

# **The Economics of E-commerce and Technology**

Platform Markets

# Platform markets

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- ▶ A platform brings together groups of users.
- ▶ Examples:
  - ▶ Real world: Credit cards, HMOs, Shopping malls
  - ▶ Technology: operating systems, video games, DVDs
  - ▶ Online: Web search, Amazon marketplace, iTunes.
- ▶ Same-side network effects
  - ▶ Negative: An Xbox developer prefers less competition.
  - ▶ Positive: An Xbox user prefers more users.
- ▶ Cross-side network effects
  - ▶ An Xbox user prefers more developers.

# Platform markets

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- ▶ **Platforms differ from traditional retailers**
  - ▶ Pays for goods up-front, eliminating coordination problem.
- ▶ **Three-sided network**
  - ▶ YouTube: consumers, advertisers, content providers.
- ▶ **Platforms may be**
  - ▶ Closed (iOS)
  - ▶ Licensed (Windows mobile)
  - ▶ Open (e.g. Android)
- ▶ **In these slides...**
  - ▶ Mainly think about single platform
  - ▶ Assume platform has bargaining power

# Monopoly Pricing

# Pricing

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- ▶ There are 2 groups of agents,  $k=1,2$
- ▶ Let  $n_k$  be population size,  $n_k^e$  be expected population size
  - ▶ Demand curve for group  $k$  is  $p_k(n_k; n_1^e, n_2^e)$ .
  - ▶ Fulfilled expectations demand is  $p_k(n_k; n_1, n_2)$ , where  $n_k = n_k^e$ .
  - ▶ Cost  $c(n_1, n_2)$
- ▶ Firm chooses  $(n_1, n_2)$  to maximize profits,

$$\pi = n_1 p_1(n_1; n_1, n_2) + n_2 p_2(n_2; n_1, n_2) - c(n_1, n_2)$$

- ▶ Ignoring problem of multiple equilibria
- ▶ First order condition for  $n_1$ :

$$p_1(n_1; n_1, n_2) + n_1 \frac{\partial p_1(n_1; n_1, n_2)}{\partial n_1} + n_1 \frac{\partial p_1(n_1; n_1, n_2)}{\partial n_1^e} + n_2 \frac{\partial p_2(n_2; n_1, n_2)}{\partial n_1^e} = \frac{\partial c(n_1, n_2)}{\partial n_1}$$

# Pricing

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- ▶ Marginal benefit consists of four terms:
- ▶ First and second – same as standard MR curve
  - ▶ Marginal and inframarginal effects of increasing quantity.
- ▶ Third – same side network effects
  - ▶ How increasing  $n_1$  raises value of marginal type-1 agent.
- ▶ Fourth – cross side network effects
  - ▶ How increasing  $n_1$  raises value of marginal type-2 agent.

# Pricing: Lessons

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- ▶ **Subsidize those who create value for others**
  - ▶ Search engines subsidize users with free search and email.
- ▶ **Typically platform have “money side” and “subsidy side”.**
  - ▶ Example: Adobe gives pdf readers away free.
- ▶ **Same side vs. cross side network effects**
  - ▶ Ladies night on Thursday but not Friday.
- ▶ **Other considerations**
  - ▶ Attract marquee users (Macy’s pays lowest rents in mall)
  - ▶ Adverse selection (Westside rentals, TheLadders, eHarmony)
  - ▶ Long run effect of prices (Mac vs. Windows)
  - ▶ Mobilization (Charge zero to select equilibrium).

# Details of fee structure

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- ▶ **The details of the fee structure varies across websites:**
  - ▶ Subscription fees (Westside rentals)
  - ▶ Fee per posting (Craigslist)
  - ▶ Fee per click (Price shopper)
  - ▶ Sales commission (eBay)
- ▶ **Choice depends on details. E.g. job postings**
  - ▶ What can platform observe?
  - ▶ How much heterogeneity is there?
  - ▶ Can system be gamed? Is there adverse selection?
- ▶ **General idea: charge in units that agents care about.**
  - ▶ E.g. charge “per click” for display ad.



# Competing

# Competing

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- ▶ **Will there be unique winner?**
  - ▶ Multi-homing cost
  - ▶ Strength of network effects
  - ▶ Desire for variety of platform
- ▶ **Could you win a battle?**
  - ▶ First-mover advantage
  - ▶ High expectations
  - ▶ Technology or cost advantage
- ▶ **Should you open up and share?**
  - ▶ Network size bigger
  - ▶ Compete within market rather than for market.
- ▶ **There are also intermediate forms of compatibility**
  - ▶ Windows vs MAC in 1980s vs 2010s

# Threat of envelopment

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- ▶ **Biggest threat may come from business vanishing**
  - ▶ Rival offers new functionality (e.g. gmail vs hotmail)
  - ▶ Convergence of technology (e.g. iPhone vs iPod)
- ▶ **Change business model**
  - ▶ Real lost server business to Windows
  - ▶ Formed Rhapsody, charging customers for songs
- ▶ **Form partnerships with other firms**
  - ▶ Become part of bigger bundle of services
- ▶ **Sue**
  - ▶ Real sued Windows for \$760m

# Mobilizing a Platform Market

# Barriers to Mobilization

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- ▶ **Standing risk (e.g. Zune)**
  - ▶ Users may not make platform specific investments
- ▶ **Holdup risk (e.g. Intel)**
  - ▶ Concern platform increases prices after specific investments
- ▶ **Integration risk (e.g. Nintendo)**
  - ▶ Suppliers worries platform will start producing complements.
- ▶ **Favoritism risk (e.g. Covisint)**
  - ▶ Users worry platform will skew competition
- ▶ **Relationship risk (e.g. Autobytel)**
  - ▶ Suppliers don't want to lose control of customer relationship
- ▶ **Competitive risk (e.g. B2B exchanges)**
  - ▶ Suppliers don't want more intense competition

# Overcoming Mobilization Hurdle

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- ▶ **Same strategies as with one-sided networks**
  - ▶ Product announcements
  - ▶ Introductory discounts
  - ▶ Start with small networks
  - ▶ Obtain marquee users (exclusively?)
- ▶ **Permanently subsidize one side**
  - ▶ The subsidy side then turns up with high probability.
  - ▶ Examples: Westside Rentals; Monster.
  - ▶ Subsidy needs to overcome homing cost.
- ▶ **Start as vendor or merchant and transition into platform**

# Transition: Vendor to Platform

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- ▶ Firm starts as traditional vendor
  - ▶ Makes and sells some product
  - ▶ Shanda (online games), CNET (reviews)
- ▶ “More of the same” strategy (e.g. Schwab, mutual funds)
  - ▶ Vendor supplements own product with 3<sup>rd</sup> parties
- ▶ “Something different” strategy (e.g. Google, AdSense)
  - ▶ Add new functionality for second side of market
- ▶ Which side to start with?
  - ▶ Start with side with weaker need for other side
  - ▶ LinkedIn found employees before employers.
  - ▶ YouTube (customers) vs. Brightcove (website support)

# Transition: Merchant to Platform

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- ▶ **Firm starts as merchant**
  - ▶ Devolves control of inventory, pricing and merchandising
  - ▶ Amazon (marketplace), iTunes
- ▶ **Merchants have advantages over platform**
  - ▶ Overcome mobilization hurdle
  - ▶ Scale means that have lower costs on inputs
  - ▶ Retains control, e.g. combine complements to increase values
  - ▶ Sustain reputation for quality
- ▶ **But a platform**
  - ▶ Offers greater variety
  - ▶ Has much lowers costs, and no risk
  - ▶ Can be scaled quickly