

Explaining the Effects of Credit Score on Mortgage Rates

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Abstract

In this research project, we are trying to reject the null hypothesis that credit score does not affect the interest rate on a mortgage loan. This is important because the majority of homeowners have financed their home using a mortgage loan, and the interest rate they receive depends on many different factors, including credit scores. If homeowners are aware that a higher credit score will effectively help them lower the interest rate they pay on their mortgage, they can work to improve it and save money. Our main findings indicate that there is a significant relationship between mortgage interest rates, combined loan to value, unpaid principal balance, original loan term, occupancy, property type, and whether they are a first-time home buyer. The data also suggests that credit score does indeed have a statistically significant effect on what kind of interest rate borrowers receive on their loans. A higher credit score will tend to lower the interest payment homeowners must pay on their mortgage.

Introduction

The topic of this research paper is whether or not there is evidence that the credit scores of borrowers affect the interest rate they receive on their mortgage loan. This paper uses data from FreddieMac, released “at the direction of its regulator, the Federal Housing Finance Agency, as part of an effort to increase transparency and help investors build more accurate credit performance models.” The null hypothesis is that a borrower's credit score has no effect on the interest rate given to them for a mortgage loan. The dependent variable was the original interest rate as indicated on the mortgage note for quarter four of 2021. The independent variables we chose were combined loan to value (cltv), unpaid principal balance (upb), original loan term (term), occupancy (occ), property type (propertytype), and first-time home buyer (firsttimehomebuyer).

Variable	Observations	Mean	Std. Dev.	Minimum	Maximum
Interest Rate	864,083	3.071103	0.4383533	1.5	5.5
Credit Score	863,474	745.4985	46.94305	568	850
Loan-to-Value	864,083	69.21033	18.09729	3	105
Unpaid Balance	864,083	289,293.90	151,048.30	1,400	1,582,000
Term	864,083	321.6948	71.497	85	367

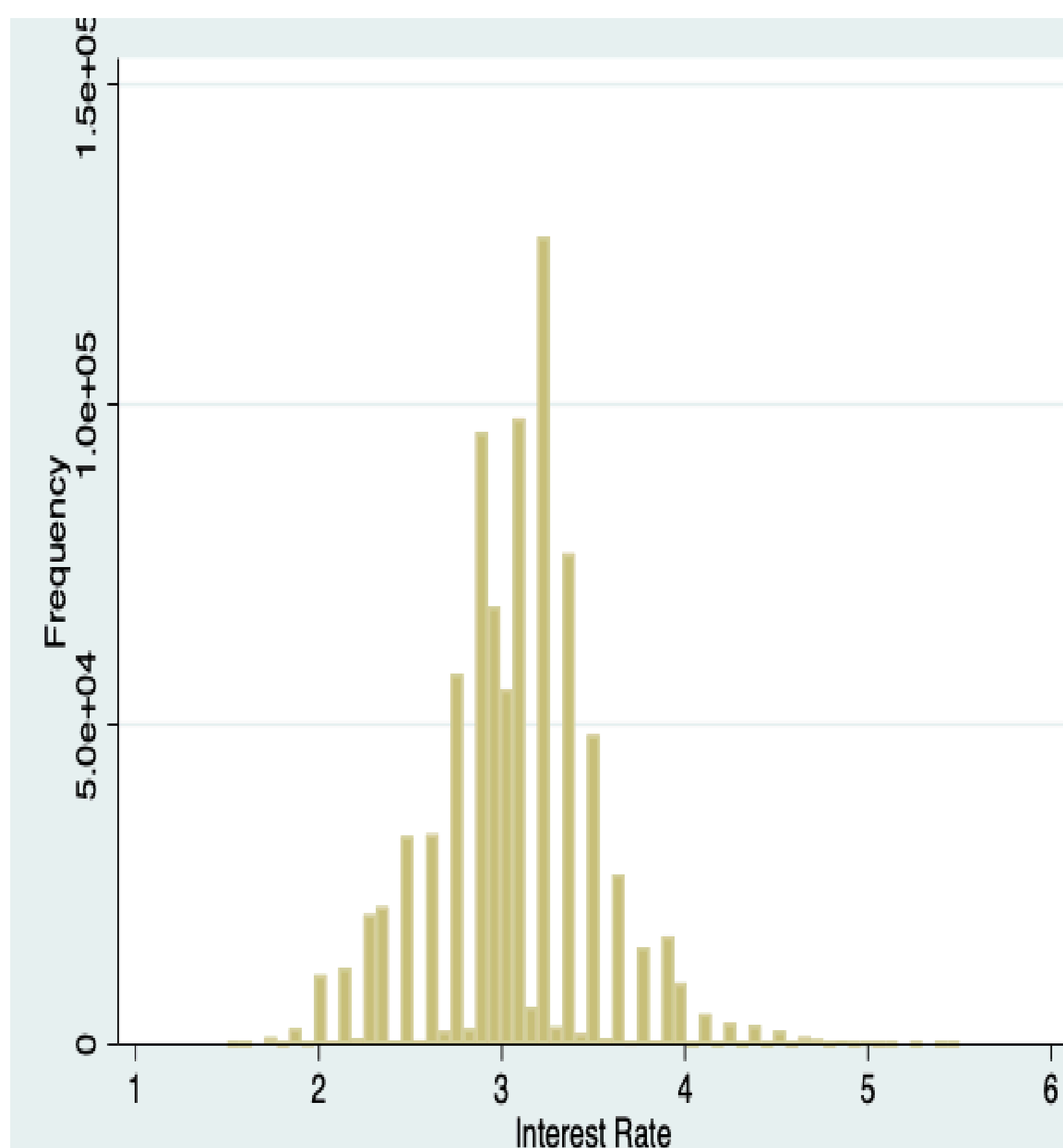
VARIABLES	(1) ir	(2) ir	(3) ir	(4) ir	(5) ir	(6) ir	(7) ir
cs	-0.00261*** (1.06e-05)	-0.00246*** (1.01e-05)	-0.00238*** (1.01e-05)	-0.00208*** (8.16e-06)	-0.00237*** (7.73e-06)	-0.00236*** (7.74e-06)	-0.00234*** (7.72e-06)
cltv		0.00705*** (2.33e-05)	0.00751*** (2.41e-05)	0.00232*** (1.97e-05)	0.00269*** (1.83e-05)	0.00267*** (1.82e-05)	0.00305*** (1.97e-05)
upb			-2.37e-07*** (2.98e-09)	-4.68e-07*** (2.52e-09)	-3.80e-07*** (2.21e-09)	-3.66e-07*** (2.21e-09)	-3.67e-07*** (2.21e-09)
term				0.00373*** (5.30e-06)	0.00358*** (4.90e-06)	0.00358*** (4.89e-06)	0.00359*** (4.90e-06)
2.occ					-0.529*** (0.00156)	-0.530*** (0.00156)	-0.522*** (0.00156)
3.occ					-0.476*** (0.00207)	-0.477*** (0.00206)	-0.479*** (0.00206)
60.propertytype						-0.0199*** (0.00604)	-0.00995* (0.00602)
61.propertytype						0.195*** (0.00442)	0.192*** (0.00443)
62.propertytype						-0.0225*** (0.00127)	-0.0274*** (0.00128)
63.propertytype						-0.00181 (0.00121)	-0.00659*** (0.00121)
2.firsttimehomebuyer							-0.0487*** (0.000889)
Constant	5.015*** (0.00798)	4.417*** (0.00774)	4.391*** (0.00773)	3.396*** (0.00644)	4.104*** (0.00635)	4.101*** (0.00651)	4.062*** (0.00651)
Observations	863,474	863,474	863,474	863,474	863,474	863,474	863,474
R-squared	0.078	0.163	0.169	0.477	0.568	0.570	0.571

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Regression Results

The regression results are shown in *table 3*. Regression (1) shows the coefficient is negative and significantly significant at the 1% level, which is consistent with the notion that credit score is associated with mortgage interest rates. The coefficient -0.00261 implies if a borrower's credit score at the time of negotiation increases by one point, then their mortgage interest rate is predicted to decrease by 0.00261%. To put this into a more reasonable scale, a 50-point increase in credit score, which is a very attainable increase, would lead to the prediction of a 0.13% decrease in the mortgage interest rate the borrower receives.

Regressions (2) through (7) reveal how the estimated relationship between *CS* and *IR* changes as more control variables are added to the model. Regression (7) contains the full set of controls used in this study. Approximately 57% of the total variation in *IR* is explained by this model. The estimated coefficient for *IR* shown in regression 7 is -0.00234. Thus, an individual's interest rate on their mortgage is predicted to decrease by around 0.12 percentage points if their credit score increases by 50 points after controlling for combined loan-to-value, unpaid balance, term, occupancy status, property type, and whether or not this is their first home.



Conclusion

In conclusion, our results reaffirmed our intuition that an increase in credit score corresponds to a decrease in mortgage interest rate. While I don't believe our findings and intuitions would be of much surprise to anyone, after running various tests on more than 850,000 observations, we trust that we can have confidence in our results. We believe our findings are important because of the rise in prices, leading to a rise in the need for credit. According to the consumer financial protection bureau, from 2020 to 2021, closed-end loans increased by 528,000, approximately 4% (2022). The results from our research could be a great resource for individuals desiring credit. Analyzing the effect of critical deciding factors for one's mortgage rate could in turn help them financially. We believe our model could be improved by adding other explanatory variables and analyzing the interaction between the variables as well.