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Profits as Commercial Success

ABSTRACT. Courts often use the extent of a patented invention's commercial success as crucial nontechnical proof of the patent's validity. Relying on misguided economic reasoning, most courts use revenue as the primary yardstick for commercial success. This Note argues that courts instead should use profits as the proper measure of an invention's commercial success. Current jurisprudence's use of revenue reflects the flawed premise that firms maximize revenues rather than maximizing profits. As a result, courts will often find commercial success when the financial data suggest otherwise and vice versa. This Note finds the accounting and economic issues involved to be insubstantial, while requiring a threshold profit showing could materially further judicial economy.

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INTRODUCTION

Patent litigation typically involves highly technical issues.¹ Fact-finding responsibility, however, falls to juries and judges who rarely have a technical background and who virtually never have one in the specific field of the patents in question.² The vast majority of patent disputes require the fact-finder to determine whether the underlying invention meets the core statutory requirement of not being obvious.³ Courts have developed a number of nontechnical, “secondary” considerations to aid the nonobviousness inquiry, with commercial success being the most commonly employed. If an invention met with commercial success, the reasoning goes, the likelihood increases that it was not obvious to competitors who otherwise would have been motivated to develop it themselves. But what evidence should prove commercial success?

Ask economists or businesspeople what motivates businesses, and they will tell you profits. The pursuit of profits drives the creation of new businesses and investment in existing ones. Accountants’ income statements typically put the

1. The Patent and Trademark Office (PTO), which makes the initial determination of patentability, is staffed with technical experts. U.S. Patent & Trademark Office, Patent Operations, <http://www.uspto.gov/web/offices/pac/dacp/peg/> (last visited Nov. 30, 2007) (“Patent Operations has more than 3500 highly skilled scientists and engineers.”); U.S. Patent & Trademark Office, Patent Examiner Qualifications, <http://www.uspto.gov/go/ac/ahrpa/ohr/jobs/qualifications.htm> (last visited Nov. 30, 2007) (listing technical or science degrees that qualify one as a patent examiner). As a result, commercial success is less determinative than it is in nontechnical courts. On commercial success, see *infra* Part I.

2. Justice Frankfurter noted:

It is an old observation that the training of Anglo-American judges ill fits them to discharge the duties cast upon them by patent legislation. The scientific attainments of a Lord Moulton are perhaps unique in the annals of the English-speaking judiciary. However, so long as the Congress, for the purposes of patentability, makes the determination of originality a judicial function, judges must overcome their scientific incompetence as best they can.

Marconi Wireless Tel. Co. v. United States, 320 U.S. 1, 60-61 (1943) (Frankfurter, J., dissenting) (footnote omitted). The Court of Appeals for the Federal Circuit has several notable exceptions to this rule: Judge Pauline Newman (doctorate in chemistry), Judge Alan D. Lourie (doctorate in chemistry), Judge Richard Linn (bachelor’s in electrical engineering), and Judge Kimberly Ann Moore (bachelor’s and master’s in electrical engineering). See John D. Collier, *How To Win in the Federal Circuit’s Patent Trial Division*, INTEL. PROP. TODAY, Jan. 2002, at 22, 22; United States Court of Appeals for the Federal Circuit, Judicial Biographies, <http://fedcir.gov/judgbios.html> (last visited Nov. 30, 2007).

3. 35 U.S.C. § 103(a) (2000); see also *infra* note 9 and accompanying text. Empirically, obviousness is the leading basis for finding a patent invalid in litigation. John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 208 (1998).

profit figure on the “bottom line,” which has become a synonym for paramount consideration.⁴

Current commercial success jurisprudence, however, works from the misconception that businesses are motivated by *revenue*. This Note will show how this flawed economic assumption can easily lead to erroneous determinations of patent validity and encourage abuses of the patent system. Part I traces the origins and rise of commercial success as one of the most important determinants of patent validity—and the justification for using commercial success, a nontechnical variable, as evidence for making an essentially technical decision. Part II describes situations in which equating commercial success with revenues leads to the wrong decision on patent validity, even to the point of encouraging abuse of the patent system. Part III touches on how courts can judge profitability and considers how using profitability could actually further judicial economy. Finally, Part IV refutes a potential normative argument for using revenue instead of profits.

I. COMMERCIAL SUCCESS’S KEY ROLE IN PATENT LAW

A patent is analogous to a deed in real property—but instead of specifying ownership of certain land, a patent specifies ownership of a particular area of technology.⁵ While a county recorder’s office maintains records of real property deeds, the U.S. Patent and Trademark Office (PTO) examines applications and determines whether and what patents to grant. Just as an owner of real property may sue for trespass, a patentee may sue for infringement.

An accused infringer will almost always counterclaim that the patent in question is invalid,⁶ essentially arguing that the patent does not meet the statutory requirements for patentability and that the PTO erred in issuing the patent. Accused infringers have greater incentives and resources to find proof of invalidity than does the PTO. As a result, roughly half of all patent infringement cases result in the invalidation of part or all of the patent, and litigants hotly contest validity.⁷

4. See RANDOM HOUSE UNABRIDGED DICTIONARY 245 (2d ed. 1993) (defining “bottom line” as “the deciding or crucial factor”).

5. See *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 510 (1917); *In re Papesch*, 315 F.2d 381, 391 (C.C.P.A. 1963) (comparing the claims in a patent to the “metes and bounds of a deed identif[ying] a plot of land”).

6. Often, the accused infringer will only need to invalidate the subset of claims that form the basis of the infringement suit to prevail and hence will limit the invalidity challenge to that subset.

7. Allison & Lemley, *supra* note 3, at 205 (forty-six percent invalid). Overall, patentees, who must prove both validity and infringement to prevail, only win approximately twenty-five

The most frequent statutory basis for a finding of invalidity is that the patented invention is obvious.⁸ The U.S. Patent Act provides:

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior [technology] are such that the subject matter as a whole would have been *obvious* at the time the invention was made to a person having ordinary skill in the . . . [relevant] subject matter . . .⁹

Commentators have noted that nonobviousness is the greatest hurdle to receiving or enforcing a patent, calling it “the ultimate condition of patentability.”¹⁰

Determining nonobviousness presents two substantial challenges to the judge or jury.¹¹ First, the fact-finder is virtually never a “person having ordinary skill” in the relevant technology. Second, the point of reference is the time of the invention, while litigation often arises many years later, during which time the field has made substantial progress.¹²

Consider one typical case involving nonobviousness, in which the parties contested a patent on the antibiotic Cipro, invented twenty-one years before the litigation. The fact-finder determined that a “person of ordinary skill” at the time of its invention “would have had a Ph.D. in chemistry, organic chemistry or microbiology,”¹³ with “several years of work experience in the pharmaceutical industry designing drugs.”¹⁴ In this case, the fact-finder not only had to view an invention from the perspective of an extraordinarily skilled scientist, he also had to do so while ignoring twenty-one years of hindsight and

percent of cases. Paul M. Janicke & LiLan Ren, *Who Wins Patent Infringement Cases?*, 34 AIPLA Q.J. 1, 5-6 (2006).

8. Allison & Lemley, *supra* note 3, at 208 tbl.1.
9. 35 U.S.C. § 103(a) (2000) (emphasis added).
10. Robert P. Merges, *Commercial Success and Patent Standards: Economic Perspectives on Innovation*, 76 CAL. L. REV. 803, 812 (1988) (quoting NONOBVIOUSNESS—THE ULTIMATE CONDITION OF PATENTABILITY (John F. Witherspoon ed., 1980)).
11. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (“Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.”).
12. See, e.g., *In re Dembiczak*, 175 F.3d 994, 999 (Fed. Cir. 1999) (warning against hindsight); see also Gregory N. Mandel, *Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L.J. 1391 (2006).
13. *Bayer AG v. Carlsbad Tech., Inc.*, No. 01CV0867-B, 2002 U.S. Dist. LEXIS 27830, at *11 (S.D. Cal. Aug. 6, 2002).
14. *Id.*

progress! While this task would challenge a panel of luminaries in the field, it poses a far greater challenge to a generalist judge or jury of laypersons.

To aid fact-finders presented with such thorny challenges, courts have developed the nontechnical “secondary considerations” of nonobviousness. These include long-felt need, failure of others, professional approval, and, most importantly, commercial success.¹⁵ Although a patent case could proceed without invoking any of these secondary considerations, in practice, litigants often marshal all possible arguments, including commercial success.

A. *The Growing Importance of Commercial Success*

The Supreme Court has recognized commercial success as a possible determinant of patent validity since 1876.¹⁶ In 1966, with the landmark decision of *Graham v. John Deere Co.*,¹⁷ the Court reaffirmed the vitality of secondary considerations “[a]s indicia of obviousness or nonobviousness.”¹⁸ The Court listed commercial success as the first secondary consideration.¹⁹

In 1982, Congress created the Court of Appeals for the Federal Circuit and gave it exclusive appellate jurisdiction over patent cases from any federal district court.²⁰ Congress aimed to create national uniformity in patent law, which had previously suffered from circuit splits that distorted investment

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15. See *Graham*, 383 U.S. at 17 (listing “commercial success, long felt but unsolved needs, failure of others, etc.” (emphasis added)); *Ecolochem, Inc. v. S. Cal. Edison Co.*, 227 F.3d 1361, 1380 (Fed. Cir. 2000) (giving extra weight to the *Graham* factors, of which commercial success is the first); see also *Nat’l Steel Car, Ltd. v. Can. Pac. Ry.*, 254 F. Supp. 2d 527, 570 (E.D. Pa. 2003) (“Secondary considerations that may be taken into account are: (1) long-felt but unsolved need; (2) commercial success; (3) failed efforts of others; (4) copying by others; (5) praise for the invention; (7) [sic] unexpected results; (8) disbelief of experts; (9) general skepticism of those in the art; (10) commercial acquiescence; and (11) simultaneous development.”). See generally 2 DONALD S. CHISUM, CHISUM ON PATENTS § 5.05 (2007).
 16. *Smith v. Goodyear Dental Vulcanite Co.*, 93 U.S. 486, 495-96 (1876) (stating that the general use of an invention is *always* a factor to be considered in determining validity and noting that in a close case “it is sufficient to turn the scale”). Courts and commentators had long employed commercial success and the other secondary considerations as indicia of patentability. See Richard L. Robbins, Note, *Subtests of “Nonobviousness”: A Nontechnical Approach to Patent Validity*, 112 U. PA. L. REV. 1169 (1964); see also Edmund W. Kitch, *Graham v. John Deere Co.: New Standards for Patents*, 1966 SUP. CT. REV. 293, 330-35 (examining the logical underpinnings of commercial success’s relevance).
 17. 383 U.S. 1 (first Supreme Court decision interpreting the Patent Act of 1952, Pub. L. No. 82-593, 66 Stat. 792 (codified as amended at 35 U.S.C. §§ 1-376)).
 18. *Id.* at 18.
 19. *Id.* at 17-18.
 20. Federal Courts Improvement Act of 1982, Pub. L. No. 97-164, § 127(a), 96 Stat. 25, 37-39 (codified at 28 U.S.C. § 1295 (2000)).

decisions. For example, a company deciding where to build a factory that could arguably infringe on a competitor's patent might choose a location within a circuit with more favorable patent law jurisprudence.²¹ Commentators agree that the Federal Circuit's jurisprudence has vastly increased the weight given to commercial success.²²

In one of its earliest rulings, the Federal Circuit found that a district court committed reversible error by excluding consideration of commercial success.²³ One commentator writes, "the Federal Circuit has transformed commercial success from a tiebreaker to a virtual trump card."²⁴ Moreover, "[s]everal Federal Circuit judges have waged a prolonged campaign to discredit the 'secondary' label"²⁵ assigned to factors such as commercial success by *Graham*.

21. The House Report concluded,

At present, the validity of a patent [sic] is too dependent upon geography (*i.e.*, the accident of judicial venue) to make effective business planning possible. It is particularly difficult for small businesses to make useful and knowledgeable investment decisions where patents are involved when they fear a patent may be tied up for years in expensive litigation and when the standard of patentability varies from circuit to circuit. A single court of appeals for patent cases will promote certainty where it is lacking to a significant degree and will reduce, if not eliminate, the forum-shopping that now occurs.

H.R. REP. NO. 97-312, at 22 (1981) (internal citations omitted). Congress also aimed to relieve the workload of the regional circuits, *id.* at 27, and make better use of existing judicial resources, *id.* at 24. *See generally* 4 CHISUM, *supra* note 15, § 11.06[3][e][i] (2005 & Supp. 2005).

22. *See, e.g.*, WILLIAM M. LANDES & RICHARD A. POSNER, *THE ECONOMIC STRUCTURE OF INTELLECTUAL PROPERTY LAW* 305 (2003); Merges, *supra* note 10, at 820-26; Reed W.L. Marcy, Note, *Patent Law's Nonobviousness Requirement: The Effect of Inconsistent Standards Regarding Commercial Success on the Individual Inventor*, 19 HASTINGS COMM. & ENT. L.J. 199 (1996). Landes and Posner consider this trend odd, since commercial success helps nontechnical judges make validity decisions, while the Federal Circuit has more technical expertise than any other federal court. LANDES & POSNER, *supra*.
23. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539 (Fed. Cir. 1983).
24. Merges, *supra* note 10, at 827; *see also* Marcy, *supra* note 22, at 215-16; Dorothy Whelan, Note, *A Critique of the Use of Secondary Considerations in Applying the Section 103 Nonobviousness Test for Patentability*, 28 B.C. L. REV. 357, 358-59 (1987). Marcy also argues that the Federal Circuit's commercial success jurisprudence harms predictability for small individual inventors and leads to inefficiently high investment in developing existing inventions rather than engaging in further research. Marcy, *supra* note 22, at 216-17.
25. Merges, *supra* note 10, at 834; *see* Howard T. Markey, *Why Not the Statute?*, 65 J. PAT. OFF. SOC'Y 331, 338-39 (1983) (calling them the "the misnamed 'secondary considerations'" (emphasis added)); Giles S. Rich, *Laying the Ghost of the "Invention" Requirement*, 1 APLA Q.J. 26, 38 (1972) ("There is just one unfortunate word in [*Graham's* secondary factors] passage: 'secondary.' I don't think it should be given any weight though some courts seem to have done so . . .").

B. Theoretical Justifications

Commercial success has huge practical advantages as a mode of proof in patent litigation, particularly because of its accessibility to nontechnical judges and juries. It also has strong theoretical justifications under the two economic theories of patent law with the widest acceptance in scholarly writings and case law: classical theory and prospect theory.²⁶

1. Classical Theory

The classical economic theory of patents sees them as a mechanism for inducing inventive activity and disclosure by providing the reward of monopoly protection. The potential for commercial success presumably provides incentives for others to try to perfect the invention, and the failure of others to do so suggests nonobviousness. Put most simply, the classical theory-based argument goes, “if an invention is both obvious *and* lucrative, why wasn’t it thought of earlier?”²⁷

26. There are actually five economic theories of patent law: rewards, patent-induced, prospect theory, race-to-invent, and rent dissipation. See generally A. Samuel Oddi, *Un-Unified Economic Theories of Patents—the Not-Quite-Holy Grail*, 71 NOTRE DAME L. REV. 267 (1996) (discussing the various theories of patent law and investigating their predictions). The two “classical” economic theories are the rewards theory and the patent-induced theory. These theories are really two sides of the same coin, in that an incentive to invent *ex ante* becomes an *ex post* reward for success. This Note consequently refers to the rewards theory and patent-induced theory together as “the classical theory.”

The classical and prospect theories are the most prominent in scholarly writings. See, e.g., Ann Bartow, *Separating Marketing Innovation from Actual Invention: A Proposal for a New, Improved, Lighter, and Better-Tasting Form of Patent Protection*, 4 J. SMALL & EMERGING BUS. L. 1, 14 (2000) (noting that classical reward-based theory and prospect theory are “the two predominant economic theories of patents”). The classical theory has a long-standing basis in the case law. *Graham v. John Deere Co.*, 383 U.S. 1, 11 (1966) (adopting the patent-induced theory by referring to “the *inducement* of the patent” (emphasis added)).

Scholars, however, have found that prospect theory also explains much of the Federal Circuit’s jurisprudence. See, e.g., Kevin Rhodes, Comment, *The Federal Circuit’s Patent Nonobviousness Standards: Theoretical Perspectives on Recent Doctrinal Changes*, 85 NW. U. L. REV. 1051, 1094-1100 (1991). In addition to producing reasoning and results fully consistent with prospect theory, several Federal Circuit cases have cited directly to Edmund Kitch’s seminal 1977 article, Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265 (1977), which first introduced prospect theory. E.g., *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 640 (Fed. Cir. 2000) (Newman, J., concurring in part and dissenting in part), *rev’d on other grounds*, 535 U.S. 722 (2002); *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1531 (Fed. Cir. 1995).

27. LANDES & POSNER, *supra* note 22, at 305.

If one breaks down this reasoning into component parts, commercial success implies nonobviousness with the aid of four inferences:

First, that the commercial success is due to the innovation. Second, that if an improvement has in fact become commercially successful, it is likely that this potential commercial success was perceived before its development. Third, the potential commercial success having been perceived, it is likely that efforts were made to develop the improvement. Fourth, the efforts having been made by [persons skilled in the field], they failed because the patentee was the first to reduce his development to practice.²⁸

Arguably, the first inference—that the commercial success is due to the patented invention—is the weakest of the four. Courts have responded to this by requiring that a patentee show a nexus between the commercial success and the patent itself.²⁹ To have probative value, the commercial success cannot result from nontechnical business prowess or from technical features not covered in the patents-in-suit.³⁰ For example, courts have found the nexus severed by factors such as superior advertising, market power, or unpatented features.³¹ With these logical inferences and the requirement of a nexus, commercial success provides a proxy for nonobviousness.

2. Prospect Theory

Prospect theory³² posits that the patent system acts like the system for assigning mining rights to U.S. public lands.³³ Just as granting mineral rights

28. Kitch, *supra* note 16, at 332.

29. *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539 (Fed. Cir. 1983); *Solder Removal Co. v. U.S. Int'l Trade Comm'n*, 582 F.2d 628, 637 (C.C.P.A. 1978). Note, however, that some commentators think the Federal Circuit has not sufficiently heeded precedent about what can negate a showing of nexus, such as marketing or business acumen. *E.g.*, *Merges*, *supra* note 10, at 827.

30. See generally 2 CHISUM, *supra* note 15, § 5.05[2][f] (reviewing cases finding and severing nexus).

31. See, e.g., *Cable Elec. Prods., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1027 (1985). See generally 2 CHISUM, *supra* note 15, § 5.05[2][f][i].

32. The prospect theory in patent law has no relation to the area of behavioral economics of the same name. The former derives its name from analogy to mining prospects, whereas the latter refers to how humans perceive the prospects of gains or losses. On the area of behavioral economics called prospect theory, see Daniel Kahneman & Amos Tversky, *Prospect Theory: An Analysis of Decision Under Risk*, 47 *ECONOMETRICA* 263 (1979); and CHOICES, VALUES, AND FRAMES (Daniel Kahneman & Amos Tversky eds., 2000).

on tracts over public lands encourages prospecting and mining, granting property rights on an area of technology encourages its development.³⁴ Patents give assurances of the exclusive right to develop and market a technology without the danger of free riding by others.

For example, in 1976 the Supreme Court considered a patent on an automated system for using water to clean cow droppings from barns.³⁵ The Court found the patent obvious as a simple use of water and automation. Prospect theory would justify upholding the patent because it would have enabled a manufacturer to invest in designing a marketable system and proving its value to America's dairy farmers. Without the assurances of exclusivity granted by a patent, a manufacturer would be less likely to make investments in this socially beneficial system. Why invest in demonstrating the value of automated cleanup to dairy farmers without assurances that others could not sell cheaper versions of the same system once dairy farmers were sold on it?

Prospect theory strongly supports the use of commercial success to demonstrate nonobviousness because it indicates that the patent serves as the "foundation for a series of now valuable contract rights" formed in reliance on its validity.³⁶ Prospect theory accepts commercial success to prove patent validity for normative, reliance-based reasons, not because commercial success actually proves nonobviousness.³⁷ Of course, prospect theory would still require a showing of nexus to prove that the patented invention itself—not

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33. Kitch introduced this new theory in 1977, a decade after his landmark article on *Graham*. See Kitch, *supra* note 26.
34. Prospect theory has faced a number of criticisms. See, e.g., Roger L. Beck, *The Prospect Theory of the Patent System and Unproductive Competition*, 5 RES. L. & ECON. 193 (1983) (challenging Kitch's assumptions that patents protect future developments); Rebecca S. Eisenberg, *Patents and the Progress of Science: Exclusive Rights and Experimental Use*, 56 U. CHI. L. REV. 1017, 1043 (1989) (finding no support for the theory in judicial decisions); Shubha Ghosh, *Patents and the Regulatory State: Rethinking the Patent Bargain Metaphor After Eldred*, 19 BERKELEY TECH. L.J. 1315, 1353-57 (arguing that prospect theory has an unrealistic view of inventors as risk-averse and incorrectly assumes that commercialization furthers social good); Robert P. Merges & Richard R. Nelson, *On the Complex Economics of Patent Scope*, 90 COLUM. L. REV. 839, 868-76 (1990) ("The real problem is not controlling overfishing, but preventing *underfishing* after exclusive rights have been granted."); Oddi, *supra* note 26, at 282 (arguing that the theory has had no success in predicting the outcome of individual patent cases).
35. *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273 (1976); see also Kitch, *supra* note 26, at 284 (discussing *Sakraida*).
36. Kitch, *supra* note 26, at 283; see also Oddi, *supra* note 26, at 281-82 (providing an overview of prospect theory).
37. See Merges, *supra* note 10, at 841 ("Kitch discards any worry about the inferential links between market success and patentability; the fact that the invention has commercial value means it is patentable.").

extraneous factors—serves as the basis of the valuable contract rights. Some commentators have suggested that prospect theory provides the underpinnings for the expanded role of commercial success in the Federal Circuit's jurisprudence.³⁸

C. Critiques of Commercial Success

The convenience of commercial success for nontechnical fact-finders and its grounding in theory have led to its increased use, but it has also drawn significant scholarly criticism. In a 1966 article noting the four inferences³⁹ required to deduce nonobviousness from commercial success, Professor Edmund W. Kitch argues that each of these inferences could be quite weak.⁴⁰ Of course, courts have responded to the weakest of these inferences—that commercial success is due to the claimed invention—by requiring proof of nexus.⁴¹ Even here, however, Merges notes that the nexus requirement marked a significant *softening* from the earlier requirement that the proof of a link must be “*positively clear . . . that the commercial success asserted was the direct result*” of the invention.⁴²

Merges also reviews theoretical models and empirical studies of invention and innovation,⁴³ finding that they undermine each of the four inferences between commercial success and nonobviousness.⁴⁴ For example, firms act on incomplete information, with differing approaches to research and development (R&D) and varying levels of responsiveness to market demands.⁴⁵ Firms with entrenched products will not find certain innovations profitable, although other firms might.⁴⁶ Competing researchers may proceed in different

38. See Rhodes, *supra* note 26, at 1094-95. Prospect theory also supports strong patent rights in general, Oddi, *supra* note 26, at 287, and commentators have found extensive evidence that the Federal Circuit's jurisprudence has significantly strengthened the rights of patentees. See, e.g., LANDES & POSNER, *supra* note 22, at 334-53.

39. See *supra* Subsection I.B.1.

40. See Kitch, *supra* note 16, at 332.

41. See *supra* text accompanying notes 29-31.

42. Merges, *supra* note 10, at 824 (quoting *In re Heldt*, 433 F.2d 808, 812 (C.C.P.A. 1970)); see also *id.* at 833 (“[T]he Federal Circuit's nexus standard is hardly a model of clarity.”).

43. Invention is the actual technological step forward. Innovation is the process of bringing a working version of the invention to market. *Id.* at 807.

44. *Id.* at 852-60.

45. *Id.* at 852-55, 860. This undermines the second of the four inferences.

46. *Id.* at 855-56, 860 (citing *Shelco v. Dow Chem. Co.*, 322 F. Supp. 485, 508 (N.D. Ill. 1970)). This undermines the third of the four inferences. Merges also notes that the first firm to invent (i.e., conceive of the solution) might not be the first to innovate (i.e., bring a

directions, driven by academic pressures rather than financial incentives.⁴⁷ Overall, most scholarly attention on commercial success has attacked its use, rather than addressing ways to improve its accuracy.⁴⁸ The courts, however, continue to place great weight on commercial success,⁴⁹ and it remains a heavily litigated issue.⁵⁰

II. THE CURRENT MISGUIDED USE OF REVENUE DATA

Despite the growing importance of commercial success in patent cases, courts use the wrong metrics for proving it. The Federal Circuit's jurisprudence clearly holds that commercial success is "usually shown by significant *sales* in a relevant market."⁵¹ Sales, of course, equal revenues. Courts have also found other metrics related to revenue to be probative of commercial success, including market share (i.e., revenue divided by market size) and unit

workable version of the invention to market). *Id.* at 860. This observation undermines the fourth inference.

47. *Id.* at 857-58 (citing *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367 (Fed. Cir. 1986)). Competitors without any profit motive completely upend the assumptions of commercial success.
48. *Id.*; see, e.g., Ben Depoorter, *The Several Lives of Mickey Mouse: The Expanding Boundaries of Intellectual Property Law*, 9 VA. J.L. & TECH. 4, ¶ 11 (2004), http://www.vjolt.net/vol9/issue2/v9i2_a04-Depoorter.pdf; Glynn S. Lunney, Jr., *Patent Law, the Federal Circuit, and the Supreme Court: A Quiet Revolution*, 11 SUP. CT. ECON. REV. 1, 25 (2004) (noting "the Federal Circuit's practice of reserving its most outrageous [commercial success] overreaching for those cases where a certiorari petition is unlikely"); Mandel, *supra* note 12, at 1423-25 (arguing that empirical evidence shows that commercial success does not cure hindsight bias); Arti K. Rai, *Engaging Facts and Policy: A Multi-Institutional Approach to Patent System Reform*, 103 COLUM. L. REV. 1035, 1111 (2003); Nathan Machin, Comment, *Prospective Utility: A New Interpretation of the Utility Requirement of Section 101 of the Patent Act*, 87 CAL. L. REV. 421, 446 (1999).
49. See, e.g., *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d. 1367, 1380 (Fed. Cir. 1986) (noting that commercial success is not mere icing on the cake); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539 (Fed. Cir. 1983) (holding that a lower court's failure to consider evidence of commercial success is reversible error).
50. See, e.g., *Visto Corp. v. Smartner Info. Sys.*, No. 06-80339, No. 06-80352, 2007 U.S. Dist. LEXIS 8481, at *12-13 (N.D. Cal. Jan. 29, 2007) (litigating discovery of commercial success information); *Pfizer Inc. v. Teva Pharm. USA, Inc.*, 461 F. Supp. 2d 271 (D.N.J. 2006). Following the lead of Learned Hand, Merges would weigh commercial success much less than failure of others. The actual failure of others goes much more directly to nonobviousness than does commercial success. Merges, *supra* note 10, at 862-66, 875.
51. *J.T. Eaton & Co., Inc. v. Atl. Paste & Glue Co.*, 106 F.3d 1563, 1571 (Fed. Cir. 1997) (emphasis added); see also *Ormco Corp. v. Align Tech., Inc.*, 463 F.3d 1299, 1312 (Fed. Cir. 2006); *Neupak, Inc. v. Ideal Mfg. & Sales Corp.*, 41 F. App'x 435, 440 (Fed. Cir. 2002); *Bose Corp. v. QSC Audio Prods. Inc.*, 293 F.3d 1367, 1373 (Fed. Cir. 2002); *Eli Lilly & Co. v. Teva Pharms. USA, Inc.*, No. 02-0512, 2004 U.S. Dist. LEXIS 14724 (S.D. Ind. July 29, 2004).

sales (i.e., revenue divided by unit price).⁵² By contrast, when opinions do refer to profitability, they do so merely as an afterthought to revenue data.⁵³ As a result, lower courts typically do not permit discovery of profit data even in cases centered on commercial success.⁵⁴

This Part begins by arguing that profits and not revenues should be the measure of commercial success. It then considers what role a *lack* of profits should have in the nonobviousness inquiry and concludes that a lack of profits should exclude any consideration of commercial success entirely. This conclusion has no value if patentees would never sue to enforce an unprofitable patent, so the Part explains why holders of unprofitable patents do indeed have incentives to bring suit. This Part finishes by suggesting possible explanations for how revenue became so entrenched in the case law.

A. *Profits Should Prove Commercial Success and Nonobviousness*

Current commercial success jurisprudence works from the flawed presumption that businesses aim to maximize revenue rather than profits. In many—but not all—cases, higher revenues will indeed result in higher profits for a firm, provided it can keep its costs sufficiently under control. As the two following hypothetical situations demonstrate, however, in a number of situations, measuring commercial success by revenue will lead to an incorrect conclusion about nonobviousness.

1. *Hypothetical: Lower Volume, Higher Price*

Assume that the mousetrap market is highly competitive, with several manufacturers, each selling three million mousetraps at one dollar apiece. With average costs of \$0.90 per trap, each manufacturer makes a profit of \$0.10 per

52. See, e.g., *Kansas Jack, Inc. v. Kuhn*, 719 F.2d 1144, 1151 (Fed. Cir. 1983); see also *Cable Elec. Prod., Inc. v. Genmark, Inc.*, 770 F.2d 1015, 1026-27 (Fed. Cir. 1985) (dismissing per-unit profitability data as irrelevant).

53. See, e.g., *Hildebrand v. Steck Mfg. Co.*, 395 F. Supp. 2d 1036, 1048 (D. Colo. 2005) (noting a “gross profits estimation of \$416,000” and “total gross sales at \$2,331,081.43”); *Ortho-McNeil Pharm., Inc. v. Mylan Lab., Inc.*, 348 F. Supp. 2d 713, 756 (N.D. W. Va. 2004) (mentioning “\$5 billion in sales and more than \$1 billion in profit” before continuing to discuss sales trends).

54. See, e.g., *Chubb Integrated Sys. Ltd. v. Nat’l Bank of Wash.*, 103 F.R.D. 52, 56-57 (D.D.C. 1984) (refusing to compel answer to interrogatory question about profits because case law does not find profits probative of commercial success); see also *Dynacore Holdings Corp. v. U.S. Philips Corp.*, No. 01 Civ. 5012, 2002 U.S. Dist. LEXIS 18666, at *9 (S.D.N.Y. Oct. 4, 2002) (noting that “profit margins or other indicia of profitability” are not discoverable in order to show commercial success).

trap. All manufacturers have long strived to develop a better mousetrap, which could sell in quantities of one million traps a year at two dollars apiece to those consumers who have serious rodent problems.

Firm *A*'s engineers manage to develop the better mousetrap, which *A* patents. *A* determines it can maximize its profits by giving up building normal mousetraps and using its existing plant to build one million of these better mousetraps annually, and selling them at two dollars apiece. Production costs for the better mousetrap will remain \$0.90 per trap.⁵⁵

As a result of its better mousetrap, *A*'s profits rise from three hundred thousand dollars per year⁵⁶ to 1.1 million dollars per year,⁵⁷ a nearly fourfold increase. At the same time, its revenues have *dropped* from three million dollars⁵⁸ to two million dollars⁵⁹ as *A* goes "upscale." If one also assumes the total dollar size of the mousetrap market remains constant, *A*'s market share has also fallen by one-third.⁶⁰

A's competitors knew about the potential for a better mousetrap and had a substantial profit incentive to develop it themselves, but failed. Courts should clearly infer nonobviousness from this situation. However, determining commercial success by revenues or market share would prevent this inference.

2. Hypothetical: Lower Average Costs, Same Marginal Costs

Now consider the widget market and assume that it is also highly competitive, with all widget manufacturers using effectively the same manufacturing process. Widgets sell for one dollar apiece, with a breakdown of \$0.50 for electricity, \$0.40 for other costs, and \$0.10 of profit. Each manufacturer sells one million widgets annually and maximizes its profits by running its machinery eight hours a day.

Industry engineers had long known that it was theoretically possible to reuse the condensation generated by one day's manufacturing to power the first four hours of manufacturing the next day. Widget manufacturer *X*'s engineers finally perfect this environmentally friendly process and patent it.

55. This is a very reasonable assumption. Although there will be fewer units for spreading fixed costs, marginal costs tend to decrease at lower levels of production due to less overtime, less use of electricity at peak-rate periods, etc.

56. Three million mousetraps times \$0.10 profit per mousetrap.

57. A price of two dollars with average costs of \$0.90 yields \$1.10 in profits per unit. Multiply this profit by one million mousetraps produced annually.

58. Three million mousetraps at a price of one dollar per mousetrap.

59. One million mousetraps at a price of two dollars per mousetrap.

60. Three million dollars to two million dollars is a one-third drop.

Prior to this, *X* and all other widget manufacturers spent five hundred thousand dollars a year on electricity.⁶¹ Using the patented process to avoid using electricity for four hours a day saves *X* two hundred fifty thousand dollars annually on electricity.⁶²

Why doesn't *X* expand its hours of operation now that it has this process? Because all businesses maximize profit by producing until the marginal cost of each additional unit equals the marginal revenue. The new process only saves electricity on the first four hours of operation, so the marginal cost to *X* of expanding production from eight hours to nine hours does not change,⁶³ and *X* will keep production at eight hours to maximize profits.

With this new process, *X*'s profits increase from one hundred thousand dollars⁶⁴ to three hundred fifty thousand dollars,⁶⁵ but its revenues remain constant at one million dollars. Again, although courts should infer nonobviousness, basing commercial success on revenue prevents this inference.⁶⁶

B. Lack of Profits Should Exclude Considerations of Commercial Success

The previous Section argued that courts should consider profitability as proof of nonobviousness. The logical converse does not follow. Specifically, a *lack* of profits does not tend to prove obviousness. The Federal Circuit has properly held that lack of commercial success should *not* weigh toward

61. Fifty cents of electricity per unit times one million units per year.

62. Four hours is half of the eight hours that the machines are run, so the savings are half of five hundred dollars.

63. For example, beyond eight hours the firm might have to pay overtime to its workers or nuisance compensation to residential neighbors who dislike manufacturing noise outside business hours. Or, perhaps expanding production beyond one million units would involve going onto a relatively expensive spot market to buy certain inputs, whereas the first one million units are covered by a long-term contract at a good price.

64. Ten cents times one million units.

65. One hundred thousand dollars plus two hundred fifty thousand dollars in electricity savings.

66. Of course, *X* could license its patent to other widget manufacturers for a royalty between zero and two hundred fifty thousand dollars annually, but licensing is counted as a secondary consideration separate from commercial success, which is the weightiest secondary consideration. See *Minn. Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1575 (Fed. Cir. 1992). But see *EWP Corp. v. Reliance Universal Inc.*, 755 F.2d 898, 907-08 (Fed. Cir. 1985). See generally 2 CHISUM, *supra* note 15, § 5.05[3] (discussing licensing as a secondary consideration). Moreover, if the widget industry had some barriers to expanded production, the industry as a whole might still not experience revenue growth for quite some time.

obviousness.⁶⁷ This holding applies regardless of whether revenues or profits prove commercial success.

Deducing obviousness from commercial failure requires two extremely troublesome inferences.⁶⁸ First, one must infer that the commercial failure results from the invention's lack of potential. This inference is unreasonable, as few patented inventions are immediately successful; rather, most require extensive development to reach full marketability.⁶⁹

Second, one must infer that if no one else skilled in the field attempted to develop the invention, the patentee succeeded because of the invention's obviousness. This inference is also very weak. Indeed, the most nonobvious patents sometimes emerge from areas no one else was considering because the patent-holder was years ahead of the rest of the field. Pioneering patents often result in commercial failure⁷⁰ because they depend on other technologies that have either not yet matured or are prohibitively expensive.⁷¹

Lack of profits does, however, have a proper role in showing lack of commercial success and lack of a nexus between the invention and purported commercial success.⁷² In other words, a lack of profits should be a completely *neutral* factor, acting only to remove any consideration of commercial success

67. *Gentry Gallery, Inc. v. Berklinc Corp.*, 134 F.3d 1473, 1478 (Fed. Cir. 1998) (quoting *Medtronic Inc. v. Intermedics, Inc.*, 799 F.2d 734, 739 n.13 (Fed. Cir. 1986) (“[T]he absence of objective evidence is a neutral factor.”)). See generally 2 CHISUM, *supra* note 15, § 5.05[2][h].

68. Recall that inferring nonobviousness from commercial success requires four potentially shaky inferences. See Kitch, *supra* note 16, at 332; see also *supra* Subsection I.B.1. To investigate whether the reverse of the inference makes sense, we must consider the logical negatives of the four inferences identified by Kitch. These logical negatives are: (1) the commercial failure is due to the invention's lack of commercial potential; (2) if an improvement has in fact become a commercial failure, it is likely that this potential failure was perceived before its development; (3) the potential commercial failure having been perceived, it is likely that no efforts were made to develop the improvement; and (4) no efforts having been made by others skilled in the field, the patentee succeeded because of the invention's obviousness. Inferences (1) and (4) are extremely problematic, for the reasons discussed in the main text.

69. See *CFMT, Inc. v. Yieldup Int'l Corp.*, 349 F.3d 1333, 1340 (Fed. Cir. 2003).

70. Commercial failure typically implies lack of either revenues or profits.

71. See EDITH TILTON PENROSE, *THE ECONOMICS OF THE INTERNATIONAL PATENT SYSTEM* 30-31 (1951); Oddi, *supra* note 26, at 275.

72. For more on the potential inferences from lack of profitability, see Richard L. Robbins, Note, *Subtests of “Nonobviousness”: A Nontechnical Approach to Patent Validity*, 112 U. PA. L. REV. 1169, 1177 (1964). Robbins argues that commercial failure at least rebuts any possible inference of “long-felt need,” another of the “secondary considerations” mentioned in *Graham* and heavily employed by the Federal Circuit. Lack of profits could similarly be used to rebut “failure of others,” also listed as a secondary consideration in *Graham*. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

from the case. The fact-finder should evaluate an unprofitable patent's nonobviousness upon its technical or scientific merits, as well as the other secondary considerations, without any commercial success data. Removing commercial success from consideration due to the absence of profits does not require the two extremely troublesome inferences noted above. Moreover, this limited conclusion makes sense under both prospect theory and the classical theory.⁷³

1. Classical Theory Sees No Success, No Nexus, and Negated Inferences

The classical theory dictates that a lack of profits should remove any consideration of commercial success for three reasons. First, in the business world, commercial success is profitability, not revenues. In other words, a court should not properly even find commercial success in the absence of profits.

Second, a lack of profitability severs the nexus that the case law requires between alleged commercial success and the patented invention.⁷⁴ Courts have found a number of possible factors to sever this nexus, including advertising,⁷⁵ dominant market position,⁷⁶ and superior workmanship.⁷⁷ Consider a product that experiences commercial success as currently defined—substantial revenues—but loses money. The patentee has thus charged less than the cost of production. This unprofitable underpricing provides an alternative explanation for the substantial revenues, at least as authoritative as good advertising or superior workmanship.

73. In some circumstances, an unforeseeable event will significantly reduce revenues or increase costs for a previously profitable product. In these cases, a court might decide to allow the patentee to submit evidence that but for the event, it would have been profitable. The standard of proof for accepting such evidence, however, should be substantially higher than the “preponderance of the evidence” used to show nonobviousness. “Clear and convincing evidence” suggests itself as a possibility. The court should also consider whether the product would have been profitable if the costs of proper hedging and insurance were factored in.

74. This is the first of the four inferences mentioned in Subsection I.B.1.

75. *McNeil-PPC, Inc. v. L. Perrigo Co.*, 337 F.3d 1362, 1370 (Fed. Cir. 2003) (“[Patentee] launched a massive marketing and advertising campaign in connection with the launch of [the product], obscuring any nexus that might have existed between the merits of the product and its commercial success.”).

76. *Schwinn Bicycle Co. v. Goodyear Tire & Rubber Co.*, 444 F.2d 295, 300 (9th Cir. 1970) (recognizing market position as a secondary consideration).

77. *Demaco Corp. v. F. Von Langsdorff Licensing, Ltd.*, 851 F.2d 1387, 1393 (Fed. Cir. 1988).

Third, recall from Subsection I.B.1 that deducing nonobviousness from commercial success requires four separate inferences.⁷⁸ The third inference is that “the potential commercial success having been perceived, it is likely that efforts were made to develop the improvement.”⁷⁹ As discussed above, profits, not revenues, motivate business choices, including efforts to develop an improvement. If an invention turns out to be unprofitable then the likelihood increases that others perceived the unprofitability and did *not* invest in developing improvements increases. Any inference of nonobviousness is hence improper.

Although it seems completely intuitive that the absence of profits should negate any showing of nonobviousness through commercial success, no case law has established this proposition. This disparity came to the forefront in a recent unpublished Federal Circuit opinion, *Medpointe Healthcare, Inc. v. Hi-Tech Pharmacal Co.*⁸⁰ The two-judge majority found it self-evident that a patent’s lack of profitability negated any showing of commercial success.⁸¹ Chief Judge Mayer vehemently dissented, writing, “I have been unable to find any case that suggests that a product was commercially unsuccessful because it had only broken even at the time of inquiry.”⁸²

2. Prospect Theory Sees Worthless “Contract Rights”

Bear in mind that prospect theory would lead courts to place great weight on commercial success because it indicates that the patent forms the “foundation for a series of now valuable contract rights.”⁸³ The value of a contract right to its holder and to the economy depends on its profitability. A patent that generates no profits serves as the basis for contract rights that

78. The four required inferences were: (1) the commercial success is due to the innovation (i.e., the existence of nexus); (2) if an improvement has in fact become commercially successful, it is likely that this potential commercial success was perceived before its development; (3) the potential commercial success having been perceived, it is likely that efforts were made to develop the improvement; (4) efforts having been made by [persons skilled in the field], they failed because the patentee was the first to reduce his development to practice. Kitch, *supra* note 16, at 332.

79. *Id.*

80. 115 F. App’x 76 (Fed. Cir. 2004).

81. *Id.* at 80.

82. *Id.* at 82 (Mayer, C.J., dissenting).

83. Kitch, *supra* note 26, at 283; *see also supra* Subsection I.B.2.

generate no societal surplus,⁸⁴ removing the prospect theory-based argument for upholding the patent.

To employ prospect theory's analogy, consider a plot of land under which the lessee has discovered gold. For each of the twenty years of the lease, the lessee expects to extract one million dollars worth of gold, at the cost of one million dollars in labor, equipment, and pollution-control. The lessee's activities generate zero benefit to the lessee or to society. Hence, society would be no worse off if the government simply canceled the lease.⁸⁵ The same reasoning applies to unprofitable patent rights.

C. Why Sue To Enforce an Unprofitable Patent?

The previous Section reached an actionable conclusion for courts: exclude any consideration of commercial success for an unprofitable patent. For this conclusion to have any value, this Note must show that patentees would sue to enforce an unprofitable patent in the first place. Patent law provides for damages typically equal to profits lost by the patentee because of the infringement.⁸⁶ On its face, this seems to make the issue of how to handle unprofitable patents moot. If a patent proved unprofitable for its owner, then its infringement would yield zero damages, discouraging patent litigation in the first place. A closer look at damages calculations and other available remedies, however, shows that holders of unprofitable patents often will have strong incentives to sue infringers.

In assessing damages for patent infringement, profits generally mean *marginal* profits that would have accrued from producing the additional

84. Of course, a patent may have significant positive externalities on society that the patentee does not capture. For example, a patent might indicate a broad new set of approaches to addressing an old problem. These externalities, however, do not bear on the value of the contract rights founded on the patent.

85. There may be transaction costs involved with returning the labor and capital to other uses. In the patent context, however, the transaction costs involved with simply enforcing a patent are usually very high. Raymond Van Dyke, *Functional Economics: The New Language in Computing Lost Profits*, 34 AIPLA Q.J. 195, 215 n.115 (2006) (citing AIPLA REPORT OF THE ECONOMIC SURVEY 2005, at 22 (2005)) (observing that the typical cost of "litigation fees" for a simple patent case is three hundred fifty thousand dollars, and complicated, higher-damages cases range from six hundred fifty thousand dollars to 4.5 million dollars, typically costing three million dollars). The savings from avoiding additional patent enforcement might well outweigh the transaction costs of reallocating the labor and capital tied to an invalidated patent.

86. The other two possible measures of damages are established royalties and hypothetical royalties. See generally 7 CHISUM, *supra* note 15, § 20.03 (2002 & Supp. 2005) (describing the three measures of damages for patent infringement).

units.⁸⁷ Courts ignore *fixed* costs in profitability determinations.⁸⁸ This choice makes sense in that it awards to the plaintiff the money it would have made but for the defendant's infringement. For example, it means that a patentee with an unprofitable product with high fixed costs but low marginal costs could recover damages of nearly its full sale price per lost unit in damages. Suing to enforce unprofitable patents can thus net substantial sums of money.

Consider the following hypothetical involving a software program to manage the manufacture of widgets. Both companies *A* and *B* develop software for widget makers, and both recognize the potential for a new software process to run it. Company *B* talks to some of its customers and realizes that the process is an obvious next step and that many widget makers will want their in-house engineers to develop the software. In contrast, *A* does not talk to its customers, and hence does not realize the obviousness of the process. *A* then patents the process,⁸⁹ and invests one million dollars in developing the software based on it.

However, *A* sells only fifty installations at ten thousand dollars per installation for total revenues of five hundred thousand dollars. For each installation sold, *A* has an average *loss* of five thousand dollars but a marginal *profit* of ten thousand dollars, since it costs nothing to create another copy of an already-written software program.⁹⁰ If *A* successfully sues a group of widget-makers who developed their own version, it will get damages of ten thousand dollars per lost installation. Incidentally, if *A* also wins a permanent injunction against the widget-makers, it could threaten temporarily to shut down the defendants' operations, extracting substantially more.⁹¹ A widget-maker would be willing to pay up to its full expected profits to buy off an injunction that

87. *Paper Converting Mach. Co. v. Magna-Graphics Corp.*, 745 F.2d 11, 22 (Fed. Cir. 1984) ("The incremental income approach to the computation of lost profits is well established in the law relating to patent damages."); see also 7 CHISUM, *supra* note 15, § 20.03[1][d][ii] (2002 & Supp. 2005). Judge Easterbrook, known for his strong law and economics reasoning, has realized that this simplifies matters too much. In one case, he based damages on the shape of the demand curve. *In re Mahurkar Double Luman Hemodialysis Catheter Patent Litig.*, 831 F. Supp. 1354, 1385 (N.D. Ill. 1993).

88. *Magna-Graphics Corp.*, 745 F.2d at 22.

89. The PTO often issues patents on inventions that later litigation determines are obvious. See Allison & Lemley, *supra* note 3.

90. Concededly, this hypothetical is somewhat simplified because additional installations would likely involve some marginal costs, such as sales commissions, product manuals, and support.

91. See *eBay Inc. v. MercExchange, L.L.C.*, 126 S. Ct. 1837 (2006) (holding that courts should not issue permanent injunctions against infringers as a matter of right, but only if the traditional four-factor equity test for permanent injunctions dictates an injunction). Justice Kennedy's concurrence remarked that the threat of an injunction "can be employed as a bargaining tool to charge exorbitant fees." *Id.* at 1842 (Kennedy, J., concurring).

otherwise might shut down production while its engineers retool to work around the patent.

Using marginal profits to measure damages gives patentees an especially strong incentive to sue to enforce unprofitable patents in industries with low marginal costs. These industries include software and pharmaceuticals. Disturbingly, Company *A* in the hypothetical above could have intended this result all along, knowing that the patent was likely obvious but planning on using it to push its software on widget-makers.⁹² Alternatively, *A* could have had mixed motives, hoping to produce a profit without resorting to threats of patent litigation, but keeping it as a backup option.

Other factors also increase the value of suing for damages on an unprofitable patent. First, any reasonable doubt in the measure of damages is resolved in favor of the plaintiff.⁹³ Second, defendants' trial counsel cannot make too much of their case against large damages awards without appearing to the jury to admit to the infringement in the first place.⁹⁴ Third, 35 U.S.C. § 284 expressly provides that damages shall "in no event [be] less than a reasonable royalty . . ."⁹⁵ This section provides an alternative measure of damages that acts as a minimum floor, ensuring that patentees have incentives to sue on many otherwise unprofitable patents.

D. Origins of Commercial Success as Revenues

Given the wide acceptance that profits, and not revenues, motivate business decisions,⁹⁶ why did jurisprudence come to rely upon revenues? No published opinion known to the author actually explains the decision to use revenues instead of profits, and the judges who first interpreted *Graham* are no longer available to explain their reasoning, making any answers necessarily speculative. One possibility is that many judges come from private practice, where partner compensation has increasingly been determined by revenue

92. Company *B* in the hypothetical above might have also recognized this possibility but decided against it because of scruples or fear of alienating widget makers who bought another of its products.

93. See *Kaufman Co. v. Lantech, Inc.*, 926 F.2d 1136, 1141 (Fed. Cir. 1991) ("Any doubts regarding the calculatory precision of the damage amount must be resolved against the infringer.").

94. Juries often act in a seemingly irrational manner when awarding damages in patent cases. See, e.g., *Standard Havens Prods., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1374 (Fed. Cir. 1991) (finding that a \$5.93 million award was not "speculative" despite the fact that "neither party can ascertain exactly how it was calculated").

95. 35 U.S.C. § 284 (2000).

96. See, e.g., RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* 10 (6th ed. 2003).

generation.⁹⁷ It is also possible that the judges who first introduced revenue as the primary measure were not schooled in law and economics. Indeed, *Graham* came down in 1966 as the law and economics movement was in its nascence.⁹⁸

An intriguing alternative explanation is that American businesses paid more attention to revenues forty years ago than they do now. In 1959, seven years before *Graham*, economist William J. Baumol put forth the “Revenue Maximization Hypothesis.”⁹⁹ He posited that structural and incentive factors, such as a distaste for laying off employees,¹⁰⁰ made many executives focus on increasing revenues once they had achieved a minimum acceptable profit level.¹⁰¹ Baumol wrote, “Surely it is common experience that, when one asks an executive, ‘How’s business?’, he will answer that his *sales* have been increasing (or decreasing), and talk about his profit only as an afterthought, if at all.”¹⁰² This answer could easily have come from the published opinions of many federal judges. When asked, “How commercially successful is this patentee?” judges write of increasing or decreasing sales, with profits only mentioned as an afterthought, if at all.¹⁰³

Starting in the 1930s, the profit-maximizing incentives of the managers of publicly traded corporations weakened “as corporations had become larger, management ownership had shrunk and shareholders had become more widely dispersed.”¹⁰⁴ This trend reversed in the 1980s and 1990s, with a number of changes in corporate governance, including the use of hostile takeovers to remove underperforming managers,¹⁰⁵ the rise of shareholder activism,¹⁰⁶ and, above all, the increase in incentive-based CEO compensation such as stock

97. See Milton C. Regan, Jr., *Taking Law Firms Seriously*, 16 GEO. J. LEGAL ETHICS 155, 157 (2002). One could object that the “eat what you kill” system had not yet become the dominant model by the 1960s, but revenue concerns had always been on the minds of law firm partners. The current focus of law firms on revenue is unmistakable, and certainly helps explain the continued vitality of revenues in commercial success jurisprudence.

98. As just one of many possible examples, Richard Posner published the first edition of his first book, *Economic Analysis of Law*, fully seven years after *Graham*. See RICHARD A. POSNER, *ECONOMIC ANALYSIS OF LAW* (1st ed. 1972).

99. WILLIAM J. BAUMOL, *BUSINESS BEHAVIOR, VALUE AND GROWTH* 45-53 (1959).

100. *Id.* at 46.

101. *Id.* at 49.

102. *Id.* at 47.

103. See *supra* notes 51-54 and accompanying text.

104. See Bengt Holmstrom & Steven N. Kaplan, *Corporate Governance and Merger Activity in the United States: Making Sense of the 1980s and 1990s*, J. ECON. PERSP., Spring 2001, at 121, 129 (discussing several works by Michael C. Jensen).

105. See *id.*

106. *Id.* at 134-35.

options.¹⁰⁷ The press lionizes managers, like former General Electric CEO Jack Welch, who excel at maximizing their company's expected profit streams, as reflected in their stock price.¹⁰⁸ Corporate law around the world is increasingly moving toward putting profits and shareholders first.¹⁰⁹ Whatever one's ideological take on corporations' current relentless focus on earnings and stock prices, few would think their managers' version of commercial success is revenue.

Publicly traded corporations, of course, do not commercialize all patents. Venture capital has exploded since *Graham* from virtually nothing¹¹⁰ to raising new capital at an annualized rate of twenty-nine billion dollars per year as of this writing,¹¹¹ while financing the commercialization of an increasing portion of U.S. innovation.¹¹² Venture capital funds are structured to provide very strong incentives for their managers to focus on profitability, typically paying

107. *Id.* at 133.

108. See, e.g., *The Revolutionary Spirit*, ECONOMIST, Sept. 18, 1999, at 17, 17 (praising General Electric's then-CEO Jack Welch, under whom the company's share price rose "thirtyfold").

109. See, e.g., *id.* ("If the past decade has had a single theme, it has been the transformation of American capitalism. This is seen not just in record profits at American firms . . . it is more visible still in companies around the world falling over themselves to ape the American way . . . Michelin, once the epitome of the French, state-supported way, has caused outrage by proposing to cut its workforce even when profits are healthy."). This is relevant because roughly half of all patents issued by the U.S. PTO have listed inventors residing outside the United States. See PTO, *Patent Counts by Country/State and Year* (2007), available at http://www.uspto.gov/go/taf/cst_utl.pdf (noting that 83,948 of the 173,771 patents issued in 2006 listed nonresident inventors); see also Henry Hansmann & Reinier Kraakman, *The End of History for Corporate Law*, 89 GEO. L.J. 439 (2001) (arguing that most countries' corporate law will converge toward a "standard model" of U.S.-style shareholder control). Hansmann and Kraakman do not even consider America to have been shareholder-centric in the 1950s and 1960s, being "manager-oriented" rather than shareholder-oriented. *Id.* at 443-44.

110. See PAUL GOMPERS & JOSH LERNER, *THE VENTURE CAPITAL CYCLE* 1 (2d ed. 2004) (describing annual inflows at virtually zero in the mid-1970s, nearly a decade after *Graham*).

111. See Press Release, Nat'l Venture Capital Ass'n & Thomson Fin., *Venture Capital Fundraising Activity Healthy and Prudent in Second Quarter of 2007* (July 16, 2007), available at <http://www.nvca.org/pdf/Q207VCFundraisingfinal.pdf> (reporting \$7.2 billion in the second quarter of 2007, which annualizes to a rate of \$28.8 billion). Of course, inflows were considerably higher at the peak of the dot-com boom in 2000. GOMPERS & LERNER, *supra* note 110, at 1 (reporting inflows of \$105 billion in 2000).

112. See GOMPERS & LERNER, *supra* note 110, at 306 (estimating that by 1998, "venture funding accounted for about fourteen percent of U.S. innovative activity," and finding that venture capital has had a significant positive impact on patenting); see also Holmstrom & Kaplan, *supra* note 104, at 136-37 (locating increasing use of venture capital in a trend of decentralization in the U.S. economy); William A. Sahlman, *The Structure and Governance of Venture-Capital Organizations*, 27 J. FIN. ECON. 473, 482 (1990) (listing some notable venture capital-backed successes).

managers twenty percent of the fund's profits.¹¹³ Fund managers keep close control over the ventures they finance, maximizing long-term profit streams, which determine the price the venture will fetch upon resale or public stock offering.¹¹⁴ This incentive scheme leads venture capital funds, like CEOs, to keep a strong focus on profits, a focus that judges should recognize by moving toward using profits as the measure of commercial success.

III. IMPLEMENTING PROFITS AS COMMERCIAL SUCCESS

Profits equal revenues minus costs. This relationship highlights two potential drawbacks to using profits instead of revenues to prove or disprove commercial success. First, determining profitability requires calculating costs, which requires additional calculation. Second, since costs—like revenues—can be manipulated, additional potential for “fuzzy numbers” enters the picture.

Neither of these two drawbacks should prevent using profits instead of revenues. Courts have significant experience in determining profits in many other situations, including assessing patent damages.¹¹⁵ Corporate scandals such as Xerox's have shown the extreme susceptibility of revenue to manipulation.¹¹⁶ Moreover, companies typically already retain the appropriate profitability records for other purposes.

This Part considers the practical aspects of having courts use profits rather than revenue to determine commercial success. It first details how courts should measure profits in the simplest case, where the firm in question markets only the patented invention. It then looks at how the accounting extends to the more complex situation where the patentee has multiple products. It then argues that the changes from revenues to profits would not create more work for courts and could even increase judicial efficiency. The Part concludes by noting that using profits does not create any perverse incentives.

A. Simplest Case: Firm Only Markets the Patented Invention

In the simplest case, a court must determine the profitability of a patentee who sells only products embodying the patented invention. Looking at the

113. GOMPERS & LERNER, *supra* note 110, at 91; Sahlman, *supra* note 112, at 491.

114. See Sahlman, *supra* note 112, at 506-10.

115. Of course, courts recognize the fact that economic profits—the ideal to be used under either classical or prospect theory—often differ widely from accounting profits. See, e.g., *Telurate Sys., Inc. v. Caro*, 689 F. Supp. 221, 238 (S.D.N.Y. 1988).

116. See, e.g., Complaint, *SEC v. Xerox Corp.*, No. 02-272789 (S.D.N.Y. Apr. 11, 2002), available at <http://www.sec.gov/litigation/complaints/compl17465.htm> (detailing how Xerox manipulated its revenues).

measures of profitability in this case will help clarify what measures to use in more complicated situations. Issues to consider include the appropriate timeframe, whether to include development costs, how to handle nondeveloped fixed costs, and what the benchmark should be.

First, over what timeframe should courts look to determine profitability? Many cases dealing with commercial success as revenue focus on annual numbers in the latest available year.¹¹⁷ This timeframe makes sense for a number of reasons: it provides a large sample size, seasonal variations cancel out over the course of a year, and financial and tax reporting numbers are audited every year. Alternatively, courts could look to the entire lifetime of the invention, from the firm's decision to pursue developing it through the present. Which makes the most sense?

Lack of profitability over an annual period should definitely *negate* any inference of commercial success from high revenue numbers or market share over the same year. As demonstrated in Subsection II.B.1, a lack of profitability severs the nexus between the merits of the invention and any other indicators of commercial success. Unprofitability indicates that the revenue or market share numbers resulted from setting the price to an unprofitable and hence unsustainable amount. This inference holds true over any discrete time period, whether a year, quarter, or decade.

Classical theory and prospect theory differ on what timeframe a patentee must look at *affirmatively* to prove commercial success. Classical theory, with its focus on inducing rational agents to invent, would require a patentee to show profitability in net present value over the entire period from the start of development through the present.¹¹⁸ Recall that inferring nonobviousness from commercial success requires an inference that the potential of the invention drew others to attempt to develop the invention. Economic theory predicts that firms make decisions based on the net present value of that decision. Looking

117. See, e.g., *Bose Corp. v. QSC Audio Prods., Inc.*, 293 F.3d 1367, 1392 (Fed. Cir. 2002) (annual sales of one hundred million dollars); *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 1482 (Fed. Cir. 1997) (annual sales of forty-eight million dollars); *Eli Lilly & Co. v. Generix Drug Sales, Inc.*, 460 F.2d 1096, 1099 (5th Cir. 1972) (current annual rate of sales exceeding sixty-five million dollars). Many other cases focus on lifetime sales. See, e.g., *Symbol Techs., Inc. v. Opticon, Inc.*, 935 F.2d 1569, 1579 (Fed. Cir. 1991) (one hundred and fifty million dollars of total sales); *Black & Decker Mfg. Co. v. Sears, Roebuck & Co.*, 679 F.2d 1101, 1104 (4th Cir. 1982) (total sales volume of approximately one hundred and sixty-two million dollars); *Ill. Tool Works, Inc. v. Sweetheart Plastics, Inc.*, 436 F.2d 1180, 1187 (7th Cir. 1971) (several billion cups sold).

118. Ideally, a court could determine the full measure of profits generated from the patented invention, but that would involve forecasting the future, a pursuit for which courts are badly suited.

back to the start of development should not pose a huge evidentiary problem, since patents only last twenty years from the application date.

Prospect theory would allow a patentee to show profitability over a much shorter timeframe, such as a year. This timeframe would best approximate the current value of the contract rights founded upon the validity of the patent, the same contract rights that prospect theory uses to justify using commercial success in the first place.¹¹⁹ Whether a court decides to adopt a lifetime or annual approach should depend on whether it prefers the prospect or classical theory, as well as evidentiary availability and judicial economy.

Second, courts should definitely include all of the costs of developing the patented invention into a marketable product. To see why, consider the absurd results if they did not: patents in industries with high development costs and low marginal costs would always appear profitable. This standard would find virtually all software and pharmaceutical patents nonobvious because much of the cost of products in those industries lies in their development.

If a court decided to use annual profit numbers, it would have to allocate some portion of the development costs to that year. The logical accounting approach is to amortize the development costs across the life of the patent, allocating a portion of the up-front development costs to each later year during which the patentee actually benefits from its investment. Both international accounting standards¹²⁰ and U.S. tax accounting¹²¹ actually require this treatment of development costs and could provide a starting point.

Third, it goes without saying that variable costs should factor into the profitability decision. Whether to include nondevelopment fixed costs, such as the machines used to manufacture the patented widgets or the salaries of widget engineers, presents a harder question. Classical theory would simply count these toward the overall profitability of the invention, since such costs would have factored into the decisions of others to attempt to develop the patent.

Prospect theory, which supports the use of commercial success because it indicates valuable contract rights founded on the patent, would also count fixed costs. Fixed costs virtually always involve contract rights, either explicitly

119. See *supra* Subsection I.B.2 (discussing why prospect theory leads to the conclusion of commercial success being relevant).

120. International Accounting Standard 38 permits amortization of development costs if certain criteria are met. International Accounting Standard Committee, International Accounting Standard 38 (1998), reprinted in 2003 O.J. (L 261) 258, 336-60, available at http://eur-lex.europa.eu/LexUriServ/site/en/oj/2003/l_261/l_26120031013en02580385.pdf; see also Deloitte Touche Tohmatsu, IAS Plus International Accounting Standards IAS 38, Intangible Assets, <http://www.iasplus.com/standard/ias38.htm> (last visited Nov. 30, 2007).

121. See 26 U.S.C. § 263A (2000).

or implicitly, and hence factor into the value of the overall contract rights founded on the patent. For example, a capital lease or loan taken out to purchase widget-manufacturing equipment factors explicitly into the current value of the contract rights. Alternatively, any owner's equity that went into purchasing widget-manufacturing equipment involves an implicit contract whereby the firm intends to earn a return on that investment.

Finally, the bar for finding profitability should not be zero. Instead, it should be the typical returns in the relevant industry for comparable projects.¹²² For example, consider an oil refining company that patented an improved refining process at the same time that the demand for refined oil products skyrocketed, boosting the profits of all refineries. The proper test for whether the refining process was a commercial success should be neither zero nor the average cost of capital. Rather, it should be the average level of profitability within the industry.

B. Multiple Products

The accounting becomes more complicated when the patent in question does not cover all of a firm's products or services. The question arises of how to allocate fixed costs. For example, consider a firm that produces product *X*, covered by the patent in question, and product *Y*, not covered by the patent. The firm manufactures both *X* and *Y* in the same factory on many of the same machines. How should a court allocate the cost of the factory, the machines, and the maintenance of those machines between products *X* and *Y*?

A whole field of accounting—cost accounting—addresses this very issue. These issues of allocation are fundamental to financial reporting, tax accounting,¹²³ and the internal accounting that supports management decisions. As a result, a firm must have already prepared these numbers in preparing its financial statements,¹²⁴ determining its taxes, and making production decisions. For the first two purposes, these numbers conform to relevant rules and are audited. For the third purpose, of supporting management decisions, a firm with inaccurate cost allocation would make

122. Effectively, this results in a measurement of whether there is a profit from an economic point of view, which would deduct the opportunity cost of the invested capital.

123. See 26 U.S.C. § 263A (2000) (uniform capitalization rules). See generally DAVID H. MARSHALL, WAYNE M. MCMANUS & DANIEL F. VIELE, ACCOUNTING 484-526 (7th ed. 2005) (discussing cost accounting).

124. Even nonpublic companies must generally produce audited financial statements. For example, firms receiving venture capital must provide audited financial statements to their investors. Similarly, firms seeking debt financing from banks or the bond market generally must also provide audited financial statements. See MARSHALL ET AL., *supra* note 123, at 18.

improper decisions about production volume, price, or a whole range of other business variables.¹²⁵

C. Factors Mitigating the Impact on Judicial Economy

The two measures of damages used in the majority of patent infringement cases—“lost profits” and “reasonable royalty”—require courts to calculate profit figures.¹²⁶ As a result, a court that calculates profit numbers once in determining the presence or absence of commercial success could save time at a later stage of the litigation. These savings further mitigate any additional judicial burden from using profits in place of revenues.

The “lost profits” measure of damages involves calculation of the cost structure of the relevant product. A court would have already investigated this in determining profitability for commercial success. When the patentee or infringer produces multiple products, courts have to determine issues of cost allocation.¹²⁷ A court that had already determined profitability for purposes of commercial success would have already investigated and determined how to allocate costs.

The “reasonable royalty” measure of damages requires the court to consider the fifteen factors described in *Georgia-Pacific Corp. v. U.S. Plywood Corp.*¹²⁸ No

125. It is always possible that a firm fudged these numbers in anticipation of patent litigation where commercial success might play a role. Financial reporting and tax reporting rules, however, put constraints on manipulation. Additionally, if the firm manipulated its internal management cost accounting numbers, its management decisions would seem irrational. For example, if the firm in the example above consistently attempted to allocate an undue share of the costs to the unpatented product Y, which presumably faces normal market pressures, then Y would likely consistently have returns below the firm’s cost of capital. This situation would make the firm’s decision to keep producing Y very suspect, which could indicate the need for an adjustment of cost away from Y toward X for the purposes of the litigation.

126. See 7 CHISUM, *supra* note 15, § 20.03 (2002 & Supp. 2005) (discussing monetary relief). Courts sometimes use a third measure of damages, “established royalty,” which does not involve a court investigation into profitability. See *id.* § 20.03[2] (discussing established royalty damages). An unscientific review of Federal Circuit cases in LexisNexis finds 217 mentions of “lost profits” and 205 mentions of “reasonable royalty,” as compared with only 36 mentions of “established royalty.” This suggests that a solid majority of patent cases involve one of the two measures of damages that do require a computation of profitability.

127. *Velo-Bind, Inc. v. Minn. Mining & Mfg. Co.*, 647 F.2d 965, 973 (9th Cir. 1981) (“[D]amages are limited to that part of the profits, which must be apportioned as between those created by the patent and those not so created . . .”); see also *Carbice Corp. v. Am. Patents Corp.*, 283 U.S. 27 (1931) (denying damages based on profits lost from sale of unpatented product related to patented product).

128. 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), *modified and aff’d sub nom.* *Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc.*, 446 F.2d 295 (2d Cir. 1971); see also *Rite-Hite Corp.*

fewer than four of these fifteen factors involve the existence or degree of overall profitability.¹²⁹ Unlike the “lost profits” measure, which generally only requires an understanding of marginal profits,¹³⁰ all four of these imply an understanding of overall profitability, taking into account total fixed and variable costs. Total profits are taken into account regardless of whether the patentee or infringer achieved the profits in question.¹³¹

Furthermore, a court lacking the expertise to determine profitability could easily delegate this task to a special master. The Federal Rules of Civil

v. Kelley Co., Inc., 56 F.3d 1538, 1555 (Fed. Cir. 1995) (en banc) (citing *Georgia-Pacific*, 318 F. Supp. at 1116).

129. The four *Georgia-Pacific* factors involving profits include the following:

8. The established *profitability* of the product made under the patent; its commercial success; and its current popularity.

....

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

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

....

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

Georgia-Pacific, 318 F. Supp. at 1120 (emphasis added). All four factors imply an understanding of overall profits to be reaped from the patented invention. For example, with relation to factor fifteen, no licensee would pay anything to license a patent when the fixed and variable costs of usage exceeded the revenues it could bring in.

Factor eight appears to contemplate precisely the same measure of profitability that this Note argues should apply to commercial success, including development costs. Factors twelve, thirteen, and fifteen seem to contemplate the potential profitability once the patentee has fully developed the invention up to the point that it is ready for licensing.

130. For more detailed analysis, see Judge Easterbrook’s discussion of lost profits in *In re Mahurkar Double Lumen Hemodialysis Catheter Patent Litigation*, 831 F. Supp. 1354, 1383-94 (N.D. Ill. 1993).

131. See *Trell v. Marlee Elecs. Corp.*, 912 F.2d 1443, 1446 (Fed. Cir. 1990). In *Trell*, the Federal Circuit noted that “[i]n determining the result of such a hypothetical negotiation, the district court may consider the infringer’s anticipated profits, as indicated by evidence of *actual* profits.” *Id.* (emphasis added). This wording implies overall profitability, including fixed and variable costs.

Procedure explicitly contemplate submitting accounting questions to special masters, and extensive case law arising from a variety of substantive areas of law has clarified many aspects of this procedure.¹³² District courts dealing with patent suits have long submitted accounting issues regarding damages to special masters.¹³³ Indeed, courts have also delegated a number of technical patent issues¹³⁴ to special masters, suggesting that district courts feel quite comfortable doing so.

D. Judicial Economies, Including Requiring a Threshold Profitability Showing

This Note concluded in Section II.B that a lack of profits negates any possible inference of commercial success. Judges could turn this conclusion into a time-saving evidentiary requirement that a patentee must make a preliminary showing of profitability before considering any commercial success or nexus-related discovery, motions, or evidence admission. Putting this burden on the patentee makes sense, as the patentee typically will have the easiest access to the relevant accounting data.

In those cases where the patentee failed to meet the burden of showing profitability, the trial court would no longer have to hear evidence and arguments based on commercial success. Also, recall that courts normally determine commercial success by “significant sales in a relevant market.”¹³⁵

132. See FED. R. CIV. P. 53(a)(1)(B)(ii) (“[A] court may appoint a master to . . . hold trial proceedings and make or recommend findings of fact on issues to be decided by the court without a jury if appointment is warranted by . . . the need to *perform an accounting or resolve a difficult computation of damages* . . .” (emphasis added)); see, e.g., *Smith v. Dental Prods. Co.*, 168 F.2d 516 (7th Cir. 1948) (death of a master). The eighty-two pages of annotations for FED. R. CIV. P. 53 provided in 28 U.S.C.A. (West 1992 & Supp. 2007) also illustrate this point.

133. See, e.g., *Studiengesellschaft Kohle, m.b.H. v. Dart Indus., Inc.*, 862 F.2d 1564 (Fed. Cir. 1988) (reviewing reasonable royalty calculated by a master); *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1157 (6th Cir. 1978) (“[T]he accuracy of the patent owner’s accounting method is a ‘matter to be decided on the basis of testimony in the hearing before the Master.’” (quoting *Gen. Elec. Co. v. Sciaky Bros., Inc.*, 415 F.2d 1068, 1075 (6th Cir. 1969))). On the importance of profits to damages, see *supra* Section III.C.

134. See, e.g., *Lacks Indus., Inc. v. McKechnie Vehicle Components USA, Inc.*, 322 F.3d 1335 (Fed. Cir. 2003) (delegating the issue of whether the on-sale bar invalidated claims); *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 584 (Fed. Cir. 2000) (doctrine of equivalents), *rev’d on other grounds*, 535 U.S. 722 (2002); *Riverwood Int’l Corp. v. Mead Corp.*, 212 F.3d 1365, 1367 (Fed. Cir. 2000) (level of skill in the art); *Desper Prods., Inc. v. QSound Labs, Inc.*, 157 F.3d 1325 (Fed. Cir. 1998) (claim construction); *Newman v. Quigg*, 877 F.2d 1575, 1581 (Fed. Cir.), *modified*, 886 F.2d 329 (Fed. Cir. 1989) (patentability itself); *Power Mosfet Techs., L.L.C. v. Siemens AG*, Nos. 2:99CV168-DF, 2:OOCV208-DF, 2002 U.S. Dist. LEXIS 27560, at *37-38 (E.D. Tex. Sept. 30, 2002) (claim construction).

135. See sources cited *supra* note 51.

Using profitability instead would avoid the determination of either the “relevant” market or what constitutes “significant” sales. In the absence of profits, moreover, a court would have no need to expend significant resources on the vexing question of whether a nexus exists.¹³⁶

E. Using Profits Creates Few Incentives To Be Inefficient

The parallels between patent and antitrust law run deep¹³⁷: a patent is, after all, a government-granted monopoly of sorts.¹³⁸ Profitability acts as a “secondary consideration” in antitrust as well, providing objective but indirect indicia of market power.¹³⁹ Critics of antitrust law’s use of profits as proof point to its potentially perverse incentives, encouraging firms with market power to squander resources to appear less profitable and avoid antitrust liability.¹⁴⁰ Using profitability in patent law would have the *opposite* effect on patentees and their licensees: they have every incentive to pursue efficiency in the hopes of proving commercial success in future litigation.

Of course, an infringer’s commercial success can also be used by a patentee to show the patent’s nonobviousness. For example, in *Gambro Lundia AB v. Baxter Healthcare Corp.*,¹⁴¹ the patentee proved the commercial success of a patent on hemodialysis by noting that the infringer (i.e., the defendant) had sold 14,800 dialysis machines embodying the patent.¹⁴² Facing such a situation, infringers would indeed appear to have incentives to squander resources to appear less profitable and hence avoid a finding of nonobviousness.

136. Indeed, determining the existence of a nexus appears to be quite difficult. For example, Chisum devotes significantly more space to the case law regarding nexus than to the existence of commercial success itself. Compare 2 CHISUM, *supra* note 15, § 5.05[2][f], *with id.* § 5.05[2][b]-[2][e].

137. See Louis Kaplow, *The Patent-Antitrust Intersection: A Reappraisal*, 97 HARV. L. REV. 1813 (1984); George L. Priest, *Cartels and Patent License Arrangements*, 20 J.L. & ECON. 309, 309 (1977). *But see* 2A PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW ¶ 518(b) (2d ed. 2002) (noting that lower courts have been moving away from presuming market power from patent rights).

138. In the future, judges, practitioners, and scholars in patent law might look to antitrust law to further develop their understanding of commercial success. For example, antitrust has developed several methods of measuring market power that courts could use to measure how much a patented invention differentiates a product from the rest of the market. This is a promising area for future research.

139. AREEDA & HOVENKAMP, *supra* note 137, ¶ 516.

140. *See id.* ¶ 516f3 (taking the “quiet life” over profits).

141. 110 F.3d 1573 (Fed. Cir. 1997).

142. *Id.* at 1579; *see also* Syntex (U.S.A.) Inc. v. Paragon Optical Inc., 7 U.S.P.Q.2d (BNA) 1001, 1005 (D. Ariz. 1987) (measuring commercial success by sales of the infringer and patentee).

Three factors mitigate the impact of this incentive. First and most importantly, most cases involve the commercial success of the patentee, not the infringer.¹⁴³ Second, any infringer who acts on these incentives faces an increased chance of being found a willful infringer, liable for treble damages.¹⁴⁴ Third, patent terms last only twenty years, ensuring only a limited period of wastefulness at most. Overall, using profits to measure commercial success would improve the efficiency of incentives, if it changes them at all.

IV. AN ALTERNATE NORMATIVE REASON TO USE REVENUE

Part II of this Note argued that profits should supplant revenues as the measure of commercial success in showing nonobviousness. This Part considers a normative economic counterargument, which weighs in favor of keeping revenues as the measure of commercial success.

A. Normative Argument

Commentators and economists have long recognized that the patent system involves a tradeoff. Society gives patentees a limited-term monopoly, which allows the patentee to raise prices above marginal costs to extract monopoly rents. This monopoly has attendant costs in terms of deadweight loss (potential utility which goes to neither the producer nor the consumer) and lessened consumer surplus (because the product gets to fewer consumers, at a higher price). In return, individuals and organizations get an incentive to produce valuable inventions.¹⁴⁵

Consider a typical market, where marginal costs are above zero for every unit sold (i.e., producing an additional unit for sale costs additional money). If the patentee is completely unworried about patent validity, the figure below demonstrates how the patentee (or its licensees) will behave. It sells at the profit-maximizing price, where marginal cost (*MC*) equals marginal revenue (*MR*). This price is above the socially optimal price, which is where the additional cost of producing one unit equals what a consumer will pay for it.¹⁴⁶

In this way, using revenues as the proof of commercial success encourages firms to set a price below the profit-maximizing monopoly price, thereby minimizing the deadweight loss to society and increasing consumer surplus. In

143. 2 CHISUM, *supra* note 15, § 5.05[2][g].

144. 35 U.S.C. § 284 (2000); *see also* Read Corp. v. Portec, Inc., 970 F.2d 816, 826 (Fed. Cir. 1992) (noting that willfulness typically merits treble damages).

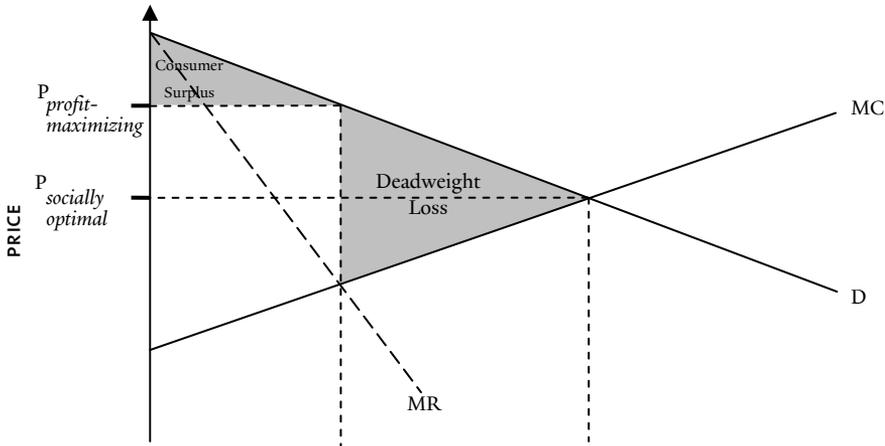
145. LANDES & POSNER, *supra* note 22, at 11-36.

146. This Figure assumes no price discrimination.

other words, jurisprudence tells patentees, "If you take *less* than full monopoly profits in the short term, you are more likely to have your patent upheld, and hence be more likely to maintain some monopoly profits for the *full* patent term."¹⁴⁷ Measuring commercial success with revenues mitigates the deadweight loss from granting a full monopoly to the patentee.¹⁴⁸

Figure 1.

PROFIT-MAXIMIZING PATENTEE ONE HUNDRED PERCENT CERTAIN OF VALIDITY



147. Consider the following simple model for a product covered by a single patent with one hundred percent probability of validity, produced by the patentee, with p for price and q for quantity. Consider a demand curve described by $p = 100 - q$, and marginal cost of production described by $p = 25 + \frac{1}{2}q$. Differentiating and solving, we see that the patentee will maximize profits by producing only thirty units at seventy dollars per unit, whereas the socially optimal production occurs at fifty units at fifty dollars per unit. This leads to a deadweight loss of two hundred dollars, with the patentee reaping profits of \$1125 before paying fixed costs.

Now alter the model to allow for the patent to be invalidated, with increased probability of validity with increased revenues, as might happen with current commercial success doctrine. Specifically, the probability of enforcement equals $\ln(p^* q^* e / \$2500)$. A risk-neutral patentee will maximize profits by choosing the production quantity that maximizes the product of this probability function with the actual profits reaped at that quantity. The patentee will maximize expected profitability by producing thirty-six units at sixty-four dollars per unit. The deadweight loss has gone down to ninety-eight dollars (a fifty-one percent decline), while the patentee reaps pre-fixed-cost profits of \$756 (a thirty-three percent decline). Of course, whether this completely wipes out innovation incentives depends entirely on the fixed costs of the patentee, including R&D costs. If those costs were more than \$756, then this shift will leave the previously profitable patentee with a loss.

148. Cf. Ian Ayres & Paul Klemperer, *Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 MICH. L. REV. 985 (1999) (arguing that uncertainty and delay in the patent system may have net social benefits by preventing patentees from extracting full monopoly profits).

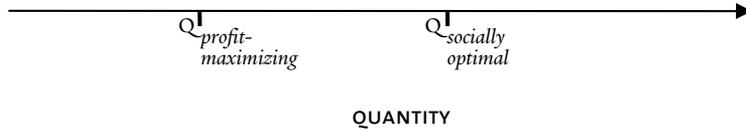
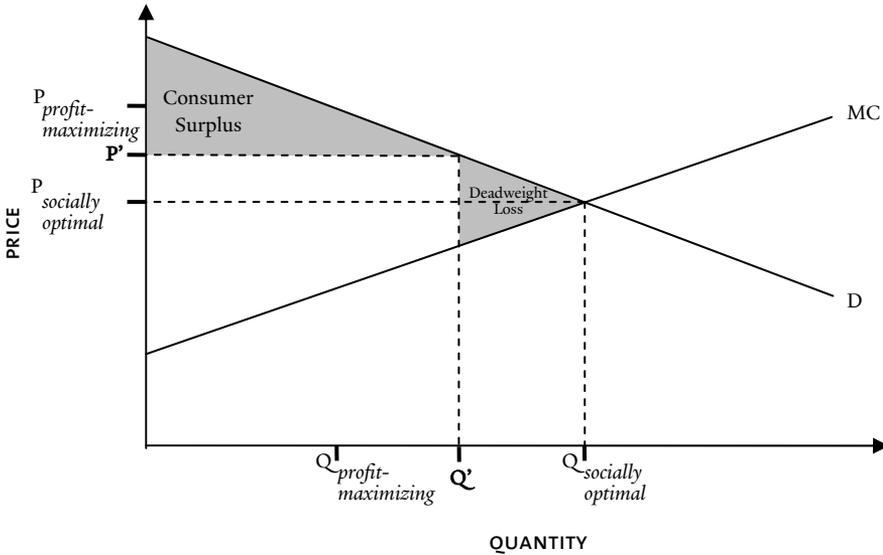


Figure 2.
PATENTEE HOPING TO SHOW LARGE REVENUES AS PROOF OF COMMERCIAL SUCCESS



B. Counterargument: Unclear Tradeoffs

Using revenues to measure commercial success reduces the ex post deadweight costs of granting a patent monopoly. This does not say anything, however, about the wisdom of this policy. These ex post costs are simply part of the patent tradeoff: in return for their monopoly profits, society creates incentives for the technological advances that drive long-term economic growth. In the extreme, society could reduce these ex post costs to zero by simply making all patents unenforceable.¹⁴⁹ However, that would also take away many of the financial incentives to produce new technologies.¹⁵⁰

149. With the inability to exclude others from using the invention, the patentee's profit-maximizing strategy would be to sell $Q_{socially\ optimal}$ units at price $P_{socially\ optimal}$.

150. There are many other potential incentives to produce new technologies (e.g., being first to market or using trade secret protection).

Economists simply do not know and cannot measure the socially optimal level of patent protection.¹⁵¹ Invention is an extremely unpredictable process, performed by a wildly diverse group of individuals – ranging from scientists in large laboratories to tinkerers in their garages – who have complex motivations, part financial, part academic prestige, part sheer curiosity. Complicating matters further, patentees extract monopoly profits in a variety of manners, ranging from industrial production to licensing to litigation. Patentees only remain uniform in keeping their marginal cost structure as private as possible from competitors – as well as from economists.

Since economics cannot determine whether use of revenues or profits provides the economically optimal incentives to invent, courts should instead choose the standard that leads to the most accurate nonobviousness determination. This Note has aimed to show that measuring commercial success as profits does just this. Additionally, courts might also aim for consistency and honoring congressional intent. Congress has clearly indicated that patentees have the right to extract monopoly profits as an incentive to invent,¹⁵² and case law has consistently honored that determination.¹⁵³

151. See, e.g., SUBCOMM. ON PATENTS, TRADEMARKS & COPYRIGHTS OF THE S. COMM. ON THE JUDICIARY, 85TH CONG., AN ECONOMIC REVIEW OF THE PATENTS SYSTEM 80 (Comm. Print 1958) (prepared by Fritz Machlup), available at <http://www.mises.org/etexts/patentsystem.pdf> (“If we did not have a patent system, it would be irresponsible, on the basis of our present knowledge of its economic consequences, to recommend instituting one. But since we have had a patent system for a long time, it would be irresponsible, on the basis of our present knowledge, to recommend abolishing it.”); George L. Priest, *What Economists Can Tell Lawyers About Intellectual Property: Comment on Cheung*, in 8 RESEARCH IN LAW & ECONOMICS 19, 24 (1986) (“I believe there is little hope that economic analysis can resolve the question of the appropriate scope of the protection of intellectual property.”).

Despite his uncertainty about the patent system as a whole, Machlup did state that marginal changes to the system might benefit society: “[A]lthough ‘it may be impossible to estimate the total benefits and costs of the patent system, one may attempt to analyze the marginal benefits and costs of particular moderate changes in the duration, scope, or strength of patent protection.’” 3 FRITZ MACHLUP, *THE ECONOMICS OF INFORMATION AND HUMAN CAPITAL* 165 (1984). This Note proposes just such a moderate change. See also Daniel R. Cahoy, *An Incrementalist Approach to Patent Reform Policy*, 9 N.Y.U. J. LEGIS. & PUB. POL’Y 587 (2006).

152. For example, consider the provisions in Title 35 that allow patentees to engage in behavior that would otherwise run afoul of antitrust law. E.g., 35 U.S.C. § 261 (2000) (divvying up sales territory); 35 U.S.C. § 271(d)(5) (2000) (tying a patented product to a separate product).
153. E.g., *In re Mahurkar Double Luman Hemodialysis Catheter Patent Litig.*, 831 F. Supp. 1354 (N.D. Ill. 1993).

C. Counterargument: Inapplicable to Newer Industries, yet Still Inaccurate

This Note assumed in Section IV.A that marginal cost was consistently greater than zero. This assumption makes sense for many industries, such as heavy manufacturing, oil refining, or aerospace. In these industries, the revenue-maximizing incentives provided by revenue-based jurisprudence would indeed mitigate the ex post costs of the patent monopoly.¹⁵⁴

This assumption, however, does not make sense for many of the industries that compose an ever-greater proportion of both U.S. economic activity and patents issued. It costs almost nothing for Oracle to create another copy of its database software or for Pfizer to create another pill. These industries have high fixed costs for R&D, but marginal costs near zero. All firms maximize profits (or at least minimize losses) by producing until marginal costs equal marginal revenues. So, firms with marginal costs near zero will already produce until marginal revenues are also near zero. By definition, when marginal revenues are zero, the firm has maximized its revenues.

In other words, firms with low marginal costs—even those without patents—already maximize their profits (or minimize losses) by maximizing revenues.¹⁵⁵ Measuring commercial success as revenues provides no incentives to mitigate the ex post costs of a patent, while providing the fact-finder a less accurate proxy for nonobviousness than would using profitability.¹⁵⁶ As the economy and composition of patent cases shifts away from the “old economy” toward high-R&D industries, using revenues will do less and less to minimize ex post costs, while remaining inaccurate and prone to abuse.

CONCLUSION

Commercial success has become a crucial factor in determining nonobviousness. Courts currently accept proof for commercial success that comports with neither classical theory’s inferential basis for it, nor prospect theory’s “valuable contract rights” basis, nor congressional intent. By using revenues instead of profits, courts incorrectly find no commercial success in cases where the invention’s performance on the market should provide strong

154. As mentioned in Section IV.B., these ex post costs are the cost of the invention spurred by the patent system.

155. Maximizing profits (or minimizing losses) from a patent should *not* be confused with actually *having* profits from a patent, which this Note argues should be the basis for proving commercial success.

156. See *supra* Part II.

proof of nonobviousness.¹⁵⁷ Conversely, courts will incorrectly infer nonobviousness from substantial revenues achieved through an unprofitable level of production.¹⁵⁸

Using profits will put little additional burden on courts and may actually lighten their burden. Profits are simply revenues, which courts already calculate, minus costs, of which businesses must keep track for tax, financial reporting, and management purposes. Having calculated profits in determining commercial success, a fact-finder who has found infringement and must calculate damages will often find much of the requisite data already available. Should a court feel it lacks the requisite accounting skill, the Federal Rules of Civil Procedure provide extensive guidance on employing a special master. Courts could even save substantial resources by requiring the patentee to make an initial showing of profitability before allowing any discovery, motions, or arguments on commercial success.

Commercial success has existed in patent law for over a century¹⁵⁹ and has a strong basis in both Supreme Court and Federal Circuit precedent.¹⁶⁰ Although Congress is contemplating a number of reforms to the patent system, it will likely leave commercial success as is.¹⁶¹ Since commercial success will continue to play a pivotal role in patent litigation, courts should move from revenues to profits as the primary method of proof.

157. See *supra* Section II.A.

158. See *supra* Section II.B.

159. *Smith v. Goodyear Dental Vulcanite Co.*, 93 U.S. 486, 495 (1876). See generally *Kitch*, *supra* note 16 (reviewing the history of commercial success jurisprudence).

160. See *Graham v. John Deere Co.*, 383 U.S. 1 (1966).

161. See, e.g., Patent Reform Act of 2005, H.R. 2795, 109th Cong. (2005) (not mentioning commercial success). *But see* FEDERAL TRADE COMMISSION, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY ch. 4, at 19 (2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (recommending shifting the burden of proof of nexus to the patentee and a case-by-case determination of relevance).