



# Market failure & the economics of patents

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# What is a market failure?

- Situations in which the market alone does not reach Pareto Efficiency
- The 'market alone' produce an outcome where an individual may be made better-off without making someone else worse-off
- In these cases, is a public intervention justified?
  - Which type of intervention? Depending on the situation and its characteristics various types of action are possible

# Various categories of mkt failure

- Due to:
  - Asymmetries of information
  - Lack of competition
  - Externalities
  - Public good
  - ...

# What is a public good?

- Two characteristics identify the public good:
  - Non excludability: once produced it is not possible (or not convenient) to impede the fruition of the good
    - Such as in presence of free-riding
  - Non rivalry: a good cannot be consumed at the same time by two individuals
- In economics terms: the marginal cost of one additional individual consuming the good is zero (or very close to zero)
- The market does not create appropriate incentives to produce these goods

# Pure public good

- A pure public good is both non-excludable and non-rival
  - Can you think of an example of pure public good?
- Can you think of a good which is excludable and non-rival?
- And a good that is rival but non-excludable?

# Private & public good

	<b>Excludable</b>	<b>Non-excludable</b>
<b>Rivalrous</b>	<u>Private goods</u>	<u>Common goods</u>
	food, clothing, cars, parking spaces	fish stocks, timber, coal
<b>Non-rivalrous</b>	<u>Club goods</u>	<u>Public goods</u>
	cinemas, private parks, satellite television	free-to-air television, air, national defense

# Data, Information, Knowledge

- Data: basic elements of information
- Information: sets of data
- Knowledge: comprehension of information and their applicability
  
- Economic theory did not distinguish information from knowledge for quite a long time
  - We consider information to be the same as knowledge

# Information market failure

- Which is the contribution of information in relation to the innovation process and also to economic growth?
- Conflict interest between social and individual interest
  - Why?
    - Which is the social interest?
    - Which is the individual (firm) interest?

# Arrow (1962) and Nelson (1959)

- Knowledge, given its characteristics of public good, once created, generate benefits also to those that did not contribute to produce it (it's a sort of spillover, knowledge spillover)
- The private marginal benefit of who made the investment to produce the new knowledge is inferior to the social benefit
  - Why is it so?

# Example

- Let's think about the output of a research
  - What is the output of the research that made Google to come into life? Or Facebook?
- Have you seen “The Social Network” movie?
  - <https://www.youtube.com/watch?v=BzZRR4KV59I>
  - <https://www.youtube.com/watch?v=xdiFzcpmmJc>

# As a consequence

- On the one hand the higher is the amount of knowledge in the economic system, the higher will be the benefit for the entire system
- On the other hand the private sector will invest in the production of knowledge only if they can return of the investment made to produce such knowledge

# Which available solutions?

- Two possible solutions:
  - Public funding to the creation of knowledge
  - Incentives for privates to invest in new knowledge production
    - Patent system
- How does the patent system works? How does it respond to the two objectives of favouring knowledge diffusion and providing the incentives to firms to invest in knowledge creation?

# What is a patent

- It is a right on a 'public' good
- Temporary monopoly on the property of a piece of information/knowledge or set of information/knowledge
- It probably represent the most important dimension of intellectual property rights (IPRs)

# The economics of patents

- The patent system has two main functions:
  1. Incentivise private sector investment in research (or in production of new knowledge): private incentive
  2. Facilitate the diffusion of innovation: social benefit
    - Inventions that would be kept secret without patents are more likely to be revealed when under patent protection, making them freely available after the patent expires

# According to David (2003)

- By increasing the expected private returns from innovation, it acts as an incentive mechanism to private investment in knowledge production.
- Patents facilitate the market test of new invention because they allow disclosure of the related information while (in principle) protecting against imitation
- Patents create transferable rights (by granting a license, the owner of the knowledge allows it to be exploited by other agents).
- Patents are a means to signal and evaluate the future value of the technological effort of the companies that own them (which is particularly useful in the cases of new or young companies for which other classes of “intangibles” cannot be used for proper evaluation).
- This way of providing market incentives for certain kinds of creative effort leaves the evaluation of the intellectual production to be determined *ex post*, by the *willingness of users to pay*; it thereby avoids having society try to place a value on the creative work *ex ante* – *as would* be required under alternative incentive schemes, such as offering prospective authors and inventors prizes, or awarding individual procurement contracts for specified works

# According to Hall & Harnoff (2012)

## The Patent System Tradeoffs

Effects on:	Benefit	Cost
Innovation	creates an incentive for R&D; promotes the diffusion of ideas	impedes the combination of new ideas & inventions; raises transaction costs
Competition	facilitates entry of new small firms with limited assets; allows trading of inventive knowledge, markets for technology	creates short-term monopolies, which may become long-term in network industries

# Summing up, patents are useful for:

- Create the incentives for firms to invest in R&D (providing an economic return from the investment)
  - Know-how generated via R&D is very costly to produce and relatively cheap to reproduce
- In some sectors is the only way to advance research in the private sector:
  - Pharmaceutical and Biotech
    - Impede rapid imitation from competitors (and impede free riding)
    - Function also as signalling for start-up to raise venture capitalists (VC) funds
- Allow an efficient market for knowledge and facilitate technology transfer

# Conversely the drawbacks are

- Given the indivisibility of knowledge:
  - Knowledge is cumulative (dispersion and fragmentation across agents)
  - Obstacle for new innovation based on knowledge owned by others
- Hostile behaviours: ‘patents war’
- Knowledge exchange and diffusion limited

# Licenses

- Two main types of licenses:
  - Exclusive: patent licensing to only one buyer
    - Problems of diffusion and fragmentation of knowledge and inventions
  - Non exclusive: patent licensing to more operators at a lower price compared to exclusive license
    - Usually adopted when the invention is of lower value

# Public finance of research

- In ancient times scientists were supported by riches and kings
- Today they are publicly supported by the State
- The greater the amount of knowledge in the society, the larger the welfare of the society
  - Think about Education, Health, and so on  
(examples of public good market failure in which the State support the expenditures)