Some Reasons the Market Doesn’t Work

• Information Goods (Reminder: public goods)
  – Software, digital content like music and movies
  – Solution: Intellectual Property, public sponsorship

• Natural Monopolies
  – electricity grid, telephone lines, hydro-electric plants
  – Solution: regulation

• Unnatural Monopolies (price fixing; antitrust violations)

• Network Externalities: (today’s lecture)
  – Direct and indirect network externalities
    solution: open interfaces?
  – Physical networks: Like natural monopolies; price regulation.
Reminder: With private goods, the competitive market leads to efficient production and pricing

\[ Mc = p^a \]

Demand curve
Marginal cost

Apples, a

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Reminder: With information goods the competitive market will not reward inventors. Proprietary market will involve deadweight loss.
Direct network externalities in a network

Why does demand depend on the number of users? (e.g., Metcalf’s law)?
What is the competitive outcome with open standards?
What is the outcome with closed standards? (several standards?)
Is monopoly worse than competition? (refer to open versus closed standards)
What is “tipping”? IP can protect a closed standard, thus giving much more market power than necessary to reward innovation
Indirect Network Effects and Systems Competition

• Examples of “systems” (complementarity)
  – Game platforms and games
    • Sega & Nintendo tried to avoid open interfaces
  – Operating systems and applications
    • IBM PC opened interfaces to win the PC war (contrast with mainframes)
    • Microsoft tried to avoid the java “middleware” interface

• Notice: the value of the “system” increases with the number of applications. Thus applications create network benefits and “tipping”.

• Closed standards can lead to monopoly, even if it is possible to enter the market with another standard.
Indirect Network Effects: The system with fewer applications is less profitable.

\[ n_1(p_1; \rho_2, a_1, a_2) \]  

users of platform 1, \( n_1 \)

\[ n_2(p_2; \rho_1, a_1, a_2) \]  

users of platform 2, \( n_2 \)
Indirect Network Effects: The system with more applications has more incentive to add still more of them.
Network Markets: Will firms choose open interfaces as a business strategy?

- Firms in the examples had different strategies. The “best” strategy is clearly context-specific.

- In favor of open interfaces:
  - Attract second-source developers to create applications. Hope to “tip” into monopoly with indirect externalities.
  - Entrench your standard by attracting other OEM’s.
  - Better yet: license instead of opening the interface. (compare IBM PC example with Sega example)
    - Keeps interfaces closed.

- Danger of open interfaces:
  - Lose market dominance (IBM PC example)
Some firms have kept interfaces closed

• Sega and Nintendo tried to stop game makers from developing games
• If they kept their interfaces closed, then they could get the games developed under exclusive license – that is even better.
• Best of all possibility worlds: attract the games from other platforms (openness), and have your own exclusive games (closedness)
Network Markets:
Welfare and regulation

• For social welfare, is it better to have open interfaces?
  Avoids tipping to one vendor who becomes a monopolist
  Users get the benefits of network effects and lower prices

• Open interfaces might be hard to achieve – there is a natural tendency toward tipping.
  However, we learn from the IBM PC example that open interfaces can be the best form of competition.

• Regulatory efforts to force openness:
  Antitrust treatment
    European order in the IBM mainframe case
    European order the European Microsoft case
  Allow reverse engineering (Sega case)