

**REASONABLE ROYALTY PATENT INFRINGEMENT DAMAGES AFTER
UNILOC**

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I. INTRODUCTION

The United States Court of Appeals for the Federal Circuit's decision in *Uniloc USA, Inc. v. Microsoft Corp.* fundamentally changed the patent damages landscape by rejecting use of the "25 percent rule of thumb"¹ for determining a reasonable royalty.² Given the prominence of the rule in many recent damages awards, and its likely role in many undisclosed monetary settlements, the consequences for future patent cases are profound. But *Uniloc* is only the latest in a series of recent decisions that focus on damages methodology. These legal developments point to a higher standard of economic analysis in patent damages cases, while reaffirming the traditional hypothetical negotiation and *Georgia-Pacific* factors.³ In this Article, we review the economic reasoning of these decisions. We then discuss the implications for an economically coherent analysis of reasonable royalties.

The 2009 case *Lucent Technologies, Inc. v. Gateway, Inc.* signaled a reinvigorated gatekeeper role for the judiciary in damages questions.⁴ In this decision, the court, while sustaining a finding that a feature in Microsoft's software products infringed a Lucent patent, vacated a jury award of nearly \$358 million for lack of sufficient evidentiary support.⁵ In *i4i Ltd. Partnership v. Microsoft Corp.*, while procedural issues constrained the Federal Circuit from deciding whether there was a sufficient evidentiary basis for a \$200 million jury award, the court tellingly noted "the outcome might have been different" if the court had the opportunity to consider whether the award was "grossly excessive or monstrous."⁶ Most recently, in *Uniloc*, where the jury award was \$388 million, the Federal Circuit affirmed the district court's grant of a new trial on damages

¹ The "rule" sets a royalty equal to 25% of the infringer's profit from sales of the products embodying the licensed technology. This method is discussed in more detail in Part III *infra*.

² *Uniloc USA, Inc. v. Microsoft Corp.*, No. 2010-1035, slip op. at 41 (Fed. Cir. Jan. 4, 2011) [hereinafter *Uniloc II*].

³ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120, 166 U.S.P.Q. (BNA) 235, 238 (S.D.N.Y. 1970). For a discussion of these factors, see *infra* Part V.

⁴ 580 F.3d 1301, 92 U.S.P.Q.2d (BNA) 1555 (Fed. Cir. 2009).

⁵ *Id.* at 1335, 92 U.S.P.Q.2d (BNA) at 79.

⁶ 598 F.3d 831, 857, 93 U.S.P.Q.2d (BNA) 1943, 1963 (Fed. Cir. 2010).

after prohibiting use of the “25 percent rule” and condemning misuse of the “entire market value rule.”⁷

These decisions show an increasing demand for economic analysis to support claimed reasonable royalties. *Lucent* emphasized close scrutiny of “comparable” licenses used as damages benchmarks to avoid erroneous results.⁸ It further warned that invoking the entire market value rule requires evidence that the claimed royalty rate results in a total damages amount that is “economically justified.”⁹ *Uniloc* subsequently declared the 25 percent rule “arbitrary, unreliable, and irrelevant,” and thus inadmissible under *Daubert v. Merrell Dow Pharmaceuticals, Inc.* and the Federal Rules of Evidence.¹⁰ *Uniloc* also criticized faulty use of entire market value as a “check” on the reasonableness of the plaintiff’s damages calculation, which the court deemed grave enough to justify a conditional new trial on damages.¹¹

While *i4i* did not establish new guiding principles for damages, it raised important concerns about the economic basis for the outcome, given factors such as the gap between the actual price of the infringing product (Microsoft Word) and the price assumed by the plaintiff’s expert, and questions about the consistency of the award with the principles set out in *Lucent*. The plaintiff’s reliance on the 25 percent rule and the significance of other economic issues make it an instructive case in its own right. A court may yet decide many of these questions because Microsoft is seeking a new trial in its appeal to the Supreme Court.¹²

In this Article we review and discuss the damages claims in these key cases in more detail. Part II begins with an examination of the comparability of licenses following *Lucent* and *Uniloc*. In Part III, we briefly review the origin and use of the 25 percent rule from an economic perspective, not only to reinforce the soundness of the *Uniloc* decision but also to discuss related methodological issues that may still arise in future cases.

⁷ *Uniloc II*, No. 2010–1035, slip op. at 41, 49.

⁸ *Lucent*, 580 F.3d at 1329, 92 U.S.P.Q.2d (BNA) at 1575.

⁹ *Id.* at 1338–39, 92 U.S.P.Q.2d (BNA) at 1582.

¹⁰ *Uniloc II*, No. 2010–1035, slip op. at 41; see *Daubert v. Merrell Dow Pharm., Inc.*, 509 U.S. 589, 27 U.S.P.Q.2d (BNA) 1200 (1993); FED. R. EVID. 103(a).

¹¹ *Uniloc II*, No. 2010–1035, slip op. at 49.

¹² See Petition for Writ of Certiorari at 9–12, *i4i Ltd. P’ship v. Microsoft Corp.*, No. 10–290 (U.S. filed Aug. 27, 2010), cert. granted 131 S. Ct. 647 (2010).

Uniloc is highly unusual for bringing down the full weight of *Daubert* upon such a widely used damages methodology. The decision—referring to earlier work by one of the authors explaining the arbitrary nature of the 25 percent rule—found the rule to be fundamentally flawed as a baseline royalty rate in a hypothetical negotiation.¹³

Uniloc makes it clear that patent damages methodology requires an economically coherent hypothetical negotiation tied to the *Georgia-Pacific* factors and grounded in the facts of the particular case.¹⁴ In this Article, we endeavor to anticipate issues suggested by our analysis for future reasonable royalty determinations within this framework. The opinions of *Uniloc*, *Lucent*, and *i4i* raise a series of important questions regarding the calculation of a reasonable royalty, which we address in Part IV.

First, we foresee that damages experts could resort to reported “industry average” royalty rates—either as starting points to be modified under the *Georgia-Pacific* factors, or as corroboration of the rates experts propose—as an alternative to applying the stringent *Lucent* criteria to specific benchmark licenses. We explain why this procedure would be as flawed as the 25 percent rule for determining a baseline royalty rate, based on a review of the data in a widely-used royalty database.

Next, we consider the comparability of licenses with lump-sum payments and those with running royalties. We clarify that the value of running royalties can always be expressed as an equivalent lump-sum amount, so this difference in form is not a fundamental obstacle to comparability.

We then discuss *Uniloc’s* holding that the entire market value of the products cannot be admitted in the damages analysis unless the patented component is the basis for customer demand.¹⁵ This is critical to avoid a false inference of overall “smallness” of a claimed royalty. We further reconcile this

¹³ *Uniloc II*, No. 2010–1035, slip op. at 38–39 (citing Roy J. Epstein & Alan J. Marcus, *Economic Analysis of the Reasonable Royalty: Simplification and Extension of the Georgia-Pacific Factors*, 85 J. PAT. & TRADEMARK OFF. SOC’Y 555, 574 (July 2003), and Roy J. Epstein, *Modeling Patent Damages: Rigorous and Defensible Calculations* at 22 (2003), http://www.royepstein.com/epstein_aipla_2003_article_website.pdf (paper presented at the AIPLA 2003 Annual Meeting)).

¹⁴ *See id.* at 46.

¹⁵ *Id.* at 50–51.

basis-for-demand requirement with the observation in *Lucent* that “there is nothing inherently wrong” with royalties in license agreements based on a percentage of the product’s sale price.¹⁶

Given the potential difficulty in locating relevant benchmark licenses that survive the *Lucent* “cut,” we then discuss alternative royalty analyses in Part V. These alternatives treat the infringing activity as an investment that must earn a rate of return to be worthwhile. The key is to examine the infringer’s next best alternative investment in order to place bounds on an economically rational royalty in a hypothetical negotiation. We explain how this approach, based on an application of standard principles of corporate finance, comports with the *Georgia-Pacific* hypothetical negotiation analysis.

Finally, in Part VI, we illustrate our analysis with the facts of *i4i*. The damages phase of this case invites discussion because extensive portions of the trial record are posted on the Internet. The damages calculation is also noteworthy because *i4i*’s expert, similar to Uniloc’s expert,¹⁷ relied on the 25 percent rule and performed reasonableness “checks” based on the entire value of Microsoft’s sales.¹⁸

II. LUCENT AND COMPARABLE LICENSES

Lucent severely criticized the use of royalty rates from other license agreements as damages benchmarks without sufficient regard to their comparability. Some of the licenses relied upon by the plaintiff in that case were “radically different.”¹⁹ For others, it was not even possible to ascertain their subject matter.²⁰ Moreover, the court found it doubtful that the technology covered by the other license agreements was in any way similar to the patent in

¹⁶ *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1339, 92 U.S.P.Q.2d (BNA) 1555, 1582 (Fed. Cir. 2009).

¹⁷ *Uniloc II*, No. 2010–1035, slip op. at 12.

¹⁸ *See i4i Ltd. P’ship v. Microsoft Corp.*, 598 F.3d 831, 852–53, 93 U.S.P.Q.2d (BNA) 1943, 1959–60 (Fed. Cir. 2010).

¹⁹ *Lucent*, 580 F.3d at 1327, 92 U.S.P.Q.2d (BNA) at 1574.

²⁰ *Id.* at 1327–28, 92 U.S.P.Q.2d (BNA) at 1574.

suit.²¹ The court also determined that the financial terms of the other licenses implied royalties far below the amount awarded by the jury.²²

It is a basic principle of damages analysis to look to market rates paid for comparable patents to serve as benchmarks for damages when there is no established arm's length royalty scheme for the patent in suit.²³ Assessing comparability generally requires significant economic analysis. By definition, other patents will involve different technologies. Additionally, rates in other license agreements can vary widely for many reasons, even when the technologies are similar. It is therefore also important to establish that the licensing terms in the proposed comparables are consistent with those in the hypothetical negotiation to determine a reasonable royalty.

For example, one patent may be economically "strong" (in the sense that the specific technology has no close and inexpensive substitute) while another may be economically "weak" because commercially acceptable alternatives or design-arounds are readily available. When a patent's value is derived from reducing manufacturing costs, the cost savings for different patents or even different applications of the same patent may not be the same. Differing degrees of licensing exclusivity, duration, field of use, and potential overlap and competition with the patent holder's own sales could influence the royalty. Patents may also differ in the amount of additional investment required to achieve commercialization, including research and development, production facilities, product testing and regulatory approvals, marketing, and acquisition of additional intellectual property rights. Furthermore, royalties in other licenses may be part of a complex transaction that includes joint licensing of other patents (*i.e.*, patent pooling), cross-licenses, know-how, and/or product support, as non-cash features of the deal. Royalties from other licenses may therefore require significant adjustments to be appropriate for valuing the patent in suit.

Lucent recognizes that, due to such considerations, the fact that another license was struck in the same general industry in itself gives virtually no information on comparability.²⁴ The decision stated that mere "personal

²¹ *Id.* at 1329, 92 U.S.P.Q.2d (BNA) at 1575.

²² *Id.* at 1330–31, 92 U.S.P.Q.2d (BNA) at 1576–77.

²³ *See Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120, 166 U.S.P.Q. (BNA) 235, 238 (S.D.N.Y. 1970).

²⁴ *Lucent*, 580 F.3d at 1328, 92 U.S.P.Q.2d (BNA) at 1574.

computer kinship” was not sufficient to establish comparability of different licenses for damages analysis.²⁵

The Federal Circuit emphasized that *all* of the licenses used by Lucent’s expert as comparables involved pools and cross-licenses, although the case itself involved essentially a single Lucent patent.²⁶ That made it impossible to determine the stand-alone value of a single patent, which was the key damages issue in *Lucent*.²⁷ For example, Lucent licensed five patents to Vox in return for a one-time payment of \$50,000 and a royalty of \$2 for each Vox unit sold.²⁸ But these terms are consistent with the royalty for each patent being worth \$0.40/unit or any other combination of prices that adds up to the total of \$2, up to \$1.96 for one patent and \$0.01 for each of the other four. Allocation of the \$50,000 payment only further clouds the problem of valuing a single patent in the group.

Similarly, it was impossible in *Lucent* to determine the stand-alone value of one side of a cross-license with the information presented at trial.²⁹ For example, Hewlett-Packard licensed patents to Microsoft in return for a license on Microsoft’s patents, plus a payment of \$80 million.³⁰ At best, one could only say that the Hewlett-Packard patents collectively were worth \$80 million more than the Microsoft patents. It is impossible, however, to determine the value of a single patent in such a cross-licensed portfolio.

Lucent clarifies that proving comparability requires assessing similarity of the technologies, as well as evaluating the specific economic provisions of the agreements to be used as benchmarks.³¹ In addition, the court explains it is not

²⁵ *Id.*

²⁶ For example, an IBM-Dell license used by Lucent’s expert appeared to govern IBM’s licensing of its entire patent portfolio to Dell. Also, the Lucent-Vox, Lucent-Acer, and Microsoft-MPEG agreements each licensed multiple patents in return for a royalty that generally did not identify values for the individual items. The Microsoft-Apple, Microsoft-Hewlett Packard, Microsoft-Imprise, and Lucent-Kenwood licenses involved cross-licenses of patent portfolios owned by these companies. *Id.* at 1328–32, 92 U.S.P.Q.2d (BNA) at 1574–77.

²⁷ *See id.* at 1308–09, 92 U.S.P.Q.2d (BNA) at 1559.

²⁸ *Id.* at 1330, 92 U.S.P.Q.2d (BNA) at 1576.

²⁹ *See id.* at 1328–29, 92 U.S.P.Q.2d (BNA) at 1574–75.

³⁰ *Id.* at 1328, 92 U.S.P.Q.2d (BNA) at 1574.

³¹ *See id.* at 1325–32, 92 U.S.P.Q.2d (BNA) at 1572–77.

appropriate to assume that either the royalty for a pool of patents or the monetary payment that accompanies a cross-license agreement is indicative of the value of a single patent without substantial supporting analysis.³²

The rigorous economic standards for comparability in *Lucent* have in short order become critical threshold requirements for the validity of a damages analysis. Recently, the Federal Circuit in *ResQNet.com, Inc. v. Lansa, Inc.* vacated a patent damages award primarily because there was no “discernible link” to the claimed technology for the majority of the licenses considered by the plaintiff’s expert.³³ Moreover, the expert relied on royalty rates from licenses that conveyed rights to substantial amounts of non-patent property, including software, which undermined them as benchmarks.³⁴ In *Wordtech Systems v. Integrated Networks Solutions*, the decision ordered a new trial in part because the damages verdict conflicted with the clear weight of the evidence.³⁵ Among other issues, the court faulted the use of benchmark lump-sum royalties without regard to the expected volume of sales and rejected benchmark running royalties for lack of comparability with the lump-sum actually awarded by the jury.³⁶

In our view, the key insight regarding comparability in *Uniloc* was the recognition that proponents of the 25 percent rule used it mainly as a surrogate comparable license, instead of identifying an actual benchmark license.³⁷ In the wake of *Lucent*, the deficiencies of the rule as a comparable can hardly be overlooked any longer. *Uniloc* explained that there must be a factual basis to associate the royalty rates used in prior licenses to the particular hypothetical negotiation at issue in the case.³⁸ Because the rule fails to satisfy this “fundamental” requirement, it is unreliable and irrelevant.³⁹

³² *Id.* at 1328–29, 92 U.S.P.Q.2d (BNA) at 1574–75.

³³ 594 F.3d 860, 870, 93 U.S.P.Q.2d (BNA) 1553, 1560 (Fed. Cir. 2010).

³⁴ *Id.*

³⁵ 609 F.3d 1308, 1311, 95 U.S.P.Q.2d (BNA) 1619, 1622 (Fed. Cir. 2010).

³⁶ *Id.* at 1320, 95 U.S.P.Q.2d (BNA) at 1631.

³⁷ *Uniloc II*, No. 2010–1035, slip op. at 45–46 (Fed. Cir. Jan. 4, 2011).

³⁸ *Id.* at 45.

³⁹ *Id.*

III. ECONOMICS AND THE 25 PERCENT RULE

Uniloc ended an era in patent damage litigation by declaring the 25 percent rule inadmissible under *Daubert*.⁴⁰ The rule had neither a basis in economics nor the general acceptance among licensing professionals suggested by its proponents. Instead, the rule was little more than a sweeping assumption about what a royalty rate should be.

The 25 percent rule originated as a 5% running royalty on sales of a developed and successful technology in a commercial license agreement originally negotiated by Robert Goldscheider in the 1950s.⁴¹ The royalty covered a complex package of exclusive intellectual property rights, including a portfolio of patents and other non-patent rights.⁴² It “occurred” to Mr. Goldscheider that the 5% running royalty in this arrangement equated to approximately 25% of the licensee’s profits from sales of the products embodying the licensed technology.⁴³

This example’s ability to take hold in patent litigation as a damages “rule” is perplexing. On its face, it conflicted with the standard requirements for a valid royalty benchmark. Instead of a non-exclusive right to a single, naked patent, the rule involved an exclusive license to a portfolio of patents and other, non-patent, property.⁴⁴ The stand-alone patent value is only a fraction of the 5% royalty due to the value of the other rights conveyed. Moreover, because the royalty covered a portfolio of patents, the value of an individual patent would be a fraction of this fraction. Thus, the 25 percent rule would overstate the value of any single patent in this situation and give no useful information as to potential infringement damages.

Earlier professional licensing literature described royalty scenarios that roughly correspond to the 25 percent rule as special cases, not as generally valid or expected levels. For example, one observer wrote of possible royalties “between 10 and 20 percent” of profits when the licensor has a strong patent position covering something tangible and profitable, and up to 30% when an

⁴⁰ *Id.* at 41.

⁴¹ Robert Goldscheider et al., *Use of the 25 Per Cent Rule in Valuing IP*, LES NOUVELLES, Dec. 2002, at 123.

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.*

invention is “the vital element” in a manufactured product.⁴⁵ On this spectrum, application of the 25 percent rule would require not just a strong patent, but a “vital” patent.

Another observer estimated that “the licensor is not entitled more than about twenty to twenty-five percent of the estimated profits” and, further, that a 5% running royalty on sales was “just about tops for a very fine situation” in which the licensee was making an above-average pre-tax profit rate of twenty percent (compared with an average pre-tax profit of ten percent).⁴⁶ This scenario would correspond to a royalty implied by the 25 percent rule, but the implication is that the 25 percent rule is close to the upper bound on value and would be biased upwards as a measure of the value of most patents. In addition, given that many products require licenses to multiple pieces of intellectual property, it is clear that a licensee would rapidly be driven into bankruptcy if each patent was valued at 25% of the profits.

The 25 percent rule in practice amounted to a surrogate license to provide a royalty rate when no actual comparable license was identified. *Uniloc* properly curbed this approach as “arbitrary” and divorced it from a hypothetical negotiation analysis based on case-specific facts.⁴⁷ The licensing literature provides no support for treating a rate based on 25% of profits as a representative royalty. Moreover, even as a starting point, the rule had no economic foundation. The rule’s main use was to ensure that a damages calculation started at a high value, with no assurance that the balance of the analysis would yield an accurate damages figure.

Economically, there was another fundamental problem with the 25 percent rule not addressed by *Uniloc*. A vital but never resolved issue for the rule involved the appropriate definition of the profit to be apportioned. Proponents of the rule have made fundamentally conflicting arguments on this point over the years. One study showed that the bottom-line result could swing

⁴⁵ Archie M. Palmer, et al., *The Making and Application of Royalty Rates*, in PRACTICING LAW INSTITUTE, PATENT LICENSING 69 (Albert S. Davis, Jr. ed., 1958).

⁴⁶ George S. Hastings, *Royalty Bases from Licensor’s Viewpoint*, in PRACTICING LAW INSTITUTE, PRACTICAL PATENT LICENSING 78 (Albert S. Davis, Jr. ed. 1966).

⁴⁷ *Uniloc II*, No. 2010–1035, slip op. at 47 (Fed. Cir. Jan. 4, 2011).

by more than 400% for this reason alone.⁴⁸ Because there was no reasoned basis for selecting one profit basis over another, the 25 percent rule was far more arbitrary than even its critics generally recognized.⁴⁹

There are many different profit concepts in accounting and economics. In accounting, gross profit is defined as net sales minus cost of goods sold.⁵⁰ Net income is the excess of all revenues and gains for the period over all expenses and losses for the period.⁵¹ Operating income equals gross profit minus non-manufacturing overhead expenses, such as marketing, research and development, administration, and amortization.⁵² EBITDA (earnings before interest, taxes, depreciation, and amortization) equals operating income plus depreciation and amortization expense.⁵³ And there are still more profit measures in accounting, each for a particular purpose. Economists often analyze profits in terms of incremental cash flow, which can be approximated by EBITDA but is usually best studied using a firm's internal cost accounting reports.

As an example, for Microsoft, gross profits for the company as a whole are on the order of 80%.⁵⁴ Its operating income, however, is less than half this level.⁵⁵ It appears that in *i4i* the claimed damages were based on a gross profit rate, which would be more than twice as large compared to the operating income

⁴⁸ Jonathan E. Kemmerer & Jiaqing Lu, *Profitability and Royalty Rates Across Industries: Some Preliminary Evidence* at 7 (2008), <http://www.royaltysource.com/news/Profitability%20and%20Royalty%20Rates.pdf>.

⁴⁹ See Alan Cox & Stephen Rusek, *The Demise of Junk Science and the 25% Rule*, LAW360 (July 28, 2010), <http://www.law360.com/web/articles/181888>.

⁵⁰ CHARLES T. HORNGREN ET AL., *COST ACCOUNTING: A MANAGERIAL EMPHASIS* 41 (2003).

⁵¹ *Id.* at 63.

⁵² Kemmerer & Lu, *supra* note 48, at 5.

⁵³ *Id.*

⁵⁴ *Microsoft Yearly Income Statements Report*, MICROSOFT, <http://www.microsoft.com/investor/EarningsAndFinancials/TrendedHistory/AnnualStatements.aspx> (follow "Yearly Income Statements FY 1991 - FY 2010 (Excel 75 KB)" hyperlink) (last visited Feb. 14, 2011) [hereinafter *Microsoft Income Statement*].

⁵⁵ *Id.*

basis.⁵⁶ On the other hand, the plaintiff's expert in *Paice LLC v. Toyota Motor Corp.*, another recent case involving the 25 percent rule, used a profit rate apparently based on the infringer's operating profit, which was adopted by the court.⁵⁷ In *Procter & Gamble Co. v. Paragon Trade Brands, Inc.*, the evidence was that the infringer had gross profitability of 22.39% and a net profit margin of approximately 7%.⁵⁸ These alternatives imply more than a threefold swing in profits and potential damages.

The importance of the profit definition is demonstrated in many cases, not just those involving the 25 percent rule. In *Georgia-Pacific*, for example, the district court determined an expected profit for the infringer of \$48.64 per thousand square feet on an absorption basis.⁵⁹ However, the court also found that the infringer could pay a royalty of \$50.00 and still realize a "reasonable profit."⁶⁰ The appellate court disagreed.⁶¹ Instead, it started with an expected profit of \$50.00 and deducted a separately determined reasonable profit of \$14.35 (found to equal 9% of the selling price) to arrive at a \$35.65 royalty.⁶²

Proof of the fitness of the particular profit concept used should be part of any economically coherent damages analysis. Indeed, in *Fromson v. Western Litho Plate & Supply Co.* the Federal Circuit remanded a damages award in part to clarify whether a reasonable royalty calculated with the 25 percent rule should be based on gross profit or some other profit measure.⁶³ Even when the 25 percent rule is not in play, a court must establish and consistently apply a careful definition of profit in the reasonable royalty analysis.

⁵⁶ *i4i Ltd. P'ship v. Microsoft Corp.*, 598 F.3d 831, 853, 93 U.S.P.Q.2d (BNA) 1943, 1959–60 (Fed. Cir. 2010) (finding Microsoft's "profit margin" as 76.6%).

⁵⁷ 609 F. Supp. 2d 620, 629–30, 91 U.S.P.Q.2d (BNA) 1835, 1840–41 (E.D. Tex. 2009).

⁵⁸ 989 F. Supp. 547, 611 (D. Del. 1997).

⁵⁹ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1129, 166 U.S.P.Q. (BNA) 235, 245 (S.D.N.Y. 1970). Absorption costing deducts all manufacturing costs, including incremental costs and fixed and variable overhead costs.

⁶⁰ *Id.* at 1143, 166 U.S.P.Q. (BNA) at 255.

⁶¹ *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc.*, 446 F.2d 295, 299, 170 U.S.P.Q. (BNA) 369, 372 (2d Cir. 1971).

⁶² *Id.* at 300, 170 U.S.P.Q. (BNA) at 372.

⁶³ 853 F.2d 1568, 1578, 7 U.S.P.Q.2d (BNA) 1606, 1616 (Fed. Cir. 1988).

IV. ISSUES IN ECONOMIC ANALYSIS FOLLOWING UNILOC

The opinions in *Lucent* and *Uniloc* highlight the need to engage in detailed examination of “comparable” licenses used and reject empty rules of thumb for reasonable royalty calculation.⁶⁴ We have identified three significant issues that, based on these opinions, may arise in damages calculations and address each in turn.

A. Pitfalls in Using Royalty Databases

Given the heightened scrutiny of licenses under *Lucent*, it would not be surprising if damages experts considered using summary royalty database information or royalty surveys as alternative evidence of comparable royalties. But there are serious pitfalls in using these information sources in a damages analysis. The district court case *IP Innovation L.L.C. v. Red Hat, Inc.* foreshadows some of these issues by excluding the plaintiff’s expert in part for uncritical reliance on overall reported industry average royalty rates.⁶⁵

The most basic problem arises with blanket generalizations about “typical” royalties in a particular industry. For example, the following summary of rates was published by RoyaltySource[®], a widely used royalty database:⁶⁶

Table 1: RoyaltySource[®] Royalty Rate Transaction Analysis

Industry	Average	Median	Max	Min
Chemicals	4.8%	4.5%	25.0%	1.0%
Internet	13.5%	10.0%	80.0%	0.3%
Telecom	5.5%	4.9%	50.0%	0.4%
Consumer Goods	6.0%	5.0%	40.0%	0.1%
Media	12.7%	8.0%	70.0%	0.1%
Food processing	3.9%	3.0%	30.0%	0.3%
Medical/health	5.8%	5.0%	50.0%	0.1%
Pharmaceuticals/biotech	7.7%	5.0%	90.0%	0.0%
Energy	5.3%	4.6%	75.0%	0.1%

⁶⁴ See *Uniloc II*, No. 2010–1035, slip op. at 41 (Fed. Cir. Jan. 4, 2011); *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1329, 92 U.S.P.Q.2d (BNA) 1555, 1575 (Fed. Cir. 2009).

⁶⁵ 705 F. Supp. 2d 687, 690–91 (E.D. Tex. 2010) (Rader, J.).

⁶⁶ *Industry Royalty Rate Data Summary*, LICENSING ECONOMICS REV., Dec. 2007, at 6.

Machines/tools	5.3%	4.5%	25.0%	0.5%
Automotive	4.8%	4.0%	20.0%	0.5%
Electrical	4.4%	4.1%	20.0%	0.5%
Semiconductors	5.1%	4.0%	30.0%	0.0%
Computers	5.3%	4.0%	25.0%	0.2%
Software	11.6%	6.8%	77.0%	0.0%

Within each industry, minimum and maximum royalties vary from 19.5% to 90%, indicating there is a wide range in royalty rates. For software, the most relevant category for the *Lucent*, *i4i*, and *Uniloc* cases, the range is from 0% to 77%. Given such ranges, the average or median royalty gives virtually no information about the market rate for a specific patent.

Uniloc discussed how the plaintiff's expert opined that royalty rates for software in his experience are "generally above—on average, above 10% or 10, 11%," which he used as evidence that his claimed royalty (2.9% of Microsoft's sales) is reasonable.⁶⁷ But this opinion simply recites the published RoyaltySource® average.⁶⁸ *Lucent*, *Red Hat*, and our discussion of the above table, in our view, would compel the conclusion that the expert's opinion provides no evidence about an appropriate check on a reasonable royalty.

To help evaluate potential reliance on royalty databases in analyzing a hypothetical negotiation, we investigated the information in RoyaltySource® more closely.⁶⁹ Based on our review, it is highly questionable whether the data could ever satisfy a *Lucent* standard. First, RoyaltySource® is *not* limited to patent royalties. Instead, it covers a broad range of intellectual property transactions, including agreements in which patents have been applied for but have not issued and many transactions that do not pertain to patent rights at all.⁷⁰ Second, the actual licensing agreements are available for only a small

⁶⁷ *Uniloc II*, No. 2010–1035, slip op. at 47–48.

⁶⁸ See *Industry Royalty Rate Data Summary*, *supra* note 66, at 6. The same expert also cited the average rate of 11.6% for software from the Licensing Economics Review in his work in *Red Hat*. See *Red Hat*, 705 F. Supp. 2d at 691.

⁶⁹ An Appendix describing this analysis in detail is on file with the authors.

⁷⁰ *Industry Royalty Rate Data Summary*, *supra* note 66, at 6 (noting that analysis is done on "technology licenses from public sources," excluding trademark license transactions).

fraction of the royalty rates reported in the database.⁷¹ The majority of the rates are essentially bare numbers, which precludes a careful assessment of comparability.⁷² Third, the reported royalties include patent rights bundled with other types of intellectual property, such as copyrights. In other cases, the rates are balancing payments in a cross-license that do not in any way measure stand-alone value.⁷³ Fourth, the reported patent royalty rates frequently apply to multiple patents and even large portfolios of patents.⁷⁴ Fifth, the databases generally do not distinguish licenses reached as part of litigation settlements from those negotiated in the normal course of business.⁷⁵ Sixth, the data are likely biased upward for purposes of assessing representative royalty rates for litigated patents.⁷⁶ This analysis abundantly confirms the findings in *Lucent* and *Red Hat* that merely tabulating rates on an industry-specific basis is inadequate to adjust for comparability.

We reached these conclusions by studying underlying licenses available from RoyaltySource® for two industries: software and consumer electronics. Using two industries kept the number of licenses manageable while still yielding enough information to be useful. In addition, we conferred with RoyaltySource® management, which confirmed the overall point that the database includes “technology licenses,” which are not limited to patent rights.⁷⁷

In brief, we found only a *single* software license and a *single* consumer electronics license in the database that satisfied even initial criteria for a benchmark rate in a hypothetical negotiation for a license to a single patent.⁷⁸ We screened for agreements that were non-exclusive, naked, arm’s length, one-way (*i.e.*, not a cross-license), and not reached in a litigation settlement. These initial criteria, it must be emphasized, do not address the full range of *Lucent* comparability issues that would need to be considered in a specific case.

⁷¹ *Id.*

⁷² *Id.* at 6–7.

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ Telephone Interview with David Weiler, Managing Director, RoyaltySource® (Aug. 10, 2010).

⁷⁸ See Appendix, *supra* note 69.

To put this result in context, RoyaltySource® reported 259 underlying royalty rates in the software category in the table above.⁷⁹ As of August 2010, agreements related to patents were available for only forty-five of these rates.⁸⁰ Therefore, the vast majority of rates (over 80%) were essentially bare numbers not necessarily related to patents at all, and should be discarded for analyzing a hypothetical negotiation. Nearly all of the remaining rates would require significant adjustments to be even minimally comparable for the purpose of calculating damages. For example, a 2003 licensing agreement between NCT Group, Inc. and Stopnoise, Inc. set a royalty of 5%, but this rate included rights to thirty-five U.S. patents.⁸¹

In addition, we think it likely that the RoyaltySource® royalties are biased upwards and unrepresentative of the broader universe of litigated patents. This is not a criticism of RoyaltySource®, but rather a limitation of the available data. The royalty database only includes information reported in publicly available sources, the most important of which are Securities and Exchange Commission filings.⁸² However, the disclosures in public accounting statements only describe specific business transactions that are large enough to be material to the overall financial position of a company.⁸³ Accordingly, a company may take a large number of small licenses and only rarely have a transaction large enough to be reportable. The small licenses, which may well take the form of modest lump-sum payments, are highly unlikely to be included in a public database in the proportion that reflects their true frequency. This consideration, combined with the high incidence of exclusive, non-naked, and/or licensed multiple patents, implies the data are skewed to over-represent relatively high running royalties.

⁷⁹ *Industry Royalty Rate Data Summary*, *supra* note 66, at 6.

⁸⁰ Telephone Interview with David Weiler, Managing Director, RoyaltySource® (Aug. 10, 2010).

⁸¹ See License Agreement Between NCT Group, Inc. and Stopnoise, Inc. (Jan. 6, 2003), <http://www.sec.gov/Archives/edgar/data/722051/000072205103000014/exh-10aj.txt>.

⁸² Telephone Interview with David Weiler, Managing Director, RoyaltySource® (Aug. 10, 2010).

⁸³ The SEC filings are generally Form 8-K reports that pertain to “a material definitive agreement not made in the ordinary course of business.” See SEC, CURRENT REPORT (FORM 8-K), *available at* <http://www.sec.gov/about/forms/form8-k.pdf>; see also Mark Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2022 (2007).

Published decisions support our analysis of the upward bias in royalty databases. In *Laserdynamics, Inc. v. Quanta Computer, Inc.*, the patent holder entered into numerous lump-sum licensing agreements that ranged from \$266,000 to as low as \$57,750.⁸⁴ In *Wordtech Systems, Inc. v. Integrated Networks Solutions Inc.*, the patent holder entered into two lump-sum licensing agreements, neither of which exceeded \$350,000.⁸⁵ The parties established the existence of the small lump-sum royalties through discovery, but because such lump-sum amounts are not material, they are unlikely to be included in databases containing publicly available royalty information. These omissions bias upwards the average royalties that are computed from such databases.

B. Comparability of Lump-Sum and Running Royalties

The problem of comparing the value of a running royalty claim to lump-sum royalty benchmarks was an important issue in *Lucent*. Lucent sought an 8% running royalty but the jury instead awarded a lump-sum of \$358 million.⁸⁶ The Federal Circuit described the award as “problematic,” in part due to a lack of testimony explaining how a hypothetical negotiation over a running royalty is probative of a lump-sum payment.⁸⁷

A simple thought experiment demonstrates that a running royalty always has a lump-sum equivalent. Consider a licensor whose sole asset is a multi-year running royalty license agreement. Assume the licensor wishes to cash out by selling the future royalty stream. There must be a market price for this asset. This price expresses the royalty stream as a lump-sum with the same value.

Several later decisions have already cited *Lucent* for the proposition that “fundamental differences exist between lump-sum agreements and running-royalty agreements.”⁸⁸ This is true to a point, but these differences are not

⁸⁴ No. 2:06–CV–348–TJW, 2010 U.S. Dist. LEXIS 56634 at *6 (E.D. Tex. June 9, 2010).

⁸⁵ 609 F.3d 1308, 1320, 95 U.S.P.Q.2d (BNA) 1619, 1629 (Fed. Cir. 2010).

⁸⁶ *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1323–24, 92 U.S.P.Q.2d (BNA) 1555, 1570–71 (Fed. Cir. 2009).

⁸⁷ *Id.* at 1327, 92 U.S.P.Q.2d (BNA) at 1573.

⁸⁸ *Id.* at 1330, 92 U.S.P.Q.2d (BNA) at 1575; *see, e.g., ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 878, 93 U.S.P.Q.2d (BNA) 1553, 1567 (Fed. Cir. 2010)

unbridgeable. Economically, there is not an intrinsic conflict between a running royalty and a lump-sum. The approaches are linked by the discount rate, which reflects the market's view of the time value of money and the value of avoiding risk. For example, suppose a running royalty is 8% of sales and the patent has only one more year before expiration. Looking forward one year, the expected amount of the royalty would be 8% times the expected sales. If the expected sales were \$1 million, the value of the expected royalty would be \$80,000. Suppose the discount rate is 10%. The present value of the royalty would be a lump-sum amount of \$72,727 (calculated as \$80,000 divided by 1.1). The running royalty can be expressed as a smaller, but economically equivalent, lump-sum because a dollar received with certainty today is more valuable than a dollar received later and perhaps not at all.⁸⁹ Use of the appropriate discount rate ensures consistency between the two alternatives.

Lucent discussed advantages and disadvantages of a running royalty relative to a lump-sum.⁹⁰ In our view, these are primarily different manifestations of risk that influence the discount rate. For example, the running royalty is uncertain for both parties because future sales, particularly for an early-stage invention, may be lower (or higher) than expected. This "volume" risk, which could also involve the credit risk of the licensee, drives the discount rate up. In some cases, a licensor may have a preference to receive a royalty sooner as a lump-sum. This "liquidity" risk also drives the discount rate up.⁹¹

In the context of the facts of *Lucent*, the running royalty claimed for the four year damages period (2003–2006) amounted to \$561.9 million.⁹² The Federal Circuit opinion indicated that the lump-sum equivalent for this royalty stream would have provided the most apposite comparison to the lump-sum licenses

(Newman, J., concurring in part and dissenting in part); *Wordtech*, 609 F.3d at 1319, 95 U.S.P.Q.2d (BNA) at 1628–29.

⁸⁹ A running royalty paid for many future periods would require a more extensive discounting calculation but does not change this basic conclusion.

⁹⁰ *Lucent*, 580 F.3d at 1327, 92 U.S.P.Q.2d (BNA) at 1573.

⁹¹ Additional considerations may affect the choice of the form of a royalty. For example, a running royalty may entail additional costs, such as collection and verification. A lump sum royalty provides an undiluted incentive to maximize the value of practicing the licensed patent.

⁹² *Lucent*, 580 F.3d at 1323, 92 U.S.P.Q.2d (BNA) at 1570.

presented to the jury as benchmarks.⁹³ Our “back of the envelope” calculation indicates the implied lump-sum would have been in excess of \$460 million.⁹⁴ The Federal Circuit was alarmed that the \$358 million jury award was already roughly three to four times the average amount in the lump-sum agreements in evidence.⁹⁵ Perhaps the jury would have reached a different conclusion if the claimed running royalty clearly equated to an even higher multiple of the benchmark royalties.

A different issue with a lump-sum royalty arose in *Uniloc*. At trial, Uniloc argued that “a lump-sum royalty is per se unreliable because it is fundamentally at odds with the compensatory nature of 35 U.S.C. § 284,” and that a reasonable royalty needs to have a running royalty component.⁹⁶ The statutory language certainly does not discuss the form of a reasonable royalty and we see no basis in economics for excluding pure lump-sums as potential damages awards.

The fact that a running royalty can be converted to an equivalent lump-sum value does not mean that the analysis is trivial. Indeed, comparisons to other lump-sums also require care. *Wordtech Systems* indicates some of the economic issues that typically need to be addressed.⁹⁷ We are comfortable in asserting, however, that there are well-developed techniques in economic and financial analyses for principled and reliable solutions to this problem.

C. *The Entire Market Value Rule and Reasonable Royalties*

The *Lucent* decision is also important for clarifying use of the entire market value rule and the relationship between royalty base and rate in the

⁹³ See *id.* at 1331, 92 U.S.P.Q.2d (BNA) at 1576 (translating complicated licensing schemes into lump-sum figures for purposes of analysis).

⁹⁴ Assuming \$561.9 million in claimed running royalties equally distributed over the four year damages period and a discount rate of 10%. We assume the claimed royalties do not include prejudgment interest.

⁹⁵ *Lucent*, 580 F.3d at 1332, 92 U.S.P.Q.2d (BNA) at 1577.

⁹⁶ *Uniloc USA, Inc. v. Microsoft Corp.*, 632 F. Supp. 2d 147, 151–52 (D.R.I. 2009).

⁹⁷ *Wordtech Sys., Inc. v. Integrated Networks Solutions, Inc.* 609 F.3d 1308, 1320, 95 U.S.P.Q.2d (BNA) 1619, 1629 (Fed. Cir. 2010).

context of reasonable royalty damages.⁹⁸ The entire market value rule holds that when: (a) a product consists of unpatented components together with a patented component; and (b) the sale of the entire assembly depends on a patented invention embodied in it, then damages may be based on the value of the entire assembly.⁹⁹ The unpatented components must function together with the patented component as if they were all components of a single assembly used to produce a desired result.¹⁰⁰ For the entire market value rule to apply, the patentee must prove that “the patent-related feature is the ‘basis for customer demand.’”¹⁰¹ If so, the royalty base may be expanded to include the value of the entire assembly and not just the patented component.¹⁰²

Lucent illustrates significant pitfalls in the use of the entire market value rule. Before trial, Lucent’s damages expert applied a 1% royalty to the entire market value of the *computer* loaded with the infringing software.¹⁰³ The district court excluded this opinion regarding the royalty base.¹⁰⁴ At trial, the expert presented a revised theory that instead limited the royalty base to the value of the Outlook software.¹⁰⁵ However, the expert did not apply the 1% rate to the new royalty base.¹⁰⁶ Instead, he increased the claimed royalty to 8%.¹⁰⁷ The rationale seemed to be to preserve the amount of the original damages claim.¹⁰⁸ But because the district court found that the damages generated by the 1%

⁹⁸ The entire market value rule can also arise in the context of a lost profits damages claim. See, e.g., *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1549, 35 U.S.P.Q.2d (BNA) 1065, 1072 (Fed. Cir. 1995).

⁹⁹ *Id.* at 1549–50, 35 U.S.P.Q.2d (BNA) at 1072–73.

¹⁰⁰ *Id.* at 1550, 35 U.S.P.Q.2d (BNA) at 1072.

¹⁰¹ *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1336, 92 U.S.P.Q.2d (BNA) 1555, 1580 (Fed. Cir. 2009) (quoting *Rite-Hite Corp.*, 56 F.3d at 1549, 35 U.S.P.Q.2d (BNA) at 1072).

¹⁰² *Rite-Hite Corp.*, 56 F.3d at 1549–50, 35 U.S.P.Q.2d (BNA) at 1072; see also *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1580, 12 U.S.P.Q.2d (BNA) 1026, 1031 (Fed. Cir. 1989).

¹⁰³ *Lucent*, 580 F.3d at 1338, 92 U.S.P.Q.2d (BNA) at 1581.

¹⁰⁴ *Id.*

¹⁰⁵ *Id.*

¹⁰⁶ *Id.*

¹⁰⁷ *Id.*

¹⁰⁸ *Id.* at 1338, 92 U.S.P.Q.2d (BNA) at 1582.

royalty rate on the entire computers were excessive, the Federal Circuit rejected allowing essentially equivalent damages through a calculation that artificially increased the royalty rate simply because the associated royalty base was reduced.¹⁰⁹

Application of the entire market value rule to Lucent's damages claim was problematic, because the evidence used to derive the originally claimed 1% royalty rate did not support application of this rate to the entire market value of a computer loaded with software.¹¹⁰ Furthermore, there was no evidence that an 8% royalty applied to the value of the software was the market rate for a royalty for a comparable patent.¹¹¹ Both considerations indicate an overstatement of the plaintiff's damages claim. While Lucent apparently claimed approximately \$10 per computer (or copy of Outlook) as a royalty, the Federal Circuit's analysis indicated royalties from the claimed comparable licenses to be as low as \$0.01/unit.¹¹²

The issue came to the fore again in the recent *Red Hat* decision, in which the court excluded an expert opinion on damages based on the entire market rule. The court stated that assuming the validity of the entire market value rule in this case was "unfounded" and a "stunning methodological oversight."¹¹³ The damages analysis was further flawed because the expert "arbitrarily picked a royalty rate."¹¹⁴ Such a royalty rate combined with the particular royalty base could not be expected to reflect the outcome of an economically meaningful hypothetical negotiation.¹¹⁵

Lucent also explains that in construing an economically rational license agreement in a hypothetical negotiation, one may still use the value of an assembly as the royalty base, even when the entire market value rule does not apply.¹¹⁶ The critical requirement is that the royalty rate, and hence the total

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ *Id.*

¹¹² *See id.* at 1338–39, 92 U.S.P.Q.2d (BNA) at 1582.

¹¹³ *IP Innovation L.L.C. v. Red Hat, Inc.*, 705 F. Supp. 2d 687, 690 (E.D. Tex. 2010) (Rader, J.).

¹¹⁴ *Id.* at 690–91.

¹¹⁵ *See id.*

¹¹⁶ *See Lucent*, 580 F.3d at 1338, 92 U.S.P.Q.2d (BNA) at 1582.

amount of the royalty, be “economically justified” given the chosen base and the other facts in the case.¹¹⁷ This heightens the importance of identifying license rates for technologies with comparable economic significance and using the corresponding royalty bases to arrive at an economically reliable and consistent result. Thus, the comparability of a proposed benchmark royalty rate must also be assessed in terms of the associated royalty base. When the royalty base for the benchmark is narrower than the royalty base claimed for the patent-in-suit and the entire market value rule does not apply, the proposed benchmark rate will require a commensurate *downward* adjustment. Otherwise, the computed damages will be too large.

The plaintiff in *Uniloc* interpreted *Lucent* to mean that the entire market value could be used as the royalty base with a royalty rate that was “low enough.”¹¹⁸ The court’s decision, however, rejected this argument and did not allow “consideration of the entire market value of accused products for minor patent improvements simply by asserting a low enough royalty rate.”¹¹⁹ This is no contradiction with *Lucent*, however, given the requirement that the rate be in an acceptable range, as determined by the evidence.¹²⁰ *Uniloc* indicated a lack of independent evidence for the claimed royalty in relation to any specific royalty base.¹²¹ In our view, this implies there was no metric to establish that the royalty was in fact “low enough” to be economically justified when applied to the entire market value of the accused products.

Uniloc illustrated an additional misuse of the entire market value rule as a “check.” The plaintiff’s expert opined that the \$565 million royalty, which equated to 2.9% of the total revenue for Office and Windows, was reasonable because average software royalties were supposedly 10% or more.¹²² By this logic, the royalty was almost 75% below the average level. The Federal Circuit again rejected the argument because the patented feature was not the basis for demand for the entire product.¹²³ The problems we identified with royalty databases further indicate that the 10% “average” was almost certainly

¹¹⁷ *Id.*

¹¹⁸ *Uniloc II*, No. 2010–1035, slip op. at 49 (Fed. Cir. Jan. 4, 2011).

¹¹⁹ *Id.* at 51.

¹²⁰ *Lucent*, 580 F.3d at 1338–39, 92 U.S.P.Q.2d (BNA) at 1582.

¹²¹ *See Uniloc II*, No. 2010–1035, slip op. at 47.

¹²² *See id.* at 53.

¹²³ *Id.* at 51–53.

meaningless in this context.¹²⁴ As a result, the “check” was an economically unreliable and potentially highly biased comparison.

Such a “check” disregards the accepted standard for “reasonableness” of a royalty expressed in the “willing seller and willing buyer” rule.¹²⁵ Microsoft’s damages theory entailed a lump-sum in the \$3 to \$7 million range.¹²⁶ At trial, Uniloc criticized this amount because it was a very small percentage of Microsoft’s total sales.¹²⁷ However, when the entire market value rule does not apply and comparable royalty rate benchmarks do not exist, a comparison with total Office and Windows revenue is irrelevant for assessing the reasonableness of Microsoft’s position, regardless of how small that ratio may be.¹²⁸

V. ANALYTICAL ROYALTIES

In the wake of *Lucent* and *Uniloc*, the question arises how a reasonable royalty might be determined when no comparable license is available. *Lucent* would still appear to require a “flexible” analysis of the *Georgia-Pacific* factors in this situation.¹²⁹ For convenience, we reproduce the factors here:

- 1) “The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.
- 2) The rates paid by the licensee for the use of other patents comparable to the patent in suit.
- 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.

¹²⁴ See *supra* Section IV.A.

¹²⁵ See *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970).

¹²⁶ *Uniloc II*, No. 2010–1035, slip op. at 52.

¹²⁷ *Id.* at 51–53.

¹²⁸ The jury may have been hopelessly confused at this point because the cross-examiner of Microsoft’s expert stated the effective royalty under Microsoft’s theory was 0.000035%, which the witness did not correct. *Id.* at 52. The actual rate was 1,000 times higher than this. *Id.*

¹²⁹ See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1335, 92 U.S.P.Q.2d (BNA) 1555, 1579–80 (Fed. Cir. 2009).

- 4) The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.
- 5) The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promotor [sic].
- 6) The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales.
- 7) The duration of the patent and the term of the license.
- 8) The established profitability of the product made under the patent; its commercial success; and its current popularity.
- 9) The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.
- 10) The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.
- 11) The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.
- 12) The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses 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 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.”¹³⁰

Factors 1–2 pertain to comparable licenses and therefore play no role when no comparable license is available. Factors 3–14 summarize various economic considerations that might be inputs to the hypothetical negotiation outlined in Factor 15.

One of the authors of this Article wrote about economic principles that are particularly useful for the *Georgia-Pacific* analysis when comparable licenses are not available.¹³¹ That approach is an extension of the method used by the Second Circuit in its *Georgia-Pacific* decision (which was based on the infringer’s expected profit and a benchmark for minimum required profitability when selling the infringing product).¹³² More broadly, that earlier article discusses the infringing activity as an investment project using the standard economic framework of expected Net Present Value (“NPV”) investment analysis.¹³³ The article asserts that the calculation of the expected return should consider all incremental expenses and the capital investment needed to commercialize the patent at issue.¹³⁴ In that model, the project must at least earn back its cost of capital to be economically worthwhile.¹³⁵ That requirement therefore implies an upper bound on a reasonable royalty.

¹³⁰ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120, 166 U.S.P.Q. (BNA) 235, 238 (S.D.N.Y. 1970).

¹³¹ See Epstein & Marcus, *supra* note 13, at 570–72.

¹³² *Id.* at 570–71; see *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc.*, 446 F.2d 295, 299, 170 U.S.P.Q. (BNA) 369, 371–72 (2d Cir. 1971).

¹³³ See Epstein & Marcus, *supra* note 13, at 559–60.

¹³⁴ *Id.* at 559.

¹³⁵ *Id.* at 560.

The investment framework also implies additional bounds on reasonable royalties because it requires a comparison of the profits from the infringing activity to the expected NPV of the infringer's "next-best" alternative project at the time of the hypothetical negotiation.¹³⁶ The next-best alternative may take the form of a "design around" using non-infringing technology. Because this alternative was not chosen initially, it presumably offers lower profits. But the next-best alternative can also include accepting some amount of reduced profits if the infringing feature is not incorporated in the product at all. The maximum willingness to pay for the relevant patent rights then depends on the profitability of the infringing activity relative to the next-best alternative. Similarly, a minimum amount can be determined that would be acceptable to a willing licensor.

For example, suppose a firm could engage in an infringing investment project with an expected NPV of \$10 million. But, the project would only have an expected NPV of \$9 million using non-infringing technology. In a hypothetical royalty negotiation, the infringer would be willing to pay a maximum royalty of \$1 million (either as a single upfront payment or as a running royalty on future sales with an equivalent present value).¹³⁷ The infringing feature may also be a component of a larger system that would still be marketable but less attractive without the feature. If the project would have an NPV of \$9.5 million without the feature, the infringer's maximum willingness to pay for a reasonable royalty would be further constrained to \$500,000.

This analysis identifies bounds on a maximum reasonable royalty that would be competitive in a hypothetical negotiation with a willing licensee. The outcome of the hypothetical negotiation should fall in the range between the minimum and upper bounds. Economics suggests that in the absence of additional evidence, the mid-point of this range is a plausible "bargaining solution."¹³⁸ It is noteworthy that the court in *Georgia-Pacific* also used assumed

¹³⁶ See *id.* at 557–58. In general, it is necessary only to consider alternative investment projects that can substitute for the patented article or process because in the absence of financial or other constraints, the infringer presumably is already undertaking all other profitable projects.

¹³⁷ See *id.* at 558.

¹³⁸ The mid-point would correspond to the "Nash" solution in economic bargaining theory. For further discussion of the Nash solution see Jonathan D. Putnam & Andrew B. Tepperman, *Bargaining and the Construction of Economically Consistent Hypothetical Licensing Negotiations*, LICENSING JOURNAL, Aug. 2004, at 9.

bargaining mid-points.¹³⁹ But the mid-point is not mandated *a priori*. The most appropriate point in the royalty range should reflect the relevant information available for a case-specific analysis.¹⁴⁰

The ability of the patent holder to extract value through the royalty is limited by the value of the infringer's alternative investment. We view this principle as providing a flexible and economically coherent framework to help reach a reasonable royalty consistent with the *Georgia-Pacific* factors, particularly in the absence of other benchmark licenses. The importance of the next-best alternative also has long been recognized in analyses of the reasonable royalty and in decided cases.¹⁴¹

¹³⁹ *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1141–42, 166 U.S.P.Q. (BNA) 235, 254–55 (S.D.N.Y. 1970).

¹⁴⁰ *Monsanto Co. v. Ralph* potentially illustrates a limitation of the hypothetical negotiation framework in this context. 382 F.3d 1374, 1383, 72 U.S.P.Q.2d (BNA) 1515, 1521 (Fed. Cir. 2004). If the minimum amount acceptable to the patent holder exceeds the infringer's maximum willingness to pay, then the bargaining range breaks down and the hypothetical negotiation would not be successful. See Putnam & Tepperman, *supra* note 138, at 13–14. In this case, a different approach would be needed to determine damages adequate to compensate for the infringement. Regarding the particular facts in *Monsanto*, we question whether the key problem was actually that the minimum the patent holder would accept exceeded the maximum the infringer was willing to pay. We read the decision as indicating the parties had a fundamental disagreement over the scope of the rights to be conveyed in the hypothetical negotiation. The decision discusses no finding or proof that the infringer would fail to be profitable for the use that Monsanto was willing to license.

¹⁴¹ See, e.g., Marcus B. Finnegan & Herbert H. Mintz, *Determination of Reasonable Royalty in Negotiating a License Agreement: Practical Pricing for Successful Technology Transfer*, 1 LICENSING L. & BUS. REPORT 13, 16 (1978) (“The maximum royalty that would normally be acceptable for a licensee to pay is that is equal to the cost of the next best available alternative.”); *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1349–55, 51 U.S.P.Q.2d (BNA) 1556, 1562–67 (Fed. Cir. 1999). In *Mars, Inc. v. Coin Acceptors, Inc.*, the Federal Circuit upheld a damages award in which the district court had awarded a reasonable royalty rate that exceeded “the cost of implementing the cheapest available, acceptable, noninfringing alternative,” but was discounted to reflect the fact that the infringer “did not have—but probably could have designed—an acceptable alternative.” 527 F.3d 1359, 1372–73, 87 U.S.P.Q.2d (BNA) 1076, 1086–87 (Fed. Cir. 2008).

VI. *i4i* v. MICROSOFT

We now turn to the \$200 million damages award in *i4i* to illustrate our analysis. Our discussion includes the role of the entire market value rule, the use of the 25 percent rule, and the implications of the profit concept used by the plaintiff's expert. The authors of this Article were not involved in *i4i*. The analysis that follows is based on information in the published decision and the publicly available trial testimony.

The royalty base at issue in the case came from versions of Microsoft Word in Office Professional 2003 and 2007 sold to businesses.¹⁴² At trial, the damages expert relied on a survey that indicated only 1.9% of the copies of the product were used in an infringing manner.¹⁴³ Therefore, instead of invoking the entire market value rule, the expert scaled down the royalty base to include only 1.9% of the relevant sales of Word.¹⁴⁴ We do not disagree that the base should be scaled down. But, as we will explain, the expert committed a different version of the scaling error criticized in *Lucent*. The reduced royalty base was still too large.

The plaintiff's expert used the 25 percent rule as a starting point.¹⁴⁵ He applied the rule to profits defined as 76.6% of the value of the assumed infringing sales.¹⁴⁶ This rate, which must be based on gross profits or something similar, is far higher than one based on operating income. The originator of the 25 percent rule, Robert Goldscheider, insisted that the rule is based on a royalty derived from operating income.¹⁴⁷ Operating income for Microsoft during the claimed damages period was approximately 35% of revenue.¹⁴⁸ Under Goldscheider's methodology, the calculated damages would drop from \$200 million to under \$100 million. The trial testimony does not reveal what justification, if any, the plaintiff's expert had for using the higher profit rate.

¹⁴² *i4i Ltd. P'ship v. Microsoft Corp.*, 598 F.3d 831, 840, 93 U.S.P.Q.2d (BNA) 1943, 1950 (Fed. Cir. 2010).

¹⁴³ *Id.* at 855, 93 U.S.P.Q.2d (BNA) at 1961.

¹⁴⁴ *Id.*

¹⁴⁵ *Id.* at 853, 93 U.S.P.Q.2d (BNA) at 1959–60.

¹⁴⁶ *Id.*

¹⁴⁷ Robert Goldscheider et al., *supra* note 41, at 131.

¹⁴⁸ *Microsoft Income Statement*, *supra* note 54.

This damages claim is also highly problematic because of the “but-for” price assumption the plaintiff’s expert used in the profit analysis.¹⁴⁹ The expert defined profit based on revenues that Microsoft *never made*. He assumed an average price of \$499 for the units in the royalty base.¹⁵⁰ But this price was the list price of a *non-Microsoft* product called XMetaL.¹⁵¹ The defendant’s expert testified that this benchmark was two times the price at which Word 2003 was actually sold.¹⁵²

The plaintiff’s theory appears to be that but for Microsoft’s infringement, Microsoft would have offered the XMetaL feature only in a separate version of Word sold at a much higher price.¹⁵³ That is, Microsoft would have price-discriminated based on the assumption that some customers “really needed” XMetaL and would be willing to pay a substantial premium for it.¹⁵⁴ However, the economic logic of this argument troubles us. Because Microsoft had the option of selling Word in this manner but chose not to do so, such a theory seems virtually refuted by the facts.

Regardless of why the expert considered XMetaL, his use of a but-for price that far exceeded the actual price would necessitate a “price elasticity” adjustment to reduce the quantity sold in calculating but-for revenue.¹⁵⁵ Basic economic principles dictate that a higher price will reduce quantity demanded even from a group of customers who “really needed” the infringing functionality.¹⁵⁶ The assumed royalty base of 1.9% of Word should be reduced

¹⁴⁹ See *i4i Ltd. P’ship*, 598 F.3d at 854, 93 U.S.P.Q.2d (BNA) at 1960.

¹⁵⁰ *Id.* at 853, 93 U.S.P.Q.2d (BNA) at 1959.

¹⁵¹ Transcript of Trial, May 13, 2009, Afternoon Session, at 136, *i4i Ltd. P’ship v. Microsoft Corp.*, 670 F. Supp. 2d 568 (E.D. Tex. 2009) (No. 6:07CV113), available at <http://www.i4ilp.com/court/transcripts/May%2013,%202009-%20Afternoon%20Session.pdf>.

¹⁵² Transcript of Trial, May 19, 2009, Morning Session, at 84, *i4i Ltd. P’ship v. Microsoft Corp.*, 670 F. Supp. 2d 568 (E.D. Tex. 2009) (No. 6:07CV113), available at <http://www.i4ilp.com/court/transcripts/May%2019,%202009-%20Morning%20Session.pdf>.

¹⁵³ See Transcript of Trial, May 13, 2009, *supra* note 151, at 57–58.

¹⁵⁴ *Id.* at 58.

¹⁵⁵ See Roy J. Epstein, *The Market Share Rule with Price Erosion: Patent Infringement Lost Profits Damages after Crystal*, 31 AIPLA Q.J. 1, 14–17 (2003).

¹⁵⁶ *Id.* at 16.

further, potentially significantly, but a price-elasticity adjustment was not performed. This consideration indicates to us that the royalty base was still too large for the damages calculation.

The reasonableness “check” used in *i4i* was, in some respects, more extreme than the one in *Uniloc*. The claimed royalty applied to a small fraction of Microsoft’s sales of Word sold to businesses.¹⁵⁷ At trial, however, the plaintiff’s expert compared the royalty to total profits from all versions of the entire Microsoft Office suite.¹⁵⁸ He concluded his testimony by noting that this royalty was less than 1.5% of this profit base.¹⁵⁹ In terms of the entire market value, it is likely that comparisons of this nature in future cases will require much more foundation.

There is a possibility that *i4i* could be retried. Should this occur, it will be interesting to see whether a new damages case will be required. Microsoft may face *Lucent*-style challenges to their use of other licenses where they paid relatively small lump-sum royalties.¹⁶⁰ For plaintiffs, how a royalty rate would be analyzed without the 25 percent rule, how the royalty base will be determined, and what but-for price will be used are issues that may have far-reaching and lasting methodological consequences.

VII. CONCLUSION

Uniloc and *Lucent* mark significant progress in the continuing evolution of economically rigorous damages analyses in patent damages cases. As a result of these decisions, expert testimony on the amount of a reasonable royalty should be subject to higher evidentiary standards. Benchmark licenses will require more careful proof of comparability, and the 25 percent rule will no longer be “on call” as a surrogate comparable license. Furthermore, it will no longer be sufficient to argue that a damages claim is economically justified by an uncritical check of its reasonableness based on the entire market value of a product when the patented feature is not the basis for the entire demand.

These decisions will likely make it more difficult in many cases to show the existence of comparable licenses. There are major pitfalls in using royalty

¹⁵⁷ *i4i Ltd. P’ship*, 598 F.3d 831 at 855, 93 U.S.P.Q.2d (BNA) at 1961.

¹⁵⁸ Transcript of Trial, May 13, 2009, *supra* note 151, at 88–89.

¹⁵⁹ *Id.* at 89.

¹⁶⁰ See Transcript of Trial, May 19, 2009, *supra* note 152, at 107.

rates from commercially compiled databases as substitutes for actual licenses. The logic of *Lucent* applies to the databases as well.

The value of a running royalty can always be expressed as a lump-sum. *Lucent* was correct to point out differences in these two license forms, but economically they can be reconciled. An analysis of comparables should be able to use both types of license. Moreover, we see no reason in economics to preclude use of a lump-sum as a fully compensatory reasonable royalty award.

When benchmark licenses are not available, we expect greater reliance on analysis of the infringing activity viewed as an investment project that must earn a rate of return. This framework evaluates the project relative to the return from the “next best” alternative investment and bases a reasonable royalty on the difference between them. The appellate court in *Georgia-Pacific* used the same fundamental logic in its final determination of a reasonable royalty.

A long line of cases shows how reasonable royalties can be determined by principled, fact-based analysis when no established or comparable royalties are available.¹⁶¹ The investment framework offers an economically coherent model that is consistent with the *Georgia-Pacific* factors and complements the analysis in *Uniloc* and *Lucent*. These tools should have great value in reducing the potential for biased and unreliable damage awards in future cases.

¹⁶¹ See *TWM Mfg. Co. Inc. v. Dura Corp.*, 789 F.2d 895, 895, 229 U.S.P.Q. (BNA) 895 (Fed Cir. 1986); *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1158, 197 U.S.P.Q. (BNA) 726, 731 (6th Cir. 1978); *Polaroid Corp. v. Eastman Kodak Co.*, 16 U.S.P.Q.2d (BNA) 1481 (D. Mass. 1990).