

Can Internet Platforms Allocate Resources More Efficiently in Markets Characterized by Rationing?

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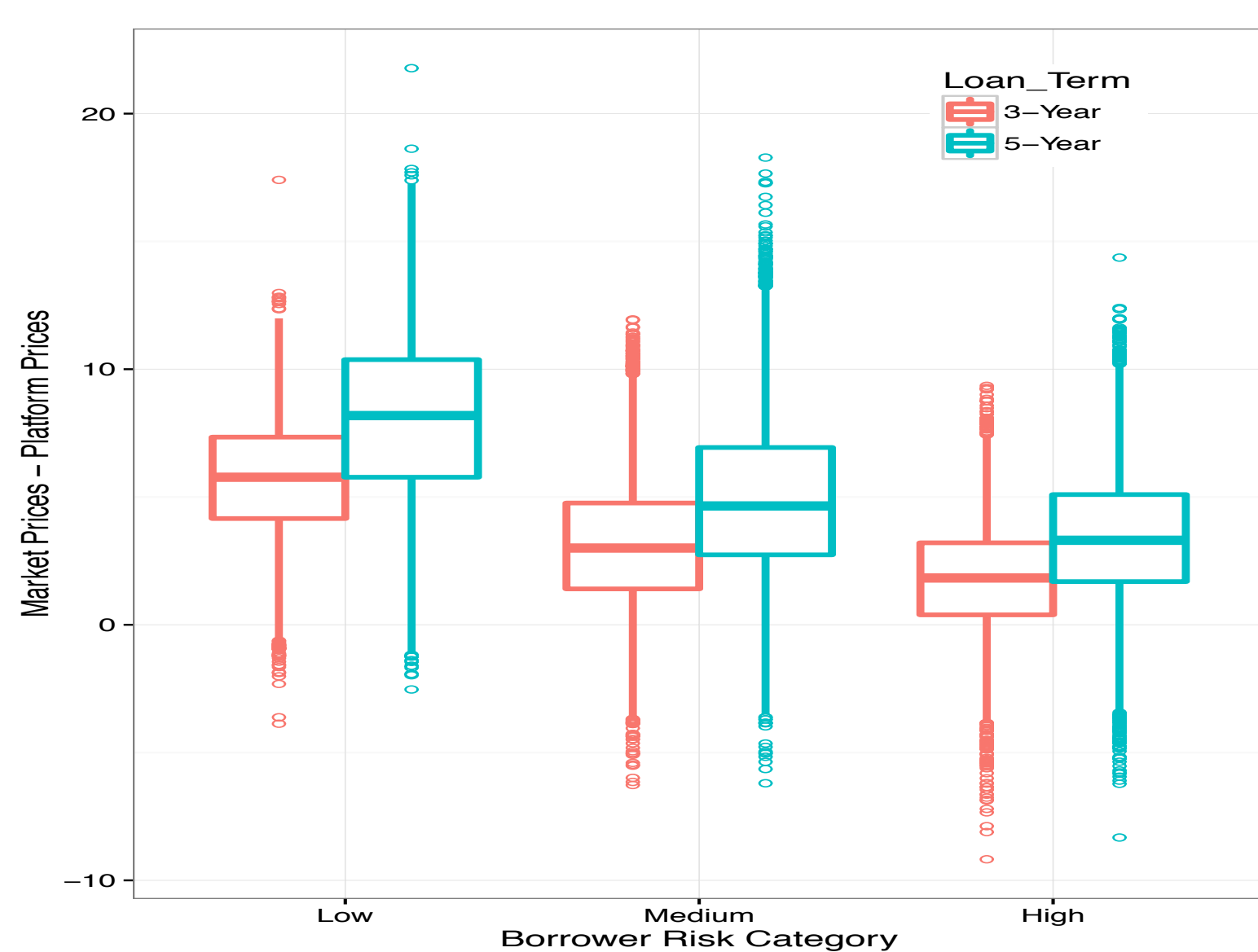
Abstract

In many internet marketplaces, which facilitate the transactions between buyers and sellers, the equilibrium price or allocation vectors are often controlled by the platform owner. In this paper I show evidence of how controlling just the price vector can result in better outcomes for consumers in a market that is conventionally rationed. The platform in question is a Peer to Peer (P2P) internet credit market where the price vector is determined by the platform owner. I first show evidence that the platform assigned prices are lower, on average across borrower credit types, than the prices that would be determined through an auction among the lenders. Then I build a structural econometric model of loan demand and repayment, and estimate it using granular data on the choices made by different borrowers. From this I recover policy invariant parameters which I subsequently use to conduct a counterfactual experiment in which the borrowers are offered prices which are determined through an auction among the lenders. I find that under the auction pricing mechanism, when prices are higher, borrowers choose loans of shorter maturity and smaller sizes.

Price Vectors Under Different Mechanisms

The data for this paper comes from Prosper.com which is the second largest, by loan volume, peer-to-peer internet credit market in the US. Currently, the interest rates for all loans are assigned by Prosper (the posted-price regime) however, before Dec. 20, 2010, all loan interest rates were determined through an auction among lenders. Iyer, et. al (2015) show the interest rates determined through that auction were better predictors of default and reflected the borrower creditworthiness better than the finest credit scores. Given this ability of market to price loans efficiently, I predicted the auction-determined interest for each borrower in my sample under the new posted-price regime. For this I used rich data on credit variables from the credit bureau to match borrowers under the two pricing mechanism. Given the inefficiency of standard matching metrics to match in high dimensions, I turned this matching problem into a prediction problem and used machine learning to predict the interest rate in the auction mechanism.

Fig. 1: Market Prices minus Platform Prices



A Model Loan Demand and Repayment

1. Maturity Contract choice: a borrower j who picks k -year contract gets indirect utility given by

$$U_{jk}^* = \alpha_{LK} L_j^* + W_{jk}' \alpha_{XK} + X_{1j}' \alpha_X + \varepsilon_{Ujk}$$

2. Loan size choice: Conditional on the contract choice, the loan size choice of borrower j is given by

$$L_j^* = \beta_U I(U_{j5}^* > U_{j3}^*) + W_j' \beta_W + X_{2j}' \beta_X + \varepsilon_{Lj}$$

3. Repayment choice: Conditional on contract and loan size choices, the fraction of loan amount repaid by borrower j is given by

$$S_j^* = \gamma_U I(U_{j5}^* > U_{j3}^*) + \gamma_L L_j^* + W_j' \gamma_W + X_{3j}' \gamma_X + \varepsilon_{Sj}$$

W_{jk} : interest rate and loan origination fee on k -year loan contract for borrower j , L_j^* : Loan size chosen by borrower j , S_j^* : Fraction of loan repaid, X_{1j} , X_{2j} , X_{3j} : borrower specific variables for equations 1, 2, and 3, respectively.

Estimation Results

Dep. Variable	Contract Maturity		
	Marginal Effect	Average Effect	Average Effect
Interest Rate Diff.	-0.0165 (0.0042)		
Interest Rate		-0.0220 (0.0015)	0.0152 (0.0013)
Contract Maturity		0.2914 (0.0095)	-0.2621 (0.0041)
Log(Loan Amount)	0.2691 (0.0092)		-0.0398 (0.0077)
N	30,000		
Controls	Credit Scores, Seasonal Fixed Effects, Demographic vars.		

The estimates of the demand model show that as loan interest rates increase on longer maturity contracts relative to the shorter maturity contracts, the likelihood that borrowers will choose longer maturity contracts decreases and the borrowers will choose smaller loans. If borrower choose to take larger loans, it increases the likelihood that they will pick the longer maturity contract. Finally, if borrowers had chosen loan contracts with larger amounts or longer maturities, it increases their likelihood of default.

Counterfactual Experiment

Fig. 2: Maturity Contract Choice

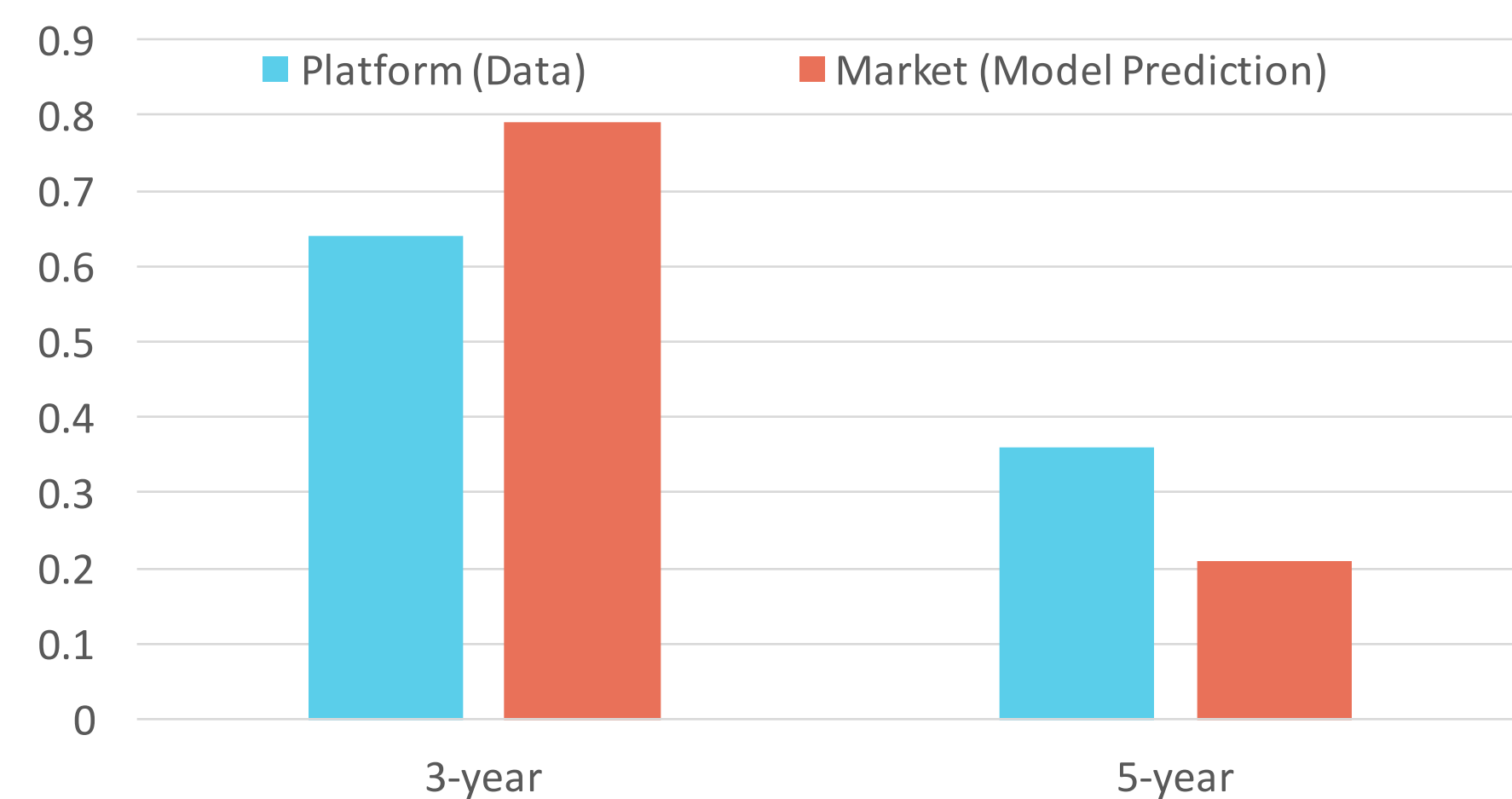
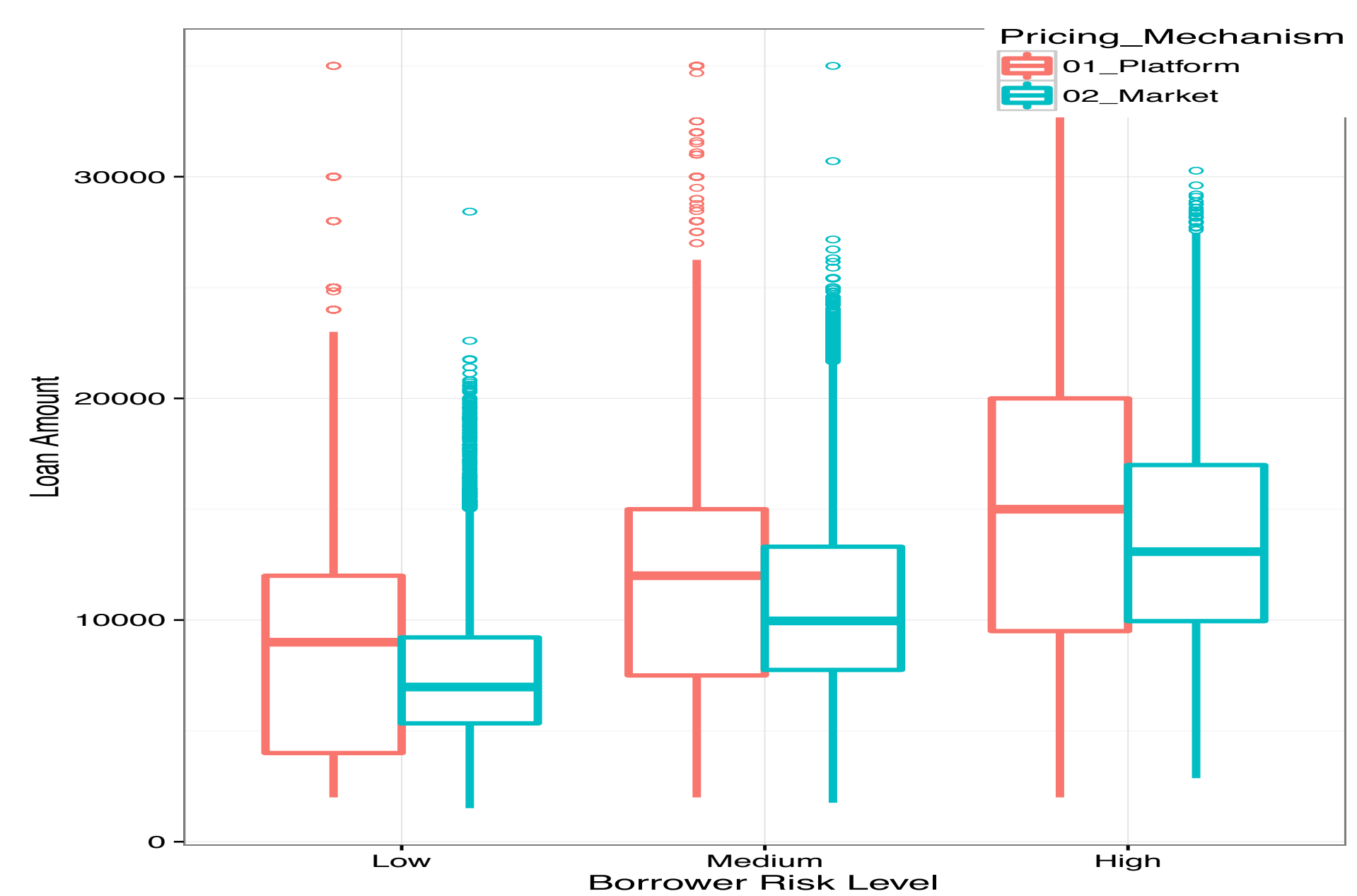


Fig. 3: Loan Amount Choice



Conclusions

The results of the counterfactual experiment present an interesting insight into how a P2P internet credit platform can improve the allocation of credit which is usually rationed when lenders get to pick the prices. However, the paper does not answer the question of why the lenders finance the borrowers at interest rates which are lower than the ones they would set themselves.