The Economics of Internet Markets

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Introduction

- Remarkable growth of internet platforms
  - Amazon founded in 1995 - $25 billion in annual sales.
  - Taobao founded in 2003 - 200 million active users.
  - Facebook founded in 2004 - 500 million active users.
  - Google founded in 1998 - over a billion searches a day.

- This talk: What is economically distinctive about these markets? What have we learned? What is missing?

- Organize talk, and recent research, into three parts
  - Platform competition, Marketplace design, Market behavior.
What is distinctive about internet markets?

- Changes in *technology* reduce costs of market operation
  - Costs of communication and search, changing displays, measuring behavior, aggregating and processing data, etc.

- Technological changes enable distinctive *economic* features
  - Scalability
  - Customization
  - Innovation
Platform Competition

- Approach in IO: think of platforms as intermediaries that bring users together to enable economic or social exchange.
- Process is characterized by network effects
- Not specific to internet, but useful for general insights.
  - How can platforms attract users and extract revenue?
  - What is the nature of competition and market structure?
Platform Strategy and Market Structure

- Platforms set user prices; users decide whether to participate.
  - Strategy: Optimal pricing relies on *cross-subsidization*.
  - Competition: potential for concentration or *market tipping*.

- Common concern is lock-in and dynamic inefficiency
  - Users become coordinated on a platform, preventing entry.
  - Examples: payment cards, operating systems.

- Should we have the same concern in internet industries?
  - Maybe ... although switching and *multi-homing* costs can be low, enabling entry - ex. of Twitter & Facebook.
Market Design

▶ How to create efficient, innovative marketplaces?
  ▶ Efficiently match users with opportunities
  ▶ Facilitate competition and safe exchange
  ▶ Promote innovation built on underlying platform

▶ Technology creates new challenges (scale, heterogeneity) but also allows for new mechanisms (real-time, data intensive).

▶ Describe some novel solutions to the above problems.
Sponsored Search

- Google gets over a billion search queries a day: the problem it faces is how to match results with user requests.
  - Ranking algorithm used to allocate “organic” positions
  - Auction used to allocate positions to sponsored results.

- Positions are valuable to advertisers because queries can reveal particular need at particular time.

- Market-based approach to matching users and opportunities that operates in real-time at enormous scale.
Sponsored Search: An assignment approach

Model of Edelman, Ostrovsky, Schwarz (2007); Varian (2007)

- $M$ positions that will receive $x_1 > \ldots > x_M$ clicks
- $N$ advertisers with “per-click” values $v_1 \geq \ldots \geq v_N$
- Advertiser $n$’s payoff from position $m$ is $v_n x_m - t$

Theorem - appealing properties of the model.

- Efficient assignment is assortative (advertiser $k$ in position $k$)
- Efficient assignment can be supported with CE prices
- CE prices must be increasing, on a per-click basis.
Sponsored Search: Designing a market

- Google’s "generalized second price" auction
  - Bidders offer a maximum payment per click
  - Positions assigned in order of bids
  - Bidders pay minimum necessary to sustain position

- Design features a series of incremental innovations
  - Bids are per-click, not per-position ⇒ simplification
  - Bidders pay next highest bid, not own bid ⇒ stability
  - Bids are weighted by quality scores ⇒ relevance

**Theorem** - appealing properties of GSP.

- Pure NE exist, although bidders have no dominant strategy.
- (Refined) NE are “equivalent” to the competitive equilibria.
Reputation Mechanisms

- Problem in internet markets: What am I buying? Can I trust the person with whom I’m trading?
  - Jin-Kato (2007) baseball card experiment: much greater misrepresentation online where cards can’t be examined.

- Online reputation and evaluation mechanisms
  - Elicit and aggregate user feedback
  - Transmit the information to subsequent users
Reputation: an eBay Case Study

- Mechanics of eBay’s reputation system
  - After a transaction, buyer and seller can submit feedback - pos, neg, neutral - and short text (“AAA+++ seller”).
  - About 70% of traders give feedback, so millions of feedbacks each day. *But ... almost 99% of feedbacks are positive.*

- Bolton, Greiner and Ockenfels (2008) re-design
  - Problem: fear of retaliation limits negative feedback
  - Solution: kill sequential feedback; add detailed ratings
  - In “trust game” experiments, efficiency gains of 15-25%
  - In the field, detailed scores lower and more spread out.
Internet markets provide an opportunity to study competition and consumer behavior in structured, data-rich environments.

Many interesting questions involve the effect of technology:
- reductions in search and display costs
- new flexibility in pricing and targeting products, etc.

One lesson is that the *equilibrium market response* to changes are not necessarily the same as “first-pass” effects.
Hypothesis: reduction in search costs should intensify competition and reduce price dispersion, at least in homogenous goods markets.

Evidence (fairly rich) suggests a subtler story

- Early studies found lower prices, although still dispersion.
- Ellison & Ellison (2009): on price search engines, sellers compensate for increased competition with “obfuscation” strategies - add-ons, up-sells, or bait-and-switch tactics.
Auctions and Posted Prices

- Hypothesis: reduced costs of assembling buyers would shift markets from posted prices to auctions.
- Einav-Levin et al.: here’s eBay

Internet reduces cost of running auctions, but as markets become thicker, less need for price discovery.
What’s missing?: Empirical strategies

- Enormous amount of data ⇒ shift in mindset.
  - A lot of research on markets (empirical IO) over the last 25 years has focused on developing econometric methods designed to substitute or compensate for lack of data.
  - In internet markets, ability for micro-level and experimental measurement is vastly improved, but now there can be “too much” data - requires new thinking and approaches.
What’s missing?: Experiments and Innovation

- Central feature of the internet - rapid innovation/adaptation.

- Experimentation and incremental innovation
  - Platforms regularly engage in experiments to try out market design changes - Google ran 6,000 just last year.
  - Market participants do the same - seller experiments on eBay (Einav, Kuchler and Levin, 2010)

- Important consequences for innovation, platform competition, market design - and for economics research!
The End