(UN)REASONABLE ROYALTIES

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Though reasonable royalty damages are ubiquitous in patent litigation, they are only a hundred years old. But in that time they have become deeply misunderstood. This Article returns to the development and origins of reasonable royalties, exploring both why and how courts originally assessed them.

It then turns a harsh eye toward all that we think we know about reasonable royalties. No current belief is safe from criticism, from easy targets such as the twenty-five percent "rule of thumb" to fundamental dogma such as the hypothetical negotiation. In short, this Article concludes that we are doing it wrong, and have been for some time.

This Article is agnostic as to outcome; departure from traditional methods can and has led to both overcompensation and undercompensation. But it challenges those who support departure from historic norms—all while citing cases from the same period—to justify new rules, many of which fail any economic justification.

INTRODUCTION

Despite significant recent interest in patent damages,[1] the state of damages law has gotten worse, not better, in the doctrinal sense. At the forefront is the reasonable royalty analysis in which courts guess at what a hypothetical negotiation would have looked like if the parties had worked out a payment before the infringement. This Article makes a simple claim that is agnostic to the amount of reasonable royalties awarded: quite plainly, we are doing it wrong and have been for some time.

This Article explores why reasonable royalties were created as an alternative to lost profit recovery, how they evolved, and—importantly—where the rules started down the wrong path. Neither the history nor the purpose of reasonable royalties is borne out in how patent trials are conducted today. Unlike so many others, this Article stakes no claim that damages are too high or too low. How

[1] A search of Westlaw's Journals and Law Reviews database for [patent & ("reasonable royalties")] yields 586 articles since 2007 and 334 in the history of all its databases until 2006; twenty-nine of these (nearly ten percent) were published in 2006. David O. Taylor, *Using Reasonable Royalties to Value Patented Technology*, 49 GA. L. REV. 79, 81-84 (2014), briefly lists some of the extensive recent literature.

would we know? Compared to what? The only attempts at empirical study[2] are untied to the value of each patent or some other baseline that is somehow the "right" amount of damages.[3] As this Article discusses, both plaintiffs and defendants have unquestioningly used our current wrong-headed rules to their advantage when it suits them. Doing so departs from tradition.

Reasonable royalties are relatively new to patent law, having turned only a hundred years old. They were created for the cases where patentees could not prove actual damages through lost profits or otherwise. In short, they were intended to be a general damages measure used to compensate patentees who could not clearly show how they were harmed. The goal throughout was that patent owners would be compensated in relation to the value of their inventions.[4]

But this calculation is not easy. Even before current trends, reasonable royalty analysis was a "difficult judicial chore," fraught with peril from beginning to end, involving "more the talents of a conjurer than those of a judge."[5] Among other concerns that the parties did not negotiate and at least one of them likely never wanted to, the patent likely only covers a small portion of the accused product and its value, the defendant's pricing model did not account for having to pay licensing fees, there are few benchmarks to determine what an appropriate fee might be, and experts diverge wildly in their assumptions when estimating an appropriate fee.

Despite these flaws, the standards used to determine reasonable royalty damages were reasonably stable for the first fifty years, focusing on the value of the technology. In 1970, courts began to use the hypothetical negotiation rule, which viewed the reasonable royalty as a byproduct of what the parties might have agreed to if they had actually negotiated. Although this rule had roots in past practices, it constituted a departure because it required considering not only the invention's value, but also how the parties would have negotiated that value. Over time, this dogma has led to an almost fetishization of the hypothetical negotiation, with some parties arguing that damages should be based on relative bargaining power rather than the actual value of the invention.

The first decade of the 2000s saw widespread concern that patent damage awards were too high. It prompted congressional testimony on damages as part

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[2] *See, e.g.*, Daniel Harris Brean, *Ending Unreasonable Royalties: Why Nominal Damages Are Adequate to Compensate Patent Assertion Entities for Infringement*, 39 VT. L. REV. 867, 875 (2015); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2025-29 (2007).

[3] David W. Opderbeck, *Patent Damages Reform and the Shape of Patent Law*, 89 B.U. L. REV. 127, 137 (2009).

[4] Taylor, *supra* note 1, at 86-87 (characterizing damages as the value of the "patent technology" as opposed to the value of the "patent right").

[5] Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1574 (Fed. Cir. 1988).

of proposed patent reform,[6] as well as many, many articles. Whether verdicts delivered actual, rather than perceived, overcompensation is unclear from the evidence.[7] It may have simply been that the number of damage awards was growing.[8]

Tied to damage award concerns, some worried that non-practicing entities ("NPEs"), pejoratively "patent trolls," had no product to sell and were perceived to assert lower quality patents.[9] As a result, these plaintiffs could theoretically demand and negotiate settlements that were too high compared to the asserted patents' value. Whether this is true is hotly contested.[10] To the extent that these settlements were used as evidence at trial, damage awards might be inflated.

Courts had historically recognized that those who did not practice the patent were not helped, but instead were disadvantaged because they lacked evidence of the invention's value on the market. As such, it was more rational for companies to infringe because the worst case scenario would be paying for a license they would have had to pay for anyway.[11] It appears that this traditionally recognized disadvantage has borne out: a study of all damages awards from 1995-2011 showed that a very small percentage of NPE cases actually went to judgment, and when they did win a judgment, the awards were smaller,[12] though one NPE achieved a high profile victory in the hundreds of millions of dollars.[13]

[6] *Patent Reform in the 111th Congress: Legislation and Recent Court Decisions: Hearing Before the S. Comm. on the Judiciary*, 111th Cong. (2009), http://www.judiciary.senate.gov/meetings/patent-reform-in-the-111th-congress-legislation-and-recent-court-decisions [https://perma.cc/U9Z7-MVMF].

[7] Michael J. Mazzeo, Jonathan H. Ashtor & Samantha Zyontz, *Do NPEs Matter? Non-Practicing Entities and Patent Litigation Outcomes*, 9 J. COMPETITION L. & ECON. 879, 894-95 (2013) (showing median awards higher during 2000-2010 than during 1995-2000, but not generally increasing during 2000s).

[8] *Id.* at 892.

[9] This perception is borne out to some degree in reality, as many NPEs tend to have a lower win rate. *See generally* John R. Allison, Mark A. Lemley & David L. Schwartz, *How Often Do Non-Practicing Entities Win Patent Suits?*, 32 BERKELEY TECH. L.J. 235 (2017); John R. Allison, Mark A. Lemley & Joshua Walker, *Patent Quality and Settlement Among Repeat Patent Litigants*, 99 GEO. L.J. 677 (2011); Michael Risch, *A Generation of Patent Litigation*, 52 SAN DIEGO L. REV. 67 (2015).

[10] *See* Michael Risch, Editorial, *Framing the Patent Troll Debate*, 24(2) EXPERT OPINION ON THERAPEUTIC PATENTS 127, 129 (2014) ("A leading theory is that NPEs obtain remedies that far exceed the value of the patents by suing inadvertent infringers who are locked in and face high design around costs, which may also reduce *ex ante* incentives to invest.").

[11] *See* Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1574-75 (Fed. Cir. 1988).

[12] *See* Mazzeo et al., *supra* note 7, at 881.

[13] Mark Heinzl & Amol Sharma, *Getting the Message: RIM to Pay NTP $612.5 Million to Settle BlackBerry Patent Suit*, WALL STREET J., Mar. 4, 2006, at A1 ("Research In Motion Ltd., on the brink of a possible court-ordered shutdown of its widely used BlackBerry wireless

Whether damage awards were too high or not, courts took action. In 2009, the Federal Circuit reversed a large—too large, really—damages award. But in doing so, it took an old rule about lost profits and applied it to reasonable royalties.[14] The opinion flipped the law on its ear,[15] despite protestations that it was not doing so.

This departure buoyed defendants all too tired of patent damages risk, especially in specious cases brought by patentees with marginal-quality inventions and even weaker patents. Patentees now complain that they cannot win any damages. Defendants point to a few huge awards and say balderdash. Expert witness economists on both sides complain that the courts are making damages rulings unsupported by economic rationale.

This Article does not attempt to determine who is correct, a virtually unknowable answer. Instead, it takes a hard look at when and how the current law departed from traditional methods, and evaluates some proposals for improving the system that are consistent with those methods.

Part I explores the slow development of the reasonable royalties remedy. This detailed analysis provides new insights into the history that is missing in contemporary analysis. It shows that the goal of reasonable royalties was to be compensatory, applying when plaintiffs could not show other types of damages. It concludes that the calculation of reasonable royalties was meant to be flexible and imprecise, though time-tested evidentiary methods ensured that patent damages remained within a reasonable band of compensation.[16]

Part II explains why this history matters. Those who support a departure from history, yet still cite to it, have the burden of showing that traditional methods were insufficient to determine reasonable royalties. Given the weak economic rationale for many of the new rules, this is a tall order.

Part III examines many recent and proposed changes to the reasonable royalty framework. An historical examination shows that lost profits and reasonable royalties are different, and for that reason they should be treated differently.[17] Reasonable royalties were intended to compensate the patentee for harm when other proof was unavailable. The remedy was not created to mimic some sort of

email device, agreed to pay $612.5 million to settle its long-running legal battle with NTP Inc.”).

[14] *See* Taylor, *supra* note 1, at 90.

[15] *See id.*

[16] *See, e.g.*, Amy L. Landers, *Let the Games Begin: Incentives to Innovation in the New Economy of Intellectual Property Law*, 46 SANTA CLARA L. REV. 307, 340 (2006); Thomas F. Cotter, *Patent Damages Heuristics* 13 (Univ. Minn. Law Sch. Legal Studies Research Paper Series, Paper No. 16-21, 2016), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2809917 [https://perma.cc/STH5-36FR].

[17] *See, e.g.*, Eric E. Bensen, *Apportionment of Lost Profits in Contemporary Patent Damages Cases*, 10 VA. J.L. & TECH. 1, 3 n.2 (2005); Mark A. Lemley, *Distinguishing Lost Profits from Reasonable Royalties*, 51 WM. & MARY L. REV. 655, 669 (2009).

hypothetical negotiation.[18] Indeed, the Supreme Court made clear early on that hypothetical negotiation was not the proper approach,[19] but this seems to have been long forgotten. So too with other recent elements of reasonable royalty analysis, whether from the last ten years or from the last forty-five years. For the most part, the analyses are inconsistent with traditional application and do not offer an economically rational justification for change.

This Article concludes that courts should return to the roots of reasonable royalty analysis by focusing on a patent's value above all else. The fact that the most salient, recent cases may involve difficult factual scenarios is no reason to change how the law should be applied. Additionally, there is no reason to believe that traditional methods of calculating royalties would lead to overcompensatory or undercompensatory awards.[20] In other words, one can assess damages reasonably without favoring either party.[21]

I. THE DEVELOPMENT OF PATENT DAMAGES

Understanding where reasonable royalties went wrong requires understanding where they came from and how they differ from other damages methodology. This Section traces the history of the current damages regime to show where the system went off the tracks. In short, reasonable royalties developed out of the common law to provide just compensation when plaintiffs could not show actual damages. Those damages were a combination of harm to the patentee (e.g., foregone licenses) and benefits to the infringer (e.g., cost savings) but were not a surrogate for the plaintiff's lost profits. Before that point, the only remedy available to plaintiffs who could not prove lost profits was nominal damages. This detailed discussion of history is plainly and directly contrary to the modern retelling of reasonable royalties that imply nominal damages are an appropriate reasonable royalty award.[22]

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[18] *Contra* Lemley, *supra* note 17, at 669 ("By contrast, reasonable royalty damages are designed to mimic the result that patentees not interested in or able to take advantage of market exclusivity would have achieved if they had been able to bargain with the infringers beforehand.").

[19] Sinclair Ref. Co. v. Jenkins Petroleum Process Co., 289 U.S. 689, 693 (1933).

[20] *See, e.g.*, John B. Scherling & Ryan M. Sullivan, *Rational Reasonable Royalty Damages: A Return to the Roots*, 4 LANDSLIDE 55, 55 (2011); Taylor, *supra* note 1, at 90.

[21] *See* Erik Hovenkamp & Jonathan S. Masur, *How Patent Damages Skew Licensing Markets* 30 (Univ. Chi. Coase-Sandor Inst. of Law & Econ. Research Paper Series, Paper No. 774, 2016), http://papers.ssrn.com/abstract=2825236 [https://perma.cc/MPT8-HU23] (arguing that random, imprecise damage calculations are preferable to precise calculations using improper methods).

[22] *See, e.g.*, Brean, *supra* note 2, at 898; Oskar Liivak, *When Nominal Is Reasonable: Damages for the Unpracticed Patent*, 56 B.C. L. REV. 1031, 1045-62 (2015). *But cf.* Nathaniel C. Love, *Nominal Reasonable Royalties for Patent Infringement*, 75 U. CHI. L. REV. 1749, 1766 (2008).

A. *Actual Royalties*

The notion that patent infringement should be remedied by a reasonable royalty for the use of the invention is so commonplace and ubiquitous that it may surprise some to learn that the concept is only about a hundred years old and first appeared in statutory form in 1946. Nonetheless, the Supreme Court has grappled with the proper way to calculate damages in complex cases for much longer than reasonable royalties have been around.

Consider the touchstone case of *Seymour v. McCormick*,[23] a case in law before a jury. In that case, the plaintiff was an NPE (it did not make the device at issue) and the patent claimed an improvement. The Court considered these facts and opined:

> Where an inventor finds it profitable to exercise his monopoly by selling licenses to make or use his improvement, he has himself fixed the average of his actual damage, when his invention has been used without his license. If he claims any thing above that amount, he is bound to substantiate his claim by clear and distinct evidence. When he has himself established the market value of his improvement, as separate and distinct from the other machinery with which it is connected, he can have no claim in justice or equity to make the profits of the whole machine the measure of his demand.[24]

Seymour is considered the first case to require limiting damages to the value added by the patent. For context, the statute at the time required "actual damages" at law as a remedy.[25] Thus, in one fell swoop, the Court limited damages to only those *actually incurred* by the licensor, which were limited to only the *added value* of the improvement.[26] But this was not a reasonable royalty analysis, because it was based on the patentee's actual licensing history with other licensees, not an estimate of what might have been licensed if the plaintiff were so inclined.

And it was not apportionment, a concept limited to dividing profits. The Court went on to describe the type of proof required:

> It is only where, from the peculiar circumstances of the case, no other rule can be found, that the defendant's profits become the criterion of the plaintiffs loss. Actual damages must be actually proved, and cannot be

[23] 57 U.S. (16 How.) 480, 481 (1853).

[24] *Id.* at 490.

[25] The prior statute provided for treble damages as a matter of course. *Id.* at 481, 488.

[26] The Court even recognized royalty stacking. *Id.* at 490-91 ("[I]t follows that each one who has patented an improvement in any portion of a steam engine or other complex machines may recover the whole profits arising from the skill, labor, material, and capital employed in making the whole machine, and the unfortunate mechanic may be compelled to pay treble his whole profits to each of a dozen or more several inventors of some small improvement in the engine he has built. By this doctrine even the smallest part is made equal to the whole . . . .").

> assumed as a legal inference from any facts which amount not to actual proof of the fact. . . . The question is not what speculatively he may have lost, but what actually he did lose.[27]

Seymour v. McCormick is a prescient opinion, foreseeing many of the challenges that courts and litigants face today. But it was also intimately bound up with the statute of its time. Only *actual* damages were allowed at law before a jury: the plaintiff's lost profits, either through sales or loss of actual licensing activity.

Lest there be any confusion on this point, about five years later in *Corporation of New York v. Ransom*,[28] the Court explicitly rejected a jury instruction that involved an estimated royalty based on the value to the infringer:

> [T]he jury are at liberty to infer . . . that the defendant . . . has saved the cost of the purchase and operation of the additional number of engines which would have been required to produce the same results if this invention had not been used; and that . . . if they had admitted the plaintiffs' rights, would have paid the amount of this additional cost, or a large portion of it, as the consideration for a license to use this invention . . . and that the plaintiffs have therefore lost by the infringement what the defendant would have so paid to secure such license.[29]

Instead, the Court makes clear that damages could *only* occur if the defendant somehow made a profit that the plaintiff could have earned had it made or sold the invention.[30]

This pronouncement seems to create a "working requirement" and close the door on NPEs. But five years after *Ransom*, in *Suffolk Co. v. Hayden*,[31] the Court ruled (without mentioning *Ransom*) that "general evidence"—that is, evidence of the benefit to the infringer—might be used to calculate the loss to the patentee when there were no actual licenses from which to determine a royalty:

> There being no established patent or license fee in the case, in order to get at a fair measure of damages, or even an approximation to it, general evidence must necessarily be resorted to. And what evidence could be more appropriate and pertinent than that of the utility and advantage of the invention over the old modes or devices that had been used for working out similar results? . . . [A] jury will be in possession of material and controlling facts that may enable them, in the exercise of a sound judgment,

[27] *Id.* at 490; *see also id.* at 489 ("An infringer of such a patent could not be liable to damages to the amount of the profits of his railroad, nor could the actual damages to the patentee be measured by any known ratio of the profits on the road.").

[28] 64 U.S. (23 How.) 487 (1860).

[29] *Id.* at 489-90 (1860) (rejecting jury instruction); *accord* Packet Co. v. Sickles, 86 U.S. (19 Wall.) 611, 618 (1874) (reversing jury instruction to consider saved costs and the like).

[30] *Ransom*, 64 U.S. (23 How.) at 490-91.

[31] Suffolk Co. v. Hayden, 70 U.S. (3 Wall.) 315 (1865).

> to ascertain the damages, or, in other words, the loss to the patentee or owner, by the piracy, instead of the purchase of the use of the invention.[32]

Ten years later, though, in *Packet Co. v. Sickles*, the Court again ruled that defendant's saved costs could *not* be used to determine loss of plaintiff's value, at least not all the time.[33] The Court did not mention *Ransom*. Instead, it distinguished *Suffolk* by noting that the availability of actual prior licenses that could be used as evidence meant that "general evidence" of cost savings could not be used.[34]

Importantly, this was the last time *Suffolk* would be used to imply that damages could be based on gains to the defendant for some forty years. Indeed, as late as 1895—and without mention of *Suffolk*—in *Coupe v. Royer*[35] the Court reversed a jury verdict based on evidence of cost savings by the defendant and ordered nominal damages because there was no showing of actual harm to the patentee and no actual royalties.[36] This, of course, is contrary to *Suffolk* and even contrary to the *Packet* dicta that general damages might be available where actual royalty evidence was unavailable.

B. *Apportionment and the Entire Market Value Rule*

But the concept of *actual damages* as set forth by the *Seymour* Court was too narrow and too difficult to prove at law. In 1819, courts were given equity jurisdiction,[37] and they began awarding profits as an accounting. Requests for an accounting of defendant's profits were brought in equity, and damages requests for lost sales or lost actual royalties were brought at law.[38] No damages were allowed in equity in early cases.[39] In 1870, Congress recognized this trend and amended the patent statute to explicitly allow "profits to be accounted for

[32] *Id.* at 320.

[33] *Packet*, 86 U.S. (19 Wall.) at 617.

[34] *Id.*

[35] 155 U.S. 565 (1895).

[36] *Id.* at 582-85.

[37] Act of Feb. 15, 1819, ch. 19 ("That the circuit courts of the United States shall have cognizance, as well in equity as at law, of all actions, suits, controversies, and cases, arising under any law of the United States . . . ."); *see also* Patent Act of 1836, ch. 357, § 17 ("And be it further enacted, [t]hat all actions, suits, controversies, and cases arising under any law of the United States, granting or confirming to inventors the exclusive right to their inventions or discoveries, shall be originally cognizable, as well in equity as at law, by the circuit courts of the United States. . . ."); Tilghman v. Proctor, 125 U.S. 136, 148 (1888); Root v. Ry. Co., 105 U.S. 189, 194 (1882).

[38] *See* Livingston v. Woodworth, 56 U.S. (15 How.) 546, 559-60 (1853) ("Under these circumstances, were the infliction of damages, by way of penalty, ever consistent with the practice of courts of equity, there can be perceived in this case no ground whatever for the exercise of such a power.").

[39] *See* Elizabeth v. Pavement Co., 97 U.S. 126, 138 (1878).

by the respondent" in addition to actual damages if profits were insufficient, but only in suits in equity.[40] Thus, damages (actual lost royalties) might be had in equity, but they were kept distinct from defendants' profits.[41] As a practical matter, plaintiffs preferred a hundred percent of defendant's profits to a royalty. An important limitation, though, only made defendants' profits available where some other equitable relief was allowed, such as permanent injunctions or where there were inadequate remedies at law.[42] If a plaintiff could not find an equity hook, then only damages at law were available.

When granted in equity, the profits were to be "accounted." The notion of profit apportionment in equity grew in parallel to the separate strand of royalty/licensing damages from *Seymour*. Apportionment was associated with lost profits—generally limiting damages to only the portion of profits associated with the value of the patented invention; it was rare to allow full profits.[43]

Thus, although *Seymour* mentions the importance of limiting damages to the value of the improvement, the case does not actually apportion royalty damages. Instead, because the patentee had licensed the *improvement* for a fixed sum, then the damages for infringing that improvement amounted to the lost licensing revenue.

But enter damages based on profits of any kind; in that case, apportionment must be explicitly considered, though courts struggled with this calculation, as they continue to do now. The norm became to assign the damages inquiry to a special master in equity when the only question was a calculation of profits held by the defendant in trust for the plaintiff.[44] This was in contrast to leaving a lost royalty determination up to a jury in actions at law.[45] This made the profits inquiry technical, but the courts still guided just what was to be tallied. Some complain today that courts are ill-equipped to be rendering damages judgments and that judges should not tinker with expert opinions. Whatever the merits of this concern, it is not a new feature in patent damages. Even one hundred thirty

[40] Birdsall v. Coolidge, 93 U.S. 64, 68-69 (1876) (interpreting 1870 Patent Act). *Compare* REVISED STATUTES OF THE UNITED STATES, PASSED AT THE FIRST SESSION OF THE FORTY-THIRD CONGRESS 1873-1874, tit. LX, ch. 1, § 4921 (providing that in suits at equity: "upon a decree [injunction] being rendered . . . complainant shall be entitled to recover, in addition to the profits to be accounted for by the defendant, the damages the complainant has sustained thereby"), *with id.* § 4919 (providing that in suits at law: "Damages for the infringement of any patent may be recovered . . . . [T]he court may enter judgment thereon for any sum above the amount found by the verdict as the actual damages sustained . . . not exceeding three times the amount of such verdict . . . .").

[41] Marsh v. Seymour, 97 U.S. 348, 360 (1878).

[42] *Root*, 105 U.S. at 215-16.

[43] Rubber Co. v. Goodyear, 76 U.S. (9 Wall.) 788, 803 (1869).

[44] *See* Packet Co. v. Sickles, 86 U.S. (19 Wall.) 611, 617-18 (1874).

[45] *See, e.g.*, *Birdsall*, 93 U.S. at 70-71.

years ago, the Supreme Court took issue with expert findings and rendered its own instead.[46]

In *Mowery v. Whitney*,[47] for example, the Court limited damages to the specific advantage that the defendant obtained over use of the prior art.[48] But by this time, perhaps because of statutory changes, the Court's thinking had expanded beyond the rule that damages may only be the plaintiff's lost profits and began considering saved costs and other competitive advantages that might enhance the defendant's profit.[49]

In *Littlefield v. Perry*,[50] the Court held that only profits associated with improvements to a stove would be allowed, and not profits on all stove sales.[51] In *Manufacturing Co. v. Cowing*,[52] the Court considered whether an improvement so benefited the product that it displaced the prior competing products, justifying an award of all profits (rather than apportionment).[53]

Gradually, a general trend formed; profits could not be awarded on all sales unless the patent was responsible for all sales. The Court in *City of Elizabeth v. American Nicholson Pavement Co.*[54] put it this way:

> [T]hough the defendant's general business be ever so profitable, if the use of the invention has not contributed to the profits, none can be recovered. The same result would seem to follow where it is impossible to show the profitable effect of using the invention upon the business results of the party infringing. It may be added, that, where no profits are shown to have accrued, a court of equity cannot give a decree for profits, by way of damages, or as a punishment for the infringement. But when the entire profit of a business or undertaking results from the use of the invention, the patentee will be entitled to recover the entire profits, if he elects that remedy.[55]

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[46] *E.g.*, Mfg. Co. v. Cowing, 105 U.S. 253, 256-57 (1882); *see also* Tilghman v. Proctor, 125 U.S. 136, 157 (1888); *In re* Cawood Patent, 94 U.S. 695, 709-10 (1876); Livingston Gifford, *The Patent Situation from the Standpoint of the Manufacturer*, 39 ANN. REP. A.B.A. 702, 720 (1916) ("In the next place the inquisition for the ascertainment of profit has been the most prolific source of endless proceedings before masters and in the end has resulted in the court jumping at conclusions, often mere guesses in all but name. No court, however, will ever admit that its guess is a guess.").

[47] 81 U.S. (14 Wall.) 620 (1872).

[48] *Id.* at 651.

[49] *Id*.

[50] 88 U.S. (21 Wall.) 205 (1875).

[51] *Id.* at 229.

[52] 105 U.S. 253 (1881).

[53] *Id.* at 255; *see also* Warren v. Keep, 155 U.S. 265, 269 (1894).

[54] 97 U.S. 126 (1877).

[55] *Id.* at 139 (citing Livingston v. Woodworth, 56 U.S. (15 How.) 546 (1853)).

The next important case, *Garretson v. Clark*,[56] synthesized this precedent in an enduring way: the entire market value rule.[57] In a brief opinion, the Court stated that patent plaintiffs have a choice, either "give evidence tending to separate or apportion the defendant's profits and the patentee's damages between the patented feature and the unpatented features, and such evidence must be reliable . . . and not conjectural or speculative";[58] or "show, by equally reliable and satisfactory evidence, that the profits and damages are to be calculated on the whole machine, for the reason that the entire value of the whole machine, as a marketable article, is properly and legally attributable to the patented feature."[59]

The mandate of *Garretson* and its predecessors is clear. When apportioning profits, there must be no speculation, and there must be apportionment if there is no basis for attributing all of the profits to the patented invention. In *Garretson*, the plaintiff provided sales price and manufacturing costs of mop heads, without apportioning for the value of the invention (a better way to attach the mop head to the broomstick) or proving that the entire value was in the better attachment feature. As a result, only nominal damages were awarded.

But *Garretson* came at a time of expansion in equity jurisdiction. The 1870 Act's addition of actual damages to profit accountings gave the courts significantly more flexibility in assessing remedies. It is no wonder, therefore, that virtually all of the Supreme Court opinions from this time were from bench trials held in equity.[60]

Thus, in *Seymour*, the Court affirmed a damages award in equity of a $5 per unit license fee, because the defendant "improvidently" had no profits.[61] But the Court often gave with one hand and took away with the other. For example, in *Black v. Thorne*,[62] the Court ruled that *any* cost improvement for the defendant by using the infringing method or device constituted a profit for the purposes of accounting in equity.[63] But the Court ruled that one must consider benefits of the invention compared to *any* available alternative, not just the one that the defendant happened to be using prior to the infringement.[64]

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[56] 111 U.S. 120 (1884).

[57] *Id.* at 121-22.

[58] *Id.* at 121.

[59] *Id.*

[60] *But see* Root v. Ry. Co., 105 U.S. 189, 215-16 (1882) (holding that equity jurisdiction is unavailable where no equitable remedy is available, such as with expired patents).

[61] Marsh v. Seymour, 97 U.S. 348, 359-60 (1878).

[62] 111 U.S. 122 (1884).

[63] *Id.* at 122-24.

[64] *Id.* at 124; *see also* H. A. Toulmin, Jr., *Problems in Profits and Damages in Patent Accountings*, 2 VA. L. REV. 507, 515 (1915) (discussing difficulties in determining whether alternatives are those practically available or theoretically available).

In *Tilghman v. Proctor*, the Court extended this view, noting that benefits to the defendant, if proven, would constitute profits even in the absence of an actual profit.[65] The Court then conducted an extended review of the special master's report determining how much money was saved by using the infringing process and assessing that amount as the profits to be returned in equity.[66]

Nonetheless, the Court in *Dobson v. Hartford Carpet Co*.[67] drove home the point that equitable remedies were always about apportionment of profits, and not actual damages.[68] The Court allowed only nominal damages because there was no evidence that a patented carpet design was the reason for any price difference (profit) as compared to an equally durable carpet, and there was no other evidence of actual damages.[69] Congress overturned *Dobson* as to design patents with a new rule that ostensibly granted all of a defendant's profits to the patentee.[70] But, driving home the point that the apportionment was here to stay, Congress did not meddle with the apportionment rule for profit determinations in the case of utility patents.

C. *The March Toward Reasonable Royalties*

Despite the popularity of profit accounting in equity, the *Seymour* rule that actual damages at law must be tied to actual licenses lost continued as well. But what constituted a lost royalty? The Court confronted this issue in *Rude v. Westcott*.[71] There, the plaintiff waived profit damages (presumably due to apportionment problems), and the evidence of damage was several settlement agreements with other parties.[72] The Court noted that such royalties would be biased by the risk facing each defendant:

> Many considerations other than the value of the improvements patented may induce the payment in such cases. The avoidance of the risk and expense of litigation will always be a potential motive for a settlement. . . . It is plain, without regard to the settlement had, that an

[65] 125 U.S. 136, 146 (1888).

[66] *Id.* at 152-61.

[67] 114 U.S. 439 (1885).

[68] *Id.* at 444.

[69] *Id.*

[70] 35 U.S.C. § 289 (2012) (extending liability to "total profit" for infringement of design patents); Frederic H. Betts, *Some Questions Under the Design Patent Act of 1887*, 1 YALE L.J. 181, 181-82 (1892); Mark A. Lemley, *A Rational System of Design Patent Remedies*, 17 STAN. TECH. L. REV. 219, 223 (2013). The Supreme Court recently ruled that profits may be granted on less than an entire product. Samsung Elec. Co., Ltd. v. Apple, Inc., 137 S. Ct. 429, 436 (2016) (holding that relevant product for determining damages does not need to be entire product, but can also be component of full product).

[71] 130 U.S. 152, 165 (1889) (holding that evidence of royalties can only be introduced if they were paid prior to infringement).

[72] *Id.* at 159.

> agreement of this kind, where the charge may be fixed at the pleasure of the owner of the patent, cannot be received as evidence of the value of the improvements patented so as to bind others having no such agreement.[73]

In so ruling, the Court held that the *only* evidence of a royalty could be that which was paid before infringement.[74]

Thus, actual royalties were an uneasy lodestar. They were the best evidence, but also the worst evidence. As one commentator noted:

> Great caution should be exercised by the master and the court to ascertain whether or not this license fee is sporadic or does truly represent the legitimate market value of the device or structure in question. It is only when the license fee represents a market price that it becomes a safe and sane guide.[75]

Such proof of consistent license fees was hard to come by, and without it plaintiffs were forced to settle for nominal damages[76] unless they could prove profits in equity. For example, in *Hurlbut v. Schillinger*,[77] the special master's finding of a five cent per unit royalty was unsupported by facts,[78] but the Court upheld an award of defendant's full profits (four cents per unit) under the entire market value rule.[79]

It bears repeating that, throughout all of the history laid out in this Article, district courts employed special masters to sift through the evidence and make factual determinations in cases tried to the bench. In *Rude v. Wescott*, for example, following the denial of settlement royalties, the special master heard and weighed evidence of what a reasonable value of the improvement might have been, a finding that was affirmed in part by the district court.[80] The Supreme Court reversed, making clear that the calculation of damages required fixed numbers and not estimates of value: "Actual damages must be calculated,

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[73] *Id.* at 164.

[74] *Id.* at 165.

[75] Toulmin, *supra* note 64, at 522.

[76] *See, e.g.*, Blake v. Robertson, 94 U.S. 728, 733-34 (1877) ("No license fee charged by the complainant is shown. The burden of proof rests upon him. Damages must be proved; they are not to be presumed. The complainant made a profit of forty dollars an inch on the width of the jaws of the numerous machines he had sold. But inventions covered by other patents were embraced in those machines. It was not shown how much of the profit was due to those other patents, nor how much of it was manufacturer's profit. The complainant was, therefore, entitled only to nominal damages.").

[77] 130 U.S. 456 (1889).

[78] *Id.* at 458.

[79] *Id.* at 472.

[80] Rude v. Wescott, 130 U.S. 152, 161 (1889).

not imagined; and an arithmetical calculation cannot be made without certain data on which to make it."[81]

However, the Court saw the damages provisions as amended in 1870 to grant judges far more leeway to do justice with damages. For example, before the 1870 Act, judges could not modify equity profit awards if they were insufficient due to unfairly low pricing,[82] but, as noted above, the new statute explicitly allowed for such mixing of damages and profits. Furthermore, after 1870 judges at law could elect to increase any damages award up to three times as circumstances dictated.[83] This included finding royalties that varied from the exact evidence provided where the infringing use was less than what the prior licenses contemplated.[84] By this time, some lower courts were interpreting the case law to allow for damages in equity not just when profits were unavailable, but rather, anytime damages exceeded profits.[85]

Courts, however, were not completely willing to diverge from the past. For example, in *Keystone Manufacturing Co. v. Adams*,[86] nominal damages were awarded because there was no proof of an actual royalty nor profits by the defendant, and the Court disallowed consideration of profits by companies similar to the defendant. This was an ironic ruling, given the general rule that profits due to cost savings were to be compared by looking at *any* available alternatives,[87] not just the alternative available to the defendant. In short, defendants could show lack of benefit if anyone else obtained benefit from an unpatented process, but plaintiffs could not show benefits even if everyone else benefited from the patent except the defendant.

Even so, the strictness of awarding only nominal damages in the absence of actual damages (or profits) did not last forever. By 1912, in *Westinghouse Electric and Manufacturing Co. v. Wagner Electric and Manufacturing Co.*,[88] the Supreme Court began to see how difficult it could be to prove damages:

> [T]his statutory right has been often nullified by those infringers who had ingenuity enough to smother the patent with improvements belonging to themselves or to third persons. . . . [T]he greater the number of improvements the greater the difficulty of separating the profits. And if that

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[81] *Id.* (quoting New York v. Ransom, 64 U.S. (23 How.) 487, 488 (1860)).

[82] Birdsall v. Coolidge, 93 U.S. 64, 69-70 (1876).

[83] *Id.* at 70.

[84] *Id.* at 70-71.

[85] *E.g.*, Kissinger-Ison Co. v. Bradford Belting Co., 123 F. 91, 93 (6th Cir. 1903) ("Neither is there any doubt . . . where the injury resulting from an infringement shall be greater than the gains and profits made by the infringer, the patentee, in addition to the profits to be accounted for, is entitled to recover the damages he has sustained." (citations omitted)).

[86] 151 U.S. 139, 148 (1894).

[87] *See, e.g.*, Sessions v. Romadka, 145 U.S. 29, 45-46 (1892); McCreary v. Pa. Canal Co., 141 U.S. 459, 465-66 (1891).

[88] 225 U.S. 604 (1912).

> difficulty could only be converted into an impossibility the defendant retained all of the gains. . . .[89]

Thus, the Court ruled that if apportionment was impossible, then *all* of the defendant's profits must be awarded.[90]

Just a short time later, however, in *Dowagiac Manufacturing Co. v. Minnesota Moline Plow Co.*,[91] the Court walked this back, making clear that the plaintiff still had the burden to show apportionment or, in the alternative, to show that apportionment was impossible.[92] *Dowagiac* was an action in equity referred to a special master to determine both profits and damages under the 1870 Act.

While reaffirming that apportionment of profits was required, the Court nevertheless opened up a new avenue for damages. First, the Court repeated the notion from *Westinghouse* that exactness was no longer required and that reasonable approximation from experts might be allowed.[93] More importantly, the Court explicitly endorsed the notion that reasonable royalties—not actual royalties—might be allowed. In *Dowagiac*, the plaintiff had no licensees—it held the patent for its own use, but it did not provide apportionment evidence of the defendant's profits.[94] However, the Court made no mention that such apportionment evidence would have been required to show a reasonable royalty, instead implying that a reasonable royalty is the fallback when apportionment evidence is missing.[95] As the Court noted:

> [T]here was no established royalty. In that situation it was permissible to show the value by proving what would have been a reasonable royalty, considering the nature of the invention, its utility and advantages, and the extent of the use involved. Not improbably such proof was more difficult to produce, but it was quite as admissible as that of an established royalty.[96]

[89] *Id.* at 615.

[90] *Id.* at 620-22.

[91] 235 U.S. 641 (1915).

[92] *Id.* at 646-47.

[93] *Id.* at 647 (explaining that when "mathematical exactness [is] not possible . . . that degree of accuracy is not required but only reasonable approximation").

[94] *Id.* at 646.

[95] *Accord* Packet Co. v. Sickles, 86 U.S. (19 Wall.) 611, 617-18 (1874); Philp v. Nock, 84 U.S. (17 Wall.) 460, 462 (1873) (describing that licensing damages may be proven, or in alternative profit damages with apportionment may be proven).

[96] *Dowagiac*, 235 U.S. at 648.

The notion of reasonable royalties had been percolating for a few years,[97] but there was no governing rule that allowed them.[98] Nonetheless, the *Dowagiac* Court implied that reasonable royalties were the law all along, citing the long-ignored *Suffolk* decision, which allowed consideration of benefits to the defendant in the absence of existing licenses,[99] and *Packet*, which contemplated the use of such evidence but disallowed it in that case because there were existing licenses.[100]

Because appeals were no longer mandatory after the Judiciary Act of 1891,[101] the push toward reasonable royalties came almost completely from the lower courts through creative reinterpretation of Supreme Court jurisprudence. For example, one case cited in *Dowagiac* stated boldly: "The principle of *Suffolk v. Hayden* was frequently applied by the Supreme Court,"[102] which is simply false. Another case cited is *Philp v. Nock*, which did not support reasonable royalties at all, but instead held that "the profit made by the defendant and *that lost by the plaintiff* are among the elements" to be considered.[103] Another, *Burdell v. Denig*,[104] said that if either plaintiff's profits or actual royalties are unavailable, the other may be considered.[105] In another, the Court discussed "cost savings" but only in the context of apportionment of profits.[106] None of these cases even hint at the historic shift to reasonable royalties in *Dowagiac*. Indeed, *Dowagiac* cites some of these cases for their original propositions—that royalty damages required evidence of actual prior royalties.[107]

Thus, other than *Suffolk*, the *Dowagiac* Court primarily relied on circuit court opinions, such as *Hunt Bros. Fruit-Packing Co. v. Cassiday*,[108] a decision that allowed a jury to determine a reasonable royalty based on a portion of the selling

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[97] ANTHONY WILLIAM DELLER, WALKER ON PATENTS § 563, 1850-51 (1937) suggested that this was the law. *But see* City of Seattle v. McNamara, 81 F. 863, 864 (9th Cir. 1897) (ruling that Walker on Patents did not express current state of law, and plaintiff had to prove damages with evidence).

[98] H. A. Toulmin, Jr., *Problems in Profits and Damages in Patent Accountings (Part II)*, 3 VA. L. REV. 34, 36 (1915).

[99] Suffolk Co. v. Hayden, 70 U.S. (3 Wall.) 315, 320 (1865).

[100] Packet Co. v. Sickles, 86 U.S. (19 Wall.) 611, 618 (1874).

[101] Act of Mar. 3, 1891, ch. 517, 26 Stat. 826.

[102] U.S. Frumentum Co. v. Lauhoff, 216 F. 610, 618 (6th Cir. 1914).

[103] Philp v. Nock, 84 U.S. 460, 462 (1873) (emphasis added). That is, actual loss, not reasonable royalties or cost savings, was to be considered.

[104] 92 U.S. 716 (1876).

[105] *Id.* at 720.

[106] Sessions v. Romadka, 145 U.S. 29, 45 (1892) (holding that cost savings can be considered in estimating damages without royalty).

[107] Dowagiac Mfg. Co. v. Minn. Moline Plow Co., 235 U.S. 641, 648 (1915).

[108] 64 F. 585 (9th Cir. 1894).

price of the patentee's (not the infringer's) machine.[109] The court held that such reasonable royalties were only to be allowed in the absence of lost profits in competition and lack of evidence of actual royalties collected.[110] It further relied on other circuit court opinions that had applied *Suffolk*.[111] Ironically, *Cassiday* was later abrogated in the Ninth Circuit,[112] based on the Supreme Court's opinion in *Coupe*. However, the *Dowagiac* opinion made no mention of this, and instead reinterpreted *Coupe*.[113] Although *Coupe* quite plainly disallowed consideration of cost savings, *Dowagiac* implied that the plaintiff's problem in *Coupe* was that there was simply insufficient evidence of a reasonable royalty, and had there been such evidence, then surely reasonable royalties would have been allowed.

Even with its dubious assertion that reasonable royalties were always allowed, the Court remanded the case for further hearings, recognizing that the evidence was heard prior to *Westinghouse*'s shift in the nature of proof required. In any event, *Dowagiac* represents the practical, if not actual, birth of reasonable royalties as an alternative to the complexities of awarding profits and the apportionment of those profits to the contribution of the invention.

To recap, at the time that the Supreme Court first made reasonable royalties available as a measure of damages, they were intended to reflect actual damages in the absence of evidence relating to existing license fees.[114] They were to be based almost exclusively on cost savings to the defendant (a form of profit), but were distinguished from disgorgement of the defendant's profits in equity. As

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[109] *Id.* at 586-87 (holding that in absence of established royalty or proof of lost sales, it is up to jury to establish reasonable royalty).

[110] *Id.* at 587.

[111] U.S. Frumentum Co. v. Lauhoff, 216 F. 610, 617-18 (6th Cir. 1914) (citing trend of cases toward reasonable royalties: "To send the successful plaintiff away after years of litigation and with only nominal damages is repellent to the sense of justice. Such a result has been many times condemned . . . ."); McCune v. Balt. & O. R. Co., 154 F. 63, 63-64 (3d Cir. 1907) (applying *Suffolk Co.* and determining that *Coupe* did not overrule it); *see also* Merrell Soule Co. v. Powdered Milk Co. of Am., 7 F.2d 297, 299 (2d Cir. 1925) ("But we think any reader of that ruling decision will say that what turned the scale in favor of liberality was the line of cases there reviewed and coming from various lower courts. . . .").

[112] City of Seattle v. McNamara, 81 F. 863, 864 (9th Cir. 1897) (announcing new doctrine, as directed by Supreme Court, that damages are to be assessed only to extent that they are proven by evidence).

[113] Dowagiac Mfg. Co. v. Minn. Moline Plow Co., 235 U.S. 641, 648 (1915) ("True, some courts have regarded [*Coupe*] as impliedly holding that this practice was not permissible, but the decision does not admit of such an interpretation."). Other cases had wondered whether *Coupe* implicitly overruled *Suffolk*. *E.g.*, *McCune*, 154 F. at 64 (noting that *Suffolk* has been cited as support for proposition that measure of damages was not changed).

[114] Taylor, *supra* note 1, at 100 ("And the guideline that courts adopted focused on the value of patent rights based on the tort law principle of making the patent owner whole.").

such, there was no disgorgement of profits or apportionment calculation. This benefited plaintiffs and defendants alike.[115]

Finally, there was no hypothetical negotiation contemplated—reasonable royalties were distinctly not an estimated substitute for an actual royalty, if only the parties had agreed. Indeed, actual licenses were not used, because that constituted evidence of actual damages; reasonable royalties were explicitly contemplated in their absence.

Professor Liivak argues that *Dowagiac* did not overrule or otherwise modify *Rude* and *Coupe*, and that no reasonable royalties should be paid where the plaintiffs cannot prove harm.[116] With respect, this Article plainly disagrees, both as to the interpretation of those cases (which were about quality of proof and what might constitute proper damages if not lost profits) and as to *Dowagiac* (which clearly reinterpreted *Coupe* to be a lost profits case). *Suffolk* (also never overruled) considered benefits to the infringer to be a measure of harm to the patentee who could have obtained a license, even after the fact.[117] *Rude* and *Coupe* nowhere set forth the strong statement of a duty to commercialize that Professor Liivak attributes to them, and instead relate to the ability to *prove* damages.[118]

Indeed, commentators at the time viewed reasonable royalties to be a clean break from prior law that denied damages to those who could show no harm.[119] As one commentator after *Dowagiac* noted, proof of damages became easier:

> The proofs are of necessity general and simple. They may include in addition to proof of the amount of infringement committed, evidence of the custom of the trade, of the royalty charged for similar articles, or even the mere opinion of persons familiar with the trade as to what would be fair under all the circumstances. It can be based on a percentage of the selling price, a price per piece, or per unit of time, or of the product produced.[120]

These types of proof do not evince a contemporary understanding that actual harm must be shown. As one court put it: "This damage or compensation is not, in precise terminology, a royalty at all . . . this phrase is a convenient means of

[115] Gifford, *supra* note 46, at 720-21 ("What then is the remedy for this intolerable condition [unfair and costly damage calculation procedures]? It is . . . the assessment of a reasonable royalty.").

[116] Liivak, *supra* note 22, at 1055.

[117] Suffolk Co. v. Hayden, 70 U.S. (3 Wall.) 315, 320 (1865).

[118] Dicta in the *Aro Manufacturing Co. v. Convertible Top Replacement Co.* plurality opinion does not change this conclusion. 377 U.S. 476, 505-07 (1964).

[119] Toulmin, *supra* note 98, at 34-43; *see also* James Ryan, *A Short History of Patent Remedies*, 6 CYBARIS INTELL. PROP. L. REV. 150, 195 (2015) (stating that *Dowagiac* "marked a fundamental shift from how patent damages were approached just twenty years earlier").

[120] George P. Dike, *The Trial of Patent Accountings in Open Court: A Proposed Reform in Procedure*, 36 HARV. L. REV. 33, 44 (1922).

naming this particular kind of damage."[121] In other words, reasonable royalties were *not* a replacement for established royalties or hypothesized royalties, as some have argued.[122]

D. *Reasonable Royalties Take Hold*

Importantly, *Dowagiac* implied that reasonable royalties were to be determined by a jury, at least in matters at law. After *Dowagiac*, courts unsurprisingly saw more reasonable royalty arguments, and damages awards grew because there were fewer nominal damages awards.

Courts initially required that royalty determinations be tied to the specific value of the patent. In doing so, emphasis on subject matter expertise was often favored over credentialed economics expertise. For example, one case affirmed a mechanical engineer as an expert.[123] Another case relied on the uncontradicted testimony of an independent inventor in the field as to what a royalty should be.[124] One court excluded testimony from an accountant in a fruit peeling patent case because he was not familiar with the operations of canneries, even if he was familiar with the books.[125]

Because many of the determinations were made by special masters, expertise in presenting subject matter testimony was likely less important. Upon failure of apportionment evidence, courts were willing to calculate their own reasonable royalty despite a lack of express testimony about them,[126] and appellate courts were more willing to affirm factual findings upon the admission of relevant underlying evidence.[127]

Indeed, some defendants' representatives argued that whereas damages had previously been unfair to plaintiffs they were now unfair to defendants.[128] But

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[121] U.S. Frumentum Co. v. Lauhoff, 216 F. 610, 617 (6th Cir. 1914) ("It may also be well called 'general damage'; that is to say, damage not resting on any of the applicable, exact methods of computation but upon facts and circumstances which permit the jury or the court to estimate in a general, but in a sufficiently accurate, way the injury to plaintiff caused by each infringing sale.").

[122] *See* Eric E. Bensen & Danielle M. White, *Using Apportionment to Rein in the* Georgia-Pacific *Factors*, 9 COLUM. SCI. & TECH. L. REV. 1, 25-26 (2008).

[123] Fox Typewriter Co. v. Underwood Typewriter Co., 287 F. 453, 454 (6th Cir. 1923).

[124] Munger v. Perlman Rim Corp., 275 F. 21, 25 (2d Cir. 1921) ("[A] pioneer in motor exploitation and himself an inventor and manufacturer, gave it as his opinion that from 10 per cent. to 15 per cent. of the sale price of infringing rims would be a reasonable royalty . . . .").

[125] Dunkley Co. v. Cent. Cal. Canneries, 7 F.2d 972, 976 (9th Cir. 1925).

[126] *See, e.g.*, K.W. Ignition Co. v. Temco Elec. Motor Co., 283 F. 873, 878-79 (6th Cir. 1922).

[127] *See, e.g.*, Malleable Iron Range Co. v. Lee, 263 F. 896, 900-01 (7th Cir. 1920).

[128] *See The "Profits and Damages" Section of the Nolan Bill*, 2 J. PAT. OFF. SOC'Y 546, 549 (1920); *see also, e.g.*, *Malleable Iron Range Co.*, 263 F. at 898 ("[T]he District Judge . . . contrary to the finding and recommendation of the master, added 20 per cent. as

accountings in equity (and along with it, reasonable royalty calculations) were often still done by special masters, which was a costly and secretive process that afforded little future precedent.[129] This is not to say that courts blindly accepted calculations by special masters; as before, such calculations continued to be questioned even under reasonable royalty analysis.[130]

The end result of this uncertainty was competing proposals for damages reform, which ended in a revision passed in 1922 that removed the separation of equity and law in damages, giving all courts the right to award profits.[131] Furthermore, the *Westinghouse* rule was memorialized in the statute, allowing for an award even with uncertainty in the calculation of damages.[132] The statute also explicitly contemplated the use of experts and consideration of reliable testimony in open court, but also explicitly allowed for estimation where concrete data was unavailable.[133]

Notably, however, the revised statute did not reflect the attempt of defendant representatives to limit damages to reasonable royalties. The initial proposal was that upon uncertain proof, the court might adjudge a "reasonable sum as a royalty or general damages,"[134] but the final text allowed the judge to award "a reasonable sum as profits or general damages."[135]

It was not until 1946 that reasonable royalties were explicitly authorized by statute.[136] At the same time, the statute removed defendants' profits from the menu of allowed remedies, and instead authorized only "general damages," as "due compensation," but "not less than a reasonable royalty."[137] Thus, reasonable royalties were to be the damages for all innocent infringement.[138]

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punitive damages."); Reliance Constr. Co. v. Hassam Paving Co., 248 F. 701, 702 (9th Cir. 1918) (awarding reasonable royalty nearly double defendant's profits). *But see* Dowagiac Mfg. Co. v. Deere & Webber Co., 284 F. 331, 350 (8th Cir. 1922) (awarding both profits and reasonable royalty); Metallic Rubber Tire Co. v. Hartford Rubber Works Co., 275 F. 315, 323 (2d Cir. 1921) (denying reasonable royalty where evidence of profits was available because "the payment of a royalty under all the circumstances of even 1 1/2 per cent. would be in the nature of a gratuity").

[129] Dike, *supra* note 120, at 33.

[130] Page Mach. Co. v. Dow, Jones & Co., 238 F. 369, 372-73 (S.D.N.Y. 1916) (L. Hand, J.).

[131] Act of Feb. 18, 1922, ch. 58, sec. 8, § 4291, 42 Stat. 389, 392 (codified at R.S. § 4921 (1923); 35 U.S.C. § 70 (1934)).

[132] *Id.*

[133] *Id.*

[134] *The "Profits and Damages" Section of the Nolan Bill*, *supra* note 128, at 546.

[135] 42 Stat. at 392.

[136] *See* Act of Aug. 1, 1946, ch. 726, 60 Stat. 778 (codified at 35 U.S.C. § 70 (1946)).

[137] 35 U.S.C. § 70 (1946).

[138] *Compare* Eli E. Fink, *The New Measure of Damages in Patent Cases*, 29 J. PAT. OFF. SOC'Y 822, 824 (1947) ("It appealed to one's sense of justice that the patentee without an established royalty or lost sales was entitled to a reasonable royalty, no more and no less,

The 1952 Patent Act simplified the language, but retained the basic core of the 1946 law, including the right to hear expert testimony: "[T]he court shall award the claimant 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 . . . ."[139] The statute has remained unchanged ever since.

Courts continued the trend from *Dowagiac* and *Suffolk* that value was to be broadly construed, including cost savings or price advantages.[140] But the underlying guideline never changed: damages, including a reasonable royalty, should be commensurate with the patent's value. Thus, one court required apportionment of an actual royalty received between valid patents, invalid patents, and unpatented items, but also considered evidence of manufacturing costs, marketing, sales prices, and other indicia of value.[141]

Courts were no longer willing to limit royalties to nominal damages simply because a non-patented alternative was possible.[142] Instead, the recognition, likelihood of implementation, and benefits of such alternatives affected the royalties calculation.[143] Further, the focus was on value rather than profits.[144] Because factors other than the patent's value affected profits, a reasonable royalty was determined without reference to profits, and could even exceed profits.[145]

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against an innocent infringer."), *with* William F. Lee & A. Douglas Melamed, *Breaking the Vicious Cycle of Patent Damages*, 101 CORNELL L. REV. 385, 446 (2016) (arguing that innocent infringers should be treated differently, and that "paradigmatic" case does not apply where parties do not pre-clear patents).

[139] Act of July 19, 1952, ch. 950, 66 Stat. 792, 813 (codified at 35 U.S.C. § 284).

[140] Note, *Recovery in Patent Infringement Suits*, 60 COLUM. L. REV. 840, 849 (1960).

[141] *See* Austin-Western Rd. Mach. Co. v. Disc Grader & Plow Co., 291 F. 301, 304-05 (8th Cir. 1923).

[142] *See* Devex Corp. v. Gen. Motors Corp., 667 F.2d 347, 356 (3d Cir. 1981), *aff'd on other grounds*, 461 U.S. 648 (1983); Fox Typewriter Co. v. Underwood Typewriter Co., 287 F. 453, 455 (6th Cir. 1923); Malleable Iron Range Co. v. Lee, 263 F. 896, 900 (7th Cir. 1920); *cf.* Page Mach. Co. v. Dow, Jones & Co., 238 F. 369, 372 (S.D.N.Y. 1916) (L. Hand, J.). *But see* Union Carbide Corp. v. Graver Tank & Mfg. Co., 282 F.2d 653, 670 (7th Cir. 1960) (citing to a pre-*Dowagiac* case and implying that nominal damages were proper if infringing alternative could be found).

[143] Christopher B. Seaman, *Reconsidering the* Georgia-Pacific *Standard for Reasonable Royalty Patent Damages*, 2010 BYU L. REV. 1661, 1672-73.

[144] Paul M. Janicke, *Contemporary Issues in Patent Damages*, 42 AM. U. L. REV. 691, 716-18 (1993) (noting tension between compensation for loss to patentee and value to infringer, which might exceed that potential loss).

[145] *Austin-Western Rd. Mach. Co.*, 291 F. at 304-05 ("The contention that 'the judgment should be reversed, because it exceeds the actual total profit made by defendant,' is clearly without merit. A reasonable royalty is a measure of damages, and is recoverable without respect to profits." (citing Dowagiac Mfg. Co. v. Minnesota Plow Co., 235 U.S. 641 (1915))).

At bottom, though, the courts recognized that determining a reasonable royalty was ultimately a rough estimate, prone to error.[146] Essentially any reasonable method for determination could be used.[147] Attempts to seek too much detail unrelated to the patent's value were rejected.[148]

After a 1978 Sixth Circuit case[149] (whose rule was later adopted by the Federal Circuit)[150] made it more difficult to win lost profits, virtually every case became a reasonable royalty case.[151] The first ninety-five years of reasonable royalties saw a steady progression of doctrinal standards that culminated with perhaps one of the most influential and most cited district court opinions in history.[152] As a result, assuming that the evidence was properly admitted, the court's or jury's damages determinations have almost never been questioned.[153] Indeed, until 2009, royalty findings were almost always affirmed.[154] But the standards were not policed as well as some may have preferred, and they met new challenges that accompanied growth in patenting, which led to a concern about overcompensation. This, in turn, led to changes in how reasonable royalties were calculated, especially because the Supreme Court revised how all expert testimony was to be considered. Part III, below, evaluates some of these changes in light of the history described in this Section.

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[146] *See* Cincinnati Car Co. v. N.Y. Rapid Transit Corp., 66 F.2d 592, 595 (2d Cir. 1933) (L. Hand, J.) ("The whole notion of a reasonable royalty is a device in aid of justice, by which that which is really incalculable shall be approximated, rather than that the patentee, who has suffered an indubitable wrong, shall be dismissed with empty hands.").

[147] Merrell Soule Co. v. Powdered Milk Co. of Am., 7 F.2d 297, 300 (2d Cir. 1925) ("[S]ince the Dowagiac decision . . . if the evidence indicates any reasonable method by which a jury could award general damages against a trespasser upon the patent property of the plaintiff, either the jury or the court may estimate and award such damages.").

[148] Activated Sludge, Inc. v. Sanitary Dist. of Chi., 64 F. Supp. 25, 34 (N.D. Ill. 1946) (sustaining objection to thirty-two-page interrogatory with hypothetical question that was "lacking in many essentials of such a question, and not embracing a fair statement of defendant's proof"), *aff'd*, 157 F.2d 517 (7th Cir. 1946).

[149] Panduit Corp. v. Stahlin Bros. Fibre Works, Inc., 575 F.2d 1152, 1157 (6th Cir. 1978).

[150] State Indus., Inc. v. Mor-Flo Indus., Inc., 883 F.2d 1573, 1577 (Fed. Cir. 1989).

[151] Lemley, *supra* note 17, at 656.

[152] *See generally* Georgia-Pacific Corp. v. U.S. Plywood Corp., 318 F. Supp. 1116 (S.D.N.Y. 1970), *modified*, Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc., 446 F.2d 495 (2d Cir. 1971); *see also* Janicke, *supra* note 144, at 725; Seaman, *supra* note 143, at 1681.

[153] *See, e.g.*, Lindemann Maschinenfabrik v. Am. Hoist & Derrick Co., 895 F.2d 1403, 1406 (Fed. Cir. 1990) (affirming very low award and noting that party challenging damages "must show that the award is, in view of all the evidence, either so outrageously high or so outrageously low as to be unsupportable").

[154] *E.g.*, Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1336 (Fed. Cir. 2009); *see also, e.g.*, Union Carbide Corp. v. Graver Tank & Mfg. Co., 282 F.2d 653, 671 (7th Cir. 1960); Dunkley Co. v. Cent. Cal. Canneries, 7 F.2d 972, 977 (9th Cir. 1925).

II. WHY HISTORY MATTERS

Fidelity to historic patent standards is important for a variety of reasons. Patent damage cases from the late nineteenth and early twentieth centuries remain vibrant. Indeed, many nineteenth century cases are routinely cited for the proposition that reasonable royalties damages should be limited or apportioned. These cases cannot be fully understood without the context of related cases—the ones that are not usually cited today but that are the focus here. Indeed, studying the circumstances leading to the creation of reasonable royalties reminds us of the problems associated with their absence. Any proposal to change how such damages are calculated ought to consider whether the same limitations were long ago rejected due to deleterious effect.

Relatedly, studying the history of reasonable royalties brings focus to the purpose of the damages measure: to do justice. This traditional purpose is often forgotten, misstated, or misunderstood today.[155] Identifying the compensatory purpose can guide normative discussion of damages rules more clearly than analysis rendered in a vacuum.[156]

Finally, history creates a presumption, at least in this area, because all sides seem to keep citing old cases. As discussed above, courts a hundred years ago confronted many of the same concerns that arise today, resolving those concerns in a particular way. Thus, anyone departing from the same history he or she claims to embrace has some burden of proof to show that the current methods are normatively better, address some unforeseen problem, or are otherwise justified. This paper examines—cursorily, at least—the economic rationality of some recent changes to the law. Where those changes make little economic sense, the burden of departing from traditional methods grows. Where proposals are made to change the current law, history can support those proposals. For example, as discussed in the next Section, many commentators criticize the current application of the *Georgia-Pacific* factors, both as overcompensatory and undercompensatory. But the real problem is that the *Georgia-Pacific* factors should never have been adopted as a matter of doctrine or tradition. The current critiques support that argument, but history shows that proposals to abandon these factors are not without some basis in historical doctrine, and proposals to continue the use of these factors must show why.

III. EVALUATING CURRENT AND PROPOSED RULES

A close examination of current trends in calculating reasonable royalties shows that such methods are not in congruence with history and are no better

[155] *See* Janicke, *supra* note 144, at 722 (commenting on "[t]he list of justice-oriented premises that courts have *now artificially encrusted* upon the concept of hypothetical negotiation" (emphasis added)).

[156] *See* Taylor, *supra* note 1, at 111-17 (exploring public policy reasons to focus on traditional measures of technology valuation rather than hypothetical negotiation).

than historical methods. In many ways, they are worse. There are a few proposals, however, that are more consistent with historic trends.

This analysis does not necessarily mean that calculating royalties will be easier using traditional methods. Nor does it mean that calculating royalties will be more accurate regardless of how one might define that term. And it surely does not require a finding that royalties should move in a particular direction. Instead, the process and evidentiary methods are critical to evaluating proper damages.

A. *The* Georgia-Pacific *Factors*

Georgia-Pacific was a case about plywood that had been pending since the 1950s. Indeed, the special master considered damages for six or seven years before awarding profits, and when that was rejected by the court, the master spent another few years considering reasonable royalties.[157] The case is famous and a worthy starting point.

The court listed fifteen factors—without citation—that it claims had been used to determine royalties in the past.[158] This alone renders the case

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[157] *See Georgia-Pacific Corp.*, 318 F. Supp. at 1117-18.

[158] *Id.* at 1120. The factors are

1. The royalties received by the patentee for the licensing of the patent . . . .

2. The rates paid by the licensee for the use of [comparable] patents . . . .

3. The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold.

4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others . . . .

5. The commercial relationship [and competition] between the [parties] . . . .

6. The effect of selling the patented specialty in promoting sales of other products of the licensee . . . .

7. The duration of the patent and the term of the license.

8. The established profitability [and success] of the [infringing] product . . . .

9. The utility and advantages of the patent property over the [prior art].

10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor . . . .

11. The extent to which the infringer has made use of the invention . . . .

12. The portion of the profit or of the selling price that may be customary . . . to allow for the use of the invention or analogous inventions.

13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.

14. The opinion testimony of qualified experts.

15. The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to

problematic; the listing of elements of analysis without context, precedent, or explanation provides no guidance, certainty, or aid to fact finders.[159]

Nonetheless, these factors are essentially required discussion for experts and courts alike. According to Lexis, as of November 2017 the decision has been cited by over seven hundred opinions, twelve hundred court documents, three hundred law review articles, and one hundred treatise sections,[160] making it one of the most cited district court opinions in history.

The factors are straightforward and primarily relate to the value considerations discussed in prior cases.[161] But, as discussed further below, the list includes a hypothetical negotiation as a factor, and discusses licensors and licensees as if the factors are describing arms-length negotiations. The list could have been taken from a licensing handbook as opposed to a conglomeration of cases.

Despite listing the factors and describing a hypothetical negotiation that included market and bargaining considerations, the *Georgia-Pacific* court does not seem to actually consider the factors when determining the royalty. In that sense, the case gives little guidance about how to use the factors to actually calculate a reasonable royalty.[162]

But the case has much to say in addition to the list of factors. For example, the plaintiff's experts, credited by the court, were the general counsel and head of sales for the patentee.[163] This is consistent with evidence allowed in earlier cases that focused on the specific value of the patent. Indeed, the court estimated the profits of the infringer by looking at the profits of the patentee,[164] a somewhat flexible method of determining a royalty.

The case also introduces the notion of apportionment to reasonable royalties, citing a lost profits case. The defendant argued that because other patents gave value to the product, apportionment should apply.[165] The court disagreed, finding instead that the patent-in-suit provided the primary value of the product.[166] But this finding was odd on two fronts. First, there was surely some

> pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.

Id.

[159] *See* Seaman, *supra* note 143, at 1704.

[160] References to: Georgia-Pacific Corp. v. U.S. Plywood Corp., LEXIS https://advance.lexis.com (search "318 F. Supp. 1116"; then follow "Find references to this case" hyperlink) (last visited Dec. 28, 2017).

[161] *See* Daralyn J. Durie & Mark A. Lemley, *A Structured Approach to Calculating Reasonable Royalties*, 14 LEWIS & CLARK L. REV. 627, 636 (2010).

[162] Cotter, *supra* note 16, at 31.

[163] *See Georgia-Pacific Corp.*, 318 F. Supp. at 1142.

[164] *Id.* at 1131.

[165] *See id.* at 1132.

[166] *Id.*

other value in the product, like the wood itself and even the cost of manufacturing. Second, this was not a lost profits case, and the court did not hint at what would happen to the royalty if there was apportionment. The list of factors would have already taken that into account.

Relatedly, the court found that sales that would have been made along with the wood, so-called convoyed and collateral sales, would have affected the royalty, even if they were not provable as lost profits under the entire market value rule.[167] In a hypothetical negotiation, the licensing party would expect to get paid additionally for those sales, though not at the same rate as lost profits because not all of the sales would be due to the infringement.

Despite its outsized importance—or perhaps because of it—*Georgia-Pacific* was a disaster in light of the history of reasonable royalties as it existed at that point in time. First, it introduced the notion of apportionment with respect to reasonable royalties but cited cases that all held that reasonable royalties only apply if you *cannot* apportion *profits*.[168] This error continues today, as discussed *infra* in Section III.C. Second, having introduced this error, *Georgia-Pacific* gets the analysis wrong by finding that the patent was responsible for all the profits, which is unlikely and tends to overstate the patent's value.[169]

Third, despite listing many factors to consider, the court did not actually analyze any of them to reach a conclusion. Instead it weighed one party's experts against the other's.[170] Indeed, the court of appeals reversed the district court's damages calculation.[171]

From a traditional standpoint, value should be the primary focus, not a baseline royalty to be "adjusted" by the value metrics of *Georgia-Pacific*. Even *Georgia-Pacific* itself did not propose this "adjustment" methodology. Although the factors are reasonably helpful proxies for value, they were never intended to be adjustors, they were meant to be initial considerations.

Thus, modern courts that allow testimony of the adjustment methodology seem to depart from traditional methods.[172] Indeed, the Federal Circuit has recognized that the *Georgia-Pacific* factors are dicta and criticized district courts

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[167] *Id.* at 1130.

[168] *See id.* at 1130; *see also* Union Carbide Corp. v. Graver Tank & Mfg. Co., 282 F.2d 653, 671-72 (7th Cir. 1960).

[169] *See Georgia-Pacific Corp.*, 318 F. Supp. at 1131.

[170] *See id.* at 1140-42.

[171] Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc., 446 F.2d 295, 299 (2d Cir. 1971). Contrary to the positions taken in other cases, the court did *not* rule that defendants must always be left with a profit, only that they may be. *Id.*

[172] *See, e.g.*, Commonwealth Sci. & Indus. Research Org. v. Cisco Sys., Inc., 809 F.3d 1295, 1305-06 (Fed. Cir. 2015) (remanding for district court to use factors to adjust downward); i4i Ltd. P'ship v. Microsoft Corp., 598 F.3d 831, 854 (Fed. Cir. 2010) (affirming use of adjustment methodology to increase royalty), *aff'd on other grounds*, 564 U.S. 91 (2011).

for relying on the factors rather than focusing on what the *Georgia-Pacific* court actually held.[173] This appellate concern for the outsized role of *Georgia-Pacific* has not waned:

> Although we have never described the *Georgia-Pacific* factors as a talisman for royalty rate calculations, district courts regularly turn to this 15-factor list when fashioning their jury instructions. Indeed, courts often parrot all 15 factors to the jury, even if some of those factors clearly are not relevant to the case at hand. And, often, damages experts resort to the factors to justify urging an increase or a decrease in a royalty calculation, with little explanation as to why they do so, and little reference to the facts of record.[174]

In *WhitServe, LLC v. Computer Packages, Inc.*,[175] the court found that a damages award was not supported by the evidence because the expert provided neither evidence nor explanation about why a particular royalty rate should be awarded.[176] The court was especially critical of witnesses listing *Georgia-Pacific* factors without further explanation.[177]

In sum, although the factors may be reasonably helpful in determining value, the way they are currently used is inconsistent with how value has long been determined.

B. *The Hypothetical Negotiation*

The hypothetical negotiation is a staple of reasonable royalty analysis by parties and courts, but it is not—as currently applied, at least—consistent with the traditional reasonable royalty framework. This Section considers how the current rule came to be and evaluates proposals to abandon it.

1. The Willing Buyer Framework

To the extent that hypothetical negotiation has any roots in history, it is based on appraisal and valuation rather than negotiation. As reasonable royalty jurisprudence developed, appellate courts tried to guide damages determinations. While they focused on value and the royalties owed even in the

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[173] *See, e.g.*, Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1578 (Fed. Cir. 1988) (noting, in reference to defendant's use of *Georgia-Pacific*, that "[c]ases should not be cited for mere words" but rather "what the court did in a cited case").

[174] Ericsson, Inc. v. D-Link Sys., Inc., 773 F.3d 1201, 1230 (Fed. Cir. 2014).

[175] 694 F.3d 10 (Fed. Cir. 2012).

[176] *Id.* at 32-33.

[177] *Id.* at 31 ("[R]eciting each factor and making a conclusory remark about its impact on the damages calculation before moving on does no more than tell the jury what factors a damages analysis could take into consideration. Expert witnesses should concentrate on *fully* analyzing the *applicable* factors, not cursorily reciting all fifteen." (citation omitted)).

presence of noninfringing alternatives, the Supreme Court provided little other guidance for royalty calculations.

Some courts settled on an offshoot of a basic accounting principle—that the fair market value of something must be what a willing buyer would pay and what a willing seller would accept.[178] Thus, Judge Learned Hand provided an early discussion in a 1916 noninfringing alternative opinion: "the plaintiff must show that that preference [to infringe] would have been strong enough to compel it to pay the reasonable royalty rather than to adopt such [prior art]."[179] But cases as early as 1878 considered this formulation.[180]

A few years later, in *Austin-Western*, the court stated that fact-finders were to

> determine what amount a person desiring to manufacture and sell the patented article would, as a business proposition, be willing to pay as a royalty; that is, what amount could he fairly pay as a royalty and be able to make and sell in the market the patented article at a reasonable profit to himself.[181]

Further, this amount did not consider the profits at the infringing price point, but instead what the profits might have been if the royalty were included as a cost.[182] The role of profits continued to be part of the analysis through the years.[183]

But as the formulations note, early courts did not require willing parties on both sides. For example, in *Merrell Soule Co. v. Powdered Milk*,[184] the patent was exclusively licensed to the plaintiff who had no intention of licensing to third parties.[185] The court quoted *Austin-Western*, discussed the value of the patented process to the plaintiff, and then jumped directly to the buyer side of the analysis without giving any further thought to what a willing seller would do.[186]

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[178] For a contemporary example, see LAWRENCE ROBERT DICKSEE & FRANK TILLYARD, GOODWILL AND ITS TREATMENT IN ACCOUNTS 68 (3d ed. 1906) (describing valuation of surplus profits as between willing buyer and seller and noting that "no rules can be laid down, as each individual case will possess special features which require to be taken into consideration before it is possible to arrive at a fair estimate of the value").

[179] Page Mach. Co. v. Dow, Jones & Co., 238 F. 369, 372 (S.D.N.Y. 1916) (L. Hand, J.). Note that Judge Hand's opinion is based in part on the now-disregarded "standard of comparison" law, but the willing buyer portion of the analysis continues to be applied. *See id.*

[180] *See* McKeever's Case, 14 Ct. Cl. 396, 425 (1878).

[181] Austin-Western Rd. Mach. Co. v. Disc Grader & Plow Co., 291 F. 301, 304 (8th Cir. 1923).

[182] *Id.* at 305.

[183] *See, e.g.*, Faulkner v. Gibbs, 199 F.2d 635, 639 (9th Cir. 1952); Georgia-Pacific Corp. v. U.S. Plywood Corp., 243 F. Supp. 500, 539 (S.D.N.Y. 1965).

[184] 7 F.2d 297 (2d Cir. 1925).

[185] *Id.* at 300.

[186] *Id.* at 299-300 ("The question then is, What would a reasonable man, who wished to go into this business in the hope of procuring a reasonable profit, be willing to pay for the use of

Future courts grasped on to this framework. For example, cases in 1930, 1937, and 1952 quoted the *Austin-Western* standard.[187] And though noninfringing alternatives no longer negated damages, they were relevant to willing buyers: "[Royalties] should be fixed at such a sum as the defendants would probably have consented to pay, rather than dispense with the patented machine" and use the noninfringing alternative.[188] At the same time, "having [infringed, defendant] cannot be heard to dispute the utility of the patent."[189]

2. The Evolution of the Willing Seller

Courts also slowly evolved the willing buyer framework to add willing sellers. In 1921, *A. Mecky Co. v. Garton Toy Co.*[190] discussed "endeavoring to ascertain what these parties would say to each other, if, being honorable business rivals, the defendant should desire, and the plaintiff should be willing to grant, a license upon reasonable terms."[191] In 1928, the *Egry Register Co. v. Standard Register Co.*[192] case offered a similar definition without citation to any other case: "the fiction that a license was to be granted at the time of beginning the infringement, and then to determine what the license price should have been . . . . what the parties would have agreed upon, if both were reasonably trying to reach an agreement."[193]

Then, in 1938, the court in *Horvath v. McCord Radiator & Manufacturing Co.*[194] stated that the measure should be "that which would be accepted by a prudent licensee who wished to obtain a license but was not so compelled and a prudent patentee, who wished to grant a license but was not so compelled."[195] *Horvath* cited *Austin-Western*, *Powdered Milk*, and *Egry*, among others, and it has been cited by many as the source of the willing buyer/willing seller framework.[196] But for decades, the framework was simply that a willing

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a necessary process . . . .").

[187] *Faulkner*, 199 F.2d at 639; Goodyear Tire & Rubber Co. v. Overman Cushion Tire Co., 95 F.2d 978, 984 (6th Cir. 1937); Rockwood v. Gen. Fire Extinguisher Co., 37 F.2d 62, 66 (2d Cir. 1930).

[188] Dunkley Co. v. Cent. Cal. Canneries, 7 F.2d 972, 976 (9th Cir. 1925) (citing Page Mach. Co. v. Dow, Jones & Co., 238 F. 369, 372 (S.D.N.Y. 1916) (L. Hand, J.)).

[189] *Id.* at 976-77.

[190] 277 F. 507 (E.D. Wis. 1921).

[191] *Id.* at 511.

[192] 23 F.2d 438 (6th Cir. 1928).

[193] *Id.* at 443 (introducing fiction of license and agreement but not citing *Austin-Western* or *Powdered Milk* and noting that the commercial situation, parties' expectations, and other factors will affect analysis).

[194] 100 F.2d 326 (6th Cir. 1938).

[195] *Id.* at 335.

[196] *See id.* at 335-36. For cases discussing the effects of *Horvath*, see *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 612 F.2d 1353 (3d Cir. 1980); *Schnadig Corp. v. Gaines*

buyer/willing seller framework, expressing at most the legal fiction that the valuation determinations would be based on parties who would pay or accept payment instead of accepting the best noninfringing alternative.

3. A Transition to Negotiation

Many, even those who recommend against the hypothetical negotiation, consider the willing buyer framework and the hypothetical negotiation to be one and the same.[197] But the notion of a hypothetical negotiation did not appear for more than sixty years after reasonable royalties took hold. A search on Lexis for "hypothetical negotiation" in November 2017 yielded 961 appearances of the term in cases: one each in 1960, 1972, 1974, 1975, and 1977, with the remainder in the last forty years.

The first published case containing the term "hypothetical negotiation" came from a special master in 1960, who used it to justify a reasonable royalty that aided sales of noninfringing goods.[198] Although the royalty was assessed only on infringing sales, the royalty calculation considered that a royalty rate negotiation would have included the potential of the infringing product to aid unrelated sales.[199]

The special master used the term almost nonchalantly, as if it were a term of art already in play, which implies that the state of expertise at the time may have included hypothetical negotiations even if courts did not.[200] On the other hand, the third appearance of the term "hypothetical negotiation" cites back to

Manufacturing Co., 620 F.2d 1166 (6th Cir. 1980); *Henry Hanger & Display Fixture Corp. of America v. Sel-O-Rak Corp.*, 270 F.2d 635 (5th Cir. 1959).

[197] Taylor, *supra* note 1, at 122.

[198] Union Carbide Corp. v. Graver Tank & Mfg. Co., 282 F.2d 653, 671 (7th Cir. 1960) ("The fact that Lincoln had such sales of supplies, equipment and machines and the extent thereof and the profit therefrom was given weight by me in arriving at the conclusion that in the hypothetical negotiation of a reasonable royalty the parties would have taken such facts into consideration and that Lincoln as a proposed licensee would be willing, if thought necessary and desirable, to charge part or all of the royalty agreed upon to other operations rather than include the royalty in the selling price of its 660 flux.").

[199] *Id.* ("It must be kept in mind that the Master calculated no royalty upon the sale by Lincoln of non-infringing material, but that such royalty was confined solely to the sale of the infringing flux. It seems a logical and commonsense view that Lincoln, if it had been negotiating with Union Carbide for a license, would have taken into consideration all advantages which might accrue to it in determining a royalty which it would be willing to pay."). This will become relevant to the discussion of the entire market value rule in Section III.C.

[200] For example, *A. Mecky Co. v. Garton Toy Co.*, 277 F. 507, 511 (E.D. Wis. 1921), discusses whether negotiating parties would have agreed to an overly high royalty given costs, but that case has never been cited for the negotiation point as a method of calculating royalties. It is possible, however, that the analysis was used.

Powdered Milk,[201] which had no willing seller and thus could not have been about a hypothetical negotiation.[202]

The heavily cited *Georgia-Pacific* case both implicitly and explicitly expands the determination of value from the economics facing a willing buyer to encompass a full-blown negotiation, complete with bargaining power:[203]

> [T]he hypothetical negotiations would not occur in a vacuum of pure logic. They would involve a market place confrontation of the parties, the outcome of which would depend upon such factors as their relative bargaining strength; [and other economic and business factors listed related to the patent and its value].[204]

This departure from precedent was without citation or justification, and radically changed how royalties are calculated.[205]

4. History Does Not Support the Hypothetical Negotiation

Despite its entrenchment since 1970—or perhaps because of it—the hypothetical negotiation is inconsistent with historical practice. As discussed below, even after 1970, courts expressed discomfort with the concept. So too have some commentators who suggest scaling it back or even abandoning it.[206] But even the critiques and reform proposals take for granted that hypothetical negotiation was a feature of the established tradition—when, in fact, it was a departure from tradition.

The hypothetical negotiation complicates the more economically relevant and straightforward question: What is the reasonable value of the invention given the patent, other technology, and market conditions?[207] The willing

[201] Foster v. Am. Mach. & Foundry Co., 492 F.2d 1317, 1322 (2d Cir. 1974) (discussing fact-specific difficulties that would shape hypothetical negotiation between parties and referencing *Powdered Milk* for how these difficulties must be considered).

[202] *But see* Ned L. Conley, *An Economic Approach to Patent Damages*, 15 AIPLA Q.J. 354, 377-78 (1987) (arguing that willing buyer and willing seller analysis is no different than hypothetical negotiation).

[203] Georgia-Pacific Corp. v. U.S. Plywood Corp., 318 F. Supp. 1116, 1121, 1132 (S.D.N.Y. 1970).

[204] *Id.* at 1121.

[205] John M. Golden, *"Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111, 2141 (2007). Taylor, *supra* note 1, at 104-05, describes this as a shift from valuing the patented technology to valuing the patent right.

[206] *Cf.* Seaman, *supra* note 143, at 1711 (suggesting that non-infringing substitutes should play greater role in hypothetical negotiation); Scherling & Sullivan, *supra* note 20, at 56 ("[W]e ultimately want the outcome, not the bargaining drama, of the hypothetical negotiation."); Ted Sichelman, *Purging Patent Law of "Private Law" Remedies*, 92 TEX. L. REV. 517, 554 (2014) (arguing that hypothetical negotiation does not promote innovation goals).

[207] Durie & Lemley, *supra* note 161, at 636.

buyer/willing seller analysis might sound the same, but it is not. The hypothetical negotiation includes many extraneous elements that have no place in a damages calculation, like bargaining power[208] and a guarantee of profit. Furthermore, a focus on negotiation implies that the value of a patent must be fixed before the infringement, and successful patents should go uncompensated if the success was a surprise.[209] Early cases contemplated neither of these implications.[210] Instead, courts held that reasonable royalties were sufficiently compensatory.[211]

The Supreme Court itself has weighed in on pre-infringement hypothetical negotiation and found it wanting. In 1933, the Supreme Court made it clear that damages need not be limited to a willing buyer and willing seller at the time of infringement; in fact, the value of the patent may not be fully known until much later.[212] It is not as if this case were unheard of; a key passage was quoted in

[208] *Compare* Einer Elhauge, *Do Patent Holdup and Royalty Stacking Lead to Systematically Excessive Royalties?*, 4 J. COMPETITION L. & ECON. 535, 543 (2008) ("Nothing in this literature provides any reason to think it would be appropriate to discount all the patent holders' returns by . . . a measure of a bargaining power . . . ."), *with* Lemley & Shapiro, *supra* note 2, at 1999 (arguing that benchmark royalty includes what patentee can bargain for).

[209] Lee & Melamed, *supra* note 138, at 411-12. Similarly, poorly performing inventions might lead to high damages if ex ante estimates were wrong.

[210] *See* Standard Brands, Inc. v. Fed. Yeast Corp., 38 F.2d 314, 328 (D. Md. 1930) ("[A rule requiring the defendant to make a profit] would be abhorrent to the well-settled rules designed for the protection of private property. The infringer should not be enabled, through the effect of his own wrongful act, to compel the owner of the patent to deal with him as if he were the lawful prospective purchaser of a license under the patent."); A. Mecky Co. v. Garton Toy Co., 277 F. 507, 513 (E.D. Wis. 1921) (considering costs and profits of infringer, but not willfulness: "in the application of the rule care should be taken to ascertain reasonableness of a royalty as of the time and under the circumstances attending the commencement and duration of the infringement"); Lee & Melamed, *supra* note 138, at 422-23, argue that *A. Mecky* implies that damages should only be considered prior to infringement, but that seems inconsistent with the analysis in that case that considered post-infringment costs and profits. Indeed, each of the cases cited by Lee & Melamed imply that post-infringement information should be used, and that "at the time of infringement" never meant an ex ante bargaining cutoff, but instead meant "not at the time of patenting."

[211] *Compare* ResQNet.com, Inc. v. Lansa, Inc., 594 F.3d 860, 869 (Fed. Cir. 2010) ("At all times, the damages inquiry must concentrate on compensation for the economic harm caused by infringement of the claimed invention."), *with* Janicke, *supra* note 144, at 722-27 (discussing problems with hypothetical negotiation and suggesting it be discarded in favor of damages based on business realities), *and* Sichelman, *supra* note 206, at 554 (arguing that compensatory framework of patent law is misguided).

[212] Sinclair Ref. Co. v. Jenkins Petroleum Process Co., 289 U.S. 689, 699 (1933) ("An imaginary bid by an imaginary buyer, acting upon the information available at the moment of the breach, is not the limit of recovery where the subject of the bargain is an undeveloped patent. Information at such a time might be so scanty and imperfect that the offer would be nominal."). *But see* Lee & Melamed, *supra* note 138, at 413 (arguing that ex post knowledge

Lucent Technologies, Inc. v. Gateway, Inc.: "Here is a book of wisdom [the value of the patent after infringement] that courts may not neglect."[213]

Of course, courts and commentators[214] have long recognized that the hypothetical negotiation is entirely speculative:

> The methodology encompasses fantasy and flexibility; fantasy because it requires a court to imagine what warring parties would have agreed to as willing negotiators; flexibility because it speaks of negotiations as of the time infringement began, yet permits and often requires a court to look to events and facts that occurred thereafter and that could not have been known to or predicted by the hypothesized negotiators.[215]

In another famous case, *Panduit Corp. v. Stahlin Bros. Fibre Works*,[216] the court was not so enamored with the *Georgia-Pacific* description of the negotiation and cited back to the original willing buyer language from *Austin-Western*.[217] The court expressed reservations:

> [A] reasonable royalty . . . cannot be treated, as it was here, as the equivalent of ordinary royalty negotiations among truly "willing" patent owners and licensees. That view would constitute a pretense that the infringement never happened. It would also make an election to infringe a handy means for competitors to impose a "compulsory license" policy upon every patent owner . . . . [T]he infringer would have nothing to lose, and everything to gain if he could count on paying only the normal, routine royalty non-infringers might have paid. As said by this court in another context, the infringer would be in a "heads-I-win, tails-you-lose" position.
>
> . . . .
>
> Determination of a "reasonable royalty" . . . rests on a legal fiction. Created in an effort to "compensate" when profits are not provable, the "reasonable royalty" device conjures a "willing" licensor and licensee, who like Ghosts of Christmas Past, are dimly seen as "negotiating" a "license." There is, of course, no actual willingness on either side, and no license to do anything, the infringer being normally enjoined . . . .[218]

Instead of relying on a license negotiation, the *Panduit* court cited the earliest reasonable royalty cases focusing on the value of the invention.[219] The court

about value was properly applied to breach of contract in *Sinclair*, but that same considerations should not apply to reasonable royalties).

[213] Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1333 (Fed. Cir. 2009).

[214] Lemley & Shapiro, *supra* note 2, at 2019.

[215] Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1575 (Fed. Cir. 1988).

[216] 575 F.2d 1152, 1157 (6th Cir. 1978).

[217] *Id.* at 1158.

[218] *Id.* at 1158-59.

[219] *Id.* at 1157-58 (citing cases from 1928 to 1963).

noted that defendants cannot deny the utility of the patent that they infringed.[220] It allowed royalty evidence based on technical experts, but found error in expert testimony about licensing that was unrelated to the value of the invention.[221] Further, the court noted that considerations of noninfringing alternatives must look at the quality of the substitution.[222] Finally, the court discounted evidence of royalties associated with litigation settlements because "[l]icense fees negotiated in the face of a threat of high litigation costs 'may be strongly influenced by a desire to avoid full litigation.'"[223]

The *Panduit* court's pronouncements are consistent with the history of reasonable royalty analysis. Interestingly, *Georgia-Pacific*'s conception of the hypothetical negotiation seems to have gained more credence than *Panduit*'s skeptical approach. It is unclear why this occurred, given *Panduit*'s dominance in lost profit analysis.[224] It may be that wide citation of the *Georgia-Pacific* factors meant that its view of the hypothetical negotiation rode *Panduit*'s coattails to broad acceptance.

Notwithstanding some skepticism, courts continue to enforce the hypothetical bargain as if it were written in stone.[225] For example, having quoted the Supreme Court's edict that courts should not limit themselves to the time of negotiation, in *Lucent*, the Federal Circuit doubled down on the notion that post-infringement value *should be estimated at the time of infringement*: "Even though parties to a license negotiation will usually not have precise data about future usage, they often have rough estimates as to the expected frequency of use."[226] To be fair, the *Lucent* court noted the lack of evidence showing post-infringement use of the invention by customers.[227] Nonetheless, the squeezing of post-infringement use into a hypothetical pre-infringement forecast is confusing, unnecessary, and inconsistent with historical application of reasonable royalties.

Further, the *Lucent* court's analysis of a lump sum (rather than percentage) award caused odd hypothetical negotiation issues. As the court noted: "Faced with the jury's selection [of a lump sum], our task is to determine . . . whether substantial evidence supports the jury's implicit finding that Microsoft would have agreed to, at the time of the hypothetical negotiation, a lump-sum, paid-in-full royalty of about $358 million."[228] The court goes on to analyze the relative

[220] *Id.*

[221] *Id.* at 1161-62.

[222] *Id.* at 1162-63.

[223] *Id.* at 1164 n.11 (citing Rude v. Westcott, 130 U.S. 152 (1888)).

[224] The case has been cited over five hundred times. References to: Panduit Corp. v. Stahlin Bros. Fibre Works, LEXIS, https://advance.lexis.com (search "575 F.2d 1152;" then follow "Find references to this case" hyperlink) (last visited Dec. 28, 2017).

[225] Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1574 (Fed. Cir. 1988).

[226] Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1334 (Fed. Cir. 2009).

[227] *Id.*

[228] *Id.* at 1325.

benefits and risks of running royalties versus lump-sum payments, and how the parties might have negotiated for them.[229] Lucent had not asked for a lump-sum royalty, and there was no evidence that the parties would have negotiated for one exceeding $350 million.[230] Regardless, the court followed this odd methodology. That a plaintiff would have sought a lump sum, even if true, highlights difficulties of the hypothetical negotiation. The timing of payments a plaintiff might desire should have no bearing on the value of the invention.

Hypothetical negotiation does not necessarily disregard history in a manner that favors either plaintiffs or defendants.[231] For example, in *Hanson*, the royalty was based on the purchase of an infringing snow-making machine that was used sparingly for experimental purposes.[232] The court held that because a hypothetical negotiation would have yielded a per machine (rather than per use) royalty, it did not matter that the machines were not actually used much,[233] as if compensatory damages should be the same for one minute of infringement versus one year. This ruling is inconsistent with prior Supreme Court precedent which limited damages when the use period was limited.[234] This does not mean that damages must necessarily be based on actual hours of use, but it does mean that devotion to the hypothetical negotiation leads the damages calculation away from its remedial underpinnings.[235]

The following quote offers perhaps the best example of the excesses of the hypothetical negotiation: "In addition, during its closing argument to the jury, Home Depot went so far as to suggest that Mr. Powell might have offered to allow it to use his patented invention for free."[236] At this point, the hypothetical negotiation has ceased to be a damages framework and is simply a free-for-all.

5. Recognizing the Limits

There is some evidence that the Federal Circuit has begun to view the hypothetical negotiation a bit more skeptically,[237] though it has not hinted at abandoning it. Most recently the Federal Circuit described the hypothetical

[229] *Id.* at 1326-27.

[230] *See id.* at 1327-28.

[231] Thus, ex post information should be used whether the value goes up or down. Lee & Melamed, *supra* note 138, at 416.

[232] Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1076 (Fed. Cir. 1983) .

[233] *Id.* at 1080.

[234] Birdsall v. Coolidge, 93 U.S. 64, 70-71 (1876).

[235] Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1577-78 (Fed. Cir. 1988).

[236] Powell v. Home Depot U.S.A., Inc., 663 F.3d 1221, 1239 (Fed. Cir. 2011).

[237] *See* Carnegie-Mellon Univ. v. Marvell Tech. Grp., Ltd., 807 F.3d 1283, 1304 (Fed. Cir. 2015) ("[A]ny reconstruction of the hypothetical world in which the infringer did not actually infringe but negotiated in advance for authority to practice the patents, does not require 'mathematical exactness,' but a 'reasonable approximation' under the circumstances." (citing Dowagiac Mfg. Co. v. Minn. Moline Plow Co., 235 US 641 (1915))).

negotiation as "one approach."[238] In *Apple Inc. v. Motorola, Inc.*,[239] the court recognized the limits of the hypothetical negotiation.[240] The district court had excluded an expert because the underlying source of factual information was a technical expert hired by the plaintiff, Apple. The district court reasoned that in a hypothetical negotiation, no party would agree to a royalty based only on facts provided by the other party.[241] The Federal Circuit reversed, holding that experts are allowed to base their opinions on any facts allowed by the Federal Rules of Evidence.[242] The court further distanced itself from the hypothetical negotiation by affirming exclusion of an expert who testified that the first patent in a portfolio would be licensed for forty to fifty percent of the portfolio rate but did not justify that rate based on the individual value of the patent.[243]

This leads to the general point—reasonable royalties are supposed to be compensatory in nature. The question is not what the parties would have negotiated, it is what the appropriate amount of compensation should be. Even a running royalty looks like a lump sum when assessed as damages after the fact. The only question is the amount. And that analysis is hard enough; trying to *also* speculate whether the parties would have negotiated a lump sum or a running royalty adds an unnecessary layer of complexity.[244] In *Lucent*, this uncertainty was exacerbated because Lucent's counsel apparently referred to a price per unit royalty (as opposed to a percentage of sales royalty) as a "lump sum" royalty.[245] This type of imprecision should not make a difference, but it does if one holds jury verdicts up to the test of what a hypothetical negotiation would have been.[246]

This comparative historical approach should be distinguished from normative valuation proposals, such as setting damages so that parties are no better and no

[238] *Id.* at 1303.

[239] 757 F.3d 1286 (Fed. Cir. 2014), *overruled on other grounds by* Williamson v. Citrix Online, LLC, 792 F.3d 1339 (Fed. Cir. 2015).

[240] *Id.* at 1320-21.

[241] *Id.*

[242] *Id.* at 1321.

[243] *Id.* at 1325.

[244] John C. Jarosz & Michael J. Chapman, *The Hypothetical Negotiation and Reasonable Royalty Damages: The Tail Wagging the Dog*, 16 STAN. TECH. L. REV. 769, 829 (2013) ("Our approach focuses on the contributions of the patent, licensing comparables, and design around costs. Each of those should be assessed objectively, without the distractions and distortions introduced by bargaining drama."); Jay Pil Choi, *How Reasonable is the "Reasonable" Royalty Rate? Damage Rules and Probabilistic Intellectual Property Rights* 17-18 (CESifo Working Paper No. 1778, 2006) (discussing economic illogic of hypothetical negotiation when patents are probabilistic).

[245] Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1330 (Fed. Cir. 2009).

[246] Cotter, *supra* note 16, at 17.

worse off than they would have been without infringement.[247] The but-for view of damages is one way to calculate value, and accepting it is a normative judgment.[248] One can determine what would have happened without infringement without resorting to the hypothetical negotiation.[249]

To be clear, however, eliminating the hypothetical negotiation in favor of the traditional approach is not meant to limit the parties' arguments. A party might well argue that the context of the invention and the infringing product are such that a payment untethered to actual sales should be allowed. But the notion that damages should be limited in a wildly successful product using a wildly productive invention because there was uncertainty at the time of infringement that might have affected a bargaining process that never happened departs dramatically from the traditional remedial point of view.

6. Profit Making and the Hypothetical Negotiation

One common explanation for the hypothetical negotiation is that it allows for damages that leave the infringer with a profit.[250] This too is inconsistent with the historical treatment of damages. While the willing buyer analysis always considered whether a profit could be obtained at the reasonable royalty, the caselaw's development did not assume that a profit must be obtained at the current offering price.[251]

Recent cases are inconsistent on this point. For example, in *WesternGeco L.L.C. v. Ion Geophysical Corp.*,[252] the court affirmed exclusion of testimony that would have set a reasonably royalty at four times the infringing product's revenues, apparently because the expert estimated the rate at ten percent of the infringer's *customers*' revenues.[253] While the outcome of this decision makes sense from a value standpoint, the district court arrived at the conclusion through devotion to the hypothetical negotiation: "As a matter of law, no such risk can be taken in a hypothetical negotiation in which infringement is deemed known. . . . With knowledge of validity and infringement, such a financially

[247] *See* ROGER D. BLAIR & THOMAS F. COTTER, INTELLECTUAL PROPERTY: ECONOMIC AND LEGAL DIMENSIONS OF RIGHTS AND REMEDIES 61 (2005); Thomas F. Cotter, *Patent Holdup, Patent Remedies, and Antitrust Responses*, 34 J. CORP. L. 1151, 1176 (2009).

[248] This Article takes no view on the but-for formulation. On the one hand, it is a reasonable way to determine value. On the other hand, given difficulties of detection, costs of enforcement, and effects on negotiation, simple neutrality may not be an appropriate way to design a compensatory remedy.

[249] Even if the appropriate measure is what the parties would have agreed to, the hypothetical negotiation construct is not an appropriate way to answer the question. Indeed, the hypothetical negotiation could be used to distort such a determination.

[250] *See, e.g.*, Lee & Melamed, *supra* note 138, at 416.

[251] *See, e.g.*, Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1081 (Fed. Cir. 1983).

[252] 791 F.3d 1340 (Fed. Cir. 2015).

[253] *Id.* at 1353 n.9.

catastrophic agreement would have been totally unreasonable."[254] That a party would not have taken the risk is *not* a reason to deny damages if the compensatory amount is otherwise reasonable. Indeed, the Federal Circuit noted that reasonable royalties might well exceed profits.[255] Instead, the problem was that the royalty far exceeded the value of the invention, and thus was not based on any reasonable economic principle.

The closest any recent court has come to recognizing the traditional rule about profits is in *Aqua Shield v. Inter Pool Cover Team*,[256] in which the court noted that anticipated profits without the infringement as compared to anticipated profits with the infringement would be the likely measure of the invention's value.[257] Further, the court noted something very important—something that is often lost in discussions of royalty stacking and component parts. Even if a royalty eliminates a profit, that profit is based on a price set without paying the royalty.[258] In other words, profit can be maintained with a price increase, and if companies paid the full cost for all the inventions in each product, they would simply cost more money.[259] Of course, much of the analysis depends on the competitive landscape, noninfringing alternatives, and whether the defendant is a price taker.[260] Royalties may still be overcompensatory, but complaints about the system rarely take dynamic pricing effects into account.

But even despite consideration of what actually occurred, the *Aqua Shield* court couched the analysis in terms of a hypothetical negotiation, as if a profit forecast could determine the value of the invention, and even reversed the award because the actual profits were used as a cap.[261] It is unclear why a forecasted profit is better than the actual profit to determine the invention's value. Indeed, some courts have described this method—called the analytical method—as separate from the hypothetical negotiation,[262] though if that were really true, it is unclear why projections should be the starting point.

This is not to say that the forecast is irrelevant; the forecast might, for example, highlight a lack of profit due to management choices.[263] But relying

[254] *Id.* at 1353.

[255] *Id.*

[256] 774 F.3d 766 (Fed. Cir. 2014).

[257] *Id.* at 770-71.

[258] *Id.* at 772.

[259] *E.g.*, Douglas Dynamics, LLC v. Buyers Prods. Co., 717 F.3d 1336, 1346 (Fed. Cir. 2013) ("The infringer's selling price can be raised if necessary to accommodate a higher royalty rate, and indeed, requiring the infringer to do so may be the only way to adequately compensate the patentee for the use of its technology.").

[260] *Aqua Shield*, 774 F.3d at 772.

[261] *Id.* at 772.

[262] Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1324 (Fed. Cir. 2009).

[263] Radio Steel & Mfg. Co. v. MTD Prods., Inc., 788 F.2d 1554, 1557 (Fed. Cir. 1986) (querying whether low profit was due to sale as loss leader).

on a forecast risks overcompensation. In one case, an expert seized on a business plan created just before infringement began and testified that the hypothetical negotiation would have yielded a one-time, lump sum payment based on estimated sales.[264] That is, the royalty base was hypothesized to be the estimate, and the jury awarded hypothesized damages even though the actual royalty base—and thus use of the invention—turned out to be far lower than the estimates. The Federal Circuit affirmed, saying: "The fact that [defendant] did not subsequently meet those projections is irrelevant to [defendant's] state of mind at the time of the hypothetical negotiation."[265] Here, again, devotion to the hypothetical negotiation led to an outcome divorced from the value of the invention, something far removed from traditional analysis.

But what if the invention is wildly successful and drives substantial profits? Here, too, damages for infringement should not be based on a hypothetical negotiation that would occur before anyone knew how popular the invention would be. Such a measure is non-compensatory.[266] The willing buyer/willing seller framework was intended to aid courts in considering economic value through a simple willingness-to-pay framework. The hypothetical negotiation that this simple standard has since grown into has become detached from the very economic measure of value that parties purport to want.

A contrary example shows how such a calculation might be done. In *Summit 6, LLC v. Samsung Electronics Co.*,[267] a patent related to shrinking the file size of photos down in order to send them via text message was infringed by a cell phone camera.[268] The expert (1) estimated revenues associated with the camera only, (2) used surveys to determine the percentage of users that took photos and sent them via the infringing system, (3) determined the profit margin on only that percentage of use, and (4) determined a per unit profit, which profit the expert then opined would be evenly split between the parties.[269]

This methodology appears to be a reasonable and straightforward way to do what the courts have long commanded—determine the value of the invention. It avoids net sales, focuses on actual use using the defendant's own survey data, and considers both costs of production and all the other features of the product. Yet, the defendant attacked it as unreliable, *because such an analysis had never been done before*.[270] This novelty assertion is false, as such methods are routinely how damages were calculated prior to *Georgia-Pacific*. It is also a telling statement about how poorly tied expert witness testimony may sometimes

[264] Interactive Pictures v. Infinite Pictures, 274 F.3d 1371, 1384-85 (Fed. Cir. 2001).

[265] *Id.* at 1385.

[266] *Cf.* Sichelman, *supra* note 206, at 552 (arguing that hypothetical negotiation is unnecessary because damages should be sufficient to incentivize invention).

[267] 802 F.3d 1283 (Fed. Cir. 2015).

[268] *Id.* at 1287-88.

[269] *Id.* at 1295-96.

[270] *Id.* at 1294.

be to the actual value of the invention. Indeed, to defend its position, the plaintiff argued that the opinion was reliable "because it was within the framework of *Georgia-Pacific*."[271] In affirming this "novel" valuation methodology, the court even noted that "[t]here is no dispute that use of the claimed invention is relevant under *Georgia-Pacific*."[272]

C. *Apportionment and the Entire Market Value Rule*

How to properly assign value to the invention in multi-component products has garnered more attention, both positive and negative, than any other aspect of reasonable royalties. At its core, the reasonable royalty is usually some royalty percentage applied to some royalty base, such as ten percent of all sales. But how the royalty base is determined, and its interplay with the royalty rate, can be complex. The base might be smaller than sales of the entire product due to apportionment, or larger if sales of other, noninfringing goods are considered.

The current manner in which courts and some commentators would like royalties calculated represents a marked divergence from the original goals of reasonable royalties. This Section discusses the path of legal changes and assesses them through the lens of history.

1. Convoy and Collateral Goods

The entire market value rule had always been used in lost profits analysis to justify awarding *all* profits. The rule had been expanded to include the profits of related goods expected to be sold at the same time—referred to as convoy and collateral goods.[273]

Convoy sales migrated to reasonable royalties, allowing royalties to be collected on related goods.[274] This is different from the discussion of a royalty on related goods, such as that in *Georgia-Pacific*. There, the court talked about increasing the royalty rate on *infringing* goods to account for collateral sales.[275] The entire market value rule, however, would expand the "royalty base" by exacting a royalty on *noninfringing* goods.[276]

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[271] *Id.*

[272] *Id.* at 1298.

[273] *See, e.g.*, Nat'l Gypsum Co. v. Steel Sys. Int'l, Inc., No. 85-cv-02134, 1988 U.S. Dist. LEXIS 11641, at *6 (D. Or. 1988) ("It is appropriate to grant damages for a non-patented part such as the 'J track' where 'the patentee can normally anticipate the sale of the non-patented component together with the sale of the patented components.'" (citations omitted)).

[274] *See, e.g.*, Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc., 750 F.2d 1552, 1568 (Fed. Cir. 1984).

[275] Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers Inc., 446 F.2d 295, 299 (2d Cir. 1971).

[276] *Trans-World Mfg. Corp.*, 750 F.2d at 1568.

In *Rite-Hite Corp. v. Kelley Co.*,[277] the court explicitly noted the differences in determining the value of collateral sales in setting a royalty rate from analysis of the entire market value royalty base.[278] The case the *Rite-Hite* court cited as the basis for increasing the "royalty base,"[279] *Leesona Corp. v. United States*,[280] was a convoy good royalty case—multiple separate components had been requisitioned by the U.S. government, which induced infringement of one of them, but the other components were also purchased at the same time.[281] *Leesona* itself cited *Marconi Wireless Telegraph Co. of America v. United States*,[282] a 1940s Court of Claims case that applied the entire market value rule to exact a royalty on spare parts sold with the infringing radios.[283]

In *TWM Manufacturing Co. v. Dura Corp.*,[284] the defendant had long sold wheels and axels with the infringing automobile suspension system.[285] The court ruled that because the *infringer* failed to provide evidence that the wheels were ever sold separately, it found no error in including them in the royalty base.[286] The court cited several lost profits cases to support the view that the wheels and axels were part of the package, but then used the hypothetical negotiation to imply that this would have affected the reasonable royalty.[287]

Traditionally, one of the questions for convoy and collateral sales has been what constitutes the full product. In *Rite-Hite*, for example, the court implied that so long as all the patented and unpatented components function as a single unit and are ordinarily sold together, they should be included in the royalty

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[277] 56 F.3d 1538 (Fed. Cir. 1995).

[278] *Id.* at 1549 n.9 ("This issue of royalty base is not to be confused with the relevance of anticipated collateral sales to the determination of a reasonable royalty rate.").

[279] *Id.* at 1549.

[280] 599 F.2d 958 (Ct. Cl. 1979)

[281] *Id.* at 975 ("We recognize that Leesona could not prevent Eagle Picher from manufacturing and selling anodes, cathodes, and covers for a metal-air battery. But the point is that the Marine Corps wanted a mechanically rechargeable air battery and established specifications for such a battery. The government was not merely buying a battery. It was buying a mechanically rechargeable battery, and to be so rechargeable the anodes were needed.").

[282] 99 Ct. Cl. 1 (1942).

[283] *Id.* at 56 (allowing royalties on spare parts sold with product but held for later repair).

[284] 789 F.2d 895 (Fed. Cir. 1986).

[285] *Id.* at 897 (discussing fact that defendant sold products with infringing system from at least 1967 until lawsuit was brought in 1973).

[286] *Id.* at 901.

[287] *Id.* ("Where a hypothetical licensee would have anticipated an increase in sales of collateral unpatented items because of the patented device, the patentee should be compensated accordingly."); *see also* Deere & Co. v. Int'l Harvester Co., 710 F.2d 1551, 1559 (Fed. Cir. 1983).

base.[288] This "single functioning unit test" did not originate with *Rite-Hite*, however, since at least one Federal Circuit case attributes it to *Georga-Pacific*'s entire market value analysis of whether the patent is an "entirety" (i.e., a functional unit).[289]

Considering whether parts are sold together to form a single unit makes sense when considering convoy and collateral sales. Indeed, this is how *Marconi* initially applied the rule as far back as 1942 when discussing spare parts.[290] Concerns associated with awarding royalties on noninfringing goods should be fairly obvious: such damages are arguably outside the statute because they award damages for noninfringing sales. While such awards had been contemplated at least since the 1940s, Federal Circuit opinions confirming such royalties in the late 1980s and 1990s may have brought new attention to the issue.

2. *Lucent*, *Uniloc*, and the Birth of Apportionment

The *Lucent* case involved an old Bell Labs patent relating to the graphical selection of information.[291] The infringing products were "date pickers" in Microsoft Money and Microsoft Outlook that allowed users to select a date by clicking a day on a calendar rather than by typing numbers.[292] The jury awarded approximately $358 million as a reasonable royalty.[293] The *Lucent* court's analysis, however, was complicated by two facts. First, Microsoft had failed to object to plaintiff's evidence in support of the royalty.[294] Second, the jury awarded a "lump sum" royalty rather than a running royalty,[295] which makes it hard to apply a royalty rate to a sales royalty base because, theoretically, a lump sum royalty is fixed no matter how many sales there were. *Lucent* held that the lump sum award was simply unsupported by substantial evidence, even with plaintiff's evidence all having been admitted.[296] The jury award was more (as much as four times more) than all of the comparable licenses, which covered additional technology and patents.[297]

Having ruled that the evidence did not support the jury's royalty verdict, the Federal Circuit went further and addressed Microsoft's argument that the jury

288 Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1549-50 (Fed. Cir. 1995); *see also* Tec Air, Inc. v. Denso Mfg. Mich. Inc., 192 F.3d 1353, 1362 (Fed. Cir. 1999).

289 Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1578 (Fed. Cir. 1988).

290 Marconi Wireless Tel. Co. of Am. v. United States, 99 Ct. Cl. 1, 22-23, 56 (1942).

291 Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1308 (Fed. Cir. 2009).

292 *Id.* at 1323.

293 *Id.* at 1335.

294 *Id.* at 1325.

295 *Id.*

296 *Id.* at 1335.

297 *Id.* at 1332.

improperly considered the entire market value of the Outlook software. The court noted that considering the entire market value would have been an error.[298]

The court stated, as if it were well-settled law, that the plaintiff must prove that the *feature* is the basis for customer demand for the whole product.[299] The feature demand requirement was a marked change from past royalty cases, which had instead considered whether all of the components worked as a functioning unit. There was little precedential support for the feature demand view of the entire market value rule. The *Lucent* court cited to *Rite-Hite* (a convoy goods case about noninfringing products sold in addition to the infringing product), *TWM* (a convoy goods case), and *Bose Corp. v. JBL, Inc.* (which endorsed the functioning unit standard, not the "feature demand" standard).[300] The court then discussed historic lost profit apportionment cases and the importance of awarding damages associated with value,[301] but nowhere did the court address the elephant in the room: that reasonable royalties are different from lost profits, that the purposes of the rules are different, that the old cases initially never applied the entire market value rule to reasonable royalties, and that when they finally started to do so it was to *add on* to the royalty base as a convoy good, not to apportion a single functioning unit to a smaller amount.

For example, the *Rite-Hite* court cited to *Western Electric Co. v. Stewart-Warner Corp.*[302] for the notion that the entire market value rule applies to "components" of a whole for calculating a royalty base.[303] But in *Western Electric* where the court granted royalties on the whole—the unpatented components were simply plastic housing and leads of a silicon chip, and the whole product had already been used in actual license agreements.[304] The court noted that had the base been smaller, the rate would have been higher.[305] In *Western Electric*, the entire market value rule was discussed briefly, in the last paragraph, citing a lost profits case to note that the district court had not erred in including the entire product in the royalty base.[306] *Western Electric* is hardly a

[298] *Id.* at 1336.

[299] *Id.* at 1337.

[300] Bose Corp. v. JBL, Inc., 274 F.3d 1354, 1361 (Fed. Cir. 2001).

[301] *Lucent*, 580 F.3d at 1339.

[302] 631 F.3d 333 (4th Cir. 1980).

[303] Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1549-50 (Fed. Cir. 1995) (citing *W. Elec.*, 631 F.3d at 333).

[304] *W. Elec.*, 631 F.3d at 340-41.

[305] *Id.* at 340 ("The court also noted that the base used by Western in its licensing contracts was the housed device and not the chip, and that if Western had in fact used the value of the chip, it probably would have used a substantially larger royalty rate than it was using. . . . What [defendant] wants us to do is to hold the 1½% rate intact, but significantly reduce the base.").

[306] *Id.* at 341 (citing Westinghouse Co. v. Wagner Mfg. Co., 225 U.S. 604, 614-15 (1912)).

strong statement that royalty base must be apportioned. *Lucent* represents the first real application of the entire market value rule as a way to apportion the royalty base to a *lower* amount, rather than to a larger amount to cover convoy and collateral goods.

The *Lucent* opinion points out two reasons to support its new rule that it would have been legal error to use total product sales as a royalty base. First, the patent at issue was not responsible for customer demand of the program, which is a straightforward application of the rule . . . if it were a lost profits case.[307] Second, the expert originally suggested a one percent royalty on the sales price of the whole computer, but later testified to eight percent of the sales price of Outlook.[308] This, the court would not abide: "Being precluded from using the computer as the royalty base, he used the price of the software, but inflated the royalty rate accordingly. This cannot be an acceptable way to conduct an analysis of what the parties would have agreed to in the hypothetical licensing context."[309]

In one sense, the court was right about the problem. The comparable license information as well as the value of the invention implied a small (perhaps one percent) royalty rate, *but not on entire computers*, and so the district court was correct to disallow testimony suggesting a one percent rate on sales revenue for all computers equipped with Outlook software. And thus, raising the rate to eight percent of Outlook revenues in order to achieve the same total damages was simply an end-run around the court's prior order, and the Federal Circuit recognized it for what it was.[310]

But in another sense, the royalty base and the royalty rate must bear some relationship to each other. Indeed, the court even noted: "Simply put, the base used in a running royalty calculation can always be the value of the entire commercial embodiment, as long as the magnitude of the rate is within an acceptable range (as determined by the evidence)."[311] Indeed, the court noted that Microsoft would not be complaining about the royalty base if the rate were

307 *See* Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1333 (Fed. Cir. 2009).

308 The district court barred the initial expert report. *Id.* at 1338.

309 *Id.*

310 *Id.*; *see also* Elizabeth M. Bailey, Gregory K. Leonard & Mario A. Lopez, *Making Sense of "Apportionment" in Patent Damages*, 12 COLUM. SCI. & TECH. L. REV. 255, 259 (2011) ("The underlying cause of problem damages awards is the approach sometimes taken by damages experts of choosing the royalty rate and royalty base independently of each other, and without reference to the economic value of the patented technology.").

311 *Lucent*, 580 F.3d at 1338-39 ("Thus, even when the patented invention is a small component of a much larger commercial product, awarding a reasonable royalty based on either sale price or number of units sold can be economically justified.").

a tenth of one percent instead of eight percent.[312] The court pointed to the complexities of modern licensing to justify a flexible approach.[313]

Thus, the court seemed to be defending the entire market value rule against detractors. But the detractors were complaining about the use of the entire market value rule to allow for adding unpatented convoy and collateral goods—that is, *increasing* royalty awards—not about using the rule to apportion royalty bases of infringing products *downward*.[314] Apportioning the royalty base to a lower amount was a concept that was essentially foreign to legal scholarship until 2005.[315]

In *Uniloc*, the Federal Circuit extended the apportionment view of the entire market value rule first espoused in *Lucent*. A primary basis for the court's concern with using the entire revenues as a base is that the invention—product activation—did not drive customer demand or account for the entire value of the software.[316] Nobody buys Windows for the anti-piracy key. Even so, it is unclear why that should make a difference if there was other reliable evidence of the value of product activation. Consider, for example, if the product activation functionality allowed Microsoft to increase its revenue by ten percent. If true, then the three percent royalty on all sales requested by the plaintiff (about one third of the additional value associated with the patented technology) might be reasonably attributed to the invention. An obsessive focus on "demand" and "entire value" detracts from what should be the real question long taught by the case law: What is the value of this invention and how should that be determined?

The *Uniloc* court instead created a new rule: experts must apportion the royalty base, and *then* determine a royalty rate.[317] In other words, contrary to the entire history of how reasonable royalties have been calculated, unless the entire market value rule is satisfied, courts cannot admit evidence of the infringing product's sales, *no matter how low the royalty rate is*: "The Supreme Court and

[312] *Id.* at 1339.

[313] *See id.* ("There is nothing inherently wrong with using the market value of the entire product, especially when there is no established market value for the infringing component or feature, so long as the multiplier accounts for the proportion of the base represented by the infringing component or feature.").

[314] Landers, *supra* note 16, at 362; Lemley, *supra* note 17, at 662 n.34 ("And the Federal Circuit in *Lucent v. Gateway* said that the entire market value rule applied to reasonable royalty cases, though a review of the opinion suggests that the court actually confused the entire market value rule with the question of the royalty base.").

[315] *Compare* Bensen, *supra* note 17, at 3 n.2 (noting that only one district court case contemplated apportionment of royalty base, and that other courts have not followed), *with* Bensen & White, *supra* note 122, at 31-34 ("[A]pportionment should be a threshold determination in every reasonable royalty analysis.").

[316] Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1319 (Fed. Cir. 2011).

[317] *Id.* at 1318-19 (citing *Garretson v. Clark*, 111 U.S. 120 (1884), as the basis for the need to apportion first).

this court's precedents do not allow consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate."[318]

Despite broad, unspecified reliance on the Supreme Court and Federal Circuit precedents, the *Uniloc* pronouncement was contrary to what the court had *just written* in *Lucent*: "Simply put, the base used in a running royalty calculation can always be the value of the entire commercial embodiment, as long as the magnitude of the rate is within an acceptable range (as determined by the evidence)."[319]

Nonetheless, the *Uniloc* court cited *Lucent* to support its view that courts must *always* apportion the royalty base, presumably because *Lucent* was the first case to hold such an apportionment should happen.[320] Like *Lucent*, the court also cited *Garretson* (a lost profits apportionment case), *Rite-Hite* (which cites *Leesona*, a convoy goods case, and otherwise allowed for broad recovery), *TWM* (which was a convoy sale case and cited only lost profits cases), and *Bose Corp. v. JBL, Inc.*[321] (which cites *Fonar Corp. v. General Electric Co.*,[322] which cites *Paper Converting Machine Co. v. Magna-Graphics Corp.*[323]—a lost profit case—and which endorsed the single functioning unit theory rather than the "entire market demand" theory).[324] Not one of these cases implies, let alone *requires*, that a plaintiff must apportion the royalty base independently of the determination of the royalty rate.

To be sure, like *Lucent*, the *Uniloc* court was addressing a real problem. The defense's expert's theory was that damages were only .000035% of Microsoft's $20 billion in sales.[325] And perhaps that percentage is too low,[326] just as the 2.9% requested by the plaintiff may be too high.[327] After all, product activation likely generated more than $7 million in value for Microsoft. A proper reconciliation of this wide difference, though, surely cannot be achieved through conjuring some hypothetical royalty base on which to assess a percentage. This completely flouts the remedial goals of reasonable royalties.

[318] *Id.* at 1319-20.

[319] Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1338-39 (Fed. Cir. 2011).

[320] *Uniloc*, 632 F.3d at 1318, 1320 (citing *Lucent* for tracing history of entire market value rule).

[321] 274 F.3d 1354, 1361 (Fed. Cir. 2001).

[322] 107 F.3d 1543, 1552 (Fed. Cir. 1997).

[323] 745 F.2d 11, 22-23 (Fed. Cir. 1984).

[324] *Uniloc*, 632 F.3d at 1320.

[325] *Id.* at 1320-21.

[326] This percentage obviously seemed too low for the jury, which awarded approximately $388 million, which, in turn, was far less than the $564 million requested. *Id.* at 1301.

[327] *Id.* at 1311.

3. Conflict Between the Functional Unit Rule and Apportionment

As noted above, the downward apportionment of the royalty base where the feature does not drive demand is a marked departure from the traditional functional unit analysis. When applied to apportionment of the royalty base as opposed to convoy sales, the functional unit view of the entire market value rule would lead to little apportionment. Most products that defendants wish to apportion downward are single units containing many components. Thus, there would be no reason to apportion under the functional unit rule, because the royalty base would always apply to the entire product. This is the rule working as designed. With respect to reasonable royalties, the entire market value rule was originally used to determine whether convoy sales—that is, sales *beyond* the functional unit—should be included in the royalty base. There was no need to consider market demand of features because the entire market value rule had never been used to decrease the royalty base when all the parts formed a single unit.

This new application of the entire market value rule to apportion the royalty base downward, however, creates a divergence between the new (requiring the invention to drive customer demand) and the old (requiring the parts to work together). Mixing and matching application of the rule without recognizing this divergence only increases the confusion. For example, in a recent case an expert testified that he did not apply the entire market value rule; a *Daubert* motion followed because there were unpatented components in the product.[328] The court denied the motion, noting that the parts are a "single functioning unit."[329]

This Article does not claim that allowing royalties on convoy and collateral goods is the best economic policy. It does, however, make clear that application of a market demand version of the entire market value rule is a recent departure that has no basis in history, and only serves to confuse analysis.

4. The Smallest Salable Unit

The "smallest salable unit" rule, an extension of using the entire market value rule as a downward apportionment of the royalty base, first made an appearance in *Cornell University v. Hewlett-Packard Co.*,[330] a 2009 district court decision disallowing use of the whole device (a computer) as the royalty base.[331] Instead, the court stated that the royalty should have been assessed on revenues associated with the smallest component on a price list (or otherwise for sale) in which the patented technology appeared.[332] The edict was prompted in part by

[328] Ergotron, Inc. v. Rubbermaid Commercial Prods., LLC, No. 10-cv-02010, 2012 U.S. Dist. LEXIS 121795, at *11 (D. Minn. Aug. 28 2012).

[329] *Id.* at *37-38.

[330] 609 F. Supp. 2d 279, 292 (N.D.N.Y. 2009).

[331] *Id.* at 292.

[332] *Id.* at 288.

the plaintiff expert's response to a prior order to apportion the royalty base (consistent with *Lucent*), in which the expert hypothesized a new royalty base for a smaller unit (which was not for sale), rather than simply focusing on the value of the invention compared to the whole.[333] The court noted that the expert should have apportioned the royalty base to a salable unit rather than trying to extrapolate the value of a non-salable unit.[334]

By 2013, courts were calling apportionment to the smallest salable unit a *requirement*, with a royalty based on sales price now an exception to the rule under the "entire market value rule."[335] Suddenly, the smallest salable unit rule was engrained as if it had always been the law, despite having been made out of whole cloth just a couple years earlier.[336]

Part of the confusion about royalty base apportionment and smallest salable unit arises from a footnote in a prior case. As noted above, *Rite-Hite* expanded the royalty base for convoy sales under the entire market value rule, but noted in a footnote that this expansion was different than increasing the royalty rate under a hypothetical negotiation because parties might have anticipated convoy sales.[337]

In 1995, a district court cited *Rite-Hite*, *TWM*, and profit cases to justify limiting the royalty base to just a component of an infringing device, with no explanation of how that base should be calculated.[338] Though not much came of this ruling, it clearly shows the confusion spawned by the footnote in *Rite-Hite*.

Almost fifteen years later, the misunderstanding came back in *Cornell University*[339]: "As the Federal Circuit explained in *Rite-Hite,* whether or not a plaintiff is entitled to include the entire market value of a system incorporating infringing and noninfringing components in the royalty base is separate from the analysis of the effect of convoyed or collateral sales on the royalty rate."[340] What this restatement leaves out is that *Rite-Hite* was only considering the addition of convoyed sales to the royalty base; the *Cornell University* decision implies that

333 *Id.*

334 *Id.*

335 AVM Techs., LLC v. Intel Corp., No. 10-cv-00610, 2013 U.S. Dist. LEXIS 1165, at *5-6 (D. Del. Jan. 4, 2013).

336 *See* Versata Software, Inc. v. SAP Am. Inc., 717 F.3d 1255, 1268 (Fed. Cir. 2013) ("The entire market value rule is a narrow exception to the general rule that royalties are awarded based on the smallest salable patent-practicing unit.").

337 Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1549 n.9 (Fed. Cir. 1995).

338 Mars, Inc. v. Coin Acceptors, No. 90-cv-00049, 1995 U.S. Dist. LEXIS 21697, at *7-9 (D.N.J. Oct. 31, 1995) (citing *Rite-Hite*, 56 F.3d at 1549; Slimfold Mfg. Co. v. Kinkead Indus., Inc., 932 F.2d 1453, 1458 (Fed. Cir. 1991); State Indus., Inc. v. Mor-Flow Indus., Inc., 883 F.2d 1573, 1580 (Fed. Cir. 1989); TWM Mfg. Co. v. Dura Corp., 789 F.2d 895, 901 (Fed. Cir. 1986)).

339 609 F. Supp. 2d 279 (N.D.N.Y. 2009).

340 *Id.* at 289.

the statement was somehow directed to apportioning the royalty base downward based on components of a complete product, which was not even remotely the case.

The *Cornell University* reading was not a given. At least some courts understood *Rite-Hite*'s distinction between the entire market value rule for adding convoy sales and apportioning the royalty base to a smaller amount.[341] And another district court clearly understood *TWM* as a convoy case.[342]

Furthermore, *Cornell University* does not even seem to apply the very rule it created. In *Cornell University*, neither the processor "brick" nor the "processor" that the court thought should be used for the royalty base was entirely sold separately, and both were often sold as parts of whole machines.[343] Calling the processor a "salable" unit when it was not, in fact, sold makes little sense. Nonetheless, courts have seized on the rule. For example, one opinion would require even more apportionment—if the smallest salable unit also has many components, then the royalty base must be apportioned even more.[344]

In *LaserDynamics, Inc. v. Quanta Computer, Inc.*,[345] the Federal Circuit accepted the smallest salable unit method of *Cornell University* as a "general" rule,[346] without even a hint that the term was invented by a district court judge just two years prior. A Lexis search for "smallest salable" yields one hit in 2009 (*Cornell University*), one in 2010, one in 2011, and then in August of 2012 (when *LaserDynamics* declared it to be the "general rule") *many* matches thereafter.[347] It is unclear when or how the smallest salable unit requirement became a general rule in such a short time as applied only in district court cases. Like much of *Georgia-Pacific*, it was essentially a break with history.

LaserDynamics attempts to explain this break by discussing how the entire market value rule is derived from old Supreme Court caselaw about apportioning profit,[348] though none of the cited cases so held—and certainly not for reasonable royalty analysis. *LaserDynamics* then reversed what had been the law of reasonable royalty for its nearly hundred-year history: "Importantly, the requirement to prove that the patented feature drives demand for the entire

[341] *See* Century Wrecker Corp. v. E.R. Buske Mfg. Co., Inc., 913 F. Supp. 1256, 1276 (N.D. Iowa 1996).

[342] *See* Fototec Int'l Corp. v. Polaroid Corp., No. 94-cv-00821, 1996 U.S. Dist. LEXIS 6757, at *13-14 (N.D. Ga. Feb. 21, 1996) (citing *TWM Mfg.*, 789 F.2d at 901).

[343] *Cornell Univ.*, 609 F. Supp. 2d at 290.

[344] AVM Techs., LLC v. Intel Corp., No. 10-cv-00610, 2013 U.S. Dist. LEXIS 1165, at *7 (D. Del. Jan. 4, 2013).

[345] 694 F.3d 51 (Fed. Cir. 2012).

[346] *Id.* at 67 ("Thus, it is generally required that royalties be based not on the entire product, but instead on the 'smallest salable patent-practicing unit.'").

[347] References to: "smallest salable", LEXIS, https://advance.lexis.com (search "smallest salable") (last visited Nov. 22, 2017).

[348] *Id.*

product may not be avoided by the use of a very small royalty rate."[349] For this contention, *LaserDynamics* relied on *Uniloc*,[350] which, as noted above, was contrary to the language in *Lucent* from just a couple of years earlier—that a low enough royalty would be sufficient to offset a high royalty base.

To be sure, the problem facing the court was real: plaintiff's proposed royalty in *LaserDynamics* was ridiculous—two percent of the entire revenues of a laptop for a small patent on one component of the machine. The patent was surely not worth two percent of the laptop's sales price, which included the hardware and operating system, among other things. But the solution was not to make up non-economically rational rules that depart from nearly a century of legal precedent. The solution was to better utilize the general tools available to rein in ridiculous awards. For example, in *LaserDynamics*, what evidence could there possibly have been that two percent of a laptop's sales price was attributable to the patent? Why was the expert testimony admitted in the first place? The *LaserDynamics* court noted as much: "Furthermore, [the expert's apportionment and royalty rate] appears to have been plucked out of thin air . . . ."[351] Most troublesome is that the infringing device was not actually sold by the defendant—that is, it was not actually a smallest salable unit. The court was untroubled by this, however, suggesting that the plaintiff offer either testimony of a lump sum royalty or sales price data from other manufacturers, as if either of these speculative enterprises were somehow better than actually doing the hard work of determining the value of the patented invention within the infringing product.[352]

5. Combined Application of Entire Market Value and Smallest Salable Unit

In *VirnetX, Inc. v. Cisco Systems, Inc.*,[353] the plaintiff's expert offered three damages theories for technology relating to secure communication services used in Facetime and virtual private networking.[354] The first was based on a one percent royalty on the entire sales price, yielding an estimate of more than $700 million.[355] The second was based on a Nash Bargaining Solution, which is discussed further below. Third, the expert determined that eighteen percent of the Apple iOS sales were due to Facetime, and a forty-five percent split after Nash bargaining would yield a reasonable royalty of $606 million.[356]

349 *Id.*
350 Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1319-20 (Fed. Cir. 2011).
351 *LaserDynamics*, 694 F.3d at 69.
352 *Id.* at 70.
353 767 F.3d 1308 (Fed. Cir. 2014).
354 *Id.* at 1325.
355 *Id.*
356 *Id.* at 1325-26.

The Federal Circuit reversed the judgment. It ruled that the entire market value rule required an apportionment of the royalty base associated with the value of the patent *prior to* setting the royalty rate.[357] Indeed, the court intimated that showing the jury all of the net revenues could be prejudicial in and of itself.[358] Thus, the court held that even if the smallest salable unit is the whole product, the expert must still determine some way to apportion the royalty base, in addition to calculating a percentage.[359] Of course, this only increases uncertainty, because even if one follows the supposed smallest salable unit rule, a judgment might be overturned.

But more generally, the language of *VirnetX* makes one thing clear: the entire market value rule was now being used to routinely require apportionment of the royalty base downward regardless of whether the base has any relationship to something that is actually on sale. A mere five years earlier, *Lucent* announced such a proposition for the first time in the history of patent damages calculation, and even that case recognized that the royalty rate should be tied to the royalty base. But at most five years later (and maybe only three years later in *LaserDynamics*[360]), the idea that experts must apportion the royalty base independent of their determination of the royalty rate was not just commonplace, but mandatory without exception.

To say that this method is nontraditional is an understatement. One reason the new method departs from past practice is that it is unclear how such an apportionment would be done while also presenting a royalty rate based on economic rationale and evidence.[361] Ironically, this vision of the entire market value rule comes to a complete loggerhead with the hypothetical negotiation. *VirnetX* apparently stands for the proposition that one cannot have both, because hypothetical negotiators do not apportion the sales base prior to fixing a royalty rate.

That said, as noted above, the hypothetical negotiation is no better a way to determine compensatory value than is downward apportionment of the royalty base. Neither one of them follows from history, nor makes any economic sense.[362] For example, in *VirnetX*, Apple argued that three licenses from 2012 could not be compared, because "at the time those licenses were entered into,

[357] *Id.* at 1329.

[358] *Id.* at 1327.

[359] *Id.* Unlike some prior cases, the court recognized that the smallest salable unit rule is new, not some long-established rule. *Id.*

[360] LaserDynamics, Inc. v. Quanta Comput., Inc., 694 F.3d 51, 68 (Fed. Cir. 2012).

[361] *See* David J. Teece & Edward F. Sherry, *On the "Smallest Saleable Patent Practicing Unit" Doctrine: An Economic and Public Policy Analysis* 19 (Tusher Ctr. for the Mgmt. of Intellectual Capital, Working Paper No. 11, 2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2764614 [https://perma.cc/3JEL-V2AY].

[362] Thomas F. Cotter, *Four Principles for Calculating Reasonable Royalties in Patent Infringement Litigation*, 27 SANTA CLARA COMPUTER & HIGH TECH. L.J. 725, 751 (2011).

VirnetX was in a much better financial position (and therefore a better bargaining position) than it was in 2009."[363] If damages are to be compensatory based on the loss, value, cost savings, or other measurement, they should not vary based on the financial strength of the plaintiff. Apple's argument amounts to a theory that poorer plaintiffs deserve less damages, simply because they lack bargaining leverage. This is contrary to the history and purpose of reasonable royalties. It is surely not the way to calculate infringement damages.

The entire market value rule, though not part of a hypothetical negotiation, does no better. In *VirnetX*, the court ruled that the royalty *rate* presented by the plaintiff was acceptable; it was based on comparable licenses, which were allowable because they were sufficiently related to the patents in suit.[364] But those comparable licenses and their associated rates *were based on full net revenue*. This means that the royalty rate already took the value of the inventions into consideration using the *full* royalty base.[365] Thus, if the royalty base were apportioned downward as the court seems to require, then the royalty rate would necessarily have to increase. It is hard, then, to see how Apple could object given that the court approved the comparable licenses.

On retrial, the jury awarded $334 million to VirnetX instead of $368 million.[366] That verdict was reversed by the District Court on non-damages grounds,[367] and after a *third* trial, the jury awarded $302 million.[368] The damages expert took other (percentage-based) licenses obtained by VirnetX and divided the revenue received by the units sold to determine a per-unit royalty at trial. Apple objected, but the court ruled that the expert's methodology did not implicate the entire market value rule because it was based on a per-unit cost from other licenses rather than the price of the iPhone.[369] Although Apple may

[363] VirnetX, Inc. v. Cisco Sys., Inc., 767 F.3d 1308, 1330 (Fed. Cir. 2014). The court did not accept this argument, but neither did it explicitly rule it out. *Id.* at 1330-31.

[364] *Id.* at 1330-31. *See infra* Section III.E for a discussion of comparable licenses.

[365] It is entirely possible, of course, that the comparable royalty rates overvalued the invention, but the jury likely took that into account by awarding much less than was requested. Further, once admitted as comparable, the onus was on Apple to show that the rate was too high.

[366] Jess Davis, *Apple Hit With $625M Verdict In VirnetX Patent Rematch*, LAW360 (Feb. 3, 2016), https://www.law360.com/ip/articles/754652?nl_pk=7545a5b5-6a94-47d3-8aa3-2e19884905c5&utm_source=newsletter&utm_medium=email&utm_campaign=ip.

[367] VirnetX, Inc. v. Apple, Inc., Memorandum Opinion & Order at 13-14, No. 6:12-cv-00855, 2013 U.S. Dist. LEXIS 185621, at *30-31 (E.D. Tex. July 22, 2013).

[368] Andrew Chung, *Apple Just Lost its Patent Retrial to VirnetX*, REUTERS (Oct. 11, 2016), https://www.reuters.com/article/us-apple-suit-virnetx-holdg/apple-loses-patent-retrial-to-virnetx-owes-302-4-million-idUSKCN1212Y5 [https://perma.cc/7PZJ-BU4R].

[369] VirnetX, Inc. v. Apple, Inc., Memorandum Opinion & Order at 17, No. 6:10-cv-00417 (E.D. Tex. Sept. 29, 2017) ("The licenses upon which Mr. Weinstein's analysis was based were already apportioned, and Mr. Weinstein explained to the jury the differences between the licenses and the hypothetical negotiation. . . . Further, VirnetX did not present a theory

be right that the per-unit price is too high, whether VirnetX sought a lower percentage of end-product revenue or a higher percentage of apportioned revenue is both opaque and immaterial.[370] The case is now pending appeal.

Recent cases continue to highlight the tension between the hypothetical negotiation and the entire market value rule. The Federal Circuit continues to treat the smallest salable unit rule as something that has been long adopted.[371] The same is true for the entire market value rule as applied to apportioning the royalty base.[372] But even in doing so, the court has ruled that these principles did not apply where there was good evidence in the hypothetical negotiation. Instead, the court affirmed the district court's use of actual licensing negotiations, which focused on end-unit sales.[373]

The preference for actual negotiations (which used all revenue as a base) highlights the dissonance created by rules such as the smallest salable unit and apportionment of the royalty base—especially if one believes in the hypothetical negotiation.[374] The court distinguishes its finding from the smallest salable/apportionment rules by noting that the per-unit dollar royalty would be the same whether assessed by chip or final unit,[375] but this simply supports this Article's contention that apportioning the royalty base is mostly irrelevant if the royalty rate is adjusted as well. The per-unit price will be a lower percentage of end-unit sales and a higher percentage of per-chip sales. Bright-line rules simply do not dictate how parties negotiate.[376]

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that violated the entire market value rule, as the jury was not told the total revenue or total price of the accused products, and the Court instructed the jury not to consider any outside knowledge they may have had about these figures.").

[370] In this case, the per-unit price roughly equaled the prior percentage of end-product revenue, so Apple's argument did not come out of left field. However, the argument still illustrates the problem of requiring apportionment of the royalty base without an approach that ties back to the products at issue.

[371] *See* Commonwealth Sci. & Indus. Research Org. v. Cisco Sys., Inc., 809 F.3d 1295, 1302 (Fed. Cir. 2015).

[372] *Id.* ("[W]e have also explained that '[t]he entire market value rule is a narrow exception to this general rule' 'derived from Supreme Court precedent' in *Garretson*." (quoting LaserDynamics, Inc. v. Quanta Comput., Inc., 694 F.3d 51, 67 (Fed. Cir. 2012))).

[373] *Id.* at 1303.

[374] J. Gregory Sidak, *The Proper Royalty Base for Patent Damages*, 10 J. COMPETITION L. & ECON. 989, 993 (2014) (arguing that consideration of downstream retail price is justified because it is used in hypothetical negotiation).

[375] *Commonwealth Sci. & Indus. Research Org*, 809 F.3d at 1303 n.1.

[376] The case adds a wrinkle to apportionment, which is that inclusion in a standard might artificially increase the value of the patent for apportionment purposes. *Id.* at 1304-05. The effect of standards on the equation is beyond the scope of this Article, though considering a standard appears to be in line with other apportionment considerations. It is not clear that the analysis should cut either way. A weak invention could be buoyed by adoption, but a strong invention might be adopted because of its prowess.

The criticism here should not be taken as an endorsement of poor expert damages analysis, but rather of the modern trend toward a rigid rule to deal with such analysis. Returning to the birth of the smallest salable unit rule, as in prior cases like *Lucent* and *Uniloc* that have turned reasonable royalty standards into rules, the *Cornell University* court had a point: "The court is left to wonder why, if the royalty base mattered so little, Cornell exerted so much energy in pushing for the largest possible base before, during, and even after trial."[377]

Thus, the entire market value rule and its concomitant royalty base apportionment are proxies for a different concern: that royalty rates (or even per-unit royalties) simply do not reflect the value of the invention.[378] If that is true, then courts should address that concern head on, rather than by twisting a rule to do something that it was never intended to do and that, instead, only multiplies litigation. Further, defendants should offer better evidence of low value to offset plaintiffs' evidence of high value.

To the extent there is concern that large revenues lead to prejudice with the jury, experts could be required to report per-unit royalties rather than percentage royalties if the evidence allows. For example, in *Medtronic*, the court required an "apportionment" of the defendant's profits, but only to the extent that such division was used to determine how the parties might have split funds in a license based on the value of the invention.[379] In other words, the amount requested was too high given the value, and the court fixed a lower royalty as an absolute dollar amount for each and every sale. The court found that admission of full profits data without discussion of the value of the improvement was prejudicial.[380]

6. Reasonable Royalties Were Created to Avoid Apportionment

Downward apportionment and the smallest salable unit rule are inconsistent with historic practices.[381] Quite simply, the law of apportionment of profits was not considered a precursor to apportionment of the royalty base.[382] For example, in one early case, the court only awarded profits for individual parts of a whole device, but awarded royalties on the entire device.[383] Another early case made clear that the reasonable royalty already took the value of the invention as compared to the whole into account.[384] Another case was reversed and remanded for reasonable royalty analysis because actual profits and actual royalties could

[377] Cornell Univ. v. Hewlett-Packard Co., 609 F. Supp. 2d 279, 289 (N.D.N.Y. 2009).

[378] Cotter, *supra* note 16, at 39-41.

[379] Medtronic, Inc. v. Catalyst Research Corp., 547 F. Supp. 401, 414 (D. Minn. 1982).

[380] *Id*. at 414-15.

[381] *But see* Brean, *supra* note 2, at 898 (arguing that statute changed historic framework for calculating reasonable royalties, though noting that statute does not require rigid rules).

[382] Fink, *supra* note 138, at 826.

[383] Fox Typewriter Co. v. Underwood Typewriter Co., 287 F. 453, 454 (6th Cir. 1923).

[384] Munger v. Perlman Rim Corp., 275 F. 21, 25 (2d Cir. 1921).

not be apportioned.[385] In another case, the court considered arguments that the patented improvement was just one of many patented inventions in the infringing device, and that the patented invention had little value.[386] Even so, the court awarded a 2.5% royalty *on all sales*.[387] In doing so, it noted that profit apportionment was impossible, which gave rise to reasonable royalties in the first place.[388]

In short, *the entire point of reasonable royalties was that they should apply when apportionment was not possible*. To require apportionment of reasonable royalties misses the entire reason the remedy was created in the first place.[389] The irony is that the *Lucent* court cites to the entire market value rule for lost profit apportionment as a "rigid rule" dating from "the distant past, before a contemporary appreciation of the economics of infringement damages."[390] This is inconsistent with the actual development of the law; the lost profit apportionment cases discussed in *Lucent* and this article make perfect economic sense. Damages should be limited to the value of the patent. What does not make sense is apportioning a revenue base and then further apportioning through a royalty rate. That is double apportionment and it is unclear how experts and juries are supposed to account for the patent's repeated value in a way that makes any economic sense. There is certainly no line of precedent that gives any guidance for this new concept.

Indeed, none of the cases cited in favor of apportionment even hinted at the notion that courts should apportion the royalty base downward. A Lexis search for "(apportion w/20 reasonable royalties) and patent" yielded 74 hits: only 6 before 1960 and almost all in district courts.[391] Only one district court case, from the 1990s, suggested that the entire market value rule be used to apportion the royalty base downward prior to *Lucent*, and that unpublished opinion was

385 Alliance Sec. Co. v. De Vilbliss Mfg. Co., 76 F.2d 503, 504-05 (6th Cir. 1935).

386 Enter. Mfg. Co. v. Shakespeare Co., 47 F. Supp. 859, 864-67 (W.D. Mich. 1942).

387 *Id.*

388 *Id.*

389 *See* Ellipse Corp. v. Ford Motor Co., 461 F. Supp. 1354, 1380 (N.D. Ill. 1978) ("Plaintiff's attempt to apportion a 'profit' to the [infringing component of a whole car] has no relevance to the determination of reasonable royalty. Congress amended the patent statute in 1946 to eliminate the recovery of profits precisely because of the impossibility of apportioning profits to a piece or part of a larger entity.").

390 Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1336 (Fed. Cir. 2009).

391 References to: apportion, reasonable royalties & patent, LEXIS (last visited Dec. 28, 2017), https://advance.lexis.com (search "(apportion w/20 reasonable royalties) and patent").

ignored.[392] By contrast, a search for "(apportion w/20 profits) and patent" yielded 464 hits, many before 1900.[393]

The earliest use of the term "apportionment" in near proximity of both "royalty base" and the "entire market value rule" is *TWM*, a convoy case precursor to *Rite-Hite*. *TWM* described the entire market value rule with respect to lost profits and unpatented features, citing only to lost profits cases.[394] It is not until the next paragraph that the case then mentions the effect of the entire market value rule on a royalty base, but this discussion is not about apportionment of unpatented features, but about convoyed sales of additional products.[395] *TWM* cites *King Instrument Corp. v. Otari Corp.*,[396] *Paper Converting Machine Co. v. Magna-Graphics Corp.*,[397] and *Kori Corp. v. Wilco Marsh Buggies & Draglines*,[398] all of which were lost profits cases.

The use of the entire market value rule in proximity to the royalty base was not mentioned again until 1992, in which a district court quoted *TWM* by combining pieces of the *two separate paragraphs* (one on apportionment of profits, one on entire market value inclusion of convoy goods) to imply that the entire market value rule should apply to the royalty base.[399] Even so, the court still made clear that the entire market value rule is about convoy goods.[400]

Indeed, contrary to the *Lucent* court's view, judges have always understood that the entire market value rule was about convoy goods in a reasonable royalty analysis. The birth of the application of the entire market value rule in reasonable royalties can probably be traced to *Marconi*[401] in 1942. But even there, the court

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392 Mars, Inc. v. Coin Acceptors, No. 90-cv-00049, 1995 U.S. Dist. LEXIS 21697, at *8-9 (D.N.J. Oct. 31, 1995).

393 References to: apportion, profits & patent, LEXIS (last visited Dec. 28, 2017), https://advance.lexis.com (search "(apportion w/20 profits) and patent").

394 TWM Mfg. Co v. Dura Corp., 789 F.2d 895, 901 (Fed. Cir. 1986). Note that the court muddied the waters, however, because it described "parts of the whole," when in fact it was applying the rule to related goods.

395 *Id*.

396 767 F.2d 853, 865 (Fed. Cir. 1985).

397 745 F.2d 11, 22-23 (Fed. Cir. 1984).

398 761 F.2d 649, 653 (Fed. Cir. 1985).

399 Andrew Corp. v. Gabriel Elecs., Inc., 785 F. Supp. 1041, 1054 (D. Me. 1992) (quoting *TWM Mfg.*, 789 F.2d at 901).

400 *Id.*

401 Marconi Wireless Tel. Co. of Am. v. United States, 99 Ct. Cl. 1, 49 (1942) ("[T]he invention was of such paramount importance that it substantially created the value of the component parts . . . and that it therefore falls within the entire market value rule. The complete cost of the transmitting and receiving sets should be used as the base in the application of a reasonable royalty."). Professor Lemley agrees that *Marconi* is the source of later judicial applications of the entire market value rule to reasonable royalties, though it appears that *Marconi* did so in reasonable royalties as well, and not just in lost profits as Lemley argues. *See* Lemley, *supra* note 17, at 662 n.34.

recognized that there is a sliding scale between the royalty base and the royalty rate, such that the two were related and not to be considered separately.[402] The court was clear that the royalty rate, in conjunction with the base, should be used to properly value the invention, and that traditional profit apportionment was a completely different analysis. This sliding scale relationship between the royalty base and the royalty rate never changed.[403]

The irony is that rote application of the supposed entire market value rule to apportion the royalty base is diametrically opposed to how the same analysis would have been done in a profits analysis. In profits apportionment, the entire market value rule means the patentee recovers *one hundred percent* of the profits (which almost never happens); apportionment means the patentee recovers something less than one hundred percent of the profits based on the value of the invention. But in a reasonable royalty context, *the royalty does the apportionment*.[404] The whole point of a royalty is that the patentee recovers the value of the invention—which is usually less than the profits, but could sometimes be more. Taking the royalty base apportionment view of the entire market value rule to its logical end would mean that if a patentee could prove that the patent were the basis for customer demand, then the royalty should equal one hundred percent of the revenue, and no case has ever so held.

To see why royalty base apportionment had never been considered a viable option—even under the hypothetical negotiation—consider the following hypothetical. Imagine that a product sells for $100, and the invention is worth $2, which the parties split. Common sense dictates, and the hypothetical negotiation demands (if you are so inclined), that the royalty rate be one percent on sales of $100, or even that the royalty be a fixed $1, regardless of sales price.

But if one is required to apportion the royalty base according to the patent's value, then the royalty base would be $2 per unit. But at that royalty base, the rate should be fifty percent! This makes little sense from a royalty point of view (who keeps accounting records on fictional component valuations?) and is

[402] *Marconi Wireless*, 99 Ct. Cl. at 47 ("In [lost profits analysis] plaintiff would be entitled only to the profits on the features or elements covered by his patent. If, however, the recovery of compensation in the same instance were measured by a reasonable royalty . . . the differential between the patented and unpatented features of the machine would be taken into account by scaling down the percentage of royalty accordingly. It would make no difference in the ultimate compensation to plaintiff if the reasonable royalty were fixed at 5 percent of the selling price of the complete machine rather than 20 percent of one quarter of the sales price of the machine.").

[403] *Contra* Brian J. Love, *Patentee Overcompensation and the Entire Market Value Rule*, 60 STAN. L. REV. 263, 273 (2007) (discussing overcompensation caused by use of entire market value rule, without explaining why royalty rates cannot be used to set proper "benchmark" royalty).

[404] Damien Geradin & Anne Layne-Farrar, *Patent Value Apportionment Rules for Complex, Multi-Patent Products*, 27 SANTA CLARA COMPUTER & HIGH TECH. L.J. 763, 770-72 (2011).

nonsense from a hypothetical negotiation point of view (who negotiates for a royalty based on accounting records that nobody keeps and are thus not administrable?). Indeed, it is the very type of split that the court rejected in *VirnetX*.[405]

What if the value can only be reduced to an approximation, like $10, because other products with similar but fewer features cost that much? This is reasonable enough—in fact, some experts might use this type of methodology in order to determine the value of an invention.[406] But having done so, the royalty rate would be ten percent.

The most recent cases seem to walk back the bright-line rhetoric of prior cases. For example, in *Ericsson, Inc. v. D-Link Systems, Inc*,[407] the defendant argued that comparable licenses could not be used because they were based on net sales and after *VirnetX* no reasonable royalty could be based on net sales.[408] The court rejected this argument and reframed the bright-line language of *VirnetX* and *LaserDynamics*, stating that: "the governing rule is that the *ultimate combination of royalty base and royalty rate* must reflect the value attributable to the infringing features of the product, and no more. As a substantive matter, it is the 'value of what was taken' that measures a 'reasonable royalty' . . . ."[409] This is a fair statement of the law as it had always been applied, and even as it had been discussed in *Lucent*.

Ericsson's language is not how the intervening cases like *LaserDynamics* defined the entire market value rule. To harmonize the cases, the court reframes the royalty base apportionment rule as an evidentiary principle—that undue focus on total revenues can bias a jury,[410] and should be avoided under Federal Rule of Evidence 403.[411] As a result, courts should give cautionary instructions but admit the license evidence in question.[412]

This language hearkens back to the *Lucent* opinion which, as discussed above, was essentially a ruling that evidence offered had been prejudicial and could not support the jury's verdict. *Lucent*'s failure was to pin the problem on the entire market value rule, rather than *Ericsson*'s evidentiary concern.

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[405] VirnetX, Inc. v. Cisco Sys., Inc., 767 F.3d 1308, 1333 (Fed. Cir. 2014).

[406] *See, e.g.*, Apple Inc. v. Motorola, Inc., 757 F.3d 1286, 1315-16 (Fed. Cir. 2014) (using mouse and trackpad to determine value of gesture invention), *overruled on other grounds by* Williamson v. Citrix Online, LLC, 792 F.3d 1339 (Fed. Cir. 2015).

[407] 773 F.3d 1201 (Fed. Cir. 2014).

[408] *Id.* at 1225-26.

[409] *Id.* at 1226 (emphasis added) (citing *VirtnetX, Inc.*, 767 F.3d at 1326).

[410] *See generally* John Campbell et al., *Countering the Plaintiff's Anchor: Jury Simulations to Evaluate Damages Arguments*, 101 IOWA L. REV. 543 (2016) (simulating anchoring in jury trials).

[411] *Ericsson, Inc.*, 773 F.3d at 1226-27.

[412] *Id.* at 1228.

Despite *Ericsson*, district courts sometimes apply the bright-line rules.[413] Even if not, the great uncertainty for litigants is that they never know which precedential opinion will be relied on in any given case. Criticism of a rule requiring apportionment of the royalty base should not be confused with criticism of apportionment generally. The history of patent damages has taught that damages ought to be based on the value of the invention. Thus, a call to more critically consider damages evidence is well taken.

The argument here is not that experts should ignore the value of the invention in comparison with all of the non-patented components. Instead, the argument is that experts should determine the value of the invention and estimate the proper royalty, in line with the way such calculations had been done for the entire history of reasonable royalties until 2009.

D. *Rules of Thumb*

Rules of thumb, in which courts assume shortcuts, are a relatively new phenomenon. Although some of them may be reasonably efficient, rules of thumb depart from the traditional method of valuing the patented invention.

In the 1990s and 2000s, as the number of patent cases grew, courts began to allow such evidence. One rule was the "25% Rule," which hypothesized that a default royalty rate would be twenty-five percent of profits, to be adjusted up or down by the *Georgia-Pacific* factors.[414] The rule had been the topic of several articles purporting to document that twenty-five percent (of profits, not of sales) was common in negotiated agreements, and that several judicial decisions had upheld its use.[415]

In *Uniloc*, the court rightfully rejected this rule of thumb. *Uniloc*'s product activation invention was implemented in every version of Microsoft Windows.[416] The product literally did not work without it—activation was core to Microsoft's anti-piracy strategy.[417] The damages stakes were huge. But customers did not buy the product in order to use the activation feature, so the value of the invention was a key point of contention in the case.[418] The damages totaled $388 million, or two percent of Microsoft's Windows and Office revenues. Uniloc had asked for about three percent.[419]

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[413] *See, e.g.*, GoDaddy.com LLC v. Rpost Commc'ns Ltd., No. 14-cv-00126, 2016 U.S. Dist. LEXIS 61670, at *14-16 (D. Ariz. May 10, 2016).

[414] Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1312-14 (Fed. Cir. 2011) (describing articles supporting, and several cases between 1997 and 2010, accepting 25% Rule evidence).

[415] *Id.* at 1314.

[416] *Id.* at 1298.

[417] *Id.* at 1297.

[418] *Id.* at 1319.

[419] *Id.* at 1313.

The 25% Rule departs from the long history of how reasonable royalty evidence had been allowed by courts. The Federal Circuit noted:

> The meaning of these cases is clear: there must be a basis in fact to associate the royalty rates used in prior licenses to the particular hypothetical negotiation at issue in the case. The 25% Rule of thumb as an abstract and largely theoretical construct fails to satisfy this fundamental requirement.[420]

The rule was arguably based on actual ex ante licensing trends[421] and thus fed into the hypothetical negotiation. But focus on the hypothetical negotiation masked the problems with the 25% Rule—that it was not sufficiently tied to the value of the patent. The rule does tie to any "particular technology, industry, or party."[422] It took the court a while to discard the rule of thumb, but if district courts were paying attention, they would have seen that rules of thumb were not historically supported[423] and the Federal Circuit was likely to disallow them at some point.

Using a different rule of thumb, in *VirnetX* the plaintiff's expert offered an opinion based on a Nash Bargaining Solution, which the court described as reaching a fifty-fifty split on profits, totaling $588 million.[424] The court noted that the expert did not apply the facts of a hypothetical bargain to the assumptions that ordinarily must hold to reach a Nash equilibrium.[425]

The Federal Circuit ruled that the Nash Bargaining Solution was inadmissible. Essentially, the fifty percent split was no better than the *Uniloc* rule of thumb.[426] Though supported by complex mathematical game theory, it started with an unsupported assumption that each party would equally split incremental value.

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420 *Id.* at 1317.

421 John C. Jarosz, Carla S. Mulhern & Michael Wagner, *The 25% Rule Lives On*, LAW360 (Sept. 8, 2010, 11:45 AM), https://www.law360.com/articles/187507/the-25-rule-lives-on; *see also* Stephen A. Degnan & Corwin Horton, *A Survey of Licensed Royalties*, 32 LES NOUVELLES 91, 95 (1997). *But see* Roy J. Epstein, *Modeling Patent Damages: Rigorous and Defensible Calculations* 22 (Paper Presented at the AIPLA 2003 Annual Meeting), http://www.royepstein.com/epstein_aipla_2003_article_website.pdf [https://perma.cc/T8ZM-4NY8] (arguing that twenty-five percent rule is arbitrary because it is applied ex post and does not take into account hypothetical negotiation).

422 *Uniloc*, 632 F.3d at 1316.

423 *See, e.g.*, Fromson v. W. Litho Plate & Supply Co., 853 F.2d 1568, 1578 (Fed. Cir. 1988) ("[W]e cannot fathom . . . the rationale that led to selection of a 'standard 10% profit' . . . .").

424 VirnetX, Inc. v. Cisco Sys., Inc., 767 F.3d 1308, 1325 (Fed. Cir. 2014). The expert actually broke it down to forty-five percent or fifty-five percent based on Apple's stronger hypothetical bargaining power—another nod to the hypothetical negotiation that is completely unrelated to the value of the patent. *Id.*

425 *Id.* at 1332.

426 *Id.* at 1333.

Experts complain that courts should not substitute their view of economics when Nash bargaining is well accepted in the field.[427] Indeed, one would expect that royalty estimates need to split profits some way, and fifty-fifty is a reasonable place to start.[428] These expectations are both valid. The problem with Nash Bargaining is not an economic one, but that it departs from the traditional method by taking the hypothetical negotiation too far. To assume that the parties would just split the profits ignores both the value of the invention and also the other things that bring value to the product. More importantly, it ignores all of the assumptions that go into a Nash bargaining equilibrium.[429] Despite the mathematical backing, assuming an equal split relies too heavily on the hypothetical negotiation but brings none of the nuanced assumptions of a Nash equilibrium mathematical analysis.

E. *Gatekeeping and Expert Testimony*

The judicial process used to determine reasonable royalties has necessarily changed over time. Some of those changes are inconsistent with the traditional approach, but are nonetheless required by later statutory or judicial pronouncements. This Section addresses some of the changes and considers how traditional methods might still be implemented.

In 1993, the Supreme Court clarified the standard used for expert testimony in *Daubert*.[430] Such testimony was to be admissible if it was both relevant and reliable.[431] Reliability, in turn, required that evidence be based on a scientific method which was validated and otherwise supported by facts rather than speculation.[432] Some specific factors to be considered were testing, peer review, acceptance in the community, and so forth, but the Court explicitly rejected a requirement that expert testimony be generally accepted.[433] A few years later, the Court made clear these rules applied to experts with "technical" and "other specialized" knowledge, not just scientists.[434] Furthermore, district court judges

[427] *See generally* Lance Wyatt, *Keeping up with the Game: The Use of the Nash Bargaining Solution in Patent Infringement Cases*, 31 SANTA CLARA HIGH TECH. L.J. 427 (2015) (providing thorough discussion of history of using Nash Bargaining in patent damages).

[428] Cotter, *supra* note 16, at 35-36 (arguing that assuming a fifty-fifty split may be the least costly way to estimate damages).

[429] Muriel Niederle, *Nash Bargaining* 10-22, STANFORD UNIV., http://web.stanford.edu/~niederle/Nash%20Bargaining.pdf [https://perma.cc/N9EY-XSMV] (describing how knowledge of payoffs to other parties causes Nash bargaining to deviate from fifty-fifty split).

[430] Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 587 (1993).

[431] *Id.* at 589.

[432] *Id.* at 590.

[433] *Id.* at 589, 593-94.

[434] Kumho Tire Co. v. Carmichael, 526 U.S. 137, 141-42 (1999).

were the gatekeepers charged with keeping unreliable expert testimony from the jury.[435]

It is unclear how much the *Daubert* case changed the substantive standard for evidence admitted in reasonable royalty cases. As discussed above, courts had always been both willing to receive underlying factual testimony and skeptical of expert testimony untethered to those facts.[436] Additionally, much of the evidence was heard by special masters before that time, so there was not a long history of judicial action. Further, the standard *Daubert* replaced was arguably more stringent. More recently, courts have made clear that *Daubert*, at the very least, *should* force experts to tie their reports to underlying facts, even if the analysis is difficult.[437]

In addition to any effect on substance, it is clear that *Daubert* changed the procedure by which testimony was admitted. *Daubert* appeared just as special masters waned in usage, and parties were quick to remind courts of their gatekeeper role. Motions in limine, evidentiary motions heard just before trial, were filed in greater and greater number and came to be known as "*Daubert* motions."

A PriceWaterhouseCoopers study of these motions documents their extensive use in financial expert cases,[438] with about twice as many challenges coming against plaintiff experts.[439] The study found that forty-four percent of financial expert testimony (in all types of cases) was excluded in 2015.[440] Interestingly, that percentage matched the sixteen year average exclusion rate since the rule applied to all experts.[441] The average exclusion rate between 2000 and 2015 was highest in intellectual property cases, at forty-nine percent.[442] There was some

[435] *Daubert*, 509 U.S. at 589.

[436] Durie & Lemley, *supra* note 161, at 632.

[437] *See, e.g.*, Summit 6, LLC v. Samsung Elecs. Co., 802 F.3d 1283, 1296 (Fed. Cir. 2015) (citing *Kumho Tire*, 526 U.S. at 150).

[438] *See generally* Charles Reddin, Douglas E. Branch & Saleema Damji, Daubert *Challenges to Financial Experts: A Yearly Study of Trends and Outcomes 2000-2015*, PRICEWATERHOUSECOOPERS (May 2016), https://www.pwc.com/us/en/forensic-services/publications/assets/pwc-daubert-study-whitepaper.pdf [https://perma.cc/P78Z-2375].

[439] *Id.* at 34 (stating that, between 2000 and 2015, sixty-eight percent of *Daubert* challenges were made against plaintiffs and thirty-two percent against defendants). Once challenged, however, the exclusion rates were about the same between plaintiffs and defendants. *Id.* (reporting that an average of forty-four percent of plaintiff-side and forty-six percent of defendant-side financial expert witnesses had testimony excluded from 2000 to 2015).

[440] *Id.* at 25.

[441] *Id.*

[442] *Id.* at 28. Exclusion rates were lowest in antitrust, at thiry-five percent. *Id.*

variation in district courts by circuit, ranging from thirty-five percent to fifty-five percent.[443]

But the study showed an interesting trend on appeal. When courts allowed testimony, they were affirmed about eighty-nine percent of the time.[444] But when courts excluded testimony, the exclusion order was reversed forty-two percent of the time.[445] Thus, the data indicates two patterns: first, that courts have tended to take the gatekeeping role too far, and second, that appellate courts and district courts were often not on the same page about what evidence to exclude.

There are at least three ways that courts can address the transition from special master to jury in order to return to some of the traditional benefits offered by older methods while hopefully avoiding their pitfalls: (1) controlling the admission of comparable licenses, (2) adjusting the timing and type of evidentiary rulings, and (3) appointing neutral experts.

1. The Role of Comparable Licenses

Courts have always been concerned about the proper use of comparable licenses. For example, though sometimes allowed as evidence, courts have traditionally held that settlement royalties have little or no probative value for reasonable royalty,[446] and are also inadmissible if negotiated in the midst of the parties' dispute.[447] Furthermore, courts were aware of the potential for royalty stacking (exacting several royalties on a single product) even at the outset.[448]

This skepticism continues today, though for a time district courts may have grown lax in the types of comparables that could be considered.[449] The *Lucent*

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443 *Id.* at 30.

444 *Id.* at 35.

445 *Id.*

446 Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1082 (Fed. Cir. 1983); Dunkley Co. v. Cent. Cal. Canneries, 7 F.2d 972, 976 (9th Cir. 1925); Gear Grinding Mach. Co. v. Studebaker Corp., 4 F.2d 510, 511 (6th Cir. 1925); Farmers' Handy Wagon Co. v. Beaver Silo & Box Mfg. Co., 259 F. 270, 272 (7th Cir. 1919); *see also* Cotter, *supra* note 16, at 32; Durie & Lemley, *supra* note 161, at 642; Lee & Melamed, *supra* note 138, at 418 (same); Taylor, *supra* note 1, at 102-03. *But see* Jonathan S. Masur, *The Use and Misuse of Patent Licenses*, 110 NW. U. L. REV. 115, 145 (2015) (arguing that settlement licenses may be more accurate than licenses negotiated out of litigation).

447 Deere & Co. v. Int'l Harvester Co., 710 F.2d 1551, 1555-58 (Fed. Cir. 1983).

448 *See* Dowagiac Mfg. Co. v. Deere & Webber Co., 284 F. 331, 350 (8th Cir. 1922) (stating nothing about hypothetical negotiation, but noting it was "not fair or just" to charge defendant for entire royalty "where it did not manufacture, but only sold, the infringing articles"); *cf.* Carnegie-Mellon Univ. v. Marvell Tech. Grp., Ltd., 807 F.3d 1283, 1304 (Fed. Cir. 2015).

449 The literature is replete with commentary about the use of comparable licenses. *See, e.g.*, Masur, *supra* note 446, at 127-44; Tejas N. Narechania & Jackson Taylor Kirklin, *An Unsettling Development: The Use of Settlement-Related Evidence for Damages*

court's 2009 finding, however, which stated that a large jury award based on comparable licenses was not supported by substantial evidence, made an impact.[450] Importantly, the court did not categorically bar any particular type of license,[451] but it did send a message that district courts ought to pay closer attention to the types of evidence used to prove reasonable royalties.[452]

Lucent points out how not to use comparable licenses. The licenses used by Lucent's expert covered many patents at once or were otherwise not technologically comparable to the value of the infringed patent.[453] This leads to a more general point made throughout the history of damages, which is that expert testimony must be based on competent underlying evidence that justifies the use of comparable information.[454]

Though courts have always been sensitive to licenses, *Lucent*'s high-profile reversal brought new focus by litigants to ensure that only licenses related to the patents and technology at issue be used in damages calculations.

Not every court excluded licenses. In *VirnetX*, for example, the court allowed the expert to use licenses to patents on related technology.[455] On the other hand, *ResQNet*[456] did not allow the use of some licenses.[457] Interestingly, the *ResQNet* majority implied that litigation settlement licenses were acceptable, though such licenses have often been criticized.[458] For purposes of this paper, the takeaway is that more than just economics experts should be involved. As in days of old,

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Determinations in Patent Litigation, 2012 U. ILL. J.L. TECH. & POL'Y 1, 39-40; Seaman, *supra* note 143, at 1693-95.

[450] Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1335 (Fed. Cir. 2009).

[451] *Id.*

[452] *Id.* at 1336 ("[D]istrict court judges must scrutinize the evidence carefully to ensure that the 'substantial evidence' standard is satisfied, while keeping in mind that a reasonable royalty analysis 'necessarily involves an element of approximation and uncertainty.'" (quoting Unisplay, S.A. v. Am. Elec. Sign Co., 69 F.3d 512, 517 (Fed. Cir. 1995))). This was a positive side-effect of *Lucent*'s odd procedural posture whereby Microsoft failed to object to any of the evidence yet later objected to how that evidence was used by the jury. *Id.* at 1325.

[453] *Id.* at 1328-29.

[454] *Id.* at 1330 ("But no testimony described how the patented technology of the Vox agreement relates to the licensed graphics boards. Lucent's expert never explained to the jury whether the patented technology is essential to the licensed product being sold, or whether the patented invention is only a small component or feature of the licensed product (as is the case here).").

[455] VirnetX, Inc. v. Cisco Sys., Inc., 767 F.3d 1308, 1330 (Fed. Cir. 2014).

[456] 594 F.3d 860 (Fed. Cir. 2010).

[457] *Id.* at 870 ("These five re-branding or re-bundling licenses . . . furnished finished software products and source code, as well as services such as training, maintenance, marketing, and upgrades, to other software companies in exchange for ongoing revenue-based royalties.").

[458] *Id.* at 872.

those involved in actually negotiating licenses and selling in the market must build the proper foundation about what the license covers, and how it was negotiated.[459]

In *Oracle America, Inc. v. Google, Inc.*,[460] the district court confronted the comparable license question with respect to prior licenses of the entire Java program.[461] Citing only a party's declaration, the court required Oracle's expert to limit any reasonable royalty calculation to only the patented feature value and not use full license rates where the Java language had previously licensed as a whole.[462] In other words, the court allowed the comparable license, but required it to be partitioned.

Herein lies a problem with *Lucent* and its progeny. As noted above regarding *Lucent*—and more importantly by the court—Microsoft did not object to the admission of any of the testimony,[463] and there may well not have been a valid objection had the proper foundation for each license been laid. Instead, the court ruled that the evidence as admitted was insufficient to support the verdict.[464] This ruling ostensibly increases uncertainty because parties cannot know if verdicts will be upheld *even if all of their evidence is admitted*. Indeed, this is exactly the complaint of litigants in the post-*Lucent* world.[465]

But the uncertainty of *Lucent* need not be propagated. First, even if *Lucent* did not realize it, future plaintiffs should know that comparable license evidence cannot be used to support a royalty rate without evidence that ties the license to the invention at issue in some way.[466] This is not a surprise; instead, it is entirely consistent with the history of patent damages. Second, *Lucent* makes clear that parties should be objecting to evidence, and now they do. The rate of challenges

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459 *Id.* at 871 ("Thus, the district court in this case made the same legal error that this court corrected in *Lucent*. This trial court, like the one in *Lucent*, made no effort to link certain licenses to the infringed patent.").

460 798 F. Supp. 2d 1111 (N.D. Cal. 2011).

461 *Id.* at 1115.

462 *Id.*

463 Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 ("At times, Microsoft's briefs seem to suggest that the district court judge 'abdicated' her role as a gatekeeper. The responsibility for objecting to evidence, however, remains firmly with the parties. Here, the record reveals that, at trial, Microsoft objected neither to the introduction of any of the licenses discussed below nor to the testimony of Lucent's expert as it related to those licenses.").

464 *Id.* at 1335.

465 George W. Jordan III & James D. Woods, *The Economics of Reasonable Royalty Damages in Patent Litigation:* Lucent v. Gateway, LANDSLIDE, May/June 2010, at 31.

466 Carnegie-Mellon Univ. v. Marvell Tech. Grp., Ltd., 807 F.3d 1283, 1304 (Fed. Cir. 2015) ("Past licensing practices of the parties and licenses for similar technology in the industry may be useful evidence. But such evidentiary use must take careful account of any 'economically relevant differences between the circumstances of those licenses and the circumstances of the matter in litigation.'" (quoting Gaylord v. United States, 777 F.3d 1363, 1368 (Fed. Cir. 2015))).

to experts has accelerated. Although the results of those challenges might be uncertain due to some of rules described in this Article, challenges should be welcomed as a way to sort out the proper evidence before appeal.

Close consideration of comparable licenses is consistent with historic practice and complements de-emphasis of the hypothetical negotiation. Courts have often held that settlement licenses should almost never be considered, even if they are the only available licenses.[467] Experts are typically not in favor of this rule, as it removes key data they could use to determine damages. This may be so, but the data is simply not probative of value even if it is probative of negotiation—there are too many confounding factors.[468]

Actual licenses should be used only if they can be tied to the value of the technology, rather than to the likely damages in litigation. Indeed, actual licenses are a direct form of damages—they are not reasonable royalties. *Rite-Hite*, for example, conflated the established royalty, which had always been a separate measure of damages, with the reasonable royalty.[469] As others have pointed out, use of comparable licenses untied to ongoing value-based enterprises leads to a circularity,[470] and a downward spiral in licensing because defendants will lack the incentive to enter into licenses when the worst that might happen is paying the license fee anyway.[471] Interestingly, others argue that comparable licenses lead to an upward spiral.[472] This makes the use of multipliers or other "kickers" difficult to apply with any consistency.[473] Courts throughout the history of reasonable royalties have understood this fact,[474] though recently it seems to have been lost, likely due to the overcompensation concerns.

Damages can be calculated without comparable licenses, even if it is more difficult.[475] Reasonable royalties—general damages—were invented for exactly those cases where actual licenses were unavailable to prove damages. Thus,

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467 *See* Masur, *supra* note 446, at 124-25.

468 Masur argues that settlement licenses may be highly probative if the likelihood of success is known. *Id.* at 145. This is surely true, and such licenses would have likely been considered probative from a historical standpoint, but Masur's extension that a multiplier might be used when the likelihood of victory is unknown is much less certain, as Masur himself notes. *Id.* at 148-52; *see also* Taylor, *supra* note 1, at 130 (arguing that comparable licenses be adjusted to consider discounts).

469 Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1554 (Fed. Cir. 1995) ("The [reasonable] royalty may be based upon an established royalty, if there is one, or if not, upon the supposed result of hypothetical negotiations between the plaintiff and defendant.").

470 Mark Schankerman & Suzanne Scotchmer, *Damages and Injunctions in Protecting Intellectual Property*, 32 RAND J. ECON. 199, 201-04 (2001).

471 Masur, *supra* note 446, at 133-34.

472 Lee & Melamed, *supra* note 138, at 438.

473 Lemley & Shapiro, *supra* note 2, at 2021-24.

474 Dunkley Co. v. Vrooman, 272 F. 468, 468-69 (6th Cir. 1921).

475 Jarosz & Chapman, *supra* note 244, at 820.

earlier royalty awards often exceeded actual licenses.[476] Embracing the history of reasonable royalties means letting go of the hypothetical negotiation, including comparable licenses if necessary.[477]

2. The Timing and Type of Evidentiary Rulings

Most of the exclusion of expert testimony has come in the form of *Daubert* motions.[478] But that gatekeeping function is about process, not the final outcome.[479] Further, the gatekeeping mandate is facially inconsistent with a substantial evidence analysis, which is about whether the evidence itself supports an award, especially where the evidence was properly admitted.[480] As the court noted in a later case, above a minimum threshold of relevance, the jury must sort things out, even if it is complex.[481]

This apparent conflict came to a head in *Apple Inc. v. Motorola, Inc.*,[482] in which the district court rejected almost all of the expert testimony of both sides and dismissed the case in part due to lack of evidence on damages.[483] The appellate court ruled that an estimate based on product comparisons, though not the best method nor one that directly measured what a consumer would pay for the incremental feature, was reasonably reliable.[484]

But even in allowing the evidence, the court still scrupulously considered the factual support for expert opinions. On a different patent, the court affirmed exclusion of a licensing expert that did not provide comparable licenses nor evidence of technical reasons to support the proposed licensing rate.[485] Even so, the court allowed the remainder of the testimony, which examined but did not specifically value an alternative: "Nor is there a requirement that a patentee

476 Reliance Constr. Co. v. Hassam Paving Co., 248 F. 701, 702 (1918).

477 *Contra* Bensen & White, *supra* note 122, at 2 n.3 (arguing that reasonable royalties were merely a stand-in for actual royalties and that profit must be allowed Though some cases have so held, this is inconsistent with the full evolution described here.

478 Daubert v. Merrell Dow Pharm., Inc., 509 U.S. 579 (1993).

479 *Id.* at 595.

480 *See, e.g.*, i4i Ltd. P'ship v. Microsoft Corp., 598 F.3d 831, 856-57 (Fed. Cir. 2010) (holding that expert testimony arguing for royalty that exceeded price of software survived *Daubert* challenge but might not have survived substantial evidence review had such review been preserved on appeal), *aff'd*, 564 U.S. 91 (2011). Note that in a later case, at least part of the methodology used in *i4i*, the twenty-five percent rule, was rejected. Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1317 (Fed. Cir. 2011).

481 *i4i Ltd. P'ship*, 598 F.3d at 856.

482 757 F.3d 1286 (Fed. Cir. 2014), *overruled on other grounds by* Williamson v. Citrix Online, LLC, 792 F.3d 1339 (Fed. Cir. 2015).

483 *Id.* at 1313.

484 *Id.* at 1319.

485 *Id.* at 1324.

value every potential noninfringing alternative in order for its damages testimony to be admissible."[486]

Perhaps most importantly, the court in *Apple* made clear that experts are not necessary for a royalty calculation: "If a patentee's evidence fails to support its specific royalty estimate, the fact finder is still required to determine what royalty is supported by the record."[487] In other words, zero damages are exceedingly rare, occuring only when the patent really is valueless, *not* when the expert's determination of value is weak.[488] This is wholly consistent with the traditional approach to reasonable royalty damages. In fact, the statutory change that eliminated profits awards in 1946 made clear that there must be some minimal award of damages.[489] It also contradicts recent proposals that suggest that nominal or zero damages should routinely be rewarded.[490]

Given the requirement that there be *some* damages award, it would be most helpful to juries if *Daubert* motions were heard much earlier in the case.[491] Currently, such motions are heard just before trial. At this late stage, there is little time for experts to modify reports if some portion is rejected, and—as *Apple* shows—sometimes experts are not allowed to update their opinions at all. As a result, experts will often provide three or four different models for damages as a redundant approach, in case one option is rejected. This not only multiplies work, it also increases the uncertainty of which theory will be presented. Of course, because many cases settle early, conducting the damages work later in the case may still be cheaper.

There are at least three benefits to hearing challenges to damages expert testimony earlier in the case. First, it would allow experts to update their opinions in a cogent way, which would assist juries in making decisions. Second, it would afford the other party time to depose experts about their updated reports, something that does not happen now. Third, it would allow parties to know what expert testimony will be before the jury when they enter final pre-trial settlement

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[486] *Id.* at 1325.

[487] *Id.* at 1327; *see also id.* at 1330 ("Even if Apple had not submitted expert evidence, this alone would not support a finding that zero is a reasonable royalty.").

[488] *Id.* at 1327. The court puts it even more starkly: in hypothetical negotiation terms no willing patentee will accept zero dollars on a valid and infringed patent. *Id.* at 1328. As discussed elsewhere in this Article, however, that should not be the metric.

[489] Aro Mfg. Co. v. Convertible Top Replacement Co., Inc., 377 U.S. 476, 505-06 (1964).

[490] Cotter, *supra* note 362, at 744.

[491] THE SEDONA CONFERENCE, COMMENTARY ON PATENT DAMAGES AND REMEDIES 36 (John M. Desmarais et al. eds., 2014); Stuart Graham et al., *Final Report of the Berkeley Center for Law & Technology Patent Damages Workshop* 15-18 (2016), https://www.law.georgetown.edu/continuing-legal-education/programs/academic-conferences/Patent-Law/upload/Berkeley-Patent-Damages-Final-Report-2016-08-15.pdf [https://perma.cc/22VN-BEJM]

conferences.[492] Currently, a common sticking point is a disagreement about what the damages testimony at trial will be, just as claim construction disputes are sticking points to early case settlement.

These are the same benefits that were offered by the traditional special master approach. As described above, expert testimony was often taken, cross-examined, challenged, and reentered without the high stakes risk of exclusion on the eve of trial. Moving evidentiary decisions earlier in the case would provide some of the benefits of traditional methods without the delay of the special master system.

3. Neutral Experts as Quasi-Special Masters in High-Stakes Cases

Although expert testimony may be admissible, it is frequently so contradictory that it is impossible to tell which is closer to reality. Having a financial expert not beholden to either party can aid in the analysis, even if the judge or jury rejects the conclusions in the end.

For many years, this function was handled by the special master. Indeed, even when special masters became unnecessary in 1946,[493] courts continued to use them for decades.[494] The Supreme Court considered a special master damages case as late as 1983.[495] One of the questions in the petition involved review of the special master's findings (which the appellate court rejected), but the Supreme Court did not grant certiorari on that question.

One of the last special master damages cases appears to have been in 1993. The master was appointed in December 1992, a decision was rendered and objections were heard by September 1993,[496] much more quickly than older cases. The court increased the royalty two percentage points over what special master awarded (from eight to ten percent).

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[492] One proposal suggests using neutral experts, discussed in Section III.E.3, for this purpose. J. Gregory Sidak, *Court-Appointed Neutral Economic Experts*, 9 J. COMPETITION L. & ECON. 359, 381 (2013).

[493] H.R. REP. NO. 79-1587, at 2 (1946), *adopted as the report of the Senate Committee on Patents*; S. REP. NO. 79-1503, (1946), *as reprinted in* 1946 U.S.C.C.A.N. 1386, 1386-87 ("[B]y making it unnecessary to have proceedings before masters and empowering equity courts to assess general damages irrespective of profits, the measure represents legislation which in the judgment of the committee is long overdue.").

[494] *See* TWM Mfg. Co v. Dura Corp., 789 F.2d 895, 898 (Fed. Cir. 1986) (special master used in bench trial); Code-Alarm, Inc. v. Electromotive Techs. Corp., No. 87-cv-74022, 1995 U.S. Dist. LEXIS 22397, at *2-3 (E.D. Mich. Apr. 28, 1995); Nat'l Gypsum Co. v. Steel Sys. Int'll, Inc., No. 85-cv-02134, 1988 U.S. Dist. LEXIS 11641, at *4 (D. Or. Oct. 5, 1988) (special master used); Studiengesellschaft Kohle m.b.H. v. Dart Indus., 666 F. Supp. 674, 677-78 (D. Del. 1987) (special master assigned to determine damages but district court overruled), *aff'd*, 862 F.2d 1564 (Fed. Cir. 1988).

[495] Gen. Motors Corp. v. Devex Corp., 461 U.S. 648, 650-51 (1983).

[496] FMT Corp. v. Nissei ASB Co., No. 1:90-cv-00786, 1993 U.S. Dist. LEXIS 19625, at *1 (N.D. Ga. Sept. 27, 1993).

Special masters were generally expensive and time consuming. Indeed, this was one of the reasons why the law changed in 1946 in the first place.[497] Cases that took six[498] or seven[499] years were not unheard of. The damages determinations were so long, they were often considered separate trials. A recent Federal Circuit case recounted the long history of using special masters and ruled that a liability appeal may go forward while a damages trial was ongoing.[500]

Even if special masters were not so cumbersome, they are largely barred by the right to a jury trial.[501] Courts have held that the Seventh Amendment "preserves to the patentee the right to elect a jury by seeking damages in an infringement action."[502]

The goal then, is to mimic some of the benefits of truly independent special masters in handling complex evidence, while avoiding the costs of delay and lack of jury trials. One previously proposed solution is the appointment of a neutral expert under Federal Rule of Evidence 706.[503] Such an expert need not prepare long and detailed reports to be adopted by the court. Furthermore, the expert need not agree with either of the parties[504] or even provide a damages number at all. But this procedure would be costly, and should probably be limited to high-stakes litigation.

This procedure would not interfere with the right to a jury and has long been approved by the courts,[505] making it consistent with the historical approach. The Supreme Court long ago ruled that such an expert could testify and express opinions about the facts in dispute.[506]

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[497] Kori Corp. v. Wilco Marsh Buggies & Draglines, Inc., 761 F.2d 649, 654 (Fed. Cir. 1985).

[498] Ellipse Corp. v. Ford Motor Co., 461 F. Supp. 1354, 1377 (N.D. Ill. 1978) ("The court finds that the Special Master devoted at least 4,000 hours to this case over approximately a six year period . . . .").

[499] Merrell Soule Co. v. Powdered Milk Co. of Am., 7 F.2d 297, 297 (2d Cir. 1925).

[500] Robert Bosch, LLC v. Pylon Mfg. Corp., 719 F.3d 1305, 1313-16 (Fed. Cir. 2013).

[501] Apple Inc. v. Motorola, Inc., 757 F.3d 1286, 1315 (Fed. Cir. 2014), *overruled on other grounds by* Williamson v. Citrix Online, LLC, 792 F.3d 1339 (Fed. Cir. 2015); Tegal Corp. v. Tokyo Electron Am., Inc., 257 F.3d 1331, 1340-41 (Fed. Cir. 2001).

[502] *In re* Tech. Licensing Corp., 423 F.3d 1286, 1290 (Fed. Cir. 2005). *But cf.* Paice LLC v. Toyota Motor Corp., 504 F.3d 1293, 1315-16 (Fed. Cir. 2007) (finding no right to jury for ongoing royalties determination).

[503] Sidak, *supra* note 492, at 360 (arguing that benefits of neutral experts outweigh costs).

[504] *See* Smithkline Diagnostics, Inc. v. Helena Labs., Corp., 926 F.2d 1161, 1168 (Fed. Cir. 1991) ("A court is not restricted in finding a reasonable royalty to a specific figure put forth by one of the parties.").

[505] Graffis v. Woodward, 96 F.2d 329, 330-31 (7th Cir. 1938) (appointing auditor to take evidence and submit facts in complex case did not violate Seventh Amendment).

[506] *Ex parte* Peterson, 253 U.S. 300, 310-11 (1920).

Nonetheless, such a procedure should not be used all the time, lest it be used to delay trials and increase costs, the exact reasons special masters were no longer required.[507] Thus, appointing a neutral expert should only be considered in special cases. Where parties are seeking tens or even hundreds of millions of dollars (and the defendant argues that damages should be very small), having a third party assess the veracity of the damages claims for the court would be helpful. Indeed, such a procedure could be used in an expedited way simply to aid in determination of *Daubert* motions.[508]

This proposal is mindful of the drawbacks associated with neutral experts. First, the point of having adversarial litigation is that the truth will come out in each party's presentation and cross-examination of evidence.[509] This is true, but damages evidence can be particularly opaque and wildly divergent on the same facts. Courts often assign technical neutral experts, and there is no reason why they cannot obtain assistance in the financial realm as well. Second, the potential for burden and costs can be problematic. The costs of such an expert should be split and, as noted above, borne only in those cases that merit the additional expenditures. Third, experts often have their own biased or even uninformed viewpoints, and simply might want to further their own desires for the patent system or their own (even idiosyncratic) damage calculation methods, with the judge's imprimatur, no less. This is a typical complaint about neutral experts.[510] It is not clear, however, that the potential for bias outweighs the benefit of guidance on expert reports that are surely biased by the party-expert affiliations. The same lack of neutrality could have been argued about special masters, or even judges; the traditional approach is to seek out and avoid bias rather than avoid potentially helpful procedures for fear of it.

CONCLUSION: A RETURN TO FOCUS ON VALUE

Lucent and *Uniloc* led to a shift from the standards that governed throughout history to more explicit rules, some of which had never been seen in the history of reasonable royalty analysis. Ironically, the shift to rules led to even more uncertainty, piling rigid rules that seem contrary to economic rationality on top of the inherently difficult endeavor of determining reasonable royalties.

To the extent that there was a concern about overcompensation, the new rules have achieved their goal. Damages awards have dropped precipitously. Despite

[507] *Graffis*, 96 F.2d at 332.

[508] *See* Honeywell Int'l, Inc. v. Nikon Corp., No. 04-cv-01337, 2009 U.S. Dist. LEXIS 17115, at *5 (D. Del. Mar. 4, 2009) (describing how special master was used only to determine evidence admissibility for submission to jury); Sidak, *supra* note 492, at 372 ("One possibility is that the court would use its neutral economic expert solely for *Daubert* purposes.").

[509] Graham et al., *supra* note 491, at 18.

[510] JOE S. CECIL & THOMAS E. WILLGING, COURT-APPOINTED EXPERTS: DEFINING THE ROLE OF EXPERTS APPOINTED UNDER FEDERAL RULE OF EVIDENCE 706, at 32-33 (1993); Graham et al., *supra* note 491, at 18.

tremendous growth in litigation since 2010, damage awards are much lower, falling to a $2.9 million median award in 2014, the second lowest in twenty years, and about half the medians of the 2000s and lower than the medians in the 1990s.[511]

A common theme throughout this discussion is that the invention's value should govern[512] instead of obsessive focus on a hypothetical negotiation or rote adherence to economically suspect rules.[513] This is no easy task, of course, and it never has been.[514] But the shortcuts simply do not reflect the nature of reasonable royalties. This is ironic, because the remedial measures are more of a liability rule than a property rule,[515] which is usually favored by modern commentators concerned about overcompensation. It is time to return to the roots of reasonable royalty: a remedial measure of damages that should apply when it is impossible to discern or apportion lost profits. Some of the court's recent cases have begun to move in this direction, citing back to original Supreme Court cases, like *Dowagiac*, and even *Suffolk*.[516]

Though the traditional approach of focusing on value may be difficult, it is not impossible. Nor must it ignore concerns like royalty stacking; where there is evidence that multiple patents are associated with a product, that should be

[511] CHRIS BARRY ET. AL., PRICEWATERHOUSECOOPERS, 2015 PATENT LITIGATION STUDY: A CHANGE IN PATENTEE FORTUNES 4 (2015), http://www.pwc.com/en_US/us/forensic-services/publications/assets/2015-pwc-patent-litigation-study.pdf [https://perma.cc/JV52-A2YM].

[512] Geradin & Layne-Farrar, *supra* note 404, at 779-84.

[513] Taylor, *supra* note 1, at 141; *see generally* Durie & Lemley, *supra* note 161, at 636; Jarosz & Chapman, *supra* note 244; Peter Lee, *The Accession Insight and Patent Infringement Remedies*, 110 MICH. L. REV. 175, 232-33 (2011); Seaman, *supra* note 143 (arguing that *Georgia-Pacific* test for reasonable royalties gives too much discretion to juries and advocating for estimation based on cost of non-infringing substitute).

[514] Cotter, *supra* note 16, at 20 (discussing heuristics that might be used when solid royalty evidence is lacking); *see also* Cotter, *supra* note 362, at 742-44 (describing difficulties with calculating value of next best alternative); Taylor, *supra* note 1, at 133-41; Ted M. Sichelman, *Innovation Factors for Reasonable Royalties*, TEX. INTELL. PROP. L.J. 21-22 (forthcoming 2017), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2865022 (recognizing that "implementing [value determinations] can be daunting").

[515] Taylor, *supra* note 1, at 155-56.

[516] *See, e.g.*, Carnegie Mellon Univ. v. Marvell Tech. Grp., Ltd., 807 F.3d 1283, 1304 (Fed. Cir. 2015); Aqua Shield v. Inter Pool Cover Team, 774 F.3d 766, 770-71 (Fed. Cir. 2014).

considered in setting the royalty.[517] Another long used valuation method is a cost savings methodology.[518] There are many others.

A focus on value does not mean that concepts such as the salable unit should never be relevant. For example, in *Lucent* a question emerged about whether the royalty base should be the revenue for sales of entire computer (with Microsoft Office preinstalled), Microsoft Office (which included Outlook), or Outlook (the infringing product). This analysis is complicated by the nature of bundling (Outlook costs less in the bundle), but in all events basing a royalty on the sales price of an entire computer seems silly in this context.

Lucent thus brought focus to the value of the invention and found that there was little or no evidence of the benefits to users nor to the profitability of the product.[519] Examination of the invention's benefits was consistent with traditional analysis of reasonable royalties, but did not require pronouncements about the entire market value rule and apportionment.

The problem with mandatory royalty base apportionment is that the relationship between the royalty base and the royalty rate is fluid, so adjusting them together should not affect the final calculation and adjusting them separately makes no economic sense. If one is instead concerned with a large gross sales number (and the risk that small errors in royalty rate will lead to large swings in total royalties), one answer is to use—when possible—a price per unit that is tied to the value of the invention.[520] That way, it does not matter what the net sales are, and a reasonable royalty might be set with less risk of error. Indeed, focusing on the fixed, per unit, value allows estimation without having to value each of the other components of the product.[521]

How can better expert testimony be elicited without rigid rules? Courts cannot dictate how experts do their jobs. This is especially true for strict followers of the hypothetical negotiation, where expert testimony that parties would have negotiated a certain way is easy to come by despite its speculative nature.

But courts can control the evidence that comes before them. Judges could require parties to make offers of proof to show relevance of the royalty rate and

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517 *See* Ericsson, Inc. v. D-Link Sys., Inc., 773 F.3d 1201, 1234 (Fed. Cir. 2014) ("The district court need not instruct the jury on hold-up or stacking unless the accused infringer presents actual evidence of hold-up or stacking. Certainly something more than a general argument that these phenomena are possibilities is necessary.").

518 *See, e.g.*, Apple Inc. v. Motorola, Inc., 757 F.3d 1286, 1321 (Fed. Cir. 2014), *overruled on other grounds by* Williamson v. Citrix Online, LLC, 792 F.3d 1339 (Fed. Cir. 2015); Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1080 (Fed. Cir. 1983); Comair Rotron, Inc. v. Matsushita Elec. Corp. of Am. & Matsushita Elec. Indus. Co., Ltd., No. 85-cv-04308, 1993 U.S. Dist. LEXIS 21500, at *6 (D.N.J. May 4, 1993).

519 Lucent Techs., Inc. v. Gateway, Inc., 580 F.3d 1301, 1332-33 (Fed. Cir. 2009).

520 *See Carnegie-Mellon*, 807 F.3d at 1304-05; Ellipse Corp. v. Ford Motor Co., 461 F. Supp. 1354, 1376 (N.D. Ill. 1978).

521 *Contra* Lemley & Shapiro, *supra* note 2, at 2024-25 (arguing that apportionment is difficult because one must value all components).

the base to economic reality. And they can rule that the complexities and amounts at issue (such as those in *Lucent*) are simply too prejudicial to allow.

The more difficult issue, skeptics will argue, is that courts do not know economics better than economists. On the one hand, this is surely true. Economists do an outstanding job of analyzing the paucity of data available and making some conclusions. This job is made even more difficult by arbitrary rules such as the smallest salable unit rule.

On the other hand, judges know a lot about jury trials and about how expert testimony is heard and reflected in verdicts. Judges also determine questions of relevance and prejudice each and every day. They are well equipped to rule on whether the foundation for an expert report is supported by common sense or some other evidentiary basis. Indeed, some economists have complained that courts are substituting their own analysis with the economist's. Earlier court input on underlying evidentiary support might allay some of those concerns.