

AMENDING PATENT CLAIMS

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I. INTRODUCTION

Patent claim amendments have been a largely uncontroversial part of the patent system since 1836. Amendments allow a patent applicant or patent owner to alter its claims — the short summaries of the invention at the end of the patent that define the exclusive rights of the holder — from those first sought from, or issued by, the United States Patent and Trademark Office (“Patent Office”). A liberal approach to claim amendments has long been assumed to be a desirable part of the patent system, at least for amendments that occur before patent issuance or nar-

row the patent owner's exclusive rights (normally due to concern that the patent claimed more than statutorily permitted).¹

Two developments have unsettled this status quo in recent years. First, and most prominently, after the America Invents Act of 2011 ("AIA")² created new post-issuance proceedings to review and cancel issued patents that fail the requisite statutory criteria, the Patent Office made it virtually impossible to amend claims in these proceedings.³ The Patent Office's highly restrictive approach fueled both policy⁴ and constitutional⁵ challenges to these new proceedings. A statutory challenge to the amendment practice deeply fractured the en banc Federal Circuit in *Aqua Products, Inc. v. Matal*.⁶ In two separate majorities, the Federal Circuit struck down the Patent Office's restrictive approach but found that such an approach would be permissible and entitled to administrative deference if properly promulgated.⁷

Second, many commentators are concerned about the quality of issued patents, which are often seen as claiming too broadly or too vaguely.⁸ Searching for leverage to encourage patent owners to draft more responsibly, a few commentators have turned to claim amendments. Their proposals vary but share the common goal of restricting or penalizing claim amendments to discourage patent owners from drafting overbroad or vague claims.⁹

1. See Brief for Biotechnology Innovation Organization as Amicus Curiae Supporting Appellant at 8–9, *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) (No. 2015-1177) [hereinafter *BIO Aqua Br.*] (en banc) (suggesting that "the ability of the patentee to amend its claims" in Patent Office proceedings is assumed to "be a common and otherwise unremarkable procedure that would unfold as a matter of course if not of right").

2. Leahy-Smith America Invents Act, Pub. L. 112–29, 125 Stat. 329 (2011).

3. *Aqua*, 872 F.3d at 1299–1300 (O'Malley, J., majority opinion).

4. See Alden Abbott et al., *Crippling the Innovation Economy: Regulatory Overreach at the Patent Office*, REGULATORY TRANSPARENCY PROJECT OF THE FEDERALIST SOCIETY (Aug. 14, 2017), <https://regproject.org/wp-content/uploads/RTP-Intellectual-Property-Working-Group-Paper.pdf> [<https://perma.cc/VER4-QY3P>] ("[T]he right to amend is important as a matter of policy. It is a key feature of successful post-issuance review programs . . .").

5. See, e.g., Brief for Biotechnology Innovation Organization & Association of University Technology Managers as Amici Curiae in Support of Petitioner at 28–29, *Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC*, 138 S. Ct. 1365 (2018) (No. 16-712) (identifying inability to amend as one of the reasons *inter partes* review is constitutionally infirm).

6. *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017).

7. *Id.* at 1290–91 (issuing five opinions, none for a majority, and splitting into different majorities for different issues).

8. R. Polk Wagner, *Understanding Patent-Quality Mechanisms*, 157 U. PA. L. REV. 2135, 2136–38 (2009) (noting that "the need to improve patent quality is essentially undisputed").

9. Tun-Jen Chiang, *Fixing Patent Boundaries*, 108 MICH. L. REV. 523, 575 (2010) (proposing abolishing post-issuance claim amendments and denying examination amendments retroactive effect); Wagner, *supra* note 8, at 2167 (proposing that amendments create strong prosecution history estoppel against asserting infringement by equivalents); Stephen Yelderman, *Improving Patent Quality with Applicant Incentives*, 28 HARV. J.L. & TECH. 77, 120 (2014) (proposing a bond for each original claim that would be forfeited if the claim is amended or cancelled).

Even as claim amendments move from background assumption to debated policy issue, little serious work exists evaluating the desirability of claim amendments either during examination or post-issuance — what benefits they provide at what cost and whether and to what extent claim amendments are socially optimal.¹⁰ Given their historical pedigree, examination claim amendments are normally assumed to be necessary or inherent to the process of patent examination.¹¹ Even those who advocate restricting claim amendments to improve patent quality tend to narrowly focus on the benefits for patent quality, without conducting an overall evaluation of social desirability.¹² Likewise, the five opinions and seventy-seven pages of *Aqua Products* focused on narrow questions of statutory interpretation and administrative deference, with only passing reference to the policy justifications for post-issuance claim amendments.¹³ Proponents of post-issuance claim amendments tend to make conclusory assertions of the clear social benefit from preserving the patent owner’s rights while narrowing the restrictions on the public.¹⁴ Conversely, opponents tend to make generalized arguments about the undesirability of making ultimate invalidation of a claim more difficult.¹⁵ This Article provides the comprehensive evaluation of patent claim amendments, both during examination and post-issuance, missing from the literature. The results are mixed and are unlikely to completely satisfy either side of current policy debates over the patent system generally, and claim amendments specifically.¹⁶

10. For a notable exception, *see generally* Chiang, *supra* note 9, discussed and distinguished extensively *infra* Sections III.A, IV.E. Additionally, several commentators have addressed continuation applications, which is one specific means of essentially amending patent claims post-issuance. Examples are cited throughout this Article.

11. *See, e.g.*, Timothy B. Lee, *Why the Roots of Patent Trolling May Be in the Patent Office*, ARSTECHNICA (Mar. 5, 2018), <https://arstechnica.com/tech-policy/2018/03/why-the-roots-of-patent-trolling-may-be-in-the-patent-office/#p3> [<https://perma.cc/W4QB-DXH3>] (“Patent examiners don’t just decide whether or not to approve a patent. They’re also supposed to narrow a patent’s claims to make sure it only covers what the inventor actually invented.”).

12. *See* Wagner, *supra* note 8, at 2167–68 (providing one-paragraph consideration of the costs of limiting claim amendments); Yelderman, *supra* note 9, at 120–21 (not reaching ultimate social desirability of penalizing claim amendments to improve patent quality).

13. *See generally* *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017).

14. *See, e.g.*, Brief of Amicus Curiae Pharmaceutical Research and Manufacturers of America in Support of Petitioner at 11, *Aqua*, 872 F.3d 1290 (No. 2015-1177) [hereinafter PhRMA *Aqua Br.*].

15. *See, e.g.*, Brief of Askeladden, L.L.C. as Amicus Curiae in Support of Intervenor Director of the United States Patent and Trademark Office at 18, *Aqua*, 872 F.3d 1290 (No. 2015-1177) [hereinafter Askeladden *Aqua Br.*].

16. *See* Lisa Larrimore Ouellette, *Cultural Cognition of Patents*, 4 IP THEORY 28, 28–30 (2014) (describing sharp divide between sides in patent policy debates); Ted Sichelman, *Markets for Patent Scope*, 1 IP THEORY 42, 47–48 (2010) (describing debate among scholars between “commercialization market optimists/coordination pessimists . . . who advocate relatively narrow patent scope, and commercialization pessimists/coordination optimists . . . who advocate relatively broad patent scope”).

Examination claim amendments rest on weaker foundations than their long-standing and widespread acceptance would suggest.¹⁷ On the one hand, examination amendments help protect the basic incentives to innovate, disclose, and commercialize at the heart of the patent system by allowing the inventor to still obtain effective patent protection even when the initial claims are rejected as claiming more than allowed or are insufficient to protect the full scope of the invention. On the other hand, examination amendments may be duplicative of the other tools patentees have to protect their legitimate claim scope and create undesirable incentives for patent owners to draft the type of vague and broad claims most beneficial to themselves but most problematic for patent quality.

Post-issuance claim amendments raise greater concerns about notice and the reliance interests of competitors and about strategic amendments designed specifically to capture competitor's products or to prevail in litigation. They may also be less necessary to protect innovation incentives because the patent owner has already enjoyed a period of exclusivity. On the other hand, the extent to which competitors are relying on claim language is uncertain, and accused infringers themselves have incentives and opportunities to attack and create problems with even meritorious patents. Moreover, patent owners that have invested or made business decisions based on patent protection have their own legitimate reliance concerns. In sum, the justifications for post-issuance claim amendments are, at most, different in degree, not different in kind, from examination amendments.¹⁸

Finding the social desirability of claim amendments ambiguous is superficially unsatisfying. But it has important policy implications. Any normative conclusion about claim amendments depends on where the risk of error should lie: denying warranted amendments through a restrictive approach would undermine inventor incentives, yet allowing unwarranted amendments through a liberal approach would interfere with legitimate competition and follow-on innovation.¹⁹ Assigning this risk of error, in turn, depends on the "careful balance between the need to promote innovation and the recognition that imitation and refinement through imitation are both necessary to invention itself and the very lifeblood of a competitive economy" that is Congress's primary objective in designing the patent laws.²⁰ Commentators strenuously debate the normative questions surrounding this balance, including whether (and to what extent) patent protection is needed to incentivize inventors, whether strong patent rights that maximize protection for inventors or weaker

17. *See infra* Part III.

18. *See infra* Part IV.

19. *See infra* Section V.A.2.

20. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989).

patent rights that permit greater competition and follow-on innovation are optimal, and whether the status quo currently favors patent owners or accused infringers.²¹

For this reason, examination amendments are a potentially useful, though long overlooked, tool for Congress to implement policy choices about the fundamental balance of the patent system.²² To be clear, Congress is not limited to either maintaining the liberal status quo towards examination amendments or suddenly abolishing them after nearly two hundred years. A variety of middle ground possibilities exist, such as altering fee structures, changing presumptions of the permissibility of amendments, or requiring greater showings that amendments are warranted. In this regard, this Article provides the theoretical foundation for restricting or penalizing claim amendments as a means of addressing concerns with patent quality, as a few commentators have recently proposed,²³ though without reaching a definitive conclusion that this should be done.

Turning to post-issuance amendments, in light of the statutory ambiguity found by the Federal Circuit in *Aqua Products*, the procedural nature of the amendment issue, and the uncertainty about the social desirability of post-issuance claim amendments, any approach adopted by the Patent Office would be reasonable and therefore entitled to administrative deference.²⁴ Thus, the Patent Office *could* restrict claim amendments in post-issuance invalidity proceedings. But that does not necessarily mean that the Patent Office *should*. The statutory text and legislative history of the AIA, the ambiguity in the social optimality of claim amendments, and the historically limited role of the Patent Office all suggest that Congress did not envision that the new AIA post-issuance invalidity proceedings would sharply break from historical amendment practice in a way that would adjust the patent system's basic balance.²⁵ To the contrary, the evidence suggests that the AIA post-issuance proceedings have exceeded Congress's expectations in terms of invalidating issued patents, at least partially due to the near-impossibility of claim amendments.²⁶ Principles of administrative legitimacy suggest that an administrative agency using its delegated powers should be a

21. See Dan L. Burk & Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575, 1580–81 (2003). This Article follows the consensus that the patent system is driven by utilitarian, economic considerations, not moral rights, distributive considerations, or the desire to reward inventors, and therefore “[w]e grant patents in order to promote innovation, and so we should grant patents only to the extent necessary to encourage such innovation.” *Id.* at 1596–99.

22. See *infra* Section V.A.2.

23. See *infra* Section V.A.2.

24. See *infra* Section V.B.2.

25. See *id.*

26. See *id.*

faithful agent implementing Congress's wishes to the extent possible.²⁷ Thus, while the Patent Office might be warranted in imposing incremental restrictions on claim amendments in post-issuance validity proceedings — such as imposing additional fees for amendments — it should avoid restrictions that severely limit amendments or make them nearly impossible, absent more express direction from Congress.

Ultimately, the best approach to claim amendments in post-issuance invalidity proceedings might be to abandon a one-size-fits-all solution that is likely to generate significant errors (either unwarranted amendments under a liberal policy or denial of warranted amendments under a restrictive policy). Instead, Congress could give the Patent Office discretion to allow post-issuance claim amendments on a case-by-case basis in light of the specific context of the individual patent.²⁸ When a patent owner seeks to amend its claim in a post-issuance invalidity proceeding, the administrative patent judges of the Patent Trial and Appeal Board (“PTAB”) assigned to the proceeding could decide whether an amended claim is warranted based not just on technical considerations of novelty, non-obviousness, and adequate disclosure but also based on specific evidence of the actual need and social desirability of the amendment. The latter considerations could include the patent owner's investments in research, development, and commercialization; the opportunities the patent owner had to recoup these investments; the degree of reliance by competitors and the public; and the needs and practices of the specific industry.²⁹ Alternatively, the PTAB could refer the proposed amendment to a newly-created board of technical, economic, patent examination, and patent policy experts to make this decision.

Such a discretionary approach to post-issuance amendments is consistent with other recent proposals for more tailored and context-specific approaches to patent law to better reflect the diverse situations in which the trade-off between innovation incentives and competition arises.³⁰ It is a particularly appealing form of tailored and contextual patent law because it minimizes concerns about cost, institutional competence, and regulatory capture that often accompany such proposals.³¹

The rest of the Article proceeds in four parts. Part II provides an overview of the practice of amending patent claims during examination and post-issuance. Part III weighs the benefits and costs of claim amendments during examination, while Part IV does the same with regard to post-issuance amendments. Part V applies the lessons drawn

27. Christopher J. Walker, *Inside Agency Statutory Interpretation*, 67 STAN. L. REV. 999, 1001–03 (2015).

28. *See infra* Section V.C.

29. *See infra* Section V.C.1.

30. *See infra* Section V.C.2.

31. *See infra* Section V.C.3.

from Parts III and IV to current policy debates related to both examination and post-issuance amendments and introduces the possibility of discretionary post-issuance claim amendments. A brief conclusion follows.

II. THE PRACTICE OF AMENDING PATENT CLAIMS

A. Patent Claiming

A United States patent has two primary parts: “a written description of the invention” and “one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.”³² The written description, or specification, discloses the technical information that is the “quid pro quo” justifying the exclusive rights granted by the patent.³³ Claims are numbered, single sentences (though often long and convoluted) at the end of the patent that summarize the invention for which protection is sought.³⁴

Claims have two closely related roles. First, they create and substantively define the patent owner’s right to exclude, such that the patent owner’s rights are limited to the scope of the claims.³⁵ Second, claims provide public notice of the boundaries of the patent owner’s rights to delineate what activities are reserved to the patent owner and what remain open to the public.³⁶ Patent claims require the translation of complex, technical concepts into brief, legal shorthand, leading to general terminology, incomplete descriptions, and “an amalgam of multiple vocabularies and perspectives,” such as ordinary English, conventions of claim drafting (i.e., “patentese”), and scientific or technical words.³⁷ Patent owners often draft claims with vague and ambiguous terminology that can be read narrowly to avoid the prior art when obtaining the patent and broadly to cover a competitor’s product in subsequent licensing negotiations or litigation.³⁸

A patent normally includes several claims that vary in scope by including more or fewer features or vary in the words or structure used to

32. 35 U.S.C. § 112(a)–(b) (2012).

33. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1345 (Fed. Cir. 2010) (en banc).

34. ROBERT PATRICK MERGES & JOHN FITZGERALD DUFFY, *PATENT LAW & POLICY: CASES & MATERIALS* 35 (7th ed. 2017).

35. See Christopher A. Cotropia, *Patent Claim Interpretation Methodologies and Their Claim Scope Paradigms*, 47 WM. & MARY L. REV. 49, 65 (2005).

36. See *id.* at 62–65.

37. *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 396–97 (Ct. Cl. 1967); Peter S. Menell et al., *Patent Claim Construction: A Modern Synthesis and Structured Framework*, 25 BERKELEY TECH. L.J. 711, 719–20 (2010).

38. Dan L. Burk & Mark A. Lemley, *Fence Posts or Sign Posts? Rethinking Patent Claim Construction*, 157 U. PA. L. REV. 1743, 1753 (2009).

describe the invention.³⁹ The patent owner can thus maximize the reach of its patent, reduce the risks arising from the inherent problems of patent claiming, and increase the chances that at least one claim will cover a competitor's product and not encroach on the existing knowledge in the field ("prior art").⁴⁰

An inventor seeking patent protection must file a draft patent with the Patent Office. A Patent Office examiner reviews the application to determine whether it satisfies the statutory requirements for a patent.⁴¹ The examiner normally issues one or more "Office Actions" finding the invention unpatentable either because the disclosure is insufficient or, more commonly, because it is too close to the prior art.⁴² The patent prosecutor then normally provides a "Response," which explains why the examiner is wrong and the invention is a sufficient advance over the prior art to warrant a patent.⁴³ Additionally or alternatively, the prosecutor may amend the claims to narrow or clarify them in a way designed to distinguish the prior art identified by the examiner or ensure that the claims are supported by the disclosure in the specification.⁴⁴

B. Claim Amendments During Patent Examination

Claim amendments have existed since the Patent Act of 1836, which created the current system of Patent Office pre-issuance examination to ensure that patents comply with the statutory criteria of patentability.⁴⁵ Since at least 1870, the applicant has had an express right to make amendments that the examiner must consider.⁴⁶ Today, patent claims are freely amendable at the applicant's discretion, with the examiner required to consider amendments filed before or in response to the examiner's first office action.⁴⁷ Even subsequently, the claims remain

39. Michael J. Meurer & Craig Allen Nard, *Invention, Refinement and Patent Claim Scope: A New Perspective on the Doctrine of Equivalents*, 93 GEO. L.J. 1947, 1975 (2005).

40. *Id.*

41. Menell et al., *supra* note 37, at 720.

42. F. SCOTT KIEFF ET AL., *PRINCIPLES OF PATENT LAW: CASES & MATERIALS* 105 (5th ed. 2011).

43. *Id.* at 106.

44. *Id.*

45. Patent Act of 1836 § 18, Pub. L. No. 24-357, 5 Stat. 117. The 1836 Act actually provided for specification amendments, but this was functionally equivalent at a time when the specification performed the role of modern claims. *See Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 379 (1996). Congress retained amendments when it officially introduced claims in 1870. *See Patent Act of 1870* §§ 26, 41, Pub. L. No. 41-260, 16 Stat. 198. The United States had a brief period of pre-issuance review from 1790 to 1793, but this differed significantly from modern examination, with high-ranking officials making essentially discretionary decisions. *See OREN BRACHA, OWNING IDEAS: THE INTELLECTUAL ORIGINS OF AMERICAN INTELLECTUAL PROPERTY, 1790-1909*, at 193-94 (Cambridge University Press 2016).

46. *Compare Patent Act of 1870* § 41, with 35 U.S.C. § 132(a) (2012).

47. 37 C.F.R. §§ 1.111(a), 1.115(a)-(b) (2017).

amendable and must be considered by the examiner with the payment of an additional fee.⁴⁸ Like original claims, a procedurally proper claim amendment is presumptively patentable, with the burden falling on the examiner to prove unpatentability.⁴⁹ Unsurprisingly given the liberal approach, amendments are “a common practice in prosecution of patent applications.”⁵⁰

Claim amendments in examination fall into three major categories. First, and most commonly, examination amendments respond to the examiner’s rejection of the original claims by narrowing the scope of the claim to distinguish the prior art or make the claim commensurate with the disclosure in the specification (depending on the grounds for the rejection).⁵¹ Indeed, a common patent prosecution strategy is to obtain the broadest claim scope that the examiner will allow by first claiming broadly and then iteratively narrowing the claims in response to examiner rejections.⁵²

Second, broadening claim amendments are permitted — and are treated as if filed in the original application — provided they are supported by the specification’s disclosure.⁵³ Broadening amendments sometimes result from the applicant or its attorney independently realizing that they initially had an incomplete understanding of the invention or had erred in the difficult task of translating inventions into words.⁵⁴ Less desirably, the applicant or its attorney may realize that the paucity of the prior art and the way the disclosure was drafted allows them to claim more broadly than what the inventor considered the invention to be.⁵⁵ Broadening amendments are allowed even if not the result of inde-

48. *Id.* §§ 1.113(a), 1.114(a), (c).

49. See *PhRMA Aqua Br.*, *supra* note 14, at 8 (arguing that aside from AIA post-issuance proceedings, “neither Congress nor the PTO has ever placed a similar patentability burden on a patent owner or applicant”).

50. *Hughes Aircraft Co. v. U.S.*, 717 F.2d 1351, 1363 (Fed. Cir. 1983).

51. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 234 F.3d 558, 592, 638 (Fed. Cir. 2000) (en banc) (Newman, J., concurring in part and dissenting in part) (describing “[i]nformal inquiry” that only 10–15% of simple inventions and virtually no complex inventions are granted patents without amendments and noting “[i]t has been routine practice for patent solicitors to initially present broad claims to an invention, in the expectation of honing the claims in interaction with the examiner”), *vacated on other grounds*, 535 U.S. 722 (2002).

52. *Festo*, 234 F.3d at 592 (Plager, J., concurring).

53. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 909 n.2 (Fed. Cir. 2004). The doctrine of “late claiming” once restricted broadening amendments more than one year after filing, but it has been replaced by the more limited concept of prosecution laches that “applies only in egregious cases of unreasonable and unexplained delay in prosecution.” *MANUAL OF PATENT EXAMINING PROCEDURE* § 2190 (9th ed., Rev. 08.2017, Jan. 2018) [hereinafter *MPEP*]; see 1 R. CARL MOY, *MOY’S WALKER ON PATENTS* § 3:31 (4th ed. 2017).

54. See STEPHEN A. BECKER, *PATENT APPLICATIONS HANDBOOK* § 6:13 (2017) (“The new claims may cover features or aspects of the invention that did not occur to you when the original application was prepared.”).

55. See Oskar Liivak, *Rescuing the Invention from the Cult of the Claim*, 42 *SETON HALL L. REV.* 1, 8–16 (2012) (describing presumption “that claim drafters will attempt to claim all that

pendent realization by the applicant or attorney. “[I]t is not improper for an applicant to broaden [it]s claims during prosecution in order to encompass a competitor’s products, as long as the disclosure supports the broadened claims.”⁵⁶

Third, some examination amendments clarify or alter claim language without narrowing or broadening claim scope. Whether in response to an examiner rejection or from independent realization, amendments may more clearly specify the invention to distinguish from prior art references or better track the disclosure in the specification.⁵⁷ Amendments may even be made to purposefully cover or better target a competitor’s product, even without broadening scope.⁵⁸

To be clear, the substantive claim amendments that are the focus of this Article differ from other types of patent amendments. Amendments to the specification are allowed only to the extent they do not add new matter — information that departs from or adds to the original disclosure.⁵⁹ New matter can only be added via a continuation-in-part application that is not entitled to the benefit of the original filing date when compared to the prior art.⁶⁰ The limits on specification amendments are uncontroversial. They ensure that the applicant provides a complete disclosure at the time of filing,⁶¹ preserving the quid pro quo of disclosure upon which patent protection is premised. Patents also are amended for other, more technical reasons, such as correcting the named inventors or correcting an erroneous translation from a related foreign patent application.⁶²

C. The Development of Post-Issuance Claim Amendments

This section traces the development of post-issuance claim amendments from their inception pre-dating examination amendments to the six different avenues for post-issuance amendments today.

they can” in light of the prior art and disclosure requirements, even if it extends beyond the actual invention).

56. *Liebel-Flarsheim*, 358 F.3d at 909 n.2.

57. *Cf. Slimfold Mfg. Co. v. Kinkead Indus.*, 810 F.2d 1113, 1116–17 (Fed. Cir. 1987) (describing amendment in reissue proceeding that did not change claim scope but instead simply removed ambiguity by specifying the antecedent basis for term “on said sleeve”).

58. *Cordis Corp. v. Medtronic AVE, Inc.*, 511 F.3d 1157, 1185 (Fed. Cir. 2008) (finding that claim added to cover competitor’s product “does not broaden the scope of coverage”).

59. 4 DONALD S. CHISUM, CHISUM ON PATENTS § 11.04 (2018).

60. *Id.*; 4A *id.* § 13.03.

61. 4 *id.* § 11.04.

62. MPEP, *supra* note 53, §§ 602.01(c)(1), 2163.07.

1. Reissue

The roots of post-issuance claim amendments lie in the reissue practice the Patent Office developed in the early 1800s. From 1793 to 1836, United States patents were issued upon compliance with administrative formalities but without substantive examination.⁶³ When problems were discovered post-issuance, often in litigation, patent owners sought to surrender their original patent and receive a replacement amended to address the problem.⁶⁴ Despite a lack of express statutory authority, the Patent Office began granting such requests in the 1810s.⁶⁵ The Supreme Court endorsed this practice in 1832,⁶⁶ and Congress codified it the same year.⁶⁷ Patent owners' opportunities to correct problems in original claims were doubled by the Patent Act of 1836, which retained reissue proceedings despite introducing pre-issuance examination and examination amendments.⁶⁸ The Supreme Court first restricted reissue proceedings in the late 19th century, introducing several limits on broadening reissues in light of concerns that reissuance was primarily used to expand claim scope to ensnare competitor's products.⁶⁹

The Patent Act of 1952 recodified the reissue proceedings and codified the judicial limits imposed in the 19th century.⁷⁰ A patent owner today can obtain a reissued patent for the same invention disclosed in the original specification when an error in original prosecution resulted in its original claims being invalid or inoperative due to a defective specification or, more relevant for present purposes, due to claiming more or less than the patent owner's invention.⁷¹ As with examination amendments, reissue claim amendments can: (1) narrow claims to avoid prior art or ensure adequate support from the specification; (2) expand claims to provide adequate protection against infringement of all embodiments of the invention; or (3) cure ambiguity or vagueness that may render the patent indefinite or otherwise invalid.⁷²

But reissue amendments are more limited than examination amendments. First, reissuance amendments require an "error" during original prosecution, although courts have tended (though inconsistently) to in-

63. Bracha, *supra* note 45, at 201–03.

64. EDWARD C. WALTERSCHEID, *TO PROMOTE THE PROGRESS OF USEFUL ARTS: AMERICAN PATENT LAW AND ADMINISTRATION 1798–1836*, at 266–67 (Fred B. Rothman & Co. 1998).

65. *Id.*

66. *Grant v. Raymond*, 31 U.S. 218, 243 (1832).

67. Patent Act of July 3, 1832 § 3, Pub. L. No. 22-162, 5 Stat. 559.

68. Patent Act of 1836 § 13, Pub. L. No. 24-357, 5 Stat. 117.

69. 4A CHISUM, *supra* note 59 § 15.02[5], [9] (2018).

70. *Id.*

71. *Id.* § 15.03.

72. *Id.* § 15.03[1][a].

terpret this broadly to include errors of fact,⁷³ errors of law,⁷⁴ and even errors of judgment.⁷⁵ Most commonly, the “error” requirement excludes deliberate decisions to forego claim scope in order to secure original issuance.⁷⁶ Second, reissuance extinguishes all prior infringement claims unless the reissued claims are substantially identical to the original claims, requiring the same scope but permitting clarifications or other minor wording changes.⁷⁷ Third, broadening amendments are only allowed in the first two years after patent issuance to protect public reliance interests.⁷⁸ Finally, a competitor has absolute intervening rights to continue using, selling, or offering to sell specific physical products that did not infringe the original claims and that it made, used, sold, offered to sell, or imported prior to the reissuance.⁷⁹ Courts further have discretion to grant equitable intervening rights, which permit competitors to continue courses of conduct (e.g., manufacturing or selling a certain category of products) that they engaged in or had made substantial preparations for before reissuance and that did not infringe the original claims.⁸⁰ However, intervening rights may only be granted to the extent necessary to protect competitor investments and businesses.⁸¹

2. Continuation

Another means for patent owners to alter their claim scope developed beginning in the 1850s: continuation applications.⁸² Technically, continuation applications do not amend original claims. Instead, they are new applications filed while the original application is still pending that have the same specification and are entitled to the same filing date but have new claims.⁸³ When looked at broadly as part of an entire family of

73. *See, e.g., In re Oda*, 443 F.2d 1200, 1206 (C.C.P.A. 1971) (finding “adequate evidence in the record to show that the error in saying ‘nitrous’ instead of ‘nitric’ was a translation error” that permitted reissue).

74. *See, e.g., Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1575 (Fed. Cir. 1991) (“An error of law is not excluded from the class of error subject to correction in accordance with the reissue statute.”).

75. *See, e.g., Fleming v. Escort Inc.*, 774 F.3d 1371, 1380 (Fed. Cir. 2014) (concluding that the fact that “Fleming failed to appreciate the full scope of his invention and the inadequacy of the original claims for properly capturing the full scope” was “a classic reason that qualifies as error” for reissue).

76. 4A CHISUM, *supra* note 59 § 15.03[2][e].

77. 35 U.S.C. § 252 (2012); 4A CHISUM, *supra* note 59 § 15.05[1]; *see also* Slimfold Mfg. Co. v. Kinkead Indus., 810 F.2d 1113, 1115–16 (Fed. Cir. 1987) (“[I]t is the scope of the claim that must be identical, not that the identical words must be used.”).

78. 35 U.S.C. § 251(d) (2012); 4A CHISUM, *supra* note 59 § 15.03[4][b].

79. 35 U.S.C. § 252.

80. *See id.*

81. *See id.*

82. 4A CHISUM, *supra* note 59 § 13.02.

83. *Id.* § 13.01; *see also* 35 U.S.C. § 120.

patent applications covering an invention or series of related inventions, continuation applications can be seen as part of an overall patent prosecution and initial examination strategy, rather than as some sort of post-issuance proceeding.⁸⁴ Functionally, however, continuations operate similar to other post-issuance claim amendments by allowing applicants to alter their claim scope or claim language after obtaining patent protection for an invention while retaining the benefit of their original filing date.⁸⁵ Therefore, this Article treats them as a form of post-issuance claim amendment.

Continuation applications sometimes are used to obtain narrowed or clarified claims in response to concerns that the original claims were overbroad or imprecise.⁸⁶ Often, however, patent owners use continuation applications to obtain broader claims. A continuation may allow the patent owner to continue to pursue a broad claim that it sought in examination of the original patent but narrowed in response to an examiner rejection to obtain immediate patent protection.⁸⁷ Other times, the patent owner monitors market developments and uses the continuation to obtain new claims designed to capture competitor products and advancements outside the scope of the original claims.⁸⁸ Commentators have sharply criticized this latter use because it allows the patent owner to obtain broadened claims years after original issuance, capture the innovations of others, and surprise mature industries, while benefitting from the original application's filing date.⁸⁹

Broadening continuations therefore function similarly to broadening reissues but without being subject to the restrictions on broadening reissues.⁹⁰ Unsurprisingly, "continuations are the method of choice for amending claims post-issuance,"⁹¹ even if reforms have addressed some of the worst abuses of continuation applications.⁹²

84. See Mark A. Lemley & Kimberly A. Moore, *Ending Abuse of Patent Continuations*, 84 B.U. L. REV. 63, 68 (2004).

85. Chiang, *supra* note 9, at 533–34.

86. Lemley & Moore, *supra* note 84, at 76 (describing one use of continuations as when the applicant "drafted the claims poorly in the first instance and want[s] a second chance at drafting claims of appropriate scope").

87. *Id.* at 68, 76.

88. *Id.* at 76.

89. *Id.* at 76, 79.

90. Chiang, *supra* note 9, at 534.

91. *Id.*

92. Specifically, patent applications are now normally published 18 months after filing and have a term of 20 years from the filing of the original application, rather than 17 years from issuance of the continuation application. This makes it more difficult both to surprise mature industries and to keep continuation applications pending for decades. See Lemley & Moore, *supra* note 84, at 80.

3. Post-Issuance Patent Office Invalidity Proceedings

a. Reexamination

In 1980, Congress created a reexamination proceeding that allows the Patent Office to reconsider the validity of an issued patent if there is a “substantial new question of patentability.”⁹³ Frequently, reexamination is initiated by an accused infringer who has been accused of, or sued for, infringement.⁹⁴ Reexaminations are “conducted according to the procedures established for initial examination.”⁹⁵ Therefore, they “take[] place as series of back-and-forth written statements, between the USPTO and the patent owner, about whether the claims undergoing reexamination are patentable,” with “the patent owner . . . able to present the usual array of arguments and [narrowing or clarifying] amendments to overcome any rejections.”⁹⁶ In fact, claims are amended in approximately two-thirds of reexaminations, a significantly more common outcome than either complete confirmation or cancellation of claims.⁹⁷

With that said, the applicant’s ability to amend is more limited in reexamination than in initial examination. First, “[n]o proposed amended or new claim enlarging the scope of a claim of the patent will be permitted in a reexamination proceeding.”⁹⁸ Second, reexamination amendments are normally limited to those that are “pertinent to the question of patentability raised by the reexamination order.”⁹⁹ Third, as with reissue, “the patentee has no right to recover infringement damages for periods prior to the date that the reexamination certificate issued” unless the asserted claim is substantially identical (i.e., identical in scope even if not wording) to the original patent claim.¹⁰⁰ Finally, claims amended in

93. 35 U.S.C. §§ 302–03 (2012).

94. Ben Picozzi, Comment, *Reimagining Finality in Parallel Patent Proceedings*, 125 YALE L.J. 2519, 2522 (2016) (noting that “requestors commonly use ex parte reexamination as a supplement, not an alternative, to litigation” so that “[p]arallel judicial and administrative proceedings are common,” with 33% of ex parte reexaminations involving patents in known parallel litigation); USPTO, *Inter Partes Reexamination Filing Data - Septeber [sic] 30, 2017*, https://www.uspto.gov/sites/default/files/documents/inter_parte_historical_stats_roll_up.pdf [<https://perma.cc/32UB-FH7F>] (showing that 66% of *inter partes* reexaminations involved patents known to be in litigation).

95. 35 U.S.C. § 305. Although the procedures of the *inter partes* reexamination proceeding that existed from 1999–2011 differed somewhat from initial examination, the ability to amend was similar to that in *ex parte* reexamination. Compare 35 U.S.C. § 314(a) (2006) (pre-AIA), with 35 U.S.C. § 305 (2006).

96. 5 MOY, *supra* note 53 § 16:123 (2017).

97. USPTO, *Reexamination Statistics*, <https://www.uspto.gov/learning-and-resources/statistics/reexamination-information> [<https://perma.cc/WAD8-CAT2>] (showing amended claims in 67% of *ex parte* reexaminations and 60% of *inter partes* reexaminations).

98. 35 U.S.C. § 305.

99. 4 CHISUM, *supra* note 59 § 11.07[4][d][iv] (2018).

100. *Tennant Co. v. Hako Minuteman*, 878 F.2d 1413, 1417 (Fed. Cir. 1989).

reexamination are subject to the same intervening rights that apply in the reissue context.¹⁰¹

b. AIA Proceedings

The America Invents Act of 2011 expanded the Patent Office's ability to review the validity of issued patents by creating three new adversarial, post-issuance proceedings before three-judge panels of the Patent Trial and Appeals Board (PTAB).¹⁰² *Inter partes* review allows any party to use printed prior art to challenge an issued patent from nine months after the patent issues through the life of the patent if it is "more likely than not that at least [one] of the claims challenged in the petition is unpatentable."¹⁰³ Post grant review allows any party to challenge a patent on any basis within nine months of issuance.¹⁰⁴ Covered business method patent review — a temporary program lasting until 2020 — allows a party accused of patent infringement to challenge an issued patent on any basis, but only for patents on non-"technological inventions" related to data processing in the financial industry.¹⁰⁵

On first glance, the AIA extends the traditional liberal approach to claim amendments into these new post-issuance invalidity proceedings, allowing patent owners to make at least one motion to amend to cancel claims and propose a reasonable number of non-broadening substitute claims.¹⁰⁶ However, when the PTAB interpreted the AIA, it departed from the normal rule that amendments are like original claims and must be proven unpatentable by the Patent Office. In a series of regulations, rules, and decisions between the effective date of the AIA and 2015, the PTAB interpreted the AIA as requiring that the patent owner prove that the amended claim was patentable on all grounds in light of all prior art known to the patent owner.¹⁰⁷ The practical consequence of this burden shift was that amended claims were almost never allowed in the new AIA post-issuance invalidity proceedings.¹⁰⁸

The en banc Federal Circuit divided sharply without a single majority when the PTAB's restrictive approach to claim amendments was chal-

101. 35 U.S.C. § 307.

102. Sarah Tran, *Patent Powers*, 25 HARV. J.L. & TECH. 609, 631 (2012).

103. *Id.* at 634 (quoting 35 U.S.C. § 324(a)); *see* 35 U.S.C. § 311.

104. Tran, *supra* note 102, at 631–34.

105. *Id.* at 636–37.

106. 35 U.S.C. § 316(d) (*inter partes* review); *Id.* § 326(d) (post-grant review); Leahy-Smith America Invents Act, Pub. L. 112–29, § 18, 125 Stat. 329 (2011) (adopting post-grant review procedures for covered business method review).

107. *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1300–01 (Fed. Cir. 2017) (O'Malley, J., majority opinion).

108. *See id.* (demonstrating amendments were only allowed in a handful of new post-issuance proceedings).

lenged on statutory and administrative deference grounds.¹⁰⁹ A majority of the Federal Circuit, in an opinion written by Judge O’Malley, reversed the PTAB’s restrictive approach, but that majority split as to whether this was because the statute foreclosed it or because the Patent Office had not adopted it through the proper channels to obtain administrative deference.¹¹⁰ A separate majority of the en banc Federal Circuit, in an opinion written by Judge Reyna, held that the statute was ambiguous, and the Patent Office’s determination of the proper burden for claim amendments in the new AIA post-issuance proceedings would be entitled to administrative deference if properly promulgated.¹¹¹ The PTAB subsequently decided that it “w[ould] not place the burden of persuasion on a patent owner with respect to the patentability of substitute claims” and would limit the inquiry to “the prior art of record.”¹¹² The Patent Office also explored other changes “aimed at making the ability to amend claims ‘feasible and meaningful’” in AIA post-issuance proceedings.¹¹³

D. Claim Amendments as an Optional Design Choice

Because of their long-standing liberal allowance, claim amendments may seem like a necessary or inherent feature of the patent system or patent examination. Indeed, the strong criticism of the new post-issuance review procedures results in part from their departure from the status quo on claim amendments.¹¹⁴ Yet, the patent system certainly *could* operate without, or with limited, claim amendments. Indeed, other countries impose a variety of restrictions on amendments in examination¹¹⁵ or post-issuance.¹¹⁶

109. See generally *id.*

110. *Id.* at 1335 (Reyna, J., concurring).

111. *Id.*

112. David Ruschke, *PTAB Issues Guidance for Motions to Amend After Aqua Products*, USPTO DIRECTOR’S FORUM (Dec. 28, 2017), https://www.uspto.gov/blog/director/entry/ptab_issues_guidance_for_motions [<https://perma.cc/9YLQ-5KXW>].

113. Ryan Davis, *New AIA Plan May Be a Tough Path to Patent Amendments*, LAW360 (Oct. 29, 2018), <https://www.law360.com/articles/1096163/new-aia-plan-may-be-a-tough-path-to-patent-amendments> (last visited Dec. 20, 2018) (quoting speech by USPTO Director Iancu).

114. See, e.g., Brief of J. Kenneth Blackwell et al. as Amici Curiae Supporting Petitioner at 16–17, *Oil States Energy Servs., LLC v. Greene’s Energy Group, LLC*, 138 S. Ct. 1365 (No. 16-712) (objecting to AIA procedures as “upset[ting] this fundamental tenet of American patent law” by not “provid[ing] patentees with a fair opportunity to defend or amend their claims”).

115. See, e.g., *Rule 137 — Amendment of the European Patent Application*, EUROPEAN PATENT OFFICE, <https://www.epo.org/law-practice/legal-texts/html/epc/2016/e/r137.html> [<https://perma.cc/LZ2W-3K8D>] (describing timing limitations on amendments to European patent applications); Sunil Kumar Tyagi, *International Report - De-coding the Law: Nature of Claim Amendments Allowed in India*, IAM (Feb. 2017), <https://www.iam-media.com/patents/de-coding-law-nature-claim-amendments-allowed-india> [<https://perma.cc/RW86-4VGC>] (noting prohibition on broadening amendments, new claims, and claims that replace existing claims); *Changes in Practice of the Russian Patent Office Due to New Patent Regulations*,

In a patent examination system without (or with limited) claim amendments, the patent applicant could draft its original claims knowing that those claims would either be accepted or rejected by the Patent Office, with no (or only limited) opportunity to alter them.¹¹⁷ The applicant could still hedge against mistakes in understanding the invention, claim drafting, or judgment of what the Patent Office will allow by including multiple claims of varying scope.¹¹⁸ The examiner could then evaluate the claims presented and either approve or reject them. If the examiner rejected the claim, the applicant could still have an opportunity to argue to the examiner and on appeal why the examiner misunderstood the claim, the cited prior art references, or the relationship between the prior art references and the original claims. The applicant, however, could not alter its claims to overcome the examiner's rejection. The effect could be similar for post-issuance challenges, as was the effective result of the PTAB's restrictive approach.

Some have suggested that claim amendments are necessary because the Patent Office gives claims their "broadest reasonable construction" in examination and some post-issuance proceedings, rendering the claims more likely to implicate the prior art or be inadequately supported by the disclosure than if they were given their best interpretation.¹¹⁹ This has it backwards — the liberal availability of claim amendments is a justification for use of the "broadest reasonable construction," not the other way around.¹²⁰ Eliminating or restricting claim amendments might require reconsideration of the "broadest reasonable construction" stand-

PATENTICA (Dec. 27, 2016), <http://www.patentica.com/news/301-changes-in-practice-of-the-russian-patent-office-due-to-new-patent-regulations> [<https://perma.cc/MGE5-8AJB>] (describing limitation to a single opportunity to amend).

116. See ASSOCIATION INTERNATIONALE POUR LA PROTECTION DE LA PROPRIÉTÉ INTELLECTUELLE, *Amendment of Patent Claims After Grant (in Court and Administrative Proceedings, Including Re-examination Proceedings Requested by Third Parties) (Q189)* (2014), <http://aippi.org/library/q189-summary-reports/> [<https://perma.cc/4ARU-JE8Y>] (describing variations ranging from a complete ban in one country to prohibition on broadening amendments to a limitation to complete cancellation but not rewriting of claims, etc.).

117. Cf. Meurer & Nard, *supra* note 39, at 1952 ("A good patent agent or attorney predicts the embodiments that could be chosen by infringers and finds appropriate language to draft a suitably broad claim.").

118. See *id.* at 1975.

119. *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1298–99 (Fed. Cir. 2017) (O'Malley, J., majority opinion). As of November 13, 2018, the PTAB switched from the "broadest reasonable interpretation" standard in AIA post-issuance proceedings to the claim construction standard used in litigation. Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,341 (Oct. 11, 2018) (to be codified at 37 C.F.R. pt. 42).

120. *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989) (justifying broadest reasonable interpretation standard based on ability to amend).

ard,¹²¹ but that standard is not itself a barrier to limiting claim amendments.

Nor are arguments that eliminating or restricting claim amendments would be “unfair” to patent owners¹²² persuasive. The difficulties of predicting what claims will satisfy the statutory criteria and effectively protect the invention requires a task “familiar to transactional lawyers — identifying relevant contingencies” — and are not likely to be “more vexing than similar problems facing attorneys who deal with other complex legal problems.”¹²³ Eliminating or restricting claim amendments would be detrimental to patent owners but must be evaluated in the larger context, including patent owners’ other tools to protect their legitimate claim scope.¹²⁴ Moreover, the negative effects for patent owners should not be conflated with the social optimality of limiting or restricting claim amendments. “[T]he primary purpose of our patent law is not the creation of private fortunes for the owners of patents but is ‘to promote the progress of science and the useful arts.’”¹²⁵

In sum, despite the “competing” and “self-serving appeals to fairness” on both sides regarding claim amendments,¹²⁶ the consensus justifications for the American patent system are economic and utilitarian considerations, not moral ones.¹²⁷ Thus, the proper approach to claim amendments depends on what will best achieve the underlying goals of incentivizing innovation without unduly restricting competition and follow-on innovation.¹²⁸ Parts III and IV take up the question of whether Congress *should* eliminate or restrict claim amendments. This section’s more limited point is that Congress *could* do so.

121. *Cf.* *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2145 (2016) (explaining that the opportunity to amend in post-issuance proceedings was one reason why the “use of the broadest reasonable construction standard [in *inter partes* review] is . . . not unfair to the patent holder”).

122. *See* Blackwell, *supra* note 114, at 16 (describing *inter partes* review as “unfair to patentees” because it does not provide “a fair opportunity to defend or amend their claims”).

123. *Meurer & Nard*, *supra* note 39, at 1952. To be fair, transactional lawyers will often be able to negotiate to address unexpected contingencies, but such renegotiations require mutual assent of the parties and an opposing party may see a strategic advantage from refusing to do so. *Cf., e.g.*, *Burlington N.R.R. Co. v. Nebraska Pub. Power Dist.*, 931 F. Supp. 1470 (D. Neb. 1996) (addressing dispute where contracting party refused to renegotiate pricing rate in light of changed circumstances even though the contract provided a process for such renegotiation).

124. *See infra* Section III.C.

125. *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 511 (1917) (quoting U.S. CONST., art. I, § 8).

126. Chiang, *supra* note 9, at 554.

127. *Burk & Lemley, Policy Levers*, *supra* note 21, at 1596–99.

128. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989) (describing basic trade-offs of patent system).

III. EVALUATING EXAMINATION CLAIM AMENDMENTS

Putting aside the relevance of long-standing practice for the time being,¹²⁹ this Part evaluates from first principles whether, and to what extent, allowing claim amendments during examination is socially optimal under the utilitarian framework that underlies the American patent system. As discussed in Section II.B, amendments can narrow claim scope, broaden claim scope, or simply clarify claim scope. This Part discusses examination amendments collectively, except where it is necessary to specify different consequences of different types of amendments, in particular, narrowing and broadening amendments.

Courts and commentators often assume there is no downside to claim amendments, at least for narrowing and clarifying amendments.¹³⁰ Several Federal Circuit judges described the supposed “‘worst’ possible outcome” from claim amendments as being “that a patent issues in which the previously-examined claims have been narrowed and clarified in such a way” as to limit the patentee’s ability to assert infringement and provide notice to the public about “exactly how to innovate around those claims in the future.”¹³¹ Similarly, a leading industry group contended that the process of claim amendments “strikes a careful balance between the rights of the inventive community and the rights of the general public.”¹³² This Part weighs the well-recognized benefits of examination amendments against the overlooked costs they impose.

A. *The Trade-Off Between Innovation Incentives and Monopoly Costs*

The primary justification for permitting claim amendments in Patent Office proceedings is to protect inventors by “ensur[ing their] patentable subject matter remains properly protected.”¹³³ When an original claim covers both matter to which the inventor is entitled and matter to which they are not, narrowing claim amendments offer a middle ground that allows the inventor to receive only the protection that is warranted, rather than being denied any protection whatsoever.¹³⁴ Narrowing amendments ensure that the inventor receives some protection for the invention and

129. See *infra* Section V.A.1.

130. See, e.g., *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984) (suggesting that the process of claim amendments during patent examination “serves the public interest” while not impairing the interests of patent applicants); Yelderman, *supra* note 9, at 111–12 (describing the conventional wisdom regarding amendments that a patentee’s “reduction of the [claim] scope will presumably lead to public benefits”).

131. *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1315 (Fed. Cir. 2017) (O’Malley, J., majority opinion) (discussing post-issuance amendments).

132. PhRMA *Aqua Br.*, *supra* note 14, at 11.

133. *Aqua*, 872 F.3d at 1309 (O’Malley, J., majority opinion).

134. See *id.* at 1312.

may create stronger rights by increasing the chances that the issued claim satisfies the statutory criteria of patentability and will be upheld in later proceedings.¹³⁵ Similarly, when an original claim covers less than the full scope of the invention, broadening claim amendments ensure that the inventor receives sufficiently broad patent protection to reflect its contribution and effectively exclude competitors.¹³⁶

Protecting inventors is not itself a justification for allowing claim amendments, since the primary purpose of the patent system is not to reward inventors for their labor but to encourage innovation.¹³⁷ However, the benefits to the patent owner further this public objective of the patent system: granting inventors exclusive rights allows for super-competitive pricing, so that inventors can recoup their research and development costs and are therefore incentivized in the first place to undertake costly and risky research and development and disclose that research to the public.¹³⁸ Claim amendments allow patent owners to “obtain protection commensurate with [their] actual contribution to the art.”¹³⁹ The process of initial claiming, rejection, and amendment to narrow the claims and avoid the prior art — or initial claiming, subsequent realization of the full scope of the invention, and amendment to broaden the claims to fully cover the invention — “bring[s] claims more in line with what the applicant actually invented,” rather than being too broad or too narrow.¹⁴⁰ Permitting inventors to obtain rights that fully reflect their contribution, but nothing more, furthers the patent system’s “careful balance between the need to promote innovation and the recognition that imitation and refinement through imitation are both necessary to invention itself and the very lifeblood of a competitive economy.”¹⁴¹

135. *See id.*

136. *See* Alan Devlin, *Improving Patent Notice & Remedies: A Critique of the FTC’s 2011 Report*, 18 MICH. TELECOMM. & TECH. L. REV. 539, 585–86 (2012) (recognizing, in the context of continuations, that broadening amendments “may efficiently enable the inventor to procure the return envisioned by the patent bargain” despite initially “struggl[ing] to find appropriate language to describe technologies that they created following a protracted and expensive R&D process”).

137. *Motion Picture Patents Co. v. Universal Film Mfg. Co.*, 243 U.S. 502, 511 (1917) (quoting U.S. CONST., art. I, § 8).

138. Andres Sawicki, *Better Mistakes in Patent Law*, 39 FLA. ST. L. REV. 735, 740–41 (2012). The minority prospect theory favors broad patent rights to incentivize expenditures on commercialization and allow the coordination necessary to take an invention to market. *Id.* at 758–59; *see also* John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 440–41 (2004) (describing the basics of prospect theory). This theory would generally favor a liberal amendment policy to protect the patent owner’s ability to coordinate commercialization.

139. *In re Yamamoto*, 740 F.2d 1569, 1571 (Fed. Cir. 1984) (quoting *In re Prater*, 415 F.2d 1393, 1404 n.30 (C.C.P.A. 1969)).

140. Dawn-Marie Bey & Christopher A. Cotropia, *The Unreasonableness of the Patent Office’s “Broadest Reasonable Interpretation” Standard*, 37 AIPLA Q.J. 285, 293 (2009).

141. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989).

By contrast, “[s]crapping patent claims wholesale, rather than providing a meaningful opportunity to address prior art and preserve claims to the extent possible, [could] squander[] the financial and intellectual capital the inventive community devotes to new discoveries.”¹⁴² If a sufficient number of innovators were unable to obtain patent protection, or patent protection that fully covers their invention, because their initial claims were faulty and there was no opportunity to amend, the advantages offered by patent protection could become illusory. This would have the potential to deter innovators from undertaking the necessary research and development, disclosing their invention to the public, and/or bringing their invention to market.¹⁴³

Professor T.J. Chiang contends that there will only be reduced inventor incentives without claim amendments in the relatively uncommon situation where the patent owner could have foreseen the later development — a competitor’s product or a later-identified piece of prior art — at filing and inadvertently did not account for it in the claim language.¹⁴⁴ He believes that unforeseen subsequent developments, by contrast, would only marginally affect innovation incentives because unforeseen developments are too uncertain for reasonable reliance by the inventor in making choices about research paths to pursue.¹⁴⁵ However, it is not clear why the focus should be on the foreseeability of the specific development that will undermine a specific claim. Without amendments, or with restricted amendments, patent owners as a class would know that subsequent developments — whether unexpected prior art for overly broad claims or unforeseen products of competitors for overly narrow claims — could destroy patent value and there would be no, or limited, opportunity to adjust their claims to account for these developments.¹⁴⁶ The expected value of patenting would be reduced and corresponding innovation incentives diminished.¹⁴⁷ For example, if patent owners know that 20% of patents will be rendered worthless by subsequent developments, they will discount the expected value of patent rights accordingly,

142. PhRMA *Aqua Br.*, *supra* note 14, at 17–18.

143. See Glynn S. Lunney, Jr. & Christian Johnson, *Not So Obvious After All: Patent Law’s Nonobviousness Requirement, KSR, and the Fear of Hindsight Bias*, 47 GA. L. REV. 41, 48 (2012) (“Nor do we want to provide [the inventor] with an overly narrow set of rights, because providing a set of rights that would provide less than a reasonable return may lead our inventor to decide not to make the necessary investment in the first place.”).

144. See Chiang, *supra* note 9, at 553–54.

145. See *id.* at 544–49.

146. Cf. Sawicki, *supra* note 138, at 759–60 (arguing that evaluating the impact of mistakes in patent protection should focus not just on the effect on the specific inventor but also on the effects on inventors as a class).

147. See David L. Schwartz, *Retroactivity at the Federal Circuit*, 89 IND. L.J. 1547, 1554 (2014) (noting that *ex post* developments that undermine patent value will undermine innovation incentives “[e]ven though the investors and companies cannot predict whether their patents will be affected” because “they understand that their patents are more probabilistic”).

regardless of whether they can foresee an exact prior art reference or competitor development that will affect them specifically.

On the flip-side of the increased innovation incentives that claim amendments provide, they restrict competition and follow-on innovation by increasing the chances that the patent owner will obtain exclusive rights that effectively exclude others from practicing the invention.¹⁴⁸ However, these costs are probably not properly attributable to claim amendments. To the extent that claim amendments result in the patent owner receiving exclusive rights commensurate with its contribution, the costs to competition and follow-on innovation are not so much a cost of claim amendments as a cost of patent protection generally and the innovation incentives it generates. Restrictions on competition are only properly attributed to claim amendments, as opposed to patent protection itself, when amendments allow patent owners to obtain broader claim scope than is warranted by their contribution. In such circumstances, the increased monopoly costs of decreased competition and follow-on innovation are disproportionate to the innovation incentives provided by patent protection.¹⁴⁹ The question of whether claim amendments allow patent owners to obtain greater than warranted protection is taken up below.¹⁵⁰

B. Public Notice and Reliance Interests

For narrowing amendments (and probably clarifying amendments), the iterative process of initial broad claiming, rejection, and narrowing (or clarifying) amendment could promote public notice by allowing “ambiguities [to] be recognized, scope and breadth of language explored, and clarification imposed,” while creating a public record about the meaning of claim language.¹⁵¹ Therefore, claim amendments can reduce uncertainty about the patent owner’s claim scope that could undermine the patent owner’s own efforts to license or commercialize the invention, deter competition, and hinder follow-on innovation.¹⁵² Thus, according

148. See Chiang, *supra* note 9, at 545 (“[I]ncreasing the patentee’s return on a patent also increases the monopoly cost on society and reduces the reward to legitimate competitors.”).

149. See Lunney & Johnson, *supra* note 143, at 47–48 (“We do not want to provide an inventor with an overbroad set of rights, because providing a set of rights that would enable her to recover more than a reasonable return would, among other things, impose unnecessary deadweight losses on society.”).

150. See *infra* Section III.D. Professor Chiang suggests that amendments that address any subsequent development that was unforeseeable at the time of filing necessarily impose increased monopoly costs on society without corresponding benefits for innovation incentives. Chiang, *supra* note 9, at 545. I addressed this argument earlier in this Section.

151. *In re Zletz*, 893 F.2d 319, 321 (Fed. Cir. 1989); Michael Risch, *The Failure of Public Notice in Patent Prosecution*, 21 HARV. J.L. & TECH. 179, 190 (2007).

152. See *General Elec. Co. v. Wabash Appliance Corp.*, 304 U.S. 364, 369 (1938) (“The limits of a patent must be known for the protection of the patentee, the encouragement of the

to at least some Federal Circuit judges, “the ‘worst’ possible outcome [from claim amendments] is that a patent issues in which the previously-examined claims have been narrowed and clarified in such a way that . . . the public is put on notice of exactly how to innovate around those claims in the future.”¹⁵³

The public notice effects of claim amendments cut both ways. While narrowing and clarifying amendments may provide *ex post* public notice related to the scope of issued patents, examination amendments — especially, but not exclusively, broadening amendments — can undermine *ex ante* public notice related to patent applications. Amendments allow the boundaries of the inventor’s rights to be shifted, undermining the public’s ability to rely on the original claim language to evaluate what is protected, what remains open, and what the likelihood is that the Patent Office will grant the patent claims.¹⁵⁴ However, since patent applications generally are confidential and not publicly available until eighteen months after filing,¹⁵⁵ amendments during this period do not raise any such notice or reliance concerns. Even after publication, patent applications are only assertions of right that might ultimately be rejected by the Patent Office, and the public is therefore less likely to rely on application claims as delineating the line between permissible and impermissible conduct and is less warranted in doing so. Moreover, competitors do not, or cannot, always monitor published patent applications.¹⁵⁶ Effective monitoring of patent applications is likely in industries where the number of patents and competitors is low.¹⁵⁷ But in industries where the number of competitors or patents is high, there is less likely to be effective monitoring of, and therefore reliance on, the claims of pre-issuance patent applications.¹⁵⁸ In sum, there are likely some *ex ante* public notice costs from claim amendments during initial patent examination for some patents in some industries, but the significance of such costs is uncertain

inventive genius of others and the assurance that the subject of the patent will be dedicated ultimately to the public.”).

153. *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1315 (Fed. Cir. 2017) (O’Malley, J., majority opinion).

154. Chiang, *supra* note 9, at 525.

155. 35 U.S.C. § 122(a)–(b) (2012). Applications that benefit from the filing date of an earlier application, such as continuations, are published eighteen months after the filing of the earlier application, meaning that continuations and other such applications may sometimes be published when they are filed. *Id.* § 122(b)(1)(A).

156. See Lemley & Moore, *supra* note 84, at 90 (“[I]t does not necessarily follow that competitors will take advantage of that opportunity” to monitor published patent applications.).

157. See Christina Mulligan & Timothy B. Lee, *Scaling the Patent System*, 68 N.Y.U. ANN. SURV. AM. L. 289, 307 (2012) (noting that “[i]n industries with low discovery costs, a rational firm is likely to spend enough money to find all patents relevant to its products”).

158. See *id.* at 302, 307 (concluding that “the more firms and patents there are, the larger the discovery costs will be” for finding patents and that “in industries where discovery costs are high, the rational firm might not even try to avoid infringement, because a dollar spent on patent searches will produce much less than a dollar in savings due to reduced litigation”).

and is off-set, at least to some extent, by the *ex post* notice benefits provided by the public record of claim scope generated by the back-and-forth of claim, rejection, and amendment.

C. Administrative Costs and Complications

Like public notice, administrative cost considerations run both ways. Examination amendments may increase costs by requiring additional work by the attorney and the patent examiner to prepare, review, and evaluate the claim amendment.¹⁵⁹ Assuming the original claims were properly rejected as unpatentable,¹⁶⁰ the additional costs to the applicant may not be socially problematic because the applicant is in the best position to avoid the costs by drafting narrower or clearer original claims, as well as to determine whether the benefits of amending the claim outweigh its costs.¹⁶¹ In theory, the Patent Office could shift some of the costs it incurs from amendments to the applicant by charging additional fees for amendments. But the Patent Office's current policy requires no additional fee for amendments, unless the applicant is adding claims without cancelling other claims such that the number of claims in the amended application exceeds twenty in total or exceeds three independent claims.¹⁶² Thus, in practice, allowing examination claim amendments imposes additional actual costs on the Patent Office from reviewing and making a decision about the amended claims.

However, these additional costs may be offset by cost-savings achieved by allowing examination amendments. Absent the opportunity for narrowing amendments, a patent applicant facing an all-or-nothing scenario where a claim is either accepted or rejected would have the incentive to fight any rejection by all possible means.¹⁶³ Patent applicants have a variety of tools by which to challenge a rejection and extend examination, including seeking an interview with the examiner, requesting continuing examination, filing a continuation application, appealing within the Patent Office and to the Federal Circuit, or filing a new district court action challenging the rejection.¹⁶⁴ All of these tools increase

159. Bey & Cotropia, *supra* note 140, at 307.

160. *But see id.* at 304–09 (suggesting that the broadest reasonable interpretation standard used during patent examination leads to erroneous rejections that impose unnecessary amendment costs on the applicant).

161. *See* Risch, *supra* note 151, at 191 (suggesting that the costs of claim amendments could make applicants draft clearer claims).

162. *See* MPEP, *supra* note 53, § 714.10.

163. *See* Yelderman, *supra* note 9, at 121 (noting that a consequence of restricting claim amendments “might be that applicants will persist in arguing for debatable claims longer than they [otherwise] would”).

164. Lemley & Moore, *supra* note 84, at 67–68, 68 n.14.

delay and costs for the applicant and the Patent Office,¹⁶⁵ and only some allow the Patent Office to recoup costs by charging additional fees.¹⁶⁶ In theory, this increased debate could lead to more scrutiny that improves the quality of issued claims, i.e., makes them more commensurate with the invention.¹⁶⁷ However, because most patents are practically irrelevant, expending this extra effort at the examination stage may not be a wise use of resources, at least absent a way to target those patents most likely to be relevant.¹⁶⁸

Narrowing claim amendments thus can serve as a cost-saving device in the same way that settlement in litigation reduces litigation costs.¹⁶⁹ The applicant and the examiner can essentially reach a mutual agreement on claim scope that the examiner is willing to allow and the applicant is willing to accept. This avoids the costs that a persistent applicant can impose by using the various means of challenging a rejection.¹⁷⁰

Broadening and clarifying examination amendments may also reduce administrative costs. Without the opportunity to broaden or clarify claim scope in examination, an inventor whose initial claims were imprecise or did not fully cover its invention would presumably use the procedures available to broaden or clarify claim scope post-issuance (continuation applications and reissuance) assuming these procedures were still available. If all broadening and clarifying amendments were prohibited — whether in examination or through these post-issuance procedures — the inventor would be forced to file a second patent application that covered the broader aspects of its invention omitted from the initial claims or claimed its invention more precisely and then argue that this second patent application was not anticipated or rendered obvious by the original application. In any event, the likely result would be two proceedings to achieve what broadening or clarifying examination amendments allow to be done in a more efficient, single proceeding.

165. See Wagner, *supra* note 8, at 2167 (noting that restricting amendments “is likely to extend the time and cost of the prosecution phase, and thereby increase the workload at the Patent Office”).

166. See USPTO, *Table of Patent Fees - Current, Proposed and Unit Cost* 1–3, https://www.uspto.gov/sites/default/files/documents/Table_of_Patent_Fees-Current_Proposed_and_Unit_Cost.pdf [<https://perma.cc/H3V7-NNNP>] (listing additional fees only for request for continued examination, continuation applications, and appeals within the Patent Office).

167. Yelderman, *supra* note 9, at 121.

168. See Mark A. Lemley, *Rational Ignorance at the Patent Office*, 95 NW. U. L. REV. 1495, 1497 (2001).

169. See J.J. Prescott & Kathryn E. Spier, *A Comprehensive Theory of Civil Settlement*, 91 N.Y.U. L. REV. 59, 61–62 (2016) (describing elimination or reduction of litigation costs as a primary benefit of settlement).

170. These costs may not be avoided if the applicant files a continuation application to further pursue the original claims. See *supra* Section II.C.2. (discussing continuation applications generally).

Ultimately, it is an uncertain and difficult empirical question whether examination amendments result in a net increase or savings of administrative costs. As a result, administrative costs do not weigh strongly in favor or against examination amendments.

D. Drafting Incentives, Examination Incentives, and Strategic Behavior

Examination claim amendments affect the way patent applicants research and draft their patent applications. The opportunity to amend gives applicants protection from some of the inherent shortcomings in patent law. For example, it helps patent applicants navigate the notoriously difficult requirement that the patent owner translate a technical concept into words by allowing correction of the inaccuracies and flaws that will inevitably arise in even carefully drafted initial claims.¹⁷¹ Similarly, the multiple drafting opportunities provided by examination amendments mitigate the challenges the patent owner faces in comparing the invention to the prior art to determine the invention's full scope, given that "the universe of prior art is extraordinarily vast" and "the legal doctrines regarding the prior-art limitation are also inherently vague."¹⁷² Thus, claim amendments reduce the costs, delays, and risks that these challenges pose for an inventor trying to draft precise claims that fully cover the invention but nothing more than the invention.¹⁷³

Absent liberal amendments, applicants would have an incentive to spend more effort and time exploring their invention to understand its full scope, searching the prior art to understand the exact parameters of what is open for patenting, and carefully drafting their claims to fully cover their invention but avoid the prior art. This would increase the costs of patenting, thereby reducing the expected value of patent protection and the corresponding innovation incentives provided to inventors.¹⁷⁴ It would also delay the filing of patent applications as inventors work to perfect their claims, postponing the time when inventors can

171. *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 397 (Ct. Cl. 1967) (describing problems that arise in translating inventions into words).

172. Chiang, *supra* note 9, at 537.

173. See Devlin, *supra* note 136, at 585 (recognizing in context of continuations that amendments "may efficiently enable the inventor to procure the return envisioned by the patent bargain" despite initially "struggl[ing] to find appropriate language to describe technologies that they created" because "[i]t is notoriously difficult in certain fields for inventors to employ language to accurately encapsulate the nature of the invented product or process").

174. See Jeanne C. Fromer, *Claiming Intellectual Property*, 76 U. CHI. L. REV. 719, 760 (2009) ("To the extent, then, that it is thought that more innovation will come from a greater incentive to seek intellectual property rights, it is important to keep down the cost of claim drafting.").

reap the rewards of exclusivity and undermining their ability and incentives to invest in commercialization.¹⁷⁵

Arguably, however, imposing these additional costs on patent applicants is socially desirable. The most significant, and often overlooked, cost of examination amendments is the negative incentive they provide to draft low quality original claims. “Patent applicants have an incentive to allow claims to remain vague so that they can mold the claims to fit the future product of a currently unknown, potential infringer or to avoid invalidation if previously undiscovered prior art comes to light.”¹⁷⁶ Patent applicants also have incentives to draft broad claims because they increase the value of the patent by increasing the number of infringing products, while the downsides of broad claims that might read on more prior art are minimized by the opportunity to draft multiple claims of varying scope and the presumption of validity that applies in litigation.¹⁷⁷ Thus, vague and/or broad claiming:

[O]ffers a number of critical advantages to the patentee. It allows the patentee to capture some value for an invention at a very early stage simply by receiving a grant. And it hedges against the patent being undermined by the passage of time and technology, allowing patents to change their scope to fit later circumstances.¹⁷⁸

The ability to amend claims makes broad and/or vague claiming a viable strategy.¹⁷⁹ If the examiner allows the claim, the applicant gets the benefits offered by a vague and/or broad claim protected by the presumption of validity.¹⁸⁰ Even if the examiner rejects the claim, the applicant can simply amend to clarify or narrow it.¹⁸¹ Patent applicants have little incentive to carefully search the prior art and to draft claims that accurately reflect the invention’s contribution over the prior art, since amendments

175. See Edmund W. Kitch, *The Nature and Function of the Patent System*, 20 J.L. & ECON. 265, 275–80 (1977).

176. Risch, *supra* note 151, at 188.

177. Oskar Liivak, *Overclaiming Is Criminal* 12 (Cornell Legal Studies Research Paper No. 16–35), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2836165 [https://perma.cc/ENR6-R52P] (“Without a doubt patent applicants aim to get as much technological real estate as the PTO will grant.”); Yelderman, *supra* note 9, at 97–102.

178. Wagner, *supra* note 8, at 2151.

179. See *id.* at 2167 (noting that the ability to amend claims contributes to the incentives patentees have to draft vague claims); Chiang, *supra* note 9, at 557 (noting that “patentees have little incentive to draft good claims in the first place” because of the ability to amend).

180. Yelderman, *supra* note 9, at 101 (noting that broad claims that cover a large swath of potentially infringing commerce are most benefited by the presumption of validity).

181. See *id.* at 120 (suggesting that the ability to amend means that the only cost to filing overbroad claims are limited prosecution and filing costs).

allow the applicant to narrow the claim if invalidating prior art is found by the examiner or broaden the claim if the original claims are narrower than the prior art would allow.¹⁸²

The significant benefits of broad and/or vague claiming will often outweigh the costs of amendments to applicants. The delay and monetary costs to the applicant created from amendments will normally be dwarfed by the value that patent owners get from vague and overbroad claims. Under the doctrine of prosecution history estoppel, amending claims in examination may also bar the patent owner from utilizing the doctrine of equivalents to assert infringement against products that do not fall literally within the claim's scope but are close enough.¹⁸³ However, the potential advantages of broad and/or vague claims will often make it worth losing the possibility of the doctrine of equivalents, which is an uncertain doctrine limited to products that are insubstantially different and “perform[] substantially the same function in substantially the same way with substantially the same result.”¹⁸⁴ Perhaps the best evidence that the benefits of broad and/or vague claims are greater than the costs of amendments is that patent prosecutors generally dislike first-action allowances — where the patent examiner allows a claim without rejection and amendment — because it suggests that they did not draft the original claims broadly enough.¹⁸⁵

The broad and/or vague claiming strategy facilitated by examination amendments imposes significant social costs. Patent examiners do not effectively police against such claims because of limited resources, heavy workloads, and incentives and biases in favor of patent issuance.¹⁸⁶ Moreover, overbroad and vague claiming creates feedback effects, as examiners have to expend time and effort evaluating and rejecting unclear or clearly unpatentable claims, diverting resources from other applications¹⁸⁷ and thereby increasing the chances that other over-

182. See Bhaven N. Sampat, *When Do Applicants Search for Prior Art*, 53 J.L. & ECON. 399, 401–02 (2010) (providing empirical evidence that “in many cases, applicants do not conduct even cursory searches for prior art,” though finding variations among types of industries and inventions).

183. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 733–41 (2002) (holding that prosecution history estoppel presumptively bars the doctrine of equivalents when a narrowing amendment is made unless the patent owner can rebut the presumption by showing that the amendment was not made for reasons of patentability or did not cover the subject matter of the alleged equivalents).

184. *Aquatex Indus., Inc. v. Techniche Sols.*, 479 F.3d 1320, 1326 (Fed. Cir. 2007) (describing the basic doctrine of equivalents test); see also David L. Schwartz, *Explaining the Demise of the Doctrine of Equivalents*, 26 BERKELEY TECH. L.J. 1157, 1158 (2011) (summarizing literature showing “successful use of the doctrine has substantially diminished over time”).

185. Lemley & Moore, *supra* note 84, at 67 n.8.

186. Wagner, *supra* note 8, at 2151–53.

187. See Michael D. Frakes & Melissa F. Wasserman, *Is the Time Allocated to Review Patent Applications Inducing Examiners to Grant Invalid Patents?: Evidence from Micro-Level Application Data* 4 (Nat'l Bureau of Econ. Research, Working Paper No. 20337, 2014) (“Our

broad or vague claims will slip through the cracks.¹⁸⁸ This in turn increases the expected value of, and therefore incentivizes, overbroad and vague original claims.

The incentives created by liberal allowance of examination claim amendments, at least narrowing amendments, contribute to the most significant present concern with patent quality — an excess of claims that are either too vague, too broad, or both.¹⁸⁹ Vague claims make evaluation of scope and validity challenging (undermining public notice), allow patentees to obtain a patent under a narrower understanding of claim scope and then assert it later based on a broader understanding of claim scope, and make it more likely that claims fail to satisfy the statutory requirements of patentability.¹⁹⁰ Overly broad claims allow the patentee to control more than what it invented and disclosed in the patent,¹⁹¹ giving the patentee a windfall while stifling competition and follow-on innovators.¹⁹²

These patent quality problems are normally blamed on the quality of Patent Office examination.¹⁹³ Recently, however, Professors Liivak, Wagner, and Yelderman have recognized that these problems result, in significant part, because applicants have incentives to draft broad and/or vague claims.¹⁹⁴ As Professor Yelderman notes, applicants seek overbroad claims “because current prosecution and litigation rules cause the expected value of these claims to exceed their expected cost.”¹⁹⁵ The liberal availability of narrowing claim amendments is a significant reason that the expected value of overbroad claims exceed their expected costs and therefore a significant contributor to the widely-recognized patent quality problems in the American patent system.¹⁹⁶

results suggest that as an examiner is given less time to review an application, the less active she becomes in searching for prior art, the less likely she becomes to make obviousness rejections (which are especially time-intensive exercises), and the more likely she becomes to grant the patent.”).

188. *Cf.* Yelderman, *supra* note 9, at 121 (“Reduced incentives to file broad claims means fewer examiner resources spent challenging plainly unpatentable claims.”).

189. *Id.* at 78 (“Everyone, it seems, wants to improve the quality of issued patents.”); Wagner, *supra* note 8, at 2136 (“[T]he need to improve patent quality is essentially undisputed.”); *id.* at 2149–51 (describing substantial vagueness as a significant patent quality problem); Liivak, *Overclaiming is Criminal*, *supra* note 177, at 2 (describing “overly broad claims” as a patent quality problem). More liberal allowance of broadening amendments could create positive incentives to draft narrower and more tailored original claims. *See* Yelderman, *supra* note 9, at 111–12.

190. *See* Wagner, *supra* note 8, at 2149–50.

191. *See* Liivak, *Overclaiming is Criminal*, *supra* note 55, at 15.

192. *See* Cotropia, *Claim Scope Paradigms*, *supra* note 35, at 117–19.

193. *See* Yelderman, *supra* note 9, at 83–84; Wagner, *supra* note 8, at 2137.

194. Liivak, *Overclaiming is Criminal*, *supra* note 177, at 3; Wagner, *supra* note 8, at 2138; Yelderman, *supra* note 9, at 80.

195. Yelderman, *supra* note 9, at 80.

196. *See* Chiang, *supra* note 9, at 557; *cf.* Wagner, *supra* note 8, at 2167.

E. Weighing the Costs and Benefits of Claim Amendments During Examination

The limited existing analysis of examination amendments suggests that their supposed low costs make them cost-benefit justified regardless of the extent of their positive impact on innovation incentives.¹⁹⁷ This conventional wisdom underestimates the costs of examination amendments and overstates the benefits. Examination claim amendments are less clearly warranted than their historical pedigree and widespread acceptance would suggest.

First, commentators often overlook or downplay how examination amendments encourage patent owners to draft the type of overbroad and vague claims that are currently seen as the most problematic for patent quality. For example, even though Professor Chiang recognizes the negative drafting incentives created by liberal allowance of claim amendments, he does not appear to weigh these incentives as a reason to be skeptical of examination amendments.¹⁹⁸

Yet, as Professor Yelderman recognizes, “improving patent quality could simply be a matter of increasing the costs and reducing the benefits of low quality claims, so that applicants will on average file fewer of such claims in the first instance.”¹⁹⁹ Likewise, Professor Wagner notes that “[u]ntil patentees have strong, unequivocal incentives to seek patents that clearly meet the standards of patentability, that are explained in the context of the prior art, and that draw clear and unambiguous lines around their subject matter, we will not succeed [in improving patent quality].”²⁰⁰ Restricting claim amendments would increase the costs of drafting vague and overbroad claims and “provide important incentives for patentees to draft clear, coherent, and appropriate claims.”²⁰¹

Second, the primary benefit of claim amendments during examination is that they preserve inventors’ incentives to innovate, disclose, and commercialize their inventions by ensuring some patent protection even if the initial claims are unpatentable or do not fully cover the invention.²⁰² This benefit appears less valuable in light of the other tools pa-

197. See, e.g., Chiang, *supra* note 9, at 526 (“Before the issuance of a patent, amending claims to fix mistakes is useful, since before issuance such mistakes are harmless.”); see also *In re Zletz*, 893 F.2d 319, 321–22 (Fed. Cir. 1989) (suggesting that the result of claim amendments during examination are “claims that are precise, clear, correct, and unambiguous” without “uncertainties of claim scope”).

198. Compare Chiang, *supra* note 9, at 557 (recognizing that claim amendments provide patentees with negative drafting incentives), with *id.* at 561–62 (focusing solely on amendments to cover after developed technology as a cost of examination amendments).

199. Yelderman, *supra* note 9, at 80–81.

200. Wagner, *supra* note 8, at 2138.

201. *Id.* at 2167.

202. See *supra* Section III.A.

tent owners have to hedge against errors in claim drafting and potential future developments.²⁰³ To mitigate the problems resulting from the inherent shortcomings of language, the difficulty translating technical concepts into words, and the inventor's potential uncertainty about the precise invention, the patent applicant can draft up to three independent claims (claims that stand by themselves) and seventeen dependent claims (claims that include all of the limitations of an independent claim but add an additional feature) for the basic filing fee (and can pay extra for more).²⁰⁴ By filing multiple claims with varying language and scope, the patent applicant can mitigate the risk of some claims being found unpatentable, being imperfectly drafted, or not fully covering the invention.²⁰⁵

Additional tools exist to protect the patent owner against unforeseen developments after the patent issues. If previously unknown prior art appears in litigation that threatens the validity of the patent, the patent owner is protected by the presumption of validity and the clear and convincing evidence standard.²⁰⁶ Conversely, if the original claims were drafted too narrowly, the patent owner could use post-issuance tools like continuations and reissuance (within two years) to broaden the claim scope.²⁰⁷ Moreover, "the doctrine of equivalents exists to prevent a patent owner from losing effective protection because she did not draft claims that effectively cover what she invented."²⁰⁸ Under this doctrine, the patent owner can establish infringement against products that do not fall precisely within the claim scope but are close enough.²⁰⁹

These other tools available to the patent owner (assuming they remain constant) undermine the assumption that claim amendments are necessary to protect the patent owner's legitimate claim scope and innovation incentives. Rather, claim amendments combined with these other tools may unduly tilt the scales in favor of patent owners, at the expense of competitors, follow-on innovators, and the public. Put another way, the only reason that the iterative process of initial claim, rejection, and amendment is necessary to ensure that the patent owner receives patent protection commensurate with its contribution may be that the patent owner is underinvesting in understanding the full scope of the invention, researching the prior art, and drafting appropriate claims in the first in-

203. Meurer & Nard, *supra* note 39, at 1975 ("Patent prosecutors have access to a range of claim-drafting techniques that mitigate problems with language and later-developed technology.").

204. See USPTO, *Patent Fees*, *supra* note 166, at 1.

205. See Meurer & Nard, *supra* note 39, at 1975.

206. Yelderman, *supra* note 9, at 96 ("[A]t least some claims have their likelihood of validity improved by the presumption.").

207. See *supra* Section II.C.1–2.

208. Lemley & Moore, *supra* note 84, at 78.

209. See *id.*

stance. Rather, the patent owner can draft as broadly and/or vaguely as possible, shifting the cost and the burden to the Patent Office, and therefore the public, to determine if the claim is commensurate with the patent owner's contribution. Thus, while beneficial for inventors' incentives, the decreased costs and effort that inventors must expend in understanding their invention, searching for prior art, and drafting precise claims because of liberal amendment availability may ultimately be socially undesirable.

Likewise, the earlier filing of patent applications encouraged by liberal amendment policy may be socially problematic. Some commentators see early patent filing and issuance as more efficient because it allows coordination of technological development, encourages an optimal pace of investment and development, prevents duplicative efforts among competitors, encourages earlier disclosure of technical information, and leads to earlier expiration of patent protection that returns the invention to the public domain.²¹⁰ Other commentators, however, have recently suggested that early filing is problematic because it occurs when there is less information and greater uncertainty about the technology and market.²¹¹ This uncertainty leads to excessive patent filings that overwhelm the Patent Office²¹² and produce a thicket of issued patents (many worthless) that make patent clearance more difficult;²¹³ requires resort to continuation or additional applications as more information is gained;²¹⁴ results in patents with less useful technical disclosures and less certain claims written in vague and general terms;²¹⁵ and can undermine commercialization of the invention if the early patent owner is disinclined or ill-suited to optimally commercialize the invention.²¹⁶

To be clear, the objective of this Section is not to reach a definite conclusion that examination claim amendments are undesirable. The empirical evidence to support such a conclusion is absent, and the arguments offered in the previous sections are too ambiguous. For example, the negative drafting incentives and related patent quality concerns may not be strong enough to weigh against claim amendments. Furthermore, other factors beyond claim amendments contribute both to poor patent quality generally (e.g., deficiencies in patent examination, market incentives, and cognitive biases) and negative drafting incentives specifically

210. See John F. Duffy, *Rethinking the Prospect Theory of Patents*, 71 U. CHI. L. REV. 439, 440–41 (2004).

211. Christopher A. Cotropia, *The Folly of Early Filing in Patent Law*, 61 HASTINGS L.J. 65, 93–96 (2009); see also Mark A. Lemley, *Ready for Patenting*, 96 B.U. L. REV. 1171, 1186–87 (2016).

212. See Cotropia, *Folly*, *supra* note 211, at 104–07.

213. See *id.* at 105–06.

214. *Id.* at 104.

215. *Id.* at 116–18; see also Lemley, *Ready*, *supra* note 211, at 1187.

216. See Cotropia, *Folly*, *supra* note 211, at 108–12.

(e.g., the presumption of validity and flaws in patent claim construction).²¹⁷ Other means of improving patent quality, including other ways of reducing applicants' incentives to draft vague and/or overbroad claims, may be preferable to eliminating or restricting examination amendments.²¹⁸ And deficiencies in original claims may be the result of simple mistakes that need the fresh eyes of the examiner to correct, rather than any sort of intentional or strategic effort.²¹⁹

Furthermore, claim amendments may be more effective or socially optimal than the other tools patent owners have to protect their legitimate claim scope. Hedging against future problems by drafting a variety of claims is limited by the difficulty of foreseeing future developments. Eliminating or restricting claim amendments could increase the costs of patenting by forcing patent owners to spend more time and money searching for prior art and drafting more precise claims; these increased costs could reduce the incentive effects of patent protection. Post-issuance proceedings, like continuations and reissuance, can avoid these difficulties because the patent owner can draft claims *after* future developments but they may be more socially problematic than examination amendments because they create greater delay, uncertainty, and potential for strategic behavior.²²⁰ In litigation, the presumption of validity "hardly renders issued patents immune to invalidity challenges"²²¹ and is inapplicable in AIA post-issuance proceedings. And the doctrine of equivalents only protects against competitor alterations that result in insubstantial differences from the claim and that perform substantially the same function in substantially the same way to achieve substantially the same result as the claimed invention.²²²

Finally, examination amendment policy may have important distributional effects. Small entities and inventors may have a stronger need for liberal amendments during examination because they are likely less capable than large corporations of bearing the increased costs and delays of drafting perfect initial claims.²²³ Additionally, they may be less so-

217. See Wagner, *supra* note 8, at 2150–58.

218. See Yelderman, *supra* note 9, at 113–15, 121–28 (suggesting changing the Patent Office fee structure, replacing the presumption of validity with a presumption of infringement, and monetary penalties for claims found invalid post-examination); Wagner, *supra* note 8, at 2165–68, 2170–72 (suggesting possibility of claim construction during examination to lock-in claim scope, weakening or eliminating the presumption of validity, and imposing penalties on owners of invalid patents).

219. See Chiang, *supra* note 9, at 561 (accepting the need for claim amendments to address inadvertent mistakes too costly to avoid and not resulting from strategic behavior).

220. See Lemley & Moore, *supra* note 84, at 65.

221. Yelderman, *supra* note 9, at 96.

222. See *AquaTex Indus., Inc. v. Techniche Sols.*, 479 F.3d 1320, 1326 (Fed. Cir. 2007).

223. See W. Keith Robinson, *Protecting American Innovators by Combating the Decline of Patents Granted to Small Entities*, 88 ST. JOHN'S L. REV. 379, 393–95 (2014) (describing the problems of cost and delay that small entities experience in the patent system).

phisticated and have fewer resources to take advantage of other opportunities for protecting their legitimate claim scope, such as filing multiple claims of varying scope and wording or using continuations and reissuance.²²⁴ Thus, any move towards restricting claim amendments should be mindful of these distributive effects that might necessitate exceptions or accommodations for smaller entities and individual inventors, similar to the already-existing small entity application and examination fees.

The conclusion to properly draw from this Section is that the justifications for claim amendments during examination are more disputable and complex than their historical pedigree and widespread acceptance would suggest. Rather than being a necessary or crucial part of patent examination, claim amendments reflect a trade-off between ensuring adequate protection for inventors' legitimate claim scope (and therefore innovation incentives) and ensuring adequate patent quality to protect competitors, follow-on innovators, and the public. The proper approach to claim amendments thus depends on underlying normative views about how to strike the "careful balance between the need to promote innovation and the recognition that imitation and refinement through imitation are both necessary to invention itself and the very lifeblood of a competitive economy."²²⁵ Section V.A returns to this question.

IV. EVALUATING POST-ISSUANCE CLAIM AMENDMENTS

Moving beyond examination claim amendments, this Section evaluates claim amendments allowed after patent issuance. Post-issuance amendments have been the subject of significant debate recently, but the debate over amendments in AIA invalidity proceedings has focused largely on questions of statutory interpretation and administrative deference.²²⁶ Other considerations of post-issuance amendments have focused narrowly on continuation applications,²²⁷ without considering the other tools for amending claims of issued patents. Once again, this Section returns to first principles and evaluates the costs and benefits of post-issuance amendments, making distinctions as necessary between the dif-

224. *See id.* at 407.

225. *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 146 (1989).

226. *See, e.g., Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1290–91 (Fed. Cir. 2017) (en banc) (splitting the en banc Federal Circuit into two separate majorities reached in five separate opinions joined by overlapping judges, often only partially); *compare, e.g., PhRMA Aqua Br.*, *supra* note 14, at 15 ("Rejecting the PTO's burden-swapping position would dramatically increase the rate of amendment and provide the protection to patent owners that Congress intended."), *with, e.g., Askeladden Aqua Br.*, *supra* note 15, at 6 ("Overturning the Patent Office regulation so that the patent owner no longer has to establish that substitute claims are patentable would subvert the purposes that *inter partes* review was designed to serve.").

227. *See, e.g., Moore & Lemley*, *supra* note 84.

ferent tools of reissuance, continuations, and post-issuance invalidity proceedings.

A. The Trade-Off Between Innovation Incentives and Monopoly Costs

At first glance, post-issuance amendments present a trade-off between innovation incentives and monopoly costs similar to examination amendments. Post-issuance amendments may enhance incentives to innovate by ensuring that the patentee receives protection even if the original claim is struck down as overbroad or is insufficient to fully protect the invention. But doing so necessarily imposes the monopoly costs of reduced competition and follow-on innovation. If amendments merely allow the patent owner to retain or obtain its legitimate claim scope, these monopoly costs are better attributed to patent protection itself, rather than to amendments.²²⁸ On closer inspection, however, the effects of post-issuance amendments may diverge from those of examination amendments because of the context in which post-issuance amendments arise.

First, timing effects may reduce the need for post-issuance amendments to preserve the patent owner's innovation incentives. Because post-issuance amendments necessarily occur after the patent owner has obtained patent protection, the patent owner will have had at least some period of exclusivity to recoup its research and development costs through monopoly pricing, at least in theory.²²⁹ Therefore, post-issuance amendments are more necessary to protect innovation incentives when they occur closer in time to patent issuance — before the patent owner has had significant opportunity to recoup its research and development costs — than when they occur further in time from patent issuance. Moreover, post-issuance amendments are more necessary to protect innovation incentives in fields and industries where there is a larger gap between patent issuance and commercialization that reduces the patent owner's opportunity to recoup research and development costs before the need for amendment arises. For example, there is less justification for post-issuance amendments in information technology, where commer-

228. See *supra* Section III.A.

229. See Sawicki, *supra* note 138, at 761 (noting that invalidity decisions later in a patent's life means that "the inventor will have had at least some period of exclusivity in which to appropriate returns"). This opportunity may be illusory to the extent there is not an active practice of ex ante technology transfer in an industry and a patent owner can only obtain its "reward" through litigation in which the scope and validity of the claim can be challenged.

cialization often occurs before patent issuance and the invention becomes outdated early in the patent term.²³⁰

The later timing of post-issuance amendments, compared to examination amendments, also provides greater opportunities for the patent owner to use other tools to protect its legitimate claim scope. Beyond the tools discussed in the context of examination amendments,²³¹ the patent owner already had the chance in examination to claim, face a rejection or make subsequent realizations about the full scope of the invention, and amend its claim (assuming the opportunity for examination amendments remains constant). Moreover, the multiple avenues for post-issuance amendments may be unnecessarily duplicative for protecting patent owners' legitimate claim scope. For example, if overbroad claims were issued that subsequently pose invalidity problems, the patent owner can narrow them via a reissuance proceeding or continuation application.²³² And if the patent owner originally sought claims that were too narrow to protect its legitimate invention, it can broaden its claims through reissuance (within two years of issuance) or by filing a continuation application.²³³ Thus, these tools for post-issuance adjustment of claim scope undermine the justifications for amendments in post-issuance validity proceedings (and vice-versa).

On the other hand, a liberal opportunity to amend post-issuance may be warranted by the greater risk to a patent owner's legitimate claim scope in that context. Post-issuance validity or scope concerns normally arise in the context of litigation against a highly motivated, and often well-financed, adversary.²³⁴ "Even if the patentee is not being deliberately ambiguous," litigators representing the accused infringer are paid to "create, identify, and exploit ambiguities in language" to allow them to assert invalidity or non-infringement.²³⁵ And litigators will often be able to create, identify, and exploit ambiguities and vagueness in claim language, whether because of the inherent imprecision of language, the difficulties of converting complex, technical ideas into legal shorthand, or the patentee's incentives to use vague or ambiguous claim language.²³⁶

230. See Benjamin N. Roin, *The Case for Tailoring Patent Awards Based on Time-to-Market*, 61 UCLA L. REV. 672, 719 (2014) (showing that software products have an average time-to-market of 5–14 months compared to 12–16 years for pharmaceuticals).

231. See *supra* Section III.C.

232. See *supra* Section II.C.1.

233. See *supra* Section II.C.1–2.

234. See, e.g., Saurabh Vishnubhakat et al., *Strategic Decision Making in Dual PTAB and District Court Proceedings*, 31 BERKELEY TECH. L.J. 45, 49 (2016) (finding that 70% of *inter partes* review invalidity challenges involved parallel district court litigation).

235. Burk & Lemley, *Fence Posts*, *supra* note 38, at 1752–53.

236. Greg Reilly, *Judicial Capacities and Patent Claim Construction: An Ordinary Reader Standard*, 20 MICH. TELECOMM. & TECH. L. REV. 243, 256 (2014).

Thus, accused infringers post-issuance can exploit the inherent malleability of patent claims to limit “the scope and strength of a patent, even if the teachings of the patent reflect an important advancement in the art.”²³⁷ By contrast, the examiner in *ex parte* patent examination is independent, lacking the accused infringer’s incentives to manipulate or exploit the ambiguity of claim language, and has incentives to give fair (or even permissive) treatment to the patentee’s invention and claims.²³⁸ Post-issuance claim amendments therefore offer a unique benefit not present in examination to close loopholes or clarify ambiguities in claim language that are being exploited by self-interested accused infringers.

In sum, to protect inventors’ innovation and disclosure incentives, post-issuance amendments may be less important than examination amendments because of: (1) the period of exclusivity that the patent owner will have already had to recoup its research and development costs, and (2) the additional opportunities it already had to protect its legitimate claim scope. But this possibility should not be overstated. The extent to which the patentee has been able to recoup its investment will vary with the circumstances. And the other tools to protect legitimate claim scope may be insufficient protection against a motivated accused infringer exploiting the inherent malleability of patent claims.

B. Public Notice and Reliance Interests

The most common concern with post-issuance claim amendments is that they undermine public notice and interfere with the reasonable reliance interests of competitors and the public.²³⁹ A competitor that relied on the original claim language in making design and investment decisions may find that its product falls within the scope of a broadened amended claim and that it now infringes the patent.²⁴⁰ Likewise, a competitor that relied on the original claim language to determine that it was free to operate in the space because the claim was likely invalid may face a narrower amended claim that still covers its product but now is legally effective.²⁴¹

The competitor faces a choice of two socially-undesirable options: (1) abandon or redesign the product, thereby incurring losses it would not have incurred if it had known of the post-amendment claim language

237. Jason Rantanen, *How Malleability Matters*, 6 IP THEORY 1, 3 (2016).

238. See Greg Reilly, *Decoupling Patent Law*, 97 B.U. L. REV. 551, 560 (2017) (describing factors that may bias patent examiners in favor of the patentee).

239. See Chiang, *supra* note 9, at 529–30.

240. *Id.*

241. See *id.* at 550–51.

ex ante and could have designed or invested differently;²⁴² or (2) pay the patentee a licensing fee that reflects not only the actual value of the claimed invention, but also the costs already incurred in reliance on the original claim language.²⁴³ Perhaps it is unreasonable for competitors and the public to rely on the originally issued claims in making investments, given that they know (or should know) about the possibility of post-issuance claim amendments. But if competitors cannot reasonably rely on original claim language, the result is uncertainty, causing the stifling of legitimate, socially-desirable conduct: competition and follow-on innovation.²⁴⁴

However, reliance interests do not only run one way. Many patent owners, at least those that commercialize their invention, may have incurred costs in reliance on patent protection, beyond the costs of research and development discussed above: patenting costs, market testing, design and manufacturing costs for commercial embodiments of the patented invention, distribution costs, marketing costs, etc.²⁴⁵ These costs may have been incurred in reliance on the expected returns from the exclusivity provided by the patent.²⁴⁶ When a patent claim is entirely invalidated or rendered worthless in light of subsequent developments because of its unduly limited claim scope, the patent owner suffers losses that it could have avoided if it had known *ex ante* that it would not have the exclusivity benefits provided by patent protection.²⁴⁷ Post-issuance claim amendments help preserve the patentee's settled expectations and reliance interests in the issued patent by "providing a meaningful oppor-

242. See Harry Surden, *Efficient Uncertainty in Patent Interpretation*, 68 WASH. & LEE L. REV. 1737, 1752 (2011) (noting that uncertainty of claim scope undermines efforts to "reduc[e] risk by reorienting production activities, or attempting to 'invent around' a particular claim by creating products that do not infringe").

243. See Chiang, *supra* note 9, at 534 (recognizing this problem in the context of continuation applications).

244. See *id.* at 553 ("If the patentee is permitted to amend [its] claim . . . then the competitor who relied on the patent claim will be made to bear the loss by paying royalties, reducing competitor incentive to rely on claims and create noninfringing designs.").

245. See Ted Sichelman, *Commercializing Patents*, 62 STAN. L. REV. 341, 343 (2010) ("[T]he inventor must undertake costly and risky development and testing to transform the invention into a commercially viable product."); *id.* at 352 ("Often, the capital required for the market testing and product commercialization phase is tremendous.").

246. See Michael J. Burstein, *Rules for Patents*, 52 WM. & MARY L. REV. 1747, 1781 (2011) ("[I]nventors and entrepreneurs will make investment decisions in reliance upon [the] settled expectations" created by issued patent rights.); Transcript of Oral Argument, at 54:2–11, *Oil States Energy Servs., LLC v. Greene's Energy Group, LLC*, 138 S. Ct. 1365 (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").

247. See *PhRMA Aqua Br.*, *supra* note 14, at 17–18 ("Scrapping patent claims wholesale . . . squanders the financial and intellectual capital the inventive community devotes to new discoveries.").

tunity to address prior art [or competitor developments] and preserve claims to the extent possible.”²⁴⁸

The relative weight of these competing reliance interests will vary based on the circumstances. Concerns about interference with competitor reliance interests may be overstated for two reasons. First, competitors may not actually rely on original claim language, with evidence suggesting that companies tend not to search for, read, or evaluate patents before making business decisions, at least in some industries.²⁴⁹ Second, even when there is reliance on the original claim language, competitors are protected to some extent by intervening rights, which allow them to continue selling and using products they made, purchased, or imported before the post-issuance amendments, and potentially (at the court’s discretion) allow them to continue engaging in activities undertaken, or for which there was substantial preparation, before amendment.²⁵⁰ To be fair, intervening rights do not apply to amendments made via continuation applications.²⁵¹ Even where applicable, courts sparingly allow intervening rights and limit them to the extent necessary to recover direct expenditures, often leaving competitors’ long-term investments and lost alternative business opportunities unrecouped.²⁵²

Patent owners’ reliance interests will also vary with the circumstances. Patent owners that engage in significant commercialization activities are likely to have greater reliance interests than those that do not,²⁵³ and different patent owners will have different abilities to protect their market positions even without patent rights. Moreover, patent owners have other tools for hedging against the risk of outright invalidation and the period of exclusivity that will exist before the need for post-issuance amendments arises. These tools may offer similar protections for patent owners’ reliance interests as they do for patent owners’ innovation incentives.²⁵⁴

248. *Id.* at 17.

249. Mark A. Lemley, *Ignoring Patents*, 2008 MICH. ST. L. REV. 19, 21–22. *But see id.* at 29 (suggesting patents are not ignored in the pharmaceutical industry); Lisa Larrimore Ouellette, *Do Patents Disclose Useful Information?*, 25 HARV. J.L. & TECH. 545, 548 (2012) (finding that 64% of nanotechnology researchers have read patents).

250. *See supra* Section II.C.1; *see also* Meurer & Nard, *supra* note 39, at 1995 (noting that intervening rights “mitigate[] potential problems related to notice” to competitors).

251. 35 U.S.C. § 252 (2012).

252. *See* Chiang, *supra* note 9, at 570; *supra* Section II.C.1.

253. *See* BRIAN T. YEH, CONG. RESEARCH SERV., R42668, AN OVERVIEW OF THE “PATENT TROLLS” DEBATE 8 (2013) (noting that patent holders that do not commercialize “may create disincentives for firms to invest in the rest of the process to turn inventions into products and bring them to market”).

254. *See supra* Section IV.A.

C. Administrative Costs and Complications

Post-issuance claim amendments introduce additional layers of administrative costs and complications. Most obviously, the Patent Office must expend time and effort on a second round of examination to ensure that the amended claims comply with the statutory requirements, time and effort that could otherwise be spent on examining original patent applications or evaluating originally issued claims in post-issuance review proceeding. In theory, the Patent Office could recoup some of these costs by charging additional fees for amendments in post-issuance proceedings, but it currently only does so for reissuance and continuation applications.²⁵⁵

Claim amendments in post-issuance invalidity proceedings, like *inter partes* review, impose additional costs not found in reissuance or continuation proceedings. They can increase the cost, scope, complexity, and time of post-issuance invalidity proceedings and delay any parallel litigation that is stayed pending the outcome of the post-issuance proceeding.²⁵⁶ Relatedly, claim amendments generate greater uncertainty of outcomes for post-issuance review proceedings and accompanying litigation, as the potential outcomes now include *valid but changed*, in addition to *valid* or *invalid*.²⁵⁷ This increases the difficulty of making rational settlement decisions that reflect the expected value of post-issuance review and litigation, as well as general business planning.

Moreover, an amended claim must be examined for compliance with all of the statutory requirements of patentability, including eligible subject matter, novelty and non-obviousness over the prior art, and adequate disclosure. This creates administrative complications for post-issuance invalidity proceedings like reexamination and *inter partes* review, which are limited to the novelty and non-obviousness of the invention in light of printed publications.²⁵⁸ These administrative complications are surmountable in reexamination which is conducted by patent examiners in the same way as initial examination.²⁵⁹ But amendments raise a host of difficult questions in *inter partes* review, where the decision makers are Administrative Patent Judges, only a minority of whom have examina-

255. See USPTO, *Patent Fees*, *supra* note 166.

256. See *Askeladden Aqua Br.*, *supra* note 15, at 14 (noting that with amendments “the patent owner could, at the expense of the petitioner, engage the Board in a prolonged back-and-forth to successively amend the claims that avoid the prior art of record”).

257. *Id.* at 16 (“[P]etitioners would face uncertainty about the possibility that new unknown substitute claims will survive *inter partes* review and about the possible scope of such claims.”).

258. 35 U.S.C. §§ 302, 311(b) (2012).

259. *Id.* § 305.

tion experience, and the process is adversarial and adjudicative.²⁶⁰ Having the Administrative Patent Judges evaluate the patentability of amended claims is problematic because they are not trained examiners and therefore may not be familiar with conducting prior art searches.²⁶¹ The Administrative Patent Judges could refer the amendments to patent examiners for review, but it is unclear whether the statute permits this.²⁶²

However, the additional administrative costs of post-issuance amendments may be a feature, not a bug. Only a tiny fraction of issued patents are litigated, licensed, or otherwise become relevant.²⁶³ Therefore, it might be rational (at least as a matter of administrative costs and putting aside for now the potential negative effects on reliance interests) to only expend a moderate amount of resources in initial examination to get a rough approximation of claim scope.²⁶⁴ It would then be more practical to expend additional resources on post-issuance review proceedings and amendments to get the “correct” claim scope for those patents that do become relevant.²⁶⁵

D. Drafting Incentives, Enforcement Incentives, and Strategic Behavior

A primary concern with post-issuance claim amendments is that a patent owner could purposefully modify a claim to cover a competitor’s product developed subsequent to the patent owner’s filing and not originally contemplated by the patent owner.²⁶⁶ This undermines opportunities and incentives for legitimate competition, design-around, and follow-on innovation.²⁶⁷ The amended claim must be supported by the original specification, but a patent owner will often be able to find a hook for the modified claims in the dense, often-broadly framed, and

260. See Jennifer R. Bush, *Administrative Patent Judges: Not Your Typical Federal Judge* 1, FENWICK & WEST LLP (July 10, 2014), https://www.fenwick.com/FenwickDocuments/Administrative_Patent_Judges.pdf [<https://perma.cc/RU3Q-ZLD6>].

261. Askeladden *Aqua Br.*, *supra* note 15, at 14 (noting that the PTAB “is ill-equipped to examine new claims” because it does not normally “search for prior art” or “reject claims”).

262. See STRONGER Patents Act of 2017, S. 1390, 115th Cong. § 316A(c)(3) (as introduced June 21, 2017) (proposing amendments to AIA to allow the PTAB to “order an expedited patentability report from a patent examiner on a substitute claim”); Ryan Davis, *Questions Surround Idea For PTAB Amendment ‘Off-Ramp’*, LAW360 (July 24, 2017), <https://www.law360.com/articles/946351> (last visited Dec. 20, 2018) (noting that proposal for sending amendments from the PTAB to patent examiners would likely require new legislation).

263. See Lemley, *supra* note 168, at 1497.

264. See *id.* (“[I]t is much cheaper for society to make detailed validity determinations in those few cases than to invest additional resources examining patents that will never be heard from again.”).

265. See *id.*

266. See Lemley & Moore, *supra* note 84, at 76 (discussing this problem in the context of continuation applications).

267. *Id.* at 78–79.

frequently ambiguous description of the invention.²⁶⁸ This risk is most acute in the limited situations in which post-issuance broadening amendments are allowed.²⁶⁹ But even non-broadening amendments could clarify ambiguous claim language in a way that makes it more clearly applicable to a competitor's product or tailor overbroad claim language to avoid invalidating prior art while still covering the competitor's product.²⁷⁰

Post-issuance amendments, especially the most common narrowing amendments, also further incentivize patent owners to originally draft low-quality, vague and/or overbroad claims, and to amend claims in examination to be the broadest or vaguest that the examiner will allow. If the examiner fails to reject these claims during examination but an accused infringer mounts a successful invalidity challenge post-issuance, post-issuance amendments allow the patent owner to narrow the claims and retain the amount of patent protection that it was entitled to in the first place.²⁷¹

Beyond negative drafting incentives, post-issuance claim amendments also create incentives for strategic and undesirable behavior in patent enforcement. They provide patent owners greater ability and incentive to assert low-quality patents with overbroad and/or vague claims to obtain cost-motivated settlements. The patent owner will often be able to narrow the claim in a post-issuance proceeding in a way that still allows a viable infringement claim,²⁷² requiring the accused infringer to incur the full costs of litigation to fully invalidate the claim. Accused infringers also will have less incentive to challenge weak patents in post-issuance invalidity proceedings if the patent owner can amend the claim to still assert infringement while avoiding invalidation.²⁷³ When competitors initiate such proceedings, but the claims are amended to exclude the competitor's product, the competitor may not have an incentive to challenge the amended claims, which increases the chances that potentially unwarranted amended claims will survive the post-issuance proceeding.²⁷⁴

268. See Jeffrey D. Sullivan & David Loretto, *Symbol Technologies v. Lemelson, Prosecution Laches, and the Still-Unmet Challenges of Junking "Junk Patents"*, 33 AIPLA Q.J. 285, 302, 308 (2005) (suggesting that the disclosure doctrines of written description and enablement are insufficient to prevent claim amendments that capture developments of others because of "opaque" and "broad but vague or obscure disclosure[s]").

269. See *supra* Section II.C.1–2.

270. See *Cordis Corp. v. Medtronic AVE, Inc.*, 511 F.3d 1157, 1185 (Fed. Cir. 2008) (finding that claim added to cover competitor's product "does not broaden the scope of coverage").

271. See En Banc Brief of the Internet Ass'n et al. as Amici Curiae in Support of Intervenor at 15–16, *In re Aqua Prods., Inc.*, No. IPR2013-00159 (P.T.A.B. Aug. 22, 2014) [hereinafter *Internet Ass'n Aqua Br.*].

272. See *Askeladden Aqua Br.*, *supra* note 15, at 18.

273. See *id.* at 16.

274. See *Internet Ass'n Aqua Br.*, *supra* note 271, at 16–17.

The negative incentives, however, run both ways. A patent owner asserting its patent today faces a reasonable probability that the accused infringer will initiate a post-issuance invalidity proceeding. The burden of proof in such proceedings is only a preponderance of the evidence, and the Patent Office applies a “broadest reasonable construction” standard that is more likely to implicate prior art and therefore invalidate the patent.²⁷⁵ Without the ability to amend its claim in these proceedings, the patent owner may lose effective patent protection altogether, a risk that could discourage assertion of even meritorious patent claims. However, such assertion should be encouraged because “[a] patentee’s assertion of reasonable claims of infringement is the mechanism whereby patent systems provide an innovation incentive.”²⁷⁶

Relatedly, prohibiting or restricting post-issuance claim amendments increases the incentives for competitors to ignore even meritorious patent assertions, challenge even strong patent rights, and exploit the inherent uncertainties of patent claims, rather than giving claims fair readings. If the patent owner sues, the competitor can initiate relatively cheap post-issuance invalidity proceedings, benefit from the more favorable burden of proof and claim construction standards, and avoid any risk that the patent owner could better tailor its claims. These negative incentives from restricting claim amendments would undermine the value patent owners can expect from patent protection and therefore also undermine their incentives to innovate.

E. Weighing the Costs and Benefits of Post-Issuance Claim Amendments

Post-issuance claim amendments look problematic on first glance. They undermine public notice and pose a threat to competitors who have relied on the original claim language in making investment and business decisions.²⁷⁷ They protect patent owners who draft overbroad and vague original claims or assert weak patents against competitors and may even allow patent owners to lay in wait and strategically amend claims to capture competitors’ independently-developed products.²⁷⁸ And they impose the additional costs required to engage in a second round of examination.²⁷⁹ All of these costs come with questionable benefits, as patent owners already will have had a period of exclusivity to recover their research and development costs and plenty of other opportunities to protect

275. *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–45 (2016).

276. *Checkpoint Sys., Inc. v. All-Tag Security S.A.*, 858 F.3d 1371, 1375 (Fed. Cir. 2017).

277. *See supra* Section IV.B.

278. *See supra* Section IV.D.

279. *See supra* Section IV.C.

their legitimate claim scope as a hedge against invalidation.²⁸⁰ For example, it is unclear that patent owners need amendments in post-issuance invalidity proceedings to protect their legitimate claim scope when reissuance allows them to mitigate the inherent problems with translating inventions into words and account for unforeseen developments.²⁸¹ Unsurprisingly, perhaps, many commentators treat post-issuance amendments with deep skepticism even as they embrace examination amendments as clearly warranted.²⁸²

But this differential reaction overstates the costs of post-issuance amendments and underestimates the benefits. Patent owners have their own reliance interests in making investment and business decisions that will be disturbed if they lose effective patent protection altogether.²⁸³ These reliance interests might actually be stronger than those of competitors, since competitors often have the benefits of intervening rights and may not be reading original claims or engaging in patent clearance, at least in some industries.²⁸⁴ Eliminating post-issuance amendments would give competitors less incentive to license or settle even in the face of a strong patent assertion and greater incentive to try to manufacture some defect in the original claims.²⁸⁵ In light of these negative incentives for competitors, post-issuance amendments may be necessary to protect inventor incentives, especially in industries with a prolonged time from invention to commercialization.²⁸⁶ And using post-issuance amendments to achieve the proper calibration of patent protection may be a wise allocation of resources as compared to investing more in making this precise determination during examination.²⁸⁷

Professor Chiang suggests that we should have less concern for the costs to patent owners than to competitors and the public in this context because patent owners draft the original claims and are therefore the “lowest cost avoiders” when an original claim does not accurately reflect their legitimately protectable subject matter.²⁸⁸ Professor Chiang’s conclusion largely rests on his assumption, disputed above,²⁸⁹ that the patent system has no interest in allowing a patent owner to capture develop-

280. See *supra* Section IV.A.

281. See *Internet Ass’n Aqua Br.*, *supra* note 271, at 23–24 (“[T]he reissue process obviates any need for patent owners to rely on a motion to amend in *inter partes* review to save their patents.” (italics added)).

282. See, e.g., Chiang, *supra* note 9, at 526 (arguing for abolishing post-issuance claim amendments while arguing that pre-issuance “amending claims to fix mistakes is useful”).

283. See *supra* Section IV.B.

284. See *supra* Section IV.B.

285. See *supra* Section IV.D.

286. See *supra* Section IV.A.

287. See *supra* Section IV.C.

288. Chiang, *supra* note 9, at 554.

289. See *supra* Section III.A.

ments unforeseen at the time of filing. To him, claim amendments are only needed due to the patent owner's negligent or strategic drafting that could be avoided with greater care or less self-interested behavior, other than a small number of "unavoidable mistakes," where avoiding draft mistakes would be too costly.²⁹⁰ Professor Chiang unduly discounts the inherent problems of translating a technical innovation into legal words²⁹¹ and the ability of self-interested accused infringers (and their skilled litigators) to manufacture ambiguity and shortcomings in even well-written claims.²⁹²

But even if he did credit these problems, Professor Chiang would still conclude that between two faultless parties, the risk of loss should remain where it lies (with the patent owner) absent a compelling justification.²⁹³ However, where to apportion loss between two faultless parties is a policy choice properly entrusted to the legislature. One could imagine a rational Congress concluding that a "compelling justification" exists to permit post-issuance amendments (and therefore shift the risk of loss to accused infringers) because of the importance of patent protection in promoting innovation and the importance of innovation to economic well-being. The next Section takes up these issues.

Ultimately, there is no strong reason to differentiate between examination and post-issuance amendments in evaluating their social optimality. At most, the cost and benefits of post-issuance proceedings are different in degree, not different in kind, from examination amendments. As with examination amendments, the optimality of post-issuance amendments comes down to the trade-off between protecting patent owner incentives to innovate by maximizing patent owners' opportunities to recoup their investments and protecting competition and follow-on innovation by maximizing protections for competitor reliance interests and incentives for good patent quality.

V. THE POLICY OF CLAIM AMENDMENTS

Most evaluations of the patent system tend to reach a strong normative conclusion that one approach or another is clearly optimal, often based on the author's priors about the proper role of patent protection in the modern economy.²⁹⁴ In comparison, it may seem unsatisfying to conclude that the proper approach to claim amendments is ambiguous and

290. Chiang, *supra* note 9, at 554–59.

291. *See supra* Section II.A.

292. *See supra* Section IV.A.

293. Chiang, *supra* note 9, at 558–59.

294. *See* Sichelman, *supra* note 16, at 49; *see also* Ouellette, *Cultural Cognition*, *supra* note 16, at 28–32 (connecting the strong views and hard conclusions often reached by patent commentators to confirmation bias).

reasonably could be resolved either in favor of a liberal approach to amendments or a more restrictive approach depending on one's feeling about the basic trade-off between incentivizing innovation and protecting competition.²⁹⁵

Yet, this conclusion offers important insights. First, it supports the role of claim amendments as a promising, if underutilized, "policy lever" for Congress to adjust and calibrate the patent system's trade-off between innovation incentives and competition. Second, it indicates that the PTAB should not adopt a claim amendment policy for post-issuance invalidity proceedings that is significantly more restrictive than traditional approaches without clearer direction from Congress. Third, and most importantly, the ambiguity in the optimality of claim amendments suggests that adopting a uniform claim amendment policy is futile and likely to generate significant errors regardless of its content. Rather, individualized, case-by-case determinations of whether particular claims amendments are warranted are preferable, at least in post-issuance invalidity proceedings where such determinations are feasible.

A. Examination Claim Amendments as a Policy Lever

The justifications for permitting claim amendments during original patent examination are at least somewhat ambiguous and perhaps significantly so.²⁹⁶ Surprisingly, however, claim amendments have been widely assumed to be desirable and liberally available in examination as a statutory right of the patent owner since the 19th century.²⁹⁷ This section explores the consequences of this significant disconnect between actual historical practice and the theoretical justifications for that practice.

1. The Relevance of the Long-Standing Liberal Approach to Examination Amendments

The well-established practice of liberal examination claim amendments may point to the proper resolution of their theoretical ambiguity. The Supreme Court has recognized that in intellectual property law, like other areas of law, "a page of history is worth a volume of logic."²⁹⁸ The theoretical uncertainty has been repeatedly resolved in favor of liberal examination amendments by both Congress and the Patent Office. When Congress has consistently "continued [a] policy through many years,"

295. See *supra* Sections III.D, IV.E.

296. See *supra* Part II.

297. See *supra* Section II.B.

298. *Eldred v. United States*, 537 U.S. 186, 200 (2003) (quotations omitted) (addressing copyright).

one can “assume that experience has demonstrated its wisdom and beneficial effect upon the arts and sciences.”²⁹⁹

Strong reasons reasonably could be required to depart from such a long-standing, consistent practice of examination claim amendments. Indeed, the Supreme Court has emphasized the need to “be cautious before adopting changes that disrupt the settled expectations of the inventing community.”³⁰⁰ Even restricting or eliminating claim amendments prospectively could undermine these expectations, given the sometimes significant lag time between activities undertaken in reliance on a certain level of patent protection (research and development, investing in a certain industry, creating the infrastructure for commercialization, etc.) and the filing of a patent application. Entire technologies, industries, or business models may have developed based on a general expectation of a certain level of patent protection.³⁰¹

But this does not mean that the policy of liberal claim amendments must, or even should, be maintained. Long-standing practice, settled expectations, and reliance interests are relevant considerations but are not dispositive if outweighed by other considerations. Regardless of “the lengthy history” of a patent law doctrine or practice, “Congress can legislate [it] out of existence any time it chooses,” with the wisdom of doing so a policy question within Congress’s discretion.³⁰² Specifically, the task of weighing reliance interests and settled expectations that have developed based on a well-established practice against other considerations suggesting the need for change is entrusted to Congress, which has “the constitutional authority and the institutional ability to accommodate fully the varied permutations of competing interests that are inevitably implicated.”³⁰³

In sum, the fact that examination amendments have been liberally allowed since 1836 counsels that Congress should act cautiously in restricting or eliminating such amendments and should only do so in light of strong countervailing factors. However, historical practice does not bind Congress to a liberal examination claim amendment policy.

299. *Cont’l Paper Bag Co. v. E. Paper Bag Co.*, 210 U.S. 405, 429–30 (1908).

300. *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 739 (2002).

301. *See Ass’n for Molecular Pathology v. USPTO*, 689 F.3d 1303, 1347 (Fed. Cir. 2012) (Moore, J., concurring in part) (“This long-term policy of protecting isolated DNA molecules has resulted in an explosion of innovation in the biotechnology industry, an industry which, unlike the financial services industry or even the software industry, depends on patents to survive.”), *rev’d sub nom. Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013).

302. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 28 (1997) (addressing doctrine of equivalents).

303. *See Ass’n for Molecular Pathology*, 689 F.3d at 1344–47 (Moore, J., concurring in part).

2. Claim Amendments as a Tool for Addressing Patent Quality Concerns

This Article does not provide a definitive answer as to how, if at all, Congress should use its discretion with regard to examination claim amendments. With the ambiguity in the justifications for examination amendments, the policy choice comes down to where the risk of error should lie. A liberal amendment policy creates the risk of overprotecting innovation incentives at the expense of competition and follow-on innovation, whereas a restrictive amendment policy creates the opposite risk. This question implicates underlying views about the importance of patent protection in innovation, the proper scope of patent protection to balance innovation and competition, and the current state of patent protection in the United States. The patent community is largely divided into two polarized camps on these questions.³⁰⁴ In truth, the best conclusion today is probably the same as that reached by two leading economists in the 1950s: “[i]f national patent laws did not exist, it would be difficult to make a conclusive case for introducing them; but the fact that they do exist shifts the burden of proof and it is equally difficult to make a really conclusive case for abolishing them.”³⁰⁵

With that said, the weighing of the costs and benefits of examination amendments suggests that they are not as defensible as their historical pedigree and widespread acceptance would suggest. Restricting, or even eliminating, claim amendments may not have the negative consequences that many assume³⁰⁶ and might actually have beneficial effects, though, again, the empirical evidence is lacking to make any definite judgment in this regard. As a result, examination claim amendment policy is a reasonable tool for Congress to use to adjust the basic trade-offs between innovation incentives and competition that lie at the heart of the patent system. If there were strong enough reasons to think that this balance had tilted too far in favor of initial inventors to overcome the presumption

304. See Ouellette, *Cultural Cognition*, *supra* note 16, at 28–30.

305. Heidi L. Williams, *How Do Patents Affect Research Investments?*, 9 ANNUAL REV. ECON. 441, 442 (2017) (reciting quote); *id.* at 464 (“[W]e still have essentially no credible empirical evidence on the seemingly simple question of whether stronger patent rights — either longer patent terms or broader patent rights — encourage research investments into developing new technologies.”); Ouellette, *Cultural Cognition*, *supra* note 16, at 30 (“I have recently reviewed the evidence on whether patents promote innovation and concluded that it is more ambiguous, and other reviews agree.”).

306. See Michael W. Kirk, *Comments on Proposed Rules: “Changes to Practice for Continuing Applications, Requests for Continued Examination Practice, and Applications Containing Patentably Indistinct Claims”* 71 *Fed. Reg.* 48 (January 3, 2006), AM. INTELLECTUAL PROP. L. ASS’N (Apr. 24, 2006), https://www.uspto.gov/sites/default/files/documents/fpp_continuation_aipla.pdf [<https://perma.cc/CA7R-Y3C5>] (contending that with limits on the ability to amend claims via continuation applications “[i]nventors would be far less able to adequately protect their property”).

that arises from long-standing practice, abandoning the liberal approach to examination amendments in favor of a more restrictive approach would be a proper means of recalibrating this balance. To be clear, restricting claim amendments does not necessarily equate with eliminating them. There are many intermediate steps that would depart from the traditional policy of freely amendable patent claims while preserving a meaningful opportunity to amend, such as imposing or increasing fees on amendments, requiring the applicant to demonstrate a good faith reason why amendment is necessary,³⁰⁷ or allowing amendments to be rejected by the examiner for “undue delay, bad faith or dilatory motive on the part of the [applicant], repeated failure to cure deficiencies by amendments previously allowed, undue prejudice to the opposing party by virtue of allowance of the amendment, [or] futility of amendment.”³⁰⁸

This discussion provides the theoretical justifications for recent proposals to address patent quality problems by imposing burdens on examination claim amendments. Poor patent quality is widely seen as one of the most significant problems in the modern patent system,³⁰⁹ and the liberal approach to examination claim amendments contributes to patent quality problems.³¹⁰ Given this relationship, a few commentators have proposed limits on examination amendments as one reform that could contribute to improved patent quality. For example, Professor Yelderman proposed requiring the applicant to post a bond for each original claim filed that would be returned when the claim issued but forfeited if the claim was cancelled or amended.³¹¹ Similarly, Professor Wagner suggested imposing penalties when claims are amended, such as vigorous application of the doctrine of prosecution history estoppel to prevent or limit proof of infringement by equivalents when claims are amended during prosecution.³¹²

This Article provides the theoretical work that justifies commentators’ reliance on claim amendment policy as a means of addressing the patent quality problem. Because the commentators themselves are focused on patent quality generally, not claim amendments specifically, they focus primarily on the benefits restrictions on claim amendments would offer for patent quality, without purporting to conduct a full anal-

307. *Cf.* *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 741 (2002) (requiring the patentee to “show that at the time of the amendment one skilled in the art could not reasonably be expected to have drafted a claim that would have literally encompassed the alleged equivalent” to overcome prosecution history estoppel).

308. *Cf.* *Foman v. Davis*, 371 U.S. 178, 182 (1962) (adopting this standard for amendments to pleadings under FED. R. CIV. P. 15(a)).

309. Wagner, *supra* note 8, at 2136–38 (noting that “the need to improve patent quality is essentially undisputed”).

310. *See supra* Section III.D.

311. Yelderman, *supra* note 9, at 120–21.

312. Wagner, *supra* note 8, at 2167.

ysis of the optimality of restricting claim amendments.³¹³ If one believes patent quality is as significant a problem as many do — and that restricting claim amendments can help improve it, as is suggested in Section III.D — this provides the type of strong reason for Congress to depart from the long-standing liberal approach to claim amendments and adopt a more restrictive approach.

This is not meant to endorse the proposals of Professors Yelderman or Wagner. The patent quality issue is complex — some have questioned the severity of the problem,³¹⁴ there may be other or more significant causes than applicant drafting incentives,³¹⁵ and it is not clear that either Yelderman's bond proposal or Wagner's vigorous prosecution history estoppel approach is the best way to address applicant incentives or restrict amendments.³¹⁶ The point is more limited. In light of the ambiguity in the justifications for claim amendments and the connection to the basic trade-off at the heart of the patent system, commentators are justified in looking to alterations in claim amendment policy to address significant problems in the patent system, like patent quality.

B. Reconsidering the Debate over Claim Amendments in Post-Issuance Invalidation Proceedings

This Section turns to the insights that this Article offers for the polarized debate that has developed over post-issuance claim amendments in the new AIA post-issuance invalidity proceedings.³¹⁷ It suggests that the Patent Office *could* continue its restrictive approach but that the Patent Office *should* await further direction from Congress.

1. The Polarized Debate over Claim Amendments in AIA Proceedings

The Patent Office's restrictive approach to claim amendments in AIA invalidity proceedings, which made them virtually impossible, sparked considerable opposition and debate, largely focused on narrow questions of statutory interpretation and administrative deference specif-

313. See Yelderman, *supra* note 9, at 120–21 (acknowledging the incentives his proposal may create to prolong debate over claim rejections, but otherwise not discussing other consequences of restricting claim amendments); Wagner, *supra* note 8, at 2167–68 (providing a brief, one paragraph discussion of the costs of his proposed penalties on claim amendments before summarily concluding that the benefits of improved applicant incentives are likely to outweigh these costs).

314. See, e.g., James E. Malackowski & Jonathan A. Barney, *What Is Patent Quality? A Merchant Banc's Perspective*, LES NOUVELLES, June 2008, at 123, 134.

315. See Wagner, *supra* note 8, at 2147–58 (describing multiple causes of low patent quality).

316. See generally Liivak, *Overclaiming is Criminal*, *supra* note 177 (proposing criminal penalties for intentional overclaiming).

317. See *supra* Section II.C.2.

ic to the AIA proceedings.³¹⁸ However, the competing sides on these questions have also taken competing absolutist positions on the wisdom of post-issuance claim amendments more generally. These absolutist positions are currently influencing debates at the administrative and legislative levels, as discussed in the following section.

Proponents of the Patent Office’s restrictive approach contend, for example, that liberally allowing post-issuance amendments “would lead to an increase in the survival of weak patents,”³¹⁹ undermine Congress’s efforts to provide a low-cost means of invalidating low-quality patents,³²⁰ and incentivize abusive litigation that relies on high costs to “extort[]” legitimate competitors and innovators.³²¹ To these stakeholders, a restrictive approach to post-issuance claim amendments is indisputably correct and vital to the proper functioning of the patent system.³²²

Opponents of the Patent Office’s restrictive approach describe “the inability to amend claims” post-issuance as part of the “procedures that have been stacked against patent owners” that undermine “stable and effective property rights for inventors” and the “innovation economy.”³²³ Likewise, they suggest that the absence of amendments post-issuance and lack of an “iterative process” of rejection, response, and amendment are part of a “slanted design” that “cause[s] harm to all patent holders, making it far more difficult for product-producers to get to market.”³²⁴ To these stakeholders, liberally permitting post-issuance proceedings is

318. See, e.g., *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017) (en banc) (splitting the en banc Federal Circuit into two separate majorities reached in five separate opinions joined by overlapping judges, often only partially); compare, e.g., *PhRMA Aqua Br.*, *supra* note 14, at 15 (“Rejecting the PTO’s burden-swapping position would dramatically increase the rate of amendment and provide the protection to patent owners that Congress intended.”), with, e.g., *Askeladden Aqua Br.*, *supra* note 15, at 6 (“Overturning the Patent Office regulation so that the patent owner no longer has to establish that substitute claims are patentable would subvert the purposes that *inter partes* review was designed to serve.”).

319. *Askeladden Aqua Br.*, *supra* note 15, at 6–7, 19–20.

320. *Internet Ass’n Aqua Br.*, *supra* note 271, at 14 (arguing that restricting claim amendments “would . . . frustrate Congress’s goal of ‘improving patent quality’”).

321. *Askeladden Aqua Br.*, *supra* note 15, at 6–7, 19–20.

322. *Id.* at 1–2 (arguing that “[p]ermitting patent owners to sidestep the probable invalidation of a weak patent . . . by substituting new claims” would undermine “the reforms contemplated by the America Invents Act to check patent abuse” and threaten the “health of that [patent] system”).

323. See David Lund, *The STRONGER Patents Act: Important Legislation to Protect Our Innovation Economy*, GEORGE MASON UNIV., ANTONIN SCALIA L. SCH., CTR. FOR THE PROT. OF INTELLECTUAL PROP. (June 21, 2017), <https://cpip.gmu.edu/2017/06/21/the-stronger-patents-act-important-legislation-to-protect-our-innovation-economy/> [<https://perma.cc/22H9-NTEP>].

324. Brief of Gary Lauder et al. as Amici Curiae Supporting Petitioner at 18–20, *Oil States Energy Servs., LLC v. Greene’s Energy Grp., LLC*, 138 S. Ct. 1365 (2018) (No. 16-712).

indisputably correct and vital to the proper functioning of the patent system.³²⁵

2. The Administrative Legitimacy Case Against Unduly Restricting Claim Amendments in Post-Issuance Invalidity Proceedings

Despite striking down the Patent Office’s restrictive approach to claim amendments in AIA post-issuance invalidity proceedings, a majority of the en banc Federal Circuit found the AIA ambiguous as to the proper procedure for claim amendments in such proceedings³²⁶ and held that “[s]hould the Patent Office present a fully considered interpretation of the governing statute and properly promulgate such a rule through APA compliant rulemaking, *Chevron* deference would be on the table.”³²⁷ Under the *Chevron* framework, because the AIA is ambiguous in relevant part, courts would have to “defer at [*Chevron*] step two to the agency’s interpretation so long as the construction is a reasonable policy choice for the agency to make.”³²⁸ For the time being, the PTAB has chosen not to re-promulgate its restrictive approach to post-issuance claim amendments in AIA proceedings.³²⁹ However, given the ambiguity in the justifications for post-issuance amendments, the Patent Office could adopt the traditionally liberal approach to amendments in examination *or* re-promulgate a restrictive approach pursuant to the proper procedures under *Chevron* and *either* would be a reasonable policy choice entitled to deference under *Chevron*.

That the Patent Office *could* readopt a restrictive approach and receive deference does not mean that it *should* do so. *Chevron* deference determines the relative power of courts and agencies to fill a statutory gap.³³⁰ But it does not tell us how the Patent Office should, in the first instance, use the power *Chevron* grants it to resolve the statutory ambiguity regarding claim amendments in AIA post-issuance invalidity proceedings. Resolving that question implicates the basic theory of

325. See Lund, *supra* note 323 (arguing that by liberalizing amendments and other reforms PTAB “proceedings will move closer to a fair fight to truly examine patent validity” and “protect our innovation economy by restoring stable and effective property rights for inventors”).

326. See *Aqua Prods. v. Matal*, 872 F.3d 1290, 1328 (Fed. Cir. 2017) (en banc) (Moore, J., concurring).

327. *Id.* at 1341–42 (Reyna, J., concurring in part).

328. *Nat’l Cable & Telecomms. Ass’n v. Brand X Internet Servs.*, 545 U.S. 967, 986 (2005) (internal quotations omitted); see also *Aqua Prods.*, 872 F.3d at 1343 (Taranto, J., dissenting) (“[T]he patent owner may be assigned the burden of persuasion [by the Patent Office] as long as doing so is reasonable.”).

329. See Ruschke, *supra* note 112.

330. See Abbe R. Gluck & Lisa Schultz Bressman, *Statutory Interpretation from the Inside — An Empirical Study of Congressional Drafting, Delegation, and the Canons: Part I*, 65 STAN. L. REV. 901, 990 (2013) (“*Chevron* has been characterized by many as a counter-*Marbury* principle that allows agencies rather than courts to say what the law is.”).

administrative legitimacy. “The conventional model for understanding this relationship between Congress and the administrative state . . . is to view it in principal-agent terms. In other words, Congress delegates authority to federal agencies, and those agencies are expected to faithfully implement congressional wishes.”³³¹ Thus, in determining how to fill the statutory ambiguity regarding post-issuance claim amendments, the Patent Office should seek to most faithfully implement congressional wishes regarding amendments in AIA proceedings, even if Congress did not directly resolve this question.³³² The text, legislative history, and context of the AIA all suggest that a restrictive approach to post-issuance claim amendments would not be the most faithful implementation of Congress’s desires.

The text of the AIA seems to assume that amendments would be a regular part of the AIA proceedings, as in other Patent Office proceedings, providing that “the patent owner may file [one] motion to amend the patent.”³³³ Although *Aqua Products* found this provision ambiguous, thereby giving the Patent Office power over amendments, a majority of the Federal Circuit seemed to conclude that the best reading of the AIA (though not the only reasonable reading) was contrary to the Patent Office’s restrictive approach to amendments.³³⁴ Likewise, the relevant legislative history, though sparse, indicates that Congress assumed that AIA proceedings would not significantly break with past practices regarding amendments.³³⁵ Thus, the mere ambiguity regarding amendments in the AIA does not mean that every resolution of the amendments issue would be equally faithful to Congress’s wishes.³³⁶

The context in which the post-issuance amendments question arises confirms that a restrictive amendment policy would not be the most

331. Chris Walker, *Daniels on Principal-Agent Theory in Administrative Law (AdLaw Bridge Series)*, 36 YALE J. ON REG.: NOTICE & COMMENT (Jan. 16, 2015), <http://yalejreg.com/nc/daniels-on-principal-agent-theory-in-administrative-law-adlaw-bridge-series-by-chris-walker/> [https://perma.cc/9SAX-CGPK].

332. See Abbe R. Gluck & Lisa Schultz Bressman, *Statutory Interpretation from the Inside — An Empirical Study of Congressional Drafting, Delegation, and the Canons: Part II*, 66 STAN. L. REV. 725, 767–69 (2014) (finding that congressional drafters see themselves in a partnership with agencies and use various tools to shape the way that agencies interpret and implement statutes).

333. 35 U.S.C. § 316(d)(1) (2012).

334. *Aqua Prods. v. Matal*, 872 F.3d 1290, 1324–25 (Fed. Cir. 2017) (O’Malley, J., majority opinion) (reaching this conclusion explicitly on behalf of five judges total and indicating that two other judges agree with the conclusion); *id.* at 1340 (Reyna, J., concurring) (suggesting on behalf of two judges total that the statute is best read as placing a burden of production but not persuasion on the patent owner).

335. *Id.* at 1299 (O’Malley, J., majority opinion) (summarizing legislative history).

336. See Gluck & Bressman, *Part I*, *supra* note 330, at 996 (finding that congressional statute drafters do not “intend to delegate [to agencies] whenever ambiguity remains in finalized statutory language . . . [A]lthough ambiguity sometimes signals intent to delegate, often it does not . . .”).

faithful resolution of the ambiguity in the statutory text (and gaps in the legislative history). In enacting the AIA, Congress was legislating against a nearly two-hundred-year background of liberal allowance of claim amendments — at least for the non-broadening amendments at issue in AIA proceedings — in both initial examination and in the various post-issuance proceedings Congress has from time-to-time created (reissuance, continuation practice, *ex parte* reexamination, and *inter partes* reexamination).³³⁷ This historical precedent does not make amendments a necessary or inherent feature of the patent system. However, absent clear support in the statutory text or legislative history, it is doubtful that a restrictive approach to amendments that would significantly depart from this long-standing practice faithfully reflects congressional wishes.

Nor is there a compelling policy reason to presume that Congress desired to depart from the long-standing liberal approach to claim amendments. As explained above, the costs, benefits, and justifications for post-issuance claim amendments are ambiguous and depend on where to place the risk of error.³³⁸ Moreover, there is widespread agreement that the PTAB has been much more significant and effective at invalidating issued patents than Congress or stakeholders expected when debating and passing the AIA,³³⁹ which is due, in part, to the inability to amend claims.

In the modern administrative state, one could easily imagine Congress entrusting and empowering the Patent Office to resolve the policy ambiguities regarding claim amendments and make the necessary trade-offs between the competing policy interests of preserving inventors' incentives and protecting competition and follow-on innovation.³⁴⁰ But that would be a significant departure from the long-standing structure of the American patent system. The Patent Office is a comparatively weak administrative agency with the comparatively routine task of fact-specific evaluations of specific patent applications (or now issued patents) for compliance with the statutory criteria established by Congress.³⁴¹ Congress has given the Patent Office little role in making policy decisions or developing the substantive legal criteria for patent protection.³⁴²

337. See *supra* Sections II.B–C.

338. See *supra* Part IV.

339. See JOHN R. THOMAS, CONG. RESEARCH SERV., R44905, INTER PARTES REVIEW OF PATENTS: INNOVATION ISSUES I (2017).

340. See Melissa F. Wasserman, *The Changing Guard of Patent Law: Chevron Deference for the PTO*, 54 WM. & MARY L. REV. 1959, 1962 (2013).

341. See Burstein, *supra* note 246, at 1755.

342. *Id.* at 1755, 1757. But see Wasserman, *supra* note 340, at 1965–66 (contending that the AIA changed this traditional role).

The AIA does direct the Patent Office to “prescribe regulations” that “set[] forth standards and procedures for allowing the patent owner to move to amend the patent,”³⁴³ which one might argue demonstrates a congressional desire to leave amendment policy to the Patent Office’s discretion. This would be consistent with the overall effect of the AIA, which was to shift some policy discretion from the courts to the Patent Office.³⁴⁴ However, the best conclusion is probably that the reference to “standards and procedures for allowing the patent owner to move to amend the patent”³⁴⁵ reflected Congress’s desire to give the Patent Office discretion to implement the long-standing liberal policy in the new context of adversarial, trial-like AIA proceedings, not to give the Patent Office complete policy discretion over post-issuance amendments in AIA proceedings.³⁴⁶ This conclusion is most consistent with the historical background of liberal allowance of claim amendments, the traditionally limited institutional role of the Patent Office, the express statutory command that “the patent owner may file [one] motion to amend the patent,”³⁴⁷ and the admittedly limited legislative history.

To be clear, the question this section is addressing is how the Patent Office *should* use the power it has over claim amendments in AIA proceedings in light of the statutory ambiguity found by the Federal Circuit in *Aqua Products*. Consistent with *Aqua Products*, general principles of administrative deference, and the ambiguity in the policy justifications for post-issuance claim amendments, the Patent Office *could* adopt a restrictive approach to amendments. However, to most faithfully serve as Congress’s agent, and therefore maximize administrative legitimacy, the Patent Office should not depart significantly from the long-standing liberal approach to claim amendments unless Congress more clearly indicates that the Patent Office should do so.³⁴⁸ If, consistent with the modern administrative state and the overall effect of the AIA,³⁴⁹ Con-

343. 35 U.S.C. § 316(a)(9) (2012).

344. *Cf.* Wasserman, *supra* note 340, at 1965 (“[T]he AIA rejects over two hundred years of court dominance in patent policy by anointing the PTO as the chief expositor of substantive patent law standards.”).

345. 35 U.S.C. § 316(a)(9).

346. *Cf.* Gluck & Bressman, *supra* note 330, at 1003 (finding that congressional drafters overly intend to delegate implementation questions to agencies but that most drafters do not intend to delegate agencies discretion to decide major policy questions).

347. 35 U.S.C. § 316(d)(1).

348. *Cf.* Gluck & Bressman, *supra* note 330, at 1003 (finding support among congressional drafters for the major questions doctrine, which “supports a presumption of *nondelegation* in the face of statutory ambiguity over major policy questions or questions of major political or economic significance”).

349. *Cf.* Sarah Tran, *Policy Tailors and the Patent Office*, 46 U.C. DAVIS L. REV. 487, 489 (2012) (“For almost eighty years, broad congressional delegations of authority have empowered administrative agencies and other institutions to craft flexible policy measures for their constituents.”).

gress wants to shift complete policy discretion over post-issuance claim amendments to the Patent Office, Congress could expressly delegate this power to the Patent Office by amending the relevant statutory provisions to provide, for example, that “the Patent Office may make rules and regulations to determine whether, on what terms, and pursuant to what procedures an applicant can amend its claims.”

Alternatively, Congress might choose to dictate post-issuance claim amendment policy itself, using it as a means to adjust the basic trade-off of the patent system. In fact, legislation currently pending in Congress, the STRONGER Patents Act, would allow more liberal claim amendments in AIA proceedings, including placing the ultimate burden on the challenger to prove unpatentability of the amended claim.³⁵⁰ The express aim of the legislation is to strengthen the position of patent owners in AIA post-issuance proceedings³⁵¹ motivated by concerns that the PTAB has unduly tilted the balance against patent owners in a way that undermines “stable and effective property rights for inventors.”³⁵² Or Congress could go the other direction. Even if the AIA proceedings have exceeded expectations in terms of invalidating issued patents, many view them as a beneficial reform that has brought the patent system closer to the proper trade-off in terms of patent protection,³⁵³ and Congress could endorse this result by codifying restrictions on claim amendments in such proceedings.

The conclusion that further congressional action is necessary to depart from the traditional liberal approach to claim amendments raises several well-recognized problems: structural barriers to passing legislation (so-called “vetogates”), the negative effects of political expediency, and the risk of capture by well-organized and well-financed minority interests.³⁵⁴ Despite these shortcomings, congressional intervention seems to be a necessary prerequisite to any significant departure from the

350. STRONGER Patents Act, S. 1390, 11th Cong. §§ 102–03 (as introduced June 21, 2017). The patent owner would have to make a prima facie showing that the amendment responds to the grounds of unpatentability raised in the AIA proceeding, satisfies the disclosure requirements, and does not broaden claim scope, but then the burden would shift to the challenger to rebut this showing or otherwise prove unpatentability. *Id.* The proposal would also allow the PTAB to seek an advisory patentability opinion from a patent examiner. *Id.*

351. Doug Pearson, *Senate Bill for STRONGER Patents Act Aims to Address Key PTAB Patent Owner Woes*, PTAB LITIGATION BLOG (July 3, 2017), www.ptablitigationblog.com/senates-stronger-patents-act-aims-address-key-ptab-patent-owner-woes/ [https://perma.cc/9CGX-NYRK]; Steve Brachman, *STRONGER Patents Act Introduced in House, Seeks to Strengthen a Crippled Patent System*, IP WATCHDOG (Mar. 26, 2018), <https://www.ipwatchdog.com/2018/03/26/stronger-patents-act-house/id=95188/> [https://perma.cc/ZZH5-BDX9].

352. Lund, *supra* note 323.

353. See THOMAS, *Innovation Issues*, *supra* note 339, at 19–20.

354. See Arti K. Rai, *Patent Validity Across the Executive Branch: Ex Ante Foundations for Policy Development*, 61 DUKE L.J. 1237, 1266–67 (2012).

long-standing liberal approach to claim amendments to preserve democratic and administrative legitimacy and the proper role of the Patent Office as a faithful agent of Congress under the principal-agency framework that dominates administrative law theory.³⁵⁵

C. Discretionary Post-Issuance Claim Amendments

The prior Sections concluded that Congress should determine the proper policy with regard to claim amendments in post-issuance invalidity proceedings but that there is no clearly correct answer because of the ambiguity of the justifications for post-issuance claim amendments and their connection to the core trade-offs of the patent system. This Section suggests that much of the ambiguity with regard to post-issuance claim amendments comes from trying to determine their optimality at a wholesale level for all patents, rather than individually on a case-by-case basis. It suggests that creating a system of individualized determinations by the Patent Office ultimately is the best approach to resolving the ambiguity in the optimality of claim amendments in post-issuance invalidity proceedings. To be clear, this Section is limited to amendments in post-issuance invalidity proceedings, like *inter partes* review or reexamination, which have been the focus of recent debate over post-issuance amendments. A discretionary approach to amendments may also be worth considering in reissuance and/or continuation proceedings, though those contexts may raise more of the cost and institutional competence concerns addressed in Section V.C.3 below.

1. The Appeal of Discretionary Post-Issuance Claim Amendments

The ambiguity in the justifications for post-issuance claim amendments results from the interaction of a number of factors that will vary from patent to patent. Some competitors may have relied on the original claim scope of some patents when making investment and business decisions, whereas other competitors may not have even been aware of other patents at the time of their investment and business decisions. Some patent owners may commercialize the invention and have made their own investments and business decisions in reliance on effective patent protection, whereas other patent owners may not commercialize the invention and therefore may not have any of their own reliance interests. Some patent owners may have recouped their research and development costs through the period of exclusivity they had before the post-issuance claim

355. Walker, *supra* note 331 (“If we don’t work hard to ensure that federal regulators act as faithful agents of Congress, the constitutional and democratic legitimacy of the modern administrative state is on even more perilous footing.”).

amendment issue arose, whereas other patent owners may not yet have had an adequate opportunity to do so.³⁵⁶

Likewise, some patent owners may be acting strategically to capture competitor innovations and advancements, whereas other patent owners may be acting to protect their legitimate invention that was imperfectly claimed during the original examination. And some patent owners may be to blame for the need for post-issuance claim amendments because they purposefully drafted their claims vaguely or ambiguously, whereas other patent owners with legitimately important inventions may be the victims of the inherent imprecision of language, the difficulties translating technical concepts into words, and the motivated exploitation of these difficulties by accused infringers and their lawyers.³⁵⁷

It is difficult to determine as a general matter which of these considerations are most likely to be present, which way they are likely to point with regard to claim amendments, and how they should be relatively weighted. There are simply too many considerations and too much variance to make an accurate one-size-fits-all determination for all patents. For that reason, a wholesale policy on post-issuance claim amendments, whether liberal or restrictive, is likely to generate a significant number of errors, either allowing amendments even where they are unwarranted or denying amendments even where they are warranted. The basic conclusion of the prior Sections is that any general policy on post-issuance claim amendments requires a determination of where to place the risk of error based on a view about the basic trade-off between innovation and competition at the heart of the patent system.

If any general policy on claim amendments is likely to generate significant errors, a better approach may be to abandon the effort to craft a general, one-size-fits-all approach to claim amendments in favor of an approach that allows a case-by-case evaluation. Such an individualized approach could account for the various relevant considerations discussed above to determine, on the facts of a particular patent, which considerations are present and in what significance in order to determine the optimality of a claim amendment for that particular patent. For that reason, the best congressional intervention for addressing the issue of post-issuance claim amendments may be to revise the AIA (and potentially the reexamination statute) to eliminate any patent owner right to amend in favor of empowering the PTAB, or some other component of the Patent Office, to make a discretionary decision as to whether to allow amendment on a case-by-case basis. Congress could directly determine the criteria for the Patent Office to use in making this evaluation. Alternatively, and consistent with recent proposals to give the Patent Office a

356. See generally *supra* Section IV.E.

357. See *supra* Section IV.E.

greater policy-making role in the patent system, Congress could delegate to the Patent Office the authority to specify the relevant criteria.

Giving the Patent Office discretion over claim amendments on a case-by-case basis may seem foreign in the modern patent system. The Patent Office primarily serves a ministerial function of evaluating specific patent applications for compliance with general criteria of patentability set by Congress with no case-by-case discretion to weigh the desirability of patent protection or depart from the general patentability requirements.³⁵⁸ However, there are historical analogs. The Patent Act of 1836 created a process in the Patent Office for a discretionary, case-by-case evaluation of whether to extend the term of a patent beyond the then-standard seventeen-year term.³⁵⁹ To obtain an extension, the patent owner had to demonstrate the value of the invention, the expenses it had incurred as a result of the invention, and that it had failed to obtain “a reasonable remuneration for the time, ingenuity, and expense” of the invention “without neglect or fault” on its part.³⁶⁰ A board consisting of the Commissioner of Patents, Secretary of State, and Secretary of the Treasury then weighed this evidence against any evidence offered by adverse parties as to why an extension should not be granted and against general considerations of the public interest to determine whether “it is just and proper that the term of the patent should be extended.”³⁶¹

The 19th century practice of patent term extensions certainly involved different considerations than the claim amendments question, but both implicate the core trade-off between ensuring adequate innovation incentives and leaving sufficient room for competition and follow-on innovation. This historical practice of discretionary patent term extensions provides evidence that discretionary post-issuance claim amendments would not be exceptional when evaluated in the full history of the patent system, even if foreign to the Patent Office’s modern role.

2. The Movement for Greater Discretion in the Patent System

A discretionary, case-by-case approach to post-issuance claim amendments would fit within a larger trend in the academic literature and policy proposals that seek to reduce the dominant one-size-fits-all nature of the patent system by tailoring the patent system to specific con-

358. Tran, *supra* note 349, at 491–92.

359. Patent Act of 1836 § 18, Pub. L. No. 24-357, 5 Stat. 117. Congress abolished the general practice of patent term extensions in 1861. Patent Amendments of 1861 § 16, Pub. L. No. 36-302, 12 Stat. 246.

360. Patent Act of 1836 § 18, Pub. L. No. 24-357, 5 Stat. 117.

361. *Id.*

texts.³⁶² Indeed, the theoretically ideal economic approach to patent protection would only grant a patent if the invention (or its disclosure or commercialization) would not have occurred “but for” the expectation of receiving a patent.³⁶³ Although an individual evaluation of this “but for” question for each patent application would not be administrable, patent policy should try to develop tools that approximate it as closely as is feasible.³⁶⁴

For that reason, “commentators have increasingly lamented the patent system’s lack of an institution that is willing and able to tailor innovation policy to the needs of different types of inventors and industries.”³⁶⁵ Professors Dan Burk and Mark Lemley (as well as many academics building on their work³⁶⁶) recognized that the relationship between innovation and patent protection is industry-specific and therefore advocated greater use of “discretion . . . to tailor patent law to individualized circumstances in different industries.”³⁶⁷ Relatedly, Professor Peter Lee proposed greater patent-by-patent tailoring in claim construction — the process of determining the meaning and scope of the patent claims — by “consider[ing] the technological contributions of a patented invention and the competitive dynamics of a particular industry when construing claims.”³⁶⁸ And Professor Lemley and Daralyn Durie have commended the Supreme Court’s recent reforms to the doctrine of obviousness (whether an invention is a sufficient advance to warrant patent protection) for putting “greater focus on the characteristics of individual cases” and “put[ting] more weight on the factual determination of what scientists would actually think and do about a particular invention.”³⁶⁹

Congress too has shown at least some interest in departing from rules of general applicability in the patent system in favor of more tailored, contextual, or individualized determinations. The AIA allows the Patent Office to prioritize for review applications for inventions that are deemed particularly important to the national economy or national com-

362. See, e.g., Peter Lee, *Substantive Claim Construction as a Patent Scope Lever*, 1 IP THEORY 100, 111 (2010) (noting that while the “United States employs a ‘unitary’ patent system that, at least nominally, applies the same standards of patentability and confers the same bundle of rights to all inventions . . . there is much wisdom to tailoring patent law to particular inventions and industries”).

363. FED. TRADE COMM’N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY 10–11 (2013).

364. *Id.* at 11.

365. Tran, *Policy Tailors*, *supra* note 349, at 490–91.

366. See, e.g., JOHN R. THOMAS, CONG. RESEARCH SERV., R43264, TAILORING THE PATENT SYSTEM FOR SPECIFIC INDUSTRIES (2015).

367. Burk & Lemley, *Policy Levers*, *supra* note 21, at 1589, 1658 (focusing on courts’ discretion).

368. Lee, *supra* note 362, at 101.

369. Daralyn J. Durie & Mark A. Lemley, *A Realistic Approach to the Obviousness of Inventions*, 50 WM. & MARY L. REV. 989, 991 (2008).

petitiveness without charging applicants a premium for this prioritization.³⁷⁰ And a proposal in the pending STRONGER Patents Act would allow the PTAB to convert an AIA post-issuance proceeding into a special reexamination proceeding upon a showing of good cause based on criteria like the level of investment in research leading to the invention, the secondary considerations of non-obviousness, and any intervening changes of law in substantive patentability criteria.³⁷¹

3. The Advantages of Post-Issuance Claim Amendments as a Discretionary Tool in the Patent System

As this Section will show, proposals for more discretionary, case-by-case tailoring within the patent system face three primary objections: cost, institutional competence, and capture. Post-issuance claim amendments are well-positioned to mitigate these concerns and therefore offer a promising route to achieving greater contextual sensitivity in patent protection.

Requiring greater consideration of the specific context of individual patents or patent applications will generally increase decision costs as compared to general, one-size-fits-all approaches.³⁷² These increased decision costs make case-by-case contextual analysis undesirable if they outweigh the benefits gained in terms of reduced error costs.³⁷³ Increasing decision costs in patent examination is normally undesirable because the Patent Office must examine hundreds of thousands of patents a year,³⁷⁴ but only a small number of those patents will ever be used against competitors in a way that make potential error costs significant.³⁷⁵ As a result, the increased decision costs from contextual, case-by-case analysis in patent examination are generally thought to outweigh the benefits of reduced error costs from more tailored examination decisions.³⁷⁶

A contextual, case-by-case analysis of claim amendments in post-issuance proceedings is not subject to the same degree of criticism on cost grounds as it would be if implemented during examination. The number of patents subject to post-issuance proceedings is only a small fraction of the number of patent applications the Patent Office must ex-

370. Tran, *Policy Tailors*, *supra* note 349, at 497, 497 n.38.

371. STRONGER Patents Act, S. 1390, 115th Cong. § 316A(d)(1) (as introduced June 21, 2017).

372. FED. TRADE COMM'N, *supra* note 363, at 11, 11 n.76.

373. *Id.* at 11 n.76.

374. Burstein, *supra* note 246, at 1756.

375. See Lemley, *supra* note 168, at 1497.

376. FED. TRADE COMM'N, *supra* note 363, at 11 n.76.

amine.³⁷⁷ Thus, the absolute costs of implementing a contextual, case-by-case analysis of amendments in post-issuance proceedings would be significantly less than the costs of doing so in examination (or than any other similar effort at individualized evaluations in examination). Moreover, these lower costs would be more wisely spent. Rather than increasing the precision of decision-making for a large swath of patents that will never prove relevant, as in examination, the increased costs will be targeted at those patents where obtaining precision and reducing errors is most desirable: patents that are affecting and disputed by competitors.

The second major objection to proposals for more discretionary or individualized determinations regarding patent rights is whether the relevant decision makers are competent to make the necessary context-sensitive decisions. This objection arises whether the contextual decisions are to be made in examination or litigation. In examination, patent examiners tend to have scientific but not legal training, are often fairly inexperienced, tend to turn over quickly, and have less than 20 hours to spend on each patent application.³⁷⁸ Examination therefore is not amenable to the type of fact-finding, consideration of patent economics, and nuanced evaluation required for contextual, case-by-case determinations about the proper scope of patent protection. Moreover, because examination occurs before patent issuance, and often before commercialization of the invention, the information may not yet be available to, for example, assess the value of the invention or the impact of the patent owner's exclusive rights on competitors and the public.³⁷⁹

Similarly, in litigation, courts are ill-suited to make the type of express policy decisions necessary to make individualized, contextual determinations on the need and proper scope of patent protection.³⁸⁰ Courts “have difficulty gathering and processing economic and technological information” needed for contextual determinations of patent protection and instead tend to “rel[y] on arguments from statutory language, precedent, and logic” not particularly useful to these determinations.³⁸¹ Courts are also limited by their role of resolving specific controversies, limited to the specific arguments and evidence presented by the parties, and fo-

377. Compare USPTO, *U.S. Patent Statistics Chart Calendar Years 1963 - 2015*, https://www.uspto.gov/web/offices/ac/ido/oeip/taf/us_stat.htm [<https://perma.cc/9SWN-7PFZ>] (showing that, in recent years, the Patent Office has received over 500,000 utility patent applications per year), with USPTO, *Patent Trial and Appeal Board Statistics* (Oct. 31, 2016), https://www.uspto.gov/sites/default/files/documents/aia_statistics_october2016.pdf [<https://perma.cc/8AC7-2AD9>] (showing that the Patent Office handles fewer than 2,000 AIA post-issuance proceedings per year).

378. Burstein, *supra* note 246, at 1756; Reilly, *Decoupling*, *supra* note 238, at 566–67.

379. Lee, *supra* note 362, at 112.

380. Burstein, *supra* note 246, at 1789.

381. *Id.*

cused on resolving the specific dispute rather than addressing broader policy questions.³⁸²

Post-issuance proceedings may offer greater institutional competence than either examination or litigation for implementing discretionary, context-specific elements within the patent system. Fewer patents go through post-issuance proceedings (or litigation) than through examination,³⁸³ making the costs of individualized determinations of patent protection more viable. Of current decision-makers in the patent system, PTAB judges may be the best situated for making this type of determination. They have the legal training lacking among patent examiners and the technical training lacking among judges.³⁸⁴ They are also experienced patent practitioners, normally with at least 10 years of experience within the patent system.³⁸⁵ Therefore, they are better positioned than either examiners or federal judges to make determinations about the significance of inventions, the needs of various industries, and the patent's and proposed amendment's effects on competition and follow-on innovation. Although they may not have sophisticated economic training, this does not make them any worse than either judges or examiners. And PTAB judges could be empowered to access sophisticated economic analysis if needed, either from the Patent Office's newly created Office of the Chief Economist or through expert witnesses.³⁸⁶

Finally, those who favor implementing greater patent-specific or industry-specific tailoring through patent litigation emphasize that courts are less vulnerable to capture — being beholden to special interests or regulated entities for financial, career, or informational reasons — than Congress or the Patent Office.³⁸⁷ Congress is influenced financially and in terms of the information available to it by significant lobbies with strong, albeit competing, views on the patent system.³⁸⁸ The Patent Office and its examining corps has traditionally been biased in favor of patent owners and patent issuance because of its examiner evaluation system, fee structure, and historically limited role of only interacting with inventors and issuing patents.³⁸⁹

382. Rai, *supra* note 354, at 1268.

383. Compare USPTO, *Patent Statistics*, *supra* note 377, with USPTO, *Patent Trial and Appeal Board Statistics*, *supra* note 377.

384. Reilly, *Decoupling*, *supra* note 238, at 568.

385. Bush, *supra* note 260.

386. See Wasserman, *supra* note 340, at 2009–12 (noting in the context of arguing for deference to validity determinations in PTAB adjudications that “[t]he PTO could expand this host of information-gathering techniques and rely upon them more heavily to collect the technological and economic data necessary to craft substantive patent law standards that promote innovation” and utilize the Chief Economist).

387. Rai, *supra* note 354, at 1266–72.

388. *Id.* at 1266–67.

389. Wasserman, *supra* note 340, at 2014.

The PTAB mitigates some of these traditional concerns about capture of the Patent Office, since it gives the Patent Office experience with competitors and the negative effects of patents, as well as more balanced financial incentives from the fees paid by competitors.³⁹⁰ Admittedly, there is some concern that the PTAB may become biased against patent owners, since its existence, importance, and finances depend on challengers filing a large volume of post-issuance petitions.³⁹¹ However, the PTAB and its judges are ultimately under the supervision of the Patent Office as a whole, and the Patent Office's hierarchy has at least some ability to influence the PTAB and its policies.³⁹² In the modern patent system, the Patent Office as an institution should have fairly balanced incentives, given its dual role of examining and issuing applications from patent owners and reviewing and deciding post-issuance challenges by competitors.³⁹³

Thus, rather than either a generally applicable liberal or restrictive approach, a better claim amendment policy may be allowing the PTAB to make a discretionary decision on whether a post-issuance claim amendment is warranted based on the context of individual patents. It also offers a means for introducing more discretionary, contextual, and policy-driven analysis into the patent system while mitigating concerns of cost, competence, and capture. Alternatively, Congress could create a system by which the PTAB refers the claim amendment question to a special board composed of technical, economic, patent examination, and patent policy experts, perhaps after the PTAB makes an initial finding as to whether the amendment overcomes the challenged grounds of invalidity. Such a board would be the modern echo of the board composed of the Secretary of State, Secretary of Treasury, and the Commissioner of Patents that evaluated applications for patent term extensions in the mid-19th century.³⁹⁴

VI. CONCLUSION

This Article's comprehensive evaluation of the optimality of claim amendments fills a surprising gap in the literature given the current salience of claim amendments. The insights it provides are mixed and unlikely to fully please any one side in contemporary patent policy debates.

390. *Id.* at 2014–15.

391. See Brief of Unisone Strategic IP, Inc. as Amicus Curiae Supporting Petitioner at 4–10, *Oil States Energy Servs., LLC v. Greene's Energy Grp., LLC*, 138 S. Ct. 1365 (No. 16-712) (2018).

392. See John M. Golden, *Working Without Chevron: The PTO as Prime Mover*, 65 DUKE L.J. 1657, 1663 (2016).

393. See Wasserman, *supra* note 340, at 2014–15.

394. Patent Act of 1836 § 18, Pub. L. No. 24-357, 5 Stat. 117.

Examination amendments rest on shakier normative grounds than their historical pedigree and widespread acceptance would suggest. Conversely, the justifications for post-issuance amendments are greater than many assume and are, at most, different in degree, not different in kind, from examination amendments. In both settings, the optimal claim amendment policy depends on where the risk of error should lie — with deserving inventors denied the opportunity to amend or with legitimate competitors when unwarranted amendments are allowed. This depends on a normative judgment of the proper balance at the core of the patent system between incentivizing innovation and protecting competition.

For that reason, examination claim amendments offer a promising, though underutilized, tool for Congress to calibrate the basic balance of the patent system. And it is Congress that ultimately should choose whether to depart from long-standing liberal allowance of claim amendments, even if the Patent Office reasonably could do so for AIA proceedings given the current statutory ambiguity. A promising claim amendment policy for Congress to adopt would be to move away from a generally-applicable policy for post-issuance claim amendments and towards a policy that allows the Patent Office to make a discretionary, context-specific determination as to whether a post-issuance amendment of a specific patent achieves the optimal balance between spurring innovation and protecting competition and follow-on innovation.