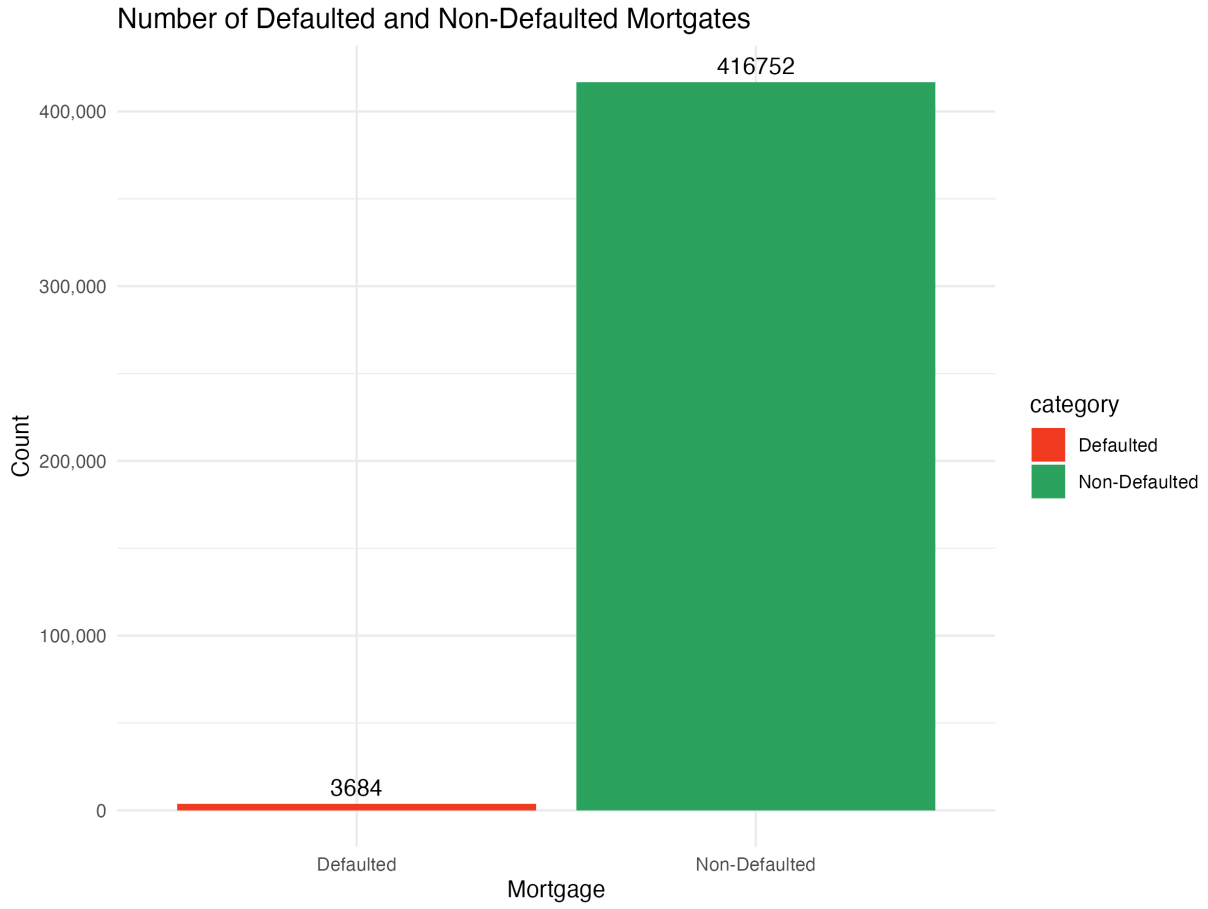
CAN YOUR CREDIT SCORE AND DEBT PREDICT MORTGAGE DEFAULT? HERE'S WHAT THE DATA SHOWS

In today's housing market, where home prices in the USA are reaching historic highs, understanding mortgage defaults has never been more important. When homeowners can't make their mortgage payments, it affects not just their own finances, but can ripple through the entire economy – as we learned during the 2008 financial crisis.

The Big Picture: How Common Are Mortgage Defaults?

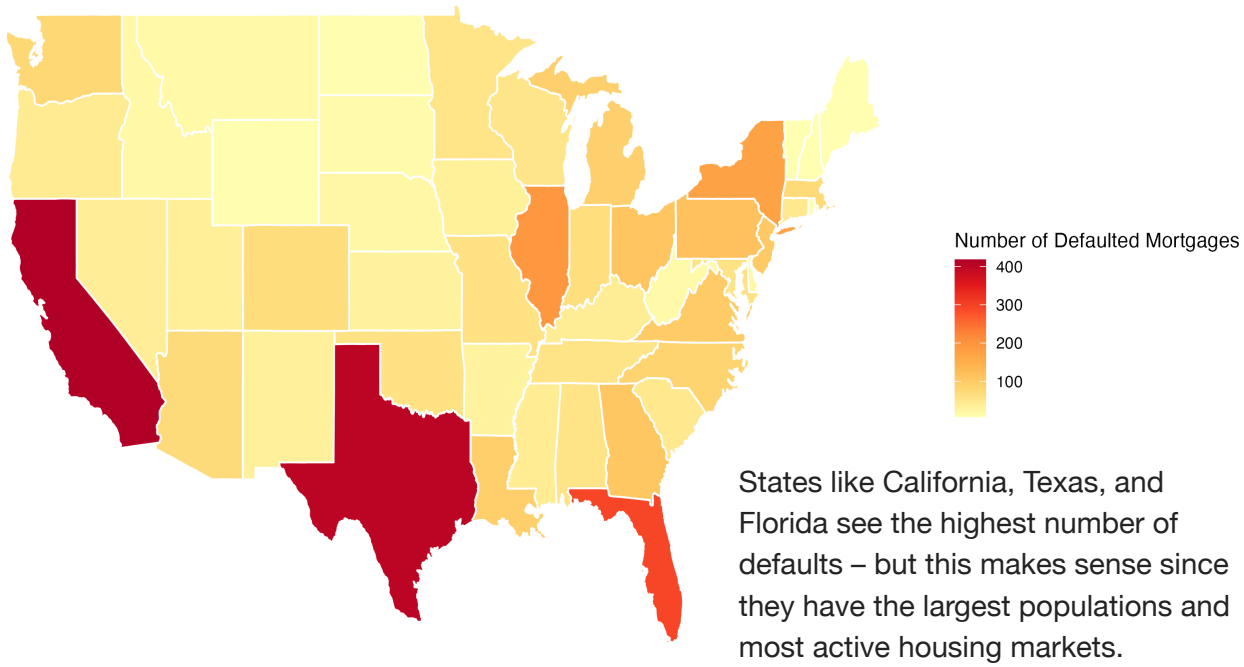


Using data from Fannie Mae, one of the largest mortgage companies in America, we looked at home loans that were started in early 2016. The good news? Most homeowners keep up with their payments. Only a small percentage of mortgages end up in default (when payments are missed for more than 30 days).

Where Are Defaults Happening?

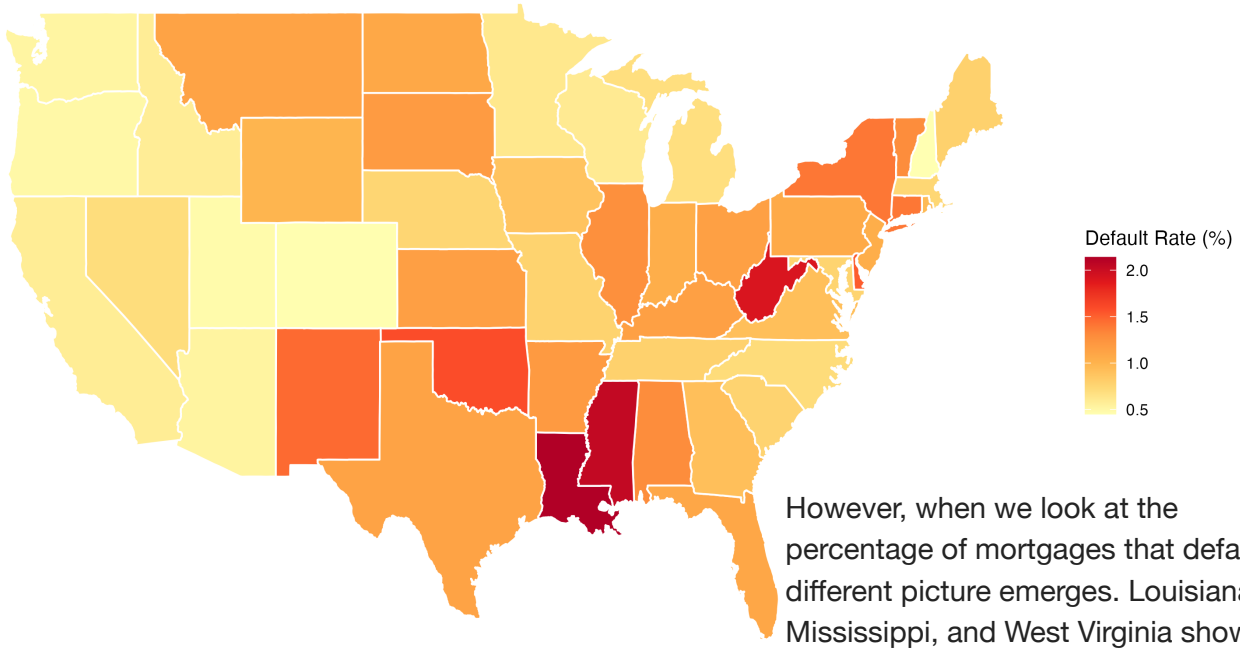
Our analysis revealed some interesting patterns across the United States:

Number of Defaulted Mortgages By State
Darker colors indicate more cases of mortgage defaults



States like California, Texas, and Florida see the highest number of defaults – but this makes sense since they have the largest populations and most active housing markets.

Mortgage Default Rate by State
Darker colors indicate higher mortgage default rates



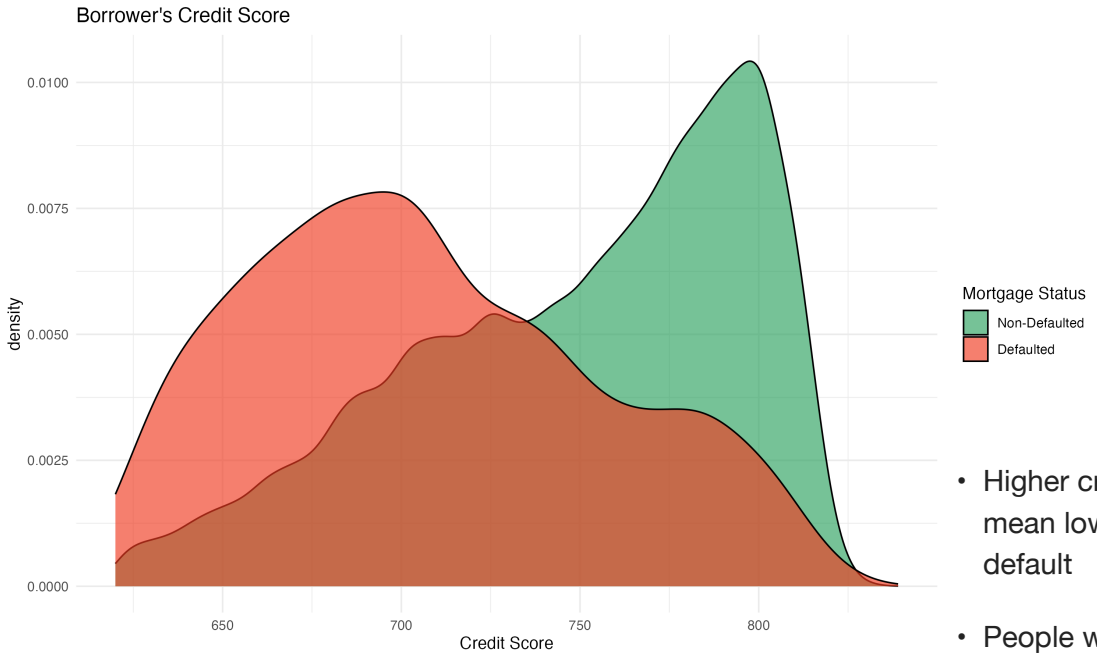
However, when we look at the percentage of mortgages that default, a different picture emerges. Louisiana, Mississippi, and West Virginia show the highest rates of default, likely due to economic challenges in these regions.

Two Key Numbers That Matter

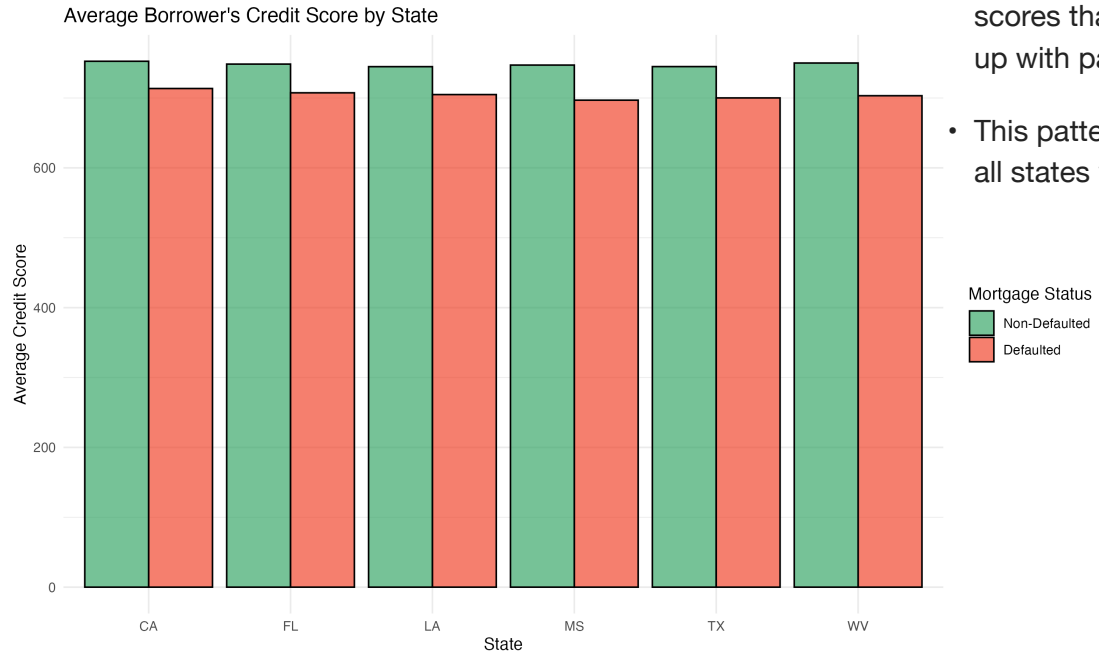
When deciding whether to approve a mortgage, lenders focus on two crucial numbers:

1. Your Credit Score

Think of your credit score as your financial report card. Our analysis shows it's one of the best predictors of whether someone will default on their mortgage. Here's why:

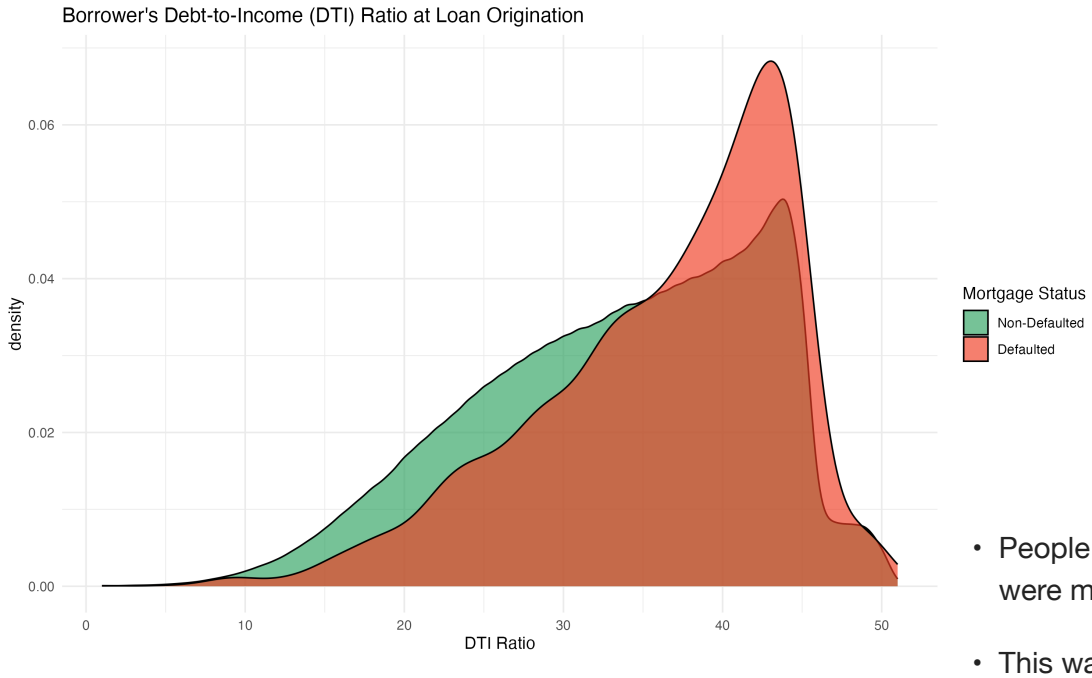


- Higher credit scores usually mean lower chances of default
- People who defaulted typically had lower credit scores than those who kept up with payments
- This pattern held true across all states we studied

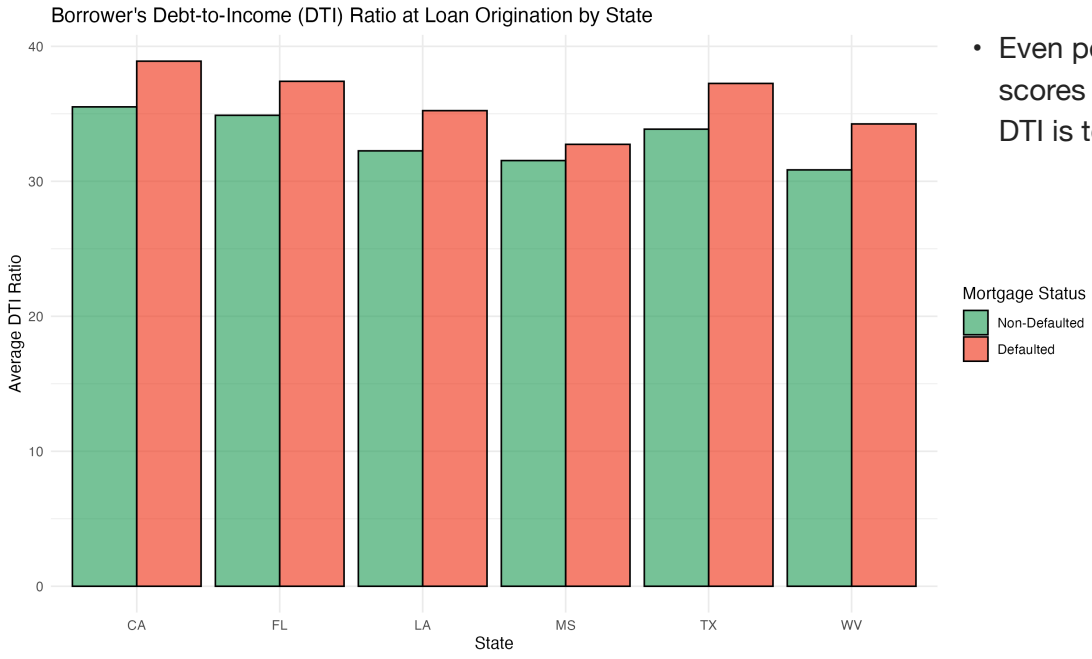


2. Your Debt-to-Income Ratio (DTI)

This number shows how much of your monthly income goes to paying debts. Our analysis found:



- People with higher DTI ratios were more likely to default
- This was especially true in states with higher default rates
- Even people with good credit scores might struggle if their DTI is too high



What the Numbers Tell Us

Using these two factors, we created a mathematical model to predict the likelihood of mortgage default.

$$\text{Probability (Default Mortgage)} = \frac{1}{1 + e^{-(11.345 + 0.0282854 \times \text{DTI} - 0.0169967 \times \text{Credit Score})}}$$

When Debt-to-Income ratio = 0 and Credit Score = 0, the log odds of loan default is 11.345. This is mainly theoretical as a credit score of 0 is not practical

Higher Debt-to-Income (DTI) increases default probability. For each 1 unit increase in DTI, the log odds of default increase by 0.0283. To get odds ratio: exp(0.0282854) = 1.029. This means for each 1 unit increase in DTI, the odds of default increase by 2.9%

Higher credit scores decrease default probability. For each 1 point increase in credit score, log odds of default decrease by 0.017. To get odds ratio: exp(-0.0169967) = 0.983. This means for each 1 point increase in credit score, the odds of default decrease by 1.7%

Confusion Matrix Table

	Actual	
Predicted	**Non-Defaulted**	**Defaulted**
Non-Defaulted	28619	119
Defaulted	13362	261

Our model's performance tells an interesting story about its predictive power. Out of all the mortgages we analyzed:

- The model correctly identified 28,619 mortgages that stayed current (didn't default).
- It correctly flagged 261 mortgages that actually did default
- However, it also made some mistakes: it falsely flagged 13,362 good mortgages as potential defaults, and missed 119 actual defaults

Let's break down what these numbers mean:
Overall Accuracy = (Correct non-defaults + Correct defaults) ÷ (Total number of cases) = (28,619 + 261) ÷ (28,619 + 13,362 + 119 + 261) = 68.18%
This means if you gave the model 100 mortgages to analyze, it would make the correct prediction for 68 of them.

The model also shows two other important measures:

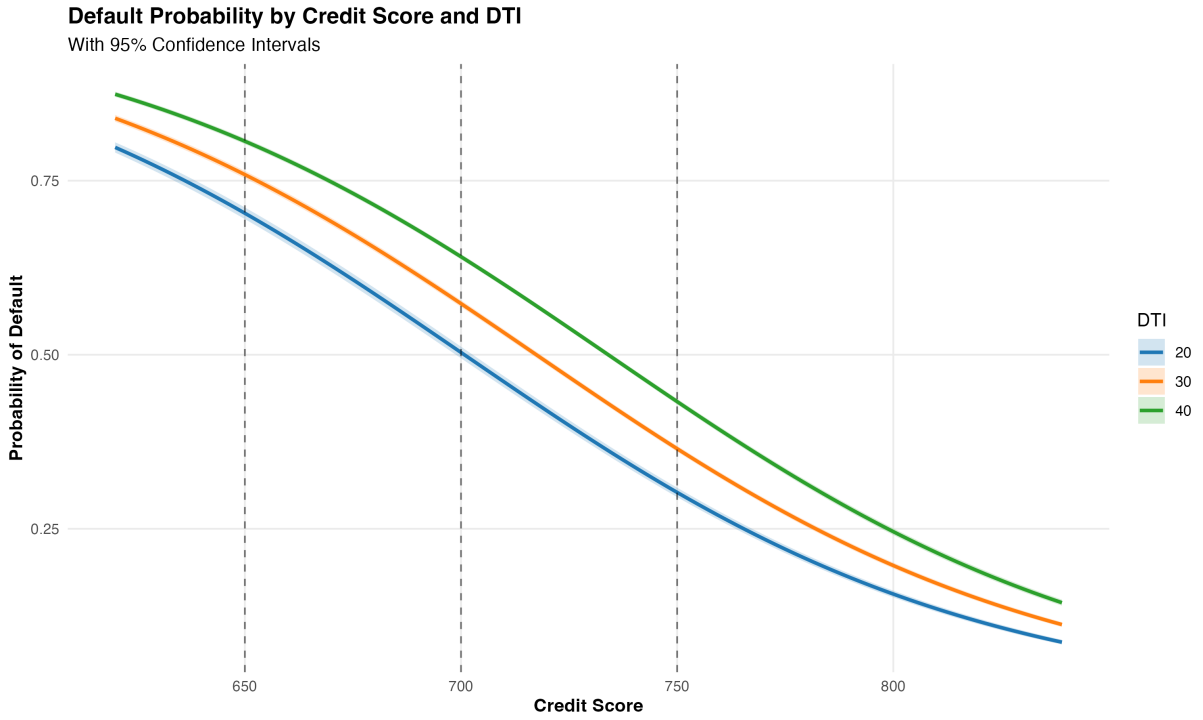
- Success at catching defaults (Sensitivity) = 261 ÷ (261 + 119) = 68.68%
- Success at identifying good loans (Specificity) = 28,619 ÷ (28,619 + 13,362) = 68.17%

In everyday terms, this means our model caught about 69% of actual defaults (like a safety net catching most, but not all, falling objects) and correctly identified 68% of healthy mortgages. While not perfect, these results show that credit scores and debt-to-income ratios can be useful warning signs of potential mortgage troubles.

Here's a real-world example. Let's say you're looking at a mortgage with:

- A credit score of 700 (which is considered good)
- A DTI of 30% (meaning 30% of monthly income goes to debt payments)

Our model suggests this combination carries about a 57% chance of default. This might seem high, but remember this is just a statistical prediction, not destiny. Many other factors influence whether someone actually defaults.



The Bottom Line

While no crystal ball can perfectly predict mortgage defaults, our analysis shows that credit scores and debt-to-income ratios are powerful indicators. For homebuyers, this means:

- Focus on improving your credit score before applying for a mortgage
- Keep your debt levels manageable relative to your income
- Consider these factors especially carefully if you're buying in a state with historically higher default rates

By understanding these patterns, both lenders and borrowers can make smarter decisions about mortgages, potentially helping more Americans achieve and maintain successful homeownership.

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This article was written with the assistance of Claude AI (Anthropic, 2024), using data analysis from Fannie Mae's mortgage dataset. The AI was used to help structure and clarify the content while maintaining accuracy of the underlying data analysis.