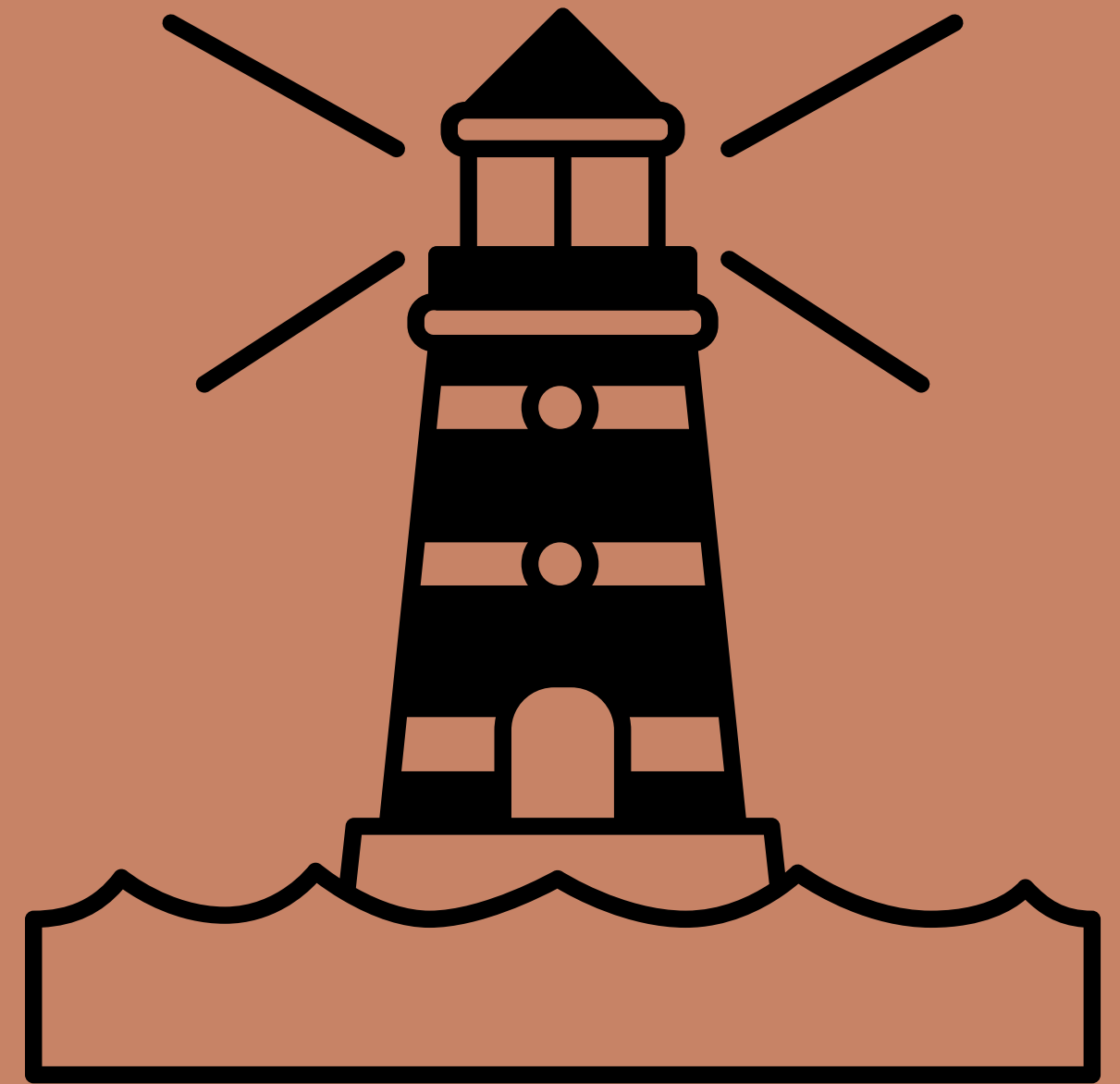


Lighthouse Bank Loan Program Evaluation

Prepared by Jessica Moloney



Project Goals



Who are the loan applicants?

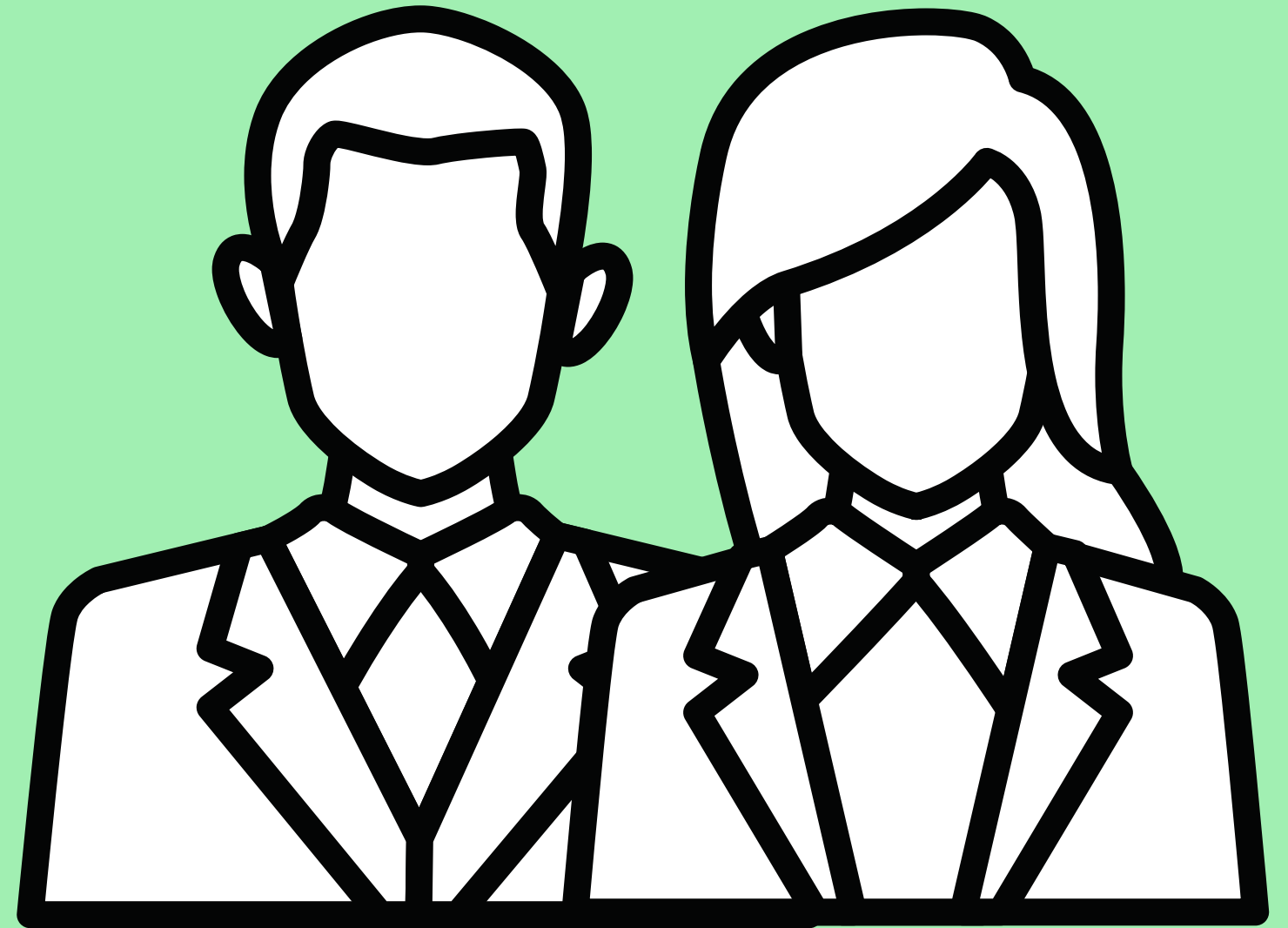
Which applicants get loans?

Can we predict who Lighthouse gives loans?

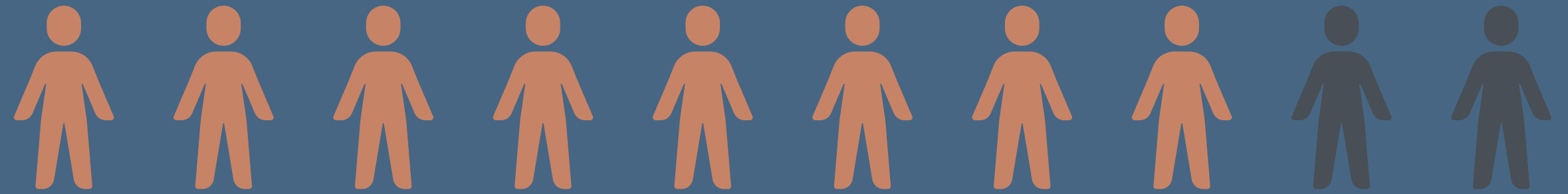
What determines loan eligibility?

What opportunities are there to reach more customers?

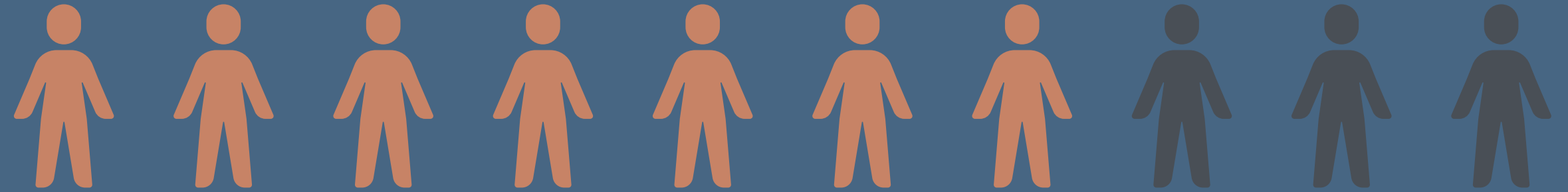
Who are the loan
applicants?



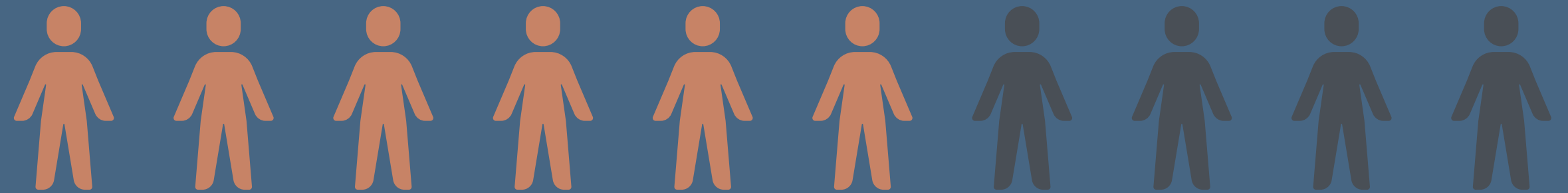
male



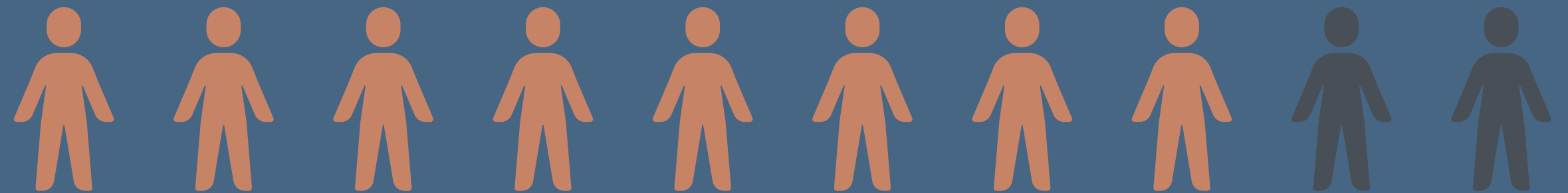
married



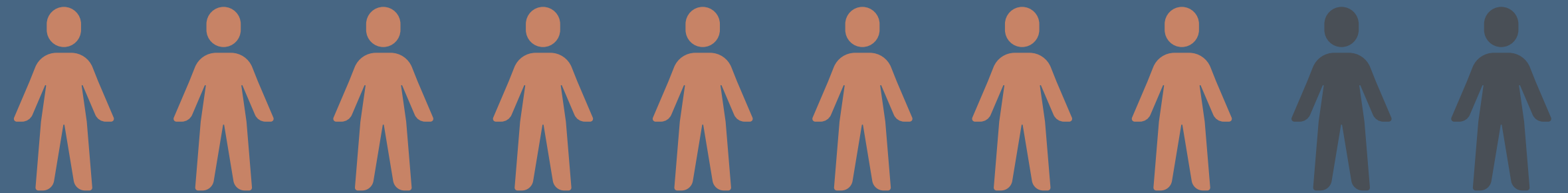
no dependents



highly educated



credit experience



**Applicant Income
(Median)**

\$3,800

**Coapplicant Income
(Median)**

\$1,000

**Total Income
(Median)**

\$5,300



What is the most
common loan
type?





Loan Amount (Mean)

\$ 140,000

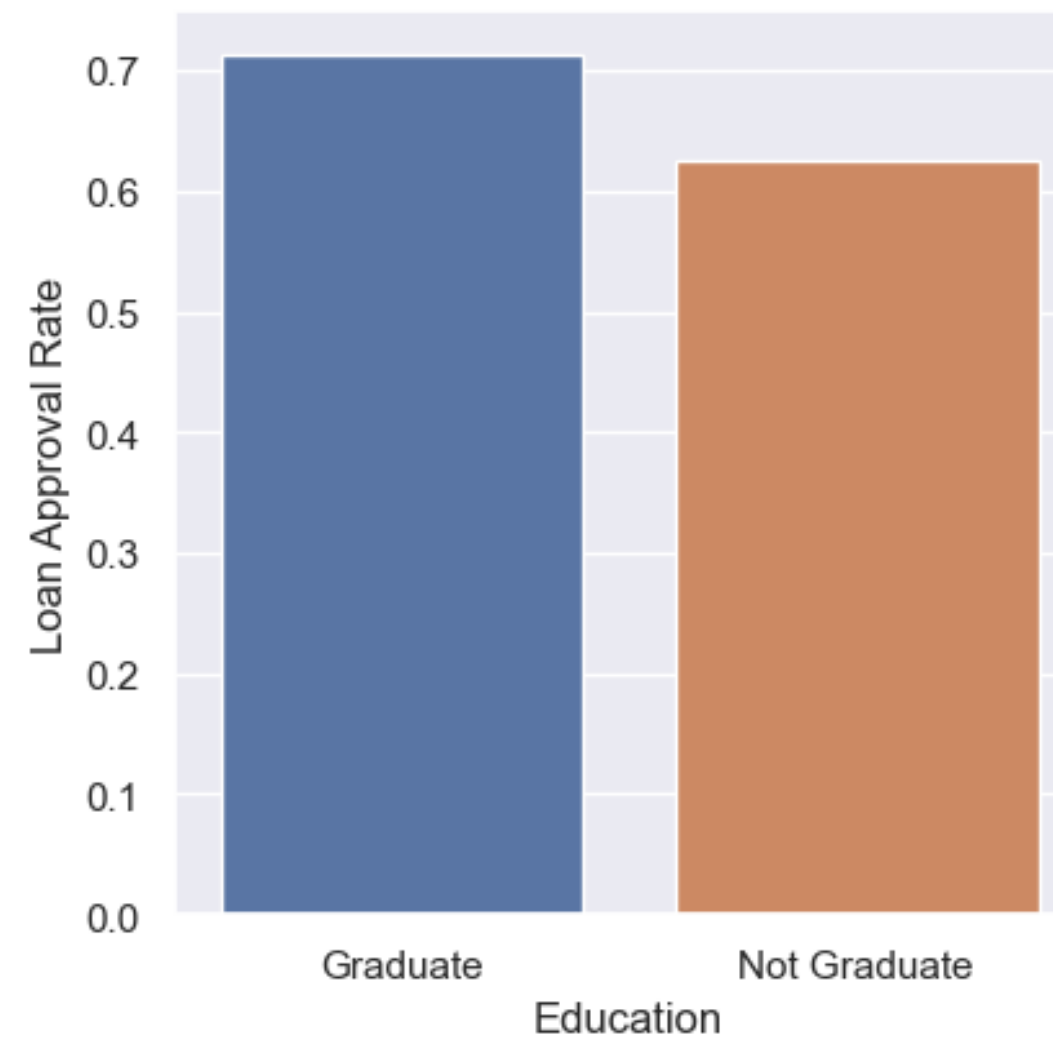
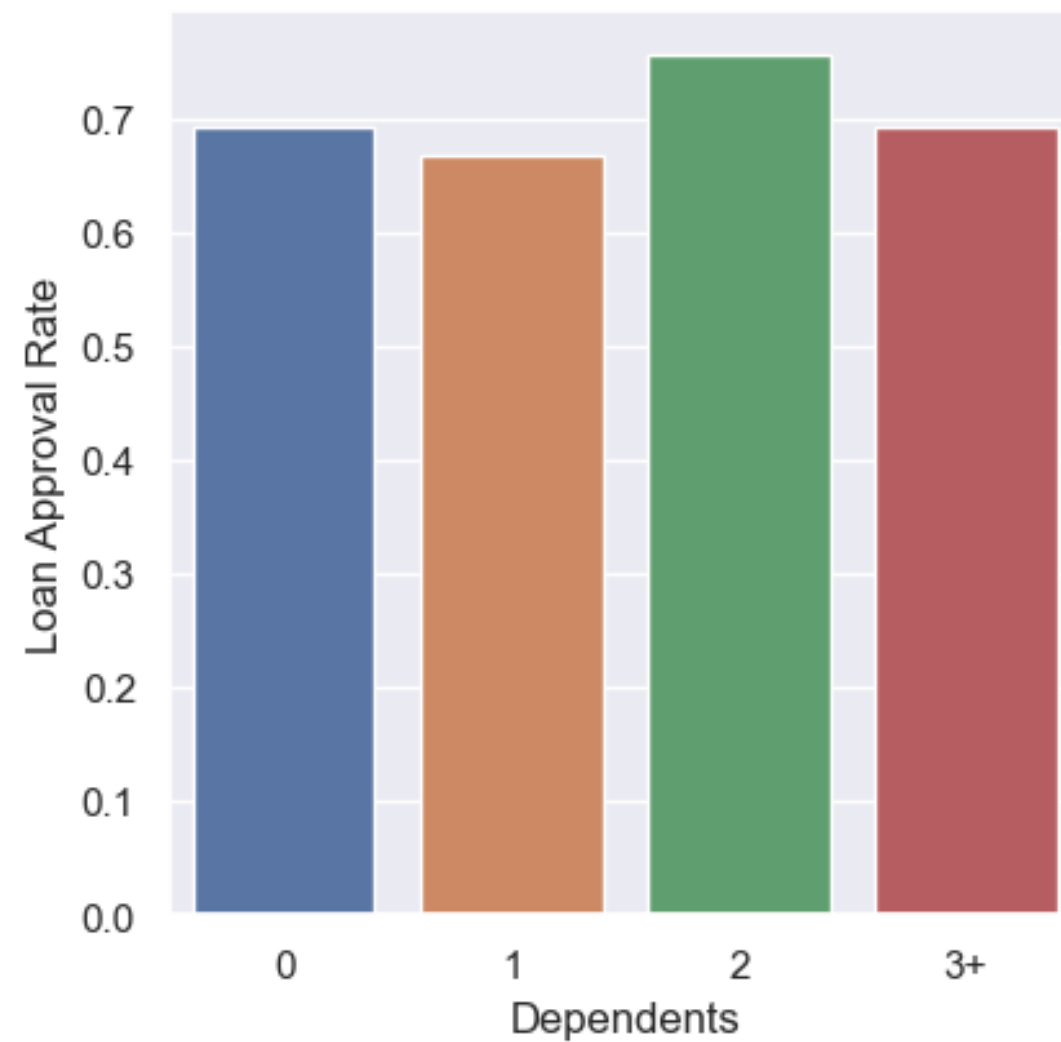
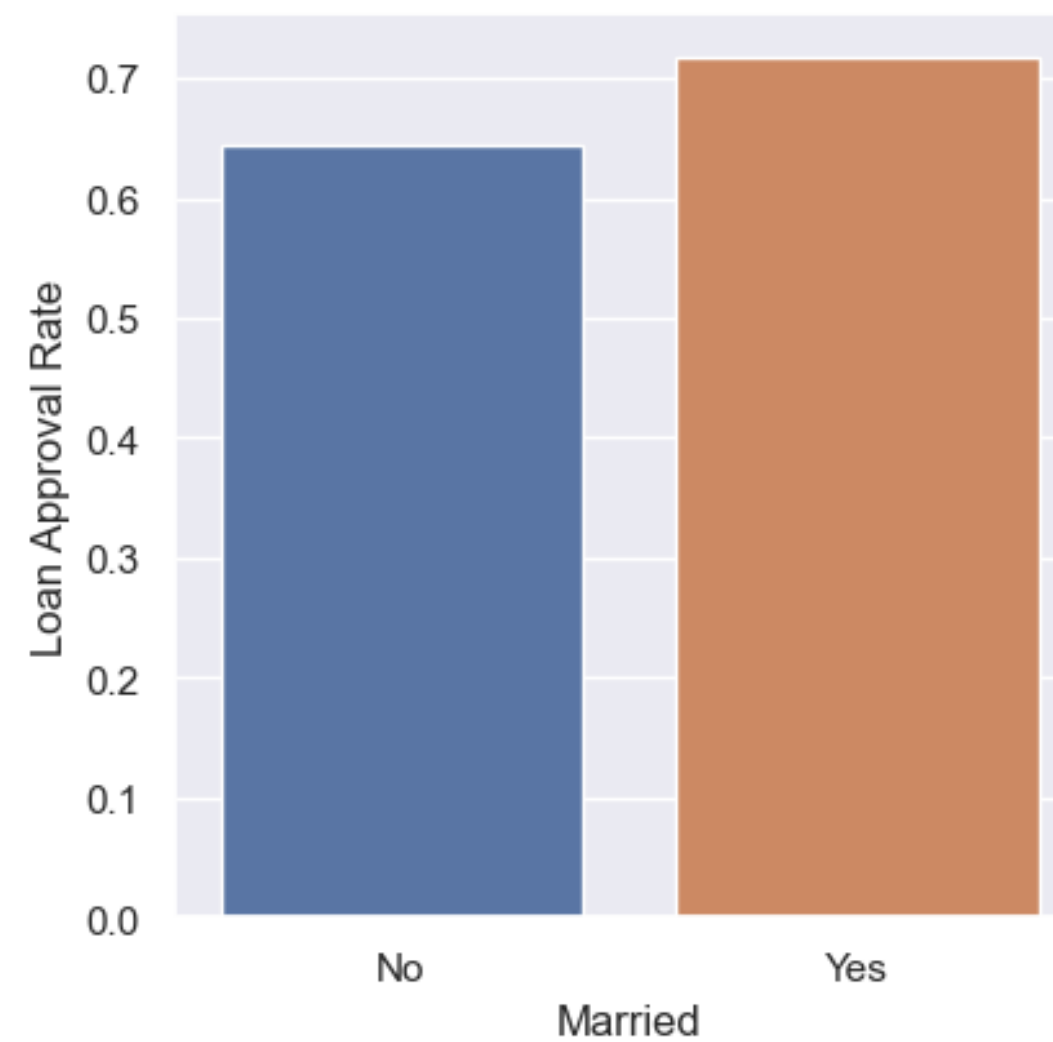
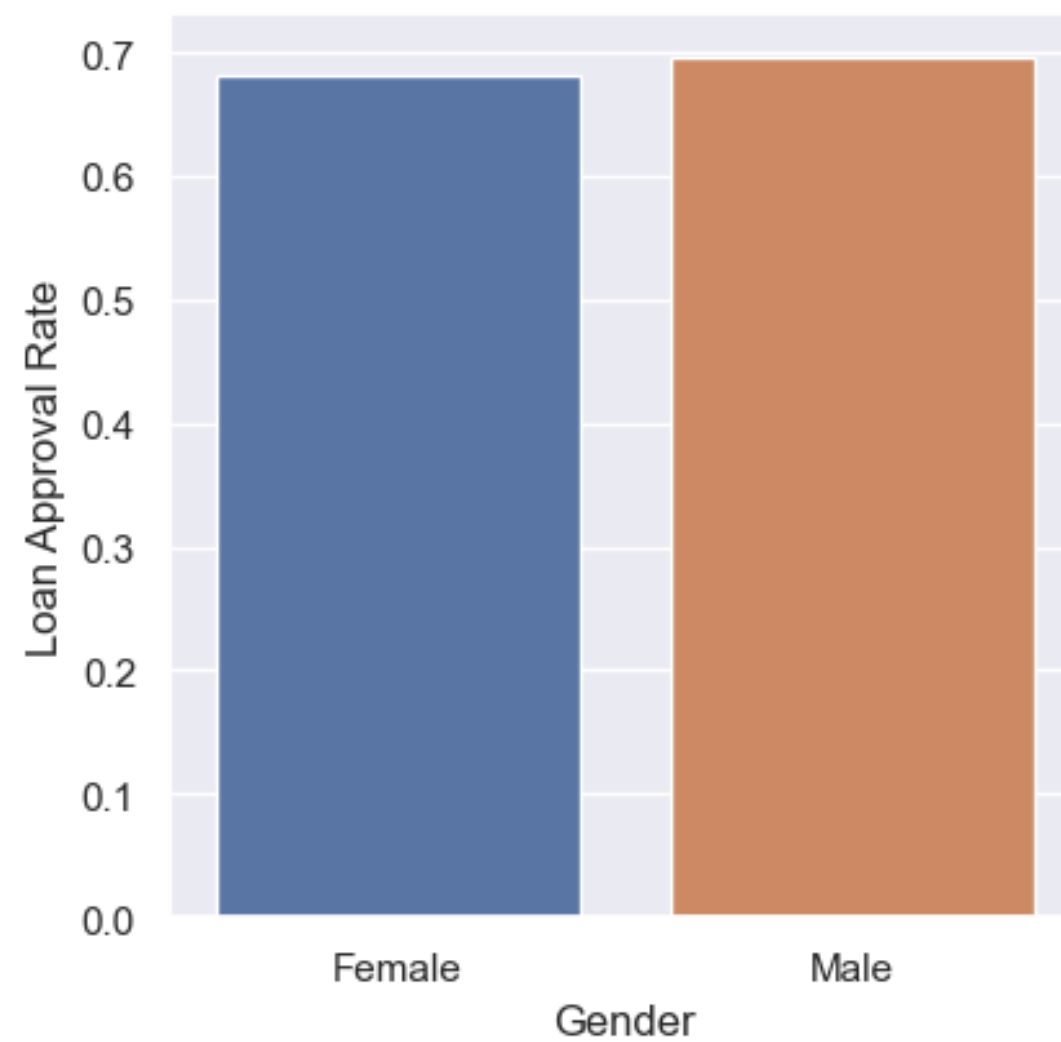


Loan Term (Mean)

30 years

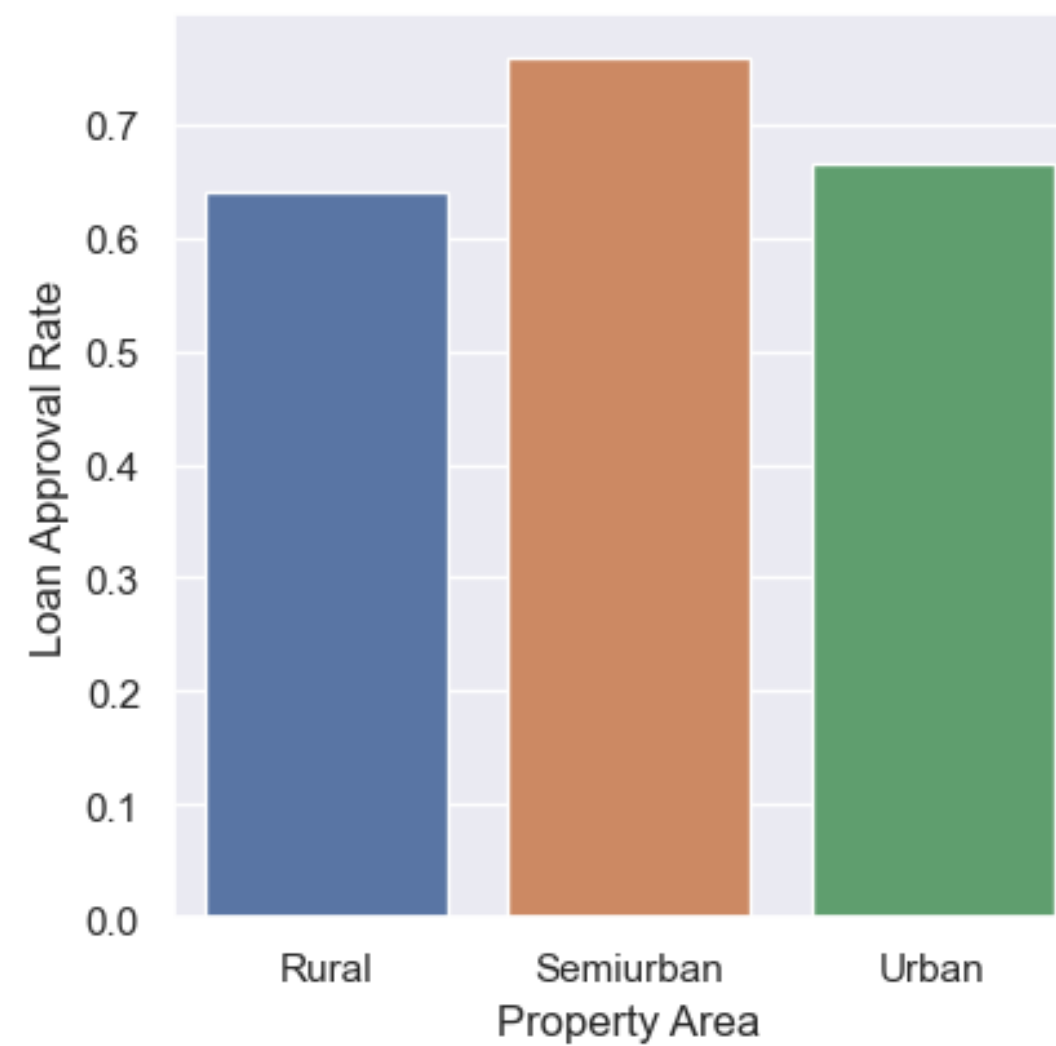
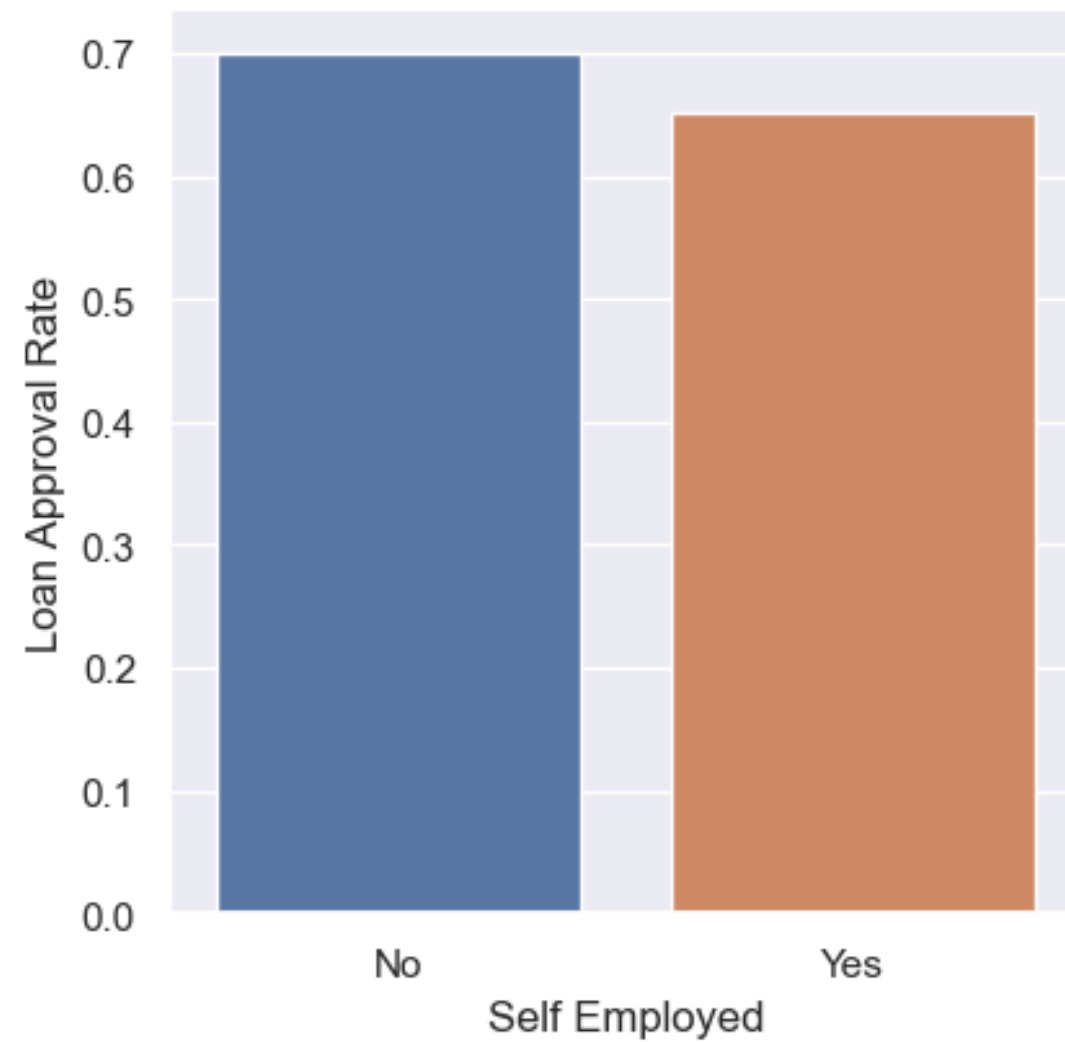
Which applicants
get loans?





Slightly higher approval rate for applicants who:

- are Men
- are Married
- have 2 Dependents
- have a Graduate Education



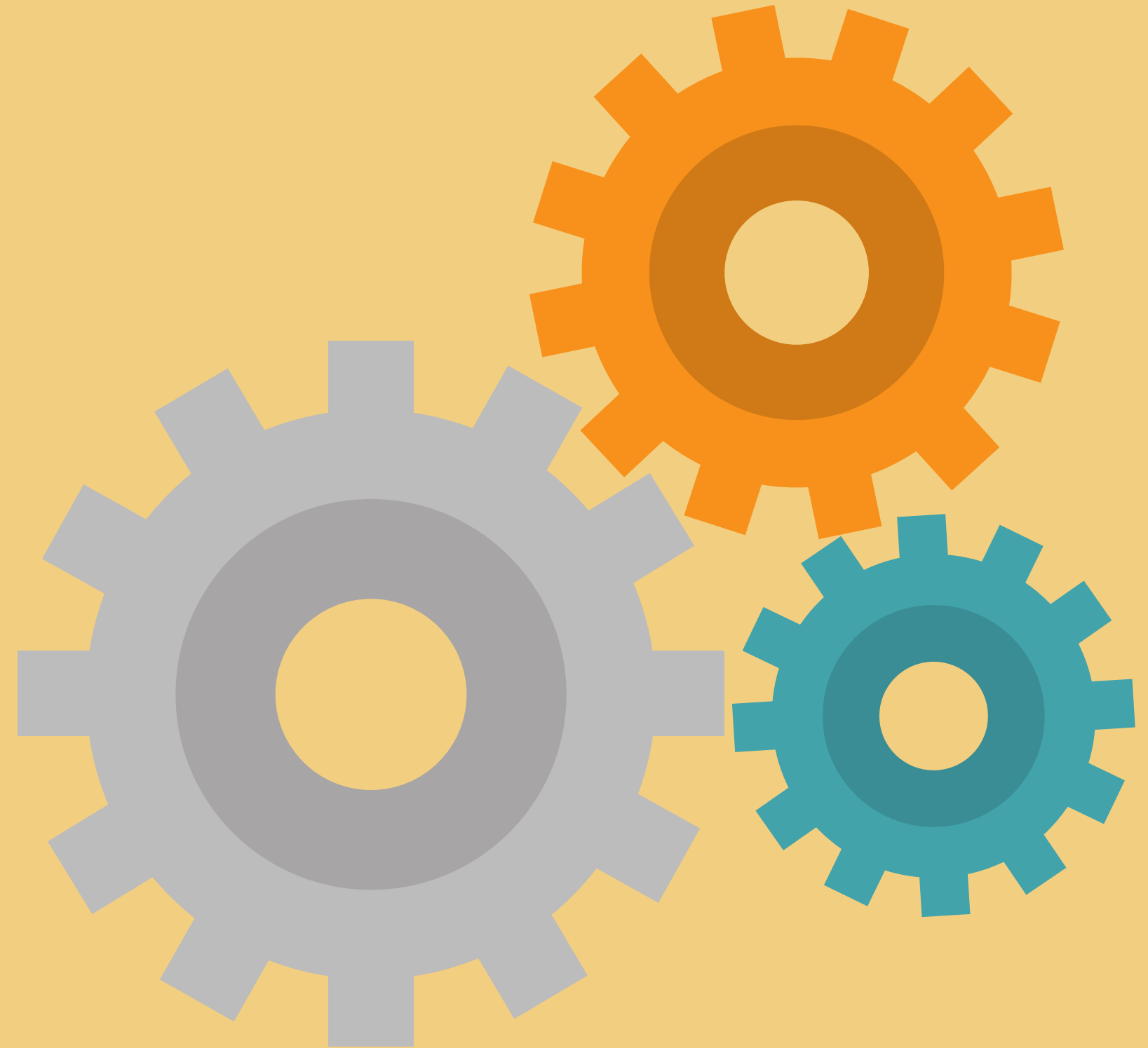
Slightly higher approval rate for applicants who:

- are not self employed
- have a semiurban property



Much higher approval
rate for applicants with
a credit history

Machine Learning to Predict Loan Approvals



Pipeline

- ▶ **add total income: Pipeline**

- ▶ TotalIncomeAdder

- ▶ **preprocessing: ColumnTransformer**

- ▶ **numeric**

- ▶ SimpleImputer

- ▶ StandardScaler

- ▶ **categorical**

- ▶ SimpleImputer

- ▶ OneHotEncoder

- ▶ RandomForestClassifier

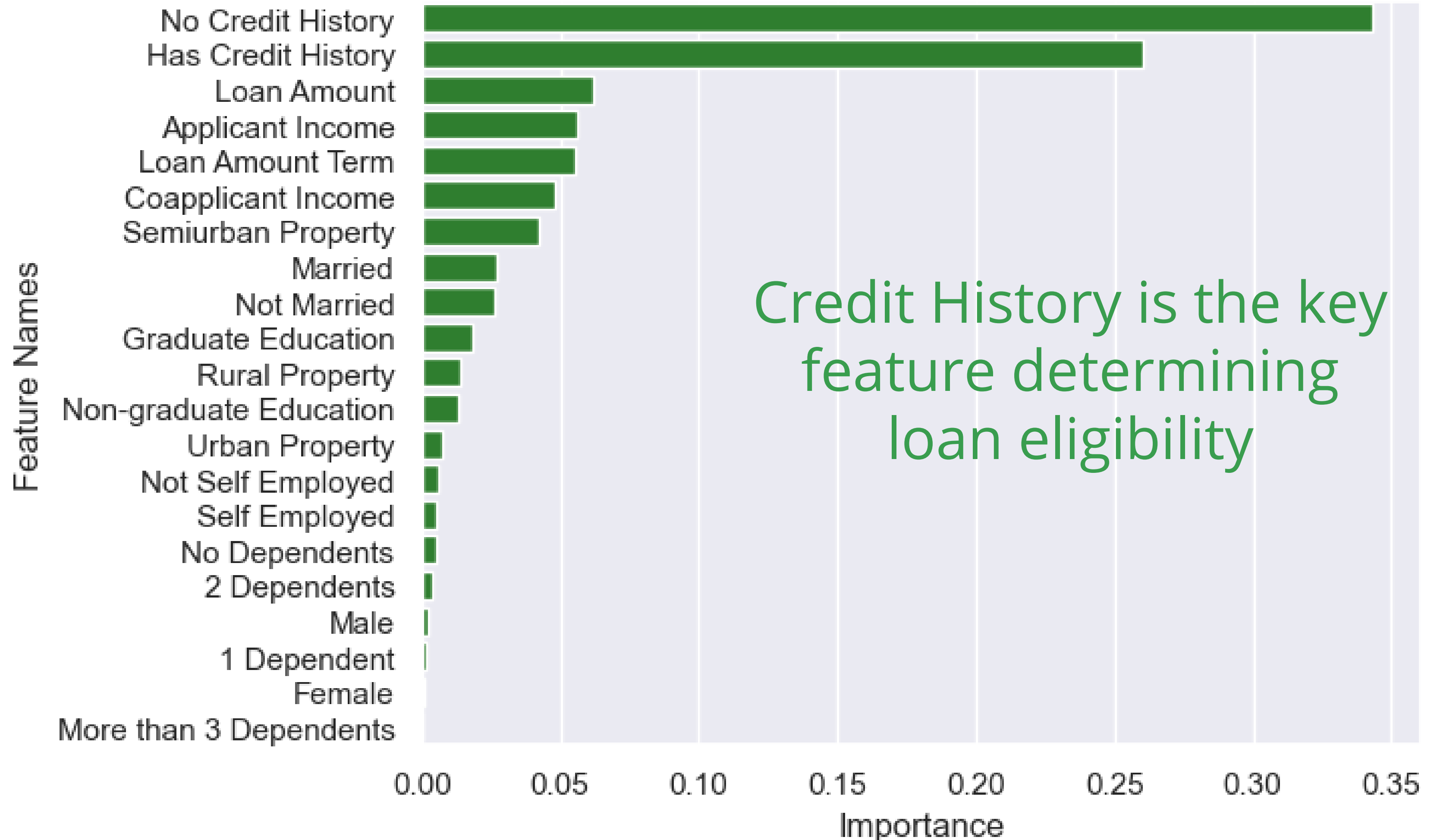
Input

```
{  
  "Gender": "Female",  
  "Married": "No",  
  "Dependents": "2",  
  "Education": "Graduate",  
  "Self Employed": "No",  
  "Applicant Income": 37719,  
  "Coapplicant Income": 0.0,  
  "Loan Amount": 152.0,  
  "Loan Amount Term": 360.0,  
  "Credit History": "0.0",  
  "Property Area": "Semiurban"  
}
```

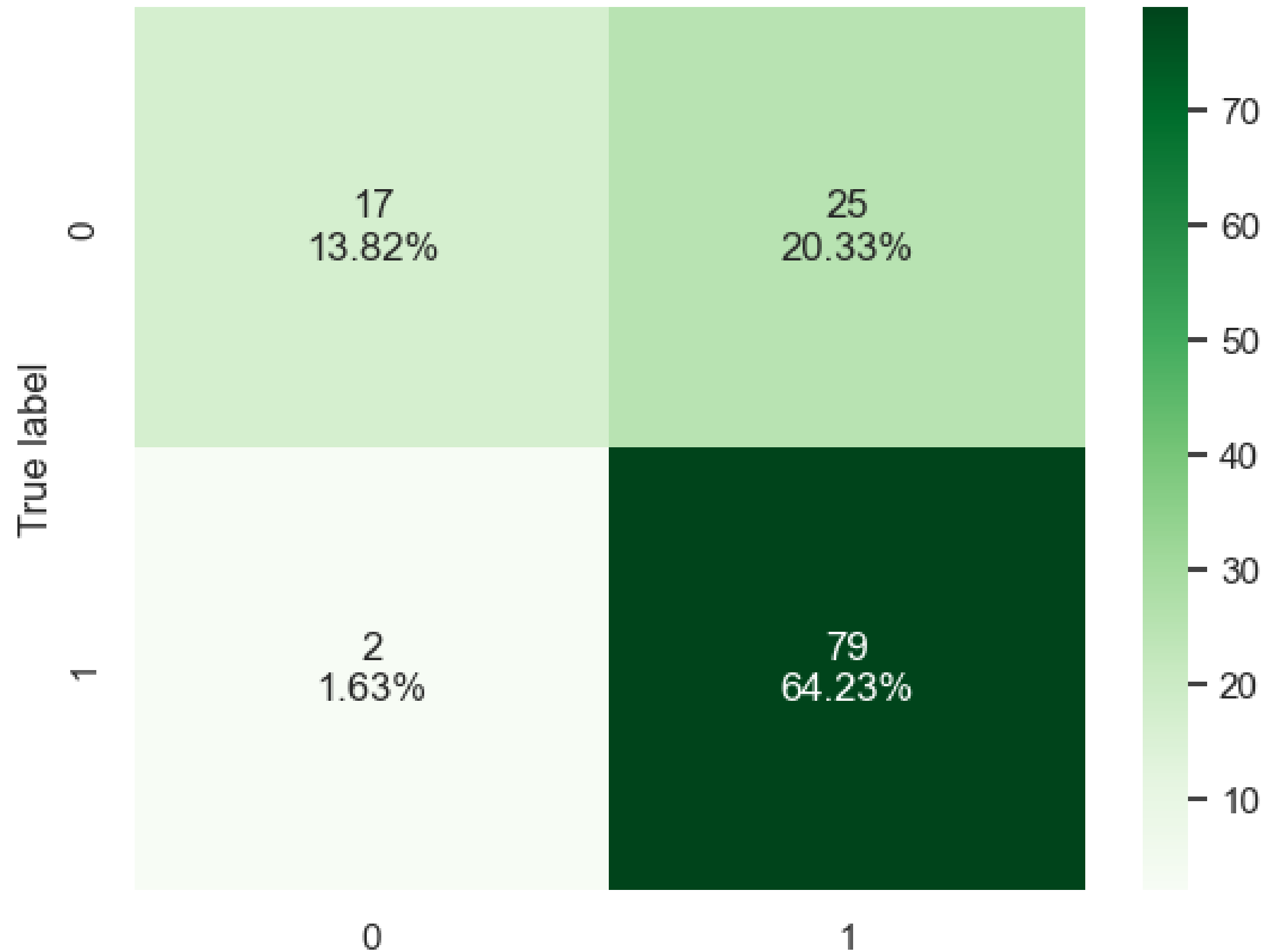
Output

"There is a 60.2% probability this loan application will be rejected."

Relative Feature Importance



How good is the model?



Accuracy=0.780
Precision=0.760
Recall=0.975
F1 Score=0.854

Opportunities



Targeted marketing for
underrepresented groups

Evaluate emphasis on credit history

Work to eliminate any
discriminatory practices

Thank
you!