

ECONOMIC BENEFITS OF CLARIFYING THE STANDARD FOR ASSESSING
“REASONABLE ROYALTY” DAMAGES UNDER PATENT LAW

Everett Ehrlich, Ph.D.

The patent system has been a feature of economies for centuries. It gives inventors the right to control the use of their inventions for a pre-specified period of time, so long as they make the inventions public and thereby increase the overall base of knowledge available to society at large.

The patent system was built around the idea of protecting the inventor of a “better mousetrap.” That is, the patents have traditionally been for the invention of a new product or technique that was self-contained, like a mousetrap. But at the cutting edges of today’s economy, this model of patent rights misses the mark.

Many modern devices – for example, from “smart” phones like the Blackberry, to cars to MRI machines -- reflect the agglomeration of hundreds or perhaps thousands of patents for individual parts or components, or even for discrete elements of those parts and components. Each plays some role in making the device work in the manner it does, but any individual component’s role may be extremely minor when compared to the functions of the overall device. And this complexity makes it difficult to assess whose rights are involved in a product. Moreover, added technological complexity can make it hard to identifying the products to which patents relate -- it has been noted that over 60 companies claim to hold the patent that makes Wi-Fi Internet connection possible.¹

A great paradox of patent law is that, while it gives rights it gives to *inventors* (those who make new discoveries), its purpose is to guarantee a steady supply of inventions to the *innovators* (those who develop commercial products utilizing those inventions). But it’s the innovators who create economic growth, employment, and a higher standard of living. The patent rights granted to inventors are a way of striking a balance between inventors and innovators, as a means to achieve the end of an expanding economy. But the failure of the patent system to anticipate and accommodate the complexities of modern technology now works against that purpose. Just as the nature of innovation has changed, the patent system must adjust so that it can continue to fulfill its purpose of promoting innovation.

Return for a moment to the fact that over 60 inventors claim the patent to Wi-Fi connection. Someone attempting to offer such a service would have to come up with a strategy to address this maze of claimants – they would have to recognize some and not others and, by doing so, leave themselves open to suit. The fact that some companies have chosen to offer this technology does not mean that the risk does not exist. In fact, we can only wonder how many *other* companies might offer new and innovative products and services making use of that technology were it not for the risks involved in doing so.

A further, and even more significant, risk posed by the current patent system is the way in which damages are arrived at in a “complex” product. Imagine a producer who is sued by a patent holder who

claims infringement and wins his suit. When claiming damages, the patent holder notes that the producer infringed on his rights and, as a result, was able to gain revenue of “x” dollars. What portion of that amount is given to the patent holder? Under today’s law, the practical answer is whatever portion a jury or judge is willing to grant. The award could be greater than all the profit earned by selling the product, it could be as great as *all the revenue earned by producing the product*. There is no legal guideline or restriction to prevent such an award under the “reasonable royalty” standard for patent damages; instead, examples of this kind of abuse have been documented by numerous independent observers of the patent system.² Moreover, it is entirely possible – and has sometimes been the case – that more than one patent holder can sue one producer for infringement related to a particular product, meaning that the liability of a producer can be *multiples of every cent ever spent on the product in question*.

The potential for abuse inherent in this system has substantial negative effects on the economy, on employment, on research, and on investment. The first such adverse effect is obviously the higher level of risk associated with bringing any innovation to market if it relies on work patented by others. No matter how diligently a company may search for the holders of original patents – as is its obligation – there is no protection from the holders of patents, perhaps little known and unpublicized ones, from emerging once the product has gained a foothold in the market and, in essence, ambushing the producer in court. This risk inhibits innovators from competing in markets, and is a particular difficulty for smaller firms, which lack larger legal staffs and are more vulnerable to this kind of legal tactic.

But an even more pernicious aspect of the current system’s failure to adapt to modern technological realities is the growing role of “non-practicing entities,” or NPEs. Non-practicing entities are companies that perform no research themselves, make no products, and provide no services to consumers. They employ mostly lawyers and their support staff. They are set up to scour the economy for patents that can be used as a basis for a lawsuit. When they identify one, they buy the patent, and bring suit against as many companies as possible – one recent example noted an NPE patent holder that sued 40 firms *at the same time*.³ This allows the NPEs – sometimes referred to as “patent trolls” due to this strategy – to spread their costs, while their targets are forced to divert staff time and financial resources in order to defend themselves. Many companies are often prepared to give the claimant money simply to go away. NPEs, therefore, exist solely to bring new litigation against innovators.

Certainly, NPEs sometimes may identify legitimate infringements. But even when they do, the damages they have the right to seek are not aligned with the losses usually associated with infringement. Thus, these firms profit from what is a quirk in patent law. But their profit does not improve the incentives to inventors, as patent law is designed to do. Inventions are used in the economy because they have *use-value* – that is, they produce a better product for which consumers are willing to pay. So, for example, a cellular telephone that costs \$100 may contain a switch or display that is worth \$1 out of that hundred. An NPE, in contrast, may acquire that patent for \$2 or more because of the damages that can be won in court. But no inventor will produce an invention that can only be made worthwhile by winning damages in excess of the invention’s actual use-value. For one, it is a risky approach to invention. More importantly, according to the Bureau of Economic Analysis, more than two-thirds of private industry’s research and development is done in-house, anyway. So NPEs can

enrich themselves, but provide no new incentives to perform R&D. (And were inventors actually to *do* research leading to patents in order to pursue these nuisance suits, it would mean that the nation's research agenda has been directed away from the goals of competitiveness and towards serving litigiousness, producing a subtler but real source of inefficiency that weakens the economy in the long term.)

The patent suits brought by NPEs, and the costs they impose on innovators, therefore, act like a tax on innovation. They lead to no new research activity, but do impose significant costs and additional risk on innovators who seek to use inventions in new products. The key enabler of this strategy is the vague standard for calculation of "reasonable royalty" damages for patent infringement. Historically, the damages standard most often invoked in infringement suits was the claim for lost profits, the financial impact of sales lost by the patent owner because of infringement -- much as the holder of a patent on a better mousetrap would lose profits if a competitor usurped his design. But NPEs cannot claim this lost profits measure of damages because, as entities that do not provide any product or service, they have no profits to lose. Instead, the practice of NPEs is to seek a "reasonable royalty" from a jury that must decide the amount of the award without clear guidance tied to any economically relevant factor, such as the value contributed to the defendant's product by the invention embodied in the patent, or even the alleged infringer's profits. In the absence of any such guidance, the door is opened for NPEs to threaten their targets with the prospect of "jackpot" damages awards and, therefore, a forced settlement.

For these reasons, many participants in the patent system have advocated a system in which the calculation of reasonable royalty damages is based on the value of the particular aspect of the defendant's product that infringes the invention reflected in the plaintiff's patent: if a switch is found to be worth \$1 out of the \$100 cellular phone, damages would be set by reference to that \$1 in added value. In the rest of this paper, we attempt to estimate the economic losses, most importantly the employment losses, that result because current law does not contain this "rational damages" standard. Conversely, this paper estimates the economic and employment gains that would arise from a system of damages tied to the value of the real economic contribution of the particular infringing aspect of the defendant's product.

Economic Effects

How much do NPEs transfer from innovators and what is the effect of that transfer on the economy as a whole? In this paper, we construct a model of the process as follows. When NPEs impose unwarranted costs and risks on innovators, they reduce the innovators' ability to finance investment and R&D. (Uncertainty over a Wi-Fi patent, for example, leads potential Wi-Fi providers to delay or postpone follow-on research and development and subsequent investment.) One way to summarize these interactions is to note that, by foreclosing potentially profitable activities, these costs and risks impose losses on the firm that reduce the firm's value and, hence, its ability to finance those activities. So eliminating the excessive or "surplus" transfer from innovators has the prospect of increasing their investment and their research and development activities. By making them profitable, it would also increase their willingness to hire and make it possible for them to improve the compensation they offer.

But, when assessing the macroeconomic effects of this transfer, it must be noted that if NPEs are no longer allowed to press for unwarranted damages, those firms will no longer make the surplus profits they make by gaming the system. Regardless of its source or merit, spending is spending. If we transfer resources from NPEs to innovator firms, aggregate spending will not change much – what changes the most is *who* is doing the spending, although the rationality and efficiency of that spending will improve. But what *will* change is the total level of investment and R&D in the economy, since the excess profits of NPEs don't lead to added investment and research, but the added value of innovative firms does. Those investments and research activities produce something “new” or “extra” to the economy – the returns to investment and research. Those returns are the place to find the difference in the economy as a result of restricting the damages awarded to NPEs when infringement occurs.

The steps to identifying the gains from restricting excess damages imposed on innovative firms, therefore, are, in sequence:

- First, to estimate the value of those damages;
- Second, to estimate how eliminating this burden would increase the value of the innovative companies that now must pay them;
- Third, to identify the investment and research gains that follow from that increase in value, and to calculate the employment effects that come from the stream of returns created by those activities.

The Value of Excess Damages

In order to develop an information base to estimate the costs associated with patent claims – both those that end up in litigation and those that are disposed of prior to the filing of a lawsuit – confidential information was obtained regarding the types and costs of litigation in nine technology companies. The nine companies range in size from a market capitalization of slightly over \$1 billion to over \$50 billion (as of early March, 2009), and have a combined \$197 billion in revenue, and performed \$18.8 billion in research and development, in 2008. (It should be noted, however, that the problem of NPE lawsuits is not limited to the so-called “high technology” industries. The financial services industry, for example, has experienced similar difficulties with regard to the patents that underlie such important functions as check visualization and clearing.)

When surveyed, these firms reported that the costs of litigation *virtually all from NPE litigants alone* in 2008 totaled about \$800 million – both in terms of actual damages paid and the use of staff resources to support the process. Obviously, neither all of these suits nor all of the awards that they might win are illegitimate. As a base assumption, we assume that half these costs occur due to the reality or potential for unwarranted damages, or \$400 million.

The Greater Value of Innovative Companies

The nine companies involved in the survey, as stated, had combined revenues of \$197 billion in 2008. How large a share of their industries do they represent?

The nine companies come from North American Industry Classification codes 334 (computer and electronic product manufacturing), 5112 (software publishers), 517 (telecommunications), and 518 (Internet service providers, Web search portals, and data processing services). The data for shipments by NAICS 334 is from 2006, while the other data is from 2007. In the last years available, those industries had shipments of \$1,130 million. If excessive damages award are proportional to revenue, a reasonable assumption, then the \$400 million experienced by the nine survey companies translates to a total of \$2.29 billion by these four technology industries examined here.

How would a reduction of almost \$2.3 billion affect the value of the companies in these high technology industries? Using a price-earnings ratio of 12.5, the value seen in the entire market of public companies as represented by the Vanguard Total Stock Market ETF, this implies a gain in the value of these companies of \$28.7 billion.

The Economic Benefits

In 2007, the last year for which data were available from the Bureau of Economic Analysis, the combined historical cost value of equipment and software in the manufacturing and information sectors was \$1,350 billion, and the value of new private equipment and software in that year was \$247 billion, roughly 20 percent of that total. Thus, it seems reasonable to presume that around 20 percent of new value transferred to these sectors will be invested or, using the estimate of \$27.5 billion in greater value, investment will rise by \$5.5 billion in those industries. Similarly, in 2004, the last year for which data exist, research and development in those three sectors totaled \$156 billion, again compared to assets of \$1,350 billion, or 12 percent of that value. This suggests that a gain of \$27.5 billion in value in these industries would lead to greater research and development of \$3.3 billion (around 2 percent of the total). These values are annual, as they are the *flow* of investment and research that accrue to the *stock* of greater enterprise value.

This analysis assumes hurdle rates of return – that is, the rate of return companies require to invest -- of 15 percent for equipment and software in the private economy, and 20 percent for R&D. Using those assumptions, these new flows of investment and research would produce returns of \$826 million and \$661 million, respectively, on an annual basis. Using \$60,000 revenue per job created, chosen to reflect the high-quality employment typically associated with investment and research in those industries, these streams of benefits would add 24,780 jobs to the economy on a steady-state basis. These added jobs would accumulate annually so long as the investments and research added to the economy did not depreciate or become obsolescent, thus, it is likely that the total employment gained over five years could total as much as 100,000.

Moreover, in the absence of changes in policy, the employment losses experienced due to the current policy will probably grow. The patent litigation costs of the technology companies in our sample doubled over the past four years alone. Were it to double again, the employment losses would exceed 50,000 a year by the end of the same five year period. **Rather than gaining as many as 100,000 jobs over five years by clarifying the reasonable royalty standard, our economy could lose as many as 150,000 jobs over the same period from the continued adverse effects of the existing legal standard.**

The Manufacturing Alliance on Patent Policy Study

A recent paper by Professor Scott Shane of Case Western Reserve University, on behalf of the Manufacturing Alliance, attempts to estimate the economic effects of the changes in patent law discussed here, albeit from the position of advocacy of *preserving* the current system. Professor Shane concludes by estimating that 51,000 jobs would be *lost*, not gained, were the changes discussed in this paper implemented.

Professor Shane estimates that *all* patent judgments would drop by 20 percent to 39 percent in the face of these changes, and then posits that the value of *all patents* would drop by an equivalent 20 to 39 percent, because the value of patents is determined by what they might be awarded in court. If that were true, he argues, then the value of public companies would drop in value, and that for each dollar they declined in value, they would lose a dollar in revenue, because the value-to-sales ratio exhibited by public companies has traditionally been around one. Using that decline in sales, he estimates a range for employment losses.

There are several problems with this methodology, even if the initial estimate of a 20 to 39 percent decline in all awards was accepted (the estimate was based on guesstimates by 209 lawyers out of a sample of almost 1,000 about the possible impact of clarification of the damages standard). First, as mentioned, two-thirds or more of all patents are produced by the firms that use them – “in house” as opposed to “purchased” research and development. These would be unaffected in “value” by this change. Second, as stated above, inventors do not receive the full value of patent awards because they produce inventions in line with those inventions’ *use-value*. The value of patents to them, therefore, would also not change by 20 to 39 percent. Third, even if Professor Shane had accurately measured the decline in the “average” infringement suit, he would not have estimated the costs to the defendant of legal, engineering, and other resources needed to provide a defense.

Going further, the fact that the value of public companies falls does not in any way logically lead to the sales of those companies falling, dollar for dollar. In fact, the causality is usually the opposite – the value of companies falls *because* their sales fall. Were Professor Shane’s assumption to have merit, then the economy would be shrinking at this moment by the 50 percent that the value of all public companies has shrunk since last June.

But, most importantly, Professor Shane’s analysis does not reflect whether the damage awards now allowed by patent law are *economically rational*. In fact, under his set of assumptions, anything that increased the value of damage awards in patent infringement cases would make the economy grow faster – triple damages, quadruple damages, and so on. So long as it increased the damages awarded, it would increase the value of public companies, which would increase their sales, which would generate employment. It is a difficult chain of economic logic to follow and accept.

This paper was based on a different set of assumptions. First, it has demonstrated why there is reason to believe that patent award judgments have deviated from economic rationality. Second, it has attempted to estimate those costs using original data from a group of firms. Finally, it has attempted to estimate employment effects by looking at relationships that make intuitive sense – that companies that

grow in value because of higher earnings will do more investment and research, and therefore employ more people.

CONCLUSION

The disconnect between the awards that may be obtained in patent infringement suits and the true value of patents' contributions to subsequent innovations has led to an unwarranted transfer of resources away from these follow-on innovators to Non-Practicing Entities that search for patents to purchase as a premise for lawsuits. While this may increase the price received for patents by inventors, it does not lead to greater research activity, but does reduce the investment and follow-on research activity of these innovators.

This dynamic leads to reduced investment and research and, ultimately, employment. Given the assumptions made here, the adverse effects on job creation is substantial – failure to increase employment by 25,000 and by as many as 100,000 jobs in the next five years due to this opportunistic exploitation of patent law.

Everett Ehrlich

Dr. Everett M. Ehrlich is one of the nation's leading business economists. His firm, ESC Company, combines economic analysis, business development, and communications skills to solve a wide range of business problems. ESC's diverse clientele have included leading firms in the financial, accounting, pharmaceutical, automotive, and other industries, and such diverse organizations as the Pew Center for Global Climate Change and the Major League Baseball Players Association. He also recently served as Executive Director of the CSIS Commission on Public Infrastructure under co-chairmen Felix Rohatyn and Warren Rudman; a bipartisan bill to enact their recommendations was introduced in the 110th Congress.

Dr. Ehrlich served in the Clinton Administration as Under Secretary of Commerce for Economic Affairs, the principal economic policy official for Commerce Secretaries Brown and Kantor and chief executive of the nation's statistical system. As such, he led the first comprehensive strategic review of the nation's economic statistics in four decades, leading to a major modernization of featured measures of the economy. He supervised the redesign of the 2000 decennial census. He co-chaired the White House working group on the restructuring of the U.S. economy in the face of information technology, was a leader in the U.S. planning effort of the two G-7 Jobs Summits, and oversaw the Administration's economic analysis of global climate change.

Prior to his service as Under Secretary, Dr. Ehrlich was Vice-President for Economic and Financial Planning, and for Strategic Planning, of Unisys Corporation, from 1988 to 1993. As such, he had responsibilities concerning corporate development and finance, formulating business strategy, and economic forecasting. He reported directly to two chairmen of the company. He has also been the Senior Vice-President and research director of the business-based think tank, the Committee for Economic Development.

Dr. Ehrlich earlier served as Assistant Director of the Congressional Budget Office, where he directed the CBO program in trade and technology, infrastructure and space transportation, energy and the environment, and agriculture. He joined CBO in 1977, after having served as a Legislative Aide to Congressman John Conyers, Jr., and having briefly taught economics at the university level.

Dr. Ehrlich is the author of two critically-acclaimed novels: *Big Government* (1998), and *Grant Speaks* (2000), both by Warner Books. He was, for eight years, a regular economics commentator on National Public Radio's *Morning Edition*, and his writings have appeared in *The Financial Times*, *Investors Business Daily*, *The Christian Science Monitor*, *The Washington Post*, *The International Economy*, *The New York Review of Books*, and other publications.

Dr. Ehrlich was born in New York City in 1950 and is a product of its public schools. He received a B.A. in 1971 from S.U.N.Y. Stony Brook and a Ph.D. in economics in 1975 from the University of Michigan.

Dr. Ehrlich can be reached at ehrich@evehrlich.net.

¹ IEEE Standards Association, 802.11 Patent Letters of Assurance, http://standards.ieee.org/db/patents/pat802_11.html; Mark A. Lemley and Carl Shapiro, *Patent Holdup and Royalty Stacking*, at <http://faculty.haas.berkeley.edu/shapiro/stacking.pdf> (May 31, 2006), at 27. A number of those entities are sending demand letters and filing lawsuits asserting infringement claims. *See, e.g.*, Nancy Gohring, *Hotspot Operators Face New Patent Fee Demand*, WNN Wifi Net News (Oct. 5, 2004) (available at <http://wifinetnews.com/archives/004184.html>); Peter Judge, *Wi-Fi world under threat from Symbol patent: Wireless vendor to seek license fees from all Wi-Fi equipment vendors*, Techworld.com (Sep. 23, 2004) (available at <http://tinyurl.com/git2s>).

² *Patent Reform Act of 2007*: Hearing Before the Subcomm. On Courts, the Internet and Intellectual Property of the House Comm. on the Judiciary, 110th Cong., 1st Sess. 63 &67-69 (2007) (Professor John Thomas); *Patent Quality Enhancement in the Information-Based Economy*: Hearing Before the Subcomm. On Courts, the Internet and Intellectual Property of the House Comm. on the Judiciary, 109th Cong., 2d Sess. 38 (2006) (Professor Mark Lemley); *see also* Mark Lemley & Carl Shapiro, "Patent Holdup and Royalty Stacking," 85 Tex. L. Rev. 1991 (2007); *Reply: Patent Holdup and Royalty Stacking*, 85 Tex. L. Rev. 2163 (2007).. Analysts affiliated with entities as divergent as the American Enterprise Institute and the Center for American Progress have reached the same conclusion. Ted Frank, "There is a Role for Congress in Patent Reform," http://www.aei.org/publications/pubID.27550,filter.all/pub_detail.asp; McCurdy, "Patent Trolls Erode the Foundation of the U.S. Patent System," available at www.scienceprogress.org/2009/01/patent-trolls-erode-patent-system.

³ "Boeing, Ebay, QVC Hit With Sales Patent Suit," IPLaw360 (March 2, 2009).