Lecture # 7 -- What is Intellectual Property Protection?

I. Types of Intellectual Property Rights (IPR)

- This lecture begins the policy section of the course.
    - We begin by looking at policies designed to encourage invention and innovation. In the next section of the course, we will look at policies aimed at the diffusion of knowledge.
- Recall the market failures we are dealing with, such as the public goods nature of knowledge, make it difficult for inventors to completely recover the returns to their inventions.
    - As a result, incentives to innovate will be too low.
- The problem is that private rates of return < social rates of return.
    - Thus, solutions must
        1. Raise expected rates of return, or
        2. Restrict the exploitation of knowledge
- Intellectual property rights restrict the exploitation of knowledge to help inventors be rewarded for their innovations.
    - However, a tradeoff exists. IPR grant monopolies to the inventor for a period of time.
    - As a result, inventors can sell their inventions at a price greater than marginal cost.
    - However, since knowledge is non-rival, we would like lots of people to have access to it.
        - Thus, limiting access lowers welfare.
    - As a result, IPR both raises the private rate of return, but may also lower the social rate of return.
        - However, without IPR to help recover the fixed costs of creating knowledge, the knowledge might not exist in the first place.

A. Patents

- Patents provide firms with temporary monopolies for their inventions. The tradeoff is that the inventor makes the information public.
- Legal issues
    - Patent protection extends from 20 years after the initial application. This is known as the priority date.
- Patent protection is country specific. That is, US patents only have legal force in the US, even if the inventor is not American.
    - To have protection in multiple countries, one must file applications in each country.
    - Alternatively, one can file an application at the World Intellectual Property Office (WIPO) or European Patent Office (EPO) and designate the member states in which protection is desired.
        - There is one application, but the patent application is still examined in each country.
        - There is a fee for each country.
    - As long as an inventor files abroad within one year of the *priority date*, he will be considered first, even if other file in the time in between.
        - The priority date is the first application date for the patent and any related applications.
- Requirements for patent protection – The invention must be:
    1. Novel – that is, the invention must be something new
    2. Nonobvious – the invention must be a new contribution to knowledge
    3. Useful – the invention must have some practical value.
- A patent consists of a set of claims.
    - Claims are technical descriptions of the process, machine, method, or matter contained in the application.
    - Each claim must independently pass the tests stated above.
    - It is possible for only some of the claims to be accepted.
- Citations on the patent "narrow the realm" of the current invention.
    - Citations are references to the "prior art."
    - They are an acknowledgment by the inventor of pre-existing inventions that are similar.
    - The inventor cannot claim infringement against something also contained in a cited patent.
- Until 2011, in the US, patent examiners follow a "first to invent" principle.
    - That is, if two or more parties claim the same invention, the one that can show to have invented the product first wins the patent.
    - As of 2011, the US follows the norm used elsewhere, in which a "first to file" principle is used.

- Enforcement of patents
    - When a patent holder believes someone is infringing on the invention, they can take the defendant to court.
    - In the US, all patent appeals from the US District Courts and the USPTO are held in the Court of Appeals of the Federal Circuit.
        - Established in 1982
        - Goal: to standardize interpretation of patent laws. Avoided the possibility of "forum shopping" for a district that would be favorable to your view.
        - There was concern that the Justice Department, FTC, and lower courts tended to look at patents in terms of antitrust law.
        - Most challenged patents tended to be ruled invalid.
        - In 1980, the Supreme Court ruled that monopoly protection was the point of a patent, so enforcing them was not a violation of antitrust.
    - Since the Court of Appeals was instituted, patents have been more likely to be held up in court.
        - Data:
            - Before 1980, a patent found to be valid was upheld on appeal 62% of the time. Between 1982-1990, this rose to 92%!
            - Similarly, before 1980, a finding of an invalid patent was only overturned 12% of the time. This rose to 28% between 1982-1990.
    - Possible remedies
        - An injunction barring further use of infringing item
        - Damages equal to lost profits.
        - The court can also require the defendant to pay the plaintiff's court costs and attorney's fees.

B. Copyrights

- Copyrights offer protection for "original work of authorship" that is "fixed in any tangible medium of expression."
    - E.g. literature, art, music
- Legal issues
    - Copyrights can be affixed by the author, and can be registered at the Copyright Office.
    - Protection typically extends for the life of the creator + 70 years (or 95 years total for corporations).
        - In the US, these terms were set in 1998. Until then, protection typically extended for the life of the creator + 50 years.
    - Unlike patents, uniqueness is not an issue.
        - Two or more authors can claim copyright protection for similar works, as long as they are both original.
        - Originality means that the work was not already in the public domain.

- Patents provide protection to an idea. Copyrights provide protection to the expression of an idea, rather than the idea itself.

- Copyrights grant five basic rights:
  1. The right to reproduce the protected work
  2. The right to prepare derivative works from the protected work
  3. The right to distribute copies
  4. The right to perform literary, musical, dramatic, and choreographic works publicly
  5. The right to display such works.
- Limits to copyright protection
  0. "Originality" only means that a work has not been copied. Independent creation of an identical work is legal.
  1. Scope of protection varies with creative content of the material.
     - E.g. names, places, and events of non-fiction are not copyrightable.
  2. Reproduction allowed for "fair use"
     - "Fair use" includes literary criticism, parody, and classroom teaching.
  3. For sale doctrine
     - Consumers can resell books, CD's, etc.
     - The assumption is that the initial purchase price includes the value of any future resales.
- Possible remedies are stronger than for other forms of IPR.
  - Monetary damages, including statutory damages.
  - Infringing material may be impounded.
    - The court may order this material sold or destroyed.
  - Can be fined up to $10,000 or imprisoned for up to one year.

C. Semiconductor Chip Protection

- Because semiconductor chips were being copied by foreign inventors, Congress passed the Semiconductor Chip Act of 1984.
  - Fine-tunes copyright law to fit needs of a new technology.
- Changes to standard copyright law for semiconductors:
  - Limits protection to 10 years
  - Codifies process of reverse engineering, which is legal.
    - That is, a resulting chip does not infringe if it is the result of study and analysis, which is likely to be documented by firms.
  - Provides more limited remedies than standard copyright laws.
  - Originality standard is higher than standard copyright laws.

D. Trademarks

- Provides orderly rules for marketing.
- Trademarks are registered with the USPTO.
- Trademarks must be distinctive.
    - E.g. cannot use “orange” to refer to a citrus product.
    - Cannot simply be descriptive (“pasteurized” milk cannot be registered as a trademark)
- Trademark violations are upheld when a likelihood of confusion is found.

E. Trade Secrets

- A trade secret is “any formula, pattern, device, or compilation of information which is used in one’s business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it.”
- Trade secret law makes stealing a trade secret illegal.
    - Still can be reverse engineered
    - Trade secret laws are found in state, not federal, law.
    - Varies across states.
    - However, 16 states have enacted the Uniform Trade Secrets Act
- The value of a trade secret depends solely on its commercial value.
    - It is, by definition, not made public, so disclosure for public benefit is not an issue.
- Possible remedies are injunctive relief and damages.
- Policies vary by country.
    - In Japan and Germany, firms must reveal trade secrets at trial.
    - In the 1970s, Coca-Cola withdrew from the Indian market rather than comply with a law requiring transfer of technology (e.g. the Coca-Cola recipe) to an Indian company.

II. Economic Issues for Patents

- Reward theory of patent protection
  - Monopoly rents provide a reward for successful innovation
    - Justification is to allow firms to recoup private expenses of R&D.
    - Necessary if the resulting knowledge is a public good.
  - However, because goods are sold at a higher price, the quantity is lower and there is a deadweight loss, conditional on the invention having taken place.
- Contract theory of patent protection
  - Patents are contracts between inventors and society
  - Monopoly rights granted in exchange for diffusion of information
    - If the information in a patent is useful to other inventors, there is a positive externality created.
- Patent races
  - Because patents provide a valuable monopoly, researchers may put too much effort into trying to be first.
  - The idea of a patent race is that firms *overinvest* in order to win the race. That is, innovation proceeds too quickly.
  - However, since empirical work suggests the social rate of return is greater than the private rate of return, this problem does not appear to be large enough to dominate the public goods nature of knowledge.
    - Still, awareness of the possibility is useful for efficient policy design
- How long should patent protection last?
  - Policy must trade off the benefits of longer protection (more inventions) with the costs (slower diffusion).
    - Marginal benefit of additional protection: additional inventions inspired from increased length.
      - We assume the MB declines as length increases.
      - Since knowledge becomes obsolete eventually, gains from increasing length benefit fewer and fewer long lasting inventions.
    - Marginal cost of additional protection: additional lost welfare from increased property rights.
      - MC slopes upward because social costs increase over time – more alternatives are kept out of the market.
  - Early work by Nordhaus (1969) suggested that the US length of 17 years was optimal, but there is not consensus on this result.
  - MB higher for more significant inventions
    - As a result, optimal length would be higher
  - How can patent policy deal with this?
    - Petty patents
      - Petty patents are used for minor inventions. They receive shorter protection.
      - Germany issues petty patents, but only gives protection for three years.

        - Patent renewal fees
            - In Germany, renewal fees start small and increase over time.
            - Only patents that are major inventions are likely to be renewed for the whole 20 year period.
- Patent scope
    - Patent scope refers to how broad a patent can be – that is, how close must an invention be to the patent to be considered infringement.
    - Broader scope makes patents more valuable to firms after the invention is complete, yet may lower incentives to do the R&D, since the likelihood of infringing on another patent is greater.
        - The tradeoff is most apparent in fields where invention is cumulative.
        - Currently, the debate is over whether too many "obvious" inventions are patented.
    - Doctrine of Equivalents – an invention that does not literally infringe upon a patent can still be found to infringe if the differences are insubstantial.
        - Has been applied more liberally by the Circuit Court of Appeals.
        - Some observers are concerned that it has been used too liberally.
        - As we'll see, many recent policy questions revolve around the appropriate scope of patent protection.
        - For now, simply note that standards vary across countries.
            - U.S. allows a broader range of patents
            - E.U. focuses on technicality and industrial applicability
- Are patents necessary?
    - Knowledge as public good argument assumes copying is easy
        - If it is not, other means of appropriabilty, such as first mover advantage, may be effective
            - For example, using knowledge generated by others may require absorptive capacity
        - If secrecy is effective protection, patents are less important
    - This motivates the discussion of our next class, where we will discuss when firms are or are not likely to use patents as a means of protecting innovation.

III. Economic Issues for Copyrights

- Copyrights give incentives to the original creator, but may make it difficult to develop new products related to protected material.
    - Copyrights include the right to make derivative work.
        - Derivative work is work based on preexisting work.
        - Others must obtain permission from the copyright holder.
- How can firms behave in a world where copying makes it difficult to enforce copyrights?
    - Digital media make copying easier.
    - What strategies can firms use to still earn money?
    - Note that prices could be higher or lower.
        - While this may seem counterintuitive, the logic is as follows:
            - Low price, with no frills: encourages lots of sales. People with lower willingness to pay will buy. However, little profit per sale.
                - If there is some cost to sharing , a lower price encourages more people to buy the original.
                - What might these costs be?
                    - Lower quality
                    - Transaction cost of copying (lower with IT)
                        - Digital rights management adds costs
                - Fear of punishment
            - High price, with added quality (e.g. allow a copy): Only capture surplus from those with high willingness to pay. However, earning more per sale.
                - Some consumers are willing to pay more for the ability to make copies, etc.
- Varian suggests several strategies, such as complementary products to enhance the value of the purchase, as strategies to deal with weak copyright protection. We'll discuss these in the information technology section of the course.