Algorithmic Price Discrimination

Oren Bar-Gill
Harvard Law School
Price discrimination can be very profitable for sellers.

To price discriminate, sellers need to know the WTP of different buyers.

In the past, sellers could only discriminate between (often large) groups of buyers, e.g., businesses vs. consumers.
Introduction

- Algorithmic analysis of Big Data provides WTP information at the individual level.
- This opens the door to a qualitative jump in the incidence and intensity of price discrimination.
  - Limits on price discrimination
    - Arbitrage
    - Fairness concerns
Introduction

- Examples of Algorithmic Price Discrimination
  - Price discrimination based on credit reports and credit scores. [Julie Brill]
  - TSYS and FICO recently teamed up to create a new data analytics tool, helping credit card issuers “put the data into action…”
Introduction

Examples of Algorithmic Price Discrimination

- Interview with senior managers at TSYS and FICO (PYMNTS.com, Dec. 30, 2014)
  - “we are touching about 5 petabytes of data at any one point in time.”
  - Objective: “to take transactional data to combine it with other data, and then put it against [issuers’] strategy from a business perspective and execute against it.”
  - “One of the areas that we are addressing at the moment is how we can shift weekly and daily batch feeds of data into real transactional, real-time campaign effectiveness.”
Introduction

- Examples of Algorithmic Price Discrimination
  - TSYS-FICO Interview (cont.)
    - “We are seeing instances where if we add weather data or traffic pattern data into the mix, we start to see a different potential engagement model with the end consumer based on their spending habits. You can then develop a different campaign at any particular point in time. That’s going to get a different engagement effect with a particular consumer based on what frame of mind they’re in at that point in time.”
Introduction

Examples of Algorithmic Price Discrimination

- Airlines!
- Home Depot [Hannak et al; mentioned by Christian]
- Amazon’s dynamic pricing
- Gambling Industry [Natasha Schull] – uses algorithms in "dynamically responsive" ways:
  - "We'll be able to learn an individual customer's tolerance for loss and understand their sweet spots – each of us has a different spectrum and this technology will let us deliver bonuses at exactly the right moment."
Introduction

- Normative questions:
  - Is this new level of price discrimination good or bad for consumers?
  - Does it increase or decrease social welfare?

- Depends on the different components of consumers’ WTP:
  - Preferences
  - Misperceptions
No Misperception
No Price Discrimination
No Misperception
With Price Discrimination

Supply
Demand

Price

Quantity
Overestimation
No Price Discrimination
Overestimation
With Price Discrimination

Supply

Demand

Price

Quantity
Underestimation
No Price Discrimination
Underestimation
With Price Discrimination
TBA

- Non-uniform misperceptions
- Price misperception
  (in addition to benefit misperception)
(Tentative) Conclusions

- **WTP = Only Preferences**
  - Price discrimination hurts consumers
  - But increases social welfare

- **WTP = Preferences + Overestimation**
  - Price discrimination hurts consumers
  - And may or may not increase social welfare
(Tentative) Conclusions

- WTP = Preferences + Underestimation
  - Price discrimination may or may not hurt consumers
  - And definitely increases social welfare