



Balancing Judicial Misvaluation and Patent Hold-Up: Some Principles for Considering Injunctive Relief After *eBay*

Nicholas P. Chan

ABSTRACT

It is increasingly common for patent infringers to sink substantial resources into a product's development, manufacture, and marketing before a patentee alleges infringement. Infringers may sign contracts, hire employees, and purchase specialized facilities and equipment—all before realizing that their product might infringe someone else's patent. If a patent holder successfully proves infringement, the court must remedy the infringement by awarding the patentee either forward-looking damages or an injunction. Often, neither presents a particularly palatable option.

To award the patentee damages, the court must assign a value to the patentee's invention. Judicial valuation of technology is simultaneously expensive and prone to significant error. The patent system is designed to reward those who innovate in ways the market endorses; when courts, rather than markets, dictate the value of an invention, they distort the economic incentives the patent system relies on to promote innovation.

But if the court issues an injunction instead, the infringer may suffer catastrophic losses on its sunk investments if the injunction is actually enforced. Knowing this, the patentee could wield the injunction to threaten those investments and demand payment for their continued safety. This type of strategic behavior, known as "patent hold-up," allows patentees to capture payments not tied to the merits of their invention. Handing patentees this windfall distorts their incentives and encourages other parties involved in innovation to behave in undesirable ways.

This Comment explores how judicial misvaluation and patent hold-up distort incentives in ways that cause harm to research and innovation. It then sketches guidelines for estimating the magnitude of these distortions in specific cases and urges courts to weigh these distortions when considering injunctive relief. When neither damages nor an injunction presents a palatable solution to infringement, a court that understands the adverse consequences of misvaluation and hold-up will be able to choose the lesser of two evils.

AUTHOR

Nicholas P. Chan is a Comments Editor of *UCLA Law Review*, volume 59, and J.D. Candidate, 2012, at UCLA School of Law.

I am grateful to Professor Doug Lichtman for his support and encouragement and for sharing his tremendous insight on this topic. I thank Julius Nam, Amanda Wolin, Aaron Sussman, Warren Biro, and the other members of the *UCLA Law Review* for all their hard work and help in refining this Comment. I also thank Marize Alphonso and Nick Palatucci for providing helpful feedback and suggestions.

TABLE OF CONTENTS

INTRODUCTION	748
I. INJUNCTIONS BEFORE <i>EBAY</i> AND THE <i>EBAY</i> CASE	751
II. APPLYING <i>EBAY</i>	752
A. Property Rule or Liability Rule: When Should an Injunction Issue?	753
B. Valuation Problems: The Case for Injunctions	759
1. The Economic Value of an Invention	759
2. Why Courts Struggle With Valuing Technology	761
3. The Problems Caused by Misvaluation	763
a. The Effects of Overvaluation on Patentee Incentives	764
b. The Effects of Overvaluation on Other Parties' Incentives	767
C. Hold-Up Problems: The Case for Damages	768
1. How Patent Hold-Up Works: A Look at the Apple iPhone	769
2. The Problems Caused by Patent Hold-Up	772
3. Judicial Reactions to Patent Hold-Up	774
D. Balancing Misvaluation and Hold-Up	776
1. A Threshold Requirement: Inadvertent Infringement	776
2. Assessing the Hold-Up Problem	779
3. Assessing the Valuation Problem	780
4. Balancing Costs and Issuing Relief	782
E. Grounding the Analysis in <i>eBay's</i> Four Factors	783
1. Irreparable Injury and Inadequacy of Damages	783
2. Balance of Hardships	784
3. Public Interest	786
CONCLUSION	787

INTRODUCTION

Courts have usually issued injunctions for patent infringement under the theory that markets value technology better than courts do. But recent developments in technology and business strategy have shown that this theory does not always hold true in practice.

Admittedly, courts are poorly equipped to assess a patent's value. Our adversarial system, for all its strengths, is not an ideal method for valuing technology. At trial, each side invariably presents its own expert witness to testify on the issue of damages, a process Judge Richard Posner disparagingly refers to as the "battle of experts."¹ After listening to the experts argue for wildly different numbers, the jurors are asked to award damages adequate to compensate the patent holder for the infringement. Not surprisingly, the number chosen seldom comes close to the patent's actual market value. Jurors will usually overvalue or undervalue the technology, awarding damages that excessively or inadequately compensate the patent holder. Either result distorts economic incentives the patent system was carefully calibrated to create, resulting in suboptimal levels of innovation.

It therefore makes sense that courts have long favored injunctive relief as a remedy for patent infringement. With an injunction, the court only needs to sign the order and let the parties—the market—decide the patent's value. The court dodges messy questions about market power, consumer preferences, and the like; and the court avoids the distortions caused by errors in its valuation of the technology. But recent changes in industry practices and the nature of technology² suggest that the private negotiations following an injunction may be plagued with troubling distortions of their own.

Severe distortions can occur when the defendant has already made substantial product-specific investments by the time a patentee alleges infringement.³ It can take years from the conception of a product before it reaches the marketplace. During this time, companies may sign agreements, hire employees, and invest in specialized and product-specific facilities, research, and equipment—all before realizing that their product might infringe someone

-
1. *Walgreen Co. v. Sara Creek Prop. Co.*, 966 F.2d 273, 276 (7th Cir. 1992).
 2. In the past, most products were covered by only one patent; the product was the invention. But today, many products contain dozens of patented components. See Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCIENCE 698, 699 (1998) (describing how many patents often read on a single product).
 3. I use the term "product-specific investment" to refer to investments that are made for the purpose of making a specific product and that have no use or value outside of that.

else's patent. If a patent holder proves infringement after the deals have been signed and the investments made, the infringer may suffer catastrophic losses on these investments if an injunction is enforced.

Knowing this, patent holders can wield the injunction threat to great effect in settlement negotiations.⁴ By threatening to enjoin the defendant's business, the patent holder in effect holds the defendant's product-specific investments hostage and can coerce settlement amounts that grossly exceed the value of the patent's technological contribution.⁵ The problem becomes even more acute when multiple patents cover the defendant's product, as is increasingly common.⁶ In those cases, a defendant's product-specific investments can include not only manufacturing facilities and the like, but also the amounts already paid and the contracts already signed to obtain permissions from other patent holders.

Characterized in the academic literature as "patent hold-up,"⁷ this opportunity for strategic behavior distorts patent valuation. The patentee receives a payment that mainly reflects the value of the defendant's product-specific investments rather than the value of the patent's technological contribution to the product. In other words, the patent holder receives an amount that is not tied to the merits of his invention. This distorts the economic incentives driving the patent system and results in suboptimal levels of innovation.

Until recently, courts deciding patent cases remained largely unaware of the problems caused by patent hold-up and continued to apply the "general rule

4. In 2006, the makers of BlackBerry paid \$612.5 million to avoid an injunction that would have shut down service to all BlackBerry devices in the United States. Mark Heinzl & Amol Sharma, *RIM to Pay NTP \$612.5 Million to Settle BlackBerry Patent Suit*, WALL ST. J., Mar. 4, 2006, at A1.

5. The economic value of a patent's technological contribution is discussed *infra* Part II.B.1.

6. Apple's iPhone, for example, is covered by well over two hundred patents. Many of them are owned by Apple—its then-CEO Steve Jobs proudly proclaimed at the 2007 Macworld Conference that the company had "filed for over 200 patents for all the inventions in the iPhone and we intend to protect them." Ryan Block, *Live From Macworld 2007: Steve Jobs Keynote*, ENGADGET (Jan. 9, 2007, 12:00 PM), <http://www.engadget.com/2007/01/09/live-from-macworld-2007-steve-jobs-keynote>. But the iPhone likely also reads on dozens of additional patents not owned by Apple, as evidenced by the endless complaints alleging patent infringement by the iPhone. See *infra* Part II.C.1; see also Mike Masnick, *Another Day, Another Patent Lawsuit Against Apple Over the iPhone*, TECHDIRT (Apr. 8, 2009, 11:07 PM), <http://www.techdirt.com/articles/20090408/2119394438.shtml> ("Apple has been sued over the iPhone over and over and over and over and over again. And now it's happened yet again. People talk about how every high tech product today is likely to be violated [sic] hundreds, if not thousands, of patents, and the iPhone seems to be on its way to proving that point.").

7. See, e.g., Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-Up*, 74 ANTITRUST L.J. 603 (2007); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991, 2008–10 (2007).

that courts will issue permanent injunctions against patent infringement absent exceptional circumstances.”⁸ The U.S. Supreme Court overturned this rule in *eBay Inc. v. MercExchange, L.L.C.*,⁹ admonishing the Federal Circuit for categorically granting injunctive relief in patent cases.¹⁰ The Court instructed lower courts to look to “well-established principles of equity” when deciding whether to grant or deny an injunction, and provided a four-factor test for lower courts to apply.¹¹ But the majority provided no guidance on how to apply these factors and took no position on whether an injunction was appropriate in the case before them. The result has been much uncertainty in patent disputes¹² and much ink spilled over *eBay*’s meaning.¹³

This Comment argues that, among other things, *eBay* empowers courts to foreclose a patentee’s use of product-specific investments for leverage in negotiations. In the world of automatic injunctions before *eBay*, an infringer with product-specific investments faced a Hobson’s choice: Negotiate with the patentee on his terms or face an injunction that would render its investments worthless. A rational patentee would exploit this situation by offering to settle for an amount that reflected the value of the infringer’s product-specific investments.¹⁴ *eBay* enables courts to stop this abusive tactic by removing the injunction threat when the opportunity for patent hold-up presents itself. With the prospect of a crippling and disproportionate injunction removed, a defendant can choose to litigate and ask the court to assess damages rather than negotiate with its investments held hostage. Although damages are a flawed remedy for patent infringement, courts should use their discretion under *eBay* to deny injunctions when the costs of patent hold-up make injunctive relief an even more flawed option.

8. *MercExchange, L.L.C. v. eBay, Inc.*, 401 F.3d 1323, 1339 (Fed. Cir. 2005).

9. 547 U.S. 388 (2006).

10. *Id.* at 394 (“[T]he Court of Appeals erred in its categorical grant of [injunctive] relief.”).

11. *Id.* at 391. The four factors are: (1) whether the plaintiff suffered irreparable injury; (2) whether remedies at law, such as damages, are inadequate to compensate for that injury; (3) whether the balance of hardships between the plaintiff and defendant warrants a remedy in equity; and (4) whether the public interest would be disserved by an injunction. *Id.*

12. The risk of facing an injunction has become *the* leading issue in all kinds of diligence discussions and litigation risk assessments.

13. See, e.g., Douglas Ellis et al., *The Economic Implications (and Uncertainties) of Obtaining Permanent Injunctive Relief After eBay v. MercExchange*, 17 FED. CIR. B.J. 437 (2008); James M. Fischer, *What Hath eBay v. MercExchange Wrought?*, 14 LEWIS & CLARK L. REV. 555 (2010); J. Scott Larson, *The Unsettled Aftereffects of eBay and Survey of Its Continued US Litigation Impact*, INTELL. PROP. & TECH. L.J., Mar. 2010, at 5.

14. See *infra* Part II.C.

I. INJUNCTIONS BEFORE *EBAY* AND THE *EBAY* CASE

Section 271 of the Patent Act gives a patent owner the right to exclude others from making, using, selling, or importing the patented invention.¹⁵ Before *eBay*, this right to exclude was essentially absolute. Decades of case law made it clear that the appropriate remedy for patent infringement was an injunction prohibiting further infringement.¹⁶ Courts denied injunctive relief only in exceptional circumstances, such as when an injunction would prove ruinous to the public health and welfare.¹⁷ This all changed in 2006 when the Supreme Court issued its ruling in *eBay*.¹⁸

eBay, Inc. runs a website that allows users to buy and sell goods in live online auctions. In addition to the auction system, users can buy and sell products at fixed prices using the site's "Buy It Now" feature. The plaintiff, MercExchange, alleged that the "Buy It Now" feature infringed a number of its patents.

Following a jury trial, the district court found one of MercExchange's patents valid and infringed, and awarded MercExchange over \$25 million in damages.¹⁹ However, the court denied MercExchange's request to enjoin eBay's infringement.²⁰ On appeal, the Federal Circuit reversed the district court for abuse of discretion.²¹ Calling the patentee's right to exclude "the essence of the concept of property,"²² the Federal Circuit emphasized that injunctions were to be denied only in "exceptional" cases.²³

A unanimous Supreme Court reversed the Federal Circuit and held that injunctions do not issue automatically upon a finding of patent infringement. Instead, a district court must consider "traditional equitable principles" when

15. 35 U.S.C. § 271(a) (2006).

16. *See, e.g.*, *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1246–47 (Fed. Cir. 1989) ("Infringement having been established, it is contrary to the laws of property, of which the patent law partakes, to deny the patentee's right to exclude others from use of his property."). 35 U.S.C. § 283 provides the statutory authority for injunctive relief: "[C]ourts . . . may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent . . ." 35 U.S.C. § 283.

17. *See, e.g.*, *City of Milwaukee v. Activated Sludge, Inc.*, 69 F.2d 577, 593 (7th Cir. 1934) (refusing to enjoin infringement where doing so would force the city to run massive quantities of raw sewage into Lake Michigan).

18. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006).

19. *MercExchange, L.L.C. v. eBay, Inc.*, 275 F. Supp. 2d 695 (E.D. Va. 2003).

20. *Id.* at 715.

21. *MercExchange, L.L.C. v. eBay, Inc.*, 401 F.3d 1323 (Fed. Cir. 2005).

22. *Id.* at 1338 (quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1246–47 (Fed. Cir. 1989)).

23. *Id.* at 1339.

deciding whether to enjoin infringement.²⁴ Specifically, the Court instructed lower courts to apply a four-factor test that requires a patentee to demonstrate: “(1) that it has suffered an irreparable injury; (2) that remedies available at law, such as monetary damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between the plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.”²⁵

II. APPLYING *EBAY*

The four equity factors remain poorly defined in the patent context, and *eBay* has spawned much uncertainty in patent disputes. When are damages “inadequate to compensate” for infringement? What “balance of hardships” warrants an injunction, and what kinds of hardship may a trial court consider? What exactly is the public’s interest in any particular patent fight?²⁶

To further complicate things, *eBay* was issued alongside diverging concurrences by Chief Justice Roberts and Justice Kennedy. While the Chief Justice instructed lower courts to apply the four-factor test with an eye toward history and precedent,²⁷ Justice Kennedy argued that business practices and the nature of technology have changed in recent times, making historical practice less instructive in many of the cases courts face today.²⁸ Justice Kennedy observed that, unlike cases decided decades ago, modern patent fights allow the patentee to use an injunction “simply for undue leverage in negotiations,” or to “be employed as a bargaining tool to charge exorbitant fees.”²⁹ Today’s economic realities, Kennedy urged, should inform a court’s application of *eBay*’s four-factor test.³⁰

24. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 393 (2006).

25. *Id.* at 391.

26. See ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, PATENT LAW AND POLICY: CASES AND MATERIALS 950 (5th ed. 2011) (noting that when deciding requests for preliminary injunctions, courts weigh multiple competing public interests).

27. *eBay Inc.*, 547 U.S. at 395 (Roberts, C.J., concurring) (“When it comes to discerning and applying [the four factors], in this area as others, ‘a page of history is worth a volume of logic.’” (quoting *N.Y. Trust Co. v. Eisner*, 256 U.S. 345, 349 (1921))).

28. *Id.* at 396 (Kennedy, J., concurring) (“[T]rial courts should bear in mind that in many instances the nature of the patent being enforced and the economic function of the patent holder present considerations quite unlike earlier cases.”).

29. *Id.*

30. *Id.* at 395–97.

The Court was clear about one thing, however: Patent rights are just like any other right.³¹ They do not qualify for automatic injunctions, and the rules governing injunctions in patent cases are the same as in any other case.³² It is illuminating, then, to examine how courts and scholars have analyzed the propriety of injunctions outside the patent context.

A. Property Rule or Liability Rule: When Should an Injunction Issue?

The question of whether to protect an entitlement with an injunction or damages is not new. The seminal work on this topic, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, divides remedies into two major categories: property rules and liability rules.³³ A right is protected by a property rule when it cannot be violated without the right-owner's permission.³⁴ A right is protected by a liability rule when anyone can violate the right without the right-owner's permission, as long as the violator is willing to pay damages.³⁵

How does the law decide which to use? Property rules are desirable because they ensure that whenever the right is transferred between rational parties, both parties to the transaction are better off.³⁶ With a property rule protecting it, a right cannot be transferred (or violated) without its owner's consent. The right moves only if the buyer values the right more than the seller, and so rights protected by property rules will only ever be moved to a higher-valued use.³⁷

Liability rules, by contrast, provide no assurance that the buyer values the right more than its owner; they ensure only that the buyer values the right

31. *Id.* at 394 (majority opinion) (“[T]he decision whether to grant or deny injunctive relief rests within the equitable discretion of the district courts, and . . . such discretion must be exercised consistent with traditional principles of equity, in patent disputes no less than in other cases governed by such standards.”).

32. *Id.*

33. Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089 (1972). For these ideas applied to intellectual property, see Robert P. Merges, *Of Property Rules, Coase, and Intellectual Property*, 94 COLUM. L. REV. 2655 (1994).

34. See WARD FARNSWORTH, *THE LEGAL ANALYST: A TOOLKIT FOR THINKING ABOUT THE LAW* 188 (2007).

35. *Id.*

36. *Id.* at 190–92.

37. A transfer (or violation) occurs only if the owner consents to it—something he will do only if the transfer leaves him better off. The buyer, meanwhile, will purchase the right only if the purchase also leaves him better off.

more than the liability amount.³⁸ When the liability amount falls below the value of the right to its owner, an inefficient transfer can occur. To illustrate, imagine that the owner of a house values his right to live in that house peacefully, quietly, and nuisance-free at \$100,000. If a neighbor builds a noisy, smoke-billowing cement factory next door, the homeowner can ask a court to protect his right to live free of the nuisance.³⁹ If the court opts to protect that right with a liability rule, it must determine the liability amount—the damages the neighbor must pay to violate the plaintiff's right to be free of the nuisance. Choosing any amount below \$100,000 risks forcing an inefficient transfer. If the court puts a \$60,000 price tag on the right and the defendant values the right (or more precisely, the ability to violate it) at \$80,000, the defendant, if rational, will keep his factory and pay the plaintiff the \$60,000. This is inefficient—while the defendant shows a \$20,000 surplus, the plaintiff ends up with a \$40,000 loss. Thus, when courts choose to use a liability rule but then underset the liability amount, they risk effecting an inefficient transaction. On the other hand, when courts overset the liability amount, they may block an efficient transaction from occurring.

Thus, the case for property rules is particularly strong when a court has trouble discovering the efficient liability amount—when it cannot accurately estimate the value of the right to its owner.⁴⁰ In addition, evaluating the evidence needed to set the liability amount can amount to a taxing and expensive judicial chore. Courts may elect to use a property rule when damages would be expensive for the court to compute.⁴¹ But there are sometimes reasons to prefer liability rules.

Property rules may be undesirable when they allow a plaintiff to “extort” defendants, “that is, to obtain compensation possibly far in excess of the plaintiff's actual damages.”⁴² Throughout the law, many (but not all) remedies seek to compensate victims for their injury—no more, no less.⁴³ This is not by accident: Economic incentives are often thrown out of kilter when a right-holder is better off having its right violated than not.

38. FARNSWORTH, *supra* note 34, at 190–92.

39. This hypothetical is adapted from the facts of *Boomer v. Atlantic Cement Co.*, 257 N.E.2d 870 (N.Y. 1970).

40. FARNSWORTH, *supra* note 34, at 192–93.

41. *See id.*

42. A. Mitchell Polinsky, *Resolving Nuisance Disputes: The Simple Economics of Injunctive and Damage Remedies*, 32 STAN. L. REV. 1075, 1110 (1980).

43. *See* Stephen E. Margolis, *The Profits of Infringement: Richard Posner v. Learned Hand*, 22 BERKELEY TECH. L.J. 1521, 1530 (2007) (“[I]n many areas of the law, damages to the plaintiff, rather than profits of the defendant, are deemed to be the efficient remedy. Specifically, in contract and in many tort claims, including patent infringement, damages suffice.”).

Consider the remedy for breach of contract. Courts ordinarily award the plaintiff expectation damages, the goal of which is to restore the plaintiff to the position he would have been in but for the breach.⁴⁴ Courts usually disfavor compensation above this level⁴⁵ because overcompensating plaintiffs incentivizes all kinds of inefficient behavior:⁴⁶ It discourages efficient breach,⁴⁷ incentivizes parties to take inefficient precautions to prevent breach,⁴⁸ gives parties a perverse incentive to get the other to breach, and deters parties from entering into contracts altogether.⁴⁹ Courts may therefore opt for a liability

-
44. RESTATEMENT (SECOND) OF CONTRACTS § 347 (1981) (“Contract damages are ordinarily based on the injured party’s expectation interest and are intended to . . . put him in as good a position as he would have been in had the contract been performed.”).
45. This is not to say that overcompensation never happens; courts occasionally award punitive damages to further another goal: deterrence. *See, e.g., Delzer v. United Bank of Bismarck*, 527 N.W.2d 650 (N.D. 1995) (awarding punitive damages for breach of contract). In particular, a measured degree of overcompensation is needed to ensure optimal deterrence in cases where the defendant can sometimes escape liability for the harm caused. *See A. Mitchell Polinsky, Punitive Damages: An Economic Analysis*, 111 HARV. L. REV. 869, 887 (1998) (“[I]f a defendant can sometimes escape liability for the harm for which he is responsible, the proper magnitude of damages is the harm the defendant has caused, multiplied by a factor reflecting the probability of his escaping liability.”).
46. *See Melvin Aron Eisenberg, Probability and Chance in Contract Law*, 45 UCLA L. REV. 1005, 1045 (1998) (“[T]he best explanation for the expectation measure is . . . that it provides the right kind of incentives to contracting parties . . .”). *But see Ian Ayres & Kristin Madison, Threatening Inefficient Performance of Injunctions and Contracts*, 148 U. PA. L. REV. 45, 87 (1999) (“[L]aw and economics scholars in the last decade have found it increasingly difficult to conjure a single damage measure that induces both sides to behave efficiently on a variety of dimensions both before (ex ante) and after (ex post) a potential breach.”).
47. *See Jordan A. Goldstein, The Efficiency of Specific Performance in Stock-for-Stock Mergers*, 29 DEL. J. CORP. L. 747, 755 (2004) (“[I]t may be more efficient for some contracts *not* to be performed. Measuring damages by expectancy approximates a promisee’s actual economic loss and generally provides an incentive for promisors to breach only efficiently.”). Most courts continue to adhere to the efficient breach hypothesis, denying damages that would overcompensate the plaintiff (for example, punitive damages and liquidated damages that operate as penalties) so as to not discourage efficient breach. *See, e.g., Patton v. Mid-Continent Sys.*, 841 F.2d 742, 750 (7th Cir. 1988) (reasoning that if the defendant is forced to pay punitive damages, “an efficient breach may be deterred, and the law doesn’t want to bring about such a result”); *Topps Co. v. Cadbury Stani S.A.I.C.*, 380 F. Supp. 2d 250, 261 n.12 (S.D.N.Y. 2005) (“[A]warding punitive damages for a simple breach of contract would deter breaches that the law endeavors to protect.”). At the same time, a number of legal scholars have attacked the premise that overcompensation deters efficient breach. *See, e.g., William S. Dodge, The Case for Punitive Damages in Contracts*, 48 DUKE L.J. 629, 663–88 (1999).
48. *See Ayres & Madison, supra* note 46, at 87 (“[M]oving the plaintiff’s expected payoff toward expectation damages . . . is more likely to induce more efficient defendant precaution and risk allocation.”); Eisenberg, *supra* note 46, at 1046 (“The expectation measure provides an incentive for the efficient rate of precaution . . .”).
49. *E.I. DuPont de Nemours & Co. v. Pressman*, 679 A.2d 436, 446 (Del. 1996) (“Parties would be more reluctant to join in contractual relationships . . . if they faced the prospect of damages which could be out of proportion to the amounts involved in the contract.”). Moreover, contracts become much less useful when each party has an incentive to covertly sabotage the other’s ability to perform.

rule when a property rule risks overcompensating the plaintiff by enabling him to extort the defendant.⁵⁰

Courts also hesitate to use property rules when they fear transaction costs might prevent the parties from reassigning the right.⁵¹ Property rules ensure that the buyer must value the right more than the seller before a transfer occurs, but this condition is necessary, not sufficient, for a transfer. Even when a prospective buyer values the right more than its owner, transaction costs may prevent the parties from cutting a deal.⁵²

Consider one common transaction cost: the bilateral monopoly. A bilateral monopoly is a situation in which there is a single buyer and a single seller—the two parties can deal only with each other.⁵³ A bilateral monopoly arises whenever an injunction issues.⁵⁴ A simple example will illustrate the problem. Suppose that Jon operates a factory. The factory does well and brings in \$10,000 a year for Jon. Unfortunately, the factory also pollutes Rusty's farmland, making portions of it unsuitable for farming and costing Rusty \$1000 a year in lost productivity. If a court enjoins Jon's factory, can the parties be relied upon to bargain around the injunction?

A transfer would clearly be efficient: Jon values the right to operate his factory more than Rusty values his right to operate in the absence of Jon's factory. Jon could pay Rusty up to \$9999 a year to avoid the injunction and still be better off as result. Rusty, meanwhile, could receive as little as \$1001 a year from Jon and still be better off. The bargaining range—the potential values a negotiation could settle upon—therefore runs from \$1001 to \$9999. Although paying any amount in that range would leave him better off, Jon would still prefer to pay as little as possible. At the same time, Rusty would prefer to be paid as much as possible. In negotiation, each party may stubbornly—but rationally—commit to a non-overlapping range of values, at which point the process devolves into a game of chicken.⁵⁵ If neither party backs down, everyone loses: a compromise is not reached, the negotiation breaks down, and the court winds up enforcing an inefficient injunction. In this way, a bilateral monopoly can prevent parties from consummating an exchange, even when an exchange would be desirable for everyone. Courts therefore tend toward

50. *Cf.* *N. Ind. Pub. Serv. Co. v. Carbon Cnty. Coal Co.*, 799 F.2d 265, 279–80 (7th Cir. 1986) (“[Defendant] is seeking specific performance in order to have bargaining leverage with [plaintiff], and we can think of no reason why the law should give it such leverage.”).

51. FARNSWORTH, *supra* note 34, at 192–94.

52. *Id.* at 192–93.

53. *See* *Walgreen Co. v. Sara Creek Prop. Co.*, 966 F.2d 273, 276 (7th Cir. 1992).

54. *Id.*

55. FARNSWORTH, *supra* note 34, at 131–32.

liability rules when they believe a bilateral monopoly might prevent the parties from reaching an efficient outcome.⁵⁶

These academic theories have made their way into judicial opinions.⁵⁷ In *Walgreen v. Sara Creek Property*, Judge Richard Posner instructed that “[t]he weighing of all these costs and benefits is the analytical procedure that is or at least should be employed by a judge asked to enter a permanent injunction.”⁵⁸

Walgreen was a commercial tenant of Sara Creek Property. Under the terms of their lease, Walgreen had the right to operate an exclusive pharmacy at the Southgate Mall. When Sara Creek began to lease mall space to another pharmacy, Phar-Mor, Walgreen sought an injunction to compel Sara Creek’s compliance with the lease. The trial court awarded Walgreen specific performance and Sara Creek appealed the injunction.⁵⁹

On appeal, Judge Posner began by examining the costs and benefits of an injunction. Injunctive relief offers two advantages. First, an injunction reduces the judicial resources needed to value the right.⁶⁰ Court assessment of damages requires a costly discovery fight that consumes judicial resources, as well as the resources of both parties. Private bargaining brought about by an injunction is usually less costly.⁶¹ Second, private negotiation is more likely to arrive at an efficient price than judicial valuation: “[A] premise of our free-market system, and the lesson of experience here and abroad as well, is that prices and costs are more accurately determined by the market than by government. A battle of experts is a less reliable method of determining the actual cost”⁶² But Judge Posner explained that injunctions come with downsides as well. One downside is the opportunity it creates for strategic bargaining, which can break down the private negotiation and bring about an inefficient result.⁶³

56. The larger the bargaining range, the more severe the bilateral monopoly problem. See Ayres & Madison, *supra* note 46, at 105 (“[C]onstrain[ing] the price over which parties might bargain can . . . avoid the ex post inefficiencies of bilateral monopoly haggling.”).

57. See, e.g., *Walgreen Co.*, 966 F.2d at 276; *Sony BMG Music Entm’t v. Tenenbaum*, 721 F. Supp. 2d 85, 112–114 (D. Mass. 2010) (discussing property rules and liability rules in the context of copyright law).

58. *Walgreen Co.*, 966 F.2d at 276.

59. *Id.* at 274.

60. *Id.* at 275.

61. *Id.* (“[T]he effect of upholding the injunction would be to substitute for the costly processes of forensic fact determination the less costly processes of private negotiation.”).

62. *Id.* at 275–76.

63. *Id.* at 276. Posner was specifically referring to bilateral monopolies, but there are other types of strategic bargaining that may make a property rule undesirable. One example is holdout—the problem that arises when multiple permissions are needed before a socially beneficial activity can commence. Building a walkway along the beach may require an easement from multiple property owners. Each owner has an incentive to negotiate strategically and “hold out” for up to

The costs and benefits of damages mirror those of injunctive relief. An award of damages avoids the problems presented by strategic bargaining, but imposes costs of its own. These costs include the diminished accuracy of the valuation and the expense required to gather and evaluate evidence of damages.⁶⁴

Posner ultimately affirmed the district court's grant of specific performance, writing that the trial court properly balanced the costs of damages against the costs of an injunction and reasonably concluded that the costs of a damages remedy exceeded those of an injunction.⁶⁵ Notably, the lease had ten years to run.⁶⁶ To properly assess damages, a court would have had to project Walgreen's sales revenues and costs over the next ten years and then project the impact on those figures from competition with Phar-Mor.⁶⁷ Any figure the court arrived at would be "fraught with uncertainty."⁶⁸ Given the difficulty of calculating damages, and the likelihood of substantial error in doing so, Posner concluded that injunctive relief was appropriately granted.⁶⁹

How do these costs and benefits play out in patent litigation? The law favors property rules where the right is difficult to value, and technology is, by its nature, difficult to value. But other factors, such as the opportunity for extortion or strategic bargaining, cut in favor of a liability rule. The most troubling factor in this respect is extortion through patent hold-up: the opportunity for a patent owner to strike exaggerated royalty deals by exploiting an infringer's product-specific investments.

If the court issues an injunction, it side-steps the valuation problem but may enable the hold-up problem. If the court awards damages, it quashes the hold-up problem but then it faces the valuation problem. Understanding the adverse consequences of both misvaluation and hold-up will enable a court to choose the lesser of two evils.

the entire value of the walkway, knowing that a refusal to grant an easement will doom the entire project. Of course, the party seeking the easements cannot afford to pay each owner the entire value of the walkway. In the end, that party may decide that building the walkway is not worth the headache of negotiating with a group of strategic holdouts, and so the walkway is never built. The holdout problem can be so egregious in these kinds of cases that it is thought to justify government's eminent domain power—"your house is protected by a property rule against being taken by your neighbor, but only by a liability rule against the government." FARNSWORTH, *supra* note 34, at 197.

64. *Walgreen Co.*, 966 F.2d at 276.

65. *Id.* at 278.

66. *Id.* at 277.

67. *Id.*

68. *Id.*

69. *Id.* ("[H]ere damages would be a costly and inaccurate remedy; and on the other side of the balance some of the costs of an injunction are absent and the cost that is present seems low.")

B. Valuation Problems: The Case for Injunctions

Judge Posner noted two disadvantages to damages: They may be expensive for courts to assess and they may substantially overvalue or undervalue the right. Both cut in favor of injunctive relief. To determine how severe these problems are in patent cases, this Comment examines the theoretical efficient value that courts strive to assess, and the process by which they assess it.

1. The Economic Value of an Invention

The goal of patent damages is to restore the patentee to the position it would have been in but for the infringement.⁷⁰ This measure of damages is mandated by § 284 of the Patent Act, which instructs courts to award a successful patentee damages “adequate to compensate for the infringement.”⁷¹ This measure is also correct as a matter of public policy, as awards that exceed or fall below this amount create incentives with negative consequences for innovation.⁷²

But for the infringement, a patentee might have profited from its invention in two ways: (1) The patentee could have produced a product that utilized the patented technology, selling it at a premium that reflected the patentee’s monopoly over the technology; or (2) the patentee could have licensed the technology to firms that would then produce a product utilizing the technology.⁷³ Accordingly, patent law provides two theories for recovery of damages: lost profits and reasonable royalty.

A lost profits measure is typically used where the patentee and infringer sell competing products.⁷⁴ The lost profits analysis invites a patentee to show that the infringement caused the patentee to lose profits it would have otherwise

70. See *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1350 (Fed. Cir. 1999) (“In *Aro Manufacturing*, the Supreme Court stated that the statutory measure of ‘damages’ is ‘the difference between [the patent owner’s] pecuniary condition after the infringement, and what his condition would have been if the infringement had not occurred.’” (quoting *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 507 (1964) (plurality opinion))); John W. Schlicher, *Measuring Patent Damages by the Market Value of Inventions—The Grain Processing, Rite-Hite, and Aro Rules*, 82 J. PAT. & TRADEMARK OFF. SOC’Y 503, 503 (2000) (“[P]atent damages should award patent owners the market values or economic benefits of the inventions that they were unable to capture due to infringement.”).

71. 35 U.S.C. § 284 (2006) (emphasis added).

72. See *infra* Part II.B.3.

73. A patentee can also do both, that is, produce the patented technology while simultaneously licensing the technology to its competitors. Of course, the more the patentee licenses out the technology to its competitors, the less market power it will have by virtue of its patent.

74. A lost profits theory may also be appropriate where the patentee would prefer to exclusively license. Because the infringement precludes the patentee from exclusively licensing its patent, the patentee is forced to forgo the profits it would have obtained from an exclusive license.

made. An infringing competitor may cause the patentee lost profits by diverting sales from the patentee's product, by eroding the product's sale price, or by causing the patentee to lose sales on bundled products.⁷⁵ For example, a patentee might argue that, absent infringement, it would have sold 500 units at a profit of \$100 per unit. But due to competition from the infringing product, the patentee only sold 200 units with profits of \$50 per unit. If these numbers can be proven to a court's satisfaction, the patentee is entitled to \$40,000 under a lost profits theory.⁷⁶

When a patentee does not sell products, there is usually no case for lost profits.⁷⁷ In these cases, the patentee would seek to exploit the invention by selling licenses; its profits from the patent stem from licensing agreements.⁷⁸ To restore the patentee to its position absent infringement, a court must replicate the deal the parties would themselves have struck prior to the infringement.⁷⁹ To this end, courts imagine a "hypothetical negotiation" between the parties and attempt to discern a "reasonable royalty" for the invention.⁸⁰

Put another way, courts ask: If the patentee and infringer had negotiated before the infringement began, what agreement would they have reached?⁸¹ Logically, no infringer would agree to pay more than the technology's marginal value over the next-best alternative: If a firm has the option of incorporating into its product either the technology in dispute (A) or the next-best alternative

75. See *Rite-Hite Corp. v. Kelley Co.*, 56 F.3d 1538, 1548–49 (Fed. Cir. 1995) (loss of sales on collateral products); *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 902 (Fed. Cir. 1986) (price erosion). Infringement might also cause the patentee lost profits by preventing it from price discriminating (charging different prices to different customers for the same product). See Ramsey Shehadeh & Marion B. Stewart, *An Economic Approach to the "Balance of Hardships" and "Public Interest" Tests for Preliminary Injunction Motions in Patent Infringement Cases*, 83 J. PAT. & TRADEMARK OFF. SOC'Y 341, 349–51 (2001).

76. The patentee's profit but for the infringement would be \$50,000 (five hundred units at \$100 per unit). But because of the infringement, the patentee's profit was only \$10,000 (two hundred units at \$50 per unit). To make him whole, a court would award the patentee \$40,000.

77. *Rite-Hite Corp.*, 56 F.3d at 1548 ("Normally, if the patentee is not selling a product, by definition there can be no lost profits."). *But see supra* note 74.

78. There are other instances in which a reasonable royalty should be pursued instead of lost profits. Reasonable royalties are generally appropriate if: (1) the patentee does not "practice" the patented invention; (2) the patentee is unable to quantify lost sales or other indicators of lost profits with reasonable certainty; or (3) the infringer's use of the invention is more efficient than the patentee's. In the third case, although the infringer's use causes the patentee to lose profits, the infringer's use is more efficient. The patentee thus gains more from licensing the technology to the infringer than practicing the invention itself; the reasonable royalty exceeds lost profits to the patentee.

79. See *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1157–58 (6th Cir. 1978).

80. See, e.g., *Radio Steel & Mfg. Co. v. MTD Prods., Inc.*, 788 F.2d 1554, 1557 (Fed. Cir. 1986) (explaining the hypothetical negotiation framework).

81. See generally Lemley & Shapiro, *supra* note 7, at 1995–98 (proposing an economic model for ex ante negotiations).

technology (B), the maximum amount the firm would be willing to pay for A—technology A’s economic value—equals the profits the firm expects to reap using A instead of B. Using A may increase the firm’s profits by allowing it to increase its product’s sale price, to sell more units, to decrease the cost-per-unit of manufacturing or distributing the product, or some combination of the above. The important point here is that the economic value is not the value of A as compared to not having any technology at all; it is the value of A as compared to the next-best alternative technology.⁸²

In sum, an invention’s economic value equals the greater of: (1) the value of the technology if the patentee had practiced it exclusively, and (2) the value the infringer⁸³ would have paid for the technology *ex ante*.⁸⁴ The former is measured by lost profits; the latter by reasonable royalty, which is the technology’s marginal value over the next-best noninfringing substitute.⁸⁵

2. Why Courts Struggle With Valuing Technology

Courts, especially lay juries, are not equipped to accurately assess lost profits or reasonable royalties since assessing either requires a complex and sophisticated examination of market conditions and the technology at issue. Even the Federal Circuit recognizes the inherent difficulty in valuing technology, having described the task as “a difficult judicial chore, seeming to involve more the talents of a conjurer than those of a judge.”⁸⁶ Moreover, an invention’s economic value is unlikely to remain constant. While parties often negotiate

82. *Grain Processing Corp. v. Am. Maize-Prods. Co.*, 185 F.3d 1341, 1351 (Fed. Cir. 1999) (“[A]n accurate reconstruction of the hypothetical ‘but for’ market takes into account any alternatives available to the infringer.”); Roger D. Blair & Thomas F. Cotter, *Rethinking Patent Damages*, 10 TEX. INTELL. PROP. L.J. 1, 3 (2001) (“[A] complete analysis must take into account that a variety of nonpatented technologies may be substitutable, if only imperfectly so . . .”).

83. This might be a slight oversimplification—there is a good argument that the proper economic value should not be infringer-specific. See John W. Schlicher, *Patent Damages, the Patent Reform Act, and Better Alternatives for the Courts and Congress*, 91 J. PAT. & TRADEMARK OFF. SOC’Y 19, 73 (2009) (arguing that the economic value is not necessarily the value the invention has to the infringer, but rather the value the invention has to the most efficient licensee).

84. Thomas F. Cotter, *Patent Holdup, Patent Remedies, and Antitrust Responses*, 34 J. CORP. L. 1151, 1176 (2009) (“[T]he patentee should recover the greater of (1) its provable lost profits attributable to the infringement, or (2) (at least) the royalty the parties would have agreed to *ex ante* . . .”).

85. *Union Carbide Corp. v. Graver Tank & Mfg. Co.*, 345 F.2d 409, 411 n.2 (7th Cir. 1965) (“[I]n calculating [reasonable royalty] damages, the patent owner may recover only for the difference between the patented product and such other as the infringer could have used had he known he infringed.”).

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

complex licenses that account for fluctuations in value over time, courts have neither the resources nor the expertise to craft such sophisticated arrangements.⁸⁷

These theoretical difficulties have been validated in practice. Some courts, unable or unwilling to engage the difficult economic issues, endorse the use of shortcuts and rules of thumb to calculate the reasonable royalty amount.⁸⁸ Many cases have applied a “25 percent rule” in which the court begins its calculation by setting the reasonable royalty amount to 25 percent of defendant’s expected profits on the infringing product.⁸⁹ Another rule of thumb, the “5 percent rule,” suggests 5 percent of the infringer’s revenue from the product as a reasonable royalty.⁹⁰ These rules of thumb are not based on the underlying economics of the specific case and thus can overvalue or undervalue the invention—sometimes grossly so.⁹¹ Indeed, it is telling that the 25 percent and 5 percent rules, when applied to the same case, almost never produce consistent results.⁹²

Even when a court endeavors to run the analysis properly, it inevitably makes mistakes along the way. At trial, each party will marshal impressively credentialed expert witnesses who will each present their highly technical economic forecasts—the process Judge Posner disparagingly refers to as the “battle of experts.”⁹³ To nobody’s great surprise, the experts forecast wildly different numbers. The true value of the invention probably lies somewhere in between, but on what basis is the jury to divine it? There is simply too much conflicting and highly technical information for us to be confident about a

87. In the same vein, parties in negotiation can arrange elegant solutions such as cross licenses or patent pools. They can also negotiate over terms other than price. These options can substantially reduce transaction costs.

88. See Roy J. Epstein & Alan J. Marcus, *Economic Analysis of the Reasonable Royalty: Simplification and Extension of the Georgia-Pacific Factors*, 85 J. PAT. & TRADEMARK OFF. SOC’Y 555, 573 (2003).

89. See, e.g., Paice LLC v. Toyota Motor Corp., 609 F. Supp. 2d 620, 629–30 (E.D. Tex. 2009) (applying the 25 percent rule); GSI Group, Inc. v. Sukup Mfg. Co., 641 F. Supp. 2d 732, 745 (C.D. Ill. 2008) (“The ‘25% Rule’ has been accepted as a proper baseline from which to start [a reasonable royalty] analysis.”); Bose Corp. v. JBL, Inc., 112 F. Supp. 2d 138, 167 (D. Mass. 2000) (“Courts have found the 25%/75% approach to be a useful approach to arriving at a baseline royalty rate.”). For many years, the Federal Circuit tacitly tolerated use of the 25 percent rule. However, a very recent Federal Circuit case resoundingly rejects it (and rightfully so). Uniloc USA, Inc. v. Microsoft Corp., 632 F.3d 1292, 1315 (Fed. Cir. 2011) (“This court now holds as a matter of Federal Circuit law that the 25 percent rule of thumb is a fundamentally flawed tool for determining a baseline royalty rate in a hypothetical negotiation.”).

90. See Epstein & Marcus, *supra* note 88.

91. See *id.*

92. *Id.* at 574 (“[T]he 25% rule and the 5% rule in general are not mutually compatible. They only yield equivalent results when the infringer’s profit margin is 20%.”).

93. Walgreen Co. v. Sara Creek Prop. Co., 966 F.2d 273, 276 (7th Cir. 1992).

jury's ability and willingness to sift through it all to arrive at an economically reasonable number.⁹⁴

Some commentators have also expressed concern that the damages system does not scale appropriately to products that involve hundreds of patents.⁹⁵ Suppose a plaintiff claims that the defendant's cell phone infringes its patent and asks for "only" 1 percent of the defendant's profits from sales of the phone. Such a small amount might, at first glance, seem like a modest request. But what if the patent is only one of three hundred required to make the phone?⁹⁶ In that case, 1 percent may well be an excessive request—if the infringer paid 1 percent of its profits to license each patent involved, it would be liable for 300 percent of its profits!⁹⁷ This result cannot be a reasonable royalty, as no reasonable entity would agree to pay more in licensing than it could make in sales. It may be hard, however, for juries to see past this, and some have argued that juries do not.⁹⁸

3. The Problems Caused by Misvaluation

Damage awards that leave the patentee better or worse off than it would have been but for the infringement distort the economic incentives that the patent system was carefully calibrated to create.⁹⁹ If courts systematically undercompensate patentees, they reduce the incentives to obtain patents. Firms will have less incentive to innovate and more incentive to protect their innovations with trade secret law instead.¹⁰⁰ Patent law benefits the public in part because it

94. See *Merges*, *supra* note 33, at 2664 ("Because each asset covered by an [intellectual property right] is in some sense unique—a characteristic guaranteed by various requirements for protectability in intellectual property statutes—it is difficult for a court in an infringement case to properly value the right-holder's loss.")

95. See, e.g., Lemley & Shapiro, *supra* note 7, at 2024–25.

96. The iPhone has at least two hundred (and probably over three hundred) patents that read on it. See *supra* note 6.

97. It is possible, of course, that the patent in question really is worth 1 percent, but on average this will not be the case.

98. See, e.g., Lemley & Shapiro, *supra* note 7, at 2024–25. It is also impractical for defendants to introduce (let alone explain) the hundreds of other patents that cover the accused product to the jury. *Id.* at 2024.

99. There may, however, be circumstances where awarding the patentee an amount greater than the patent's economic value is desirable. For example, where the type of infringement at issue is difficult to detect, it may be sensible to increase damages to ensure adequate deterrence. See Cotter, *supra* note 84, at 1177.

100. FTC, *THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION* 145 (2011) ("Under these circumstances, inventors would also be more likely to rely on trade secrets rather than patents to protect intellectual property, thus undermining the patent system's benefit of public disclosure.")

requires public disclosure of an invention in exchange for a patent. By contrast, the public learns nothing from a firm that chooses to protect its discoveries with trade secrets; indeed, there is an obligation that the firm take reasonable efforts to keep the discovery secret.¹⁰¹ Undercompensation would also encourage infringement because infringers would obtain a better license from the court than through *ex ante* negotiations.¹⁰² Such widespread infringement would further devalue patents, in turn further reducing incentives to obtain them.

At the same time, “[p]atent law seeks to avoid the dangers of overprotection just as surely as it seeks to avoid the diminished incentive to invent that underprotection can threaten.”¹⁰³ Overcompensating patent holders results in its own alarming distortions, and it derails many of the incentives the patent system relies on to promote innovation. In particular, overcompensating patentees skews incentives for both patentees and potential infringers. Start with the incentives for patentees.

a. The Effects of Overvaluation on Patentee Incentives

Overcompensating patentees incentivizes them to litigate rather than negotiate.¹⁰⁴ The increased incentives to litigate discourage technology transfer and undermine the patent system’s disclosure benefit, and the increased litigation adds to the federal docket while diverting resources from productive activities like research and development.

It is not hard to imagine how overcompensating plaintiffs in patent litigation encourages more patent litigation. Suppose a patentee notices that another firm is unwittingly preparing to incorporate the patentee’s technology into its product. At this point the patentee has two options: approach the firm and

101. *See, e.g.*, *MicroStrategy, Inc. v. Bus. Objects, S.A.*, 331 F. Supp. 2d 396, 416 (E.D. Va. 2004) (“[R]easonable efforts must be taken to maintain secrecy.”); *Religious Tech. Ctr. v. Netcom On-Line Comm’n Servs., Inc.*, 923 F. Supp. 1231, 1253 (N.D. Cal. 1995) (“Information is protectable as a trade secret where the owner has taken ‘efforts that are reasonable under the circumstances to maintain its secrecy.’” (emphasis omitted)).

102. This is greatly tempered by the penalties that courts impose for willful infringement. When the infringer knew or should have known of an objectively high risk of infringement, the trial court may (but need not) impose punitive damages. *See In re Seagate Tech., LLC*, 497 F.3d 1360, 1370–71 (Fed. Cir. 2007) (en banc).

103. *Lab Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 548 U.S. 124, 127 (2006) (per curiam) (Breyer, J., dissenting).

104. *See* FTC, *supra* note 100, at 146 (“Overcompensation through damages encourages *ex post* transactions at the expense of *ex ante* transactions with technology transfer.”); Schlicher, *supra* note 70, at 533 (“When . . . the litigation value of patents exceeds the licensing value of patents, there will tend to be too much deterrence, too much litigation, and too few business transactions.”).

negotiate a license, or wait for infringement to occur and then bring a patent lawsuit. If the patentee negotiates with the firm before the infringement occurs (and before the firm makes product-specific investments), the firm would be willing to pay up to the difference in value between the patented technology and its next-best alternative—the invention's economic value.¹⁰⁵ But if courts systematically award damages well above this number, the patentee has an incentive to litigate for damages instead.¹⁰⁶ Rather than approach the firm immediately, the patentee is better off waiting for infringement to occur and then bringing a patent action.¹⁰⁷ In short, when the rewards for litigating substantially exceed¹⁰⁸ those for negotiating, patent holders will prefer to litigate rather than negotiate.

If the mismatch becomes great enough, it can skew a patentee's incentives even further. Normally, a patentee has an incentive to publicize its invention once it receives the patent. This is true whether the patentee seeks to license the invention or practice the invention itself. If the patentee wishes to license its invention, it will want to share its invention with as wide an audience as possible because each time the patentee convinces someone else to use its technology, the patentee receives licensing revenue. It's a win-win situation: Society benefits from the patentee's efforts to disseminate new technology and the patentee gets paid every time someone else adopts its technology. And if the patentee seeks instead to exclude (rather than license) its competitors in order to practice the invention by itself, the patentee still has a strong incentive to widely disclose the technology. By making others aware of the patent, the

105. This assumes that the patentee does not prefer to exclude and practice the technology itself. See *supra* Part II.B.1.

106. In fact, patent law purposely deviates from the ex ante negotiation amount. While an ex ante negotiation will depend on how likely the parties believe it is that the patent-at-issue will be found valid and infringed, courts run the hypothetical negotiation with the parties assuming that the patent was unquestionably valid and infringed. See *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1325 (Fed. Cir. 2009) (“The hypothetical negotiation also assumes that the asserted patent claims are valid and infringed.”); *Mobil Oil Corp. v. Amoco Chems. Corp.*, 915 F. Supp. 1333, 1352–53 (D. Del. 1994) (“[F]or the purposes of the hypothetical negotiation, [plaintiff’s] patents are deemed unquestionably valid and enforceable and will be infringed by [defendant] if the parties do not negotiate a license.”). Unlike the myriad other ways in which courts overestimate damages, this exaggeration is intentional and economically justified. See Blair & Cotter, *supra* note 82, at 40–42; Doug Lichtman, *Understanding the RAND Commitment*, 47 Hous. L. Rev. 1023, 1041 (2010) (“[A] patent holder whose patent survives litigation must be compensated for having incurred that risk, and so the royalty calculation made after verdict must build patent validity and infringement into the math.”).

107. The incentive to “hide and wait” is even stronger where hold-up is a possibility. In that case, the patentee has an incentive to lie low and wait for the firm to sink more and more money into product-specific investments, locking itself into the technology.

108. The difference must be substantial enough to more than offset the high cost of litigating the patent.

patentee further deters others from infringing due to the enhanced damages available for willful infringement.¹⁰⁹ Moreover, wide disclosure affords the patentee enhanced flexibility in litigation by allowing it to pursue third parties for induced infringement.¹¹⁰ Under ordinary conditions, then, the patent system gives patentees a strong incentive to share their patented invention with the world.

But the incentive to disclose evaporates when courts overcompensate patentees. As explained, a patentee normally benefits from the wide disclosure of its patent because disclosure increases the patentee's licensing revenue and gives the patentee advantages in litigation. But these benefits come at a cost. By widely disclosing its patent, the patentee reduces the likelihood that others will infringe the patent: The vast majority of patent infringement happens inadvertently,¹¹¹ and it is axiomatic that as the number of people who know about a patent increases, the number of people who may inadvertently infringe it decreases.

Normally, the benefit of increased licensing revenue outweighs the "cost" of forgoing opportunities to litigate—but not so when a patentee stands to gain much more from litigation than from *ex ante* licensing. When courts overcompensate patentees by awarding them damages that dramatically exceed their invention's economic value, the cost of disclosure (forgoing lucrative litigation) outweighs the benefit (increased licensing revenue). Substantial overcompensation therefore incentivizes patentees to lie low with their patents, hoping that someone will inadvertently infringe, thereby allowing the patentee to reap the outsized rewards of litigation. Overcompensation guts the patent systems' disclosure benefit by replacing the incentive for patentees to disclose their inventions with an incentive to hide them instead.¹¹² In short, by

109. See generally *In re Seagate Tech., LLC*, 497 F.3d 1360 (Fed. Cir. 2007) (providing the modern willful infringement doctrine).

110. Liability for induced infringement requires that the third-party defendant had knowledge of the patent or evinced willful blindness as to its existence. See *Global-Tech Appliances, Inc. v. SEB S.A.*, 131 S. Ct. 2060, 2067–70 (2011).

111. See Christopher A. Cotropia & Mark A. Lemley, *Copying in Patent Law*, 87 N.C. L. REV. 1421, 1458–64 (2009) (examining the results of an empirical study, and concluding that "overwhelmingly, infringers are not choosing to infringe, but are designing products in ignorance of the patent in ways that are later found to infringe").

112. One might object by arguing that the technology is already disclosed by virtue of the patent being published. Although publication of patents is one way in which technology is disclosed, many scholars believe that the patent system's disclosure benefit is primarily realized when patentees educate other firms about their patented technology. See *id.* at 1465 ("A variety of evidence already suggests that scientists in most industries rarely read patents, and that even if they did, those patents aren't a particularly good means of conveying technical information.").

encouraging patentees to litigate rather than negotiate *ex ante*, overcompensation discourages efforts at technology transfer and disclosure.

b. The Effects of Overvaluation on Other Parties' Incentives

Now consider how overcompensation impacts the incentives of other parties involved in innovative activity. First, heavy-handed remedies produce unintended¹¹³ anticompetitive effects by depressing the market for substitute products.¹¹⁴ A firm that wishes to sell a substitute product may fear that the substitute treads too close to the patented product and thus might infringe it. When deciding whether to offer the substitute, a firm would consider the probability that the substitute infringes, the cost if it were found to infringe, and the profits it expects to earn by selling the product. As the cost of infringement goes up, firms are increasingly discouraged from developing and selling substitutes, including products that ultimately would not have been found to infringe. Discouraging others from developing substitutes for a patented product gives the patented product *de facto* exclusivity that is broader than what the patent grant intended, leading to lack of competition and choice that harms consumers.

On a similar note, excessive damage awards deter firms from trying to design around patents whenever there is a chance the design-around might be found to infringe. The Federal Circuit has explained that “one of the benefits of a patent system is its so-called ‘negative incentive’ to ‘design around’ a competitor’s products, even when they are patented, thus bringing a steady flow of innovations to the marketplace.”¹¹⁵ By weakening the incentive to design around, overcompensation undermines yet another benefit of the patent system.

Excessive damage awards further discourage innovative activity in areas where patent coverage is uncertain. Paying damages for patent infringement reduces a firm’s return on investment in innovative research and development, and so excessive damages may reduce the incentive to invest below optimal

113. It is true that any enforcement of patent rights produces an anticompetitive effect. This is the price society pays under the *quid pro quo* of the patent system; the bargain struck is public disclosure in exchange for exclusivity over the disclosed technology. But when damage awards exceed the economic value of the technology, the *de facto* exclusivity awarded to the inventor is broader than what the patent laws intended.

114. See John W. Schlicher, *Patent Damages, the Patent Reform Act, and Better Alternatives for the Courts and Congress*, 91 J. PAT. & TRADEMARK OFF. SOC'Y 19, 51 (2009) (“[T]he prospect of increased damages may discourage the introduction of many new products that would have been found not to infringe any claim, if the matter were litigated.”).

115. *State Indus., Inc. v. A. O. Smith Corp.*, 751 F.2d 1226, 1236 (Fed. Cir. 1985).

levels.¹¹⁶ Indeed, firms that wish to minimize their exposure to excessive liability may cease research and development entirely in fields where patent coverage is uncertain.¹¹⁷ Because, as discussed above, systematic overcompensation gives patentees an incentive to make patent coverage uncertain by lying low with their patents, this perverse synergy can seriously impair innovation.¹¹⁸ Excessive damages also deter firms from clearing up the uncertainty since the prospect of excessive liability discourages them from challenging vague or overbroad patents.¹¹⁹

For all these reasons, it is critical that damage awards accurately replicate the economic value of the invention—the market reward an invention could have earned absent infringement. Because courts lack the ability to accurately assess this value, and because assessing ongoing damages can be costly, courts are understandably reluctant to compute forward-looking damages. It is administratively easier to enjoin future infringement and thereby let the parties work out any forward-looking damages for themselves. But what are the possible problems with asking the parties to work the numbers out, and might they exceed the problems associated with judicial misvaluation?

C. Hold-Up Problems: The Case for Damages

It can take years from the conception of a product before it reaches the marketplace. During this time, companies may sign agreements, hire employees, and invest in specialized and product-specific facilities, research, and equipment—all with no awareness that they are infringing a patent. If the patent holder proves infringement after the deals have been signed and the investments made, the infringer may suffer catastrophic losses on these investments if an injunction is enforced. Knowing this, patent holders can wield the injunction threat to extort settlement amounts that capture the infringer's potential loss on these investments in addition to the economic value of their patent. Patent hold-up thus enables patentees to capture more than their patent's economic value. This

116. See FTC, *supra* note 100, at 146.

117. *Id.* (“Inflated damage awards also discourage innovative activity when companies minimize their exposure by stopping research and development in technology for which patent coverage is uncertain.”).

118. If coverage is so uncertain that all firms stay out of the field entirely, it is true that the patentees in that field lose out too. This scenario resembles a prisoner's dilemma: Every patentee is better served by defecting than not, and so patentees are unlikely to cooperate to solve the problem. See generally FARNSWORTH, *supra* note 34, at 100–08 (describing the prisoner's dilemma problem). The end result is a severe reduction in innovation in the field.

119. FTC, *supra* note 100, at 146 (“Overcompensation can deter socially beneficial challenges . . .”).

causes all the same problems as overcompensation by judicial misvaluation. It also leads to a number of problems unique to patent hold-up.

1. How Patent Hold-Up Works: A Look at the Apple iPhone

Apple's iPhone took over two and a half years to develop.¹²⁰ The iPhone project began in early 2005 when then-Apple CEO Steve Jobs realized that the touch-screen technology Apple was developing for tablets could be deployed in mobile phones. Jobs foresaw the revolutionary impact this technology would have on the mobile device market and instructed Apple's engineers to shelve the tablet idea in favor of designing a touch-screen phone instead.¹²¹

In February 2005, Jobs charged Apple's engineers with designing a prototype. By November 2005, over two hundred of Apple's top engineers were working full time on the project.¹²² From the start, Apple faced numerous technological obstacles. First, Apple had to design a new operating system for the phone: The iPod's operating system was too bare to manage the complicated networking and graphics required, and Apple's operating system for its computers was too resource-intensive to run on a cell phone chip.¹²³ Fortunately, Apple had a wealth of experience with designing operating systems to draw from.

This was not the case with numerous other obstacles Apple faced. Apple was a newcomer to the mobile phone business, and it lacked relevant experience with designing mobile phone hardware. It invested heavily—hired consultants, purchased new equipment, and constructed new facilities—to fill this experience gap. As *Wired* explained:

They were less prepared to discuss the intricacies of the mobile phone world: things like antenna design, radio-frequency radiation, and network simulations. To ensure the iPhone's tiny antenna could do its job effectively, Apple spent millions buying and assembling special robot-equipped testing rooms. To make sure the iPhone didn't generate too much radiation, Apple built models of human heads—complete with goo to simulate brain density—and measured the effects. To predict the iPhone's performance on a network, Apple engineers bought nearly a dozen server-sized radio-frequency

120. See Fred Vogelstein, *Weapon of Mass Disruption*, WIRED, Feb. 2008, at 118, 122, available at http://www.wired.com/gadgets/wireless/magazine/16-02/ff_iphone?currentPage=1.

121. Of course, development of a touch-screen tablet was later resumed, giving us the Apple iPad.

122. Vogelstein, *supra* note 120, at 124.

123. *Id.* at 123.

simulators for millions of dollars apiece. . . . One insider estimates that Apple spent roughly \$150 million building the iPhone.¹²⁴

Two and a half years later, the iPhone launched. Within days, Apple was hit by a patent infringement suit.¹²⁵ Many more would follow. Among other things, aspects of the device's touchscreen,¹²⁶ virtual keyboard,¹²⁷ visual voicemail,¹²⁸ caller ID,¹²⁹ web browser,¹³⁰ digital camera,¹³¹ antenna,¹³² accelerometer,¹³³ processor,¹³⁴ operating system,¹³⁵ graphics display,¹³⁶ audio

-
124. *Id.* at 125. Indeed, Apple continued to hire specialists even after the iPhone's launch to improve the phone's wireless capabilities, which had been weak due to Apple's lack of expertise in the field. *Id.*
125. Joseph Weisenthal, *LG Accuses Apple of Ripping Off iPhone Design*, TECHDIRT (Feb. 13, 2007, 3:49 PM), <http://www.techdirt.com/articles/20070213/062953.shtml>.
126. Paul Miller, *Quantum Strikes Again, Charging iPhone Touchscreen Infringement*, ENGADGET (Feb. 20, 2007, 6:42 PM), <http://www.engadget.com/2007/02/20/quantum-strikes-again-charging-iphone-touchscreen-infringement>; Natalie Weinstein, *Apple Sued Over iPhone Screen Tech*, CNET (Feb. 14, 2009, 2:57 PM), <http://news.cnet.com/apple-sued-over-iphone-screen-tech>.
127. Jacqui Cheng, *Apple Targeted for iPhone Patent Infringement*, ARS TECHNICA (Aug. 6, 2007, 5:34 PM), <http://arstechnica.com/apple/news/2007/08/apple-targeted-for-iphone-patent-infringement.ars>.
128. Jacqui Cheng, *Apple, AT&T Dial Up Patent Infringement Lawsuit With Visual Voicemail*, ARS TECHNICA (Dec. 4, 2007, 10:48 AM), <http://arstechnica.com/apple/news/2007/12/apple-att-dial-up-patent-infringement-lawsuit-with-visual-voicemail.ars>.
129. Jeff Smykil, *Company Sues Apple Over iPhone's Caller ID*, ARS TECHNICA (Feb. 28, 2008, 3:46 PM), <http://arstechnica.com/apple/news/2008/02/company-sues-apple-over-iphones-caller-id.ars>.
130. Tom Krazit, *Inventor Files Patent Suit Over iPhone Web Browsing*, CNET (Nov. 24, 2008, 10:56 AM), http://news.cnet.com/8301-13579_3-10106805-37.html; Lance Whitney, *SoftView Files Patent Suit Against Apple, AT&T*, CNET (May 12, 2010, 11:40 AM), http://news.cnet.com/8301-13579_3-20004791-37.html.
131. Chloe Albanesius, *Apple, RIM, Motorola Sued for Patent Infringement Over Camera Tech*, PCMAG (Mar. 21, 2011, 3:32 PM), <http://www.pcmag.com/article2/0,2817,2382335,00.asp>; Jared Newman, *Kodak Sues RIM and Apple Over Lawsuit-Magnet iPhone*, PCWORLD (Jan. 15, 2010, 8:15 AM), http://www.pcworld.com/article/186995/kodak_sues_rim_and_apple_over_lawsuitmagnet_iphone.html.
132. Dan Frommer, *Motorola Sues Apple for Patent Infringement*, BUS. INSIDER (Oct. 6, 2010, 2:06 PM), <http://www.businessinsider.com/motorola-sues-apple-for-patent-infringement-2010-10>.
133. Jack Purcher, *Tritton Technologies Files Patent Infringement Case Against Apple*, PATENTLY APPLE (Aug. 31, 2010), <http://www.patentlyapple.com/patently-apple/2010/08/tritton-technologies-launch-patent-infringement-case-against-apple.html>.
134. Jack Purcher, *X2Y Sues Apple, HP and Intel Over Processor Related Technology*, PATENTLY APPLE (June 1, 2011), <http://www.patentlyapple.com/patently-apple/2011/06/x2y-sues-apple-hp-and-intel-over-processor-related-technology.html>.
135. Sara Yin, *Nokia Expands U.S. Patent War With Apple*, PCMAG (Mar. 29, 2011, 3:19 PM), <http://www.pcmag.com/article2/0,2817,2382763,00.asp>.
136. Jack Purcher, *Former SGI Files Patent Infringement Lawsuit Against Apple*, PATENTLY APPLE (Nov. 20, 2010), <http://www.patentlyapple.com/patently-apple/2010/11/former-sgi-files-patent-infringement-lawsuit-against-apple.html>.

processing,¹³⁷ data compression,¹³⁸ data transmission,¹³⁹ GPS,¹⁴⁰ and Wi-Fi technology¹⁴¹ have all been accused of patent infringement.

Many of these lawsuits do not present a substantial risk of hold-up. Where Apple can respond to an injunction with a relatively cheap and effective design-around (issuing a software update to change infringing code, for example), the injunction threat makes for a relatively weak bargaining chip. These lawsuits presumably settle for amounts close to the values the inventions would have commanded ex ante.¹⁴²

But what about cases in which Apple cannot easily design around the patent? Consider, for example, Kodak's recent (and ongoing) lawsuit against Apple. In early 2010, Kodak filed suit against Apple in the International Trade Commission (ITC), alleging that the iPhone infringed a number of its patents.¹⁴³ The key patent in the case roughly covers image previewing in digital cameras.¹⁴⁴

Before bringing its action against Apple, Kodak sued Samsung and LG for infringing the same patent. After Kodak won an initial victory in the ITC, Samsung and LG—now staring at the very real risk of an importation ban on their cell phones—settled with Kodak for \$550 million and \$414 million, respectively.¹⁴⁵ These outsized settlements were paid for one feature

-
137. Jack Purcher, *Hybrid Audio LLC Files Patent Infringement Lawsuit Against Apple*, PATENTLY APPLE (Dec. 22, 2010), <http://www.patentlyapple.com/patently-apple/2010/12/hybrid-audio-llc-files-patent-infringement-lawsuit-against-apple.html>.
 138. Josh Lowensohn, *ITC Ruling Mixed in S3 Graphics v. Apple*, CNET (July 1, 2011, 2:20 PM), http://news.cnet.com/8301-27076_3-20076219-248/itc-ruling-mixed-in-s3-graphics-v-apple.
 139. Saul Hansell & Kevin J. O'Brien, *Suing Apple, Nokia Says iPhone Infringes on Patents*, N.Y. TIMES, Oct. 23, 2009, at B7, available at <http://www.nytimes.com/2009/10/23/technology/companies/23nokia.html>; Miyoung Kim, *Samsung Countersues Apple Over iPhone, iPad*, REUTERS (Apr. 22, 2011, 9:02 AM), <http://www.reuters.com/article/2011/04/22/us-samsung-apple-idUSTRE73L0DG20110422>; Reuters, *NTP Expands Patent Suits to Apple, Google*, PCMAG (July 9, 2010, 2:31 PM), <http://www.pcmag.com/article2/0,2817,2366271,00.asp>.
 140. Jack Purcher, *Walker Digital of Priceline.com Sues Apple Over iPhone Feature*, PATENTLY APPLE (Apr. 14, 2011), <http://www.patentlyapple.com/patently-apple/2011/04/walker-digital-of-pricelinecom-sues-apple-over-iphone-feature.html>.
 141. *HTC Sues Apple for Patent Infringement*, PRNEWswire (Aug. 16, 2011), <http://www.prnewswire.com/news-releases/htc-sues-apple-for-patent-infringement-127883748.html>.
 142. Companies like Apple rarely disclose these settlement amounts, as doing so tends to encourage even more suits.
 143. Mary Ellen Lloyd, *Kodak Sues Apple, RIM Over Patents*, WALL ST. J., Jan. 14, 2010, <http://online.wsj.com/article/SB10001424052748704281204575002891721364642.html>.
 144. Florian Mueller, *Eastman Kodak v. Apple and RIM: Target Date for ITC Decision Postponed by One Week*, FOSS PATENTS (June 23, 2011, 5:38 PM), <http://fosspatents.blogspot.com/2011/06/eastman-kodak-v-apple-and-rim-todays.html>.
 145. Chris Burritt & Susan Decker, *Kodak CEO Perez Says \$1 Billion at Stake in Apple, RIM Patent Dispute*, BLOOMBERG (Mar. 25, 2011, 1:15 PM), <http://www.bloomberg.com/news/2011-03-25/kodak-says-1-billion-at-stake-in-apple-rim-patent-dispute.html>.

of the phones' digital camera. Digital cameras in turn are just one of dozens of components found in any smartphone. The fact that such a relatively minor and ancillary component was able to command such outsized royalties is a sobering illustration of the leverage an injunction can afford patentees in ex post negotiations.

And now Kodak is asking the ITC to ban the importation of iPhones into the United States. Can the infringement of one patent really lead to an importation ban on iPhones—a device covered by hundreds of other patents, a device that Apple has invested hundreds of millions of dollars in, and a cultural icon embraced by consumers the world over?¹⁴⁶ There can be little doubt that Apple, if faced with an importation ban on its iPhones, would (begrudgingly) write Kodak a very large check to license the camera technology—regardless of what the technology might have commanded ex ante. Kodak, too, is well aware of its tremendous leverage: Its CEO has estimated that the royalties from Apple and RIM may well exceed \$1 billion.¹⁴⁷

With the stakes so high, here is the maddening thing for Apple: While *eBay* opened the door to arguing against injunctive relief, there is little to indicate whether a hold-up argument can win the day in court. Should it?

2. The Problems Caused by Patent Hold-Up

Patent hold-up enables patentees to extract value from an infringer's product-specific investments in addition to the economic value of the patent. Patent hold-up is therefore tantamount to overvaluation and leads to all the same inefficient incentives.¹⁴⁸ Overvaluation—whether by judicial misvaluation or patent hold-up—encourages patentees to spend resources litigating rather than innovating, suppresses the development of legitimate substitutes, discourages

146. The ITC does not apply *eBay* when deciding whether or not to ban importation, so the answer here is almost certainly yes. While district courts derive their authority to grant injunctive relief from 35 U.S.C. § 283, the ITC derives its authority to issue importation bans from a different statute. The Federal Circuit has therefore held that “*eBay* does not apply to [ITC] remedy determinations . . .” *Spansion, Inc. v. Int’l Trade Comm’n*, 629 F.3d 1331, 1359 (Fed. Cir. 2010). While *Spansion* is probably correct as a matter of statutory interpretation, the decision is troubling from a public policy perspective. The concerns I sketch about patent hold-up apply with equal force to cases before the ITC. Accordingly, legislative reform is sorely needed. For a discussion of some potential reforms, see generally William Dolan, iBrief, *The International Trade Commission: Potential Bias, Hold-Up, and the Need for Reform*, 2009 DUKE L. & TECH. REV. 11.

147. Burritt & Decker, *supra* note 145.

148. See *supra* Part II.B.3; see also Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, in 1 INNOVATION POLICY AND THE ECONOMY 119, 126 (Adam B. Jaffe et al. eds., 2001) (arguing that some companies “refrain from introducing certain products for fear of holdup”).

technology transfer, undermines the patent system's disclosure benefit, and fosters uncertain patent coverage.¹⁴⁹ Worse yet, overcompensation from patent hold-up leads to its own unique problems.

Overcompensation from hold-up encourages inventors at the margin to devote their research efforts to inventions likely to produce exploitable hold-up. This is troubling because the inventions most likely to produce exploitable hold-up are not particularly innovative or groundbreaking; they are simply obvious steps forward. To see why, recall the elements of patent hold-up: An infringer makes product-specific investments with no awareness that the technology is the subject of someone else's patent. Lack of awareness is key: If the infringer had known about the patent, the infringer would not have made product-specific investments until it had dealt with the patentee. For patent hold-up to occur, the infringer—who had no idea the technology existed—must have independently invented the technology itself. Thus, the inventions most likely to produce exploitable hold-up are those most likely to be replicated by another before the patent term expires—predictable, piecemeal advances. In this way, patent hold-up incentivizes firms at the margin to devote additional resources to pursue these lackluster advances, leaving less capital for more groundbreaking research.

Overcompensation from hold-up also exacerbates the bilateral monopoly problem that comes with injunctive relief.¹⁵⁰ The bilateral monopoly concern becomes more acute when patent hold-up is at play because hold-up adds to the bilateral monopoly's bargaining range. The infringer is better off paying any amount that is less than the cost of switching to a noninfringing alternative. The patentee, meanwhile, will sometimes be better off receiving just about any amount above zero; sometimes the patentee has no intention of enforcing the injunction and merely seeks one to force the infringer to pay the patentee to get out of it.¹⁵¹ The bargaining range can therefore run from \$0 to the cost of switching. For companies that have already committed to using the patented technology, switching costs can run into the tens of millions. This enormous bargaining range gives rise to a severe bilateral monopoly problem.¹⁵²

149. See *supra* Part II.B.3.

150. See Benjamin H. Diessel, Note, *Trolling for Trolls: The Pitfalls of the Emerging Market Competition Requirement for Permanent Injunctions in Patent Cases Post-eBay*, 106 MICH. L. REV. 305, 334–35 (2007) (explaining how patent hold-up may exacerbate bilateral monopoly problems associated with injunctive relief).

151. Other times the injunction really is worth something to the patentee—such as cases where the patentee practices the invention itself or seeks to exclusively license the patent.

152. See *supra* note 55.

Bilateral monopolies with such large bargaining ranges are problematic for two reasons: (1) They encourage intensive bargaining between the parties, which is a wasteful use of resources; and (2) they can prevent the parties from reaching an efficient result.¹⁵³ The likelihood that negotiations will completely break down is admittedly slim, but the enormous bargaining range all but guarantees that the talks will be costly and protracted before an agreement is reached.¹⁵⁴ And in instances where bargaining *does* fall apart, the result may be disastrous—the defendant abandons its investments, lays off its employees, and files for bankruptcy, while the plaintiff has little to show for its efforts. Little wonder then that courts dislike giving injunctions when the injunction would give rise to a severe bilateral monopoly problem.

3. Judicial Reactions to Patent Hold-Up

Courts are beginning to acknowledge the problems caused by patent hold-up.¹⁵⁵ Justice Kennedy's concurring opinion in *eBay*, joined by three other justices, appears to instruct courts to consider some of the problems described above.¹⁵⁶ Justice Kennedy expressed concern that injunctions may be used as "undue leverage in negotiations," and he observed that in those cases, "damages may well be sufficient to compensate for the infringement and an injunction may not serve the public interest."¹⁵⁷ Although Justice Kennedy did not

153. *Walgreen Co. v. Sara Creek Prop. Co.*, 966 F.2d 273, 276 (7th Cir. 1992) ("[In bilateral monopolies] both parties will have an incentive to devote substantial resources of time and money to the negotiation process. The process may even break down . . . and if it does break down, the injunction will have brought about an inefficient result.").

154. For a clear example of this, look at what happened after the RIM-NTP trial. *See generally* Tom Krazit & Anne Broache, *BlackBerry Saved*, CNET (Mar. 3, 2006, 4:00 PM), http://news.cnet.com/BlackBerry-saved/2100-1047_3-6045880.html. At trial, the jury found NTP's patent valid and infringed. After the Federal Circuit affirmed the jury's finding, the parties tried to negotiate a license for the patent. Many days spent negotiating yielded nothing as the clock continued to run. Those watching from the sidelines grew increasingly concerned that an injunction—which would have shut off email service to all BlackBerry devices in the United States—would actually be enforced. Even the U.S. government began to worry about the possibility of breakdown, prompting it to intervene and ask the district court not to enjoin infringement in the interest of national security. Only after the judge rebuked both parties for dragging out the process—and demanded that they settle, *or else*—did the parties reach an agreement (RIM agreed to pay NTP \$612.5 million).

155. *See, e.g.*, *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 395–97 (2006) (Kennedy, J., concurring); *Broadcom Corp. v. Qualcomm Inc.*, 501 F.3d 297, 310 (3d Cir. 2007) (discussing the inefficiencies produced by patent hold-up); *Hynix Semiconductor Inc. v. Rambus Inc.*, 609 F. Supp. 2d 951, 966–68 (N.D. Cal. 2009) (explaining that injunctions should not encourage patent hold-up).

156. *eBay Inc.*, 547 U.S. at 395–97 (Kennedy, J., concurring).

157. *Id.* at 396–97.

use the term “hold-up” to describe situations where the patentee may use an injunction for undue leverage in negotiations, the Federal Trade Commission Report to which he cited does.¹⁵⁸

A few trial courts have accepted Kennedy’s invitation to account for hold-up in their injunction analysis. In *z4 Techs v. Microsoft*,¹⁵⁹ the first patent case after *eBay* to deny injunctive relief, the district court incorporated Justice Kennedy’s concurrence into its application of *eBay*’s four-factor test.¹⁶⁰ In *z4 Techs*, the jury found that Microsoft Office and Microsoft Windows XP both infringed plaintiff *z4*’s patent.¹⁶¹ After the verdict, *z4* asked the court “to enjoin Microsoft from making, using, selling, offering for sale, and/or importing . . . Windows XP products since 2001 and Office products since 2000.”¹⁶² The court declined to do so, explaining that “the resources, time, and expense required to redesign its Windows and Office software products would create a significant hardship on Microsoft.”¹⁶³ Although the court did not refer to patent hold-up specifically, it intuitively recognized that an injunction would have given *z4* unacceptable leverage in negotiations.

In *Hynix Semiconductor Inc. v. Rambus Inc.*,¹⁶⁴ the court cited Kennedy’s concurrence for the proposition that “injunctions should not encourage holdup.”¹⁶⁵ The court succinctly explained how injunctions may encourage hold-up: “[a] patent to a technological sliver enables its owner to threaten to enjoin the manufacture or use of the entire device, and in turn, receive a payoff far greater than the value of its invention.”¹⁶⁶ The court also recognized that “[e]xtensive sunk costs present another opportunity for a patent holder to extract a disproportionate sum from an infringer because the infringer cannot recover its existing investment,” and that “the court in equity should be mindful that an injunction can impose disproportionate costs on the infringer and on the general public . . .”¹⁶⁷ With these principles in mind, the court proceeded with its injunction analysis, noting that the defendant could not easily design

158. See FTC, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY, ch. 3, at 37 (2003), available at <http://www.ftc.gov/os/2003/10/innovationrpt.pdf> (“Panelists discussed the strategic use of patents in licensing negotiations, and in particular one type of strategic use, generally known as ‘hold-up.’”).

159. 434 F. Supp. 2d 437 (E.D. Tex. 2006).

160. *Id.* at 441.

161. *Id.* at 438.

162. *Id.* at 439.

163. *Id.* at 442.

164. 609 F. Supp. 2d 951 (N.D. Cal. 2009).

165. *Id.* at 966.

166. *Id.*

167. *Id.* at 967–68.

around the patent, nor could it feasibly switch to an alternative technology.¹⁶⁸ The court thus concluded that an injunction would deal “immediate and devastating harm” to the defendant.¹⁶⁹ Because the plaintiff had failed to show more than “the slight possibility” of irreparable harm, the court further reasoned that the plaintiff’s motive in seeking an injunction was probably “not to prevent irreparable harm but . . . to increase its leverage in negotiating an ongoing license”¹⁷⁰—the essence of patent hold-up. Accordingly, the court denied the plaintiff’s request for injunctive relief.¹⁷¹

Unfortunately, *z4 Techs* and *Hynix* remain outliers in the case law. Since *eBay*, few courts have considered patent hold-up problems in their injunction analysis. The following subparts therefore propose a framework, grounded in precedent and public policy, for inserting patent hold-up into the injunction analysis.

D. Balancing Misvaluation and Hold-Up

Following Judge Posner’s lead, trial courts should weigh the costs of awarding damages against the costs of injunctive relief. In patent litigation, this requires balancing the misvaluation problems against the hold-up problems previously discussed.¹⁷² Specifically, trial courts should assess the severity of each problem, compare them, and deny injunctive relief when they believe the costs of hold-up likely exceed the costs of misvaluation.

1. A Threshold Requirement: Inadvertent Infringement

Courts must not allow defendants that knowingly infringe to make investments for the purpose of escaping an injunction.¹⁷³ The reason is simple: When an infringer knows about the patent before it makes product-specific investments, the infringer can effectively negotiate with the patent’s owner. Because product-specific investments have not yet been made, the negotiation would not be distorted by patent hold-up. Conducted without the specter of patent hold-up, this private negotiation would accurately price the invention,

168. *Id.* at 975–78.

169. *Id.* at 985.

170. *Id.*

171. *Id.* at 986.

172. Patent hold-up is not the only potential downside to injunctive relief; when there are other costs to granting an injunction, they too should enter the analysis.

173. Commentators widely agree that the absence of copying is a critical element of patent hold-up. See, e.g., Lemley & Shapiro, *supra* note 7, at 2036–37.

making it preferable to judicial valuation. Thus, when an infringer knows about the patent before making product-specific investments, the law should encourage the infringer to negotiate with the patentee (thereby pricing the patent in the private market) rather than litigate (thereby relying on courts to price the patent).¹⁷⁴ To this end, an infringer should be allowed to ask for judicial valuation only when an effective ex ante negotiation was not possible: when the infringer had no knowledge that its activities constituted infringement at the time it made its product-specific investments.

Moreover, “knowledge” must be construed broadly to at least encompass willful blindness in addition to actual knowledge.¹⁷⁵ Infringers would otherwise be encouraged to turn a blind eye to relevant patents in the field while recklessly making product-specific investments. When a potential infringer can discover the patent ex ante with minimal effort (that is, by not choosing to be willfully blind), it is in a great position to effect an efficient ex ante negotiation in place of an inefficient ex post valuation. Judicial valuation should be avoided when an efficient private negotiation is available; when a would-be infringer is clearly the least cost avoider, the law should encourage it to avoid judicial valuation by facilitating an efficient, private negotiation.

Inquiry into a defendant’s state of mind is not foreign to patent law. Although patent infringement is a strict liability offense, patent law cares about a defendant’s state of mind when deciding whether to award punitive damages for willful infringement. Under willful infringement’s two-prong test, infringement is deemed willful if the plaintiff proves, by clear and convincing evidence, that (1) the infringer’s actions had an “objectively high likelihood” of constituting infringement; and (2) the objectively high risk of infringement was known or was so obvious that it should have been known to the infringer.¹⁷⁶

The test for willful infringement can reasonably be applied here as well. Specifically, an infringer waives any patent hold-up argument if it willfully infringed at the time it made its product-specific investments. After all, the rationale for punishing willful infringement there is the same as it is here: If the infringer knew that it was infringing, it could have—and should have—negotiated.¹⁷⁷

174. Cf. Lichtman, *supra* note 106, at 1036 (explaining how and why patent law is designed to encourage private parties to negotiate rather than litigate).

175. For what it means for a defendant to be willfully blind with respect to its infringement, see generally *Global-Tech Appliances, Inc. v. SEB S.A.*, 131 S. Ct. 2060 (2011) (applying the willful blindness doctrine to a patent infringement case).

176. See *In re Seagate Tech., LLC*, 497 F.3d 1360, 1371 (Fed. Cir. 2007) (en banc).

177. See Lichtman, *supra* note 106, at 1039.

And while a willful infringement standard furthers this important policy, it does not do so at all costs. When defining the contours of the inadvertent-infringement standard, courts must be careful that the chosen standard does not undermine the overall goal of properly aligning incentives. There are, in other words, two competing policy objectives in play: While there must be an exception designed to force *ex ante* negotiations when they are possible, that exception must not swallow the general rule designed to combat patent hold-up. Limiting the exception to willful infringement strikes a proper balance.

To be sure, the proposed penalty for willful infringement—waiver of all arguments based on patent hold-up—is quite draconian.¹⁷⁸ The proposed inadvertent-infringement rule gives the patentee a windfall in cases where a defendant willfully infringes before making product-specific investments. In other words, whenever the rule is triggered, the patentee has free rein to exploit hold-up and extort potentially excessive sums of money from the infringer. But this is not as troubling as may first appear. Given the rule's draconian consequences, it will be the rare case indeed where a defendant knows that a product will infringe another's patent and proceeds to invest large sums into making the product anyway. While systematic overcompensation compromises many of the incentives patent law relies on to promote innovation,¹⁷⁹ overcompensation in exceptional cases has little, if any, impact on those incentives. So long as a windfall to the plaintiff is the exception and not the rule—so that the plaintiff cannot reliably count on being overcompensated—there is less reason to worry about skewing his incentives.

Finally, there is the issue of timing: When is the willful infringement inquiry made? Start with the easy cases. On one extreme, there is the defendant that knew that it would infringe before making its product-specific investments; it clearly is not an inadvertent infringer. On the other extreme, there is the defendant that had no reason to know that it was infringing until the plaintiff served it with a complaint; it clearly is an inadvertent infringer. But consider the defendant that learns of its infringement *before* it is sued but *after* it has already made substantial product-specific investments—if the defendant continues to infringe after learning of its infringement, is the defendant an inadvertent infringer?¹⁸⁰

178. Some might call for a less severe penalty with more nuance. That would add complexity to the rule, however, for which I see no commensurate gain.

179. See *supra* Parts II.B.3, II.C.2.

180. This question is important for the willful infringement doctrine in its own right. See Lichtman, *supra* note 106, at 1039 n.44 (“Discretion is an important part of the doctrine because willful damages are inappropriate in some instances where the formal test is nonetheless met. For instance, sometimes an infringer will hear of an obviously valid patent only after the infringer

Yes. The purpose of an inadvertent-infringement requirement is to force would-be infringers into *undistorted* ex ante negotiations. As soon as a defendant makes product-specific investments, the chance for undistorted negotiations is lost—at that point the patentee can potentially hold those investments hostage. If the goal is to deny patentees the leverage that comes from patent hold-up when the costs of allowing that leverage would be too great, the defendant must be allowed to forgo the patentee’s distorted offer and try instead for judicial valuation.

In sum, if the trial court finds that the infringer willfully infringed at the time it made its investments, a court ought not consider the patentee’s ability to hold up the infringer. Only when the infringer was unaware of its infringement at the time it made its investments should a court proceed to the next step in the analysis: assessing the hold-up and misvaluation problems.

2. Assessing the Hold-Up Problem

When a court grants an injunction, the negotiated royalty will reflect two components: (1) the economic value of the invention and (2) any additional costs the defendant must incur to switch to a noninfringing alternative, up to the value of the defendant’s product-specific investments.¹⁸¹ To illustrate, imagine that a company infringes technology X and that the next-best noninfringing alternative available is technology Y.¹⁸² Suppose X is superior to Y because it enables the infringer to produce its product at less cost without sacrificing quality; say the infringer saves \$20 million using technology X over Y. Suppose also that the owner of the patent on X does not manufacture competing products.¹⁸³

First consider an ex ante negotiation. Since the infringer gains \$20 million from using the patented technology over its next-best alternative, the infringer

has made patent-specific investments. . . . Willful damages ought not punish the infringer for turning down [a deal distorted by patent hold-up].”).

181. *See id.* at 1040 (“[T]he infringer will be willing to overpay for the technology, paying the intrinsic value of the technology . . . plus a kicker that reflects the savings associated with not having to change its production facilities or in other ways disrupt existing business relationships and practices.”).

182. The alternative need not be unpatented. When the next-best alternative is patented, the cost of using that alternative is something that also factors into the ex ante negotiation and is reflected in the economic value of the patent at issue.

183. This assumption simplifies the example by taking lost profits off the table. If the patentee does practice the invention, the economic value of the patent is the greater of: (1) the patentee’s lost profits due to the infringement and (2) the amount the infringer would pay for a license in ex ante negotiation.

would pay up to that amount for the right to use technology X.¹⁸⁴ If the patent holder demanded any more, the infringer would use technology Y instead, since at that point the cost of using X would outweigh the benefit. The price the patent could command in ex ante negotiation—its economic value—is therefore \$20 million.

But the negotiation following an injunction can look a lot different. At this point, the infringer may have invested heavily in using technology X. By switching from X to Y, the firm would still forgo the \$20 million in savings. But now the firm might have to scrap some of its prior investments in tools, employees, and facilities designed to utilize X, and retool, rehire, and refit those facilities to utilize Y. These after-investment switching costs may be enormous. Suppose the after-investment switching costs add up to \$180 million; that brings the total cost of switching to \$200 million. The patentee can now demand some amount just under \$200 million for relief from the injunction, knowing that the infringer is better off paying (for instance) a \$190 million royalty than spending \$200 million to make the switch.

Incentives become distorted when patentees are overcompensated in litigation—when they receive more than the economic value of their patent. The magnitude of the distortion tracks the magnitude of the overcompensation. The distortion caused by patent hold-up is therefore quantified by the defendant's after-investment switching cost.¹⁸⁵ The after-investment switching cost also quantifies the degree to which hold-up increases the parties' bargaining range, and it therefore informs the severity of the bilateral monopoly that an injunction would create. Courts, in deciding motions for injunctions, should therefore consider reliable evidence of the defendant's after-investment switching costs.

3. Assessing the Valuation Problem

The expected distortion caused by judicial misvaluation is more difficult to theoretically quantify. Nevertheless, courts may look at several factors to arrive at a reasonable estimate.

One important factor is the invention's economic value. In general, the larger the patent's economic value, the larger (in absolute terms) the expected

184. The \$20 million sets a ceiling, not a floor, on the amount that an infringer would willingly pay for a license. See Lemley & Shapiro, *supra* note 7, at 1995–98 (providing an economic model for ex ante negotiations).

185. The distortion might be tempered somewhat if the litigation is between repeat players, each with substantial product-specific investments of their own.

misvaluation. Suppose we believe that courts can estimate a patent's economic value within plus-or-minus 50 percent of its actual value.¹⁸⁶ Under this simplistic model, more valuable patents will result in larger average errors. A court that values an invention at \$10 admits that the actual economic value lies between \$5 and \$15—a potential \$5 swing each way. A court that values an invention at \$100 million dollars admits that the actual economic value lies between \$50 million and \$150 million dollars—a potential \$50 million swing each way. The expected error—the magnitude of distortion—grows as the invention's value grows. Of course, the invention's economic value is itself unknown; if it could be measured precisely, there would be no misvaluation problem in the first place. Nevertheless, precision is not required here. The proposed analysis looks to some admittedly crude proxies for hold-up and misvaluation, but it only makes a recommendation when one evil significantly exceeds the other.

A second factor is whether the patentee competes in the market with the infringing product. When the patentee produces a product that competes with the infringing product, the harm to the patentee is more difficult to predict. The harm to a practicing entity may include lost profits in the form of lost sales, price erosion, and loss of collateral sales. Predicting these losses invites speculation on a host of economic variables—consumer preferences, substitutability, and price sensitivity, to name a few. Forecasting lost profits is hardly an exact science, and misvaluation is inevitable when a court tries to set the number itself. Moreover, competition with an infringing product can cause intangible harm, such as a loss of brand prestige or a loss of consumer goodwill.¹⁸⁷ These intangible harms may be even more prone to misvaluation.¹⁸⁸

A third factor is the availability of similar and reliable licenses. Two kinds of licensing agreements, when they exist, may allow a court to value the patent in suit with greater confidence: (1) licensing agreements in which the patentee has licensed the patent in suit to others and (2) licensing agreements in which the infringer pays royalties for patents similar to the patent in suit. Indeed, courts have long considered both kinds of licensing agreements when doing a

186. This model is only for illustrative purposes. It is clearly flawed, but in ways that do not affect the purpose of the illustration here. First, courts are more likely to overvalue patents than they are to undervalue them. Second, there is no reason to believe that the expected error grows linearly with economic value.

187. *See* *z4 Techs., Inc. v. Microsoft Corp.*, 434 F. Supp. 2d 437, 441 (E.D. Tex. 2006).

188. *See* *Rent-A-Center, Inc. v. Canyon Television & Appliance Rental, Inc.*, 944 F.2d 597, 603 (9th Cir. 1991) (stating that damage to goodwill would be difficult to value).

reasonable royalty analysis.¹⁸⁹ Of course, established royalties are useful only to the extent they are reliable and not negotiated under circumstances very different from the hypothetical negotiation. For example, license agreements entered into to settle litigation (or the threat of litigation) are viewed with skepticism since the royalty rate may reflect a desire to avoid litigation more than it reflects the patent's economic value.¹⁹⁰ As a result, courts must scrutinize the details of these royalties to ensure that they accurately reflect the economic value of the patent in suit. But when they pass muster, established licenses provide courts with a helpful clue for setting an appropriate damages award.

The above factors do not form an exhaustive list. In particular cases, a court may uncover other facts that make valuation difficult and misvaluation likely. For example, the court in *Broadcom Corp. v. Qualcomm Inc.*¹⁹¹ identified a special marketplace dynamic that would have made valuation difficult and misvaluation likely. The court found that the plaintiff was competing with the defendant for "design wins"—convincing downstream producers to develop and produce cell phones using the plaintiff's processing chip rather than the defendant's.¹⁹² The impact of the defendant's infringement on the plaintiff's ability to secure these design wins would have been almost pure speculation. Any time the facts of a case make valuation difficult and misvaluation likely, courts should add a weight to the scale in favor of an injunction.

4. Balancing Costs and Issuing Relief

After a court assesses the potential for misvaluation and patent hold-up, it should choose the less costly of the two and issue the corresponding remedy. In other words, when the cost of patent hold-up is expected to exceed the cost of judicial misvaluation, a court should deny injunctive relief.

189. These licensing agreements make up the first two *Georgia-Pacific* factors, a list of factors invariably cited by courts in their reasonable royalty analysis. See *Ga.-Pac. Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970), modified by 446 F.2d 295 (2d Cir. 1971).

190. See *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078–79 (Fed. Cir. 1983) (“[S]ince the offers were made after the infringement began and litigation was threatened or probable, their terms should not be considered evidence of an ‘established royalty,’ since license fees negotiated in the face of a threat of high litigation costs may be strongly influenced by a desire to avoid full litigation.”).

191. 543 F.3d 683 (Fed. Cir. 2008).

192. *Id.* at 702–03.

Damages Preferable	Injunction Preferable
<ul style="list-style-type: none"> • High after-investment switching costs 	<ul style="list-style-type: none"> • Valuable patent • Direct competition between the plaintiff and defendant • Lack of comparable, reliable licensing agreements

While the value of the patented invention relative to the defendant's switching costs is the most probative factor, it should not be given dispositive weight unless one value utterly eclipses the other.¹⁹³

E. Grounding the Analysis in *eBay*'s Four Factors

So far, the discussion has justified the proposed balancing framework primarily on public policy grounds. But the balancing framework tightly tracks the four factors articulated in *eBay* as well.¹⁹⁴

1. Irreparable Injury and Inadequacy of Damages

Most courts consider the first two factors interchangeable, and they are usually analyzed together: An injury is irreparable when monetary damages are inadequate to compensate for that injury.¹⁹⁵

Courts typically find irreparable injury when the injury is difficult to quantify.¹⁹⁶ For example, quantifying an injury from the loss of prospective

193. If there are no switching costs, then patent hold-up is obviously not a concern, and the other factors are rendered moot.

194. To recall, the four factors are: (1) whether the plaintiff has suffered irreparable injury; (2) whether damages are inadequate to compensate for that injury; (3) whether the balance of hardships between the plaintiff and defendant warrants a remedy in equity; and (4) whether the public interest would be disserved by an injunction. *See supra* note 25 and accompanying text.

195. *See, e.g.,* *Acumed LLC v. Stryker Corp.*, 551 F.3d 1323, 1327–29 (Fed. Cir. 2008) (considering irreparable harm and inadequacy of damages together); *Ross-Simons of Warwick, Inc. v. Baccarat, Inc.*, 102 F.3d 12, 19 (1st Cir. 1996) (stating that when a plaintiff suffers “substantial injury that is not accurately measurable or adequately compensable by money damages, irreparable harm is a natural sequel”); *Somerset Place, LLC v. Sebelius*, 684 F. Supp. 2d 1037, 1042 (N.D. Ill. 2010) (“These two requirements—irreparable harm and no adequate remedy at law—tend to merge.”); *Fischer, supra* note 13, at 562 (“It is generally understood that the two terms are interchangeable.”).

196. *See, e.g., Broadcom Corp.*, 543 F.3d at 703 (“[D]ifficulty in estimating monetary damages reinforces the inadequacy of a remedy at law.”); *MacGinnitie v. Hobbs Grp., LLC*, 420 F.3d 1234, 1242 (11th Cir. 2005) (“[Plaintiff] has shown irreparable harm which cannot be undone through monetary remedies These injuries are in the form of lost opportunities, which are

customers or damage to the goodwill of a business is a difficult, if not impossible, task for the courts. Accordingly, courts consistently find such injuries irreparable.¹⁹⁷

The first two *eBay* factors therefore allow courts to consider the difficulty of valuation when deciding whether an injunction is appropriate. This is a critical step in this Comment's proposed analysis. Courts should therefore assess the factors that make valuation difficult and misvaluation likely¹⁹⁸—valuable patents, direct competition between the patentee and the infringer, lack of comparable licensing agreements—under the first two *eBay* factors.

2. Balance of Hardships

When applying this factor, courts compare the harm to the plaintiff if an injunction is denied with the harm to the defendant if an injunction is issued.¹⁹⁹ If an injunction would cost the defendant more than it would benefit the plaintiff, this factor weighs against injunctive relief.²⁰⁰ Courts are told to “give serious consideration to the balance of equities.”²⁰¹

When balancing equities, courts routinely consider the economic harm an injunction could cause the defendant.²⁰² One intuitive justification for this is the prevention of economic waste. For example, in *Boomer v. Atlantic Cement*,²⁰³

difficult, if not impossible, to quantify.”); *Ocean Spray Cranberries, Inc. v. PepsiCo, Inc.*, 160 F.3d 58, 61 (1st Cir. 1998) (stating that injunctive relief may be granted for breach of contract “where harm caused by [the] breach, although economic in nature, is impossible to measure accurately”); *Rent-A-Center, Inc. v. Canyon Television & Appliance Rental, Inc.*, 944 F.2d 597, 603 (9th Cir. 1991) (stating that damage to the goodwill of a business would be difficult to calculate, thus supporting a finding of irreparable injury). For a potential explanation of why courts find irreparable harm when the harm is difficult to quantify, see Douglas Lichtman, *Irreparable Benefits*, 116 YALE L.J. 1284, 1292–93 (2007).

197. See, e.g., *Stuhlbarg Int'l Sales Co. v. John D. Brush & Co.*, 240 F.3d 832, 841 (9th Cir. 2001) (“Evidence of threatened loss of prospective customers or goodwill certainly supports a finding of the possibility of irreparable harm.”); *Gateway E. Ry. Co. v. Terminal R.R. Ass'n*, 35 F.3d 1134, 1140 (7th Cir. 1994) (“[I]njury to goodwill can constitute irreparable harm that is not compensable by an award of money damages.”); *Rent-A-Center*, 944 F.2d at 603 (“[I]ntangible injuries, such as damage to ongoing recruitment efforts and goodwill, qualify as irreparable harm.”).

198. See *supra* Part II.D.3.

199. See, e.g., *Winter v. Natural Res. Def. Council, Inc.*, 555 U.S. 7, 25–26 (2008) (balancing the harm to plaintiffs if the Court denied an injunction against the harm caused to defendants if the Court issued an injunction).

200. See *id.*

201. *Earth Island Inst. v. Carlton*, 626 F.3d 462, 475 (9th Cir. 2010) (quoting *Winter*, 555 U.S. at 9).

202. See, e.g., *id.* (“Economic harm may indeed be a factor in considering the balance of equitable interests.” (citing *Amoco Prod. Co. v. Vill. of Gambell*, 480 U.S. 531, 545 (1987))).

203. 257 N.E.2d 870 (N.Y. 1970).

the New York Court of Appeals refused to enjoin the defendant's cement factory, even after finding that its production of dirt, smoke, and vibrations created a nuisance. The court emphasized the harm the defendant would suffer if it was forced to shut down its factory, as it had over \$45,000,000 invested in the plant.²⁰⁴ This amount so exceeded the damage caused to the plaintiffs (approximately \$185,000) that the balance of hardships overwhelmingly favored the defendant.²⁰⁵ The "large disparity in economic consequences [between] the nuisance and [] the injunction" prompted the court to deny injunctive relief, overturning the lower court in the process.²⁰⁶

Boomer bears a striking resemblance to cases involving patent hold-up. Like the defendant in *Boomer*, defendants in patent cases that have made product-specific investments risk devastating losses on those investments. The defendant's loss on its product-specific investments is the proxy by which courts ought to quantify the severity of patent hold-up: The size of these investments represents the degree to which the patentee can extort the defendant.²⁰⁷

Another reason to consider economic hardship on the defendant is that it contributes to the severity of a bilateral monopoly. Indeed, Judge Posner cites *Boomer* for this very point: Because the factory cost the defendant \$45 million to build, "[a]n injunction against the nuisance could therefore have created a huge bargaining range . . . and the costs of negotiating to a point within it might have been immense."²⁰⁸ This was important, Posner explained, because courts have long considered "[t]he size of the bargaining range" as "a factor in the denial of injunctive relief."²⁰⁹

In sum, the balance of hardships enables courts to consider the harm patent hold-up would cause a defendant if an injunction were to issue—both because of concerns over extortion and concerns over bilateral monopolies.

Lastly, it is well established that "court[s] need not balance the hardship when a defendant's conduct has been willful."²¹⁰ This is in tune with the inadvertent infringement condition, which requires that the defendant must not have willfully infringed when it made its product-specific investments.²¹¹

204. *Id.* at 872–73.

205. *Id.*

206. *Id.* at 872.

207. *See supra* Part II.D.2.

208. *Walgreen Co. v. Sara Creek Prop. Co.*, 966 F.2d 273, 278 (7th Cir. 1992).

209. *Id.* (citing *Gitlitz v. Plankinton Bldg. Props., Inc.*, 280 N.W. 415, 418 (Wis. 1938)).

210. *United States v. Marine Shale Processors*, 81 F.3d 1329, 1358–59 (5th Cir. 1996) (citing *United States v. Pozsgai*, 999 F.2d 719, 736 (3d Cir. 1993); *U.S. EPA v. Env'tl. Waste Control, Inc.*, 917 F.2d 327, 332 (7th Cir. 1990)).

211. *See supra* Part II.D.1.

3. Public Interest

The public interest factor, which considers the impact of an injunction on third parties, is the least clearly defined factor. Courts are to “pay particular regard for the public consequences in employing the extraordinary remedy of injunction.”²¹² Courts are given broad flexibility in applying this factor to achieve socially desirable outcomes.²¹³

For patent cases in particular, the public has a strong interest in a well-functioning patent system—one that promotes the sciences and investment in innovation.²¹⁴ The patent system operates by rewarding innovators in exchange for public disclosure of their invention. But it does not follow ad infinitum that the larger the reward, the larger the incentive to innovate; over-rewarding patentees stunts innovation in numerous ways.²¹⁵ Giving patent holders free rein to exploit hold-up overcompensates them, impeding innovation and disclosure of new technologies. At the same time, enabling hold-up creates excessive risks for third parties, leading them to reduce investments in technologies where patent coverage is uncertain, or to avoid developing in the technology space altogether. A well-functioning patent system requires the right incentives for all parties involved, and incentives on all sides are thrown out of kilter when patentees can rely on patent hold-up for supercompensatory awards.

Courts must therefore be mindful that an injunction will not always serve the public’s interest in a healthy patent system. Justice Kennedy appreciated this in *eBay*: “[When] the threat of an injunction is employed simply for undue leverage in negotiations, legal damages may well be sufficient to compensate for the infringement and an injunction may not serve the public interest.”²¹⁶ This Comment submits that leverage from an injunction is “undue” when it is used to distort incentives to the detriment of the patent system.

212. *Winter v. Natural Res. Def. Council, Inc.*, 555 U.S. 7, 24 (2008) (quoting *Weinberger v. Romero-Barcelo*, 456 U.S. 305, 312 (1982)).

213. *See, e.g., id.* at 24–26 (weighing the public’s interest in national security against possible harm to the public’s ecological, scientific, and recreational interests).

214. The Federal Circuit has long held that the public has an interest in promoting innovation. Unfortunately, it sometimes cites this interest to justify injunctive relief without questioning whether the injunction would *actually* serve the public’s interest in promoting innovation. *See, e.g., Sanofi-Synthelabo v. Apotex, Inc.*, 470 F.3d 1368, 1383–84 (Fed. Cir. 2006) (“We have long acknowledged the importance of the patent system in encouraging innovation. . . . [T]he significant ‘public interest in encouraging investment in drug development and protecting the exclusionary rights conveyed in valid pharmaceutical patents’ tips the scales in favor of [the patentee].” (quoting *Sanofi-Synthelabo v. Apotex, Inc.*, 488 F. Supp. 2d 317, 346 (S.D.N.Y. 2006))).

215. *See* FTC, *supra* note 100, at 145–47; *see also supra* Parts II.B.3, II.C.2.

216. *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 396–97 (2006) (Kennedy, J., concurring).

The public interest is best served when a court issues a remedy that properly aligns incentives—a remedy that awards the patentee the ex ante value of its invention. While neither damages nor an injunction will ever perfectly replicate the invention's ex ante value, it is imperative that courts choose the remedy that comes closer. The public's interest in an effective patent system depends on it.

CONCLUSION

Courts have long understood the problems associated with judicial misvaluation in patent cases, and they have long mitigated these problems by issuing injunctions. But today's economic reality—and the Supreme Court's decision in *eBay*—demands a more nuanced approach. The conditions for patent hold-up will only grow more prevalent as high-tech products become more complex and expensive to produce. To ensure that the patent system promotes rather than hinders innovation in these high-tech sectors, courts must understand the harms caused by allowing patentees to exploit hold-up. After placing those harms on a scale, a court will sometimes find that the benefits of avoiding judicial misvaluation are not enough to tip the scale back in favor of injunctive relief. In those cases, a court promotes innovation and the public interest by denying the injunction and awarding the patentee forward-looking damages instead.

The Supreme Court in *eBay* invites courts to consider the impact of patent hold-up in their injunction analysis, and sound public policy demands that they do.