PATENTS AND OTHER INTELLECTUAL PROPERTY RIGHTS

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Keywords: Efficiency, incentives, innovation, invention, market failure, monopoly, property rights, public good, second best.

Contents

Summary

This article reviews intellectual property rights (IPRs), with some emphasis on the protection of agricultural and life sciences innovations. The main institutional features of IPRs are first discussed, along with a brief historical background and an articulation of the main rationale for the existence of such rights. This is followed by an overview of the principal economic issues related to IPRs. The main benefits/costs trade-offs of allowing patents and other IPRs are explained, and specific issues are then analyzed in some depth, including the scope of patent protection, the effects of patent races, and the problems arising when IPRs concern cumulative and/or complementary innovations. The economics of IPRs are further illustrated by a discussion of instruments alternative to patents, such as prizes and government procurement contracts. The article ends with a brief discussion of some open policy issues in this area.

1. Introduction

Property rights are well entrenched in the institutional setting of many societies, and we have come to consider them an integral part of capitalism and market-oriented

economies. Intellectual property rights (IPRs) are special kinds of property rights defined over some intangible assets associated with human inventiveness and creativity. The economic rights that individuals have on assets are conceptually distinct from associated legal rights, although economic rights are enhanced by the existence of an appropriate legal system that clearly defines such rights and improves enforcement. This is particularly relevant for IPRs, where the intangible nature of the assets involved means that the actual functioning of these rights owes much to the letter and practice of the law. Several distinct forms of IPRs have evolved over time to define and deal with various forms of property, but they all share the principle that innovators receive a priority or exclusivity in the economic exploitation of the product of their work.

The purpose of this article is to review some of the main issues surrounding IPRs. Although it is readily recognized that the analysis of IPRs gives rise to considerations that touch on many disciplines (including law, history, and moral philosophy), it is arguably the case that IPRs are meant, first and foremost, to address an economic problem. The present article, after a brief presentation of the institutional setting, will therefore focus on the economic implications of IPRs. In this age of seemingly unprecedented scientific and technological breakthroughs, it is of considerable interest to analyze the role that IPRs may play in bringing about innovations and economic growth.

2. A Brief Taxonomy and History

Patents, copyrights, trademarks, and trade secrets are the most common forms of IPRs, although related but distinct forms of intellectual protection have arisen to deal specifically with agricultural innovations. A patent is arguably the strongest form of IPRs. It is typically issued by a government agency (in the United States, for example, the Patent and Trademark Office (PTO)) upon successful evaluation of an application, and confers to the inventor the sole right to exclude others from economically exploiting the innovation (by making it, using it, selling it, etc.) for a limited time period (for most countries this time period is now 20 years from the date of filing).

To be patentable an innovation must be *novel* in the sense of not constituting part of the prior art or, more generally, of not already being in the public domain. In the United States it is possible for an idea to be novel and yet already published, provided the publication date is within one year of the filing date (the implementation of this "grace period" is feasible because of the somewhat unique U.S. *first-to-invent* principle for awarding patents, as opposed to the *first-to-file* criterion used virtually everywhere else). To be patentable, an innovation must also involve an inventive step, meaning that is must be *non obvious* to a person with ordinary skills in the particular field of application. The innovation must also be *useful*, that is, the innovation must permit the solution of a particular problem in at least one application. A major requirement of a patent application is "disclosure." That is, the patent application must describe the invention in sufficient detail to *enable* those skilled in the particular field to practice it. In so doing, the patent application also lays out specific claims as to the scope of the patent itself. In this context, a unique feature of U.S. patent law is the requirement that the best mode of practicing the invention be disclosed in the patent application.

The foregoing describes so-called *utility* patents, the most important and common kind. The subject matter of such patents encompasses machines, industrial processes, composition of matter, and articles of manufacture. Other patents that can be obtained in the United States are (industrial) design patents, utility model (petty) patents, and plant patents. Important kinds of scientific discoveries, such as laws of nature, natural phenomena, and abstract ideas, have traditionally been outside the statutory scope of patents. Recent developments in computer software, information technology, and biotechnology are challenging a constraining interpretation of such exclusions.

Copyrights apply to original works of authorship. Examples illustrating the statutory domain of copyrights include books, photographs, sound recordings, motion pictures, and other artistic works in general. An explicit condition for such creative expressions to be protectable by copyrights is that they be fixed in a tangible medium (because copyrights protect the form of expression rather than the subject matter). Unlike patents, there is no novelty or usefulness requirement, although there are conditions of *originality* (the work has not been copied) and *authorship*. In the United States, works can be registered and deposited at the Copyrights Office, but property rights under the copyright statute exist independently of such a formality. Protection under the copyright statute in the United States extends for the lifetime of the owner plus 50 years.

A trademark is a sign, word, symbol, or device (which may include or combine letters, numbers, pictures, emblems, etc.) that distinguishes the goods or services of an enterprise from those of others. No novelty or originality is necessary, but the main requirement is *distinctiveness* (a mark cannot be a generic description). For trademarks to be valid, they typically have to be registered (in the United States, for example, with the PTO). Any unauthorized use of a mark identical (or confusingly similar) to a valid trademark is prohibited. Protection of trademarks does not have a time limit, provided they are used and renewed periodically.

Trade secrets cover any information a firm may have, including formulae, devices, methods, techniques, processes, etc., that confers to this firm an advantage over competitors from not being generally known. For trade secret protection to apply, the general requirement is that reasonable efforts be undertaken to maintain secrecy. More specifically, protection is extended against another party's discovery by inappropriate means, but a trade secret offers no protection against independent discovery or reverse engineering. In the United States, trade secret protection is rooted in state law, so that the scope of protection may vary across states.

The first law that granted exclusive (but limited in time) rights to the makers of inventions appears to have been implemented by the Republic of Venice in 1474. An important antecedent to U.S. legislation is the 1624 English statute of monopolies, which limited the power of the Crown to grant monopolies. In curtailing such an abused privilege, an exception was made for monopolies granted for "manners of new manufacture." The U.S. patent law is rooted in the Constitution, Article 1, which established that "Congress shall have the power … to promote the progress of science and useful arts by securing for limited times to authors and inventors the exclusive right to their respective writing and discoveries." The first attempt to implement this principle in the United States was with the 1790 U.S. Patent Act, subsequently

amended, extended, and consolidated several times. The bulk of current U.S. legislation dealing with IPRs originated with the Patent Act of 1952.

U.S. patent law only applies within the United States, and each nation essentially grants its own patents. An important exception is the European Patent Office (EPO), which came into existence in 1977 and which grants European patents. As compared with the United States, the EPO patent procedure differs slightly on the determination of novelty (there is not a one-year grace period on published material, for example, and there are no geographical limitations on the identification of admissible prior art) and entails a somewhat more restrictive definition of what is patentable. International treaties and conventions provide a degree of international cooperation. The Paris Convention for the Protection of Industrial Property, originating in 1883 and now adhered to by about 140 countries, provides that each country extends to the citizens of other countries the same IPRs available to its own citizens. It also allows for a right of priority, such that upon filing in a member nation an inventor can, within a given time period, seek protection in other countries with the original filing date applying. The Patent Cooperation Treaty (PCT) came into effect in 1978 and is adhered to by about 90 countries. It facilitates filing for patent protection for the same invention in member countries by providing centralized filing and standardized application procedures. These and related treaties are administered by the World Intellectual Property Organization (WIPO), an intergovernmental organization with headquarters in Geneva, Switzerland.

Further international harmonization in this field has been achieved by the Uruguay Round of the General Agreement on Tariffs and Trade (GATT), the precursor to the current World Trade Organization (WTO), which included an Agreement on Trade Related Intellectual Property Issues (TRIPS). This 1994 agreement provides for national treatment and most favored nation treatment on matters of patents, trademarks, and copyrights. It limits national discretion on what is patentable, limits compulsory licensing, mandates uniform or minimum protection terms (such as the 20-year term for patents), and sets out conditions for exceptions to standard practice. One such exception relates to inventions of plants and animals or essentially biological processes: such innovations can be deemed not patentable by member countries, but in such a case, alternative means of IPR protection—an "effective *sui generis* system"—must be provided.

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Biographical Sketch

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