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The rising tide of patent damages

Abstract

Very large awards and settlements for patent infringement have increased dramatically since the 1980s. A large fraction of these awards have occurred in the computer hardware and software industries. Complex technologies such as computer hardware and software require rights to a very large number of patents. One explanation for the large awards for patent infringement is the bargaining power of a patentee that has a credible injunction threat for a product that requires rights to multiple patents. This can lead to infringement damage awards and settlements that overestimate the patent's contribution to product value.

Les coûts financiers liés à la violation des brevets ont augmenté de façon spectaculaire depuis les années 80. Un grand nombre des dommages et intérêts prononcés dans cette matière concerne le secteur de l'électronique et des logiciels dont la spécificité réside dans dans l'existence d'une pluralité de brevets pour un même produit. L'importance des dommages et intérêts prononcés en matière de violation de brevets tient dans le pouvoir de négociation d'un détenteur d'un brevet disposant d'une menace suffisamment crédible à l'encontre d'un produit couvert par une pluralité de brevets. De telles pratiques peuvent conduire à des montants de dommages et intérêts et de transaction surévaluant la contribution de ce brevet.

1. Debates over the patent system in the United States have often generated extreme positions. Some argue that the patent system is broken beyond repair and must be abandoned. Others say that the patent system is so fundamental to the performance of the economy that any attempt to modify it would undermine technological progress.

Neither position accurately describes the state of the U.S. patent system. The patent system is integral to the economy, but is need of reform, particularly to address the way that patents impact some industry sectors. Signals of the need for reform include a rising trend in very large damage awards and settlements for patent infringement along with evidence that the calculations of infringement damages are prone to error when an infringed patent is only one component of a product's value.

I. Trends in large awards and settlements for patent infringement

2. The number of awards and settlements for infringement of U.S. patents that exceed $100 million in year 2000 dollars has been rising rapidly over the past several decades. Before 1980, awards or settlements for patent infringement rarely exceeded $100 million in inflation adjusted dollars and they were infrequent throughout the decade of the 1980s.[1] The number of large patent damage awards or settlements increased in the 1990s. On average, there were about three awards or settlements each year exceeding $100 million during that decade. Large patent damage awards and settlements exploded after the turn of the century. From 2000 to 2007, infringement awards or damages larger than $100 million averaged about eight per year.[2]

3. The increase in the number of very large awards and settlements for patent infringement suggests that there has been a shift in the monetization of patent rights. This trend alone does not imply that the patent system is broken if the increase in awards and settlements coincides with a more significant role for patent rights in providing incentives for innovation. However, that does not appear to be the case, at least in some industry sectors characterized by products covered by multiple patent rights ("complex technologies").

4. An alternative explanation for the increase in very large awards and settlements for patent infringement is that judges and juries have become more accustomed to awarding very large damages, perhaps for similar reasons that have created an increasing trend in large damage awards in other types of litigation. With regard to patent litigation, many scholarly articles have made the case that the creation of the Court of Appeals for the Federal Circuit in 1982 coincided with an appellate climate that has been much more favorable to patent owners and promoted large damage awards for patent infringement. These factors alone do not suggest that large damage awards and settlements are improper. However, they are troubling if patents are not a significant determination of innovative effort for the economy.

5. Very large patent damage awards and settlements overwhelmingly occur in two broadly defined industry categories: (1) computers, including hardware and software and (2) medical, including pharmaceuticals, biotech and medical equipment. These two industry categories account for more than seventy percent of all awards

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1 All awards and settlement numbers are normalized to the producer price level in 2000.

2 These numbers are calculated from actual awards and settlements collected from publicly available data. While they may include some compensation that is not strictly related to intellectual property, they understate the total to the extent that some awards and settlements are not publicly disclosed.

and settlements for patent infringement in excess of $100 million (in year 2000 dollars). Including the related field of telecommunications increases the share of these very large awards and settlements to more than 75 percent.

6. Awards that go to non-practicing entities (NPEs), defined as patentees that do not practice the technology covered by the patent, figure prominently in two industries – computer hardware and biotechnology (Figure 1). These two industries represent about 30 percent of total large awards for patent infringement, but over 70 percent of large awards to non-practicing entities. Including telecommunications, the corresponding figures are 35 percent of all payments and 80 percent of all payments to NPEs. In the computer hardware industry, NPEs were the recipients of more than half of all payments for patent infringement exceeding $100 million in year 2000 dollars.

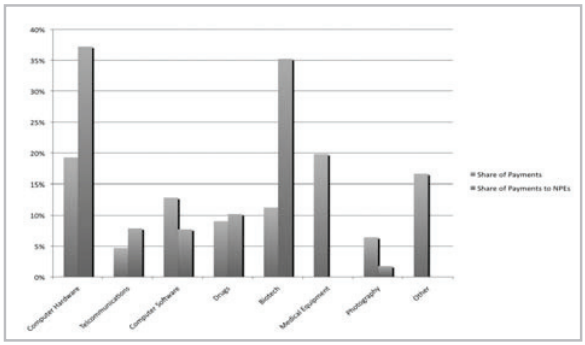

Figure 1. Industry share of all awards/settlements exceeding $100M and industry share of awards/settlements exceeding $100M paid to non-practicing entities.

7. Recent survey data suggest that these figures underestimate the significance of patent infringement actions by non-practicing entities. A survey of nine technology companies reported that in 2008 these companies had a total of 1217 licensing requests and 166 lawsuits pending for patent infringement. Both the number of licensing requests and lawsuits pending show explosive growth from just a few years earlier. In 2004, these companies had 185 licensing requests and 97 pending lawsuits for patent infringement.[3]

8. At these nine companies, more than 80 percent of all patent licensing requests were from NPEs over the period 2004-2008. This is larger than the estimated share of very large awards and settlements for patent infringement paid to NPEs in the computer hardware industry based on publicly available data. However the number likely reflects the increasing role of NPEs in patent infringement cases in this industry. Since 2000, eight of the twelve payments for patent infringement in excess of $100 million in this industry went to NPEs. The website www.patentfreedom.com reports that the number of patent lawsuits filed by non-practicing entities more than doubled from 2004 to 2008.[4]

3 Testimony of Steven R. Appleton, Chairman and Chief Executive Officer, Micron Technology, Inc., Hearing on The Patent Reform Act of 2009 Senate Committee on the Judiciary, March 10, 2009.

4 https://www.patentfreedom.com/research-lot.html accessed March 23, 2009.

9. While the computer hardware and biotechnology industries account for most of the payments to non-practicing entities, there are fundamental differences between NPEs in these two industries and the technical and economic characteristics of their patent claims. Most of the NPEs in biotechnology that received large awards or settlements for patent infringement are small research laboratories or universities. These are entities that specialize in research and their efforts are instrumental to the development of new pharmaceutical products and related technologies.. Furthermore, the technologies covered by the patents generally have a close relationship to a particular product or process. The patent may enable the production of a protein that can be useful for a new biologic drug or the patent may cover a technology for medical testing or drug development. As a result, it is easier to estimate the contribution of a biotechnology patent to the value of a new drug than it is to estimate the contribution of a semiconductor patent to an integrated circuit that also embodies many other patented technologies.

10. The NPEs in the computer hardware industry tend to have different business models compared to NPEs in the biotechnology industry. Most of the NPEs that are the recipients of very large payments for patent infringement in computer hardware are firms that either did not produce a commercial product or are exiting the line of business for which the patent claims are relevant. Furthermore, their patents often address only one or a few features of a complex technology that requires access to numerous other patent rights to make or sell a commercial product. These distinctions are important for the following reasons.

1. Computer hardware requires rights to numerous technologies

11. Unlike many biotech and pharmaceutical patents, the technology covered by patents in computer hardware typically do not define a product or a process to produce a product. Instead, they often cover only *a feature* of a product or a process to produce a product. It can be particularly difficult to value a patent that is one of a great many inputs into a commercially useful product. While this valuation problem is not unique to computer hardware patents, the computer industry is exceptional in that many important products are covered by hundreds or even thousands of patents.

2. Computer hardware patents are often ancillary to R&D efforts

12. Various studies have reached the conclusion that patents have limited value in protecting research programs in the computer and related industries from misappropriation.[5] Trade secrets and complementary investments are more

5 See, e.g., Bessen, James and Michael J. Meurer (2008), *Patent Failure: How Judges, Bureaucrats and Lawyers Put Innovators at Risk*, Princeton University Press; Hall, Bronwyn and Rosemarie Ham-Ziedonis (2001), "The Determinants of Patenting in the U.S. Semiconductor Industry, 1980–1994, *Rand Journal of Economics*, 32 (Spring), p. 101–28; and W.M. Cohen, R.R. Nelson and J.P. Walsh, "Protecting their Intellectual Assets: Appropriability Conditions and Why U.S. Manufacturing Firms Patent (or Not)," Working Paper 7552, February, 2000, National Bureau of Economic Research, Cambridge, Mass., revised 2004.

important for competitive advantage in this industry. Trade secrets reflect the fact that manufacturing skills are often more relevant to commercial success than patentable inventions. For an integrated circuit manufacturer, the basic concept of monolithic integrated circuits is a patentable technology, but that does not substitute for the know-how to build circuits with very narrow line widths, which is critical to commercial success.

3. Network effects, switching costs and economies of scale are important sources of value

13. Much of the value in the computer hardware industry is the result of complementary investments made by firms and consumers in the industry. Intel and Microsoft owe their initial success in part to superior technology, but also to the fact that their technologies have become industry standards. Firms and consumers make investments that are specific to these standards and that create value for other users. These networks effects enhance the value of individual investments for the "Wintel" platform and make patent protection a less important determinant of the ability to appropriate returns from investment.

Network effects, switching costs, and economies of scale create value that can be mistakenly attributed to patents. The use a particular patented technology to stack data in a microprocessor can be a source of value, but most of the value comes from investments that support the microprocessor's architecture, create demand for the microprocessor, and add to the cost of switching to an alternative architecture. The threat of an injunction can allow a patent owner to extract a significant fraction of these benefits despite the fact that the patented technology may be of only secondary importance to the value of the product.

4. Failing companies eliminate opportunities to resolve patent disputes

14. Despite the fact that hundreds or even thousands of patents cover computer hardware technologies and other complex products, patent litigation is relatively infrequent. This is because most companies would rather do business with their customers than fight over patent rights in the courtroom. Companies that want the freedom to design and sell products free of infringement litigation have incentives to enter into exensive cross-licensing agreements. Such agreements are common in the computer hardware industry. They are supported by the threat that failure to cross-license can result in the destruction of their businesses from massive patent litigation. Unfortunately, the threat of "mutually assured destruction" is empty when a company is failing or exiting a business and therefore has little to lose from an adverse litigation outcome. Indeed, this is the pattern that emerges from the data on large awards and settlements for patent infringement in computer hardware.

15. Payments for patent infringement to non-practicing entities raise troubling issues when the patents cover a small element of a product or process and when network effects, economies of scale and switching costs are more important than patents as sources of product value. These characteristics are strongly present in markets for computer hardware, software, and information technology. They are somewhat less of a concern in markets for biotechnology and pharmaceuticals. The next section illustrates the potential to over-estimate infringement damages for patents that cover products that benefit from multiple sources of value.

II. Potential to over-estimate damages for complex technologies

16. The Alcatel-Lucent 2007 jury verdict that initially awarded Alcatel-Lucent $1.5 billion for infringement of two MP3 patents provides a clear illustration of the risk that damage awards may greatly exceed a patent's contribution to product value when the product embodies complex technologies. MP3 is a format standard for the storage and transmission of compressed digital audio files on the Internet, personal computers, and portable devices. Lucent-Alcatel alleged that Microsoft's Windows Media Player, which employed MP3 technology as well as other formats for transmitting and storing audio and video files, infringed two of Lucent-Alcatel's patents necessary to implement the MP3 standard. Although the district court judge overruled the jury verdict and an appeals court ruled in favor of the defendant for technical reasons having to do with ownership of the patents, the jury verdict illustrates the potential for very large damage awards for patent infringement despite the fact that the patent represents only a very small part of a product's value.

17. The jury in the Alcatel-Lucent patent case based its damage award for patent infringement on a reasonable royalty of 0.5% per licensed computer. It arrived at the total damage award of $1.5 billion by multiplying the 0.5% royalty times the average price of a personal computer and then applying that figure to the total number of computers sold over the damages period. While not clear from the record, the jury calculation apparently applied the 0.5% royalty to each of the infringed Alcatel-Lucent patents.

18. A key problem with the damages approach accepted by the jury is that it attributed the royalty to the *entire market value* of the computer rather than apportioning the royalty to account for the value contributed by the MP3 patents at issue. The MP3 patents covered technology employed by the Windows Media Player, which Microsoft supplies as a component of its Windows operating systems. While a media player enhances the functionality of the computer, the player is a complement to the operating system software and a prevailing royalty rate reasonably should apply to the software, not to the entire computer. To do otherwise would lead to nonsensical results. For example, a feature-laden computer could cost $2,000. The 0.5% royalty applied to such a computer for each patent would give a value for the two Alcatel-Lucent patents of $20, which is a significant

fraction of the price of the entire operating system. On its face, this result appears to assign too much value to the two MP3 patents at issue given all of the other functionality added to the operating system. Furthermore, Alcatel-Lucent is just one of several entities that together own or license a total of at least 36 MP3 patents.

19. While there is no single correct approach to the calculation of damages that is appropriate for every instance, a reasonable estimate of the economic impact from patent infringement must take into account the contributions from other inputs, including other intellectual property rights. Excessive awards may energize efforts to patent new technologies, but they also increase costs to technology users, which can make it more difficult for those users to develop and commercialize their innovations.

20. A rule that instructed courts to apportion damages for patent infringement would reduce the risk of excessive infringement damage awards such as the jury verdict in the Alcatel-Lucent trial. A statutory apportionment rule is not necessary as evidenced by the corrective action taken by the court in that case. Furthermore, a statutory rule could introduce undesirable rigidities in the calculation of damages for patent infringement. Nonetheless, general guidance is desirable to avoid the most egregious errors that can occur by failing to recognize that an infringed patent is but one of many sources of product value, a fact that is particularly important for complex technologies such as computer software, semiconductors and information technology.

21. Some might argue that real-world negotiations are the only reliable indicators of patent values. For products that require many patents, licensing negotiations depend on the structure of the market in which the negotiations occur as much or more than the technological contribution of the licensed patent. An injunction threat can give a patentee enormous leverage to bargain for a large share of a product's value. If one firm has 100 patents that are essential to make or use a product and another firm has only one, the firm with one patent may use an injunction threat to obtain a large share of the value of the product. But it makes little sense to conclude that one essential patent contributes as much value to a product as 100 equally essential patents.[6] At the same time, it is clearly the case that some patents are much more valuable than others and a patentee should be able to offer evidence to support a claim for a disproportionate share of product value.

22. Another argument is that a patent should earn a "reasonable royalty" and the royalty figure applied by the jury in the Alcatel-Lucent case was "reasonable". The problem with this argument is that the economic underpinnings of a reasonable royalty are weak. At best, a reasonable royalty reflects a likely award assessed by a court for infringement damages. This turns the calculation back onto itself. The court will award damages that reflect a reasonable royalty, and the reasonable royalty is what the court will award. The net result is that neither the court's determination nor the reasonable royalty for actual licensing transactions can be used to justify what is actually reasonable. The amount of the Alcatel-Lucent jury verdict illustrates why a commonly used royalty figure can lead to nonsensical damages for patent infringement, as do examples cited by Lemley and Shapiro in their discussion of royalty stacking.[7] When many patents each earn a "reasonable royalty", the result can be total royalties that are unreasonable by any measure.

23. The apportionment of royalties for patent infringement is not a simple calculation. Such an analysis may require an estimate of the number of patents as well as other intellectual property such as copyrights, know-how, trade secrets and trademarks that cover a technology. Patent owners are sometimes reluctant to divulge information about their patents as it might invite lawsuits to challenge their validity.[8] The calculation may also require an accounting for other inputs that contribute value to a product. But courts should make an effort to elicit damage calculations that reasonably apportion value in patent infringement litigation when many patents cover a technology in addition to the patents being asserted in the case and when intellectual property is only one factor that contributes value to a product. ■

6 See Richard Gilbert and Michael Katz, "Efficient Division of Profits From Complementary Innovations," University of California at Berkeley working paper, 2009. (Derives conditions under which a proportionate sharing rule provides efficient incentives for investment in research and development when many patents are essential to use a technology.)

7 Mark Lemley and Carl Shapiro, "Patent Holdup and Royalty Stacking," *Texas Law Review*, 85(7), p. 1991-2049, 2007.

8 Disclosure might also limit the ability of a patentee to strategically assert its patents against firms that are unaware of the patents' scope. But this strategic flexibility is hardly socially desirable as patent scope is supposed to be in the public domain.