

INTRODUCTION: ANTITRUST, STANDARD ESSENTIAL PATENTS, AND THE FALLACY OF THE ANTICOMMONS TRAGEDY: LEGAL AND INDUSTRIAL POLICY CONCERNS

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At the turn of the millennium, David Teece noted that fundamental changes in the global economy were changing the basis of competitive advantage.¹ These changes strip away traditional sources of competitive differentiation and expose a new foundation for wealth creation: the development, astute deployment, and utilization of intangible assets, of which knowledge, capabilities, and intellectual property are the most significant.²

The development of markets for knowhow and intellectual property has broken the traditional nexus between tangible and intangible assets. Previously, the principal business model firms employed for extracting value from inventive and creative activities was to both create and commercialize new ideas and technology. Firms bundled ideas, inventions, and the results of creative activities into tangible objects and offered them for sale to capture value from the creative idea. In the case of music, for example, a creative entity might sell records or CDs. For quite some time, as intellectual property regimes have strengthened, it has been possible to specialize in what one did well—either the tangible objects or the abstract ideas. In the case of an “idea” generator, the creators and inventors can simply license their ideas to other entities that are better equipped to implement the idea.

A system of properly designed and adequately enforced IP rights benefits not simply the creative individuals, groups, and organizations that generate intangible assets, but also consumers. New technologies such as

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1. See David J. Teece, *Capturing Value from Knowledge Assets: The New Economy, Markets for Know-How, and Intangible Assets*, 40 CAL. MGMT. REV. 3, 55–62 (1998).

2. See *id.* at 62–63.

artificial intelligence, machine learning, and automation are becoming increasingly important. Soon, robots will make robots, more products will be 3D–printed, and robots will deliver services. The work of creative and inventive people is going to be even more salient to the United States economy in the future.³ As such, it is incredibly important to properly protect intellectual property rights. Otherwise, the inventive and creative activities—the lifeblood of economies—will decline or, at a minimum, be put at risk. Rights over intangible property must not be second–class.

At this critical junction in the evolution of our society and the economy, if policymakers and courts reward the production of tangible goods while shortchanging intangibles, they will be out of step with technological progress and the march of civilization. Creative and inventive people may have to revert to making a living by producing tangible assets within large, vertically–integrated firms. Such firms take ideas, embed them in objects, and then move them from the laboratory to the market. If a failure to enforce intellectual property relegates creative innovators to low–wage activities, the development of highly innovative small– and medium–sized enterprises will be stunted because they will not have the resources, capabilities, or passion to vertically integrate. Instead, large–scale vertically integrated firms—that pay low wages and experience lackluster growth with only modest levels of innovation—will populate the landscape.

This special issue of *Berkeley Technology Law Journal* is based on a special symposium, wherein the authors expressed deep concern that some legal scholars and economists who engage in debates about the patent system and FRAND licensing appear unfamiliar with, or do not consider, the empirical evidence (or lack thereof) on patent holdups and patent thickets that allegedly stifle innovation. They have mounted attacks on intellectual property—patents in particular—but typically have not stated the implicit assumptions in their theories. These critics frequently assert that patent holders too often engage in holdup, charge too much for a license to patent rights, and generally hinder the system of innovation itself through

3. A Brookings Institute report revealed that industries such as tech-driven manufacturing (pharmaceuticals, automotives, chemicals), energy (metal ore mining and gas extraction), and service (management and scientific consulting, architecture, software) industries generated \$2.7 trillion—roughly seventeen percent of U.S. gross domestic product—in 2013, while employing just 9 percent of the workforce, or 12.3 million American workers. MARK MURO ET AL., BROOKINGS INSTITUTION, AMERICA’S ADVANCED INDUSTRIES: WHAT THEY ARE, WHERE THEY ARE, AND WHY THEY MATTER 3 (2015), www.brookings.edu/wp-content/uploads/2015/02/AdvancedIndustry_FinalFeb2lores-1.pdf

patent thickets.⁴ These arguments have gained momentum and even impacted court opinions. Maureen Ohlhausen, as acting chair of the FTC, recently noted, “U.S. and international antitrust agencies have lost their way in recent interventions in standard setting space . . . [which] threatens to upset the balance between patent holders’ rights and consumers’ access to technology.”⁵ Makan Delrahim, the U.S. Assistant Attorney General for the Antitrust Division of the Department of Justice, would seem to agree.⁶

The situation echoes the concerns of famous economist John Maynard Keynes that those “in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.”⁷ More recently, Columbia University economist Paul Romer identified a “disturbing blind spot” in economics and explained that “the trouble is not so much that macroeconomists say things that are inconsistent with the facts. The real trouble is that other economists do not care.”⁸ He further noted that “an indifferent tolerance of obvious error is ever more corrosive to science than committed advocacy of error.”⁹

Each contributor to this special issue is endeavoring not to fall into the trap Romer warned about. Indeed, reflecting similar concerns to Romer, our first contributor, Jonathan M. Barnett asks: “Has the Academy Led Patent Law Astray?”¹⁰ He questions the allegedly adverse effects of a strong patent system and examines the disconnect between theory and evidence on this subject.¹¹ Barnett determines that the assumptions underlying patent holdup and stacking models strip away the reality of sophisticated repeat

4. See generally Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007).

5. Maureen K. Ohlhausen, *The Elusive Role of Competition in the Standard Setting Antitrust Debate*, 20 STAN. TECH. L. R. 93, 97–98 (2017).

6. “I worry that we as enforcers have strayed too far in the direction of accommodating the concerns of technology implementers who participate in standard setting bodies, and perhaps risk undermining incentives for IP creators” Makan Delrahim, Assistant Att’y Gen., U.S. Dep’t. of Justice, Assistant Attorney General Makan Delrahim Delivers Remarks at the USC Gould School of Law’s Center for Transnational Law and Business Conference (Nov. 10, 2017), www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-usc-gould-school-laws-center.

7. JOHN MAYNARD KEYNES, *THE GENERAL THEORY OF EMPLOYMENT, INTEREST, AND MONEY* 383 (1936).

8. Paul Romer, *The Trouble with Macroeconomics* 22 (Sept. 14, 2016) (unpublished manuscript), <https://paulromer.net/wp-content/uploads/2016/09/WP-Trouble.pdf>.

9. *Id.*

10. Jonathan Barnett, *Has the Academy Led Patent Law Astray?*, 32 BERKELEY TECH. L.J. 1313 (2016).

11. *Id.* at 1318.

players and standards evolution.¹² He finds little evidence of thickets or holdup and stacking effects.¹³ He thus revisits the theoretical models used to support predictions of transactional blockages and harm to innovation.¹⁴

Barnett is also deeply critical of ongoing and proposed restrictions on injunctions.¹⁵ His assessment is that there are substantial social costs in substituting liability rules for property rules.¹⁶ He also notes that the patent ambush literature received widespread endorsement after early Rambus cases.¹⁷ Indeed, the FTC case against Rambus became the “poster child for patent holdup” even though, ironically, the “government *lost* . . . twice.”¹⁸ Barnett concludes that given Rambus’s vindication, this is “not an especially compelling illustration of patent holdup.”¹⁹

The predicament described resonates well with Romer’s concerns mentioned earlier. Too many scholars have an “indifferent tolerance of obvious error.”²⁰ Barnett points out that “the conceptual triplet” of stacking, holdup, and thickets, has “been presented in the context of stylized theoretical settings” but has never “matured into descriptively reliable statements about real-world markets.”²¹ He asserts that “remarkably, all available empirical evidence fails to confirm these . . . theories.”²²

The above are only a selection of Barnett’s trenchant comments and conclusions. We intend them to pique the reader’s interest in his Article and his call for courts and regulators to revisit recent decisions displacing property rules with liability rule protections.

Richard A. Epstein and Kayvan B. Noroozi follow Barnett’s analysis with a more specific focus on standards–essential patents (SEPs).²³ They focus on similar issues to Barnett, but their Article is more specific to FRAND and mobile phones. They are highly cognizant of the changing economic landscape and the importance of intellectual property rights to the advancement of an emerging knowledge economy, where objects made by

12. *Id.* at 1319.

13. *Id.* at 1338–39.

14. *Id.*

15. *Id.* at 1361.

16. *Id.*

17. *Id.* at 1330–31.

18. *Id.* at 1331.

19. *Id.* at 1332.

20. Romer, *supra* note 8, at 22.

21. Barnett, *supra* note 9, at 1338.

22. *Id.*

23. Richard A. Epstein & Kayvan B. Noroozi, *Why Incentives for ‘Patent Holdout’ Threaten to Dismantle FRAND, and Why It Matters*, 32 BERKELEY TECH. L.J. 1381 (2017).

machines are ubiquitous and creative works generated by people are scarce.²⁴ Epstein and Noroozi are also acutely aware of how a well-functioning system of intellectual property and FRAND licensing has powered the highly dynamic mobile phone industry.²⁵ They recognize that the European Telecommunications Standards Institute (ETSI) and the FRAND framework support the powerful technologies underlying standards development that have enabled establishment and growth of a global mobile telecommunications industry.²⁶

Epstein and Noroozi remind readers that standards are not just about interoperability rules. They note that new technologies enable new standards and orders-of-magnitude improvement in upload and download speeds on a limited spectrum, in addition to enhancing many other aspects of wireless performance. Innovators and implementers work together in standards development organizations (SDOs) to select new enabling technologies developed and tested by members and others. The best technologies get incorporated into new standards that are then made available to all, subject to a FRAND royalty contract. Implementers are third-party beneficiaries of the FRAND licensing contract. Epstein and Noroozi acknowledge that ETSI, the leading SDO in mobile phone technology, is the manifestation of what distinguished patent law expert Professor Robert Merges calls “an institution that lowers the cost of IPR exchange.”²⁷

Epstein and Noroozi further contend that the historic high performance of the intellectual property rights (IPR) marketplace is put at risk once the bargain between innovator and implementer is revised or reinterpreted in ways that shortchange innovators upstream or downstream.²⁸ They point to the first ETSI IPR rules of 1992, which included Most Favored Nation (MFN) and other provisions unpalatable to upstream innovators.²⁹ In 1994, when ETSI adopted a balanced approach that respected the patent rights of contributors to the SDO, innovation and concomitant standards development gained momentum. Epstein and Noroozi do recognize, however, that the balance that ETSI intended is not spelled out in detail but is left to the parties to negotiate.³⁰ They note that in the context of deep

24. *See id.* at 1389.

25. *Id.* at 1390–94.

26. *See id.* at 1395.

27. *See id.* at 1394–95; *see also* Robert P. Merges, *Of Property Rules, Coase, and Intellectual Property*, 94 COLUM. L. REV. 2655, 2655 (1996).

28. Epstein & Noroozi, *supra* note 22, at 1394.

29. *Id.* at 1395.

30. *Id.* at 1396.

heterogeneity of circumstances facing licensors and licensees, the nature of the exchange is “deliberately vague,” allowing room for negotiation.³¹ They see this as a virtue and not as “an invitation for courts to fill in the gaps or clarify the boundaries”³²

Epstein and Noroozi draw attention to “an influential body of literature, led by Mark Lemley and Carl Shapiro, [that] has . . . focused primarily on the risk of ‘patent holdup’ . . . while paying short shrift to the correlative risk of ‘patent holdout’”³³ They also note that “the principal focus of Lemley and Shapiro’s work has been to discourage the availability of injunctions in the context of products that practice multiple patents”³⁴ Citing to work by Robert Merges, Epstein and Noroozi maintain that “strong property rights rule[s] for patents facilitates contractual solutions . . . whereas liability rules ‘work against the flexible, voluntary institutions that are formed to overcome the costs faced by transactors’.”³⁵ They are critical of *eBay, Inc. v. MercExchange, L.L.C.*³⁶ for having “jettisoned that subtle and flexible mixed remedial approach and instead reverted to a stark and simplistic opposition between ‘property rules’ and ‘liability rules.’”³⁷

Epstein and Noroozi vividly attack the “royalty stacking” paradigm and view it as nothing more than a “horror fiction.”³⁸ They are likewise critical of recent court decisions that they see eroding the FRAND framework, including *Apple v. Motorola*³⁹ and *Microsoft v. Motorola*.⁴⁰ They worry that, under *Microsoft*, perhaps one can no longer make an offer outside of the FRAND range even as an opening bid; it must somehow be FRAND from the outset. Implementers, of course, like to make counteroffers; yet, the net effects of *Microsoft* and *Apple* are that “innovators are pressured to begin at FRAND, and only go lower.”⁴¹ Epstein and Noroozi raise concerns of a slippery slope under the nondiscriminatory component of FRAND, with each implementer trying to convert the nondiscriminatory term into a de facto most-favored licensee clause. The authors’ concern appears to be that under the specter of *Microsoft*, *Apple*, and government antitrust

31. *Id.*

32. *Id.*

33. *Id.* at 1405–06.

34. *Id.* at 1406.

35. *Id.* at 1412 n.83.

36. 547 U.S. 388 (2006).

37. Epstein & Noroozi, *supra* note 22, at 1407.

38. *Id.* at 1411.

39. 757 F.3d 1286 (Fed. Cir. 2014).

40. 795 F.3d 1024 (9th Cir. 2015).

41. Epstein & Noroozi, *supra* note 22, at 1419.

intervention into leveraging activities, there is a drift towards litigation and a movement away from negotiated resolutions of licensing issues.⁴² The primary culprit is a misallocation of rights, as implementers in the United States now face virtually no credible injunction risk. Meanwhile, breach of contract, and breach of duty of good faith and fair dealing claims based on opening offers alone threaten upstream innovators.⁴³

Finally, Epstein and Noroozi question the wisdom of *Commonwealth Scientific and Industrial Research Organisation (CSIRO) v. Cisco Systems, Inc.* if it means the benefits of standardization flow to implementers and not upstream to innovators.⁴⁴ They find the Federal Circuit's interpretation "misguided" and are critical of decisions that fail to recognize that new technologies typically undergird new standards. When this occurs, upstream innovators should be rewarded and not have their contributions diminished because they have been embedded in a standard—especially if the standard would never be promulgated but for the new and patented technology contributed by others. The authors provide insightful policy implications: legal rules must recognize and allocate value to innovation, while also embracing a new economic order in which the development of commercial embodiments becomes a low-margin industry.⁴⁵ Most notably, an efficient marketplace for innovation necessarily allows specialization between innovators and implementers, rather than forcing an increasingly inefficient vertical integration between the two.⁴⁶ Thus in Silicon Valley 2.0, brilliant young entrepreneurs should not be distracted by developing and selling their innovations as products, but rather should be able to develop firms that

42. *Id.*

43. *Id.*

44. *See id.* at 1425. *See also* Jorge L. Contreras, *CSIRO v. Cisco: The Convergence of RAND and non-RAND Royalties for Standards-Essential Patents*, PATENTLY-O (Dec. 7, 2015), <https://patentlyo.com/patent/2015/12/convergence-royalties-standards.html>. Professor Contreras explains that in *Commonwealth Scientific and Industrial Research Organisation v. Cisco Systems, Inc.*, the Federal Circuit:

established important new guidelines for the calculation of 'reasonable royalty' damages for standards-essential patents (SEPs), even in the absence of the patent holder's commitment to license on reasonable and nondiscriminatory (RAND) terms The decision signals another important step toward the convergence of 'reasonable royalty' damages in RAND and other patent cases.

Id. Note that, with compensation, some of this ought to be transferred to consumers; but even if true in the short run, in the long run consumers are harmed by diminished innovation.

45. Epstein & Noroozi, *supra* note 22, at 1420.

46. *Id.* at 1430.

occupy the far more impactful and lucrative role of generating and transacting ideas alone.⁴⁷

The contribution from Alexander Galetovic, Stephen Haber, and Lew Zaretzki delves even deeper into the anticommons thesis.⁴⁸ They focus exclusively on smartphones and describe how concerns about royalty stacking are empirically inaccurate. While the royalty stacking thesis is highly questionable as a theoretical matter—since patents are not self-enforcing—the authors conduct empirical research to provide additional insight. Their methodology involves taking a royalty stacking model, using it to calculate the expected cumulative royalty, and showing that the observed reality is very distant from what the royalty stacking model predicted.⁴⁹ Their stacking model predicts a 79.5 percent cumulative royalty if stacking occurs versus an sixty-seven percent rate if the patent holders could collude.⁵⁰ They find that the actual rate is 3.4 percent, leading them to remark that “the actual yield is more than 20 times lower than . . . the yield predicted by the anticommons royalty stacking model”⁵¹

As they explain: “The implication is straightforward: patent holders in the world smartphone value chain do not exercise any meaningful monopoly power to raise prices to the levels that monopoly and royalty stacking theory predict.”⁵² The authors go on to note that “patent holders are not monopolists, and that they confront competitive pressure, perhaps from other technologies.”⁵³ They also explain that other factors limit potential monopoly power, including the difficulty of obtaining injunctions and the fact that patents are not self-enforcing. The FRAND contract is perhaps a factor, too, as it does have teeth. The authors leave the reader with a political economy puzzle that they do not attempt to unlock: why have public officials turned their attention to royalty stacking in mobile phones when the evidence against it is so strong?⁵⁴

47. *Id.*

48. Alexander Galetovic et al., *Is There an Anticommons Tragedy in the World Smartphone Industry?*, 32 BERKELEY TECH. L.J. 1527 (2017).

49. *Id.* at 1532–33.

50. *Id.* at 1532.

51. *Id.* at 1532–33.

52. *Id.* at 1533.

53. *Id.* at 1556.

54. *Id.* at 1556–57.

David J. Teece's Article contributes a trenchant review of the "patent thickets" and "tragedy of the anticommons" literatures.⁵⁵ His Article points out that the theoretical possibility of underusage—key to the anticommons paradigm—is not borne out of practice. Notwithstanding, the anticommons literature seems to have a life of its own, in part because infringers readily seize upon it as an excuse to continue infringing, particularly after *eBay*, since injunctions are now quite hard for U.S. patent owners to secure. Teece points out that the anticommons literature is erroneous perhaps because the paradigm arose by observing problems with real property rights clutter. However, there is an important difference between property rights over real property and property rights covering inventions: the latter are not self-enforcing.⁵⁶ Whereas an owner of real property can occupy or control access to the asset through private actions (such as locks and security guards), the owner of patents must rely on the courts to stop trespassers or infringers. Moreover, in the context of standards-essential patents, FRAND agreements impose contractual obligations on patent owners to "make licenses available," further limiting any power of the patent owner to block follow-on or complementary innovation.

Teece identifies a different "tragedy" for policymakers to worry about. However, it is not the anticommons tragedy of underuse; rather, it is the tragedy of infringement, sometimes widespread. For instance, as the author notes, in the telecommunications field, firms often make and sell standards-compliant products without taking licenses under all of the claimed SEPs and without paying royalties, at least not in a timely fashion, to many—and perhaps most—patent holders.⁵⁷ Thus, contrary to the "underuse" anticommons theory, one frequently sees a situation of uncompensated use. The fact that firms use others' patented technology without paying suggests that, if anything, there is overuse, not the underuse that anchors the anticommons paradigm. In short, Teece argues that in invention-rich environments, unpaid use is likely the bigger problem. Furthermore, undercompensation may persist even in cases where infringement was found depending on how the court set damages.⁵⁸ As a consequence of the

55. David J. Teece, *The "Tragedy of the Anticommons" Fallacy: A Law and Economics Analysis of Patent Thickets and FRAND Licensing*, 32 BERKELEY TECH. L.J. 1489 (2017).

56. *Id.* at 1498.

57. *Id.* at 1511.

58. Whether undercompensation will persist in the face of a court finding of infringement depends on how the court sets damages following a verdict of validity and infringement. *Id.* at 1513. If the court only orders the infringer to pay the same level of royalties that it could have negotiated *ex ante*, prior to a finding of validity and

reduced rewards for innovation because of free riding, society will not achieve the level of investment in innovation that it would otherwise enjoy.

Interestingly, the problem of undercompensation is likely to be amplified further not only when the environment is patent rich, but when those patents cover enabling or general-purpose technologies. To allow the issue to be seen in a clear light, Teece reviews the social returns to innovation literature and discusses the special circumstance of general purpose and enabling technologies.

It is well recognized in the economics literature that society underinvests in research and development (R&D) because of positive externalities that go unrewarded. There is often a sizeable gap between the private return to successful innovators and the social return of such innovations to society as a whole. The phenomenon is overusage, or at least underpayment for the use that occurs. These concerns are especially significant in the context of enabling general purpose technologies. That is, the business model appropriability problems associated with licensing alluded to above are amplified in the presence of enabling technologies that are relevant to multiple downstream applications.

Teece concludes that the real tragedy is uncritical acceptance of the anticommons thesis. Anticommons and “royalty stacking” concerns have led some courts and arbitration panels to reduce patent royalties for SEPs. The far more serious problem is the prospect of undercompensation to the patent owner, especially when technologies exhibit enabling and general-purpose characteristics.⁵⁹ Accordingly, the tragedy, if there is one, is underpayment for technologies that have high social returns, resulting in underinvestment in R&D and, in the longer run, lower innovation and growth than society desires and is willing to pay for.⁶⁰

David Kappos and the Honorable Paul R. Michel address the origins, development, and future of smallest salable patent-practicing unit (SSPPU) legal doctrine as they seek to dispel confusion about its role in U.S. patent

infringement, then the infringer plays a “heads I win, tails I break even” game, which encourages infringement and results in overuse and undercompensation. *Id.* However, following a verdict in the patent holder’s favor, the court may require the infringer to pay a royalty rate appropriate for a proven-valid-and-infringed patent, rather than the (discounted) rate that it could have negotiated ex ante for what might be termed an “untested” patent for which the issues of validity and infringement have not been litigated, and which may be seriously disputed. *Id.* In this case, appropriate compensation is only delayed (assuming appropriate prejudgment interest is awarded), rather than eliminated entirely. *Id.*

59. *Id.* at 1520.

60. *Id.* at 1525.

law and licensing.⁶¹ They note that the concept first appeared in the context of an evidentiary ruling on the admissibility of damages and that some commentators have advanced it into a rule prescribing how to calculate patent damages and royalty units.⁶² However, the Federal Circuit rejected its universality in *CSIRO*. Even if applicable for calculating damages, it does not “dictate how negotiating parties may arrive at mutually agreeable licensing terms. It certainly does not require that the prices of inputs to the manufacture of an infringing product determine the proper royalty base.”⁶³ The authors see SSPPU as being limited primarily to jury trials for damages.

More significantly, the authors state that “the concern animating the SSPPU approach does not exist . . . outside the jury context.”⁶⁴ Nor does it provide support for the notion that using the SSPPU as a royalty base is a requirement for FRAND or that it should prevail over market determined royalty bases.⁶⁵ Kappos and Michel conclude that “[n]o court has ever held that SSPPU is a hard-and-fast substantive requirement of patent law, and indeed the Federal Circuit has held just the opposite in *CSIRO*.”⁶⁶ Their view is that SSPPU is quite simply not the law; and, if it were, it would be bad economics and would reduce incentives for innovation.

Contreras et al. examine litigation relating to standard essential patents, including litigation by nonpracticing entities (NPEs) in Europe.⁶⁷ Based on case-level data from Germany and the United Kingdom, as well as declared patents in the SEP database, they analyzed all assertions of SEPs by NPEs, in terms of frequency of assertion, timing of assertion, plaintiff characteristics, and litigation outcome. They found that while large numbers of NPEs operate in the United States, few availed themselves of the European courts during the periods studied.⁶⁸ The large majority of NPE SEP assertions in Europe during the periods studied were by Europe-based NPEs, not U.S. entities.⁶⁹

61. David Kappos & Paul R. Michel, *The Smallest Salable Patent-Practicing Unit: Observations on Its Origins, Development, and Future*, 32 BERKELEY TECH. L.J. 1433 (2017).

62. *See id.* at 1434–35.

63. *Id.* at 1436.

64. *Id.* at 1445.

65. *See id.* at 1449–50.

66. *Id.* at 1455.

67. Jorge L. Contreras et al., *Litigations of Standards-Essential Patents in Europe: A Comparative Analysis*, 32 BERKELEY TECH. L.J. 1457 (2017)

68. *Id.* at 1485.

69. *Id.*

The totality of these Articles constitutes a fresh look at the law and economics of patents in today's world of complex products, which incorporate patented and non-patented inventions, where some patents might be standards essential. The Articles in this special issue of the *Berkeley Technology Law Journal* convey a message that the market for knowhow has worked reasonably well historically, despite the plethora of patents and the problematic nature of validity and infringement. However, while market processes have worked well in the past, generally unfounded antitrust concerns and judicial mistakes threaten the proper operation of intellectual property markets and the global innovation system.⁷⁰

70. For a discussion of similar concerns, see generally Ohlhausen, *supra* note 5.