

# INTRODUCTION: The Kauffman Foundation Conference on Intellectual Property and Innovation

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## THE KAUFFMAN FOUNDATION CONFERENCE ON INTELLECTUAL PROPERTY AND INNOVATION

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This special issue offers a selection of papers, all presented at the Kauffman Foundation Conference on Intellectual Property and Innovation, held in St. Louis (USA) on April 2-3, 2009. This conference was organized by the Center on Law, Innovation and Economic Growth of the Washington University School of Law, and sponsored by the Ewing Marion Kauffman Foundation and the Skandalaris Center for Entrepreneurial Studies.

The conference endeavored in particular to debate a recent book authored by two Washington University economists, Michele Boldrin and David K. Levine, entitled *Against Intellectual Monopoly* (Cambridge University Press, 2008). In this book, Boldrin and Levine argue that patents and copyrights are not essential to stimulate innovation because innovators are usually able to recoup their costs in other ways, for instance through first-mover advantages. Because intellectual

monopoly (which they believe to be a more accurate term than intellectual property) often hinders innovation, the authors propose to simply abolish patents and copyrights.

In their paper “Does Intellectual Monopoly Help Innovation?” Boldrin and Levine clarify their position and respond to criticism. They also point out an interesting analogy between the economic case against protectionism and the economic case against intellectual monopoly. Protectionism can make economic sense in some exceptional cases, but economists generally plead against it because allowing protectionism is a slippery political slope. By analogy, intellectual monopoly can make economic sense under some narrow conditions, but because it tends to expand under the pressure of rent-seeking forces, it may be better to simply abolish it.

Mark A. Lemley responds in “A Cautious Defense of Intellectual Oligopoly With Fringe Competition.” He argues that IP rights are rarely if ever “intellectual monopolies.” They cause deviation from perfect competition, but they do not cause the social harms associated with monopoly pricing. This does not mean that the existing IP regime always gets the balance right, but that some markets do require some form of IP to encourage innovation.

In “Evaluating the Economic Performance of Property Systems,” James Bessen develops a framework for evaluating the performance of property systems. He finds evidence that the U.S. patent system fails in several ways, though his framework does not allow us to determine whether society would be better off without patents.

In “Copyright Abolition and Attribution,” Ben Depoorter, Adam Holland, and Elizabeth Somerstein contemplate what a world without copyright protection would look like. They argue that such a world would in any case need a limited form of copyright protection—a mandatory right of attribution—to make it easier for creators to recoup some of their costs in competitive markets.

The issue ends with four comments. Charles McManis offers a rhetorical perspective in “A Rhetorical Response to Boldrin & Levine: Against Intellectual (Property) Extremism.” Economists tend to believe that they use no rhetoric but only pure logic. McManis (inspired by McCloskey) believes that this view is incorrect and analyzes the rhetorical strategies Boldrin and Levine use in their book. George Selgin and John L. Turner argue in “Watt, Again? Boldrin and Levine Still Exaggerate the Adverse Effect of Patents on the Progress of Steam Power” that James Watt’s patent did not retard the further development of steam technology. In “Responding to the Challenges of ‘Against Intellectual Monopoly,’” Liza Vertinsky makes the point that mainstream law and economics theories do not capture empirical reality

sufficiently well to make the type of policy conclusions that Boldrin and Levine make. More research is needed that is based on the paradigm of New Institutional Economics. The issue ends with “A Recommendation on How to Intelligently Approach Emerging Problems in Intellectual Property Systems” by Douglass C. North, the Nobel Laureate who developed the point that the great acceleration in innovation and productivity we associate with the Industrial Revolution was caused by a better legal protection of inventors. North argues that our current understanding of IP is still incomplete, as we still need to better understand its cognitive, political, and dynamic aspects.

# Does Intellectual Monopoly Help Innovation?\*

MICHELE BOLDRIN AND DAVID K. LEVINE

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*In this paper, we begin our analysis of copyrights and patents by asking: why should creators have the right to control how purchasers make use of an idea or new good? This gives creators a monopoly over the idea. We refer to this right as “intellectual monopoly,” to emphasize that it is this monopoly over all copies of an idea that is controversial, not the right to buy and sell copies. The government does not ordinarily enforce monopolies for producers of other goods. This is because it is widely recognized that monopoly creates many social costs. Intellectual monopoly is no different in this respect. The question we address is whether it also creates social benefits commensurate with these social costs.*

## 1. INTRODUCTION

We are witnesses to both an intense debate over copyrights and patents and a general agreement that some special kind of legal protection is needed to secure for inventors and creators the fruits of their labor. For all the emotion, it seems both those in favor of strengthening and those in favor of weakening existing protection agree that intellectual property laws need to strike a balance between providing sufficient incentive for creation and the freedom to make use of existing ideas. Put differently, both sides agree that intellectual property rights are a “necessary evil” that fosters innovation, and the disagreement is over where the line should be drawn. For the supporters of intellectual property, current monopoly profits are barely enough; for its enemies currently monopoly profits are too high. In fact, one is tempted to say, for many “enemies” of intellectual property, profits are always too high as long as they are positive.

In our recent book *Against Intellectual Monopoly* we reach conclusions that are at variance with both sides. We are not of the view that innovators should work

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\* Based on our book *Against Intellectual Monopoly*, and on the papers presented and the discussions at the Kauffman Foundation Conference on Intellectual Property and Innovation, Washington University St. Louis Law School, April 2009.

out of benevolence. Certainly few people do something in exchange for nothing. Creators of new goods are not different from producers of old ones: they want to be compensated for their effort. However, it is a long and dangerous jump from the assertion that innovators deserve compensation for their efforts to the conclusion that patents and copyrights, that is monopoly, are a good way of providing that reward. Since innovators may be rewarded even without patents and copyright, we should ask: is it true that intellectual property achieves the intended purpose of creating incentives for innovation and creation that offset its considerable harm?

There are three broad types of intellectual property recognized in most legal systems: patents, copyrights and trademarks. Trademarks are different in nature than are patents and copyrights: they serve to identify the providers of goods, services or ideas. Copying or imitating – which would be violations of either copyright or patents – are quite different from lying – which would be a violation of trademark. We do not know of a good reason for allowing market participants to steal identities or masquerade as people they are not. Conversely, there are strong economic advantages to allowing market participants to voluntarily identify themselves. While we may wonder if it is necessary to allow the Intel Corporation a monopoly over the use of the word “inside,” in general there is little economic dispute over the merits of trademarks. We focus, therefore, on patents and copyrights and we refer to these two sets of legally protected rights when we use the terms “Intellectual Property” and “Intellectual Monopoly.”

Some critics, both at this conference and elsewhere, have argued that the term “monopoly” in this case is too strong. Charles McManis (2009), for example, argues in his contribution to this volume that the term is too strong when applied to copyright because the latter seeks to protect “expression” of ideas, not the idea being expressed. Maybe it is too strong, but, in the English vocabulary, we cannot find a better term describing a legal right that allows sellers of, say, books to determine what lawful buyers of their product are allowed to do with it. In particular, how else to define the following facts, if not as an exercise of monopoly power? Publishers of academic journals can prevent the original authors of the articles published in the journal from circulating copies of the same, even for free. Citations from books, or music, or movies that were legally purchased cannot be longer than a few lines or seconds without additional payments to the original publisher, even if such citations are obtained through legal and widely available technologies. As a third, dramatic, example consider the recent Google Books or Google Prints disaster, in which publishers of books that had been legally purchased, at library rates, by libraries around the world have successfully challenged the right of such libraries to enter into cooperation with Google in order to digitize those books and make them searchable and usable on

line, for free, through Google's proprietary technology. Should we not call this an exercise of "monopoly power"? Very well, what should we call it, then? Maybe a crime against culture and the world diffusion of knowledge?

As a matter of fact, a "monopoly" is, in economic parlance, the exclusive right to sell/produce a certain object of service. The U.S. Constitution allows Congress "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."<sup>1</sup> Our perspective on patents and copyright is a similar one: From a social point of view, and in the view of the founding fathers, the purpose of patents and copyrights is not to enrich the few at the expense of the many. Nobody doubts that J.K. Rowling and Bill Gates have been greatly enriched by their intellectual property – nor is it surprising that they would argue in favor of it. But common sense and the U.S. Constitution say that these rights must be justified by bringing benefits to all of us.

The U.S. Constitution is explicit that what is to be given to authors and inventors is an exclusive right – a monopoly. Implicit is the idea that giving this monopoly serves to promote the progress of science and useful arts. The U.S. Constitution was written in 1787. At that time, the idea of copyright and patent was relatively new, the products to which they applied few, and their terms short. In light of the experience of the subsequent 219 years we might ask: is it true that legal grants of monopoly serve to promote the progress of science and the useful arts?

Common sense suggests that it could. How is a musician to make a living if the moment she performs her music, everyone else can copy and give it away for free? Why would the large corporations pay the small inventor when they can simply take his idea? Is not the explosion of creativity and invention unleashed since the writing of the U.S. Constitution a testimony to the powerful benefit of intellectual property? Would not the world without patent and copyright be a sad cold world, empty of new music and of marvelous new inventions? These are the very practical questions that our work tries to address.

We begin by asking: why should creators have the right to control how purchasers make use of an idea or new good? This gives creators a monopoly over the idea. We refer to this right as "intellectual monopoly," to emphasize that it is this monopoly over all copies of an idea that is controversial, not the right to buy and sell copies. The government does not ordinarily enforce monopolies for producers of other goods. This is because it is widely recognized that monopoly creates many social costs. Intellectual monopoly is

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<sup>1</sup> U.S. Constitution Article 1, Section 8. The U.S. Constitution, not being copyrighted, is online at various places, such as <http://www.law.cornell.edu/constitution>.

no different in this respect. The question we address is whether it also creates social benefits commensurate with these social costs.

This may also be the appropriate point to discuss Mark Lemley's (2009) criticism, according to which "monopolistic competition" is the rule of the game in almost every industry, hence what difference does a patent or a copyright make? It makes a big difference: in the market for shoes or bread, competing firms freely select where to position themselves. If one likes to position very close or very far from its competitors, there is no legal constraint to prevent such a choice from being implemented. When patents and copyrights enter the scene the situation changes: one cannot choose to compete with our publisher by lawfully purchasing a copy of our book, reproducing it with legal means, and then try to sell it on the market. The world of free monopolistic competition is an always-changing one. The world of legal monopoly is not, for two decades in the case of patents and for pretty much ever in the case of copyrights. Thereby the qualitative difference. Is it also quantitatively important? We believe it is, and the whole book is practically dedicated to show by means of data and facts that Intellectual Monopoly does make a, negative, quantitative difference on our collective well-being. We may have made the wrong calculations and we may have looked at the wrong facts, but we need to be proved wrong with facts and data. Just arguing that "*cosi' fan tutte*" is not enough.

Recognize, first, that intellectual monopoly is a double-edged sword. The existence of monopolies increases the cost of creation. In one extreme case, a movie that cost \$218 to make had to pay \$400,000 for the music rights.<sup>2</sup> In *Against Intellectual Monopoly* we go through numerous examples of cases where, far from increasing innovation and creation, intellectual monopoly has instead served to inhibit or prevent it. A brief list of examples is instructive:

- Boulton and Watt's steam engine patent most likely delayed the industrial revolution by a couple of decades.
- Selten's automobile patent set back automobile innovation in the United States by roughly the same amount of time.
- The Wright Brothers airplane patent forced innovative work on airplane technology out of the United States to France.
- The patent system of England and France forced the chemical industry to move to Germany and Switzerland, where chemical patents did not exist or were much weaker.

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<sup>2</sup> The \$218 movie was *Tarnation* and the information from BBC News, is at <http://news.bbc.co.uk/2/hi/entertainment/3720455.stm>.

- When Verdi gained copyright over his works he stopped producing new works. More generally, there is no evidence that the adoption of copyrights stimulated the creation of classical music.

Given that we quoted the paradigmatic case of Boulton and Watt, this may be a good place to address the criticisms that George Selgin and John Turner (2006, 2009) have raised against our interpretation of this specific story. We should establish, first of all, that while some of the detailed facts they correct us about are certainly the way they say, an equal number of other are not. So, for example, Ed and William Bull were father and son, and the latter continued the enterprise where the first had left it. Similarly, Hornblower may or may not have paid back huge amounts of royalties to B&W and may or may not have been a poor businessman, but there is no doubt that B&W actively used the legal system to prevent him from marketing his own machine. The book also reports the correct statistics for horsepower and engines installed, and we are grateful to Selgin and Turner for pointing us to the more recent and more reliable data, which we used and that yields the very same result. All these details, at the end, do not change the two main facts upon which our argument is founded: B&W's patent allowed for a monopolization of the English market for steam engines until 1800; the adoption of steam engines exploded only after the patent expired, did so extremely rapidly and it was accompanied by enormous efficiency gains that had been altogether absent during the previous 25 years. We do not make any claim of originality here, dozens of economic historians have argued one of these points or all of them during the last few decades. Our contribution was, purely, to put them together and point the finger to the likely culprit: B&W's patent. Where Selgin and Turner differ from us, at the end, is on the interpretation of these facts. They see this as a natural development and claim that the trajectory is exponential as it should be, in their view. We see it differently and have argued why in the book and elsewhere. This does not seem the place to dwell back on the same set of issues.

Those listed earlier are not the only examples of patent-blocked innovations and development, but are some of the most egregious. In the opposite direction, our book reports numerous examples of how innovation thrives without patents and copyright, and of the various inimical effects of the monopoly wrought by intellectual property. More importantly, we search the empirical literature long and hard without finding a single case in which a strengthening of intellectual monopoly un-controversially increased innovations. We find that a strengthening of intellectual monopoly increases patenting and copyright claims, but patents and copyright do not increase actual innovation.

We are by no means the first economists to reach this conclusion. After reviewing an earlier set of facts in 1958, the distinguished economist Fritz Machlup wrote

*“it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting [a patent system]”* Machlup (1958:80).<sup>3</sup>

## 2. DOES INTELLECTUAL MONOPOLY INCREASE INNOVATION? THEORY

From a theoretical point of view, intellectual monopoly may both increase and decrease innovation: it provides more revenues to those that innovate, but also makes innovation more costly. Innovations generally build on existing innovations. While each individual innovator may earn more if he has an intellectual monopoly, he also faces a higher cost: he must pay off all those other monopolists owning rights to existing innovations.

A number of economic historians, Douglass North and his followers foremost among them, have argued that the great acceleration in innovation and productivity we associate with the Industrial Revolution was caused by the development of ways to protect the rights of inventors, allowing them to profit from their innovations.<sup>4</sup> Central among such ways was the attribution of patents to inventors, and their upholding either by Parliament or by the courts. Relative to the very poorly defined contractual rights of pre-seventeenth century Europe, plagued by royal and aristocratic abuses of property and contracts, there is no doubt that allowing individuals a temporary but well-defined monopoly over the fruits of their inventive effort was a major step forward. Even monopolistic property is much better than a system that allows arbitrary seizure by the rich and powerful. This does not, however, contradict our claim that widespread and ever-growing monopolistic rights are not as socially beneficial as well-defined competitive property rights.

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<sup>3</sup> He nevertheless concluded that we should keep the patent system. We discuss his position further in our conclusion.

<sup>4</sup> A starting point for Douglass North's views of the role that well-defined property rights, and patents in particular, played in the Industrial Revolution are his works of 1981, and 1991. It should be noted that North does not subscribe to a naïve view of the evolution of property rights according to which they become progressively more “efficient” or just simply “better” as time goes on and the economy develops. Being aware of the fact they are, more often than not, determined by rent-seeking agents within a political game, North is careful at pointing out that the system of property rights one often faces is substantially inefficient or inefficiency-inducing along more than one dimension.

To put it differently, about four centuries ago, as Western societies moved away from post-medieval absolutist regimes, the establishment of patents constituted a step forward for the creation of a system of property rights that favored entrepreneurship and free market interaction. By the force of the same reasoning, the abolition of patents and of the distortionary monopolistic rights they entail may well result, now, in an analogous boost to entrepreneurial effort and free competition. The contribution that the Neo-Institutional approach may still provide to this debate was well discussed in the paper by Vertinsky (2009), also in this volume, which raises a number of relevant issues we unfortunately cannot address here. We would like, though, to point out one thing: patents are by no means the only legal instruments allowing for contractability of ideas and for the creation of a market for technology transfers. Beginning with the path-breaking work of Jack Hirshleifer in the early 1970s, it has become clear that economically valuable information can be traded in the absence of patents and under conditions of competition or nearly so. There is no *prima facie* evidence, either theoretical or empirical, for the claim that the disappearance of patents would increase transaction costs associated with technology transfer. Most likely, it will reduce them insofar as it will reduce incentives for rent-seeking, defensive patenting, submarine patenting and all the gigantic legal costs these practices have brought upon us. In summary, well-defined and protected private property of own ideas does not require monopoly over them, pretty much in the same way that private property of our own cars does not require the two of us becoming the only motorized citizens of the USA.

Theory also suggests that small countries with low IP protection should witness a surge in the inflow of IP-related investment after their IP protection is increased, as they capture investments from other countries where intellectual monopoly is protected less. The latter is a particular kind of “zero-sum game”<sup>5</sup> that, unfortunately, appears to have gone beyond a mere theoretical possibility. What is less obvious is what the outcome will be once every country adopts the same high degree of IP protection. Leave aside the more or less terrifying scenarios of escalation – in which countries out-do each other trying to attract IP-related investments by progressively increasing their local protection of intellectual monopoly. It is still worth asking if a world where everyone has the same degree of IP protection as, say, the U.S. currently does is a world with a higher or lower rate of innovation and a higher or lower social welfare than a world with much less IP protection.<sup>6</sup>

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<sup>5</sup> In fact, negative-sum insofar as it increases lobbying efforts and related wasteful transaction costs.

<sup>6</sup> Writing about the use of patents to lure investments away from other countries tempted us to engage in a digression on the role that patents played in Europe, roughly between 1400 and 1800. Here are some hints for further reading. The original purpose of patents was to attract specific

### 3. DOES INTELLECTUAL MONOPOLY INCREASE INNOVATION? FACTS

Theory gives an ambiguous answer, so let us look at evidence, supported by a bit of statistical common sense.

Given the continued extension of patent protection to new areas – business practices and computer software, for example – one might hope that there is recent strong evidence that the introduction of patent protection has led to a substantial increase in innovation. These hopes, alas, are not to be fulfilled: It is already apparent that the recent explosion of patents in the U.S., the EU and Japan, has not brought about anything comparable in terms of useful innovations and aggregate productivity. This we asserted a few years ago, while writing our book, and it is readily apparent today, in the midst of the Great Recession: the patents explosion, certainly, did not bring about any increase in aggregate productivity.

Just as there is no hope of finding evidence supporting the claim “more patents = higher productivity” in recent data, the historical evidence also provides little or no support for this contention.<sup>7</sup>

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groups of artisans and highly skilled professionals that were, for one reason or another, lacking in the country or city promising the patent. Monopoly was the carrot offered by most Italian and Northern European cities to inventors that agreed to emigrate and set up shop there. In England, during the seventeenth, eighteenth and most of the nineteenth centuries a royal patent privilege was awarded to those citizens who would travel abroad and be the first to bring back new goods and technologies. United States patent laws were less inclined to provide incentives to pirate foreign innovators, but it still discriminated heavily against foreign citizens and innovations until the 1861 reform; pirating of foreign inventions, especially British, was thriving. Notice the interesting fact: all these practices just amounted to imitation, or piracy in modern jargon, rewarded with local monopoly! This is something worth keeping in mind in the light of current sermons against Indian, Chinese, Mexican and Brazilian people “pirating our inventions.” Our reading of historical records is that all this “reciprocal stealing” had no effect on the total amount of inventions.

<sup>7</sup> To read more, a few good books to begin with are Epstein and Maarten (2005, eds.), Khan (2005:ch.2), Landes (1969) and Landes (1998). A recent and fairly unbiased synthesis of the historical literature concerned with the impact of patents on the Industrial Revolution and inventive activity during the 18<sup>th</sup> and 19<sup>th</sup> century, McLeod and Nuvolari (2006), concludes by saying “However, it would be wrong to assume that the emergence of patent systems played a critical or determinant role in such a transition. The evidence discussed in this paper has shown that the institutional arrangements supporting inventive activities in this historical phase were extremely variegated and sophisticated. [...] In other words, the roots of western industrialization seem to have been wider and deeper than the emergence of modern patent systems.”

### 3.1. COPYRIGHT AND MUSIC IN THE 18<sup>TH</sup> CENTURY

The effect of copyright is difficult to analyze because it is hard to get reliable data prior to the 19<sup>th</sup> century. Copyright was already fairly ubiquitous across Europe early in the 19<sup>th</sup> century, and its term length there has changed little since then.

The one exception turns out to be in the case of classical music. Copyright was unknown in the world of music until around the end of the 18<sup>th</sup> century. As a result, a large proportion of classical music, still today accounting for about 3% of all music sales but, obviously, a much larger portion of music production until late in the 19<sup>th</sup> century, was produced without the benefit of copyright protection.

Here is what Frederic Scherer, a strong supporter of intellectual property, has to say about it in his extensive study of classical music:

*The evolution of copyright from an occasional grant of royal privilege to a formal and eventually widespread system of law should in principle have enhanced composers' income from publication. The evidence from our quantitative comparison of honoraria received by Beethoven, with no copyright law in his territory, and Robert Schumann, benefiting from nearly universal European copyright, provides at best questionable support for the hypothesis that copyright fundamentally changed composers' fortunes. From the qualitative evidence on Giuseppe Verdi, who was the first important composer to experience the new Italian copyright regime and devise strategies to derive maximum advantage, it is clear that copyright could make a substantial difference. In the case of Verdi, greater remuneration through full exploitation of the copyright system led perceptibly to a lessening of composing effort (Scherer, 2004:191).<sup>8</sup>*

Professor Scherer also exploited the variations in copyright law between European countries, using music to conduct a third natural experiment. He compared the average number of composers born per million population per decade in various European countries. Turning first to England, he considers the pre-copyright period 1700-1752, and the post copyright period 1767-1849. As controls he looks also at what happened in Germany, Austria and Italy in which there was no change in copyright during this period.

	<i>Pre</i>	<i>Post</i>	<i>Ratio</i>
<b>UK</b>	0.348	0.140	0.40
<b>Germany</b>	0.493	0.361	0.73
<b>Italy</b>	0.527	0.186	0.35
<b>Austria</b>	0.713	0.678	0.95

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<sup>8</sup> It should be apparent that everything we know about the impact of copyright on classical music we have learned from Scherer (2004), and his sources. An additional valuable reference for the details relative to the extension of the Statute of Anne to musical compositions is Carroll (2005).

We see that the number of composers per million declined everywhere, but it declined considerably faster in the UK after the introduction of copyright than in Germany or Austria, and at about the same rate as in Italy. So there is no evidence here that copyright increased musical output.

However, the evidence is mixed, because the same experiment in France is more favorable to copyright. In France the pre copyright period is 1700-1768, and the post copyright period is 1783-1849

	<i>Pre</i>	<i>Post</i>	<i>Ratio</i>
<i>France</i>	0.126	0.194	1.54
<i>Germany</i>	0.527	0.340	0.65
<i>Italy</i>	0.587	0.153	0.31
<i>Austria</i>	0.847	0.740	0.86

Here we find that in France when copyright is introduced the number of composers per million increased substantially more than in other countries. This should be noted, as it is pretty much the only piece of evidence we have been able to find which supports the idea that copyright increased classical music production.

Looking more broadly at the entire European scene and at the careers of comparable composers living with or without copyright protection, Scherer finds it difficult to conclude that copyright law was a significant factor either way in determining the amount of musical composition taking place. It may not have reduced the incentive to compose music, but it certainly did not increase it either: whatever the mechanism affecting composers' incentives, copyright protection was not an important part of it.

### 3.2. PATENTS AND INNOVATION IN THE 19<sup>TH</sup> CENTURY

Kenneth Sokoloff, together with Naomi Lamoreaux and Zorina Khan,<sup>9</sup> examined the role of patents in the U.S. in the 19<sup>th</sup> and early 20<sup>th</sup> century. In 1836 the U.S.

*instituted an examination system under which, before granting patents, technical experts scrutinized applications for novelty and for the appropriateness of claims about invention. This procedure made patent rights more secure by increasing the likelihood that a grant for a specified technology would survive a court challenge, and may also have provided some signal about the significance of the new technology. Thereafter, both patenting and sales of patent rights boomed (Lamoreaux and Sokoloff, 2002:7-8).*

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<sup>9</sup> The mentioned research work of Khan, Lamoreaux and Sokoloff is covered in a variety of articles and books, including the book by Khan (2005), which contains a large bibliography. On the growth of intermediaries and their role, see Lamoreaux and Sokoloff (2002). See also Sokoloff and Khan (2000).

The aim of this research is to show that the patent system introduced in the U.S. after the 1830s created a well-defined market for patents and technologies that did not exist previously, and that the creation of such a market led to an increase in the number of patents registered and traded. It should be observed that the institutional change that led to the booming of patenting and the sales of patent rights was to make it more difficult to get patents—quite the opposite of modern institutional changes. In addition, while this research makes it clear that the number of patent agents, and of inventors making use of their services, boomed, they also document that an important portion of the services was to assist inventors in getting patents, and in navigating the thicket of existing patents—socially wasteful activities that would be unnecessary in the absence of a patent system.

One important difficulty is in determining the level of innovative activity. One measure is the number of patents, of course, but this is meaningless in a country that has no patents, or when patent laws change. Petra Moser gets around this problem by examining the catalogs of innovations from 19<sup>th</sup> century World Fairs. Of the catalogued innovations, some are patented, some are not, some are from countries with patent systems, and some are from countries without. Moser catalogues over 30,000 innovations from a variety of industries.

*Mid-nineteenth century Switzerland [a country without patents], for example, had the second highest number of exhibits per capita among all countries that visited the Crystal Palace Exhibition. Moreover, exhibits from countries without patent laws received disproportionate shares of medals for outstanding innovations (Moser, 2003:3).*

Moser does, however, find a significant impact of patent law on the direction of innovation

*The analysis of exhibition data suggests that patent laws may be an important factor in determining the direction of innovative activity. Exhibition data show that countries without patents share an exceptionally strong focus on innovations in two industries: scientific instruments and food processing. At the Crystal Palace, every fourth exhibit from a country without patent laws is a scientific instrument, while no more than one seventh of other countries' innovations belong to this category. At the same time, the patentless countries have significantly smaller shares of innovation in machinery, especially in machinery for manufacturing and agricultural machinery. After the Netherlands abolished her patent system in 1869 for political reasons, the share of Dutch innovations that were devoted to food processing increased from 11 to 37 percent (Moser, 2003:6).*

Moser then goes on to say that

*Nineteenth-century sources report that secrecy was particularly effective at protecting innovations in scientific instruments and in food processing. On the other hand, patenting was essential to protect and motivate innovations in machinery, especially for large-scale manufacturing (Moser, 2003:6).*

It is interesting also that patent laws may reflect the state of industry and innovation in a country

*Anecdotal evidence for the late nineteenth and for the twentieth century suggests that a country's choice of patent laws was often influenced by the nature of her technologies. In the 1880s, for example, two of Switzerland's most important industries, chemicals and textiles, were strongly opposed to the introduction of a patent system, as it would restrict their use of processes developed abroad (Moser, 2003:34-35).<sup>10</sup>*

More recent work by Moser (2005, 2006), exploiting the same data set from two different angles, strengthens this finding – that is, that patents did not increase the level of innovation. In her words: “Comparisons between Britain and the United States suggest that even the most fundamental differences in patent laws failed to raise the proportion of patented innovations” (Moser, 2006:abstract). Her work appears to confirm two of the stylized facts we often insist upon. First that, as we just mentioned in discussing the work of Sokoloff, Lamoreaux and Khan, innovations that are patented tend to be traded more than those that are not, and therefore to disperse geographically farther away from the original area of invention. Based on data for the period 1841-1901, innovation for industries in which patents are widely used is not higher, but rather more dispersed geographically than innovation in industries in which patents are not, or scarcely, used. Second, when the “defensive patenting” motive is absent, as it was in 1851, an extremely small percentage of inventors (less than one in five) chooses patents as a method for maximizing revenues and protecting intellectual property.

Summing up: careful statistical analyses of the 19<sup>th</sup> century's available data, carried out by distinguished economic historians, uniformly show two things. Patents neither increase the rate of innovation, nor are the best instrument to maximize inventors' revenue. Patents create a market in patents and in the legal and technical services required to trade and enforce them.

### 3.3. PATENTS AND INNOVATION IN THE 20<sup>TH</sup> CENTURY

A number of studies have attempted to examine whether introducing or strengthening patent protection leads to greater innovation using data from post WWII advanced economies. We have identified twenty-three economic

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<sup>10</sup> Petra Moser's dissertation, which won the 2003 Gerschenkron Prize awarded by the Economic History Association for the best dissertation in the field, is a mine of valuable information on the role of patents in determining innovative activity during the 19th and early 20th century. The main findings are summarized in Moser (2003).

studies (shown in the table below) that have examined this issue empirically.<sup>11</sup> The executive summary: they find weak or no evidence that strengthening patent regimes increases innovation; they find strong evidence that strengthening the patent regime increases ... patenting! They also find evidence that, in countries with initially weak IP regimes, strengthening IP increases the flow of foreign investment in sectors where patents are frequently used.

<b>Authors</b>	<b>Years</b>	<b>Country</b>	<b>Industry</b>
<i>Arora et al [2003]</i>	1990-2002	U.S.	Many
<i>Arundel</i>	Many	Many	Many
<i>Baldwin and Hanel</i>	1993	Canada	Many
<i>Bessen and Hunt</i>	1980-1996	U.S.	Software
<i>Branstetter and Sakakibara</i>	1988-1998	Japan	Many
<i>Gallini</i>	1980s	U.S.	Many
<i>Hall and Ham</i>	1980-1994	U.S.	Semiconductor
<i>Hall and Zeidonis</i>	1979-1995	U.S.	Semiconductor
<i>Jaffe</i>	Many	Many	Many
<i>Kanwar and Evenson</i>	1981-1990	Many	Aggregate
<i>Kortum and Lerner</i>	1980-2000	U.S.	Many
<i>Lanjouw</i>	1990s	India	Pharmaceutical
<i>Lanjouw and Cockburn</i>	1975-1996	India	Pharmaceutical
<i>Leger</i>	1978-2000	Mexico	Agriculture
<i>Lerner-1</i>	1850-2000	Many	Many
<i>Lerner-2</i>	1971-2000	U.S.	Financial
<i>Levine and Saunders</i>	1981-2001	U.S.	Software
<i>Licht and Zoz</i>	1992	Germany	Many
<i>Lo</i>	c. 1986	Taiwan	Many
<i>Mann</i>	1900-2002	U.S.	Software
<i>Park</i>	1987-1995	OECD	Many
<i>Qian</i>	1979-1999	Many	Pharmaceutical
<i>Sakakibara and Branstetter</i>	1988-1995	Japan	Many
<i>Scherer and Weisbrod</i>	1970s	Italy	Pharmaceutical

The authors who find the strongest effect on innovation of increased patent protection are Kanwar and Evenson (2003), and Lo (2004). The latter examines the 1986 reform in Taiwan, while the former use time series data from a cross section of countries to regress R&D as a fraction of GDP on various variables

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<sup>11</sup> All of the empirical studies listed in the table can be found in the references of the book. The data about patents come from the 2003 Annual Report of the USPTO, which can be found online at [www.uspto.gov/web/offices/com/annual](http://www.uspto.gov/web/offices/com/annual), additional basic data is from [www.cms.hhs.gov](http://www.cms.hhs.gov).

including a qualitative measure of IP protection. Both sets of results are worth examining a bit more closely than the rest.

Lo (2004) finds increased innovation by Taiwanese inventors as measured by R&D expenditure and by the number of U.S. patents they were awarded. However, given the worldwide surge in U.S. patents about this time, and the fact that the number of Taiwanese patents awarded to these same inventors did not much increase, we can neither reliably conclude that the effect of the 1986 law was an increase in innovation, nor a jump in aggregate or sector productivity. What the reform certainly did, and Lo documents this convincingly, was to increase the number of patents awarded to Taiwanese firms, especially in the U.S., which is altogether not surprising. Lo himself points out that the main channel through which the Taiwanese reform had a positive effect was by fostering foreign direct investment in Taiwan, especially in those sectors in which patents are widely used.

This is an important point, which deserves a separate comment. In a world in which strong patent protection in some countries co-exists with weak protection in others, a country that increases patent protection should observe an increase in the inflow of foreign investment, especially in those sectors where patented technologies are used. Profit-maximizing entrepreneurs always choose to operate in those legal environments where their rights are the strongest. In the U.S., for example, economists and people with common sense alike have long argued that the policy of offering tax incentives and subsidies to companies that relocate in one state or another is not a good policy for the United States as a whole. Nobody denies that, if you provide a company with high enough subsidies and tax incentives, it will probably take them and relocate to your state, at least temporarily. The problem is that, after you do so, other states will respond by doing the same, or more. In the ensuing equilibrium, the total amount of investment is roughly the same as when no one was offering a subsidy, but everyone is now paying a distorting tax to finance the subsidy. When capital moves freely across countries, the very same logic applies to the international determination of IP rights. In what economists call the Nash Equilibrium of this game, it is obvious that patent holders prefer to locate in countries with strong IP laws. This increases the stock of capital in the receiving country and reduces it everywhere else, especially in countries with low IP protection. Hence, absent international cooperation, the strong incentive of most countries to keep increasing patent protection, even in the absence of lobbying and bribing by intellectual monopolists.

As for the study by Kanwar and Evanson, they have data on 31 countries for the period 1981-1990. Using two 5-year averages, they find support for the idea that higher protection leads to higher R&D as a fraction of GDP. Their

measures of IP protection do not always seem to make sense, but this is not the proper place to engage in a statistical debate. There are five levels of IP protection and R&D as a fraction of GDP ranges from a ten-year average of .231% in Jordan to 2.822% in Sweden. They find that increasing IP by one level raises R&D as a fraction of GDP between 0.6% and 1.0%. As before, the most favorable interpretation of this result is that countries offering higher levels of IP protection also attract investments in those sectors in which R&D and patents are most relevant. A less favorable interpretation of this result, instead, points out that Kanwar and Evenson have forgotten to include a main determinant of the ratio of R&D to GDP: that is, market size as measured by GDP. The most elementary theory of innovation, either under competition or under monopoly, shows that the innovative effort is increasing in the size of the market, and that large and rich countries will invest a larger share of their GDP in R&D compared with small and poor countries. Putting Kanwar and Evenson's data together with GDP data from the 1990 CIA World Fact Book, we find that a 1% increase in the size of a country as measured by GDP increases the ratio of R&D to GDP by 0.34%.

It is interesting to look at the residual error that is left over after we predict the ratio of (the logarithm of) R&D to GDP from (the logarithm of) GDP. Sorted by IP level we find

<i>IP Level</i>	<i>Average Residual</i>
<b>0</b>	-0.95
<b>1</b>	-0.46
<b>2</b>	0.20
<b>3</b>	0.20
<b>4</b>	0.10

What does this show? The question is whether increasing the IP level leads to an increase in the residual. Moving from level 0 to 1 and from level 1 to level 2 this is true, but not moving from 2 to 3 or from 3 to 4. In other words, once you control for market size, higher IP protection increases the R&D/GDP ratio at the very low levels, but becomes uncorrelated with the R&D/GDP ratio at any level of IP protection equal to 2 or more on the Kanwar and Evenson scale. This reinforces the idea that what we are seeing is primarily the effect of foreign investment. Among poor countries with low IP protection, increases bring in more foreign investment and raise R&D. In richer countries with high levels of IP, foreign investment is not an issue, and increases in IP have little or no effect on innovation.

### 3.4. DATABASES

The case of databases is still an experiment in the making, or at least it was until about five years ago. Unusually enough, the U.S. is, at least for now, on the right side of the divide. Databases, it seems obvious, have become increasingly important for private individuals, businesses, academic researchers, industrial R&D and, unfortunately, also for national security.

The experiment-in-the-making and the intense debate accompanying it, both began in 1996. On March 11, the European Union issued a directive requiring member states to provide statutory protection of databases on the basis of copyright, even if the database in question contained material that was not itself under copyright. The EU also tried to force non-member states to accept its directive. It did this by deciding that EU protection would be extended to their citizens only if the non-member states provided similar protection. By 2001, all EU countries had fully implemented the EU directive.

Which one do you think is higher: The rate of creation of databases in the EU – where they are protected by IP – or in the U.S. – where they are not? Well, you guessed right: in the U.S. In fact, it is not even a race, the U.S. wins hands down, as Block points out. After documenting in detail the excellent state of the database industry in the U.S., its amazing growth rate and productivity, as well as the fact that the adoption of the directive does not seem to have produced any sustained increase in the EU's production of databases, Block adds

*For the entire period measured, U.S. online database production outpaced all of Europe by a factor of nearly 2.5:1 ... American dominance of database production cannot be explained by incentives given to creators because American protection of database rights is much weaker than the Directive (Block, 2000:7).*

To which we only add that, most probably, American dominance of the industry *can* be explained by economic incentives to creators as measured by the actual profits accruing to them and by the competitive environment in which they operate, and that, almost certainly, neither of them is increased much by the EU Directive.

## 4. ABOLITION

Defenders of intellectual monopoly like to portray intellectual property as a powerful and beneficial medicine. If a medicine has serious side effects and scientific studies have found at best weak evidence of temporary benefits, would you employ such a drug on an otherwise healthy patient? Probably not, unless the illness was life threatening. Yet we have documented that innovation thrives in the absence of intellectual monopoly (the patient is healthy), that the

latter has serious side effects (the evils of intellectual monopoly) and that a series of scientific studies have found weak or no evidence that it increases innovation (the proposed beneficial effect is probably absent).

“On the basis of the present knowledge” progressively but effectively abolishing intellectual property protection is the only socially responsible thing to do. Evidence has accumulated during the last fifty years leaving little doubt about the damaging effects of current intellectual property laws. At the same time, legal, economic, and business know-how has also accumulated about how markets for innovation operate without intellectual monopoly. To rule out abolition *a priori* would be no more sensible now than it would have been to rule out the abolition of tariffs and trade barriers fifty years ago, when the trade liberalization process that has given us prosperity and globalization began. For a long time, the individuals and firms that profited from trade barriers argued that these increased the wealth of the nation, defended homeland companies and jobs, and that abolishing them would lead to a disaster for many sectors of our economy. It took a while to realize this was not true, and that trade barriers were nothing more than rent-seeking devices, favoring a minority and dramatically hurting the overall economy and everyone else, beginning with low-income consumers. The same is now true of patents and copyright.

Which leads us to address, albeit very briefly, another concern raised by Mark Lemley (2009) in his contribution: that we grossly overstate the positive impact that competition may have had, or would have, on innovative activity. Again, this may well be true, but there is no empirical evidence whatsoever in the literature that this is the case. In our book we provide dozens of examples of competitive industries that are highly innovative and are so because they are open to free entry and competition. The list goes from the very important in terms of GNP (software at its origin or the financial industry until now, or the whole of agriculture until the 1970s) to the somewhat secondary, or even marginal (the pornography industry and fashion design) or, why not, our own industry: academic research is based upon and thrives on open competition. Our critics, we insist, may well be right, but the burden of the proof is now on their shoulders. It is up to them to prove, with data and facts, that our examples are distorted or irrelevant or special. Until that is done we can only remind the reader that for many centuries the very same negative and dismissive evaluation of the power of competition had been offered in opposition to advocates of free trade. The last century and a half are there to prove who was right and who was wrong.

Therefore, while waiting for empirical proof that competition harms innovation or fosters it very little, let us move on to the main issue: is it worth advocating the abolition of patents and copyright? Scientific studies of the current system agree that it is badly broken. Getting rid of it may therefore be a good idea. Still, one

should pause. Realizing that intellectual monopoly may be akin to cancer, we recognize that simply cutting it all out at once poses problems. Since intellectual property laws have been around for a long while, we have learned to live with them. A myriad of other legal and informal institutions, business practices and professional skills have grown up around them and in symbiosis with them. Consequently, a sudden elimination of intellectual property laws may bring about collateral damages of an intolerable magnitude.

What this example suggests is that abolition must be approached by smaller steps, and that the sequencing of steps matters. Gradual reform is necessary both because of the need for other institutions, to reform in parallel, and also because it is a political necessity. The number of people prospering thanks to intellectual monopoly is large and growing. While some of them, such as movie stars, have accrued much wealth, for many others this is not the case. For many ordinary people intellectual monopoly has become another way of earning a living and, while most of them would be able to earn an equally good or even better living without it, many others need time to adjust. Further, and again in analogy with trade barriers, while the number of people who would benefit from the elimination of intellectual monopoly is large and growing, the gain each one of them perceives as likely is small. In spite of the brouhaha surrounding the “pirating” of popular music and movies, the direct personal saving from copyright reduction or even abolition would not be substantial as music, movies and books are a tiny share of household consumption. In the case of medicines and software, consumers’ potential savings may be more substantial but harder to perceive. Finally, and most importantly, if in the 1950s or 1960s the average citizen of the world could hardly have forecast the tremendous improvement in her standard of living that free trade would have brought about within thirty years, even harder it is now to perceive the incremental technological advances that a progressive elimination of intellectual monopoly could bring about in a couple of decades.

In summary, dismantling our intellectual property system poses a set of circumstances that the literature on collective action has identified as major barriers to reform. A few well-organized and coordinated monopolists on the one side are bound to lose a lot if the protective barriers are lifted. A very large number of uncoordinated consumers on the other side would receive very small personal gains from the adoption of freer competition. For a long time then, the battleground is going to be one of competing ideas and theories aimed at convincing public opinion that substantial gains are possible from the elimination of intellectual monopoly. In the meantime, there is a vast array of ideas both for greatly expanding intellectual property and, in the opposite

direction, for useful reform. In this, our concluding, chapter, we try to sort these proposals into the bad, the good, and the just plain ugly.

## 5. BAD POLICY

Despite the fact that our system of intellectual property is badly broken, there are those who seek to break it even further. The first priority must be to stem the tide of rent-seekers demanding ever greater privilege. Within the United States and Europe, there is a continued effort to expand the scope of innovations subject to patent, to extend the length of copyright, and to impose ever more draconian penalties for intellectual property violation. Internationally, the United States – as a net exporter of ideas – has been negotiating dramatic increases in protection of U.S. intellectual monopolists as part of free trade agreements.

There seems to be no end to the list of bad proposals for strengthening intellectual monopoly. To give a partial (and dated, as it was last compiled in 2007 and we do not have here the opportunity to update it) list starting with the least significant

- Extend the scope of patent to include sports moves and plays.<sup>12</sup>
- Extend the scope of copyright to include news clips, press releases and so forth.<sup>13</sup>
- Allow for patenting of story lines – something the U.S. Patent Office just did by awarding a patent to Andrew Knight for his “The Zombie Stare” invention.<sup>14</sup>
- Extend the level of protection that copyright offers to databases, along the lines of the 1996 EU Database Directive, and of the subsequent WIPO’s Treaty proposal.<sup>15</sup>
- Extend the scope of copyright and patents to the results of scientific research, including that financed by public funds; something already partially achieved with the Bayh-Dole Act.<sup>16</sup>

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<sup>12</sup> To the best of our knowledge, the first published statement of this proposal is in Kukkonen (1998), but a quick search on Google shows the idea is receiving lots of attention from interested lawyers and law firms, see Das (2000), <http://www.mofo.com/news/updates/files/update1022.html>.

<sup>13</sup> As in the Spanish case of *Gedeprensa*.

<sup>14</sup> The recent extension of patents to story lines is discussed in [www.emediawire.com/releases/2005/11/emw303435.htm](http://www.emediawire.com/releases/2005/11/emw303435.htm). For a (more than sympathetic, but highly revealing in its biasedness) legal “analysis” of the whole idea of patenting plots, visit [http://www.plotpatents.com/legal\\_analysis.htm](http://www.plotpatents.com/legal_analysis.htm), which comes directly from the law firm that worked hard to patent fictional plots.

<sup>15</sup> As we discussed in Chapter 8 of our book and references therein.

- Extend the length of copyright in Europe to match that in the U.S. – which is most ironic, as the sponsors of the CTEA and the DMCA in the USA claimed they were necessary to match ... new and longer European copyright terms.<sup>17</sup>
- Extend the set of circumstances in which “refusal to license” is allowed and enforced by antitrust authorities. More generally, turn around the 1970’s Antitrust Division wisdom that led to the so-called “Nine No-No’s” to licensing practices. Previous wisdom correctly saw such practices as anticompetitive restraints of trade in the licensing business. Persistent and successful lobbying from the beneficiaries of intellectual monopoly has managed to turn the tables, portraying such monopolistic practices as “necessary” or even “vital” ingredients for a well-functioning patent licensing market.<sup>18</sup>
- Establish, as a relatively recent U.S. Supreme Court ruling in the case of *Verizon vs Trinko* did, that legally acquired monopoly power and its use to charge higher prices is not only admissible, it “is an important element of the free-market system” because “it induces innovation and economic growth.”
- Impose legal restrictions on the design of computers forcing them to “protect” intellectual property.<sup>19</sup>
- Make producers of software used in P2P exchanges directly liable for any copyright violation carried out with the use of their software, something that may well be in the making after the Supreme Court ruling in the *Grokster* case.<sup>20</sup>

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<sup>16</sup> There is no need for references here, still, here is one to an old and rather interesting case of university research patenting, Apple (1989).

<sup>17</sup> Again, material abounds on the web and in the regular press about the ongoing debate as to whether to extend the EU copyright term to match the current extended US term. To start, see <http://news.bbc.co.uk/1/hi/entertainment/music/3547788.stm>. For a piece by Dennis Karjala on EU-US harmonization, see <http://homepages.law.asu.edu/~dkarjala/OpposingCopyrightExtension/legmats/HarmonizationChartDSK.html>.

<sup>18</sup> See [http://www.usdoj.gov/atr/public/hearings/ip/chapter\\_1.pdf](http://www.usdoj.gov/atr/public/hearings/ip/chapter_1.pdf) for a relatively technical discussion of the issues involved in the “unilateral refusal to licensing” practice. For a list of the “Nine No-No’s,” and a not-unbiased discussion of the opportunity to dispose of them, clearly favoring the disposal option, see Gilbert and Shapiro (1997). For a very different view, cogently applied to the two recent Microsoft antitrust cases, see First (2006).

<sup>19</sup> Information and news about the Digital Rights Management (DRM) initiative (in its multiple versions) and its very controversial nature is widespread on the web and in other media. The curious reader may want to begin with the relevant Wikipedia entry and then continue from there.

<sup>20</sup> For detailed information about the *Grokster* case, Wikipedia is again a good starting point, while additional info can be found at the Electronic Frontier Foundation page on *MGM v. Grokster*. A middle-of-the-road legal assessment is in Samuelson (2004). For the sad effect of the Supreme Court ruling on economic innovation, go to [www.grokster.com](http://www.grokster.com) and read the scary message welcoming you.

- Allow the patenting of computer software in Europe – this we escaped, momentarily, due to a sudden spark of rationality by the European Parliament.<sup>21</sup>
- Allow the patenting of any kind of plant variety outside of the United States, where it is already allowed.<sup>22</sup>
- Allow for generalized patenting of genomic products outside of the United States, where it is already allowed.<sup>23</sup>
- Force other countries, especially developing countries, to impose the same draconian intellectual property laws as the U.S., the EU and Japan.<sup>24</sup>

Why these are bad ideas should be self-evident by now – and all should be rejected.

Developing countries in particular should be wary of negotiating away their intellectual freedom in exchange for greater access to U.S. and EU markets. Developing countries are, slowly but surely, giving in to the U.S. and EU pressure and modifying their national legislation in accordance with the requirements imposed by TRIPS and the WIPO. This is partly the effect of sheer lobbying and political pressure by Western governments and large multinationals. Partly, this is also due to the lack of a workable and coherent alternative to the over-reaching redesign of world intellectual property rights underlying TRIPS and its ideology. This trend makes an open and critical debate on such themes in developing countries even more urgent and valuable than it would be in any case.

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<sup>21</sup> On July 2, 2005 the European Parliament voted 648 to 14 (18 abstentions) to scrap the so-called “Directive on the Patentability of Computer Implemented Inventions.” While this was good news, the battle on software patents in Europe is far from over. The vote is attributable more to a general fight with the EU Commission, tending to ignore whatever the European Parliament suggests, than to a widespread opposition to software patents within the latter body. In the meanwhile, though, grassroots opposition has grown and, especially within the business community, a variety of action groups have sprung up that oppose software patents along pro-business lines and on the basis of pro-free market arguments such as those exposed in this book.

<sup>22</sup> News and information on this topic is widespread throughout all kinds of media. The FAO online Forum on Biotechnology in Food and Agriculture, at <http://www.fao.org/biotech/forum.asp>, is a particularly informative starting point for the interested reader. A number of reasonable reforms that would improve the developing countries’ situation in the agricultural sector can be found at <http://issues.org/17.4/barton.htm>.

<sup>23</sup> Having abundantly clarified why genomic patents are a bad idea, references to people liking them for misguided reasons are Putnam (2004) and Hale et al. (2006).

<sup>24</sup> This being the main, if not the only, reason behind the existence of TRIPS-WTO, as is easily verified from documents contained on the TRIPS website at [http://www.wto.org/english/tratop\\_e/trips\\_e/trips\\_e.htm](http://www.wto.org/english/tratop_e/trips_e/trips_e.htm).

## 6. GOOD POLICY

There are a great many things that can be done to make modest improvements in the current system of both patents and copyrights. In the case of patents there are a variety of proposals for making the patent system less vulnerable to “submarine” patenting, and generally tightening up the system so that a patent has some real connection to innovation, and is not merely a claim to someone else’s invention. In the case of copyright, a major priority is to make sure that all the abandoned and orphaned works do not forever remain unusable because they are under copyright, and the copyright holder is dead, has disappeared or is in any case untraceable.

For both patents and copyright, a fundamental priority is to prevent the public domain from shrinking further, and, when possible, push back the fences that are progressively enclosing it. This means, on the one hand, opposing new proposals for the extension of copyright term and coverage beyond those established by the 1998 Digital Millennium Copyright Act (DMCA) and Copyright Term Extension Act (CTEA). On the other hand, it also means taking proactive actions to defend from rapacious hands what is growing in the public domain and needs to be nurtured. Private economic initiative can be extremely useful along this dimension and the recent Open Innovation Network initiative, led by IBM, is a wonderful case in point.<sup>25</sup>

Jaffe and Lerner (2004) document in great detail how the patent system, as it is currently implemented in the U.S., is broken.<sup>26</sup> They make numerous proposals to make frivolous patents more difficult to get and enforce. We support these proposals in principle – and while we might disagree over some of the details, we expect that were we to debate the matter, they would convince us on some points, and we would convince them on others.

One proposal in particular, is to allow patents to be challenged before they are granted. This would allow real evidence to be brought to bear on the issue of prior art – something the U.S. Patent Office seems to know little about, as the thousands of “how to swing a swing” and “peanut-butter and jelly sandwiches” patents suggest.<sup>27</sup> Realistically, however, few individuals or firms

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<sup>25</sup> Information about IBM and other companies’ protective patent pool on Linux is widespread through the web and other media. Visit Wikipedia under OSDL and Free Standards group to learn more, or go directly to the sites of the OIN at <http://www.openinventionnetwork.com>, and of the Linux Foundation at [http://www.linux-foundation.org/en/Main\\_Page](http://www.linux-foundation.org/en/Main_Page).

<sup>26</sup> A detailed discussion of possible, and all very reasonable, reforms can be found in Jaffe and Lerner (2004).

<sup>27</sup> Obviously, the “how to swing a swing” patent (U.S. Patent 6368227) is here just a label for a gigantic, and ever-growing, class of patents that are so logically unfounded that one might think we fabricated the whole thing. Well, we must admit that we do not have the level of imagination needed

would be likely to monitor the patent system carefully enough to identify bad patents, or to incur the expense of providing the public good of challenging bad patents. Quillen et al (2002) examine the rigor with which the U.S. Patent Office carries out its examining activities and compare it to that of the European and Japanese Patent Offices. They take the opposite approach from Lerner and Jaffe, suggesting that the patent office is not the appropriate place to reach decisions concerning patentability. They conclude by asking

*...why should we not go to a registration system and avoid the expenses of operating an examination system ... shouldn't we abolish continuing applications so that the USPTO will be able to obtain final decisions as to the patentability of subject matter presented in patent applications and avoid having rework imposed upon it. Finally, so long as the USPTO grants a patent for virtually every application filed, are the courts justified in adhering to the clear and convincing evidence standard for overcoming the statutory presumption of validity? (Quillen et al., 2002:50-51)*

It is striking but true that either of these proposals, although they go in opposite directions, would be an improvement over the current system. That speaks volumes about how bad the current system is: mathematicians call it a “global minimum,” a position such that any movement away from it, in any direction, improves things. This is another such case.

Also of great significance is the proposal of Gallini and Scotchmer (2001) to allow the “independent invention” defense to patent claims. That is, they would allow proof that an invention was independently derived, and not obtained directly or indirectly as a consequence of the similar invention that was patented first, as a defense against patent infringement. For example, if you patented the “one-click” with the mouse to paste text into a word processor, and sued me because my word processor also pasted text with just one click, I could defend myself by showing that I had written my word processor in my spare time and had never read your patent, or seen a copy of your word processor. This would not only relieve the innovator from concern that in his ignorance he would run afoul of some existing patent, it would also make it substantially more difficult to engage in submarine warfare, as the inventor who is torpedoed by the submarine could argue, and prove, that his invention was independent. This reform, alone, would be of great social value and would enormously reduce the burden of intellectual monopoly. As we have illustrated

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to reach the heights achieved by the USPTO in cooperation with some of the most shameless rent-seekers in the world. For entertaining surveys of this modern set of legal monstrosities, out of an almost endless list of sites, the following few: [www.freepatentsonline.com/crazy.html](http://www.freepatentsonline.com/crazy.html), [www.crazypatents.com](http://www.crazypatents.com), [www.totallyabsurd.com](http://www.totallyabsurd.com), [www.patentlysilly.com](http://www.patentlysilly.com) should keep you amused if not frightened.

repeatedly, simultaneous or independent inventions are almost the rule in the creative process, rather than the exception. For many great inventions of the last century – the radio, the TV, the airplane, the telephone – allowing the two or more independent and simultaneous inventors to both exploit their invention commercially would have greatly benefited consumers and economic progress in general. This is even more true and more relevant today, as the number of judicial disputes over practically identical and simultaneous innovations skyrockets, especially in the fields of software, biomedical products, and telecommunications, and for business practices in general.

An alternative reform would be to require mandatory licensing at fees based on estimates of R&D costs. The principle is the following: if it costs \$100 to invent a gadget, 10% is a reasonable rate of return on this type of investment, and expected demand for licensing is in the order of 100 units, then a net present value fee of \$1.10 would be right. If the cost of uncertainty is an additional five cents we should set the mandatory licensing fee at \$1.15 for this particular patent. William Kingston (2001) takes a more serious look at how this might work in practice, particularly figuring a multiplier to account for the many failed innovations needed to produce a successful one. Kingston points out that cost estimates are already widely used in patent litigation and are not so difficult to produce and document. He estimates that, for most of the cases he studied, the total revenue from licensing products that are successfully patented and licensed should be about eight times their R&D cost, if the license is taken immediately; for licenses issued as the products actually go to market, a multiplier of four would be more appropriate. In the case of pharmaceuticals, he suggests a multiple of two would be sufficient – noting that “If three such licenses were taken, the payments would [already] put the product into the most profitable decile (the home of the blockbuster drugs)” (Kingston, 2001:32).

A backdoor to reducing the term of patents, and making it less easy to accidentally run afoul of long-standing but meaningless patents, would be to reintroduce patent renewal – for example, keeping the term of a patent fixed, while splitting the twenty-year term into smaller increments, with a renewal required at each stage. This is discussed by Cornelli and Schankerman (1999) and by Scotchmer (1999).

In copyright, the most immediate problem is that of an Administration, a Congress, and a Supreme Court that are “bought and paid for.” The triple whammy of giving automatic copyright to every work, whether or not it is registered, eliminating the need for renewal, and extending the term of copyright to be essentially infinite means that, over time, virtually everything written will become inaccessible. The Obama Administration is now taking care of spreading this gospel around the world by placing such issues as “getting tough on pirates”

at the top of its diplomatic agenda. Lessig (2004),<sup>28</sup> among others, documents in great detail the problems caused by these “ugly reforms.” He proposes that some of the ill effects could be undone by a modest renewal fee. Landes and Posner (2003) suggest that the legal principle of abandonment could be applied to copyright holders who do not actively make it clear that they are maintaining their copyright. Either or both of these proposals – however politically naïve they might be – would be a great improvement over the current situation.

The debacle we currently face in copyright is that as more and more draconian laws concerning copyright are introduced, less and less real copyright protection is possible, as it has proven impossible to police the P2P networks in any realistic sense. Many have suggested that the way out of this dilemma is through mandatory licensing. Radio broadcasters currently pay a fixed fee, but do not require special permission to broadcast a song. In the same way, downloads could be made legal and payments to copyright holders based on the number of times a song is downloaded. This is not a perfect proposal – the possibility of manipulating the “download ratings” comes to mind, and the mandatory licensing fee for internet radio was set untenably high – but on balance, would probably serve to improve the current situation.

The recent, and widely advertised if limited, decisions by Apple and EMI to renounce policing P2P file sharing via technological means (that is, by giving up on DRM) is also a positive step. It signals that at least a few among the big players are realizing that the “technological police” approach is a losing business proposition, and that plenty of money can be made by selling downloadable music that consumers can then share and redistribute more or less freely.<sup>29</sup>

## 7. SUBSIDIES FOR INNOVATION AND CREATION

It is theoretically possible that the competitive market alone provides insufficient incentive to innovate – although, as we already said, there is no evidence that this is the case. Suppose that we succeed in abolishing intellectual monopoly and discover, after a few years, that there is less innovation than would be socially

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<sup>28</sup> See especially the chapter “Registration and Renewal” in the public domain version at <http://www.authorama.com>.

<sup>29</sup> Mildly good legal news also seems to be coming from the European courts, which have started to rule against some of the most preposterous requests to treat any form of music downloading as theft, even when intended only for personal use and with no commercial purposes. For the Spanish and Italian court rulings, see, for example, [http://www.theregister.co.uk/2006/11/03/spanish\\_judge\\_says\\_downloading\\_legal/](http://www.theregister.co.uk/2006/11/03/spanish_judge_says_downloading_legal/) and <http://www.repubblica.it/2006/10/sezioni/cronaca/cassazione-3/lecito-scaricare-file/lecito-scaricare-file.html>.

desirable. Unlikely as this event may be, we as economists must nevertheless consider it. Hence, should we reintroduce intellectual monopoly in this case?

Intellectual property law is about the government enforcing private monopolies. In countries without effective tax collection mechanisms, both historically and currently, government grants of monopolies were and are commonplace; we all have seen some old label for a tea or chocolate brand reporting “By Appointment of Her Majesty.” As nations develop, more effective tax collection infrastructures have been replacing such revenue devices as the salt monopoly, or the grant of exclusive import rights to the brother-in-law of the president. Hence, the sale by government officials of exclusive rights to carry out this or that commercial activity, or to produce and commercialize certain goods and services, have progressively disappeared in almost all advanced market economies. Intellectual property is one of the few remaining anachronisms from the pre-history of modern tax collection—worse, indeed: it is a distorted anachronism that is now being exploited for rent-seeking purposes that are opposite to those for which it was originally established. The answer is that—if there is indeed a need for extra incentives—it should be done through subsidization and not through government grants of monopoly.

A first question might be what level of subsidy would replace the profits of the current monopolists?<sup>30</sup> Schankerman (1998) makes the calculation that a subsidy to R&D of 15%-35% would be enough to provide an incentive equivalent to that currently provided by patents – ironically subsidies of nearly this level are already available in addition to patents, especially in the pharmaceutical industry, as we documented in the previous chapter. Indeed, the offensive sight of the government using taxpayers’ money to subsidize research and then awarding a private monopoly reaches absurd heights in academia, where in recent years the mantra of “private-public partnership” has taken hold. A more egregious form of public subsidy for private monopolies is hard to imagine.

Like monopolies, subsidies can lead to rent-seeking and have distortionary effects, so they should scarcely be a first resort. Some economists, such as Paul Romer (1996), painfully aware of these negative side effects, have proposed to

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<sup>30</sup> Schankerman and Pakes (1986) have studied patent returns in various European countries. Using their data, Kingston (2001:18) estimates the subsidies that would be required to replace the current patent system: “Schankerman and Pakes reported that for patents in Britain, France and Germany, the returns appear to be only a small fraction of the domestic R&D expenditure of the business enterprises. The means of the discounted sum of rewards from patent age 5 were about \$7,000 in Britain and France and \$19,000 in Germany. The value of patents as a proportion of total national R&D expenditure was 0.057 in France, 0.068 in Britain and 0.056 in Germany (1986, pp. 1068, 1074). Schankerman subsequently estimated that a subsidy to R&D of 15%-35% would be enough to provide an equivalent incentive to patents (1988, p. 95).” 1988 here is clearly a typo in Kingston’s working paper. The date of the cite should be 1998.

avoid some of these distortions by the use of narrowly targeted subsidies – for example to graduate students who, the evidence suggests, are key instruments in the process of innovation. Others, such as Martin Hellwig and Andreas Irmen (2001), suggest that broad subsidies to investment in general – interest rate subsidies, for example – are likely to be the least distortionary. Yet others, such as Michael Kremer (2001a,b; Glennerster, Kremer and Williams, 2006), suggest that prizes awarded after the fact create greater incentives to innovate. Nancy Gallini and Suzanne Scotchmer (2001) go further and compare various subsidization methods in their recent work. Their technical analysis is beyond the scope of this book, but the basic point remains: various intelligent forms of subsidies for basic research and even applied invention exist, and an appropriate mix can be found that would greatly improve upon patents and copyright.

## 8. UGLY POLICY

Whether the Disney Corporation will get to continue their monopoly of Mickey Mouse does not seem like an issue that should lead either to revolt or to non-violent insurrection. But have no doubt – intellectual monopoly threatens both our prosperity and our freedom and to strangle innovation all together.

This might seem an exaggerated statement, made only to stir controversy – and sell a few more copies of our copyrighted book. Yet, despite the fact that by 1433 the great Chinese explorer Cheng Ho's fleets had explored Africa and the Middle East,<sup>31</sup> in the subsequent centuries the world was colonized by Europeans and not by the Chinese. The monopolists of the Ming Dynasty saw a threat to their monopoly – which was then a monopoly of intellectual and administrative power – in the innovative explorations of Cheng Ho and forced him to stop. This led to a static, inward looking and regressive regime, where Emperors ruled under mottos such as “stay the course” and “do nothing,” and where innovation and progress not only faltered, but were progressively replaced by obsolescence, regression, and, eventually, poverty. And so it is that in the United States we celebrate Christopher Columbus day, rather than Cheng Ho day.

At a smaller scale, but with a no less real impact on world history, we find that intellectual property has delayed the development of the steam engine, the automobile, the airplane, and innumerable other useful things. This took place at a time before the United States became the sole dominant world power, and before a system nearly as noxious as the current system in the United States and the European Union was in place. It took place during a time when very many

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<sup>31</sup> To start learning about him, see, for example, <http://famousmuslims.muslimonline.org/zheng-he-cheng-ho.html>.

countries were still competing for world primacy, and the collusive pact among intellectual monopolists that our modern trade agreements have been built to enforce, was not in the cards. If the Wright brothers preferred litigation to invention, at least the French were free to develop the airplane. If Gottlieb Daimler and Karl Benz were the first to build a practical automobile powered by an internal-combustion engine, their German patent did not prevent John Lambert, only six years later, from developing America's first gasoline-powered automobile. Nor did it prevent the Duryea Brothers, shortly after, from founding America's first company to manufacture and sell gasoline-powered vehicles.<sup>32</sup>

Where, today, is a software innovator to find safe haven from Microsoft's lawyers? Where, tomorrow, will be the pharmaceutical companies that will challenge the patents of "big pharma" and produce drugs and vaccines for the millions dying in Africa and elsewhere? Where, today, are courageous publishers, committed to the idea that accumulated knowledge should be widely available, defending the Google Book Search initiative? Nowhere, as far as we can tell, and this is a bad omen for the times to come. The legal and political war between the innovators and the monopolists is a real one, and the innovators may not win as the forces of "Stay the Course" and "Do Nothing" are powerful, and on the rise.

Certainly the basic threat to prosperity and liberty can be resolved through sensible reform. But intellectual property is a cancer. The goal must be not merely to make the cancer more benign, but ultimately to get rid of it entirely. So, while we are skeptical about the idea of immediately and permanently eliminating intellectual monopoly – the long-term goal should be no less than a complete elimination. A phased reduction in the length of terms of both patents and copyrights would be the right place to start. By gradually reducing terms, it becomes possible to make the necessary adjustments – for example to FDA regulations, publishing techniques and practices, software development and distribution methods – while at the same time making a commitment to eventual elimination.

Given that it may well be the case that some modest degree of intellectual monopoly is superior to complete abolition – why do we set as a goal complete elimination of intellectual property? Our position on intellectual monopoly is not different from the position most economists take on trade restrictions: although some modest amount of protection might be desirable in special cases, it is more practical and useful to focus on the elimination of restrictions

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<sup>32</sup> Apart for two small entries on Wikipedia and a few other small sites, there is little on the web about either John Lambert or the Duryea Brothers. Still, by searching and reading carefully, their stories and their achievements do emerge slowly but surely. Neither of them took out a patent, but their innovative actions started the American automobile industry nevertheless. See Scharchburg (1993).

as a general rule. Similarly, while some modest amount of intellectual monopoly might be desirable in very special cases, it is more practical and useful to focus on the elimination of intellectual monopoly as a general rule. In innovation as in trade, a modest degree of monopoly is not sustainable. Once the lobbyist's nose is inside the tent, the entire lobby is sure to follow, and we will once again be faced with a broken patent system and absurdly long copyright terms. To secure our prosperity and freedom we must abolish intellectual monopoly from the tent entirely. To do so we must develop the very same patient determination with which we have been after trade restrictions for more than half a century, and we are not done yet.

This analogy between intellectual property and trade restrictions is not a purely rhetorical tool, nor a random comparison. For centuries, human innovative activity took the form of creating new consumption goods, new machines and new staples of food. But the transmission of ideas from one producer to another and across countries was not nearly as fast, standardized, and routinized as it is today. Creative human activity was focused on the creation and reproduction of physical goods and not on the creation and reproduction of ideas. Free trade of commodities was therefore key in fostering progress: the more competitors entered the market with shoes like yours, the more you had to improve on your shoes to keep selling them.

This dialectic we used to call economic progress, and, after a few centuries of intellectual debate and numerous wars, Western societies came to understand that restricting international trade was damaging because protectionism prevents economic progress and fosters international tensions leading to conflict. Since at least the late Middle Ages, the battle has been between the forces of progress, individual freedom, competition and free trade, and those of stagnation, regulation of individual actions, monopoly, and trade protection. Now that the intellectual and political battle over free trade of physical goods seems won, and an increasing number of less advanced countries are joining the progressive ranks of free-trading nations, pressure for making intellectual property protection stronger is mounting in those very same countries that advocate free trade. This is not coincidence.

Most physical goods already are and, in the decades to come, will increasingly be, produced in less developed countries. Most innovations and creations are taking place in the advanced world, and the IT and bio-engineering revolutions suggest this will continue for a while at least. It is not surprising then, that a new version of the eternal parasite of economic progress – mercantilism – is emerging in the rich countries of North America, Europe and Asia.

Economic progress springs from having things produced as efficiently as possible, so that they can sell at the lowest price. This wisdom applies to both the

things we *buy* and to those we *sell*, and therein lies the trap of mercantilism. Most of us have learned that the surest way to make a profit is to “buy cheap and sell dear.” When there is adequate competition and everyone tries to buy cheap and sell dear, then the *only* way I can buy cheap and sell dear is for me to be more efficient than you. This generates incentives for innovation and progress. The trap and tragedy of mercantilism comes when this individually correct philosophy is transformed into a national policy: that we are all better off when our country as a whole buys cheap and sells dear. It was this myopic and distorted view of the way in which markets function that Smith, Ricardo, and the classic economists were fighting against 250 years ago. At that time wheat producers in England wanted to restrict free trade in wheat so English producers could sell it dear. That meant English consumers could not buy it cheap. Now, before moving to the next paragraph, consider the current debate about preventing “parallel imports” of medicines, CDs, DVDs, and other products covered by intellectual monopoly. Do you see a parallelism? That is our point.

The contemporary variation of this economic pest is one in which our collective interest is, allegedly, best served if we buy goods cheap and sell ideas dear. In the mind of those preaching this new version of the mercantilist credo, the World Trade Organization should enforce as much free trade as possible, so we can buy “their” products at a low price. It should also protect our “intellectual property” as much as possible, so we can sell “our” movies, software, and medicines at a high price. What this folly misses is that, now like three centuries ago, while it is good to buy “their” food cheap, if “they” buy movies and medicines at high prices, so do “we.” In fact, as the case of medicines and DVDs proves, the monopolist sells to “us” at even higher prices than to “them.” This has dramatic consequences on the incentives to progress: when someone can sell at high prices because of legal protection from imitators, they will not expend much effort looking for better and cheaper ways of doing things.

For centuries, the cause of economic progress has been identified with that of free trade. In the decades to come, sustaining economic progress will depend more and more upon our ability to progressively reduce and eventually eliminate intellectual monopoly. As in the battle for free trade, the first step must consist in destroying the intellectual foundations of the obscurantist position. Back then the mercantilist fallacy taught that, to become wealthy, a country must regulate trade and strive for trade surpluses. Today, the same fallacy teaches that without intellectual monopoly, innovations would be impossible and that our governments should prohibit parallel imports and enforce draconian intellectual monopoly rules. We hope that we have made some progress in demolishing that myth.

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# A Cautious Defense of Intellectual Oligopoly with Fringe Competition

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*In a 2008 paper, Michele Boldrin and David Levine offer a strong attack on intellectual property. While Boldrin and Levine make a plausible case, it is an exaggeration to say as they do that patents and copyrights are intellectual monopolies and are not necessary to encourage invention or creation. More significant is their claim that competition, not monopoly, drives innovation. Boldrin and Levine overstate the case for competitive innovation and understate the case for innovation driven by either market power or the prospect of acquiring market power through patent innovation. They are correct that we will get some innovation in many industries, and even the same level of innovation in some industries, without IP protection. But for most types of invention and creation we just can't be confident that IP isn't driving at least some innovation. On balance, IP protection will give us more benefit in the industries in which it spurs competitive innovation and fringe competition than the harm it causes in raising prices and constraining downstream innovation. It is, as Mike Scherer puts it, "a system that, despite its manifest imperfections, has worked tolerably well." Nonetheless, Boldrin and Levine do point the way toward needed reforms of the IP system short of its abolition.*

In their book *Against Intellectual Monopoly*, Michele Boldrin and David Levine (2008) offer a strong attack on intellectual property (IP), which they call "intellectual monopoly." In their view, IP is not necessary to encourage invention or creation. Quite the contrary, they argue that we get innovation from competition, not monopoly. Further, because monopoly imposes well-recognized social costs, we are better off without it if it doesn't in fact spur new innovation.

Boldrin and Levine make a plausible case on their own terms. Nonetheless, I think their terms are misleading. IP rights are rarely if ever "intellectual monopolies." Most patents, to say nothing of most copyrights, create no

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economic rents.<sup>1</sup> Indeed, most patents are abandoned for failure to pay maintenance fees amounting to no more than a few thousand dollars (Moore, 2005). I may have the right to prevent anyone else from selling a “thumb-wrestling ring with stabilizing handle,”<sup>2</sup> but it isn’t meaningful to talk about my having a “monopoly” over thumb-wrestling rings with stabilizing handles. There is no economic market limited to thumb-wrestling rings. Similarly, and with even more confidence, we can say that even quite successful books, music and movies do not define or dominate any economic market. Stephenie Meyer may be a popular author, but the price she charges for her books is the same as the price every other author charges. The existence of IP rights allows a certain amount of market segmentation – I can write a book somewhat like Stephanie Meyer’s, but I can’t just copy Meyer’s – and therefore allows virtually all creators to charge a price above the marginal cost of copying, which approaches zero (see Yoo, 2004). But it doesn’t create a monopoly.

What this means is that we can’t assume that IP rights generally impose deadweight losses on society. They cause deviation from atomistic, perfect competition, but they don’t cause monopoly pricing. With a small number of exceptions, therefore, they don’t cause the social harms Boldrin and Levine correctly associate with monopoly pricing. Some patents, and perhaps one or two copyrights, do in fact confer power in a relevant economic market. And we should pay attention to those. But it is a very large exaggeration to say that patents and copyrights are intellectual monopolies.

More significant is Boldrin and Levine’s claim that competition, not monopoly, drives innovation. If this is right, we wouldn’t need IP rights even if they were costless. I am sympathetic to the idea that competition is an important driver of innovation (see, e.g., Lemley, 2007a; Baker, 2007).<sup>3</sup> But as I suggest below, I think Boldrin and Levine overstate the case for competitive innovation and understate the case for innovation driven by either market power or the prospect of acquiring market power through patent. In the debate between Ken Arrow and Joseph Schumpeter (compare Arrow, 1962, with Schumpeter, 1943), I tend to be an Arrowhead, not a Schumpeterian: I agree that competition often drives innovation and that monopoly often inhibits it. But

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<sup>1</sup> For discussion, see, e.g., *Illinois Tool Works, Inc. v. Independent Ink, Inc.*, 547 U.S. 28 (2006); Hovenkamp et al., 2001.

<sup>2</sup> U.S. Patent No. 4,998,724. Or see a recent episode of “Chuck” featuring the ring.

<sup>3</sup> On the relative value of innovation and static competition, see, e.g., Solow, 1956 (attributing nearly 90% of GNP growth in the U.S. to technological change rather than labor and capital improvements); Bessen, 2008 (studying the 19<sup>th</sup> century cotton weaving industry and finding the same); Baker, 2008:4 (“the push of competition generally spurs innovation more than the pull of monopoly”).

often is not always, and the fact that in some circumstances market exclusivity promotes innovation counsels against a blanket condemnation of IP.<sup>4</sup>

The analysis of the wisdom of IP rights is complicated by the fact that innovation – and IP rights – work differently in different industries. As Dan Burk and I have argued, the rules appropriate for some industries work poorly in others (Burk and Lemley, 2009). The classic theory of patent law arguably works poorly in the information technology industries for a variety of reasons that have been explained elsewhere (see, e.g., Bessen and Meurer, 2008), and that Boldrin and Levine (2008:72-78) echo. Innovators in the IT industries tend to use patents defensively, to protect themselves against suit, rather than relying on exclusivity and affirmative enforcement of IP rights. By contrast, the pharmaceutical, biotechnology, and medical devices industries depend critically on the enforcement of patents to obtain at least partial market exclusivity (Burk and Lemley, 2009:ch.4). Similarly, commercialization-based theories of patents that focus on the purported need for exclusivity to produce and market the invention rather than to invent it (Kitch, 1977) also seem to carry more weight in the pharmaceutical industry, burdened by government regulation of entry, than in other industries in which commercialization is easier (Lemley, 2004).

We see similar divisions in copyright, though they don't divide as cleanly by industry. Significant sectors of the computer software industry have effectively abandoned copyright protection, using the copyright law only to ensure the continued openness of open source software.<sup>5</sup> At the same time, other software developers rely heavily on copyright protection to prevent counterfeiting. In other industries, the importance of strong copyright protection depends on the economics of creativity in that industry. It is fairly cheap to produce music, for instance, so that – the vehement effort to expand music copyrights notwithstanding – we might well get significant new music

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<sup>4</sup> Boldrin and Levine ask – presumably rhetorically – “how many industries can you mention where the mechanism described in the Schumpeterian model has been at work, with innovators frequently supplanting the incumbent monopolist, becoming a monopolist in turn, to be killed shortly after by yet another innovator?” (Boldrin and Levine, 2008: 170-71). Presumably the reader is intended, after a moment's reflection, to answer “well, gosh, none.” In fact, however, a moment's reflection reveals quite a few. Off the top of my head, they include computer hardware (bought an IBM computer lately?), video games (it's Atari, no wait it's Nintendo, no wait it's Sega, no wait it's Sony, no wait it's Microsoft, oops, it's Sony a second time, but here comes Nintendo again), search engines (Altavista, then Excite, then Yahoo!, then Google), statins (where the prescribed drug of choice seems to vary year by year), and cell phones (Motorola StarTac anyone?). Remember, I am not a Schumpeterian: I don't think we should passively accept monopoly in the hopes that it will always or even usually sow the seeds of its own destruction. But Boldrin and Levine's claim that it *never* happens just won't fly.

<sup>5</sup> For analyses of open source peer production, see, e.g., Benkler, 2006; 2002; McGowan, 2001.

even absent copyright protection. By contrast, blockbuster movies often require the investment of hundreds of millions of dollars, something that seems unlikely without some prospect of recouping that investment. That doesn't mean we would get no movies at all; the outpouring of creativity occasioned by YouTube makes it clear that people want to create, and will do so even absent any realistic prospect of making money by doing so. But the movies that would be created absent copyright protection won't include high-budget films like *The Lord of the Rings*.<sup>6</sup>

The fundamental question dividing these technologies and industries involves appropriability. Appropriability – the ability of the creator to capture rents sufficient to pay back the fixed cost investment of creation – is itself a function of both a number of different factors. Among those factors are the fixed cost of creation, the cost of imitation, and the availability of other returns than those provided by IP law. Boldrin and Levine correctly point out that a creator doesn't need to capture the full social value of their inventions; in fact, we don't want them to (Boldrin and Levine, 2008:160-66; Frischmann and Lemley, 2007). They also correctly identify a number of mechanisms other than IP that companies can and do use to appropriate returns, including first-mover advantage, learning externalities, prizes, and complementary products (Boldrin and Levine, 2008:130-45). To this list we might reasonably add peer recognition, network effects, personal drive, government or private sponsorship, and brand identification.<sup>7</sup> There is no question that these appropriation mechanisms provide some incentive to creators, and that in some cases they provide enough incentive to drive creation. Similarly, Boldrin and Levine point to particular examples in which imitation is costly and time-consuming, though notably that is in part because of *other* IP rights – trade secrets – that they don't criticize (Boldrin and Levine, 2008:161-66). But pointing to examples where IP isn't necessary is not sufficient to support the Boldrin-Levine thesis. Their thesis is that *all* innovation and creation – or at least all innovation and creation we want to have – will be motivated by these alternative mechanisms.<sup>8</sup> To evaluate

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<sup>6</sup> Perhaps we shouldn't care – Glynn Lunney (1996) has argued that copyright prompts inefficient overinvestment in gala works. But the market is surely able to punish those who overinvest in expensive films, as long as cheap films are around to challenge them.

<sup>7</sup> Boldrin and Levine do not object to trademark law.

<sup>8</sup> The closest they come to making this case is in chapter 8, discussing the inconclusive-but-not-promising results of economic studies of the role of patents. Unfortunately, social science is hard. We don't get many natural experiments. And most of the natural "experiments" conducted on the patent system involve national variations in patent rules over time. Those experiments contain a fatal flaw: the expected return from an invention is based on its global sales, not national sales. As a result, it doesn't make sense to say, as Boldrin and Levine do in talking about the pharmaceutical industry, that "cross-country variations in patent protection of medical

that implicit claim, we need to know exactly how much money the average inventor needs to make in order to break even.<sup>9</sup> That in turn is a function of the ratio between the cost of creation and the cost and delay associated with imitation. If it's easy to create, and it is relatively hard to copy, first mover advantages may well be sufficient to ensure returns to creators. But if innovation is costly and time-consuming, and if copying is easy, the likelihood of recoupment is much less. One way to distinguish the industries that rely heavily on patent law from those that don't is that the patent-reliant industries face significant innovation costs, in part because of the way innovation works in those industries but in significant part because of regulatory delay imposed by the FDA (Ridgway, 2006; Eisenberg, 2001:123). It's not that it is costless to bring a generic drug to market, but that the ratio of innovator cost to imitator cost is too high to rely on first mover or trademark advantages.<sup>10</sup>

Focusing on the ratio of creation to imitation cost also enables us to pay attention to how the need for IP rights might change over time. Advances in technology can make it both easier to create and distribute original works, and easier to copy those works. Technology has made it much easier to produce and distribute new music than ever before. Accordingly, it has made record company intermediaries – the traditional beneficiaries of music copyright – less and less relevant. At the same time, technology has made illegal copying cheap and easy, taking it out of the province of commercial counterfeiters and making it possible for everyone to infringe music copyrights (see Boldrin and Levine, 2008:173). As a result, some argue (focusing on the cost of innovation) that we don't need music copyright in the new digital environment, while others argue (focusing on the cost of imitation) that it needs to be strengthened. Each side is focused on one part of the fraction; to get the right answer, we need to pay attention to the whole fraction. Similarly, scholars have disputed whether fashion design should

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products should have had a dramatic impact on national pharmaceutical industries" (Boldrin and Levine, 2008:218, 232). National differences in patent laws should affect the price and quantity of drugs sold in those countries, but the worldwide sales of a pharmaceutical patented everywhere except Switzerland should be the same whether the inventor is Swiss or not.

<sup>9</sup> Boldrin and Levine (2008:130-34) rightly point out that it is the average expected return, not the actual ex post return, that matters.

<sup>10</sup> Boldrin and Levine assert that we didn't have or need patent protection for most of the critical advances in medicine. But most of the advances they cite weren't drugs. And when they do turn to drugs, they get the facts wrong – for example, by claiming that aspirin wasn't patented (Boldrin and Levine, 2008:229). Contra Jeffrey, 2005:77-80 (documenting the patenting and successful enforcement of aspirin in the U.S.). Boldrin and Levine may be relying on the fact that aspirin was not patented in Germany, where it was invented. But as I noted above, the market for inventions is global, and so is the calculus of risk and reward. The fact that even in the 19<sup>th</sup> century Bayer was careful to obtain patent protection in the U.S. and the U.K. suggests that they were certainly not indifferent to the patentability of aspirin.

be brought within the copyright system.<sup>11</sup> The question is once again complicated, because technology has both reduced the cost of design and also reduced the cost of imitation.<sup>12</sup> And even the pharmaceutical industry – the poster child for strong patent protection – presents a tougher case than one might suppose (Boldrin and Levine, 2008:ch.9), because the high costs of bringing a new drug to market are counterbalanced by the extraordinary legal power we confer on pharmaceutical inventors by combining patent protection with the exclusivity of the regulatory state (Ridgway, 2006).

Bottom line: Do we need monopoly to drive appropriability? Perhaps occasionally, but generally not. But remember that IP rights aren't generally monopolies. Perhaps occasionally, but generally not. So, while we don't need "intellectual monopoly," what IP law gives us is more akin to "intellectual oligopoly" – product-differentiated competition among a limited number of market players – and the more modest boost in appropriability provided by that product differentiation may be desirable in some circumstances.<sup>13</sup> To be clear, oligopoly is not desirable in and of itself, but only to the extent that Schumpeter is right that perfect competition drives prices too quickly to marginal cost and prevents recoupment of fixed cost investments.

Further, IP rights may facilitate start-ups in some circumstances by giving an inventor who doesn't have the capital to enter the market at scale some breathing room. The fact that I can prevent exact duplication of my new idea by a large established player in my industry may give me the time to get established in that industry. It may also facilitate capital investment, since venture capitalists often look at IP portfolios in deciding whether to invest in a new company (Lemley, 2000; Long, 2002).<sup>14</sup> Thus, IP rights may facilitate not just oligopoly, but what is

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<sup>11</sup> Compare Raustiala and Sprigman, (2006) (arguing that fashion design flourishes in the absence of copyright protection) with Hemphill and Suk (2009) (arguing that decreases in the cost of imitation in fashion are beginning to erode incentives for designers).

<sup>12</sup> Boldrin and Levine object that no one knows what inventions or creations to copy unless they wait to see which ones are successful, and by that time the inventor has recouped investment (2008:137-45). This is a fair point, but it only works sometimes. If an unknown creator designs a new dress, it may not be quickly copied. But if the dress is a hit, imitators will rush to copy the next dress from the same designer. So Boldrin and Levine's argument might bring us new creation by unknown creators, but it won't give any margin to new innovation by established creators.

<sup>13</sup> Curiously, Boldrin and Levine (2008:226) criticize the pharmaceutical industry for spending so much R&D money on "me-too" drugs rather than drugs that open entirely new markets. They deride it as an "anemic and pathetic version" of market competition (2008:231). But that's precisely the sort of competitive, as opposed to Schumpeterian, innovation that they purport to want to encourage by eliminating IP rights. Competitive innovation is in general more likely to benefit society than pure copying.

<sup>14</sup> John Allison and Ronald Mann (2007) find a significant positive relationship between startup patents and the success of those firms, though it is not clear which way causation runs in that story.

arguably the most important form of competition – the “creative destruction” of a new disruptive technology (Schumpeter, 1943). And while I agree with Boldrin and Levine that competition is valuable, there seems little question that innovation is more valuable still. (Ask yourself whether you’d rather have a \$200 iPhone, despite being stuck with a lousy cellular carrier, or a really, really cheap 1990s-era brick-shaped cell phone). So IP rights offer the promise of promoting not just intellectual oligopoly but also fringe competition by new technologies.

That sounds like a pretty good deal. Why, then, call this a “cautious defense”? The answer is two-fold. First, Boldrin and Levine are correct that we will get some innovation in many industries, and even the same level of innovation in some industries, without IP protection. And IP rights are not costless. They not only impose static inefficiencies in the forms of reduced output and higher prices, but can interfere with innovation as well as promote it by raising input costs and creating the potential for holdup. Monopolists, as Boldrin and Levine (2008:87-90) correctly point out, are frequently stupid. We don’t want them running our economy, any more than we want Soviet central planners doing so. So in an ideal world, we would give IP protection only in those circumstances in which we need it.<sup>15</sup> And if we could tell in advance what those circumstances were, we would adjust policy accordingly. But for the most part, we can’t. The need for IP-driven appropriability varies by industry, within industry by technology, within technology by particular invention and particular inventor, and even then may vary over time. We sometimes do carve particular pieces out of the IP regime: we don’t give copyright protection to cooking or fashion design, and we don’t give patents to abstract scientific principles or laws of nature. But for most types of invention and creation we just can’t be confident that IP isn’t driving at least some innovation. The result is an educated guess that, on balance, IP protection will give us more benefit in the industries in which it spurs competitive innovation and fringe competition than the harm it causes in raising prices and constraining downstream innovation. It is, as Mike Scherer puts it, “a system that, despite its manifest imperfections, has worked tolerably well” (Scherer, 2009).

Second, and more important, the fact that some stylized version of “IP” will promote innovation doesn’t mean that our existing IP regime necessarily does so. Boldrin and Levine overreach in calling for the abolition of IP, but it is the case that some aspects of the IP regime inhibit rather than promote innovation. So their effort might more profitably be directed not to attacking IP as a whole, but in focusing on the subset of IP rules that seem unlikely to

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<sup>15</sup> As Larry Lessig (1996:638) puts it, “sufficient incentive is something less than perfect control.”

promote innovation. Some examples of rules that might be thought to inhibit rather than promote innovation follow:<sup>16</sup>

- There is no question that the duration of copyright is far too long. Whether or not retroactively extending copyright terms is constitutional,<sup>17</sup> it's a really terrible idea. It provides no new incentive to create, and it makes it harder to build on the works of others.
- Copyright law too often restricts not slavish imitation, but a defendant's own creative works that use small amounts of the plaintiff's creativity, whether in music sampling, satire, collage, or backgrounds in movies and television. Not only are these uses unlikely to interfere with any expected copyright owner incentive, but enforcement of copyright against them raises the cost of the defendant's creativity and the prospect of having that creativity enjoined or held up.
- Indirect infringement rules in copyright may reach too broadly, shutting down "dual-use" technologies that have many legitimate uses as well as being usable for infringement. Doing so stifles innovation in media technologies in the service of promoting creativity in copyright industries.
- In modern patent litigation the overwhelming majority (90% or more) of lawsuits are brought not against copiers, but against defendants who independently invented the technology in question (Cotropia and Lemley, 2009). Whether or not you consider that a problem in itself, it certainly suggests that patent litigation is too often used for ends other than promoting technology transfer. And it suggests that there is an awful lot of near-simultaneous invention going on, something that might or might not be consistent with Boldrin and Levine's claim that we don't need patents to drive those inventions (Boldrin and Levine, 2008:202-208; Vermont, 2006),<sup>18</sup> and may mean we are over-rewarding inventors who

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<sup>16</sup> N.B. I am *not* suggesting that all these changes are desirable, only that these are the places where Boldrin and Levine might make their strongest stand.

<sup>17</sup> *Eldred v. Ashcroft*, 537 U.S. 186 (2003).

<sup>18</sup> Boldrin and Levine take this as evidence that "intellectual monopoly is absolutely not necessary for great inventions to take place" (Boldrin and Levine, 2008:208). But I'm not so sure. Sometimes simultaneous invention will be the result of exogenous changes in circumstances that make the invention possible for anyone, where it wasn't before. But patent law, properly interpreted, shouldn't grant patents in those cases (Lemley, 2007b). And sometimes pure serendipity is at work. But sometimes simultaneous invention reflects not the ease of invention, but the fact of a "patent race." See Duffy (2004) (discussing the advantages of patent races). Without the lure of a patent, neither inventor may have been racing to be the first.

have made only a marginal social contribution by slightly accelerating the disclosure of an idea (Stiglitz, 2008:1706-07).

- In some circumstances damages rather than an injunction may be the appropriate remedy for infringement of an IP right, particularly where an injunction would block legal as well as illegal activity (Lemley and Weiser, 2007). The Supreme Court decision in *eBay v. MercExchange*<sup>19</sup> took an important step toward rationalizing the law of IP remedies by requiring that a plaintiff prove entitlement to an injunction on a case-by-case basis. But the benefits of a liability rule will be undone if the damages awarded under that rule are punitive, and both statutory damages in copyright law<sup>20</sup> and current patent practice in setting reasonable royalties often overcompensates IP owners (Lemley, 2009; Love, 2007), leading to unintended deterrence.
- Antitrust law too often defers to claims of IP ownership, allowing IP owners to convert a weak right into a strong one or a narrow right into a broad one.<sup>21</sup>

My argument, then, is not that the existing IP regime gets the balance right; I don't think it does. Our IP regime should be more concerned with preventing rapid duplication, and less concerned with internalizing all social benefits or giving creators control over productive reuses, than it is today. Rather, the argument is that the right set of policies for encouraging innovation will probably include at least some IP in the mix – not because we want to encourage intellectual monopoly, but because we want to encourage dynamic competition.

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<sup>19</sup> 547 U.S. 388 (2006).

<sup>20</sup> 17 U.S.C. § 504(c).

<sup>21</sup> A notable example involves agreements by pharmaceutical companies to pay generics not to enter the market, preserving legal exclusivity of a weak patent. Despite the unquestionably anticompetitive nature of these agreements, courts have generally permitted them on the grounds that they must defer to the IP right in question. See, e.g., *In re Ciprofloxacin Hydrochloride Antitrust Litig.*, 544 F.3d 1323 (Fed. Cir. 2008). For criticism, see, e.g., Hovenkamp et al., 2003; Hemphill, 2006. For detailed analysis of the complex relationship between IP and antitrust, see Hovenkamp et al., 2003.

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# Evaluating the Economic Performance of Property Systems

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*How should the economic performance of property systems be evaluated? Benefit-cost analysis is widely used to evaluate non-market based regulation when prices are not available. Market prices provide better information for property systems, but market prices are not necessarily socially optimal when property rights are imperfect. This paper discusses two practical approaches to evaluating the performance of property systems, one based on an analysis of institutional performance, the other based on measuring incentives. As an illustration, I show how these approaches might be used to evaluate the US patent system.*

## 1. INTRODUCTION

A well-developed literature and practice evaluates the economic performance of government programs using non-market forms of regulation. Policy analysts use benefit-cost analysis to evaluate non-market resource allocations, following Kaldor (1939) and Hicks (1939). This provides a useful way of evaluating economic performance when prices are not available. For example, applied economists use this approach and related metrics to evaluate environmental regulation (Stavins, 2008; Tietenberg, 2002) or the regulation of common pool resources (Ostrom, 1990).

However, following Coase (1960) and Arrow (1970, 1971), markets can be used as a form of regulation alternative to Pigovian taxes/subsidies and to command-and-control policies. If the government can create appropriate property rights, externalities can be internalized and markets can be used to achieve Pareto optimal regulation. Examples include tradable pollution permits overcoming pollution externalities and patents overcoming free-rider externalities.

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But how can property systems be evaluated? It is sometimes argued, often implicitly, that there is no need to evaluate property systems. Indeed, many new rights have been created in recent years without any formal evaluation of their performance.<sup>1</sup> With property systems, in contrast to non-market regulatory systems, prices *are* usually available. With well-defined and enforceable property rights, these prices reveal the values placed on goods by market participants and, with competitive markets, these prices should theoretically lead to a Pareto optimal resource allocation.

However, property rights are not always perfectly defined and enforced. For example, poorly defined land rights have given rise to squatters on Brazil's frontier (Alston et al., 1999) and problems defining patent rights have caused excessive litigation in some technologies (Bessen and Meurer, 2008a). In these cases, prices do not necessarily lead to a Pareto optimal allocation nor do they necessarily reveal the intrinsic value placed on resources by market participants, as I show in a related paper (Bessen, 2009). And applied economists are well aware that the institutional details of property rights matter. An empirical literature studies the importance of institutional features such as titling and public notice for the performance of property rights.<sup>2</sup>

Surprisingly, the theoretical literature seems to lack a general model of property rights where those rights might be both imperfectly defined and/or imperfectly enforced.<sup>3</sup> There is a literature on regulatory compliance with uncertain enforcement,<sup>4</sup> however, that literature does not address specific issues related to property rights. There is also a literature on patents with uncertain enforcement,<sup>5</sup> but this literature also does not deal with imperfect

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<sup>1</sup> Some examples are new rights for databases in Europe, new property-like assets created by through securitization of financial instruments, and the extension of patent rights to cover genes, software, methods of doing business, and mental processes.

<sup>2</sup> Bessen and Meurer (2008a) on patents; De Soto (2000), Lanjouw and Levy (2002), Besley (1995), Alston et al. (1996, 1999), Clay (2006) on conflicting rights; Miceli et al. (2002) on titling; Miceli et al. (2008), Gerard (2001) on mining patents; Baker et al. (2001) on adverse possession; Libecap and Lueck (2009) on surveying and recording systems; Lueck (1995) on possession rules.

<sup>3</sup> Barzel (2003:52) describes problems of definition and enforcement as problems of transaction costs. Defining transaction costs broadly as "the resources used to establish and maintain economic rights," he states that "Without transaction costs, property rights are well-defined and enforced, which implies that all imposition of costs on one party by another result in full compensation." But this approach fails to identify concretely what happens when property rights are poorly defined or enforced.

<sup>4</sup> This literature includes Calfee and Craswell (1984), Craswell and Calfee (1986), Kaplow (1990), Kolstad et al. (1990), and Shavell (1984).

<sup>5</sup> Models of patents with uncertain enforcement include Bessen (2005), Bessen and Meurer (2006), Crampes and Langinier (2002), Farrell and Shapiro (2008), Lemley and Shapiro (2005), Meurer (1989), and Shapiro (2001).

definition of patents. Imperfectly defined property rights can generate overlapping claims on the same asset. One problem with overlapping claims, especially where property boundaries do not correspond to the optimal economic division, is that they can lead to an “anticommons” (Heller, 1998, 2008). This has been modeled by Buchanan and Yoon (2000) and Schulz et al. (2002). Shapiro (2001) developed a similar model specifically for patents. However, these models generally assume certain enforcement. In this paper I use a simple model of imperfect property rights where those rights might be both imperfectly defined and imperfectly enforced.

It is, of course, possible to evaluate property systems by conducting a full welfare analysis or a benefit-cost analysis. However, the data to make such evaluations appear difficult to obtain in many cases. This paper outlines two methods for obtaining limited evaluations of property systems that do not have such difficult data requirements. Using a model of exclusionary property rights, I show that there are several ways property systems can fail to achieve Pareto optimal allocations. These are each related to distinct institutional failures. This provides a first criterion for evaluating performance: whether property institutions do what they are supposed to do or not. Although this method of evaluation does not provide a quantitative measure of misallocation, it identifies specific institutional failures that correspond to market distortions.

Second, using the model, I show that estimates of the private value of assets and of the costs of disputes over rights – both of which can be estimated in some cases – provide a means for measuring performance in the case of one particular type of failures.

To illustrate the application of these methods, I show how they could be applied to evaluating the operation of the US patent system. In the next section I develop a simple but general model of property rights with possibly imperfect enforcement and imperfect definition. Following that, I describe how some aspects of economic performance can be evaluated using the model and I then perform that analysis using data on the US patent system.

## 2. A MODEL OF EXCLUSIONARY PROPERTY RIGHTS

To fix ideas, I model a congestion externality. With slight modification, the same model can be applied to other types of externalities, including positive externalities. The model considers two sorts of private, exclusionary property rights: simple possession and legal exclusionary rights. I assume that a single party “possesses” an asset. Possession gives that party limited, privately-enforced

exclusionary rights.<sup>6</sup> Although there are many different sorts of private enforcement, including mechanisms involving reputation, repeated interaction, boycotts and threats of violence, I model these rights as enforced by a simple technological exclusion such as a wall or a fence. That is, possession means that other parties face an extra cost if they seek to expropriate the asset.

I also consider legal exclusionary rights where one or more owners obtain legal title that conveys a right of exclusion that can be enforced in court. Both obtaining title and legal enforcement involve costs to the owner and enforcement is not perfect. Note also that because the rights might not be perfectly defined, multiple parties might obtain legal claims to the same asset, including non-possessing parties (I assume that the possessing party can also obtain legal title).

## 2.1. EXTERNALITY

I begin with a simple model of a congestion externality of the sort that has been used to model natural resources.<sup>7</sup> Since the focus of this paper is on the effect of property rights on the pricing of assets, this same analysis can be done easily with a positive externality instead, e.g., patents on inventions. I choose to model a congestion externality because that is the sort of externality that Garret Hardin (1968) and others have used to discuss property rights.

Let  $x$  designate the extent of an activity undertaken using a scarce resource. This variable could represent the number of cattle grazing on a pasture (Hardin, 1968), or the number of fishing boats on a particular fishing ground (Gordon, 1954), or the number of cars in a parking lot (Buchanan and Yoon, 2000). Let  $c$  be the unit cost of this activity, for example, the cost of a head of cattle or of a fishing boat rental (in the parking lot example,  $c = 0$ ).

Let  $v(x)$  be the average consumer value derived from each unit of  $x$ , where  $v$  is positive and twice differentiable. Thus  $v$  represents the value of each head of cattle after grazing, or the average catch per boat on the fishing ground or the value of parking a car. The congestion externality implies that  $v'(x) < 0$ . I further assume that the marginal effect of the externality is non-decreasing, that is,  $v''(x) \leq 0$ .<sup>8</sup>

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<sup>6</sup> This is a bit of an oversimplification because possession gives rise to legally enforceable claims as well in some cases. To the extent that this is true, possessory rights can be modeled as legally enforceable rights.

<sup>7</sup> See, for example, Gordon (1954). For an early model of road congestion externalities see Knight (1924).

<sup>8</sup> My results will hold with a less restrictive assumption, however, this assumption seems reasonable enough and it simplifies the exposition.

Note that  $v$  implicitly includes both technological factors, such as the weight gain of each head of cattle, and market factors, such as the price per pound of beef. Because of the latter,  $v$  reflects the relative scarcity of the asset; that is, for example, if there is a lot of pasture land, then the price of beef will be relatively low and so the value derived from grazing on this particular pasture will be lower than if pasture land were less plentiful. Finally, note that  $v$  also reflects investments made in improving the asset. In some contexts, for example patents on inventions, the emphasis of analysis has been on investment incentives.

## 2.2. SOCIAL OPTIMUM

Assume that there are a large number of prospective users of the asset and that both the users and the social planner are risk neutral. The net social surplus is

$$(1) \quad S(x) = v(x)x - cx.$$

To assure a well-behaved social optimum with  $x > 0$ , I assume further that

$$(2) \quad v(0) > c \text{ and } \varepsilon \equiv -v'(x)\frac{x}{v} < 1$$

where  $\varepsilon$  is the (negative) elasticity of  $v$  with respect to  $x$ .

Then the first order condition for the social optimum and the corresponding net surplus are

$$(3) \quad x^S = x \text{ such that } v(x^S) = \frac{c}{1 - \varepsilon(x^S)}, \quad S = (v(x^S) - c)x^S$$

This first order condition provides our benchmark of Pareto optimality. Note that this allocation corresponds to a price. Suppose that a single agent had perfect control over the use of the asset. That agent could achieve this Pareto optimal allocation by charging each user a unit price

$$(4) \quad p^S = \varepsilon v(x^S)$$

Suppose there are  $M$  users and the  $j$ th user has activity level  $x_j$ . Since there is a competitive market, users would acquire rights to use the asset until the individual profit of the  $j$ th user is zero:

$$\pi_j = v(x)x_j - (c + p^S)x_j = 0, \quad x \equiv \sum_{i=1}^M x_i$$

where summation is over all participating users. It is straightforward to show that the property owner realizes the rent maximizing allocation by charging the Pareto optimal price and the zero profit condition is solved when  $\sum x_j = x^S$ , or, in other words, the Pareto optimal allocation is realized. The property owner, in this case, receives the entire social surplus.

### 2.3. POSSESSION

Now suppose that there are no legal property rights, however, the single agent who possesses the asset takes private measures to exclude users. Suppose that these measures impose an additional unit cost of  $c_0$  on users. There are two sorts of allocations realized, depending on the value of  $c_0$ .

If  $c_0 \geq p^S$ , then the asset owner will maximize profits by charging a price  $p^* = p^S$ . The owner is able to charge the Pareto optimal price because the exclusionary measures are sufficiently costly to prospective users.

If, instead,  $c_0 < p^S$ , then the best that the owner can do is to charge  $p^* = c_0$ .<sup>9</sup> In this case, it is straightforward to show that  $\sum x_j > x^S$ , or, in other words, weak exclusion leads to overuse of the asset. In these situations, the addition of a legal property right can enhance social welfare.

### 2.4. LEGAL EXCLUSIONARY RIGHTS

Now suppose that the party who possesses the asset can also obtain legal title by spending  $t$ . However, because the asset boundaries might not be perfectly defined for a variety of reasons (see Bessen, 2009), a total of  $N$  parties can obtain legal claims on the asset. Note that I interpret this condition broadly to include cases where multiple parties have claims to a single *usable* asset at its socially optimal scale. For example, a shopping mall might be the best social use for some land, but the land might be subdivided into smaller, socially inefficient house-sized plots. In this case, the boundaries of the housing plots are technically well-defined, but technological indivisibilities make these plots sub-optimal.

Let the possessing agent be designated  $i=1$  and the remaining, non-possessing agents,  $i = 2, \dots, N$ . I assume that possession is sufficient to provide notice, that is, prospective users know that owner 1 has rights to the asset. The non-possessing owners, however, must choose to spend  $u$  in order to provide notice *ex ante*. I assume that this cost is not so large as to deter formal acquisition of rights and that prospective users of an asset know the number of

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<sup>9</sup> In the unconstrained case, the owner makes out best with the unconstrained rent-maximizing price. In the constrained case, the owner makes out best when the price equals the constraint ( $c_0$ ) because the owner's rents decrease monotonically with price at any given  $x$ .

rights that claim the asset but they do not know the identities of those rights holders *ex ante*.<sup>10</sup> They search costlessly for these identities and find only the identities of those rights holders who have spent  $u$  to improve their notice. They then contract with those rights holders. An important feature of the model is that it does not pay all rights holders to spend  $u$ , and, consequently, some rights are not contracted over *ex ante*.

The combination of legal and privately enforced exclusion can be modeled as a game with the following stages (see Figure 1):

1. Asset owners  $A_i$ ,  $i = 1, \dots, N$ , each decide whether to spend  $t$  to obtain title. Non-possessing owners,  $i = 2, \dots, N$ , decide whether to spend an additional  $u$  to provide notice. Each  $i$ th owner declares a price,  $p_i$ .
2. Prospective users search for the identities of asset owners and find those who have spent  $u$  in addition to user  $i = 1$ . Prospective users decide whether to pay the owners they have identified, to use the asset without paying *ex ante*, or to not use the asset at all.
3. Each of  $M$  users,  $B_j$ , who chooses to use the asset in amount  $x_j$  sinks  $cx_j$  into its use.<sup>11</sup> Given the competitive nature of the market, users enter until the zero profit condition is met.
4. Asset owners can costlessly detect use of the asset. If  $B_j$  uses the asset but does not pay owner  $A_i$ , they bargain to reach a settlement prior to litigation. I assume that the negotiation, if successful, realizes a Nash bargaining solution with each party receiving equal shares of the net surplus.
5. If negotiations break down, then  $A_i$  initiates a lawsuit against  $B_j$  at a cost  $L$  to each party. Party  $A_i$  wins the suit with probability  $1 - q_i$ , independently of actions taken by other asset owners.<sup>12</sup> If party  $A_i$  wins, it receives an injunction against  $B_j$ . I assume that under these conditions,  $B_j$  will settle by paying  $v x_j$ .

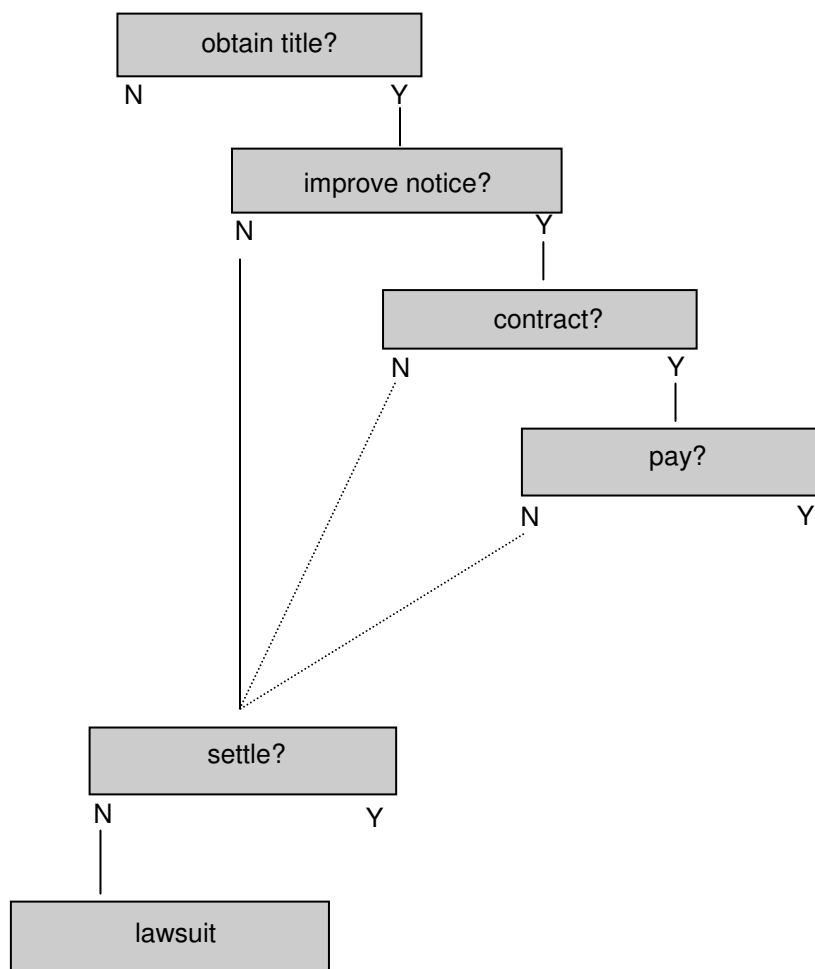
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<sup>10</sup> This is a strong assumption and it could be modeled more realistically as a game of Bayesian inference where the asset users have priors about the number of rights holders and in a perfect Bayesian equilibrium the actual number of rights holders correspond to their (possibly) updated priors.

<sup>11</sup> Or  $(c + c_0) x_j$  if using the asset without permission of the possessing owner.

<sup>12</sup> A more complicated model might consider the possibility that a lawsuit with one party might influence the probability of winning for other parties. In this case, the variables  $q_i$  represent the probability of winning given the actions of other parties. However, since lawsuits don't occur in equilibrium under the other assumptions made, this interpretation should not affect the results.

Figure 1. Model Decision Tree



To simplify the outcomes, I assume that there is a minimum efficient scale for users,  $\underline{x}$ , such that  $x_j \geq \underline{x}$  and  $c_0 \underline{x} > L > 0$ . This is sufficient to assure that when rights are relatively certain, both parties can credibly threaten to engage in a lawsuit and that such lawsuits will always be settled in stage 4. This simplifies the discussion, however, it obviously does not apply to those situations where the direct costs of litigation are excessive.

## 2.5. SOLUTION REGIONS

I assume that property owners choose prices that maximize their rents subject to Cournot assumptions (taking other prices as given) and subject to the zero profit condition for asset users. An owner might not be able to realize the price that brings the greatest possible rent because that price might be so high that users will choose to ignore the property rights and take their chances in ex post negotiation or, possibly, litigation. This condition places a constraint on the maximum price that any owner can charge. Ignoring for the moment whether the  $i$ th owner can charge this price, the first order maximizing condition for the unconstrained rent-maximizing price is (see Appendix for calculations)

$$(5) \quad p_i^* = \varepsilon(x^*)v(x^*)$$

where  $x^*$  is level of total activity given the zero profit condition and the given prices.

The  $i$ th owner will be able to get this price as long as asset users make more by paying this amount than they could get from a Stage 4 negotiation. The per unit amount that the  $i$ th owner gets from a Stage 4 negotiation with activity level  $x$  is

$$(6) \quad \underline{p}_i(x) \equiv \begin{cases} (1 - q_1)v(x) + c_0, & i = 1 \\ (1 - q_i)v(x), & i > 1 \end{cases}$$

If  $p_i^* \leq \underline{p}_i(x^*)$ , then asset users will choose to pay the unconstrained price,  $p_i^*$ , and, because this is a rent-maximizing price, asset owner  $i$  will also make out best at this price. Otherwise, if  $p_i^* > \underline{p}_i(x^*)$ , asset users will make out better by not paying unless the owner charges a “constrained” price of  $\underline{p}_i$  or less. In this case, it is straightforward to show that the asset owner makes out best by

charging exactly  $\underline{p}_i$ , leaving the owner indifferent to getting paid or going to Stage 4 enforcement and leaving the asset users indifferent to paying or not.<sup>13</sup>

Non-possessing owners' decision to spend  $u$  to improve public notice of their rights depends on whether they are able to charge the unconstrained price or not. If so, then they will spend  $u$ , because they make out better by getting paid rather than by taking enforcement action. But if the price is constrained, then they are indifferent to whether they get paid up front or whether they take enforcement action. In this latter case, a non-possessing owner ( $j > 1$ ) will not spend  $u$  to improve public notice and, as a result, it will not contract with users ex ante, but will, instead, pursue its claims ex post (Stage 4) where it will receive this amount from a negotiated settlement. This means that this scenario gives rise to ex post disputes and, possibly, to litigation. It is the only scenario in this model that does give rise to disputes.

Note also that the possessing property owner might not choose to obtain legal title. If  $c_0 > p^*$ , then the possessing property owner makes out better just by utilizing the degree of technological exclusion provided by possession. In this case, the owner can charge the rent-maximizing price without having to pay title cost,  $t$ , and without having to engage in enforcement activity.

Given these distinctions, I show in the Appendix that the efficiency performance of the different solutions falls into four zones, depending on whether there are multiple property owners with claims on the asset and whether one or more of those owners can charge their unconstrained rent-maximizing price. These results are summarized by the chart in Figure 2.

**Figure 2. Solution Regions**

	Single Owner	Multiple Owners
Unconstrained price (one or more owners)	Pareto optimal allocation	Underuse
Only constrained prices	Overuse	Ambiguous

The top row includes cases where at least one owner is able to charge the unconstrained price. The Pareto optimal allocation is only realized when there is a single owner with a right that is relatively certain to be enforced (unconstrained price). In this case, property users obey the law and respect property rights.

<sup>13</sup> The intuition here is that owners' profits decrease monotonically with the activity level,  $x$ , once  $x$  exceeds rent-maximizing level. Under the zero profit condition, the lower the price, the greater the level of  $x$ , hence as prices fall below the rent-maximizing price, profits decline.

When a single owner owns a relatively *uncertain* right, then the price is constrained and there is too much use of the resource – “weak” property rights tend in the direction of the “tragedy of the commons.” In addition, a single owner of a relatively uncertain right will not spend  $u$  to establish clear notice. This results in a dispute (at Stage 4) and, possibly, litigation.

On the other hand, when there are multiple owners, there will be too little use of the resource compared to the Pareto optimal level as long as one or more of the owners have rights that are relatively certain to be enforced. When there are multiple owners, all with relatively certain rights, this gives rise to an “anti-commons” where the failure of owners to coordinate gives rise to excessively high prices and a socially low level of resource use. When one owner has a strong right, but additional owners have rights that are relatively unlikely to be enforced, this situation might be better described as one of “notice failure” (see Bessen, 2009). In this case, poorly defined rights give rise to disputes and litigation and the resource is also underutilized. When multiple owners all have relatively uncertain rights, the resource allocation could provide too little or too much use compared to the Pareto optimal level.

The economic performance of a property system thus depends on where that system falls on these two dimensions: whether the asset owner(s) can charge their rent-maximizing price or not and whether there are multiple legal claims on the asset or not. These dimensions correspond loosely, but not exactly to the oft-cited requirement that property rights need to be “enforceable and well-defined.” An insufficient probability of enforcement can constrain the price that the asset owner charges. However, if technological exclusion measures are sufficiently effective, then a Pareto optimal price can be realized even when the legal right has uncertain enforcement, but, in this case, asset owners will simply not obtain title to the property. Similarly, multiple claimants can arise when rights are not well-defined, but they can also arise when the rights are clearly defined, but are sub-optimally small. However, these two sub-cases can be distinguished because, according to the model, poorly defined rights give rise to disputes and litigation, while rights that are merely sub-optimally small do not.

### 3. EVALUATION

#### 3.1. INSTITUTIONAL PERFORMANCE

This framework provides a means for categorizing the performance of a property system according to where that system falls on the chart in Figure 2. And, to some extent, this can be determined by examining the performance of the titling and notice institutions of that property system. If these institutions work as they

are supposed to, then this indicates that the system likely falls into the “optimal” cell in the upper left; if the institutions don’t work as they are supposed to, then this might mean the system falls into a sub-optimal cell. Several straightforward questions can be used to categorize institutional performance:

1. Do most property owners obtain title? For example, De Soto (2000) documents cases where large numbers of property owners do not obtain title in less developed countries. Several factors might induce owners not to seek title: title might be too expensive to obtain, rights might be unreliably enforced, or private means of exclusion might work sufficiently well so as to make title superfluous.
2. Is there evidence that property owners have overlapping rights? One sort of such evidence is that property owners are aware of the benefits of coordination and attempt to coordinate, whether that effort is successful or not. For example, Libecap and Wiggins (Libecap and Wiggins, 1985; Wiggins and Libecap, 1985) document that owners of oil field leases understand the benefits of unitary control, even though they are often unable to contract to achieve such coordination.<sup>14</sup>
3. Do the property institutions provide effective public notice of boundaries? This involves several subsidiary inquiries. Is boundary information publicly available? Are access and search costs low? For example, is the information in standardized forms and are third parties available to conduct the search? Is the interpretation of the information predictable? For example, are district court or agency decisions often overturned? Are reliable third party interpretations available and insurable? Do users of the asset usually perform a thorough clearance search before investments are sunk? An example of notice failure in land occurs on the Brazilian frontier where conflicting laws give overlapping rights both to absentee owners of large estates and to settler squatters (Alston et al., 1999).

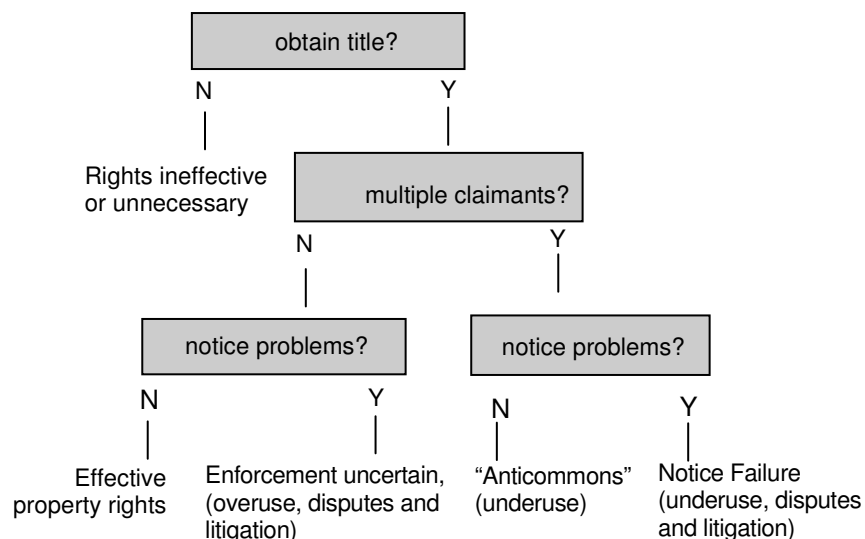
A decision tree based on these inquiries is shown in Figure 3. If asset owners do not obtain title this might be because the property system is ineffective – e.g., title is too expensive or enforcement is too unreliable – or it might mean that private exclusion measures are simply effective enough. The other outcomes correspond to the various cells in Figure 2. Thus these inquiries into institutional performance shed some light on the qualitative nature of the

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<sup>14</sup> Heller (2008) suggests that property owners might not want their desire to coordinate to become public knowledge. Except in cases where the coordination is in blatant violation of antitrust statutes, there does not seem to be a clear economic motive to suppress such information. To the contrary, because parties can privately gain by coordinating, they have economic incentives to make their willingness to do so public knowledge.

economic performance of the property system. This helps identify the sources of institutional failure, if any, but it does not directly provide a quantitative measure of how bad any such failure might be.

**Figure 3. Decision Tree for Classifying Institutional Performance**



### 3.2. QUANTITATIVE EVALUATION OF PATENT NOTICE

For one specific scenario – notice failure – it is possible to estimate a lower bound of the extent to which prices exceed the Pareto optimal level. Further, given an estimate of the elasticity of  $v$ , one can then estimate a lower bound on the associated loss of welfare.

In this scenario, one owner,  $A_1$ , has a right that is relatively likely to be enforced and can therefore charge the unconstrained price,  $p_1^*$ . However, because property rights are not well-defined, other owners,  $A_j, j=2, \dots, N$ , have rights that are relatively unlikely to be enforced and they can only charge their constrained prices,  $p_j$ . The total actual price that a user pays to all asset owners is

$$(7) \quad P^a \equiv p_1^* + \sum_{j=2}^N p_j = \left( \varepsilon(x^a) + \sum_{j=2}^N (1 - q_j) \right) v(x^a)$$

where  $x^a$  is the equilibrium level of use. The first term in parentheses corresponds to that portion of the total price going to the property owner with the relatively certain right while the second term corresponds to that portion going to the owners of “weaker” rights.<sup>15</sup> In this scenario, the optimal price would be realized if owner 1 held the only legal claim to the asset. In that case, the total price would be

$$(8) \quad P^* = \varepsilon(x^*)v(x^*).$$

Define the share of actual rents going to the “weaker” property owners

$$(9) \quad R \equiv \frac{P^a x^a - \varepsilon(x^a)v(x^a)x^a}{P^a x^a} = \frac{Z}{\varepsilon(x^a) + Z}, \quad Z \equiv \sum_{j=2}^N (1 - q_j).$$

As long as  $Z$  is not too large and  $v$  does not decrease too rapidly with small changes in  $x$ , then (see Appendix)

$$(10) \quad \ln \frac{P^a}{P^*} \approx \frac{R}{2}.$$

This represents the extent to which poorly defined property rights inflate costs to asset users. These inflated prices make use of the asset suboptimal. The magnitude of this under-utilization depends on the elasticity,  $\varepsilon$ , but with an estimate in hand, the associated loss of social welfare can be calculated.

The ratio  $R$  can also be estimated. In this scenario, claimants with relatively uncertain rights (that is,  $j = 2, \dots, N$ ) assert their rights after the users have sunk their investments. This means that the rents paid to “weak” property owners represents a risk of ex post disputes that asset users will take into account when they make their decisions to enter the market and invest. Alternatively, the asset owner with relatively certain rights (user 1) can indemnify her customers against these risks, as is typically done in many markets, and correspondingly increase the price charged. The result is the same, however, in that the risk inflates the effective price of asset use. The numerator of  $R$  thus represents the

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<sup>15</sup> Note that litigation cost,  $L$ , does not enter this expression because under the assumptions made, all disputes are settled in Stage 4 without going to trial (see Appendix). To the extent that disputes eventually do go to trial, the rents would be net of litigation cost in a more realistic model. However, this makes no difference in practice to the calculation I perform below. Also, if rights are so uncertain that an asset owner cannot credibly commit to spending  $L$  in Stage 5, then that right is not enforced, that owner does not collect rents, and so does not appear in this equation.

expected dispute risk to asset users while the denominator represents the total rents realized from the asset by all users, making  $R$  the share of dispute risk in total rents. Where a lower bound on dispute risk can be estimated (as I show below for the case of patents), then these can be compared to measures of total rents received to obtain an estimate of the degree of excessive prices. My simple model does not consider other losses from disputes (e.g., lost business, management distraction costs) and it assumes that disputes settle before going to trial, thus avoiding direct litigation costs. To the extent that these costs add to the ex ante risk to asset users, they also increase the effective price of asset use and should thus also be included in this calculation. Note, finally, that this calculation only applies to the case of “notice failure,” where a single party owns a relatively certain right and other parties have relatively uncertain rights.

#### 4. EXAMPLE: PATENTS

Patents are property rights in inventions intended to overcome the free-riding externality. How do patents perform at this task? Boldrin and Levine (2008) argue that patents are neither necessary nor helpful at promoting innovation. In this section, I apply the limited framework developed above to some empirical evidence about patents. I do this as a simple illustration of the approach developed here, rather than as an exhaustive final analysis of the US patent system. A complete analysis would need to go into greater depth and consider a wider range of evidence than I present here. Nevertheless, a brief consideration might help illustrate some of the main themes of my proposed approach to evaluating property rights systems.

Note that patents address a free-riding externality. This is a positive externality while the congestion externality I modeled above is a negative externality. Nevertheless, the model can be readily adapted to the case of patents with only some minor differences.<sup>16</sup> Indeed, Shapiro (2001) creates a model that is an instance of my model, for the specific case where there are overlapping rights that are all relatively certain to be enforced.

##### 4.1. INSTITUTIONAL PERFORMANCE

First, consider the three inquiries concerning institutional performance (for a more complete discussion of some of this evidence, see Bessen and Meurer (2008a)):

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<sup>16</sup> The main difference is that  $v$  now represents the demand for the technology among heterogeneous users. In this setting, social welfare is calculated slightly differently: it now includes rents, as with the congestion externality, but it also includes infra-marginal consumers' surplus.

1. Do most property owners obtain title? Table 1 shows the percentage of public firms in several high tech industries that applied for patents in 1999 or earlier that were granted by 2002. In almost all of these industries, most firms acquire patents. The exception is business services including software (these firms are mostly in the software industry). Software firms might obtain patents less frequently because historically the law significantly limited the degree to which software inventions could be patented. However, by 1999, case law affirming the validity of software patents had been well established. More important, the high degree of innovation during the decades when software patents were not routinely issued indicates that private means of exclusion (trade secrecy, first mover advantage, etc.) are highly effective in the software industry so that legal property rights might be frequently superfluous.

**Table 1. Share of Public Firms in Technology Industries with Patent Applications or Grants, 1999**

<i>Industry</i>	<i>SIC Code</i>	<i>Percent with Patents</i>
Chemicals and pharmaceuticals	28	85%
Machinery, including computer equipment	35	87%
Electronics and electrical equipment, excluding computers	36	87%
Instruments	38	88%
Business services, including software	73	35%

2. Is there evidence that property owners have overlapping rights? Industry participants contend that patent “thickets” exist in some industries such as information technology and electronics industries (Levin et al., 1987). Surveys find that among the main reasons to acquire patents are blocking competitors from developing their own technologies, preventing lawsuits (through threat of counter-suits) and for use in negotiations (Cohen et al., 2002). These uses only make sense if multiple firms have overlapping patent rights on each others’ technologies. On the other hand, outside of standard setting organizations, which are a special case, there appears to be little effort to establish patent pools (see Lerner et al., 2003), even though antitrust authorities have set forth clear guidelines for doing so (US Department of Justice and Federal Trade Commission, 1995). Furthermore, survey evidence among biomedical researchers and lawyers finds that overlapping patents rarely force researchers to abandon research paths; instead, they ignore patents in cases of possible conflict (Walsh et al., 2003). In summary, the evidence suggests that overlapping patent rights might be significant in some industries, but

evidence of an “anticommons” is weak at best. The evidence might be more consistent with a “notice failure” scenario where many overlapping rights have relatively uncertain prospects of enforcement.

3. Do the property institutions provide effective public notice of boundaries? This involves several subsidiary inquiries:
4. Is boundary information publicly available? Although patent documents are made public (in some cases only when the patents issue), it is possible for patent applicants to revise the claims in their patents over many years and by doing so, to effectively change the boundaries of their rights. One method of doing this is to maintain continuing applications, and by the late 1990s, nearly one third of all patent applications were continuing applications as opposed to original applications (Bessen and Meurer, 2008a).
5. Is the interpretation of the information predictable? Courts interpret patent boundaries through a process known as “claim construction.” However, this process has become unpredictable so that nearly 40% of district court claim interpretations are overturned on appeal (Moore, 2005). It is even more difficult to obtain a reliable determination of patent boundaries prior to a lawsuit. Although lawyers will provide interpretations of patent boundaries, these are expensive, they are not guaranteed and the market for insurance against misinterpretations hardly functions (Betterley, 2006). This contrasts, say, with the predictable role of surveyors in interpreting land deeds and the availability of title insurance for land.
6. Do asset users usually perform thorough clearance searches before investments are sunk? According to a survey of patent counsel who are members of the Intellectual Property Owners Association, 65% do not always conduct clearance searches before introducing a product (Cockburn and Henderson, 2003). In some industries such as computers and software, firms routinely do not conduct clearance searches because the numbers of overlapping patents they would have to search would make the cost of search prohibitively expensive, aside from the unpredictability of any determinations.

In sum, firms in most technology industries do acquire patents, indicating that these property rights do deliver positive private value. However, there is substantial evidence that some of the public notice functions of the patent system do not work well. Patent boundaries can be hidden for significant periods of time, interpretation of these boundaries is unpredictable and, not surprisingly, clearance searches are not conducted in many industries. For these reasons, the institutions of the patent system do not function as property

systems are supposed to function. This inquiry does not, however, reveal how significant this failure is.

#### 4.2. QUANTITATIVE EVALUATION OF PATENT NOTICE FAILURE

Given the diagnosis of notice failure, the next step is to obtain a quantitative evaluation of this failure, specifically by estimating the extent to which prices exceed the Pareto optimal level as in equation (10). The variable  $R$  in (10) can be approximated as follows. First, the denominator represents the total rents received, in this case, the discounted expected future returns to R&D investment. In a competitive equilibrium with free entry, firms will invest in R&D until the total R&D investment equals the expected present value of future R&D rents from that investment. Beyond this point, further investment is no longer profitable. This means that under competitive equilibrium, the denominator equals the level of R&D spending. This will be true even when notice failure raises prices above their Pareto optimal level. Of course, barriers to entry in the performance of R&D might limit R&D spending, providing rents in excess of the R&D investment, but these barriers to entry are also likely to raise prices even further above the Pareto optimal level. Consequently, even without competitive markets, R&D spending is likely to serve as a first order approximation of R&D rents.

The numerator represents the rents going to the holders of relatively uncertain rights. As above, this corresponds to the risk of ex post disputes. This risk can be estimated from the loss of wealth that firms experience following the filing of a lawsuit against them using event study methods (see Bessen and Meurer, 2008b).<sup>17</sup> Since some disputes are settled without a lawsuit being filed, this loss of wealth understates the total dispute risk and thus understates the rents to owners of uncertain rights.<sup>18</sup>

From the analysis of lawsuit filings for US public firms in 1999 (Bessen and Meurer, 2008b), I obtain an estimate for loss of wealth of \$29 billion (in 1999 dollars), after accounting for under-reporting and the stock market “bubble” (see the paper for details). This compares with \$160 billion of non-Federal spending

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<sup>17</sup> In practice, lawsuits also involve deadweight loss in addition to a transfer. In the model above, I ignored such deadweight loss and included conditions so that litigation would not occur. It is straightforward to extend the model to scenarios where litigation occurs and where it creates deadweight losses. Deadweight losses increase the cost to users of the technology, thus driving up effective relative prices, so these should be included in the numerator of  $R$ . Note, moreover, that these estimates of lost wealth include the majority of cases where lawsuits are settled prior to trial.

<sup>18</sup> Note that I am comparing the current litigation risk to current R&D spending. However, current R&D spending corresponds, in equilibrium, to *future* rents earned on innovations. Thus to the extent that R&D has been increasing, my estimate of  $R$  is understated.

on industrial R&D in 1999. Inserting these values into (10) implies that patent notice problems increased the effective prices of technologies at least 9% above their optimal levels. The true value might be substantially greater, given that the estimate of  $R$  ignores disputes that are settled without litigation.

The effect of this mis-pricing on R&D spending and on social welfare depends on the price elasticity of technology. Nevertheless, it is clear that at reasonable values for this elasticity, notice failure reduced technology use and slowed R&D spending, although these reductions were not necessarily very large.

This price premium can also be compared to the “effective subsidy” that patents provide to R&D spending. Schankerman (1998) reviews the literature and concludes that this effective subsidy rate is only 10-15%, somewhat less than the increase in effective technology prices resulting from notice failure. Bessen and Meurer (2008a) compare litigation risk with private returns from patents among public companies and find that in the chemical and pharmaceutical industries, the private benefits substantially exceed the litigation risk, but that in other industries, the reverse is true. Thus the excessive user cost of technology arising from poorly defined patent boundaries might well eliminate the net incentives the patent system provides in overcoming free riding.

## 5. CONCLUSION

This paper provides a framework for evaluating the performance of property systems when rights might not be perfectly enforced and perfectly defined. I identify several distinct patterns of behavior associated with distinct institutional failures. The framework provides a simple set of inquiries to evaluate institutional performance and a quantitative means to measure the significance of one sort of institutional failure, specifically notice failure.

Applying this framework to the current US patent system as an illustration, I find evidence that patent institutions fail in several ways to provide clear notice of property boundaries and that this increases technology prices significantly above their Pareto optimal level.

This evidence, although strongly suggestive, is also limited. Although I identify specific institutional failings, this does not imply that patent reform can or cannot correct these failings. In contrast, Boldrin and Levine (2008) argue that patents are not necessary to encourage innovation and that society would be better off without them. My limited evaluation of the patent system cannot make such global judgments.

## Appendix

### SOLUTION ZONES

First, consider the  $i$ th asset owner's rent maximizing problem. That owner seeks to choose a price,  $p_i$ , taking the prices of all other asset owners as given. The rents will also depend on the level of use,  $x$ , which is determined by the free entry zero profit condition,

$$(A1) \quad v(x) - \sum_{j=1}^N p_j - c = 0.$$

The Lagrangean for this constrained maximization problem is

$$\mathcal{L}(x, p_i) = p_i x + \lambda \left( v(x) - p_i - \sum_{j \neq i}^N p_j - c \right)$$

with a first order condition of

$$(A2) \quad p_i^* = \varepsilon(x)v(x)$$

as in (5). Alternatively, the  $i$ th asset owner can pursue an enforcement action against the  $j$ th asset user. The payoffs to the asset owner and asset user in Stage 4 (under the assumptions, parties will always settle in Stage 4 rather than go to litigation in Stage 5) can easily be shown to be

$$\{(1 - q_i)v(x)x_j, q_i v(x)x_j\}$$

From this, the user will be indifferent between paying ex ante and going into Stage 4 negotiations when the price charge by owner  $i$  is

$$(A3) \quad \underline{p}_i(x) \equiv \begin{cases} (1 - q_1)v(x) + c_0, & i = 1 \\ (1 - q_i)v(x), & i > 1 \end{cases}$$

In other words, this is the largest price that the asset owner can charge; when this is less than  $p_i^*$ , this will be the "constrained" price. In this case, the asset owner makes the same profit by charging this price ex ante as by negotiating ex post, so there is no advantage to either party to forming an ex ante contract.

This means that the asset owner has nothing to gain from spending  $u$  in order to establish notice in this case. The net result is that relatively uncertain enforcement, asset owners end up in disputes (or litigation) and they only expect to receive an amount equal to the constrained price.

On the other hand, when  $\underline{p}_i > p_i^*$ , the asset owner has an incentive to charge  $p_i^*$  ex ante and therefore to spend  $u$  to put prospective users on notice. If they did not do this, then prospective users – knowing that an asset owner with a relatively certain right exists, but not knowing who that asset owner is – would use the asset less than if they were charged  $p_i^*$ . Although the  $i$ th asset owner would receive a higher price, the use of the asset and the total rents would be less than at the rent-maximizing price. So, as long as  $u$  is not too large (as I have assumed), the asset owner would be better off spending  $u$  to establish notice and forming ex ante contracts.

To consider the solution zones, designate asset owners  $i=1, \dots, n$  as charging their unconstrained prices and asset owners  $i=n+1, \dots, N$  as charging constrained prices. Then substituting (A2) and (A3) into (A1),

$$v(x) - n\varepsilon(x)v(x) - v(x) \sum_{i=n+1}^N (1 - q_i) - c = 0$$

or

$$(A4) \quad v(x) = \frac{c}{1 - n\varepsilon - \sum_{i=n+1}^N (1 - q_i)}.$$

When  $N=1$  and  $\underline{p}_i > p_i^*$ , (A4) yields,

$$v^{1u}(x) = \frac{c}{1 - \varepsilon}$$

This is that same as (3), so, in other words, the unconstrained price yields the Pareto optimal allocation. When  $\underline{p}_i < p_i^*$ , then

$$v^{1c}(x) = \frac{c}{q} \quad \text{but, comparing (A3) and (A2), } \frac{c}{q} < \frac{c}{1 - \varepsilon}.$$

Hence  $v^{1u} > v^{1c}$ . From this it is straightforward to show (see Bessen (2009) for use of the implicit derivative) that  $x^{1u} < x^{1c}$ , or, the asset is overused in this case.

When  $N > 1$  and at least one asset owner can charge the unconstrained price, (A4) can be written in the form of

$$(A5) \quad v^{Nu}(x) = \frac{c}{1 - \varepsilon - Z}, \quad Z > 0.$$

From this it follows that where an equilibrium exists,  $v^{Nu} > v^{Lu}$ , and from this it is straightforward to show underuse by taking the implicit derivative of (A5) (see Bessen, 2009 for details).

#### DERIVATION OF (10)

Taking the implicit derivative of (A5),

$$\frac{dP}{dZ} = \frac{v \cdot v'}{v''x + v'(2 - Z)}.$$

Then, as long as  $Z$  and  $v''$  are not too large,

$$\frac{d \ln P}{dZ} \approx \frac{1}{2} \frac{1}{\varepsilon + Z}.$$

Comparing a change in  $Z$  from 0 to the sum given in the text yields (10).

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# Copyright Abolition and Attribution

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*An increasing number of scholarly voices challenge the balance between incentives and deadweight losses created by intellectual property rights. In their book *Against Intellectual Monopoly* (2008), Boldrin and Levine) move beyond pragmatic calls to fine-tune the scope of intellectual property rights to question the very premises of the *quid pro quo* underlying the intellectual property rights system. In this brief essay, we contemplate the effects of removing traditional copyright protection. We draw upon the available literature in economic theory and copyright scholarship to examine the likely incentive effects of copyright abolition on authors, while considering the available non-legal forms of remuneration for authors. Furthermore, we contemplate a version of copyright protection grounded and limited to a mandatory right of attribution.*

## 1. INTRODUCTION

Most economists and utilitarian thinkers regard intellectual property as a “necessary evil.” Following the textbook explanation, intellectual property laws provide necessary economic incentives to creators and inventors. Because information goods, such as books, inventions, and other intellectual products, are based on ideas and information, they possess some of the characteristics of public goods; specifically, consumption is non-rivalrous and it is difficult to exclude non-purchasers from benefiting from the ideas presented in the original works. Intellectual property protection addresses these issues by providing rights-holders with the legal means to exclude unauthorized uses of their creative works. At the same time, it is generally recognized that granting exclusive rights on unique products enables artists and innovators to set prices above marginal cost, generating deadweight losses. The utilitarian approach to intellectual property law is commonly understood as involving a *quid pro quo*: society temporarily accepts this burden in return for the additional incentives provided to the creative and inventive arts and crafts and, consequently, the expansion of the public domain over time (Cooter and Ulen, 2007). Under this

general framework, most scholars in the field of law and economics continue to examine the balance between incentives and deadweight losses, as set by various legal doctrines in intellectual property areas, such as the idea/expression dichotomy in copyright law, the interaction between intellectual property rights and antitrust rules, et cetera (Gordon and Bone, 2001).

At the same time, an increasing number of scholarly voices, from a host of perspectives and angles, challenge the underlying premise of the traditional balance between incentives and deadweight losses created by intellectual property rights. Such calls for change are heard most frequently with regard to the field of copyright law. For the most part, an emerging literature seeks to update copyright laws so that those laws are better aligned with economic, social and technological changes. Some argue that current copyright laws disproportionately favor certain industry stakeholders (e.g. Litman, 1989, 1996); while others argue that new technological advances reduce the required scope of copyright protection (e.g. Ku, 2002).

Some recent challenges to copyright law cut much deeper. In *Against Intellectual Monopoly*, Boldrin and Levine (2008) move well beyond pragmatic calls to fine-tune or moderate the scope of intellectual property rights. Instead, the authors question the very premises of the *quid pro quo* that is the basis of the general structure underlying the intellectual property rights system. The book pursues two main arguments. First, Boldrin and Levine highlight the deep-seated costs involved with providing monopolistic control over ideas and inventions. Exclusive powers, protected with injunctive rights, do not merely increase prices and reduce access; they also slow down the progress of the arts and sciences by reducing product competition. Second, *Against Intellectual Monopoly* stakes the claim that society's interest would be better served if governments eliminated intellectual property rights. Boldrin and Levine present a host of historical examples to make the case that intellectual property law is mostly inefficient (2008:4) and that intellectual protection is (and always has been) an "unnecessary evil" (2008:2).

Boldrin and Levine offer an engaging and provocative perspective on the nature and effect of intellectual property rights. To say the least, *Against Intellectual Monopoly* is persuasive enough to make its readers wonder what a world without intellectual property rights would look like. Would the world have more (and better) books and movies? Perhaps the planet would have fewer illnesses, and we would travel in faster cars (maybe even ones that fly)? Indeed, the arguments of Boldrin and Levine suggest that, by adhering to intellectual property rights protection, society has failed to optimally bolster creative and innovative output. Or perhaps such a conclusion is naïve, because the unavailability of intellectual property remedies would simply cause markets

to rely on more stringent contract enforcement measures and other instruments (Barnett, 2009). Or perhaps the same political forces that have shaped our intellectual property system would bring about additional statutory provisions, not unlike the Digital Millennium Copyright Act, that serve the interests of content industries and innovators. All of these issues deserve more attention than this short essay warrants. Instead, this essay takes a slice of the monumental task ahead, focusing on the separate field of copyright law. In what follows, we contemplate the effects of removing copyright protection. We draw upon the available literature in economic theory and copyright scholarship to examine the likely incentive effects of copyright abolition on authors, while considering the available non-legal form of remuneration for authors. Furthermore, we contemplate a version of copyright protection, grounded and limited to a mandatory right of attribution.

The essay proceeds as follows. In Section 2, we first survey a number of recent insights on the familiar incentive-monopoly balance that underlies the structure of copyright law. Section 3 and 4 briefly review a few market- and intrinsic-based motivations that drive creative output. Finally, in Section 5 we address natural rights, fairness and demoralization arguments in making a case for an expanded right of attribution as a baseline for the protection of authors.

## 2. COPYRIGHT MONOPOLY COSTS AND AUTHORSHIP INCENTIVES

What would markets for original expressive works look like if copyright protection was no longer available? A cost-benefit analysis of removing copyright protection for works of expression, such as books, paintings, songs and the expressive aspects of computer programs, would begin with the following basic observations. Most obviously, removing the protection of copyright would end the price-setting powers of copyright holders. The resulting competitive pricing should increase consumers' and content producers' access to creative works and spur the creation of derivative works. Indirect evidence of such positive access effects can be observed in the context of works for which the copyright term has expired. For instance, there is some evidence that works of fiction that have entered the public domain are in print more than comparable copyrighted works (Heald, 2009).<sup>1</sup> Moreover, the beneficial effects of access also would be amplified by advancements of digital technologies, which have reduced considerably the costs of distribution, the

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<sup>1</sup> Heald observes a ratio of 6.3 editions of each public domain book and 3.2 editions of each copyrighted book for best-selling fiction books published from 1913-1932.

traditional reliance on intermediaries and the need for capital-intensive investments in markets for expressive works.

Of course, the presumptive beneficial effects of the increased access to copyrighted content rely on the assumption that the production of available original works remains constant despite the abolition or reduction in scope of copyright law. Because most copyright-eligible works share public goods characteristics, such as non-rivalrous consumption patterns and difficulties in regulating access, public goods theory predicts that they are vulnerable to suboptimal production. Accordingly, if individuals can copy the author's work unencumbered, without having to incur the cost of creation, market competition would "drive down the expected return of the work to a point that the author would be unable to recoup those costs, and thus, would be unwilling to create the work in the first instance" (Ku et al., 2009:31). If we assume that legal means, and not technological ones, are the primary way to exclude access to free riders, how much creativity do we stand to lose by abolishing traditional copyright laws? Unfortunately, it is difficult to formulate answers to this fundamental question.

First of all, it should be noted that it is very difficult to estimate the true incentive losses, given the absence of a genuine sense of what copyright law currently provides in terms of incentive benefits. Regrettably, the limited empirical evidence on copyright law and creative output, available to date, is inconclusive (Png, 2006). On the one hand, historical studies of registrations with the U.S. Copyright Office suggest that the expected value of copyright protection is rather limited. Landes and Posner (2003) applied multiple-regression analysis to examine the price sensitivity of copyright registration renewals to increases of registration fees. The observed elasticity of registrations with respect to the relatively minor increases in fees during the period 1910-2000 suggests that the present value of the future earnings from the copyrighted works is small. Similarly, a recent study by Ku et al. (2009) found little empirical evidence of independent incentive effects produced by copyright protection. Looking at the effect of increased protection on renewals and registration of different categories of expressive works, the authors' findings suggest that the odds of whether a change in the law will have an effect upon any single category of creative works are "at best slightly better than a coin toss," and there is a similarly small chance that strengthening copyright protection will increase the number of works produced, and vice versa. The only consistent factor associated with increases in the number of new copyright registrations was a change in the population. By contrast, an event study conducted by Baker and Cunningham (2006:582-84) suggests that expansions of copyright law during the period of 1986-98 had a significant positive influence on the stock-market value of companies in copyright-

intensive industries. Excess returns to equity increased on average with 25 basis points as a result of expansionary court decisions, while broadened copyright protection via statutes increased excess returns by an average 46 basis points. An analysis of an index based on influential cases and statutes suggests similar positive effects on equity returns. It is important to note, however, that increases in stock-value may be an imperfect proxy for measuring creative output, since an increase of market value may reflect increased profits from existing works rather than profit arising from future creations stimulated by the increased copyright protection (Png, 2006).

Second, a growing strand of scholarship argues that new technologies have altered the cost-benefit calculus of the traditional *quid pro quo* in myriad ways (Litman, 1996). First, because technology reduces the costs of production of copyright eligible products, the scope of copyright entitlements does not need to be so broad. And, despite the reduction in production costs in many areas of cultural production, copyright scope has expanded over time, thus leading many commentators to question the efficiency of copyright laws (Landes and Posner, 2003). Scholars continue to explore public choice explanations for legislative trends observed in copyright law (see Litman, 2009). Second, digital technology has lowered distribution costs in ways that challenge the traditional business model and reserved rights in favor of copyright intermediaries. Moreover, the promise of digital technology and networking has sparked movements proclaiming the advent of new models of peer-based production (Benkler, 2006) and of new copyright exchange norms of broad access and cultural exchange, such as those promoted by the Creative Commons project (Lessig, 2004). Third, digital technology creates pervasive difficulties for effectively curtailing illicit access and the copying of copyrighted content. Effective technological techniques that circumvent copyright enforcement, as well as the social costs involved in enforcement, further reduce the appeal of property-based models of information goods. Fourth, modern technologies have created new experiences and customary norms among consumers of intellectual property goods, thus conflicting with existing legal norms in copyright law (Feldman and Nadler, 2006; Depoorter and Vanneste, 2005; Tehrani, 2007).

Third, and more fundamentally, a strand of literature highlights the negative impact of copyrights on the creation of new works. Broadening the scope of copyright law, while ensuring greater protections, may also increase the costs of creation. Because expressive creation is cumulative in nature, the monopoly created by exclusivity raises the cost of future innovation by requiring prospective creators to obtain licenses (see Landes and Posner, 2003). In order to create a new work in the wake of expanding copyright protection, the author of a new work must always obtain permission from another copyright owner that

is protected, thus causing others to incur transaction costs, as well as the potential cost of a license or royalty payment. Additionally, given the difficulty involved in applying copyright excuse doctrines, such as fair use, to new copy technologies (Carroll, 2007; Depoorter, 2009; Nimmer, 2003; Leval, 1990), risk averse authors may decide to alter their works in order to avoid incurring liability (Gibson, 2007). Although economists have recognized the opposing effect of copyright monopoly on creation incentives for some time (Gordon and Bone, 2001), recent theories on transaction costs and other obstacles in licensing (Heller, 2009; Depoorter and Parisi, 2003 and the importance of cumulative production (Heverly, 2003; Frischmann and Lemley, 2007) have highlighted the chilling effect of copyright monopoly. Overall, these indirect costs to the creation of derivative works, or potentially infringing works, may partially offset the alleged incentive benefits of copyright on the creation of original works.

To summarize, in a model where authors are competing producers and users of copyrighted content, accessing the optimal scope of copyright protection is a delicate exercise. Both over- and under-protection of creative works may prove to have a negative impact on the incentive to create new works, and stronger copyright protection may actually hinder creation by discouraging creators' incentive to borrow from previous works. Negative impacts on creativity likewise apply in the reverse; decreased protection decreases the incentive to invest in the creation of new works (Landes and Posner, 2003). While there are an increasing number of theoretical arguments that undermine the quid pro quo of copyright protection, the empirical investigation of the incentive-monopoly tradeoff awaits further examination. To date, existing studies of both U.S. copyright registrations and copyright renewals provide conflicting results (for an overview, see Png, 2006).

### 3. EXTRINSIC REWARDS FOR AUTHORS

If the incentive effects of copyright protection on authorship are ambiguous and the dissemination of expressive works is feasible at relatively low costs, the argument in favor of a reduced scope of copyright protection is obviously strengthened. The current level of creative output suggests then that authors already have incentives to create expressive works that are unrelated to the monopoly rights related to copyright law. In this section we review some of the extrinsic rewards available to authors of expressive works.

Several theories have been forwarded to support the argument that cultural markets will thrive without (or continue to do so despite) any resort to the rights and royalties supported by copyright protection. In essence, these theories suggest that there are innate benefits derived from being the first, original author.

First, a number of economic theorists have explored the role of timing advantages in competitive market settings. For instance, within the context of marketing strategies, the concept of *lead-time* is proffered as providing considerable opportunities to the originator to capitalize on his product (Palmer, 1989). One advantage afforded to those who enter the market first is the ability to maximize capital gains via price discrimination. By being first, one has the ability to offer one's goods to those enthusiastic consumers willing to pay higher prices, while dropping prices respectively to capture the less enthusiastic audiences. In the context of copyright, the sale of hardcover and paperback books illustrates this notion: those consumers anxious to acquire a book are willing to pay a premium for the hardcover (i.e., first to market) edition of the book; the less enthused consumers will still pay for the book, but are willing to wait in order to pay less for the paperback edition. Another benefit of being the first to the market is the ability to take advantage of exclusivity contracts in order to assure a market for sale of the goods. Publishers and movie producers, for example, are able to enter into contracts with stores or theaters to stipulate those outlets as the exclusive means of distributing the goods to the public (Palmer, 1989:296). Pre-contractual agreements, the argument goes, would assure that there is a market prior to production in order to curb the free-rider problem. Furthermore, lead-time can also be used to afford an originator trademark-like protection via quality control. By being first on the market, the original producer has a clear advantage over copiers because of his/her ability to provide assurances about the quality of the product. Moreover, lead-time also provides a pioneering author the distinct advantage of garnering inside information with regard to the underlying commodity. Integral to marketing is the ability to predict and respond to consumer demand. Lead-time affords the opportunity to obtain feedback from early adopting consumers, thereby accelerating the product cycle (von Hippel, 2005). By contrast, copiers will always be one cycle behind, and therefore unable to offer the latest versions of a product, or the product most precisely attuned to consumer demand. Even if the copier is aiming for a broader market segment, an original producer who perceives and leverages the demands of the most vocal consumers can ensure that the target is constantly moving (Rogers, 1964). Moreover, such inside information affords originators additional lead-time with respect to investing and producing complementary goods and services, "thus reaping some of the benefits of the increased social product made possible by their creativity" (Palmer, 1989:298). Finally, timing also confers production advantages, especially with regard to more complex material goods and derivate markets. It is rarely, if ever, the case that a consumer good can be brought to market by a single individual. More and more, a product represents the contributions of many different individuals and businesses, both in production and marketing. This has

implications for original producers. Lead-time affords them the opportunity to pitch and test a product on the market. If a product is successful in these initial stages, this fosters credibility for the producer. Examples might include investors, the publishers of copyrighted works, or the manufacturers of components or subsidiary materials. At least initially, a secondary copier will not enjoy a similar imprimatur because the copier will be quickly identified as a latecomer attempting to free ride on an original creator's creative efforts, cachet, and investments, in an effort to convince the other players in the arena to give him or her a chance.

A few remarks are in order. First, the economic literature on lead-time is based on production and distribution processes that predate the breakthrough of digital copying and electronic commerce and distribution. These technological advances reduce the costs of making perfect substitutes as copies and have likely reduced any lead-time periods between original authors and copiers. Second, and more fundamentally, lead-time advantages essentially depend on the successful use of marketing and contracting strategies by the original author. From this perspective, it is entirely feasible for copiers with more marketing experience and networks to outperform original authors. In this sense, lead-time is just that: it is a timing advantage for preparing marketing and production strategies up until the moment of market entry of the product. Given modern distribution and copying technologies, further time advantages gradually reduce upon market entry.

A second argument relates to the opportunity of authors to obtain revenue from selling physical complements to their creative works. In a copyright vacuum, the prospect of unlimited access through file sharing technology enhances artists' opportunities to derive income from physical complements to their expressive works, such as T-shirts or dolls and revenues from endorsements, advertisements, and public appearances (Ku, 2002:309). Live performances, in particular, present lucrative financial opportunities for recording artists because the performances have additional value as a commodity that only the band itself can provide to the public; they inherently have exclusive control over the distribution. Emerging business models in the music industry, such as the so-called "360 contracts" in which record companies obtain not merely the exclusive recording services of an artist but also multiple rights relating to potential merchandising and endorsements, suggest how acclaimed musical artists may obtain revenue from the publicity that results from the widespread access to their musical works. As the advertising slogan has it, "Sell the sizzle, not the steak." The appeal of original creative works increases the value of derivative works in secondary markets. And even if the absence of copyright meant that parties, unrelated to the author and not expected to obtain a license, received a share of the proceeds in

derivate markets, such products would provide further publicity, increased complexity of meaning, and enhanced value for the original works and the original author. A classic example would be the vast assortment of merchandise associated with the Star Wars universe. While the movies are a cognitive anchor for consumers of Star Wars products, the array of available merchandise, from books to sleepwear, added to the iconic stature of the movie trilogy and its originator.

In similar vein, a modern, emerging view is that of authorship as a marketable “brand.” Musical works and accompanying videos set a public image that is marketable in various secondary markets; again, free availability and dissemination aids in building and promoting a brand. For many artists, the image supported by the music proves to be marketable in a list of derivative markets – some of which might be legally protected by existing rights such as the right of attribution, trademark rights, rights of publicity, et cetera. The notion that an artistic image provides commercial opportunities is exemplified by the widespread appeal of celebrities to protect their commercial likelihood, as formally granted in several states’ adaptation of the right of publicity.<sup>2</sup>

Taken together, non-copyright related benefits and authorship-derived marketable opportunities might provide sufficient rewards to artists to devote the necessary time and resources into the production of artistic works. It is important to note, however, that it may be difficult to apply the above arguments equally to all areas of expressive works since the costs of creation are not uniform across creative industries. Supply (production costs) and demand aspects (customers, elasticity of demand) are very different in various areas of expressive works (books, music and films), so the economic incentive requirements and ability to obtain complementary revenues are likely different as well.

#### 4. AUTHORSHIP AND NON-PECUNIARY REWARDS

Of course, copyright royalties and monetary incentives are not the sole motivation for authors. Indeed, our cultural understanding, as well as literature in sociology and psychology, reflects a widespread appreciation of the intrinsic motivations of authors of books, musical works, art, and movies to express thoughts, feelings, and other creative expression through the arts (on the romantic conception of authorship, see e.g. Boyle, 1988; Gordon, 1993; Lemley, 1997; Woodmansee, 1984).

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<sup>2</sup> See, for instance, the case of *White vs. Samsung Electronics*, where the 9th Circuit held that “Television and other media create marketable celebrity identity value. Considerable energy and ingenuity are expended by those who have achieved celebrity value to exploit it for profit.” (971 F.2d 1395 C.A.9 (Cal), 1992.

Likewise, the economic literature has discussed a host of motivational, non-pecuniary factors that drive economic and cultural production. Examples of economic works addressing aspects related to awards are analyses of status incentives (e.g. Auriol and Renault, 2001; Dubey and Geanakoplos, 2005; Ederer and Pataconi, 2004; Loch et al., 2001; Fershtman et al., 2001) and of rewards as feedback (Sururov and van de Ven, 2006). Economic theories on social recognition (Brennan and Pettit, 2004; English, 2005), identity (Akerlof and Kranton, 2005), superstars, and positional goods (Hirsch, 1976; Frank, 1985) can easily apply to the production of expressive works, given the community aspects of cultural goods. Most recently, Frey and Neckermann (2008) highlight the potential role of prizes, decorations, and titles and their potential as unique stimuli quite distinct from monetary and other non-monetary rewards. Awards work as incentives via a number of channels that have been shown to influence human behavior. Particularly, the authors describe how awards are especially effective in motivating agents because (1) winning an award makes the recipient feel good about himself irrespective of monetary or status consequences, hence even without others knowing about the award; (2) awards are typically conferred by a principal whose opinion the agent values; (3) they generate social prestige and bring recognition within the peer group; (4) because awards are typically set up as tournaments and many persons enjoy competing, i.e. working towards an award generates process utility (e.g. Frey et al., 2004) and pleasure irrespective of the outcome; and (5) the monetary compensation or other material or immaterial benefits associated with winning awards. As the authors suggest, however, awards also have ex post effects because they create and establish role models, distributing information about successful and desirable behavior (Frey and Neckermann, 2008).

Still, while intrinsic incentives may triumph in bringing about certain categories of expressive works, they might be insufficient for other types of works. For instance, production costs have decreased for some genres of music - most significantly perhaps for electronic music and alternative rock. This is arguably less true with regards to classical music, wherein new technologies have increased quality standards and, in doing so, maintained steep production costs. Similarly, while digital technology may have reduced the costs of filmmaking in alternative genres, the average production costs may remain substantial. In light of the non-uniformity of production costs for various categories of expressive works, it is important to note that removing copyright protection is likely to cause substitution effect; leading to reduced investments in more costly production genres or content that is not as useful in secondary markets.

## 5. COPYRIGHT REFORM AND ATTRIBUTION

Most copyright theorists agree that authors should be entitled to some reward for their creativity, whether they reach this conclusion from a moral rights, Lockean labor, or purely utilitarian perspective. The preceding sections reviewed a host of existing pecuniary and non-pecuniary rewards that are unrelated to the royalty benefits conferred by copyrights.

However, even if original authors already obtain *some* returns that are unrelated to copyrights, valid concerns remain with regard to the potentially disparaging effect of unlimited legal copying on original creators of expressive works. Specifically, the freedom and likely success of copiers in a world without copyright might have some negative repercussions on the motivation of potential authors. When considering the potential negative effects of abolishing traditional copyright prerogatives, the concept of *demoralization costs*, as developed by Frank Michelman in the context of public takings, comes to mind. As is the case with property owners whose property is taken by the government without receiving just compensation, copyright holders and their sympathizers might feel disparaged by a legal system that does not recognize the costs that authors invest in the creative process. Accordingly, without receiving or being otherwise accorded some status or recognition that would make it possible to distinguish an original author from a copier, creators might be demoralized when witnessing the success of copiers that they perceive as free riding on their creative effort. Demoralization of an original author is especially likely when copiers are able to obtain most of the revenue due to savvy marketing; or when copiers manage to attain reputational benefits that are normally bestowed upon original authors. Similarly, in the context of derivative works, an original author might experience demoralization when confronted with derivative works that he or she disapproves of for ideological, moral, or personal reasons. Such potential demoralization might have dynamic effects that extend to potential authors and other observers who might be “disturbed by the thought that they themselves may be subjected to similar treatment on some other occasion” (Michelman, 1967:1214). This might stifle creativity and would likely present an obstacle to any meaningful reform in this direction.

How can a legal system provide recognition and a realistic prospect of remuneration, without necessarily burdening society with the monopoly costs described in such convincing manner by Boldrin and Levine in *Against Intellectual Monopoly*? The intuition gleaned from fairness, natural rights, and demoralization perspectives suggests that any radical reduction of existing copyrights would be well served by establishing a baseline of protection for original authors. Imagine, in this respect, an attribution-centered system of copyright protection. Such a system would abolish the exclusive rights of authors to reproduce and distribute

their works (i.e. anyone is free to copy creative works), while requiring explicit acknowledgement of the original source, under penalty of law. Further, if the original author had not granted permission for the copying or derivative creation, a disclaimer would need to be attached to every copy of the work to signal that the original author did not approve of that particular use of his or her work.<sup>3</sup> Hence, following the more radical approaches to copyright reform, a compulsory attribution system would not provide the author with any rights of control whatsoever over his or her works. For instance, an author would not be able to prevent copying of the work, subsequent uses of his work, or the creation of derivative works, any more than authors under the current system can prevent someone from being “merely” inspired by their work. It might be useful to conceive of this system as “fair use” in the U.S. sense of the term, but writ large. Under an attribution-only regime, *all* uses are fair, as long as there is attribution or the opportunity to decline it.

A compulsory right of attribution, as described here, has roots in the European tradition of moral rights, traditional academic norms about both plagiarism and citation of others’ works, and the school of thought that gives the “public” or the informational commons a vital and sometimes even equal—role in the authorship of creative works (Hyde, 2010; Zemer, 2007; Tushnet, 2004; Litman, 2001). Specifically, a model of copyright attribution would (1) acknowledge and reinforce the creative author’s contribution to the new work; (2) maintain and facilitate opportunities for creators to receive economic benefit from their work.

(1) With respect to moral rights, a new, “strong” right of attribution acknowledges that an author has a personal stake in expressive works that he or she has created. Moreover, it supports the proposition that an author deserves to be recognized and acknowledged by society whenever his or her work is used. Further, society might be wise to respect the connection between that author’s identity and the work in question, and as a result of doing so must permit the author to *disclaim* any purposeful connection between that author’s work and any downstream uses of that work. It would be up to the original author to decide whether she would prefer to simply have her name removed from the work. This recognizes the dignitary interests of the author and minimizes an author’s fear of association with certain derivative works. At the same time, dissociation would sever any claim the original author might have to later inspired works.

Although it is true that an author would have fewer rights, it would be inaccurate to say that an attribution-based system denigrates the author’s role in creative

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<sup>3</sup> In this regard, an attribution-only right would echo the optional Creative Commons “share alike” licenses, as well as the GPL software license, both of which allow subsequent uses of the work, but mandate that any downstream use must be offered to the public under identical licensing terms.

works. To the contrary, the fundamental tenet of such a system is that a subsequent user's creative influences *must* be recognized and acknowledged. But the logical extension of this is also to recognize that all authors are subsequent users. *All* authors place old wine in new bottles (Barlow, 1992; Chon, 1996) and repackage culture for new and previously unimagined uses. Some argue that the current conception of copyright law tends to overindulge in the notion of the *solitary* romantic genius that creates *ex nihilo*. Instead, it is frequently claimed that all authors inevitably "stand on the shoulders of giants," and whether consciously or unconsciously, draw on *all* of the culture to which they have been exposed for inspiration (Hyde, 2010; Zemer, 2007). An attribution-based system celebrates the creative contributions of authors, but also returns authorship to its rightful place within culture, that of simultaneous beneficiary, participant, and contributor.

(2) A reinforced right of attribution also maintains and facilitates opportunities for creators to derive economic benefits from their creative works. There are several ways in which an attribution-based system strengthens the competitive position of original creators vis-à-vis those strictly involved in the business of copying.

First, an attribution-only system dovetails nicely with at least one existing business model currently gaining prominence, that of the "creator-as-brand." Increasingly, a creator is not simply the medium through which creative content materializes, but is a draw in his or her own right. Famous or even semi-famous authors give speeches, do readings, and serve on panels. Musicians endorse products; appear in movies, television, and video games, and celebrity personas often sell otherwise unremarkable creative works merely by virtue of their celebrity status. A creator is a "package," all the elements of which contribute to the success of the others. In fact, beyond a certain threshold, content can even become more popular because of who created it, rather than because of any intrinsic merit of its own.

Second, a system of compulsory attribution should generate additional publicity for authors. The intricate network of influences and cooperation behind every creative work will be better exposed under a mandatory attribution regime. Mainstream consumers will be introduced to new creators with whom they were previously unfamiliar, and simultaneously will see their favorite creator's name surface more often. Early adopting consumers and those who pride themselves on discernment will have a wealth of information at hand with which to assert their status as cognoscenti. From the viewpoint of creators, the increased attention should generate additional marketing opportunities, especially on-line, as creators will be increasingly able to demonstrate precisely what degree of cultural penetration they are enjoying. As a corollary, those looking to commission creative works will be in an improved position to match their artistic

needs to a creator capable of fulfilling them, which signifies more opportunities, as well as more precisely targeted cultural offerings.

Third, with reputation serving as the coin of the realm in a world without traditional copyright, creators will need to guard their reputations and images very closely. A newly created right of disassociation could meet this challenge. An artist seeking to market her “brand” as representing a certain ethos, or to a particular demographic, would be able to distance herself from those uses of her work of which she does not approve, or demand an explicit disclaimer, whichever option the creator thinks best suits the needs of her image. This will make it possible for creators to insulate themselves effectively, if not perfectly, from the effects of derivative works that, from the creator’s point of view, proceed in an undesirable direction.

Finally, a statutory right of attribution bolsters the role of authenticity as a source of value for creative works. Such shift corresponds nicely with existing policy rationales for trademark law.<sup>4</sup> The organizing principle of trademark law is that markets and consumers must be protected from the confusion that may result if producers of different products can freely select source identifiers. Trademark law seeks to reduce information cost by preventing businesses from selecting closely resembling marks, symbols, or colors to identify products that compete for consumers. Any potential confusion harms consumers, trademark holders, and markets more generally. Both trademark and copyright infringers are, in a sense, parasitical. Companies produce knock-off versions of originals in order to free ride on the goodwill that an original product has created with its consumer base. A copy of a creative work attempts to abscond with all of the goodwill associated with the author and his or her work. Even when potential consumers are not confused, there is the further issue of dilution, as the original brand and its connotations become less and less singular when confronted with a multitude of pretenders. If multiple people release additional editions of a book, and claim these are “official” or “approved” versions, customers may benefit from the lower prices that should accompany robust competition, but the original authors do not receive any of the reward. An attribution-based system would address many of the “consumer confusion” type of problems that may arise when the source of a copyrighted work is in question, especially when the identity of the creator is as much the commodity as the creative work. In the existing legal constellation, there is a presumption that only the author is in a position to legally offer copies for sale. The author’s name is, in a sense, his or her trademark, providing source

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<sup>4</sup> In this sense, a right of attribution would complement the existing trademark regime, but apply to authored works in a manner unrelated to any use in commerce, a likelihood of confusion, or any other limitation in trademark law.

identification. By contrast, in a world without traditional copyright protection, the freedom to create copies generates problems involving source identification. A system of mandatory attribution fills in the identification gap and resolves potential issues of reverse passing off<sup>5</sup> without adding the constraints on consumption, sharing, and reuse that traditional copyright entails. In this sense, mandatory attribution restores the natural connection between copyright and trademark law by restoring the ability of consumers to obtain information about *both* the author and the seller of the product.

While this may be fundamentally irrelevant for some, especially in a competitive market, there have always been consumers willing to pay more to obtain the “real thing.” This may be true because some consumers believe it is an imprimatur of quality, or because they believe an association with the original will somehow distinguish them as consumers. A rough analogy might be the cachet that comes from owning Beatles recordings on original vinyl, rather than on mp3. Something about the decreased distance from the source casts the consumer in a more flattering light, or frames him or her as a genuine member of the cognoscenti, just as being able to say one buys Parmesan cheese from Parma does.

To conclude, an attribution-centered system ensures that a consumer of creative works will be able to make an informed decision as to whether to buy from the original artist or from a copier. A skilled creator, or perhaps that creator’s publicity apparatus, will be able to leverage this effectively. Compulsory attribution renders the consumption of creative works as much about the “who” as the “what,” and it therefore stands to reason that a system that reinvigorates and strengthens the social and cultural aspects of the creator/consumer relationship stands to benefit both artists and the public in general.

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<sup>5</sup> This issue has attained particular relevance given the decision in *Dastar Corp. v. Twentieth Century Fox Film Corp.* (539 U.S. 23, 2003). In *Dastar* the court rejected trademark-based claims regarding acts of reverse passing off because it would have the effect of extending exclusive rights of reproduction beyond the statutory scheme of copyright.

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# A Rhetorical Response to Boldrin & Levine: Against Intellectual (Property) Extremism

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*The two sides of the contemporary debate over intellectual property agree that the law needs to “strike a balance” between providing sufficient incentive for creation and the freedom to make use of existing ideas. Michele Boldrin and David Levine, on the other hand, boldly declare in their recent work “Against Intellectual Monopoly” that they have arrived at conclusions that “are at variance with both sides.” In this commentary, I examine 1) their assertion that intellectual property should be viewed as an “intellectual monopoly”; 2) their claim to have mustered evidence and authorities showing that innovators and creators can be well protected in the absence of intellectual property law; and 3) their rhetorical practices throughout the book. I conclude that 1) their assertion that intellectual property constitutes an “intellectual monopoly” is itself a bad analogy and an example of the logical fallacy of hasty generalization; 2) the evidence and authorities they muster in support of their claim that innovators and creators can be well protected in the absence of intellectual property law are unpersuasive, as they actually tend to support the opposite conclusion; and 3) their book as a whole is an example of bad rhetorical argumentation.*

## 1. INTRODUCTION

*“Economics, and law and economics, could with profit become more self-conscious about rhetoric, becoming thereby more civilized.” -- Donald N. (today Deirdre N.) McCloskey<sup>1</sup>*

This comment offers a rhetorical response to Boldrin and Levine (2008), beginning with the above-quoted observation of McCloskey—which is itself a conscious variation on Justice Holmes’s remark (1897) that law becomes more civilized as it becomes more self-conscious.

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<sup>1</sup> McCloskey, 1988:766-767. As we will see, McCloskey also offers a more succinct rendering of this thought: “Economist, know thy own rhetoric” (1988:759).

McCloskey, an economist, has long argued that economic reasoning, like legal reasoning, is and ought to be social and rhetorical, and that economists, particularly economists interested in law and economics, should cast aside the “Received View” that economists are scientists in the modern mode, the credo of such scientism being “an amalgam of logical positivism, behaviorism, operationalism, and the hypothetical-deductive model of science” (McCloskey, 1983:481). The rhetoric of science in economics, says McCloskey, is for the most part bad, “not least because it makes lawyers feel like unscientific imbeciles” (McCloskey, 1988:752).

Michele Boldrin and David Levine are thus to be complimented for having eschewed the official rhetoric of economics, with its impenetrable formulae and regression analyses, in favor of writing their book in a language and style accessible to legal academics, particularly legal academics such as myself, whose training is more in the classical philosophic and rhetorical traditions than in modern economics or the social sciences. For that I am deeply grateful.

At the same time, it must be said that Boldrin and Levine do not appear to be particularly self-conscious with regard to the rhetoric they deploy in their book. It may be—as McCloskey says of economics as a whole—that they believe their book “uses no rhetoric but logic” (1988:752). But according to McCloskey, that is precisely the problem with the rhetoric of economics. It claims to be engaging in a species of “dialectic,” the classical name for logic, which does not view itself as social, and even “sneers at social reasoning” (1988:754). As McCloskey points out, classical Platonic dialectic “needs only two people, a victim and a Socratic arguer” (1988:752). Socrates calls the method of argument *elenchos*—the individual refutation. McCloskey adds:

The rhetoric of the ‘compelling’ proof is not gently ‘persuasive,’ as in Latin *persuadeo* from the same root as ‘sweet.’ On the contrary, it is authoritarian, browbeating, shaming, anything but sweet. As James Boyd White says of the *elenchos*, ‘What matters between us is not the other witnesses who can be brought forward to support your view or mine but whether you can make me your witness or I can make you mine.’ In legal terms, *elenchos* is cross-examination, to be contrasted with evidence of third parties or appeals to rules of law. (McCloskey, 1988:752-753)

The rhetoric of law, by contrast, is said to use what McCloskey calls social reasoning—i.e. reasoning that makes essential use of our position as members of a community—including both the use of witnesses and arguments based on analogy (1988:753). McCloskey goes on to argue (in the time-honored form of a rhetorical question) that economists as well as philosophers need to be less dismissive of these two forms of argument, and economists and lawyers alike need to become more self-conscious and skillful in their use of both:

Are these not in fact the usual forms of legal reasoning? Are they really all wrong, to be discarded in serious conversation? Or should we rather make distinctions between good analogies and bad, good arguments from authority and bad, good rhetoric and bad?" (McCloskey, 1988:757)

Boldrin and Levine's book offers an interesting case study in that regard, for three reasons: First, in a departure from the official rhetoric of economics, Boldrin and Levine base the foundational argument—and indeed the title—of their book on the following analogy: Intellectual property should be viewed as a kind of "intellectual monopoly" (2008:8-9). Second, Boldrin and Levine rely entirely on historical evidence and authorities to support their claim that innovators and creators can be adequately protected in the absence of intellectual property, as the latter does not increase either innovation or creation, and is thus an "unnecessary evil" (2008:7). Third, Boldrin and Levine offer their book as a contribution—indeed, as a definitive solution—to a debate over patent and copyright law that has occupied intellectual property law scholars for at least the past 20-30 years.<sup>2</sup>

Leaving aside for the moment the question of whether this debate over intellectual property protection has indeed been as "furious" and emotional as

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<sup>2</sup> In a larger sense this debate has been going on ever since the ratification of the U.S. Constitution, Article I, §8, clause 8 of which authorizes Congress "To promote the Progress of Science and the useful Arts by granting for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." I have selected the decade of 1980-90 as the approximate starting point for the modern debate over intellectual property protection for the following reasons: 1) In 1980, the U.S. Supreme Court decided in *Diamond v. Chakerabarty*, 447 U.S. 303 (1980) that Congress, in section 101 of the U.S. patent statute, 35 U.S.C. §101, intended to extend patent protection to "anything under the sun that is made by man . . .," 447 U.S. at 309; 2) in the same year Congress amended sections 101 and 117 of the Copyright Act of 1976, 17 U.S.C. §§ 101, 117, to make it clear that copyright protection extends to computer programs, and also amended the U.S. patent statute by adding §§ 200-212 (popularly known as the Bayh-Dole Act), which make it clear that recipients of federal research funding are entitled, subject to certain limitations and conditions, to claim patent protection on federally funded research results; 3) in 1981, the U.S. Supreme Court decided in *Diamond v. Diehr*, 450 U.S. 175 (1981) that a manufacturing process that in several of its steps uses a mathematical formula embodied in a computer program was patentable and that a claim containing otherwise patentable subject matter does not become non-statutory merely because it uses a mathematical formula, computer program or digital computer; 4) in 1982, Congress created the Court of Appeals for the Federal Circuit, which was henceforth to have exclusive jurisdiction to hear appeals of cases arising under the U.S. patent statute; and 5) in 1988, Congress amended § 271 of the patent statute, see 35 U.S.C. § 271 (d)(4) & (5), to make it clear that it was not a misuse of a patent to refuse to license or use any rights to the patent or to condition a patent license or a sale of patented product on the acquisition of another patent license or purchase of a separate product, unless the patent owner has market power in the relevant market for the patent or patented product on which the license or sale is conditioned—thereby indicating that Congress did not view patents as constituting per se "legal monopolies."

Boldrin and Levine assert,<sup>3</sup> I concur with their statement that both sides of the debate do agree on at least one point—namely that intellectual property law needs to “strike a balance” between providing sufficient incentive for creation and the freedom to make use of existing ideas (2008:6). Boldrin and Levine, on the other hand, boldly announce that they have arrived at conclusions that “are at variance with both sides” (2008:6). In their view, intellectual property protection is neither a necessary good nor a necessary evil, but an “unnecessary evil” that should be abolished outright (2008:7, 11, 243-244).

In the commentary that follows, I will explain why I believe both Boldrin and Levine’s foundational analogy and the evidence and arguments they marshal in support of their basic claims to be misconceived, and why I find the rhetorical strategy of their book to be, frankly, irritating. In so doing, however, I will also attempt to remain conscious of and acknowledge my own rhetorical strategy as I critique theirs.<sup>4</sup>

I have already noted that I concur with Boldrin and Levine’s statement that the two sides of the contemporary debate over intellectual property (hereinafter IP) at least agree that the law needs to “strike a balance” between providing sufficient incentive for creation and the freedom to make use of existing ideas. I should here add that I also agree with virtually every specific suggestion Boldrin and Levine offer in the last chapter of their book for achieving a better balance in the current system of patents and copyright protection (2008:248-253) even if I do not view these as interim steps toward “progressively but effectively” abolishing the intellectual property system altogether (2008:243-244).

My fundamental disagreement with Boldrin and Levine goes, rather, to their assertion that intellectual property should be viewed as an “intellectual monopoly”; their claim to have mustered evidence and authorities showing that innovators and creators can be well protected in the absence of IP law; and their rhetorical practices throughout their book. In the remainder of this commentary I will endeavor to persuade my reading audience that: 1) Boldrin and Levine’s claim that IP constitutes an “intellectual monopoly” is itself a bad analogy, as well as an

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<sup>3</sup> To this reader, at least, Boldrin and Levine seem to be exaggerating the fury and emotions surrounding this debate in an apparent effort to emphasize that their own arguments are based on strict logic. However, exaggeration is itself a standard (if disreputable) rhetorical ploy, as is Boldrin and Levine’s repeated use of the pejorative and exaggerated term, “intellectual monopoly.” Boldrin and Levine also engage in exaggeration in a number of other places in their book. See, e.g., *infra* notes 6, 8, 15, and 18 and accompanying text.

<sup>4</sup> For example, I am here consciously attempting to ingratiate myself with my reading audience and to establish my character as a fair and candid person—both of which are standard moves for a speaker seeking to win over his or her audience. See Edward P.J. Corbett’s *Classical Rhetoric for the Modern Student* (1971:50), discussing the three modes of persuasion—i.e. *logos* (the appeal to reason), *pathos* (the appeal to emotions), and *ethos* (the appeal of the speaker’s own personality or character).

example of the logical fallacy of hasty generalization (also known as exaggeration); 2) the evidence and authorities they muster in support of their assertion that innovators and creators can be well protected in the absence of IP law are unpersuasive, as they actually tend to support the opposite conclusion; and 3) the book as a whole is an example of bad rhetorical argumentation.

## 2. DO PATENTS AND COPYRIGHTS GRANT PRODUCERS OF CERTAIN IDEAS A MONOPOLY?

Boldrin and Levine's book puts me, as an IP law academic, in an unaccustomed position. Like most other IP academics, I have devoted the bulk of my scholarship to defending the proposition that IP law should—and indeed, as a matter of constitutional mandate, *must*—promote the public interest. That constitutionally mandated purpose is contained in Article I, section 8 of the United States Constitution, which authorizes Congress to “promote the Progress of Science and the useful Arts” through the specific mechanism of “securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.” Thus, the constitutional objective of federal copyright and patent law is and must be to promote progress, while granting authors and inventors “exclusive rights” for limited times is merely the constitutionally approved means for furthering that objective.

Boldrin and Levine, by contrast, boldly conclude “that creators’ property rights can be well protected in the absence of ‘intellectual property,’ and that the latter does not increase either innovation or creation” (2008:7).<sup>5</sup> Thus, Boldrin and Levine seem to be arguing that, not only are legal scholars on both sides of the supposedly “furious” and emotionally charged contemporary debate over intellectual property protection misguided, but the constitutional framers themselves got it wrong, as the very “exclusive rights” envisioned by the framers of the U.S. Constitution as a means of promoting progress in

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<sup>5</sup> Here I should note that creating incentives to innovate and create is arguably only one of at least three justifications for the constitutional authorization to Congress to create exclusive rights with respect to the writings and discoveries of authors and inventors, respectively—the other two justifications being to create an incentive to publicly disclose innovations and creativity, rather than relying on trade secrecy, and to create an incentive to commercialize innovations and creativity. See generally Kieff (2001:742), citing Rich (1942). Rich recognizes that the first two justifications for the U.S. patent system may be extrapolated from Article I section 8 clause 8 of the U.S. Constitution, which authorizes Congress to “promote the Progress of . . . the useful Arts, by securing for limited Times to . . . Inventors the exclusive Right to their . . . Discoveries,” but goes on to argue that the same can be said of the third type of inducement, the inducement to commercialize the invention, which “is by far the greatest in practical importance” (Rich, 1942:177). See also Kieff (2003).

science and the useful arts are in fact “monopolies”—and thus constitute an unnecessary evil (2008:9, equating the constitutional “exclusive right” and “monopoly”).

From both a legal and a rhetorical perspective, this is, to say the least, a breathtakingly sweeping assertion.<sup>6</sup>

Having thus thrown down the gauntlet, Boldrin and Levine proceed to summarize the system of IP law as follows: “Currently patents and copyrights grant producers of certain ideas a monopoly” (2008:6). In his paper, Mark Lemley (2009) offers one reason why this assertion is fallacious, when he notes that IP rights are rarely if ever “intellectual monopolies.” Of course, Lemley assumes here that when Boldrin and Levine use the term “intellectual monopoly” they mean “economic monopoly” as that term is defined in the economic literature and antitrust cases. Otherwise, Boldrin and Levine could be open to the charge that they are merely deploying the term “monopoly” in an inchoate, pejorative sense, which would constitute a classic example of “bad rhetoric.”

In any event, Boldrin and Levine explicitly state in their introductory chapter that “exclusive rights” of the sort referred to in the U.S. Constitution are “monopolies.” However, it is difficult for this legal academic to believe they really

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<sup>6</sup> I should immediately acknowledge that I am here deploying a standard rhetorical strategy that McCloskey identifies as the *argumentum ad verecundiam*—an appeal to reverence or authority—in this case, an appeal to reverence for the authority of the Constitution and its framers (see McCloskey, 1988:755). But appeals to reverence or authority are not necessarily illegitimate. Indeed, Boldrin and Levine themselves make just such an appeal in response to George Selgin and John Turner, who criticize their introductory characterization of James Watt’s 1769 steam engine patent as a prime example of an “intellectual monopoly.” Boldrin and Levine find it sufficient to note that “many students of the Industrial Revolution [share] our view—or more properly, we share theirs” (2008:11). Boldrin and Levine thus suggest that, because their critics, George Selgin and John Turner, are offering a revisionist, and perhaps minority, interpretation of history—detailed in another article appearing in this special issue (Selgin and Turner, 2009)—the authority of their interpretation should be viewed with suspicion. But the same can be said of Boldrin and Levine’s own contribution to the contemporary debate over intellectual property. By staking out a position that is at variance, not only with both sides of the current debate over intellectual property, but also with views that trace all the way back to the constitutional framers, Boldrin and Levine’s introductory chapter begins to take on the tone of a Socratic dialogue, in which Socrates boldly rejects the received wisdom of the community, preparatory to reducing his selected victim to jelly. Admittedly, Boldrin and Levine do soften their challenge to the wisdom of the constitutional framers, noting that in 1787 “the idea of copyright and patent was relatively new; the products to which they applied, few; and their terms, short” (2008:9). But this turns out to be an exaggeration, as is evidenced by Boldrin and Levine’s own subsequent recognition in Chapters 2 and 3 of their book that the origin of modern Anglo-American patent law actually traces back to the English Statute of Monopolies, enacted by Parliament in 1623 (over 150 years prior to the adoption of the U.S. Constitution) (2008:43-44), and modern Anglo-American copyright law traces back to the 1710 Statute of Anne (2008:30,44-45). In other words, Anglo-American patent law has been around for almost 400 years, and copyright law for almost 300 years.

mean what they say. After all, for the past 30 years, we legal academics—and more importantly, the courts and Congress—have been listening closely enough to economists (or at least to the law and economics specialists among us) that we think we now understand what does and does not constitute an economic “monopoly,” to the point that even I, an economically untrained law professor, think I get it—even if in my youth I might well have referred to a patent (as some judges and attorneys still do) as a “legal monopoly.” Today, however, discriminating judges, attorneys, and law professors alike know that referring to a patent as a “monopoly” can get one into real trouble in the courtroom, as the opinion in *Jamesbury Corp. v. Litton Industrial Products* (756 F. 2<sup>d</sup> 1556, Fed. Cir.1985) makes clear. In that case the Court of Appeals for the Federal Circuit (which has exclusive appellate jurisdiction over patent cases) held that a jury instruction referring to a patent as a monopoly constitutes reversible error (see 756 F. 2<sup>d</sup> at 1559).

With precedents such as this to rely on, it is possible for me to say with more confidence than I usually have on economics questions that IP rights, as such, are no more economic monopolies than my ownership of a plot of land at 450 Melville Avenue in University City, Missouri, is an economic monopoly, as there is an entire row of houses on my street that are occasionally leased or sold, thus subjecting any “rent-seeking” behavior on my part in the sale or lease of my own property to the price discipline of the market.<sup>7</sup> Indeed, exclusive patent rights are arguably even more limited than my exclusive rights in real or personal property. After all, my legal rights to my house and car include not only the right to exclude others from trespassing on them but also the right to peacefully enjoy them myself. With patent rights, on the other hand, the right to exclude others does not necessarily entail the affirmative right to make, use or sell my patented invention, as my doing so may infringe someone else’s patent, which turns out to be the case whenever one patents an improvement on someone else’s patented invention.

It is only when IP law confers upon a right holder an exclusive right in subject matter for which there is 1) a market demand, 2) no non-infringing substitutes available in the marketplace, and 3) at least some barriers to producing non-infringing substitutes, that an IP right holder can be said to have monopoly power. As Mark Lemley points out, while some patents, and perhaps one or two copyrights, do in fact confer power in a relevant market,

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<sup>7</sup> See Hovenkamp et al. (2001:§4.2a), noting that “if I own a widget-manufacturing plant at 324 Madison Street, I have the power to exclude anyone else from making widgets in that plant or even from entering the plant at all. We might even say that I have a ‘monopoly’ of the plant at 324 Madison Street, for I am the only person who is entitled to use it. ...But this use of the term ‘monopoly’ would be incorrect for economic analysis generally or antitrust analysis in particular. . .The same thing is true of an intellectual property grant . . .”

“it is a very large exaggeration to say that patents and copyrights are intellectual monopolies” (Lemley, 2009).<sup>8</sup>

I would also point out a second sense in which Boldrin and Levine’s statement that “patents and copyrights grant producers of certain ideas a monopoly” is an exaggeration. This is their suggestion that IP law grants “monopolies” in “ideas” (2008:6). Just one page after Boldrin and Levine make the above assertion, they themselves concede that patents do not actually protect ideas as such, but merely apply to “specific implementations of ideas”—though they add, quite correctly, that in recent years in the U.S. there has been decreasing emphasis on specificity (2008:7).<sup>9</sup> They also concede (though in less precise language than I would prefer) that copyrights are still narrower in scope, protecting (as they put it) only “the specific details of a particular narrative” (2008:7). If I could offer a friendly amendment—as copyright law extends well beyond both narratives and literary works to all sorts of artistic works, three-dimensional as well as two-dimensional, factual as well as non-factual—it would be more accurate to say, as the 1976 Copyright Act does, that copyright law protects only “original works of authorship” (including artistic as well as literary works), and that copyright protection extends only to the author’s original expression of a given idea, not to the idea itself. Indeed, section 102(b) of the Copyright Act specifically states that in no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work. Copyright law will thus protect the “specific details” of a particular narrative only if and to the extent those details are classifiable as expression, rather than the ideas being expressed. While drawing this distinction between copyrightable expression and uncopyrightable ideas is

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<sup>8</sup> I admit to finding it both ironic, and somewhat uncomfortable, as one untutored in economics, to be pointing out to two distinguished economics colleagues that their characterization of intellectual property as an “intellectual monopoly” is erroneous, both as an economic and a legal matter. I thus take some comfort in being able to quote Mark Lemley as one of my authorities, as he at least has an undergraduate degree (though only an undergraduate degree) in economics and political science, see [http://www.law.stanford.edu/display/images/dynamic/people\\_cv/lemley\\_cv.pdf](http://www.law.stanford.edu/display/images/dynamic/people_cv/lemley_cv.pdf). But he is also apparently the 34<sup>th</sup> most frequently cited legal scholar in the country—one ahead of Justice Louis Brandeis—for whatever that is worth. See Ann Bartow, “Mark Lemley cited more often than Louis Brandeis; God doesn’t even make the Top 50,” Madisonian.Net (March 1, 2009), available at <http://madisonian.net/2009/03/01/mark-lemley-cited-more-often-than-louis-brandeis-god-doesnt-even-make-the-top-50/#comments>.

<sup>9</sup> But see *In re Bilski*, 545 F.3d 943, 88 U.S.P.Q.2d 1385 (Fed. Cir. 2008), *cert. granted* 129 S.Ct. 2735, 174 L.Ed.2d 246, 77 USLW 3442, 77 USLW 3653, 77 USLW 3656 (holding that for a process to be patentable it must be tied to a particular machine or apparatus or transform a particular article into a different state or thing).

sometimes as difficult as distinguishing between unpatentable ideas and patentable implementations of ideas, it is nevertheless a bedrock principle that copyright law protects only expression, not ideas as such, and the courts have gone to considerable lengths to distinguish the two.

But having in effect conceded that neither patents nor copyrights protects ideas as such, Boldrin and Levine, just one page later, revert back to their original mischaracterization (which they repeat throughout the remainder of their book), stating that contemporary IP law “produces a monopoly—enforced by the obligation of government to act against individuals or organizations that use the idea in ways prohibited by the copyright or patent holder” (2008:8). Here, not only are Boldrin and Levine repeating their original mischaracterization, but they may also be creating a new one, as their statement could be interpreted to suggest that it is the government, rather than private rights holders, who enforce intellectual property rights, and that the government does so in criminal proceedings, when in reality, except for certain willful acts of piracy and counterfeiting, private intellectual property rights are enforced by the IP right holders themselves, who shoulder the direct costs of enforcement in private civil litigation.

With mischaracterizations such as these appearing in the first 10 pages of the book, it becomes apparent that Boldrin and Levine either did not consult with an IP law expert prior to publishing their book or disregarded the advice of that expert if they did. Their book thus lends anecdotal support for the observation of McCloskey, who complains that “although [economists] want to speak to law and political science, they do not want to listen.”

In any event, Boldrin and Levine conclude their introductory chapter by laying out the structure of the argument that is to be found in the remainder of the book. First, they will propose an answer to the question, “What would the world be like without intellectual monopoly?” Second, they will analyze the many social costs created by copyrights and patents. Third, they will examine the “theoretical argument supporting intellectual monopoly, as well as counterarguments about why intellectual property may hurt rather than foster creative activity.” And fourth, they will “examine the evidence about intellectual monopoly and innovation.” The two remaining parts of this rhetorical response to Boldrin and Levine will focus on the first and fourth points.

### 3. WHAT WOULD THE WORLD BE LIKE WITHOUT INTELLECTUAL PROPERTY LAW?

In Chapters 2 and 3 of their book, Boldrin and Levine claim the “the fertile fields of practical experience” offer abundant support for their conclusion that creativity and innovation can be well protected in the absence of intellectual

property. In their view, history is replete with actual instances in which innovation and creativity flourished in the absence of intellectual property protection. Upon close examination, however, the historical evidence they cite turns out to prove no such thing.

For example, in Chapter 2, Boldrin and Levine offer examples of creation under competition drawn from both the modern history of software development and the much lengthier and richer history surrounding the publication of books, news, movies and music. With respect to the modern history of software development, they begin with the following (rhetorical) question: “Will it surprise you to learn that virtually none of the innovations in [the software] industry took place with the protection of intellectual monopoly?” (Boldrin and Levine, 2008:15-16). But the assertion embedded in this rhetorical question turns out to be another example of the fallacy of hasty generalization (aka exaggeration), and possibly the fallacy of equivocation or ambiguity (using the same term with two or more meanings) as well. While it is true that some innovations in the early history of the software industry took place without the protection of patents or copyrights, it is nevertheless an overgeneralization to say that none of the innovations in the software industry depended on any form of “intellectual property” protection, at least as that term is conventionally understood.

For example, while it is true that during the mainframe era of computer software development software innovation took place in the absence of any explicit patent or copyright protection, that was only because during the mainframe era, software developers had no need of either form of legal protection. Software was largely developed by or for dominant hardware producers, who “bundled” the software with hardware, which was then leased, rather than sold. Software innovation could thus be protected quite adequately by two lesser-known forms of legal protection that are sometimes included in the broad rubric of “intellectual property law”—namely trade secrecy and accompanying contractual licensing agreements.<sup>10</sup>

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<sup>10</sup> In their introductory chapter, Boldrin and Levine make it clear that the two forms of “intellectual property” that concern them are patents and copyrights. But they also recognize that there are, in fact “three broad types of ‘intellectual property’ recognized in most legal systems: patents, copyrights and trademarks” (2008:7). Moreover, they also imply that the term “intellectual property” could be extended to two “lesser-known ways of protecting ideas”—namely contractual agreements (including shrink-wrap and click-wrap licenses) and trade secrecy. Thus, to say that virtually none of the innovations in the software industry took place with the protection of “intellectual monopoly” is ambiguous, as it is not clear what forms of intellectual property protection Boldrin and Levine mean to include in the pejorative term “intellectual monopoly.” As Mark Lemley (2009) points out, for all their criticism of the patent and copyright system, Boldrin and Levine are remarkably uncritical of the law of trade secrets, which would become the dominant form of legal protection for innovation and creativity in the absence of patent or copyright protection.

A particular irony in Boldrin and Levine's invocation of the mainframe era of software development as evidence that innovation can occur under competitive conditions without the protection of patents and copyrights is that the entire era was dominated by a single hardware producer, IBM, which then and now is the owner of the world's largest portfolio of patents. Only after the Justice Department filed an antitrust complaint against IBM on January 17, 1969, did IBM decide to "unbundle" the marketing of hardware and software.<sup>11</sup> And only as the mainframe era began to give way to the era of personal computers was there any particular need for patent or copyright protection for computer software. Once that need arose, Congress and the courts promptly provided it.

Perhaps sensing that the mainframe era of software development may not, after all, offer compelling historical support for the proposition that copyrights and patents are not needed for software development to thrive in a competitive market, Boldrin and Levine go on to argue that the "best evidence" is actually to be found in the more recent emergence of the open-source software movement. Here, they say, "a thriving and innovative portion of the industry...has voluntarily relinquished its intellectual monopoly—both copyright and patent" (2008:17). But Boldrin and Levine's assertion is again fallacious—the specific fallacy here being that of ambiguity or equivocation. While it is true that the open-source software movement is based on an unconventional use of intellectual property rights, it by no means follows that open-source software developers have voluntarily relinquished their patents or copyrights as such. To the contrary, they have merely chosen to license those rights on "open" rather than "proprietary" terms. Without the underlying protection of patents or copyrights, the open-source software movement would be severely hampered, as it would be entirely dependent on the law of contracts (including its limiting doctrines with respect to contractual formation and remedies) to enforce the terms of open-source licenses. At least one open-source advocate, Eben Moglen (2001), stoutly insists that open-source licenses "are not contracts: the work's user is obliged to remain within the bounds of the license not because she voluntarily promised, but because she doesn't have any right to act at all except as the license permits." The reason the user does not have any legal right to act at all except as the license permits is due to the exclusive rights created by the law of copyrights or patents. A recent appellate judicial decision, *Jacobsen v. Katzer* (535 F.3d 1373 Fed. Cir. 2008), illustrates the practical importance of Moglen's point. In that case, the court held that an open-source software licensor was entitled to preliminary injunctive relief

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<sup>11</sup> See, "The History of IBM," Wikipedia, available at [http://en.wikipedia.org/wiki/History\\_of\\_IBM#1970.E2.80.931975:\\_The\\_System.2F370\\_era](http://en.wikipedia.org/wiki/History_of_IBM#1970.E2.80.931975:_The_System.2F370_era).

under the Copyright Act of 1976, irrespective of whether such relief would be available under state contract law.

For a third historical example of how creativity can flourish in the absence of intellectual property law, Boldrin and Levine invoke the history of U.S. copyright law in the nineteenth century, during which, as Boldrin and Levine correctly note, anyone was free to reprint a foreign publication without making any payment to the author, besides purchasing a legally sold copy of the book. Because American publishers found it profitable to make arrangements with British authors to purchase copies of the author's manuscript before its publication in Britain, and British authors sometimes made more money from these arrangements than they did on royalties received in the U.K., where they did have copyright protection, Boldrin and Levine conclude that this historical evidence undermines the notion that "creative activity is low and artists are poor when and where copyright protection is weak." But their conclusion is again fallacious, as this historical evidence is irrelevant to Boldrin and Levin's larger claim about what the world would look like without any intellectual property protection at all.

As Boldrin and Levine readily concede, throughout the nineteenth century (and indeed from the enactment of the Statute of Anne in 1710) British authors enjoyed copyright protection in Great Britain, and (from 1790 on) U.S. authors enjoyed copyright protection in the U.S. More to the point, however, British authors could also enforce contracts and enjoyed the benefits of trade secret protection in the U.S., at least prior to the first publication of their manuscripts in Great Britain or elsewhere, and this is why they sometimes managed to make money in the U.S. even in the absence of copyright protection there. Thus, the historical evidence Boldrin and Levine invoke tells us nothing at all about what the world would be like were there no intellectual property protection at all anywhere. At most, it suggests that the availability of copyright protection somewhere is apparently sufficient to stimulate creative activity that can then be commercially exploited, not only in markets where copyright protection is extended to the author, but also in markets where it is not.

The evidence Boldrin and Levine proffer for what the world would look like in the absence of patent protection is similarly flawed. For example, in Chapter 3, Boldrin and Levine note that the modern version of patent protection can be traced back to the British Statute of Monopolies, which was enacted by Parliament in 1623 (2008:43-44), which means that patent protection has been available at least somewhere in the world to at least some inventors for the past 380 years. Boldrin and Levine also concede that modern economists and historians alike have argued that "the Industrial Revolution took place when it took place (allegedly, sometime between 1750 and 1850) and where it took place

(England) largely because patents giving inventors a period of monopoly power were first introduced by enlightened rules at that time and in that place” (2008:49).

Nevertheless, Boldrin and Levine claim that when one looks at the history of the Industrial Revolution “without bias-shaded glasses” (i.e. when one interprets this history as Boldrin and Levine do), one can find “a mine of examples, both of patents hindering economic progress while seldom enriching their owners and of great riches and even greater economic progress achieved without patents and thanks to open competition” (2008:51), I will leave it to the reader to examine this mine of examples, particularly the history of the Watt steam engine patent (which Selgin and Turner (2009) discuss at length elsewhere in this special issue) and determine whose interpretive glasses are more shaded with bias. I would simply point out that none of Boldrin and Levine’s historical examples wind up telling us much about what the world would be like without any patent protection at all, because they all occurred in a world in which patent protection had been available to at least some innovators somewhere in the world since well before the Industrial Revolution—and that somewhere turns out to be precisely the place where the Industrial Revolution began: namely Great Britain.

Boldrin and Levine’s penultimate chapter (Chapter 9), which discusses the pharmaceutical industry, is particularly flawed in this regard. In this chapter Boldrin and Levine argue that “if patents were a necessary requirement for pharmaceutical innovation, as claimed by their supporters, the large historical and cross-country variations in the patent protection of medical products should have had a dramatic impact on national pharmaceutical industries” (2008:218), Citing evidence of the development of aspirin by Friedrich Bayer & Company in 1897, when pharmaceutical product patent protection was not available in Germany (2008:220), evidence of the development of thriving pharmaceutical industries in such countries as Italy and Switzerland (and more recently in India) in the absence of strong domestic patent protection for pharmaceutical products (2008:216, 220, 222-225),<sup>12</sup> and research suggesting that Italy did not achieve any significant increase in the discovery of innovative drugs in the decade after patent protection was extended to pharmaceutical products (2008:222), Boldrin

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<sup>12</sup> Boldrin and Levine acknowledge that the Swiss experience is not a particularly good example of a national pharmaceutical industry thriving in the absence of patent protection for pharmaceutical products, as “the size of the internal Swiss market is too small to be relevant” (2008:240). But the same could be said about the domestic market of any country (e.g. Italy or India) whose pharmaceutical products are distributed globally. One reason for the success of the Indian pharmaceutical industry is that it markets low-cost generic equivalents of pharmaceuticals that are patented in the industrialized world. The Indian and Italian examples tell us nothing about what the world would look like in the absence of any patent protection for pharmaceutical products anywhere in the world.

and Levine (2008:238) conclude that patents do not play a helpful role in pharmaceutical innovation.

As Mark Lemley (2009) points out, this argument is flawed, as it assumes that the expected return from pharmaceutical innovation is based entirely or largely on national sales, when for the past century and a half the relevant market for pharmaceuticals (and to a large extent for patented inventions generally) has in fact been global, not national. Moreover, ever since the promulgation of the Paris Convention for the Protection of Industrial Property in 1883, all members of the Paris Union have been obliged to provide to the nationals of all other Paris Union members the same level of patent protection that they provide their own nationals, regardless of whether reciprocal patent protection is available for their own nationals in other Paris Union countries. Thus, while national differences in patent laws might affect the price and quantity of drugs sold in those countries, the worldwide sales of a pharmaceutical, as Mark Lemley (2009) points out, should be the same whether a pharmaceutical company happens to enjoy patent protection in its home country or not.

In the end, the historical examples that Boldrin and Levine cite as evidence that pharmaceutical innovation can thrive in the absence of patent protection merely confirm that as far back as the late 19<sup>th</sup> century the market for pharmaceutical products such as aspirin was already international, which is why, notwithstanding the unavailability of patent protection in Germany, Friedrich Bayer & Company filed for a British patent for aspirin in 1898 and a U.S. patent in 1900.<sup>13</sup> These historical examples tell us nothing about what the world would be like in the absence of pharmaceutical patent protection anywhere.

### 3. IS ABOLISHING IP PROTECTION ALTOGETHER THE ONLY SOCIALLY RESPONSIBLE OPTION?

In their introductory chapter, Boldrin and Levine offer what turns out to be an expurgated version of a famous 1958 statement by economist Fritz Machlup in support of their argument that there is no evidence that intellectual property law leads to more creativity and innovation. Boldrin and Levine quote Machlup as having said the following: “It would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting [a patent

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<sup>13</sup> See Wikipedia, History of Aspirin, at [http://en.wikipedia.org/wiki/History\\_of\\_aspirin#cite\\_note-26](http://en.wikipedia.org/wiki/History_of_aspirin#cite_note-26). While the British patent was overturned in 1905, the U.S. patent was ultimately upheld.

system] (2008:11).”<sup>14</sup> Only in their concluding chapter do Boldrin and Levine offer up the Machlup quote in full, which turns out to say something quite different:

If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it.<sup>15</sup>

Boldrin and Levine’s justification for playing fast and loose with the Machlup quote in their introductory chapter is as follows: First, they claim that “the fifty years since [Machlup’s statement] have turned up no evidence that patents serve to increase innovation” (2008:243). Second (invoking a medicinal analogy), they claim to have “documented that innovation thrives in the absence of intellectual monopoly (the patient is healthy), that the latter has serious side effects (the evils of intellectual monopoly), and that a series of scientific studies have found weak or no evidence that it increases innovation (the proposed beneficial effect is probably absent)” (2008:243). Finally, they argue that because “[t]he case against intellectual property is decisive . . . we must conclude that the second half of Machlup’s policy advice is now obsolete” (2008:243). On the basis of our present knowledge, they say, progressively but effectively abolishing intellectual property protection “is the only socially responsible thing to do.”

When one carefully examines the series of “scientific studies” that Boldrin and Levine rely on in their preceding chapter on the pharmaceutical industry, however, a rather different picture of the present state of our knowledge emerges. As we have seen, much of the evidence Boldrin and Levine cite in that chapter—namely, that Swiss, Italian, and Indian pharmaceutical companies thrived in the absence of patent protection for pharmaceutical products in their home countries; that Bayer developed aspirin in Germany in the absence of patent protection for pharmaceutical products in that country; and that Italy did not achieve any significant increase in the discovery of innovative drugs in the decade after patent protection was extended to pharmaceutical patents—is

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<sup>14</sup> In a chapter endnote, Boldrin and Levine concede that Machlup “nevertheless concluded that we should keep the patent system” and refer the reader to their further discussion of the Machlup quote in their concluding chapter.

<sup>15</sup> See Boldrin and Levine (2008:243), quoting Fritz Machlup, “An Economic Review of the Patent System,” Study of the Sub-Committee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, U.S. Senate, 85<sup>th</sup> Cong., 2<sup>nd</sup> Sess. Pursuant to S. Res. 236, Study No. 15 (1958). The expurgated version of the quote appearing in Boldrin and Levine’s introductory chapter not only omits the second sentence of Machlup’s statement, but also transforms what was meant as a purely hypothetical statement in the first sentence into what Boldrin and Levine mischaracterize as an affirmative “recommendation” or “policy advice” (2008:243).

simply irrelevant to the question of whether pharmaceutical innovation will thrive in the absence of pharmaceutical patent protection anywhere in the world, as all of the examples discussed in that chapter arose in a world where at least some countries were providing patent protection to pharmaceutical products. More importantly, when one closely examines Boldrin and Levine's endnotes in this chapter, one discovers that Boldrin and Levine cite at least three studies by economic experts who apparently do not share their view that IP protection serves no socially useful function and should thus be abolished.

For example, in the course of discussing the pharmaceutical industry in India, Boldrin and Levine note that the world's leading expert on the impact that the adoption of patents might have on India's drug industry was probably the late Jean Lanjouw (Boldrin and Levine, 2008:240). While Boldrin and Levine offer a quote from Lanjouw's empirical research results as support for their conclusions, they nevertheless concede in this endnote that she "is one of the analysts who, albeit in a very tentative form, has advanced the idea that patent adoption may help poor countries by making price discrimination more effective" (2008:241). In the same note, Boldrin and Levine also concede that a 2001 report to the World Intellectual Property Organization by Keith Maskus, an economist at the University of Colorado, provides a "substantially more robust statement in this direction" (2008:241).

As far as I can tell, this is Boldrin and Levine's only reference to the work of Maskus, who is perhaps the economist best known to IP legal scholars (or at least to international IP law scholars such as myself), as he has written four books on intellectual property and international trade and development, one of which he co-edited with one of the country's leading legal experts in international IP law, and another of which he co-edited with a senior economist at the World Bank.<sup>16</sup> Maskus is certainly no uncritical admirer of the U.S. intellectual property system. Indeed, one of his more recent studies, entitled "Reforming U.S. Patent Policy: Getting the Incentives Right" (2006) forcefully complains that over the past 25 years American judges and legislators have operated on the misguided principle that stronger patent protection engenders more innovation, and that as a result the country's robust capacity for innovation is being imperiled by "an increasingly overprotective patent system." He finds that the burdens of the U.S. patent system stand in sharp contrast with the more balanced systems of its major competitors, as other patent systems in the developed world, such as those of

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<sup>16</sup> Maskus is a frequent consultant for the World Bank, the United Nations Conference on Trade and Development, the World Health Organization, World Intellectual Property Organization, and the International Task Force on Global Public Goods, and has been a visiting scholar at the Development Research Group at the World Bank, U.S. State Department, University of Bocconi, CES-Ifo Institute at the University of Munich, and the China Center for Economic Research at the University of Beijing.

Canada and the European Union, “are more supportive of dynamic competition and the diffusion of technologies.”

But as the title of this study suggests, Maskus does believe that intellectual property rights (hereinafter IPRs) play an important role in innovation, and that it is thus important to get the patent incentives right. In his 2005 book (co-edited with Carsten Fink), *Intellectual Property and Development: Lessons from Recent Economic Research*, Maskus introduces a number of recent studies, the first of which focuses on international trade flows and finds that stronger IPRs have a significantly positive effect on total trade. He notes that this finding is consistent with similar results in the economic literature. He next produces a study showing that although the evidence is less conclusive in the case of foreign direct investment (FDI), and that a developing country hoping to attract inward FDI would be better advised to improve its overall investment climate and business infrastructure than to strengthen its patent regime sharply, he nevertheless concludes that IPRs are quite important for multinational firms making location decisions among “middle-income countries with strong abilities to absorb and learn technology.” He also produces a study that uses survey data of multinational firms investing in Eastern Europe and finds that weak IPRs have a negative effect on the likelihood of investments being made and weak enforcement affects the type of investments made, as companies avoid investing in production facilities if IPR enforcement is weak and concentrate instead on distribution facilities. Two studies of outward technology flows from developed countries find a significantly positive effect of the strength of IPR protection abroad. Thus, while existing research suggests that countries that strengthen their IPR regimes are unlikely to experience a sudden boost in inflows of FDI, at the same time, “the empirical evidence does point to a positive role for IPRs in stimulating formal technology transfer, through FDI in production and R&D facilities and through cross-border licensing.”

Finally, a third study that Boldrin and Levine cite in their chapter on the pharmaceutical industry is a 2002 study by economists, James Hughes, Michael Moore, and Edward Snyder, entitled “‘Napsterizing’ Pharmaceuticals: Access, Innovation, and Consumer Welfare.”<sup>17</sup> This study is useful, say Boldrin and Levine (2008:235), because it “attacks directly the costs and benefits of drug patents.” The study compares the immediate social benefits to consumers from eliminating drug patents with the long-term costs of a reduced flow of innovative

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<sup>17</sup> The authors characterize their study as “an extreme policy experiment—Napsterizing pharmaceuticals—whereby all patent rights on branded prescription drugs are eliminated for both existing and future prescription drugs without compensation for the patent holders.”

new drugs. According to Boldrin and Levine (2008:236), Hughes, Moore, and Snyder (2002) find that, even using an interest rate as low as 5% for discounting the present value of new drugs foregone, “the immediate benefit of wider drug availability exceeds the long-term cost of having fewer drugs.” The abstract of this article, however, states that the model employed yields the result that “for every dollar in consumer benefit realized from providing greater access to the current stock, future consumers would be harmed at a rate of three dollars in present value terms from reduced future innovation.” While there is an explanation for this apparent discrepancy (as the authors of the study believe the discount rate for new drugs foregone to be less than 5%, whereas Boldrin and Levine believe it to be greater than 5%), Boldrin and Levine must nevertheless eventually concede (albeit only in the same endnote where the explanation for the discrepancy is to be found) that the stated conclusion of the Hughes, Moore, and Snyder study “is the opposite of ours: they conclude that drug patents should not be abolished” (Boldrin and Levine, 2008:242, n.40).<sup>18</sup>

To be sure, none of these studies provides direct evidence that patents serve to stimulate innovation, though the third study certainly provides a sobering estimate of the social costs of assuming the opposite to be the case. However, as was noted earlier, stimulating innovation is only one of three ways the U.S. patent system might serve its constitutionally mandated purpose to promote the progress of science and the useful arts, the other two being to promote public disclosure and the subsequent commercialization and diffusion of innovation. And the larger claim of Boldrin and Levine’s book is that intellectual property is an “unnecessary evil,” which serves no socially useful purpose, or in any event none that comes close to outweighing its socially deleterious costs. As Boldrin and Levine (2008:244) put it in their concluding chapter (albeit mixing their medical metaphors in the process) intellectual property (or, as they persist in calling it, “intellectual monopoly”) is a “disease rather than a cure.” But as the unexpurgated version of Machlup’s famous statement makes clear, the burden is on Boldrin and Levine to produce persuasive evidence to that effect and/or cite us to other reputable economic authorities who share their views. That they have failed to do either in their book is hardly surprising, given the extremity of the views they espouse.

In his response to Boldrin and Levine, Mark Lemley is content to point out how they overstate the case for competitive innovation and understate the case for innovation driven by either market power or the prospect of acquiring

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<sup>18</sup> Only here do Boldrin and Levine note that these economists in fact come to a different conclusion than Boldrin and Levine because they apparently believe the relevant interest rate for discounting the social benefits of new drugs is less than 5%, whereas Boldrin and Levine believe this rate is greater than 5%.

market power through patents, and to dismiss their claim that patents and copyrights are “intellectual monopolies” as a “very large exaggeration.” In this rhetorical response to Boldrin and Levine, I would go one step further and ask why two reputable economists would engage in such exaggeration. Is it merely because they are unskilled or unpracticed in the ways of persuasive argumentation of the sort that sways courts and legislatures, or is there a deeper explanation for why their arguments turn out to be so faulty?

A possible answer is suggested by another economist, Paul Krugman (2009), who, in musing recently over the faulty academic theorizing that contributed to the current Great Recession, asked the question: “How did economists get it *so wrong*?” In Krugman’s view, “the economics profession went astray because economists, as a group, mistook beauty, clad in impressive-looking mathematics, for truth.” In other words, the central cause of the profession’s failure was “the desire for an all-encompassing, intellectually elegant approach that also gave economists a chance to show off their mathematical prowess.”

Although Boldrin and Levine have commendably eschewed arguments based on impressive-looking mathematics in their book, *Against Intellectual Monopoly*, they nevertheless seem to have been beguiled by a desire for an all-encompassing, intellectually elegant solution to the messy contemporary debate over the intellectual property. But Krugman (2009) believes that “economists will have to learn to live with messiness.” That is, they will have to “face up to the often idiosyncratic imperfections of markets and accept that an elegant economic ‘theory of everything’ is a long way off.”

In the meantime, as McCloskey (1988) has reminded us, economists “could with profit become more self-conscious about rhetoric, becoming thereby more civilized.” Indeed, McCloskey has summed up this admonition to the economics profession even more succinctly, and with those words I conclude this rhetorical response to Boldrin and Levine: “Economist, know thy own rhetoric.”

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# Watt, Again? Boldrin and Levine Still Exaggerate the Adverse Effect of Patents on the Progress of Steam Power

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*In an earlier comment on Boldrin and Levine's 2003 lecture on patents and their effect on technology, we observed that their account of James Watt's influence on the progress of steam technology contained factual errors which tended to exaggerate the negative consequences of Watt's patent. We concluded that it was far from obvious that a corrected account would support Boldrin and Levine's bold conjectures. While Boldrin and Levine's 2008 "Against Intellectual Monopoly" begins with a new version of Watt's story that claims to take our earlier criticisms into account, here we assess that version and conclude that it shares many of the shortcomings of the original.*

## 1. INTRODUCTION

Michele Boldrin and David K. Levine's 2003 Lawrence R. Klein Lecture on the destructive consequences of patents ended with a decidedly unfavorable account of James Watt's influence on the progress of steam technology. According to that account (Boldrin and Levine, 2004:348), although Watt's separate condenser constituted a "significant invention," by choosing to patent that invention in 1769, by having the patent extended by Parliament in 1775, and by aggressively prosecuting anyone who infringed the patent, Watt ultimately "set back the industrial revolution by a decade or two" (2004:349). Watt's story was therefore said to offer especially compelling support for Boldrin and Levine's claim that

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patents are “not only superfluous for, but also damaging to, technological progress and social welfare” (2004:332).

In a comment on Boldrin and Levine’s lecture (Selgin and Turner, 2006), we observed that their account of Watt’s story contained many factual errors, most of which tended to exaggerate the negative consequences of Watt’s patent; after reviewing the mistakes in some detail we concluded that it was “far from obvious” that a corrected account would support Boldrin and Levine’s bold conjectures.

Boldrin and Levine’s *Against Intellectual Monopoly*, published in 2008, begins with a new version of Watt’s story that claims to take our earlier criticisms into account. Here we assess that version and conclude that it shares many of the shortcomings of the original. Although Boldrin and Levine correct some of their previous factual mistakes, they leave others uncorrected; and where they do make corrections, they do so without correspondingly moderating their original conclusions. Finally, the new version introduces several new inaccuracies which bolster Boldrin and Levine’s thesis. For all of these reasons, we remain unconvinced of the validity of Boldrin and Levine’s claim (2008:4) that “The story of James Watt is a damaging case for the benefits of a patent system.”

## 2. OLD ERRORS REPEATED OR REVISED IN AN INCOMPLETE MANNER

Although Boldrin and Levine thank us for having pointed out “factual mistakes and imprecisions” (2008:11) in their original article, their book repeats many of the same mistakes. Thus they continue to assert (2008:1-3) that, after receiving his patent, Watt “remained ahead [of his rivals] not by superior innovation, but by superior exploitation of the legal system” and that “Many new improvements to the steam engine, such as those of William Bull, Richard Trevithick, and Arthur Wolff... were kept idle until the Boulton and Watt patent expired” in 1800. Rather than repeat the evidence contradicting these claims, we encourage interested readers to review our original criticisms, and to judge for themselves whether Boldrin and Levine have taken adequate account of them.

Where Boldrin and Levine do take our earlier criticisms into account, they often seem to do so half-heartedly, and without allowing the criticisms to influence their conclusions. For example, in their original essay Boldrin and Levine (2004:349) wrote that “in 1781, when the superior and independently designed Hornblower machine was first produced, Boulton and Watt went after him [Jonathan Hornblower] with the full force of the legal system—bankrupting and ruining him in the process.” Commenting on this passage, we observed (2006:1344-5) first, that Hornblower’s engine was not in fact “greatly

superior” to Watt’s; second, that Boulton & Watt<sup>1</sup> took no legal action at all against Jonathan Hornblower until 1792; third, that rather than going after him then “with the full force of the legal system” they merely opposed, successfully, his bid to have his 1781 patent extended; fourth, that the only Hornblower whom Boulton & Watt ever sued was Jonathan’s brother, Jabez Carter, in an action begun in 1796 (2006:1345); and, finally, that Jonathan Hornblower’s eventual bankruptcy was due, not to his having been ruined by Boulton & Watt, but by his futile attempt to build an engine that could both pump water and turn machinery. We documented each of these claims.

Perhaps in response to the above criticisms, Boldrin and Levine now write (2008:1, our emphasis), “*In the 1790s*, when the superior Hornblower engine was put into production, Boulton and Watt went after him with the full force of the legal system.” The revision does away with the troublesome gap separating Jonathan Hornblower’s original invention from the only action taken against him as part of Watt’s supposedly relentless legal persecution of his rivals. But it also introduces a new myth, to wit: that Hornblower’s engine, which he patented in 1781, was not “put into production” until the 1790s. In fact Hornblower erected his first compound engine at the Radstock colliery in 1782.<sup>2</sup>

Apart from substituting “In the 1790s” for “in 1781,” Boldrin and Levine make one other change only to their original passage on Hornblower, by dropping the reference to Boulton & Watt “bankrupting and ruining” him. Given our original criticisms the omission would represent a real improvement were it not for a footnote (n. 5) to the new version declaring that “[w]ith the 1799 judicial decision against him [sic], Hornblower had to pay Boulton and Watt a substantial amount for past royalties, while losing all opportunities to further develop the compound engine.” This revision is insufficient. First, it was not Hornblower (whether Jonathan or Jabez), but owners of Boulton & Watt engines who found themselves owing back royalties to Boulton & Watt, after having withheld those royalties in the hope that Watt’s patent would be struck down. Second, because Watt’s patent was due to expire in 1800, the validation

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<sup>1</sup> Following standard practice, except when quoting Boldrin and Levine (who do not do so), we use “Boulton & Watt” to refer to the steam engine company, and “Boulton and Watt” to refer to the two partners themselves.

<sup>2</sup> In a footnote, however, Boldrin and Levine (2008:13, n.5) seem to revert to their original claim, observing that “Boulton and Watt challenged his [Hornblower’s] invention, claiming infringement of their patent because Hornblower [sic?] engine used a separate condenser” immediately after having stated that the invention in question “was patented in 1781.” Besides ignoring the long interval between Jonathan Hornblower’s patent and any legal challenge by Boulton & Watt, this passage wrongly asserts that Hornblower’s original engine employed a condenser. It did not; and that is probably why Boulton & Watt didn’t sue him (cf. Jenkins, 1921:15; Dickinson and Jenkins 1927:304.)

of Watt's patent the year before cannot have prevented Jonathan Hornblower from renewing work on his engine except perhaps for a matter of months.

To the extent that Boldrin and Levine do substantially revise their story, they fail to make corresponding changes to their conclusions. Consider, for example, their original claim (2004:349) that Watt's patent "set back the industrial revolution by a decade or two." Although Boldrin and Levine never explain precisely how they arrived at this estimate, it was presumably based on the "explosion" in steam engine numbers and horsepower following the expiration of Watt's patent, which (according to their thesis) would have taken place long before had it not been for Watt's monopoly. Logically, one would think that the more dramatic the "explosion" of improvements after Watt's patent expired, the greater the extent of the delay in industrialization attributable to that patent.

Previously we showed (2006:1346-7) that Boldrin and Levine's original conclusions were based on discredited engine number and horsepower statistics, and that more reliable statistics pointed to a far less dramatic post-1800 "explosion" in steam power. More reliable statistics, reported in Kanefsky (1979) and Kanefsky and Robey (1980), imply an average annual increase in steam engine numbers prior to 1800 that is about 20 percent *higher* than that reported in Boldrin and Levine (2004), and an average annual increase in total engine horsepower after 1800 that is *less than a third* as great as Boldrin and Levine's original figure.<sup>3</sup>

In *Against Intellectual Monopoly*, Boldrin and Levine revise their statistics according to our suggestions (Table 1). So far, so good. But whereas logic would seem to dictate that they also lower their original estimate of the number of years by which Watt's patent delayed British industrialization, they do no such thing. Instead, they reach the less imprecise but hardly less temperate conclusion that Watt's patent retarded British economic development by "about 16 years" (Boldrin and Levine, 2008, n.5).<sup>4</sup> We are led to conclude, in consequence, that Boldrin and Levine's claim regarding the effects of Watt's patent on the pace of British industrialization is only loosely based on the statistics used to sustain it.

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<sup>3</sup> As we note in the table, although Boldrin and Levine (2004) does not include a horsepower estimate for 1800, a 2005 draft of "Against Intellectual Monopoly," in which the reported statistics are otherwise the same as those in Boldrin and Levine (2004), does so.

<sup>4</sup> Boldrin and Levine (2008:3) also repeat their original claim, only put as a question: "Was Watt's patent a crucial incentive needed to trigger his inventive genius? Or did his use of the legal system to inhibit competition set back the industrial revolution by a decade or two?" That the question is intended to be rhetorical is evident from the surrounding text.

**Table 1. Boldrin and Levine Engine and Horsepower Statistics**

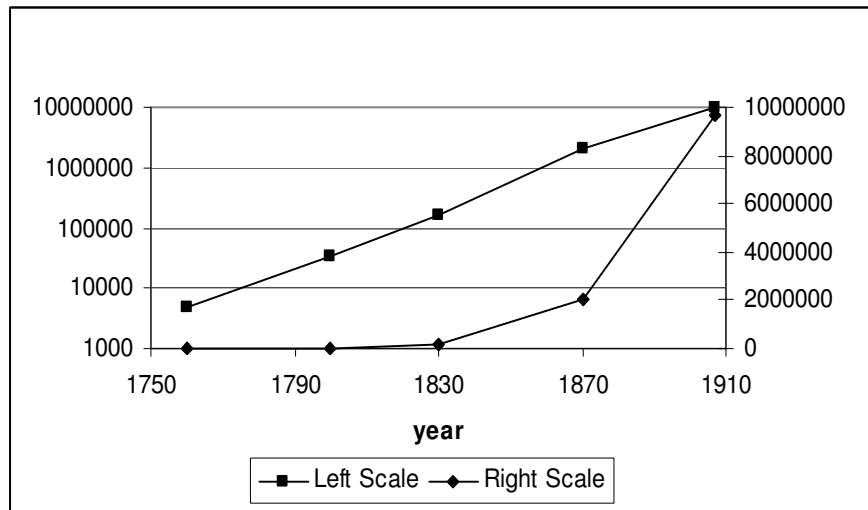
<i>Engines</i>	2004, 2005	2008
1760	n/a	510
1776	132	n/a
1800	1,000	2,25
Average growth	36.2 / year	43.5 / year

<i>Horsepower</i>	2004, 2005	2008
1800	10,000*	35,000
1815	210,000	100,000
Average growth	13,333 / year	4,333 / year

\* Although Boldrin and Levine (2004) does not supply a horsepower estimate for 1800, a 2005 draft of “Against Intellectual Monopoly” (Boldrin and Levine, 2005) does. The statistics reported in the 2005 draft are otherwise the same as those in Boldrin and Levine (2004).

**Figure 1. Estimated UK Horsepower from Steam Technology, 1760-1907**



Note: The numbers in the figure are original to Kanefsky (1979). The left scale is logarithmic.

Boldrin and Levine's revised claims concerning the more rapid growth of steam power after 1800 also ignore our (2006:1347) observation that *exponential* horsepower growth, derived using Kanefsky's (1979) data and plotted (along with linear growth) in Figure 1, shows no post-1800 "explosion" at all. Instead, the horsepower growth rate increases only slightly from 1760-1800 to 1800-1830, with a more substantial increase for the period 1830-70. This delayed and very slight acceleration contradicts Boldrin and Levine's "blocking power" thesis. It is, on the other hand, consistent with an alternative view that attributes the late acceleration of horsepower growth mainly to a gradual decline in the actual and perceived riskiness of high-pressure steam engines.<sup>5</sup>

Because Boldrin and Levine supply no reasons for not heeding our suggestion that they consider exponential growth rates, we can only assume that they see no grounds for treating technological growth as being "naturally" exponential. Grounds do, nevertheless, exist. They have been most famously articulated by Ray Kurzweil (2001), whose treatment of technological change as "an evolutionary process where the outputs of the process are used as inputs in the next phase of development" (Tuomi, 2003:3) appears to fit steam power quite well. An exponential view of technology growth is, moreover, also implicit in the "cumulative" view of research and invention that informs modern discussions of the economics of patents (e.g., Scotchmer, 1991), including that of Boldrin and Levine themselves. Finally, models of "endogenous" technological change (e.g., Aghion and Howitt, 1992; Grossman and Helpman, 1991) typically link such change to population growth, and British population growth during the Industrial Revolution was itself notoriously exponential.<sup>6</sup>

### 3. THE "BREAK EVEN" QUESTION

In some instances Boldrin and Levine take advantage of our original criticisms, not to correct, but rather to *compound*, their previous errors. For example, instead of accepting our criticisms of their original arguments to the effect that Boulton & Watt would have broken even financially without any extension of Watt's patent, they claim that we inadvertently "make [their] case quite convincingly":

Quoting F.M. Scherer they [Selgin and Turner] assert that seventeen years before the second patent expired they, Boulton and Watt, were already breaking even....Whatever profits Boulton and Watt made after

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<sup>5</sup> See Selgin and Turner (2009).

<sup>6</sup> "[I]n the second half of the [18<sup>th</sup>] century, British population moved into an exponential mode of growth which exceeded 10 percent per decade for the period 1781-1911—its peak rise of 17 per cent being reached in the decade ending 1821" (Deane, 1996:25).

that, were all extra rents due to their opportunity costs. So, we all agree that, at least for the final 17 years, the patent was not serving a useful economic purpose, hence it was damaging because it created monopoly distortions (Boldrin and Levine, 2008:11-12).

With all due respect to Boldrin and Levine, we do not agree with them at all. As a minor point, neither we nor Scherer ever state that Boulton & Watt broke even in 1783. The phrase we actually use is “in the mid-1780s” (Selgin and Turner, 2006:1343; compare Scherer, 1965:183, n.46). More importantly, and as we insisted in the very passage from which our “break even” remark was taken, whatever Boulton & Watt’s actual break even date was, that date must not be confused with the date on which the firm would have broken even *without* Watt’s patent.

The really crucial question, though (as we also insisted in our original comments) is not whether Boulton & Watt would have broken even without a patent, but whether or not the partners *expected* to be able to break even without one. Of course it’s true, as Boldrin and Levine (2008:11) observe, that Watt’s patent “was not serving any economic purpose” after Boulton & Watt broke even. But at most this fact supplies grounds, not for regretting Watt’s original patent, or even its 1769 extension, but for wishing that the patent might have been voided *ex post facto*—a procedure the merits of which hardly seem to require comment.

Boldrin and Levine (2008:4) appeal to Scherer’s work again in claiming that their view concerning the dispensability of Watt’s patent is “neither new nor particularly original.” Referring to Scherer as a “prestigious academic supporter of the patent system,” they quote him as follows:

Had there been no patent protection at all,...Boulton & Watt certainly would have been forced to follow a business policy quite different from that which they actually followed. ... The alternative would have been to emphasize manufacturing and service activities as the principal source of profits, which in fact was the policy adopted when the expiration date of the patent of the separate condenser drew near in the late 1790s.... It is possible to conclude more definitely that the patent litigation activities of Boulton & Watt during the 1790s did not directly incite progress.... Boulton & Watt’s refusal to issue licenses allowing other engine makers to employ the separate-condenser principle clearly retarded the development and introduction of improvements (2008:4-5).

A careful reading of Scherer, however, reveals a very crucial difference between him and Boldrin and Levine that the quotation above masks. For Scherer recognizes that Watt’s patent played an important part in helping him to secure funds for his invention, and, in particular, that Matthew Boulton

probably would not have gone into partnership with Watt had Boulton not been able to secure the patent's extension. Regarding the latter point, Scherer (1965:184) observes that Boulton's partnership with Watt

did not begin formally until after the extension had been enacted, and its termination date was set as the extended patent's expiration date. Thus there are reasonable grounds for inferring that Boulton's decision to invest in the project was influenced by the certainty of at least some patent protection, if not by the possibility of extended protection. In this case the grant of a patent monopoly was a probable incentive for investment in technological innovation, although not an incentive for invention.

This view is certainly distinct from Boldrin and Levine's (2008:4) claim that patents, once secured, serve only "to prevent economic progress and hurt competitors."<sup>7</sup>

Boldrin and Levine fail to make clear the difference between their views and Scherer's by not quoting the passage above and by omitting, in the passage they do quote, a crucial qualifying clause. In its entirety, the opening sentence of the passage they quote reads: "Had there been no patent protection at all, *and had Boulton nonetheless invested in the steam-engine venture*, Boulton & Watt certainly would have been forced to follow a business policy quite different from that which they actually followed" (Scherer, 1965:184-85; emphasis added). Given Scherer's own doubts as to whether Boulton would have invested in Watt's engine without extended patent protection, it seems wrong for Boldrin and Levine to place as much confidence as they do in their counterfactual claims concerning how Boulton & Watt would have fared without a patent. Instead, the partnership plans might have fallen through altogether, with Boulton returning his attention to his other manufacturing activities, and Watt abandoning steam engines once and for all to work as a land surveyor. This no-less plausible counterfactual hypothesis points to a rather different verdict concerning the extent to which Watt's patent was counterproductive.

## 4. NEW ERRORS

### 4.1. THE COMPOUND ENGINE

Boldrin and Levine's new version of Watt's story includes some errors not found in the original. For example, Boldrin and Levine claim (2008:4) that Jonathan Hornblower's compound engine, rather than the Boulton & Watt single cylinder type, "was the basis for further steam engine development after their [Boulton &

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<sup>7</sup> It bears repeating as well that Watt obtained his original financing, from John Roebuck, in return for granting Roebuck a two-thirds stake in his patent.

Watt's] patents expired," and the related claim that Arthur Woolf's 1804 "revival" of Hornblower's design "became one of the main ingredients in the (post-1800) efficiency explosion" (2008:4, n6). Neither claim is true. Although Woolf's engine gained some adherents in Cornwall, by the mid-1820s even they had rejected it in favor of Trevithick's single cylinder design, which was found to be substantially less expensive, just as efficient, and more reliable (Hills, 1989:108-9; Forrest 1864:77-8; Galloway 1881:192n; Pole, 1844:53).<sup>8</sup> Neither could Woolf's engine have played much of a role in the post-1800 efficiency "explosion," both because it was never all that popular, and because the "explosion" (assuming that's the right term) was most pronounced after the mid 1830s, when a concerted switch to truly high-pressure (>100 psi) engines finally began.

#### 4.2. PICKARD'S PATENT

Boldrin and Levine argue (2008:2) that, because James Pickard had patented the most obvious means for converting reciprocating to rotary motion, "involving the combined use of a crank and a flywheel," Watt was obliged "to contrive an alternative less efficient mechanical device, the 'sun and planet' gear," and that "[i]t was only in 1794, after the expiration of Pickard's patent that Boulton and Watt adopted the economically and technically superior crank." Elsewhere (2008:1) they state that the idea of using a crank had been "unfairly anticipated" by Pickard's partner, Matthew Wasborough, and (2008:n.3) that their view "[t]hat Pickard's patent was unjust is also the view of Selgin and Turner...who, like Watt, do not seem to provide any evidence of why this was so."

First of all, concerning whether Pickard's patent was "unjust," we never employed that term. However, we did relate the well-known story of how Pickard got the idea of using a crank from an unfaithful (and probably drunk) Soho employee. We also cited a reputable source for the story (Dickinson and Jenkins, 1927:148-56), and added a footnote to the effect that the story is affirmed by internal documents preserved at the Boulton & Watt Archives. We are consequently unable to understand why it should appear to Boldrin and Levine that we "do not provide any evidence" for our claims.

Second, the "sun and planet" gears (not "gear"), which were invented not by Watt himself but by his employee William Murdoch, were not technically inferior to a crank and flywheel; indeed, the fact that they generated two shaft

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<sup>8</sup> Unlike Trevithick, Woolf refused to give up on cast iron boilers, which were prone to cracking at pressures above 60 psi. Although Woolf's design was altogether abandoned for pumping engines, a few rotary engines employing it remained in use after the 1820s (Pole:1844:53, n.27). Starting in 1839, James Sims attempted a British revival of the compound engine, using a version of his own design. But it, too, was eventually found to be less economical than rival single-cylinder designs; by 1863 most of Sims's engines had been dismantled (Forrest, 1864:48).

rotations for each engine stroke was a decided advantage. Nor were they substantially more costly. Had they been so, or had they been as inferior as Boldrin and Levine claim, Boulton & Watt would presumably have ceased using them altogether when Pickard's patent expired in 1794. Instead, and contrary to what Boldrin and Levine state, Soho kept on equipping engines with sun and planet gears until 1802 (Dickinson and Jenkins, 1927:129,169).<sup>9</sup>

#### 4.3. THE SOHO FOUNDRY

Boldrin and Levine (2008:2) claim that "it was only after their patents expired that Boulton and Watt really started to manufacture steam engines," because until then the firm was able to extract "hefty monopolistic royalties through licensing." Mere attention to dates reveals the inaccuracy of this view, for Boulton & Watt determined to build the Soho Foundry—a new facility for producing steam engine parts—in 1795, and completed it a year later, that is, four years ahead of the expiration of Watt's principal patent. The reasons for their having done so are, moreover, well known, and had nothing to do with their having anticipated the abandonment of their engine licensing scheme. First, Boulton and Watt discovered that John Wilkinson, who had been the most important and reliable supplier of iron components for Boulton & Watt engines, had also been manufacturing components for pirate engines. This discovery led to the collapse of friendly relations between the two firms. Second, Wilkinson's Bersham ironworks had been closed by injunction following a violent dispute between John Wilkinson and his brother William (Roll, 1930:149-60).

It is true, on the other hand, that so long as Boulton & Watt continued to rely on engine royalties as their main source of profits, they were willing to supply engine parts at a loss, and that they had to abandon this practice after 1800 (Roll, 1930:275).

#### 4.4. MURDOCH'S STEAM CARRIAGE

According to Boldrin and Levine, instead of showing gratitude to William Murdoch for helping them to get around Pickard's patent, Boulton and Watt treated him very shabbily. Murdoch, they write (2008:13), "was legally barred from developing" the "steam carriage" he'd designed in 1781 "by Boulton and Watt's successful addition of the high-pressure engine to their patent, although Boulton and Watt never spent a cent to develop it." But this account is contradicted by the one found in Samuel Smiles' essay on Murdoch in his *Men of Invention and Industry*, which draws on the direct testimony of Murdoch's son.

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<sup>9</sup> Cranks ultimately came to be favored for their greater durability.

According to Smiles (1890:133-6), Murdoch's experimental steam carriage was itself inspired by a model Watt had toyed with several years before. But Watt had given up the idea, having seen no commercial potential in it. That is why, upon learning of Murdoch's experiments, Watt "feared that they might interfere with his [Murdoch's] regular duties, and advised their discontinuance." But when Murdoch persisted, Watt, far from "barring" his way, advised Boulton

that, rather than lose Murdock's services, they should advance him 100£; and if he succeeded within a year in making an engine capable of drawing a post-chaise carrying two passengers and the driver, at the rate of four miles an hour, that a locomotive engine business should be established, with Murdock as a partner.

Nor is it true that, by including the steam-carriage idea in his 1784 patent, Watt merely sought to preempt Murdoch's patenting the idea himself. On the contrary, despite his doubts Watt seriously pursued the steam-carriage idea until 1786, writing that year (according to Andrew Carnegie, whom Boldrin and Levine claim as a source for their own story) that he was still "resolved to try if God will work a miracle for these carriages" (Carnegie, 1905:190).<sup>10</sup> Watt's continuing doubts, which led him to finally abandon the steam carriage project once and for all, were based on his estimate that such a carriage would have to carry "twenty pounds of coal and two cubic feet of water per horsepower on the common roads" (1905:190). Although Murdoch, to Watt's dismay, persisted a little longer in his own experiments, at last he reluctantly accepted Watt's verdict.

#### 4.5. HIGH-PRESSURE STEAM

Boldrin and Levine's revised telling of Watt's story places more emphasis than the original did on the role of high-pressure engines in the supposed post-1800 "explosion" in steam engine numbers and efficiency. "The key innovation" behind this explosion, and particularly behind such developments as the steam train and steamboat, Boldrin and Levine (2008:2) observe, "was the high-pressure steam engine—development of which had been blocked by Watt's patent." Although Watt himself never used high-pressure steam, his separate condenser patent supposedly prevented others from doing so:

new steam engines, no matter how much better than Watt's, had to use the idea of a separate condenser. Because the 1775 patent provided Boulton

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<sup>10</sup> In fact we find nothing in Carnegie's generally flattering biography of Watt, either in the pages cited by Boldrin and Levine (Carnegie, 1905:140-1) or elsewhere, that supports Boldrin and Levine's claims concerning Watt's shabby treatment of his most loyal worker. All Carnegie has to say directly concerning this matter is that, although Murdoch's model steam carriage "performed well...nothing important came of" it (1905:147).

and Watt with a monopoly over that idea, plentiful other improvements of great social and economic value could not be implemented (2008:3)

The fatal flaw in this argument is its assumption that high-pressure steam engines require condensers, separate or otherwise. In fact, they don't.<sup>11</sup> Indeed, the vast majority of such engines, including all those employed on locomotives and steamboats, did not employ them.<sup>12</sup> It follows that Watt's monopoly of the separate condenser alone cannot have posed a barrier to the emergence of high-pressure steam technology.

Although this last observation may seem to cut the ground from beneath Boldrin and Levine's entire thesis concerning the ill effects of Watt's patent, it does not actually do so, because the specifications for both Watt's original (1769) patent and the one granted him in 1782 included headings referring to the "expansive" working of steam, that is, for using steam to push a piston, rather than as a means for creating a vacuum to pull it. A more sophisticated version of the claim that Watt's patent(s) stood in the way of the development of high-pressure steam engines assumes that these headings gave Watt an effective monopoly of engines that employed steam expansively, at any pressure, and whether condensing or not. But while this version of the "blocking power" thesis is certainly more credible than that put forward by Boldrin and Levine, it, too, is incorrect, as we have endeavored to show elsewhere (Selgin and Turner, 2009).

## 5. CONCLUSION

Boldrin and Levine's new telling of Watt's story is hardly more persuasive than their original (2004) version. Although they have corrected some of their earlier errors, their account remains inaccurate and one-sided. Although, told in this fashion, Watt's story makes for an exciting introduction to the rest of Boldrin and Levine's book, the story's value as a source of reliable inferences concerning the general merits and shortcomings of the patent system is open to doubt.

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<sup>11</sup> For details see Selgin and Turner (2009).

<sup>12</sup> The principle exceptions were high-pressure engines employed on ocean-going vessels, the condensed exhaust steam from which supplied a needed source of fresh water.

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# Responding to the Challenges of “Against Intellectual Monopoly”

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*Most would agree that a sound patent system is one in which the social benefits of the system exceed the social costs. Many would also agree that the current patent system imposes significant social costs, and that the current proposed patent reform legislation is largely motivated by a desire to address those costs. In their book, *Against Intellectual Monopoly* (2008), Boldrin and Levine base their policy recommendation to abolish the patent system on the claim that the social costs of having any patent system, even an “improved” or “reformed” one, will inevitably exceed its benefits. I argue that while *Against Intellectual Monopoly* falls short of establishing a case for abolishing the patent system, it succeeds in making a case for rethinking the law and economics paradigm of patents that has formed the foundation for much of patent law scholarship and policy. The arguments that Boldrin and Levine offer provide compelling reasons for re-examining the core assumptions underlying the dominant models of how patents impact innovation, paying greater attention to institutional alternatives and to historical lessons about the strength of competitive markets and the costs and benefits of regulatory intervention that dampens competition. I suggest we can meet the challenges highlighted by Boldrin and Levine by providing a more central role for New Institutional Economics (NIE) in the study of patent law, refocusing our analysis on the structure of activities and transactions that drive alternative processes of innovation and the roles that institutions (including but not limited to patent, contract and competition laws, and the informal rules governing collaboration and research activities) and organizations (both public and private) play in determining transactional structures and innovation outcomes.*

## 1. INTRODUCTION

Why fix a system that impedes rather than enhances innovation, ask Michele Boldrin and David Levine in their book, *Against Intellectual Monopoly* (2008). Intellectual property rights do more harm than good in most cases, they argue,

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\* Special thanks to the participants in the Kauffman Foundation Conference on Intellectual Property and Innovation hosted by Charles McManis and Gerrit De Geest at Washington University, April 2009. While this comment responds to and benefits from the conversations and comments of the participants in this conference, all views and in particular all shortcomings are my own.

and should therefore be abolished. We should rely instead, they say, on competition as the engine of innovation and the driver of economic growth, leaving markets unfettered by monopoly control over ideas. Analogies are drawn with the widely accepted view among economists that free trade is more effective than trade barriers at promoting economic growth. We should have greater confidence in the ability of competitive markets to provide the incentives needed to spur innovation, with regulatory intervention limited to performing a compensation function in those few industries and situations where the inability to appropriate returns on investment truly creates market failure.

Most of us (if not all of us) would agree that a sound patent system is one in which the social benefits of having the patent system exceed the social costs. Many would agree that the current patent system imposes significant social costs, and the current proposed patent reform legislation is largely motivated by a desire to address those costs. Boldrin and Levine base their policy recommendation to abolish the patent system on the claim that the social costs of having any patent system, even an “improved” or “reformed” one, will inevitably exceed its benefits. Using both theoretical and empirical arguments to discredit the traditional reward-based and prospect-based justifications for patents, they argue that creating monopoly power not only fails to promote inventive activity, but also in many cases diverts creative efforts away from inventive activities and towards wasteful efforts to obtain and exploit monopoly power. They underscore the lack of empirical evidence establishing a positive link between patents and innovation to support their conclusion that the patent system should be phased out, pointing to numerous examples of innovation in the absence of patent rights and innovation-reducing uses and abuses of patent rights, such as “submarine” patents, the emergence of “patent thickets,” and the activities of “patent trolls.”

I argue that while *Against Intellectual Monopoly* falls short of establishing a case for abolishing the patent system, it succeeds in making a case for rethinking the law and economics paradigm of patents that has formed the foundation for much of patent law scholarship and policy. The arguments that Boldrin and Levine offer provide compelling reasons for reexamining the core assumptions underlying dominant models of how patents impact innovation from a fresh perspective, paying greater attention to institutional alternatives and to historical lessons about the strength of competitive markets and the costs and benefits of regulatory intervention that dampens competition. But while Boldrin and Levine recognize the need to consider patents within an institutional context (e.g. evaluating patent protection in the life sciences industry in conjunction with other regulatory measures, such as FDA regulations), their analysis and the studies they draw upon do not encompass or

sufficiently explore the complex roles that patent laws play within a broader institutional environment. Their analysis shares many of the assumptions and limitations of the arguments that they critique, leaving us to wonder whether alternative avenues for uncovering the contributions that patents make to social welfare have been adequately explored.

Advocating a more central role for New Institutional Economics (NIE) in the study of patent law and, more specifically, a change in methodology for the study of how patents impact innovation, I suggest we can meet the challenges highlighted by *Against Intellectual Monopoly* by refocusing our analysis on the structure of activities and transactions that drive alternative processes of innovation and the roles that institutions (including but not limited to patent, contract and competition laws and informal rules governing collaboration and research activities) and organizations (both public and private) play in determining transactional structures and innovation outcomes.<sup>1</sup>

## 2. WHY AGAINST INTELLECTUAL MONOPOLY IS AN UNFINISHED CASE

Boldrin and Levine recognize that evaluating the comparative explanatory power of existing models of patents and innovation – including those that demonstrate net benefits from patents and those that emphasize the net costs – becomes a largely empirical question. They provide historical and contemporary examples of innovation in the absence of patents to illustrate that patents are not performing the innovation-increasing functions attributed by dominant theories, and they document situations in which patents appear to have increased costs and/or dampened innovation to show the potential negative effects of the patent system on innovation. They highlight the continuing lack of empirical evidence, despite decades of research, to demonstrate that the patent system has increased innovation, and reference empirical evidence pointing in the other direction.

Their empirical case, which combines historical anecdotes with references to empirical studies and descriptions of current industry experiences, successfully illustrates the weakness of the traditional justifications for patents. But after reading their arguments we cannot help but wonder if the costs and benefits of the patent system articulated by Boldrin and Levine and supported by the body

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<sup>1</sup> The thought that NIE has a role to play in understanding patent law is not new, although existing work stops short of recommending the mainstream methodological change that I propose. Important contributions at the intersection of NIE and patents include, without limitation: Kieff (2006); Heald (2007); Merges (2000); Barnett (2008); Burk (2004); and Lemley (2004).

of theoretical and empirical work they draw from have been adequately understood, captured, measured, and compared. Still missing is a deeper theorizing of the existing empirical data and the models underlying it to explain what the current data does and does not tell us about patents and innovation and a way of addressing the limitations of the existing literature through alternative modes of analysis. The book and the literature it surveys do not sufficiently explore how patents operate to shape human activities within the context of diverse processes of invention, innovation, technology transfer and commercialization. We are also left to wonder about the range of consequences, and in particular the costs, of the radical changes in the institutional environment, that Boldrin and Levine propose. In light of the unanswered critical questions about the mechanisms by which patents might influence innovation, *Against Intellectual Monopoly* (as well as the literature it surveys) fails to foreclose the possibility that patents may indeed play valuable roles in achieving innovation outcomes within our existing economic system – roles not readily replaced by alternative market and non-market solutions.

## 2.1. COMMON ROOTS OF THE DOMINANT APPROACHES TO PATENT LAW

Modern patent scholarship provides a number of competing views of how patents impact innovation, the majority of which fall into one of two camps – those following Arrow's original focus on the tradeoff between incentives and the cost of the monopoly power used to enhance incentives (the reward-based function of patents), and those following in the wake of Kitch's prospect theory with its focus on the role of control as facilitating downstream investment and the coordination of activities needed in developing the invention (the prospect function of patents).<sup>2</sup> Despite the diversity of views, the majority of approaches share common roots in a neoclassical economics foundation based on models of rational decision makers, decentralized private markets and competition. The common starting point for analysis is one that largely abstracts from the context of the innovation process and from the complexity of the institutional and organizational environment to isolate the tradeoffs between enhancing incentives (both directly and indirectly through control over downstream investments) and reducing competition.

The most prevalent models of patents and innovation, built largely around a reward-based theory of patents, either involve or presume an inventor who is a

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<sup>2</sup> See Arrow (1962); Kitch (1977). While there is an extensive literature suggesting other functions that patents might play, including communication and signaling functions, coordination functions, and accounting functions, this literature has remained largely peripheral to core decisions about patent law and policy, and the functions suggested have not been translated into more mainstream methodologies for analyzing patents and innovation.

rational decision maker and responds to the expectation of profit when deciding where to invest his or her effort, effort which is generally treated as fungible between alternative activities. Although the outcome of effort may be uncertain, the inventor can place an expected value on the returns available from alternative investments of effort (and other resources), and directs his or her effort to activities with the highest expected payoff. The fruits of this effort take the form of an invention that is often construed as an invention-product, although this can be expanded to include a claim over multiple invention-products or narrowed to include incremental improvements on existing invention-products) and evaluated in terms of potential market value. The focus of analysis typically centers on questions of whether monopoly is needed to solve an appropriability problem (and potentially a disclosure problem), whether at the point of invention (the reward-theory function) or in the subsequent path of development and commercialization (the prospect function) in a simplified and relatively homogenous market paradigm. While prospect-based theories seek to refocus on a broader market environment and the role that defining property rights over the invention plays in incentivizing commercialization, the underlying models of how patents impact innovation share many of the underlying assumptions of the reward-based theories and involve a similar level of abstraction from the nature and characteristics of different processes of discovery and innovation. Similarly, while the basic model has also been expanded to distinguish between the incentive effects of patents on initial inventions and on improvements or incremental inventions, the underlying models pay little attention to specific types of transactions and the specific features of markets and technology and human decision making which shape the innovation process (see Scotchmer, 1991). By abstracting from the institutional framework that governs market activities and structures competition, and by focusing on an abstract market for “inventions” and the role of patents as interventions in these markets, we are led to a view of the patent system as a departure from the broader competitive economy rather than as a part of it (see Liivak, 2009). Moreover, we are led to a study of the patent system that is largely isolated from, rather than embedded within, systems of innovation. The result is an approach to the study of patents and innovation that lacks explanatory power for many types of innovation processes and innovation outcomes.

The limits of this underlying paradigm are most evident when applied to study innovation processes that fall outside of product-focused innovation by sellers intended for and motivated by reasonably predictable commercial market opportunities. Examples include open collaboration models and user-

innovation models of innovation.<sup>3</sup> These models of innovation “contrast sharply with the seller innovator picture which dominates patent policy. In that picture, incentives for inventing, disclosing, and disseminating new technologies arise from the potential for recouping innovation investments through commercial sales” (Strandburg, 2008:471). These incentives are largely missing from certain models of collaborative discovery and development that have emerged, either around a shared project or through interest in modifying product or process use to suit user needs, calling into question the traditional roles (and justifications) for patents in facilitating innovation.

To take a contemporary innovation challenge that occupies current policy maker interest, consider efforts to shift to a new technology frontier in the development of vaccines. What can traditional approaches to patent law tell us about how patents can help or hinder this innovation goal? Using the traditional reward-based approach to patent law, we would start with a model in which individual inventors (scientists engaged in vaccine research) decide how to spend their time based on expectations about the market value of the results they might produce depending on the research path chosen. A change in the patent laws (such as an increase in patent term) increases the expected value of engaging in a research path that may lead to a patentable vaccine, so they invest more effort. Under a prospect-based approach, we would start with a similar model, but would focus instead on how defining property rights around initial discoveries might facilitate coordination of downstream commercialization of products relating to this initial discovery. In this case, however, the scientists who are conducting research on vaccine technology are often located in universities and their decision-making is shaped primarily by the policies, funding and reward structures of such institutions rather than by expectations of market returns. Moreover, public-private partnerships play a significant role in moving beyond early stage discoveries, and these types of collaborations involve a balancing of divergent objectives and incentive problems and pull into the process a range of overlapping regulations and constraints that will interact with any pre-determined rules regarding property rights. When looking downstream to commercialization, the government is both the primary funder and primary purchaser of resulting vaccines. In many cases it is not patents, but government regulation and funding, that largely determines market entry and market returns and the path of development. Both the reward-function and the prospect-function of patents seem to fail in this context, but this does not mean that patents don't have a critical role to

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<sup>3</sup> See Strandburg (2008) (exploring strategies for maintaining access to research tools in areas where basic and applied research overlap); Strandburg (2009); Madison et al. (2008).

play in structuring the transactions and activities between participants in the development, manufacture and use of the resulting vaccines.<sup>4</sup> Failing to take into account the types of transactions that occur within the vaccine innovation process and the multiple overlapping rules and constraints on individual activities will lead to very poor predictions about the impact of patents on innovation and potentially misguided patent policies.

## 2.2. WHAT NEEDS TO CHANGE?

First, we cannot abstract from the innovation process and view the production of inventions as directly analogous to the production of products that can be sold in competitive markets. As already discussed, innovation can take many different forms and can take place for many different reasons. Some types of innovation processes are driven by objectives that do not fall neatly within a model based on extracting monopoly profits from a patented invention. In the examples mentioned above, open-source models of software development and user-innovation models of innovation have very different incentive structures from what some scholars have termed the “mass-market seller’s” model of innovation (see note 3). In some cases non-economic objectives such as reputation, curiosity, or interest in use direct inventive efforts. Different types of collaborations may be needed, collaborations which cannot be replaced with decentralized market decisions between unrelated actors.

Second, we cannot begin with an abstraction from the institutional environment within which a particular process of innovation takes place. Innovation processes are embedded within an institutional environment that provides a system of overlapping rules and constraints that structure the activities of participants in the process. Examples of institutions include rules that govern the allocation of property rights, contracts, competition and antitrust, as well as business norms, social practices, and opportunities and constraints stemming from the science or technology underlying the process. In addition to the institutional environment, the process of innovation both influences and is influenced by the types of organizations that participate. Where university employees are the dominant early stage innovators, for example, we need to know something about the objectives of the decision makers within this system, the allocation of resources to different activities, and how external market incentives are mediated by the internal decision making structure.

Third, we need an approach that acknowledges and explains why transactions are not costless and examines the role that different institutions and organizational

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<sup>4</sup> The roles that patents play in such a setting is explored more fully in a working paper “Patents and Pandemics” that seeks to apply the NIE approach described here, on file with the author.

structures play in creating and/or addressing transactions costs. Determining the nature of transaction costs in different types of innovation processes, and examining how transactions are structured in response, needs to be a focal point of the analysis of how patents impact innovation.<sup>5</sup> We need a more grounded understanding of what transactions costs are and how they both determine and are determined by the “rules” of the game and the strategies of the “players.”

Fourth, we need to acknowledge the limits of the rational decision maker as the actor in models that seek to explain innovation, and efforts need to be made to enrich models of decision making to capture the effects of risk and uncertainty and the role of non-economic objectives in driving individual behavior – particularly in some areas of science and technology that seem to be dominated by different modes of discovery and development.<sup>6</sup> The rational actor assumption seems particularly out of place when studying processes of innovation and discovery, where we would expect differences in both individual and organizational decision making in the face of significant risk and uncertainty to play important roles in shaping innovation choices and outcomes. The difficulties associated with valuing the benefits of patent protection, both *ex ante* and even *ex post*, make the information demands imposed by the neoclassical model impossible to satisfy, calling into question the usefulness of this model to explain patenting behavior based on expectations of future returns.<sup>7</sup> It also precludes the study of innovation processes that take place outside of the market, rely on non-market incentives, or depend on unique social and cultural arrangements. Moreover, the potential non-economic functions that patents might play are largely neglected as a result of this rational actor paradigm. Patents might play a transformative or empowering role for potential entrepreneurs, for example. They may also reflect and shape social norms about the value of innovative activity and the types of recognition and rewards that should be allocated to the innovators (see, e.g., Holbrook, 2000).

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<sup>5</sup> Existing work in this area focuses largely on the theoretical foundation for understanding transaction costs and coordination problems. See *supra* note 1. But our understanding of what the transaction costs are and how changes in patent rules change these costs remains limited.

<sup>6</sup> An assumption that pervades most approaches to patents and innovation is the assumption lying at the core of the neoclassical model of the “rational actor” as the basic unit of productive activity. This rational actor responds to marginal changes in price and quantity with changes in effort and purchasing decisions based on a full understanding of the consequences of his or her alternative choices.

<sup>7</sup> There is an interesting literature focusing on the information and communication functions of patents that allows some role for imperfect information by relaxing assumptions of imperfect information. See, e.g., Long (2002:636-37); Parchomovsky and Wagner (2005:4-9). But incorporating more complex models of decision-making under uncertainty into existing rational actor models is more challenging.

Finally, we need to rethink the baseline for comparison in assessing alternative policy positions. A perfectly competitive market is typically used as the hypothetical benchmark for evaluating the performance of the patent system, which is viewed as transforming the market into a monopoly. It is assumed that institutions will be efficient (in terms of performing the desired policy goal, however defined) and transactions costless when making this comparison (see North, 1993). By using this as the benchmark against which to judge real world outcomes, either directly or implicitly, existing approaches to patents and innovation deflect attention from considerations of how alternative arrangements will actually work in practice and from relevant institutional comparison.<sup>8</sup> Different aspects of competition emerge when considering factors such as the role of product differentiation, concentration of production reflecting scale economies or network effects, and static competition among existing products versus dynamic competition in the development of new products, and patents may play varying roles within these different “imperfectly competitive” environments (see Lemley, 2009). Moreover, patents rarely confer the type of market power that can be used to produce monopoly rents, making a comparison of competition with patent “monopoly” both misleading when evaluating the costs and benefits of the patent system and counter-productive when searching for the functions that patents play.

### 3. A SHIFT IN METHODOLOGY

To address the limitations discussed above, I argue that we need a change in the methodology by which we study patents and innovation, one that allows us to address the limitations in existing approaches to the study of patents and innovation. Building on ideas discussed in the contribution made by North (2009), as well as ideas advanced in the existing patent literature (see *supra* note 1), I suggest that approaches to the study of patents should utilize more fully the tools and perspectives provided by New Institutional Economics (NIE) and, more specifically, should place the processes of innovation and the transactions which drive these processes at the center of study. Efforts to explain how patents impact innovation should be directed at characterizing individual and organizational decision making and the structure of human activities within an institutional environment characterized by both relevant legal institutions (such as antitrust law, contract law, and regulatory structures shaping the funding and ownership of inventions) and relevant non-legal institutions (such as the laws of

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<sup>8</sup> See Coase (1964) (discussing importance of comparing social arrangements which are all imperfect rather than making comparisons with theoretical models of ideal economic arrangements).

science and technology). The argument for a patent law that responds to context is echoed by proponents for a more nuanced, industry-specific patent law and policy (see, e.g., Burk and Lemley, 2009), and on the empirical front inroads have been made in examining sector specific effects of patents on innovation outcomes.<sup>9</sup> The push for a more systems-based approach to patent law has support in studies that push the processes of innovation to the center of the study and treat patents as one of multiple policy tools.<sup>10</sup> The proposed shift in methodology provides a way for capturing such differences when fashioning patent policy.

### 3.1. WHERE ARE WE NOW? WHERE NEXT?

The NIE approach provides us with tools for examining specific characteristics of innovative activity and aligning them with the characteristics of patents, as compared to other institutional choices. It turns the policy analysis into one of comparative institutional choice – the question of which feasible institutions will facilitate the desired types of transactions when taking into account the limitations of decision makers and governance structures. This approach has been adopted by a minority of patent scholars interested in exploring alternative functions that patents may play. But while significant contributions have been made using an NIE approach to identify alternative roles that patents may play in the innovation process, including theories of incomplete contracting, team production, transaction costs and coordination costs, these efforts remain largely fragmented and unconnected to the more complex multi-institution systems within which different kinds of innovation and related economic activity takes place. Moreover, these contributions often remain unconnected with the existing empirical work and disconnected from the legislative, administrative and judicial framework within which patent law is shaped and implemented. The resulting gap between the theoretical models and real world analysis has made it difficult to integrate existing work within a more general framework for exploring innovation and has made empirical testing a continuing challenge – helping to explain the continuing deficit in compelling empirical support for patents.

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<sup>9</sup> See, e.g., Outterson (2009) (examining the impact of patents within the context of developing antibiotics).

<sup>10</sup> Examples of efforts to unpack some of these issues include Madison et al. (2008), (arguing that understanding the construction and operation of cultural commons is essential to a full understanding of IP and its interactions with other legal and social mechanisms governing the production of knowledge); Strandburg (2005) (pointing to the importance of the characteristics of scientific researchers and the societal purpose of basic scientific research in the analysis of university technology transfer policies); Frischmann (2000).

I have been arguing that we need to start with the characteristics of the processes of innovation that we are interested in studying and the transactions that underlie (or could better support) different processes of innovation before abstracting to model how patents impact innovation. We need to incorporate the context and the operative institutions that shape and constrain behavior and to include a richer model of individual decision-making and organizational structure into our frameworks for analyzing patents and innovation. We need to consider the factors that will influence the decisions of key participants within these innovation processes and the reasons for selecting the types of transactional structures that we observe before abstracting to identify key policy variables (such as patent rules) that may influence investment decisions and the resulting innovation outcomes. To apply the valuable insights that prior models have produced, we need to move to this more contextual approach in which transactions between participants in innovation processes lie at the core of the study and evaluation of patents.

While mindful of the dangers of developing complex models that seek to mimic reality at the cost of indeterminacy and ambiguity,<sup>11</sup> the need for abstraction at some junctures of analysis does not undermine the importance of examining the context in which innovation takes place. The intended goal of introducing a more complex landscape of patents and innovation is to identify more accurately which variables are critical in influencing outcome rather than to seek models which describe all aspects of the world. There is still room for focusing on the relationship between key variables, but before any such focus more attention needs to be given to the decision-making models of participants within different processes of innovation. Perhaps this approach can avoid the dual problems of a lack of descriptiveness and indeterminacy that have been highlighted in critiques of law and economics models (see Posner, 2003).

### 3.2. REGULATING INNOVATION AND THE ROLE OF COMPETITION

Boldrin & Levine push the connection between competition and innovation to the forefront in their analysis of the patent system, arguing that competition encourages innovation, that patents create monopolies, restricting competition, and therefore that patents should be removed in the absence of strong evidence of sufficient counter-veiling benefits. Given the important role that the regulation of competition plays in innovation policy, deepening our

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<sup>11</sup> See, e.g., Posner, (2003) (expresses concern about the predictiveness and plausibility of complex law and economics models that include multiple variables, many difficult to measure, and points to the challenges of finding models that can be tested and that don't make unreasonable assumptions about the cognitive abilities of contracting parties – challenges that arise in patent law in ways analogous to the contract law examples he provides).

understanding of the connection between patents, competition and innovation needs to be a central part of the patent research agenda. Modern antitrust law and policy has adopted a more nuanced view of the relationship between competition and innovation, recognizing that while competition in innovation, or at least some forms of it, encourages innovation, competition in product markets does not always encourage innovation – rather, antitrust intervention must be responsive to different types of firm conduct and industry settings, targeting areas in which increased competition will foster innovation (see, e.g., Baker, 2007).

These issues are already a part of the modern antitrust research and policy agenda, as reflected by the interest of the DOJ and FTC in the intersection of IP and antitrust, but need to be more fully integrated into patent law and policy. Approaching patent law in a similar manner leads us to more specific questions about what types of competition, in what markets, increase innovation, and what roles patents might be playing in these different market settings, moving us beyond the notion of patents as monopoly to the study of how patents, competition and innovation are related in different technological and market contexts. More generally, we are led to ask how institutions and organizations (both private and public) can and/or should adapt to changing market and technology conditions in a manner that fosters competition in markets for innovative products and services.<sup>12</sup> Viewing patent law as a part of the regulation of innovative activities allows us to more readily integrate patent law into a system-based study of how related sets of rules and norms impact innovation.

#### 4. CONCLUSION

*Against Intellectual Monopoly* furthers the ongoing debate over future directions of the patent system by challenging policy makers and commentators to move away from the basic presumption that we need a patent system.<sup>13</sup> It falls short of convincing us that the patent system should be phased out, however, leaving unanswered the same critical questions that it raises in critiquing dominant justifications for the patent system – questions about how patents actually impact innovation and how such impact can be measured. In order to conclude whether patents have a role to play in improving social welfare, I argue that we need an approach to the study of patents that uncovers the roles that patents play in shaping activities that drive innovation. We need to begin with the needs and challenges posed by different processes of innovation. We need to investigate the

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<sup>12</sup> For views on the need for industry tailoring in patent policy, see e.g. Burk and Lemley (2009).

<sup>13</sup> The existing data on patents is rarely utilized in policy discussions. Some have argued that this imperviousness to fact is based on a deep-seated assumption that innovation will not occur without patents. See, e.g., Macdonald (2004).

ways in which the patent system influences human activities and the organization of activities involved in the creation, development and supply of innovative techniques and processes, products and services. Given that the institutional framework governing innovation is increasingly an international one, as well as one involving multiple domains and industries, the patent research agenda must also be responsive to the changing role of domestic patent law in a global knowledge economy characterized by rapid changes in science, technology, economic conditions, and consumer needs, organizations which increasingly rely on intangible assets, and a mobile work force. Only then can we address more conclusively the theoretical and empirical questions about the impact of patents in the current and evolving institutional environment.<sup>14</sup>

I am thus arguing both for a reexamination of the assumptions underlying models of patents and innovation and a shift in methodology that more fully utilizes an NIE approach towards patent law, beginning with the context of innovation and focuses on the ways in which the patent system influences human activities and the organization of activities involved in the creation, development and supply of innovative techniques and processes, products and services. This approach allows us to capture more fully the different roles that patents play in structuring human activities relevant to innovation and to expand the empirical avenues for quantifying how patents influence these activities, with more attention to the context within which innovation takes place as a starting point for identifying key variables to study. It also reorients patent policy towards the search for coordinated, responsive, adaptive systems of regulating innovation.<sup>15</sup>

*Against Intellectual Monopoly* reminds us that we should not rest on the notion that we cannot live without patents. But before resting instead on the notion that we can live without patents, we must critically examine the multiple roles that patents may play as part of the complex institutional environment within which innovation takes place. Only then can we feel confident that we are capturing the cost benefit analysis needed to support a radical change in the patent system.

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<sup>14</sup> There is a growing literature exploring different potential functions of patent rights, and this literature needs to be integrated into the design and analysis of both theoretical and empirical models of patent market performance. Ideas for future empirical work continue to emerge, and include experimental work, event studies, more industry-based comparisons, and the development and use of more refined measures of innovation and impact. Patent scholars may also benefit from looking more frequently outside of patent law for new directions or analogies with other factors that are thought to be influential in innovation and economic growth.

<sup>15</sup> This call for adaptive systems of regulation is an echo of the agenda set out by North (2009) in his contribution to the Conference.

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# A Recommendation on How to Intelligently Approach Emerging Problems in Intellectual Property Systems

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*We currently have no framework that allows us to really understand how a political system works, and how property rights and patent systems evolved, and so we do not have a body of theory that allows us to make predictive statements that would in fact lead to improving the function of property rights and patent systems. The body of neoclassical economic theory is very elegant and very useful, but it cannot describe how a system is evolving. If we want to understand how patent systems work, we may not simply rely on understanding the economics of patent systems, there must be developed a structure of incentives that will continue to encourage people to innovate and transform solutions to solve new and different problems that evolve over time. What we would ideally like in a world that is dynamic, where change is going on both in the political system and in the economic system, is to have an adaptively efficient structure.*

## 1. INTRODUCTION

Today, most of what patents and copyrights are about is the protection of monopolies, not the encouragement of more rapid development. When patent rights were first introduced in fifteenth-century Venice, then later, with the Statute of Monopolies, in Britain, property rights in general were imperfectly specified, and there was a very imperfect understanding of how political systems worked. As a result, the patent systems evolved in a turbulent manner with constant changes. Clearly, what has happened now is that an elaborate structure of law and rules has developed so that the intellectual property rights systems are becoming unrecognizable compared to their original form and to their intent of promoting innovation.

Some scholars today, Michele Boldrin and David Levine<sup>1</sup> in particular, are trying to bring this dramatic, though problematic, evolution to the forefront.

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<sup>1</sup> See, e.g., Boldrin and Levine, *Against Intellectual Monopoly*, Cambridge University Press (2008).

Others, myself included, have written about the enormous importance in history of property rights as providing incentives for innovation and enrichment. Of course, there were always incentives for monopoly too, but there is evidence that within the intellectual property system, the incentives for innovation—which help increase society’s overall wealth—are giving way to the incentives for monopoly. It is well documented that such policies have a negative impact on production and consumer surplus, not to mention the contradiction they create to the Constitutional mandate of the patent and copyright systems, “To promote the progress of science and useful arts.”<sup>2</sup>

Having framed the problem, I would like to emphasize two conditions that are related to this matter. The first concerns invention. As we constantly change the way in which the game is played, we want to be sure we provide incentives for innovation, not for perpetuating monopolies.

Second is a policy matter. What we would ideally like in a world that is dynamic, where change is going on both in the political system and in the economic system, is to have an adaptively efficient structure. What this means is that in making law and policy, it should not be assumed that the same system that worked yesterday is going to work tomorrow. Accordingly, there must be developed a structure of incentives that will continue to encourage people to innovate and transform solutions to solve new and different problems that evolve over time. This type of adaptive efficiency certainly characterized, for example, the American economy throughout the twentieth century (though it is no longer clear if that is the case). This can be seen in the way in which problems arise with unknown solutions, and then through trial and error, a solution is found. It is important that there are both trials—i.e. the creation of new ways of doing things—and ways of dealing with the errors, such as bankruptcy laws and other mechanisms to wipe out systems that fail to function. If you do not have both of these, you get into the kinds of problems that can be seen in third-world countries all the time.

## 2. THREE AREAS IN NEED OF IMPROVEMENT

In order to properly address the above concerns, there are three areas of our general approach that I believe to be critically in need of improvement. First, I think the beginning of our being intelligent about the issue of property rights is to have a better understanding of cognitive science. If we are trying to understand the world around us, which is where we always begin, the way we do this is through our eyes, ears, nose, and feeling. We translate what we get

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<sup>2</sup> U.S. Constitution, Art. I, Sec. 8, cl. 8.

from those into our brain, and our brain constructs an explanation of the world around us. Now, this approach is not new with me and not new with cognitive science—as a matter of fact, the originator was Friedrich Hayek, who wrote as a graduate student in 1920 a view of how we understand the world around us. He played a big role in providing the framework for the way we understand. But, our cognition is imperfect. The way we construct an explanation of the world is subjective. It is a reflection of what our own experiences are, and it goes back to the way in which our brain constructs a framework for the formation of ideas. In order to progress further, we have to begin by looking at the way in which we construct explanations.

We construct explanations, first of all, by building an overall political structure. The political structure is the rules of the game that are defined by a polity, and they in turn provide economic rules and specifically property rights. So, if we want to understand property rights and the way they are enforced, we have to understand the way in which the political system has created and specified the property rights structure as it exists. One corollary to this is that there is no such thing as an individual who is not an interested party in property rights, including patent systems. This follows because the structure of those rights initially arose from the interaction of all within society.

Accordingly, the second change we must make in our general approach to understanding is as follows. If we want to understand how patent systems work, we may not simply rely on understanding the *economics* of patent systems. We also must understand the *politics* of patent systems—how they were formed, and how individuals have structured and restructured them in order to be able to exploit them for their own interests. Now we have very neat, frictionless models that model how an economy works. We have nothing like these models in the political system. As a result, we have no framework that allows us to really understand how a political system works, and how property rights and patent systems evolved. We can see how they evolved, and we can tell stories about it. However, we do not have a body of theory that allows us to make predictive statements that would in fact lead to improving the function of property rights and patent systems.

Third and finally, our approach lacks a set of models for understanding the dynamic world. The body of neoclassical economic theory is very elegant and very useful, but it cannot describe how a system is evolving. One of the things that is crucial about the world we live in today, which has surely become obvious with the current financial crisis, is that the world is evolving. What made sense and structured the game yesterday does not necessarily work today and tomorrow. And so, we are stuck with the fact that a dynamic system means we have to understand not only where we are, but where we are going.