

***IER Lawrence Klein Lecture:***  
**The Case Against Intellectual Monopoly**

***David K. Levine***  
(joint research with Michele Boldrin)

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## ***Should we have intellectual property at all?***

should we have

- patents
- copyrights
- non-disclosure agreements
- shrink-wrap agreements
- and so forth

(also the “right of sale” which is not controversial)

## ***The Conventional Wisdom***

the economics literature in general acknowledges that intellectual property leads to undesirable legal "intellectual monopoly," but generally argues that this might be a good thing

*Kahn (1962) "The Role of Patents"*

"This issue is not one of principle but of practical social engineering: how much protection...of what kind is required and worth paying for"

Imagine that this quotation referred to trade protection

*Our question: "Should we allow intellectual property at all?"*

## ***Strands of the Literature***

- ◆ growth theory: unpriced “spillovers” – Lucas, Romer
- ◆ industrial organization: optimal patent protection – Gilbert and Shapiro, Gallini and Scotchmer; generally assume no innovation without protection

## ***Conventional Logic of Intellectual Monopoly***

- ◆ information, ideas are a “public good” means zero marginal cost of distribution → increasing returns to scale
- ◆ increasing returns to scale
  - fixed cost plus
  - constant marginal cost (nothing essential about zero) plus
  - marginal cost pricing → ***the firm loses money***
- ◆ conclusion: intellectual monopoly is necessary for the production of ideas and creations

## ***Are there Unpriced Spillovers?***

Hard to see why they should be unpriced

Employees moving from firm to firm seem the most likely culprit

(from Gary Becker's textbook) "Firms introducing innovations are alleged to be forced to share their knowledge with competitors through the bidding away of employees who are privy to their secrets. This may well be a common practice, but if employees benefit from access to salable information about secrets, they would be willing to work more cheaply than otherwise."

- some people (Leibowitz) explicitly recognizes that spillovers may be priced
- Evidence scarce to say the least; motivated by observations on agglomeration; best evidence (Ellison and Glaeser) is weak
- Unpriced spillovers or simple minimization of transaction cost? Easier to transact, move and so forth when at the same location

## ***Rent-Seeking***

- ◆ Sony Bono copyright extension (20 years retroactive) and Eldred Case
- ◆ impact of DMCA on academic research and free speech
- ◆ efforts to legally mandate computer hardware to reduce copying (the computer industry is roughly an order of magnitude greater in size than the media industry being protected)
- ◆ delay in the introduction of the steam engine and of the airplane
- ◆ spread of AIDs in Africa
- ◆ submarine patents and legal blackmail
- ◆ ultimately intellectual monopoly is thought control

Second best argument: we have to put up with all of this, because without IP there will not be any innovation



## ***Ordinary Economics of Scarcity***

- ◆ a new drug created by a team of (12) biomedical researcher over a period of time (1 year)
- ◆ at the end of the year the knowledge is *embodied in the researchers* (and possibly some of their writing) – no one can produce the drug unless the researchers tell them how to do it – no unpriced spillover here
- ◆ it is socially valuable to have other people know how to produce the drug
- ◆ for example: a second team of 12 expert biomedical researchers could set up a production line in Europe, while the original team sets up production in the U.S.
- ◆ transfer of knowledge is not costless – how long would it take them to explain to a group of inexperienced economists how to produce the new drug? (huge literature on the problem of technology transfer...no mystery here)

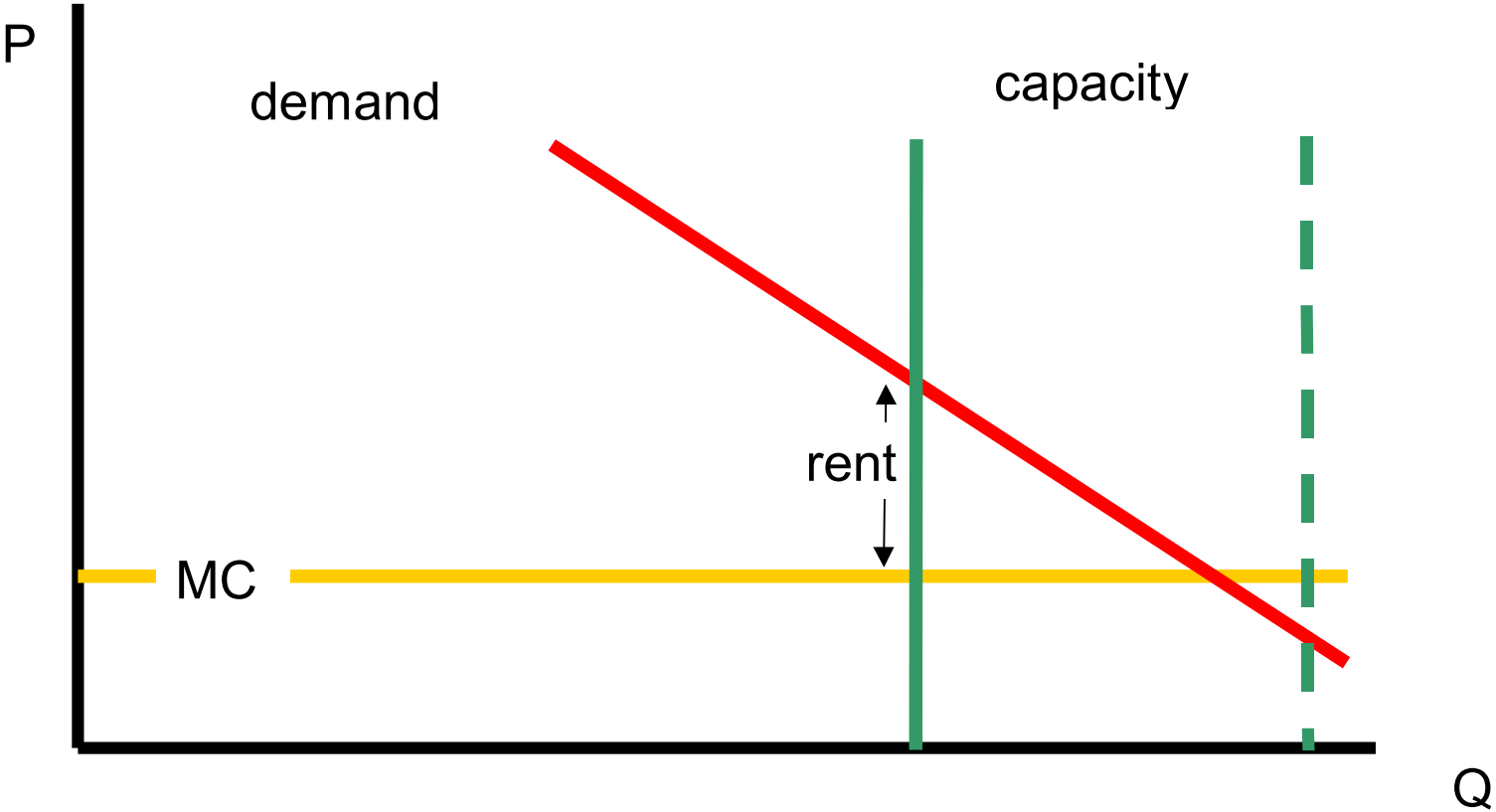
two methods by which second team can obtain knowledge

- ◆ one: reinvent the wheel (1 year of team time)
- ◆ two: have the first team teach them (1 month of time for both teams, for example)
- ◆ second method minimizes team time (1 yr. 2 months), but production starts after 1 year 1 month
- ◆ first method: maximizes team time (2 yrs) but production starts after 1 year
- ◆ beginning production one month earlier has social value – this implies that the FIRST team can sell their knowledge into a competitive market and earns a **positive return** not zero as in the conventional story

## ***What Went Wrong in the Conventional Story***

- ◆ Build a shoe-factory, face constant mc of using it: same story; why is this not an issue?
- ◆ Shoe factories have a capacity constraint – leads to a positive return
- ◆ As we saw, transmission of ideas is similarly limited by scarcity of current set of people and/or products embodying the idea
- ◆ In the shoe factory case, capacity is chosen small enough that the competitive rent covers the cost of building the factory
- ◆ With ideas there is the problem of *indivisibility*
- ◆ Indivisibility has similar implications to fixed cost, but not the same
- ◆ In the example: no guarantee that the positive return is sufficient to compensate the research team for its time

# Diagrammatics of Capacity Constraints



- ◆ it may be that (say) the team would have to produce  $\frac{3}{4}$  of an idea to be able to recover costs – but this is not feasible because of indivisibility
- ◆ on the other hand, the social optimum might be such that saving a month in the start of production has social value exceeding a year of team time – in this case the costs of the first team are necessarily covered by the competitive rent
- ◆ an immediate implication – growth reduces need for intellectual monopoly as it reduces the importance of the indivisibility
- ◆ so do innovations that reduce the size of the indivisibility, of course

## Overview

- ◆ We argue copyrights, downstream licensing and patents play harmful role in the innovation process

So this doesn't seem completely crazy, a fact:

"During the nineteenth century anyone was free in the United States to reprint a foreign publication, and yet American publishers found it profitable to make arrangements with English authors. Evidence before the 1876-8 Commission shows that English authors sometimes received more from the sale of their books by American publishers, where they had no copyright, than from their royalties in [England]" where they did have copyright.

Arnold Plant [1934] "The Economic Aspects of Copyright in Books," *Economica*, 167-195

## ***Innovation Under Competition***

- ◆ To understand whether an innovation will take place or not in a competitive environment, we must understand how much the new good/process is worth after it is created
- ◆ Focus on the extreme case where every subsequent item produced using the template is a perfect substitute for the template itself - that is, what is socially valuable about the invention is entirely embodied in the product.

$k > 0$  initial units available

Quah's 24/7 model: capital produces consumption, and simultaneously produces  $\beta$  copies of itself

representative consumer:  $u(c)$  strictly increasing, concave, and bounded below, discount factor  $0 \leq \delta < 1$ , feasible present value utility is bounded above



Solution of this social optimization problem may be decentralized as a competitive equilibrium,

price of consumption

$$p_t = u'(k_t) = u'(\beta^t)$$

price of the durable good

$$q_\tau = \sum_{t=\tau}^{\infty} \delta^t u'(\beta^t) \beta^t$$

## The Problem of Competitive Innovation

- Innovator has  $k_0 = 1$  he must sell into a competitive market
- It sells for  $q_0$ , which accrues to the fixed factor  $k_0 = 1$
- Introducing first unit of the new good, entails some cost  $C > 0$
- Innovation produced if and only if  $C \leq q_0$

*What happens as  $\beta$  increases?*

*Conventional wisdom suggests that in this case rents fall to zero, and competition must necessarily fail to produce innovations*

Conventional wisdom fails for two reasons:

- ◆ it ignores the impact of limited capacity, in all periods
- ◆ it ignores the delay in reproduction

The rent to the fixed factor may INCREASE as  $\beta$  increases.

$$q_0 = \sum_{t=0}^{\infty} \delta^t u'(\beta^t) \beta^t$$

if demand is elastic  $u'(\beta^t) \beta^t$  is increasing in  $\beta$

Note that reducing the length of time it takes to reproduce a single unit (or changing the discount factor) has an effect similar to reducing  $u'(1)$

so we can understand the traditional case as one in which there is satiation; reproduction time is very short, and the reproduction rate is very high

for patents this limit makes exactly no sense whatsoever

for copyrights it could be argued that modern technology is increasing  $\beta$  and lowering reproduction time

As it happens

- ◆ this has ambiguous consequences for price  $q_0$
- ◆ the same technological change has unambiguous consequences for the cost  $C$  - it is getting smaller
- ◆ and of course as a practical matter, it ignores any collateral uses of the creation that is not subject to reproduction cost reduction – paper books; live performances and so forth

## ***Innovation Chains: Does Intellectual Monopoly Lead to More Innovation?***

Innovations generally build on existing goods, that is on earlier innovations – it is generally recognized that intellectual property protection has an undesirable effect on future innovation – Scotchmer (1991) for example

Consider a situation where each innovation creates the possibility of further innovation; we are going to create an extreme example where competition achieves the first best and monopoly produces no innovation at all

Many different producible qualities of capital, beginning with quality zero

capital of quality  $i$  denoted  $k^i$ , depreciates at rate  $1 - \zeta$

capital  $i$  yields  $\gamma^i$  units of consumption,  $\gamma > 1$ ,

capital  $i$  reproduces  $\beta > 1$  units of itself

capital  $i$  produces  $\rho < \beta$  units of capital  $i + 1$

$\rho$  technology subject to an indivisibility of  $\underline{h}$

assume  $\rho\gamma > \beta$  (only the  $\rho$  technology used absent indivisibility)

For some  $\theta_1 < 0, \theta_2 > 0$  period utility function is

$$u(c) = \begin{cases} -(1/\theta_1)c^{-\theta_1} & c \leq 1 \\ (1/\theta_2) - (1/\theta_1) - (1/\theta_2)c^{-\theta_2} & c > 1 \end{cases}$$

elastic CES below  $c = 1$ , inelastic CES above

assume the economy is productive enough that

$$(\delta(\rho\gamma - \zeta))^{1/(1+\theta_2)} - \zeta/4 \geq \gamma$$

for example  $\theta_2 = 0.10, \rho = 2.20, \gamma = 1.05, \delta = 0.98$



## *Equilibrium and Intellectual Monopoly*

If  $\underline{h}$  is sufficiently small and there is no intellectual property the first best is achieved, consumption and investment grow over time, and a new type of capital is introduced every period

repeated innovations take place because rents are high enough to provide an incentive for innovators to undertake innovative activity

under complete monopoly (perfect patent) if  $k_0 = 1$  (revenue maximum) and  $\zeta = 1$  (no depreciation) the monopolist never innovates, and the consumption and the capital stock do not grow

if  $\zeta < 1$  and  $\underline{h} = 0$  innovation occurs to replace the capital stock only

but if  $\underline{h} > 0$  the monopolist may choose not to innovate at all

in this world patent protection leads to strictly less innovation, and an indivisibility in the production of new goods makes the problem *worse*

utility function is designed so that the global maximum of revenue  $u'(c)c$  takes place at  $c = 1$

the monopolist starts with a unit of capital that does not depreciate, so can produce a unit of consumption each period

because he can't get more profit than this better than this, this is the optimum for the monopolist, more or less regardless of modelling details for timing and commitment

monopolist chooses not to innovate because any investment to do so would necessarily reduce current period revenues below the maximum, while it cannot increase future revenue.

Similarly, the monopolist will not allow anyone else to innovate.

Call it James Watt who refused for the 31 years of his monopoly to allow innovation in the steam engine; or the Wright brothers who less successfully tried to do the same with the airplane