

# **ARE PATENT INFRINGEMENT AWARDS EXCESSIVE?: THE DATA BEHIND THE PATENT REFORM DEBATE**

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## **ABSTRACT:**

In their arguments for patent reform, proponents have cited cases with very large damage award amounts as evidence of pervasive “excessive” damages. This paper uses economic value of patents as a benchmark for comparison to conduct a systematic empirical analysis of patent damage awards to get a more complete understanding of the scope of the potential problem of “excessive” damage awards. We build a dataset consisting of information about damage awards in a comprehensive list of 340 cases decided in US federal courts between 1995 and 2008, supplemented with information about the litigants, their lawsuits and the economic value of the patents-at-issue. Our findings demonstrate that the largest awards dominating the conversation come from isolated cases: damage awards in the largest eight cases represent over 47% of total damages in our database. We build an econometric model based on our supplementary data that explains nearly 75% of the variation in observed damage award amounts, suggesting the awards are highly predictable and correlated with economic value of patents. We argue that the empirical results do not establish an argument for substantial patent reform based on a pervasive problem with “excessive” damages.

**Draft as of February 1, 2010**  
**Work in Progress, Comments Welcome**

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# ARE PATENT INFRINGEMENT AWARDS EXCESSIVE?: THE DATA BEHIND THE PATENT REFORM DEBATE

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## INTRODUCTION

The debate over “excessive” patent infringement damage awards has reached critical mass in recent years amidst patent reform efforts pending in Congress and evolving Federal Circuit case law. Specific legislative proposals have been put forth in both the House and Senate patent reform bills to alleviate the perceived concern that “damages awards . . . are too often excessive and untethered from the harm that compensatory damages are intended to measure.”<sup>1</sup> In addition, perhaps in response, a host of recent Federal Circuit decisions have revisited infringement damages jurisprudence and articulated novel and arguably more restrictive standards for calculating certain types of awards.<sup>2</sup> Yet, despite the controversy over “excessive” damages and the efforts to address them, very little systematic empirical evidence of “excessive” awards exists. In fact, very few empirical studies of patent infringement damage awards have been conducted, and those few to date have not focused on the incidence of truly “excessive” awards or their characteristics and causes.

This article directly addresses the question of “excessive” patent awards by systematically cataloguing the size of damage awards and exploring factors that contribute to the observed dollar amount of awards. Clearly, it is infeasible to make an independent determination

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<sup>†</sup> The authors are grateful foremost to F. Scott Kieff and Geoffrey J. Lysaught for their insights and comments during early development of previous outlines. The authors are also grateful to Christopher Barry, Vincent Torres, and Erik Skramstad at PricewaterhouseCoopers LLP for supplying the proprietary database on which this study was built. We also thank Josh Wright, Max Schanzenbach, Henry Butler, the Searle Civil Justice Institute Board of Overseers, and the Searle Civil Justice Institute Faculty Advisory Committee for their helpful comments on previous outlines. Elise Nelson and Matthew Sibery must also be thanked for their tireless research assistance.

Finally, the authors are grateful for the generous support of the Searle Center at Northwestern University School of Law and Microsoft Corporation.

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<sup>1</sup> Senate Report on the Patent Reform Act of 2009, S. Rep. 111-18, at 8 (May 12, 2009) [hereinafter “2009 Senate Report”].

<sup>2</sup> See *infra* Section I.E.

of damages, in each and every case based on the detailed evidence specific to the patents and parties in question. Therefore we refer to the economic literature on patent valuation to build a statistical model based on factors that have been shown to affect the economic value of patents. We analyzed 439 patent infringement damage awards granted by a judge or jury in United States district courts from 1995 to 2008, using the economic value of patents as a benchmark. These data were derived from a proprietary dataset owned by PricewaterhouseCoopers (“PwC”) and licensed to us for use in this study. The PwC dataset, which informed the proposed patent reform legislation,<sup>3</sup> contains over 1,300 final patent decisions in U.S. district courts from 1995 to 2008. We supplemented the PwC dataset by reviewing the original case records for data regarding the damage theories used, asserted patents, procedural disposition, as well as venue and party characteristics. We then coded these data for over 120 variables describing various aspects of the cases and awards, and analyzed them using standard statistical methods. The result is a comprehensive empirical evaluation of the nature and characteristics of patent infringement damage awards in U.S. district courts during this 14 year period.<sup>4</sup>

Our key findings are as follows:

- Based on empirical analysis of the distribution of awards, which used economic value of patents as a benchmark for comparison, it does not appear that there exists a systematic or pervasive problem of “excessive” patent damage awards.
- The large awards garnering media attention and scrutiny from policy makers seem to be idiosyncratic.
- The econometric model presented does a very good job in explaining the observed patent damage awards across the dataset.
- The largest awards in the dataset are not “excessive” outliers with respect to the empirical analysis in this study.

Section I analyzes the law of patent infringement damages, perceived problems and the most recent proposed legislative amendments to address them, prior empirical studies of patent infringement damages, and recent relevant case law from the Federal Circuit and certain district courts. Section II outlines the research methodology employed in this article and presents descriptive statistics about the dataset. Section III provides the results of the empirical analysis. Finally, Section IV concludes by discussing policy implications and questions for future study.

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<sup>3</sup> See, e.g., 2009 Senate Report at 9 n.40 (citing 2007 PwC Study).

<sup>4</sup> Our analysis may miss some patent infringement damages awards from cases where relevant information was not reported (though we believe the impact on our conclusions to be minimal). Further, as the dataset only contains awards in U.S. district courts before appeal, we cannot make definitive statements about the effect of the higher courts’ decisions on final patent damages awards. Caveats regarding our findings are discussed further in our concluding section.

## I. BACKGROUND

This Section provides relevant background information for our empirical analysis. Part A outlines the statutory and case law of patent infringement damages. Part B discusses the purported causes of perceived “excessive” awards that have been cited in the Patent Reform debate and Part C discusses the most recent proposed legislative reforms by the House and Senate. Part D surveys precedent empirical studies of patent infringement damages. Finally, Part E discusses recent federal case law that may affect calculation of patent damages in the future.

### A. *The Law of Patent Infringement Damages*

A patent confers the right to exclude others from making, using, selling, offering for sale or importing the invention defined by its claims.<sup>5</sup> Section 284 of the Patent Act of 1952 provides damages for infringement of patent rights. Pursuant to Section 284, a successful claimant is entitled to receive “damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer.”<sup>6</sup> The statute affords no further explanation of the composition or calculation of compensatory damages, which has given rise to extensive litigation and a library of legal scholarship. The following subsections describe the established legal framework for determining patent infringement damages.

#### 1. Framework

The two primary theories for awarding patent infringement damages are lost profits and reasonable royalties.<sup>7</sup> As its name suggests, lost profits awards the patentee<sup>8</sup> the profits that it lost as a result of the infringement.<sup>9</sup> To recover these damages, the claimant bears the burden of proving it is entitled to, and the amount of, lost profits.<sup>10</sup> By contrast, a claimant is entitled to a reasonable royalty upon proof of infringement, but nonetheless bears the burden of proving its claimed amount of reasonable royalty damages by a preponderance of evidence.<sup>11</sup> Properly

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<sup>5</sup> 35 U.S.C. § 271.

<sup>6</sup> § 284.

<sup>7</sup> *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978) (lost profits); *Georgia-Pacific Corp. v. U.S. Plywood Corp.* 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (reasonable royalties); *see also State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573 (Fed. Cir. 1989) (alternate methodologies); *see generally* RICHARD CAULEY, *WINNING THE PATENT DAMAGES CASE: A LITIGATOR’S GUIDE TO ECONOMIC MODELS AND OTHER DAMAGES STRATEGIES* (Oxford University Press 2008).

<sup>8</sup> Note that “patentee,” as used herein, refers to any party with standing to claim damages for patent infringement. This may include the original patent owner, assignees, or certain exclusive licensees.

<sup>9</sup> JANICE M. MULLER, *PATENT LAW* 498 (3rd ed. 2009).

<sup>10</sup> John M. Skenyon, Christopher S. Marchese & John Land, *Patent Damages Law and Practice* § 1:3 (Aug. 2008).

<sup>11</sup> Skenyon, Marchese & Land, *supra* note 10, § 1:3.

construed, a reasonable royalty is merely “the floor below which damages shall not fall.”<sup>12</sup> A claimant may elect whether to proceed on a theory of lost profits or claim reasonable royalty damages without seeking lost profits.<sup>13</sup> The following subsections address lost profit damages and reasonable royalty damages, as well as the theory of apportionment of damages and applicable standards of review.

## 2. Lost Profits

As the Supreme Court has stated, any theory damages for patent infringement focuses on the amount that the patentee has “suffered by the infringement.”<sup>14</sup> Causation is the key question in the lost profits analysis; as the Court phrased it: “[H]ad the Infringer not infringed, what would [claimant] have made?”<sup>15</sup> Necessarily, lost profit damages require some degree of competition between the patentee and the infringer.<sup>16</sup> To prove the amount of lost profit damages, the patentee must construct the counterfactual of what the patentee would have earned “but-for” the infringement.<sup>17</sup> Calculation of lost profits is therefore complex,<sup>18</sup> often involving expert analysis of market conditions, supply and demand dynamics,<sup>19</sup> profit margins and incremental production costs,<sup>20</sup> as well as other case-specific factors.<sup>21</sup>

Included under the rubric of lost profit damages is compensation for several distinct types of economic injuries, including: lost sales,<sup>22</sup> price erosion,<sup>23</sup> collateral sales,<sup>24</sup> future lost profits,<sup>25</sup> injury to goodwill and business reputation,<sup>26</sup> increased expenses,<sup>27</sup> and impaired

<sup>12</sup> Bandag, Inc. v. Gerrard Tire Co., 704 F.2d 1578, 1583 (Fed. Cir. 1983).

<sup>13</sup> *Id.*

<sup>14</sup> Aro Mfg. Co. v. Convertible Top Co., 377 U.S. 476, 507 (1964) (“The question to be asked in determining damages is ‘how much had the Patent Holder and Licensee suffered by the infringement. And that question (is) primarily: had the Infringer not infringed, what would Patent Holder-Licensee have made?’”).

<sup>15</sup> *Id.*

<sup>16</sup> Competition between the patentee and infringer can occur in a variety of ways. In the simplest case, the parties compete directly with one another in the relevant market, and the patented product and infringing product are direct substitutes. However, lost profit damages permits recovery under different competitive circumstances as well. A patentee can also recover lost profits on sales of a different product than its product covered by the patent that was infringed. For example, if the patentee holds a patent on its product being sold as well as a patent on possible substitutes, and the defendant infringes the patent on the substitute, the patentee can recover lost sales of its sale product. See Skenyon, Marchese & Land, *supra* note 10, § 1:7.

<sup>17</sup> Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1545 (Fed. Cir. 1995) (“[The lost profits analysis] surely states a ‘but-for’ test.”).

<sup>18</sup> Skenyon, Marchese & Land, *supra* note 10, § 1:9.

<sup>19</sup> *Id.* at § 2:15.

<sup>20</sup> *Id.* at § 2:14.

<sup>21</sup> See generally Cauley, *supra* note 7.

<sup>22</sup> Muller, *supra* note 9, at 498; See Panduit, *infra* note 32 (listing four factors for determining whether lost profits are an appropriate measure for patent infringement damages).

<sup>23</sup> Skenyon, Marchese & Land, *supra* note 10, § 1:8.

<sup>24</sup> *Id.* at § 1:15.

<sup>25</sup> *Id.* at § 1:8.

<sup>26</sup> *Id.*

growth.<sup>28</sup> With each, however, the patentee must establish causation of the harm due to the infringement.<sup>29</sup> Importantly, “the purpose of compensatory damages is not to punish the infringer, but to make the patentee whole.”<sup>30</sup> Therefore, analysis must take into account all relevant factors, and assess the difference between patentee’s pecuniary condition after the infringement, and what this condition would have been if the infringement had not occurred.<sup>31</sup>

A commonly-used methodology for calculating lost profit damages is known as the *Panduit* analysis.<sup>32</sup> This framework considers total market demand for the patented product, including the availability of acceptable non-infringing substitutes. It further assesses the patentee’s manufacturing and marketing capacity to exploit increased demand in the absence of infringement. On this basis, it evaluates the amount of additional profit the patent owner would have earned but-for the infringement.<sup>33</sup>

### 3. Reasonable Royalties

Proof of infringement entitles a patentee to reasonable royalty damages, although the patentee still bears the burden of establishing the amount of such damages.<sup>34</sup> Under Section 284, reasonable royalty damages represent “the floor below which damages shall not fall.”<sup>35</sup> There are three established theories for a plaintiff to prove the amount of reasonable royalty damages. As recently articulated by the Federal Circuit:

A reasonable royalty can be calculated from an established royalty, the infringer’s profit projections for infringing sales, or a hypothetical negotiation between the patentee and infringer based on the factors in [*Georgia-Pacific*].<sup>36</sup>

The third, “hypothetical negotiation” or “willing licensor-willing licensee” approach, is widely recognized as the most common of the reasonable royalty methodologies.<sup>37</sup> This assesses

(cont’d from previous page)

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> *Id.* at § 1:3.

<sup>30</sup> *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1223 (Fed. Cir. 1995)

<sup>31</sup> *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) (*quoting* *Yale Lock Mfg. Co. v. Sargent*, 117 U.S. 536, 552 (1886)).

<sup>32</sup> *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978).

<sup>33</sup> *Skenyon, Marchese & Land, supra* note 10, § 1:8.

<sup>34</sup> *Id.* at § 1:12. Note, however, that “[c]ourts have recognized that a reasonable royalty analysis necessarily involves an element of approximation and uncertainty. The infringer must bear the burden and the entire risk where it is impossible to make a mathematical or estimated apportionment between infringing and non-infringing items. In other words, uncertainty is resolved against the infringer where the infringer’s actions have caused the evidentiary imprecision.” *Id.*

<sup>35</sup> *Bandag, Inc. v. Gerrard Tire Co.*, 704 F.2d 1578, 1583 (Fed. Cir. 1983).

<sup>36</sup> *WordTech Sys., Inc. v. Integrated Network Solutions, Inc.*, 609 F.3d 1308, 1319 (Fed.Cir. 2010), (*citing* *Georgia-Pacific Corp. v. U.S. Plywood Corp.* 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970)).

the factors that would have influenced negotiations between the parties in an attempt to determine the royalty that would have been agreed to for licensing the patents in suit in the absence of infringement.<sup>38</sup> The calculation proceeds by determining a rate of royalty, either as a percentage or per-unit value, and multiplying that by a relevant base amount, such as the infringer's sales revenue or number of units sold. The Federal Circuit has recognized that the analysis "necessarily involves an element of approximation and uncertainty."<sup>39</sup> In other opinions, and perhaps more aptly, the Federal Circuit has characterized the task as "a difficult judicial chore, seeming often to involve more the talents of a conjurer than those of a judge."<sup>40</sup> Case law for determining the reasonable royalty rate and base, respectively, are discussed below.

The second approach of considering the "infringer's profit projections for infringing sales" is sometimes called the "analytical" approach,<sup>41</sup> and is based on projections for the infringing item at the time the infringement began.<sup>42</sup> This involves "subtract[ing] the infringer's usual or acceptable net profit from its anticipated net profit realized from sales of infringing devices."<sup>43</sup> A portion of the infringer's profit projections are then allocated to the patentee, to represent what the infringer would have paid under a reasonable license.<sup>44</sup>

Two points are worth noting. First, the term "reasonable royalty" is sometimes used as a catch-all for any award that is not lost profits, including when a patentee attempts to prove its claimed amount of lost profit damages but fails to prove such amount.<sup>45</sup> The resulting so-called "reasonable royalty" may differ from what would be calculated using the established reasonable royalty methodologies.<sup>46</sup>

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<sup>37</sup> See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009) ("The second, more common approach, called the hypothetical negotiation or the 'willing licensor-willing licensee' approach, attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began.").

<sup>38</sup> *Id.* at 1324 ("The hypothetical negotiation tries, as best as possible, to recreate the ex ante licensing negotiation scenario and to describe the resulting agreement.").

<sup>39</sup> *Id.* at 1324-25, (quoting *Unisplay v. Am. Elec. Sign Co.*, 69 F.3d 512, 517 (Fed. Cir. 1995)).

<sup>40</sup> *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 869 (Fed. Cir. 2010), (quoting *Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988)).

<sup>41</sup> Skenyon, Marchese & Land, *supra* note 10, § 1:13.

<sup>42</sup> *Id.*

<sup>43</sup> *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 899 (Fed. Cir. 1986).

<sup>44</sup> Skenyon, Marchese & Land, *supra* note 10, § 3:4.

<sup>45</sup> See *Id.* § 1:12; See Mark A. Lemley and Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 *Tex. L. Rev.* 1991, 2030 (2007).

<sup>46</sup> As mentioned above, the "reasonable royalty" under 35 U.S.C. § 284 is the "floor below which damages shall not fall," and the amount awarded under failed proof of lost profits damages must not be less, though could be *more*, than the theoretical limit of "a reasonable royalty for the use made of the invention by the infringer." § 284. See Skenyon, Marchese & Land, *supra* note 10, § 1:12 (discussing the confusion regarding calling an award for which proof of lost profits was not made a "reasonable royalty"); see also *id.* Lemley & Shapiro at 2030 (finding only fifty-eight true "reasonable royalty" cases in their dataset, despite many more damages awards in which proof of lost profits was not made).

Second, under the three theories for calculating “reasonable royalty” amounts, the first approach (basing an award on an established royalty) overlaps somewhat with the third (the hypothetical negotiated royalty), given that one of the *Georgia-Pacific* factors for determining the hypothetical royalty instructs the fact-finder to consider actual royalties earned “for the licensing of the patent in suit.”<sup>47</sup>

#### 4. Royalty Rate: *Georgia-Pacific* Factors

The determination of the rate of reasonable royalty considers all factors applicable to hypothetical *ex ante* bilateral negotiations between the patentee and infringer. The widely-cited *Georgia-Pacific* case articulated an inclusive list of fifteen possible factors.<sup>48</sup> Importantly, not all factors apply to a given case;<sup>49</sup> indeed, the Federal Circuit has characterized the list provided in *Georgia-Pacific* as “comprehensive” but “unprioritized and often overlapping.”<sup>50</sup>

There is also a certain degree of conceptual redundancy in the fifteen *Georgia-Pacific* factors. For ease of reference, the factors are often grouped into the following three general categories of inquiries:

1. The patented invention’s significance with respect to the product and market demand;
2. The existing royalty rates that people have been willing to pay for the patented invention or for similar technologies in the industry; and
3. Expert testimony regarding the patent’s value.<sup>51</sup>

Certain assumptions concerning the structure of the hypothetical license that would have been negotiated also inform the *Georgia-Pacific* analysis. These include such details as whether

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<sup>47</sup> *Georgia-Pacific Corp. v. US Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y.1970); *see also ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 869 (Fed. Cir. 2010) (emphasizing that this factor “considers only past and present licenses to the actual patent and the actual claims in [the present] litigation”). Notably, the first and third methodologies articulated above are not identical. The *Georgia-Pacific* factors collectively apply to determining a royalty rate to which hypothetical negotiating parties would have agreed, which is then multiplied by a royalty base to calculate the amount of damages. By contrast, the “established royalty” methodology looks solely to actual amounts received by the plaintiff for licensing the patents in suit under similar circumstances.

<sup>48</sup> *Georgia-Pacific*, 318 F. Supp. at 1120.

<sup>49</sup> *Wright v. United States*, 53 Fed.Cl. 466, 475 (2002) (“*The Georgia-Pacific* factors, however, serve primarily as a general guide to the reasonable royalty rate inquiry. ‘While the *Georgia-Pacific* factors are often probative of a reasonable royalty rate, the court is neither constrained by them nor required to consider each one where they are inapposite or inconclusive.’” (citing *Brunswick Corp. v. United States*, 36 Fed. Cl. 204, 211-12 (1996)); *see also* Skenyon § 1:12 (“Importantly, *no* single accepted method exists for how a court must determine ‘reasonable royalty’ damages.”) (emphasis in original).

<sup>50</sup> *ResQNet.com*, 594 F.3d at 869.

<sup>51</sup> Lemley and Shapiro, *supra* note 45, at 2018.

it would be exclusive or non-exclusive,<sup>52</sup> what would be its geographical scope and duration,<sup>53</sup> and whether it would be a paid-in-full amount or a running royalty.<sup>54</sup>

Given the prevalence of its use in assessing reasonable royalty damages, and certain blockbuster verdicts that have resulted from such use, the *Georgia-Pacific* analysis has come under increasing scrutiny in the Patent Reform debate.<sup>55</sup> As discussed below, these factors have also been the focus of certain recent Federal Circuit cases, the opinions of which have arguably articulated heightened requirements for the applicability and type of evidence required under certain factors.<sup>56</sup>

## 5. Royalty Base: Apportionment of Damages

Perhaps more controversial than the method of determining the royalty rate, apportionment of damages has engendered outcry and legislative as well as judicial responses. Apportionment comes into play where the product in question incorporates multiple components, including the patented invention as well as other features. Apportionment is the default rule under such circumstances, and requires that the patentee recover damages based solely on the value of the patented invention—market value attributable to other features must be excluded from the basis of the patentee’s recovery.<sup>57</sup> The exception to this principle is known as the “entire market value rule” (“EMVR”), which “allows for the recovery of damages based on the value of an entire apparatus containing several features.”<sup>58</sup> In order for the EMVR to apply, the patentee bears the burden of proving that the patented feature constitutes the “basis for consumer demand” of the entire infringing product.<sup>59</sup>

Apportionment, and the EMVR, apply in both lost profits and reasonable royalty analyses. In a lost profits calculation, apportionment requires that the patentee only recover lost profits attributable to the patented component, whereas the EMVR permits recovery of lost profits of unpatented components sold in combination with it.<sup>60</sup>

<sup>52</sup> *Georgia-Pacific*, 318 F.Supp. at 1120 (“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.”); Skenyon, Marchese & Land, *supra* note 10, § 1:14.

<sup>53</sup> *Id.*

<sup>54</sup> Lemley & Shapiro, *supra* note 45, at 2018-19.

<sup>55</sup> 2009 Senate Report, *supra* note 1, at 9 n.41 (“It is difficult for the Committee (let alone a lay juror) to recite all 15 of the [*Georgia-Pacific*] factors without reading them in print.”)

<sup>56</sup> *See infra* Section I.E.

<sup>57</sup> *See* *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1337 (Fed. Cir. 2009), (quoting *Garretson v. Clark*, 111 U.S. 120, 121 (1884) (“The patentee . . . must in every case give evidence tending to separate or apportion the defendant’s profits and the patentee’s damages between the patented feature and the unpatented features.”)).

<sup>58</sup> *Lucent*, 580 F.3d at 1336, (quoting *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 901 (Fed. Cir. 1986)).

<sup>59</sup> *Rite-Hite Corp. v. Kelley Co., Inc.*, 56 F.3d 1538, 1549 (Fed. Cir. 1995) (internal quotations omitted).

<sup>60</sup> *American Seating v. USSC Grp., Inc.*, 514 F.3d 1262 (2008), (citing *Rite-Hite*, 56 F.3d at 1550).

In a reasonable royalty analysis, apportionment may be applied to determine either the royalty rate, the base, or both. Apportionment may be applied to limit the royalty base to the “value of the patented invention, when it is but one part or feature among many.”<sup>61</sup> Alternately, or in addition, *Georgia-Pacific* factor thirteen considers 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.”<sup>62</sup>

Given the fact that the final reasonable royalty award is determined by multiplying the rate by the base, an appropriate amount may be obtained by applying apportionment to only a single variable to a sufficient degree. As the Federal Circuit recently explained, “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.”<sup>63</sup> Indeed, if appointment of the royalty base were required (as has been proposed by the House version of the Patent Reform bill), it could be necessary as a corollary to prevent apportionment of the royalty rate, so as to avoid undercompensating the patent-holder for its actual damages.<sup>64</sup>

## 6. Standards of Review

The amount of damages awarded for patent infringement is a question of fact, to be decided by the jury or, in a bench trial, by the judge as fact-finder. A bench award of damages is reviewed on appeal for “an erroneous conclusion of law, clearly erroneous factual findings, or a clear error of judgment amounting to an abuse of discretion.”<sup>65</sup> By contrast, jury awards, which have been a focal point in the “excessive damages” debate, are accorded special deference.<sup>66</sup> The Federal Circuit has articulated the standard of review as follows:

The jury’s award of damages is entitled to deference. Specifically, the jury’s damage award must be upheld unless the amount is grossly excessive or monstrous, clearly not supported by the evidence, or based only on speculation or guesswork.<sup>67</sup>

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<sup>61</sup> *Lucent*, 580 F.3d at 1337.

<sup>62</sup> *Georgia-Pacific Corp. v. US Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y.1970).

<sup>63</sup> *Lucent*, 580 F.3d at 1338-39.

<sup>64</sup> *See, e.g.*, John W. Schlicher, *Patent Damages, the Patent Reform Act, and Better Alternatives for the Courts and Congress*, 91 J. Pat. & Trademark Off. Soc’y 19 (2009).

<sup>65</sup> *Amstar Corp. v. Envirotech Corp.*, 823 F.2d 1538, 1542 (Fed. Cir.1987), citing *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 898 (Fed. Cir. 1986), *cert. denied*, 479 U.S. 852 (1986).

<sup>66</sup> *Monsanto Co. v. McFarling*, 488 F.3d 973, 981 (Fed. Cir. 2007) (“In reviewing damages awards in patent cases, we give broad deference to the conclusions reached by the finder of fact.”).

<sup>67</sup> *See Monsanto Co. v. Ralph*, 382 F.3d 1374, 1383 (Fed. Cir. 2004) (internal citations omitted).

The “grossly excessive or monstrous” language has been decried by proponents of sweeping reforms of the patent damages statute.<sup>68</sup> However, this standard is not unique to patent cases, and the phrase “grossly excessive or monstrous” itself derives from appellate opinions reviewing jury determinations of non-patent awards.<sup>69</sup> Moreover, despite the deference that the words connote, appellate review of patent jury awards can be highly exacting. A series of recent decisions, as discussed below, have emphasized that a plaintiff must produce “sound economic proof of the nature of the market and likely outcomes with infringement factored out of the economic picture in *all* damages calculations.”<sup>70</sup>

### B. *Perceived Problems with Patent Damages Law*

A variety of perceived problems with patent law have been raised in the media, scholarship, testimony before Congress, and other forums. This Section outlines the principal concerns and points out relevant gaps where the empirical record lacks sufficient definition to support or refute these.

A major focal point has been reasonable royalty damages calculated using the *Georgia-Pacific* factors. However, there is limited empirical evidence of reasonable royalty awards, or even their incidence. One cited empirical study found that “[s]ince 2000, reasonable royalties have overtaken lost profits as the most frequent basis of damage awards in patent cases.”<sup>71</sup> Yet, another cited study identified only 58 reported reasonable royalty awards from 1984 to 2005.<sup>72</sup> To the extent these figures, taken together, indicate that reasonable royalty damages have only recently gained popularity, the recent case law refining their application may obviate the need for legislative reform.<sup>73</sup>

Concerns over “excessive” damages have captured popular attention and have featured prominently in the legislative debates. For example one House Report asserts as a matter of fact that “current litigation practices often produce a royalty award substantially in excess of a reasonable royalty.”<sup>74</sup> A Senate Report baldly claims that “[n]o doubt several alarming cases . . . represent the tip of the iceberg” of excessive awards.<sup>75</sup> Another claims that “damages awards . . . are too often excessive and untethered from the harm that compensatory damages are intended to

<sup>68</sup> See, e.g., H.R. Rep. No. 110-314, at 25 (2007) (quoting the “grossly excessive or monstrous” standard) [hereinafter *2007 House Report*].

<sup>69</sup> See *Los Angeles Memorial Coliseum Commission v. National Football League*, 791 F.2d 1356, 1360 (9th Cir. 1986), *cert. denied*, 484 U.S. 826 (1987) (an antitrust case).

<sup>70</sup> *IP Innovation LLC v. Red Hat, Inc.*, 2010 WL 986620 at \*1 (E.D. Tex. Mar. 2, 2010) (C.J. Rader sitting by designation) (internal citations omitted) (granting in part defendant’s motion to exclude plaintiff’s damages expert’s testimony and report on reasonable royalty damages), quoting *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1350 (Fed. Cir. 1999).

<sup>71</sup> 2007 PwC Study, *infra* note 95, at 22 (2007).

<sup>72</sup> Lemley & Shapiro, *supra* note 45, at 2030.

<sup>73</sup> *Id.* at 2031.

<sup>74</sup> 2007 House Report, *supra* note 68, at 26.

<sup>75</sup> *Id.* at 12.

measure.”<sup>76</sup> Despite these assertions, there is no empirical evidence that damages are systematically “excessive,” or even that the “alarming cases” represent statistical outliers of an appropriate damages distribution.

Jury errors in calculating reasonable royalty damages are also commonly cited concerns. It has been argued that the “current damages statute is vague and provides little guidance to judges or juries determining the proper damages award, particularly when the award is based on the reasonable royalty standard.”<sup>77</sup> The *Georgia-Pacific* framework is seen as particularly problematic, due to its complexity.<sup>78</sup> Alleged underutilization of apportionment of damages is another purported issue, and it has been argued that “this can lead to excessive damages awards.”<sup>79</sup> However, no data confirming a correlation between “excessive” damages and either reasonable royalties or a failure to apportion damages currently exists. One large-scale empirical study of jury verdicts versus bench awards found that the median jury awards in recent years have been on average five times the median amounts of bench awards.<sup>80</sup> Yet, this does not confirm that the jury verdicts are in fact “excessive.”<sup>81</sup>

### C. Proposed Reforms

The House and Senate bills of the Patent Reform Act of 2009 take drastically different approaches with respect to patent infringement damages. The House bill, H.R. 1260, proposes a controversial method of “prior art subtraction” to *substantively* limit damage awards. The Senate bill, S. 515, adopts a new *procedural* approach, under which the judge will act as a “gatekeeper” of evidence relating to damage theories.

House bill H.R. 1260 proposes to limit reasonable royalty damages to a patent’s “specific contribution over the prior art,”<sup>82</sup> and has been dubbed “prior art subtraction.” It would require a

<sup>76</sup> 2009 Senate Report, *supra* note 1, at 8.

<sup>77</sup> 2009 Senate Report, *supra* note 1, at 9; *see also* Senate Report on the Patent Reform Act of 2007, S. Rep. 110-259, at 11-12 (January 24, 2008) (“Juries are given little useful guidance in calculating that reasonable royalty”) [hereinafter “2007 Senate Report”]; 2007 House Report, *supra* note 54, at 25 (“Courts often simply provide juries all of *Georgia-Pacific*’s 15 possible factors for assessing a reasonable royalty and then direct the juries to determine a reasonable royalty without much other guidance.”).

<sup>78</sup> *See id.* 2009 Senate Report.

<sup>79</sup> 2007 House Report, *supra* note 68, at 27.

<sup>80</sup> 2009 Senate Report, *supra* note 1, at 9 n.40, *citing* 2007 PwC Study.

<sup>81</sup> The 2007 Senate Report also contains anecdotal arguments against either purported cause of “excessive” damages. The minority objections of Senators Feingold and Coburn argue as follows: The truth is that, with the exception of a few possibly excessive awards, current law on damages is working. The fifteen *Georgia-Pacific* factors, which the courts have adopted, preserve flexibility for jury calculations by covering a wide range of real business circumstances. The royalty base may exclude the value added by an infringer and include the full value of products and services in demand principally due to the patented invention. *See* 2007 Senate Report, *supra* note 77, at 68.

Like the assertion that patent damages are systematically excessive, the claim that the system is “working” is similarly unsupported by empirical evidence.

<sup>82</sup> H.R. 1260, 111th Cong. § 5 (2009) (proposed amendment to 35 U.S.C. § 284 for damages).

restrictive form of apportionment to be applied in all cases involving reasonable royalty damages. Proponents have argued that prior art subtraction would address the under-utilization of apportionment<sup>83</sup> and, particularly with component technologies, prevent “excessive” damages that may result.<sup>84</sup> By contrast, opponents have called it undercompensatory,<sup>85</sup> a “judicial nightmare,” as it would require a pretrial determination of the patent’s value relative to the prior art,<sup>86</sup> inappropriate for inventions that consist primarily of novel uses or configurations of prior art components,<sup>87</sup> and otherwise impracticable.<sup>88</sup>

Senate bill S. 515, as recently amended on March 4 of this year, proposes to augment the judge’s role as evidentiary gatekeeper by requiring the judge to exclude all methodologies and factors used in calculating infringement damages that are not supported by “sufficient” evidence.<sup>89</sup> This proposal is premised on the theory that juries routinely misapply the law of patent damages, and improperly base awards on factors or methodologies for which there is insufficient supporting evidence.<sup>90</sup> The “gatekeeper” proposal presents a significant departure from current trial procedure. Under the Federal Rules of Evidence, evidence will be admitted if it is relevant.<sup>91</sup> By contrast, the sufficiency standard requires the judge to exclude any factor or methodology pretrial if no reasonable jury would find for the party on that issue.<sup>92</sup> The judge must then exclude all evidence pertaining to these damage theories.<sup>93</sup>

It is important to note that a shift to an exclusionary default rule could have negative side effects, including a significant increase in litigation costs. Pretrial proceedings would likely

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<sup>83</sup> 2007 House Report, *supra* note 68, at 27 (“[Apportionment] appears to be under-utilized. This can lead to excessive damages awards.”).

<sup>84</sup> Testimony of Mark A. Lemley, Stanford Law School, before the Senate Committee on the Judiciary (March 10, 2009), at \*7 (“Congress should implement the apportionment principle in a way that prevents patentees from manipulating their damages by changing the way they claim their invention . . . [e.g., claiming] the whole car and not just the windshield wiper.”).

<sup>85</sup> Scott Shane, *The Likely Adverse Effects Of An Apportionment-Centric System Of Patent Damages* (Jan. 14, 2009).

<sup>86</sup> Richard Cauley, *Patent Reform 2009: More on Damages*, PATENTLY-O, Mar. 13, 2009, <http://www.patentlyo.com/patent/2009/03/patent-reform-2009-more-on-damages.html>.

<sup>87</sup> William Rooklidge, “Reform” of Patent Damages: S. 1145 and H.R. 1908 (2008); see also William Rooklidge, *Patent Reform Damages Provision Violates Seventh Amendment*, PATENTLY-O, Mar. 15, 2009, <http://www.patentlyo.com/patent/2009/03/rooklidge-patent-reform-damages-provision-violates-seventh-amendment.html>.

<sup>88</sup> Schlicher, *supra* note 64, at 26-27 (2009) (“Starting with total revenue does not mean that actual awards were necessarily out of proportion to the economic value of the inventions. If the rate was sensibly determined, the actual awards may be sensible.”).

<sup>89</sup> Examples of such methodologies would include lost-profits or reasonable royalties. Examples of factors used in the calculation of infringement damages include the individual *Panduit* or *Georgia-Pacific* factors.

<sup>90</sup> See 2009 Senate Report, *supra* note 1, at 9 (“Commentators have correctly questioned whether juries are being properly advised on the evidence and factors to consider when determining damages.”).

<sup>91</sup> F.R.E. 402.

<sup>92</sup> 2009 Senate Report, *supra* note 1, at 10.

<sup>93</sup> S. 515 § 4 (proposed amendment to 35 U.S.C. § 284(b)(1)). Notably, one critic has argued that this reform would violate the Seventh Amendment protection of jury decisions. See Rooklidge, *Patently-O.com*, *supra* note 87.

become lengthier and more contentious, and each decision by the judge to exclude or admit evidence or particular theories could be the basis of an appeal seeking reversal of the damage award. The benefits of the proposal are also unclear, and some have argued that current pretrial procedure and post-verdict judicial review obviate the need for this proposal.<sup>94</sup>

#### D. Previous Empirical Studies

Certain previous studies have undertaken large-scale analysis of patent damage awards. A 2007 PricewaterhouseCoopers study (the “2007 PwC Study”) finds a fivefold disparity between median jury verdicts and median bench awards.<sup>95</sup> A 2008 update to the study (the “2008 PwC Study”) provides supplementary data and analysis.<sup>96</sup> A 2009 update to the study (the “2009 PwC Study”) provides supplementary data and new analysis of the impact of nonpracticing entities (“NPEs”) engaging in patent litigation.<sup>97</sup> A 2007 study by Lemley & Shapiro addresses reasonable royalty awards and apportionment in multi-component products.<sup>98</sup> One recent study by Allison, Lemley & Walker address patent litigation in different industry sectors, and find that litigation rates and litigant characteristics vary significantly by industry.<sup>99</sup> Finally, Opderbeck conducts empirical analysis that questions the assumption that patent infringement awards are systematically excessive.<sup>100</sup>

##### 1. 2007 PwC Study

The 2007 PwC Study aggregated bench awards and jury verdicts in the years 1980 to 2005. It contained two findings relevant to the present focus. First, it found that median jury awards were on average five times larger than median awards in bench trials, during the years studied.<sup>101</sup> Second, the study provided trend data on royalty rates, finding that average awarded royalty rates have declined in recent years.<sup>102</sup>

The analytic methodology utilized in the 2007 PwC Study is as follows:<sup>103</sup>

<sup>94</sup> Erin Coe, *Patent Damages Best Left to the Courts: Chief Judge*, IP Law 360, June 2, 2009.

<sup>95</sup> PricewaterhouseCoopers, 2007 Patent and Trademark Damages Study [hereinafter “2007 PwC Study”].

<sup>96</sup> PricewaterhouseCoopers, A Closer Look—Patent Litigation Study: Damages Awards, Success Rates and Time-To-Trial (2008) [hereinafter “2008 PwC Study”].

<sup>97</sup> PricewaterhouseCoopers, A Closer Look—Patent Litigation Trends and the Increasing Impact of Nonpracticing Entities (2009) [hereinafter “2009 PwC Study”].

<sup>98</sup> Lemley and Shapiro, *supra* note 45.

<sup>99</sup> John R. Allison, Mark A. Lemley & J.H. Walker, *Trolls on Top?*, 158 U.Penn.L.Rev. 1 (studying litigation rates of patents in specific industries). However, this study does not address the outcomes of the litigation, but notes “that is the subject of a companion piece by the authors, tentatively entitled Patent Quality and Risk Aversion Among Repeat Patent Litigants.” *Id.* at 5 n. 14.

<sup>100</sup> David W. Opderbeck, *Patent Damages Reform and the Shape of Patent Law*, 89 B.U.L.Rev. 127 (2009).

<sup>101</sup> 2007 PwC Study, *supra* note 95, at 14.

<sup>102</sup> *Id.* at 22-25.

<sup>103</sup> *Id.* at 29.

- “PricewaterhouseCoopers identified legal records in two Westlaw databases, Federal Intellectual Property—Cases (FIP-CS) and Combined Jury Verdicts and Settlements (JV-ALL), from 1980 through June 2006.”
- “The study included . . . [1,367] unique US Federal District Court [patent] cases . . . and 29 cases that included both patent and trademark issues . . . and [273] unique CAFC [patent] cases . . . 7 cases that included both patent and trademark issues.”
- “Jury verdict information varied by jurisdiction and was particularly limited during the early and mid-1980s.”

## 2. 2008 PwC Study

The 2008 PwC Study contains an updated dataset, containing data on damage awards from 1980-2007.<sup>104</sup> Furthermore, additional analysis is provided. Notably, the study lists nine “landmark” awards from 2005-2007 that exceeded \$100M. The study also lists six of the largest awards since 1985.<sup>105</sup>

The 2008 PwC Study considers the incidence of bench versus jury decisions, finding “a marked increase in jury trials since the 1980s, with the shift becoming more evident since 1995.”<sup>106</sup> The study attributes this increase to a “stark contrast” in plaintiff success rates between bench and jury trials, and median jury awards that are “significantly larger” than median bench awards. The study finds that “[j]ury success rates have consistently outperformed their bench counterparts for every year since 1995.”<sup>107</sup> Additionally, “[r]ecent awards by juries have been running several multiples of the amounts awarded by judges.”<sup>108</sup>

The 2008 PwC Study further performs some initial industry-specific analysis. For instances, the study calculates the median damage award in ten industry sectors.<sup>109</sup> The authors do not explicitly describe their methodology for identifying the industry sectors. The study also ranks judicial districts according to median damage awards from 1995 to 2007. It finds that “[c]ertain federal district courts . . . continue to be more favorable to patent holders.”<sup>110</sup> Finally, the 2008 PwC Study considers appeal rates and appellate outcomes (affirmance, reversal, or modification).

## 3. 2009 PwC Study

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<sup>104</sup> 2008 PwC Study, *supra* note 96, at 1.

<sup>105</sup> *Id.* at 3-4.

<sup>106</sup> *Id.* at 4.

<sup>107</sup> *Id.* at 5.

<sup>108</sup> *Id.* at 6.

<sup>109</sup> *Id.* at 3.

<sup>110</sup> *Id.* at 14.

The 2009 PwC Study contains an updated dataset, including information on damage awards from 1980 to 2008.<sup>111</sup> Furthermore, new analysis is conducted on NPEs involved in patent litigation. The study defines an NPE as “an entity that does not have the capabilities to design, manufacture, or distribute products that have features protected by the patent.”<sup>112</sup>

Among its key findings, the 2009 PwC Study determined that the median patent infringement damage award for NPE patent-holders was more than three times that of practicing entities during the period from 2002 to 2009.<sup>113</sup> Whereas the median during this period for practicing entities was \$3.4 million, it was \$12 million for NPEs (in inflation-adjusted numbers); by contrast, from 1995 to 2001, the medians were roughly equal for NPEs and practicing entities alike.<sup>114</sup> Also, like the 2008 PwC Study, this iteration also lists the “landmark” awards from 2005-2007 that exceeded \$100M, and further indicates the entity status of the patentee.<sup>115</sup>

In addition, the 2009 PwC Study reports the incidence of bench versus jury decisions and median bench versus jury damage awards categorized by type of entity.<sup>116</sup> It further considers the composition of types of damage awards (price erosion, lost profits or reasonable royalty) from 1995 to 2001 and 2002 to 2008, respectively, though it excludes NPE data from this analysis due to the fact that NPEs are generally not entitled to lost profit damage as they do not compete with the infringing entity.<sup>117</sup>

In addition, the 2009 PwC Study considers the success rates at trial of NPEs versus practicing entities, and further distinguishes between success on summary judgment versus at trial.<sup>118</sup> The study finds that NPEs were successful 29 percent of the time overall, compared to a 41 percent success rate for practicing patent-holders. Whereas NPEs were slightly more successful than practicing entities at trial, they were successful on summary judgment only 12 percent of the time compared with a 20 percent success rate for practicing patent-holders.<sup>119</sup>

#### 4. Lemley & Shapiro Study

In their 2007 study of reasonable royalty awards, Lemley & Shapiro focus on the extent to which court-awarded royalty rates properly apply apportionment for multi-component

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<sup>111</sup> 2009 PwC Study, *supra* note 97, at 4.

<sup>112</sup> *Id.* at 20.

<sup>113</sup> *Id.* at 6.

<sup>114</sup> *Id.*

<sup>115</sup> *Id.* at 7.

<sup>116</sup> *Id.* at 10.

<sup>117</sup> *Id.* at 11.

<sup>118</sup> *Id.* at 12.

<sup>119</sup> *Id.*

technologies.<sup>120</sup> Their data set covered all cases reported in Westlaw from 1982 to mid-2005 that awarded a reasonable royalty.<sup>121</sup>

Notably, their study was cited in the Senate Report for S. 515 for their finding that only 58 reasonable royalty awards were awarded from 1980 to 2005.<sup>122</sup> Lemley & Shapiro arrived at this count by including only “the subset of cases in which a court has written an opinion disclosing the royalty awarded.”<sup>123</sup>

Lemley & Shapiro track the differences in royalty rates between different industries groups, and find variations in the average royalty rate awarded.<sup>124</sup> They conclude “the reasonable-royalty rules do in fact accommodate component products but only to a limited extent.”<sup>125</sup> They do not appear to consider the amounts of damage awards, what royalty base was used, or track the final outcomes after appeal.

## 5. Allison, Lemley & Walker Study

In their study, *Extreme Value Patents*, Allison, Lemley & Walker analyzed data on patent litigation from 2000 to 2007 provided by the Stanford IP Litigation Clearinghouse (the “Clearinghouse”). The authors identified from the Clearinghouse data every patent that had been litigated eight or more times between 2000 and 2007, a total of 106.<sup>126</sup> They further identified a random set of 106 once-litigated patents from the Clearinghouse data. The authors collected information about entity status, industry characteristics, and indicia of patent value (such as number of claims, forward-citations, and prior art citations).<sup>127</sup>

The relevant findings of the Allison, Lemley & Walker study are noted as follows:

- Litigation Rates by Industry:
  - Software and telecommunications patents are far more likely to be litigated, even over mechanical and chemical patents.
  - In particular, software-implemented business method patents comprise a large portion of the most-litigated patents group at 15%, compared to only 4% of once-litigated patents.
  - Mechanical and electronics patents make up the bulk of the once-litigated patent cases at 53% and 25%, respectively. Conversely, they are of only minor

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<sup>120</sup> Lemley & Shapiro, *supra* note 45.

<sup>121</sup> *Id.* at 2030.

<sup>122</sup> *Id.*

<sup>123</sup> *Id.* at 2031.

<sup>124</sup> *Id.* at 2034-35.

<sup>125</sup> *Id.* at 2035.

<sup>126</sup> Allison, Lemley & Walker, *supra* note 99, at 4-5.

<sup>127</sup> *Id.* at 5.

significance in the most-litigated patent set at 8% for mechanical and 1% for electronics.

- Patent Owners:
  - More than one-third of all litigated patents were sold to another owner after issue and before the lawsuit was filed.
  - Small entities that keep their patents rather than selling them tend to litigate less often than either large entities or purchasers of small entity patents.
  - Among the most-litigated patents, there are significantly more non-practicing entities than among the once-litigated patents.
  - Ownership of once-litigated patents is more diverse, with no one type of company or industry representing any significant percentage.

The authors provide an extensive discussion of their classification technique, and references to other relevant work.<sup>128</sup> Additionally, they provide categorization of the parties' entity type to assist in identifying indicia of strategic litigation practices.<sup>129</sup>

## 6. Opderbeck Study

A recent study by David Opderbeck conducts an independent empirical analysis of patent damage awards data.<sup>130</sup> Data was obtained from the Administrative Office of the Courts data files for civil cases decided from 2002 to 2007.<sup>131</sup> His analysis finds that “damages awards are widely and stochastically distributed, which suggests that most cases are being adjudicated according to their facts rather than according to some predisposition towards large awards.”<sup>132</sup>

Opderbeck analyzes the distribution of patent infringement damage awards, finding a mean of \$4.3M, median of \$0.8M, standard deviation of \$9.8M, and skewness of 3.97.<sup>133</sup> On this basis, Opderbeck concludes that “the range of awards varied widely . . . [suggesting] a lack of any pattern in the awards.”<sup>134</sup> He further calculates the correlations between size of award and field of art. He finds “possibly significant” correlations with field of art of 0.36 (awards >= \$500k), 0.54 (awards >= \$1M), and 0.63 (awards >= \$10M), but cautions that the sample sizes of the upper award tiers were small.<sup>135</sup>

Notably, Opderbeck further studies the correlation between size of award and type of remedy (lost profits or reasonable royalty). He finds correlations of 0.12 (awards >= \$500k),

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<sup>128</sup> See *id.* at 6-11.

<sup>129</sup> See *id.* at 12-14, citing Mark A. Lemley & Nathan Myhrvold, *The Complex Ecology of Patent Plaintiffs* (working paper 2009).

<sup>130</sup> Opderbeck, *supra* note 100.

<sup>131</sup> *Id.* at 145.

<sup>132</sup> *Id.* at 130.

<sup>133</sup> *Id.* at 146.

<sup>134</sup> *Id.*

<sup>135</sup> *Id.* at 148.

0.01 (awards  $\geq$  \$1M), and 0.52 (awards  $\geq$  \$10M).<sup>136</sup> From this, Opderbeck concludes that the sample reveals “no overriding patterns to the awards, except for some varying degrees of correlation between the size of award and the field of art or type of remedy.”<sup>137</sup>

Opderbeck concludes that “the manner in which courts calculate reasonable royalty rates does not fundamentally cause any holdup and royalty stacking problems.”<sup>138</sup> Instead, he suggests that “some facially shocking but mostly innocuous data are being used as the point of a much longer spear, which aims to redefine what kind of right a ‘patent’ represents.”<sup>139</sup>

### E. *Recent Patent Damages Case Law*

Because of their recentness, several opinions on patent awards have not been addressed in the Patent Reform debates or in the academic literature. These opinions, issued within the 18 months prior to this article, have appeared to heighten the standards for establishing reasonable royalty damages and have undertaken arguably more exacting scrutiny of jury awards than their precedent.<sup>140</sup> The following briefly discusses certain principal decisions and their holdings.

#### 1. *Lucent v. Gateway*

In *Lucent v. Gateway*, a Federal Circuit panel vacated the jury’s reasonable royalty award of \$358 million for a minor component of Microsoft Office that was found to be infringing plaintiff’s patent.<sup>141</sup> The issue on appeal was “whether substantial evidence supports the jury’s

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<sup>136</sup> *Id.*

<sup>137</sup> *Id.* at 149.

<sup>138</sup> *Id.*

<sup>139</sup> *Id.*

<sup>140</sup> See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1301 (Fed. Cir. 2009); *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860 (Fed. Cir. 2010). Two district court opinions authored by Chief Judge Rader of the Federal Circuit, sitting by designation, also reflect this view. See *Cornell Univ. v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279 (N.D.N.Y. 2009) (C.J. Rader sitting by designation); *IP Innovation LLC v. Red Hat Inc.*, No. 2:07-CV-447 (RRR), 2010 WL 986620 (E.D. Tex. Mar. 2, 2010) (C.J. Rader sitting by designation). Another recent Federal Circuit opinion reiterated the principles articulated in *Lucent* and *ResQNet* in reversing the district court’s denial of defendant’s F.R.C.P. 59(a) motion for a new trial on grounds that the damages awarded by the jury were “‘clearly not supported by the evidence’ and ‘based only on speculation or guesswork.’” *WordTech Sys., Inc. v. Integrated Network Solutions, Inc.*, 609 F.3d 1308, 1319 (Fed. Cir. 2010), (quoting *Del Monte Dunes at Monterey, Ltd. v. City of Monterey*, 95 F.3d 1422, 1435 (9th Cir. 1996)). And, in the first week of 2011, the Federal Circuit further supported this line of cases with its decision in *Uniloc USA, Inc. v. Microsoft Corp.*, \_\_\_ F.3d \_\_\_, 2011 WL 9738 at \*43 (Fed. Cir. Jan. 4, 2011).

<sup>141</sup> *Lucent*, 580 F.3d at 1337 (“The only reasonable conclusion that can be drawn from this evidence is that the infringing use of Outlook’s date-picker feature is a minor aspect of a much larger software program and that the portion of the profit that can be credited to the infringing use of the date-picker tool is exceedingly small.”).

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.”<sup>142</sup>

The Court began by enumerating each of the *Georgia-Pacific* factors at issue and assessing the testimony and documentary evidence pertaining to each.<sup>143</sup> Principally relevant was the first factor, the “established royalty” for licensing the patents in suit. There, eight licenses that were accepted into evidence and used by the jury at trial were rejected as lacking “sufficient relevance”<sup>144</sup> to support the verdict. The jury had awarded a lump-sum royalty amount, but four of the licenses were based on running royalties and therefore were not comparable.<sup>145</sup> The other four licenses provided for lump-sum royalties but included additional material and arose under different circumstances than the hypothetical negotiation assumed, and therefore were not “sufficiently comparable.”<sup>146</sup>

Accordingly, the Court reversed and remanded, having reached the “unmistakable conclusion that the jury’s damage award is not supported by substantial evidence, but is based mainly on speculation or guesswork.”<sup>147</sup> Subsequent decisions have followed this mode of careful analysis of the “sufficiency” of evidence of prior licenses.<sup>148</sup>

## 2. *ResQNet v. Lansa*

In *ResQNet v. Lansa*, a Federal Circuit panel vacated a bench damage award of \$506,305 for infringement of a patent directed to a computer terminal emulation algorithm, which award was calculated by applying a hypothetical 12.5% royalty rate to the defendant’s revenues from sales of the infringing software.<sup>149</sup> At the outset, the Court emphasized that the fact-finder “must carefully tie proof of damages to the claimed invention’s footprint in the market place,”<sup>150</sup> and cited its precedent for the rule that “[t]o prevent the hypothetical [negotiation] from lapsing into pure speculation, this court requires sound economic proof of the nature of the market and likely outcomes with infringement factored out of the economic picture.”<sup>151</sup>

In arriving at a 12.5% reasonable royalty rate, the plaintiff’s expert used average royalty rates from two sets of prior licenses to the patents in suit and related technology. One set of prior licenses related to re-branding and re-bundling licenses which “furnished finished software

<sup>142</sup> *Id.* at 1309.

<sup>143</sup> *Georgia-Pacific Corp. v. US Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y.1970).

<sup>144</sup> *Wordtech*, 609 F.3d at 1309.

<sup>145</sup> *Lucent*, 580 F.3d at 1329-30.

<sup>146</sup> *Id.* at 1328-29.

<sup>147</sup> *Id.* at 1117.

<sup>148</sup> *Wordtech*, 609 F.3d at 1309.

<sup>149</sup> *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 869 (Fed. Cir. 2010).

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

<sup>151</sup> *Id.* (quoting *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1350 (Fed. Cir. 1999)).

products and source code, as well as services,”<sup>152</sup> was rejected because the plaintiff had not shown that these licenses “embody or use the claimed technology” claimed by the patents in suit.<sup>153</sup> The other set were “straight” licenses to the patents in suit, which arose as settlements of prior litigation brought by the patentee.<sup>154</sup> The Court acknowledged that the settlement licenses could be admissible, but cautioned that even these must be scrutinized because settlement royalty rates may be too high (for example, “license fees negotiated in the face of a threat of high litigation costs may be strongly influenced by a desire to avoid full litigation”<sup>155</sup>) or too low (for example, “widespread infringement [could] artificially depress . . . past licenses;”<sup>156</sup>), compared to what parties in an *ex ante* hypothetical negotiation would reach. Rather, the Court stressed use of prior licenses under *Georgia-Pacific* factor 1 must account for the “technological and economic differences” between the licenses and the assumptions underlying the hypothetical negotiation.<sup>157</sup>

### 3. *WordTech Systems v. Integrated Networks*

In *WordTech Systems v. Integrated Networks*, a Federal Circuit panel reversed the district court’s denial of defendant’s motion for a new trial in light of a jury damage award of \$250,000 for infringement of a patent directed to a device for copying video files from computer memory to multiple discs.<sup>158</sup> The jury award calculated damages as a lump sum royalty (as opposed to a running royalty on sales),<sup>159</sup> based on evidence of thirteen past licenses to the patents in suit. Notably, the Court reiterated the lessons of its *Lucent* and *ResQNet* precedent that when using past licenses to calculate a reasonable royalty damage award, the licenses in the record must be “sufficiently comparable” on the basis of the circumstances and technology involved in each<sup>160</sup> and the comparison “must account for the technological and economic differences” to the present case.<sup>161</sup> Turning to the licenses in the record, the Court scrutinized each, finding that the amounts agreed to therein were substantially lower than the royalty amount (with respect to the licenses involving a lump sum royalty)<sup>162</sup> or effective royalty rate (with respect to the licenses involving a running royalty)<sup>163</sup> awarded by the jury.

### 4. *Cornell University v. Hewlett-Packard*

<sup>152</sup> *ResQNet.com*, 594 F.3d at 870.

<sup>153</sup> *Id.* at 871.

<sup>154</sup> *Id.*

<sup>155</sup> *Id.* at 872 (quoting *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078-79 (Fed. Cir. 1983)).

<sup>156</sup> *Id.* at 872 (citing *Nickson Indus., Inc. v. Rol Mfg. Co.*, 847 F.2d 795, 798 (Fed. Cir. 1988)).

<sup>157</sup> *Id.* at 873.

<sup>158</sup> *WordTech Sys., Inc. v. Integrated Network Solutions, Inc.*, 609 F.3d 1308, 1309 (Fed. Cir. 2010).

<sup>159</sup> *Id.* at 1310.

<sup>160</sup> *Id.*, quoting *Lucent Techs, Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1328-29 (Fed. Cir. 2009).

<sup>161</sup> *Id.*, quoting *ResQNet*, 594 F.3d at 873.

<sup>162</sup> *Id.*

<sup>163</sup> *Id.* at 22.

In *Cornell University v. Hewlett-Packard*, Federal Circuit Chief Judge Rader, sitting by designation, granted the defendant’s motion for judgment of a matter of law, and in the alternative offered the plaintiff remittitur, in a damages amount of \$58,494,282.<sup>164</sup> Although the final award was still substantial, it was less than one third of the jury verdict of \$184,044,048.<sup>165</sup> Notably, Judge Rader’s opinion did not address the royalty rate at all, which was an uncontested and minimal 0.8%, and focused solely on the issue of apportionment as applied to Hewlett-Packard’s sales of CPU brick products containing, as a relatively small though functionally advantageous and “important component”<sup>166</sup> thereof, an instruction-issuing mechanism that infringed Cornell’s patent.

Chief Judge Rader first articulated the requirements for applying the EMVR in a reasonable royalty analysis.<sup>167</sup> Further, Chief Judge Rader explained that sufficient evidentiary proof of the applicability of the EMVR is a “demand curve [or] market evidence indicating that [the patented] invention drove demand for [infringer’s products].”<sup>168</sup> Requiring such economic evidence of market demand, Chief Judge Rader rejected the plaintiff’s expert’s methodology of selecting the revenue base as sales of the CPU brick without showing the connection to consumer demand for the infringed component thereof.<sup>169</sup> The Court rejected this evidence, holding that “manufactured revenues cannot . . . sustain expansion of the [EMVR] beyond some credible economic indicators.”<sup>170</sup>

Notably, another recent district court case authored by Chief Judge Rader sitting by designation took a similar approach, holding that the plaintiff “must show some plausible economic connection between the invented feature and the accused operating systems before using the market value of the entire product as the royalty base.”<sup>171</sup>

##### 5. *Uniloc USA, Inc. v. Microsoft Corp.*

Most recently, the Federal Circuit issued its opinion in *Uniloc USA, Inc. v. Microsoft Corp.*, in which it rejected the long-standing “25% Rule of Thumb” for establishing a starting point for a reasonable royalty calculation.<sup>172</sup> The Rule was a common methodology used by plaintiffs’ damages experts, whereby an initial royalty rate of 25% was assumed and case-specific factors were then applied to vary from that rate to arrive at a final number. In its opinion, the Court noted that while it had never squarely addressed admissibility of the Rule, the Federal

<sup>164</sup> *Cornell Univ. v. Hewlett-Packard Co.*, 609 F. Supp. 2d 279, 293 (N.D.N.Y. 2009).

<sup>165</sup> *Id.* at 282.

<sup>166</sup> *Id.* at 285.

<sup>167</sup> *Id.* at 286-87.

<sup>168</sup> *Id.* at 288.

<sup>169</sup> *Id.* at 285.

<sup>170</sup> *Id.* at 288.

<sup>171</sup> *IP Innovation LLC v. Red Hat, Inc.*, No. 2:07-cv-447(RRR), 2010 WL 986620 at \*3 (E.D. Tex. Mar. 2, 2010).

<sup>172</sup> *Uniloc USA, Inc. v. Microsoft Corp.*, \_\_\_F.3d\_\_\_, 2011 WL 9738 (Fed. Cir. Jan. 4, 2011).

Circuit has “passively tolerated its use where its acceptability has not been the focus of the case.”<sup>173</sup> In premising its holding in the *Daubert* standard for expert evidence, the Court held the Rule to be inadmissible “because it fails to tie a reasonable royalty base to the facts of the case at issue.”<sup>174</sup>

Explicitly, the Federal Circuit heavily relied and expanded on its precedent in *Lucent*, *ResQNet* and *Wordtech* in reaching its decision. The Court cited its precedent for the principle that “a patentee could not rely on license agreements that were ‘radically different from the hypothetical agreement under consideration’ to determine a reasonable royalty.”<sup>175</sup> The Court emphasized that 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.”<sup>176</sup> Because the 25% Rule is “an abstract and largely theoretical construct [that] fails to satisfy this fundamental requirement,” it was inadmissible as a tool for determining damages.<sup>177</sup>

Notably, the Court also harkened back to recent decisions regarding the Entire Market Value Rule in the second part of its opinion. Addressing the issue of application of the EMVR, the Court cautioned against the “danger of admitting consideration of the entire market value of the accused [product] where the patented component does not create the basis for customer demand.”<sup>178</sup>

#### F. *Implications of Recent Patent Damages Case Law and Questions for Study*

In sum, *Uniloc* and its predecessors appear to strike a new course regarding damages awards and their methodologies and evidentiary foundations. It remains to be seen whether this shift will be substantive as well as rhetorical in the long term. Currently, the broader impact of these decisions, both on appellate review of patent infringement damage awards and on initial admissibility decisions at trial, is not yet empirically observable. It is possible that a central cause of “excessive” patent damages, to the extent they existed, has been corrected by these decisions. Or, these cases may have no long-term impact.

One thing that can be observed is that the Federal Circuit bench appears to be taking an active role in reviewing patent damage awards and clarifying the rules for their determination at trial. This observation is useful in framing the question for the present empirical study of patent damage awards and for contextualizing its results. Specifically, to the extent these cases reflect a state of damages law already in flux, it may be prudent for the legislative process to wait until

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<sup>173</sup> *Id.* at \*39.

<sup>174</sup> *Id.* at \*41.

<sup>175</sup> *Id.* at \*43.

<sup>176</sup> *Id.* at \*45.

<sup>177</sup> *Id.*

<sup>178</sup> *Id.* at \*51.

the dust has cleared to reassess the situation.<sup>179</sup> Or, the opposite might be true. Since statutory changes operate differently than the organic evolution of case-by-case precedent, legislative patent reform might be more effective at fixing current problems in patent damage awards. Which fork should be taken depends on what, in fact, these problems are. That is, the nature of the appropriate remedy depends on the diagnosis of the problem.

More precisely, if “excessive” patent damages are found to behave idiosyncratically, then case-by-case correction of such individual errors and establishment of precedent to prevent their recurrence under analogous circumstances may be the best approach. However, if “excessive” damages are a systematic problem, legislative changes that would categorically impact all patent cases may be more effective. Or, as a third alternative, if “excessive” damages are systematically found across a subset of patent awards with identifiable characteristics, legislative or judicial approaches (or a combination of both) may be appropriate to target the problem. In this third case, identifying the characteristics in question will be key.

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<sup>179</sup> Burk and Lemley make a similar argument in their book, *The Patent Crisis and How the Courts Can Solve It*, although they do not specifically address the issue of patent damages nor do they ground their premises, namely that the problems in patent cases are industry-specific and otherwise idiosyncratic, in rigorous empirical data. See Dan L. Burk and Mark A. Lemley, *THE PATENT CRISIS AND HOW THE COURTS CAN SOLVE IT* (2009).

## II. RESEARCH METHODOLOGY

The goal of the empirical analysis in this study is to build a comprehensive dataset on patent awards and to – as much as is possible given available information and statistical techniques – characterize the distribution of damage awards in a systematic manner. In response to some of the concerns raised in the Patent Reform debates, we attempt to determine whether damages are systematically “excessive” and whether damages can be associated with specific characteristics such as being decided by a jury or calculated using a reasonable royalty theory. In so doing, we acknowledge that there may be several empirical definitions of “excessive” that could be convincing. A series of statistical exercises with the data showed some evidence that suggests awards may not be “excessive,” although the possibility of some “excessive” awards cannot be ruled out. Therefore, the analysis addresses the question, “Are observed patent damage awards ‘excessive?’” by uncovering and weighing empirical facts on both sides of the ledger.

The study’s fundamental frame of reference comes from the economic literature on patents, which has demonstrated through a series of empirical analyses, various factors that explain or determine the economic value of patents.<sup>180</sup> Recognizing that making an independent determination of the compensatory value of lost profits or reasonable royalties in litigated cases is infeasible for this article, economic value is used as a benchmark comparison. An extensive literature in economics has established a correlation between the value of patents and observable variables for which we could assemble data and proxies. For example, several authors have measured the importance of the number of times that patents are subsequently cited in other patent applications.<sup>181</sup> Others have noted that specific firm or industry factors may influence a patent’s value.<sup>182</sup> As such, to the extent that there is a connection between economically validated contributors to patent value and the level of damage awards, there would be less concern that the observed damage awards have been “excessive.” Finding a large number of damage awards that deviate from economic fundamentals in unpredictable ways would warrant additional scrutiny – such outliers could represent “excessive” awards, depending on the direction of the deviation and other factors. These possibilities are explored in detail in the empirical analysis below.

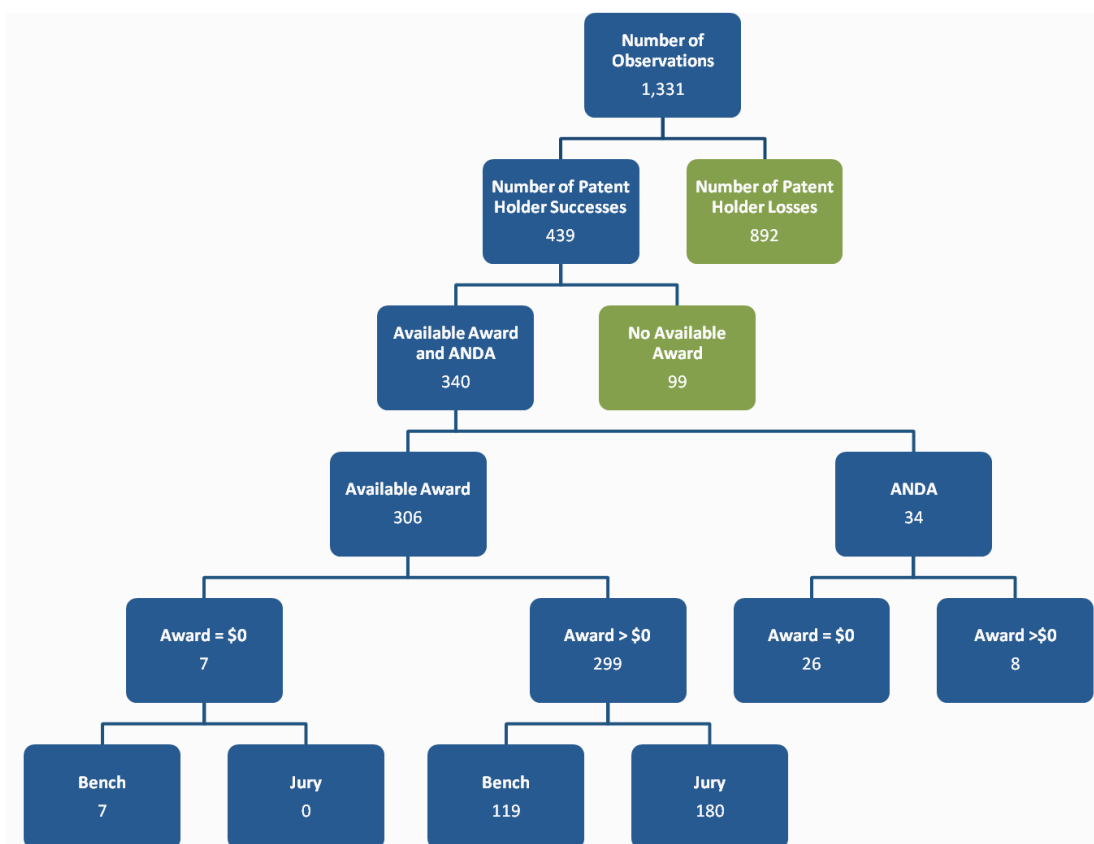
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<sup>180</sup> See e.g., John Allison & Mark Lemley & Kimberly Moore & Derek Trunkey, *Valuable Patents*, 92 GEORGETOWN LAW JOURNAL 435 (2004); John Allison and Thomas Sager, *Valuable Patents Redux: On the Enduring Merit of Using Patent Characteristics to Identify Valuable Patents*, 85 TEXAS LAW REVIEW, 1769 (2007); John Allison & Emerson Tiller, *The Business Method Patent Myth*, 18 BERKELEY TECHNOLOGY LAW JOURNAL (2003); John Allison & Mark Lemley & J.H. Walker, *Extreme Value or Trolls on Top? The Characteristics of the Most Litigated Patents*, 158 UNIVERSITY OF PENNSYLVANIA LAW REVIEW (2009).

<sup>181</sup> The survey by Zvi Griliches, *Patent Statistics as Economic Indicators: A Survey*, 28 JOURNAL OF ECONOMIC LITERATURE (1990) provides a good background on these studies. More recent contributions include Bronwyn Hall, Adam Jaffe & Manuel Trajtenberg, *Market Value and Patent Citations*, 36 RAND JOURNAL OF ECONOMICS (2005) and Nicholas van Zeebroek, *The Puzzle of Patent Value Indicators*, 20 ECONOMICS OF INNOVATION AND NEW TECHNOLOGY (2011).

<sup>182</sup> See, e.g., Ian Cockburn & Zvi Griliches, *Industry Effects and Appropriability Measures in the Stock Market’s Valuation of R&D and Patents*, 78 AMERICAN ECONOMIC REVIEW (1988).

Addressing the question posed above requires both comprehensive information about observed patent damage awards and detailed corresponding data on the potential economic value of the patents involved in the litigation. As part of its intellectual property (IP) dispute analysis practice, which provides IP litigation and valuation services, PricewaterhouseCoopers LLP (PwC) has collected an extensive database of information on patent case rulings and damage awards that includes party names, the industry of the potential infringer, whether the patent holder is a non-practicing entity, the presiding court at the time of the decision, the deciding body (bench or jury), the year of decision, the time to trial, and the associated damage awards with their component parts (where available). PwC updates this dataset every year and uses it to issue an annual report on statistics and trends in patent litigation and damages.<sup>183</sup> As mentioned above, the PwC annual reports have already been cited in the patent reform debates.<sup>184</sup> PwC agreed to provide us with the proprietary dataset underlying their reports as the foundation on which this study is built. We carefully investigated each of the damage awards identified in PwC's original database to determine the nature of the intellectual property at issue and to verify that damage awards pertaining to the same litigated case were appropriately combined. This process yielded a final case information database that is summarized in Figure 1.



<sup>183</sup> The most recent PwC studies are available at:  
<http://www.pwc.com/us/en/forensic-services/publications/patent-litigation-study.jhtml>.

<sup>184</sup> See *supra*, notes 95-97 and accompanying text.

A total of 1,331 cases were identified, in which the trial court ruled there was infringement in 439. Among these, courts awarded damages in 340 cases – with post-judgment settlement by the parties being the most common reason no award data was found. These 340 cases represent the set of observations examined in this analysis, with the identified total damage award level representing the main dependent variable of interest.<sup>185</sup> The level of some of these awards may well have changed on appeal; however, attention is focused only on the initial damage awards granted at the district court level. In other words, the damage awards in our dataset may have been changed during the appeals process, but these changes are not reflected in our current analysis.<sup>186</sup> To compare across years, we used the Consumer Price Index to translate damage awards levels from their nominal amounts into 2008 dollars.

To complement the damage awards information, we also assembled various series of data that could potentially explain the level of damages in each case. All the explanatory variables used are summarized in Table 1 and can be divided into three separate categories.<sup>187</sup> The first category is information derived from the record in each individual case, with key factors such as whether the case was decided by a judge or a jury and whether a lost profit or a reasonable royalty damages theory was utilized in determining the level of the award, if available.

The second category of variables represents information about the litigants in each case. This includes the identity of both the plaintiff and the defendant in each case – i.e., if it is an individual, a firm, a government entity or a nonprofit organization. The corporate litigants are further broken down into various industry categories and by firm size.

The third category of variables directly references the literature on economic valuation of patents. This includes publicly available information on various characteristics of patents, including information about their assignees, number of claims, and counts of their citations in subsequent patents. Economists have argued that patents embodying more substantial intellectual property often have more claims and are cited more often by later patents.<sup>188</sup> By including number of claims or appending citation information to the data for each case, it can be determined whether a particular measure of a patent's value is associated with the court's determination of patent award levels.

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<sup>185</sup> The 340 cases include those involving Abbreviated New Drug Applications (ANDAs) where lost profits and reasonable royalties are not available remedies. To avoid losing these cases in the regression analysis they are coded as having \$0 if there were no costs awarded. Because some total damages amounts include costs that cannot be separated out, all total awards include costs and attorneys fees, where available. Further, seven non-ANDA cases have a true award of \$0. In these cases, the trier-of-fact determined that the patent holders did not bear their burden of proof on damages.

<sup>186</sup> A future analysis will study the changes in awards due to the appeals process. See *infra* Section III.C.

<sup>187</sup> For a list of variables, see Appendix 1.

<sup>188</sup> See Allison et al., *Valuable Patents*, *supra* note 180.

All of the case identification and variable coding are limited to the information that could be found in Westlaw, Lexis, PACER, and the NBER patent database, in addition to information on websites like Google, Manta, Hoover's Online, Fortune, and EDGAR (for company SEC filings).<sup>189</sup>

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<sup>189</sup> The databases can be found at the following websites – Westlaw: <https://lawschool.westlaw.com>; Lexis: <http://www.lexisnexis.com/lawschool>; PACER: <http://www.pacer.gov>; NBER patent database: <http://elsa.berkeley.edu/~bhhall/patents.html> and <https://sites.google.com/site/patentdataprotect/Home>; Google: <http://www.google.com>; Manta: <http://www.manta.com>; Hoover's Online: <http://www.hoovers.com>; Fortune 1000: [http://money.cnn.com/magazines/fortune/fortune500/2009/full\\_list/](http://money.cnn.com/magazines/fortune/fortune500/2009/full_list/); and EDGAR: <http://www.sec.gov/edgar.shtml>.

**TABLE 1**  
**Summary of Variables**

Variable Groups	Description	Sources
<b>Category 1: Case Information</b>		
Identifiers	Variables including a unique ID assigned by the authors, the docket number of the case, and the full names of the first listed plaintiff and defendant in the case.	PwC database, Google, Westlaw, and PACER
Dates	Variables including the year of the original award in district court, date the complaint for case was filed, the earliest start date of trial on validity, infringement, or damages, and the number of days between the trial start date and the complaint date.	PwC database, Google, Westlaw, and PACER
Location	Variables including where the case was litigated, including state, circuit, and court.	PwC database, Google, Westlaw, and PACER
Other Case Information	Variables determining if the case contained a summary judgment for the patent holder on validity and/or infringement, if the case involved an invalidated patent-at-issue, and if the patent holder was successful in its patent claims.	PwC database, Google, Westlaw, and PACER
Damage Awards	If the patent holder was successful, variables for the total award amount, lost profits, reasonable royalties, prejudgment interest, enhanced damages, price erosion damages, and other damages. Also included are whether or not the case settled before damages were awarded, whether or not the case resulted in only an injunction, and whether or not the case was an ANDA filing.	PwC database, Google, Westlaw, and PACER
<b>Category 2: Litigant Information</b>		
General Assignee	Includes number of patent assignees associated with the patents-at-issue in the case, the names of the assignees, if one of the assignee(s) is the first named plaintiff or defendant in the case (can be both), if the plaintiff name listed is an assignee (patent holder), and if the patent holder markets or manufactures its technology covered by the patent.	PwC database, Google, Westlaw, PACER, and NBER patent database
NBER Assignee	Dummy variables from the 2002 NBER database which coded the Assignee(s) as "Unassigned," "US, Non-Government," "Non-US, Non-Government," "US, Individual," "Non-US, Individual," "US Government," or "Non-US, Government."	NBER patent database
Assignee Identifiers	Includes the variables determining whether or not the first named plaintiff or defendant are an individual, private entity, public entity, university, part of the U.S. government, a domestic entity, foreign entity, part of the 2009 Fortune 500 list, part of the 2009 Fortune 1000 list, a subsidiary of a parent company.	EDGAR, Manta, Hoover's Online, Westlaw, and Fortune 1000
Assignee Parent Identifiers	Variables for the parent companies of the plaintiff or defendant listed if it was a subsidiary that include whether or not the parent company is a private entity, public entity, domestic entity, foreign entity, part of the 2009 Fortune 500 list, part of the 2009 Fortune 1000 list, if the first named plaintiff or defendant is owned by a joint venture (2 parents or more).	EDGAR, Manta, Hoover's Online, Westlaw, and Fortune 1000
SIC Codes	Variables identifying the 2-, 3-, and 4- digit SIC codes for the potential infringers.	NBER patent database, Google, and Westlaw
<b>Category 3: Patent(s)-at-Issue Information</b>		
General Patent	Variables identifying the number of patent(s) at issue in the case and their type as either utility, reissue, design, or application number.	NBER patent database, Google, and Westlaw
Patent Classification	Includes variables for all patents-at-issue such as application year calculated for minimum and maximum (minimums and maxima differ for cases with multiple patents-at-issue and are the same for cases with only one patent-at-issue); grant date year calculated for minimum and maximum; grant date calculated for minimum and maximum; age of the oldest and youngest patent-at-issue in a case calculated for minimum and maximum; number of claims calculated for minimum, maximum, average and total; number of forward citations through 2002 from the NBER 2002 data, calculated for minimum, maximum and average; number of forward citations through 2010 if the 2002 forward citations were not available, calculated for minimum, maximum and average; the IPC4 classification listed first on the patent; and the PTO main classification for each patent listed in the case.	NBER patent database, Google, and Westlaw

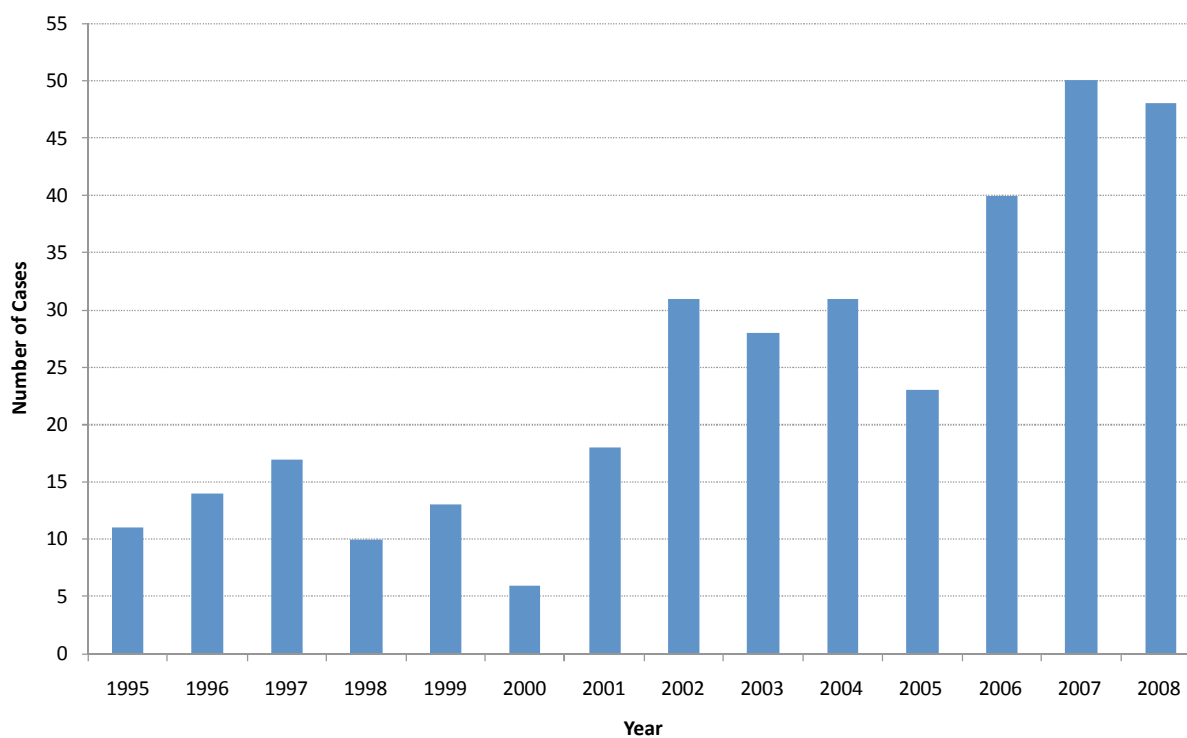
### III. EMPIRICAL ANALYSIS

#### A. Descriptive Analysis

The first step of the empirical analysis is an in-depth description of the constructed comprehensive database of available awards. As described above, the dataset of awards includes a total of 340 observations, each of which represents a litigated case for which infringement was found and damages were awarded by the court. Figure 2 displays the count of observations in the dataset by year of decision, from 1995 through 2008.

**FIGURE 2**

**Number of Cases with Patent Damage Awards by Year  
1995 - 2008  
(N = 340)**



This graphic representation underlines the fact that on a year-by-year basis, the number of patent damage awards granted is quite small. As a consequence – and particularly since one or two large awards can skew these distributions substantially – one should be careful not to over-interpret differences in observed damages from year to year.<sup>190</sup> Indeed, when controlling for the

<sup>190</sup> Another reason for caution in making year-to-year comparisons is because of the E-Government Act of 2002 (Pub.L. 107-347, 116 Stat. 2899, 44 U.S.C. § 101, H.R. 2458/S. 803) which applied to the federal  
(cont'd)

year of the decision in the regressions below it can be shown that an independent time trend has no power in explaining damage award amounts.<sup>191</sup>

To facilitate comparison with previous studies, annual summaries of the distributions of awards in the dataset are presented. Table 2 provides a more complete picture of these distributions, by including the quartiles as well as medians.<sup>192</sup> Taking 2004 as an example, after adjusting the awards to 2008 dollars, the lowest award that year was \$40,000 and the highest award that year was \$175.1 million. In between those amounts though, 25% of the awards were under \$540,000, 50% of the awards were under \$4.3 million, and 75% of the awards were under \$29.0 million. All other years can be read the same way.

**TABLE 2**  
**Distribution of Patent Damage Awards by Year (\$ in millions, 2008)**  
**1995 – 2008**  
**(N = 306)**

Year	Minimum	First Quartile	Median	Third Quartile	Maximum
1995	\$0.03	\$1.38	\$5.07	\$16.32	\$87.52
1996	\$0.02	\$0.37	\$3.57	\$22.68	\$130.36
1997	\$0.30	\$1.55	\$7.70	\$24.03	\$97.59
1998	\$0.01	\$2.18	\$3.81	\$10.63	\$225.87
1999	\$0.28	\$1.95	\$7.35	\$20.97	\$125.35
2000	\$0.48	\$0.61	\$3.02	\$6.59	\$16.54
2001	\$0.00	\$0.08	\$1.58	\$16.91	\$94.87
2002	\$0.00	\$0.61	\$5.15	\$30.77	\$117.41
2003	\$0.08	\$0.70	\$10.41	\$19.93	\$609.17
2004	\$0.04	\$0.54	\$4.27	\$28.99	\$175.09
2005	\$0.00	\$1.92	\$8.23	\$26.92	\$141.14
2006	\$0.01	\$0.44	\$2.94	\$32.22	\$327.76
2007	\$0.00	\$0.14	\$1.11	\$18.12	\$1,597.11
2008	\$0.00	\$0.66	\$2.88	\$27.18	\$1,223.88

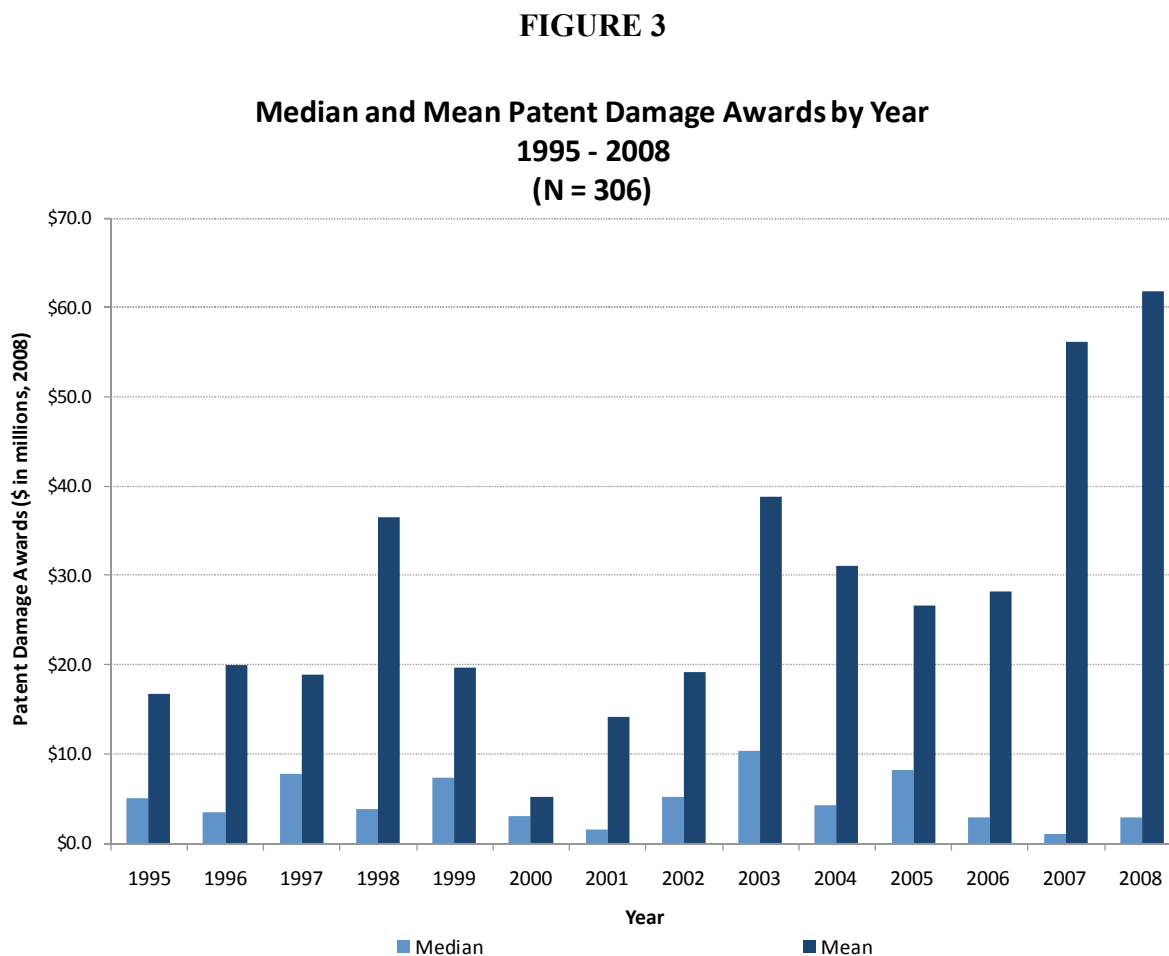
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judiciary and mandated public electronic access to all written court case opinions. This Act could account for the increase in cases starting in 2002 and going through 2008 as more courts implemented the requirements in the Act.

<sup>191</sup> Furthermore, the small number of patent infringement cases in which damages are awarded may give reason to question the hyperbolic claims by some that patent litigation damages have significant deleterious effects on research and development activities in the United States.

<sup>192</sup> Since patent cases involving Abbreviated New Drug Applications (ANDAs) are structured differently from standard patent infringement cases in terms of damages, those cases were removed from Table 2 as well as from Figures 3 – 6 for descriptive purposes. The total number of cases without ANDA cases is 306 rather than 340.

Figure 3 shows the differences in the medians and averages by year.



Although there is an underlying stability of the median over time, the increasing skewness of the awards data is evident from Table 2 and Figure 3 – for example, when they occur, outliers generate large differences between the average and the median award levels in particular years. Table 2 and Figure 3 also demonstrate an underlying stability in the distribution over time. This lack of annual variation motivates a description of the characteristics of the *entire* distribution of awards over the whole time period for which data is available.

A straightforward graphical presentation of the awards distribution is shown in Figure 4.

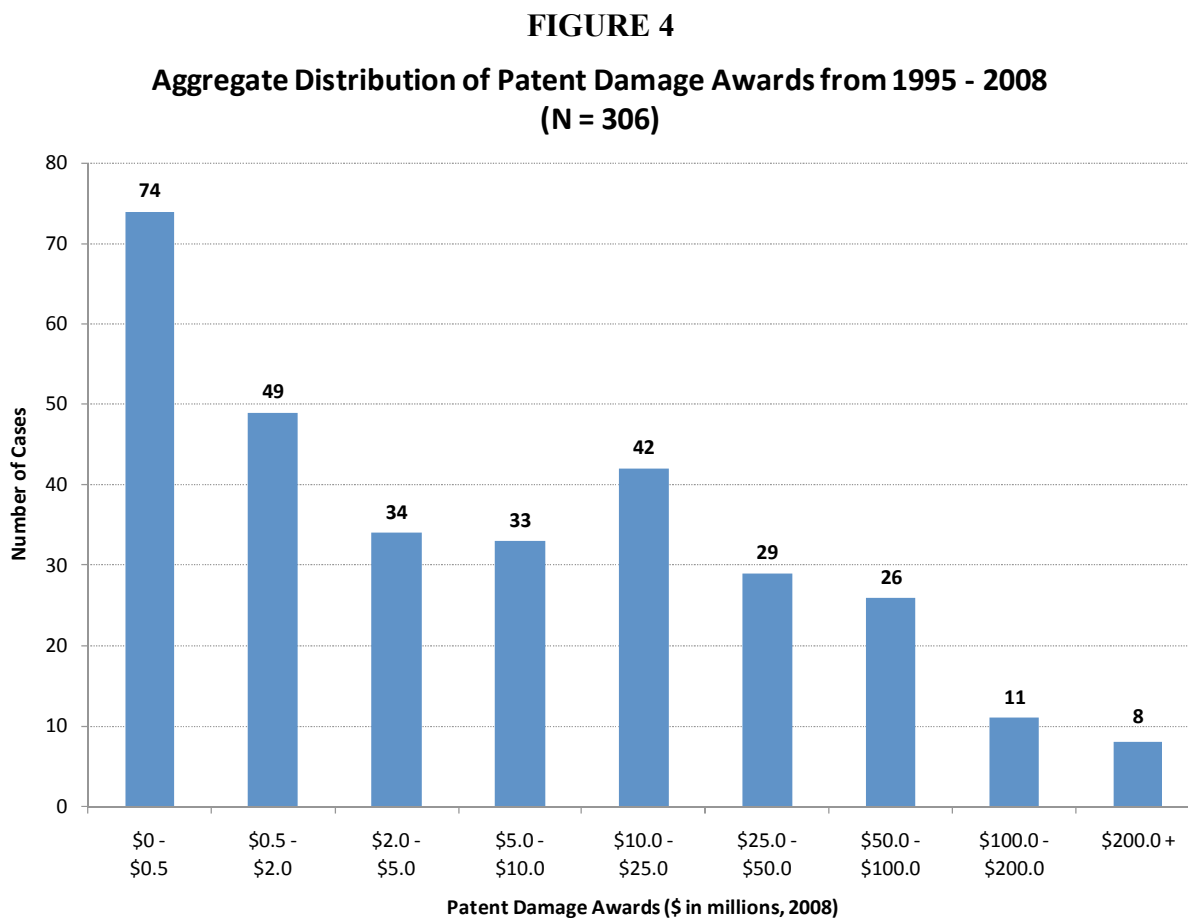


Figure 4 is a histogram of awards, broken down into increasing award-level categories. Across the dataset, 74 of the cases have damage awards of fewer than \$500,000, representing 24.2 percent of all cases during the time period. Reading from left to right in the figure, 49 cases have award values between \$500,000 and \$2 million; 34 between \$2 and \$5 million; 33 between \$5 and \$10 million, 42 between \$10 and \$25 million, 29 between \$25 and \$50 million, 26 between \$50 and \$100 million and 11 between \$100 and \$200 million. Of particular note in Figure 4 is the very last bar on the right, representing damage awards of over \$200 million. A total of eight cases fall into this highest category of damage awards, which represents 2.4 percent of all awards during the 1995 through 2008 period.

It is not surprising that these damage awards in the upper tail of the distribution would attract so much attention. As compared to the overall distribution, they are quite large. Indeed, we find that together, these eight cases represent 47.6 percent of the collective damages in *all* the non-ANDA cases from 1995 until 2008. These raw data suggest that focusing on these very large values may obscure the true nature of the overall distribution of the damage awards. In

contrast to the suggestion put forward by policy makers,<sup>193</sup> our systematic analysis of the entire distribution reveals that the largest awards are not “the tip of the iceberg” of “excessive” patent damage awards. Instead, these very large awards appear to be true outliers, as compared to the rest of the distribution.

While more details about the determination of awards will be discussed in the regression analysis described below, a descriptive analysis of the underlying distribution of damage awards is revealing about the question of whether the awards are indeed “excessive.” Cutting the data several ways shows that the distribution exhibits a great deal of skewness; a very small number of very large damage awards are not representative of what has happened across all cases. As a consequence, it may be more difficult to make an argument that damage awards are “excessive” by appealing to anything other than the very largest of the awards for empirical support. Yet, it is notable that such awards are indeed very large as compared with the rest of the distribution.

In addition to the concerns over whether patent damages are “excessive,” other perceived problems include the prevalence of damages determined under reasonable royalty theories and the risk of jury errors in calculating reasonable royalties.<sup>194</sup>

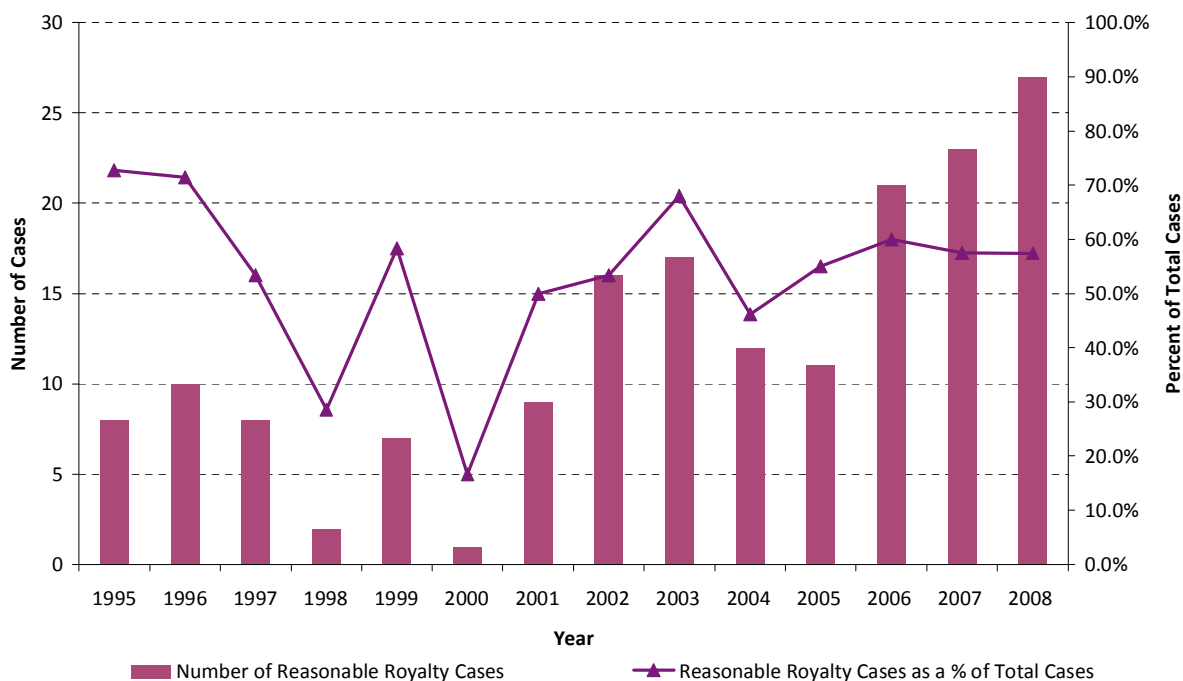
As can be seen using the bars in Figure 5 below, the raw number of patent cases where it was clear that reasonable royalties had been awarded has increased over time. We considered a case as having reasonable royalty damages only if the final decision, docket sheet, or jury verdict form clearly stated that at least part of the amount was awarded as royalties. It is possible that other awards were also based on a theory of reasonable royalties, but we were unable to determine that from the information available. These cases were not classified as having a reasonable royalty award for purposes of this analysis. However, clear reasonable royalty cases as a percent of the total patent cases where damages were awarded, have an almost constant trend over the period 1995 – 2008. This can be seen in the line in Figure 5. Generally then, cases where reasonable royalties were clearly awarded do not appear to make up a larger portion of the total number of awarded cases over time. As such, patent holders are receiving royalty damages more frequently than before due to the increased number of patent cases with awards, but not because royalties became more common over all awarded cases.

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<sup>193</sup> 2007 Senate Report, *supra* note 77, at 12.

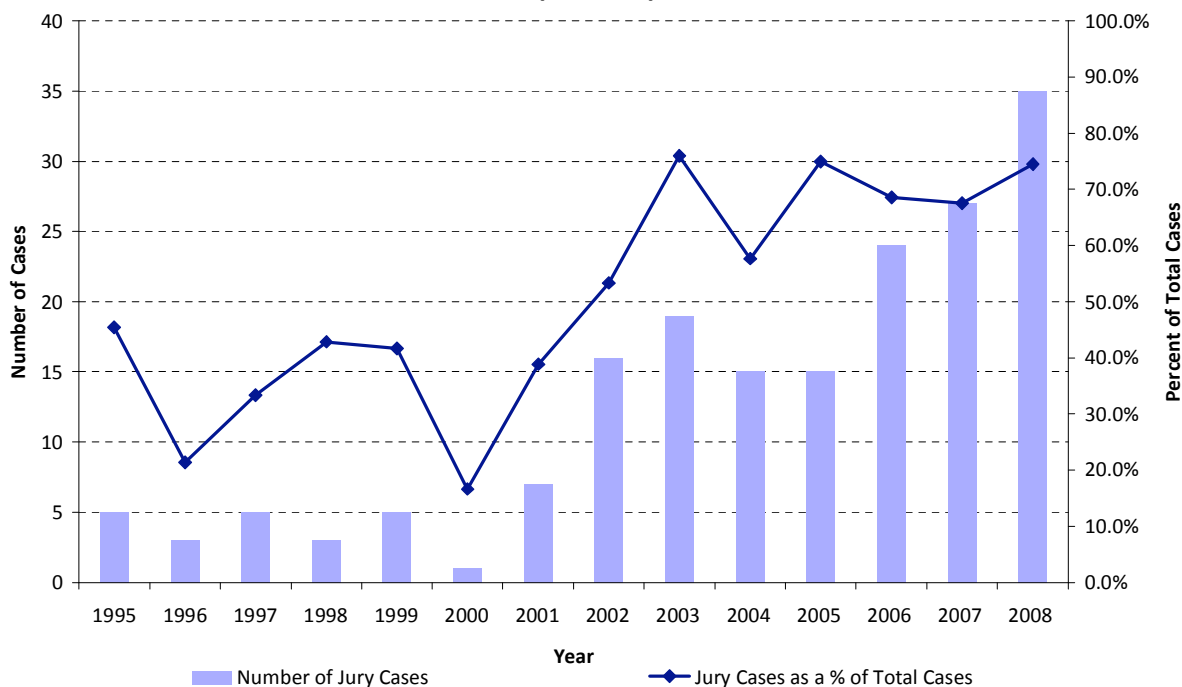
<sup>194</sup> *See infra*, Section I.B.

**FIGURE 5**  
**Patent Cases with Reasonable Royalty Awards by Year**  
**1995 - 2008**  
**(N = 306)**



Much like in Figure 5, Figure 6 below shows that the raw number of patent awards determined by juries has increased over time. However, unlike the trend for cases with reasonable royalty awards, the number of cases with jury awards increased as a proportion of all awarded cases. So not only are juries deciding more patent awards due to the increasing number of patent cases with awards, but juries are deciding patent awards in an increasing proportion to judges. Thus it has become more common over time to have a patent awards decided by a jury.

**FIGURE 6**  
**Patent Cases with Awards Decided by Juries by Year**  
**1995 - 2008**  
**(N = 306)**



Taking Figures 5 and 6 together, it is possible that although royalty cases were not necessarily more common among awarded patent cases, more of them have been decided by juries over time. To the extent that juries make errors in calculating reasonable royalties, this finding could be cause for concern. However, further analysis would be needed to determine whether juries are indeed making calculation errors.

### *B. Regression Results*

Along with the comprehensive dataset of patent infringement decisions and their associated damage awards, we assembled a detailed list of variables associated with the case, the litigants, and the patents-at-issue. The regression analysis presented below attempts to determine how much of the variation in patent damage awards can be explained by these factors and which factors in particular are associated with significantly higher or lower damage award values across the dataset. We examine outliers in this context – i.e., observed damage award values that are far away from their predicted value. Another compelling definition of “excessive” awards, in our view, are ones that are much higher than would otherwise be predicted based on the key identified explanatory variables, as discussed below.

The main goal in the regression analysis, therefore, is to use the data series enumerated in Table 1 above to explain the variation in observed patent damage awards. In an effort to use the data more effectively to generate additional explanatory power, many of the variables underwent a variety of detailed manipulations. For example, the data that identifies the circuit court in which each patent damages case was decided was translated into a series of indicator variables representing each circuit. Interaction terms for some important variables were also constructed. As an illustration, the data contains information about who decided damages (judge or jury) in each case and the particular damages theory (lost profits or reasonable royalties) utilized. Based on these individual indicator variables, combinations were considered – such as indicators for cases decided by juries using the reasonable royalty standard. In a further effort to increase the explanatory fit of the model, nonlinear representations of some regressors were considered.

Table 3 below highlights statistically significant results from the “best” regression; that is, the combination of variables that explain the greatest amount of the variation in observed damage awards.<sup>195</sup>

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<sup>195</sup> The full regression can be found in Appendix 2. In order to compare all patent infringement cases, ANDA cases are included with \$0 damages amounts in the regression.

**TABLE 3**  
**Summary of Significant Regression Results**  
**Dependant = Log of Patent Damage Awards in 2008 Dollars**

Number of obs                    338  
F( 82, 255)                        20.440  
Prob > F                            0.000  
R-squared                          0.743  
Root MSE                          2.978

Dependent = <i>Log of patent damage awards in 2008 dollars</i>	Coef.	Robust Std. Error	t	P>t	[95% Conf. Interval]	
<i>The case was decided in the court of Federal claims</i>	3.90611	1.24386	3.14	0.002	1.45657	6.35565
<i>The award was decided at a jury trial</i>	3.63275	0.86788	4.19	0.000	1.92363	5.34187
<i>Lost profit damages were awarded</i>	3.04421	0.71642	4.25	0.000	1.63337	4.45506
<i>Reasonable royalty damages were awarded</i>	2.52706	0.74070	3.41	0.001	1.06840	3.98572
<i>Other damages were awarded</i>	1.19986	0.51712	2.32	0.021	0.18150	2.21822
<i>Lost profit damages were awarded at a jury trial</i>	-2.14823	0.91964	-2.34	0.020	-3.95928	-0.33717
<i>The most recent patent grant year over all patents-at-issue in the case</i>	-0.20974	0.09974	-2.10	0.036	-0.40615	-0.01333
<i>Defendant in the case is a public company</i>	0.96190	0.56811	1.69	0.092	-0.15689	2.08070
<i>Defendant in the case is in the Fortune 501 - 1000 rankings</i>	-2.13082	1.17011	-1.82	0.070	-4.43513	0.17350
<i>The case involved an Abbreviated New Drug Application</i>	-0.84477	1.37703	-6.13	0.000	-11.15947	-5.73587
<i>Constant</i>	272.29800	100.53220	2.71	0.007	74.31884	470.27710

Remarkably, the statistical model that we constructed includes a set of regressors that explains nearly 75 percent of the variation in the observed patent damage awards, as represented by an R-squared of 0.743 (Table 3). Such a result suggests that whether they are deemed to be “excessive” or not, damage awards appear to be very predictable, as least based on the dimensions on which data were available to match with the damage award observations. These findings contrast with the suggestion in the Opderbeck study that there is no clear pattern to the observed damage awards.<sup>196</sup> It is not clear, however, that one can conclude that damage awards are not “excessive” simply because they are well predicted in the regression. In particular, it is worth noting that the dependent variable in the model reported in Table 3 is the log of damage awards; a linear version using the same regressors had much less explanatory power (R-squared = 0.384). The better fit of the log regression is not surprising, given the skewness in the underlying damages data; a well-fitting linear regression would argue even further against the “excessive” nature of damage awards.

<sup>196</sup> Opderbeck, *supra* note 96, at 149

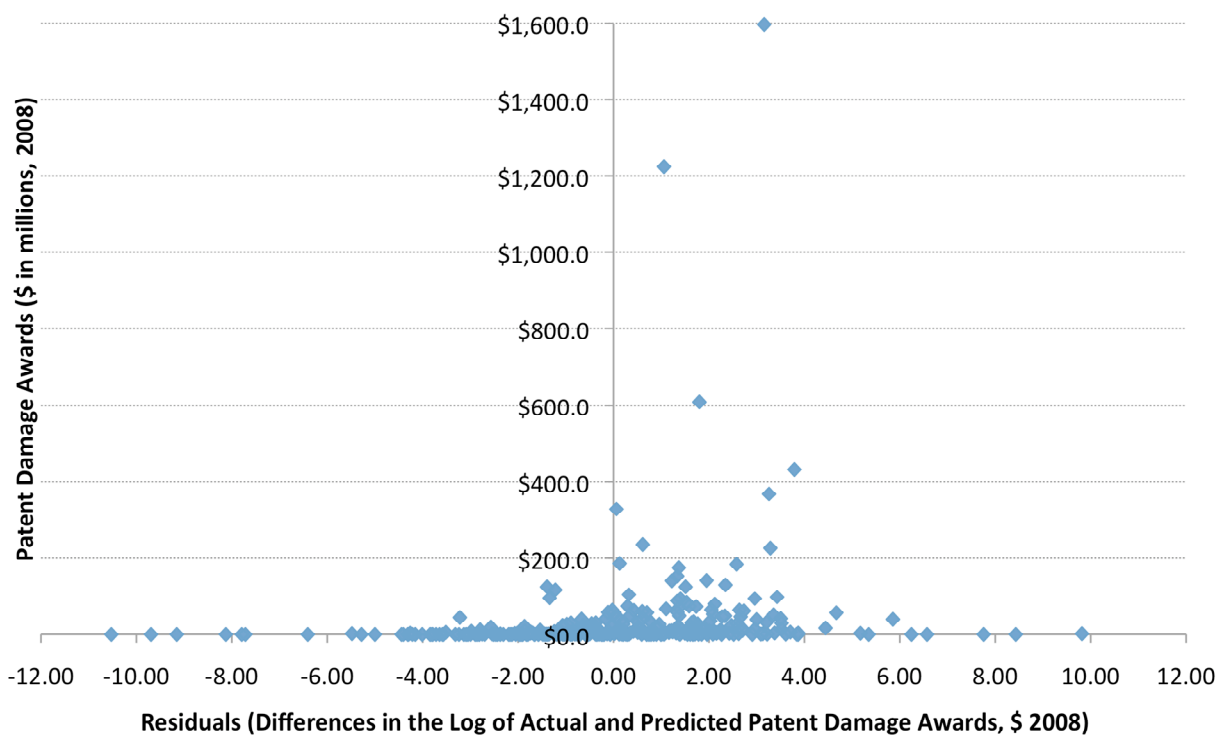
The regression summary statistics indicate that collectively the variables representing characteristics of the litigants and of the patents-at-issue are significant; however, few appear to individually explain much of the variation in the damage award values. Table 3 also highlights the subset of explanatory variables that have a statistically significant effect on the observed damage award amounts (in logs). A couple of these are worth noting, insofar as they may be tied to particular policy proposals regarding “excessive” damages mitigation. First, the dummy variable indicating cases in which damage awards were decided by juries is positive and strongly significant, suggesting damage awards are approximately 360% larger in jury trials all else equal, lending credence to the argument that large (and potentially “excessive”) awards are exacerbated by decisions made by juries instead of judges. And, as argued, juries may produce relatively higher damage awards when awarding damages based on a reasonable royalty calculation than lost profits, since the interaction term of juries and lost profits is significantly negative. In other words, damage amounts were about 215% lower in cases where juries clearly awarded lost profits than any other type of case. Although, this result must be interpreted with caution since we were not able to identify the underlying damages theory in every case.

It is also true that cases in which lost profit or reasonable royalty damage awards were clearly indicated tended to have higher total damage awards; lost profits more so than reasonable royalties. Cases clearly awarding lost profit damages had damage amounts that were about 300% higher, all else equal, and cases clearly awarding reasonable royalty damages had damage amounts that were about 250% higher, all else equal. This is also true to a lesser degree for other damages, which included conveyed sales, where damage amounts were about 120% higher. Other factors that seem to contribute to increases in damage awards include indicators for cases in which the defendant was a public company or the U.S. government.

In contrast, some of the factors that seem to decrease the awards are having a young patent and having a public defendant in the Fortune 501 – 1000. Every year later the youngest patent-at-issue in a case was granted is associated with a decrease in damages of about 20%. Further, defendants in the Fortune 501 – 1000 faced damage amounts of about 200% less than all other defendants, including the Fortune 500 and all other private businesses. All of these factors are reasonably expected. Younger patents cannot be infringed upon for as long a period, resulting in fewer damages to be claimed. Public corporate defendants ranked in the Fortune 501 – 1000 have fewer revenues on which to claim damages and possibly less likely to make as many infringing units as larger public and private defendants.

Building from these results, we have performed an additional empirical analysis to shed more light on the question of whether damages are “excessive” given the chosen benchmark of economic patent value. For each damage award observation, we use the estimated parameters from the regressions to calculate a “predicted” damage award level given the data on all the explanatory variables for that observation. The difference between the actual and the predicted damage award level (i.e., the residual) represents how well the model does in terms of explaining each observation. These residual values are plotted for the entire dataset in Figure 7.

**FIGURE 7**  
**Residuals Associated with Actual Patent Damage Awards**  
**(N = 338)**



Interestingly, none of the outliers in terms of the difference between the model's predicted award values and observed damage awards are among the cases with the very largest damage awards. Therefore, it appears that the model does a particularly good job of predicting awards, including the eight largest. This predictability might be generating a selection issue, to the extent that the database does not include a relatively large number of cases where the court has found infringement, but the parties settle the case before a damages amount is declared by the court. If these cases would have had very large damage awards had they not settled, excluding them from the analysis may have been part of the explanation for why so few cases across the dataset had very large award values. However, the predicted values for these 59 cases turned out to be quite small, with the average predicted log value equaling 10.0 (or approximately \$22,000) and the maximum equaling 16.1 (or approximately \$9.8 million). Had these cases not settled, it is entirely possible then that the very large value awards would have represented an even smaller share of the overall data.

### *C. Interpretation*

Taken together, our empirical analysis does not reveal evidence of a systematic or pervasive problem of "excessive" patent damage awards. It is quite clear that a very small number of very large awards exist; however, these very large awards are indeed rare and serve to skew the distribution immensely. Furthermore, damage award values (including the largest

awards) are quite predictable using publicly available information typically associated with the economic value of patents. Outliers that do exist are not particularly associated with very large value awards. Our comprehensive empirical analysis suggests that the very large awards that have garnered much public attention and scrutiny are isolated and – though only a systematic evaluation of the facts of each case could establish for certain – appear not to be “excessive” based on the characteristics of the associated cases.

Nonetheless, particular factors – including juries – do appear to be associated with larger damage awards. These empirical findings may be relevant in comparing the “prior art subtraction” proposal versus the jury-focused “gatekeeper” proposal put forth in the respective House and Senate Patent Reform bills. For example, according to our model, larger damages come from cases that had juries clearly awarding reasonable royalties, all else being equal. To the extent that this result is cause for concern, additional work should be done to determine the extent to which apportionment is already considered in these types of cases and the extent to which juries make other errors, if any. The answers to these questions will help to further refine the types of reforms that might be most beneficial.

As mentioned, the Federal Circuit has also been taking a more active role in reviewing patent damage awards. Since damage awards do not appear to be systematically excessive based on the models presented here, there is the possibility that the appeals and post-verdict review process is already mitigating concerns raised in the debates for Patent Reform on a case-by-case basis. Although a complete analysis of the effects of appellate and post-verdict review on patent damage awards is left to a future study, we did want to understand to some degree what happens to awards after trial. Given the attention afforded the largest patent damage awards, we chose to focus on the eight largest awards in our dataset to see whether these amounts change during the appeals and post-verdict review process.

By reading through the district court and Federal Circuit dockets and opinions for these cases after damages were initially awarded, we found that none of the eight largest awards have gone unchallenged. Further, although two of the cases are still ongoing, none of the other six awards have stood. Three of these six were appealed, but the cases were dismissed (likely due to settlement) before there was a decision on appeal. The final three awards were either decreased by the district court judge following the verdict or reversed and remanded by the Federal Circuit on appeal. Based on this analysis, to the extent large awards are a concern, it appears that the post-judgment review process does mitigate the likelihood of having to actually pay these amounts.

Generally, our analysis suggests that the underlying assumptions of Patent Reform, that damages that are systematically out of control and “untethered” from legitimate determining factors, may themselves be untethered from reality. In this light, our findings give cause to carefully question the need for and appropriate direction of Patent Reform.

#### IV. CONCLUSION

Although much of Patent Reform debate is concerned with “excessive” patent infringement damages and how to address them, very little work has been done to determine whether patent damages are indeed “excessive.” This article addressed the question of “excessive” patent awards head-on, and sought to identify whether such awards systematically exist and, if so, what are their defining characteristics and contributing factors. Because it was not possible for us to make an independent determination of damages, we chose to use economic value of patents as the benchmark in this study. Beginning with a proprietary dataset on patent damage awards licensed to us by PwC, we coded over 120 variables describing various aspects of the cases and awards for 439 successful patent cases over the period 1995 – 2008. This data was then analyzed using standard statistical methods. The result was a comprehensive study evaluating the nature and characteristics of patent infringement damages for those 14 years.

The study produced a number of findings that will be of use to policy makers and practitioners as they debate, develop and implement patent damages reforms:

- Based on empirical analysis of the distribution of awards, it does not appear that a systematic or pervasive problem of “excessive” patent damage awards exists when using economic value of patents as the relevant benchmark for comparison. Although the existence of “excessive” damages cannot be ruled out, we have constructed a statistical model that explains much of the variation in damage awards, including the largest awards, in terms of variables associated with the economic value of patents.
- The large awards garnering media attention and scrutiny from policy makers seem idiosyncratic. Over the 14 years of available data, there were only eight damage awards in excess of \$200 million. These eight awards represented nearly half of the damages in all 300+ cases in the dataset with available damage awards from 1995 through 2008.
- The econometric model in this study does a very good job of explaining the observed patent damage awards across the dataset. Nearly 75 percent of the variation in observed patent award levels can be explained by the assembled information about the cases, litigants, and patents-at-issue. Yet, certain characteristics, such as having a jury decide a reasonable royalty award, are associated with an increase in the level of damages.
- Large awards are not “excessive” outliers with respect to the empirical analysis in this study. Deviations from the model’s predictions and actual damage awards observed are reasonably small. There appears to be little connection between the size of this deviation and the size of the award.

These empirical findings could have implications for those interested in discussing and formulating reforms to the patent system. First, policy makers should be wary of basing reforms only on the most visible patent infringement cases with the largest awards. According to the

empirical analysis, the largest awards do not appear to be the “tip of the iceberg,” but rather true outliers to the award distribution. Reforms made based on outliers but applied to all cases will likely not be optimal. Further, because it does not appear that patent damages are systematically or pervasively “excessive,” comprehensive reforms like those proposed may over-regulate damages. Others have suggested that courts are best equipped to handle idiosyncratic cases, and particularly given some of the recent shifts in patent damages case law, it may be imprudent to preempt with legislation what the courts may already be able to address.

As such, the findings of our empirical analysis highlight the need for a complementary analysis of cases whose damages have been appealed, along with an examination of the effects of recent damages case law. It may well be that appellate reversal or remittitur of patent damage awards may already be effective at correcting idiosyncratic errors at trial. Understanding the results of the appeal process empirically would be very useful for informing the reform debate.

Though the results from this study may usefully inform the patent reform debates, it does have some limitations. Although the database contains a large number of patent damage awards, it may not contain every award since not every award is reported to Westlaw. Further, variable coding was limited to what was available in Westlaw, Lexis, PACER, and the NBER patent database, in addition to information on websites like Google, Manta, Hoover’s Online, Fortune, and EDGAR (for company SEC filings). This study also only uses economic patent value as a benchmark for “excessive” damages. It is likely that other appropriate benchmarks could result in different outcomes. Finally, due to the nature of our data, we were not able in this article to address several of the remaining concerns expressed in the Patent Reform debates. There is still need for empirical analysis on a variety of topics, including an analysis of “excessive” patent awards using alternative benchmarks to determine whether the results of this article continue to hold, a closer look at differences between industries, the use of apportionment in patent cases and the implications for the current patent reform proposals, and the use of insufficient evidence in patent cases in light of the courts’ current gatekeeper role.

## Appendix 1

### List of Variables and Descriptions

Variable	Description	Source
<b>Category 1: Case Information</b>		
<i>case_ID</i>	Unique identifier for each case	Assigned
<i>docket_number</i>	The docket number associate with the case	PwC database, Google, Westlaw, and PACER
<i>P_name_1</i>	Full name of the first plaintiff listed on the case	PwC database, Google, Westlaw, and PACER
<i>D_name_1</i>	Full name of the first defendant listed on the case as reported in Westlaw	PwC database, Google, Westlaw, and PACER
<i>P_pat_owner</i>	The plaintiff is the patent holder	PwC database, Google, Westlaw, and PACER
<i>year_of_decision</i>	The year associated with the leading decisions entered by PwC	PwC database, Google, Westlaw, and PACER
<i>complaint_date</i>	Date the complaint for the case was filed	PwC database, Google, Westlaw, and PACER
<i>trial_start_date</i>	The earliest start date of a trial on validity, infringement, or damages	PwC database, Google, Westlaw, and PACER
<i>time_to_trial</i>	The number of days between <i>trial_start_date</i> and <i>complaint_date</i>	calculated
<i>state</i>	The state in which the court is located	PwC database, Google, Westlaw, and PACER
<i>circuit</i>	The circuit to which the court belongs, if a federal court; Additionally: 0= the U.S. Court of Federal Claims and 12 = D.C. Circuit; State courts are left blank	PwC database, Google, Westlaw, and PACER
<i>court</i>	The court in which the decision on patent holder success was made	PwC database, Google, Westlaw, and PACER
<i>jury</i>	The decision on damages made by a jury	PwC database, Google, Westlaw, and PACER
<i>SJ_flag</i>	The case contained a summary judgment for the patent holder on validity and/or infringement	PwC database, Google, Westlaw, and PACER
<i>invalid_pat_flag</i>	The case involved an invalidated patent-at-issue	PwC database, Google, Westlaw, and PACER
<i>dmg_awd_flag</i>	The patent holder was successful in it's patent claims; i.e. the patent was found valid and/or infringed	PwC database, Google, Westlaw, and PACER
<i>dmg_awd_amt</i>	The total dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages (if applicable)	PwC database, Google, Westlaw, and PACER

## List of Variables and Descriptions (cont.)

Variable	Description	Source
<b>Category 1: Case Information (con't.)</b>		
<i>LP_flag</i>	The patent holder was awarded lost profits	PwC database, Google, Westlaw, and PACER
<i>LP_amt</i>	The lost profits dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>RR_flag</i>	The patent holder was awarded reasonable royalties	PwC database, Google, Westlaw, and PACER
<i>RR_amt</i>	The reasonable royalty dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>RR_rate</i>	The percentage rate associated with the reasonable royalty dollar award granted to the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>RR_basis</i>	The basis to which the reasonable royalty rate will be applied in the trial case before appeal of damages; =0 if the rate is not given in the decision or there is no rate; =1 if Sales; =2 if Profit	PwC database, Google, Westlaw, and PACER
<i>PJI_flag</i>	The patent holder was awarded prejudgment interest	PwC database, Google, Westlaw, and PACER
<i>PJI_amt</i>	The prejudgment interest dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>PJI_rate</i>	The percentage rate associated with the prejudgment interest dollar award granted to the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>PJI_basis</i>	The basis from which the prejudgment interest rate is derived in the trial case before appeal of damages; =0 if the rate is not given in the decision or there is no rate; =1 if Prime Interest Rate; =2 if Treasury Bills; =3 if Statutory Rate; =4 if Cost of Capital; =5 if given but Other	PwC database, Google, Westlaw, and PACER
<i>enh_dmg_flag</i>	The patent holder was awarded enhanced damages	PwC database, Google, Westlaw, and PACER
<i>enh_dmg_amt</i>	The enhanced damages dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>PE_flag</i>	The patent holder was awarded price erosion damages	PwC database, Google, Westlaw, and PACER
<i>PE_amt</i>	The price erosion dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>other_dmg_flag</i>	The patent holder was awarded other damages	PwC database, Google, Westlaw, and PACER
<i>other_dmg_amt</i>	The other damages dollar award granted to the patent holder for the patent claims in the trial case before appeal of damages	PwC database, Google, Westlaw, and PACER
<i>Settlement</i>	The case settled after a finding of validity and infringement but before damages were awarded	PwC database, Google, Westlaw, and PACER
<i>Injunction</i>	The patent holder was awarded an injunction, but no other damages	PwC database, Google, Westlaw, and PACER
<i>ANDA</i>	The case involved an ANDA filing by the potential infringer (injunction and possibly costs awarded but no other damages for patent infringement)	PwC database, Google, Westlaw, and PACER

## List of Variables and Descriptions (cont.)

Variable	Description	Source
<b>Category 2: Litigant Information</b>		
<i>Number_Assignees</i>	Number of patent assignees associated with the patents-at-issue in the case	NBER patent database, Google, and Westlaw
<i>Pat_Assignee</i>	Name of the assignee over all patents-at-issue in the case; one variable for each assignee	NBER patent database, Google, and Westlaw
<i>Assignee_Unassigned</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "Unassigned"	NBER patent database
<i>Assignee_US_Non Govt</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "US, Non-government"	NBER patent database
<i>Assignee_Non US_Non Govt</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "Non-US, Non-government"	NBER patent database
<i>Assignee_US Indiv</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "US, Individual"	NBER patent database
<i>Assignee_Non US Indiv</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "Non-US, Individual"	NBER patent database
<i>Assignee_US Govt</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "US Government"	NBER patent database
<i>Assignee_Non US Govt</i>	At least one of the patents-at-issue in the case had an assignee in the 2002 NBER patent database coded as "Non-US Government"	NBER patent database
<i>P_Assignee</i>	At least one of the patent assignee(s) is the first named plaintiff in the case	calculated
<i>D_Assignee</i>	At least one of the patent assignee(s) is the first named defendant in the case	calculated
<i>Patent_Manuf_Mkt_Tech</i>	The patent holder markets or manufactures its technology covered by the patent; =1 yes; =0 no; =2 unclear	PwC database, Google, Westlaw, and PACER
<i>P_Individual_C</i>	The first named plaintiff is an individual	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Private Entity_C</i>	The first named plaintiff is a private entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Public Entity_C</i>	The first named plaintiff is a public entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_University_C</i>	The first named plaintiff is a university	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_US Government_C</i>	The first named plaintiff is part of the U.S. government	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Domestic_C</i>	The first named plaintiff is a domestic entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Foreign_C</i>	The first named plaintiff is a foreign entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Fortune 500_2009_C</i>	The first named plaintiff is part of the 2009 Fortune 500	Fortune 1000
<i>P_Fortune 1000_2009_C</i>	The first named plaintiff is part of the 2009 Fortune 1000	Fortune 1000
<i>p_fortune_501_1K_2009_c</i>	The first named plaintiff is listed in the Fortune 501 to 1000 in 2009	Fortune 1000
<i>P_Subsidary_C</i>	The first named plaintiff is a subsidiary of a parent company	EDGAR, Manta, Hoover's Online, and Westlaw

## List of Variables and Descriptions (cont.)

Variable	Description	Source
<b>Category 2: Litigant Information (cont.)</b>		
<i>P_Private Entity_Par</i>	The first named plaintiff is a subsidiary and the parent company is a private entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Public Entity_Par</i>	The first named plaintiff is a subsidiary and the parent company is a public entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Domestic_Par</i>	The first named plaintiff is a subsidiary and the parent company is a domestic entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Foreign_Par</i>	The first named plaintiff is a subsidiary and the parent company is a foreign entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>P_Fortune 500_2009_Par</i>	The first named plaintiff is a subsidiary and the parent company is in the 2009 Fortune 500	Fortune 1000
<i>P_Fortune 1000_2009_Par</i>	The first named plaintiff is a subsidiary and the parent company is in the 2009 Fortune 1000	Fortune 1000
<i>p_fortune_501_1K_2009_par</i>	The first named plaintiff is a subsidiary and the parent company listed in the Fortune 501 to 1000 in 2009	Fortune 1000
<i>P_Joint Venture_Par</i>	The first named plaintiff is a subsidiary and is owned by a joint venture	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Individual_C</i>	The first named defendant is an individual	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Private Entity_C</i>	The first named defendant is a private entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Public Entity_C</i>	The first named defendant is a public entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_University_C</i>	The first named defendant is a university	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_US Government_C</i>	The first named defendant is part of the U.S. government	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Domestic_C</i>	The first named defendant is a domestic entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Foreign_C</i>	The first named defendant is a foreign entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Fortune 500_2009_C</i>	The first named defendant is part of the 2009 Fortune 500	Fortune 1000
<i>D_Fortune 1000_2009_C</i>	The first named defendant is part of the 2009 Fortune 1000	Fortune 1000
<i>d_fortune_501_1K_2009_c</i>	The first named defendant is listed in the Fortune 501 to 1000 in 2009	Fortune 1000
<i>D_Subsidiary_C</i>	The first named defendant is a subsidiary of a parent company	EDGAR, Manta, Hoover's Online, and Westlaw

## List of Variables and Descriptions (cont.)

Variable	Description	Source
<b>Category 2: Litigant Information (cont.)</b>		
<i>D_Private Entity_Par</i>	The first named defendant is a subsidiary and the parent company is a private entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Public Entity_Par</i>	The first named defendant is a subsidiary and the parent company is a public entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Domestic_Par</i>	The first named defendant is a subsidiary and the parent company is a domestic entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Foreign_Par</i>	The first named defendant is a subsidiary and the parent company is a foreign entity	EDGAR, Manta, Hoover's Online, and Westlaw
<i>D_Fortune 500_2009_Par</i>	The first named defendant is a subsidiary and the parent company is in the 2009 Fortune 500	Fortune 1000
<i>D_Fortune 1000_2009_Par</i>	The first named defendant is a subsidiary and the parent company is in the 2009 Fortune 1000	Fortune 1000
<i>d_fortune_501_1K_2009_par</i>	The first named defendant is a subsidiary and the parent company listed in the Fortune 501 to 1000 in 2009	Fortune 1000
<i>D_Joint Venture_Par</i>	The first named defendant is a subsidiary and is owned by a joint venture	EDGAR, Manta, Hoover's Online, and Westlaw
<i>ind_sic2</i>	The 2-digit SIC code for the potential infringer	NBER patent database, Google, and Westlaw
<i>ind_sic_mining</i>	Equals 1 if <i>ind_sic2</i> is between 10 and 14 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_cons</i>	Equals 1 if <i>ind_sic2</i> is between 15 and 17 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_manuf</i>	Equals 1 if <i>ind_sic2</i> is between 20 and 39 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_trans</i>	Equals 1 if <i>ind_sic2</i> is between 40 and 49 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_whole</i>	Equals 1 if <i>ind_sic2</i> is between 50 and 51 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_retail</i>	Equals 1 if <i>ind_sic2</i> is between 52 and 59 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_finance</i>	Equals 1 if <i>ind_sic2</i> is between 60 and 67 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_services</i>	Equals 1 if <i>ind_sic2</i> is between 70 and 89 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic_pubadmin</i>	Equals 1 if <i>ind_sic2</i> is between 90 and 99 inclusive	NBER patent database, Google, and Westlaw
<i>ind_sic3</i>	The 3-digit SIC code for the potential infringer	NBER patent database, Google, and Westlaw
<i>ind_sic4</i>	The 4-digit SIC code for the potential infringer	NBER patent database, Google, and Westlaw

## List of Variables and Descriptions (cont.)

Variable	Description	Source
<b>Category 3: Patent(s)-at-Issue Information</b>		
<i>Number_Patents</i>	Number of patents-at-issue in the case	Google, Westlaw, and PACER
<i>Pat_Utility</i>	One or more of the patents-at-issue are a utility patent	NBER patent database, Google, and Westlaw
<i>Pat_Reissue</i>	One or more of the patents-at-issue are a reissue patent	NBER patent database, Google, and Westlaw
<i>Pat_Design</i>	One or more of the patents-at-issue are a design patent	NBER patent database, Google, and Westlaw
<i>Pat_Application</i>	One or more of the patents-at-issue are an application number	NBER patent database, Google, and Westlaw
<i>Pat_App_year</i>	Application year of all patents-at-issue in the case calculated for minimum and maximum	NBER patent database, Google, and Westlaw
<i>Pat_Gyear</i>	Grant date year of all patents-at-issue in the case, calculated for minimum and maximum	NBER patent database, Google, and Westlaw
<i>Pat_Gdate</i>	Grant date of all patents-at-issue in the case, calculated for minimum and maximum	NBER patent database, Google, and Westlaw
<i>pat_age_first</i>	Age of the oldest patent-at-issue from date of complaint, calculated in days and years	calculated
<i>pat_age_last</i>	Age of the youngest patent-at-issue from date of complaint, calculated in days and years	calculated
<i>pat_age_avg</i>	Average age of all the patents-at-issue from date of complaint, calculated in days and years	calculated
<i>Pat_Claims</i>	Number of claims of all patents-at-issue in the case, calculated for minimum, maximum, average, and total	NBER patent database, Google, and Westlaw
<i>Pat_Fwd_Cite_02</i>	Number of forward citations of all patents-at-issue in the case from the NBER 2002 coding, calculated for minimum, maximum, and average number of forward citations through 2002	NBER patent database, Google, and Westlaw
<i>Pat_Fwd_Cite_10</i>	Number of forward citations of all patents-at-issue in the case not available in the NBER 2002 coding, calculated for minimum, maximum, and average number of forward citations through early 2010	Google and Westlaw
<i>IPC4_Human_Nec</i>	One or more of the patents-at-issue had an IPC code that began with "A" (Human Necessities)	NBER patent database, Google, and Westlaw
<i>IPC4_Perf_Ops</i>	One or more of the patents-at-issue had an IPC code that began with "B" (Performing Operations; Transporting)	NBER patent database, Google, and Westlaw
<i>IPC4_Chem</i>	One or more of the patents-at-issue had an IPC code that began with "C" (Chemistry; Metallurgy)	NBER patent database, Google, and Westlaw
<i>IPC4_Textiles</i>	One or more of the patents-at-issue had an IPC code that began with "D" (Textiles; Paper)	NBER patent database, Google, and Westlaw
<i>IPC4_Construction</i>	One or more of the patents-at-issue had an IPC code that began with "E" (Fixed Constructions)	NBER patent database, Google, and Westlaw
<i>IPC4_Mech_Engineering</i>	One or more of the patents-at-issue had an IPC code that began with "F" (Mechanical Engineering; Lighting; Heating; Weapons; Blasting)	NBER patent database, Google, and Westlaw
<i>IPC4_Physics</i>	One or more of the patents-at-issue had an IPC code that began with "G" (Physics)	NBER patent database, Google, and Westlaw
<i>IPC4_Electricity</i>	One or more of the patents had an IPC code that began with "H" (Electricity)	NBER patent database, Google, and Westlaw
<i>PTO_Main_Class</i>	PTO Main Class Code for patent-in-suit; each individual patent in the case has its own variable	NBER patent database, Google, and Westlaw

## Appendix 2

## Regression Results, Dependant = Log of Patent Damage Awards in 2008 Dollars

Number of obs      338  
 F( 82, 255)        20.440  
 Prob > F            0.000  
 R-squared           0.743  
 Root MSE           2.978

<i>In_adj_dmg_awd_amt_anda_plus</i>	Coef.	Robust Std. Error	t	P>t	[95% Conf. Interval]	
<i>year_of_decision</i>	0.07864	0.09717	0.81	0.419	-0.11273	0.27000
<i>circuit_dumFed</i>	3.90611	1.24386	3.14	0.002	1.45657	6.35565
<i>circuit_dum1</i>	-0.06331	1.17124	-0.05	0.957	-2.36984	2.24321
<i>circuit_dum2</i>	-0.52006	1.19492	-0.44	0.664	-2.87324	1.83311
<i>circuit_dum3</i>	-0.96773	1.11611	-0.87	0.387	-3.16571	1.23024
<i>circuit_dum4</i>	-1.86028	1.27400	-1.46	0.145	-4.36918	0.64862
<i>circuit_dum5</i>	0.37616	1.02705	0.37	0.714	-1.64642	2.39874
<i>circuit_dum6</i>	0.24098	1.19014	0.20	0.840	-2.10277	2.58472
<i>circuit_dum7</i>	0.18640	1.17592	0.16	0.874	-2.12934	2.50215
<i>circuit_dum8</i>	-0.01111	1.11937	-0.01	0.992	-2.21550	2.19328
<i>circuit_dum9</i>	0.03461	1.06085	0.03	0.974	-2.05453	2.12376
<i>circuit_dum10</i>	0.08767	1.24517	0.07	0.944	-2.36445	2.53979
<i>state_non_dom</i>	0.19997	0.55364	0.36	0.718	-0.89032	1.29025
<i>jury</i>	3.63275	0.86788	4.19	0.000	1.92363	5.34187
<i>lp_flg</i>	3.04421	0.71642	4.25	0.000	1.63337	4.45506
<i>rr_flg</i>	2.52706	0.74070	3.41	0.001	1.06840	3.98572
<i>pji_flg</i>	0.05775	0.41011	0.14	0.888	-0.74989	0.86538
<i>enh_flg</i>	0.38884	0.48927	0.79	0.427	-0.57467	1.35236
<i>other_dmg_flg</i>	1.19986	0.51712	2.32	0.021	0.18150	2.21822
<i>pe_flg</i>	1.39308	0.87988	1.58	0.115	-0.33968	3.12583
<i>jury_lp</i>	-2.14823	0.91964	-2.34	0.020	-3.95928	-0.33717
<i>jury_rr</i>	-0.78793	0.83356	-0.95	0.345	-2.42946	0.85360

**Regression Results, Dependant = Log of Patent Damage Awards in 2008 Dollars (cont.)**

<i>ln_adj_dmg_awd_amt_anda_plus</i>	Coef.	Robust Std. Error	t	P>t	[95% Conf. Interval]	
<i>pat_gyear_min</i>	-0.00063	0.09606	-0.01	0.995	-0.18980	0.18853
<i>pat_gyear_max</i>	-0.20974	0.09974	-2.10	0.036	-0.40615	-0.01333
<i>ipc4_human_nec</i>	-0.00294	0.75706	0.00	0.997	-1.49384	1.48795
<i>ipc4_perf_ops</i>	-0.84515	0.67387	-1.25	0.211	-2.17221	0.48191
<i>ipc4_chem</i>	0.46147	0.87731	0.53	0.599	-1.26622	2.18916
<i>ipc4_textiles</i>	-0.63484	1.24943	-0.51	0.612	-3.09536	1.82568
<i>ipc4_construction</i>	-0.44790	0.85991	-0.52	0.603	-2.14134	1.24553
<i>ipc4_mech_engineering</i>	-1.11392	0.82256	-1.35	0.177	-2.73380	0.50595
<i>ipc4_physics</i>	-0.09185	0.75236	-0.12	0.903	-1.57348	1.38977
<i>ipc4_electricity</i>	0.18710	0.87645	0.21	0.831	-1.53890	1.91309
<i>pat_claims_tot</i>	-0.00104	0.00372	-0.28	0.780	-0.00836	0.00628
<i>pat_claims_tot_sq</i>	0.00000	0.00000	1.23	0.219	0.00000	0.00001
<i>pat_age_avg_day</i>	0.00051	0.00044	-1.15	0.253	-0.00138	0.00037
<i>pat_age_avg_day_sq</i>	0.00000	0.00000	0.28	0.782	0.00000	0.00000
<i>pat_reissue</i>	-0.14450	1.11542	-0.13	0.897	-2.34110	2.05211
<i>pat_design</i>	0.26645	0.87577	0.30	0.761	-1.45821	1.99112
<i>number_patents_2</i>	-0.03521	0.53906	-0.07	0.948	-1.09680	1.02637
<i>number_patents_3</i>	0.38968	0.74790	0.52	0.603	-1.08318	1.86253
<i>number_patents_4</i>	0.93069	0.83005	1.12	0.263	-0.70393	2.56532
<i>number_patents_5_10</i>	1.20671	1.36055	0.89	0.376	-1.47264	3.88605
<i>number_patents_over10</i>	3.35145	2.08914	1.60	0.110	-0.76272	7.46561
<i>number_assignees</i>	-1.41991	1.28547	-1.10	0.270	-3.95140	1.11157
<i>number_assignees_sq</i>	0.37528	0.25287	1.48	0.139	-0.12270	0.87326
<i>p_assignee</i>	0.01125	0.48531	0.02	0.982	-0.94449	0.96698
<i>d_assignee</i>	0.70020	0.77284	0.91	0.366	-0.82176	2.22217
<i>assignee_us_non_govt</i>	0.46463	0.57805	0.80	0.422	-0.67373	1.60300
<i>assignee_non_us_no_govt</i>	0.54228	0.68944	0.79	0.432	-0.81545	1.90001
<i>assignee_us_indiv</i>	-0.29576	0.71182	-0.42	0.678	-1.69755	1.10603

**Regression Results, Dependant = Log of Patent Damage Awards in 2008 Dollars (cont.)**

<i>ln_adj_dmg_awd_amt_anda_plus</i>	Coef.	Robust Std. Error	t	P>t	[95% Conf. Interval]	
<i>p_university_c</i>	-0.85948	1.45832	-0.59	0.556	-3.73136	2.01241
<i>p_public_e_c</i>	-0.21795	0.54385	-0.40	0.689	-1.28896	0.85306
<i>p_individual_c</i>	-0.67180	0.75293	-0.89	0.373	-2.15455	0.81095
<i>p_foreign_c</i>	-0.51005	0.91836	-0.56	0.579	-2.31859	1.29850
<i>p_fortune_500_2009_c</i>	-0.62333	0.90839	-0.69	0.493	-2.41223	1.16558
<i>p_fortune_501_1K_2009_c</i>	0.38205	1.18319	0.32	0.747	-1.94802	2.71212
<i>p_subsidiary_c</i>	-0.74044	0.88269	-0.84	0.402	-2.47874	0.99785
<i>p_public_entity_par</i>	0.77703	1.14350	0.68	0.497	-1.47488	3.02895
<i>p_foreign_par</i>	-0.08813	1.22966	-0.07	0.943	-2.50971	2.33344
<i>p_fortune_500_2009_par</i>	1.61133	1.14890	1.40	0.162	-0.65120	3.87386
<i>p_fortune_501_1K_2009_par</i>	1.72125	1.69468	1.02	0.311	-1.61609	5.05859
<i>d_public_entity_c</i>	0.96190	0.56811	1.69	0.092	-0.15689	2.08070
<i>d_individual_c</i>	0.31373	0.93497	0.34	0.737	-1.52753	2.15498
<i>d_foreign_c</i>	0.12522	0.55530	0.23	0.822	-0.96835	1.21878
<i>d_fortune_500_2009_c</i>	0.99274	0.73543	1.35	0.178	-0.45555	2.44102
<i>d_fortune_501_1K_2009_c</i>	-2.13082	1.17011	-1.82	0.070	-4.43513	0.17350
<i>d_subsidiary_c</i>	0.90868	0.83448	1.09	0.277	-0.73467	2.55203
<i>d_public_entity_par</i>	0.49866	0.80007	0.62	0.534	-1.07693	2.07426
<i>d_foreign_par</i>	0.13395	0.80267	0.17	0.868	-1.44676	1.71467
<i>d_fortune_500_2009_par</i>	-0.15821	1.14962	-0.14	0.891	-2.42216	2.10574
<i>d_fortune_501_1K_2009_par</i>	2.30526	1.76687	1.30	0.193	-1.17426	5.78479
<i>ind_sic_minimg</i>	0.36850	0.96191	0.38	0.702	-1.52579	2.26279
<i>ind_sic_cons</i>	1.40518	1.20039	1.17	0.243	-0.95876	3.76912
<i>ind_sic_trans</i>	0.73440	0.86836	0.85	0.398	-0.97567	2.44447
<i>ind_sic_whole</i>	0.17892	0.50258	0.36	0.722	-0.81083	1.16866
<i>ind_sic_retail</i>	-1.09181	1.23107	-0.89	0.376	-3.51618	1.33256
<i>ind_sic_finance</i>	0.93959	1.19439	0.79	0.432	-1.41255	3.29172
<i>ind_sic_services</i>	0.17900	0.70570	0.25	0.800	-1.21073	1.56874
<i>ind_sic_pubadmin</i>	1.69034	1.47411	1.15	0.253	-1.21265	4.59332
<i>p_pat-onwer</i>	1.41913	1.11632	1.27	0.205	-0.77926	3.61751
<i>patent_manuf_mkt_tech</i>	0.03785	0.58696	0.06	0.949	-1.11807	1.19376
<i>anda</i>	-0.84477	1.37703	-6.13	0.000	-11.15947	-5.73587
<i>constant</i>	272.29800	100.53220	2.71	0.007	74.31884	470.27710