

# Improving Upon the Current Patent System

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## Introduction

From an economic perspective, the current patent system is flawed. The purpose of the patent system should be to give the inventor a reward proportional to the amount that his invention adds to society. By this measure, the current patent system has several flaws.

Defenders of the current system of granting intellectual property rights to inventors cite both moral and economic analysis to defend their position.<sup>1</sup> From an economic perspective, some economists (most notably John Stuart Mill) supported intellectual property protection because it allows the market to naturally price the value of the invention. Unfortunately, the current patent system has several flaws.

## Intellectual Property Rights

The biggest problem with giving any party exclusive rights to the use of an idea is that it naturally encourages economic inefficiency in the form of monopoly. If the patent protects the production of a certain product, the inventor can control the pricing of that product. Since nobody else is allowed to manufacture the product, the inventor can set the price of his good without worrying about being undercut by a competitor. This leads to a

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<sup>1</sup> John Stuart Mill, *Principals of Political Economy with Some of Their Applications to Social Philosophy* (1872)

price that is determined in too great a capacity by demand instead of production costs. The unfortunate side effect of this is that consumers who would otherwise benefit by the consumption of the product can become priced out of the market. The producer gains from this optimal pricing system, but all of his gains come from a direct loss to consumers. If the idea being patented is a production process, a similar inefficiency results.<sup>2</sup> A superior production process should lead to increased output or decreased unit production costs. In a competitive market, this should lead to a price reduction across the board in manufacturers of that product. However, when only one producer has access to the technology, the producer is able to make more profit while the market fails to provide an efficient level of the product.

The other unfortunate consequence of the current system is the encouragement of defensive patents. Corporations use this type of patent as a strategic competitive weapon. The idea of a defensive patent is that a company might patent an idea that it has no intention of utilizing in order to prevent an opponent from using the idea.<sup>3</sup> An example might be a manufacturing process that could reduce the opponent's manufacturing costs. A lower marginal cost for the opponent leads to lower market prices and thus a declining profit for the original company. The net effect of this patent should be obvious, however. By preventing the competitor from using the manufacturing process, the company not only reduces that company's profit margin, it reduces consumer surplus for the users of the product.

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<sup>2</sup> Davis, Lee N. Should We Consider Alternative Incentives for Basic Research? Patents Vs. Prizes; Department of Industrial Economics and Strategy- Copenhagen Business School

<sup>3</sup> John H. Barton, Reforming the Patent System, Science Vol 287, Number 5460, 1933-1934; March 17, 2000

Another problem with the current process is that it produces a pricing structure that can be misunderstood by the average consumer. Since politicians often base their decisions on the understanding of the average consumer, this type of misunderstanding becomes a problem. An example of this is the misunderstanding of the reimportation of drugs in the United States.<sup>4</sup> The idea of reimportation of drugs back into the United States has been argued heatedly in both public and political arenas. This topic affects a wide variety of people because there are so many different issues to address. The elderly are affected because it is them who predominately need these drugs. The drug industry is influenced by this subject because they are the ones who have to cover the costs of the reimportation. Ultimately, this is an issue about healthcare and money so American society as a whole is affected as well.

Specifically, the reimportation of drugs concerns the sale of drugs, initially produced to be sold at lower prices in another country, in America. They can be brought back into the U.S. and sold for a cheaper price than the American equivalent. For example, Pfizer may sell Lipitor in the United States for twenty dollars, while they offer it for sale in Mexico for five dollars. Reimportation of drugs is the idea that someone can buy Lipitor in Mexico and then bring it back into the United States and sell it for ten dollars.

Reimportation occurs because of differences in cost of living. Drug companies understand that people in the United States make more money than people in India. If the company tries to sell their drug to India for the price that the United States pays, then people in the poorer country would not buy it. Thus, the company would lose the market.

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<sup>4</sup> Meier, Conrad. *Drug Reimportation Bill Called 'Risky'*. Health Care News: Heartland Institute. September 2003.

In order to avoid this from happening, the company decides to charge less money to the poorer country in order to make some profit. And because the price difference is so drastic in some areas, people are able to buy drugs in the poorer country and then transport them into the United States and offer them at a discount to the American price.

At first glance, one may assume that reimportation should not be a problem. It seems that everyone wins. This is true only to a certain extent; people in the United States do get their drugs for a lower price than what they would be paying. Seems like a wonderful plan that should be implemented. Well, not exactly. The consumer does win currently, but only at the expense of the large drug companies. These companies are losing money because now they cannot sell their drug at the normal price. Those in favor of drug reimportation widely believe that the drug companies have more than enough money to support themselves. However, with a cheap alternative available to U.S. consumers, the drug companies are unable to sell the drugs produced for the U.S. and as a result their profits suffer. Declining profits mean that ultimately, the companies will have to cut costs. The highest cost that a drug company endures is research and development. For a single drug, a company spends around \$500M in research. If R&D costs were cut, the advancements of medicine will be hurt. What seems like a good idea in the short run, has clear negative implications in the long run.

Currently, the reimportation of drugs is illegal in the United States. The problem, however, lies in the types of citizens who are breaking the law. The people most guilty of buying reimported drugs are the elderly, the poor and the terminally ill. There are few political leaders and law officials who want to condemn this group of citizens. Even though it is understood that in the long term, this will have large detrimental effects on

our health as well as our economy, leaders are hesitant to stand up against the drug reimportation.

Reimportation of drugs is a topic that will continue to be argued until Congress is able to come to a solution that is mutually beneficial to all parties involved. They must find a way to balance the needs those who are rely on these drugs with the needs of the pharmaceutical companies without mortgaging our future for health and safety. We propose a new system that can address many of the problems with the current patent system, including the complex issue of drug reimportation.

## **Reward System and Optional Reward System**

One of the alternatives to awarding absolute control over the production of new products to the inventor that has been proposed is a reward system.<sup>5</sup> Is it possible for the rewards system to be Pareto superior<sup>6</sup> to the existing patent system? As long as the new system provides a level of reward that is equal to or greater than the value of intellectual property rights, without sacrificing economic efficiency, we can conclude that the system is the socially optimal means for rewarding innovation. In fact, this constraint can be loosened. All that is needed to make the new system socially optimal is an improvement in inventors' motivation to create with no additional loss in efficiency.

In their paper published in *The Journal of Law and Economics*,<sup>7</sup> Steven Shavell and Tanguy Van Ypersele produce an analytical theory-based comparison of such a system against the intellectual property system. They note that granting intellectual

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<sup>5</sup> Kremer, Michael; Patent Buyouts: A Mechanism for Encouraging Innovation. *The Quarterly Journal of Economics*, November 1998

<sup>6</sup> Pareto, Vilfredo

<sup>7</sup> Shavell, Steven & Van Ypersele, Tanguy, Rewards vs. Intellectual Property Rights; *The Journal of Law and Economics*, vol. XLIV (October 2001)

property rights promotes monopolistic pricing. They also note the drawback of a reward system, which is an inefficient correlation with demand for a product and reward level. They propose an “optional reward system,” where an innovator may choose between a patent and a reward. The inventor would be more likely to choose patent for products with very inelastic demand curves. Such products are more common in the pharmaceutical industry, for example. In an efficient market, drugs are very cheap regardless of how highly demanded they are. This is because the manufacture of pills is very inexpensive. Once the patent on a drug has run out, competition drives the price of the pills down to the marginal cost of production. However, if there is only one producer of the drug, the producer can charge a price as high as the market can bear. This leads to high profits for the producer. Conversely, an inventor will choose reward for products with an elastic demand curve. This might be the case for a new type of television screen. The reward will be higher than the profit the innovator could obtain through intellectual property rights because the control he has over pricing is not as valuable with the television screens. He would prefer to let competitors produce his product and accept a reward based on total sales, since sales will be relatively high in equilibrium.

Their optional reward system is indeed Pareto superior to the current patent system. The reason for this, according to the authors, is that when the inventor chooses the reward, he is choosing a system with higher economic efficiency. When he chooses a patent, there is no change in welfare. In either case, the innovator is at least as well off as under the old system. Thus, there is at least as much encouragement for innovation.

Our analysis questions their results. We then show that careful market analysis can help provide an innovator with an appropriate reward, regardless of the shape of the demand curve for his product. While completely eliminating intellectual property rights would not be Pareto optimal, we argue that the complete implementation of rewards for inventions would be socially optimal.

## **Model**

The work done by Shavelle and Van Ypersele holds under the assumptions made by classical economic theory. However, they also make the assumption that raising money for the reward system is costless. We know that this is not the case: a government cannot raise money in an economically efficient way. Raising money through taxes produces a deadweight loss for society. The theory can still be shown to hold if it can be shown that the net loss resulting from taxation is less than the loss associated with monopoly pricing. However, the authors' claim that market efficiency increases when the innovator chooses reward can be disputed.

Let's suppose, for example, that the government budget is explained entirely by regulation of the good in question. That is, all government income and spending comes from the system involving the patented good. If this is the case, the government will need to levy a tax on the product if it intends to provide an award to the innovator. In order to compensate the inventor by an amount at least as great as what he would receive had he been given property rights, the government will need to raise that amount of money through taxes. The profitability of intellectual property rights is described mathematically by the following term:

$$(1) \int_0^{Q_M} [D(q) - S(q)] dq - \int_0^{Q_M} [D(q) - D(p)] dq - \int_0^{Q_M} [S(c) - S(q)] dq$$

where  $D(q)$  is the demand curve for the product,  $S(q)$  is the supply curve,  $p$  is the monopoly price,  $Q_M$  is the monopoly quantity, and  $c$  is the marginal cost of production at  $q = Q_M$ . This term represents the amount of money the government must raise to adequately compensate the innovator. The government revenue generated by taxes is described as follows:

$$(2) D(p)[p - S(q)]$$

In order for the government to raise a sufficient amount of money to pay the inventor, (1) must be equal to (2), which is true when  $S(q) = c$ . This leads to a deadweight loss of

$$(3) \int_{Q_M}^{Q_E} [D(q) - S(q)] dq$$

This social loss is exactly the same as the loss in efficiency incurred through monopoly pricing. So, with perfect information, an inventor should be indifferent to choosing reward or patent, and Shevelle and Van Ypersele's reward system provides no change in social welfare.

However, if we extend the model to allow the inventor to have specific knowledge about the market for his product, (a reasonable assumption) the optional reward system runs into problems. In this case, the rational innovator will only exercise his option to choose a reward when it is higher than the profit he would make under the monopoly production of the product. This will be the case when the government overestimated the reward offered to the inventor. To fund the reward, the government would have to increase taxes above the theoretical level of equation (2). This tax increase further drives the market into disequilibrium, increasing the deadweight loss above the monopoly level of equation (3). Clearly, if the innovator chooses to exercise his option to receive an award, social welfare will no doubt be reduced. This is in direct opposition to the idea that welfare is improved when the innovator chooses reward instead of patent. Therefore, our model becomes strictly more inefficient under the optional reward system.

However, realistic changes can be made to our model that would result in the opposite conclusion. Our model can be made more realistic (and complicated) by assuming that the government is bigger and controls many sectors of a global economy. If this is the case, one can make an argument that an inefficiency in another sector can be tolerated to provide efficiency in the patent reward system. Perhaps the government is able to levy taxes more efficiently in another market or otherwise increase revenue. An optimal tariff is one theoretical to raise money effectively. If this is possible, the statements made by Shevelle and Van Ypersele remain true. Clearly though, it is feasible that giving inventors the option of accepting a reward can cause efficiency problems.

Therefore, it is our conclusion that the current patent system for rewarding innovation can be improved upon. The implementation of a reward system would be optimal to granting all inventors intellectual property rights.

## **Proposed System**

Any reward system discussed will produce economic inefficiencies.<sup>8</sup> The reward system has the potential to be much better for social welfare. An ideal reward system would come in the form of a per-unit grant. The flaws in this system have been elaborated upon and addressed in the earlier sections of this paper. The pros are that the government would be able to choose a reward level commensurate with the social relevance of the patent and choose a reward level to maximize social welfare. The reward system would need to be flexible, and it must be adjusted based on the shape of the demand curve for the patented product. Special attention would need to be paid to high impact, low marginal production cost inventions. If evaluated correctly, this system not only improves the efficiency of the market for the good, it will actually provide a more accurate incentive for innovation than the current patent system. For example, the reward for the discovery for a cure for HIV should be higher than almost any other invention because of the extremely high consumer surplus of the consumers on the far left of the demand curve. A flat reward system would not provide a high enough incentive to cure HIV, while the current patent system would lead to ridiculously high prices that eliminates some consumers from the market. A flexible rewards system would be superior to either proposed system in both arenas.

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<sup>8</sup> Levin, Jonathan & Levin, Richard; Patent Oppositions, Stanford Institute for Economic Policy Research

In addition, a flexible rewards system would reduce the pursuit of defensive patents. Under the reward system, the payout would be determined by how much the patent is used. If the patent is not to be used at all, the holder will not receive a reward. And since the holder will not have exclusive property rights, he will have no incentive to apply for the patent unless he intends on using it himself or a competitor intends on using the idea. The holder will get paid when the competitor uses the idea, but in most cases, the idea will still be practically applied. In addition, the idea will be able to be expanded on and further innovation will not be discouraged. The new system would not eliminate defensive patents altogether, because it would still be profitable for companies to patent ideas they think might be used later, but it would enable people to be able to use these ideas.

Finally, under a flexible rewards system, we would see a little bit less influence from politics, which can corrupt even the most well designed government structure. On the topic of the reimportation of drugs, the new system would provide the best solution possible: cheaper drugs as well as consistent incentive for drug manufacturers to innovate.

## **Conclusion**

In the past two decades the United States has seen many changes in its patent policy. These changes and reforms were instituted in an attempt to strengthen and extend the protection that a patent provides to an inventor. In analyzing the recent patent reforms, we can classify them in three groups. First, there have been reforms designed to provide patent protection to new types of inventions. In the early 1980s there were a series of Supreme Court rulings that allowed genetically engineered bacteria and software

to be patented. Additionally, in *State Street Bank & Trust v. Signature Financial Group* (1998), a federal circuit court ruled that both business methods and financial service products were patentable. Second, we have witnessed reforms that increase the power patent holders have in infringement lawsuits. In 1982 Congress passed the Federal Courts Improvements Act which created the Court of Appeals for the Federal Circuit (CAFC). All appeals from the many district courts of all patent cases are now assigned to this court. The idea behind the creation of the CFAC was to eliminate the incentive for patent infringers to seek out specific courts that could be described as being traditionally unsympathetic to patentees. As a result there have been noticeable increases in the number of rulings upheld in favor of patent holders. Third, the length of a patent was increased. Instead of lasting 17 years from the date of issuance, patents now have a term of 20 years from the date of application.

The result of the many patent reforms that we have witnessed in recent years has been a positive one. New patent applications rose from around 60,000 per year in the 80s to around 150,000 per year in the late 90s. In the Constitution, Congress is empowered to “promote the progress of science and useful arts, by securing for limited times to Authors and Inventors the exclusive right to their respective writings and discoveries,” and the patent reforms have certainly helped do this more effectively. What we have proposed in this paper is that, instead of taking a narrow minded approach and promoting invention by benefiting the inventor, we should attempt to reward the inventor while also considering social welfare. We believe that Congress should promote the progress of science and the useful arts by providing to authors and inventors a reward proportional to the benefits that society receives from their respective writings and discoveries.