Managing Market Mechanism Transitions: A Randomized Trial of Decentralized Pricing Versus Platform Control

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We report on a randomized trial conducted during a market design transition on a sharing economy platform, where providers who formerly set rental prices for their assets were randomly assigned to groups with varying levels of pricing control. Even when faced with the prospect of significantly higher revenues, providers retaliate against the centralization of pricing by exiting the platform, reducing asset availability and cancelling transactions. Allowing providers to retain partial control lowers retaliation substantially even though providers do not frequently utilize this additional flexibility. We discuss information asymmetry, divergent incentives, and psychological contract violation as alternative explanations for our results.

CCS Concepts: • **Applied computing → Electronic commerce**; • **Information systems**;

Additional Key Words and Phrases: market design, online markets, sharing economy, peer-to-peer markets

ACM Reference Format:
Apostolos Filippas, Srikanth Jagabathula, and Arun Sundararajan. 2019. Managing Market Mechanism Transitions: A Randomized Trial of Decentralized Pricing Versus Platform Control. In *ACM EC '19: ACM Conference on Economics and Computation (EC '19), June 24–28, 2019, Phoenix, AZ, USA.* ACM, New York, NY, USA, 2 pages. https://doi.org/10.1145/3328526.3329654

EXTENDED ABSTRACT

Many sharing economy platforms and other online peer-to-peer markets rely on decentralized and heterogeneous crowds of providers—individuals and small businesses who vary in size, expertise and objectives—for their supply of capital and labor, reducing a platform's need to make large asset investments, and facilitating scaling with greater ease. However, absent the typical directive authority and culture-building capabilities that traditional firms use to manage their employees, platforms must constantly fine-tune *market design* in order to maintain some uniformity across offers and deliver a branded service experience that is of consistently high quality.

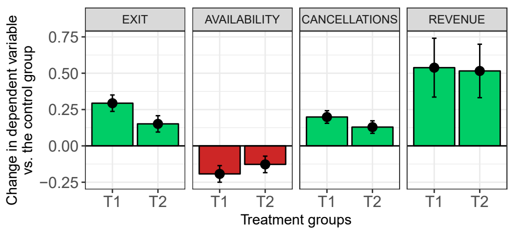
The mechanisms that comprise a platform's market design include how prices are set, how reputation systems work, and how market participants search and match. Of course, which mechanism is best—or even possible—can change over time. For example, an effective centralized pricing mechanism, hard to implement in a nascent market, can lead to large efficiency and revenue gains as a platform grows, accumulates transaction data, and conducts experiments. However, transition is challenging: the motivation for and consequences of a new mechanism can result in unanticipated market outcomes, may be misunderstood by market participants, and might even induce adverse participant reactions that may negate the anticipated efficiency or revenue gains.

Our study is situated in one such market mechanism transition undertaken by a peer-to-peer car rental platform we partnered with. Prior to the summer of 2017, the platform delegated all pricing

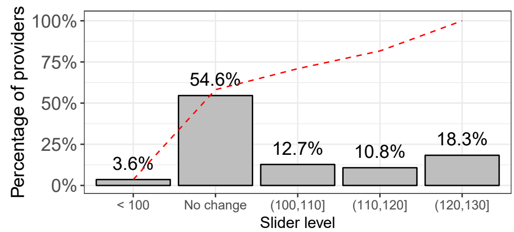
EC '19, June 24–28, 2019, Phoenix, AZ, USA

ACM ISBN 978-1-4503-6792-9/19/06.
https://doi.org/10.1145/3328526.3329654

Fig. 1. Provider responses/revenue for T1 and T2



Usage of pricing flexibility feature by T2.



and rental availability decisions to owners (providers) who listed vehicles for rent. Over a 2-month period in the summer of 2017, a randomized trial involving the platform's San Francisco Bay Area providers was conducted. Providers retained control over rental availability, but the level of control over pricing varied, with each provider assigned to one of three groups.

- For the first treatment group **(T1)**, the platform assumed complete control over pricing, using an internally developed algorithm aimed at increasing revenue.

- For the second treatment group **(T2)**, the platform assumed partial control over pricing. While prices and inter-temporal price variation were implemented centrally by the platform using the same algorithm, an owner could raise or lower the overall price level by up to 30 percent.

- Providers in the control group **(C)** maintained complete control over pricing.

Our primary experimental finding is that providers in the treatment cell T1 retaliated against the pricing mechanism change via three channels: (i) by exiting the market, (ii) by reducing asset availability, and (iii) by cancelling transactions. Providers in treatment cell T2—who retained partial pricing control—also retaliated, but the magnitude of their responses was significantly lower across all three channels. Notably, providers in both treatment groups T1 and T2 enjoyed about a 50% weekly revenue *increase* relative to the control group during the experimental window.

We explore two explanations for these findings. First, these realized revenue gains were driven by substantial volume increases in the face of lower prices: treated providers logged *double* the number of rental hours, leading to significantly lower revenue per mile and slightly lower revenue per transaction. We posit that centralized revenue optimization may not account for a range of bring-to-market costs [1] that providers are better informed about. We document some evidence that these bring-to-market costs were lower for providers in group T2.

Second, a *majority* of providers in group T2 did not alter their pricing levels during the experimental period, and the mere existence of provider control seemed sufficient to lower retaliation rates. An explanation could be that the centralization of pricing was perceived by providers as a violation of their *implicit psychological contract* [2] with the platform, which is mitigated in part by the granting of partial control.

Our field experiment provides new insight into the complex dynamics of market design transitions, and suggests guidelines for the effective management of such changes. The full paper can be accessed online at **http://ssrn.com/abstract=3382614**.

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