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# TRANSACTION COSTS AND PATENT REFORM

Paul J. Heald<sup>†</sup>

## *Abstract*

*This article considers current proposals for patent law reform in light of a simple theory about intellectual property law: In a world without transactions costs, the assignment of property rights is not necessary to stimulate the optimal production of creative goods. Because potential users of inventions could contract for their creation, a compelling justification for granting property rights in these intangibles is the reduction of real-world transaction and information costs that hinder, or make impossible, contract formation between users and creators. Proposals for patent law reform, therefore, should be evaluated by whether a change in legal rights, or in the regulatory process increases or lowers these costs.*

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In *The Problem of Social Cost*, Ronald Coase examined the simple problem of the person (or firm) that causes harm to its neighbor in the course of pursuing some legitimate business end, like grazing livestock, hauling goods on a railroad, or operating a factory.<sup>1</sup> Contrary to the accepted wisdom of the time, he concluded that in a world where the parties could costlessly enter into enforceable contracts with each other, the choice between imposing liability for causing damage or adopting a rule of no liability would have no effect on net social welfare.<sup>2</sup> Conversely, he found that the choice of a liability rule or non-liability rule could have significant welfare effects in our real world of high transaction costs.<sup>3</sup> In a previous paper, a colleague and I used Coase's insight to argue that a farmer harmed by the accidental drift of patented pollen onto his or her property should not be liable for patent infringement, while a farmer who takes advantage of this pollen drift should be liable.<sup>4</sup> In the course of that argument, it became clear that enforcing patent rights is only necessary because of high transaction costs between parties that need inventions and parties with the capacity to invent them.<sup>5</sup> This is the jumping off point for the following discussion of patent reform, but an example is necessary first.

Consider Farmer A, who plants 10 acres with herbicide-resistant patented canola seed. After expending \$100 on operating costs (seed, pesticides, and herbicides), he will harvest 100 bushels, which he can sell for \$2 per bushel, earning him a \$100 profit. His operating costs include a \$20 royalty payment to Patentee, the inventor of the herbicide-resistant seed, who developed the seed after expending \$35 on research and development. His neighbor, Farmer B, plants 10 acres with a cheaper and less productive unpatented seed. After expending \$90 for seed, pesticides, and herbicides, he will harvest 85 bushels of canola, which he can sell for \$2 bushel, earning an \$80 profit. During the growing season, pollen from the Farmer A's patented canola fertilizes Farmer B's canola. After the harvest, Farmer B saves enough hybrid seed to plant the following year. The next year, after expending only \$80 for pesticide and herbicides, Farmer B harvests 100 bushels that he can sell for \$2 per bushel. Farmer B makes \$120

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1. See Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1, 1-2 (1960).

2. See *id.* at 2-15.

3. *Id.* at 15-19.

4. Paul J. Heald & James C. Smith, *The Problem of Social Cost in a Genetically Modified Age*, 58 HASTINGS L.J. 87, 108 (2006).

5. See *id.* at 103-07.

in profit, while Farmer A makes the same \$100 profit that he made the previous year. If Farmer B is not liable for patent infringement to the inventor of the herbicide resistant seed, then the joint value of the production of Farmer A, Farmer B, and the Patentee is \$205, as illustrated below:

*Scenario 1.0 – No Liability (High Transaction Costs)*

<i>Farmer A</i>	<i>Farmer B</i>
10 Acres/100 Bushels	10 Acres/100 Bushels
(\$2/bushel x 100) – \$100 C.O.P. = \$100	(\$2/bushel x 100) – \$80 C.O.P. = \$120
<i>Patentee/Inventor</i>	
1 Royalty Payment of \$20 – \$35 R & D Costs = (–\$15)	
Joint Production = \$205	

In the scenario below, we see that imposing \$20 in damages for patent infringement will not immediately change the value of the joint production of the three parties.

*Scenario 1.1 – Liability (High Transaction Costs)*

<i>Farmer A</i>	<i>Farmer B</i>
10 Acres/100 Bushels	10 Acres/100 Bushels
(\$2/bushel x 100) – \$100 C.O.P. = \$100	(\$2/bushel x 100) – \$80 C.O.P. – \$20 damages = \$100
<i>Patentee/Inventor</i>	
1 Royalty Payment of \$20 + 1 Damage Award of \$20 – \$35 R & D Costs = \$5	
Joint Production = \$205	

If we contemplate only the value of joint production, there seems little reason to require a transfer payment from Farmer B to the Patentee. If joint production is not increased, a deadweight loss would

seem to be created by requiring a transfer from Farmer B to the Patentee/Inventor.

Even though at first glance the imposition of liability for infringement would not increase the net value of the joint production, a plausible argument can be made that unless the patentee can recover its research and development costs by collecting royalties for the use of its invention, it will have inadequate incentives to invent the herbicide resistant seed. This is the sort of true technological externality that can be used to justify a liability rule under Coasean analysis.<sup>6</sup> The hypothetical is designed to illustrate how the externality can occur. If the seed company knows that it cannot collect the second royalty, its research and development costs (\$35) will exceed its expected return (\$20 from Farmer A and it will not invent the seed. Without the herbicide resistant seed, both farmers will be forced to use the non-patented seed planted by Farmer B initially, and the patentee will save the \$35 expended on research and development. The value of joint production will fall to \$195 without the availability of the patented seed, as illustrated below:

*Scenario 1.2 – New Seed Never Invented (High Transaction Costs)*

<i>Farmer A</i>	<i>Farmer B</i>
10 Acres/85 Bushels	10 Acres/85 Bushels
(\$2/bushel x 85) – \$90 C.O.P. = \$80	(\$2/bushel x 85) – \$90 C.O.P. = \$80
<i>Patentee/Inventor</i>	
0 Royalty Payments of \$20 + \$35 R & D Costs Saved = \$35	
Joint Production = \$195	

A comparison of scenarios 1.0, 1.1 and 1.2 seems to make a strong case for liability. Forcing the transfer payment will stimulate production of the herbicide resistant seed, which will in turn increase the joint value of production by \$20, to \$205. It appears that net social welfare is increased.<sup>7</sup>

6. See *id.* at 105-07 & n.66.

7. Scenario 1.2 assumes that the patentee will not do anything socially useful with the \$35 R & D expenditure that it has saved. This may be a highly unrealistic assumption. If those savings can be invested to produce value that exceeds the \$20 canola production gain, then

From the standpoint of net social welfare, however, liability is only necessary when the total cost of transacting between the farmers and the inventor is high. Why? If transaction costs are low, then the parties will contract for the efficient solution. Rational farmers will be willing to pay up to \$20 each to the inventor in return for the creation of the patented seed, because a farmer paying \$19 for the new seed (thereby earning a gross profit of \$81) is still \$1 better off than it would be using the old seed. The inventor, on the other hand, will invent the seed if each farmer is willing to pay more than \$17.50 each, given its R&D costs are \$35. If a deal can be struck between the two farmers and the inventor, then net social welfare will be maximized without the need for a liability rule, or indeed any property right assigned in the invention. We can predict that if transaction costs are less than \$5 (the difference between the lowest acceptable price to the inventor, \$35, and the highest combined acceptable price to the farmers, \$40), then the transaction will occur in the absence of any liability rule or any property right in the invention. All that is needed is system of enforceable contracts.

In a recent paper, Professor Khan provides a nice historical example of the irrelevance of property rights when transaction costs are low.<sup>8</sup> Until 1891, the United States did not recognize copyrights in foreign books, so valuable books by famous 19th Century English authors were effectively in the public domain from the moment of their publication.<sup>9</sup> Manual type-setting at the time was highly labor intensive and expensive, and Khan describes “costly races by American publishers to be the first to print the newest English fiction” that resulted in “ruinous competition . . . likely to drive prices down to marginal cost, in which case the high initial investments would not be

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society should prefer that the herbicide-resistant seed not be invented. This question of marginal utility pinpoints one reason why economists are so hesitant to argue that patent law is efficient; it is extremely difficult to account for the alternative uses to which inventive resources might be put. Cf. RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 37 (3d ed. 1986) (noting that “[t]he costs of the patent system include . . . inducing potentially excessive investment in inventing”); Janusz A. Ordover, *Economic Foundations and Considerations in Protecting Industrial and Intellectual Property*, 53 *ANTITRUST L.J.* 503, 507 (1984) (explaining that patent law “may lead to excessive investment in the creation of intellectual and industrial property”). See also Paul J. Heald, *The Vices of Originality*, 1991 *SUP. CT. REV.* 143, 157 n.69 (1991) (“In other words, a work should be [patentable] only if necessary to encourage the work, and the work is more socially useful than whatever else the [inventor] would chose to do, for example, child rearing or brickmasonry.”).

8. See B. Zorina Khan, *Does Copyright Piracy Pay? The Effects of U.S. International Copyright Laws on the Market for Books, 1790-1920*, Nat’l Bureau of Econ. Research, Working Paper No. 10271 (2004), <http://www.nber.org/papers/w10271>.

9. See *id.* at 9.

recovered.”<sup>10</sup> Without a system of property rights, works by Dickens, Browning, and Tennyson, threatened to go under-exploited due to the difficulty in recouping high type-setting costs.<sup>11</sup> Thankfully for American readers, the number of potentially competing publishers was not so unwieldy that a contractual accommodation could not be reached between them. Indeed, publishers solved the problem through collusion, agreeing among themselves that certain publishing houses would have the exclusive rights to certain works.<sup>12</sup> Transaction costs were low enough that a contractual solution could solve the problem of the under provision of valuable goods.<sup>13</sup>

Normally, we assume that enforceable property rights are necessary to ensure the creation of public goods like inventions and books, but this is only true if the cost of transacting is high. If transaction costs are low enough, as was likely between 19<sup>th</sup> Century American printers,<sup>14</sup> then public goods will be provided even in the absence of enforceable property rights. A system of enforceable contracts will be enough. In the context of our seed scenarios, we have already seen that if transaction costs are low enough, then the new seed will be developed and social welfare optimized through contract, without the need for a patent system.

For this reason, the patent system is probably not needed to stimulate inventions that only benefit the firm that invents them. If Ford management decides that its line of SUVs needs to get better gas mileage, then it can at relatively little cost instruct its R&D unit to work on the problem. The eventual result of the intra-firm communication might be a new mechanism that raises the mileage obtained by Ford SUVs by ten percent. If only Ford benefits from this invention (because other firms cannot take advantage of the technology in their own different engine designs) then Ford will invent it whether or not it can receive a patent. The allocation of property rights in this context is unnecessary.

Typically, costs are not so low. Imagine that Ford’s invention is equally usable by others in the automotive field. In a world without patent law, Ford would have to contract with competitors to prevent losses due to free riding it before incurred the cost of invention. If

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10. *Id.* at 21.

11. *See id.* (“If all firms produced rival editions, competition was likely to drive prices down to marginal cost, in which case the high initial fixed investments would not be recovered.”).

12. *Id.* at 24.

13. *See id.* at 14-15.

14. *See id.* at 24.

competitors could easily take advantage of the invention, then Ford will have to obtain promises from its competitors to pay a royalty for using the invention. Why? If Ford's competitors can freely use the invention to increase their mileage, then Ford obtains no comparative advantage over them and would no longer have an incentive to create the gas-saving device in the first place.<sup>15</sup> Without patent law, a series of contracts would be Ford's only source of protection.

To borrow from Coase's own list of transaction costs, Ford would have to "discover who it is that [it] wishes to deal with, to inform people that [it] wishes to deal and on what terms, to conduct negotiations leading up to a bargain, to draw up the contract, to undertake the inspection needed to make sure that the terms of the contract are being observed, and so on."<sup>16</sup> Most importantly, Ford will have to overcome Arrow's information paradox,<sup>17</sup> where in a world without patent law, it must try to communicate the nature and value of its invention to its competitors *without revealing it*, because any revelation could be misappropriated. In addition, Ford would want to know enough about its competitors' operations in order to approximate its value to them.

As used in this paper, the term transaction costs encompasses all the costs of using a contractual solution to facilitate creation including: Information costs (identifying potential users of the invention; signaling the inventive capacity of the inventor; and valuing the invention), Negotiation Costs (pricing the invention; legal costs and opportunity costs; and obtaining financing), and Enforcement Costs (monitoring the parties to the contract; and preventing intra-firm opportunism). If these costs are too high in the aggregate, then the series of contracts necessary to insure invention in a world without patent law would not be entered into. The problem of innovation, therefore, is primarily a problem of reducing these costs.

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15. Unless the industry-wide mileage gains resulted in an increase in overall auto sales so that Ford's share of the increase was greater than the cost of invention.

16. Coase, *supra* note 1, at 15.

17. See Robert G. Bone, *A New Look at Trade Secret Law: Doctrine in Search of Justification*, 86 CAL. L. REV. 241, 280 & n.174 (1998)

[T]here is a significant obstacle—known as "Arrow's Information Paradox"—to bargaining over secret information. A trade secret owner generally is reluctant to reveal the secret unless the potential licensee first promises not to use it in the event a license is not negotiated. The licensee, on the other hand, is not likely to make such a promise without first learning the secret.

(footnote omitted) (citing Kenneth J. Arrow, *Economic Welfare and the Allocation of Resources for Invention*, in *The Rate and Direction of Inventive Activity* 614-16 (1962)).

The government sometimes tries to solve this problem by making research grants.<sup>18</sup> If the U.S. Department of Transportation pays Ford a sufficient sum to create a gas-saving device and dedicate it to the public domain, virtually all of the costs identified above disappear (at least from Ford's perspective). More pervasively, the government tries to solve the transaction costs problem by granting property rights to inventors.<sup>19</sup> Several scholars have recently detailed how the patent system lowers transactions costs and thereby stimulates invention.<sup>20</sup> More broadly, they explain how the granting of a limited property right in an invention makes transactions, and therefore invention, more likely to occur.<sup>21</sup>

Perhaps those who recognized that patents reduce negotiation costs in several ways have made the most important contribution.<sup>22</sup> Consider the agricultural firm with inventive capacity to engineer a valuable new seed and a group of farmers who would be willing to purchase the new seed were it invented. The firm has two significant problems in convincing the farmers to promise to pay for the future seed and thereby fund the research. First, it will have difficulty accurately describing the precise qualities and likely benefits of the new seed if it has not yet been invented. Second, even if it has already been invented (perhaps adventitiously in the course of another project), it may fear misappropriation by the farmers who will demand to examine it and understand the nature of the improvement before they make any promises of compensation. Although this is probably less a problem with seeds than with a new machine, where examination is more likely to reveal the nature of the improvement, the point is still clear—no one wants to buy a pig in a poke. If the

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18. One important source of grants is the National Institutes for Health. National Institutes of Health: Grants and Funding Opportunities, <http://grants1.nih.gov/grants/index.cfm> (last visited March 19, 2007).

19. See 35 U.S.C. §§ 101-103 (2001) ("Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.").

20. See, e.g., Robert P. Merges, *Intellectual Property and the Cost of Commercial Exchange: A Review Essay*, 93 MICH. L. REV. 1570, 1590-91 (1995); Clarisa Long, *Information Costs in Patent and Copyright*, 90 VA. L. REV. 465, 469 (2004); Clarisa Long, *Patent Signals*, 69 U. CHI. L. REV. 625, 625-28 (2002) [hereinafter Long, *Patent Signals*]; Nancy T. Gallini & Ralph A. Winter, *Licensing in the Theory of Innovation*, 16 RAND J. ECON. 237, 238 (1985).

21. See *supra* note 20.

22. See, e.g., James J. Anton & Dennis A. Yao, *Expropriation and Inventions: Appropriable Rents in the Absence of Property Rights*, 1 AM. ECON. REV. 190, 191-92 (1994) (analyzing how patents help solve Arrow's information paradox, enabling independent inventors to negotiate with firms); see also, e.g., Merges, *supra* note 20, at 1590 (1995) (discussing how intellectual property rights lower transaction costs).

firm is granted an enforceable property right in the new seed, then it can reveal it fully and with more confidence. Moreover, because a patent will make a successful negotiation more likely, the firm may be more willing to take the risk of creating the seed before approaching the farmers.

The written description and claim requirements<sup>23</sup> of patent law further reduce the cost of negotiation by identifying as clearly as possible the object of the negotiation. Words imperfectly capture the precise nature of an improvement, but written claims provide an initial and uniform specification of the rights and responsibilities of each party to the contract for invention.<sup>24</sup> Finally, circumstances may arise when neither the agricultural firm, nor the farmers have adequate capital to finance the invention. In this case, patent law reduces the cost of capital by lowering negotiation costs with the financier by creating a legal object—the patent—that can be taken as collateral.<sup>25</sup> And, as Long has pointed out, patenting signals the strength of a debtor firm's human capital and innovative capacity to venture capitalists.<sup>26</sup>

This leads to the second point of how patent law helps solve certain information problems. In addition to the signals patents send to venture capitalists and others who analyze markets, they also help identify sources of inventive capacity to potential users. It does not take much time on the United States Patent Office web site (think of it as an electronic bulletin board) to determine that Monsanto has tremendous inventive capacity in the market for new seeds.<sup>27</sup> The information provided by the publication of all patents also indirectly helps in the difficult task of valuation and pricing by providing a central clearinghouse of information on innovation.<sup>28</sup>

The property right created by the patent system reduces transaction costs in other, subtler, ways. Imagine how inventors would behave if only trade secrecy were available to protect research and development. Secrets are extremely leaky, and firms relying on trade

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23. 35 U.S.C. § 112 (2000).

24. See Paul J. Heald, *A Transaction Costs Theory of Patent Law*, 66 OHIO ST. L.J. 473, 496 (2005).

25. *Id.* at 497-99.

26. See Long, *Patent Signals*, *supra* note 20, at 646-48.

27. See United States Patent and Trademark Office, <http://patft.uspto.gov/netahtml/PTO/search-bool.html> (enter "Monsanto" in Term 1 text box; then click "Search") (last visited March 27, 2007).

28. See F. Russell Denton & Paul J. Heald, *Random Walks, Non-Cooperative Games, and the Complex Mathematics of Patent Pricing*, 55 RUTGERS L. REV. 1175, 1227 (2003).

secrecy must be constantly vigilant against misappropriation.<sup>29</sup> Precautions must be taken to fence off secrets in a physical manner, by employing locks, safes, partitions, and blackened windows, but also in a figurative sense, through the use of restrictive employment covenants and a careful division of labor.<sup>30</sup> When the end product of invention is embodied in a patent, the need for precautions is greatly reduced.<sup>31</sup> A departing employee can surreptitiously take a secret with him to be used by a future employer (who cannot consult a title registry to check the provenance of the secret). A patented invention is not so easily passed off as the former employee's.

The cost of fencing off secrets from employees is perhaps not intuitively conceived as a cost of enforcement. The first model presented above, consisting solely of the agricultural engineering firm and the two farmers, was kept deliberately simple to illustrate how the Coase Theorem applies to the market for creative goods. In reality, the picture is substantially more complex. Inventive firms are unlikely to be atomistic. Innovation usually requires the cooperation and coordination of a creative team consisting of researchers and managers within the firm and sources of capital and creative input from outside the firm.<sup>32</sup> In fact, when Blair and Stout define team production,<sup>33</sup> they even include political communities that provide raw materials, infrastructure, education resources, and tax subsidies in the production equation. More complexity is added when one considers that innovation usually involves more consumers than just two farmers. Frequently, thousands of users are in the market for a particular innovation. One might call the vast web of relationships between the creative team and diffuse users, "the inventive contract." Preventing misappropriation, intra or inter-firm, is part of the cost of enforcing the inventive contract.

The hypothetical contract between a vast team with a collective inventive capacity and the body of potential users is an interdependent series of formal and informal agreements. Monitoring and coordinating the many subsidiary agreements is another part of the enforcement costs identified above. Patents lower these costs by assigning the rights in the invention to a single, clearly identifiable

29. See Heald, *supra* note 24 at 487-88.

30. *Id.* at 488.

31. Patent counts can also be used to reduce shirking by allowing a more predictable *ex ante* division of profits from creative activity.

32. See Heald, *supra* note 24, at 487-89.

33. See generally Margaret M. Blair & Lynn A. Stout, *A Team Production Theory of Corporate Law*, 85 VA. L. REV. 247 (2001).

owner who has the proper incentives to manage team production and market the innovation to potential users.<sup>34</sup> If the only way to defeat free riders and deter misappropriation were through secrecy, the task of monitoring, coordination, and marketing would become vastly more expensive. It's difficult to imagine, for example, a complex cooperative creativity entity like the MP-3 patent pool operating on the basis of trade secrecy.<sup>35</sup> Finally, because it acts as an affirmative asset partition, patents reduce the fear of interference from creditors and heirs of those with claims to the fruits of the inventive process. This asset partition facilitates long term planning by the creative firm.<sup>36</sup>

In a world with sufficiently low transaction costs, those who needed an invention would simply contract with those possessing inventive capacity. Frequently, the cost of obtaining adequate information, the cost of negotiating agreements, and the cost of enforcing them is too high for a unitary "contract for invention" to materialize. Patent law reduces these costs through the creation of a property right, not by offering the promise of monopoly profits for patentees.<sup>37</sup> The patent system, therefore, is most accurately viewed as a mechanism by which this transaction costs problem is addressed.

This insight has concrete implications for patent law reform: Any changes to the patent system should lower information, negotiation, or enforcement costs. One measure of how well patent law can do this job is seen in the effect that the Bayh-Dole Act<sup>38</sup> had on technology transfer by universities. Before 1980, universities receiving federal funds were not allowed to patent inventions.<sup>39</sup> Predictably, universities enthusiastically embraced patenting after the change in the law, even at a time when they were apparently not engaging in significantly more research.<sup>40</sup> The authors of a study of the Bayh-Dole Act concluded that "the increase in university patenting probably reflects an increased rate of technology transfer to

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34. See Heald, *supra* note 24, at 490-96.

35. See *id.* at 495-96.

36. See *id.* at 480-84.

37. See Heald, *supra* note 24, at 489 ("[T]he role of patents . . . is not the traditional role of creating monopolies by *prohibiting* the exploitation of informational spillovers. Rather, by protecting property rights, patents here *open* the market for trade in technological information.") (citing Gallini & Winter, *supra* note 20, at 238).

38. 35 U.S.C. §§ 200-212 (2000).

39. See DONALD S. CHISUM, ET AL., *PRINCIPLES OF PATENT LAW*, 797-801 (3d ed. 2004).

40. Rebecca Henderson et al., *Universities as a Source of Commercial Technology: A Detailed Analysis of University Patenting*, 80 *REV. ECON. & STAT.* 119, 119-20 (1998).

the private sector, and this has probably increased the social rate of return to university research.”<sup>41</sup> The availability of patents (as opposed to the prior regime of trade secrecy) facilitated the technology transfer agreements, almost certainly because negotiation and information costs were lowered. If so, then the Bayh-Dole Act is a prime example of how successful patent reform might be realized.

The Bayh-Dole story shows that the mere recognition of a new property right lowers transaction costs. The effectiveness of that property right, however, is sensitive to other factors that might be the subject of reform. For example, after the creation of the Federal Circuit, the patent validity rate doubled.<sup>42</sup> During the same period, the rate of patenting followed the same upward curve, at a time when R&D expenditures were not rising in real terms.<sup>43</sup> In other words, patents became more valuable and more desirable to obtain as they became more predictably enforceable. A reliable patent, one that is less vulnerable to judicial nullification, is more likely to reduce the transaction costs described above. Reform that enhances predictability, reliability, and confidence, like the creation of the Federal Circuit, would seem to be especially desirable.

In general, the transaction costs perspective is friendly to reform proposals that are likely to make patents more tradable. Consider Lemley, Lichtman, and Sampat’s proposal for a two-tiered patent system that would allow applicants to pay a higher fee for tighter patent office scrutiny, resulting in a “gold-plated” patent.<sup>44</sup> Such a patent would be less vulnerable to judicial nullification and therefore a more certain subject of exchange. In fact, the additional payment made by the willing patentee would provide valuable information to markets about the value of the invention. On the other hand, Lemley’s suggestion that courts should play a significant role in policing patent office errors<sup>45</sup> may be misguided. He worries about too many resources being expended by the patent office to evaluate patents. Since most patents are never licensed or enforced, he is comfortable

41. *Id.* at 126.

42. See Donald Dunner et al., *A Statistical Look at the Federal Circuit’s Patent Decisions: 1982-1994*, 5 FED. CIR. B.J. 151, 154-55 & n.22 (1995) (presenting statistics of the patent validity rate—the rate at which patents are declared valid in litigation).

43. See James Bessen & Eric Maskin, *Sequential Innovation, Patents, and Imitation* 16-19, MIT Econ. Dept., Working Paper No. 00-01 (2000), <http://www.researchoninnovation.org/patent.pdf>.

44. Mark Lemley, Douglas Lichtman, & Bhaven Sampat, *What to do About Bad Patents?*, 28 REGULATION 12-13 (2005).

45. Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1531-32 (2001).

with letting the judicial system play a substantial role in making sure inventions meet the necessary statutory criteria.<sup>46</sup> The history of the Federal Circuit shows, however, that when the patent validity rate drops, the patenting rate drops.<sup>47</sup> Patents become less reliable and less frequently the object of exchange. In other words, when courts are actively striking down patents, transaction costs are likely to increase, thereby hindering the primary purpose of the patent system. One advantage of the gold-plating proposal is that it encourages owners of valuable and likely-to-be-litigated patents to self-identify, allowing the patent office to devote its resources in a more effective manner, thereby improving the reliability of patents at little additional administrative cost.

Other reform suggestions can be judged by the same criteria. For example, an examination system whereby competitors could challenge patents before they issue might also lower transaction costs. A patent that survives an *ex parte* challenge would have the desirable “gold-plated” quality. It would be less vulnerable to judicial nullification and therefore more likely to be traded or licensed. In fact, overall validity rates may rise, given that fewer bad patents should issue. And, the addition of *ex parte* challenges could be tied to a rule requiring that all patent applications be published immediately upon filing, which would get more information to interested parties more quickly than the present 18-month rule.<sup>48</sup> Any procedure, however, should be constructed to minimize the possibility that a competitor could waste resources in a bad faith, anti-competitive challenge to a patent. If the *ex parte* procedure makes prosecuting a patent too expensive, then the patent system will become less usable and patenting rates may drop.

The Supreme Court has recently initiated reform of a sort by making it harder for patentees to get injunctions. In *MercExchange, LLC v. Ebay, Inc.*, the Federal Circuit applied a virtual per se presumption that patentees are entitled to an injunction following a finding of infringement.<sup>49</sup> The Supreme Court vacated and remanded

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46. See *id.* at 1503-06, 1511.

47. Bronwyn H. Hall & Rosemarie Ham Ziedonis, *The Patent Paradox Revisited: An Empirical Study of Patenting in the U.S. Semiconductor Industry, 1979-1995*, 32 RAND J. OF ECON. 101, 104, 118 (2001).

48. 35 U.S.C. § 122(b)(1) (2000) (“[E]ach application for a patent shall be published . . . promptly after the expiration of a period of 18 months from the earliest filing date . . .”).

49. *MercExchange, LLC v. eBay, Inc.*, 401 F.3d 1323, 1339 (Fed. Cir. 2005), *vacated*, 126 S. Ct. 1837 (2006).

with instructions that the traditional four-part balancing of equities test be applied.<sup>50</sup>

The decision may make patent law look slightly more like a liability rule and slightly less like a property rule, and may effect the transaction costs equation. First, the stronger the penalty for patent infringement, the more licensing agreements may be stimulated due to the fear of being sued for infringement. Users would be less likely to conclude that a patent is not valid and that no license need be entered into. Therefore, some unnecessary contracts may be entered into, because the cost of negotiating a license for technology that does not qualify for protection is wasted. On the other hand, if penalties for patent infringement were always limited to a reasonable royalty, fewer licensing agreements would be entered into because the penalty for infringement would be no greater than the price of the license. Incentives to negotiate would be diminished, saving the cost of negotiation, but resulting in fewer voluntary exchanges. Given the costliness of judicial royalty determinations, truly voluntary changes are usually preferable.

So, one cost of a stronger property right, consistently enforceable via injunction, might be the increased licensing of *invalid* patents, but a benefit may come from the increased licensing of *valid* patents to users who might otherwise free ride. A rule that accounts for the mental state of the infringer might maximize this cost/benefit equation. The traditional four-part test endorsed by the Supreme Court for determining the appropriateness of an injunction<sup>51</sup> may, therefore, be inadequate to capture what is really at issue. The Court reminded the Federal Circuit to address the following questions before issuing an injunction:

- (1) Did the plaintiff suffer irreparable injury?;
- (2) Would remedies at law, like money damages, be inadequate to redress this injury?;
- (3) Does the balance of hardships favor injunctive relief?; and
- (4) Would equitable relief disserve the public interest?<sup>52</sup>

The primary focus instead should be on the infringer's *ex ante* evaluation of whether its activity was infringing or not. If a rational

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50. *MercExchange*, 126 S. Ct. at 1837.

51. *Id.*

52. *Id.* at 1839.

infringer would have entertained serious doubts as to the patent's enforceability, then an injunction should be more difficult obtain. Fewer sterile licensing agreements will be entered into if good faith users do not have to worry about the punitive aspects<sup>53</sup> of a permanent injunction, while users who cannot plausibly claim objective good faith will be forced by the injunction to enter into an agreement after trial.

Many patent law rules, of course, seem to have no direct bearing on the cost of the inventive contract. Instead, they seem designed to reduce the cost invoking a property right solution to the transactional problem. As many economists have noted, the granting of exclusive rights to inventors may result in monopoly costs that effect net public welfare.<sup>54</sup> For this reason, many patent rules attempt to ameliorate these costs. For example, the requirements of novelty,<sup>55</sup> non-obviousness,<sup>56</sup> usefulness,<sup>57</sup> and the limited time term<sup>58</sup> all reduce possible monopoly costs associated with granting a property right in a public good like an invention. They do this, however, by establishing rough cut rules of what sort of inventions users would be willing to contract for and on what terms. Since we cannot imagine potential users being willing to contract for inventions that are not new or useful, or that consist of insignificant improvements over the prior art, or that require eternal licenses, we limit the definition of the property right accordingly.

In a world where the creative enterprise requires complex teamwork and users are diffuse, patent law, therefore, serves a dual purpose. First, it stimulates actual transactions between parties by lowering information, negotiation, and enforcement costs by creating property rights in certain sorts of creative activity. Second, when an actual transaction is unlikely to occur before creation, it defines the scope of the property right by mimicking the basic terms that inventors and users would use to describe a contribution worthy of compensation. The basic property right created by patent law does

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53. See Mark Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking* 34, Stanford Law School, Working Paper No. 324 (2006), available at <http://ssrn.com/abstract=923468> (quantifying the premium that successful plaintiffs receive when negotiating a license with an accused infringer in the shadow of injunctive relief).

54. See e.g., Posner, *supra* note 7, at 37, 258-59.

55. 35 U.S.C. § 102 (2000).

56. 35 U.S.C. § 103 (2000).

57. 35 U.S.C. § 101 (2000).

58. 35 U.S.C. § 154 (2000) ("such grant shall be for a term beginning on the date on which the patent issues and ending 20 years from the date on which the application for the patent was filed in the United States").

much of the work in making the inventive contract a market reality. Any attempts to fine-tune that system should be keenly aware of the likely effect of change on that market.