

Intellectual Property

Intellectual Property is normally defined as the set of products protected under laws associated with copyright, patent, trademark, industrial design, and trade secrets. The US constitution expressly allows for intellectual property protection, albeit for a limited time, in the form of protection of “writings and discoveries” in order to promote “science and useful arts.” The two most important categories are copyright and patent law, and that will be the focus of this article.

Copyright, which covers the expression of ideas (e.g., through words or music) currently lasts for the duration of the author’s lifetime plus 70 years. But the protection is very narrow—if someone else should, by a remarkable coincidence, write exactly the same song or story as you without ever coming into contact with your work, your prior copyright does not prevent him from selling his work. Copyright currently exists on a work without any effort on the part of the author to attain copyright and without any requirement of quality or originality.

Patents, in contrast, last for 20 years. The protection, although shorter, is broader than that of copyright. If someone else independently creates a duplicate of your invention after you have patented yours, your patent can make his invention worthless since he will not have the legal right to sell his version. Even if his invention is slightly different, your patent may prevent him from being able to sell his invention. For this reason it is very important to be the first to patent a valuable patentable idea and ‘patent races’ sometimes occur causing a wasteful use of resources as competitors vie to be first. Unlike copyright, getting the legal patent from the patent office requires the expenditure of resources, and the ideas that are patented must pass several legal hurdles regarding the originality and quality of the ideas before a patent is granted.

Although expression and invention must be transformed into physical embodiments before they can have market value, they can also exist, and indeed must originally exist, in the mind of the creator. As such, traditional laws of property, which require physicality, do not apply. Traditional laws of economics, such as the assumption of scarcity, also seem to no longer apply, since individual expressions and ideas cannot be used up.

Economists have a term for goods which cannot be used up—nonrivalrous consumption (sometimes known as public goods)—and these goods require a different form of analysis than more typical economic goods. In particular, the prices that individual consumers are willing to pay are summed to arrive at an overall demand for the intellectual product, a process known as the vertical addition of demands, as opposed to the more traditional horizontal addition of individual demands to derive the market demand for rivalrous goods.

There is no practical mechanism for the ideal production of nonrivalrous goods, as Arrow concluded in his classic 1962 article, although Demsetz properly noted (in his classic 1969 critique) that efficiency did not require perfection, so that markets might still produce these good efficiently. The difficulty of ideally producing nonrivalrous goods is contained in the well-known tradeoff between production and consumption, to which we now turn.

The Consumption-Production Tradeoff

The fact that ideas and expressions do not get used up allows for an unusual result in terms of the ‘efficient’ or ideal level of consumption. I will illustrate the example with a creative expression but it applies equally well to ideas that are patented.

Since my listening to a song doesn’t reduce your ability to also listen to the same song, efficient consumption of that song, *once it has been produced*, is to allow everyone who has a positive value of the song that is greater than the cost of transmitting the song (often assumed to be zero) to consume the song.

This is a quite remarkable result. For typical goods, such as apples, there are fewer in existence than the number that potential consumers would wish to eat if apples were freely available, thus some rationing mechanism, such as price, must be used to determine who gets the apples. This is because most goods (including apples) are *scarce*. Efficient consumption requires that consumers with the higher values get the apples and consumers with lower values are required to do without apples. The correct *allocation* of apples is important in achieving efficiency.

The ability of one unit of a nonrivalrous good to provide for the entire set of users turns usual rules of consumption efficiency on their head. Beethoven's ninth symphony can be listened to by everyone, today and in every future generation to come, without limit. There is no *allocation* problem to be solved. Thus efficient consumption of Beethoven's ninth, if we assume zero transmittal costs, requires that we allow everyone with a positive value to listen to it.

This would seem to imply that everyone should be allowed to consume all the products that are normally copyrighted, and everyone should be allowed to use the ideas that are normally protected by patent.

But there is a fly in this ointment, which is why the term "tradeoff" exists in this section's heading.

The requirement that all potential consumers be allowed to consume the intellectual products puts some serious restrictions on the price(s) that can be charged for the product. If consumers differ from one another and the producer (creator) is unable to charge different prices to different potential customers, then no matter what price the producer picks, some potential consumers will be priced out of the market—unless the producer picks a price of zero. [If the producer could charge each potential consumer a price slightly below the maximum price that consumers are willing to pay, then all potential consumers would consume the product and efficiency would be achieved, a result known as perfect price discrimination].

A price of zero, alas, provides the producer with no revenues. If producers receive no revenue there is little reason to believe that production will occur. This, then, is the problem is brought about if one attempts to achieve efficient consumption—there is nothing for potential consumers to consume since nothing will be produced at a price of zero. Reducing consumptive efficiency is the cost involved in allowing for increased creation of ideas. As society increases the production of creative ideas by allowing producers of these ideas to control more and more of the production of the embodiments of these ideas, the consumption of these embodiments becomes less and less efficient..

The application of this tradeoff occurs when the competitive model is grafted onto these ideas. If anyone can make a copy (embodiment) of an idea or expression, without

the permission of the original creator, the price of embodiments would be expected to drop to zero (plus the transmission/publication costs) if there was free competition to reproduce physical embodiments since competition drives prices down to the level of marginal (average) cost.

Therefore, if markets are to be used to provide producers with a pecuniary incentive to create intellectual products, creators must be given some degree of control over the use of their products, prohibiting others from copying these ideas or expressions. This is where copyrights and patents come in.

This prohibition on copying is generally referred to as a ‘monopoly’ although for many intellectual products the term is not economically correct. As Edmund Kitch correctly points out, providing property rights does not confer economic monopoly—which would imply that consumers have only a small number of alternative products that are not very good substitutes. In reality, the “monopoly” conferred by copyright is no greater than the monopoly that each worker has on his or her efforts, or that each firm has on products bearing its name. The monopoly created by patent law would generally be somewhat stronger than for copyright law since it is a realistic possibility that others would have independently created the same idea, but the patent eliminates the use of such independent creations. Nevertheless, competition is still possible between the patent holder and other ideas/technologies not limited by the particular patent.

Intellectual property protection, then, can be seen to create two countervailing results. First, it provides authors and inventors the wherewithal to receive remuneration for their activities, which has the beneficial impact of increasing the production of expressions and ideas. On the other hand, copyright and patent laws allow the owners of the intellectual properties to charge positive prices for their use, restricting the usage and consumption of these ideas below their ideal levels.

There are several simplifications in the above story that weaken its generality. First, it is not clear that competition will remove all revenues from creators. The long run zero-profit solution does not arise instantaneously, and since the creator is first to market that temporal advantage would allow some level of payment to be made to the creator.

Second, it is not clear the extent to which copyright owners require remuneration to create their artistic works. The claim that creative production requires remuneration of the producers is fully consistent with the usual market principles. Adam Smith's famous quote about how production doesn't come from the "benevolence" of butchers, bakers, or candlestick makers, but instead derives from their self interested behavior, certainly has a plethora of empirical evidence to support it.

Nevertheless, it has often been argued that artistic creation is often undertaken for reasons having little to do with pecuniary rewards—the idea that artists require payment seems antithetical to various romantic notions of 'art'. [Inventors, on the other hand, are usually thought to be less interested in 'creation for creation's sake' and as such are usually assumed to require compensation.] Even if one does not subscribe to the romantic view of art, however, it is the case that the fame from creating successful works can bring its own rewards and often the ability to generate additional revenues in other markets.

The Optimal Term

One of the most important aspects of intellectual property is its limited term. In principle, economic efficiency would require that the length of protection would be the minimum necessary to provide the author/creator with the incentive to create the product. In this way the restriction on consumption would be minimized and yet the creator would receive sufficient remuneration to produce the product. This would require a different term for each intellectual product.

Although attractive in theory, such an approach does not appear practical and has not been used. The question then becomes what the efficient terms for patent and copyright might be—5 years, 50 years, 150 years?

This has led to much debate, but not much of a consensus.

The problem with determining the optimal term of intellectual property is that all the key elements that one would need to determine the optimal term are not known. These include how much incentive is required to induce creators to create, the size of the harm from reduced consumption during the term of the intellectual property law, the size of the revenues generated during the term of the intellectual property that can be used to

pay the creator, and future interest rates. No one has these facts and the difficulty in learning these facts is such that we may never be in a position to determine the optimal term.

Alternatives to Intellectual Property

Because of the imperfections of market based intellectual property systems, various alternatives have been proposed from time to time. There are two common themes of these alternatives—they tend to be government sponsored and they appear to eliminate the problems with inefficient consumption.

In these alternative systems, the government gives funding to creators. The advantage of such a system is that competition would force the price of the intellectual products down to their transmission/reproduction costs and there would be no consumers denied the product due to a price being above the transmission/reproduction costs. Of course, the funding of these products through tax revenues causes its own set of inefficiencies that might otherwise appear to be hidden from view, and there is no reason to believe that the inefficiencies from the tax code will be less than the inefficiencies from having too few users of intellectual products.

A more serious problem with this system, however, would be the ability of the government to decide how much revenue to pay to creators. Even a well-intentioned government would have great difficulty determining the optimal size of the pot that would be shared by various authors/creators. Even though the market based system of intellectual property is imperfect in generating revenues, it is far more likely to track the direction and size of the ‘optimal’ market than will even the best intentioned efforts of government functionaries attempting to perform the same task, for the simple reason that without a market to provide guidance it is virtually impossible to divine even a rough approximation to the prices and quantities that would be found in an ideal market.

A final problem with this solution is to determine which authors and which inventions should be most richly rewarded. For material such as books and music it might not be too difficult to get some measure of relative sales of reproductions and from that make a determination of the relative payments to be made to authors, since one can

examine the market shares of the sales of reproductions. Determining the relative market value of inventions would seem to be a much more difficult task, however.

Finally, all of this assumes that government run intellectual property system is purely well-intentioned and insulated from political considerations. Given our understanding of government regulation of markets, developed over several decades, it seems fair to say that politics will almost certainly enter these decisions and that the bureaucrats put in charge of these agencies will not be immune from the entreaties of various participants in these actions. Giving away other people's money is not a job that we should expect mere mortals to accomplish without expecting a good deal of rent-seeking, if not outright corruption.

Current controversies

The reliance on property rights comes to the fore in the current controversy surrounding file-sharing. It has been suggested by several prominent legal academics, following the lead of Lawrence Lessig, that traditional copyright protection of music be discarded and replaced with an organization along the lines of ASCAP or BMI, which would collect monies from taxes in related markets such as ISPs or blank CDs, and distribute the monies to creators. This is merely a variant of government provision discussed above, with all of its limitations. It is possible, however, that file-sharing cannot be controlled and that the market for sound recordings might essentially vanish. In that case some alternative is probably better than nothing, although government provision can in principle create losses greater than the vanishing of the market.

Another recent controversy surrounds the Sonny Bono Copyright Term Extension Act of 1998, which retroactively increased copyright protection from 50 to 70 years after the death of the author. The act was challenged as being unconstitutional. A group of 17 famous economists (Akerlof et. al., 2002) wrote a brief in that case criticizing the efficiency of the act. Part of their criticism had to do with the retroactive increase in copyright for old works. After all, increasing the term of copyright for already created works cannot increase the number of already created works, although it would increase the harm from having some consumers priced out of the market. The other part of their criticism had to do with the extension of the copyright term. In their view the present

value of the additional revenues fifty plus years down the road was too small to have an impact on the production of new creations and thus served no purposes. Liebowitz and Margolis (2004) criticize this brief, arguing that there are potentially valuable reasons to allow current copyright holders control over their works independent of whether it leads to new creation. Secondly, they argue that even a small increase in expected revenues can have a relatively large impact on the number of new creations, depending on the elasticity of supply, a factor ignored by the 17 economists. They also point out that a high percentage of best-sellers, which are responsible for a majority of trade sales, remained in print for over 60 years, thus indicating that the copyright extension might be expected to have an impact on incentives to create.

Kenneth J. Arrow, "Economic Welfare and the Allocation of Resources for Invention", in R. Nelson (ed.), *The Rate and Direction of Inventive Activity*. Princeton, NJ: Princeton University Press, 1962).

Brief of George A. Akerlof et al. as Amici Curiae in support of Petitioners at 12, *Eldred v. Ashcroft*, No. 01-618 (2002). <http://www.aei-brookings.org/admin/authorpdfs/page.php?id=16>

Harold Demsetz, "Information and Efficiency: Another Viewpoint," 12 *Journal of Law and Economics* 12, 1-22 (1969).

Edmund W. Kitch, "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 53 *Vanderbilt Law Review*, November, 2000, p. 1727.

Lawrence Lessig, *The Future of Ideas*, Vintage Books, 2001, New York

Stan J. Liebowitz and Stephen E. Margolis "Seventeen Famous Economists Weigh in on Copyright: The Role of Theory, Empirics, and Network Effects." <http://www.aei-brookings.org/admin/authorpdfs/page.php?id=318>