Agenda

- What do network effects mean for competition and, hence, for competition policy?
- What’s special about two-sided markets?
Network Effects
Network Effects:
Demand-side Economies of Scale

- Definition
  - Value of good to a consumer increases with total number of consumers of the good

- Sources
  - Direct (Communications paradigm): more subscribers on a communications network provides greater services to any one subscriber.
  - Indirect (Hardware-software paradigm): an increase in the number of users of a durable good ("hardware") raises the supply of a complementary good or service ("software").
Some Examples

- **Voice telephony**
  - Direct network effects are very important at the industry level.

- **Web content and applications**
  - Create network effects only in certain cases, as the dot-com bubble proved.
  - eBay is an example of direct network effects.
  - Google: advertisers versus searchers.

- **Mobile broadband applications**
  - Direct effects because two users of a given application (e.g., video conferencing) both need to utilize the service.
    - Real time downloading of applications can make a big difference, as Adobe Acrobat demonstrates.
  - Indirect effects because app providers care about the potential user base.
Adoption Experiment

- Count off! 1, 2, 3.
  - Your number is your *standalone value*: how much the product is worth to you with no one else on the network.

- *Total value* depends on how many people adopt:
  - Standalone value + $1 \times (#\ of\ others\ on\ network)

- Adoption decision
  - If total value is *greater or equal* to price, adopt

- Adoption action
  - Stand up!
Adoption Decision

- Suppose my marginal costs are $4 per person.

- Consider:
  - Static expectations.
  - Forward-looking expectations.
  - Penetration pricing.

- Lessons
  - Positive feedback can be strong.
  - Expectations matter.
  - Pricing dynamics matter.
Network Compatibility

- When technologies are compatible, products using that technology share a network.
  - Example: Acer, HP, and Lenovo personal computers.

- When two technologies are incompatible, the relevant network for each is that technology’s sales.
  - Technology may be provided by one or many vendors.
Nature of Competition Among Compatible Products

- Consumers don’t have to worry about picking winners and losers at the supplier level.
- Competition focuses on price, quality, and service at the component vendors.
- Many firms may survive.
- Example: public telephone network with fixed and mobile providers.
Critical Role of Expectations, Especially for Incompatible Products

- When making durable investments, market participants form expectations:
  - Consumers (end users)--future supply of complements or other end users.
  - Complementors--future “supply” of customers

- With incompatible products, favorable expectations can be a key source of competitive advantage.
Expectations and Installed Base

- Consumers and complementors may use today’s installed base to predict the future.
  - Leads to positive feedback
- If consumers and complementors believe others think this way, then they may make purchases from the expected winner
  - “Herding” leads to more positive feedback.
Effects of Positive Feedback

- Strong get stronger, weak get weaker.
- Makes a market “tippy.”
  - Examples: VHS v. Beta, Wintel v. Apple
  - “Winner take all markets”
- *N.B.* Demand for variety can be a countervailing force.
Lock-In and Switching Costs

- Network effects lead to substantial collective switching costs.
  - Installed base of durable components.
    - Example: Software written for x86 line of processors.
  - Coordination costs reinforce problem.

- Reinforces winner-take-all.
Network effects open new avenues of competition.

- Penetration pricing
- Subsidized complements
- Managing expectations
  - Marketing your market share
  - An extra benefit of innovation
- Compatibility decision itself
Implications for Competition

- Degree of compatibility can have significant effects on the nature of competition.
- Positive feedback means strong get stronger and weak get weaker.
- Consumer and complementor expectations are critical.
- Entry can be difficult.
- Pricing dynamics can be complicated.
- Incumbents and firms with good reputations tend to favor incompatibility.
Two-Sided Markets
What are we talking about?

User A ↔ Platform ↔ User B
What are we talking about?

User A ↔ Platform ↔ User B

- Consumers holding payment cards
- Media viewers
- Video game consumers
- Men

- Merchants accepting payment cards
- Advertisers
- Video game developers
- Women
A More Complicated Case

 ISP --- ISP

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 Household     Application

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 Advertiser
An Example with even More Parties Involved

Acquirer

Payment Network

Issuer

Merchant

Consumer
Aren’t all markets two-sided?

- Is a grocery store a platform in a two-sided market?

- No universal definition of “two-sided market.”

- Like pornography, you know it when you see it.

- One view of essential elements:
  - Cross-group network effects: Users on one side of the market value the platform more when there are more users on the other side.
  - Platform can target price or non-price policies toward specific user groups.
    - Platform can identify user groups.
    - Groups do not undo the differential policies.
There are strong implications for supplier behavior.

- **Access Decisions**: No one wants to be on one side of the market if there is no one on the other side.

- **Transaction Decisions**: Once on a platform, a user will transact with another only if the incremental benefits are greater than the incremental costs.

- **A two-sided service provider must**:
  - recognize the interdependence of demands,
  - balance the interests of both sides of the market, and
  - successfully navigate issues of customer coordination and expectations.
Two-Sided Pricing: Static Considerations

- It often is profitable (and efficient) to set non-zero prices to both sides.
  - Both sides enjoy benefits and trigger costs.
  - It is incorrect to treat only one side as the “cost causer.”

- It may be profitable (and efficient) for one side of the market to subsidize the other.
  - Networks services are valuable to one side only if the other side participates in the network.
  - Internalize access and transactions external effects.

- For a given sum of user prices, a network services provider seeks to maximize the number of transactions.
  - Prices play a balancing role, in addition to generating profits for the network.
Two-Sided Pricing: Dynamic Considerations

- Penetration pricing may be necessary when network effects are present in order to overcome the chicken-and-egg problem.
- May want to discriminate in favor of certain users that are particularly valuable to the other side.
(New?) Challenges for Competition Policy and Regulation
The Economics of Ladies’ Nights

- There are 40 women and 40 men considering whether to go to a bar.
- Women just want to dance, and each is willing to pay $4.
- Men just want to meet women, and each is willing to pay $.50 × # women.
- The bar has a marginal cost of $5 per person.
The Economics of Ladies’ Nights continued

- What price will the club owner charge if everyone has to pay the same price?
- What price will the club owner charge if she can charge women and men different prices?
- Which outcome is better for women?
- Which outcome is better for men?
  - Clear answer emerges with heterogeneous tastes.
Competition Issues Raised by Two-Sidedness

- Network effects can lead to tipping absent platform interconnection/interoperability.
- Can be misleading to look at one side of the market in isolation.
- Competition can lead to inefficient outcomes as platforms respond to firm-specific, rather than market, elasticities.
- Bad-but-popular issues:
  - Two-sided pricing leads to double billing
  - Two-sided pricing hurts creative, deserving users on one side of the platform.
Market Power

- A matter of definition
  - Economics: downward sloping firm-specific demand curve.
  - Antitrust: ability profitably to set price significantly above the “competitive” level.

- Looking at just one side of the market at a time can yield a misleading picture.
  - Platform might have a negative margin on one side and large, positive margin on the others.
  - Cost allocations may be arbitrary.

- Looking at just the average of the two sides may throw away information.
Potential Policy Responses

- Retail Price Ceilings to Limit the Exercise of Market Power
- Retail Price Ceilings to “Correct” Price Structure
- Retail Price Floors
- Merger Policy
- Impose Duty to Deal
Retail Price Ceilings to Limit the Exercise of Market Power

- Examples
  - One aspect of net neutrality debate.
  - Mobile telephone termination charges.

- Rationale
  - A platform with market power may set inefficiently high prices.

- Policy Challenges
  - Requires a lot of information to impose or induce the right prices, especially given dynamic considerations.
  - May be better to focus on the sum of the platform’s prices rather than the individual prices to the two sides.

- Similarities to Other Markets
  - Any supplier with monopoly power may set inefficiently high prices.
  - Requires a lot of information to impose or induce the right prices, especially given dynamic considerations and multi-product firms.
Ceilings to “Correct” Price Structure

- **Examples**
  - Regulation of credit card interchange fees.
  - Net neutrality regulation blocks two-sided pricing and/or offering menus of services to application providers.

- **Rationale**
  - Platform may not fully internalize external effects, leading to inefficient outcomes (Spence distortion).
  - Competition may not help (terminating access problem) and can even make the problem worse (wrong elasticities).

- **Similarities to Other Markets**
  - Spence distortion is common.
  - Recovery of fixed costs is subject to distortion from difference between market and firm-specific elasticities.

- **Policy Challenges**
  - Requires a lot of information to impose the right prices…
A ban on two-sided pricing can raise the prices paid by households.

**Household ↔ ISP ↔ Application**

- Charging application providers lowers the effective cost of supplying access to households, thus lowering access prices charged to households.
  - Toll free phone numbers, credit cards, and over-the-air television.
  - This is a version of the "waterbed effect."
- Bad intuition: only a supplier in a competitive market passes through cost savings.
  - Both theory and evidence show that this intuition is false.
- Complex pattern of effects.
  - Potential changes in access prices and application prices.
  - Ban on two-sided pricing very likely to harm households that are marginally connected to the platform.
Retail Price Floors

- **Examples**
  - Test for predatory pricing.

- **Rationale**
  - Platform may generate market power in the long run by setting low prices in the short run to drive out competitors.

- **Policy Challenges**
  - Low prices benefit consumers and it can be very difficult to distinguish “predatory” from “competitive” prices.
  - Looking at only one side of the market can be misleading.

- **Similarities to Other Markets**
  - It is almost always difficult to distinguish predatory from competitive pricing.
  - If look at profitability at the platform level (rather than a specific side) could apply the (imperfect) test of price versus average variable cost as in any other market.
In sum it is difficult to “regulate” prices efficiently in two-sided markets.

- Efficient prices are hard to determine.
  - Efficient prices depend on demand conditions even when marginal costs are constant.
  - There is no presumption that it is efficient to charge one side of the transaction marginal cost.
  - “Below cost” pricing can be efficient.
- A variety of different prices may be relevant.
  - Example: Inter-carrier compensation and end-user charges across carriers.
- Danger of not allowing suppliers to earn returns on past investments, thus harming innovation.
  - The incentives to conduct R&D and to invest in a network depend on the ability to earn a return on those investments.
Merger Policy

- **Rationale**
  - Platform mergers can reduce competition.

- **Policy Challenges**
  - Increased competition can lead to less efficient outcome due to differences between market and firm-specific elasticities.
  - Need to consider two (or more) sides of the market at once.

- **Similarities to Other Markets**
  - Recovery of fixed costs is subject to distortion from difference between market and firm-specific elasticities.
  - Excess entry can lead to higher production costs and, in theory, reduced innovation.
Vertical Foreclosure

- Intuition: A monopoly platform will harm application competition by favoring integrated application providers or application providers willing to pay for exclusivity.
Vertical Foreclosure

- Intuition: A monopoly platform will harm application competition by favoring certain application providers.
- But a platform with monopoly power has incentives to internalize complementary benefits.
- There are limits, however:
  - Inability (due to regulation or lack of information) to extract surplus from complements suppliers.
  - Inability (due to regulation or lack of information) to extract surplus from consumers.
  - Incompetence.
- Is there anything special about two-sided markets in the vertical case?
  - Perhaps: if an application is itself subject to network effects, then the mere fact that users expect discrimination, may harm the application even if there is no discrimination.
U.S. antitrust policy does little to demand interconnection or unbundling.

- Antitrust prohibits *anticompetitive foreclosure*.
  - No general duty to deal.

- American antitrust caution is driven by:
  - Assumption that monopolist typically will internalize complementary benefits.
  - Concern for platform investment incentives.
  - Concern that policy intervention is imperfect.
    - Hard to detect discrimination against applications.
    - Hard to allow platform innovation if it affects applications or interconnected networks.

- With pervasive regulation, would political strength and legal skills replace value creation as keys to competitive success?
Conclusion
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- Two-sided markets raise many difficult issues.
- But issues not as new or unique as some say.
- Issues are not a reason to abandon public policy intervention to protect competition.
- Issues are not a reason to abandon competition and use pervasive regulation as a substitute for competition.
- Issues are a reason to think carefully and act cautiously where regulation may be needed as a supplement to competition.