Privateers & PAEs: Economic Harms to Competition and Innovation

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Patent Assertion Entities & Privateers: Economic Harms to Innovation and Competition

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A. Introduction: Purpose and Objectives

This paper will address the problems of aggressive rent-seeking activities by patent assertion entities (PAEs).\(^1\) Though these problems are widespread and growing rapidly, this paper is especially concerned with those involving patent thickets and patent-thick products and systems. Patent thickets are “target-rich” environments that are particularly attractive to PAEs, because they provide ample opportunities for rent-seeking and abusive use of patents.\(^2\) Section B will explain why aggressive patent assertion is especially harmful in patent thick products and systems, such as computers, smartphones and software. It will also explain why technological developments will almost certainly increase the number and “thickness” of patent thickets, thereby providing even more target-rich environments for PAEs, as well as the magnitude of economic rents that can be earned by aggressive patent assertion activities.

While there are admittedly instances of patent abuse by practicing entities (PEs), this paper will focus on problems caused or exacerbated by patent assertion entities (PAEs) in patent thickets and by the transfer of patents from PEs to PAEs. Section C will address the fundamental differences in the strategic positions and interests of PEs and PAEs and explain why those differences affect the conduct of PAEs and increase the opportunities for, and economic harm caused by PAEs’ rent-seeking and patent holdup. It will also lay the foundation for Section F, a discussion of the anticompetitive harms that can be caused when PEs transfer patents to PAEs, especially those that incentivize assertion of the transferred patents against competitors of the PE(s) involved in what has been termed “patent privateering.”\(^3\)

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\(^1\) For an outstanding overview of these issues, see Carl Shapiro, *Patent Assertion Entities: Effective Monetizers, Tax on Innovation, or Both?* Presentation to DOJ/FTC Workshop on Patent Assertion Entities, December 10, 2012.

\(^2\) For this reason, the term “patent minefield” may be a more descriptive term for patent thickets.

Given these strategic differences between PEs and PAEs and the rapid growth in target-rich patent thickets, it is not surprising that there have been significant increases in the number of PAEs, the number of patents owned by PAEs, and the quantity of patent assertions and litigations by PAEs. While PAEs cause harm by exploiting flaws in the patent system, they compound that harm through the process of patent portfolio disaggregation, which multiplies the effects of excessive damage awards and asymmetric litigation costs. Section D reviews recent empirical studies regarding the patent assertion activities of PAEs, which, by any measure, are growing dramatically. Given the substantial increases in PAE litigation, it is essential that one consider the date range of any empirical study of PAEs or comparison of various patent entities. As a rule, any study that uses data from more than a few years ago is now obsolete because PAE activity has increased so markedly. What the FTC could reasonably characterize as the “evolving IP marketplace” a little more than two years ago has since become a revolution in the ownership and assertion of patents by PAEs.4

Section E will discuss the types of economic harms caused by PAEs and explain how PAEs exploit deficiencies in patent policy and enforcement, including the granting of injunctions (or exclusion orders), excessive patent infringement damage awards, and costly settlements stemming from excessive actual or threatened litigation. Because of the extremely high transaction costs of defending patent litigation, the settlement value is often determined by the holdup value of avoiding those costs, rather than the economic value of the patents involved.5 Section E also reviews recent empirical research, which attempts to distinguish the patent

4 THE EVOLVING IP MARKETPLACE, ALIGNING PATENT NOTICE and REMEDIES with COMPETITION (Fed. Trade Commission 2011)

5 Patent holdup is hardly new: Magliocca argues that “patent sharks” from the nineteenth century, who bought “dormant agricultural patents” and asserted them against practicing farmers, offer a historical parallel to modern NPEs. He concludes that “[t]he chief lesson that emerges from this comparison is that certain types of patents are more vulnerable to trolls than others. Opportunistic licensors flourish when there is a large gap between the cost of getting a patent and the value that can be captured with an infringement action.” Gerard N. Magliocca, "Blackberries and barnyards: Patent trolls and the perils of innovation." Notre Dame L. Rev. 82 (2006): 1809.
enforcement conduct and outcomes of PEs from PAEs and/or measure the effects of PAEs’ assertion activities. We explain why these estimates substantially understate the harm caused by PAEs, as much of the empirical literature does not measure pre-litigation costs such as settlements achieved under the threat—but not the actual filing—of litigation. Neither does most of the research attempt to measure lost management and engineering resources caused by PAE aggression, nor the increased and sub-optimal risk aversion away from innovating in technologies that might be rife with PAE activities—technological categories that presumably grow as PAE activity increases. And, given the dramatic increase and continued growth of PAEs and their assertion activities, any estimate of past harm surely understates future harm.

Finally, Section F will address the rapidly growing threat to competition and innovation by the transfer of patents from practicing entities to PAEs, i.e. “privateering.” While there may be limits on the use of antitrust or competition policy tools to moderate all of the harms caused by PAEs, cases involving privateering are ripe for investigation, prosecution and remedy by competition policy enforcement agencies and private antitrust actions. This Section will delineate some of the most critical concerns raised by such transfers and explain why antitrust authorities should prevent such transfers or, at a minimum, place conditions on the conduct of the PAE to whom the patents are transferred and monitor the activities of privateering PAEs to ensure compliance with those conditions.

B. Patent Thickets: “Target-Rich” Environments for PAEs


The patent density of products covers an extraordinary range, from products that read on a single patent (so “the patent is the product,” as in “a better mousetrap”) to products which embody thousands of patents (smartphones). When a very large number of patents read on a product, those patents constitute a “patent thicket”; we will refer to the products inhabiting
patent thickets as “patent-thick products.” Smartphones, for example, are estimated to embody thousands of patents, a substantial share of which are claimed to be “standards-essential.”

Thus, Love found that “Of all infringement claims filed by trolls in the last three years of the asserted patent’s term, 88% allege infringement of patents related to computers or electronics. 65% allege infringement of software patents.” In the study by Bessen, Meurer and Ford, “Almost two thirds of the [defendant] firms are technology firms, including software and communications firms, and these firms, on average, spend a lot on R&D and have very substantial intangible assets.” Fischer and Henkel (2011) found that “The probability that a traded patent is acquired by a troll rather than a practicing entity increases in the scope of the patent and in the patent density of its technology field.

A product with many patents means there are many patentees, which can severely exacerbate the problem of Cournot complements by increasing the rewards to opportunistic rent-seeking through patent assertion. “The Cournot-complements effect arises when multiple input owners each charge more than marginal cost for their input, thereby raising the price of the downstream product and reducing sales of that product. Effectively, each input supplier imposes a negative externality on other suppliers when it raises its price, because this reduces the number of

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6 According to analysts, smartphones utilize at least 30 different standards, for 3G wireless communications, WiFi, GPS, video display, Internet access, etc. More than 11,000 patents have been declared essential for just one of these standards, UMTS (3G), so the total number of patents is a large multiple of that number. [Add source]


8 They also found that NPE litigation is “focused on software and related technologies, it targets firms that have already developed technology, and most of these lawsuits involve multiple large companies as defendants.” James E. Bssen, Michael J. Meurer, and Jennifer Laurissa Ford, “The Private and Social Costs of Patent Trolls,” (September 19, 2011). Boston Univ. School of Law, Law and Economics Research Paper No. 11-45, 12, Available at SSRN: http://ssrn.com/abstract=1930272 or http://dx.doi.org/10.2139/ssrn.1930272

units of the downstream product that are sold. As a result, if multiple input owners each control an essential input and separately set their input prices, output is depressed even below the level that would be set by a vertically integrated monopolist. The theory of Cournot complements teaches us that the royalty stacking problem is likely to be worse the greater the number of independent owners of patents that read on a product.”

Turner has modeled firms’ decisions of whether to develop new technology as endogenously determined by the rate of invention and patenting in the economy overall. His results show that “an increase in input complementarity lowers equilibrium invention, and typically raises the rate of patenting, by both increasing dispute costs paid and by increasing the payoff to would-be patentees. This predicts that troll behavior should be most harmful in industries where input complementarities are greatest.”

Moreover, the number of Cournot complements and the potential for holdup in patent thickets will continue to increase for several reasons. The continuing excessive grants of patents, especially in information and communications technologies, will increase opportunities for abuse of those often poorly defined patents. Devices themselves are becoming even more highly integrated, so that the number of components, features and functionalities embodied in the devices causes them to “read” on a rapidly growing number of patents. And, because interoperability requires industry standards, the number of complements will grow as the number of standards practiced by integrated devices increase (e.g. adding Near-Field Communications, Wi-Fi or Bluetooth capabilities to a smartphone). I will refer to the owners of these complements as “co-patentees.”

A central tenet of this paper is that the rights and interests of co-patentees...

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12 These arguments can be generalized beyond co-patentees, to include other contributors of innovations that have not been patented, or are not even patentable, but nonetheless contribute to the economic value of the patent-thick product.
should play a much greater role in the design and enforcement of patent laws. Conversely, though, when there are many co-patents practiced by a product, the potential and incentive for patent aggression increases.

Moreover, it is the very nature of patent-thick products that there are so many technical complements that it would be impossible for any single company to develop them all—or even a substantial share of them. Therefore, each patentee is interdependent with all of the co-patentees for their patents to have any economic value, i.e., all innovators are dependent on all of the other innovators. Such a patent thicket constitutes an “innovation commons,” in the sense that none of the contributing firms could conduct all of the innovation necessary to create integrated, interconnected, multi-functional products. Thus, abuses by some patentees can create an “anti-commons,” i.e. attacks on one or more alleged infringers of patent-thick products also constitute attacks on the innovation commons. Ironically, the more reasonably most co-patentees act (e.g. cross-license with zero royalties or seek reasonable royalties), the greater the potential economic rents to those who commit patent abuse (e.g. an abusive PAE or privateers can collect excessive royalties without killing market demand for the product).

Due to the massive number of patents involved in patent-thick products, individual patents have correspondingly smaller economic value (as a share of the total patent-thick product’s value), because each patent covers a technology that is useful only in combination with other patented technologies or innovations. Unfortunately, the current patent prosecution system has

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13 Hardin’s “commons” metaphor “highlights the cost of overuse when governments allow too many people to use a scarce resource, [but] it overlooks the possibility of underuse when governments give too many people rights to exclude others,” thereby causing “the tragedy of the anti-commons.” Heller & Eisenberg, Can Patents Deter Innovation? Science 280, 698 (1998).

14 Indeed, in many—if not most of these cases—an individual patent has NO VALUE except when used in combination with many other patents.

15 Gilbert (2010) explains that most NPEs receiving large payments in the computer hardware business either did not every produce a commercial product, or are in the process of exiting the industry. Further, most patents asserted by NPEs address only a small feature that does not define the whole product. Patents of this nature, which are common in the computer hardware industry, are particularly difficult to value. Richard J. Gilbert, The Rising Tide of Patent
a strong tendency to over-reward those patent-holders who most aggressively prosecute their patents, thereby harming co-patentees, consumers and incentives for innovation. Moreover, the more patents that read on a product, the more difficulty there is for PEs to identify those patents or patentees, the more low quality patents there are likely to be, and the greater the opportunity for patent holdup. Thus, it is no surprise that a substantial share of PAE assertions target patent-thick products. Whereas PEs have strong economic interests in promoting and protecting the commons, individual PAEs have an interest in maximizing their respective revenues, even if their actions collectively harm the commons.

2. **Patent Thickets and the Patent System**

Patents are a government grant of the power to exclude others from using an invention, creating a property right that can be sold (e.g. a patent license). The Patent Clause was intended by the founders as a limit on the ability of Congress to grant patents: patents were permitted only insofar as there was a quid pro quo in the form of a public benefit in promoting innovation. Rules that permit over-compensation to patent holders at the cost of inhibiting innovation are contrary to these intended constitutional limits. If one believes that the economic returns to patents are necessary to provide incentives for investment in innovation, then the damages

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16 As Boston University legal researchers James Bessen, Jennifer Ford, and Michael J. Meurer have found, PAE litigation is heavily concentrated in the information technology (IT) sector, with approximately 75 percent of PAE-asserted patents covering computer and communications-related inventions, and 62 percent covering software-related patents. Bessen (2011), op.cit, p. #

17 As a condition for incorporating intellectual property into industry standards, standard-setting organization typically require patentees to commit to licensing their patents on “fair, reasonable and non-discriminatory” (FRAND) terms, to prevent patentees from “holding up” those who adopt the standard in making or selling the standard-based products.

rewarded—or settlements realized by—patent assertions should be aligned with the economic value of the patents.\(^{19}\)

Even in patent thickets, though, patent enforcement is typically a two-party equation: the right of one patentee (the plaintiff) to exclude versus the alleged infringement of that right by the (defendant’s) “infringing product.” The key issues are (a) whether the patents-in-suit are valid; and (b) whether the product infringes those patents. If the alleged infringing product involves a single patent (or small number of patents), this two-party “game” makes some sense: when the “product is the patent” in patent litigation, there are no (or very few) co-patentees involved and therefore no consideration of the significant “externalities” of the assertion or litigation on other patent-holders. Given the high degree of technical complementarity across patents in patent-thick products,\(^{20}\) this “two-party” approach—the patentee versus the alleged infringer—fails to adequately account for the contributions of the many co-patentees, without whose technical complementarities to the patents-in-suit would have little if any value.\(^{21}\)

It is very telling that there is case law that refers to all other patents (i.e. other than the “patents-in-suit”) as “unpatented,” reflecting the fact that the rights and interests of those who hold such patents play little or no role in making key decisions (whether to grant an injunction or reasonable royalties).\(^{22}\) In fact, in the case of a patent-thick product, other patentees may well

\(^{19}\) Moreover, the smaller the number of actual or potential patents that might read on a product, the more reasonable it is to assume that a potential infringer could avoid infringement or seek licenses; identifying all possible patents to avoid infringement is practically impossible in patent thickets.

\(^{20}\) Considering that some products read on many thousands of patents, it must be true that a very large share of all patents are technical complements to other patents and therefore have little or no economic value standing alone.

\(^{21}\) Only the “patents-in-suit” seem to matter in most patent litigation. In very thick thickets, even counting—much less identifying—those myriad co-patentees is practically impossible. Moreover, in litigation, the alleged infringer may not have an incentive to produce evidence of co-patents for fear of litigation from those co-patentees (especially if the defendant has not acquired rights to use those other patents).

\(^{22}\) “The term ‘unpatented’ is meant to convey that the [other] components are not covered by the patent at issue in the case—not that they are literally unpatented. This convention is also followed in the case law. See Rite-Hite Corp. v. Kelley Co., 56 F.3d 1538, 1551 (Fed. Cir. 1995) (explicitly defining ‘unpatented’ as ‘not covered by the patent in suit’).” Brian J. Love, PATENTEE OVERCOMPENSATION and the ENTIRE MARKET VALUE RULE, 60 Stanford L. Rev. 263, 268 fn 15 (2007)., fn 15.
contribute a substantial share of the economic value of the product, so proper incentives to innovate must ensure that all—or at least a substantial share—of the patentees are rewarded adequately for their innovations, whether through royalties or foregoing royalties through cross-licensing among patentees. Having proper incentives for innovation necessarily means that no one or few patentees can receive excessive rewards without harming co-patentees, which effectively reduces the incentives for innovation; in fact many leading scholars believe that the patent system systematically over-rewards patentees and that the problem of “over-compensation” is growing of late.\textsuperscript{23} As explained by Lemley and Melamed, “In principle, patent damages could take account of the multiplicity of technologies in a product and allocate value among them accordingly; but that rarely happens... the intense focus in the trial on the patents-in-suit almost guarantees that their importance will be exaggerated... and the damages award will be based on an inflated sense of the value of the patents-in-suit.”\textsuperscript{24}

The rationale for over-rewarding patentees is based on an economic fallacy: that the greater the rewards to patentees, the greater the incentives for innovation, the more innovation. While that may be true up to a point, beyond that point—and in many cases, damage awards far exceed it—policies and practices that generate excessive rewards to some patentees harm the many other co-patentees (without whose complementary technologies there would be no products of the kind in question), because they fail to fully account for and proportionally reward the contributions of co-patents, thereby reducing incentives for innovation.\textsuperscript{25}


\textsuperscript{25} The harm is compounded by the fact that, the more co-patents in a product, the greater the likelihood that many of those patents are merely incremental—i.e. do not represent substantial advances in technology.
3. Patent Thickets and Royalty Stacking

Royalty stacking arises when a product potentially reads on a large number of patents held by many patentees, especially if a substantial share of those patents are “declared” or are “effectively” standard-essential patents. Problems of hold-up involving royalty stacking are exacerbated when there are a large number of patentees, which increases the severity of Cournot complements. Moreover, royalty meta-stacking arises when a product has many components and functionalities that read on multiple standards and many non-standards-based patents. For example, a smartphone utilizes at least 30 different standards (by some counts a multiple of that), for wireless communications, video display, Internet access, etc. Even before the increased royalty stacks embodied in today’s smartphones, Thelander estimated that mobile phone royalties may have run as high as 22.5% for WCDMA technology, plus 15-20% for GSM technology if the phone is dual band.

26 As a physical analogy, compare the case of a railroad, R, building a railway from A to B faces scenario (1) in which there is only a single landowner L and can therefore buy the right-of-way from L; to scenario (2) in which R has to negotiate with a large number of landowners (L₁, L₂, Lₙ) along the potential route(s). In the first case, L has an interest in accepting a “fair” share of the economic value created by the right-of-way and the operating railroad; in the second case, each landowner Lₙ has an economic incentive to hold-up R for a disproportionate share of the economic value produced by complementary inputs. In rights-of-way involving real property, this problem is solved by rights of eminent domain, which, unfortunately, do not apply to royalty stacks, even though they can cause the same kind of deadweight loss of consumer welfare.

27 Note that undeclared, but effectively standards-essential patents can be even more problematic: patentee has no FRAND obligation to an SSO (and could opportunistically withhold declaration to avoid).

28 “The Cournot-complements effect arises when multiple input owners each charge more than marginal cost for their input, thereby raising the price of the downstream product and reducing sales of that product. Effectively, each input supplier imposes a negative externality on other suppliers when it raises its price, because this reduces the number of units of the downstream product that are sold. As a result, if multiple input owners each control an essential input and separately set their input prices, output is depressed even below the level that would be set by a vertically integrated monopolist. The theory of Cournot complements teaches us that the royalty stacking problem is likely to be worse the greater the number of independent owners of patents that read on a product.” Lemley (2007), op.cit, p. 2013.

29 These estimates include only the royalties to companies who have identified essential patents; they exclude expected payments to important patent-holders such as AT&T. Michael W. Thelander, “The IPR Shell Game,” SIGNALS AHEAD, June 6, 2005.
Unfortunately, the potential economic rents from patent holdups are elevated by liberal patent-granting policy and high litigation costs. As noted by Burk & Lemley,\textsuperscript{30} the USPTO has a systematic bias toward granting patents, leading to “higher” stacks that often include invalid and weak patents and overly broad claims.\textsuperscript{31} This pro-patent bias is most pronounced for software patents, many of which could not have passed “novelty” or “prior art” tests had the PTO conducted thorough searches. Because software patents were relatively new in the 1990’s, the USPTO focus on searching prior patents—and the lack of standard terms in describing software—led to far too many software patents being granted. Recent jurisprudence has compounded the problem of excessive granting of software patents by overly-broad claim construction,\textsuperscript{32} enabling earlier-generation software patents to be used against current generation software. Even though these artificially-inflated patent stacks generate little or no additional economic value, they nevertheless increase the opportunities and incentives for holdup.

The larger the stack, the smaller the contribution of any patent to the market value of a product, yet damage awards seldom reflect that basic economic principle.\textsuperscript{33} Although most patent litigation does not go to trial, overly broad claims and excessive damage awards, along with the threat of injunction, greatly increase the hold-up value of invalid or weak patents. When settlement agreements or damage verdicts include running royalties on a per unit basis (x\% or $y\$)

\textsuperscript{30} Dan L Burk & Mark A. Lemley, THE PATENT CRISIS and HOW the COURTS CAN SOLVE IT (Univ. Of Chi. Press 2009).

\textsuperscript{31} Though weak patents or patents which would be eventually found invalid make little or no contribution to innovation or economic welfare, they nonetheless have substantial hold-up value due to high litigation costs and the financial risks of uncertain litigation outcomes.

\textsuperscript{32} “Software patents are routinely overbroad. Compared to patents on other fields of endeavor, software patents routinely grant inventors claims that reach further beyond the technology that an inventor has actually invented and disclosed… The overbreadth is a symptom of a broader failing of patent law that this Article terms the functionality malfunction.” Collins, “Patent Laws Functionality Malfunction and Its Implications for the Problem of Software Patent Overbreadth.” \textit{Washington Univ. Legal Studies}, No. 13-2-1 February 2013, pp. 1-2.

\textsuperscript{33} "Fact finders do... grant somewhat lower royalty rates for component inventions... approximately 10.0.0% compared with... 14.7% for integrated product claims, [which] is equivalent to a conclusion that there are on average less than 1.5 components in a multi-component inventions. Obviously this does not reflect commercial reality..." Lemley (2007), op.cit, p. #2036
per unit), the marginal costs of production are increased, amounting to a tax on those units. Tax incidence theory tells us those costs will be shifted to consumers. Unless and until patent royalties—or patent damages and settlements—take full account of the relative small contribution of any given patent (or small sub-set of patents) to the economic value of a patent-thick product, there will be excessive returns to those patentees who most aggressively prosecute their patents, exploiting royalty stacking by committing patent holdup.\textsuperscript{34}

For these reasons, Love (2007) argues that “[i]n its current form, the entire market value rule... exacerbates the effects of ‘royalty stacking. This problem arises from the fact that a complex product constructed from many components may be covered by a number of patents owned by an equally large number of patentees. As a result, the producer of such a product may infringe multiple patents and therefore be required to pay for multiple licenses. To the extent that patent damages rules allow for the overcompensation of patentees, the infringer faces the prospect of paying overlapping royalties. Royalty stacking in the entire market value rule context can be particularly egregious.”\textsuperscript{35}

Furthermore, the potential for an injunction against the whole product enables patentees to holdup defendants by threatening to enjoin products that are predominantly non-infringing. In addition to the threat of injunction, damage awards based on “reasonable royalties” far exceed the relative contribution of the few patents-in-suit to the total value of the product. Under the threat of excessive damage awards, patentees can earn economic rents by “merely” threatening to sue, then offer to settle for less than the target’s litigation costs, even though that settlement value may substantially exceed the economic value of patents.\textsuperscript{36}

\textsuperscript{34} In some cases, overcompensation to the patents in suit may not cause overcompensation to the patentee, i.e. when the patentee holds a sizeable portfolio of related patents that were excluded from the litigation due to the inherent limits on how many patents can be included.

\textsuperscript{35} Love (2007), op. cit, p. 280

\textsuperscript{36} Note also that challenging asserted patents through a litigated outcome can generate “positive externalities.” If patents are found invalid by any one defendant, those patents have a much lower value in targeting others. Absent
C. Fundamental Differences in Strategic Positions and Interests of PE & PAEs

1. Strategic Position and Interests of Practicing Entities

Practicing entities can earn returns on their innovation investments by selling products that practice their patents. Moreover, given the dynamic feedback loop between invention and innovation, PEs have an interest in using the knowledge gained at one stage of the development cycle to innovate at subsequent stages. For example, R&D in the product, combined with knowledge gained in making the product, creates opportunities and incentives for “downstream innovation” increasing the manufacturability, reducing the costs and/or improving the quality of the product.

While any given PE has an interest in earning returns to its R&D and resulting IP portfolio, it must balance that interest against its often greater interest in growing the market for its products, even if that means taking a “smaller slice” of the “larger pie.” Therefore, PEs have an interest in moderating their royalty claims against the types of products they sell. In addition, royalty and licensing demands of PEs are also moderated by “reputational effects,” since they often have to conduct business with those to whom they license or cross-license their patents on a continuing basis. Typically, PEs are engaged in “multi-period games” with co-patentees and licensees, as suppliers, marketing partners or by collaborating in SSOs and are therefore less likely to exploit opportunities for holdup in any one period.

One important way in which PEs “share” their IP is by cross-licensing their respective patents to their competitors and/or contribute them to standards with FRAND commitments to create a mass market for devices, networks and systems (by generating scale economies and large network effects to promote adoption). PEs often cross-license with other PEs at no-or-low royalties, which cumulatively do not encumber the price of the products, thereby ameliorating the potential problem of royalty stacking. The no-or-low royalty cross-licensing or pooling of PEs’ patents collective arrangements (e.g., joint defense agreements or litigation cost-sharing assistance from industry associations), a rationale actor will not incorporate those externalities into its decision to settle or litigate.
greatly expands the total size of the market, as firms realize scale economies in production and product prices are not burdened with high royalties. Reducing market prices increases total sales, providing opportunities for further reductions in manufacturing costs, and investments in R&D for continued innovation. As the total market grows, product lines become longer, increasing the ability of PEs to meet specific needs or demands of particular groups of consumers.

Cross-licenses among PEs are an effective way to deal with the excessive number of patents, uncertain coverage of the patents, and even the validity of patents. Any large patent portfolio typically includes strong and weak patents, valid and invalid patents, and infringed and non-infringed patents. In substantial cross-licenses, the “law of averages” works out, in that each party’s “probabilistic portfolio” includes patents that are invalid or weak, but also some that are valid and strong. PEs can build on their cross-licensed patents to earn higher profits by making further innovations to differentiate products, improve product quality, and/or improve production processes. In short, the strategic interests of PEs generate strong incentives for innovation and for cooperation among co-innovators. In a world of patent-thick products and systems, such cooperation is critical to successful innovation.

2. Strategic Position and Interests of Patent Assertion Entities

In contrast, PAEs earn no revenues or profits from making or selling products—only from charging royalties to those who do. The primary or even sole interest of PAEs is rent-seeking, often achieved through patent hold-ups. Because PAEs do not practice their own or others’ patents, there is no basis for “gains in trade” from cross-licensing on any basis—much less no-or-low royalties. PAEs only seek monetary awards, which raise the costs and prices of affected products. By definition, PAEs need have no fear of defense or retaliation by counter-attacks, so there is no way to prevent them from committing holdups: détente is not workable.

Under threat of litigation, PAEs can cause alleged infringers to settle, even though the patents or their claims are not disclosed, are not valid, and/or are not infringed, simply because the cost of
litigating even unmeritorious claims\textsuperscript{37} can substantially exceed the PAE’s settlement demands. Moreover, the transaction costs of litigation are highly asymmetric between PEs and PAEs, because the PE has employees and products involved in the innovation and production processes and the PAE does not. That asymmetry increases the incentive for PAE targets to settle for an amount that is greater than the economic value of the patent(s) but less than the cost of litigating. The gains from such holdup settlements can then be used by the PAE to “encourage” others to settle at levels that far exceed the actual economic value of the patents being asserted.

The threat of injunction further increases hold-up value and settlements; the more patents in the thicket, the greater the economic rents compared to the returns to innovation. Any payment to a PAE above the actual economic value of its patents constitutes a tax on consumers, a tax on innovation, or a combination thereof. Even though the sum of the royalties (plus damages) sought by PAEs may exceed the “carrying capacity” of a particular class of products, causing great harm to innovators and consumers, no individual PAE has an interest or incentive in moderating its claims. Therefore, PAEs are effectively exploiting the “commons” of patent thick products that have been created by the collective innovations made largely by PEs.

Because PAEs do not produce products, there is no potential for cross-licenses between PEs and PAEs, exacerbating the problems related to invalid and/or weak patents. Unless PAE targets are willing to bear the substantial costs of litigating, the hold-up value of invalid or weak patents can be substantial. Furthermore, while there are significant positive reputational effects moderating the conduct of PEs, they do not restrain PAE behavior, because of (1) PAEs’ single-minded objective in maximizing the hold-up value of their patents; and (2) PAEs do not conduct other business with their target companies. Indeed, there may be significant hold-up value to

\textsuperscript{37} “The data also show that cases filed by patent monetizers were unlikely to advance very far in the trial process and often settled prior to a summary judgment decision.” Sara Jeruss, Robin Cooper Feldman, and Joshua Walker, "The America Invents Act 500: Effects of Patent Monetization Entities on US Litigation." 11 Duke Law & Technology Review 357, 370 (2012). Available at: \url{http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2158455}
generating a negative reputation: being known as the “baddest and most aggressive” patent assertion entity can increase the likelihood of early settlements reducing the PAE’s litigation costs and decreasing the chance that its patents will be found invalid, not infringed, or of little economic value in litigation.

D. Assertion Activities of PAEs

1. **PAEs Exploit Deficiencies in the Patent System**

PAEs and their defenders often argue that they perform a valuable role in promoting innovation by creating a secondary market for patents and rewarding inventors. PAEs claim that they “identify undervalued patents and invest time and effort marketing those patents to other firms...a simple case of arbitrage.”  

If most patents were actually valid and claims clearly disclosed real advances in innovation, perhaps such arbitrage would promote the public interest. If that is not the case—and substantial evidence suggests it is not—the arguments that PAEs promote innovation by facilitating invention misses the mark. Kesan and Banic show why “viewing patents as incomplete contracts is a useful means to analyze the relationship between legal institutions of patent enforcement and investment in R&D.”  

Fiona Scott Morton has emphasized that patents are incomplete contracts and explained why that is critical to analyzing the effects of PAEs and patent acquisitions on competition and innovation.

The exploitation of deficiencies in the patent system is being further compounded by the dramatic growth in secondary markets for patents. Secondary markets often increase the

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realization of the economic value of traded assets—and to some degree patent markets may do that. However, it is apparent that:

“The functioning of the patents market doesn’t drive patents’ value. The malfunctioning of the patent system drives patents’ value. If patents were clear and easy to understand, then only those patents that were being used commercially would have monetary value. That’s a tiny fraction of issued patents. But most patents aren’t clear. They’re extremely difficult to interpret, and it costs thousands of dollars just to get a lawyer’s opinion on what a patent covers. The only way to have a definite answer with respect to what a patent means is to spend millions of dollars on litigation.”

Thus, in many cases, secondary markets facilitate rent-seeking based on the holdup value of traded patents, not their economic value—as would be measured by their incremental contribution to innovation. According to Love, “NPEs are especially litigious, overwhelmingly assert high-tech patents, and lose at a relatively high rate when their infringement claims are adjudicated on the merits.”

For those reasons, Chien argues that “conventional notions of patent value need to be revised. The same patent has a much greater “exclusion value”—which I define as the value likely to be extracted from the patent—when held by a patent-assertion entity rather than a company vulnerable to countersuit.”

“[t]he patent world... is far from perfect. In fact the same market imperfections that fuel the trolling phenomenon are likely to prevent the market for patent monetization from offering the positive effects contemplated and to create harm instead. The aspects of the patent system that ensure high transaction costs, encourage nuisance litigation, and create incentives for inefficient behaviors will carry over to the new patent system with the addition of aggregators. The overarching problem is that it is difficult, if not impossible, to get a quick and inexpensive answer in a patent dispute.... Patent litigation is lengthy and expensive, so the


42 Love (2013), op.cit, p. # 1313

cost of testing whether a particular threat of infringement has merit will be high. The cost is so high, in fact, that testing a threat can easily exceed the cost of settlement, and parties may rationally choose to pay a complainant even when the claims seem quite weak...

The patent system is plagued by a vast supply of patents, many of which may be quite weak. The present system for granting patents does not overtly consider the overall patent supply in a given technical area in granting new patents. In addition, regardless of whether the patent is weak or strong, the range of each patent cannot be determined without a large investment of time and effort, and any pre-litigation predictions about the scope of a patent may prove incredibly wrong.”

Thus, PAEs do not merely exploit flaws in the patent system: they compound the harm caused by those flaws. As noted, two of the most important driving forces of increased patent assertion are the large and asymmetric costs of patent litigation and excessive damage awards due to the apportionment failure. The secondary market for patents and dramatic increase in the number of PAEs has contributed mightily to an increase in the number of assertion entities. As patent portfolios are disaggregated—for whatever reasons—there is a disproportional increase in the number of potential holdups and excessive damage awards. Thus, I concur with Lemley and Melamed that “many of the problems associated with trolls are in fact problems that stem from the disaggregation of complementary patents into too many different hands.”

Moreover, Fischer and Henkel emphasize that several aspects of the current patent enforcement system are biased in favor of PAEs, including: (1) “The patent system and its implementation induce infringement by allowing patents on trivial or not novel inventions,” which leads to patent infringements on inventions that engineers do not even think of checking for patent clearance; (2) “Patents may not be clearly delineated, in which case it is difficult to decide if a patent reads on a product or not,” which leads to infringement even when the infringer is unaware of the patent; and (3) “The more burdensome patent clearance, the more likely it is that

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45 Lemley (2013), op.cit, pp. 3-4.
some relevant patent slips an innovator’s attention. This problem is particularly prevalent in complex product technologies.”

If granting too many patents weren’t bad enough, these problems are compounded by a standard of legal review that presumes the validity of patents—notwithstanding the abundant evidence that many are not. PAEs have strong incentives and many opportunities to exploit that bias in the enforcement of patents. As Lichtman concludes, “the presumption of validity backfires. Rather than protecting accurate initial decisions from inefficient later meddling, the presumption precludes what would often be a worthwhile second look. As a result, courts today regularly enforce overbroad and undeserved patents, and strategic applicants continue to apply for undeserved patents knowing that there is a good chance the PTO will err.”

2. The Role of PAEs in Patent Enforcement

A number of recent empirical studies of patent assertion and enforcement activities have concluded that the role of PAEs has been growing rapidly and represents a substantial share of all patent assertions. Allison, Lemley and Walker found that “Non-practicing entities are clearly an important phenomenon in the modern patent system. While they account for only about 16% of the once-litigated patents, they represent over 80% of the suits filed involving the most-litigated patents, and own more than 50% of the most-litigated patents themselves.”

Their study compared the 106 most frequently litigated patents to a control group of once-litigated patents: “[t]he results are startling. The most-litigated patents are far more likely to be software and telecommunications patents, not mechanical or other types of patents. They are significantly different from once-litigated patents in ways that signal their value up front. And they are

46 Fischer (2011), op.cit.
disproportionately owned by nonpracticing entities (i.e., ‘trolls’).” 49 Recent “[e]mpirical evidence suggests that the most-litigated patents, which are responsible for more than 10% of all patent assertions, are overwhelmingly software patents and that cases involving those patents are (1) overwhelmingly filed by patent trolls, and (2) overwhelmingly unsuccessful when litigated to judgment.” 50

Cheng, Lan and Liu emphasize that the effect of NPEs on patent market dynamics depends critically on the specific features of NPEs. 51 They argue that NPEs with R&D capabilities can “integrate knowledge from both the innovation market and the product market,” can more easily monetize their intellectual licensing through licensing, and are thus more likely to interact with PEs through cooperative licensing and assignment, rather than litigation. Conversely, the authors argue that NPEs without R&D capabilities are much more likely to engage in “legal wars” with PEs. Thus, it is important to distinguish patent assertion entities (or alternatively, “patent monetization entities”) from other NPEs, in assessing the costs and benefits of patent-holding and assertion.

In a study comparing patent suits over an eight-year period, Professor Chien found that “Counting suits based on the number of defendants and including DJ [declaratory judgment] cases, the NPE share rises to 28% of all high-tech patent suits. This average reflects an increase in NPE suits as a proportion of all suits over an eight-year period, from 22% in 2000–2001 to 36% in 2006 to March 2008, counting defendants, or from 10% to 20%, counting cases.” 52 A subsequent paper by Professor Chien found that “although large companies tend to dominate patent headlines, most unique defendants to troll suits are small. Companies with less than $100M annual revenue

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49 Using data on patent suits filed between 2000 and 2007 from the Stanford IP Clearinghouse. ibid., p. 3.

50 Lemley (2013), op.cit, p. 6.


52 Chien (2009), op.cit, p. 1571.
represent at least 66% of unique defendants and the majority of them make much less than that: at least 55% of unique defendants in PAE suits make under $10M per year."\textsuperscript{53}

An initial study (based on a sample of patent litigations) by Jeruss, Feldman and Walker found that “[L]awsuits filed by [patent] monetizers increased from 22% of the cases filed five years ago to almost 40% of the cases filed in the most recent year.”\textsuperscript{54} This research has subsequently been expanded to include 100% of patent litigations over a four-year period,\textsuperscript{55} on the basis of which the authors conclude:

“Patent infringement litigation by patent monetization entities has risen dramatically over a remarkably short period of time. One of the most striking results is the following: in 2012, litigation by patent monetization entities now represents a majority of the patent litigation filed in the United States [emphasis in original]. Specifically, patent monetization entities filed 58.7% of the patent lawsuits in 2012. This is a sharp rise from 2007, when patent monetization entities filed only 24.6% of patent infringement litigations.\textsuperscript{56}

Our data also show that the parties who file the highest number of patent lawsuits are generally monetizers. Of the 10 parties who filed the greatest number of patent litigations in the years we studied, all were patent monetization entities.”\textsuperscript{57}

These findings are consistent with two recent studies by Patent Freedom, which reported that “In 2010, operating companies in the US found themselves in lawsuits initiated by nonpracticing entities (NPEs) more than 2,600 times, over five times more often than in 2004.”\textsuperscript{58} In its most recent report on NPEs, Patent Freedom found that “Patent lawsuits involving NPEs have increased dramatically over the last decade. In 2011, another record setting year, there were more than

\textsuperscript{54} Jeruss (2012), op.cit, p. 370.
\textsuperscript{55} The authors coded all of the patent litigations filed in four years, 2007-8 and 2011-12, analyzing 13,000 cases and the 30,000 patents asserted in those cases. ibid., p. 370.
\textsuperscript{56} ibid.
\textsuperscript{57} ibid.
5,200 occasions when a company found itself in litigation with an NPE, a number that has increased by an average of over 36% per year since 2004.\textsuperscript{59}

3. \textit{Technological Changes Will Continue to Increase the Density of Patent Thickets and Opportunities for Patent Holdup}

All signs point toward the continued integration of devices, with expanded features and functionality. The more components are incorporated in a device, and the more features and functions of a device, the more patents it will implicate. These developments portend a growing number of patentees who can assert patents against the makers, sellers or users of the device, increasing the likelihood of opportunistic rent-seeking patent holdups against device makers, sellers and/or users.

These trends will be compounded by the continued and increasing development of standards to facilitate or enable interconnection and interoperability, which will increase the number of standards embodied in these integrated devices. The problems associated with royalty-stacking and meta-stacking will increase accordingly and geometrically.

The continued rapid growth of wireless communications capabilities will ensure that more devices will be interconnected to other devices, for example smartphones to mobile network; office PCs to servers, other PCs, multi-function printer-copier-scanners; mobile devices to payment systems. In addition to the royalty stacks embodied in each of the interconnection devices, there are many patents on the methods of connecting those devices and methods of using those connected systems.

A growing share of the capabilities or computing and communications devices are generated by software (e.g., transforming a mobile phone into a smartphone requires an operating system; much of the functionality of a smartphone is generated by native apps or installed apps enabled by that operating system). As noted above, software patents are especially problematic (e.g., failure

to reject on prior art, overly broad claims), but these problems only increase the gap between economic and holdup value.

In addition, many “traditional” products are being transformed by the addition of computing and communications capabilities, including autos, kitchen appliances, TVs, temperature control systems, and lighting systems. On their current technological trajectory, these products will incorporate operating systems and applications software, and will be connected to the Internet for diagnosis, monitoring, and control. These richer patent-thick targets portend more patent aggression against innovators, makers, sellers, and users of these products and systems.

4. **Without Reforms, PAE Assertion and Litigation Will continue to Grow Dramatically**

Finally, it is imperative that regulators and legislators realize that economic forces will, absent significant patent reforms and active antitrust enforcement, cause the incidence of PAE patent aggression to grow and the economic harm caused by PAEs to proliferate and accelerate. There are several technological forces that will cause the number of patent thick products and systems to continue to grow, including: the integration of more features, functions and components in devices; the greater interconnection of more devices into patent-thick systems; the spread of “intelligence” to traditional products; and the growing importance of software applications and software patents. Moreover, institutional innovations by PAEs, feedback loops in the secondary market for patents, and the markets for corporate control are increasing the opportunities and the potential for earning economic rents by transferring and exploiting the holdup value of patents. Thus, it is readily apparent that the dramatic spike in PAEs and their assertion activities is not a passing phase; quite the contrary, in classical marketing terms, we are only at the “takeoff” stage of the “PAE product life cycle.” If unabated by policy reforms and remedial actions, PAEs—and the transfer of patents to PAEs—will cause even greater harm in the future.

The larger the share of patents in a portfolio that are implicated in one or more patent stacks, and the taller are those stacks, the greater the opportunities for and economic rents from hold-up by whomever controls those patents. The greater the hold-up value of a portfolio relative to its
current use, the greater the pressure on the current owner to “put it in play” and maximize the returns through patent aggression or transfer to a patent aggressor, typically a PAE, which is not “encumbered” by reputational concerns or contributing to the innovation commons.

The market for control has an inherent “positive” feedback loop, which will accelerate the rate of change in control and elevate the price of patent assets to reflect their most aggressive “rent-seeking use,” far above the socially optimal returns (which are defined by that level of rewards needed to generate innovation). Changes in control can further increase economic rents if the transaction is used to abrogate commitments or obligations of the prior owner (e.g. licenses, cross-licenses, FRAND). Because of the Cournot complements problem, the whole is less than the sum of the parts: therefore the value of a large portfolio can be increased by selling it in pieces, which creates an additional incentive for increased transactions involving portions of patent portfolios.

The most aggressive bad practices of patent-holders affects (at the limit, determines) the value of any given patent portfolio (or portions thereof). The developing market for patents incentivizes “good actors” to sell their patents or licensing rights to “bad actors.” Institutional “innovation” by PAEs that are successful in generating economic rents will be quickly copied, even though they harm innovation and consumer welfare. There has been a substantial expansion in financing available for PAEs, from private equity and venture capital firms, which are accustomed to high risk-high reward investments. Moreover, as large PEs fail, market pressures to sell or license their patent portfolios as their only or most valuable asset will rise, for distribution to debtors/equity owners or to finance reorganization. And, in many cases, the most valuable asset of failed/failing innovative startups is their patent portfolio, which, increasingly venture capital investors will put on the market to realize some return of/on their investments.

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60 Even if the attempt ultimately fails, it adds to the cost and risk of litigation by potential licensees, biasing them toward unfavorable settlements.
E. Types of Economic Harms Caused by PAEs

1. **PAEs Seek Injunctions That Harm Co-Patentees & Innovation**

   The potential for an injunction against the whole product can and does permit patentees to hold up defendants by threatening to enjoin a product even if the product is predominantly non-infringing. Although both U.S. Courts and the ITC are supposed to take account of “the public interest” in deciding whether to enjoin a product that has been found to infringe, those decisions typically give little or no weight to the potential harm to co-patentees and the public interest in not allowing some patentees to extract the economic value that should be attributed to co-patentees.

   When an injunction is granted to one patentee of a patent-thick product, co-patentees can be harmed due to: (a) loss of licensing royalties that would have been earned from sale of the now-enjoined product; (b) the loss of sales of components used in the enjoined product (which typically include co-patents); (c) the general harm of increased risk and uncertainty in the industry affected by the injunction (which is substantially greater if industry standards are involved).

   Failure to incorporate these public interest effects on co-patentees increases the likelihood—and therefore the “threat value”—of injunctions; both Courts and the ITC should be encouraged (perhaps even required) to take account of the harm injunctions cause to co-patentees and the reduced incentives for innovation. Moreover, the “mere” threat of injunction can easily enable a patentee to extract settlement payments far exceeding the amount that the patentee could expect to earn in damages based on reasonable royalties (i.e., the hold-up value), which harms co-inventors and consumers, and reduces the incentives for innovation in the industry.

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61 In eBay Inc. v. MercExchange, L.L.C., 547 U.S. 388 (2006), the Supreme Court unanimously determined that an injunction should not automatically issue based on a finding of patent infringement. Instead, a federal court must still weigh the four factors traditionally used to determine if an injunction should issue.
2. **PAEs Seek Unreasonable Royalties that Harm Co-Patentees & Innovation**

In addition to the threat of injunction, typical damage awards based on “reasonable royalties” far exceed the relative contribution of the few patents-in-suit to the total value of the product. The “thicker” the thicket, the smaller the contribution of any patent to the entire market value of the product, yet damage awards do not reflect that fact. Although the worst excesses have been somewhat moderated by recent court decisions, the continued use of the “entire market value” rule systematically generates excessive royalties and overcompensation to patentees.

“When the [entire market value] doctrine is applied but the patent at issue accounts for less than this entire value, patentees are awarded for value they did not create. This overcompensation results in socially undesirable consequences such as reduced incentives for investment in beneficial technology, increased risk of royalty stacking, and increased incentive for patent trolling. To prevent overcompensation and its attendant harms, the entire market value rule must be scaled back to its original role as a special case of the apportionment requirement, such that it may not be applied unless—as its name suggests—the patent at issue indeed accounts for the entire value of the infringing article.”

“This analysis further demonstrates that for the entire market value rule to be applied at the benchmark level two conditions must be satisfied: (i) all unpatented components of the accused device must have zero value independent of the infringing component, and (ii) the patented invention itself must not have a reasonable alternative. Application of the entire market value rule to award patent infringement damages based on an entire product is equivalent to awarding damages for infringement of a hypothetical patent covering the entire product.”

In combination, these conditions will rarely be satisfied. However, case law shows that “the Federal Circuit nonetheless routinely affirms damages awards granted under the doctrine despite

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62 "Fact finders do... grant somewhat lower royalty rates for component inventions... approximately 10.0% compared with... 14.7% for integrated product claims, [which] is equivalent to a conclusion that there are on average less than 1.5 components in a multi-component inventions. Obviously this does not reflect commercial reality..." Lemley (2007), op.cit, p. 2036.

63 "Over the last year, and as recently as this March, a pattern of cases [citing, inter alia, Cornell v HP, Lucent v. Gateway/Microsoft] has developed addressing the issue of damages apportionment in patent infringement litigation. The results seem to signal a stricter evidentiary standard for damages generally and the application of the Entire Market Value Rule in particular.” Law360, New York (April 12, 2010).

64 Love (2007), op.cit, p. #272

65 ibid., p. 274.
clear evidence that unpatented components have independent value or that reasonable alternatives exist for the patented invention.\textsuperscript{66}

Unfortunately, these upward biases in “reasonable royalties” in cases involving patent-thick products have been further compounded by courts, which deliberately increase damage awards to patentees as a “deterrent against infringing.”\textsuperscript{67} Landers argues that “[R]easonable royalty awards have delivered inexplicably harsh results in a system in which the infringer may be liable for an amount disproportionate to the harm caused. For example, in some instances, royalty rates exceed the infringing product’s selling price. Rather than creating a system that carefully balances the rights of patent holders against those of subsequent improvers, the patent system has granted the biggest wins to nonpracticing entities, who inexplicably obtain jury awards that average three times those of patentees who practice their inventions.”\textsuperscript{68}

Love concurs that “[w]hen courts award infringement damages that are greater than the intrinsic value of the litigated patents, they send the message to patent owners that aggressive enforcement of their patent rights will be more profitable than using those inventions to bring products to market.”\textsuperscript{69} Patent valuation methods that emphasize quantity over quality (e.g. numeric proportionality) exacerbate the problem of excessive rewards to patentees, further compounded by the proliferation of poor quality patents.

3. \textit{Unreasonable Settlements with PAEs’ Harm Co-Patentees & Innovation}

The threat of injunction and the likelihood of excessive rewards generate settlements that exceed the economic contribution of the patentee to patent-thick products, which amounts to a tax on the innovations of co-patentees. The high cost of defending patent litigation further compounds the problem, because defendants find it economically rational to settle for amounts

\textsuperscript{66} Ibid.


\textsuperscript{69} Love (2007), op.cit, p. # 280-281
that far exceed the true economic value of the patents-in-suit, rather than face extraordinary litigation costs and the uncertainty of an excessive damage award.\textsuperscript{70}

Because patent challenges are public goods, they will be undersupplied “because the benefits of patent challenges, but not patent licenses, spill over to others; accused infringers’ reluctance to fight back reduces social welfare and increases opportunities for holdup by artificially extending the life of weak and abused patents.”\textsuperscript{71} Settlements generate additional negative externalities and harm co-patentees because publicizing the settlements can be used in holding up similar alleged infringers (and are also often cited in arguing for excessive royalties in litigation). Hence, there is a negative feedback loop: patent abuse leads to excessive rewards, which increase the value of patent assets to patent abusers, which causes excessive patenting, which detracts from true value-generating innovation.

These distortions are further compounded as excess returns to patents increase the market value of patents and the incentives for spinning off patent assets; this downward cycle increases the likelihood that the “market for control” will pressure owners to spin off assets to the worst possible buyers (unless a “good buyer” is willing to pay slightly more than a “bad buyer” would pay). Evidence indicates that PAE assertions actually increase as the economic value of patents decreases, i.e. at the end of their terms. Love examined data on patent enforcement undertaken prior to expiration for a random sample of recently-expired patents to determine the relative timing of suits filed by NPEs compared to PEs:

“[t]he average troll-owned patent in my study changed hands twice over a 12-year span before it was asserted for the first time... the final few years of the patent term overwhelmingly benefit patent trolls asserting grossly outdated patents... The degree to which NPEs dominate the final few years of the patent term is especially shocking. Though asserting just over twenty percent of all studied patents, NPEs account for more than two-thirds of suits

\textsuperscript{70} The systemic flaws in patent damage awards enable and incentivize PAEs to commit patent holdup even when their portfolios include many invalid or weak patents: 92% of PAE’s lose on merits judgments. John R. Allison, Mark A. Lemley & Joshua Walker, Patent Quality and Settlements among Repeat Patent Litigants, 99 GEO. L.J. 677, 694 (2011).

\textsuperscript{71} Love (2009), op.cit, p. 943. This quote doesn’t match this source; find correct source.
and over eighty percent of patent claims litigated in the final three years of the patent term.\textsuperscript{72}

4. \textit{Estimates of Economic Harm Caused by PAEs}

For a number of reasons, it is difficult to measure the aggregated harm that has been caused by PAEs on innovation and economic performance. Estimating future harm is even more difficult; unfortunately, given the dramatic increases in PAE assertions and litigations, and the technological trajectory that ensures increasingly target-rich patent thickets, those harms will surely grow if patent and other public policies do not change.

By examining stock price behavior around the filing of the patent suits, Bessen, Meurer and Ford estimated that “NPE lawsuits are associated with half a trillion dollars of lost wealth to defendants from 1990 through 2010” and that “During the last four years the lost wealth has averaged over $80 billion per year.” Further, they found that “very little of this loss of wealth represents a transfer to inventors. This suggests that the loss of incentives to the defendant firms is not matched by an increase in incentives to other inventors.”\textsuperscript{73} In a subsequent study, Bessen and Meurer (2012) found that

“[t]he direct costs of NPE patent assertions are substantial, totaling about $29 billion accrued in 2011. This figure does not include indirect costs to the defendant’s business such as diversion of resources, delays in new products, and loss of market share. Even so, the direct costs are large relative to total business spending on R&D, which totaled $247 billion in 2009 (NSF 2012), implying that NPE patent assertions effectively impose a significant tax on investment in innovation... Much of this burden falls on small and medium-sized companies who make up 90% of the companies sued, accounting for 59% of the defenses, and who pay about 37% of the direct costs. The median revenue of companies sued by NPEs is $10.8 million.”

\textsuperscript{72} “Notably, NPEs’ domination of late-term litigation is almost completely attributable to firms that do nothing more than hold patents. NPEs that many do not consider trolls – universities and individual inventors, in particular – do not drive the results.” Love (2013), op.cit, p. # 1312

\textsuperscript{73} Bessen (2011), op.cit
The authors further explain that a third of the total cost to defendants is associated with patent claims that never go to court. On that basis, they conclude that

“NPE patent assertions hurt small inventors in at least two ways. As we have seen, the majority of defendants in NPE lawsuits are small/medium companies and these companies accrue larger costs relative to their size. Small/medium firms accrue 37% of the costs, but small inventors receive at most 21% of NPE costs. Also, these costs make things more difficult for small inventors who wish to license their technology—not just their patents—to other firms. If the prospective licensees expect NPE-related costs, they will be less willing to license from small inventors or they will not be willing to pay as much.”

Love’s empirical analysis of the relative ages of patents litigated found that NPEs, “enforcers of just twenty percent of all studied patents, are responsible for more than two-thirds of all suits and over eighty percent of all patent claims litigated in the final three years of the patent term.” PEs usually enforce their patents soon after issuance and have ended their enforcement activities well before their patents expire. In contrast, NPEs “begin asserting their patents relatively late in the patent term and frequently continue to litigate their patents to expiration.”

Love thus concludes that the costs of NPE litigation outweigh its benefits: “In fact, [these results] cast serious doubt on NPEs’ chief alleged benefits: that paper patentees help create a market for innovation and contribute to the dissemination of useful technology. Instead, it seems, NPEs overwhelmingly wait to assert their rights until the underlying technology is stale and unlikely to be of much use to accused infringers, who very likely independently developed the technology years earlier… Further because NPEs primarily value patents for their usefulness in extracting royalties and damages from product-producing companies these patentees should

74 ibid., p. #25
75 Bessen (2012), op.cit, p. [?].
76 Love (2013), op.cit, p. 1312.
77 ibid.
generally wait to file suit until a lucrative industry has developed and continue filing suits as long
as deep-pocketed targets remain.”78

Tucker’s case study of the effects of patent litigation of medical imaging technology supports the proposition that PAE litigation causes harm to innovation:

“the manner in which patent assertion entities enforce their property rights—lengthy litigation proceedings—may itself harm technology diffusion. Litigation by patent assertion entities may be more drawn out than other forms of patent litigation. This is partially because there is asymmetry in the harm that uncertainty from litigation poses to a firm that manufactures goods verses a firm that does not manufacture goods. [L]engthy litigation... can have real economic effects due to the lack of incremental innovation in the period when litigation is ongoing.”79

Finally, in contrast to the harm caused by PAEs through excessive litigation and other assertion activities, broad industry cross-licensing arrangements historically created “patent peace,” which enabled and incentivized the commercialization of invention through the innovation process. Thus, while Lemley and Melamed are correct that there are “opportunity costs” of cross-licenses, those costs are much more likely to steer resources toward further innovation and away from expenditures on litigation and defensive moves, which detract from innovation.80

F. Harm to Competition and Innovation by Privateering

1. Privateering and Hybrid PAEs

As discussed in the prior sections, litigation and assertion activities of PAEs are increasing dramatically; unless patent and related policy reforms are implemented, there is every reason to believe that this escalating trend will continue, as will the economic harm to innovation. Of particular concern—especially as relates to the use of antitrust enforcement by public agencies or

78 ibid., p. 1317.
80 “A cross-license among industry participants puts an implicit value on the patents owned by each side. That value might not be fully understood, or it might be underestimated, but it is real nevertheless.” Lemley (2013), op.cit, p. #14
private actions—is the transfer of patents by a PE to PAEs with conditions or incentives that cause the PAE(s) to target the competitors of the PE in downstream markets. Many transfers of patents from PEs to PAEs do not create incentives for the PAE to target competitors. Such transfers may contribute to the general rise in patent litigation and may impose social welfare costs, but they are not the focus of this section. Instead, we will focus on issues that arise when a PE transfers patents to a PAE with the intended or likely effect of those patents being used against the competitors of the PE. Carl Shapiro has referred to such PAEs as “Hybrid PAEs,” reflecting the fact that their interests and incentives are affected by the competitive interests of the PE from which their patents were transferred.81

Such transfers from PEs to Hybrid PAEs are one form of “privateering,” as explained by Thomas Ewing:

“A corporation or investor serving as the sponsor for an IP privateering engagement employs third-party IPRs as competitive tools. The privateer, a specialized form of non-practicing entity (NPE), asserts the IPRs against target companies selected by the sponsor. The sponsor’s benefits do not typically arise directly from the third party’s case against a target but arise consequentially from the changed competitive environment brought about by the third party’s IPR assertion… [T]he sponsor’s benefits may include nudging the target into a less competitive position, facilitating the licensing of a larger collection of the sponsor’s own IPRs, and causing a beneficial change to the target’s share price and/or corporate valuation. The third-party privateer’s motivation comprises collecting a litigation settlement or damages award. IP privateering… can be defined as: the assertion of IPRs by an entity (the privateer), typically in the form of an NPE, against a target company for the direct benefit of the privateer and the consequential benefit of a sponsor, where the consequential benefits are significantly greater than the direct benefits.”82

As expressed by Lemley and Melamed, “Patent assertions by practicing entities can create just as many problems as assertions by patent trolls… In addition, practicing entities are increasingly engaging in ‘patent privateering,’ in which product-producing companies take on many of the attributes of trolls. Put differently, while trolls exploit problems with the patent system, they are

81 Shapiro (2012), op.cit
82 Ewing (2011), op.cit, p. #35
not the only ones that do so.” Of course, in many cases, transfers of patents by PEs to PAEs do not involve targeting of competitors. A recent study by Michael Risch found that most troll-owned patents come from practicing entities spinning off part of their portfolio. Tom Ewing has provided an excellent typology of privateering based on the key characteristics and traits of the parties, including the PEs and PAEs and their corporate or investor sponsors. And, many PAEs are former PEs that were once in the business of producing products, but no longer do so. Instead, they focus their efforts on monetizing their own patents, so that no patent transfer is involved.

However PAEs came to hold their patents, PAEs are first and foremost “monetizers,” i.e. they attempt to maximize revenues from licensing, litigation settlements, and/or damages awards (whether lump sums or running royalties). Only in particular circumstances—which we address in this section—do monetizers have incentives to target a particular class of competitors in an industry. In many cases, PAEs attempt to monetize from as many assertion targets as possible and do not discriminate among those targets on the basis of their competitive positions in the industry. Indeed, some of the worst abuses by PAEs occur because they are indiscriminate in their assertion activities—bringing infringement claims or litigation threats against very large numbers, with little or no effort to determine whether, in fact, the targets of such threats actually practice the patents asserted, much less infringe those patents.

Thus, there is a fundamental difference between the economic incentives of PAEs and Hybrid PAEs, due to the competitive (or anticompetitive) benefits of patent assertion against the CPEs’ rivals. As explained by Lemley and Melamed,

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83 Lemley (2013), op.cit, p. #3
85 Ewing (2011), op.cit, p. #35
86 Once former PEs become “pure” PAEs, they often buy additional patents to assert.
“A revenue maximizing patent holder, whether a practicing entity or a troll, will not seek royalties above the level that maximizes its revenues. Some practicing entities [or, a Hybrid PAE], however, are willing to seek running royalties above that level. They are acting, not to maximize revenues from their patent, but to maximize profits from their product business. Their objective is to impose royalty costs on competitors that will reduce demand for the competitor’s products and thereby increase demand for their own products. They will seek to do so as long as the additional profits from product sales they can generate exceed the royalty revenues they sacrifice to pursue the scheme. In effect they[y] are willing for strategic reasons to charge supramonopoly prices.”

Thus, not surprisingly,

“[P]roducing entities… have begun to pursue a troll-like asymmetry through the transfer of patent portfolios to other parties. The benefits of such patent transfers are both financial and strategic. In 2011, Microsoft, Nokia and MOSAID entered into an agreement wherein MOSAID acquired and licensed back approximately 2,000 Nokia patents, many related to standard technology for wireless compliant handsets. In exchange for the transfer, MOSAID will pursue licensing (and litigation) with third parties, paying two-thirds of the collected royalties to Microsoft and Nokia. Since MOSAID is a non-practicing entity, the effect of this transfer arrangement is to eliminate the threat of counterclaims that would exist if Nokia or Microsoft pursued licensing arrangements themselves.”

2. **Rationale for CPE Privateering by Hybrid PAEs**

There are a number of reasons why a CPE would choose to use privateering against its rivals, rather than assert its patents directly: to exploit litigation risk asymmetries and reduce the likelihood of countersuits; to reduce the reputational harms of direct assertion; to avoid contractual commitments (or reduce the costs of honoring those commitments); and to reduce its antitrust exposure. We address each of these rationales in turn.

As explained in Section E above, there is a fundamental difference between a PE and a PAE in the risks and costs of litigation, because the former produces products and the latter does not. Thus, if a CPE asserted its patents against it rivals directly, it would risk countersuits brought by those rivals. That is not to say that such direct assertion and counter-assertion by rivals does not

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87 Lemley (2013), op.cit, p. 28.

occur, but that privateering adds another dimension for attacking rivals. Moreover, Hybrid PAEs can exploit asymmetries in litigation costs (e.g. discovery) by imposing or threatening to impose those costs to put pressure on target PEs to settle. In principle, the target of a Hybrid PAE could reciprocate by bringing or threatening litigation against the CPE-sponsor of the Hybrid, the lack of transparency in many CPE-Hybrid relationships makes that problematic.

CPEs may also outsource some of their patent assertions against rivals to avoid or reduce the reputational harms associated with such aggressive tactics by a PE, and to exploit the reputational benefits of aggressive assertion by PAEs. Very often, PEs are engaged in “repeat games” with their rivals, involving standard-setting and/or other forms of industry collaboration. If a CPE gains a reputation for aggressive patent assertion, other industry players may be less likely to cooperate with that CPE in the future. For example, if a CPE aggressively prosecutes its standards-essential patents from a prior round of the standard-setting against its rivals, those rivals may be less likely to support the proposals of that CPE in current or future rounds of standard-setting. By transferring SEPs to Hybrid PAEs, a CPE might not be held as accountable for such assertion activities by its sponsored PAE.

Conversely, CPEs may transfer patents to Hybrid PAEs to exploit the potential advantages of the negative reputation of the PAE. Since one important objective of the transfer is to have the Hybrid target the CPEs’ rivals, the greater the reputation of the PAE for aggressive tactics, the greater the risk and costs of not agreeing to settle by licensing the patents. In the simple economics of holdup: the greater the risks and costs of litigation, the greater the likelihood and expected value of a settlement. Whereas there are significant business costs associated with negative reputation for a PE, it may be economically rational for a Hybrid (and other PAEs) to cultivate a negative reputation, to increase its ability to monetize its patents.

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89 For example, the smartphone patent wars between Apple and Samsung, Apple and Motorola, and the like.

90 Although, as the number of entities which engage in aggressive patent assertion grows, there may be a corresponding decline in the negative reputational effects associated with such conduct.
A third rationale for CPE privateering is that it may provide a means of avoiding various contractual commitments, or reducing the cost of those commitments. Two important instances of such commitments are FRAND licensing and “no royalty stacking.” Although it would be good economic policy to have such commitments “travel” with SEPs when they are transferred, that is not necessarily the case (at least not in all jurisdictions). Therefore, a Hybrid PAE may attempt to abrogate such commitments through novel legal strategies, venue-shopping and the like. Even if they ultimately fail to avoid such commitments, such efforts can raise the uncertainty and litigation risks faced by targeted rivals of the sponsoring CPE.

Another form of avoiding commitments is especially troubling, namely commitments made by a CPE to antitrust enforcement agencies during the process of reviewing the transfer of a patent portfolio to a PAE. The agency might well rely on such commitments in reaching a determination that the transaction will not violate antitrust laws. Yet, absent binding commitments—such as those that might be incorporated in a consent decree—it may well be possible for the Hybrid PAE to ignore those commitments in the course of pursuing its patent assertions against the CPE’s rivals. Though there may be some risk of detection (perhaps upon complaints to the agency by those rivals), the lack of monitoring and reporting requirements by agencies would, at minimum, lower the risk and raise the costs of detection of broken commitments.

Finally, a CPE may attempt to use privateering to reduce its antitrust exposure, either to public enforcement actions or in private litigation. If the CPE were to attack its competitors directly, there is a risk that enforcement agencies could take action against it (which is not to say that enforcement agencies should not bring actions against CPEs that use privateers of their own making to attack competitors). Alternatively, the target of such direct CPE assertion could elicit

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91 “Privateering, per se, does not appear to give rise to civil or equitable liability under current law. This does not mean that a privateering target cannot bring a counterclaim against a sponsor once the sponsor’s presence is revealed; it means instead that the target will need to identify and prove some specific tort that the sponsor has committed by privateering, and the available claims will vary depending on the circumstances of particular cases.” Ewing (2011), op.cit, p. 59.
antitrust counterclaims. Such risk could restrain the anticompetitive use of patent assertion by the CPE directly, but could be less likely to restrain the conduct of a Hybrid PAE. Presumably, such privateering agreements do not command or require the targeting of rivals or specified actions against the CPEs rivals by the Hybrid PAE. Rather, we would expect such agreements to create a set of incentives that would have the effect of targeting rivals of the CPEs. For example, prior to transferring the patents to a PAE, the CPE could ensure that itself, and its strategic partners, retain licenses to those patents. Thus, in order to monetize the transferred patents, the Hybrid could be expected to target those who do not hold licenses—namely, the rivals of the CPE.92

3. **Rewards to and Competitive Harms from CPE Privateering and Hybrid PAEs**

Though not all assertion activities by Hybrid PAEs necessarily cause competitive harm, there is a troubling alignment of the rewards to both the CPE and Hybrid PAE on the one hand, and competitive harm to the CPE’s rivals on the other. We now discuss some of the important potential rewards to CPE-sponsored privateering and the manner in which it harms competition.

The over-arching interest that CPEs have in privateering is raising rivals’ costs,93 which can be done in any number of ways: through settlements or damage awards (especially if they involve running royalties, which raise rivals’ marginal costs, thereby increasing rivals’ prices and/or reducing their profits); by imposing excessive litigation costs (including diverting the attention of management and technical staff from productive activities); by raising doubts among rivals’ customers, who may be concerned about potential liability from using an infringing product.

The use of privateering may substantially increase the potential rewards for and anticompetitive harm of royalty stacking. As explained in Section B.3., royalty stacking is

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problematic in patent-thick products and industries. Moreover, the more disaggregated the ownership of patents, the more problematic is royalty stacking.\(^94\)

While up to some point, a bigger patent portfolio is better, portfolios can be so large that, at the margin, they generate diminishing returns. So, when a portfolio is that large, the economic value of patents at the margin will be less than the average value, and the whole of the portfolio is worth less than the sum of its parts. Suppose a CPE has 20,000 patents, which it can and has used to reach significant cross-licensing agreements with other holders of large patent portfolios. In that case, the total value of a CPE’s portfolio can be increased by splitting them up. By transferring those patents to one or more Hybrid PAEs, in exchange for a share of revenues from litigation and licensing, the CPE can increase the value of the total portfolio, while also raising its rivals’ costs.

Given the economic harm to competition that can be caused by CPE-sponsored privateering, there are important roles for antitrust authorities: blocking potentially anticompetitive patent transfers; and bringing enforcement actions against anticompetitive conduct by CPE-sponsored PAEs.\(^95\) I concur with Lemley and Melamed that there should be three types of antitrust limits:

“First, agreements to sell or dispersed patents that seem likely to create or exacerbate a double marginalization problem could be challenged under both the Sherman act and the Clayton act, especially if one or more of the entities involved is likely to have a strategic incentives to exploit that problem and to seek supra-monopoly royalties. Second, antitrust agencies can condition approval of mergers or other consent decree settlements on an agreement not to engage in privateering. Finally, the law might require disclosure of privateering agreements so that sham transactions or other arrangements in which the seller retains control over who can be sued can be detected and hopefully deterred.”\(^96\)

Unless enforcement agencies take steps such as these, the economic harms to competition and innovation caused by PAEs and privateering will continue to grow.

\(^{94}\) “…disaggregation of patents, including privateering… can exacerbate the royalty stacking problem and can be used to raise rivals costs.” Lemley (2013), op.cit, p. 65.

\(^{95}\) For a detailed analysis of the role of antitrust enforcement in policing anticompetitive conduct by Hybrid PAEs and their CPE sponsors, see Popofsky (2013), op.cit.

\(^{96}\) Lemley (2013), op.cit, p. 65.