EJW
ECON JOURNAL WATCH
Scholarly Comments on Academic Economics

ECON JOURNAL WATCH 11(1)
January 2014: 37-45

Ill-Conceived, Even If Competently Administered: Software Patents, Litigation, and Innovation—A Comment on Graham and Vishnubhakat

Shawn P. Miller[1] and Alexander Tabarrok[2]

LINK TO ABSTRACT

In their article in the *Journal of Economic Perspectives*, Stuart Graham and Saurabh Vishnubhakat (2013) argue that the emergence of the "smart phone wars" and the rash of recent lawsuits over software patents are *not* evidence that the patent system is broken. Graham and Vishnubhakat are both Expert Advisors at the United States Patent and Trademark Office (PTO). Their article is more successful at absolving the PTO of responsibility for low-quality patents than at demonstrating that software patenting has fulfilled the patent system's avowed purpose of promoting the "progress of science and useful arts" (U.S. Constitution, article I, sec. 8).

Graham and Vishnubhakat—henceforth GV—write:

> [W]e examined the US patents involved in some of the high-profile litigation among four major firms in the smart phone industry: Motorola, Microsoft, Apple, and Samsung. … Of the 65 software patents still involved in this litigation, thus far only 21 of them—less than one-third—have received court decisions of the type that provide

1. Stanford Law School, Stanford, CA 94305.
2. George Mason University, Fairfax, VA 22030.

> some indication of their validity or likely validity. Of those, only four patents have had decisions indicating they are invalid or likely invalid. The remaining 17 software patents evaluated so far in these cases have been declared by a court to be valid or likely valid. *This 80 percent favorability ratio is not consistent with the pronouncements that the smart phone wars are being driven by low-quality software patents*. (GV 2013, 73, emphasis added)

Similarly:

> [T]he evidence does not support…low-quality examination by the Patent Office. In fact, data from Patent Office internal quality assurance reviews on nearly 29,000 random examination audits over six years show that, for both software and non-software applications, the overwhelming majority of allowances and final rejections correctly apply the patent laws and examination standards. (GV 2013, 78)

In other words, GV's proof that software patents are not of low quality is that the PTO followed its own regulations and the law. The argument works as a partial defense of the PTO but fails as a defense of software patents. The criticism of the patent system offered by James Bessen and Michael Meurer (2008), Michele Boldrin and David Levine (2008), Dan Burk and Mark Lemley (2011), Tabarrok (2011), Lemley (2012), and others is not that procedures are not being followed. The criticism is that patents are being issued that are far too broad and ill-defined, possibly resulting in a net decrease in innovation. Indeed, GV's argument that PTO procedures and the law are being followed might be taken as a sign that the system cannot be fixed by tinkering with procedures. In our view, what is necessary to make the patent system more supportive of innovation is fundamental change to the legal rules used to define software patent boundaries (for similar judgments, see Burk and Lemley 2011; Boldrin and Levine 2008; Tabarrok 2002; 2011; Lemley 2012; Miller 2012).

Software patent boundaries and functional claiming

The subject matter of a patent is supposed to be a process, a machine, a manufacture, a composition of matter, or a design. Patents are supposed to protect inventions, not ideas. A pharmaceutical patent, for example, protects a specific set of closely related chemical structures, but you cannot patent a particular means of

curing cancer as "any means by which cancer is cured" and thereby exclude every other means of curing cancer.[3] In theory, the same rules apply to software, but in practice the courts have allowed software patents to be much broader and much more abstract than in other areas.

Traditionally, functional claims—claims about the end goal or function of say a machine or process—were allowed in patent claims so long as they were limited by a specific means. Such means-plus-function claiming was essentially a way of defining equivalents and it worked well enough for most physical devices or processes because claims were adequately limited by the specified means. When the courts applied the means-plus-function construction to software, however, they ended up specifying the means as 'a computer' or 'a data processing system,' and this is no limit at all.

Consider U.S. Patent #5,930,474 (Dunworth, Veenstra, and Nagelkirk 1999). The patent's primary claim is simply "A system which associates on-line information with geographic areas." The patent gives this example of what they intend to patent: "[I]f a user is interested in finding an out-of-print book, or a good price on his favorite bottle of wine, but does not want to travel outside of the Los Angeles area to acquire these goods, then the user can simply designate the Los Angeles area as a geographic location for which a topical search is to be performed" (ibid.). In any ordinary reading the patentee has a patent on an abstract idea, thus gaining the right to exclude others from using such an idea. In any other area of patent law, this type of patent would not be allowed. It is allowed for software, however, because software patents such as this one go on to detail the means of implementing such a function. Namely,

> A…system comprising: a computer network wherein a plurality of computers have access to said computer network; and an organizer executing in said computer network, wherein said organizer is configured to receive search requests from any one of said plurality of computers, said organizer comprising: a database of information organized into a hierarchy of geographical areas wherein entries corresponding to each one of said hierarchy of geographical areas is further organized into topics…. (ibid.)

In other words, the means of the patent is the Internet. By merely adding some entirely nugatory terms such as computer, database, and display—nugatory

3. As is usual in the law there are exceptions to everything. Under the Orphan Drug Act, for example, it is possible to get intellectual property protection that excludes all competitors from a field, even those using radically different methods.

because *any* modern method would use these devices—the patentee has turned an unpatentable idea into a patentable, and potentially very profitable, method.

The specification of the means in this patent is a bit like specifying a new business method that would periodically transmit information regarding the qualities, capabilities, and form of specified products and the time, place, and terms at which such products could be exchanged using the means of a plurality of electromagnetic devices connected to a central electromagnetic device via the electromagnetic spectrum—in other words, a patent on radio and television advertising. The Internet is a general-purpose medium, and it should not be considered a specific means that, ipso facto, limits a patent's claims. Not only are software patents often overly broad, but it is often uncertain how wide is the scope of any such patent. The abstract functional language in software claims makes it difficult to relate the words that describe claim boundaries to actual technologies (Bessen and Meurer 2008). In contrast, it is much easier for patentholders and technology users to agree on the scope of a patent that claims a specified chemical compound.

Only towards the end of the article do Graham and Vishnubhakat acknowledge that there are problems with the legal boundaries of software patents. They write that the "disclosure-claim balance … has proven particularly difficult in the software area, where terminology has tended to shift and can be imprecise, and where functional language is frequently used to describe ideas that themselves are inherently functional in nature" (GV 2013, 81). They then assert, however, that disclosure-claim correspondence requirements have been strengthened by recent Federal Circuit decisions and that new PTO guidelines focusing examiners on disclosure clarity and claim-disclosure correspondence will improve the situation.

The Federal Circuit has strengthened requirements for means-plus-function claims.[4] But current precedents make it easy for software patent applicants and holders to avoid these requirements by not characterizing their claims strictly in a means-plus-function format (Lemley 2012). The PTO is not empowered to impose more stringent requirements than those mandated by the courts or Congress. Barring additional legal changes, we may expect uncertain and overly broad software patent boundaries to remain a problem regardless of how much more PTO examiners scrutinize disclosure clarity and claim-disclosure correspondence. GV (2013, 80-81) discuss a number of new "post-grant" procedures created by the America Invents Act of 2011, but all of these procedures expand opportunities for interested parties to challenge the validity of a patent prior to litigating; they do not expand opportunities for interested parties to clarify a patent's boundaries.

4. 35 U.S. Code §112(f). *See* Lemley (2012) for examples of means-plus-function claims and a concise explanation of section 112(f), including why it was originally enacted and how it has been interpreted.

The costs of uncertain software patent boundaries

The evidence that software patents have been a problem since they first proliferated during the 1990s is considerable. Patent litigation is notoriously expensive, and software patents are responsible for a disproportionate share of total litigation costs. Bessen and Meurer (2008) reported that software patents were over twice as likely to be litigated as other patents (based on patents granted between 1983 and 1999 that were asserted in suits filed through 2005). The U.S. Government Accountability Office estimates that nearly half of all patent litigation is for software patents, and, because software is ubiquitous and claims are often broad, the GAO estimates that more than half, 64 percent, of the *defendants* in patent ligation are being sued over claimed software infringements (GAO 2013). Finally, the most litigated patents, defined as those asserted in eight or more separate lawsuits, are much more likely to cover software (Allison, Lemley, and Walker 2009; 2011; Miller 2013b).

Miller (2013b) finds that software patents are weaker, both legally and substantively, than other patents. Between 2000 and 2010 only 20 percent of software patent holders won fully adjudicated lawsuits, compared to 38 percent of non-software patent holders. Also, software patent holders were less likely than holders of other patents to win final judgments that their patents were infringed (31 percent versus 53 percent) and valid (41 versus 57 percent). Most importantly, Miller (2013a) found that software patents are much more likely to be found to lack innovation because their claims were either anticipated or obvious.

So although software patent holders are much more likely to litigate, and to litigate aggressively, they are also more likely to have their patents found not to have been infringed upon and not to have been innovative. The reason for the untoward state of software patents, we believe, is that functional language generates great uncertainty as to how judges will interpret the legal boundaries of software patent claims and, at the same time, the ubiquity of software makes an enforceable claim extremely valuable. As a result, it pays software patent holders and so-called non-practicing entities or 'trolls' to search out and bring weak claims that have value as lottery tickets. Consistent with this theory, litigated software patents are over twice as likely to be the subject of claim construction appeals (Bessen and Meurer 2008), and the Federal Circuit has been 50 percent more likely to find claim construction error when the patent covers software than when the patent covers other fields (45 versus 29 percent) (Miller 2012).

Evidence of software boundary uncertainty in GV's PTO examination statistics?

Graham and Vishnubhakat's evidence is consistent with a narrow conclusion that during the last decade the PTO has given software patent applications the same scrutiny as non-software patents in complying with existing validity standards.[5] The issue, however, is not the PTO but the law—and GV also present interesting evidence that may support our theory that software patents have uncertain boundaries.

GV provide information about the rate at which the PTO's Board of Patent Appeals and Interferences (BPAI) affirmed the patent-application rejections of PTO examiners. From 2003 to 2008, BPAI's affirmance of examiner rejections was much lower for software than non-software patents. Like Miller's (2012) finding that the Federal Circuit has been much more likely to find software patent claim construction error, the lower rate of affirmance shows that when independent experts evaluate the scope of a software patent, they disagree more frequently than when evaluating non-software patents. The recent reversal of that trend seen in Figure 4 of GV's paper (p. 79) may show the impact of *KSR Int'l Co. v. Teleflex, Inc.* (2007), where the Supreme Court gave courts, and (as GV note) by extension PTO examiners, more discretion in invalidating patents on the basis of obviousness. Thus, the courts are slowly moving in the right direction, but in light of the extent of the change that is required, we should not be sanguine about the pace of action by courts. The number of patents has exploded in the last three decades, increasing by a factor of five, and there is very little evidence that the increases in monopoly power that patents have conferred, along with associated uncertainties and costs, have been redeemed by increased innovation.

5. GV's evidence is consistent with but does not prove even the narrow conclusion that the PTO has given software and non-software patent applications the same scrutiny. The administrative appeals from PTO examiner rejections and USPTO Quality Assurance Reviews (GV 2013, 78-79) are largely "in house" quality control reviews and if, as an institution, the PTO is under-scrutinizing software patents, then it would not be surprising to see these reviews result in similar rates of examiner error for software and non-software patent applications. An independent second opinion on patent quality would be more compelling. The GAO (2013) has recently recommended just that in advising the PTO to use information on patent litigation to determine their performance and how they might improve patent quality. Moreover, as we explained earlier, recent studies of litigation outcomes paint a bleak picture of software patent quality.

What explains the smart phone wars?

Graham and Vishnubhakat's analysis of a sample of litigated patents from the "smart phone wars" includes 21 smart phone patents containing software claims that have been subject to validity determinations. Of these 21 patents, GV write that "only four," or 19 percent, have been found invalid or likely invalid, and GV argue that this 81 percent validity rate "compares favorably with other technology areas" and "is not consistent with the pronouncements that the smart phone wars are being driven by low-quality software patents" (GV 2013, 73).

Contra GV, we think that 19 percent of smart phone patents with validity problems is a large percentage and to the extent that numbers are similar in other high-technology fields that only speaks to how widespread is the low-quality patent problem. Moreover, the patents litigated by *practicing* entities (as opposed to "trolls") are not random and are likely to be of higher quality than the average (Marco 2004; Miller 2013a; 2013b). That is, we would expect parties like Microsoft, Apple, and Samsung to be savvy patent holders, expending the high legal fees only when the expected benefit of litigating exceeds the costs (Allison, Lemley, and Walker 2011; Miller 2013b). Such benefit depends on the likelihood that their patents are found to be valid.

The specific lawsuits involved in the smart phone wars do not (so far) appear to be premised on the 'lottery ticket' type of weak claims so often seen in software patent disputes. If this remains true, why has there been so much litigation over these smart phone patents? The explanation, we suspect, is uncertainty—uncertainty not only over patent boundaries, but also over how the courts will interpret licensing commitments made by the patent holders in developing smart phone industry standards. The patent-thicket problem posed a substantial danger to smart phones, so the parties agreed to license patents "essential to the standard on 'fair, reasonable and non-discriminatory'" terms (Contreras 2012). The parties involved in the smart phone wars, however, remain uncertain as to which patents the courts will find "standards-essential" and what licensing terms will be found fair (ibid.). Given the stakes, we are not surprised the number of lawsuits involving these patents has exploded.

Conclusion

GV's evidence related to PTO examination supports the idea that, over the decade 2003 to 2012, examiners have taken the law as given and applied similar levels of scrutiny to software and non-software patent applications. Their evidence is also consistent with the more fundamental argument that the legal standards for

defining software patent boundaries have been weak. We remain convinced that software patents continue to generate greater social costs than other patents.

By calling attention to the apparent legal validity of some of the software patents involved in the smart phone wars, Graham and Vishnubhakat remind critics of software patents that the fundamental issue is not PTO error. But we disagree with GV's conclusion that absence of error is proof of utility. Rather, we join others in arguing that Congress and the courts must rein in the patent system with stricter interpretations of patent boundaries to reduce patents of overbroad and uncertain scope.

References

Allison, John R., Mark A. Lemley, and Joshua Walker. 2009. Extreme Value or Trolls on Top? The Characteristics of the Most-Litigated Patents. *University of Pennsylvania Law Review* 158(1): 1-37. **Link**

Allison, John R., Mark A. Lemley, and Joshua Walker. 2011. Patent Quality and Settlement Among Repeat Patent Litigants. *Georgetown Law Journal* 99(3): 677-712. **Link**

Bessen, James, and Michael J. Meurer. 2008. *Patent Failure: How Judges, Bureaucrats, and Lawyers Put Innovators at Risk*. Princeton: Princeton University Press.

Boldrin, Michele, and David K. Levine. 2008. *Against Intellectual Monopoly*. New York: Cambridge University Press.

Burk, Dan L., and Mark A. Lemley. 2011. *The Patent Crisis and How the Courts Can Solve It*. Chicago: University of Chicago Press.

Contreras, Jorge L. 2012. The Frand Wars: Who's on First? *Patently-O Blog*, April 17. **Link**

Dunworth, Peter D., John W. Veenstra, and Joan Nagelkirk. 1999. Internet Organizer for Accessing Geographically and Topically Based Information. U.S. Patent 5,930,474, filed January 31, 1996, and issued July 27, 1999. **Link**

Graham, Stuart, and Saurabh Vishnubhakat. 2013. Of Smart Phone Wars and Software Patents. *Journal of Economic Perspectives* 27(1): 67-86.

Lemley, Mark A. 2012. Software Patents and the Return of Functional Claiming. *Stanford Public Law Working Paper* 2117302. **Link**

Marco, Alan C. 2004. The Selection Effects (and Lack Thereof) in Patent Litigation: Evidence from Trials. *Topics in Economic Analysis and Policy* 4(1).

Miller, Shawn P. 2012. Do "Fuzzy" Software Patent Boundaries Explain High Claim Construction Reversal Rates? Working paper. **Link**

Miller, Shawn P. 2013a. Where's the Innovation: An Analysis of the Quantity and Qualities of Anticipated and Obvious Patents. *Virginia Journal of Law and Technology* 18(1): 1-58. **Link**

Miller, Shawn P. 2013b. What's the Connection Between Repeat Litigation and Patent Quality? A (Partial) Defense of the Most Litigated Patents. *Stanford Technology Law Review* 16(2): 313-348. **Link**

Tabarrok, Alexander. 2002. Patent Theory Versus Patent Law. *Contributions to Economic Analysis and Policy* 1(1).

Tabarrok, Alexander. 2011. *Launching the Innovation Renaissance: A New Path to Bring Smart Ideas to Market Fast*. TED Books (New York).

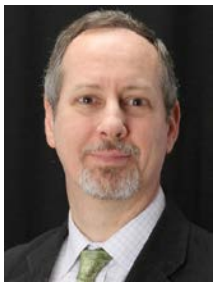
U.S. Government Accountability Office (GAO). 2013. Intellectual Property: Assessing Factors That Affect Patent Infringement Litigation Could Help Improve Patent Quality. GAO-13-465. August 22. Government Accountability Office (Washington, D.C.). **Link**

Cases Cited

KSR International Co. v. Teleflex Inc., et al., 550 U.S. 398 (2007).

About the Authors

Shawn P. Miller is Olin-Searle Fellow at Stanford Law School. His email address is smiller@law.stanford.edu.



Alex Tabarrok is Professor and Bartley J. Madden Chair in Economics at the Mercatus Center, George Mason University. His email address is Tabarrok@gmu.edu.

Go to archive of Comments section
Go to January 2014 issue

Discuss this article at Journaltalk:
http://journaltalk.net/articles/5818