

# Adjusting Patent Damages for Nonpatent Incentives

Lisa Larrimore Ouellette<sup>†</sup>

## *Table of Contents*

I.Introduction .....	188
II.Nonpatent Incentives and Overcompensation.....	190
A. Nonpatent Innovation Policies .....	191
B. The Reward-Stacking Problem.....	193
C. Potential Solutions.....	195
III.Accounting for Nonpatent Incentives Through Patent Damages .....	198
A. Repaying Nonpatent Rewards from Patent Damages.....	198
B. Reducing Patent Damages Based on Nonpatent Rewards.....	200
1. Calculating Damages Based on the Patentee’s Costs .....	200
2. Incorporating Nonpatent Rewards into the Damages Calculation..	204
3. Implementing the Cost-Based Approach.....	206
IV.Using Cost-Based Patent Damages to Improve Allocation.....	210
V.Conclusion .....	212

*Nonpatent innovation policies—including direct spending on grants and procurement, innovation prizes, and R&D tax incentives—are a significant part of innovation policy in practice and are attracting growing attention from legal scholars. When market-based patent incentives undervalue certain inventions, innovation is most efficiently incentivized by using these policies as complements, but in some cases, allowing researchers to claim nonpatent incentives in addition to patent rewards results in significant overcompensation. There are a few potential solutions to this reward-stacking problem, including limiting the patentability of inventions that have received significant alternative rewards, or conditioning nonpatent transfers on some relinquishment of patent rights. When the lost patent rewards are far more valuable than the nonpatent incentives, these solutions might*

---

<sup>†</sup> Associate Professor of Law, Stanford Law School. Thanks to Rebecca Eisenberg, John Golden, Daniel Hemel, Mark Lemley, Glynn Lunney, Jonathan Masur, Doug Melamed, and Amy Proctor for helpful comments, and to Sam Goldstein for excellent research assistance. I received an honorarium for presenting this article as part of the 2017 Conference on Patent Damages at the University of Texas School of Law, but it was not in any way contingent on the views expressed in this article, which are solely my own.

*be broader than the problem. This symposium contribution presents and evaluates an additional solution: reducing patent damages to account for the nonpatent rewards (including ex ante risk reduction) an invention has already received. Such an approach could improve not only the incentive side of innovation policy, but also the allocation side, by reducing deadweight loss while maintaining incentives to innovate. The ability of patent damages doctrine to help mediate between different bodies of innovation law is a benefit of recent proposals for patent damages reform that has thus far been overlooked.*

## I. Introduction

Although patent law historically has been the primary field in which legal scholars have thought about innovation policy,<sup>1</sup> in practice governments incentivize innovation and allocate access to knowledge goods through a wide variety of mechanisms, including direct spending on grants and procurement and tax incentives for research and development (R&D).<sup>2</sup> These state-sponsored nonpatent innovation policies have attracted significant recent interest from legal scholars.<sup>3</sup> In some cases, optimal innovation policy entails combining patent and nonpatent mechanisms.<sup>4</sup> But stacking policies can lead to two concerns: (1) overly large rewards on the incentive side, plus (2) the additional deadweight loss of relying on patents—and their attendant supracompetitive prices—to allocate access to the resulting knowledge goods.<sup>5</sup>

For example, the development of a new medical device—say, a wearable alcohol sensor—may well be most efficiently spurred through not just patent rights,<sup>6</sup> but also grants for speculative research ideas,<sup>7</sup> tax incentives to reduce capital costs and encourage entry by smaller firms,<sup>8</sup> and additional prizes to reward devices that

---

<sup>1</sup> See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1576 (2003) (“Patent law is our primary policy tool to promote innovation.”).

<sup>2</sup> See generally Daniel J. Hemel & Lisa Larrimore Ouellette, *Beyond the Patents–Prizes Debate*, 92 TEX. L. REV. 303, 315–26 (2013) (reviewing how patents, innovation prizes, direct R&D spending, and R&D tax incentives operate in the United States).

<sup>3</sup> See, e.g., Ian Ayres & Amy Kapczynski, *Innovation Sticks: The Limited Case for Penalizing Failures to Innovate*, 82 U. CHI. L. REV. 1781 (2015); Hemel & Ouellette, *supra* note 2; Amy Kapczynski, *The Cost of Price: Why and How to Get Beyond Intellectual Property Internalism*, 59 UCLA L. REV. 970 (2012). For more examples, see *infra* Section II.A. There are also incentives for innovation that are not facilitated by governments—such as first-mover advantage—but I use “nonpatent incentive” to refer to state-facilitated transfers from taxpayers to innovators.

<sup>4</sup> See Daniel J. Hemel & Lisa Larrimore Ouellette, *Innovation Policy Pluralism*, 128 YALE L.J. (forthcoming), <https://ssrn.com/abstract=3125784>.

<sup>5</sup> See *infra* Section II.B.

<sup>6</sup> See, e.g., U.S. Patent No. 8,078,334 cl. 1 (filed Jan. 23, 2008) (claiming a system including “a wearable device” that measures analytes including “alcohol”).

<sup>7</sup> See, e.g., Jayoung Kim, *Noninvasive Alcohol Monitoring Using a Wearable Tattoo-Based Iontophoretic-Biosensing System*, 1 ACS SENSORS 1011, 1018 (2016) (reporting federal grant support from the NIH and the Defense Threat Reduction Agency).

<sup>8</sup> See *Research and Development Tax Incentives for the Medical Equipment Industry*, ALLIANT GROUP, <https://www.alliantgroup.com/index.php/industries/manufacturing/medical-equipment-manufacturer> (last visited Jan. 19, 2017).

are undervalued by the market (due, for example, to positive externalities for third parties who are less likely to be harmed in alcohol-related accidents).<sup>9</sup> Yet allowing one firm to claim these nonpatent incentives in addition to full patent rents might lead to returns far in excess of what was needed to incentivize development efficiently. Furthermore, stacking patents on top of nonpatent rewards does nothing to capitalize on one of the main benefits of nonpatent mechanisms: reducing deadweight loss by funding the reward through broad-based taxation rather than proprietary pricing.<sup>10</sup>

There are a number of potential solutions to this reward-stacking problem, including limiting the availability of patent rights as a matter of patent doctrine in areas with significant nonpatent incentives, or conditioning receipt of nonpatent incentives on more limited patent rights.<sup>11</sup> This Article examines an additional solution: reducing patent damages to account for the nonpatent rewards that an invention has received, including the *ex ante* reduction of risk. The goal would be to reduce patent rents—and thus the corresponding loss to society—by either inducing efficient infringement or incentivizing the patentee to lower prices in order to preserve market share. This proposal could be implemented, for example, as part of recent proposals to base damages to some degree on an innovator’s risk-adjusted R&D costs.<sup>12</sup> Incorporation of nonpatent rewards into this cost-based approach is a doctrinal tool for mediating between different bodies of innovation law that has thus far been overlooked.

To be sure, moving to an entirely cost-based system of patent damages would be a significant change from current practice, with numerous administrative difficulties.<sup>13</sup> For example, identifying the R&D projects that should be lumped together for purposes of calculating costs and nonpatent rewards would be an important boundary-drawing problem. Compared with the other costs and benefits associated with this shift, the ability to more easily account for nonpatent incentives

---

<sup>9</sup> See, e.g., Sean Hollister, *This Alcohol Monitoring Wristband Just Won a \$200,000 Prize*, CNET (Jan. 18, 2017), <https://www.cnet.com/news/bactrack-skyn-blood-alcohol-content-wristband>.

<sup>10</sup> Taxes funded through broad-based taxation—in which taxpayers cross-subsidize each other’s knowledge-good consumption—generally impose less deadweight loss than IP. See Steven Shavell & Tanguy Van Ypersele, *Rewards Versus Intellectual Property Rights*, 44 J.L. & ECON. 525, 530 (2001). This efficiency gain disappears if the nonpatent incentives are funded through a concentrated tax. See Hemel & Ouellette, *supra* note 2, at 350.

<sup>11</sup> See *infra* Section II.C.

<sup>12</sup> See Ted Sichelman, *Innovation Factors for Reasonable Royalties*, 25 TEX. INTELL. PROP. L.J. 277 (2018) [hereinafter Sichelman, *Innovation Factors*]; Ted Sichelman, *Purging Patent Law of “Private Law” Remedies*, 92 TEX. L. REV. 517, 528 (2014) [hereinafter Sichelman, *Purging Patent Law*]; John M. Golden & Karen Sandrik, *A Restitution Perspective on Reasonable Royalties*, 36 REV. LITIG. 335 (2017); see also Hannah Brennan, Amy Kapczynski, Christine H. Monahan & Zain Rizvi, *A Prescription for Excessive Drug Pricing: Leveraging Government Patent Use for Health*, 18 YALE J.L. & TECH. 275, 310–12 (2016) (proposing a similar approach for calculating damages for government patent use under 28 U.S.C. § 1498); *infra* Section III.B.1 (reviewing this literature). For an economic analysis of these proposals, see Michael Abramowicz, *Cost-Plus Damages*, 26 Tex. Intell. Prop. L.J. 133 (2018).

<sup>13</sup> See, e.g., *infra* notes 135–136 and accompanying text.

may seem like a second-order concern. And such a policy would certainly not solve all stacking problems. For one thing, it would be inapplicable in cases in which patentees receive injunctions rather than damages—though perhaps the existence of extensive nonpatent funding should affect whether injunctions are available in a given technical field. The net welfare effect of shifting to cost-based damages is an empirical question that closely tracks whether R&D tax credits (a cost-based reward) or traditional patent remedies based on market exclusivity will provide more efficient transfers to knowledge-good producers, which I have discussed in prior work with Daniel Hemel.<sup>14</sup>

But the purpose of this Article is not to prove that this approach to patent damages is uniformly superior to either current damages doctrine or to other potential solutions to the problem of too many stacked innovation incentives. Rather, my modest goal is to show that there is not yet a satisfactory legal interface between patent and nonpatent innovation policies, and that patent damages doctrine is one viable policy tool to fill this gap. Importantly, one need not wholeheartedly embrace cost-based damages to adopt this approach. The same doctrinal hooks that support entirely cost-based damages could be used for a more modest intervention in which patent damages are reduced to account for nonpatent rewards no matter how those damages are initially calculated.

Below, Part II unpacks the problem of stacked innovation policies and explores the different policy levers for tackling this problem. Part III presents this Article's solution: adjusting patent damages to account for related nonpatent incentives. Finally, Part IV explains how this approach could be used not just for improving the mix of policies on the incentive side of innovation policy, but also on the allocation side. Economic theory indicates that despite the screening value that market power provides, somewhat reducing a patentee's market power without reducing innovation incentives is likely to be welfare enhancing.<sup>15</sup> Reducing patent damages while compensating patentees with nonpatent measures funded through broad-based taxation may well be administratively simpler than patent auctions and other proposals to accomplish the same goal.

## II. Nonpatent Incentives and Overcompensation

This Part sets out the problem that this Article is attempting to solve. Section II.A describes how state-sponsored nonpatent incentives are already a significant

---

<sup>14</sup> See Hemel & Ouellette, *supra* note 2, at 328–31 (explaining why in certain circumstances, a system that relies more heavily on tax credits—or on a combination of tax credits and weak patents—could outperform a purely patent-based system).

<sup>15</sup> See Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 MICH. L. REV. 985, 989, 1031 (1999) (explaining that “the last increment by which an unconstrained patentee chooses to increase price hurts society much more than it helps the patentee” and proposing a duopoly auction); E. Glen Weyl & Jean Tirole, *Market Power Screens Willingness-To-Pay*, 127 Q.J. ECON. 1971 (2012) (explaining that innovation policy involves a trade-off between the screening benefit of market power and the resulting pricing distortion, such that neither pure monopoly nor pure open access is the optimal allocation regime).

part of U.S. innovation policy in practice and why they sometimes may be preferable to patents. Readers already familiar with this literature may wish to skip to Section II.B, which explains why the current legal framework for nonpatent policies can lead to supra-optimal transfers to innovators. If that point seems obvious, I suggest jumping directly to Section II.C, where I present a variety of possible responses to this problem aside from tackling it through patent damages doctrine.

#### A. Nonpatent Innovation Policies

The case for government intervention in the market for inventions and other knowledge goods is well established. Because knowledge goods are nonrivalrous, they benefit parties other than the producer, and because they are often only partially excludable, those third parties are difficult to exclude from the goods' benefits.<sup>16</sup> But rational producers will invest only to the point that *their* marginal benefit exceeds their marginal cost, which will be less than the socially optimal amount that includes others' benefits. The standard justification for patent laws is that they make knowledge goods more excludable, allowing the patentee to charge above-marginal-cost prices, which increases incentives for production.<sup>17</sup> Patents thus are analogous to a "shadow tax" on knowledge goods, with the revenues going directly to the knowledge-good producers.<sup>18</sup>

Patents are not the only way that the state can increase incentives for the production of knowledge goods: producers can also be rewarded using tools such as direct R&D spending (including grants, intramural research, and procurement), innovation prizes, and R&D tax incentives. In earlier work, Daniel Hemel and I developed a framework for comparing these policies, in which we argue that no one incentive mechanism is uniformly superior.<sup>19</sup> For example, while patents leverage private information about the costs and benefits of potential projects, they may be less efficient than government-set grants and prizes when market value is a poor proxy for social value or when the government has a comparative advantage in evaluating potential avenues for R&D spending.<sup>20</sup> And while *ex post* rewards like patents provide a strong incentive to success, their delayed and speculative nature

---

<sup>16</sup> See generally Daniel J. Hemel & Lisa Larrimore Ouellette, *Knowledge Goods and Nation-States*, 101 MINN. L. REV. 167, 168–70, 192–200 (2016) (explaining this basic principle in more detail and discussing the extent to which knowledge goods are global public goods).

<sup>17</sup> See, e.g., 3 ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 143–44 (4th ed., London, W. Strahan & T. Cadell 1786) (bk. V, ch. 1, para. 119); PETER S. MENELL ET AL., INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE: 2017, at 16–18 (2017).

<sup>18</sup> Hemel & Ouellette, *supra* note 2, at 312–14, 371–73.

<sup>19</sup> For the framework, see *id.* at 326–52. For a discussion of the circumstances in which each kind of policy might be optimal, see *id.* at 375–78. For some of the seminal papers our work built upon, see Nancy Gallini & Suzanne Scotchmer, *Intellectual Property: When Is It the Best Incentive System?*, in 2 INNOVATION POLICY AND THE ECONOMY 51 (Adam B. Jaffe et al. eds., 2002); Shavell & Van Ypersele, *supra* note 10; Joseph E. Stiglitz, *Economic Foundations of Intellectual Property Rights*, 57 DUKE L.J. 1693 (2008); Brian D. Wright, *The Economics of Invention Incentives: Patents, Prizes, and Research Contracts*, 73 AM. ECON. REV. 691 (1983).

<sup>20</sup> Hemel & Ouellette, *supra* note 2, at 327–32.

means that for risky research with binding capital constraints, society may get more “bang for its buck” with *ex ante* rewards like grants and tax incentives.<sup>21</sup>

These nonpatent incentives are not merely of theoretical interest. In 2013, the federal government spent over \$130 billion on direct R&D spending (including a small amount on prizes) and over \$12 billion on the two general R&D tax incentives.<sup>22</sup> The patent shadow tax is more difficult to estimate because it is transferred directly from consumers to producers without passing through the government budget, but it is likely less than the amount transferred through nonpatent incentives.<sup>23</sup>

State-facilitated nonpatent incentives have long been a part of the real world of innovation policy, but they have lately attracted a surge of interest from IP scholars.<sup>24</sup> As just one example, while there is a long literature on how low-cost forms of cultural production can occur without IP,<sup>25</sup> it is only more recently that legal scholars have developed case studies of how nonpatent incentives have worked as a supplement or replacement for the patent system in more capital-intensive research fields such as fracking or vaccine development.<sup>26</sup> (Of course, these fields also benefit from nonpatent *market* incentives such as first-mover advantage; as noted previously, I am using “nonpatent incentives” to refer to state-facilitated transfers from knowledge-good consumers to knowledge-good

---

<sup>21</sup> *Id.* at 333–43.

<sup>22</sup> *See id.* at 321 & n.75, 322–23 & n.85, 325 & n.103 (citing sources).

<sup>23</sup> *See id.* at 372 & n.311.

<sup>24</sup> *See, e.g.*, Ayres & Kapczynski, *supra* note 3, at 1782–83 (noting that while the innovation literature has focused on IP, “[r]ecent attention has also been given to additional mechanisms,” and focusing on the role “innovation sticks” can play); Kapczynski, *supra* note 3, at 970 (“In the field of IP, I conclude, we should pay less attention to IP and more to the alternatives.”). One marker of this recent interest is the large number of scholars who convened at Yale Law School in 2014 and 2015 for two conferences on “Innovation Law Beyond IP.” For a description of the second conference, see Lisa Ouellette, *Innovation Law Beyond IP 2*, WRITTEN DESCRIPTION (Mar. 28, 2015), <https://writtendescription.blogspot.com/2015/03/the-second-innovation-law-beyond-ip.html>.

<sup>25</sup> *See generally* Kal Raustiala & Christopher Jon Sprigman, *When Are IP Rights Necessary? Evidence from Innovation in IP’s Negative Space*, in RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW (Peter Menell et al. eds., forthcoming 2019), <https://ssrn.com/abstract=2838555> (reviewing this literature).

<sup>26</sup> *See* John M. Golden & Hannah J. Wiseman, *The Fracking Revolution: Shale Gas as a Case Study in Innovation Policy*, 64 EMORY L.J. 955, 962 (2015) (“[P]atents appear to have been only bit players in the basic story behind the fracking revolution.”); Amy Kapczynski, *Order Without Intellectual Property Law: Open Science in Influenza*, 102 CORNELL L. REV. 1539 (2017) (studying how the transnational public scientific network that develops flu vaccines operates without resource to conventional IP); Lisa Larrimore Ouellette, *Nanotechnology and Innovation Policy*, 29 HARV. J.L. & TECH. 33, 71 (2015) (concluding that the development of nanotechnology has involved substantial use of both patents and other state-facilitated transfers to innovators); Laura G. Pedraza-Fariña, *Constructing Interdisciplinary Collaboration: The Oncofertility Consortium as an Emerging Knowledge Commons*, in GOVERNING KNOWLEDGE COMMONS 259 (Katherine Strandburg et al. eds., 2017) (studying the grant-funded oncofertility consortium and concluding that the role of patents was largely as an attributional device).

producers.<sup>27</sup>) In sum, it now seems widely recognized among legal scholars that patent law is not the state's only—or even primary—tool to promote innovation. But what is less clear is how, if at all, this should change how patent law scholars should think about patent law.

### B. The Reward-Stacking Problem

In practice, U.S. policy tends to offer nonpatent rewards as a complement to patent rights, not a substitute for them.<sup>28</sup> Under the Bayh–Dole Act, federal grant recipients may patent the results of their research,<sup>29</sup> and the Stevenson–Wydler Act sets similar technology transfer rules for researchers in federal laboratories.<sup>30</sup> By default, winners of innovation prizes from federal agencies retain their intellectual property rights.<sup>31</sup> And R&D tax incentives do not place any limits on the recipients' patent rights.<sup>32</sup>

Allowing producers to claim both patent and nonpatent rewards for the same knowledge good raises an obvious concern: Are we sometimes offering *too much* reward? Overcompensation is not merely an unnecessary wealth transfer; it also leads to deadweight loss from raising the funds. This is a problem for nonpatent incentives funded through general tax revenues, and—given the heightened inefficiencies of a concentrated tax—an even bigger problem for funding research on the same knowledge goods through the patent shadow tax.<sup>33</sup> Overly large rewards for knowledge-good producers might also lead to inefficient “racing” to claim the reward.<sup>34</sup>

Overcompensation can be a problem with patent incentives alone, even before nonpatent incentives are added to the picture. The holder of a patent on a small component of a complex product may receive more than the social value actually added by that component by threatening an injunction against the entire product<sup>35</sup> or

---

<sup>27</sup> See *supra* note 3.

<sup>28</sup> See generally Hemel & Ouellette, *supra* note 4 (examining when this makes sense from a theoretical perspective).

<sup>29</sup> 35 U.S.C. § 200–12 (2012).

<sup>30</sup> 15 U.S.C. § 3701–14 (2012).

<sup>31</sup> See 15 U.S.C. § 3719(j)(1) (prohibiting the agencies from acquiring an intellectual property right in the invention without written consent).

<sup>32</sup> See generally I.R.C. § 41, 174 (2012).

<sup>33</sup> See Gallini & Scotchmer, *supra* note 19, at 54; Shavell & Van Ypersele, *supra* note 10, at 526–627 (2001).

<sup>34</sup> See Michael Abramowicz, *Perfecting Patent Prizes*, 56 VAND. L. REV. 115, 185–87 (2003) (describing the “three related problems” with patent races: “excessive innovative activity,” “duplicative” research, and reinforcement of “inefficient industrial structures”). *But see* Mark A. Lemley, *The Myth of the Sole Inventor*, 110 MICH. L. REV. 709, 709 (2012) (“Patent racing cannot alone justify a patent system, but it may do more than any existing theory to explain how patents work in practice.”). Whether patent races are in fact efficient, and whether nonpatent incentives can outperform patents in this regard, are empirical questions. See Hemel & Ouellette, *supra* note 2, at 360–61.

<sup>35</sup> See Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 1993 (2007). As Ted Sichelman emphasizes, Lemley and Shapiro's arguments against injunctions for minor components of complex products apply to any patentee, practicing or not. Sichelman,

by bargaining in the shadow of an inflated damages award based on improper use of *ex post* considerations such as lock-in costs.<sup>36</sup> But even if patent damages were precisely calibrated to the marginal social value provided by an invention and there were no bargaining breakdowns, patents would still sometimes overcompensate inventors in those cases where the invention would still have been made for less than its social value.<sup>37</sup> Ted Sichelman suggests, quite plausibly, that excessive incentives are more likely for software than for pharmaceuticals.<sup>38</sup> But even in the pharmaceutical industry, producers generally do not need to receive what the market will bear for every drug. For example, a recent study at Yale concluded that the list prices for Gilead's new drugs for treating Hepatitis C approach \$100,000 for a twelve-week regimen, resulting in \$36 billion in earnings in the drugs' first twenty-seven months—likely around forty times the total cost of developing the drugs.<sup>39</sup> (Of course, patents may *undercompensate* as well, including for pharmaceuticals, such that not all welfare-enhancing R&D projects are pursued.<sup>40</sup>)

Adding nonpatent rewards to the mix exacerbates the overcompensation problem, though it can also ameliorate undercompensation. As noted above, total state-facilitated transfers from U.S. consumers to U.S. knowledge-good producers through nonpatent mechanisms may well be greater than transfers through the patent shadow tax.<sup>41</sup> The largest source of nonpatent rewards is direct spending on grants and government laboratories, so this problem directly connects to the debate over whether patents should be allowed on taxpayer-funded inventions through the Bayh–Dole and Stevenson–Wylder Acts.

---

*Innovation Factors*, *supra* note 12, at 301–02.

<sup>36</sup> See William F. Lee & A. Douglas Melamed, *Breaking the Vicious Cycle of Patent Damages*, 101 CORNELL L. REV. 385, 413 (2016).

<sup>37</sup> See Brett M. Frischmann & Mark A. Lemley, *Spillovers*, 107 COLUM. L. REV. 257, 276 (2007) (“[I]nventors do not need to capture the full social value of their inventions in order to have sufficient incentive to create.”); Hemel & Ouellette, *supra* note 2, at 329–31 (explaining why the patent reward may differ from the optimal transfer size to an innovator).

<sup>38</sup> Sichelman, *Innovation Factors*, *supra* note 12, at 302–03.

<sup>39</sup> Brennan et al., *supra* note 12, at 278, 328. For the argument that this is excessive and the calculation of a more appropriate reward, see *id.* at 328–30. This supracompetitive return is primarily due to a combination of patents and patent-like regulatory exclusivity provided by the FDA. See Lisa Larrimore Ouellette, *Patentable Subject Matter and Nonpatent Innovation Incentives*, 5 UC IRVINE L. REV. 1115, 1130 (2015).

<sup>40</sup> This can be due to the social value of the invention exceeding the value that can be appropriated through a twenty-year patent, or to inefficiencies in enforcement, such as undetected infringement or errors in adjudication. See, e.g., Eric Budish, Benjamin N. Roin & Heidi Williams, *Do Firms Underinvest in Long-Term Research? Evidence from Cancer Clinical Trials*, 105 AM. ECON. REV. 2044, 2047 (2015) (finding R&D distortion away from drugs to prevent or treat early-stage cancers that require longer clinical trials and thus have shorter effective patent term); Michael Abramowicz, *A Unified Economic Theory of Noninfringement Opinions*, 14 FED. CIRCUIT B.J. 241, 249 (2004) (calling for enhanced damages to counteract undetected infringement, where “cost internalization requires that the damages multiplier be the inverse of the probability of detection”); Anup Malani & Jonathan S. Masur, *Raising the Stakes in Patent Cases*, 101 GEO. L.J. 637, 641 (2013) (noting that patents may undercompensate due to the risk that a valid patent will be mistakenly invalidated in litigation).

<sup>41</sup> See *supra* notes 22–23 and accompanying text.

As is well established in the Bayh–Dole literature, there are some cases in which even after an invention has been created through grant-funded research, an additional incentive (such as the exclusivity provided by a patent) is needed to commercialize that invention.<sup>42</sup> The prototypical example is a promising new drug compound, for which pharmaceutical companies generally will not undertake the expense of clinical trials without sufficient patent rights.<sup>43</sup> But as Mark Lemley has noted, “the validity of commercialization theory depends a great deal on the industry in question and the particular nature of the technology.”<sup>44</sup> The widespread use of nonexclusive licenses for grant-funded inventions suggests that in many cases, exclusive patent rights are *not* needed to bring these inventions to market.<sup>45</sup> Numerous commentators thus have expressed concern that in many cases, Bayh–Dole patents force U.S. taxpayers to “pay twice” for patented products,<sup>46</sup> by which they presumably mean simply that the public is paying more than is needed to bring the invention to market efficiently. Overcompensation of grant-funded researchers through unnecessary patent rights can lead to substantial deadweight loss.<sup>47</sup>

### C. Potential Solutions

The prior literature suggests at least two classes of solutions to the reward-stacking problem described in Section II.B aside from reducing patent damages. First, the patentability of inventions that have received significant nonpatent incentives could be limited, such as through patentable-subject-matter or

---

<sup>42</sup> See, e.g., Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1669 (1996).

<sup>43</sup> See Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 503 (2009).

<sup>44</sup> Mark A. Lemley, *Are Universities Patent Trolls?*, 18 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 611, 622–23 (2008); see also Mark A. Lemley & Robin Feldman, *Patent Licensing, Technology Transfer, and Innovation*, 106 AM. ECON. REV.: PAPERS & PROC. 188, 189 (2016) (reviewing the literature on the ways patents can help commercialization, and noting that “there is increasing evidence that [non-practicing entities that assert patents] are *targeting* successful commercializers rather than facilitating new commercialization”).

<sup>45</sup> See Ian Ayres & Lisa Larrimore Ouellette, *A Market Test for Bayh–Dole Patents*, 102 CORNELL L. REV. 271, 275–76 & n.16 (2017) (noting that over sixty percent of university inventions are licensed nonexclusively and arguing that “a nonexclusive license is prima facie evidence that the invention ought not to have been patented at all”). *But see* Daniel J. Hemel & Lisa Larrimore Ouellette, *Bayh–Dole Beyond Borders*, 4 J.L. & BIOSCIENCES 282 (2017) (suggesting an overlooked benefit of Bayh–Dole patents).

<sup>46</sup> See, e.g., Rochelle Cooper Dreyfuss, *Collaborative Research: Conflicts on Authorship, Ownership, and Accountability*, 53 VAND. L. REV. 1161, 1194 (2000); Rebecca S. Eisenberg, *Public Research and Private Development: Patents and Technology Transfer in Government-Sponsored Research*, 82 VA. L. REV. 1663, 1666 (1996); Bhaven N. Sampat & Frank R. Lichtenberg, *What Are the Respective Roles of the Public and Private Sectors in Pharmaceutical Innovation?*, 30 HEALTH AFF. 332, 333 (2011); cf. Bd. of Trs. of Leland Stanford Jr. Univ. v. Roche Molecular Sys., 131 S. Ct. 2188, 2201 (2011) (Breyer, J., dissenting) (arguing that there must be some compensating benefit of Bayh–Dole because otherwise, “Why should the public have to pay twice for the same invention?”).

<sup>47</sup> See *supra* note 33 and accompanying text. One prominent example is the \$255 million in nonexclusive patent license fees that Stanford received for the Cohen–Boyer patents on early recombinant DNA technology. See Ayres & Ouellette, *supra* note 45, at 275.

nonobviousness doctrines.<sup>48</sup> Second, nonpatent incentives could be conditioned on some relinquishment of patent rights, such as through limits on the ability to patent or exclusively license the results of federally funded research. This Section explains these possibilities in turn.

One possible doctrinal avenue for limiting patents on inventions that have received sufficient nonpatent incentives is to consider such inventions not within the judicially created limits on patentable subject matter under § 101.<sup>49</sup> The Supreme Court justifies its limits on patenting laws of nature, natural phenomena, and abstract ideas based on the concern that “[m]onopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it,” thereby thwarting the primary object of the patent laws.<sup>50</sup> As I have previously explained, for those who think patentable-subject-matter boundaries should be based on an explicit economic balancing of incentives, this balancing must account for widespread use of nonpatent incentives.<sup>51</sup> For example, Katherine Strandburg suggests that subject matter ought to be defined based on whether patent law is the best institutional mechanism for rewarding innovations of that type, or whether an alternative approach is more effective.<sup>52</sup> A difficulty with widespread use of such an approach, however, is that subject-matter boundaries would vary as the state adds or removes incentives.<sup>53</sup> Defining how broadly such boundaries should be drawn would also be challenging.<sup>54</sup>

The nonobviousness requirement of § 103 may be a more promising policy lever for the fact-intensive inquiry of whether a given invention has already received sufficient state-facilitated support.<sup>55</sup> A number of commentators have suggested that the test for whether an invention is obvious under § 103 should be explicitly based on economic considerations, with the possible doctrinal hook of the Supreme Court’s admonition in *Graham v. John Deere* that the nonobviousness requirement is meant to limit patents to only “those inventions which would not be disclosed or devised but for the inducement of a patent.”<sup>56</sup> Michael Abramowicz

---

<sup>48</sup> Cf. Benjamin N. Roin, *The Case for Tailoring Patent Awards Based on Time-to-Market*, 61 UCLA L. REV. 672, 700–01 (2014) (criticizing “glaring oversights in the standards of patentability [that] routinely allow firms to patent many inventions that they would have developed anyway” by ignoring factors such as “R&D costs”).

<sup>49</sup> 35 U.S.C. § 101 (2012).

<sup>50</sup> *Alice Corp. Pty. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354 (2014) (quoting *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012)).

<sup>51</sup> Ouellette, *supra* note 39, at 1143–44.

<sup>52</sup> Katherine Strandburg, *Patentable Subject Matter from First Principles* (July 24, 2015) (unpublished manuscript) (on file with author).

<sup>53</sup> Ouellette, *supra* note 39, at 1144.

<sup>54</sup> For example, is funding for dynamically crosslinked hydrogels for drug delivery an incentive for biomaterials, drug delivery, medicine, or just the narrow category of dynamically crosslinked hydrogels for drug delivery?

<sup>55</sup> 35 U.S.C. § 103 (2012).

<sup>56</sup> *Graham v. John Deere Co.*, 383 U.S. 1, 11 (1966); see Robert P. Merges, *Uncertainty and the Standard of Patentability*, 7 HIGH TECH. L.J. 1 (1992); Glynn S. Lunney, Jr., *E-Obviousness*, 7 MICH. TELECOMM. & TECH. L. REV. 363 (2001); Tun-Jen Chiang, *A Cost-Benefit Approach to*

and John Duffy note that this test might “be viewed as establishing too stringent of an obviousness standard where the nonpatent inducements for innovation are especially powerful.”<sup>57</sup> But this seems like a valuable feature of this approach, not a bug.

A second category of solutions is to tackle stacking not through patent doctrines, but rather through conditions on nonpatent incentives. For example, the government (or any private firm or foundation) could condition a grant or a prize on acceptance of some limitation on patent rights, including forgoing patenting altogether. While a *mandatory* requirement to use only nonpatent rewards for a given technology would require an overhaul of the Patent Act and would violate U.S. obligations under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS),<sup>58</sup> an *opt-in* nonpatent reward system poses no legal problems.<sup>59</sup>

For example, the Bayh–Dole Act already imposes some limitations on the patent rights of federal grant recipients, at least in theory.<sup>60</sup> (In practice contractors often fail to satisfy their reporting obligations and agencies have never exercised so-called march-in rights.<sup>61</sup>) A number of scholars have proposed limits on Bayh–Dole patent rights to help better align the patent reward with the socially optimal transfer.<sup>62</sup> There have also been proposals for innovation prize systems in which the

---

*Patent Obviousness*, 82 ST. JOHN’S L. REV. 39, 105 (2008); Michael Abramowicz & John F. Duffy, *The Inducement Standard of Patentability*, 120 YALE L.J. 1590, 1590 (2011). Abramowicz and Duffy explain that this standard cannot mean “would not ever be disclosed” or “would not immediately be disclosed” but must mean “would not have been disclosed or devised for a substantial period of time” (such that the benefits of granting the patent outweigh the costs). Abramowicz & Duffy, *supra*, at 1599.

<sup>57</sup> Abramowicz & Duffy, *supra* note 56, at 1623.

<sup>58</sup> See 35 U.S.C. § 101 (2012); Agreement on Trade-Related Aspects of Intellectual Property Rights art. 27, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1C, 1869 U.N.T.S. 299, 33 I.L.M. 1197 [hereinafter TRIPS] (“[P]atents shall be available for any inventions, whether products or processes, in all fields of technology . . .”).

<sup>59</sup> See generally WILLIAM W. FISHER III & TALHA SYED, *Prizes, in INFECTION: THE HEALTH CRISIS IN THE DEVELOPING WORLD AND WHAT WE SHOULD DO ABOUT IT* 37 (forthcoming 2018).

<sup>60</sup> The agency that sponsored the grant is entitled to “a nonexclusive, nontransferable, irrevocable, paid-up license” to the patents, and any U.S. patent application must specify “that the Government has certain rights in the invention.” 35 U.S.C. § 202(c)(4), (6); 37 C.F.R. § 401.14(a), cl. (b). The agency may also “require periodic reporting on the utilization” of the invention, 35 U.S.C. § 202(c)(5); 37 C.F.R. § 401.14(a), cl. (h), and may exercise “march-in” rights to issue additional licenses to the invention if the contractor is not taking “effective steps to achieve practical application” or “to alleviate health or safety needs,” 5 U.S.C. § 203(a); 37 C.F.R. § 401.6, 401.14(a), cl. (j). Exclusive licensees of Bayh–Dole patents must agree “that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States” unless domestic manufacture is infeasible. 35 U.S.C. § 204; 37 C.F.R. § 401.14(a), cl. (i).

<sup>61</sup> See Arti K. Rai & Bhaven N. Sampat, *Accountability in Patenting of Federally Funded Research*, 30 NATURE BIOTECHNOLOGY 953, 954–55 (2012); Ryan Whalen, Note, *The Bayh–Dole Act & Public Rights in Federally Funded Inventions: Will the Agencies Ever Go Marching in?*, 109 NW. U. L. REV. 1083 (2015).

<sup>62</sup> Ayres & Ouellette, *supra* note 45.

prizes are conditioned on relinquishing traditional patent rights.<sup>63</sup>

Of course, the solutions described above are not mutually exclusive: we can use the nonobviousness doctrine to limit patents on inventions that would be created without the inducement of the patent system due to strong nonpatent incentives *and* condition some nonpatent rewards on curtailment of patent rights. And these possibilities do not exhaust the entire solution space for the reward-stacking problem. The following Part turns to a different solution, which could be used in conjunction with or as an alternative to the ones already described.

### III. Accounting for Nonpatent Incentives Through Patent Damages

As explained in Part II, although nonpatent incentives are ubiquitous in practice, they may lead to supra-optimal transfers to knowledge-good producers in some cases. This Part presents an alternative solution to those described in Section II.C: accounting for nonpatent incentives in patent damages awards. Before turning to any practical details, note that an important policy choice is what happens with the money saved through the reduced award: is it paid by infringers and then returned to the public fisc by the patentee, or is each infringer's liability reduced? Although taxpayers may seem to be more deserving recipients than infringers, as discussed below, the choice is not so straightforward, even as a theoretical matter.

Section III.A briefly describes the first option, in which patentees reimburse the government for relevant nonpatent funding out of patent rewards from litigation or licensing, and explains why this is not necessarily superior. Section III.B then discusses how patent damages might be reduced to account for nonpatent transfers, either as part of the broader "cost-plus" damages framework that other scholars have advocated or as a more modest adjustment to the current damages approach.

#### A. Repaying Nonpatent Rewards from Patent Damages

Requiring patentees to repay nonpatent transfers out of patent revenues is perhaps the simplest solution to the reward-stacking problem, at least if Congress were willing to pass the necessary legislation (a not insignificant hurdle). This solution could not be implemented as a matter of current patent doctrine, but it could be statutorily required under the Patent Act or under legislation that allocates tax revenues toward nonpatent incentives such as grants, prizes, or tax credits. For example, rather than restricting Bayh–Dole patent rights, one could give federal grant recipients complete freedom to exploit any resulting patents for the maximum patent rents through licensing and litigation, but with the condition that the initial grant be repaid to the Treasury.

The amount of nonpatent funding an entity has received should be relatively easy to determine from government records, although there still would be challenges in deciding whether rewards should be partitioned among different

---

<sup>63</sup> See, e.g., AIDAN HOLLIS & THOMAS POGGE, *THE HEALTH IMPACT FUND: MAKING NEW MEDICINES ACCESSIBLE FOR ALL* (2008), [http://healthimpactfund.org/wp-content/uploads/2015/12/hif\\_book.pdf](http://healthimpactfund.org/wp-content/uploads/2015/12/hif_book.pdf).

projects and whether the government should receive an additional return based on the risk reduction the entity received. For nonpatent funding that is intended to address undercompensation through the patent system—such as for environmental research or other projects with significant positive externalities beyond the normal spillovers from innovation—the relevant agency could waive the payback requirement.

Given the relative simplicity of this approach compared with a policy of having excess rewards reduced from each infringer's bill (discussed in the following Section), having patentees repay nonpatent rewards might seem clearly superior. But reimbursing taxpayers has an important downside: it does not allow nonpatent rewards funded through broad-based taxation to reduce the deadweight loss of knowledge-good allocation. The choice of what happens to the money saved through the reduced patent damages award is a choice about *who pays* for the relevant knowledge good. When excess rewards are returned to the Treasury, those rewards are paid by infringers, which means they are ultimately paid by consumers of the knowledge good through the patent shadow tax. When excess rewards are subtracted from the damages awards that infringers must pay, those rewards are paid by all taxpayers, such that they cross-subsidize each other's knowledge-good consumption.

This *who pays* question has obvious distributive implications, and one's views on whether the costs of knowledge-good production should be concentrated on users of those goods likely varies by context.<sup>64</sup> For example, for most readers, cross-subsidization probably seems more attractive for research on life-saving medicine than yachts. But the choice is not merely distributive; it is also inextricably connected with economic efficiency. As I will explain in Part IV, the most efficient allocation mechanism for a given knowledge good is likely neither pure user-pays, with the transfer paid only through the patent shadow tax, nor pure cross-subsidization, with the transfer paid only through general tax revenues and goods allocated at marginal cost. Suffice it to say for now that any such efficiency gain would not be realized if all incentives funded through general tax revenues had to be repaid.

There may be some cases, of course, in which a repayment requirement would not lead to purely user-pays allocation: such a requirement would likely deter patentees from pursuing only low-value infringers, since they might then have to forfeit the entire damages reward. This is probably a net benefit of the policy rather than a cost, given the high transaction costs of litigation and licensing. If the total market value of the invention that can be recovered through exploiting the patent is less than the nonpatent funding the patentee has received, then enforcing the patent would simply result in a transfer from knowledge-good users to all taxpayers. This wealth transfer in *who pays* would not lead to any additional incentive for the patentee, and it would come with the transaction costs of patent enforcement, so

---

<sup>64</sup> See Hemel & Ouellette, *supra* note 2, at 350.

avoiding enforcement is likely to be salutary. But note that this benefit is present whether the patentee must repay nonpatent rewards or simply cannot recover as large of patent rewards in the first place. The latter option is explored in depth in the following Section.

### B. Reducing Patent Damages Based on Nonpatent Rewards

The remainder of this Part examines how patent damages awards could be reduced based on the nonpatent funding a patentee has already received. While this approach raises logistical complications beyond those of the repayment option described in Section III.A, such as how this benefit should be allocated among multiple infringers, it has the practical advantage of being implementable through judicially developed patent doctrine, as well as the allocative efficiency benefit described in more detail in Part IV. Before turning to nonpatent rewards in particular, I begin by reviewing the growing literature suggesting that patent damages should be more heavily based on the patentee's risk-adjusted R&D costs.

#### 1. *Calculating Damages Based on the Patentee's Costs*

The Patent Act entitles successful patent plaintiffs to “damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer.”<sup>65</sup> In over two-thirds of cases, damages are based only on this floor of a “reasonable royalty.”<sup>66</sup> According to the Lex Machina database of patent lawsuits filed beginning in 2000, district courts have awarded a total of \$17.9 billion patent damages in 537 cases, of which \$14.1 billion in 471 cases was for reasonable royalties, while \$3.9 billion in 166 cases was for the patentee's lost profits (with 66 cases involving an award of both).<sup>67</sup> While Lex Machina does not report whether these awards were modified on appeal, these figures are likely a vast understatement of the impact of patent damages awards. Many patent royalties are efficiently negotiated without resort to the court system, and most patent lawsuits are settled before judgment, with these private settlement values being based on the parties' expectations of the outcome in the courts, including the expected damage award.<sup>68</sup> Additionally, the possibility of large

---

<sup>65</sup> 35 U.S.C. § 284 (2012). While the focus of this Article is on damages, patentees may also receive injunctions, *id.* § 283, which will be discussed in more detail below, *see infra* notes 117–121, as well as treble damages for willful infringement and attorney's fees “in exceptional cases,” 35 U.S.C. §§ 284–85; *see* Halo Elecs., Inc. v. Pulse Elecs., Inc., 136 S. Ct. 1923 (2016) (enhanced damages under § 284); Octane Fitness, LLC v. ICON Health & Fitness, Inc., 134 S. Ct. 1749 (2014) (attorney's fees under § 285).

<sup>66</sup> *See* PRICEWATERHOUSECOOPERS, 2015 PATENT LITIGATION STUDY: A CHANGE IN PATENTEE FORTUNES (2015), <https://www.pwc.com/us/en/services/forensics/library/patent-litigation-study-2015.html> (reporting that from 2005 to 2014, 81% of patent damage awards were based on reasonable royalties, 31% were based on lost profits, and 2% were based on price erosion, with totals exceeding 100% because some litigants receive damages under both lost profits and reasonable royalties).

<sup>67</sup> *See* LEX MACHINA, <https://lexmachina.com> (search conducted Jan. 19, 2017).

<sup>68</sup> *See, e.g.*, John R. Allison, Mark A. Lemley & David L. Schwartz, *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769, 1780 (2014) (reporting that of patent lawsuits filed in 2008 and 2009, fewer than ten percent resulted in a merits decision); Robert D. Cooter &

damages deters some firms from entering some patent-protected markets at all, and thus affects pricing in these industries.

While there are accepted nonexclusive multi-factor tests for calculating patent damages—namely, the fifteen-factor *Georgia-Pacific* test for reasonable royalties<sup>69</sup> and the four-factor *Panduit* test for lost profits<sup>70</sup>—patent damages law has faced a barrage of criticisms and seems far from settled.<sup>71</sup> John Golden has summarized the confusion: “We really have little specific sense of what the value of remedies for patent infringement generally is or should be. And it seems unlikely that we will develop a precise idea anytime soon.”<sup>72</sup> The summary of a recent expert workshop at Berkeley calls damages “one of the most contentious topics in this field” of patent law.<sup>73</sup>

Commentators have made a host of suggestions for improving patent damages law, including in many of the articles prepared for this conference, the relative merits of which are beyond the scope of this article.<sup>74</sup> In the remainder of this section, I summarize one approach that has been proposed recently by some prominent scholars: basing patent damages awards more heavily on the patentee’s costs of invention, including adjustments for risk and opportunity costs. While these proposals have different doctrinal foundations, they are each based on the same premise: patent law should provide remedies only to the extent necessary to encourage innovation.

Ted Sichelman described cost-based damages in general terms in 2014, arguing that rather than focusing on making the patentee whole, remedies should be determined “on the basis of innovation incentives per se” with a test that considers R&D costs as well as a variety of related factors.<sup>75</sup> More recently, he argues that such a test could be operationalized by adding “innovation” factors to the *Georgia-Pacific* test for reasonable royalties based on the patentee’s R&D, commercialization, and opportunity costs.<sup>76</sup> He suggests using as a cost measure the sum of R&D costs and commercialization costs, multiplied by an internal rate of

---

Daniel L. Rubinfeld, *Economic Analysis of Legal Disputes and Their Resolution*, 27 J. ECON. LIT. 1067, 1075 (1989) (reviewing the literature on settlement).

<sup>69</sup> See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) (citing *Georgia-Pac. Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970)).

<sup>70</sup> See *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1545 (Fed. Cir. 1995) (en banc) (citing *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978)).

<sup>71</sup> See, e.g., Lee & Melamed, *supra* note 36; Mark A. Lemley, *The Ongoing Confusion over Ongoing Royalties*, 76 MO. L. REV. 695, 704 (2011); Jonathan S. Masur, *The Use and Misuse of Patent Licenses*, 110 NW. U. L. REV. 115 (2015). For a thoughtful diagnosis of the underlying problem, see Tun-Jen Chiang, *The Information-Forcing Dilemma in Damages Law* (George Mason Univ. Law & Econ. Research Paper No. 16-37, 2016), <https://ssrn.com/abstract=2829179>.

<sup>72</sup> John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 508 (2010).

<sup>73</sup> Stuart Graham, Peter Menell, Carl Shapiro & Tim Simcoe, *Final Report of the Berkeley Center for Law & Technology Patent Damages Workshop*, 25 TEX. INTELL. PROP. L.J. 115 (2017).

<sup>74</sup> See generally John M. Golden, *Foreword: Patent Damages: Working Within Limits*, 36 REV. LITIG. I (2017) (introducing the twelve articles from the first round of this conference).

<sup>75</sup> Sichelman, *Purging Patent Law*, *supra* note 12, at 567.

<sup>76</sup> Sichelman, *Innovation Factors*, *supra* note 12, at 280, 307–11.

return to account for opportunity costs.<sup>77</sup> This figure would “set a range of ‘reasonable royalties’ in view of additional evidence relating to the other factors of the *Georgia-Pacific* test” in the short term,<sup>78</sup> and would become the sole measure of damages in the long term.<sup>79</sup>

John Golden and Karen Sandrik have also advocated consideration of the patentee’s R&D costs, though from the perspective of restitution law.<sup>80</sup> In particular, they note that section 42 of the *Restatement (Third) of Restitution and Unjust Enrichment* provides that a restitution remedy should be available for infringement of IP rights and gives several potential measures for monetary relief, one of which is “the cost to the claimant [i.e., the patentee] of conferring the benefit.”<sup>81</sup> They argue that “the cost of the relevant processes of invention and innovation undertaken by the original inventor or patent holder” thus “might sensibly play [a] more prominent role[,],” and that its omission from the *Georgia-Pacific* factors is “surprising.”<sup>82</sup> R&D costs could be used as “a sporadic factor” in the analysis, in setting a ceiling on damages, or as a more significant factor (with some limitation that costs be “objectively reasonable”).<sup>83</sup>

Finally, Amy Kapczynski and three Yale Law students have noted that a similar approach to patent damages is already used in a narrower context.<sup>84</sup> Under 28 U.S.C. § 1498, the federal government may use patents without license as long as it pays “reasonable and entire compensation for such use and manufacture,” with the sole remedy in the Court of Federal Claims.<sup>85</sup> This provision “is regularly used by the government in other sectors, including defense,” and was relied on “numerous times to procure cheaper generic drugs in the 1960s.”<sup>86</sup> Based on their

---

<sup>77</sup> *Id.* at 310.

<sup>78</sup> *Id.*

<sup>79</sup> *Id.* at 323.

<sup>80</sup> Golden & Sandrik, *supra* note 12.

<sup>81</sup> *Id.* at 363 (quoting RESTATEMENT (THIRD) OF RESTITUTION AND UNJUST ENRICHMENT § 49(3)(b) (2011)).

<sup>82</sup> *Id.* at 371–72.

<sup>83</sup> *Id.* at 372.

<sup>84</sup> Brennan et al., *supra* note 12.

<sup>85</sup> 28 U.S.C. § 1498(a) (2012).

<sup>86</sup> Brennan et al., *supra* note 12, at 275. The federal government has relied on § 1498 to use patented technologies including electronic passports, genetically mutated mice, and software for detecting fraudulent checks. *Id.* at 302. It is difficult to determine the overall frequency of government patent use. Searching the U.S. Department of the Treasury’s Judgment Fund website (which lists final money judgments against the United States that have no other available source of funds) and then searching those case dockets revealed twenty-one § 1498 patent awards from fiscal year 2006 through 2016 with a total payment amount of almost \$60 million. *See Judgment Fund Payment Search*, U.S. DEP’T OF THE TREASURY, <https://jfund.fms.treas.gov/jfradSearchWeb/JFPymtSearchAction.do> (last visited Jan. 27, 2017) (download payment data for each fiscal year, search for § 1498 actions, and then search dockets to eliminate § 1498 copyright suits) (data available upon request). But these are not all § 1498 awards, presumably because some are not paid through the Judgment Fund. *See, e.g., Honeywell Int’l Inc. v. United States*, 114 Fed. Cl. 637 (2014) (entering a stipulated judgment of \$75 million against the United States for use of patented night-vision goggle technology). These cases have

synthesis of the case law, they explain that § 1498 awards are not equivalent to what would be awarded in district court: injunctions are not allowed, lost profits are disfavored, and cases have expressed concern with “excessive compensation” to the patent owner.<sup>87</sup> Adjustments to § 1498 royalties have been made based on risks and expenses incurred by the patentee in developing and creating a market for the products, and to account for “reasonable” profits,<sup>88</sup> so the authors advocate awarding pharmaceutical patentees in § 1498 actions their risk-adjusted R&D costs plus average industry returns (perhaps a 10-30% bounty).<sup>89</sup>

As noted above, all of these proposals are motivated by the goal of providing patent damages only to the extent necessary to encourage innovation, and it is hard to quibble with this goal in theory.<sup>90</sup> But there may be significant problems with implementing this approach in practice, as Michael Abramowicz has nicely illustrated in his symposium contribution.<sup>91</sup> He notes, however, that there is “likely to be little danger in allowing cost-plus damages to be a small factor in the patent analysis,” and that even making cost-plus damages “as much as half of the patent damages calculus” should avoid “the worst dangers” of this approach.<sup>92</sup> As noted in

---

produced relatively few published damages analyses, so most § 1498 damages case law is relatively old, though it presumably still informs settlement values. Twenty of the twenty-one Judgment Fund cases since 2006 were settled with stipulated judgments before trial. *See* BLOOMBERG LAW, <https://www.bloomberglaw.com/dockets> (searched docket numbers from Judgment Fund website on Jan. 28, 2017). The outlier is a judgment for Boeing that settled for \$20 million while on appeal to the Federal Circuit. *See* *Boeing Co. v. United States*, 86 Fed. Cl. 303 (2009) (calculating appropriate reasonable royalty); *Boeing Co. v. United States*, 374 F. App'x 955 (Fed. Cir. 2009) (granting motion to remand case in light of settlement agreement).

<sup>87</sup> Brennan et al., *supra* note 12, at 311–12; *see, e.g.,* *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 842 F.2d 1275, 1283 (Fed. Cir. 1988) (“Though injunctions may seem to say that making for and selling to the government is forbidden, injunctions based on patent rights cannot in reality do that because of § 1498(a.)”); *Tektronix, Inc. v. United States*, 552 F.2d 343, 351 (Ct. Cl. 1977) (“[O]nly a reasonable, not an excessive, royalty should be allowed where the United States is the user—even though the patentee, as a monopolist, might be able to exact excessive gains from private users.”). *See generally* *Leesona Corp. v. United States*, 599 F.2d 958, 964 (Ct. Cl. 1979) (en banc) (“The theory for recovery against the government for patent infringement is not analogous to that in litigation between private parties.”).

<sup>88</sup> *See, e.g., Leesona*, 599 F.2d at 978 (testing reasonableness of royalty rate by comparing it to “the expense incurred by [patentee] in developing its invention, less any compensation received from defendant in its pre-1969 development contracts,” plus a “reasonable profit”); *Tektronix*, 552 F.2d at 350–51 (adjusting royalty rate upward from 7.65% to 10% because patentee “took the risks and bore the expense of developing the [infringing products] and creating a market for them”).

<sup>89</sup> Brennan et al., *supra* note 12, at 315.

<sup>90</sup> *See, e.g.,* Mark A. Lemley, *Taking the Regulatory Nature of IP Seriously*, 92 TEX. L. REV. SEE ALSO 107, 110 (2014) (“At a theoretical level Sichelman is surely right. Patents are government interventions in the marketplace designed to achieve social policy ends. Government distortion of the free market is justified only if necessary to achieve those ends—anything beyond that is social waste. If private law remedies, justified in the name of property, give the patentee more than it needs to encourage it to invent, that extra payment interferes with the free market and may actually interfere with innovation.”).

<sup>91</sup> Michael Abramowicz, *Cost-Plus Damages*, 26 Tex. Intell. Prop. L.J. 133, 148–51 (2018).

<sup>92</sup> *Id.*

the Introduction,<sup>93</sup> my goal is not to unequivocally defend cost-plus damages as a general matter, but experimenting with the approach seems worthwhile,<sup>94</sup> especially as related to nonpatent innovation rewards.

## 2. *Incorporating Nonpatent Rewards into the Damages Calculation*

The application of cost-based patent damages to the reward-stacking problem should at this point be obvious. By simply recognizing that nonpatent rewards should be a factor in calculating the patentee's costs, any of the approaches described in the previous section can be easily adapted to prevent overcompensation through multiple rewards. This does not mean that cost-based damages are easy to calculate in the first place—as discussed below, there are numerous administrative difficulties—only that it is relatively easy to add nonpatent rewards into this calculation.

Incorporating nonpatent rewards into the cost calculation is particularly straightforward because nonpatent rewards are almost always received before patent damages are likely to be calculated. Direct government R&D spending, whether through grants, national labs, or procurement, is awarded *ex ante* for prospective projects or as research costs arise.<sup>95</sup> R&D tax credits can usually be claimed in the same year in which qualifying R&D costs are incurred.<sup>96</sup> Innovation inducement prize competitions can be structured in a wide variety of ways, including in stages, but the prize is typically awarded no later than shortly after the invention at issue is completed.<sup>97</sup> (There are proposals for market-based or performance-based prizes that blend the merits of traditional fixed prize competitions and patents, but these are typically proposed as alternatives rather than complements to patents.<sup>98</sup>) In contrast, to get to the stage at which patent damages are awarded, the inventor needs to first have an invention that is ready for patenting such that an application can be filed,<sup>99</sup> then prosecute that application through the U.S. Patent & Trademark Office (which takes over two years on average),<sup>100</sup> and then file and litigate a patent

---

<sup>93</sup> See *supra* note 14 and accompanying text.

<sup>94</sup> See *id.*; see also Lisa Larrimore Ouellette, *Patent Experimentalism*, 101 VA. L. REV. 65 (2015) (advocating greater experimentation with patent doctrine).

<sup>95</sup> See Hemel & Ouellette, *supra* note 2, at 333.

<sup>96</sup> See *id.* at 334.

<sup>97</sup> See Abramowicz, *supra* note 34, at 189–90; Michael J. Burstein & Fiona E. Murray, *Innovation Prizes in Practice and Theory*, 29 HARV. J.L. & TECH. 401 (2016). But see Jonathan R. Siegel, *Law and Longitude*, 84 TUL. L. REV. 1, 17–32 (2009) (describing how the Board of Longitude initially refused to award John Harrison the promised £20,000 prize for his clock-based method of determining longitude within 30 nautical miles because the Board was seeking an astronomical solution).

<sup>98</sup> See Hemel & Ouellette, *supra* note 2, at 318–19 & nn.59–62, 332.

<sup>99</sup> See *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 67 (1998) (describing the “ready for patenting” condition).

<sup>100</sup> See *Traditional Total Pendency: Last Two Years*, U.S. PATENT & TRADEMARK OFFICE, <https://www.uspto.gov/corda/dashboards/patents/kpis/kpiOverallPendency.kpixmap> (last visited Jan. 27, 2017) (showing the average number of months from filing date to the date an application

lawsuit to the damages stage (which typically takes over two years).<sup>101</sup>

The feasibility of this approach is illustrated by the fact that in the § 1498 context, courts have *already* considered nonpatent incentives in patent damages calculations. For example, in *Leesona Corp. v. United States*, the patentee had developed and patented new rechargeable batteries, in part with the assistance of development contracts from the U.S. Marine Corps.<sup>102</sup> After the government procured the batteries from a cheaper supplier, the patentee sued under 28 U.S.C. § 1498.<sup>103</sup> The en banc Court of Claims concluded that the trial judge's damages award was "largely excessive."<sup>104</sup> A proper base for the award was "the expense incurred by [patentee] in developing its invention, *less any compensation received from [the United States] in its pre-1969 development contracts*," to which should be added "a reasonable profit."<sup>105</sup> In other words, the amount the patentee received in nonpatent rewards through procurement contracts was sensibly subtracted out of its costs before damages were calculated.

This approach could be translated to private infringement suits brought under Title 35. For example, Ted Sichelman provides a simple example of how his proposal might work, which is very similar to the *Leesona* approach:

In simplest form, suppose an innovative firm invests \$10 million in R & D and patent-driven commercialization costs over a set of successful and unsuccessful projects to acquire the patents-in-suit. If that firm requires an internal rate of return of 30% to perform such projects over time, then in a very rough sense, patent damages should roughly be \$13 million.<sup>106</sup>

My argument simply makes explicit that any such calculation should include any nonpatent rewards the firm has received. For a simple example, suppose the cost of the project is still \$10 million, that it is sure to succeed, and that we still want a 30% rate of return (such that an *ex ante* investment of \$10 million should yield an *ex post* return of \$13 million). And suppose the firm received a \$1 million state or federal commercialization grant,<sup>107</sup> plus \$1 million worth of R&D tax incentives for this set of projects, plus a \$1 million prize for its successful invention. Its net initial investment is then only \$8 million (the \$10 million cost minus the grant and tax credit), which we want to yield an *ex post* return of \$10.4 million (i.e.,

---

reaches a final disposition, excluding applications in which a request for continued examination has been filed).

<sup>101</sup> For patent cases filed between 2000 and 2015, the median time to trial was 815 days, and more than a quarter of cases took over three years to reach trial. See LEX MACHINA, <https://lexmachina.com> (search conducted Jan. 27, 2017).

<sup>102</sup> *Leesona Corp. v. United States*, 599 F.2d 958, 963 (Ct. Cl. 1979) (en banc).

<sup>103</sup> *Id.* at 964.

<sup>104</sup> *Id.* at 962.

<sup>105</sup> *Id.* at 978 (emphasis added). The actual award in the case was limited by the patentee's failure to present relevant evidence on these figures. "[T]he party having the burden of proof must suffer if a scantiness of record fails to support a fully informed and reasoned determination." *Id.* at 979.

<sup>106</sup> Sichelman, *Innovation Factors*, *supra* note 12, at 310.

<sup>107</sup> See generally Camilla A. Hrdy, *Commercialization Awards*, 2015 WIS. L. REV. 13, 52–56 (2015) (describing these programs).

1.3 x \$8 million). The firm received a \$1 million *ex post* prize, so patent damages should roughly be \$9.4 million.

In practice, of course, courts will not be presented with a neat set of related successful and unsuccessful projects, so the risk of failure will have to be accounted for in valuing *ex ante* rewards for successful projects. For example, a \$1 million grant for a project with a 1-in-10 chance of success is equivalent to \$10 million in patent rents (or other *ex post* rewards) for successful projects.<sup>108</sup> Amy Kapczynski and her students at Yale illustrate how cost-based damages might work in practice for an actual pharmaceutical product, using realistic numbers.<sup>109</sup> Their calculation could be adapted to account for the significant nonpatent incentives that biomedical inventions receive.<sup>110</sup>

### 3. *Implementing the Cost-Based Approach*

If this cost-based approach to patent damages eventually becomes accepted as at least an aspirational goal—which is beyond what I hope to accomplish with this Article—there are still potential hurdles to implementing this approach as a matter of both legal doctrine and practical administrability.<sup>111</sup> This Section briefly addresses these concerns in turn, though I do not think nonpatent incentives raise any special additional implementation concerns beyond those associated with cost-based damages more generally.

If a sympathetic policymaker is convinced by the merits of a cost-plus approach to patent damages, there are a variety of ways it could be implemented in practice. Of course, Congress could amend the Patent Act to mandate such an approach. But as this Section explains, courts could also shift damages calculations toward this approach in the same way that current damages law has evolved: as a matter of case-by-case doctrinal development.

First, to the extent the federal government chooses to make wider use of § 1498 for procurement of patented technologies such as generic pharmaceuticals, it does not seem as if this statute would need to be amended to explicitly consider

---

<sup>108</sup> For a simple example to illustrate this point, see Hemel & Ouellette, *supra* note 2, at 310–12.

<sup>109</sup> Brennan et al., *supra* note 12, at 328–30.

<sup>110</sup> See generally Ouellette, *supra* note 39, at 1128–37 (describing nonpatent incentives for biomedical inventions in the United States).

<sup>111</sup> One other concern might be that even if courts could implement cost-based damages both legally and practically, they have little incentive to do so. Having just one appellate court for patent law limits the opportunity for doctrinal percolation, though perhaps the Supreme Court will intervene in favor of greater district court discretion than the Federal Circuit’s doctrine currently allows—as it has in many other areas—encouraging more experimentation at the district court level. See John M. Golden, *The Supreme Court as “Prime Percolator”: A Prescription for Appellate Review of Questions in Patent Law*, 56 UCLA L. REV. 657, 720 (2009); Ouellette, *supra* note 94, at 110–11 (explaining the different ways in which district courts could experiment with and improve patent law, including by testing the administrability of a standard); see, e.g., *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 134 S. Ct. 1749, 1755 (2014) (rejecting the Federal Circuit’s approach to attorney’s fees as “unduly rigid” and “impermissibly encumber[ing]” district courts’ discretion).

nonpatent rewards in the cost-based approach advocated by the group at Yale. Indeed, as noted above, the en banc Court of Claims (the predecessor to the Court of Appeals for the Federal Circuit) used such an approach in *Leesona Corp. v. United States*.<sup>112</sup> To be sure, § 1498 case law is “far from pellucid,”<sup>113</sup> and courts do use the *Georgia-Pacific* factors in calculating reasonable royalties.<sup>114</sup> But as the court in one such case noted, they are “neither constrained by [the factors] nor required to consider each one where they are inapposite or inconclusive.”<sup>115</sup> The statute simply says that patentees are entitled to “reasonable and entire compensation.”<sup>116</sup> Compensating the patentee for incurred costs—including the risk and opportunity cost—plus a reasonable profit would seem to make the patentee whole.

Could such an approach be adopted for patent damages more generally, in private suits under Title 35? First, it is worth noting that while injunctions are not allowed under § 1498, they have traditionally been the norm for private patent litigation,<sup>117</sup> with damages calculated only for past infringement. Even after the Supreme Court limited the presumptive availability of injunctive relief in *eBay v. MercExchange*,<sup>118</sup> courts have still granted motions for permanent injunctions about three-quarters of the time.<sup>119</sup> I am not advocating any significant change in this practice.<sup>120</sup> But it does seem that when patentees have already received substantial nonpatent rewards such that full patent rents are more likely to be excessive, this counsels against injunctive relief under each of the four factors of the *eBay* framework.<sup>121</sup>

A more challenging doctrinal hurdle arises in cases in which the patent owner proves lost profits by showing that but for the infringement, it would have made additional profit.<sup>122</sup> Once a patent plaintiff shows “that there was a reasonable

---

<sup>112</sup> See *supra* notes 102–105 and accompanying text.

<sup>113</sup> Brennan et al., *supra* note 12, at 311; see also *supra* note 86 (explaining that most § 1498 cases settle before a court is asked to calculate damages).

<sup>114</sup> See, e.g., *Liberty Ammunition, Inc. v. United States*, 119 Fed. Cl. 368, 386 (2014), *aff'd in part, rev'd in part on other grounds*, 835 F.3d 1388 (Fed. Cir. 2016).

<sup>115</sup> *Id.*

<sup>116</sup> 28 U.S.C. § 1498 (2012).

<sup>117</sup> See *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 395 (2006) (Roberts, C.J., concurring) (“From at least the early 19th century, courts have granted injunctive relief upon a finding of infringement in the vast majority of patent cases.”).

<sup>118</sup> *Id.* at 391 (majority opinion).

<sup>119</sup> See Thomas F. Cotter & John M. Golden, *Empirical Studies Relating to Patents—Remedies*, in RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW, *supra* note 25, <https://ssrn.com/abstract=2665680> (manuscript at 8) (reviewing empirical studies).

<sup>120</sup> On the cases in which property rules are likely to outperform liability rules, see generally Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972).

<sup>121</sup> See *eBay*, 547 U.S. at 391 (“A plaintiff [seeking a permanent injunction] must demonstrate: (1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.”).

<sup>122</sup> See generally *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1545 (Fed. Cir. 1995) (en banc)

probability that the sales would have been made ‘but for’ the infringement . . . it has sustained the burden of proving entitlement to lost profits.”<sup>123</sup> In such cases, it seems difficult under current precedent to deny plaintiffs these lost profits, even if there is strong evidence that the plaintiff has already received sufficient rewards to have spurred its development of the technology at issue. Thus, while cost-based damages could be applied under § 1498 for *government* use of a pharmaceutical patent for generic procurement, it is unlikely to be effective for *private* use by a generic pharmaceutical company, even if the lost-profits award seems excessive.<sup>124</sup>

But the issue of whether lost-profits rewards should ever be denied in private litigation can be tabled for now. As noted above, over two-thirds of private patent damages awards are currently based solely on the reasonable royalty calculation.<sup>125</sup> And in cases in which courts are faced with a reasonable royalty damages calculation, commentators have generally concluded that considering the patentee’s R&D costs is within courts’ discretion under the current damages statute, 35 U.S.C. § 284, and precedent such as *Georgia-Pacific*. I see no reason why adding nonpatent rewards to the calculation would affect this conclusion.

For example, Ted Sichelman argues that no statutory amendment is needed to add his “innovation factors” to the *Georgia-Pacific* framework for reasonable royalties, at least when they are used to help ground the current standard.<sup>126</sup> Similarly, John Golden and Karen Sandrik do not propose a statutory amendment; rather, they think courts should look to the *Restatement* as a policy matter.<sup>127</sup> Judge Posner explicitly did so in *Apple v. Motorola*, although he was reversed for his decision to exclude damages evidence.<sup>128</sup> While others have not followed suit, Golden and Sandrik argue that “such an embrace is not necessary for restitutionary principles to offer guidance on how to assess the recoverable portion of value obtained from nonconsensual use—a category of value into which reasonable

---

(describing the standard for proving lost profits).

<sup>123</sup> *Id.*; see also *Versata Software, Inc. v. SAP Am., Inc.*, 717 F.3d 1255, 1265 (Fed. Cir. 2013) (noting that a “wide variety of reconstruction theories” are allowed as long as they are “supported with sound economic proof”).

<sup>124</sup> *Cf. Brennan et al.*, *supra* note 12, at 312, 328 (explaining why lost profits are not allowed in § 1498 cases, and arguing that when a company receives profits of around forty times the development cost in under two and a half years, “[e]ven adjusting for risk, and factoring in reasonable profit, society has already vastly overpaid for the drugs”).

<sup>125</sup> See *supra* notes 66–67 and accompanying text.

<sup>126</sup> Sichelman, *Innovation Factors*, *supra* note 12, at 322. In particular, he writes that “to the extent that the innovation factors could be used to improve the accuracy of the current ‘hypothetical negotiation’ standard of *Georgia-Pacific* . . . then these factors could clearly be added without transgressing statutory authority.” *Id.* As courts became more accustomed to applying these factors, however, he proposes a statutory amendment so that these factors would become the focus of the damages test. *Id.* at 323.

<sup>127</sup> See Golden & Sandrik, *supra* note 12.

<sup>128</sup> *Apple, Inc. v. Motorola, Inc.*, 869 F. Supp. 2d 901, 916 (N.D. Ill. 2012) (Posner, J., sitting by designation) (quoting RESTATEMENT (THIRD) OF RESTITUTION AND UNJUST ENRICHMENT § 42 (2011)), *aff’d in part, rev’d in part*, 757 F.3d 1286 (Fed. Cir. 2014).

royalty damages comfortably fall.”<sup>129</sup>

Dan Burk, in his comments on Sichelman’s original cost-based damages proposal, expresses an even more expansive view of the patent damages statute.<sup>130</sup> He proposes that courts consider remedies even further from current practice, such as rules based on put options.<sup>131</sup> And he suggests that incorporating the public interest into patent remedies as Sichelman suggests “requires perhaps some reorientation of judicial attitudes, but not necessarily a reorientation of remedial patent doctrines,” given that “many of the needed tools are already available.”<sup>132</sup> While Sichelman does not read the patent damages statute quite as broadly as Burk,<sup>133</sup> they both agree that courts may safely incorporate cost considerations into the reasonable royalty analysis.<sup>134</sup>

The larger concerns that have been raised about implementation of cost-based damages relate not to whether they are legally feasible under current doctrine, but rather to whether they are practically feasible for courts to implement. For example, Mark Lemley called Sichelman’s 2014 proposal “a perfectly correct statement of aspirations, but nothing that could ever be operationalized without perfect knowledge,”<sup>135</sup> and Tom Cotter was “skeptical that such a system could ever work in the real world.”<sup>136</sup>

One concern is evidentiary.<sup>137</sup> Determining the patentee’s risk-adjusted costs or an appropriate return on investment are certainly not easy, though Sichelman’s latest paper goes into considerable detail on these practicalities.<sup>138</sup> But the question is not whether there will be errors in such calculations—surely there will—but rather whether the incentives provided by a patent system in which damages are calculated this way will be on net more socially optimal than the incentives provided by the current patent system. And here, it is worth noting that in addition

---

<sup>129</sup> Golden & Sandrik, *supra* note 12, at 360.

<sup>130</sup> See Dan L. Burk, *Means and Meaning in Patent Remedies*, 92 TEX. L. REV. SEE ALSO 13, 15 (2014) (“The metric of ‘making whole’ . . . is never fixed, and instead shifts with judicial purpose.”).

<sup>131</sup> *Id.* at 21–23.

<sup>132</sup> *Id.* at 23.

<sup>133</sup> See Ted Sichelman, *Meaning Is in the Mind of the Reader: A Rejoinder to Burk, Cotter, and Lemley*, 93 TEX. L. REV. SEE ALSO 15, 22 (2014) (“I mainly disagree with Burk that the current statutory and doctrinal framework can properly yield such exotic reforms.”).

<sup>134</sup> In addition to being consistent with the U.S. patent damages statute and precedent, this approach raises no difficulty under TRIPS, which merely requires that “[t]he judicial authorities shall have the authority to order the infringer to pay the right holder damages adequate to compensate for the injury the right holder has suffered because of an infringement . . . .” TRIPS, *supra* note 58, art. 45.

<sup>135</sup> Lemley, *supra* note 90, at 112.

<sup>136</sup> Thomas F. Cotter, *Make No Little Plans: Response to Ted Sichelman, Purging Patent Law of “Private Law” Remedies*, 92 TEX. L. REV. SEE ALSO 25, 26 (2014).

<sup>137</sup> See Lemley, *supra* note 90, at 112 (“How are we to know how much incentive a patentee would require to invent? We could ask them, I suppose, but that doesn’t seem calculated to produce an accurate number.”).

<sup>138</sup> Sichelman, *Innovation Factors*, *supra* note 12, at 311–16.

to both over- and under-compensating innovators in many cases,<sup>139</sup> the current system also has remarkable evidentiary challenges. The current approach to calculating a reasonable royalty is based on a *counterfactual ex ante* hypothetical negotiation between the parties, so courts are forced to draw inferences from notoriously problematic evidence such as comparable licenses.<sup>140</sup>

Another concern is that the socially optimal patent reward should ideally be shared across all users of the patented technology—including willing licensees—and not just the first party to be sued.<sup>141</sup> One potential solution would be to adopt Bernard Chao’s proposal for contribution in patent law, allowing an infringer to implead other users of the technology and ask them to share in the judgment.<sup>142</sup> Michael Meurer has expanded on this idea to explore how patent litigation risk can be spread across supply chains.<sup>143</sup> Ted Sichelman has also suggested that accused infringers can marshal evidence of other infringing use, and that damages should be capped at disgorgement of profits stemming from the infringement, which would reduce unfairness to the first infringer.<sup>144</sup> Of course, the ease of identifying other infringers will vary by technology, with greater difficulty for method claims.

In sum, while there are certainly many details of cost-based damages proposals that need to be worked out in practice, none of these administrability concerns seem so significant as to doom cost-based damages proposals.<sup>145</sup> I thus think that scholars should continue to investigate whether such proposals will succeed in better aligning patent rewards with the socially optimal amount, including by accounting for nonpatent incentives.

#### IV. Using Cost-Based Patent Damages to Improve Allocation

Thus far, this Article has focused on the incentive side of innovation policy. That is, I have focused exclusively on the following question: can the amount transferred from the public to innovators through both nonpatent rewards and the patent shadow tax be more closely aligned with the socially optimal reward? But as I emphasize in a forthcoming article with Daniel Hemel, *Innovation Policy Pluralism*, the incentive question—how much should be transferred—can be largely

---

<sup>139</sup> See *supra* Section II.B.

<sup>140</sup> See, e.g., Chiang, *supra* note 71 (manuscript at 15); Lee & Melamed, *supra* note 36, at 412; Masur, *supra* note 71, at 121.

<sup>141</sup> See Lemley, *supra* note 90, at 113 (“The value sufficient to incent a patentee must be measured across all suits, not just one.”).

<sup>142</sup> Bernard Chao, *The Case for Contribution in Patent Law*, 80 U. CIN. L. REV. 97 (2012). Chao argues that when patent infringers have sought a right of contribution, district courts have erroneously concluded that contribution is preempted by 35 U.S.C. § 271(c), which reflects a misunderstanding of the distinction between contribution and contributory infringement. *Id.*

<sup>143</sup> Michael J. Meurer, *Allocating Patent Litigation Risk Across the Supply Chain*, 25 TEX. INTELL. PROP. L.J. 251 (2018).

<sup>144</sup> Sichelman, *Innovation Factors*, *supra* note 12.

<sup>145</sup> See generally Ouellette, *supra* note 39 (arguing for greater experimentation with patent law, including greater district court discretion to test proposals whose administrability is in question).

decoupled from the allocation question of who should pay for this transfer.<sup>146</sup> Here, I briefly explain why cost-based patent damages may be a simpler way to achieve nonpatent access allocation than prior proposals to accomplish the same goal.

In general, nonpatent rewards are funded by all taxpayers, including those who do not benefit from the resulting knowledge goods, whereas patent rewards are funded by users of the patented products who pay supracompetitive prices for such use.<sup>147</sup> If one defines an access allocation regime based on the number of firms ( $n$ ) with the right to supply the relevant knowledge good, the possibilities range from a pure monopoly ( $n = 1$ ) to an open-access regime ( $n = \infty$ ), though the patent system and tax-funded rewards only approximate these extremes.<sup>148</sup>

As economists Glen Weyl and Jean Tirole have explained, allocation based on market power (i.e., patents) has the cost of increased deadweight loss, but the benefit of selecting high social surplus projects by screening for willingness-to-pay.<sup>149</sup> Simply looking to the quantity of knowledge goods distributed under an open-access regime will not distinguish between high-value projects and those that offer only an incremental improvement. They argue that the optimal solution is never pure monopoly ( $n = 1$ ) or pure open access ( $n = \infty$ ); rather, it lies in the intermediate range.<sup>150</sup> Daniel Hemel and I explain the intuition behind this result as follows:

[T]he first bit of market power increases deadweight loss only trivially, while the last bit of market power (moving from near monopoly to full monopoly) also yields only trivial screening benefits. That is, the marginal deadweight loss from an additional increment of market power is increasing and the marginal informational benefit from an additional increment of market power is decreasing. The optimal arrangement entails an interior solution, not a corner solution.<sup>151</sup>

There are numerous ways to achieve these intermediate solutions. For example, Ian Ayres and Paul Klemperer have proposed a duopoly auction system ( $n = 2$ ): “A patent would give the holder two entitlements: the right to be only one of two producers of the product, and the right to receive the proceeds from the auction selecting the second producer of the product.”<sup>152</sup> This proposal could be

<sup>146</sup> Hemel & Ouellette, *supra* note 4. The incentive question tracks the first two dimensions of our framework of innovation policies—*reward size* (government-set vs. market-set) and *reward timing* (*ex ante* vs. *ex post*)—while the allocation question tracks the third dimension, *who pays* (user-pays vs. cross-subsidization by nonusers). Hemel & Ouellette, *supra* note 2, at 348 fig.2.

<sup>147</sup> These general observations are subject to caveats, such as that the costs of the patent shadow tax are sometimes spread to non-users through insurance markets. *See* Hemel & Ouellette, *supra* note 2, at 346 & n.191.

<sup>148</sup> *See* Hemel & Ouellette, *supra* note 4 (manuscript at 18). Patents are effective only to the extent they offer some form of market power, although in practice, the link between patents and markets is often attenuated, so  $n$  will rarely equal 1. Similarly,  $n$  can never really be  $\infty$ . But allocation via patents and nonpatent rewards will result in real variation in  $n$  with important allocative effects.

<sup>149</sup> Weyl & Tirole, *supra* note 15.

<sup>150</sup> *Id.* at 1974.

<sup>151</sup> Hemel & Ouellette, *supra* note 4 (manuscript at 19). We also note conditions under which pure monopoly or pure open-access regimes might be justified. *Id.* (manuscript at 20).

<sup>152</sup> Ayres & Klemperer, *supra* note 15, at 1031.

adapted for any  $n$ .<sup>153</sup>

An alternative that is perhaps more politically and administratively feasible would be to allow patentees to choose a shorter patent term in exchange for the ability to pay reduced taxes on patent-related income, with revenues lost through this “patent box” offset by general tax revenues.<sup>154</sup> But this is suboptimal as compared with proposals that result in reduced market power over a longer term. As Ayres and Klemperer have explained, holding the patentee’s profits constant, consumers are better off with oligopolistic pricing over a longer period compared to monopoly pricing over a shorter period.<sup>155</sup>

The cost-based patent damages approach described in Part III offers an overlooked solution to this problem. Reducing patent damages while compensating patentees through nonpatent rewards funded through general tax revenues can reduce deadweight loss while maintaining the same effective innovation incentive. Implementing this proposal to the extent advocated so far—as a modification to the *Georgia-Pacific* reasonable royalty test—seems far more likely and feasible than an  $n$ -opoly auction.

If this initial foray into cost-based damages is successful, it could be extended more broadly, perhaps to include tax-based nonpatent rewards that are keyed to patent damages. For example, if a patentee receives a \$10 million damages reward, this could be automatically reduced by some factor (say, ten percent), and the patentee could receive a tax credit to offset the loss (in this case, \$1 million). From the perspective of many patentees, there would be no change in compensation, so this would not greatly affect innovation incentives.<sup>156</sup> Rather, the effect would be to shift some of the cost from users of the patented technology (through the damages paid by the infringer) to all taxpayers, with the resulting efficiency gain explained above.<sup>157</sup> Of course, such a reform would require legislative change, so I will add it to the list to be considered with Ted Sichelman’s long-term goals.<sup>158</sup>

## V. Conclusion

While much of my focus in this article has been on how nonpatent incentives could be incorporated into patent damages calculations through cost-based approaches, I want to conclude by emphasizing that one need not be convinced by the broadest versions of these proposals in order to think that it is worth experimenting with factoring nonpatent incentives into patent damages awards. My primary goal is simply to convince readers that there is not yet a satisfactory

---

<sup>153</sup> See Hemel & Ouellette, *supra* note 4 (manuscript at 11). For a more detailed analysis of this and other auction proposals, see Abramowicz, *supra* note 34, at 229–34.

<sup>154</sup> See Hemel & Ouellette, *supra* note 2, at 331–32, 347.

<sup>155</sup> Ayres & Klemperer, *supra* note 15, at 991.

<sup>156</sup> The exact impact may vary depending on the patentee’s business model and the effect on the licensing market.

<sup>157</sup> For a discussion of the distributive consequences of user-pays versus cross-subsidization of R&D costs, see Hemel & Ouellette, *supra* note 2, at 345–52.

<sup>158</sup> See Sichelman, *Innovation Factors*, *supra* note 12, at 322–23.

interface between patents and nonpatent innovation incentives, that there ought to be, and that one of the potential policy levers for filling this role that has not been recognized is patent damages. This lever may ultimately be inferior to the other options described in Section II.C, but I hope readers are at least convinced that adjusting patent damages for nonpatent incentives has some benefits that ought to be considered in scholars' analyses of how patent damages should be calculated.