



CAPSTONE PROJECT: PREDICTING PROBLEM MORTGAGE LOANS

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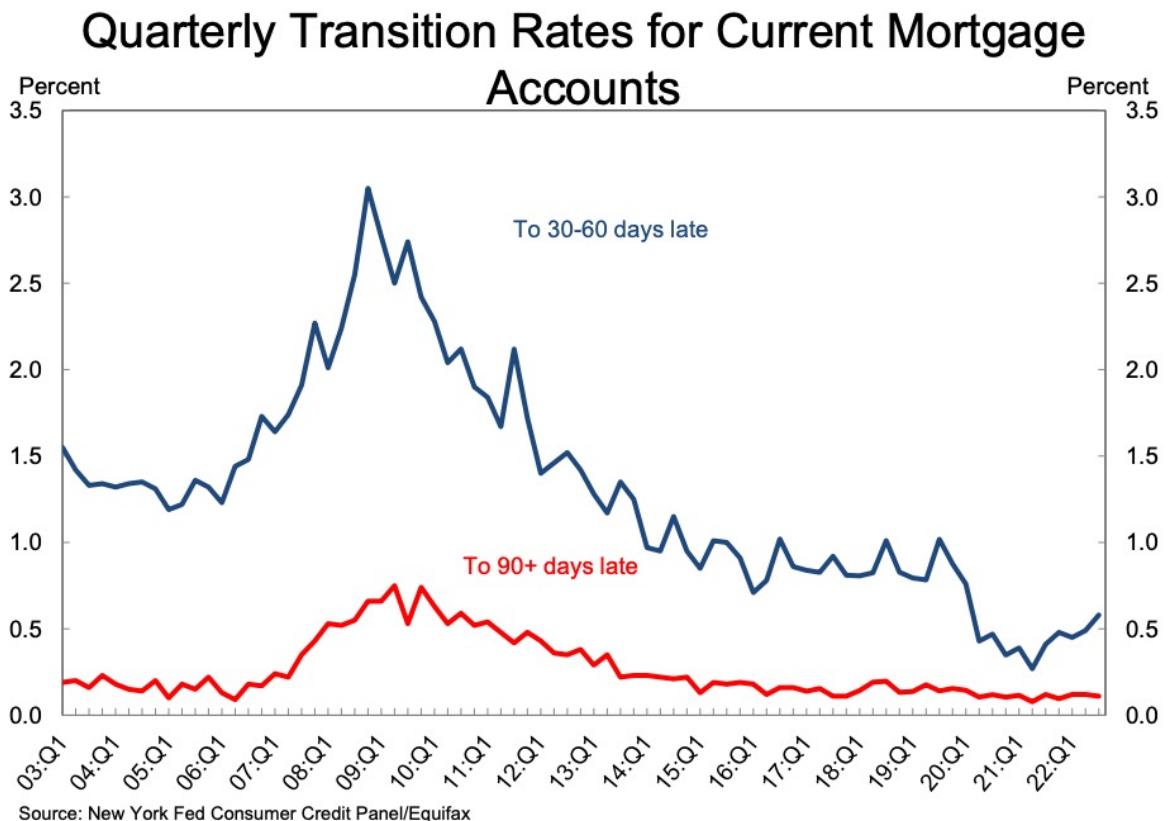
DECEMBER 2022

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PROBLEM STATEMENT

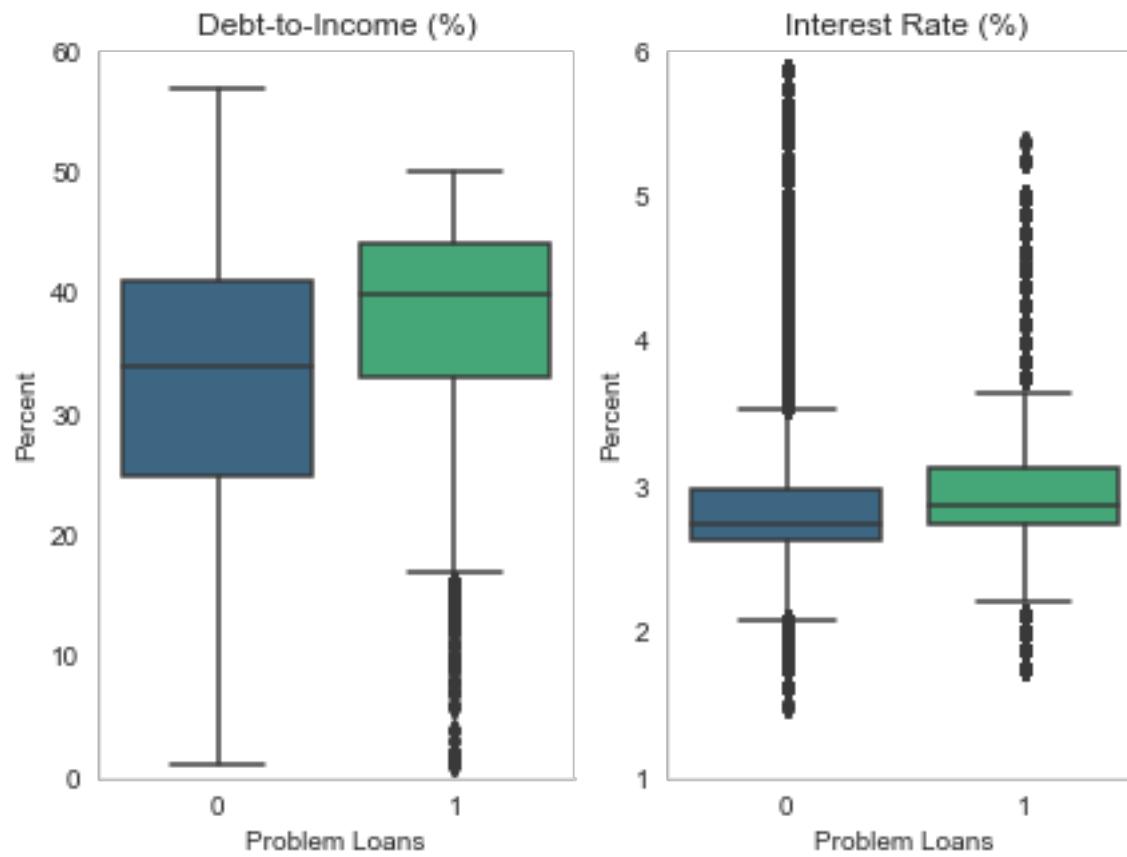
Fannie Mae wants to better predict the likelihood that a borrower will have problems paying its mortgage loan and to identify the features that best identify problem loans.



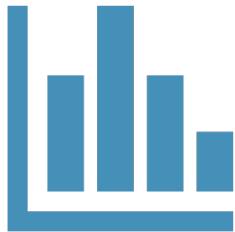
While mortgage loan delinquencies are currently very low, there are indications of potential increasing stress.

GOAL

The goal is to predict the probability of problem loans and to identify their features in order to manage credit risk.



DATA UNDERSTANDING



Data

- Fannie Mae Single Family Loan Data
- Loans acquired in Q1 2021
- Over 23 million records



Methods

- Descriptive data analysis and statistics
- Machine learning modelling

DATA UNDERSTANDING

Definitions

Problem loans

payments that are 90 or more days past due

have been modified, restructured, or received any borrower assistance

have been foreclosed

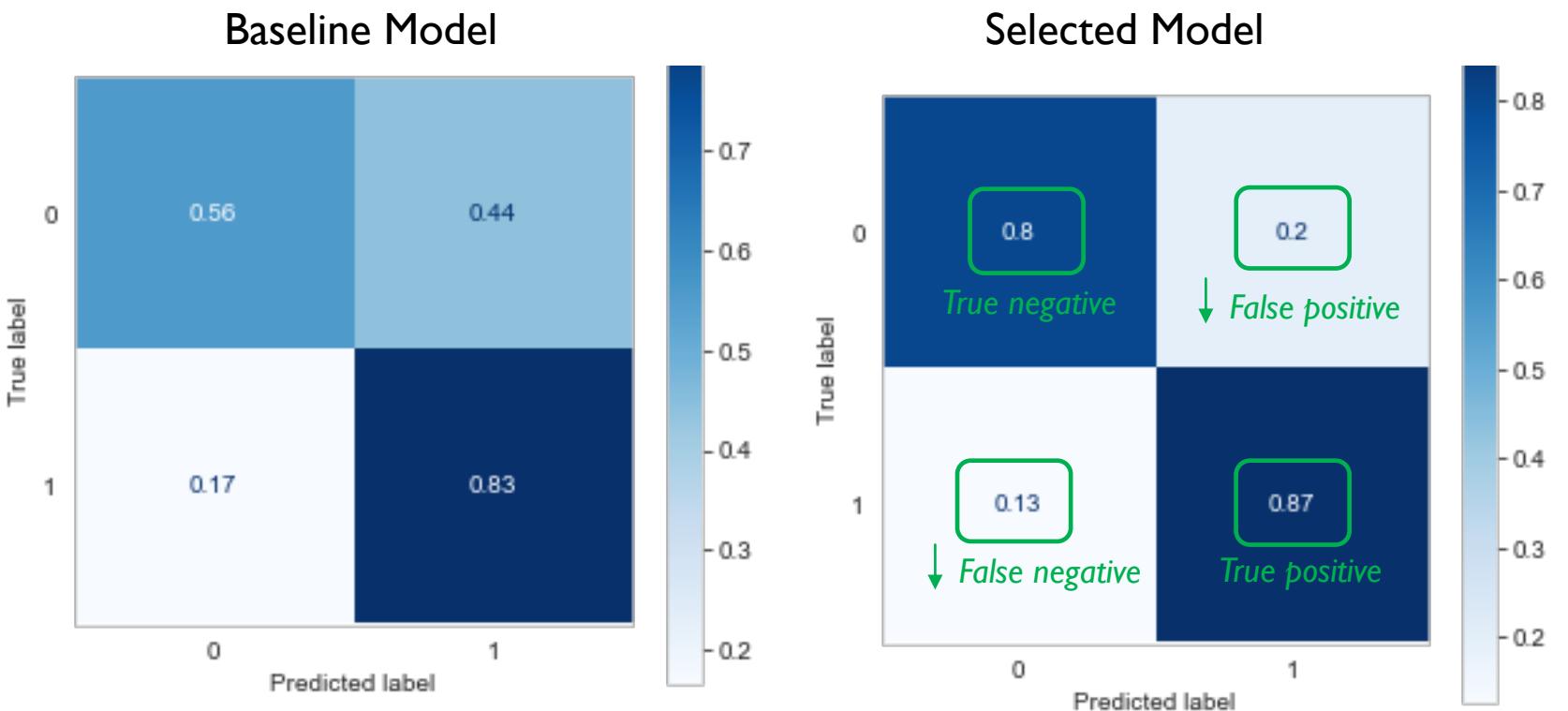
Binary classification

non-problem, performing loans are classified as '0'

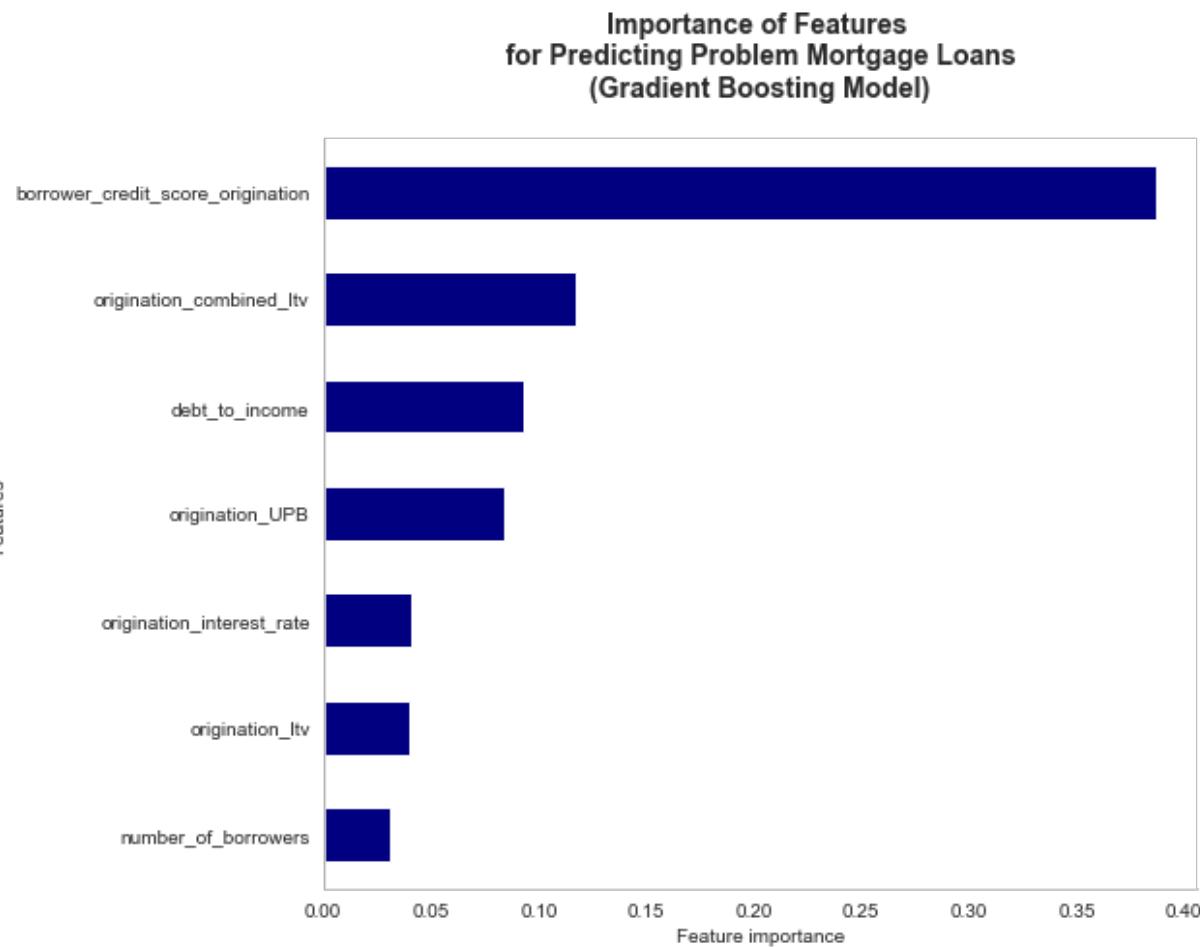
problem loans are classified as '1'

RESULTS

- Gradient Boosting model selected as best performing model
- True positive rate of 87%



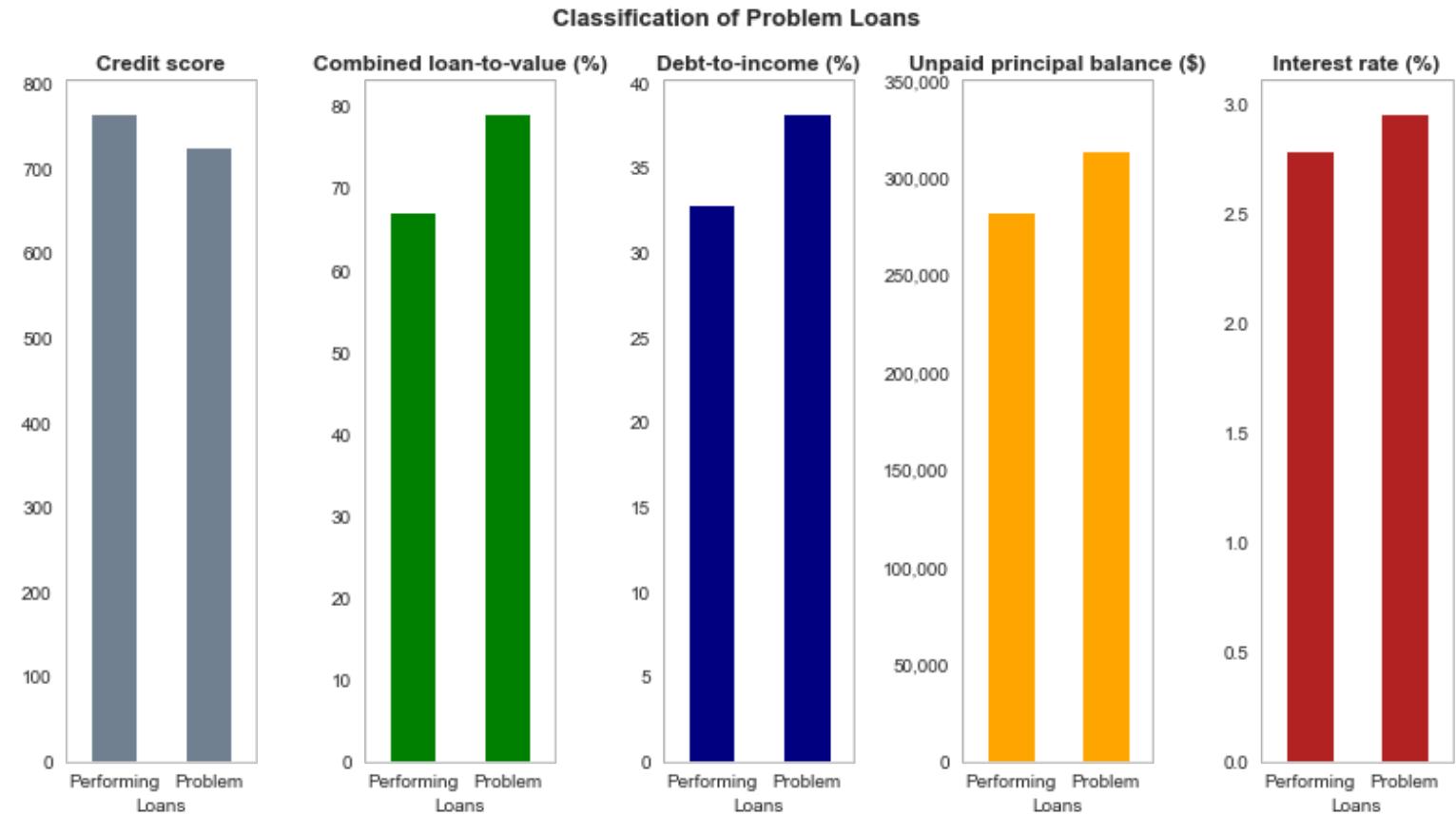
RESULTS



- Top features represent metrics that are commonly used in credit risk assessments

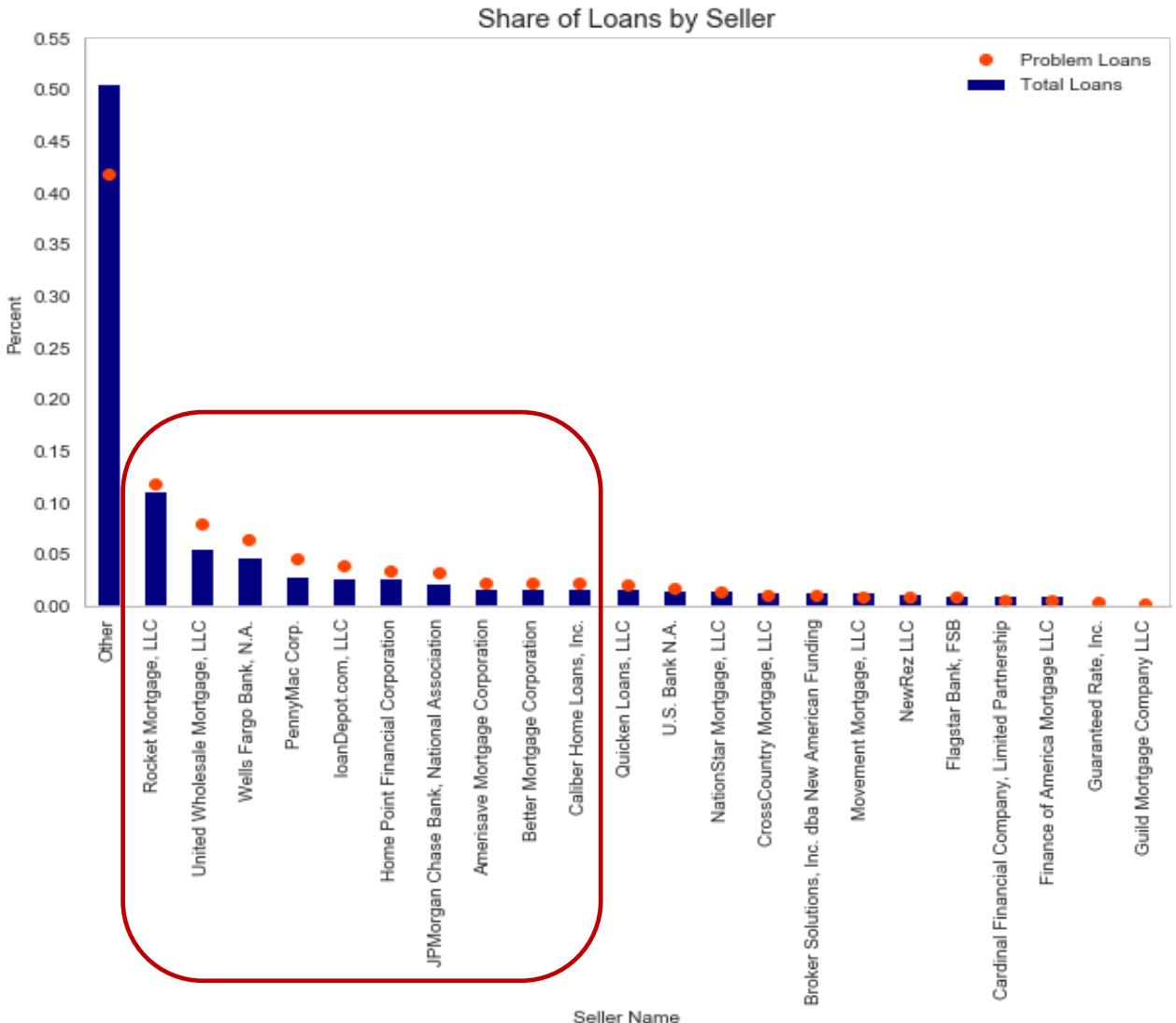
RECOMMENDATIONS

- Adjust the criteria Fannie Mae applies to the loans they acquire and guarantee
- Focus credit risk management resources on loans that are likely to be problem loans



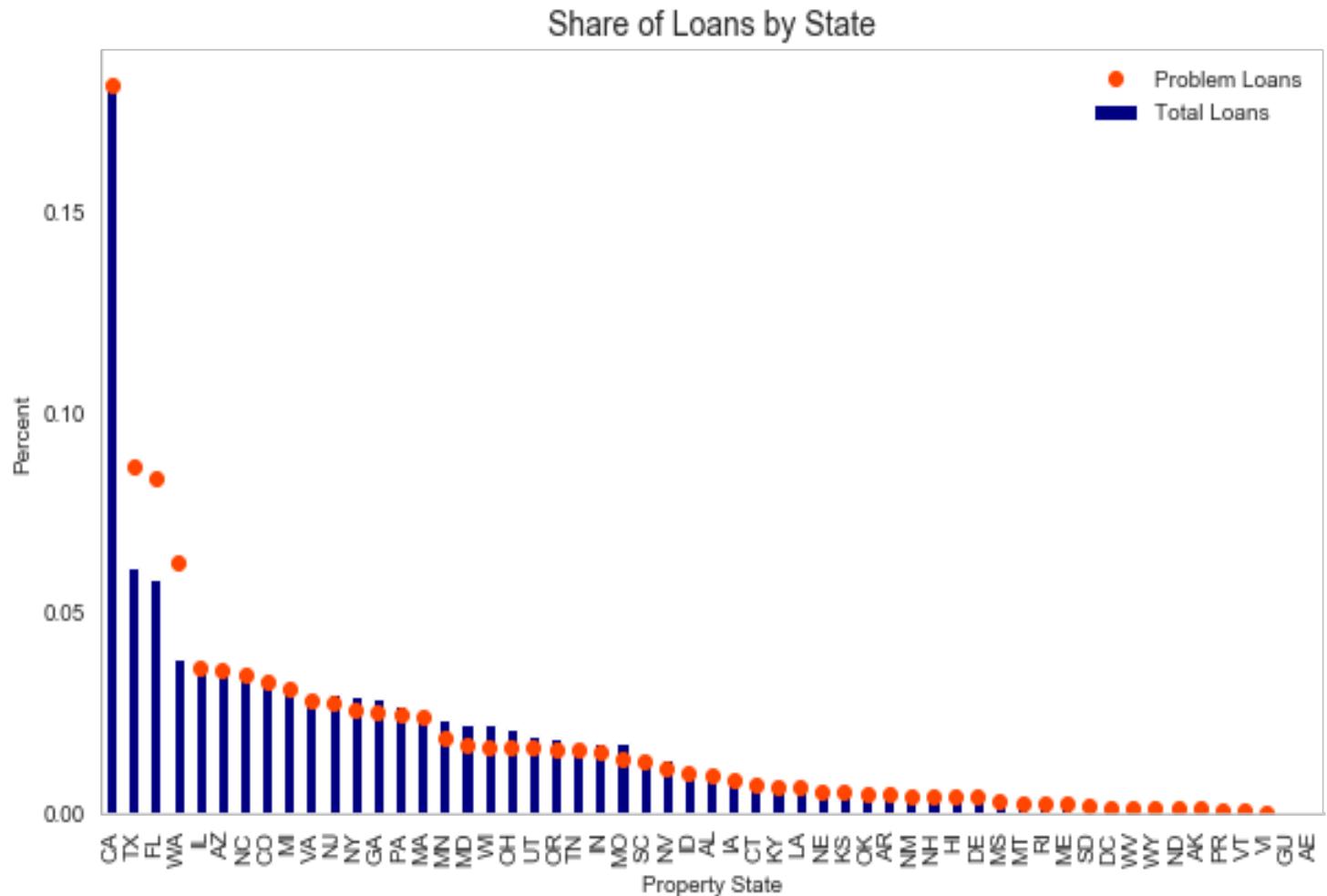
RECOMMENDATIONS

- Mortgage loans sold by some institutions should be examined more closely for problem loans compared to other institutions



RECOMMENDATIONS

- Mortgage loans for properties in certain states should also be examined more closely for problem loans compared to other states



NEXT STEPS: EXTENDED ANALYSIS



Improve model performance



Extend geographical analysis
to zipcode level



Predict value of losses for
problem loans

THANK YOU

For questions, contact:

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