How can Congress Prevent the Issuance of Poor Quality Patents?
Questions for the Record for Colleen V. Chien

Submission[1] by Professor Colleen V. Chien[2]

November 21, 2019

Combined Questions of Senator Thom Tillis and Chris Coons

1. **Senator Tillis: Professor Chien, do you agree with Professor Wasserman that better search initiatives at the USPTO – which may take greater resources or time at the outset – leads to higher quality patents? Senator Coons: Do you believe that the patent quality issues alleged in your research result from incorrect patentability analyses or shortcomings in identifying the most relevant prior art?**

   Senator Tillis and Senator Coons, thank you for your thoughtful questions. If we look at the primary reason that patents are invalidated at the PTAB, it is due to prior art. Based on my analysis of PTAB outcomes to date in which patents were invalidated, 98% of the time it was due to a prior art (102/103) issue. This share of course is skewed because inter partes review (IPR) invalidations must be based on prior art, but even among covered business method (CBM) and post grant review (PGR) invalidations, over 61-68% of invalidations, respectively, were based on prior art. The figures among pre-2012 (Bilski) litigation invalidations are similar.

   So, investments in search and prior art - which the USPTO has continuously made - are important. Professors Wasserman and Frakes' work, showing that examiners make less time-intensive rejections, and deviate more from the decisions of their international counterparts as they have less time, is important and persuasive. My work shows that Examiners search and apply non-patent literature - which can take more time to discover and apply than patent prior art because NPL is not necessarily CPC-indexed or formatted consistently - to a lesser extent than PTAB judges, applicants, or their European counterparts. (Fig. A)

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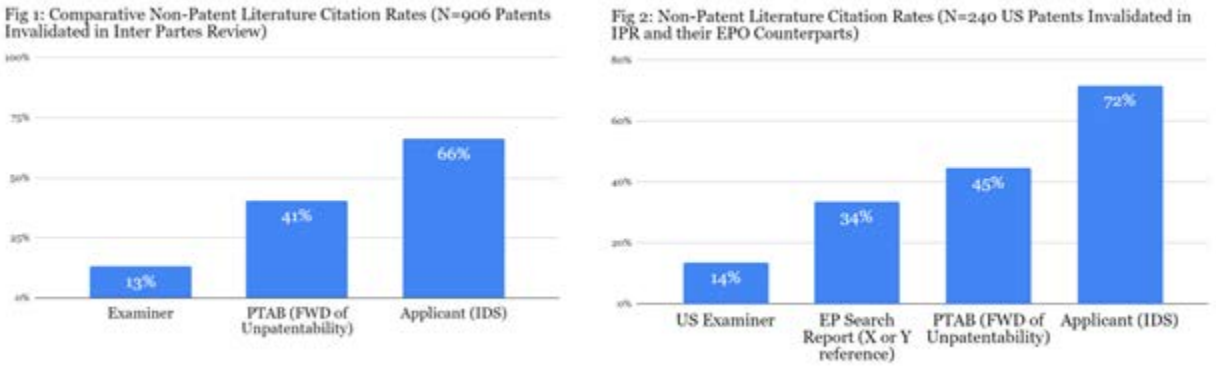
[1] This testimony draws from research conducted for over half a dozen articles, but primarily three: *Comparative Patent Quality* (50 Ariz. St. L.J. 71 (2018)), *Rigorous Policy Pilots: Experimentation in the Administration of the Law* (104 Iowa Law. Rev 2313) (2019), *Rigorous Policy Pilots the USPTO Could Try to Enhance Patent Quality and Inclusion* (Iowa Law. Rev. Online) (forthcoming)..

[2] I thank Unified Patents, Lex Machina and Google Patents BigQuery for sharing patents data, and Nick Halkowski and Chris Daley for excellent research assistance. I thank Alfred Spigarelli, formerly of the EPO, and Patent Office officials from the EPO and USPTO for their public service and for answering my questions about patent examination.

Figure A: Non-Patent Literature Citation by US Examiners, PTAB Decisions, Applicants, and EP Examiners



Source*:* Chien, *Rigorous Policy Pilots the Patent Office Could Try,* Iowa Law. Rev. Online (forthcoming 2019)*,* available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3312696

That said, as I've previously written, the quality and quantity of patents in force are the products of three sets of decisions: to submit applications of certain quality to the patent office (by the applicant), to grant or deny the patent (by the USPTO), and to keep pursuing or keep in force an application or patent (by the applicant/patentee). (described in Table A) The time that examiners spend on search is only one dimension of one of these three sets of decisions and the interaction effects are important: for example, if examiners have to spend time dealing with sloppy drafting or defects in the application or wade through huge IDS submissions, that leaves less focused time for quality search or vetting for adequate disclosure under Section 112 of the Patent Act. Consistency of examination within an art unit comes not just from an individual examiner having more time but a greater emphasis on consensus, team approaches among examiners. And weak applications can potentially be weeded out earlier through changes in timing, for example as explored in my proposal below for a "search first" pilot. As such, I believe the USPTO should take an expansive view of the levers they have to ensure patent quality and seek to align all incentives - both those on applicants and patentees, as well as on examiners - towards high quality patents. On the specific dimension of search, I believe the office should focus not only on time, but timing, teaming, and curation.

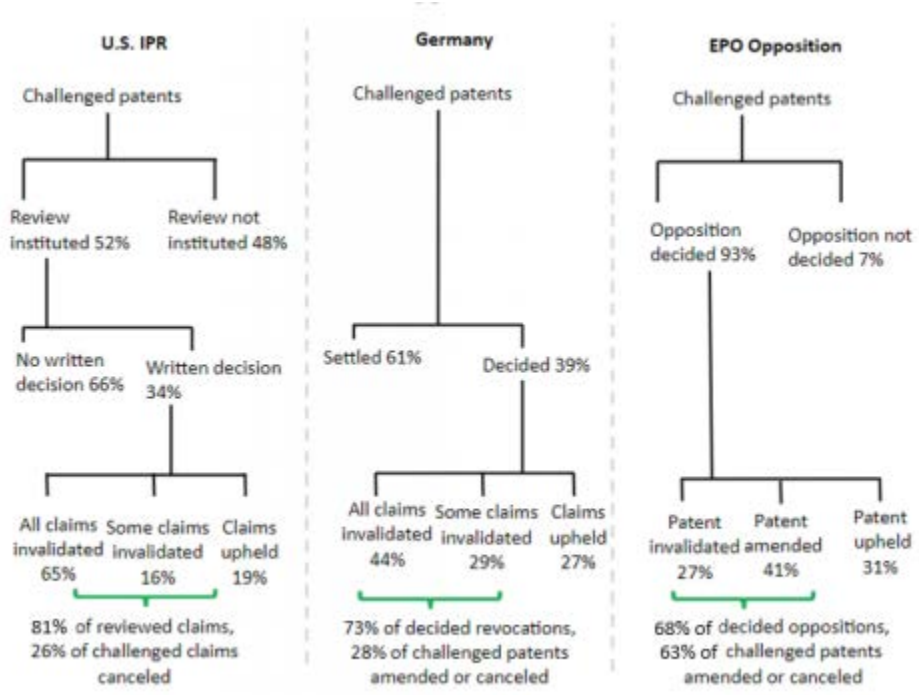
Table A: Examples of Quality Levers At Various Phases of a Patent's Life

Phase	**Quality Levers**
Pre-Submission Phase	Applicant: pre-examination search, drafting fees paid to attorneys, pre-submission quality checks using AI and related tools
Examination Phase	Office: examination time and count system structure, timing (e.g. lack of bifurcation, compact prosecution),"team" dimensions (Global Dossier or supervisory structure), prior art curation/search tools. Applicant: IDS submissions, RCE/continuations behavior, timely responses (as informed by fees)
Post-Grant Phase	Patentee: Maintenance decisions (as informed by fees), re-examination

2. **Sen. Tillis: Some of your scholarship has compared European patent searching/examination with US examination. Is there a difference in the overall quality between the two offices? What causes those differences? Sen. Coons: According to the 2018 USPTO Performance and Accountability Report, examiners are correctly applying the statutory patentability criteria between roughly 92 and 97 percent of the time. Do you dispute these numbers?**

Senator Tillis and Senator Coons, thank you for engaging on the important question of *how do we measure quality*, a challenge the underlies all quality efforts. While some lament the "high kill rate" at the PTAB as proof that US patents are of low-quality or worse than European patents, this claim isn't typically backed by data. For example, when you actually compare outcomes in EPO opposition to IPR to Germany nullity, it's not clear the US does worse: 26% of challenged claims are canceled in IPR as opposed to 28% and 63% of challenged claims being amended or canceled in German nullity and EPO opposition actions, respectively. (Fig. B) The US has a higher grant rate than the EP, on the same applications, but differences in attrition rates and dynamics and claim scope, also likely contribute to the difference.

Figure B: The Selection and Adjudication of Patents Challenged in Post-Grant Patent Proceedings



Source: Chien et. al, *Inter Partes Review and the Design of Post-Grant Patent Reviews,* 33 Berkeley Tech. L.J. 817 (2019)

At the same time, the USPTO's OPQA audit figures, as cited in Senator Coons' question are also hard to evaluate - they suggest a similar, high rate of compliance with all of the statutory provisions (97%, 95%, 92%, 93% for compliance with Sections 101, 102, 103, 112) yet we know, as cited above, that the invalidity grounds are currently not distributed as evenly. However, these are 2018-evaluated applications that won't be subject to invalidation challenges for years, when the law may have changed, so again, it's hard to say. These examples show how challenging it is to make "objective," outcome-based claims about the quality of US patents.

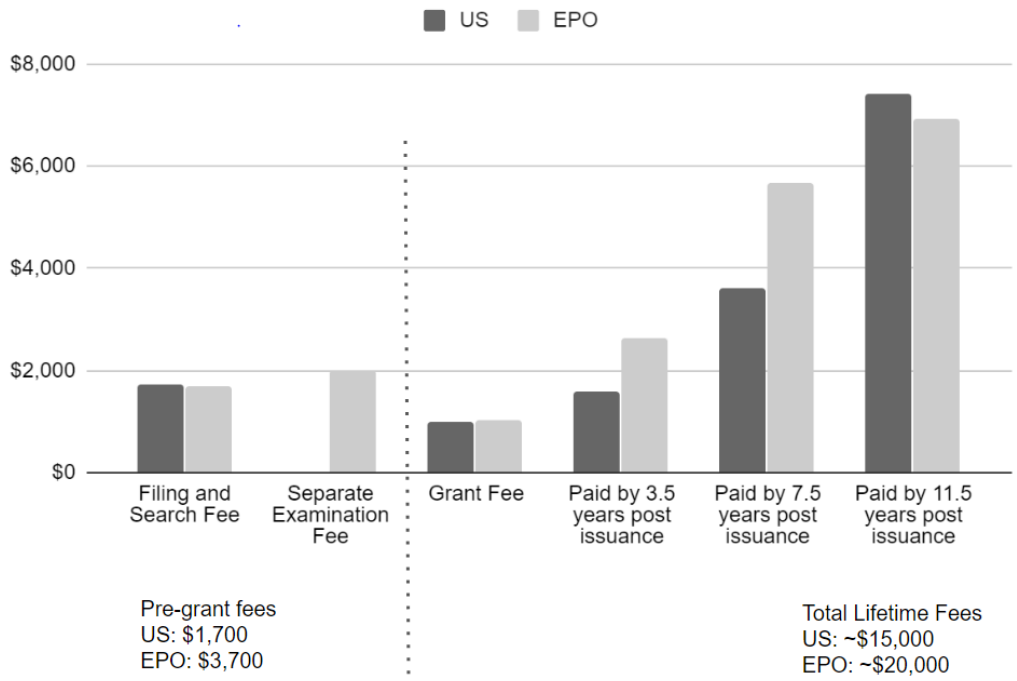
It is more feasible in my opinion to make comparative patent examination quality "process" claims. Industry surveys conducted by IAM magazine have consistently found the EPO to have the highest ratings among the five leading Patent Offices around the world[3] and EP searches are widely recognized to be high-quality.

[3] See cites in Chien, *Comparative Patent Quality* at n65; the latest (2018) report states: ""the EPO continued... to garner by far the best approval ratings of any patent office from *IAM*'s readers" https://www.iam-media.com/finance/europe-enjoys-patent-renaissance-despite-brexit-and-upc-uncertainty

Of the major differences between European and US examination processes, I believe the following to be most salient, based on speaking to current and former EP and USPTO officials:

- Time: EP examiners spend ~30-32 hours on examinations that go all the way through examination. Plus additional time for checks by the other members of the group (see below). I think the comparable number in the US is 21.
- Cost: EP examination costs more than double US examination if you proceed through the examination phase, as there is a separate, examination fee charge. "Procedural fees" are owed annually and are timed based on patent application, not grant. (See Figure below)
- Teaming: EP examination, regardless of the primary examiner's status, always involves a three-person team, with time allocated to the second member and chairperson. This is done in order to ensure consistency in approach and results in a more "uniform" product In the US, though junior examiners have their work reviewed, examination gets lonelier as you become more senior.
- Timing: examination is bifurcated into search and examination at the EPO, so an applicant has to affirmatively request examination after receiving and reviewing the search report which contains all the prior art upfront. There are therefore two distinct sets of fees paid: upfront, and then after the search report. A high percentage of applications do not continue after the search. In the US, search and examination are unified, and new references can be provided by the patent office and the applicant at any stage in the application's life..
- Tolerance for Mistakes: EP applicants have limited opportunities to refile their applications or appeal examiner decisions, their philosophy is "once and done." While the US patent office has moved in this direction, applicant's aren't required to - the US process, by being more flexible and giving patentees the option to file continuation applications, and to submit IDS art late as well, has a higher tolerance for mistakes.

Figure C: USPTO v. EPO Patent Fees



Source: Author's analysis, based on EP and US fee reports, and assuming a 24-month pendency, large entity status, and EP renewal fees. Translation fees not included.

Additional Question from Senator Tillis:

3. **Separate from allowing examiners to spend more time examining each patent, are there other search strategies that the U.S. could employ (perhaps that other countries already do) that could increase patent quality?**

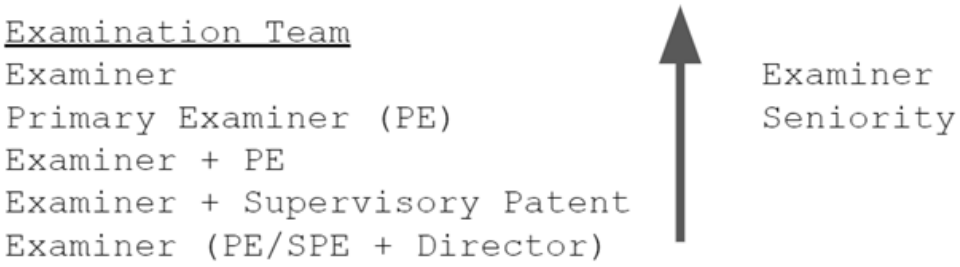
   Thank you Senator Tillis, for your important question. I think the USPTO should experiment along the dimensions discussed below, and importantly, measure and monitor how the interventions they try - whether these or others - impact the "robustness of prior art" and efficiency of prosecution. As I've documented before, nearly half of the attrition in EP cases is due, not to rejection, but applicants voluntarily withdrawing their applications after receiving a search result.[4] Taking more time to search at the front end may lead to a faster time to resolution as the parties come to a "meeting of the minds" about the application sooner.

[4] At 107 ("as EPO President Battistelli has stated, "[p]atents are granted in 49% of total filings, with 22% of applications abandoned after the search report and 29% abandoned after examination."195 In the cohort studied in this Article, in which 81% of non-granted European cases were withdrawn, that translates into 35% of cases withdrawn after search, and 46% after examination")

“Search First” Pilot: a “search-first” pilot could mimic European style examination and require the examiner to search the entire application upfront, and be bound by this initial, comprehensive search. Consistent with similar “compact prosecution” initiatives that aim to get the best prior art before the examiner early in the examination process, this would have the benefit of providing an “early signal” to patent applicants. Equipped with the information about what the universe of relevant art looks like, the applicant can make an “early decision” based on full information of the prior art regarding whether to continue to pursue the application.

“Team/Time on Demand” Pilot: Inconsistency of examination is seen as a major contributor to low patent quality. The more senior an examiner gets, the more likely that she is working alone. (Fig. D)

Figure D: Patent Examination Teaming Across Patent Seniority Levels



Like previous efforts that provide more time to patent applications, a “team/time on demand” pilot would provide additional time to cases that are likely to present challenges. But, unlike programs such as Second Pair of Eyes Review (SPER) which implemented a single, top-down decision to allocate additional resources to all applications that met a certain profile, a team/time on demand pilot would make the decision of when to apply additional resources to a local one, determined at the art unit level by individual examiners who would themselves decide when extra hours or a second opinion is needed. Examiners could allocate the extra resource in the way they desired, either by themselves using the additional time or by choosing to partner with other examiners who, for example, are expert or trusted. The extra time would be allocated accordingly. Such an experimental design would reflect the institutional wisdom embedded in previous “second pair of eyes review” programs that having two (or more) examiners on an application can increase quality and consistency. However, the design would also allow the resource decision to be informed by local examiner “know-how” rather than a top-down decision, not only about what cases need extra time or an extra pair of eyes, but also regarding who on the examination team might provide this extra help. The resource could be applied dynamically only where needed, rather than allocated in a fixed manner to all cases. If successful, team/time examination on demand would enhance patent quality and consistency without substantially raising the average cost of examination.

Investing in CPC Infrastructure and NPL Specialization: PTO could further invest in CPC classification of non-patent literature and translation capabilities, in order to reduce the time required to search and apply non-US patent documents. Artificial intelligence based techniques could be particularly helpful.

IDS and Applicant Search Pilots: PTO, in collaboration with stakeholders, could consider pilots to vary applicant behavior with respect to applicant-submitted art, pertaining to, for example IDS, third-party prior art, and pre-application submissions. This could follow in the tradition of previous USPTO initiatives like the Petition to Make Special initiative or the Glossary Pilot that invite applicants to engage in pre-filing quality measures, in exchange for downstream benefits.

Thank you for your questions and the opportunity to share my thoughts. Please do not hesitate to let me know if you have additional questions.

Respectfully submitted,

Colleen V. Chien

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Additional Questions of Senator Chris Coons

2. How can Congress and the USPTO encourage greater collaborative efforts to identify the most relevant prior art during examination?

Senator Coons, thank you for this question. The job of the USPTO is to evaluate a patent application in view of the most relevant prior art. Curated references provided by others that include relevant context can be helpful in this regard, for example, references that arise in companion patent cases tested at the PTAB and which the PTAB has found relevant or prior art searches from foreign examiners that include the "grade" of the references (X =102 reference, Y=103, A/B = background references). However, much of the information that the USPTO receives - for example in the form of IDS references - lacks this important context. The same could be said to be true of "raw dumps" of prior art that aren't indexed properly or lack key words, CPC-coding, and so on.

Some IDS' are impossibly large - take for example US Patent 9,233,141 for which applicants cited well over 2,000 references! While this was an outlier, the volume of references provided to examiners through IDS' continues to grow: my analysis, shown below in Fig. E, suggests that the number of references cited by applicants grew more than five-fold from 2001 and the present. The references also trickle in, potentially being added late in the examination, when the Examiner has no additional time to evaluate the references meaningfully.

Figure E: Applicant-Submitted Prior Art

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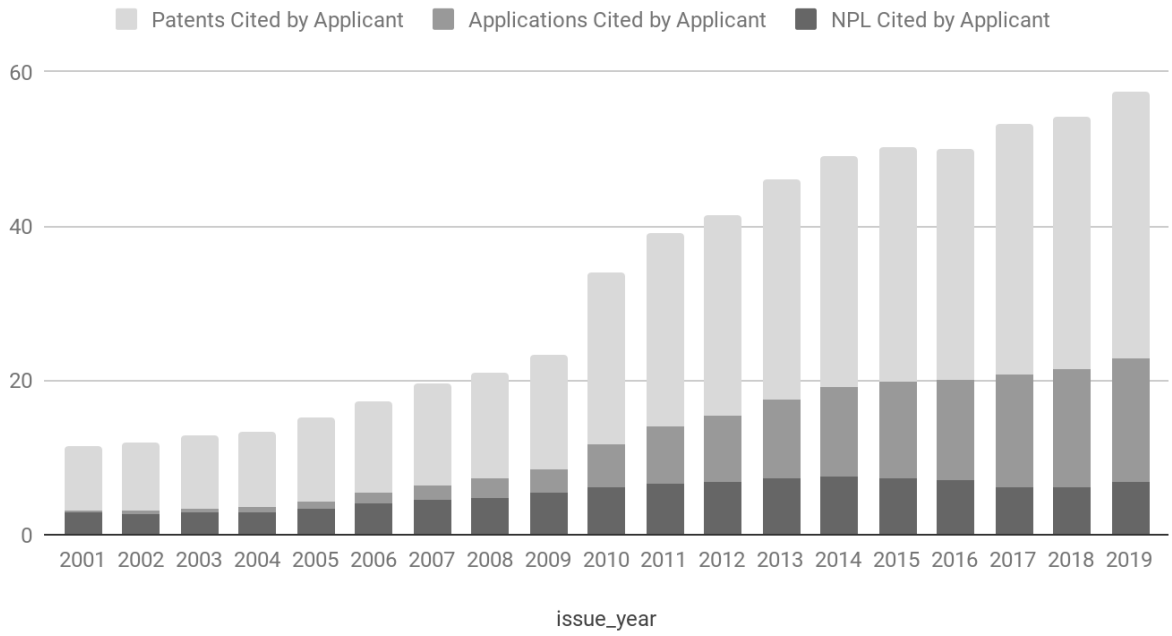

Source: Author's analysis based on Google Patents

What is also interesting is that the EPO and other jurisdictions do not rely on the applicant to submit references at all, they view themselves as the experts as to prior art. As such, it is important to recognize that collaboration is a means to an end - the end of efficiently locating the best prior art. Important efforts to increase the quantity of prior art available to examiners, like the Prior Art Archive effort launched at MIT in 2018, or Prior Art executive actions, or related efforts to have standards documentation provided to the Patent Office, or the fruits of forthcoming AI search initiatives need to be coupled with a recognition of the importance of context and curation to patent quality.

3. **Your testimony acknowledges that the USPTO "has a strong open data infrastructure in place for doing independent evaluations." Are there specific data that the USPTO could make available to facilitate better analysis of the patent examination process?**

Senator Coons, I'm so grateful for you for asking this question, as much of my time is spent trying to work with USPTO data and to use it to track the performance of the patent system. The USPTO has done an exceptional job of making data available, to the credit of the Office of the Chief Economist and other analytic, Big Data and Open Data teams within the Office. At the same time, these are some data deficiencies that, if filled, would make the work easier:

- Regular updates to the Office Action datasets (last updated in early 2017);
- Regular updates in Google Big Query to the standard USPTO datasets (uspto_oce, uspto_peds, uspto_ptab, also out of date);
- Providing small entity status over time, and disaggregating, among

- Matched NETS data on the characteristics of businesses obtaining US patents. Even aggregate data would be useful for tracking startups and small business innovation activity;
- Data that would expose details of the examination process, including data on the examiner's search process;
- If tracking the impact of the Pro Bono /Pro Se program is important, making data available on applications and patents that have gone through it available, after prosecution has closed;
- Also, as I testified to the USPTO as part of SUCCESS Act hearings, I recommend that the USPTO also create and disclosure of assignee metadata from which trends and patterns in participation in the patent system (in all of its aspects, from application to patenting to transacting) by startups, small-businesses, minority- or veteran- owned business so as to enable a fuller understanding of the role that patents play in their development and trajectory. Steps to do so could include creating a separate flag that indicates on what basis the entity qualifies for small or micro-entity payments, e,g, due to having fewer than 500 employees or on the basis of being a nonprofit. Gathering (e.g. by asking applicants / assignees or joining to datasets available to the USPTO for example through partnerships with the Small Business Association or IRS) and then releasing entity characteristics data (e.g. re: startup, veteran-owned, or minority-owned business status) to researchers would also support greater evaluation and data-informed policy making.

Thank you for your questions and the opportunity to share my thoughts. Please do not hesitate to let me know if you have additional questions.

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November 21, 2019

Question of Senator Richard Blumenthal

1. **As you know, the patent system is complex and technical. Many small inventors lack the knowledge and resources to navigate the system. For that reason, I am a major proponent of the Patent Pro Bono Program, which ensures that the patent system is open to any inventor with a good idea and is not just available for the wealthy and well-connected. The Pro Bono Program is also important to the patent quality debate. First, it gives inventors the help they need to submit clear and precise patents. Second, it ensures that as the PTO cracks down on poorly drafted patents, it does not unintentionally harm inventors with valid inventions but without the resources to hire top-dollar attorneys.**
    a. **Does the Pro Bono Program improve the quality of patent applications?**
    b. **Do you believe that the Pro Bono Program helps small inventors avoid unintended harms that could be caused by efforts to reduce the issuance of poor quality patents?**

Senator Blumenthal, thank you for your efforts to support the smallest inventors, Efforts since 2014 have resulted in thousands of patent attorneys working to assist pro se inventors, and I can only imagine that these applications are better off than they would be without assistance. However, I have been unable to gather data yet to back up this claim as pro bono /pro se applications are not consistently tracked at the USPTO. If I had the data I would seek to create a synthetic, matched control and see if the applications subject to the pro bono program were more likely to issue than those that were not, as one indicator of quality.

My one recommendation for those carrying out pro bono and pro se assistance is that they continue to help the applicant through issuance. My research (Fig. F) suggests that small entities drop out at a higher rate than large entities, which is the reverse of what we'd want and hope for from fee discounts.

FIG F: Discounted Entity Shares Over the Patent Lifecycle[3]

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[1] This testimony draws from my paper, *Innovation, Inequality and Patents* (working paper, posted to on SSRN)

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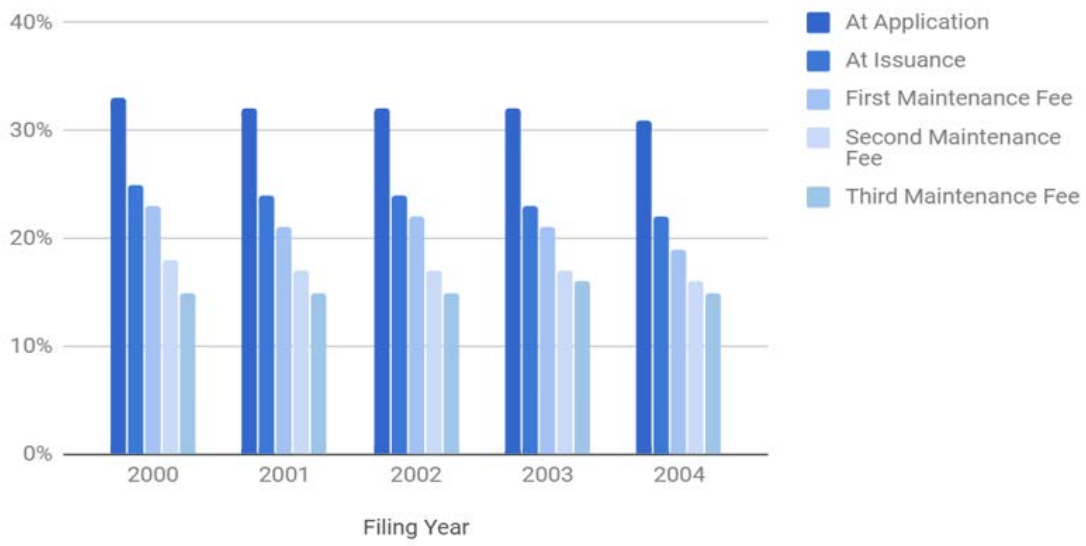
[3] Source: Chien, *Innovation, Inequality and Patents* (working paper, posted to on SSRN)



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November 21, 2019

Questions of Senator Mazie K. Hirono

1. **You put forth a proposal earlier this year to allow patent applicants to defer examination for patent eligible subject matter until after other issues relating to patentability are exhausted. This approach seems to run counter to the Patent and Trademark Office's practice of "compact prosecution," where an examiner reviews all requirements of patentability as part of an initial office action in order to speed the examination process.**
    a. **Do you have any concern that deferring patent eligible subject matter until the end of examination will unnecessarily extend examination time?**
    b. **Is it possible to incorporate your proposal within compact prosecution—for example, by requiring examiners to address patent eligibility only after identifying all other rejections in the initial action? If so, do you think such a system would have the same benefits as the one you proposed?**

Senator Hirono, thank you for your question and your engagement on my initial proposal, described in PatentlyO. My proposal had as its objective the avoidance of disagreements between Examiners and applicants about 101 patentability requirements as reflected in heightened rejection and appeal rates in certain art units . I saw these arguments as unnecessary in many cases because, based on my analysis, the case would have reached the same conclusion based on non-101 grounds, making 101 considerations superfluous. The proposal was also motivated by the idea that, a deferral option would lead to more "only 101" and help us learn about the incremental impact of the application of the Supreme Court's decisions on patentability. This type of experiential evidence, I thought, could be a particularly valuable input to the deliberations of the Supreme Court, courts, and Congress who have rule- and law-making authority, unlike the USPTO.

Since my proposal, the USPTO's 101 guidelines have, as I understand it, greatly reduced 101 rejections and appeals. The guidelines reflect a change in the USPTO's understanding and application of the law, not the law itself, and I have spoken to numerous practitioners who believe that the guidelines are out of line with the courts and

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[1] This testimony is based on my proposal in PatentlyO, *Piloting Applicant-Initiated 101 Deferral Through A Randomized Controlled Trial***, 2019 Patently-O Patent Law Journal 1.**

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that the USPTO is now issuing many patents that are invalid under current law. If this is true, it would seem inconsistent with the Office's goal of creating reliable patent rights.

This development moots my proposal because, first, there are far fewer arguments to avoid in the first place, and second, because we don't have information about how the Supreme Court's decisions are performing in application, but rather the USPTO's novel interpretation is performing. As such, I would need to rethink a 101 pilot. In the meantime, I think it's important for commentators to decide, even if the USPTO guidelines are not law, if they reflect the correct balance for promoting the useful arts.

Thank you for your questions and the opportunity to share my thoughts. Please do not hesitate to let me know if you have additional questions.

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