

Competition policy and intellectual property rights

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Competition policy and IPRs

- Tension between competition policy and IP protection
 - IPRs reward inventors by granting them market power
 - Competition policy prevents undeserved market power, or limits its exploitation
- Areas in which tension emerges
 - Compulsory licensing of patents, copyrights and trade secrets (e.g. Microsoft)
 - FRAND licensing (e.g. Qualcomm)
 - ...

This talk

- Optimal level of IP protection
- Optimal form of IP protection
- Recent theories that may shed light on the intersection between competition policy and IPRs (Segal and Whinston 2007)

Optimal level of IP protection

- Nordhaus' trade-off
 - IP protection serves to provide incentives for the creation innovative knowledge
 - However, it does so by granting inventors market power, which is socially costly

Optimal level of IP protection

- What is the optimal resolution to this trade-off?
- In a simplified model (Denicolò 2007), one obtains:

profit ratio

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elasticity of the supply of inventions

Optimal level of IP protection

- **Profit ratio**
 - ratio between the profits that IP holders actually get to the maximum hypothetical profits that they would get with complete protection
- **Elasticity of supply of inventions**
 - percentage increase in the number of inventions associated with a one percent increase in R&D expenditure

Elasticity of inventions

- Many empirical estimates based on the “innovation production function” approach
- Estimates range from 0.2 to 0.95
 - However, most cluster around 0.5/0.6
- Other approaches:
 - Acemoglu and Linn (2004): natural experiment in the pharmaceutical sector: elasticity between 0.8 to 0.85
 - Jones and Williams (2001): calibration of endogenous growth model: elasticity greater than 0.5
- No available estimate for copyrightable material
 - but arguably significantly smaller

Profit ratio: length

	real interest rate				
		2%	3%	5%	7%
patent life (in calendar time)	20	.33	.45	.63	.75
	18	.30	.42	.59	.72
	15	.26	.36	.53	.65
	12	.21	.30	.45	.57

Profit ratio: breadth

- Patent protection is limited not only in length, but also in “breadth”
 - Inventing around a patent
 - Follow-on innovations
 - Imperfect enforcement of IP rights
- Probably limited breadth contributes more than finite length to reducing the profit ratio

Optimal level of IP protection

- Any assessment is inevitably highly tentative
- For patentable innovation, what evidence is available does not seem to indicate that patent holders are systematically over-compensated
- For copyrightable material, the risk of systematic over-compensation seems more concrete

Cumulative innovation

- Many authors argue that patent protection can actually impede technological progress when innovation is sequential
- However, one must distinguish between two different issues
 - The optimal division of profit between first and second-generation innovators
 - The joint optimal profit level

Cumulative innovation

- Wrong division can indeed impede innovation
- However, the joint profit level should actually be greater than in the stand-alone case
 - There is a positive externality among innovations, so in the market equilibrium there is even more under-investment than in the stand-alone case

Cumulative innovation

- In addition to wrong division of profits, however, other effects might be at work
- Bessen and Maskin (2009) argue that patents may impede the sharing of intermediate technological knowledge
 - However, their model is based on a number of strong assumptions (e.g. intermediate knowledge not licenseable; no entry by imitators etc.)

Optimal form of IP protection

- Any level of IP protection may be provided in different ways
 - Optimal combination of length and breadth (Gilbert and Shapiro, 1990)
 - Breadth itself is a multi-dimensional variable
 - optimal combination of various aspects of breadth

Kaplow's ratio test

- An intuitive, general criterion of optimality (Kaplow, 1984)
- Optimal policy should minimise the ratio between deadweight losses and profits:

$$\frac{D(x)}{\pi(x)}$$

Breadth and length

- As an example, consider the Gilbert and Shapiro problem
- Here, x is patent breadth which is taken to be the price-cost margin that the IP holder can charge
- Typically, $D(x)$ is increasing and convex, while $\pi(x)$ is (over the relevant range) increasing and concave

Breadth and length

- Therefore, increasing breadth (i.e. x) increases the Kaplow ratio
- On the other hand, increasing length leaves the ratio unchanged
 - assuming stationarity, total discounted deadweight losses and total discounted profits increase at the same rate as length increases
- Hence, Kaplow's ratio is minimised when length is highest and breadth is lowest (given the target level of profit)

Competition and innovation

- Can competition be good for innovation?
 - If yes, then no conflict between competition policy and IP protection
- Various theories
 - Incentives to innovate are higher when firms are neck and neck
 - Technological leaders have larger market shares when competition is more intense
 - ...

Segal and Whinston

- Model of sequential innovation
- Standard assumption: the latest inventor instantaneously becomes the new incumbent
 - See e.g. endogenous growth theory (Aghion and Howitt 1992, Grossman and Helpman 1991) or the optimal patent design literature (Green and Scotchmer 1995)
- Hence, stronger competition policy (i.e. more restraints on the incumbent's behaviour) means weaker IP protection

Segal and Whinston (2007)

- They assume that it takes some time (i.e. one period in their discrete time model) for the latest inventor to become the new incumbent
- In that period, the inventor is an entrant that competes with the previous incumbent (i.e. the penultimate innovator)

Segal and Whinston

- Competition policy affects
 - The joint profit of the incumbent and the new inventor
 - The division of profit between the two firms
- Harsh competition policy reduces joint profits but facilitates entry and hence increases the new inventor's share

Segal and Whinston

- Abstract from any effect on joint profits
- Then, harsher competition policy
 - favours the new inventor in the current period
 - harms the new inventor in some future period, when he will be the incumbent facing entry by the next inventor

Segal and Whinston

- If a transversality condition holds, the former effect must prevail on the latter (**front-loading effect**)
- In this case, harsh competition policy is good for innovation

Conclusion

- Competition policy may serve to reduce excessive market power created by IP protection
- However, extreme caution must be exercised as inventors may actually be under-compensated
- Arguably, over-compensation (and hence the scope for harsh competition policy) is more likely for copyrightable material than for patentable innovations