Rose-Hulman Institute of Technology
Department of Humanities & Social Sciences / K. Christ
SV353, Industrial Organization

3-6: Market Structure, Innovation, and Networks

Economics offers two contrasting views on the relationship between market structure and innovation:

1. Schumpeter's "Creative Destruction" view: Innovation is most likely to occur in large-scale enterprises because those are the organizations that have resources to invest in innovative activities.

   ➢ Key concept: Dynamic competition

2. Arrow's "Incentive to Invest" view: Innovation is most likely to occur in competitive environments because the benefits are greater there than under conditions of monopoly.

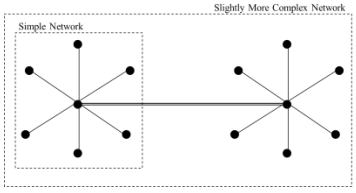
   ➢ Key concept: Replacement effect

Key distinction: Gradual vs. drastic innovation

Public policy and innovation – Key concepts/issues:

- Patents, patent breadth, optimal patent length
- Inter-firm R&D agreements (and "free-rider" problems)
- Intellectual property rights

Networks and Network Externalities: Kwoka and White's discussion (474 – 481) is useful.



Key concepts: Bandwagon effects, lock-in effects, path dependence, essential facilities (Cabral, 79).

Relevant exercises: Problem Set 3, exercise 10.

Schumpeter on Industrial Progress

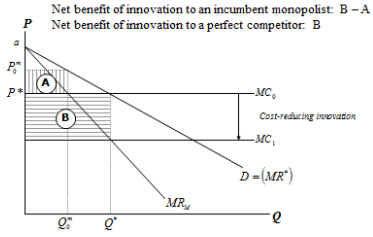
"… it is necessary to point out that … the modern standard of life of the masses evolved during the period of relatively unfettered 'big business.' … If we economists were given less to wishful thinking and more to the observation of facts, doubts would immediately arise as to the realistic virtues of a theory that would have led us to expect a very different result.

"… As soon as we go into details and inquire into the individual items in which progress was most conspicuous, the trail leads … to the doors of the large concerns … it [large-scale business enterprise] has come to be the most powerful engine of that progress … Perfect competition is not only impossible but inferior, and has no title to being set up as a model of ideal efficiency. It is hence a mistake to base the theory of government regulation of industry on the principle that big business should be made to work as the respective industry would work in perfect competition."

Joseph Schumpeter, Capitalism, Socialism and Democracy (1942)

Arrow's counterargument: the incentive to invent

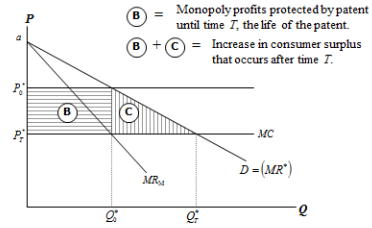
Net benefit of innovation to an incumbent monopolist: B – A
Net benefit of innovation to a perfect competitor: B



Arrow, Kenneth, "Economic Welfare and the Allocation of Resources for Inventions." In R. Nelson, ed., *The Rate and Direction of Inventive Activity: Economic and Social Factors*. National Bureau of Economic Research. Princeton: Princeton University Press (1962).

Patents – Optimal length of a patent

Ⓑ = Monopoly profits protected by patent until time *T*, the life of the patent.
Ⓑ + Ⓒ = Increase in consumer surplus that occurs after time *T*.



Networks and Network Externalities – Implications

- If network effects are strong, competition among networks is likely to be unstable, and *bandwagon* or *tipping effects* may play a role in the evolving market structure. In such settings, there is no assurance that the outcome will be socially efficient.
- There is likely to be fierce rivalry at the early stages of network development as a "competition for the market" ensues.
- Entry by new networks is likely to be very difficult.
- Incumbents will feel especially threatened by fundamental innovation involving incompatibilities with the established network.
- Discussions among network members about *compatibility standards* may take on features of strategic entry deterrence.