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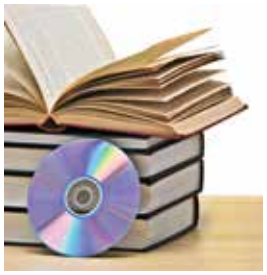

The End of Patent Groupthink

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I. Introduction

For some time, there has been a strong consensus concerning the "broken" U.S. patent system and the remedies that are necessary to "fix" it. Under this view, the establishment of the Federal Circuit in 1982 triggered an explosion in patent issuance and litigation that has threatened innovation through purported maladies known by colorful names such as "patent trolls," "junk patents" and "patent thickets." To address these issues, academic and policy commentators widely proposed policy interventions to significantly reduce the scope and force of the patent system. As this patent-skeptical commentary migrated from academic publications to real-world advocacy by public interest organizations, the patent defense bar, trade associations, and, perhaps most powerfully, significant segments of the "tech" industry, it has yielded concrete policy results. These include an extended sequence of patentee-unfriendly Supreme Court decisions (including decisions in 2010, 2012, 2013 and 2014 that substantially limited patentable subject matter[1]), enactment of the American Invents Act (the "AIA") in 2011, and the post-AIA implementation of the Patent Trial and Appeals Board ("PTAB") by the U.S. Patent & Trademark Office ("USPTO").

Recently, however, some small but important cracks have emerged in this policy consensus, as reflected in statements and actions by entities in the federal government that have cast doubt on, or rejected, key elements of the conventional narrative. This policy brief describes this incremental shift in the trajectory of U.S. patent policy and shows how this development is grounded in a growing body of empirical research and theoretical rethinking that challenges settled assumptions concerning the U.S. patent system.

II. DOJ Antitrust: From Patent Holdup to Patent Holdout

On December 19, 2019, a relatively under-discussed event took place in the patent world. Some history, however, is necessary to appreciate this event.

In 2007, the Federal Trade Commission ("FTC") and the Department of Justice's Antitrust Division ("DOJ Antitrust" or "Division") issued a report expressing concern that owners of standard-essential patents ("SEPs") relating to digital communications technologies were prone to engage in holdup behavior that would result in heavy licensing fees, which would then inflate device prices and stunt market growth. Additionally, the report identified the related risk of "royalty stacking," in which individually profit-maximizing SEP owners set royalty rates that result in a collectively inefficient licensing burden on producers and ultimately consumers.[2] In 2011, the FTC individually issued a report expressing similar concerns.[3] In 2013, DOJ Antitrust and the USPTO issued a statement continuing this same line of argument and suggesting that these concerns could be partially addressed by generally precluding SEP owners from seeking injunctive relief against alleged infringers.[4] This policy trajectory (which has been followed by competition regulators in other major commercial jurisdictions[5]) sought to substantially limit SEP owners' enforcement and licensing capacities in global digital communications markets.

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Now we get to December 19, 2019. On that date, DOJ Antitrust, the USPTO and the National Institute of Standards and Technology issued a statement that rejected this line of thinking, stating that SEPs should not be treated differently than other patents as a matter of antitrust or patent law.[6] DOJ Antitrust and the USPTO withdrew the 2013 statement and DOJ Antitrust must be understood to have separately retracted its support for much of the substance of its 2007 report with the FTC. This means that two out of three federal agencies that impact patent policy have rejected a key intellectual foundation for over a decade's worth of regulatory activity in the U.S. and abroad relating to SEPs in the 3G, 4G and now 5G wireless communications markets. This internal divergence within federal policymaking entities is vividly

illustrated in the FTC's ongoing antitrust litigation against Qualcomm, in which DOJ Antitrust unusually intervened in the district court litigation in May 2019 and has done so again in appellate court proceedings in February 2020.[7]

The December 2019 announcement reinforced and formalized remarks by DOJ Antitrust starting in November 2017, when Assistant Attorney General Makan Delrahim had rejected the Division's prior positions concerning the allegedly elevated anticompetitive risks posed by SEP owners.[8] Delrahim and other senior attorneys in the Division have noted the paucity of evidence for the patent holdup hypothesis, which casts doubt on the Division's prior position that SEP owners should generally be barred from seeking injunctive relief against infringers.[9] The December 2019 statement indicates that the USPTO now shares that view.

The joint statement makes the important additional observation that precluding SEP owners from seeking injunctive relief could give rise to opportunistic "patent hold*out*" by alleged infringers.[10] The rationale is straightforward. Absent the limited possibility of being found to have willfully infringed (which would trigger treble damages), a well-resourced infringer in a no-injunction environment will rationally decline a license and invite the patentee to litigate, with attendant costs and delays. In the worst-case scenario, the alleged infringer incurs legal fees plus a "reasonable royalty" damages award approximately equal to the licensing fees it would have paid in the first place. In best-case and "better-case" scenarios, respectively, the alleged infringer either succeeds in invalidating the patent or compels a less well-resourced patentee to agree to a more favorable royalty rate and other licensing terms.

A. Replacing Conjecture with Data

It is important to appreciate that the shift in SEP antitrust policy is firmly grounded in a recent but already well-developed body of empirical research. This point deserves some emphasis, because litigators, regulators, and, more surprisingly, scholarly commentators who continue to rely on patent holdup theories often do not seem to take this evidence into account. That research has done what academic, regulatory and industry proponents of patent holdup and royalty stacking theories have never done, namely, subject these theoretical assertions to empirical inquiry to verify that they provide an accurate picture of real-world innovation markets, rather than relying on

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stylized models in which a theory can never be more than "plausible" under "reasonable assumptions."

In this case, it turns out that the old joke about the economist's magical can opener is brutally true.[11]

Scholars who had advanced these theories had argued that profit-maximizing SEP owners would generate an aggregate royalty burden that would dramatically inflate device prices in the end-user market.[12] In some cases, these arguments referred to anecdotal reports, or simply added up publicly announced royalty rates, that SEP owners were collectively charging smartphone producers aggregate royalty burdens representing double-digit percentages of the sales price.[13] Empirical researchers that have made systematic efforts to collect and analyze royalty data have failed to find support for these claims. Using various methodologies, researchers have found that estimated total royalty burdens are in the single to mid-digits as a percentage of the device price.[14] Additionally, researchers have found that the royalty-stacking hypothesis is incompatible with the performance of the 3G and 4G wireless markets over an almost two-decade period during which device sales grew dramatically while, adjusted for increased functionality, device prices fell.[15] In light of this discrepancy between theories of market failure and evidence of market success, the U.S. taxpayer might reasonably ask why the antitrust agencies elected to dedicate scarce investigation and enforcement resources to a well-functioning market in the first place.

B. Replacing Stylized Models with Real-World Models

Given the fact that consumer technology markets have generally exhibited a virtuous combination of increasing functionality, declining prices and continuous growth, the restrained rate-setting behavior of IP holders in the smartphone market should not be especially surprising. If SEP owners were really imposing "exorbitant" royalty rates, each of those indicators of healthy market performance

would be reversed. The mismatch between theory and evidence suggests a rethink is in order.

Patent holdup theories implicitly assume a one-period payoff-maximization model in which SEP owners each have perfect monopolies and are therefore immune to pricing restraints. This simplifying assumption has led conventional wisdom astray. A holdup result is far less likely to occur in multi-period payoff maximization models in which SEP owners first seek to promote adoption of a new technology and then, once substantial adoption has been achieved, maintain "reasonable" pricing policies that accrue reputational goodwill for purposes of inducing user adoption of new technologies in the future. The latter model is far closer to real-world market conditions.

In particular, this enriched model reflects the real-world fact that innovators in digital communications markets continuously straddle overlapping product lifecycles in which the licensing fees earned from widely adopted "Tech 1.0" are used to fund R&D for upcoming "Tech 2.0," which will have to battle for market adoption against competing technologies. In this multi-generational framework, it may be rational for a "one-off" SEP owner to impose large royalties in the case of Tech 1.0, which has already secured market acceptance. However, it is irrational to do so if the SEP owner is concurrently investing billions of R&D dollars on maintaining its lead when Tech 2.0 launches. This is a more realistic characterization of the market environment faced by major wireless innovators, who compete against well-resourced and technically sophisticated competitors to maximize long-term revenues over the partially overlapping lifecycles of 3G, 4G and now 5G technologies.

III. The Supreme Court: The Overlooked Power of the Creeping Dissent

In most cases, a dissent in a judicial opinion is of little consequence for the self-evident reason that it represents the view of the minority. Yet a dissent occasionally becomes a "sleeper hit" over time as its views enter the mainstream of judicial thinking, ultimately being adopted as the basis for subsequent decisions by the same or other courts. A famous example in IP jurisprudence is Justice Brandeis's dissent to the Supreme Court's 1918 decision in *International New Service v. Associated Press*,[16] which has become an intellectual lodestar for IP-skepticism in copyright law, while the majority opinion has lapsed into obscurity. At the calculated risk of making a potentially wild prediction, I explore below the possibility that a similarly upward trajectory may be enjoyed by the under-discussed dissent authored by Justice Gorsuch in *Oil States Energy Services, LLC v. Greene's Energy Group, Inc.*,[17] a 2018 decision in which the majority delivered a strong rejection of property-rights approaches to patents and IP rights more generally.

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A. Oil States: Two Decisions in One?

At least as a matter of intellectual symbolism, the *Oil States* decision delivered a ringing endorsement for patent-skeptical commentators and advocates. In that opinion, a 7-2 majority rejected the proposition that patents are private property rights, at least in connection with the question whether a patentee is always entitled to an Article III federal court proceeding concerning a challenge to a patent's validity, rather than the administrative *inter partes* review ("IPR") proceeding provided by the AIA. (The IPR mechanism enables any party to challenge the validity of an issued patent on grounds of novelty or obviousness under sections 102 or 103, respectively, of the Patent Act.) To be clear, the Court acknowledged that the patent statute provides that patents have "the attributes of personal property" (but subject to other applicable provisions of the statute),[18] and recognized that its ruling did not foreclose more targeted challenges under the Due Process Clause or Takings Clause to administrative procedures to revoke patents.[19]

Justice Gorsuch and Chief Justice Roberts issued a dissent that may be a bellwether of an incremental moderation in the Court's usually unanimous or near-unanimous patent-skeptical decisions since approximately the mid-2000s. The dissenting Justices identified a tension between, on the one hand, the PTAB's ability to revoke patents within a framework characterized by broad administrative discretion

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and, on the other hand, a meaningful commitment to patent rights for inventors that can only be revoked by independent judges, as contemplated (according to the dissent) by the U.S. Constitution and legal practice and understanding at the time of the Constitution's ratification. Among other elements of the PTAB mechanism, the dissent expressed concern about the USPTO Director's ability to appoint members to PTAB panels that adjudicate patent challenges, especially in light of the fact that the "Director ha[d] [not] proven bashful about asserting these statutory powers to secure the 'policy judgments' he seeks."[20]

While the *Oil States* dissent obviously did not sway other members of the Court, it does indicate at a minimum that there are at least two Justices who may not be reflexively partial to the IP-skeptical consensus that has dominated the Court's patent jurisprudence since at least its 2006 decision in *eBay Inc. v. MercExchange LLC*.[21] As I describe below, both majority and minority opinions in other Supreme Court decisions shortly before and after *Oil States* indicate that there are at least six Justices who appear to have concerns about the scope of adjudicative authority that Congress delegated to the PTAB and the extent to which that authority is being applied, or could be applied, in a manner that is inconsistent with due process principles.

B. The *Oil States* Boomerang Effect

The seemingly far-fetched possibility of a patentee-friendly effect arising in connection with the decidedly patentee-unfriendly *Oil States* decision is not merely provocative speculation. Both concurrently with, prior to, and following *Oil States*, the Court granted *certiorari* in several cases relating to the mechanics of the PTAB, which reflects an interest in scrutinizing closely the PTAB's exercise of its powers under the AIA, and, in its substantive rulings in these cases, has generally construed those powers narrowly.

In *SAS Institute Inc. v. Iancu*, a decision issued concurrently with Oil States, Justice Gorsuch took the first step in cabining the PTAB's adjudicative discretion. In a 5-4 opinion, the Court held that the PTAB, when electing to "institute" a petitioner's challenge to a patent, must either institute all or none of the challenged claims, rather than cherry-picking some of the challenged claims.[22] (Determining whether to "institute" a challenge in the PTAB administrative process may be analogized to determining whether a cause of action survives summary dismissal in civil litigation.) The *SAS Institute* decision is in line with Justice Gorsuch's concerns, as expressed concurrently in his *Oil States* dissent, that administrative discretion cannot run roughshod over what he views as the Constitution's underlying commitment to meaningful patent rights for inventors.

Critically, Justice Gorsuch is not the only member of the Court who has expressed these concerns. In 2016, Justices Alito and Sotomayor had raised related concerns in objecting to the part of the majority's opinion in *Cuozzo Speed Technologies, LLC v. Lee*,[23] in which the Court upheld a provision in the AIA that immunized from judicial review the PTAB's decision whether or not to institute an IPR petition. Moreover, even while the majority in *Cuozzo* upheld the plain language of the AIA's "final and nonappealable" provision, it qualified that ruling by stating: "[W]e do not categorically preclude review of a final [PTAB institution] decision where a petition fails to give 'sufficient notice' such that there is a due process problem with the entire proceeding . . . ."[24] Reflecting this emergent concern over the AIA's expansive delegation of adjudicative powers to the PTAB, a 6-3 majority ruled recently in *Return Mail Inc. v. United States Postal Service* (decided in June 2019)[25] that a federal agency lacked standing to challenge a patent under AIA administrative proceedings. While this decision largely turned on a run-of-the-mill question of statutory construction, it suggests more generally that a majority of the Court may now be inclined toward a narrow reading of the adjudicative powers delegated to the PTAB in the AIA.

Here is a subtle data point to consider for those who like to predict what lies on the "SCOTUS" horizon. Six members of the Court have supported at least one majority or dissenting opinion that limits the powers of the PTAB, even though there are few other indications of a retreat from the Court's generally skeptical approach on other patent law issues. While *Oil States* may be most closely associated with what may ultimately be a largely conceptual holding that patents are not "public rights," the

majority opinion's more mundane "reservation of rights," which opens the door to targeted challenges to specific elements of the PTAB on due process and related grounds (a point on which it overlaps with the dissenting opinion), may presage an incremental rebalancing of patent owners' rights in the PTAB context.

IV. USPTO: Avoiding "Overshooting" on Patent Quality

The nascent attenuation in the Court's approach to IP rights, as suggested by Justice Gorsuch's intellectual leadership in the *Oil States* dissent and the majority opinions in *SAS Institute* and *Return Mail*, has potential implications for the future operation of the PTAB at the USPTO. These implications may arise in two real-world scenarios: either a patent-skeptical USPTO leadership is put on notice that dissatisfied patentees face a somewhat lower bar for appealing PTAB decisions in federal court or a patent-sympathetic USPTO leadership feels it has a mandate to raise the bar faced by petitioners who file patent challenges at the PTAB. In either case, the USPTO operates under institutional incentives to elevate the burden faced by patent challengers or, equivalently, to mitigate patentees' burden in defending the validity of their patents in the PTAB process. Current leadership at the USPTO, which has tended to express stronger statements in favor of robust patent protection than the immediately preceding administration (as evidenced by, among other things, its December 2019 joint policy statement with DOJ Antitrust), has taken both steps. To illustrate this point, I will focus on the nuanced approach taken by the current USPTO administration with respect to refining examination quality.

A. Knowing What We Don't Know About "Junk Patents"

The AIA established or modified three administrative proceedings (the IPR being the most widely used) that provide opportunities to challenge the validity of issued patents at the USPTO. All three patent challenge mechanisms reflect the widely-held view that the increase in patent issuance starting in the 1980s had reflected in part lax examination standards at the USPTO, resulting in the issuance of low-value patents that impose unnecessary litigation and other costs. While anecdotal examples of "silly" patents are well-known (and entertaining), it is hard to know whether these are simply the inevitable aberrant errors that would arise in an otherwise well-functioning system or, rather, indicate a systematic decline in patent quality. A closer look at both economic theory and empirical evidence—much of which has not been sufficiently integrated into policy commentary on this topic—shows that this is a far more complex and unsettled question than is often assumed.

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In particular, it remains unsettled whether examination standards at the USPTO were in fact significantly relaxed starting in the 1980s, compared to previous examination standards at the USPTO, examination standards at other major patent offices, or an indeterminate socially efficient standard of examination quality. Initial and widely-cited claims that the post-1982 USPTO operated as a "rubber stamp" that approved almost all patent applications have been discredited by scholars who identified calculation errors and other deficiencies in these claims.[26] Using various improved methodologies, subsequent research has estimated significantly lower grant rates with a greater degree of confidence.[27] For the period 1996-2013, one empirical study found that those rates had even declined.[28] Yet another rigorous study recognizes the limitations of current empirical evidence but presents theory and data suggesting that institutional features at the USPTO inherently induce examiners to favor approving certain categories of "invalid" patent applications.[29] While a full review of the empirical literature on these points is well beyond the scope of this policy brief, it is fair to say that we know much less about patent examination quality than the mainstream policy conversation might suggest.

To be clear, this state of uncertainty does not necessarily recommend a "do nothing" approach toward refining examination processes. It does mean, however, that any sensible policy action requires taking into account that error costs are an inevitable by-product of any upward or downward shift in examination thresholds. Any effort

to screen out "bad" patents inherently runs the risk of screening out "good" patents or doing so implicitly by enabling opportunistic challenges by well-resourced parties against "good" patents held by under-resourced innovators. Conversely, *not* increasing examination effort will inevitably fail to screen out some "bad" patents. USPTO leadership has recently undertaken sensible refinements to the PTAB process that reflect awareness of these twin dangers of "overshooting" and "undershooting" the efficient level of examination quality. Interestingly, these actions share some of the same process-related concerns expressed in recent Supreme Court jurisprudence on the PTAB that was discussed above.

B. The PTAB Rollout

In the PTAB's early years of operation (starting in 2012), petitioners who challenged the validity of a patent through the IPR process had an easy time achieving institution and then invalidating at least one claim of a challenged patent. In 2013, almost 90% of IPR petitions were instituted, although the rate subsequently declined significantly, stabilizing at slightly above 60% by 2017.[30] During approximately the same period (2012-2016), 77% of IPR petitions that survived institution resulted in at least one challenged claim being invalidated.[31] As of 2017, the invalidation rate for instituted claims stabilized at approximately 75%.[32] This is clearly a petitioner-friendly environment (although with some moderating tendencies since the PTAB's inception) that invites defendants in patent infringement litigation, or other parties, to invest resources in the IPR challenge mechanism.

To be sure, the initially high institution rates and the continuing high invalidation rates could indicate that the USPTO had been issuing large numbers of legally dubious patents consistent with the "junk patents" claim. In that case, the PTAB's apparent vigilance would be a welcome intervention. However, the data is at least equally consistent with the view that the PTAB has sometimes been used opportunistically by large, well-resourced firms for strategic purposes, possibly resulting in "false positive" errors in which the PTAB invalidates "good" patents held by innovative but less well-resourced firms. There is some reason for concern on this point, given the fact that large technology incumbents are reportedly among the most active petitioners at the PTAB. During September 2012-June 2016, 25 firms were responsible for 28% of all IPR petitions. The top five: Apple (213 petitions), Samsung (127), Microsoft (91), Google (87), and LG Electronics (81).[33]

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If the IPR mechanism is sometimes being used by incumbents to impede entry (a possible but not necessary interpretation of available evidence), a domino effect could ensue in which smaller firms decline to apply for patents or to enforce issued patents given the significantly increased enforcement costs, and significantly reduced likelihood of enforcement success, in a litigation landscape in which patents must be simultaneously litigated in district court and the PTAB. In industry segments in which firms rely on patents to capture returns on innovation, this could slow down the flow of new technologies or, as I have argued elsewhere, might specifically disadvantage smaller, R&D-intensive firms that rely on patents to extract returns on innovation through licensing and other relationships with larger producers and distributors.[34]

C. Refining the PTAB

Under the leadership of Director Andrei Iancu, the USPTO has taken actions to address the process concerns that, as discussed above, several members of the Supreme Court have identified in recent opinions relating to the PTAB. Two key changes have been implemented. In October 2018, the USPTO replaced the "broadest reasonable interpretation" standard for claim construction in PTAB administrative review proceedings with the *Phillips* (or "ordinary and customary meaning") standard applied by federal district courts.[35] In March 2019, the USPTO initiated a pilot program that provides patentees with greater opportunities to amend claims during a PTAB challenge proceeding,[36] which followed a Federal Circuit decision that had mitigated the hurdles faced by patentees in amending patent claims in an IPR proceeding.[37] Everything else being equal, both changes tend to improve patentees' ability to

survive a validity challenge. In particular, the narrower *Phillips* standard prevents challengers from arguing for broad claim constructions that capture more anticipatory prior art, while increased amendment opportunities enable patentees to narrow claims to avoid anticipatory prior art.

These changes may accelerate the declining rates at which IPR petitioners have achieved institution and the slightly declining rates at which, following institution, challengers have successfully invalidated at least one of the claims of a challenged patent. Institution rates for all PTAB challenges (of which IPRs represent the overwhelming percentage[38]) were 62% in 2019,[39] which is almost identical to the rate of approximately 60% for IPR petitions in 2017, reflecting a continuing decline since the PTAB's inception.[40] Invalidation rates for instituted petitions have remained at high levels: slightly above 80% for all PTAB challenges as of September 2019,[41] which is close to the 77% rate for instituted IPR petitions for 2012-2016.[42] In 2019, petitions filed in all PTAB mechanisms reportedly declined by 23% compared to 2018,[43] suggesting that moderating institution rates, together with the aforementioned changes undertaken by the USPTO (and possibly the end of partial institution after the *SAS Institute* decision), may have led some potential petitioners to conclude that filing was no longer cost-justified.

There is reasonable ground to believe that the USPTO's refinement of the PTAB mechanism may reflect a healthy rebalancing that now does a better job at trading off the inevitable mix of "false positive" and "false negative" errors in examination and post-examination processes. At a minimum, it shows a more nuanced approach that recognizes that any examination mechanism necessarily gives rise to both types of errors and that our empirical understanding of examination quality and design is limited. While the moderate decline in petitioners' institution rates at the PTAB could reflect an unwise reduction in the PTAB's level of scrutiny, resulting in "false negative" results in which "bad" patents are permitted to survive, it is at least consistent with the view that the PTAB mechanism has been appropriately adjusted to avoid "false positive" errors that mistakenly screen out "good" patents or induce opportunistic challenges by third parties with abundant litigation resources. Just as raising examination standards screens out "bad" patents, raising institution standards screens out "bad" patent challenges.

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V. Moving Forward

It is notable that IP-skeptical commentary among some academics, policymakers and business constituencies has progressively moderated its assertions that a robustly enforced patent system undermines innovation to prospective statements that it "threatens" or "risks undermining" innovation. While the sky may fall one day, there may be room for reasonable doubt if it has not yet fallen after the extended period of time during which the U.S. innovation economy has operated under the "burden" of historically strong levels of patent protection. There may be even further room for doubt if it is recognized that this same period has been characterized by intensive innovation in industries that happen to be especially patent-intensive, including biotechnology, semiconductors and wireless communications. It is equally notable that these industries have been propelled forward by firms that specialize in innovation and then use patent-enabled licensing and other cooperative relationships to monetize innovation. Together, these historical tendencies suggest that the IP-skeptical policy consensus may have overlooked the manner in which robust patents not only support transformative innovation but specifically enable innovation by R&D-specialist entrants that have supplied fundamental inputs behind much of today's technology ecosystem. If that is the case, then the still-nascent but meaningful shift in U.S. patent policy, as reflected by statements and actions by DOJ Antitrust, the USPTO and even certain members of the Supreme Court, may be the "redirect" that is necessary to preserve a robust institutional infrastructure for all stakeholders in the innovation economy.

ENDNOTES

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10 *See supra* note 6.

11 The joke parodies the use in theoretical economics of stylized models that sometimes depart from reality. A brief history and representative version can be found at Wikipedia, "Assume a can opener," https://en.wikipedia.org/wiki/Assume_a_can_opener.

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16 248 U.S. 215 (1918).

17 138 S. Ct. 1365 (2018).

18 The Patent Act provides that "[s]ubject to the provisions of this title, patents shall have the attributes of personal property," 35 U.S.C. § 261.

19 *Oil States Energy Services, LLC v. Greene's Energy Group, LLC*, 138 S. Ct. 1365, 1379 (2018).

20 *Id.* at 3 (Gorsuch, J., joined by Roberts, J., dissenting).

21 547 U.S. 388 (2006).

22 138 S. Ct. 1365 (2018).

23 136 S. Ct. 2131 (2016) (Alito, J., joined by Sotomayor, J., concurring in part and dissenting in part).

24 *Id.* at 11 (Breyer, J., opinion of the Court).

25 139 S. Ct. 1853 (2019).

26 For the key rebuttal, *see* Ron D. Katznelson, *Bad Science in Search of Bad Patents*, 17 FEDERAL CIRCUIT BAR JOURNAL 17 (2007). As Katznelson explains, much of the difficulty in calculating grant rates, or comparing grant rates across historical periods or patent offices, is the appropriate treatment of continuation and divisional applications in U.S. patent office practice. The technical details lie beyond the scope of this policy brief.

27 *See, e.g.,* Michael Carley, Deepak Hegde, and Alan Marco, *What is the Probability of Receiving a U.S. Patent?,* 17 YALE JOURNAL OF LAW & TECHNOLOGY 203 (2014); Katznelson, supra note 25.

28 Carley, Hegde and Marco, *supra* note 26.

29 Michael D. Frakes and Melissa F. Wasserman, *Does the U.S. Patent and Trademark Office Grant Too Many Bad Patents?: Evidence from a Quasi-Experiment*, 67 STANFORD LAW REVIEW 613 (2015).

30 MORGAN LEWIS, 2018 PTAB DIGEST: THE LATEST TRENDS AND DEVELOPMENTS IN POST-GRANT PROCEEDINGS 11 (2018), available at https://www.morganlewis.com/-/media/files/publication/report/2018-ptab-digest-june-2018.ashx?la=en&hash=B5C0D4875DE370DB6338B835402F3B2610945E7F.

31 Christian Helmers, *The Economic Analysis of Patent Litigation Data* 28, WORLD INTELLECTUAL PROPERTY ORGANIZATION, ECONOMIC RESEARCH WORKING PAPER NO. 48 (2018).

32 Daniel F. Klodowski, David C. Seastrunk and Michael R. Galgano, *Special Report – PTAB IPR Stats Over Time for Q2 2019*. FINNEGAN AIA BLOG (Aug. 13, 2019).

33 Pedram Sameni, *Patexia Insight 12: Top 25 IPR Petitioners Filed Nearly 30 Percent of All Challenges* (Sept. 21, 2016), available at https://www.patexia.com/feed/weekly-chart-top-25-ipr-petitioners-20160920.

34 Jonathan M. Barnett, *Three Quasi-Fallacies in the Conventional Understanding of Intellectual Property,* 12 JOURNAL OF LAW, ECONOMICS & POLICY 1 (2016); Jonathan M. Barnett, *Intellectual Property as a Law of Organization*, 84 SOUTHERN CALIFORNIA LAW REVIEW 785 (2011).

35 *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 FED. REG. 51340 (Oct. 11, 2018). For the source of the *Phillips* standard, see *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005).

36 *Notice Regarding a New Pilot Program Concerning Motion to Amend Practice and Procedures*, 84 FED. REG. 9497 (Mar. 15, 2019).

37 *Aqua Products v. Matal,* 872 F.3d 1290 (Fed. Cir. 2017) (holding that petitioner in a PTAB proceeding bears burden of persuasion concerning the patentability of claim amendments by the patentee).

38 From the inception of the PTO through December 2019, IPRs represented 93% of all filed petitions under all three challenge mechanisms. Source: USPTO, TRIAL STATISTICS: IPR, PGR, CBM (Dec. 2019), available at https://www.uspto.gov/sites/default/files/documents/Trial_Statistics_20191231.pdf.

39 U.S. PATENT & TRADEMARK OFFICE, ANNUAL REPORT 46 (2019).

40 *See supra* note 29.

41 *See supra* note 38.

42 *See supra* note 30.

43 UNIFIED PATENTS, *2019 Patent Dispute Report – Year in Review*, January 1, 2020, https://www.unifiedpatents.com/insights/2019/12/30/q4-2019-patent-dispute-report

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