Figures

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Abstract

This analysis uses origination-level mortgage data from corelogic_aws merged with performance data to investigate discontinuities in loan characteristics by credit score. The data, which is at the level of each individual loan, includes geographic characteristics such as zip code, state, credit score, LTV, interest, etc., and is from post-2010. Using R, Shell, Bash, HPC, and parallel programming, the analysis looks at Fannie Mae's Loan-Level Price adjustments for potential discrimination by credit score, focusing on jumps in default, mean balance, and other metrics between different score brackets, such as <620 and >= 620. The analysis includes preliminary EDA and RD regressions to explore these issues.

1 ORIG + EVENTS, Post 2010, All-Eligible Loans

1.1 LLPA by Credit Score

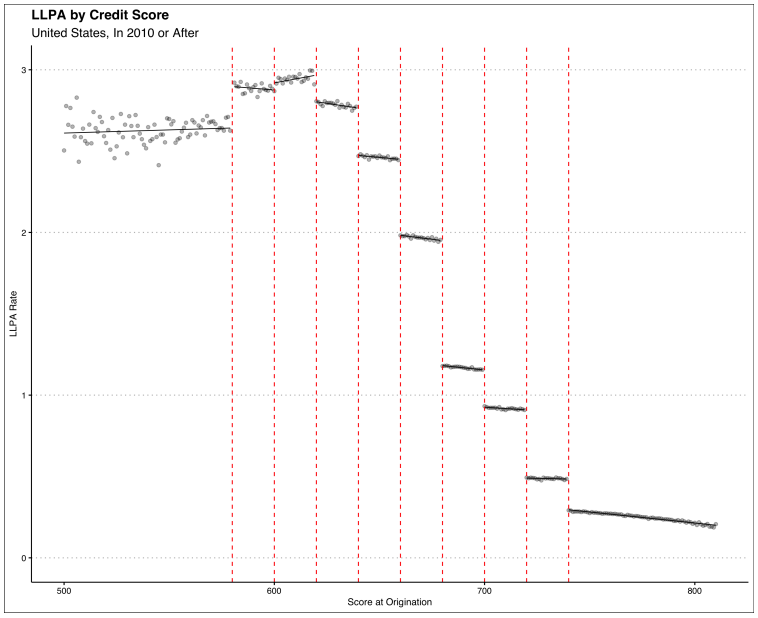

Figure 1: LLPA by Credit Score

Notes: A good “sanity check" here. It’s great to see that the merge worked, as we would have expected these clear discontinuities.

1.2 Original LTV by Credit Score

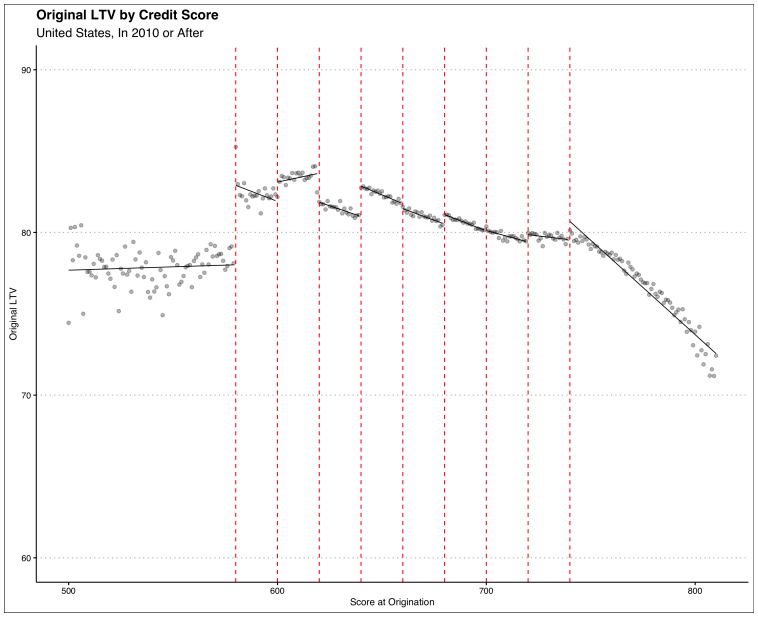

Figure 2: Original LTV by Credit Score

Notes:

1.3 Original Interest by Credit Score

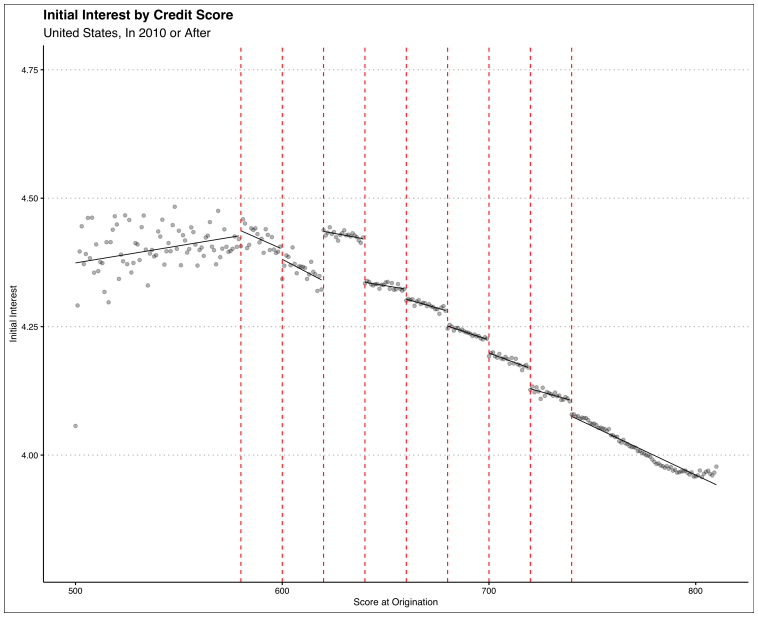

Figure 3: Original Interest by Credit Score

Notes:

1.4 90-Day Probability of Delinquency by Credit Score

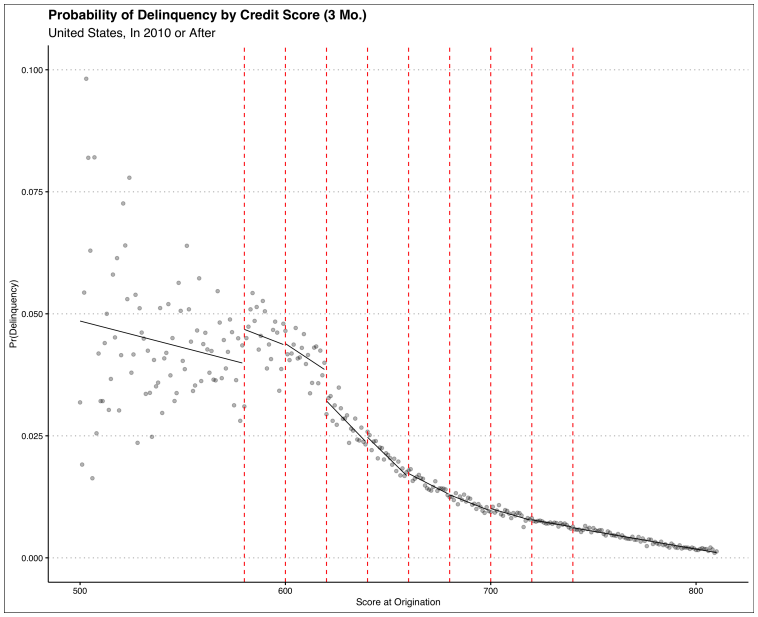

Figure 4: 90-Day Probability of Delinquency by Credit Score

Notes:

1.5 Median Balance by Credit Score

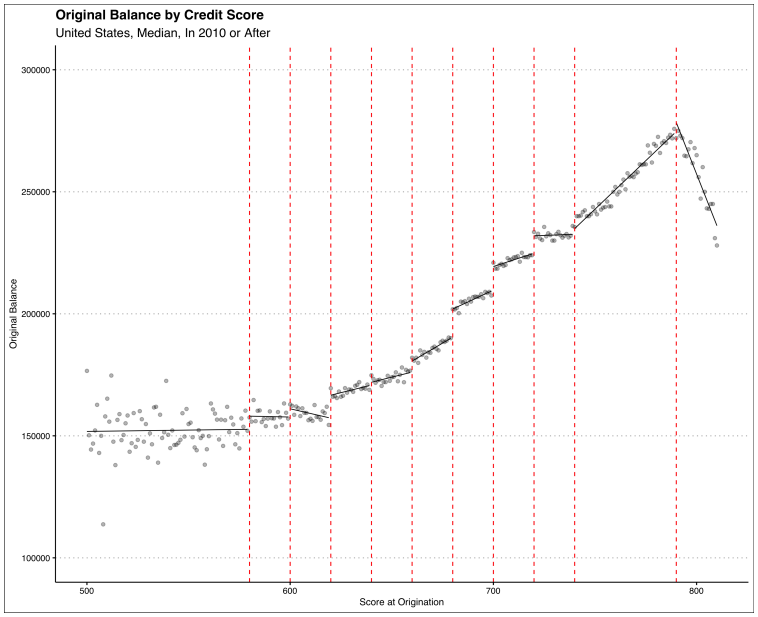

Figure 5: Median Balance by Credit Score

Notes:

1.6 Histogram

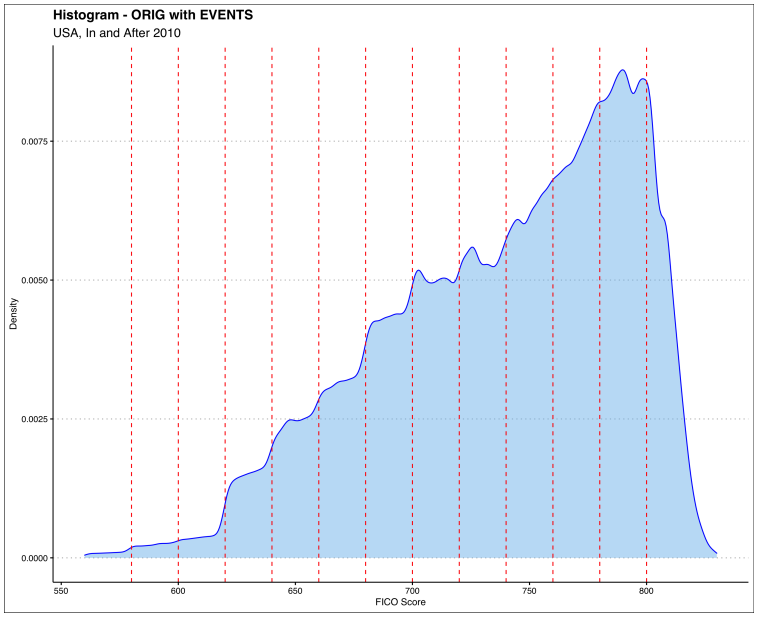

Figure 6: Number of Observations by Score

Notes:

2 R.D. Models

2.1 90-Day Delinquency on Credit

Table 1

	Dependent variable:
	90-Day Prob. of Delinquency
Above 620 cutoff	-0.006^{***}
	(0.001)
FICO Score Left	-0.0003^{**}
	(0.0001)
FICO Score Right	-0.0001
	(0.0001)
Constant	0.038^{***}
	(0.001)
Observations	374,841
R^2	0.001
Residual Std. Error	0.171 (df = 374837)
Note:	*p<0.1; **p<0.05; ***p<0.01

2.2 Log Balance on Credit

Table 2

	Dependent variable:
	Log Balance
Above 620 cutoff	0.044^{***}
	(0.005)
FICO Score Left	-0.001^{***}
	(0.0004)
FICO Score Right	0.003^{***}
	(0.0004)
Constant	11.967^{***}
	(0.004)
Observations	374,841
R^2	0.002
Residual Std. Error	0.542 (df = 374837)
Note:	*p<0.1; **p<0.05; ***p<0.01