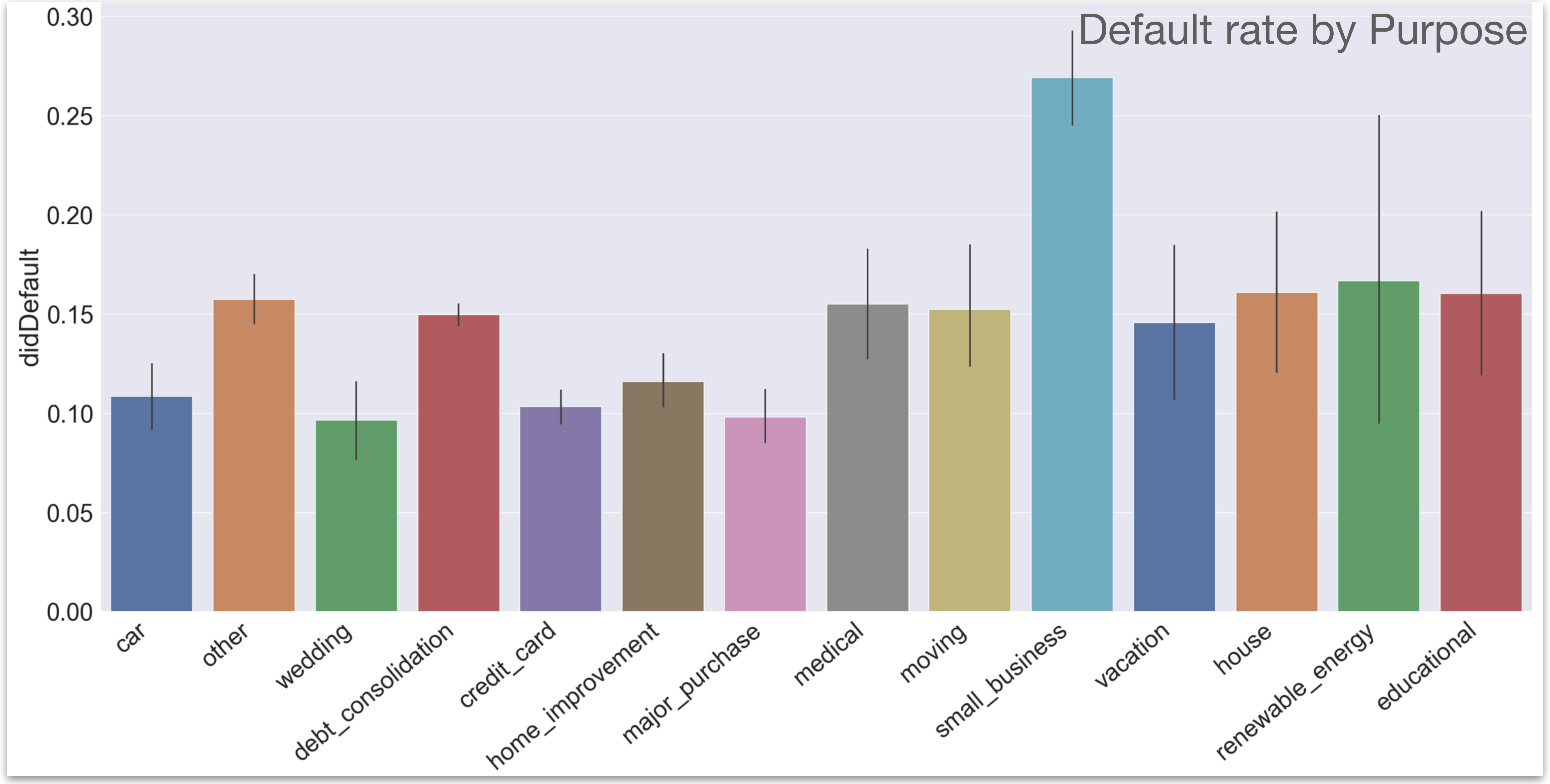


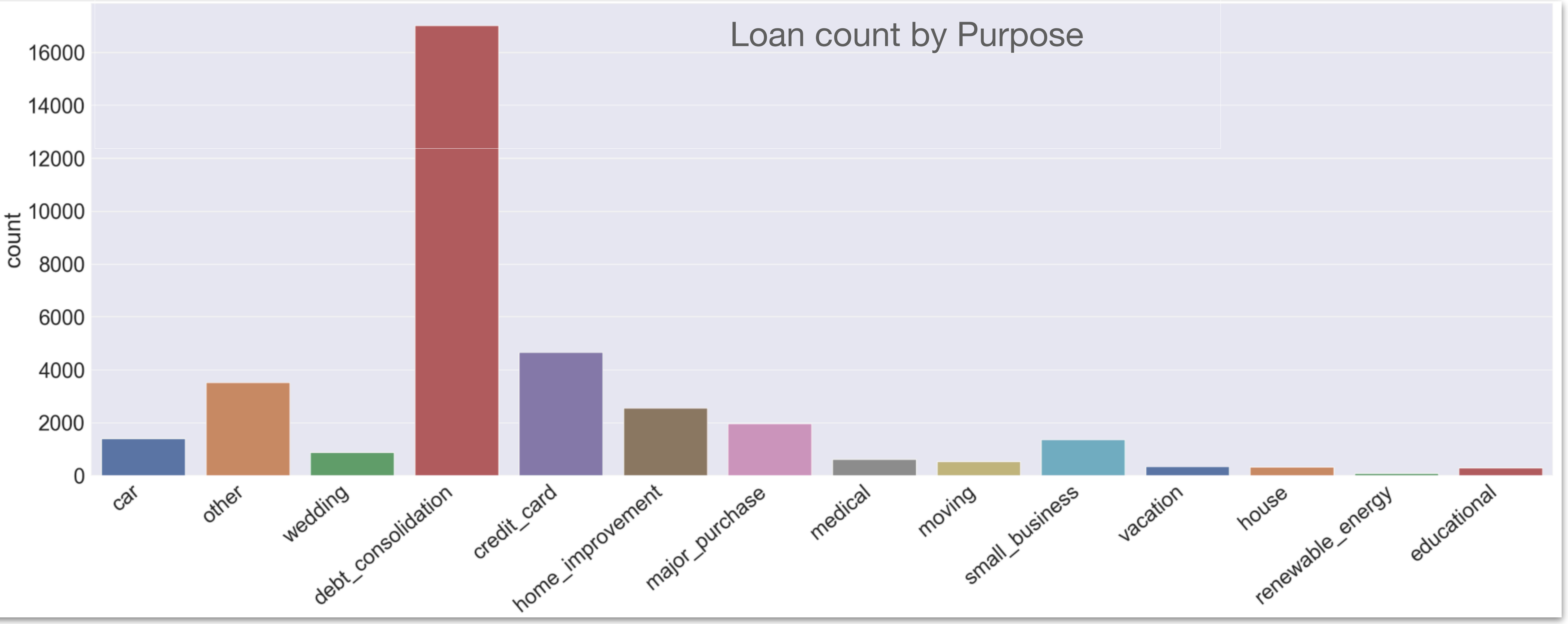
- Default rate increases as loan grade changes from A to G
- Interest Rate also increases in the same trend
  - Could be an indicative of high default rate with high interest rate

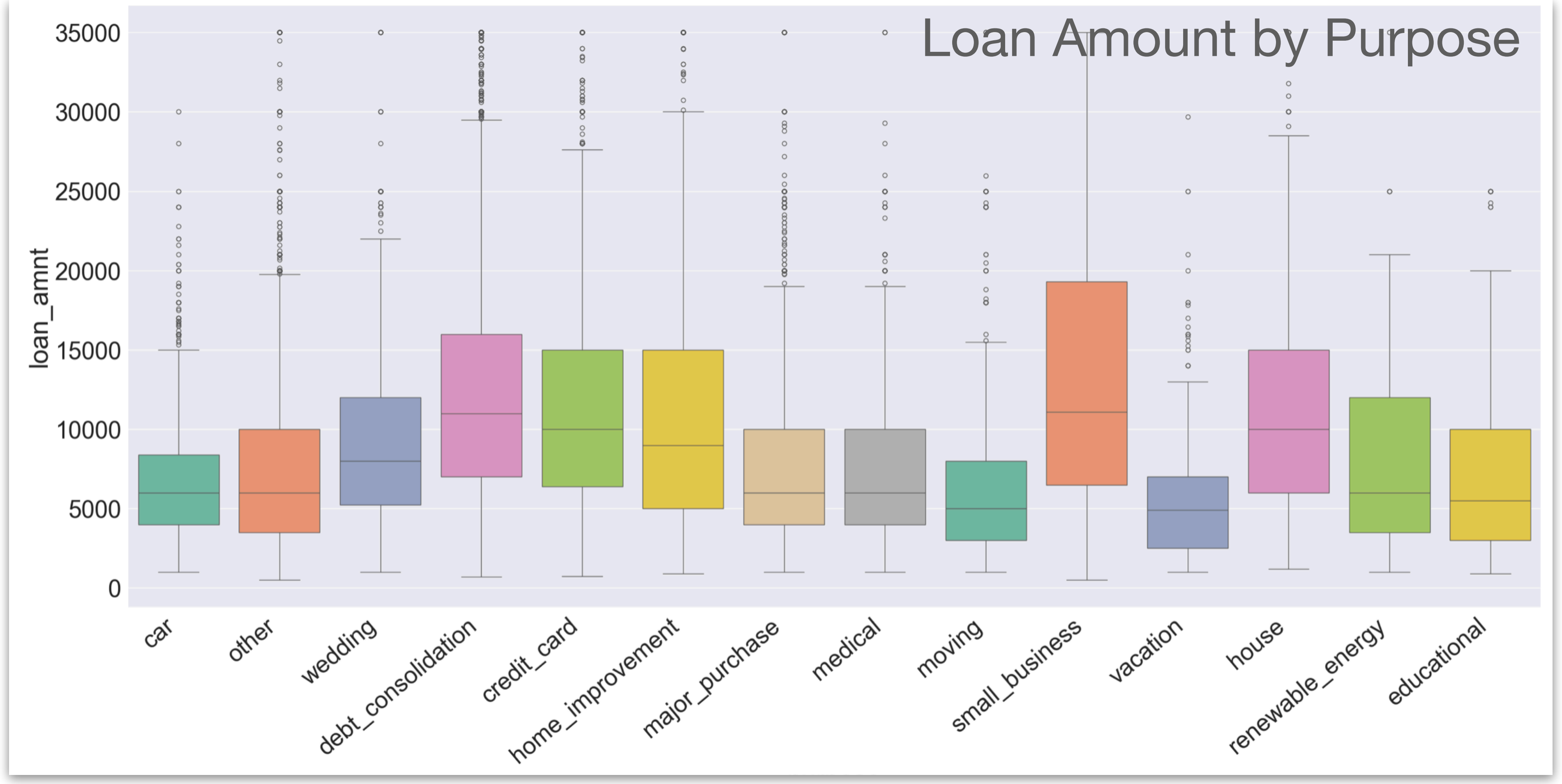


Loan Purpose

- Small business show highest defaults contributing to ~26% of overall defaults
- Debt Consolidation purpose has highest loan count of ~46%
- 50% of small business customers took high amount loans as compared to other purposes

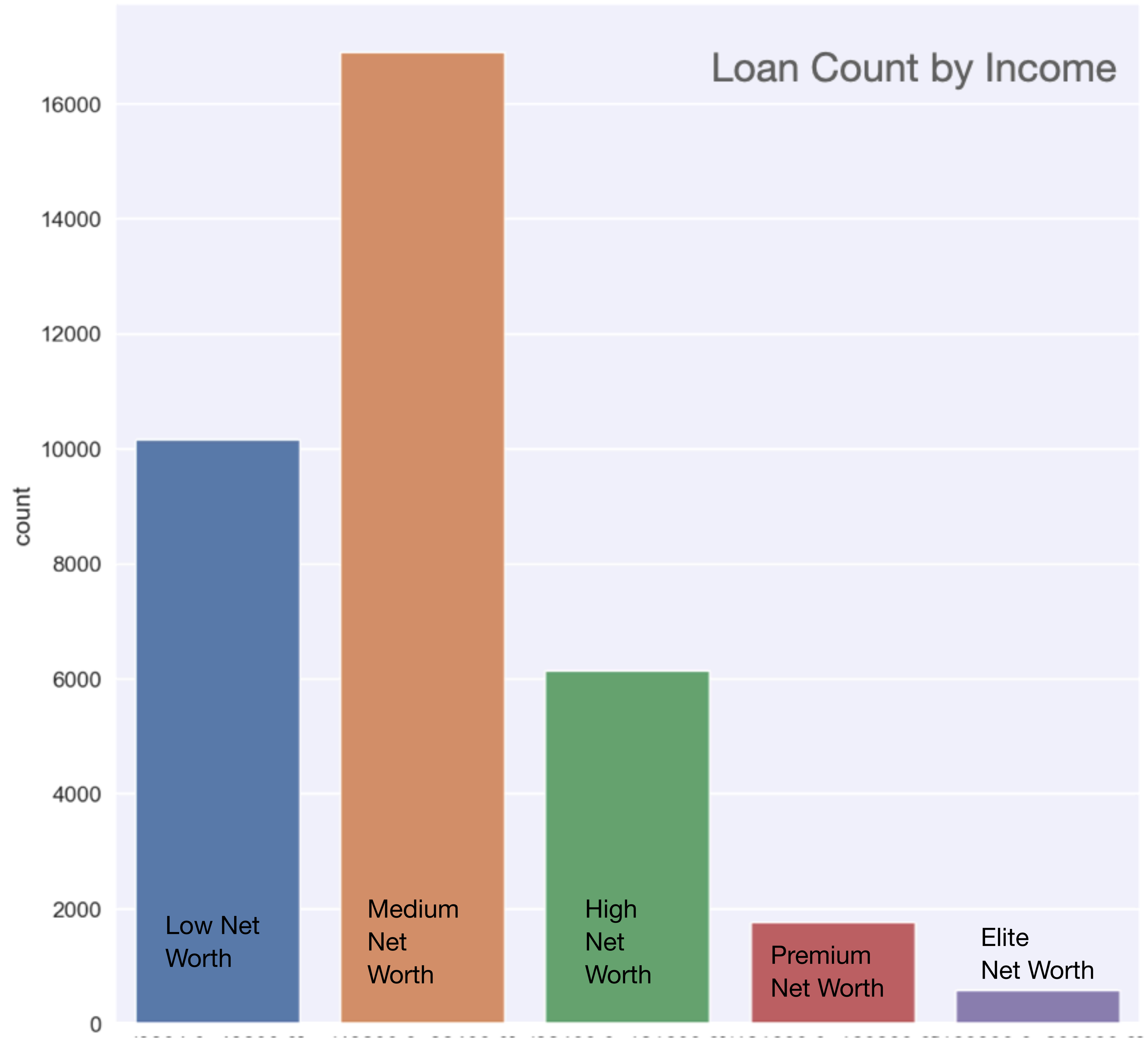


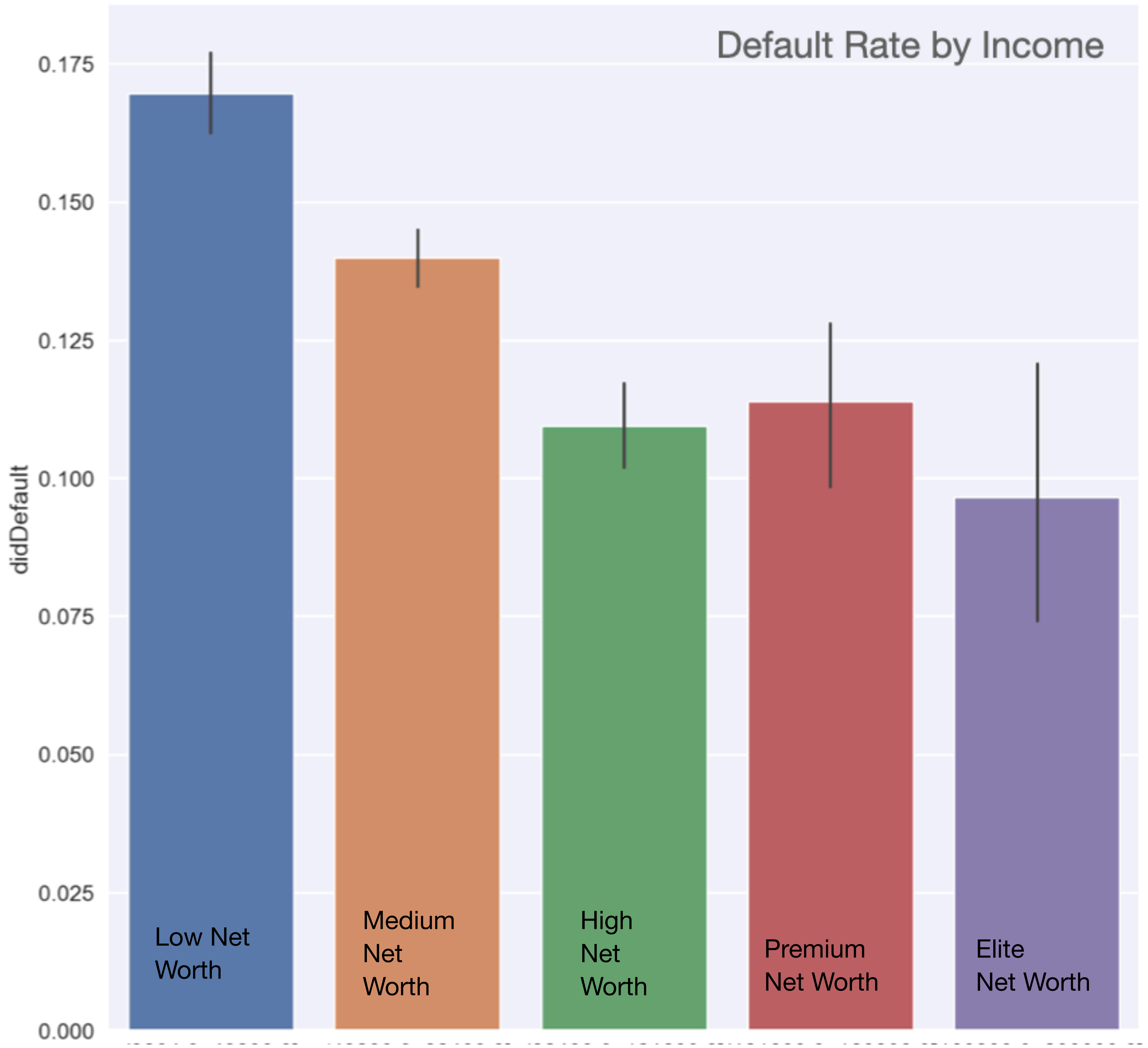




Annual Income Category

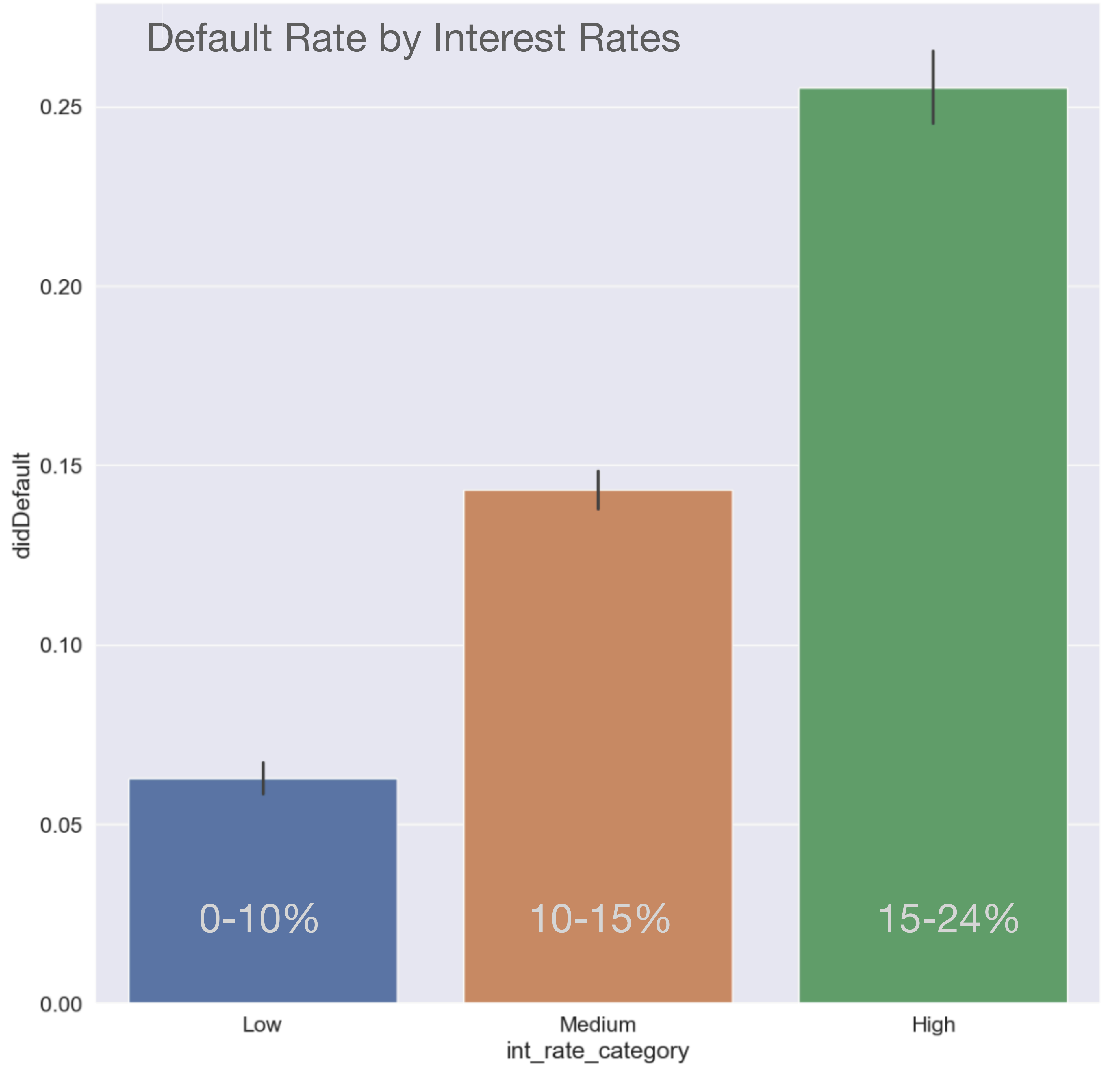
- ~45% loan offered to Medium Net Worth income category
- Low Net Worth customers depicted highest interest rate

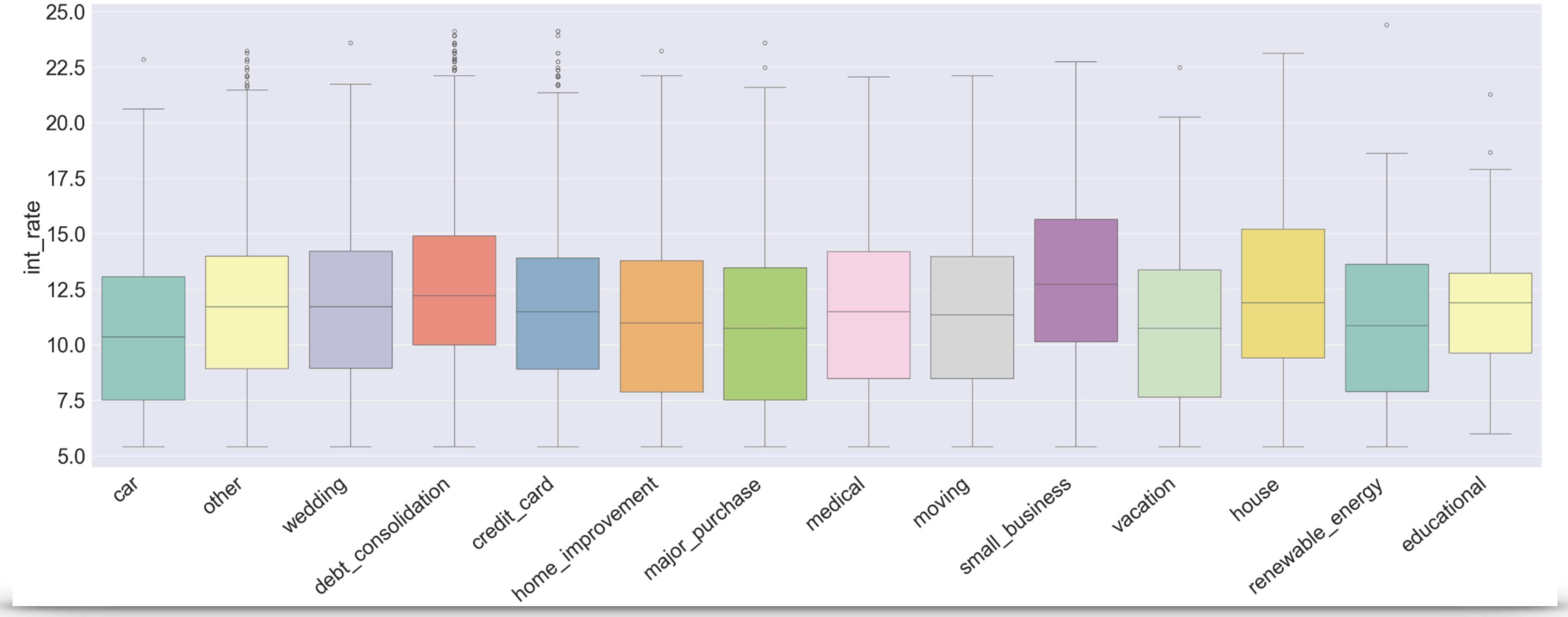


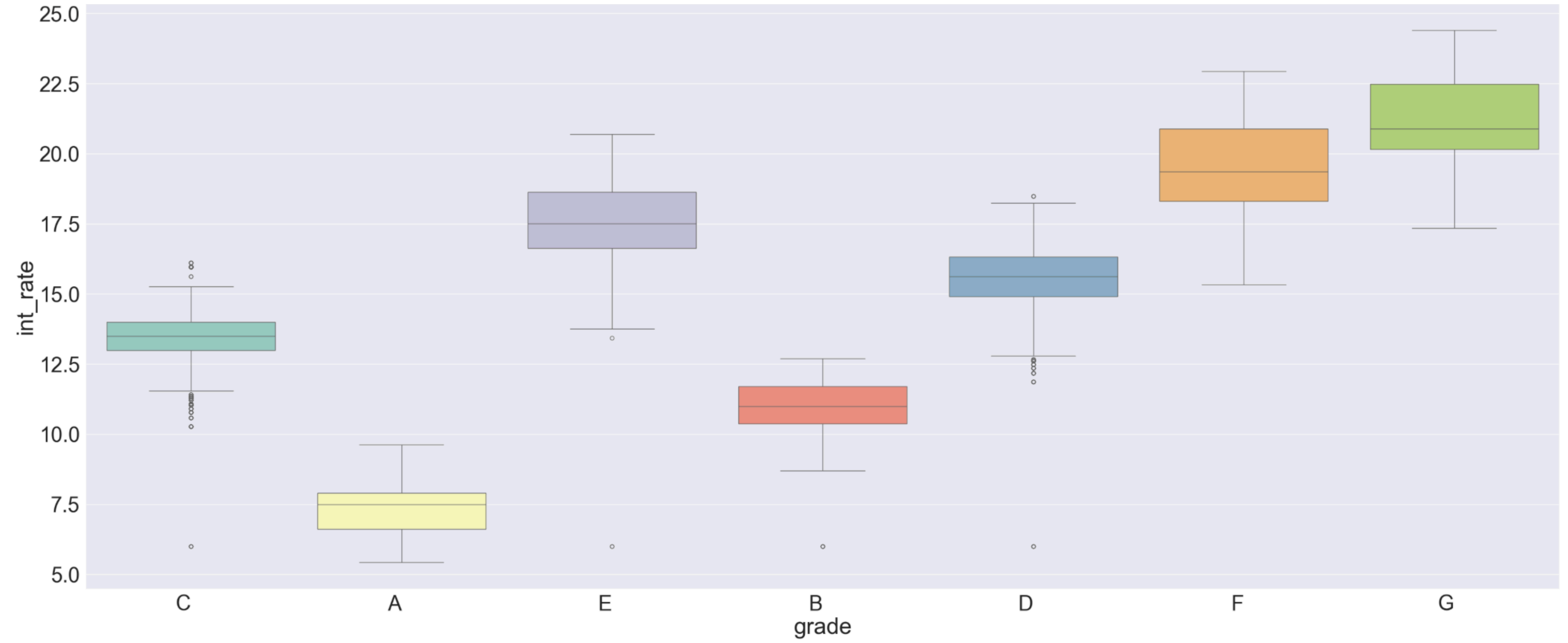


Interest Rate

- High Interest Rate (15-24%) customers showed >25% default rate
- Interest Rate increases from grade A to G but does not vary significantly across loan purpose

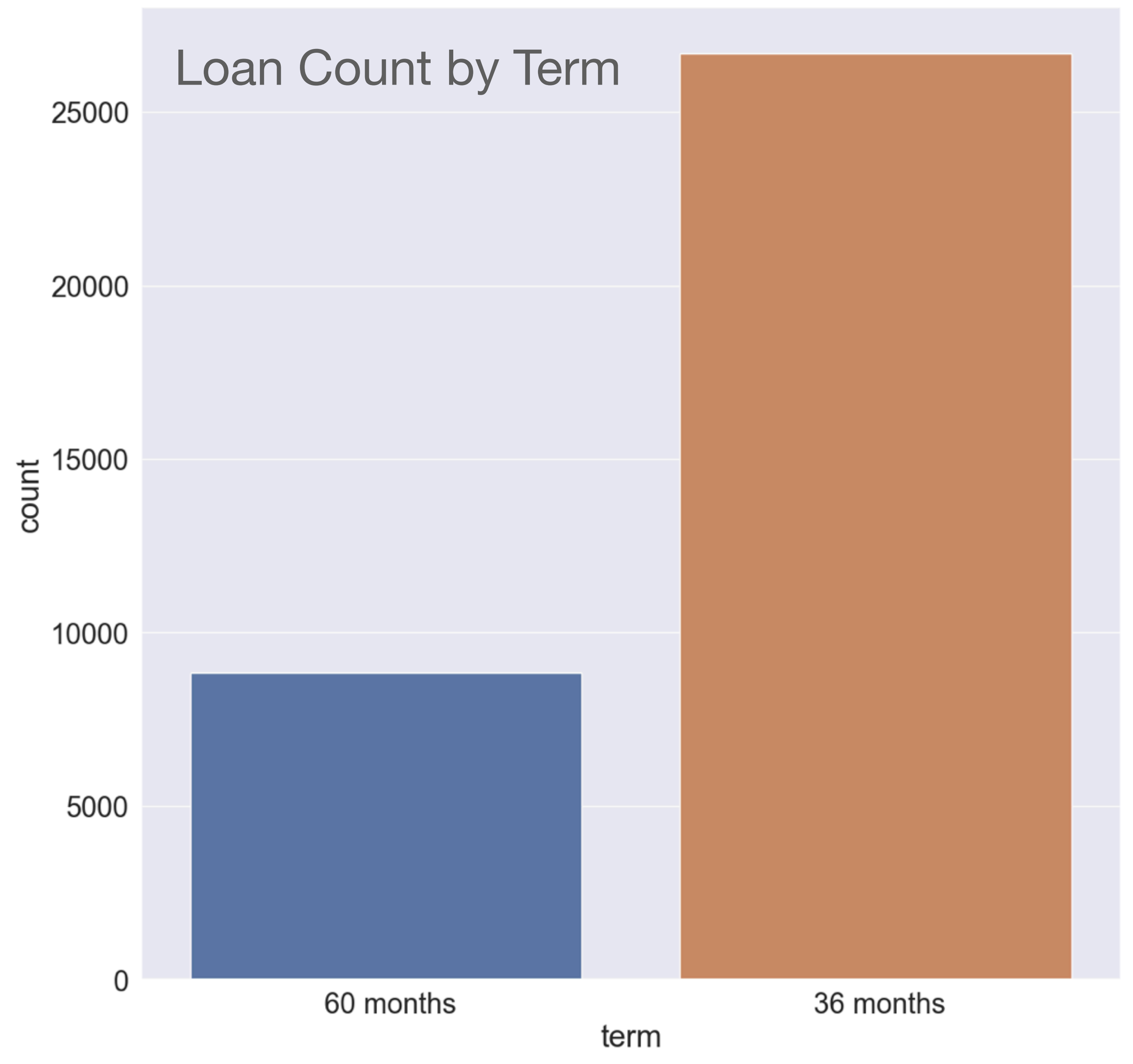


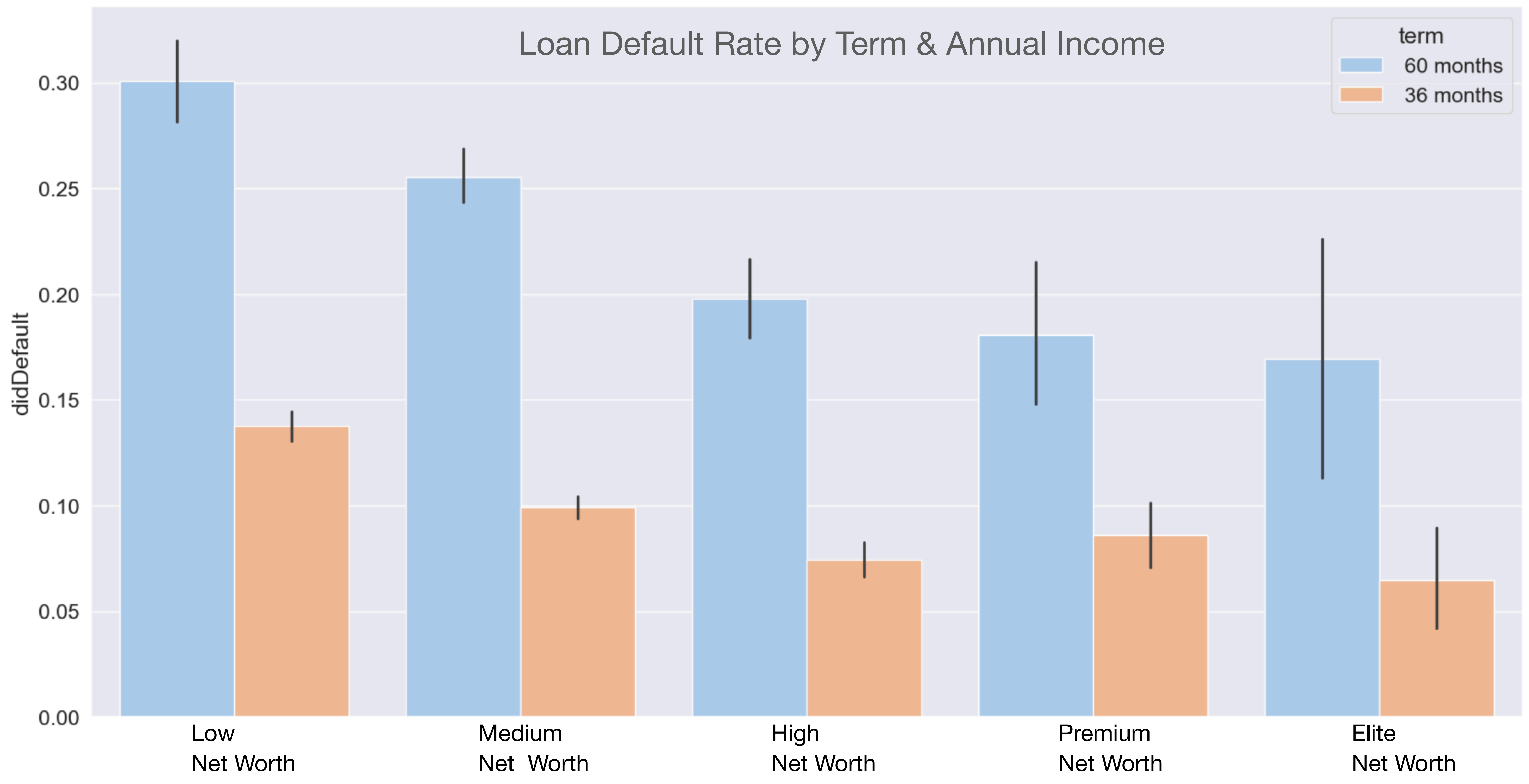




Loan Term

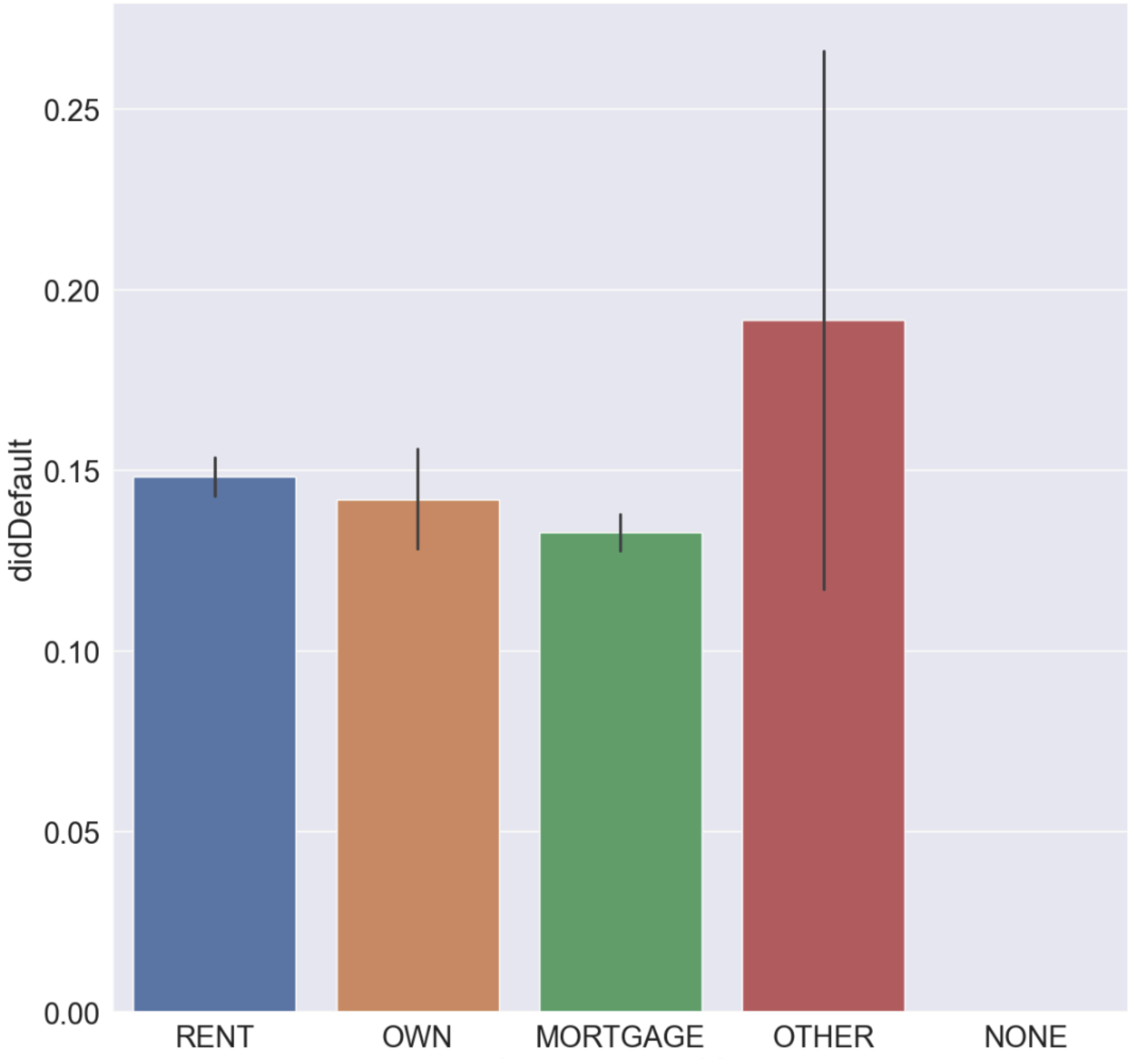
- ~77% loans offered with 36 months term
- 60 months term depicted higher default rate. Same pattern observed across customers of all salary range



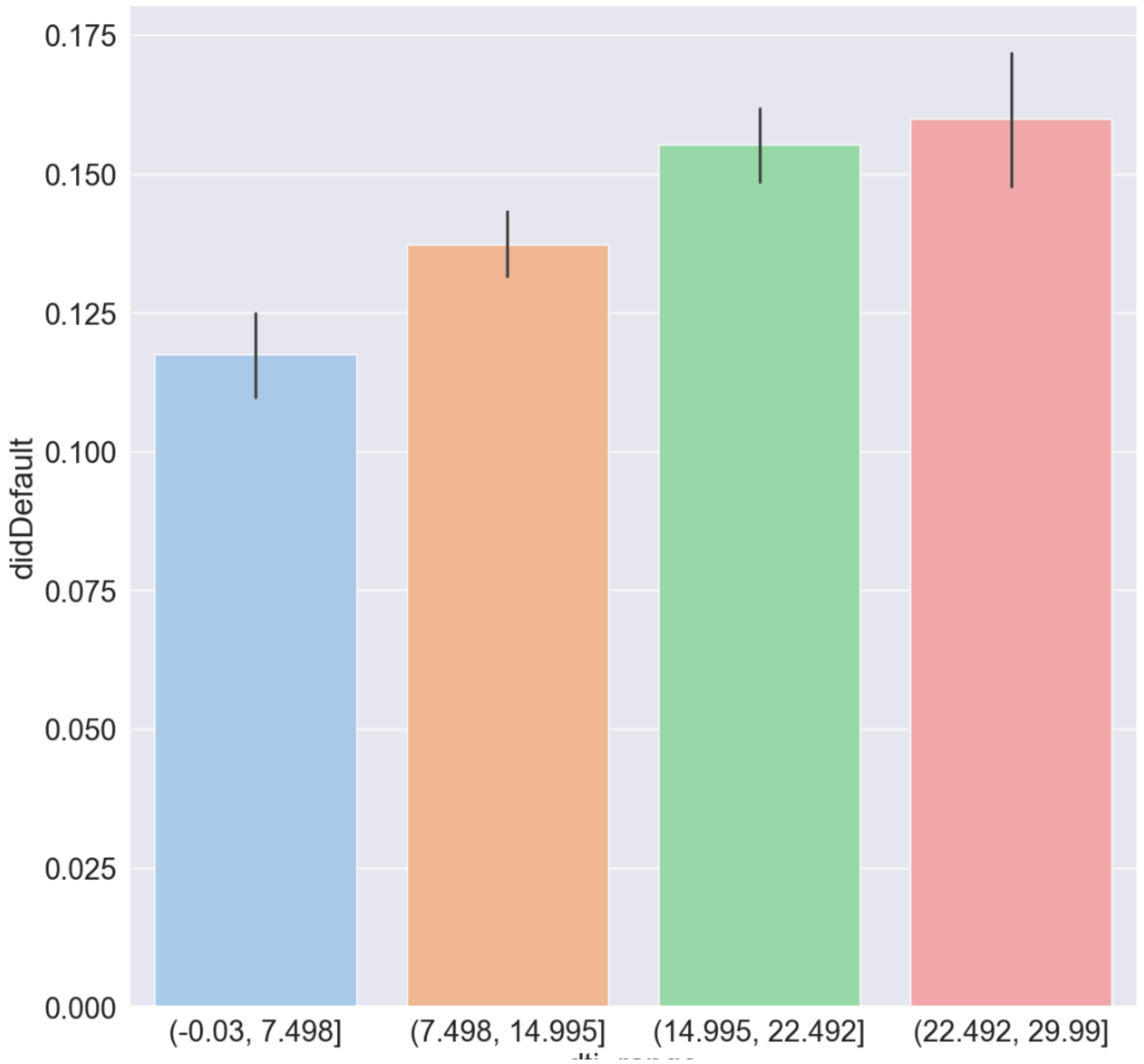


Other Key Impacting Criteria

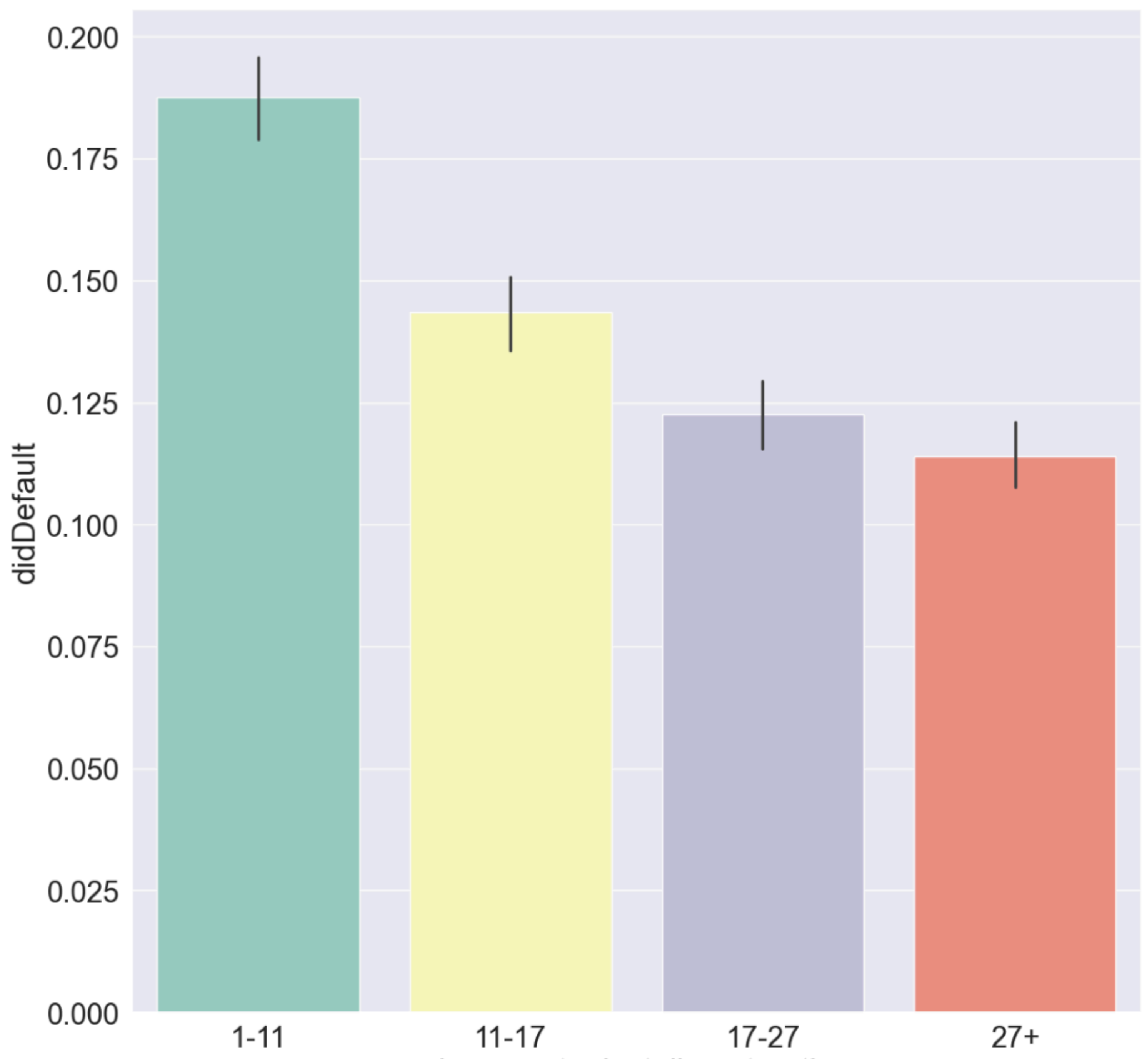
- *Home Ownership* : Customers with Other (assumed unknown) home ownership status show highest default rate
- *DTI* : Customers with higher DTI show higher default rate
- *Monthly Income to Instalment Ratio (aka MIR)* : Customers with low MIR (1-11) show higher default rate



Default Rate by
Home Ownership



Default Rate by
DTI



Default Rate by
Monthly Income to Instalment Ratio

Conclusion

- 14% of the completed loans defaulted over 5 years
- Default rate increases as loan grade changes from A to G
- Small business show highest defaults contributing to ~26% of overall defaults
- Among all income categories, low Net Worth customers depicted highest interest rate
- High Interest Rate (15-24%) customers showed >25% default rate
- 60 months term depicted higher default rate
- Certain attributes such as state, employment length, verification status did not show any impact on default rate