

PATENT INVALIDATION COSTS

GREG REILLY*

ABSTRACT

Over the past decade, patent invalidation has become easier and more common. Because invalid patents fail the statutory requirements, should not have issued, and impose significant costs, many observers have celebrated this development. Yet an undercurrent of concern exists among scholars, patent system participants, and even Supreme Court Justices. Though sometimes motivated by the self-interest of patent owners, this concern partially reflects a legitimate problem: even properly invalidating a patent years after its issuance imposes costs on patent owners, costs that would not exist if the Patent Office had rejected the patent during examination. The costs of invalid patents are well recognized, but scholars have largely overlooked the costs of *invalidating* patents, giving this phenomenon only passing attention as part of larger criticism of new invalidity proceedings in the Patent Office's Patent Trial and Appeal Board. This Article brings invalidation costs into the mainstream of patent scholarship and provides the balanced analysis missing from modern patent debates. In doing so, it complicates the typical depiction of patent invalidation as an unabated public good.

Invalidation costs include four distinct types: reliance costs from investments and other decisions made based on patent protection, uncertainty costs from insecure patent rights, *in terrorem* costs from the threat of invalidation, and adjudication costs from repetitive invalidity determinations. Yet the benefits of eliminating improper monopolies often will outweigh these costs. And valid reasons exist to doubt the significance of invalidation costs—variable reliance among patent owners, patent owners' own responsibility for their invalidation costs, predictability of invalidation costs, and the exclusivity period and monopoly profits realized before invalidation. Therefore, some ways of addressing invalidation costs (making patents incontestable, limiting invalidity proceedings, making patent invalidation prospective-only, or requiring government invalidation payments) are not warranted. Instead, an existing patent law lever—the presumption of validity and its heightened burden of proof—can be repurposed to address invalidation costs. A presumption of validity rooted in invalidation costs would neither apply universally to all patents nor be limited to district court litigation. Rather, it would apply regardless of the

* Professor of Law, Co-Director of the Program in Intellectual Property Law, and Associate Dean for Faculty & Research, Illinois Tech Chicago-Kent College of Law. Thanks to Sarah Burstein, Jordi Goodman, Paul Rogerson, Noah Smith-Drelich, James Tierney, and participants in a Chicago-Kent faculty workshop for discussions and comments on this and earlier versions of the project.

invalidation forum but only upon proof of invalidation costs or proxies for them.

TABLE OF CONTENTS

INTRODUCTION	104
I. THE “PROBLEM” OF PATENT INVALIDATION	109
<i>A. The Rise of Patent Invalidation</i>	110
<i>B. The Reasons for Patent Invalidation</i>	114
1. The Costs of Invalid Patents	114
2. Policing Patent Validity <i>Ex Ante</i> Versus <i>Ex Post</i>	115
<i>C. The Overlooked Question of the Costs of Patent Invalidation</i>	117
II. THE COSTS OF PATENT INVALIDATION.....	120
<i>A. Reliance Costs</i>	122
<i>B. Uncertainty Costs</i>	125
<i>C. In Terrorem Costs</i>	127
<i>D. Adjudication Costs</i>	129
III. QUESTIONING PATENT INVALIDATION COSTS	130
<i>A. Questioning the Existence of Invalidation Costs</i>	130
1. Absence of Patent-Based Investments?	131
2. Costs Recouped Pre-Invalidation?.....	134
3. Scope of Uncertainty and <i>In Terrorem</i> Costs?	135
<i>B. Questioning Responsibility for Invalidation Costs</i>	137
<i>C. Questioning the Consequences of Invalidation Costs</i>	140
IV. ADDRESSING PATENT INVALIDATION COSTS.....	142
<i>A. Avoiding Invalid Patents</i>	142
<i>B. Avoiding Invalidation</i>	144
1. Incontestability.....	144
2. Reducing Invalidation Opportunities.....	146
<i>C. Compensating for Invalidation</i>	147
<i>D. Weighing Invalidation Costs</i>	149
1. Reconceptualizing the Presumption of Validity to Address Invalidation Costs	149
2. Adjusting the Presumption of Validity to Address Invalidation Costs.....	152
CONCLUSION.....	155

INTRODUCTION

Since the American patent system’s inception in 1790, a patent examined and issued by the U.S. Patent and Trademark Office (Patent Office) can be invalidated after issuance if subsequently found to fail the statutory criteria for patentability.¹ Scholars widely endorse this

1. See *Blonder-Tongue Lab’ys., Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 332 (1971); see also Christopher Beauchamp, *Repealing Patents*, 72 VAND. L. REV. 647, 648–49 (2019).

arrangement based on the beliefs that *ex ante* Patent Office examination is insufficient to fully police patentability² and unwarranted patents “impose significant societal costs” without the corresponding innovation benefits typically seen as justifying patent protection.³ Patent invalidation after issuance has traditionally been seen as an unabated good for the patent system.⁴

Seemingly 230 years too late, three Supreme Court Justices recently labeled it a “problem” that a patent can be invalidated years into its existence after the patent owner built a business based on the patent.⁵ Scholars⁶ and patent system participants⁷ have also recently objected to belated invalidation of patents that were previously examined by the Patent Office and relied upon by patent owners. What has changed? Most obviously, the creation of the Patent Trial and Appeal Board (PTAB) to conduct administrative post-issuance invalidation proceedings has shifted some invalidation proceedings from the federal courts to the Patent Office.⁸ But this shift in forum alone should not generate new concerns about the negative effects of invalidation because the effect on the patent owner is the same whether the patent is invalidated in the PTAB or in federal court.

However, in addition to shifting the forum, the PTAB has made invalidity challenges easier and cheaper.⁹ *Ex post* patent invalidation is now more common, with a 400% increase in the yearly number of utility patents invalidated as insufficiently different from what previously existed.¹⁰ The greater risk of invalidation since the creation of the PTAB has highlighted the potential negative effects of belatedly invalidating a patent years after the Patent Office examined and issued it—effects that the

2. Jonathan Masur, *Patent Inflation*, 121 YALE L.J. 470, 477 (2011); see also *Regents of the Univ. of Minn. v. LSI Corp.*, 926 F.3d 1327, 1331–32 (Fed. Cir. 2019).

3. Megan M. La Belle, *Public Enforcement of Patent Law*, 96 B.U. L. REV. 1865, 1880–81 (2016).

4. See *Lear, Inc. v. Adkins*, 395 U.S. 653, 668–70 (1969) (describing “the important public interest” in invalidation of patents that do not meet the conditions for patentability).

5. Transcript of Oral Argument at 29–30, 42, 54–55, *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 584 U.S. 325 (2018) (No. 16–712).

6. See Paul M. Janicke, *Toward a Streamlined Patent Statute: Part—Incontestable but No Longer Exclusive*, PATENTLYO (Sept. 3, 2018), <https://patentlyo.com/patent/2018/09/streamlined-incontestable-exclusive.html> (proposing that “[a]fter three years from the issue date, validity of [the patent] claims becomes incontestable”); Gregory Dolin, *Dubious Patent Reform*, 56 B.C. L. REV. 881, 882–83 (2015) (raising concerns about the expansion of post-issuance invalidity proceedings).

7. See, e.g., Brief for U.S. Inventor, Inc. et al. as Amici Curiae Supporting Petitioner at 4, *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 584 U.S. 325 (2018) (No. 16–712) (objecting to patent invalidation proceedings based on how “society is harmed when title to property granted by the Government might be revoked by decisions of Executive Branch employees”); Brief for Biotechnology Innovation Organization (BIO) et al. as Amici Curiae Supporting Petitioner at 12, *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 584 U.S. 325 (2018) (No. 16–712) (contending that patents are not subject to “alteration or revocation by the legislature or executive branch” after issuance).

8. See Rochelle Cooper Dreyfuss, *Giving the Federal Circuit a Run for Its Money: Challenging Patents in the PTAB*, 91 NOTRE DAME L. REV. 235, 249, 258 (2015) (explaining that PTAB proceedings “have proven extremely popular” and that the PTAB has been effective at “clearing questionable claims from the system”).

9. *Id.* at 242.

10. Stephen Yelderman, *Prior Art in Inter Partes Review*, 104 IOWA L. REV. 2705, 2706 (2019).

comparative infrequency of *ex post* invalidation previously obscured.¹¹ The result is greater recognition that although invalid patents impose costs on the patent system, subsequently invalidating a patent after the Patent Office examined and issued it imposes its own costs.

This Article brings invalidation costs into the mainstream of patent scholarly debates. To date, the limited scholarly attention on the subject has narrowly treated invalidation costs as a problem of the new PTAB proceedings, often mixing arguments about the costs of invalidation with arguments about separation of powers, doubts about the prevalence of invalid patents, and other objections to PTAB proceedings.¹² Invalidation costs have become part of the rhetoric patent owners use to rally support for their challenges to these new proceedings—challenges seemingly motivated by self-interested concerns about their own patents' increased risk of invalidation.¹³ This Article extracts invalidation costs from the polarized and hotly contested debates over the PTAB. Regardless of the merits of the objections to the PTAB itself,¹⁴ PTAB opponents have stumbled on an issue that deserves attention in its own right: invalidation costs.

Scholars who recognize the costs imposed by *ex post* invalidation generally treat them as only relevant when “good” patents are “wrongly” invalidated.¹⁵ But such a distinction is difficult to draw in practice because a “good” patent is merely one that is valid and a “bad” patent is one that is invalid, with no reliable, independent way of identifying “good” patents aside from the validity decision.¹⁶ Therefore, this Article addresses invalidation costs that exist even if (or, more precisely, without deciding whether or not) the invalidation was correct. By contrast, a patent owner undoubtedly incurs private costs from the loss of exclusivity anytime patent protection is denied, whether in an initial examination or through post-issuance invalidation.¹⁷ But these private loss-of-exclusivity costs are offset by benefits to the public from free use of the invention and are not discussed in this Article.¹⁸

11. Dreyfuss, *supra* note 8, at 254–55 (noting shortcomings in prior invalidation proceedings).

12. *See, e.g.*, Dolin, *supra* note 6, at 882 (objecting to PTAB proceedings both by raising concerns about the costs of invalidation and raising doubts about the prevalence of invalid patents); ALDEN ABBOTT, ERIKA LIETZAN, ADAM MOSSOFF, KRISTEN OSENGA, BRIAN O'SHAUGHNESSY, RANDALL R. RADER, & ROBERT STIEN, REGUL. TRANSPARENCY PROJECT, CRIPPLING THE INNOVATION ECONOMY: REGULATORY OVERREACH AT THE PATENT OFFICE 3–5 (2017), <https://regproject.org/wp-content/uploads/RTP-Intellectual-Property-Working-Group-Paper.pdf> (objecting to PTAB proceedings based on the costs of invalidation and supposed regulatory overreach by the Patent Office).

13. *See* Greg Reilly, *The PTAB's Problem*, 27 TEX. INTELL. PROP. L.J. 31, 31 (2019) (explaining how patent owner reliance costs have been part of the arguments made by opponents of the PTAB).

14. *See id.* (explaining flaws in PTAB opponent arguments).

15. *See infra* Section I.C.

16. *See infra* Section I.C.

17. The term “patent owner” is used generally to refer to both the owner of an issued patent and to the owner of the potential rights arising from a patent application. This Article uses the pronoun “it” to refer to patent owners because they are typically corporations or other entities.

18. Jonathan S. Masur & Adam K. Mortara, *Patents, Property, and Prospectivity*, 71 STAN. L. REV. 963, 972 (2019).

Separate from the costs arising from invalidation of a “good” patent or the costs resulting from the patent owner’s loss of exclusivity, invalidation costs are the additional costs that result from the patent system’s multistage determination of patentability—where an invention examined and found patentable by the Patent Office can subsequently be deemed unpatentable and invalidated. Normally, the patent owner bears these invalidation costs, though others—competitors, licensees, and even the party challenging the patent—might also incur invalidation costs.¹⁹ The invalidation costs analyzed in this Article are distinct from, though related to, the “error costs” model used in the economic analysis of adjudication that “weighs the costs of making decisions against the costs of getting those decisions wrong.”²⁰

This Article identifies and analyzes four basic types of invalidation costs.²¹ First, invalidation imposes reliance costs from investments and other decisions the patent owner made based on patent protection. Second, invalidation imposes uncertainty costs from the patent owner’s inability to rely on the security of the patent in making investment and other decisions. Third, invalidation imposes *in terrorem* costs from decisions (such as enforcement and licensing) made under threat of potential invalidation. Fourth, invalidation imposes adjudication costs by evaluating patentability multiple times.

Just because *ex post* invalidation imposes costs does not mean that it is problematic. The well-recognized benefits of patent invalidation may, and almost certainly do, outweigh the costs of invalidation, at least in most circumstances.²² Moreover, there are reasons to discount invalidation costs. Many patent owners do not make or sell a product that embodies their invention or otherwise rely on their patents in a way that invalidation disturbs.²³ The risk of invalidation is also predictable and can be factored into decision-making and cost-benefit analysis.²⁴ It is a less concerning “known unknown,” rather than a more concerning “unknown unknown.”²⁵ In fact, the patent owner is in the best position to avoid or mitigate the costs of invalidation through the way it claims its invention, at least when it also owned the patent during examination.²⁶ And patents invalidated *ex post* necessarily had a period of exclusivity during which the patent owner may have recouped monopoly profits that outweigh the costs incurred from invalidation.²⁷ Ultimately, the existence and extent of invalidation

19. See *infra* Part II.

20. James Fallows Tierney, *Reconsidering Securities Industry Bars*, 29 STAN. J.L. BUS. & FIN. 134, 173–75 (2024); see also *infra* Section I.C.

21. See *infra* Part II.

22. See *infra* Section III.C.

23. See *infra* Section III.A.1.

24. See *infra* Section III.A.3.

25. Cf. Richard A. Epstein, *In Defense of the Contract at Will*, 51 U. CHI. L. REV. 947, 969 (1984) (describing the difference between known unknowns and unknown unknowns).

26. See *infra* Section III.B.

27. See *infra* Section III.A.2.

costs are questionable, variable, and context-dependent across industries, patent owner business models, and other specific circumstances.²⁸

Acknowledging invalidation costs, the uncertainty about the extent and amount of these costs, and the benefits of invalidation allows a balanced evaluation of possible ways to address invalidation costs. The benefits of invalidation and the uncertainty, variability, and contextuality of invalidation costs counsel against more radical changes to the patent system, such as making patents incontestable, making invalidation prospective-only, or instituting government payments to owners of invalidated patents.²⁹ The same is true of proposals to universally restrict access to validity challenges, such as by eliminating or limiting PTAB proceedings.³⁰

But this Article supports two potential interventions in the patent system. First, because invalidation costs would not exist if the Patent Office had rejected the patent applications in examination, recognizing invalidation costs offers support for proposals to make patent examination more rigorous, though this will only partially address invalidation costs.³¹ Second, invalidation costs offer a new rationale for the much-maligned presumption of patent validity, which requires clear and convincing evidence to invalidate an issued patent.³² Scholars have vigorously criticized the presumption of validity's traditional justification—the general administrative law presumption that the Patent Office correctly did its job—due to well-recognized shortcomings in examination.³³ Yet the presumption of validity can be reconceptualized and justified as a means of protecting patent owners from invalidation costs by requiring clear and convincing evidence in order to impose them.³⁴ Repurposing the presumption of validity in this manner would require important modifications. Rather than a universally applicable presumption, the patent owner should bear the burden to establish the presence of invalidation costs, or of proxies for them (e.g., making or selling the patented invention), to obtain the presumption's heightened burden of proof.³⁵ Application of the presumption's heightened burden should thus depend on the existence of invalidation costs or their proxies, rather than the forum (federal court litigation or the PTAB) of the invalidity challenge.

Ultimately, this Article's primary goal is not to definitively resolve the question of invalidation costs. Rather, the purpose is to provide a balanced analysis of invalidation costs—their existence, reasons to question them, and potential solutions—to introduce this overlooked issue into patent debates and encourage further research, analysis, and proposals. The

28. See *infra* Section III.C.

29. See *infra* Sections IV.B.1, IV.C.

30. See *infra* Section IV.B.2.

31. See *infra* Section IV.A.

32. *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 101–02 (2011).

33. See *infra* Section IV.D.1.

34. See *infra* Section IV.D.1.

35. See *infra* Section IV.D.2.

Article proceeds in four parts. Part I provides an overview of *ex post* patent invalidation, its benefits, and the lack of attention to its costs. Part II establishes the categories of costs imposed by *ex post* patent invalidation. Part III further analyzes these costs and questions their existence and strength. Part IV explores solutions. A short conclusion follows.

I. THE “PROBLEM” OF PATENT INVALIDATION

Patents come in three primary forms: utility patents that protect function, design patents that protect appearance, and plant patents that protect new asexually reproduced plant varieties.³⁶ This Article addresses solely utility patents and therefore uses the general term “patent” to refer just to utility patents. To obtain exclusive rights in an invention, the inventor must first file an application for a patent with the Patent Office.³⁷ “A patent examiner with expertise in the relevant field reviews an applicant’s patent claims, considers the prior art [i.e., the existing knowledge in the field], and determines whether each claim meets the applicable patent law requirements.”³⁸ The Patent Office issues the patent “if on such examination it appears that the applicant is entitled to a patent under the law.”³⁹

Specifically, the Patent Office examines the patent for compliance with several statutory criteria for patentability. The claimed invention must be the type of technological advancement for which patent protection is granted (“patent-eligible subject matter”), must have a real-world, practical function (“utility”) under § 101 of the Patent Act, must be an actual invention that did not previously exist under § 102 (“novelty” or “anticipation”), and must be sufficiently different from what already existed to warrant patent protection under § 103 (“obviousness”).⁴⁰ Pursuant to § 112 of the Patent Act, the patent application also must adequately teach a skilled person in the field how to make and use the invention (“enablement”), must demonstrate that the inventor actually possessed the invention (“written description”), and must claim the invention with adequate precision (“definiteness”).⁴¹

But patent examination is not, and never has been, conclusive.⁴² Rather, patentability can be reconsidered after Patent Office issuance, and patents are subject to *ex post* invalidation if subsequently found to fail the

36. *Applying for Patents*, USPTO, <https://www.uspto.gov/patents/basics/apply> (last visited Oct. 5, 2024).

37. *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 266 (2016); 35 U.S.C. § 111(a)(1).

38. *Cuozzo*, 579 U.S. at 266.

39. 35 U.S.C. § 131.

40. *Id.* §§ 101–103.

41. 35 U.S.C. § 112(a)–(b). A patent application must also disclose the best way the inventor knows to implement the invention, but this is rarely a hurdle to patentability because it is difficult to police in patent examination and not a ground for invalidity in litigation. *Id.*; see also *id.* § 282(b)(3)(A); Lee Petherbridge & Jason Rantanen, *In Memoriam Best Mode*, 64 STAN. L. REV. ONLINE 125, 126–27 (2012).

42. See Beauchamp, *supra* note 1, at 662–63.

same statutory criteria considered in examination.⁴³ Section A provides an overview of post-issuance review and *ex post* invalidation, including its recent expansion. Section B explains why patents can be reviewed and invalidated after issuance. Section C addresses how *ex post* invalidation has generally been viewed as uniformly positive, without recognition of the costs it imposes.

A. The Rise of Patent Invalidation

Rather than making Patent Office examination conclusive, “Congress has from the outset . . . lodg[ed] in the federal courts final authority to decide [the] question” of patentability through litigation.⁴⁴ A defendant sued for violating (“infringing”) patent rights has always been able to defend on the basis that the patent fails the statutory criteria of patentability—the same ones considered in examination—and is invalid.⁴⁵ The defendant can raise patent invalidity as an affirmative defense or counterclaim.⁴⁶ Since Congress enacted the Declaratory Judgment Act in 1934, competitors can, in some circumstances, proactively bring a declaratory judgment action to invalidate a patent, rather than waiting to be sued for infringement.⁴⁷

A patent challenged in federal court, whether defensively or in a declaratory judgment action, is presumed valid, with the burden on the challenger to prove it invalid by clear and convincing evidence.⁴⁸ An invalidity finding in litigation bars both prospective relief and past damages for pre-invalidation infringement.⁴⁹ The patent claim technically continues to exist, as the Patent Act does not provide for cancellation upon invalidation in litigation.⁵⁰ Historically, patent owners could relitigate invalidated claims in subsequent litigation against other accused infringers.⁵¹ However, the Supreme Court in *Blonder-Tongue Laboratories, Inc. v. University of Illinois Foundation*⁵² held that the procedural doctrine of issue preclusion bars patent owners from subsequently litigating an invalidated

43. 35 U.S.C. § 282(b)(2)–(3). The only exception is the best mode requirement. *Id.* § 282(b)(3).

44. *Blonder-Tongue Lab’ys., Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 332 (1971).

45. See 35 U.S.C. § 282(b)(2)–(3) (excepting best mode); see also Patent Act of 1793, ch. 11, § 6, 1 Stat. 318–323 (1793) (repealed 1836); Patent Act of 1836, ch. 357, § 15, 5 Stat. 117 (1836) (amended 1837, 1839, 1952).

46. *La Belle*, *supra* note 3, at 1884.

47. *Id.* at 1884–87.

48. 35 U.S.C. § 282(a); *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 95–96 (2011).

49. *Commil USA, LLC v. Cisco Sys., Inc.*, 575 U.S. 632, 644 (2015) (“[I]f the patent is indeed invalid, and shown to be so under proper procedures [as a defense in infringement litigation], there is no liability.”).

50. See *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1429 (Fed. Cir. 1988) (noting that federal court invalidation would affect reexamination based only on issue preclusion, not because the invalidated claim is cancelled). *But see* MPEP § 2286(II) (9th ed. Rev. 7, Feb. 2023), <https://www.uspto.gov/web/offices/pac/mpep/> (misstating the holding of *Ethicon v. Quigg* as being that claims invalidated in litigation “no longer exist in the patent”). It does provide an incentive for patent owners to disclaim invalidated claims by barring recovery of litigation costs in a subsequent infringement action for non-invalidated claims in the same patent if no disclaimer was filed with the Patent Office. 35 U.S.C. § 288.

51. *Blonder-Tongue Lab’ys., Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 321 (1971).

52. 402 U.S. 313 (1971).

claim against other defendants.⁵³ Thus, since 1971, invalidation in litigation is the practical equivalent of cancellation.

Observers ultimately came to see federal courts as insufficient for policing patent validity after issuance. Invalidating a patent through litigation is expensive, time-consuming, and necessitates undertaking the risk of infringement.⁵⁴ Moreover, the presumption of validity and resulting clear and convincing evidence burden in litigation insulate patents from invalidation.⁵⁵ And because over ninety percent of patent litigation settles without any ruling on the merits,⁵⁶ litigation typically does not determine a patent's validity. In fact, patent owners are often able to settle even strong invalidity challenges by releasing the defendant from infringement liability for little to no money, thereby preserving the patent rights.⁵⁷ As a result, on average, federal courts invalidated less than 100 patents per year in the early 2000s.⁵⁸

In 1980, Congress addressed the shortcomings in federal court invalidation by creating a Patent Office post-issuance proceeding that, for the first time, allowed parties to challenge and potentially win the cancellation of issued patents through the Patent Office.⁵⁹ Ex parte reexamination, a process that remains available, allows the Patent Office to reconsider the novelty or nonobviousness of a patent based only on printed prior art (e.g., prior patents and publications) under a preponderance of the evidence standard.⁶⁰ It is similar to initial patent examination, proceeding ex parte between the examiner and the applicant without participation by the challenger.⁶¹ Moreover, a patent owner can freely amend the patent by narrowing its claim to avoid the prior art.⁶² Like settlement in litigation, this allows the patent owner to preserve its patent rights even in the face of a strong invalidity challenge, albeit with narrower (and potentially less valuable) rights.⁶³ Amended claims are the most common outcome in reexamination, occurring two-thirds of the time.⁶⁴ By contrast, the Patent Office fully invalidates patent claims in only 13% of reexaminations, an

53. *Id.* at 350.

54. *Regents of the Univ. of Minn. v. LSI Corp.*, 926 F.3d 1327, 1333 (Fed. Cir. 2019).

55. Dreyfuss, *supra* note 8, at 238.

56. John R. Allison, Mark A. Lemley, & David L. Schwartz, *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769, 1787 (2014) (showing less than 200 challenger wins on validity merits decisions for cases filed in 2008 and 2009).

57. See Roger Allan Ford, *Patent Invalidity Versus Noninfringement*, 99 CORNELL L. REV. 71, 113 (2013).

58. Allison, Lemley, & Schwartz, *supra* note 56, at 1778–80.

59. *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 267 (2016).

60. See MPEP, *supra* note 50, § 2209 (summarizing reexamination).

61. See *id.*; 35 U.S.C. § 307. From 1999–2012, Congress also provided *inter partes* reexamination that allowed some participation by the requestor. MPEP, *supra* note 50, § 2609; 35 U.S.C. §§ 314(b), 315(b) (pre-America Invents Act).

62. 1 R. CARL MOY, *MOY'S WALKER ON PATENTS* § 3:31 (4th ed. 2023).

63. U.S. PAT. & TRADEMARK OFF., *EX PARTE REEXAMINATION FILING DATA* (2020), https://www.uspto.gov/sites/default/files/documents/ex_parte_historical_stats_roll_up_21Q1.pdf.

64. *Id.*

average of forty-three times per year.⁶⁵ For these reasons, reexamination failed to achieve Congress's goals of eliminating bad patents quickly and cheaply.⁶⁶

The America Invents Act of 2011 (AIA) substantially overhauled and expanded Patent Office post-issuance proceedings to address these shortcomings.⁶⁷ First, it created *inter partes* review (IPR), which allows any party to challenge an issued patent for anticipation or obviousness based on printed prior art from nine months after the patent issues through the life of the patent.⁶⁸ Second, the AIA created post grant review (PGR), which allows any party to challenge a patent on any statutory criteria of patentability within nine months of issuance.⁶⁹ These new AIA proceedings are adversarial proceedings involving both the patentee and the requestor that include limited discovery and an oral hearing.⁷⁰ Three administrative patent judges of the AIA-created PTAB, rather than a patent examiner, resolve these claims using a preponderance of the evidence standard.⁷¹ Opportunities to amend are more restricted in the PTAB proceedings, initially severely so.⁷² Unlike litigation, PTAB invalidation directly extinguishes the patent claim. After a PTAB invalidity determination and termination of any appeal or the time for appeal, the Patent Office Director must "issue and publish a certificate canceling any claim of the patent finally determined to be unpatentable."⁷³ This cancellation is not limited to prospective effect but also bars past damages for precancellation infringement because "cancelled claims [a]re void *ab initio*."⁷⁴

IPR has been more popular among patent challengers and more effective at invalidating issued patents than previous invalidity proceedings,⁷⁵ even more so than anticipated at the time the AIA was enacted.⁷⁶ On average in recent years, the PTAB has invalidated one or more claims in over 325 patents per year.⁷⁷ The result is a 400% increase from before

65. *Id.* The statistics are similar for *inter partes* reexamination, with amended claims 60% of the time and an average of thirty-eight patents with claims fully invalidated per year that *inter partes* review existed. U.S. PAT. & TRADEMARK OFF., INTER PARTES REEXAMINATION FILING DATA (2017), https://www.uspto.gov/sites/default/files/documents/inter_parte_historical_stats_roll_up.pdf.

66. *Regents of the Univ. of Minn. v. LSI Corp.*, 926 F.3d 1327, 1335 (Fed. Cir. 2019).

67. The AIA also created a temporary covered business method patent review program that expired in 2020. Sarah Tran, *Patent Powers*, 25 HARV. J.L. & TECH. 609, 636 (2012).

68. *Id.* at 633–35.

69. *Id.* at 631–32.

70. Melissa F. Wasserman, *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959, 1981–83 (2013); Tran, *supra* note 67, at 633–34, 636–37.

71. Wasserman, *supra* note 70, at 1983; Tran, *supra* note 67, at 633–34, 636–37.

72. Greg Reilly, *Amending Patent Claims*, 32 HARV. J.L. & TECH. 1, 16–17 (2018).

73. 35 U.S.C. § 307(a); *see also id.* §§ 318(c), 328(c).

74. *Fresenius USA, Inc. v. Baxter Int'l, Inc.*, 721 F.3d 1330, 1340–41, 1346 (Fed. Cir. 2013).

75. Dreyfuss, *supra* note 8, at 249–51.

76. JOHN R. THOMAS, CONG. RSCH. SERV., R44905, INTER PARTES REVIEW OF PATENTS: INNOVATION ISSUES 1 (2017), <https://crsreports.congress.gov/product/pdf/R/R44905> (describing unexpected popularity of PTAB because of its effectiveness at invalidating patents).

77. USPTO, PTAB TRIAL STATISTICS FY22 END OF YEAR OUTCOME ROUNDUP IPR, PGR 15 (2022), https://www.uspto.gov/sites/default/files/documents/ptab_aia_fy2022_roundup.pdf;

the creation of IPR in the yearly number of patents with claims invalidated based on prior art.⁷⁸

In sum, the patentability of a claimed invention can be determined in several different proceedings: Patent Office *ex ante* examination, federal court litigation, Patent Office post-issuance reexamination, Patent Office PGR, and Patent Office post-issuance IPR. Importantly, these proceedings can be additive, not alternatives, though repeated or duplicative invalidity proceedings or decisions do not always occur. For example, only 13% of patents involved in district court litigation are also challenged at the PTAB.⁷⁹ Furthermore, a variety of tools exist to mitigate repetition and duplication between these proceedings, including stays, consolidation, estoppel, discretionary denials to avoid duplication, and threshold screens that require a showing of new questions of invalidity.⁸⁰

Yet repeated invalidity proceedings and decisions do occur. For starters, anytime a patent is challenged after issuance, patentability is necessarily determined at least twice—once in examination and once post-issuance. Moreover, although the vast majority of litigated patents are not challenged at the PTAB, the patents that are challenged at the PTAB also tend to be involved in litigation, with 70% of PTAB challengers using PTAB processes defensively in response to being sued for infringement and 87% of patents challenged at the PTAB also involved in federal court litigation.⁸¹ Multiple reexaminations of the same patent are common, and a number of patents in IPRs were previously subject to reexamination.⁸² Also, nearly one-third of patents challenged in the PTAB are the subject of multiple PTAB petitions in the same year, with 9%–14% challenged at least three times in the same year.⁸³ And patents are subject to repeated validity *decisions*, not just repeated validity *challenges*. For example, “of the patents that reached a final validity determination in the PTAB, 24.5%

USPTO, PTAB TRIAL STATISTICS FY21 END OF YEAR OUTCOME ROUNDUP IPR, PGR, CBM 15 (2021), <https://www.uspto.gov/sites/default/files/documents/ptabaiafy2021roundup.pdf>; USPTO, PTAB TRIAL STATISTICS FY20 END OF YEAR OUTCOME ROUNDUP IPR, PGR, CBM 17 (2020), <https://www.uspto.gov/sites/default/files/documents/ptabaiafy2020roundup.pdf>; USPTO, PTAB TRIAL STATISTICS FY19 END OF YEAR OUTCOME ROUNDUP IPR, PGR, CBM 17 (2019), <https://www.uspto.gov/sites/default/files/documents/ptabaiafy2019roundup.pdf>.

78. Yelderman, *supra* note 10, at 2706.

79. Saurabh Vishnubhakat, *Patent Inconsistency*, 97 IND. L.J. 59, 70 (2022).

80. 35 U.S.C. § 303 (requiring “a substantial new question of patentability” for reexamination); *id.* § 315(a)(2) (staying invalidity declaratory judgment actions filed after an IPR petition); *id.* § 315(c) (providing for joinder of multiple IPR petitions); *id.* § 315(d) (allowing for “stay, transfer, consolidation, or termination” of multiple Patent Office proceedings addressing the same patent); *id.* § 315(e) (estopping petitioner from subsequently asserting invalidity in Patent Office proceedings or litigation on “any ground that the petitioner raised or reasonably could have raised during that inter partes review”); *see also* Greg Reilly, *Patent Office Power and Discretionary Denials*, 55 CONN. L. REV. 589, 604 (2023) (discussing discretionary denials to avoid duplication); *id.* at 625–26 (discussing stays of district court litigation).

81. Vishnubhakat, *supra* note 79, at 70. For reexamination, one-third of patents in reexamination are also the subject of litigation. Dolin, *supra* note 6, at 924.

82. Dolin, *supra* note 6, at 924, 927.

83. USPTO, PATENT TRIAL AND APPEAL BOARD MULTIPLE PETITIONS STUDY 17 (2023), <https://www.uspto.gov/sites/default/files/documents/ptabmultiplepetitionsstudyfy2021-2022update.pdf>.

are patents that also received at least one validity determination in the U.S. district courts,⁸⁴ while 15% of patents in IPRs were previously evaluated and upheld during a previous reexamination.⁸⁵

Multiple *ex post* invalidity proceedings and decisions necessarily increase the risk for patent owners. A single invalidity finding is conclusive and terminates a patent owner's exclusive rights, whereas a patent whose validity has been upheld can still be subject to future challenges.⁸⁶ Therefore, the more chances there are to challenge a patent's validity, the more likely a patent is to ultimately be invalidated, whether meritoriously or simply because, with enough challenges, the normal rate of error in decision-making will result in invalidation.⁸⁷

B. The Reasons for Patent Invalidation

Scholars near-universally view *ex post* patent invalidation as crucial to the patent system.⁸⁸ This Section first describes the well-recognized problems created by the existence of patents that fail the statutory criteria of patentability and then explains why *ex ante* examination is insufficient to prevent invalid patents.

1. The Costs of Invalid Patents

Invalid patents impose recognized, and perhaps substantial, social costs.⁸⁹ Patents are an exception to normal free market operation in that they stifle competition and give exclusive rights, or a monopoly, in the invention to the patent owner.⁹⁰ This patent monopoly raises prices for consumers and prices some consumers out of the market.⁹¹ It also serves as a barrier to entry to deter even legitimate competition.⁹² The traditional justification for the anticompetitive effects of properly issued patents is that exclusivity provides innovation incentives to encourage development and disclosure of new, nonobvious, and useful inventions.⁹³ A patent that fails the statutory criteria of patentability—i.e., it is not new, is obvious, or is not properly disclosed—upsets this balance by imposing

84. Vishnubhakat, *supra* note 79, at 71.

85. Dolin, *supra* note 6, at 927.

86. Vishnubhakat, *supra* note 79, at 69–70.

87. *Id.* at 63–64 (identifying duplicative invalidity challenges as a threat even to valid patents).

88. See, e.g., Ford, *supra* note 57, at 71 (“[T]he use of district courts to invalidate patents remains a core defense against bad patents.”); Michael D. Frakes & Melissa F. Wasserman, *Irrational Ignorance at the Patent Office*, 72 VAND. L. REV. 975, 978 (2019) (describing “widespread agreement that invalid patents impose significant costs on society”); La Belle, *supra* note 3, at 1883 (describing *ex post* invalidation as “important”).

89. See Frakes & Wasserman, *supra* note 88, at 1013–15.

90. *Graham v. John Deere Co.*, 383 U.S. 1, 7–9 (1966).

91. Frakes & Wasserman, *supra* note 88, at 1013.

92. Christopher R. Leslie, *The Anticompetitive Effects of Unenforced Invalid Patents*, 91 MINN. L. REV. 101, 115–17 (2006).

93. Frakes & Wasserman, *supra* note 88, at 1013.

anticompetitive costs without the offsetting benefit of disclosure of a new, nonobvious invention.⁹⁴

Beyond anticompetitive effects, invalid patents impose a variety of additional costs. Invalid patents, particularly those that claim exclusivity in ineligible subject matter or in more subject matter than they disclose, can block or chill follow-on innovation, undermining the technological progress that is the goal of the patent system.⁹⁵ Patents on inventions that already existed or were obvious create patent thickets, or overlapping rights in the same technology, which increase the costs and difficulty of licensing the technology and determining freedom to operate in the space.⁹⁶ Invalid patents also might limit access to capital because investors might be deterred from investing in a company if they evaluate the patent landscape and find patents covering similar or related technology.⁹⁷

Furthermore, invalid patents spur litigation by increasing both the number of patents and the number of disputes about those patents while also generating additional litigation costs by making litigation more complex and uncertain.⁹⁸ More generally, they create uncertainty around the legitimacy, scope, and enforceability of patent rights.⁹⁹ Opportunistic actors (such as patent assertion entities or trolls¹⁰⁰) can use invalid patents, and the uncertainty and litigation costs they create, to extract licensing revenue—perhaps set at less than the cost of litigation—from companies and individuals legitimately trying to innovate or operate in the field.¹⁰¹ Ultimately, the existence of invalid patents erodes confidence in the patent system.¹⁰²

2. Policing Patent Validity *Ex Ante* Versus *Ex Post*

There is “almost unanimous agreement” among patent scholars that the Patent Office issues many invalid patents.¹⁰³ Due to limited time, resources, and information, as well as incentives that favor patent issuance, patent examination is inadequate to police the statutory requirements of

94. *Id.*; Leslie, *supra* note 92, at 115.

95. Andres Sawicki, *Better Mistakes in Patent Law*, 39 FLA. ST. U. L. REV. 735, 755 (2012); Frakes & Wasserman, *supra* note 88, at 1014.

96. Sawicki, *supra* note 95, at 757.

97. Frakes & Wasserman, *supra* note 88, at 1014; Leslie, *supra* note 92, at 125–27.

98. R. Polk Wagner, *Understanding Patent-Quality Mechanisms*, 157 U. PA. L. REV. 2135, 2142–44 (2009).

99. *Id.* at 2140.

100. These patent owners do not commercialize inventions or transfer technology *ex ante* in a way that helps other companies develop products but instead purchase patents and extract licensing fees by suing (or threatening to sue) companies that have already developed products allegedly covered by the patent. See EXEC. OFF. OF THE PRESIDENT, PATENT ASSERTION AND U.S. INNOVATION 3–4 (2013) [hereinafter WHITE HOUSE PAE REPORT], https://obamawhitehouse.archives.gov/sites/default/files/docs/patent_report.pdf.

101. Frakes & Wasserman, *supra* note 88, at 1014; Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1518 (2001).

102. Stephen Yelderman, *Improving Patent Quality with Applicant Incentives*, 28 HARV. J.L. & TECH. 77, 83 (2014).

103. Ford, *supra* note 57, at 87–88.

patentability and ensure that only valid patents satisfying these requirements are issued.¹⁰⁴ Thus, it is widely accepted that “the [Patent Office] does a poor job of examining patents, allowing significant numbers of invalid patents to issue.”¹⁰⁵

The obvious solution to the inadequacy of patent examination and the social costs imposed by invalid patents is to improve *ex ante* patent examination to prevent issuance of invalid patents.¹⁰⁶ Unsurprisingly, “[a] variety of reforms have been proposed to improve patent quality through better examination.”¹⁰⁷ However, for over twenty years, the dominant view has been that “society ought to resign itself to the fact that bad patents will issue, and attempt to deal with the [invalidity] problem *ex post*,” if the patent’s validity becomes relevant.¹⁰⁸ The primary reason for more limited validity review in examination and “mak[ing] detailed validity determinations” *ex post* is cost.¹⁰⁹ Because the vast majority of patents are never litigated, licensed, or otherwise used in a way that makes their validity relevant, spending additional resources on examination would be wasted for most patents.¹¹⁰ Rather, according to Professor Mark Lemley’s “rational ignorance” theory, it is less costly for society to leave the real work of determining patent validity for *ex post* proceedings—litigation or post-issuance Patent Office proceedings—for the small number of patents that become relevant and are therefore challenged.¹¹¹

A second reason for policing patent validity *ex post* is that, even with more resources, “[*e*]x ante examination is not institutionally structured to provide a complete evaluation of the statutory criteria of patentability and, at best, can provide only a partial evaluation.”¹¹² Examination is an *ex parte*, document- and database-focused process that lacks the inquisitorial powers and motivated adversary necessary to investigate, depose, and compel, and find the full scope of evidence relevant to the various patentability requirements.¹¹³ Its initial confidentiality, timing in the early stage of the invention’s technological development, and English-language focus all further limit the Patent Office’s ability to fully evaluate patentability.¹¹⁴ These limitations are fundamental structural and design realities of examination that cannot be overcome with simply more time or money.¹¹⁵ By

104. *Id.* at 88–89. For example, patent examiners have an incentive to approve patents in order to get these files off the examiner’s desks for good, furthering the Patent Office’s primary mission “to help customers get patents.” *Id.* at 88.

105. Masur, *supra* note 2, at 477; *see also* Regents of the Univ. of Minn. v. LSI Corp., 926 F.3d 1327, 1331–32 (Fed. Cir. 2019).

106. Frakes & Wasserman, *supra* note 88, at 978.

107. Yelderman, *supra* note 102, at 83.

108. Lemley, *supra* note 101, at 1510.

109. *Id.* at 1497.

110. *Id.* at 1511.

111. *Id.* at 1510–11.

112. Gregory Reilly, *The Complicated Relationship of Patent Examination and Invalidation*, 69 AM. U. L. REV. 1095, 1099 (2020) (italics added).

113. *Id.* at 1099–1100.

114. *Id.* at 1100.

115. *Id.* at 1100–01.

contrast, *ex post* patent review in litigation or Patent Office post-issuance proceedings overcomes many of these obstacles, including inquisitorial powers, adversariness, and timing.¹¹⁶

Professor Melissa Wasserman and Professor Michael Frakes have recently questioned the conclusion that the Patent Office is rationally ignorant in examination. Using new data and sophisticated empirical tools in place of some of Lemley's estimates, they concluded that increasing expenditures on examination (in the form of examiner time) generates greater savings on future litigation and prosecution costs, meaning that the Patent Office is irrationally ignorant and "society would be better off investing more resources into the [Patent Office] to improve patent quality than relying on *ex post* litigation to weed out invalid patents."¹¹⁷ But even Wasserman and Frakes recognize that examination will never be perfect, finding only a 44% decrease in the likelihood of litigation from doubling examiner time.¹¹⁸ They thus accept the necessity of *ex post* invalidity determinations, even if they reject their primacy.

C. The Overlooked Question of the Costs of Patent Invalidation

Because of the costs of invalid patents and the inadequacy of policing patentability *ex ante* in examination, *ex post* invalidation has traditionally been depicted as unquestionably socially beneficial.¹¹⁹ In doing so, scholars have largely overlooked the costs imposed from invalidating a patent *ex post* rather than rejecting it *ex ante* in examination.¹²⁰ Lemley's *Rational Ignorance at the Patent Office* briefly discussed the "costs imposed by a delayed resolution of the validity question" but dismissed them as insignificant.¹²¹ Jonathan Masur and Adam Mortara evaluated the costs imposed when invalidation disturbs reliance interests and investment-based decisions at length, but only in the context of a change in the legal standards for patentability subsequent to examination.¹²² They did not address costs that arise when invalidation results not from a change in the law but because the Patent Office failed to identify the patentability problem in examination.

116. *Id.* at 1142–48.

117. Frakes & Wasserman, *supra* note 88, at 980–81.

118. *Id.* at 999.

119. See, e.g., Megan M. La Belle, *Patent Law as Public Law*, 20 GEO. MASON L. REV. 41, 55–56 (2012) (describing the problems with invalid patents and asserting "there must be a way to remedy those errors," without considering any problems or costs with *ex post* invalidation).

120. Cf. Arti K. Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development*, 61 DUKE L.J. 1237, 1263 (2012) (describing concerns about retroactivity and disturbance of settled expectations as "[l]ess recognized" in debates over design of the patent system).

121. Lemley, *supra* note 101, at 1520–21.

122. Masur & Mortara, *supra* note 18, at 975. Other scholars have raised similar concerns about interference with reliance interests from retroactive changes to patent law. See Rai, *supra* note 120, at 1263; David L. Schwartz, *Retroactivity at the Federal Circuit*, 89 IND. L.J. 1547, 1553–54 (2014); see also Gregory Dolin and Irina D. Manta, *Taking Patents*, 73 WASH. & LEE L. REV. 719, 788–95 (2016) (contending that retroactive application of IPRs to existing patents constitutes a "drastic restriction of [patent owner's] investment-backed expectations").

Recently, the enhanced risk of invalidity caused by the PTAB has sparked concern from some scholars that excessive, or excessively demanding, *ex post* invalidity procedures could lead to improper invalidation of legitimate patents that satisfy the patentability standards.¹²³ PTAB critics also contend that the heightened risk of invalidation creates uncertainty and the risk that challengers will abuse the proceedings to burden or harass patent owners.¹²⁴ And scholars and commentators have worried about “the effect of PTAB review upon reliance interests in the patent system.”¹²⁵ In fact, at oral argument in a case about the PTAB’s Article III constitutionality, Justice Breyer suggested that “it would be a problem” for invalidation to occur if a “patent has been in existence without anybody reexamining it for 10 years and, moreover, the company’s invested \$40 billion in developing it”; Justice Gorsuch was concerned that a patent owner would be “out of luck” despite “all these reliance interests and \$40 million or billion dollars spent”; and Chief Justice Roberts was likewise interested in the relationship between *ex post* invalidation and investments made in reliance on the patent.¹²⁶

These recent concerns about the costs imposed by invalidation have focused narrowly on PTAB proceedings, often mixing cost concerns with various other arguments of questionable merit to advocate for abolition or restriction of the PTAB.¹²⁷ For example, Justice Breyer specifically suggested that his reliance cost concerns were specific to when invalidation occurred “not in court but [at] the Patent Office.”¹²⁸ However, the costs to the patent owner are the same whether the patent is invalidated in litigation, reexamination, or PTAB proceedings.¹²⁹

The existing concerns about the costs of invalidation have also been limited to improper invalidation (or threats of invalidation) of “good” or legitimate patents that satisfy the statutory criteria.¹³⁰ Even PTAB critics admit that invalidation of “improperly issued patents” is indisputably

123. Dolin, *supra* note 6, at 948 (“Creating additional and ever-more expansive procedures to eradicate such [“bad” or invalid] patents is a dubious approach because it may end up imposing unnecessary and exceedingly high costs on legitimate patents and patentees.”); Vishnubhakat, *supra* note 79, at 61 (“[C]reating processes to invalidate ‘bad’ patents more easily will routinely make it easier to invalidate ‘good’ patents as well.”).

124. Dolin, *supra* note 6, at 883; ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 4.

125. Saurabh Vishnubhakat, *The Mixed Case for a PTAB Off-Ramp*, 18 CHI.-KENT J. INTELL. PROP. 514, 517 (2019).

126. Transcript of Oral Argument at 29–30, 43, 54–55, *Oil States Energy Servs., LLC v. Greene’s Energy Grp.*, 584 U.S. 325 (2018) (No. 16–712).

127. See generally Reilly, *supra* note 13 (discussing the arguments in opposition to the PTAB).

128. Transcript of Oral Argument at 29–30, *Oil States Energy Servs., LLC v. Greene’s Energy Grp.*, 584 U.S. 325 (2018) (No. 16–712).

129. See Louis Kaplow, *An Economic Analysis of Legal Transitions*, 99 HARV. L. REV. 509, 534 (1986) (noting that “[a] private actor should be indifferent as to [the source of] a given probability [that] loss will result”).

130. See Dolin, *supra* note 6, at 882 (raising concern with PTAB on grounds that “the costs of ‘weeding out’ the improperly granted patents . . . fall disproportionately on the legitimate patentees.”).

beneficial.¹³¹ But trying to identify the “good” patents for which invalidation is problematic is impossible in practice. The conventional understanding of a “good” patent is one that meets the statutory criteria of patentability; the conventional understanding of a “bad” patent is one that does not.¹³² This is the very question resolved by the validity determination. There is no other independent, readily available way to identify “which patents are of questionable quality and which ones have merit” or to conclude that the invalidity determination was wrong.¹³³

To move beyond a narrow focus on just the PTAB or the invalidation of “good” patents, the next Part more broadly addresses the invalidation costs that arise from the post-issuance invalidation of any patent in any forum—costs that would not have been incurred if the patent had been found unpatentable in examination. These invalidation costs arise from the patent system’s staged approach of making a preliminary determination of patentability in examination but leaving the final determination to post-issuance litigation or Patent Office proceedings.¹³⁴

To some extent, the invalidation costs analysis fits into the larger economic analysis of adjudication—whether by courts or administrative agencies—based on the trade-off between error costs and adjudication costs.¹³⁵ Under this framework,

legal procedure is conceived to be the minimization of the sum of two types of costs: “error costs” (the social costs generated when a judicial system fails to carry out the allocative or other social functions assigned to it), and the “direct costs” (such as lawyers’, judges’, and litigants’ time) of operating the legal dispute-resolution machinery.¹³⁶

From one perspective, the invalidation costs discussed in this Article are a form of error cost from the false positive made in examination—the issuance of a patent failing the statutory criteria of patentability—and should be part of the analysis of the trade-off between error costs and adjudication costs in crafting the optimal level of patent examination. This is essentially the debate over the Patent Office’s “rational ignorance.”¹³⁷

131. *Id.* at 884; ABBOTT, LIETZAN, MOSSOFF, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 3 (“The creation of the PTAB was well intended: it was supposed to remove [via invalidation] bad patents from the innovation economy.”).

132. See Christi J. Guerrini, *Defining Patent Quality*, 82 *FORDHAM L. REV.* 3091, 3138 (2014) (describing, though challenging, this conventional understanding).

133. See Vishnubhakat, *supra* note 79, at 82.

134. Wasserman and Frakes recognized that even if properly invalidated *ex post*, invalid patents impose costs that would not have been incurred if the patentability issue had been identified in examination and the patent never issued. Frakes & Wasserman, *supra* note 88, at 1016. This Article makes a parallel point: *ex post* invalidation also imposes costs that would not have been incurred if the patent never issued.

135. See Daniel Klerman, *The Economics of Civil Procedure*, 11 *ANN. REV. L. & SOC. SCI.* 353, 354 (2015) (litigation); Tierney, *supra* note 20, at 173–75 (administrative context).

136. Richard A. Posner, *An Economic Approach to Legal Procedure and Judicial Administration*, 2 *J. LEGAL STUD.* 399, 400 (1973).

137. See *infra* Section IV.A.

Yet invalidation costs do not arise simply because the Patent Office made a type I (false positive) error. The costs of *invalid* patents, not the costs of *invalidating* patents, are the error costs directly arising from limited patent examination. Invalidation costs arise because the patent system does not accept the error costs of examination and instead tries to belatedly eliminate these error costs by invalidating previously issued patents. But in doing so, the patent system imposes additional costs: invalidation costs. Invalidation costs certainly overlap with error costs and adjudication costs. Most clearly, adjudication costs are one of the categories of invalidation costs. Additionally, other categories—uncertainty, *in terrorem*, and perhaps reliance—could all be seen as a form of error costs known as “chilling costs”: the reduction in beneficial activity from a false positive (i.e., incorrect issuance of the patent).¹³⁸ But invalidation costs are distinct because they do not depend on an invalidity decision being erroneous and do not arise just from the trade-off between trying to get the examination decision right and trying to get it cheaply. Rather, they arise from the timing of the decision—subsequently invalidating a patent that was previously examined and issued by the Patent Office.¹³⁹

II. THE COSTS OF PATENT INVALIDATION

This Part surveys four categories of potential costs from invalidating a patent after issuance: reliance, uncertainty, *in terrorem*, and adjudication. The analysis in this Part is limited in three significant respects. First, and most importantly, the purpose of this Part is only to describe the *potential* invalidation costs that *theoretically* may exist. The purpose of this Part is just to lay out the argument for invalidation costs, not to critique or challenge it, nor to conclude that invalidation costs exist in practice, are significant, or are socially problematic. Part III undertakes the task of evaluating invalidation costs, providing plenty of reasons to question the existence or significance of these costs in practice. Second, this Part is not meant to suggest that these are the *only* costs of *ex post* invalidation. Rather, this Part draws on the existing concerns expressed about *ex post* invalidation, typically in the context of the PTAB, and organizes these concerns into a coherent framework of four major types of invalidation costs. Additional work may reveal additional costs imposed by *ex post* invalidation. Third, and relatedly, this Part primarily focuses on the costs imposed on the patent owner: the one most directly affected by *ex post* invalidation. *Ex post* invalidation may impose costs on others as well. Most obviously, patent challengers and the public bear adjudication costs from

138. Klerman, *supra* note 135, at 354.

139. For this reason, the closest economic literature is probably Louis Kaplow’s recent work on the “almost completely ignored” question of the optimal design of multistage adjudication. Louis Kaplow, *Multistage Adjudication*, 126 HARV. L. REV. 1179, 1186 (2013); Louis Kaplow, *Optimal Multistage Adjudication*, 33 J.L. ECON. & ORG. 613, 613–14 (2017). This literature is only an imperfect fit because it focuses on staged adjudication within a single legal proceeding, with a preliminary decision as to whether to proceed (e.g., a motion to dismiss or for summary judgment). By contrast, invalidation costs arise from multiple distinct proceedings, often years apart, to resolve patentability/validity.

post-issuance invalidation. Competitors or licensees also may have reliance, uncertainty, or *in terrorem* costs arising from actions they took or did not take based on the existence of a patent that was subsequently invalidated. But it is difficult to determine whether this latter set of costs is the result of the belated *invalidation* of the previously issued patent or the result of the *existence* of the invalid patent in the first place. These costs are therefore beyond the scope of this Article.

The invalidation costs discussed in this Part all arise because of the staged approach to patentability that allows a patent that was found patentable in examination to be subsequently challenged *ex post*, though they differ in some of their characteristics. Adjudication costs—attorney’s fees and the other direct costs of adjudicating an issue—are a familiar part of economic analysis of litigation and administrative decision-making.¹⁴⁰ Reliance, uncertainty, and *in terrorem* costs arguably are different ways of expressing the same basic cost: the chilling cost from deterring socially beneficial activities.¹⁴¹ But reliance, uncertainty, and *in terrorem* costs warrant separate treatment because they have different effects. Reliance costs reflect immediate losses to existing patent owners who already made investments based on patent protection, with an incidental chilling effect on future patent owners who may forego future investments out of fear of suffering similar losses. Uncertainty costs reflect the costs incurred by patent owners who forego primary innovation-related activities, such as commercialization efforts, due to the risk of invalidation. And *in terrorem* costs reflect costs incurred by patent owners who forego patent enforcement activities, such as licensing or infringement litigation, due to the risk of invalidation.

Reliance costs arise if and when a patent is actually invalidated. Adjudication costs are incurred any time an invalidity proceeding occurs. And uncertainty and *in terrorem* costs arise from the mere possibility, or threat, of invalidation or even of an invalidity proceeding. Uncertainty, *in terrorem*, and adjudication costs scale with more opportunities to invalidate a patent *ex post*, whereas reliance costs do not. This is because a single invalidity finding is conclusive and is sufficient to impose the entire possible amount of reliance costs. Uncertainty and *in terrorem* costs would not be socially problematic if it was possible to independently determine that the challenged patent was an objectively “bad” patent that was “actually” invalid, whereas reliance and administrative costs would still exist even if the challenged patent was objectively invalid.

Once again, this Part only begins the analysis of invalidation costs by developing the argument that they *may* exist, at least *in theory*. Part III continues this analysis by critiquing the argument developed in this Part

140. See *supra* Section I.C.

141. See Klerman, *supra* note 135, at 354.

and questioning the existence, significance, and social consequences of the potential or theoretical invalidation costs identified in this Part.

A. Reliance Costs

Patents are typically justified as providing exclusivity and above-competitive pricing that allows the patent owner to recoup its research and development (R&D) costs, incentivizing it and other patent owners to engage in costly R&D in the first place.¹⁴² The relevant R&D costs are typically viewed as the costs of inventing incurred before the patent is obtained or the application is even filed.¹⁴³ Because these pre-filing expenditures are not done in reliance on the issued patent, they are equally impacted if the application is rejected in examination or if the patent is invalidated post-issuance. Therefore, these expenditures are not relevant to the specific question of the costs imposed by *ex post* invalidation.¹⁴⁴

However, R&D does not stop at the invention stage.¹⁴⁵ The patent owner, or its licensee, must engage in a variety of “activities that take place after an invention is made but before it can be profitably exploited” in commercial form.¹⁴⁶ Applicants typically seek patent protection early in the developmental process, when their inventive concept and prototype are fairly rudimentary.¹⁴⁷ This rough invention must be transitioned into a perfected commercial product with optimized functionality and consumer appeal.¹⁴⁸ Sometimes, the shift from rudimentary inventive concept to polished commercial product is straightforward, but often it requires significant time and effort—perhaps even more than for the inventive concept.¹⁴⁹ In some industries, the patent owner must also obtain regulatory approval for its commercial product, which can be labor-intensive, expensive, and time-consuming.¹⁵⁰

142. Masur & Mortara, *supra* note 18, at 969–70.

143. Benjamin N. Roin, *Unpatentable Drugs and the Standards of Patentability*, 87 TEX. L. REV. 503, 509 (2009) (“[P]atent-law scholars typically focus on the role of patents in promoting inventive activity”); *see also* Masur & Mortara, *supra* note 18, at 970 (describing how “the firm invests resources first, with the hope that the R&D project will bear fruit and then result in a patent”).

144. *See* Sawicki, *supra* note 95, at 737 (distinguishing between “the additional costs incurred when the patent system produces a late” patentability decision *ex post* and “the costs incurred because of the early” examination decision).

145. Roin, *supra* note 143, at 509 (“[P]atents can be equally important in encouraging investment in the subsequent development and commercialization of inventions.”).

146. F. Scott Kieff, *Property Rights and Property Rules for Commercializing Inventions*, 85 MINN. L. REV. 697, 707 (2001).

147. Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 93–94 (2009).

148. *Id.*; *see also* Erika Lietzan, *The Drug Innovation Paradox*, 83 MO. L. REV. 39, 62 (2018) (describing the need for testing to optimize safety and commercial appeal); Emily Michiko Morris, *The Myth of Generic Pharmaceutical Competition Under the Hatch-Waxman Act*, 22 FORDHAM INTELL. PROP., MEDIA & ENT. L.J. 245, 252 (2012) (“Identifying a compound with possible therapeutic benefits is only the first of many slow and incredibly expensive steps . . .”).

149. Roin, *supra* note 143, at 509–10; *see also* Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1676–77 (2003) (giving biotechnology as an example).

150. Burk & Lemley, *supra* note 149, at 1676 (biotechnology); *id.* at 1686 (small molecule pharmaceuticals and chemicals substances regulated by EPA).

Even after perfecting the commercial embodiment, the patent owner must obtain the production facilities and labor necessary to make it.¹⁵¹ This can require specialized facilities and labor unique to the patented invention.¹⁵² In addition to producing the patented product, the patent owner must establish distribution networks for the patented product.¹⁵³ Finally, the patent owner must engage in consumer education and marketing efforts.¹⁵⁴ As well as branding efforts related to the specific product, patent owners may need to educate consumers about the need for the (by definition) new patented good or service they are introducing to the market.¹⁵⁵ All of these activities require the patent owner to invest in commercialization, either by expending its existing resources or by raising capital from outside investors.¹⁵⁶ In some circumstances, the patent owner may build a start-up company from scratch to undertake commercialization of the patented invention.¹⁵⁷

Scholars debate the extent to which the need to incentivize commercialization activities, not just inventive activities, is a justification for the patent system.¹⁵⁸ Regardless of this theoretical debate, the evidence indicates that patent owners often do, in fact, rely on patent protection in making the expenditures required to move from invention to commercial product, with the exclusivity and above-competitive pricing of patent rights seen as necessary to recoup (and thereby incentivize) these expenditures.¹⁵⁹ Commercialization expenditures therefore are often only made because of the patent and would not have been made if the patent had been rejected in examination.¹⁶⁰ Invalidation of a patent after issuance “damages these existing reliance interests” and thereby discourages future commercialization expenditures because of the risk that the patent necessary to recoup these expenditures may cease to exist.¹⁶¹ This is socially problematic because the ultimate goal of patent law is not just invention but

151. Kieff, *supra* note 146, at 708; see Transcript of Oral Argument at 55, *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 584 U.S. 325 (2018) (No. 16–712) (recognizing that “people invest in their patents to the tunes of billions of dollars in [for example] building the plant that’s going to make the product”).

152. Burk & Lemley, *supra* note 149, at 1582 (giving the example of microprocessors).

153. Kieff, *supra* note 146, at 708.

154. Morris, *supra* note 148, at 255–56.

155. *Id.*; Kieff, *supra* note 146, at 708.

156. Kieff, *supra* note 146, at 708; see also Burk & Lemley, *supra* note 149, at 1678 (describing “the cost and uncertainty of post-invention testing and development”).

157. ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 32 (describing the need to build a new company from scratch to commercialize invention).

158. See generally Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129 (2004) (describing, analyzing, and participating in the debate).

159. Roin, *supra* note 143, at 509–10; Kieff, *supra* note 146, at 710 (explaining that patent protection incentivizes patent owners to “incur all costs necessary to facilitate commercialization”); see also Vishnubhakat, *supra* note 125, at 518 (focusing on small entity patent owners); Burk & Lemley, *supra* note 149, at 1678–79 (focusing on biotechnology patent owners); Morris, *supra* note 148, at 252 (focusing on pharmaceutical patent owners).

160. See Roin, *supra* note 143, at 513 (explaining that pharmaceutical companies do not engage in commercialization without patent protection).

161. Masur & Mortara, *supra* note 18, at 970–72 (focusing on changes in patent law that render patents invalid).

improvement in people's lives from new technologies that actually reach them.¹⁶²

Undoubtedly, some commercialization expenditures occur before issuance, especially given the two to three years required for Patent Office examination.¹⁶³ Because Patent Office denial in examination would equally impact such pre-issuance commercialization expenditures, these are not *ex post* invalidation costs. However, significant commercialization expenditures often do occur post-issuance in reliance on patent protection, at least in some circumstances and industries, and therefore represent costs specific to *ex post* invalidation.¹⁶⁴

Though it is not the only one,¹⁶⁵ the pharmaceutical industry provides a particularly compelling example of patent owner expenditures made in reliance on patent protection. Pharmaceutical companies tend to seek patents early in the R&D process, often shortly after identification of a chemical compound, with patents typically issuing before or during clinical testing.¹⁶⁶ Subsequently, the patent owner must conduct “several rounds of trials in humans (‘clinical’ trials), followed by preparation and submission of a marketing application” in order to obtain the necessary regulatory approval from the Food and Drug Administration (FDA).¹⁶⁷ This approval takes several years and can require hundreds of millions of dollars from the patent owner.¹⁶⁸ Even after approval, the FDA often requires pharmaceutical companies to continue to study the safety, efficacy, and optimal use of the product, which can cost tens of millions of dollars.¹⁶⁹ Beyond FDA compliance, pharmaceutical companies make “large marketing and education investments” in product detailing—“introduc[ing] physicians, hospital formularies, pharmacies, and insurers to the new drug” and “educat[ing] them about the drug’s benefits and risks, how to use it safely, what new information has been gathered about the drug, and so on.”¹⁷⁰ Pharmaceutical companies rely on patent protection, with its exclusivity and above-competitive prices, to “fund the incredibly expensive and

162. See Roin, *supra* note 143, at 508–09 (explaining that patent system’s economic goals include encouraging development and commercialization because inventions are only useful to the public in marketable form).

163. *Patents Data at a Glance*, USPTO, <https://www.uspto.gov/dashboard/patents/> (click on “Pendency Data,” then choose “View the last two years chart” under “Traditional Total Pendency”) (last visited Oct. 6, 2024).

164. Dreyfuss, *supra* note 8, at 280 (describing the “reliance interests that mature as patent holders and licensees pour resources into exploiting their inventions”); ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 30–31 (describing the “extensive resources” needed even after “securing property rights in the invention with a patent” for “development and launch of a product”).

165. See, e.g., Burk & Lemley, *supra* note 149, at 1582 (semiconductors); *id.* at 1676 (biotechnology); *id.* at 1686 (chemical inventions subject to EPA regulation under Toxic Substances Control Act).

166. Lietzan, *supra* note 148, at 52, 57, 59.

167. *Id.* at 41.

168. *Id.*; Morris, *supra* note 148, at 252.

169. Morris, *supra* note 148, at 255.

170. *Id.*

time-consuming drug development and marketing processes.”¹⁷¹ They would not undertake commercialization costs for drugs not subject to patent protection because the patent was rejected in examination.¹⁷²

B. Uncertainty Costs

In addition to destroying reliance interests from actual expenditures based on patent protection, *ex post* invalidation may impose costs from uncertainty. Whereas reliance costs arise from the actual patent invalidation and loss of exclusive rights, uncertainty costs arise from the mere possibility that the patent could be invalidated *ex post* rather than examination being conclusive and patent rights secure. The uncertainty costs come in two forms: undermined incentives and increased complexity of decision-making.

First, beyond disrupting actual expenditures made in reliance on the patent, *ex post* invalidation—and the resulting uncertainty and insecurity of patent rights—may prevent potentially socially valuable expenditures from ever being made. The possibility of *ex post* invalidation undermines the ability of patent owners to rely on patent rights in making R&D investments.¹⁷³ Importantly, if “innovators cannot be certain that the law will preserve their prospective patent rights,” then they “may fear that they will never recoup their R&D investments and therefore refrain from making those investments in the first place,” undermining patent law’s fundamental purpose.¹⁷⁴ Thus, uncertainty about the continued existence of patent protection may chill R&D efforts, including commercialization, because these efforts are only worthwhile, at least in some circumstances and industries, if the patent owner can count on exclusivity to recoup its costs.¹⁷⁵

Patent uncertainty can have a chilling effect regardless of whether the uncertainty is about obtaining patent protection in examination or retaining patent protection post-issuance. But uncertainty about the security of patent rights post-issuance is particularly costly. Merely surviving examination does not assure the patent owner of the exclusivity necessary to recoup its R&D costs, because it could lose exclusivity and the ability to recoup its costs at any point during the patent term. The uncertainty arising from *ex post* invalidation is necessarily in addition to whatever uncertainty exists about the outcome of examination, meaning that the chilling effect is greater due to *ex post* invalidation than would exist from examination

171. *Id.* at 256–57.

172. *See* Roin, *supra* note 143, at 513 (“[P]harmaceutical companies generally refuse to develop new drugs unless they have strong patent protection over them.”).

173. Masur & Mortara, *supra* note 18, at 972 (focusing on changes in patent law).

174. *Id.*

175. *See* Alan C. Marco & Saurabh Vishnubhakat, *Certain Patents*, 16 YALE J.L. & TECH. 103, 113–14 (2013) (explaining that uncertainty about patent validity affects incentives for patent owners to conduct R&D or enter markets); *cf.* Roin, *supra* note 143, at 513 (explaining how “lengthy periods of market exclusivity” are required to make it rational to engage in the large R&D costs of pharmaceutical development).

alone.¹⁷⁶ Moreover, even if uncertainty does not chill the patent owner's initial inventive R&D efforts, the possibility of *ex post* invalidation could still chill post-issuance commercialization investments due to the fear that *ex post* invalidation could eliminate exclusivity before these (often substantial) commercialization costs are recouped.¹⁷⁷

Second, in addition to the potential chilling effect, the uncertainty created by *ex post* invalidation may make decision-making in the patent system more complicated and costly. The possibility of *ex post* invalidation can "leav[e] the patentees (and the public) perpetually uncertain of . . . even the very existence of the patent rights."¹⁷⁸ This "cast[s] a pall of uncertainty over every patent that might become valuable."¹⁷⁹ From the patent owner's perspective, this uncertainty can prevent, complicate, and make more costly efforts to obtain investments, partnerships, and licensees due to the need to address and account for the risk of invalidity.¹⁸⁰ From a competitor's perspective, uncertainty from *ex post* invalidation can make decisions regarding whether a license is required or whether there is freedom to operate more costly and complicated.¹⁸¹

Importantly, because uncertainty arises from the possibility of *ex post* invalidation, not invalidation itself, uncertainty costs potentially apply to all patents, not just those that are invalidated.¹⁸² The possibility of *ex post* invalidation must be factored into any patent valuation, especially because it is notoriously difficult to determine "which patents are of questionable quality and which ones have merit" outside of invalidity proceedings.¹⁸³ This may reduce the value of all patents and potentially the ability of all patent owners to recoup their R&D costs, potentially undermining the patent system's innovation incentives.¹⁸⁴ The extent of uncertainty costs varies with the precise nature of the *ex post* invalidity proceedings and the degree of risk they pose to issued patents. The risk of invalidation

176. See Marco & Vishnubhakat, *supra* note 175, at 104 (finding that resolving validity in litigation is as valuable to the patent owner as obtaining the patent, indicating that significant uncertainty remains after examination and is costly to the patent owner).

177. See ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 5 (focusing only on how PTAB invalidation chills "investment in and commercial development of the new technological products").

178. Dolin, *supra* note 6, at 883–84 (discussing reexamination).

179. ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 4, 32 (discussing PTAB); see also Dolin, *supra* note 6, at 833 (contending that the PTAB "cast[s] greater (and never resolved) doubts on other patents" not even challenged).

180. ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 30 (contending that the "uncertainty in patent rights generated by the PTAB . . . creates an additional layer of bureaucracy to navigate when these patent owners seek to commercialize or protect their inventions").

181. See *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 732 (2002) (explaining that uncertainty about patent rights can chill legitimate competition or cause competitors to mistakenly invest in products secured by the patent).

182. See ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 32 (contending that the uncertainty created by the PTAB "could almost lead one to believe that no issued patent is of high quality").

183. Vishnubhakat, *supra* note 79, at 82.

184. Dolin & Manta, *supra* note 122, at 724–25.

increases as *ex post* invalidation proceedings are made easier, more accessible, more numerous, or more duplicative, thereby increasing potential uncertainty and possibly leading to a greater reduction in both patent value and innovation incentives.¹⁸⁵

C. In Terrorem Costs

Ex post invalidation may impose *in terrorem* (i.e., threat) costs on patent owners by chilling patent assertions—whether in the form of infringement litigation or demand for licensing fees—and providing leverage to patent challengers.¹⁸⁶ *In terrorem* costs are similar to, and perhaps a form of, uncertainty costs because the threat of invalidation, not the invalidation itself, may interfere with the patent owner’s potentially socially valuable behavior. *In terrorem* costs therefore affect all patents, not just those that are actually invalidated. But *in terrorem* costs warrant separate treatment due to one key distinction. The uncertainty costs discussed in Section B affect the patent owner’s primary behavior in the marketplace (i.e., commercialization efforts). By contrast, *in terrorem* costs affect the patent owner’s behavior in the patent system (i.e., its use and enforcement of its patent rights).

The threat of invalidation may deter patent owners from enforcing their patent rights via infringement suits.¹⁸⁷ The ability of a patent defendant to raise invalidity, whether in litigation or in the PTAB, could mean that the risk to the patent owner—loss of the patent—will outweigh the infringement damages that can be recovered against the defendant. Every patent owner must account for this risk in making enforcement decisions¹⁸⁸ because the difficulty of determining whether a patent is valid or invalid without an invalidity proceeding in court or the PTAB¹⁸⁹ prevents any patent from being presumed safe. In addition to the potential loss of patent rights, the fact that invalidity is almost always raised as a defense in an infringement suit increases the costs of enforcement litigation—costs that are particularly significant if there are multiple or duplicative invalidity challenges (e.g., invalidity raised as a defense in litigation and in a parallel proceeding in the PTAB).¹⁹⁰ All patent owners must also weigh these increased litigation costs when making enforcement decisions, which may further deter patent owners from pursuing infringement litigation.

185. *Id.*

186. *Cf.* Lemley, *supra* note 101, at 1516 (discussing the *in terrorem* effects of “bad” or invalid patents).

187. *See* Dolin, *supra* note 6, at 943 (explaining that repeated opportunities to challenge patent validity can “preclude, or at least severely inhibit, a patentee’s ability to monetize or even enforce her patent”).

188. *See* ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 21–22 (“[T]he PTAB has become an additional hurdle that inventors must clear before being able to stop another party from unlawfully using their inventions.”).

189. Guerrini, *supra* note 132, at 3094–96.

190. Dolin, *supra* note 6, at 933 (describing “the possible high costs imposed on the patentee” from invalidity challenges).

The threat of invalidation can also chill *ex ante* licensing, i.e., licensing before the licensee has fully developed or launched a commercial product and therefore before any potential infringement has occurred. The possibility of invalidation and the difficulty of distinguishing between valid and invalid patents may cause a potential licensee to decline to license the patent and instead take its chances if sued for infringement.¹⁹¹ Relatedly, pending invalidity challenges may prevent patent owners from being able to license the patent to others, who might be unwilling to pay to license technology that will be freely available if the patent is invalidated.¹⁹²

Even when patent owners do enforce their exclusive rights through litigation or licensing, the threat of *ex post* invalidation provides leverage to the accused infringer. The threat of invalidation “become[s] a tool used [by] defendants in seeking leverage against patent owners who sue them for infringement,” with defendants “essentially asking for a premium from patent owners in settling lawsuits.”¹⁹³ Infringers can use patent owners’ fear of losing their patent rights and desire to avoid the costs of defending against invalidity challenges to extract favorable licensing or settlement terms that may not reflect the actual value of the patented technology.¹⁹⁴

Additionally, *in terrorem* costs sometimes include affirmative payments made by patent owners to escape the risk of invalidation. The increased ease of invalidating patents at the PTAB has led to at least some¹⁹⁵ rent-seeking by so-called invalidity assertion entities.¹⁹⁶ This rent-seeking takes two forms: (1) filing a PTAB petition and simultaneously shorting the patent owner’s stock on the assumption that the challenge will depress the stock price, or (2) demanding a payment from the patent owner in exchange for not filing a PTAB invalidity challenge in the first place.¹⁹⁷ Patent owners feel obligated to make these payments because the costs to the challenger are low, the odds of invalidation significant, and the cost to the patent owner of losing exclusive rights are disproportionately great.¹⁹⁸ Because investors know that a PTAB challenge poses a serious risk of invalidation, the mere filing of a petition can cause the stock price to drop (and challengers who short the stock to profit), even without the PTAB making an invalidity determination or even deciding to accept a petition for review.¹⁹⁹ The result is monetary gains by speculators who invest (or

191. See Dolin & Manta, *supra* note 122, at 792 (noting that it is “significantly harder for patentees to license their patents” due to increased risks of invalidity).

192. *Id.*

193. ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 26.

194. Dolin, *supra* note 6, at 945–46; Dolin & Manta, *supra* note 122, at 792.

195. W. Michael Schuster, *Rent-Seeking and Inter Partes Review: An Analysis of Invalidity Assertion Entities in Patent Law*, 22 MICH. TELECOMM. & TECH. L. REV. 271, 276–77 (2016) (noting uncertainty about the prevalence of invalidation assertion entities).

196. *Id.* at 272.

197. Dreyfuss, *supra* note 8, at 284–85.

198. Dolin, *supra* note 6, at 933.

199. ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 27–28.

threaten to invest) in legal proceedings and losses by those who invest in innovation (either through R&D or through purchasing patents).²⁰⁰

Because *in terrorem* costs depend on the risk of invalidation, they increase with more accessible—i.e., easier, quicker, cheaper, and more frequent—invalidation procedures.²⁰¹ In particular, opportunities for repeated and sequential invalidity challenges may exacerbate *in terrorem* costs by leaving patent validity under “a cloud of uncertainty for a potentially indefinite period.”²⁰² A prior proceeding upholding a patent could provide increased confidence in its validity, but patents are never found “valid,” just “not invalid.” They remain subject to new challenges based on other prior art, new or better arguments based on the same prior art, or even simply better challenges from those with greater resources or higher-quality lawyers. *In terrorem* effects thus remain even after prior unsuccessful challenges. These *in terrorem* costs may undermine the innovation incentives at the core of the patent system. A patent owner that opts against enforcement, accepts a lower settlement or licensing fee, or makes an affirmative payment to avoid an invalidity challenge receives less financial reward from its patent, undermining its ability to recoup R&D costs and diminishing the incentives of the patent.

D. Adjudication Costs

Ex post invalidity proceedings introduce additional direct adjudication costs into the patent system, most notably attorneys’ fees. Layering *ex post* invalidation procedures—and sometimes multiple procedures (e.g., litigation, reexamination, IPR)—on top of *ex ante* patent examination means that “[i]nstead of paying for a single process,” litigants, especially patent owners but also challengers, pay repeatedly to determine the validity of the same patent.²⁰³ These direct costs are substantial. The average cost of obtaining a patent in examination is approximately \$22,000.²⁰⁴ Determining invalidity in litigation is notoriously costly.²⁰⁵ The average cost of patent litigation through resolution ranges from \$675,000 per side in comparatively lower stakes cases to \$4 million per side in high stakes cases.²⁰⁶ These costs cover other issues, like infringement and remedies, with about half the costs typically attributed to invalidity.²⁰⁷ And PTAB

200. Dolin, *supra* note 6, at 934.

201. *Id.* at 933 (noting that the low cost of PTAB invalidation proceedings increases leverage of challengers); *id.* at 939 (noting that repeated and serial invalidity challenges give challengers more leverage); ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 26 (noting that the low cost and ease of invalidation at the PTAB give challengers more leverage).

202. Dolin, *supra* note 6, at 942.

203. See Dolin, *supra* note 6, at 905 (discussing duplication in litigation and reexamination).

204. Jonathan S. Masur, *Costly Screens and Patent Examination*, 2 J. LEGAL ANALYSIS 687, 699–700 (2010).

205. Vishnubhakat, *supra* note 79, at 60–61 (noting the high costs of patent litigation, especially regarding validity).

206. ARLENE NEAL, AM. INTELL. PROP. L. ASS’N, REPORT OF THE ECONOMIC SURVEY 2021, at 62 (2021).

207. Lemley, *supra* note 101, at 1502–03.

invalidity procedures “are far from cheap,” with costs “in the range of \$150,000 to \$300,000 per party.”²⁰⁸

While these costs may be minor for big pharmaceutical or technology companies, they can be a major obstacle for patent owners that are start-ups or small businesses, especially when aggregated due to multiple invalidity proceedings.²⁰⁹ For companies of any size, the direct costs of litigating the validity of the same patent multiple times consumes resources that it could have spent on more socially beneficial activities, especially R&D or commercialization efforts.²¹⁰ And the added costs required to defend the patent against challenge reduces the patent owner’s financial reward from the patent, with potentially negative consequences for innovation incentives.

III. QUESTIONING PATENT INVALIDATION COSTS

Having identified and categorized the potential costs of *ex post* invalidation in Part II, this Part analyzes these costs, identifying reasons to doubt their existence or significance. Section A questions the existence and extent of reliance, uncertainty, and *in terrorem* costs. Section B notes that invalidation costs could be seen as self-inflicted by patent owners and therefore not a matter of societal concern. Finally, Section C evaluates whether any private invalidation costs incurred by patent owners are socially problematic, considering the offsetting benefits that *ex post* invalidation provides. The primary lesson of this Part is that invalidation costs are variable—the existence and significance of invalidation costs will vary across different patents, patent owners, and circumstances.

A. Questioning the Existence of Invalidation Costs

Part II identified the *potential* or *theoretical* costs that arise from belatedly invalidating a patent *ex post*, rather than finding it unpatentable in examination. This Section evaluates whether—and to what extent—these costs are *actually* present. For many patents, the existence of significant post-issuance investments that were made in reliance on patent protection is doubtful, though for some patents these reliance costs are virtually indisputable. Moreover, even if these costs exist, a patent invalidated post-issuance necessarily provided a period of exclusivity that could have been sufficient to offset any incurred costs. And the extent and amount of uncertainty and *in terrorem* costs are both unclear and difficult to quantify.

208. Dreyfuss, *supra* note 8, at 285.

209. *Id.* (noting that the costs from repeated invalidity challenges “can put a patent holder in a precarious position”).

210. Dolin, *supra* note 6, at 947 (noting that the result of PTAB invalidity proceedings is that “an innovative company . . . will have less money to dedicate to further research and development”); ABBOTT, LIETZAN, MOSSOFF, OSENGA, O’SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 23 (explaining that a company that must “repeatedly defend the same patent again and again . . . cannot invest those resources in additional innovation, recruitment of talent, or operational expansion”).

By contrast, the adjudication costs of *ex post* invalidation are indisputable. Evaluating the validity of a patent a second time (or multiple times) *ex post* imposes additional attorneys' fees and other direct costs above and beyond the costs of patent acquisition—costs that are typically in the hundreds of thousands of dollars per party per invalidity challenge.²¹¹ To be sure, very few patents are actually subject to *ex post* invalidity challenges,²¹² which mitigates the total direct costs of *ex post* invalidation. For that reason, it might be rational from a total cost perspective to engage in limited examination for all patents and more detailed *ex post* invalidity review for the few patents that prove relevant.²¹³

But the *ex post* adjudication costs incurred are not evenly distributed. Invalidity challenges (and the direct costs they impose) are concentrated among the more significant and valuable patents that are actually worth enforcing via litigation or licensing, whereas the vast majority of patents are never challenged because they cover insignificant or obsolete inventions.²¹⁴ And the more significant and valuable a patent is, the broader its effects on competitors (through infringement litigation, licensing, or chilling effects), increasing the likelihood of repeated invalidity challenges (and therefore greater adjudication costs) from competitors and accused infringers.²¹⁵ Even if it is rational from a total cost perspective to delay detailed validity determinations until *ex post*, the owners of the most significant and valuable patents bear the costs of doing so. This could negatively affect innovation incentives by reducing the financial reward for the small number of patents that ultimately prove valuable.²¹⁶ It also consumes resources that otherwise might have been spent on more socially beneficial activities, like further research and innovation.²¹⁷

1. Absence of Patent-Based Investments?

Reliance costs arise from patent owners' post-issuance expenditures based on the patent, especially for commercialization.²¹⁸ However, most patent owners are unlikely to have any reliance costs because less "than half of all patented product inventions are commercialized."²¹⁹ Undoubtedly, the pool of uncommercialized patents is skewed towards the

211. See *supra* Section II.D.

212. Frakes & Wasserman, *supra* note 88, at 994.

213. See generally Lemley, *supra* note 101, at 1497 (developing rational ignorance theory).

214. See *id.* at 1501–07.

215. See ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 31 (noting that multiple PTAB challenges are more likely "the more successful the patented innovation is in the marketplace").

216. See Dennis D. Crouch, *The Patent Lottery: Exploiting Behavioral Economics for the Common Good*, 16 GEO. MASON L. REV. 141, 142 (2008) (contending that innovators respond to patent incentives even though they are like a lottery with a large potential payout for only a small number of patents).

217. See ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 23, 31 (explaining that the most valuable patents are most likely to be challenged, consuming resources of successful innovators).

218. See *supra* Section II.A.

219. Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 362 (2010).

insignificant patents that are never challenged post-issuance,²²⁰ meaning that the comparatively small number of patents that are subject to invalidity challenges are more likely to be commercialized in a way that generates reliance costs. But even for this subset of patents, there are three reasons to doubt the existence or extent of reliance costs.

First, uncommercialized patents are often asserted in litigation and are the subject of invalidity challenges. Most notably, patent owners that are nonpracticing entities or patent assertion entities (pejoratively, “patent trolls”) are now a common feature of modern patent litigation and licensing.²²¹ Though varying in precise definition, these entities do not commercialize inventions but instead use patents to extract licensing fees, often doing so not by transferring technology *ex ante* but instead by suing (or threatening to sue) companies that previously developed products allegedly covered by the patent.²²² Estimates suggest that patent assertion entities have brought over 50% of all patent litigation in recent years,²²³ while over 40% of PTAB proceedings involve patents owned by nonpracticing entities.²²⁴ These nonpracticing entities lack reliance interests from commercialization efforts, aside from the limited overhead required of a patent licensing firm.²²⁵ The prevalence of nonpracticing patent owners in *ex post* invalidation proceedings casts doubt on the extent to which these proceedings impose reliance costs.

Second, even patent owners who do commercialize their inventions may not incur significant post-issuance commercialization expenses. For some inventions, the primary R&D costs are pre-invention, with the work that is needed to go from invention to commercial product comparatively minimal.²²⁶ For example, “[m]ost of the work in software development occurs in the initial coding, not in development or production” and therefore “[t]he capital investment requirement for software development is relatively low—mostly consisting of hiring personnel, not building laboratories or manufacturing infrastructure.”²²⁷ Even the more “tedious and potentially time consuming” tasks of “[d]ebugging and test marketing” are

220. See *id.* at 343 (noting that “[m]any of these undeveloped inventions are commercially worthless”).

221. WHITE HOUSE PAE REPORT, *supra* note 100, at 5.

222. *Id.* at 3–4.

223. *Id.* at 5; 2022 PATENT DISPUTE REPORT, UNIFIED PATENTS (2023) [hereinafter UNIFIED 2022 REPORT], <https://www.unifiedpatents.com/insights/2023/1/4/2022-patent-dispute-report>.

224. *Id.*

225. See BRIAN T. YEH, CONG. RSCH. SERV., R42688, AN OVERVIEW OF THE “PATENT TROLL” DEBATE 13 (2013) (explaining that litigation does not disrupt patent assertion entities’ business and that they have nothing to lose from invalidation because their only business is patent enforcement). Many nonpracticing entities purchase patents from others, including failed commercializers, and therefore the nonpracticing entity might need to recoup an increased purchase price that reflects the reliance costs of the seller. However, because this business model often depends on buying patents cheaply, the purchase price will often not incorporate significant reliance costs. See Brian J. Love, *An Empirical Study of Patent Litigation Timing: Could a Patent Term Reduction Decimate Trolls Without Harming Innovators?*, 161 U. PA. L. REV. 1309, 1311 (2013) (noting that nonpracticing entities concentrate “where patents tend to be plentiful, cheap, and broad”).

226. See Burk & Lemley, *supra* note 149, at 1687–88 (software).

227. *Id.*

insignificant compared to the commercialization efforts required in other industries.²²⁸ And for some inventions, like software-related inventions, the time frame from invention to market (and even to obsolescence) is so quick that commercialization expenses must be incurred *before* patent issuance and therefore do not depend on patent protection.²²⁹ Finally, some expenses incurred in reliance on a patent (e.g., building manufacturing facilities or establishing distribution networks) may be readily transferable to other product lines or business pursuits, meaning that invalidation does not always lead to commercialization-related losses for the patent owner.

Third, in some situations, patent owners will be able to recover their commercialization expenditures even without patent protection. Even after patent invalidation, the patent owner's lead time advantage as the first mover may give it sufficient time to recoup its costs.²³⁰ Alternatively, if competitors have to make the same commercialization expenditures as the patent owner (e.g., building their own factory), then competitors cannot simply free ride off of the patent owner's commercialization efforts, meaning the loss of the patent does not put the patent owner in a worse position.²³¹

In sum, reliance costs do not always result from invalidation because not all patent owners have reliance interests that are upset by invalidation. The existence and extent of reliance costs will depend on the circumstances. The nature of the patent owner—whether they are a commercializing firm or licensing shop, for instance—affects the existence of invalidation costs. Entity size and development stage are also relevant, with smaller entities and start-ups more dependent on patent protection for their commercialization efforts.²³² And, perhaps most significantly, reliance costs vary among industries.²³³ For example, reliance costs tend to be low for software-related patents, where commercialization costs are lowest, product launch tends to occur before patent issuance, and patent owners are overwhelmingly patent assertion entities.²³⁴ By contrast, reliance costs are greatest in the pharmaceutical industry, where patent assertion entities are rare²³⁵ and commercialization costs are significant and tend to occur after patent issuance.²³⁶ Thus, invalidation costs are another example of what Professors Dan Burk and Mark Lemley recognized is the need of the

228. *Id.* at 1688.

229. *See* Sawicki, *supra* note 95, at 749.

230. Roin, *supra* note 143, at 510.

231. *Id.*

232. Vishnubhakat, *supra* note 125, at 518.

233. *See* Sawicki, *supra* note 95, at 749 (noting the industry-specific nature of the costs of mistaken determinations about patentability or invalidity).

234. UNIFIED 2022 REPORT, *supra* note 223 (noting that nonpracticing entities are involved in 88% of district court litigation and 54% of PTAB challenges in the high-tech industry); *see supra* Section II.A.

235. *See* Robin Feldman & W. Nicholson Price II, *Patent Trolling: Why Bio & Pharmaceuticals Are at Risk*, 17 STAN. TECH. L. REV. 773, 776–78 (2014) (suggesting that patent assertion entities were a risk for biopharma even though that risk had not yet emerged).

236. *See supra* Section II.A; Sawicki, *supra* note 95, at 774–75.

patent system to be “sensitive[e] to the industry-specific nature of innovation” and the potential need to “tailor patent law to the needs of specific industries.”²³⁷

2. Costs Recouped Pre-Invalidation?

An unpatentability decision in examination denies the patent owner any period of exclusivity in which to charge above-competitive prices and recoup its R&D costs.²³⁸ By contrast, *ex post* invalidation necessarily comes after the patent owner had some exclusivity period.²³⁹ The patent owner therefore had the opportunity to charge above competitive prices, providing an opportunity to recoup any commercialization expenditures that were made in reliance on patent protection.²⁴⁰

Whether this period is sufficient to address concerns about reliance costs will, once again, be context-dependent. The longer the period of pre-invalidation exclusivity (i.e., the later in the patent life that invalidation occurs), the more likely the patent owner recouped its reliance costs. Likewise, when the patented product is commercially viable from the outset of, or early in, the patent term (as is true for software-related inventions), the more likely the patent owner recouped its reliance costs pre-invalidation.²⁴¹ By contrast, when the patented product only becomes commercially viable well into the patent term (such as in the pharmaceutical industry), it is less likely the patent owner recouped its reliance costs pre-invalidation.²⁴² Finally, when the pre-invalidation exclusivity period is lucrative (the patent owner is able to sell large volumes, at high prices, or both), it may be sufficient to recoup reliance costs.²⁴³ But when sales are slow or prices are only slightly above competitive pricing, the patent owner may need a longer period of exclusivity than the period provided pre-invalidation to recoup its costs.

Aside from above competitive pricing, the early exclusivity that is enjoyed pre-invalidation allows the patent owner to be the first mover in a product space. The patent owner may reap the benefits of this first-mover advantage—such as developed expertise, brand recognition, established distribution networks, and customer loyalty—even post-invalidation.²⁴⁴ Even if the patent owner does not fully recoup its reliance costs

237. Burk & Lemley, *supra* note 149, at 1696.

238. Cf. Sawicki, *supra* note 95, at 749 (“An early evaluation [of patentability in examination] occurs at the patent’s birth.”).

239. *Id.* at 767.

240. *See id.* at 738, 761 (making this point for R&D investments generally).

241. *See* Benjamin N. Roin, *The Case for Tailoring Patent Awards Based on Time-to-Market*, 61 UCLA L. REV. 672, 684–85 (2014) (arguing that the longer the time from invention to commercial product, the longer patent term needed to incentivize).

242. *See id.* (arguing that the shorter the time from invention to commercial product, the shorter patent term needed to incentivize).

243. *See* Sawicki, *supra* note 95, at 738.

244. Cf. Michael S. Gal & Alan D. Miller, *Patent Challenge Clauses: A New Antitrust Offense?*, 102 IOWA L. REV. 1477, 1498–99 (2017) (contending that a licensee might have a first mover advantage even after invalidation that provides above competitive profits).

pre-invalidation, the residual effects of the first-mover advantage could provide sufficient financial advantages to compensate the patent owner for its reliance costs.²⁴⁵ Again, whether the first-mover advantage allows recovery of reliance costs will be context-dependent.

3. Scope of Uncertainty and *In Terrorem* Costs?

Ex post invalidation undoubtedly creates some uncertainty and *in terrorem* costs because increasing opportunities to invalidate a patent (e.g., adding the PTAB to litigation), or making it easier to do so, makes patent rights less secure and creates opportunities for exploitation.²⁴⁶ At the same time, uncertainty is inevitable in any legally complex endeavor.²⁴⁷ Uncertainty and *in terrorem* costs could be eliminated by making patent examination conclusive, but that would not be desirable.²⁴⁸ Eliminating *ex post* invalidation but maintaining the current cursory patent examination system would exacerbate the well-recognized problems imposed by invalid patents.²⁴⁹ Significantly reducing or eliminating *ex post* invalidation therefore necessitates making patent examination correspondingly more rigorous.²⁵⁰ But this would impose additional costs for all patents, even though very few patents are ever used in a way that makes their validity relevant.²⁵¹ Uncertainty costs would simply be replaced by higher administrative and adjudication costs, making the patent system no better.

Ultimately, uncertainty and *in terrorem* costs are concerning only if they are great enough to be socially intolerable.²⁵² PTAB opponents make dramatic claims about the massive costs of uncertainty and exploitation created by these new invalidity proceedings.²⁵³ However, the uncertainty

245. Cf. F.M. Scherer, *First Mover Advantages and Optimal Patent Protection* 13 (Harv. Kennedy Sch., Working Paper No. RWP14-053, 2014), <https://ssrn.com/abstract=2538621> (contending that first mover advantage can provide sufficient innovation incentives even without patent protection).

246. See Dolin, *supra* note 6, at 883 (“[M]ore opportunities to challenge issued patents also means more opportunities to engage in abusive practices . . .”); *id.* at 924–25 (contending that repeated invalidity opportunities leave patents in uncertain states for years); Dolin & Manta, *supra* note 122, at 724–25 (“[M]aking a patent easier to invalidate necessarily reduces the value of that patent.”).

247. See Mark A. Lemley & Carl Shapiro, *Probabilistic Patents*, 19 J. ECON. PERSPS. 75, 87 (2005).

248. See *id.* (contending that “few would advocate such a course”).

249. See *supra* Section I.B.1.

250. See Lemley, *supra* note 101, at 1520 (treating “an enhanced examination system” as required for eliminating *ex post* invalidation).

251. See *supra* Section I.B.2.

252. See Lemley & Shapiro, *supra* note 247 (“[W]e ultimately are interested not in that uncertainty *per se*, but rather in the effects of the patent system, and its uncertainty, on innovation, inventors, competition and consumers.”).

253. See Dolin & Manta, *supra* note 122, at 792 (citing only blog posts while contending that “the economic impact of the AIA-created regime on the patentees has been rather dramatic” because “it is now significantly harder for patentees to license their patents, and the value of the licenses actually agreed to has been significantly reduced post-AIA”); Richard Baker, *Guest Post: America Invents Act Cost the US Economy over \$1 Trillion*, PATENTLYO (June 8, 2015), <https://patentlyo.com/patent/2015/06/america-invents-trillion.html> (contending that decrease in patent value due to the PTAB has cost the American economy \$1 trillion based on “lore of the US patent brokers” and an unrepresentative sample of ninety-three deals).

arising from *ex post* invalidation is largely predictable.²⁵⁴ Patent owners “face a known unknown for which they can plan,” rather than the more problematic true uncertainty, or “unknown unknown,” that arises without warning.²⁵⁵ The small number of patents that have their validity challenged *ex post* is a predictable set: those with commercial value.²⁵⁶ Although predicting whether any given patent will be held invalid is difficult,²⁵⁷ the risk of invalidity is predictable: approximately 40% of patents that reach final judgment are held invalid in litigation.²⁵⁸ A higher percentage, best estimated around 60%, are held invalid at the PTAB.²⁵⁹ Thus, patent owners know the risk of invalidation and can factor it into their decision-making.²⁶⁰

The predictable risk of invalidation requires discounting patent value—and therefore licensing fees or settlement amounts—to account for the risk.²⁶¹ But this discounting is not the result of uncertainty but instead of the predictable possibility that the patent will be found invalid on rigorous review. If *ex post* invalidation was eliminated and examination was made more rigorous (as would be required), then this risk would shift from *ex post* invalidation proceedings to *ex ante* examination, and examination unpatentability rates would likely grow to approach current *ex post* invalidity rates.²⁶² The discounting of prospective patent value and resulting reduction in innovation incentives would be largely the same. Thus, much of what is characterized as uncertainty or *in terrorem* costs results not from *ex post* invalidation specifically but from rigorous patentability evaluation, which currently only occurs *ex post*.²⁶³

Ex post invalidation only imposes additional uncertainty and *in terrorem* costs if it depresses prospective patent value beyond what would occur from more rigorous examination or deters post-issuance commercialization efforts that would be incurred in a world of conclusive, but more rigorous, examination.²⁶⁴ Invalidity assertion entities that use the threat of invalidation to depress stock prices or extract payments from patent owners are one example of *in terrorem* costs from *ex post* invalidation

254. See Dolin & Manta, *supra* note 122, at 755 (“[W]hen markets value a patent, they take into account the possibility that upon judicial scrutiny the patent may be found to be invalid.”).

255. Epstein, *supra* note 25, at 969.

256. See generally Lemley, *supra* note 101, at 1505, 1522.

257. See *infra* Section III.B.

258. Allison, Lemley, & Schwartz, *supra* note 56, at 1801.

259. Reilly, *supra* note 13, at 37–38 (analyzing the debate about the PTAB’s invalidation rate).

260. See Dolin & Manta, *supra* note 122, at 724–25 (recognizing that a known risk of invalidity “allow[s] the inventors, investors, patent applicants, and patentees to adjust their behavior and investment decisions based on the known projected return on their investment”).

261. See *id.* at 755.

262. Cf. Reilly, *supra* note 13, at 39 (explaining that the more rigorous evaluation currently occurring in litigation is more likely to be “right” than the more cursory review currently occurring in examination).

263. Cf. Lemley, *supra* note 101, at 1521 (explaining that an increased examination system would also impose costs from delay and uncertainty).

264. See *supra* Section II.B.

specifically,²⁶⁵ but the limited data suggests that these practices have “not been widely adopted” and are only a tiny portion of *ex post* invalidation proceedings.²⁶⁶ Serial *ex post* invalidity challenges are a more significant example of uncertainty and *in terrorem* costs that are specific to *ex post* invalidation, not just the result of rigorous patentability review. The more any patent is challenged, the more likely it is to be invalidated.²⁶⁷ Therefore, subjecting a patent to multiple rounds of rigorous *ex post* review increases the risk of invalidity—and discounts patent value—beyond what would exist with rigorous but conclusive patent examination.

At the same time, any negative impacts of the known risk of *ex post* invalidation (e.g., chilling post-issuance commercialization or depressing patent value) might be offset by other factors. Specifically, an issued patent that survives an invalidity challenge provides the patent owner significant benefits in the form of above-competitive prices and potentially significant damages or licensing revenue. And the patent owner obtains some of these benefits pre-invalidity even if the patent is later invalidated. These benefits might mitigate the costs arising from the known rise of invalidation. In sum, delaying the unpatentability determination until post-issuance likely imposes some uncertainty and *in terrorem* costs, especially from serial challenges.²⁶⁸ But the extent and degree of these costs are unclear, hard to quantify, and not as great as PTAB opponents contend.

B. Questioning Responsibility for Invalidation Costs

Arguably, the patent owner is the one responsible for any invalidation costs it incurs. Theoretically, the patent owner could have avoided invalidation costs by not obtaining or asserting an invalid patent.²⁶⁹ If the patent was invalid, then the patent owner only has itself to blame for its invalidation costs, which should not be a matter of societal concern.

To some extent, invalidation costs are a problem of the patent owner’s own making. The patent owner controls the content of the patent it asserts, either by controlling the drafting of its own patent application or by choosing the patents it acquires wisely. In theory, the patent owner could use this control to avoid invalidity concerns by drafting claims (or purchasing patents with claims already drafted) to avoid prior art references, making sure that the specification adequately describes how to make and use the invention, and making sure claim terms are sufficiently clear. As an even more direct measure, patent owners that are or employ the inventors of their patented technology can avoid a common basis for

265. See *supra* Section II.C.

266. See Schuster, *supra* note 195, at 276–78 (estimating that these entities are clearly less than 2.5% of all IPR petitioners).

267. See Vishnubhakat, *supra* note 79, at 63–64 (identifying duplicative invalidity challenges as a threat even to valid patents).

268. See Lemley, *supra* note 101, at 1520 (recognizing that costs exist from delayed resolution of invalidity via *ex post* invalidation).

269. Cf. Kaplow, *supra* note 129, at 524 (noting that “there does not exist a legitimate expectation of continuing to profit from such [harmful] activity”).

ex post invalidation—their own prior sales and public uses of the invention²⁷⁰—simply by filing the application within the Patent Act’s one-year grace period after the disclosure.²⁷¹

Patent owners continue to control some risk of invalidation post-issuance based on how broadly they assert their patents—in other words, how much exclusive territory they seek to control. Patent claims are malleable, typically with broad and ambiguous terminology that can be shaped to define the invention more broadly or more narrowly.²⁷² Asserting a broader meaning of the claim increases the claim’s scope and infringement chances but also increases the risk that the claim is invalid for encroaching on the prior art or exceeding the disclosure in the specification.²⁷³ Sometimes, patent owners manipulate the malleability of claims to attempt to cover subsequent innovations that are different from or surpass the patent owner’s original invention.²⁷⁴ Any invalidation costs in these situations are consequences of the patent owner’s strategic behavior.

Other times, however, patent owners are not at fault for their invalidation costs. Determining whether an invention complies with the patentability requirements is a notoriously difficult task.²⁷⁵ The possible prior art for anticipation or obviousness is vast and difficult to find, covering any public disclosure anywhere in the world.²⁷⁶ It includes documents not stored in searchable databases, such as product sheets distributed at trade shows, poster presentations made at academic conferences, or academic papers cataloged in a single library. It includes documents not written in English. And it includes disclosures not documented (or not fully documented) in written form, such as prior third-party offers for sale or public use of the claimed subject matter. Because of the vast and obscure prior art, scholars recognize that patent examiners cannot possibly make comprehensive and reliable determinations of novelty and nonobviousness.²⁷⁷ With the exception of their own disclosures (documents, sales, and uses), even diligent patent owners are not better positioned than examiners.²⁷⁸ When a patent is found anticipated or obvious *ex post* based on prior art that was difficult to find, invalidation costs are not properly blamed on the

270. See Stephen Yelderman, *Prior Art in the District Court*, 95 NOTRE DAME L. REV. 837, 869–72 (2019) (finding that activity prior art is a common basis for invalidity, a significant portion of which is the patent owner’s own activities).

271. 35 U.S.C. § 102(b)(1).

272. Jason Rantanen, *The Malleability of Patent Rights*, 2015 MICH. ST. L. REV. 895, 899, 942, 944 (2015).

273. Ford, *supra* note 57, at 95.

274. See Jason Rantanen, *How Malleability Matters*, 6 IP THEORY 1, 2 (2016) (“[P]atent owners can actively expand the scope and strength of those rights independent of a patent’s technological teachings.”).

275. See Sawicki, *supra* note 95, at 745 (“[W]e cannot know to a certainty whether a given invention complies with the requirements of the rules.”).

276. On the difficulty of prior art searching discussed in this paragraph, see generally Reilly, *supra* note 112, at 1117–37.

277. See *id.* at 1153–54.

278. See Peter S. Menell & Michael J. Meurer, *Notice Failure & Notice Externalities*, 5 J. LEGAL ANALYSIS 1, 36 (2013) (noting that searching for patents is “particularly difficult”).

patent owner but instead on the nature of patentability requirements and the breadth of the public domain.

Additionally, it is notoriously difficult for a patent owner to write a patent claim that accurately claims the invention at the right level of generality.²⁷⁹ The patent owner is entitled to claim exclusive rights to the inventive concept, not just the specific way(s) of carrying out the inventive concept (“embodiments”) that it identified in the patent document or developed in the real world.²⁸⁰ A patent owner that writes its claims too narrowly risks limiting its rights to just parts of its inventive concept, making it too easy for competitors to freely use that concept and vitiate the exclusive rights.²⁸¹ But if the patent owner writes its claim too broadly in trying to cover the full inventive concept, then it runs the risk of encroaching on the prior art or extending beyond the specification in a way that renders the patent invalid.²⁸² Even a diligent patent owner trying to accurately capture its contributions will struggle with the difficult task of translating an inventive concept that exists in the inventor’s mind into written English and, even more problematically, into the specialized format and language of patent claims.²⁸³ Though drafting overly broad claims or asserting an overly broad interpretation of a claim in litigation sometimes reflects strategic behavior,²⁸⁴ other times it results from patent owners’ struggle to properly claim their inventions at the right level of generality.²⁸⁵ In these circumstances, invalidation and its costs result from the fact that the patent system requires the inherently difficult task of translating an inventive concept into specialized words.²⁸⁶

Undoubtedly, patent owners are responsible for some invalidation costs—e.g., when invalidation is based on their own prior disclosures or they strategically overclaim or overly assert their claims. Often, however, invalidation and its costs reflect the very nature, requirements, and shortcomings of the patent system, including the broad definition of prior art and the artificial requirement to translate an inventive concept into specialized legal words. A diligent and good faith patent owner operating within the parameters of the patent system will sometimes seek, obtain, and enforce a patent that ultimately proves invalid. Invalidation costs in

279. See Reilly, *supra* note 72, at 27.

280. See Phillips v. AWH Corp., 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (“[W]e have repeatedly warned against confining the claims to those embodiments [in the specification].”).

281. See Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 731–32 (2002) (explaining the danger that the claim language will not cover the full scope of the invention).

282. See JONATHAN S. MASUR & LISA LARRIMORE OUELLETTE, PATENT LAW: CASES PROBLEMS & MATERIALS 25 (3d ed. 2023) (describing the limits on claiming too broadly).

283. See Festo, 535 U.S. at 731–32.

284. See Rantanen, *supra* note 272, at 953–54 (describing how patent owners can create value by expanding the claim scope after issuance beyond their technological contribution).

285. Cf. Tun-Jen Chiang, *The Levels of Abstraction Problem in Patent Law*, 105 NW. U. L. REV. 1097, 1100–01 (2011) (describing the difficulty in identifying the right level of abstraction at which to define the invention).

286. Festo, 535 U.S. at 731–32 (describing this difficulty).

these situations are properly attributed to the inherent shortcomings of the patent system, not the patent owner.

C. Questioning the Consequences of Invalidation Costs

Invalidation costs are only socially problematic if they are so substantial that they outweigh the benefits of *ex post* invalidation. At a broad level, the benefits of some opportunity for *ex post* invalidation seem to clearly outweigh the costs because no one seriously contends that Patent Office examination should be made fully conclusive.²⁸⁷ The more debatable question is the proper level of *ex post* invalidation—whether the benefits of more expansive *ex post* invalidation (e.g., adding the PTAB to litigation) outweigh the costs. For several decades, economists have struggled to evaluate the broader question of the patent system’s ultimate effect on social welfare, unable to reach a definitive conclusion.²⁸⁸ The narrower question of whether increasing the opportunities for and ease of *ex post* invalidation enhances social welfare is a similarly intractable theoretical and empirical question. This Section offers some thoughts about the social welfare implications of *ex post* invalidation while acknowledging that any definitive conclusions are impossible.

The short-term public benefits of *ex post* invalidation seem to clearly outweigh its costs.²⁸⁹ Eliminating the patent owner’s exclusive rights allows free use of the invention, often leading to competition that can reduce prices, increase accessibility, and improve quality.²⁹⁰ Because the patent owner already developed and disclosed the invention, invalidation provides the public both the benefit of the innovation and its disclosure *and* the benefits of free competition.²⁹¹ Likewise, the public will get the benefit of whatever commercialization efforts the patent owner made in reliance on the patent without having to pay above-competitive prices. Commercialization efforts can provide significant value to the public, such as finding the commercially optimal form of the invention, developing safety and efficacy information, and educating the public about the need for and benefits of the invention.²⁹² Thus, invalidation represents a wealth transfer from the patent owner, which will not realize the full value of its investments, to the public. These offsetting public benefits mean that invalidation costs do not constitute social harm in the short term.²⁹³ At the same time, distributive concerns that arise from requiring the patent owner to bear the full brunt of the loss are relevant for optimizing policy because

287. Lemley & Shapiro, *supra* note 247, at 87.

288. LISA LARRIMORE OUELLETTE & HEIDI WILLIAMS, THE HAMILTON PROJECT, REFORMING THE PATENT SYSTEM 6–7 (2020), https://www.hamiltonproject.org/wp-content/uploads/2023/01/Ouellette_Williams_LO_6.16_FINAL.pdf.

289. *Cf.* Masur & Mortara, *supra* note 18, at 972 (noting that the harm created by interfering with reliance interests is not about the invalidated patent but instead future patentees).

290. *See* Ford, *supra* note 57, at 109–10 (noting benefits of invalidation).

291. *See* Masur & Mortara, *supra* note 18, at 972.

292. *See* Morris, *supra* note 148, at 250 (discussing commercialization efforts in the context of pharmaceuticals).

293. Masur & Mortara, *supra* note 18, at 972.

imposing a concentrated loss on an individual to achieve a dispersed public benefit is often seen as problematic.²⁹⁴

In the long term, *ex post* invalidation could impose social costs if future patent owners are unwilling to invest in innovation and commercialization because patent rights are not sufficiently secure or because the costs incurred from invalidation outweigh the benefits of exclusive rights.²⁹⁵ But this depends on the extent and degree of invalidation costs, the amount of exclusivity benefits that result from patents that survive an invalidation challenge or that can be recouped before invalidation, and the ultimate impact invalidation has on invention and commercialization incentives. As previously noted, exclusivity can provide substantial benefits in terms of higher selling prices, licensing fees, and damages awarded in litigation, some of which will be realized by owners of invalidated patents before invalidation.²⁹⁶ Moreover, the extent and degree of reliance, uncertainty, and *in terrorem* costs are unclear and will vary depending on the circumstances—including the industry, the nature of the patent owner, the timing, and whether it is a first or serial invalidity challenge.²⁹⁷ It is impossible to reliably determine the impact of the patent system and patent system changes on innovation incentives.²⁹⁸ Thus, it is ultimately ambiguous whether invalidation costs chill innovation and commercialization, though there are reasons to doubt the extent and significance of any chilling effect.

Even if *ex post* invalidation diminishes innovation or commercialization incentives, these diminished incentives must be balanced against the benefits of *ex post* invalidation. Because the costs of invalid patents are well-recognized, widespread, and substantial,²⁹⁹ the benefits of invalidating patents *ex post* may be sufficient to outweigh quite substantial invalidation costs. Thus, merely because invalidation costs are significant does not necessarily mean that *ex post* invalidation is socially problematic.

Finally, reducing the rigor of *ex post* invalidation to address invalidation costs would necessitate an increase to the rigor of examination.³⁰⁰ The net result could be socially neutral or detrimental. More rigorous patent examination would result in more unpatentability findings, shifting the potential impact on innovation incentives from *ex post* invalidation to examination with the same overall effect.³⁰¹ And the increased

294. See Kaplow, *supra* note 129, at 527–28 (describing general tendency to avoid risk and to spread the possibility of large losses using insurance and similar measures); cf. Frakes & Wasserman, *supra* note 88, at 1027 (“[I]t may enhance both equity and efficiency if the costs associated with screening invalid patents were to be spread across a large base, rather than being concentrated on a small group of individuals in society.”).

295. Masur & Mortara, *supra* note 18, at 972.

296. See *supra* Sections III.A.2–3.

297. See *supra* Sections III.A.1, 3.

298. See OUELLETTE & WILLIAMS, *supra* note 288, at 6–7.

299. See *supra* Section I.B.1.

300. See Lemley, *supra* note 101, at 1513 (assuming that making examination conclusive would require more extensive examination).

301. See *supra* Section III.A.3.

adjudication costs of imposing more rigorous examination on all patents, even though very few ever have their validity challenged, could offset or even dwarf the costs imposed by *ex post* invalidation.³⁰²

In sum, invalidation costs likely exist, but their extent and degree are ambiguous and will vary depending on the circumstances. The existence of invalidation costs is not necessarily a social welfare problem because *ex post* invalidation provides substantial benefits that might outweigh any costs it imposes. And our current system might be less socially costly than a system of rigorous but conclusive patent examination. Ultimately, the long-standing empirical ambiguity about the social welfare implications of patent policy prevents any strong conclusions.

IV. ADDRESSING PATENT INVALIDATION COSTS

After surveying both the possible invalidation costs and the reasons to doubt them in Parts II and III, the best conclusion is that while invalidation costs exist, their extent, degree, and significance are unclear and context-dependent. Any patent system modifications made to address invalidation costs therefore must be nuanced. The preceding analysis suggests several principles to inform consideration of possible interventions. First, any intervention must account for the prevalence and costs of invalid patents. Second, and relatedly, any proposal to reduce the rigor of *ex post* invalidation must recognize the need for a corresponding increase to the rigor of examination and the costs that entails. Third, any intervention must be flexible enough to account for the variability and contextual nature of invalidation costs.

This Part surveys possible ways to address invalidation costs. Section A explains that avoiding invalid patents through better *ex ante* patent examination is only a partial solution because of patent examination's inherent shortcomings. Section B explores proposals to limit *ex post* invalidation, finding that across-the-board proposals do not adequately account for the ambiguity and variability of invalidation costs. Section C suggests compensating patent owners for invalidation to address the social costs of both invalid patents and invalidation but ultimately decides such proposals are impractical. Finally, Section D concludes that reconceptualizing and retooling the existing presumption of validity is the most promising way of addressing invalidation costs is.

A. Avoiding Invalid Patents

Invalidation costs within the meaning of this Article are the additional costs of invalidating a patent post-issuance rather than finding it unpatentable in examination. The most obvious way to address these additional costs is to improve *ex ante* examination to prevent invalid patents from ever issuing.³⁰³ Scholars have long proposed increasing the rigor of patent

302. See *supra* Section III.A.3.

303. See *supra* Section I.B.2.

examination, although they do so out of concern about the costs of invalid patents.³⁰⁴ Because more rigorous examination would prevent invalid patents from ever issuing, these proposals would also address the additional invalidation costs that result from delaying the unpatentability finding to post-issuance.³⁰⁵

But any proposal to make patent examination more rigorous runs into the debate over whether the Patent Office is “rationally ignorant.” As previously discussed,³⁰⁶ Lemley famously argued that perfunctory examination is warranted because the costs of rigorous examination are wasted for most patents that never prove relevant.³⁰⁷ By contrast, Wasserman and Frakes’s recent analysis concluded that more rigorous examination would be cost-justified because it would substantially reduce patent litigation.³⁰⁸ The reduction in litigation and PTAB costs resulting from issuing less invalid patents—costs that include what this Article labels the adjudication costs of *ex post* invalidation—were one factor in Wasserman and Frakes’s conclusion.³⁰⁹ But their analysis did not include any of the other costs that can result from invalidating a patent *ex post* rather than in examination. This Article thus provides further support for Wasserman and Frakes’s conclusion that the Patent Office is irrationally ignorant by showing that delaying invalidation until *ex post* can impose additional reliance, uncertainty, and *in terrorem* costs that an examination unpatentability finding would avoid.³¹⁰

But Wasserman and Frakes assume that even if examination time is doubled, *ex post* invalidation (and therefore its costs) would remain inevitable.³¹¹ There is also no indication that the political will exists to invest the additional \$660 million that Wasserman and Frakes estimate would be required to hire the additional examiners necessary to double examination time—even if doing so was cost-justified.³¹² Moreover, rigorous *ex ante* examination can never completely substitute for *ex post* invalidation because patent examination is not structurally capable of providing a complete and reliable patentability determination. Examiners struggle to find obscure prior art and lack the inquisitorial powers (investigators, depositions, compulsory process, cross-examination) and motivated adversary

304. See *supra* Section I.B.2.

305. Michael Xun Liu, *Balancing the Competing Functions of Patent Post-Grant Proceedings*, 25 J. INTEL. PROP. L. 157, 165–66 (2018) (describing the “clear benefits to avoiding errors during examination in the first place instead of going back to invalidate patents after they have already been granted” because “[a]n issued patent creates reliance interests in the patentee, investors, and customers that are undermined if the patent is later revoked”).

306. See *supra* Section I.B.2.

307. See Lemley, *supra* note 101, at 1510–11.

308. See generally Frakes & Wasserman, *supra* note 88.

309. *Id.* at 994–1013 (demonstrating that litigation savings would also include the costs of resolving infringement and remedies).

310. *Cf. id.* at 1016 (recognizing that a patent invalidated *ex post* imposes costs on the public that would not exist if rejected in examination).

311. See Lemley, *supra* note 101, at 1513.

312. Frakes & Wasserman, *supra* note 88, at 1021.

necessary to do so.³¹³ Examiners also have difficulty appreciating or predicting the full scope of the patent's claims because examination occurs early in the technological and commercial development process.³¹⁴ Because these structural shortcomings cannot be addressed simply by more money or time, *ex post* invalidation proceedings remain necessary to fully evaluate patentability.³¹⁵ Indeed, nearly half of all anticipation and obviousness invalidations in litigation and 12% in IPR were based on a type of prior art (sales, uses, and non-traditional publications) that was not suited for consideration in examination.³¹⁶

In sum, improving patent examination can reduce instances of invalidation costs by preventing invalid patents from ever issuing. But it is only a partial solution. Thus, *ex post* invalidation and its costs would remain a significant part of the patent system.

B. Avoiding Invalidation

Rather than improving *ex ante* examination, reducing invalidation opportunities is the most typical proposal from those concerned about the costs imposed by *ex post* invalidation.³¹⁷ The proposals range from the extreme approach of making patents incontestable to the more moderate approach of limiting the PTAB's reach. Though there is superficial rationale for addressing invalidation costs by reducing invalidation opportunities, these proposals downplay the problem and costs of invalid patents and the ambiguity and variability of invalidation costs. Proposals that would reduce invalidation opportunities across-the-board are misguided.

1. Incontestability

At the most extreme, some scholars concerned about invalidation costs have recently floated the possibility of making issued patents incontestable, though only in preliminary, sketch form.³¹⁸ Patent incontestability was long thought a non-starter³¹⁹—and for good reason. Because of the significant concerns about the existence and costs of invalid patents and the current inadequacy of examination, incontestability would require making examination substantially more rigorous.³²⁰ But, as noted above, even doubling examination time would only partially address the problem

313. Reilly, *supra* note 112, at 1099–1100.

314. *Id.* at 1100.

315. *Id.* at 1141–48.

316. Yelderman, *supra* note 270, at 885–86; Yelderman, *supra* note 10, at 2733.

317. See, e.g., ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 33–34 (proposing ways to limit the PTAB).

318. See Janicke, *supra* note 6 (proposing incontestability “[a]fter three years from the issue date”).

319. Lemley & Shapiro, *supra* note 247, at 87 (noting that “few would advocate” making “the PTO’s validity determinations final”). *But cf.* 15 U.S.C. § 1065 (stating that trademark law allows incontestability of a mark after five years).

320. See Lemley, *supra* note 101, at 1513 (assuming that conclusive examination would be more extensive); see also *supra* Section I.B.

of invalid patents.³²¹ If examination were conclusive, examination would have to be even more rigorous than merely doubling time.³²² Given doubts about the political will for doubling time,³²³ the examination improvements necessary to make patents incontestable are not remotely feasible.³²⁴

To be fair, the skeleton proposals for incontestability would not make examination conclusive but would only make patents incontestable after, for example, a period of years or a specific invalidity proceeding.³²⁵ However, inventors typically file for patents shortly after conception; significant post-filing work is required before launching a commercial product.³²⁶ As a result, patents tend to be asserted not until several years post-issuance.³²⁷ Thus, barring invalidation after, say, three³²⁸ or five³²⁹ years is illogical when most patents will not have been asserted yet.

Incontestability proposals also do not account for the lack of a “true” or single answer to the question of patentability.³³⁰ Because patent claims are malleable, their scope can vary over time and in different contexts³³¹ with patent owners tending to seek to broaden claim scope as time goes on and the original technology becomes obsolete.³³² Patents made incontestable after a certain time or particular proceeding may have been based on a narrower understanding of claim scope that was more likely to support validity, but a patent owner could subsequently assert the claim more broadly, protected from the increased risk of invalidity by the patent’s incontestability.³³³ Similarly, even a well-financed and motivated adversary will struggle to find the vast and obscure prior art that might be relevant to invalidity,³³⁴ especially when the adversary is, for example, a smaller

321. See *supra* Section IV.A.

322. See Lemley, *supra* note 101, at 1513 (arguing that conclusive examination is only possible if the Patent Office made “its examinations perfect—that is, that no bad patents would issue”). Lemley’s contention that conclusive examination must be “perfect” was based only on the costs of invalid patents. Conclusive examination with a reasonable error rate could be warranted if cumulative invalidation costs outweigh the cumulative costs of invalid patents. Because the extent and significance of invalidation costs is questionable, however, the examination error rate likely would have to be quite small for invalidation costs to outweigh invalid patent costs.

323. See *supra* Section IV.A.

324. See Lemley, *supra* note 101, at 1511 (describing it as “ludicrous and unworkable” to have “the equivalent of a full trial on validity [say, one thousand hours of examination] before granting a patent”).

325. Janicke, *supra* note 6 (proposing initially allowing invalidity challenges in litigation or the PTAB but making patents incontestable three years after issuance).

326. Cotropia, *supra* note 147, at 68–70.

327. See John R. Allison & Mark A. Lemley, *Empirical Evidence on the Validity of Litigated Patents*, 26 AIPLA Q.J. 185, 236–37 (1998) (identifying an average time from patent issuance to final validity decision as 8.6 years); Love, *supra* note 225, at 1331 (finding that product producing companies typically did not assert patents for the first time until twelve years were left on the patent term, and nonpracticing entities did not until nine years remained).

328. Janicke, *supra* note 6.

329. 15 U.S.C. § 1065 (trademark incontestability).

330. See Vishnubhakat, *supra* note 79, at 82.

331. See *supra* Section III.B.

332. See Rantanen, *supra* note 272, at 953–54 (“[P]atent owners can actively expand the scope and strength of those rights independent of the patent’s technological teachings.”).

333. Ford, *supra* note 57, at 94–96.

334. See *supra* Section III.B.

entity, a less sophisticated party, or a party with less exposure.³³⁵ An early validity determination often will not reliably reflect the full scope of the prior art, especially in certain circumstances (e.g., a small or less motivated defendant). But incontestability would enshrine this unreliable outcome.

To be sure, it is possible that at some point invalidation costs could outweigh the imperfections in initial invalidity determinations such that incontestability would be warranted. But this will not be true as a universal matter due to the ambiguity and variability in the scope and strength of invalidation costs. Nor does this argument account for the problem of patent owners exploiting claim malleability to assert their patents more broadly than their technological contributions because any invalidation costs in these circumstances are the result of the patent owner's own strategic behavior, not imperfections in the invalidation process.³³⁶ Thus, proposals that would make patents universally incontestable, even after a certain trigger (e.g., time or a proceeding), are poorly tailored to addressing the invalidation costs problem.

2. Reducing Invalidation Opportunities

Rather than full incontestability, those concerned with invalidation costs often propose limiting opportunities for *ex post* invalidation. Because concerns about invalidation costs have recently arisen in the context of PTAB proceedings, the most common proposal is to weaken the PTAB: restricting access to it, forcing a choice between a PTAB and a litigation invalidity challenge, or even eliminating the PTAB altogether.³³⁷

Once again, these proposals are generally not well-tailored to the invalidation costs problem. These proposals would make it universally harder to invalidate patents, even though invalidation costs vary in their existence and significance across patent owners. As a result, proposals to limit invalidation opportunities are too sensitive to the possibility of invalidation costs and not sensitive enough to the existence and costs of invalid patents. The proposals that would eliminate or severely restrict the PTAB are illustrative. PTAB proceedings were created exactly because there was widespread agreement that the problems from invalid patents necessitated providing more opportunities—and making it easier—to invalidate patents.³³⁸ Trying to address invalidation costs by significantly limiting the PTAB would mitigate the invalidation costs issue by exacerbating the invalid patents costs issue. Ultimately, it does not make sense to protect all

335. Cf. Reilly, *supra* note 112, at 1142–46 (emphasizing the importance of resources and a motivated adversary to getting a full patentability evaluation).

336. See *supra* Section III.B; see also Rantanen, *supra* note 274, at 12–13.

337. See ABBOTT, LIETZAN, MOSSOFF, OSENGA, O'SHAUGHNESSY, RADER, & STIEN, *supra* note 12, at 33–34 (proposing significant restrictions on the PTAB). See generally Reilly, *supra* note 13 (explaining how various arguments to eliminate or restrict the PTAB seem based on concerns about invalidation costs).

338. See *supra* Section I.A.

patent owners from the risk of invalidation just because some would face invalidation costs.

While generally making invalidation less common or more difficult is not well-tailored to address invalidation costs, perhaps more limited reforms could be justified. Most notably, uncertainty, *in terrorem*, and adjudication costs tend to be highest when there are duplicative or repeated invalidity challenges.³³⁹ Proposals that would limit duplicative or serial invalidity challenges are more closely tailored to the invalidation costs problem.³⁴⁰ Yet there remains the problem of changing patent breadth due to claim malleability and the lack of reliability in prior art searching, which both suggest that some repeated invalidity challenges are warranted.³⁴¹ Thus, any proposal to limit duplicative or serial invalidity challenges would have to be very carefully designed to address invalidation costs without unduly restricting invalidity challenges based on changing claim breadth or newly discovered prior art.

C. *Compensating for Invalidation*

If patent invalidation is socially beneficial but invalidation costs are socially problematic, then perhaps the optimal solution is to compensate the patent owner for the loss suffered due to invalidation. The public would receive the benefits of invalidation, while the patent owner would receive compensation for the loss it suffers to achieve this public benefit.³⁴² One possibility is a direct government payment to the patent owner to offset the invalidation costs. Though completely foreign to the modern system, historical precedent exists for this type of payment: state patents under the Articles of Confederation often provided for a payment to the patent owner if the state legislature subsequently revoked the patent.³⁴³ Alternatively, making invalidation only prospective would provide patent owners indirect compensation by allowing recovery of damages for infringement committed prior to invalidation (or prior to filing of the invalidity challenge).³⁴⁴ This is analogous to what occurs in the licensing context, where a “licensee who successfully challenges a patent must pay royalties up to the point where it took the affirmative step of prompting adjudication of validity.”³⁴⁵

339. See *supra* Sections II.B–D.

340. See, e.g., Vishnubhakat, *supra* note 79, at 103–26 (describing various possible ways to reduce duplicative proceedings, both in the Patent Office and between the Patent Office and courts).

341. See *supra* Section IV.B.1.

342. A similar notion underlies the concept of just compensation for government takings. See Masur & Mortara, *supra* note 18, at 985. Compensation for invalidation would be a policy choice, not constitutionally mandated, because patent owners have no reasonable expectation of being free from *ex post* invalidation. See Dolin & Manta, *supra* note 122, at 781–87 (recognizing that *ex post* invalidation itself is not a taking because patents are issued subject to this possibility, but contending the PTAB constituted a taking for previously issued patents because it was so radically different).

343. Greg Reilly, *Power Over the Patent Right*, 95 TUL. L. REV. 211, 236 (2021).

344. Dreyfuss, *supra* note 8, at 283 (suggesting the possibility of “requir[ing] the successful [invalidity] challenger to pay damages, but only up to the time that the petition for review was filed”).

345. *Id.*

Theoretically, compensating the patent owner is an appealing way to respond to invalidation costs. It is a targeted solution that directly addresses the cost issue without the collateral consequence of protecting invalid patents. Compensation in either of the above forms can and should be conditioned on proof that the patent owner incurred specific invalidation costs, thereby accounting for the context-dependent ambiguity and variability in invalidation costs.³⁴⁶ Compensation also reflects the difficulty in evaluating validity, the lack of a “true” answer to a patent’s validity, and the frequent absence of patent owner “fault” for invalidation.³⁴⁷ And it accounts for the distributive concerns of imposing a concentrated loss on the patent owner to obtain the dispersed benefits of invalidation.³⁴⁸ In fact, in the takings context, direct government payment, or “just compensation,” is the established way to address government actions that achieve a public benefit by interfering with property rights and upsetting reliance interests.³⁴⁹ Similarly, prospectivity is a common tool to protect reliance interests and mitigate the costs of legal change, even for socially beneficial changes.³⁵⁰ Specifically, Professor Jonathan Masur and Adam Mortara have proposed making general changes to patent law prospective-only due to concerns about reliance costs from invalidation of previously issued patents.³⁵¹ The same could be done for decisions to invalidate individual patents.

Despite some theoretical appeal, both government payments and prospective-only invalidation are probably infeasible because they would be seen as radical solutions with little historical pedigree.³⁵² Moreover, compensating the patent owner for invalidation could create negative incentives to recklessly invest in reliance on the patent without accounting for potential invalidity. It also would provide patent owners with a windfall because (by definition) owners of invalidated patents have not made a legitimate contribution to technological progress to warrant a payment. As the Supreme Court has noted, “[a] patent yielding returns for a device that fails to meet the congressionally imposed criterion of patentability is anomalous.”³⁵³

The prospective-only approach is particularly problematic because it imposes the costs of compensating the patent owner on competitors, including the accused infringer that successfully invalidated the patent. Even if the patent owner is not at fault for invalidation, there is no reason to impose the invalidation costs on the successful challenger or the patent

346. See *supra* Part III.

347. See *supra* Section III.B.

348. See *supra* Section III.C.

349. See Masur & Mortara, *supra* note 18, at 983.

350. See *id.* at 995–97.

351. See generally *id.*

352. See Greg Reilly, *The Justiciability of Cancelled Patents*, 79 WASH. & LEE L. REV. 253, 330–31 (2022) (discussing prospectivity).

353. *Blonder-Tongue Lab'ys, Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 343 (1971).

owner's competitors rather than the patent owner or the public.³⁵⁴ Imposing retroactive damages would also discourage challengers from litigating to a final invalidity judgment and encourage settlements that preserve the patent but minimize the retroactive damages. This would deny the public the social benefits of invalidation.³⁵⁵

In sum, compensating patent owners for their invalidation costs through either direct government payments or prospective-only invalidation has some theoretical appeal. But this approach would create negative incentives, provide windfalls to patent owners who did not contribute to technological progress, and be practically infeasible.

D. Weighing Invalidation Costs

Addressing invalidation costs requires a nuanced mechanism that can account for the ambiguity and variability in their existence and significance as well as the existence and costs of invalid patents. Fortunately, such a mechanism already exists in patent law: the presumption of patent validity. Though not typically justified as a means of mitigating invalidation costs, the presumption of validity can be reconceptualized and repurposed as a useful, albeit imperfect, tool to address invalidation costs in a contextualized manner that does not unduly undermine the ability to combat invalid patents. However, key adjustments are necessary to convert the presumption of validity into a tool to address invalidation costs, particularly conditioning entitlement to the presumption on the presence or absence of invalidation costs, not on the forum of the invalidity challenge.

1. Reconceptualizing the Presumption of Validity to Address Invalidation Costs

Under § 282 of the Patent Act, “[a] patent shall be presumed valid,” and “[t]he burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity.”³⁵⁶ Although not explicit in the statute, the Supreme Court has held that § 282 incorporated the common law heightened burden of persuasion to prove a patent invalid.³⁵⁷ Thus, a challenger must prove a patent invalid by clear and convincing evidence to invalidate the patent in infringement litigation in federal court.³⁵⁸ By contrast, post-issuance invalidity proceedings in the Patent Office have never required clear and convincing evidence to invalidate a

354. See *ePlus, Inc. v. Lawson Software, Inc.*, 790 F.3d 1307, 1309 (Fed. Cir. 2015) (Dyk, J., concurring in denial of rehearing en banc) (“[I]t would be ‘manifestly unjust’ to allow ePlus to recover [against the defendant] from its invalid patent ‘when the rest of the industry is not impeded by the patents.’” (quoting *Mendenhall v. Barber-Greene Co.*, 26 F.3d 1573, 1583 (Fed. Cir. 1994))).

355. See *supra* Section I.B.

356. 35 U.S.C. § 282(a).

357. *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 101–03 (2011).

358. Doug Lichtman & Mark A. Lemley, *Rethinking Patent Law’s Presumption of Validity*, 60 STAN. L. REV. 45, 47 (2007).

patent because Congress instead specified a preponderance of the evidence standard.³⁵⁹

This distinction between federal court litigation and Patent Office proceedings results from the primary rationale for the presumption of validity: the more general presumption of administrative correctness, i.e., that a government agency is presumed to do its job correctly.³⁶⁰ Thus, the heightened burden “represents judicial deference to the [Patent Office]’s institutional expertise.”³⁶¹ Though it noted that “other rationales may animate the presumption,” the Supreme Court has seemingly endorsed the primacy of the administrative correctness rationale.³⁶²

The presumption of validity has been heavily criticized exactly because of its premise that the Patent Office did its job correctly.³⁶³ Commentators have noted that the same extensive problems with Patent Office examination that underlie the invalid patents problem also do not warrant presuming correctness:³⁶⁴ the *ex parte* nature of examination, the limited access to and difficulty finding relevant prior art, the high volume of patent applications, the limited time each application receives, the individual and institutional incentives that favor issuance, and the high invalidation rates.³⁶⁵ Scholars have called for eliminating or limiting the presumption because of its misplaced justification.³⁶⁶ The Supreme Court instead reaffirmed the presumption, relying on statutory grounds and deferring any concerns about the underlying rationale to Congress.³⁶⁷

Reconceptualizing the heightened burden of proof as a means of protecting patent owners from invalidation costs can redeem the presumption of validity *and* address invalidation costs. Some scholars have recognized protection of patent owner interests as a secondary rationale alongside the

359. See Reilly, *supra* note 13, at 40; Alan Devlin, *Revisiting the Presumption of Patent Validity*, 37 SW. U. L. REV. 323, 337–38 (2008); 35 U.S.C. § 316(e) (*inter partes* review); *id.* (post grant review); see also § 305 (providing that reexamination shall be conducted like initial examination).

360. *Id.*, 564 U.S. at 97; David O. Taylor, *Clear but Unconvincing: The Federal Circuit’s Invalidity Standard*, 21 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 293, 312 (2011).

361. Devlin, *supra* note 359, at 330–31.

362. *Id.*, 564 U.S. at 108; *id.* at 97 (describing, without questioning, the Federal Circuit’s reliance on administrative correctness); *id.* at 111 (noting that the heightened burden may be easier to overcome for prior art that was not considered by the Patent Office because “its considered judgment may lose significant force”); see also *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 426 (2007) (describing “the rationale underlying the presumption” as “that the PTO, in its expertise, has approved the claim”).

363. See, e.g., Taylor, *supra* note 360, at 313 (“[T]he Federal Circuit’s standard is based on incorrect assumptions. The USPTO likely does not always—or even usually—find and consider the most relevant prior art.”); Lichtman & Lemley, *supra* note 358, at 47 (“[T]he reality is that PTO expertise is brought to bear under such poor conditions that any advantages associated with expertise are overwhelmed by the disadvantages associated with insufficient funding and inadequate outsider information.”); Devlin, *supra* note 359, at 333–37 (summarizing reasons to be skeptical of the Patent Office expertise argument).

364. See *supra* Section I.B.2.

365. See Devlin, *supra* note 359, at 333–37; Taylor, *supra* note 360, at 313–15; Lichtman & Lemley, *supra* note 358, at 53–56.

366. See, e.g., Devlin, *supra* note 359, at 327 (proposing a two-tier system of patent examination with the heightened validity standard only applying if applicants chose more rigorous examination).

367. *Id.*, 564 U.S. at 95, 113–14.

traditional administrative correctness rationale. Specifically, “[t]he presumption of validity . . . encourage[s] patent holders to invest in development and commercialization” by “reduc[ing] the risk associated with those investments” and ensuring that the patent owner “likely will have a valid patent” to recoup its investments.³⁶⁸ The presumption also reduces uncertainty about validity that can paralyze businesses and be exploited by others.³⁶⁹ And by making it more difficult to prove invalidity, the presumption discourages would-be challengers from bringing invalidity challenges in the first place, which in turn reduces the adjudication costs associated with resolving patent validity.³⁷⁰ Even the Supreme Court made passing reference to how the presumption could protect patent owners from the negative effects of invalidation.³⁷¹

Leveraging the presumption of validity is a promising way of addressing invalidation costs. Unlike incontestability, prospectivity, or government payments, it is imminently feasible as an existing and familiar part of the patent system. Unlike compensation for the patent owner, it imposes no direct costs on the public or competitors, nor does it give patent owners a windfall when they made no legitimate contribution to technological progress. Most significantly, the presumption of validity can be sensitive to both the variability and contextual nature of invalidation costs and the problem of invalid patents. Making patents incontestable or reducing opportunities for invalidation (e.g., by restricting or eliminating the PTAB) would require systemic statutory changes that partially or entirely immunize patents from invalidation. By contrast, the presumption of validity is applied on a case-by-case basis and therefore can be applied variably depending on the context, even though courts currently apply it universally.³⁷² Thus, it could be readily adjusted to reflect the varying applicability and strength of invalidation costs, as discussed further below.³⁷³ Making the presumption of validity variable and contextual is consistent with a growing body of patent literature that rejects one-size-fits-all approaches to patent law in favor of tailoring patent law to individual circumstances—for example, to reflect industry differences³⁷⁴ or inventions’ different impacts on social welfare.³⁷⁵

The presumption of validity also does not prevent or significantly restrict invalidation of “bad” patents. Patents can still be and are invalidated

368. Lichtman & Lemley, *supra* note 358, at 52.

369. Devlin, *supra* note 359, at 332.

370. Lichtman & Lemley, *supra* note 358, at 52.

371. *i4i*, 564 U.S. at 108 (noting parenthetically patent owner reliance interests as one of the “other rationales [that] may animate the presumption”).

372. *Id.*

373. See *infra* Section IV.D.2.

374. See Burk & Lemley, *supra* note 149, at 1675.

375. See Christopher Buccafusco & Jonathan S. Masur, *Drugs, Patents, and Well-Being*, 98 WASH. U. L. REV. 1403, 1407 (2021) (proposing that the patent term be tailored for pharmaceuticals based on contributions to social welfare).

despite the presumption of validity,³⁷⁶ with truly “bad” patents the most likely to succumb even under the clear and convincing evidence standard. The heightened burden of proof matters most at the margins, where patent validity is the least clear. These marginal cases arise because patent validity is notoriously difficult to determine,³⁷⁷ making it often impossible to conclusively label a patent valid or invalid.³⁷⁸ When the patent invalidity question could reasonably go either way and significant invalidation costs are present, the presumption of validity would tilt the outcome towards the patent owner in these marginal cases.

The presumption of validity is not a perfect means of addressing invalidation costs. It is not a narrowly tailored solution because it protects patents from being invalidated when the problem is invalidation costs, not invalidation itself. But possible ways to address invalidation costs specifically, such as government payments or prospectivity, are even more problematic.³⁷⁹ Rather, invalidation costs can feasibly be addressed only indirectly via invalidation itself. Use of the presumption of validity is more narrowly tailored and less protective of invalid patents than other possibilities, like incontestability or reducing invalidation opportunities.³⁸⁰ Limiting the presumption to circumstances where invalidation costs are most likely would further reduce the impact of this solution on invalid patents.³⁸¹

Perhaps no intervention is warranted to address invalidation costs, given the ambiguity and variability surrounding them and the lack of a perfectly tailored solution. This Article does not dispute that possibility. But invalidation costs do exist, and among possible interventions, the presumption of validity is reasonably tailored to address them. In any event, the presumption of validity already exists and incidentally protects patent owners anyways, so it is likely worthwhile to make it a more intentional and better-tailored tool to address invalidation costs.

2. Adjusting the Presumption of Validity to Address Invalidation Costs

The presumption of validity is not currently designed to reflect the goal of protecting patent owners from invalidation costs, despite some efforts to justify it that way.³⁸² Repurposing the presumption to address invalidation costs would require conditioning access to the heightened burden of proof on evidence of, or proxies for, invalidation costs, rather than

376. See Allison, Lemley, & Schwartz, *supra* note 56, at 1787 (finding invalidity rate of 42% in litigation).

377. See Vishnubhakat, *supra* note 79, at 82 (noting that there is no readily available way to identify invalid patents).

378. See Guerrini, *supra* note 132, at 3094–96.

379. See *supra* Section IV.C.

380. See *supra* Section IV.B.

381. See *infra* Section IV.D.2.

382. See *supra* Section IV.D.1.

conditioning it on the forum of the invalidity challenge (litigation or the Patent Office).

First, a presumption of validity rooted in invalidation costs should be variable and context-dependent. Currently, the presumption is universally applied to all patents in litigation. Even under the prevailing administrative correctness rationale, some critics have objected to the automatic presumption in situations when the relevant prior art was not considered in examination.³⁸³ But a presumption based on administrative correctness should be universal because part of presuming the Patent Office did its job correctly is presuming that it found the relevant prior art references.³⁸⁴ By contrast, a presumption of validity rooted in invalidation costs would only be warranted when those invalidation costs are present. Invalidation costs are variable and context-dependent, with their existence and significance depending on characteristics such as the business of the patent owner, its stage of development, the industry, and the number of prior invalidity challenges.³⁸⁵ Thus, a presumption of validity justified by invalidation costs should also be variable and context-dependent.

Specifically, the default standard of proof should be preponderance of the evidence, with the burden on the patent owner to establish its entitlement to the heightened burden of proof based on invalidation costs. The patent owner could be required to provide actual evidence of specific invalidation costs. However, the ambiguity surrounding invalidation costs makes it difficult to determine what evidence, what type of invalidation costs, and what amounts would warrant the presumption. Moreover, finding specific evidence of some of the less concrete invalidation costs, such as uncertainty and *in terrorem* costs, would be difficult. It would also be potentially circular because these costs depend (to some extent) on the threat of invalidity, which itself depends (to some extent) on the presumption of validity.

To reduce the administrative costs of applying a variable and context-dependent presumption, the patent owner should only be required to establish proxies for invalidation costs. Some readily available proxies that tend to align with an increased likelihood of invalidation costs currently exist. First, the fact that the patent owner works, i.e., commercializes, the invention could be used as a proxy because it increases the chances of reliance costs.³⁸⁶ This option would be consistent with renewed interest in

383. *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 108 (2011) (identifying objection); *see also* Taylor, *supra* note 360, at 297 (proposing using a “preponderance burden of proof when litigation involves unconsidered, material prior art”).

384. *See* Taylor, *supra* note 360, at 312 (describing presumption of administrative correctness as requiring “presum[ing] that examiners search, find, and consider the most relevant prior art, compare the claims of patent applications with the most relevant prior art, and allow only valid claims to issue as patents over the most relevant prior art”). The fact that there might be good reasons to doubt the Patent Office found the relevant prior art is not an argument against an automatic presumption but instead against the administrative correctness rationale itself.

385. *See supra* Part III.

386. *See supra* Section II.A.

imposing a “working” requirement that would mandate that patent owners practice their invention or at least provide advantages to those who do.³⁸⁷ The working proxy could be further narrowed by requiring other indicators that reliance costs are likely, such as industry (e.g., pharmaceutical) or company development stage (e.g., start-up).³⁸⁸ Second, the patent’s survival of prior invalidity challenges could be used as a proxy because it represents situations where uncertainty, *in terrorem*, and adjudication costs are particularly likely or high.³⁸⁹ Third, invalidity challenges early in the patent term could be used as a proxy because it is not very likely that the patent owner would have already recouped its investments or that the patent owner’s own actions stretched the scope of the claims and caused the invalidation.³⁹⁰ Undoubtedly, there would be definitional and line-drawing issues with these proxies, but these challenges would likely be less difficult than collecting and evaluating actual evidence of invalidation costs in every case. The precise details of implementing the proposal—including the exact proxies and their parameters, the procedure for establishing entitlement to a heightened burden, and whether legislative intervention is required³⁹¹—are left to future work.

Second, a presumption of validity based on invalidation costs should not depend on the forum of the invalidity challenge. The current presumption, rooted primarily in administrative correctness, logically only applies to invalidity challenges in litigation, because there is no need for the Patent Office to defer to itself.³⁹² But invalidation costs are largely the same regardless of whether the invalidity challenge occurs in infringement litigation or Patent Office proceedings.³⁹³ Therefore, a presumption of validity based on invalidation costs should not be forum-dependent and should instead be extended to Patent Office invalidity proceedings. As with litigation, the heightened burden of proof would not automatically apply in the PTAB but would instead require actual evidence of specific invalidation costs or, more likely, establishment of proxies for those invalidation costs. Because the Patent Act specifically provides for the preponderance burden in Patent Office proceedings,³⁹⁴ extending the heightened burden of proof to the Patent Office would require legislative action.

387. See Marketa Trimble, *Patent Working Requirements: Historical and Comparative Perspectives*, 6 U.C. IRVINE L. REV. 483, 485, 488–89 (2016) (describing renewed interest in working requirements); John F. Duffy, *Reviving the Paper Patent Doctrine*, 98 CORNELL L. REV. 1359, 1360, 1363 (2013) (proposing reinvigorating the old paper patent doctrine that, among other things, made it easier to invalidate patents that were not commercialized and harder to invalidate those that were).

388. See *supra* Section II.A.

389. See *supra* Sections II.B–D.

390. See *supra* Sections II.B–C.

391. See *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 113–14 (2011) (concluding that Congress codified the heightened burden of proof and “[a]ny re-calibration of the standard of proof remains in its hands”).

392. See *supra* Section IV.D.1.

393. See *supra* Section I.C.

394. See *supra* Section IV.D.1.

CONCLUSION

Traditionally, patent invalidation has been regarded as indisputably beneficial because it eliminates unwarranted monopolies that impose costs on competitors and consumers. In many ways, it is beneficial. The existence and costs of invalid patents are well-documented and the inadequacy of *ex ante* patent examination is well-established. But the traditional view overlooks the costs imposed when a patent is invalidated belatedly after issuance rather than being found unpatentable in examination. Just as the existence of invalid patents imposes costs, so too does the invalidation of issued patents. There are adjudication costs from deciding the validity of the same patent multiple times, reliance costs when commercialization investments are made based on the issued patent, uncertainty costs from the lack of stability in the issued patent, and *in terrorem* costs from the leverage and potential gamesmanship created by threatening valuable patent rights.

Recent invocations of invalidation costs to criticize the new PTAB invalidity proceedings ignore that these costs are not dependent on the forum of invalidation and existed long before the PTAB's creation. These recent criticisms also overlook or understate the variability in the existence and scope of invalidation costs across patent owners, industries, and contexts. And they fail to balance invalidation costs with the costs of invalid patents. Any intervention to address invalidation costs must be narrow and contextual. The most promising option, though imperfect, is to reconceive the presumption of validity as reflecting invalidation costs, not administrative correctness. Doing so would require adjusting the presumption to be variable and contextual, depending on evidence of or proxies for invalidation costs rather than the forum of the invalidity challenge.

Ultimately, this Article's goal is not to definitively conclude that invalidation costs are a sufficient problem to warrant an intervention in the patent system. Rather, its more limited goal is to demonstrate that invalidation costs are a real issue that warrant a place in patent debates. To date, they have been either overlooked or misused in results-oriented attacks on the PTAB. This Article brings invalidation costs into the mainstream of patent scholarship, providing a balanced, nuanced analysis to spark further work and discussion.