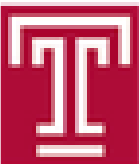


Robo-Selling, Big Data and Antitrust's Error-Cost Framework



Error-cost

Private: NOT optimal Social: Efficient	Private: optimal Social: Efficient
Private: NOT optimal Social: Inefficient	Private: optimal Social: Inefficient

Error-cost

Private: optimal

Social: Efficient

Private: optimal

Social: Inefficient

Error-cost

Private: optimal

Social: Efficient



Private: optimal

Social: Inefficient

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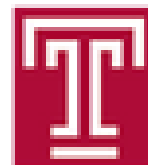
Article

Antitrust and the Robo-Seller: Competition in the Time of Algorithms

Salil K. Mehra[†]

INTRODUCTION

Disruptive innovation can turn users into newly-minted economists. Consider the controversial practice of “surge pricing” enabled by the ride-sharing service Uber.¹ Confronted on occasions such as New Year’s Eve by prices six to seven times as much as normal, users tend to ask for an explanation. On the one hand, surge pricing resembles basic market economics—many people want a ride, market demand pushes the price up, and those higher prices attract more drivers until the price falls to a new level.² But as Uber’s own marketing recognizes, this is a market whose price signals act within a proprietary



Robo-selling

Product of:

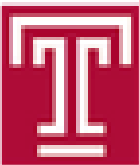
- Interconnectivity (smartphones, IoT)
 - Mass Data Collection (“Big Data”)
 - Algorithmic Processing (mass crunching → true AI/machine learning, e.g., the transition from “sound wave” matching to computers capable of natural language processing)
- competitive intelligence/automated pricing**

Robo-selling

- Mass data collection, algorithmic processing, automated price setting
- Allows better price coordination and “learning” about market conditions
- Can make explicit price fixing or tacit collusion more stable because: less mistake, quicker detection (Cournot), less “human factor”
- Cost reductions / increased allocative efficiency

US v. Topkins

- Agreement to use software algorithm to fix prices . . .
- on Amazon Marketplace . . .
- for wall décor (movie posters) (discontinuous sales, heterogeneous products, not ideal situation for price fixing)



Meyer v. Kalanick [Uber] (SDNY 2016)

- Hub and spoke allegation
- Horizontal allegation
- Ancillary procompetitive benefit
- Consumer welfare gain vs. before (taxi)
- But less restrictive alternative/”directly related and reasonably necessary” to the effect (§ 45)



Uber study (Cohen et al.)

Use of massive data set:

- Specific: Uber helps consumers
- Systemic: mass data analysis can make enforcement more accurate?

Error-cost

Private: NOT optimal Social: Efficient	Private: optimal Social: Efficient
Private: NOT optimal Social: Inefficient	Private: optimal Social: Inefficient

Error-cost

Private: optimal

Social: Efficient



Private: optimal

Social: Inefficient

Error-cost

Private: optimal

Social: Efficient

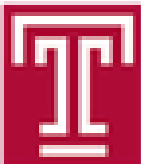
Private: optimal

Social: Inefficient

Proposal

- Competition enforcement should not stay static, should use data to fine-tune
- Proactive “competition by design”
- Regulator/industry discussion of standards for robo-selling technologies
- “rules of the road” rather than aggressive post-hoc enforcement

THANKS! I look forward to questions, comments.



Thanks!

<smehra@temple.edu>

Error-cost

Private: NOT optimal Social: Efficient	Private: optimal Social: Efficient
Private: NOT optimal Social: Inefficient	Private: optimal Social: Inefficient

Error-cost

Private: optimal

Social: Efficient



Private: optimal

Social: Inefficient

Error-cost

Private: optimal

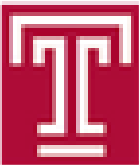
Social: Efficient

Private: optimal

Social: Inefficient

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(save for these parentheses)



I was told there would be no math (p.1344)

Working through the model, suppose q_1 denotes the quantity firm 1 chooses and q_2 denotes firm 2's choice, and that the demand for the product is given by an inverse relationship between quantity and price (as is normal) given by the function $p = 1 - q_1 - q_2$. To simplify, assume the cost of production to be zero. As a result, firm 1's payoff is its revenue (the price times the quantity chosen) minus cost, or

$$(1 - q_1 - q_2)q_1$$

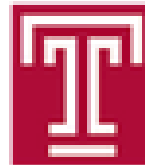
and firm 2's payoff will be

$$(1 - q_1 - q_2)q_2.$$

Since firm 1's payoff function is a parabola with the open part facing down, its optimal strategy can be found by taking the partial derivative of its payoff function with respect to q_1 and setting it equal to zero (thereby finding a maximum point), yielding

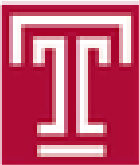
$$1 - 2q_1 - q_2 = 0.$$

Solving for q_1 , we get $q_1 = 0.5 - q_2/2$, and since firm 2's payoff function is identical, firm 2's best response is $q_2 = 0.5 - q_1/2$. As a result of this symmetry, $q_1 = q_2$, which yields the result that each firm will produce the Nash equilibrium quantity of $1/3$,²⁶ which implies positive profits of $1/9$.²⁷ As has been ob-



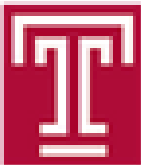
Basic intuition

- Cournot demonstrated that even in the absence of tacit collusion or explicit agreement, as # firms ↓, firms price above the competitive level *independently*
- Basically, a good reason to worry about oligopoly

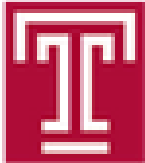


Robo-selling and oligopoly

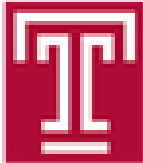
- Tacit collusion and explicit price-fixing styled as Prisoner's Dilemma



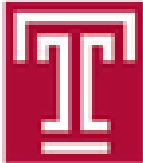
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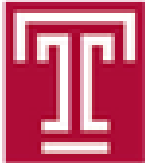
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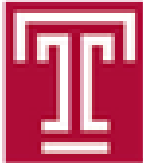
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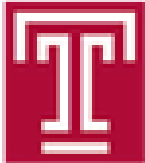
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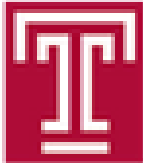
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