

Promoting the Progress and Ensuring Patent Quality Through Rigorous Policy Evaluation and Piloting¹

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Overview

Article I, Section 8, Clause 8, of the United States Constitution grants Congress the power "to promote the progress of science and useful arts." The core function of the US Patent and Trademark Office is to determine what inventions truly represent progress in view of the prior art. While to date most conversations about patent quality have centered on back-end measures, like inter partes review, or the use of weak patents over abstract ideas to get injunctions, today I will argue that:

1. Focus on Prior Art Vetting: More attention should be paid to the most important, front-end tool that the patent office has to issue valid patents: prior art vetting. While 11%-15% of office actions involve section 101, over 90% of patents are subject to a prior art rejection and my research suggests that there is a gap between the USPTO examiners and others and that this gap is correlated with outcomes.
2. Use Rigorous Pilots to Create Hard Evidence for Hard Decisions: There are many unknowns with respect to patent quality, and it would be premature to adopt wholesale some of the suggestions you'll hear today. However, the USPTO can fill these gaps in knowledge by being much more rigorous and deliberate in its evaluation of past and future policy pilots, using causal inference and other statistical tools to estimate, when it rolls out or pilots changes or interventions, their impact.
3. Consider Not only Time, But Team, Fee and other Quality Levers: The USPTO and Congress should take an expansive view of rigorous piloting to ensure patent quality looking at a variety of levers:

Time: The USPTO already has tried giving examiners more time, for example, when it implemented various Second Pair of Eyes programs over the years, and more counts were given to examiners. It also tried and is currently trying a number of different approaches to improving access to prior art. These should be evaluated rigorously.

Team: The USPTO has smartly worked to provide not just more time but more "team" to Examiners, with foreign examiners (through the Global Dossier), applicants and industry

¹ Adapted from several articles and presentations: *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), *Opening the Patent System: Diffusionary Levers in Patent Law*, 89 Southern Cal. L. Rev. 4 (2016) (discusses defensive-only patents). See also proceedings of the *Rigorous Policy Pilots* workshop (May 2019), including presentations by the USPTO and other government agencies, available at <https://www.law.upenn.edu/institutes/ppr/policypilots/>, and forthcoming blog series in the *Regulatory Review*; Duke-Santa Clara Conferences on Patent Quality, and accompanying IPLaw360 article series. For more see colleen.com

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(through programs like STEPP, PETTP, SEE and the Crowdsourcing prior art, 3P prior art submission, Track One, Prior Art Partnerships), other US examiners (through collaborative search efforts). We must use rigor to learn from these interventions.

Prior Art Curation/ IDS Policies: Examiners need context and curation, not just references. Though both contain prior art, large IDS are much less useful than carefully crafted international search reports and PTAB petitions. More rigorous policy attention should be paid here.

Defensive Only Patents/Maintenance Fees: Most patents are held for defensive reasons and don't need to be "litigation grade." It's not always known upfront which patents these are, making front-end gold-plating proposals challenging to the point of being unworkable. As described in my Article, *Opening the Patent System*, the USPTO should pilot offering a "back-end lead plating" option, what I call a "defensive only" patent option. Though this idea may sound novel, it's not, it's a version of the License on Right patent option that Germany and England offer, in the form of a discount on maintenance fees in exchange for a disclosure that the patent is being held for defensive reasons only. We can learn from prior sector commitments like *OIN* and *LOT* to perfect the US version for piloting.

Continuations Practice: The USPTO examination process has a high tolerance for examiner mistakes, because it allows applicants to refile their rejected applications, and in many cases, get these cases allowed. While the practice limits the negative consequences associated with any bad Examiner decision, it makes Examiner inconsistency and mistakes tolerable, in turn, driving lower patent quality and satisfaction. Let's test out ways to not only encourage but compel compact prosecution, for example by publishing grant rates on continued applications or making sure information on repeat filings is available to examiners.

Inclusion Pilots: The applications of women and small and micro entity inventors have a lower success rate, with perverse distributional consequences including the higher application, lower grant rates to discounted entities and a higher grant rate to Asian female vs. US female inventors, my research suggests (see figures below). My paper, *Rigorous Policy Pilots the Patent Office Could Try*, suggests pilots to get at the root causes of these issues.

4. Get Help and Focus on Innovators and Innovation, not just Patent Quality: Expand the Edison Scholar program and recruit econometric and FAC talent to work with the Office of Patent Quality Assurance, continue to release data and datasets to support independent evaluation. Also, prioritize the connection and release to the public of US patent data federated with NETS and business data so that we can get insights about the functioning of the patent system to encourage innovators and innovation, not just patent quality.

A. Patent Quality is Hard.

“I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not.”

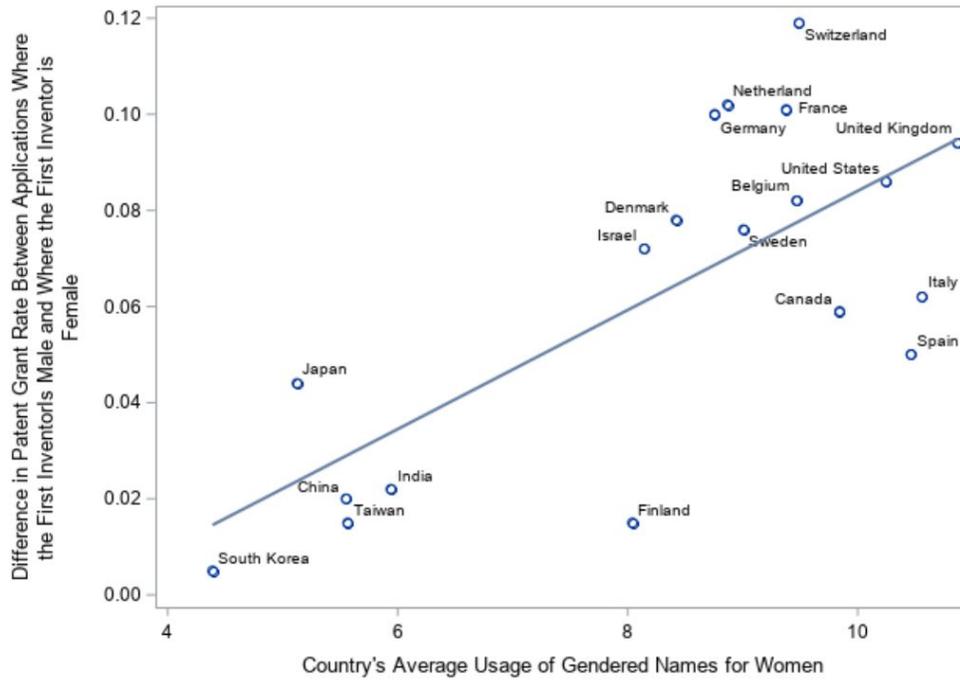
- Thomas Jefferson (former Patent Examiner)

1. Patent quality is hard. Even Thomas Jefferson struggled with it, writing, “I know well the difficulty of drawing a line between the things which are worth to the public the embarrassment of an exclusive patent, and those which are not.”
2. Patent quality concerns are not new. Independent government reviews in 1990, 1997, 2000, 2007, and 2015 each found serious problems with the USPTO’s quality processes. The Patent Quality Review Office at the PTO was created in 1974 to address quality concerns. Patent examination as we know it today was introduced in 1836 to remedy the previous system’s defect of registering patents without applying any quality filters at all, “deluging the country with worthless monopolies and laying the foundation for endless litigation.” The patent registration system that preceded it, in turn, was motivated by the challenges that the first patent examiners – a board comprised of the Secretary of State, Attorney General, and Secretary of War, among them the Founding Fathers of the United States– met in trying to thoroughly examine patent applications despite their demanding schedules
3. Patent quality is the shared responsibility of applicants and the Patent Office, and applicants don’t always invest in quality. My research suggests that ratios of R&D per tech patent have dropped, the fees paid to agents and attorneys for patent drafting have stayed essentially flat for the past 20 years. This reflects the predominant desire in tech industries to use patents for defensive and trading, not offensive uses. As “software eats the world” pursuit of freedom to operate, not litigate, has increasingly become the primary motivation for seeking patents.
4. Like other aspects of the patent system, patent quality reflects a balance, between pendency and efficient production on one hand and on quality on the other.
5. The Patent Office is constrained. It suffers from human resource constraints, due to the strong demand for technical and legal talent that means patent examiners often have opportunities to advance professionally by leaving the USPTO, driving turnover. It suffers from authority constraints: because the USPTO lacks substantive rulemaking authority, anytime it does something that appears to heighten the burden on applicants - even something as basic as asking applicants to disclose the ultimate party in interest - it is vulnerable to claims by patent applicants, sometimes bitterly fought, that it is overstepping its authority.

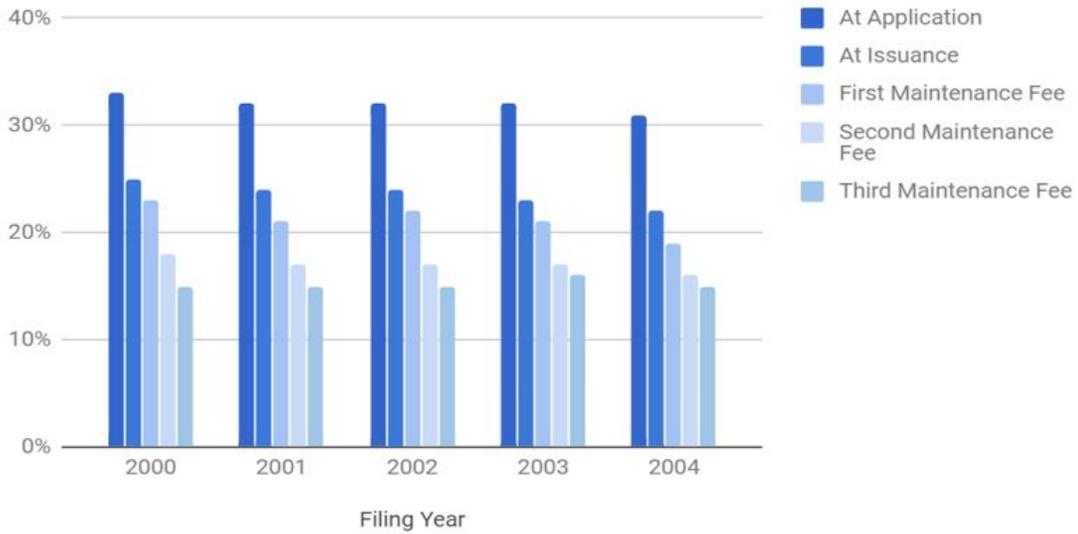
B. Patent Quality Matters.

1. Inconsistent patent examination drives work and rework, the invalidation of wrongly issued patents is highly disruptive and undercuts the certain right property that some companies depend on.
2. Poor patent quality harms bona fide patent interests. It gives those that tread on the legitimate patents of others an excuse to refuse to pay, banking instead on the possibility that the patent is invalid. Because it is impossible to separate the wheat from the chaff, companies that depend crucially on patents can be seriously harmed when their patents are called into question.
3. Mistaken transfers, like the \$350 million paid from banks to DataTreasury for its ultimately invalidated patents, lead to higher prices and a loss of consumer welfare. The dynamic effect of allowing patents over routine and incremental advances that would have happened anyway has led to more patents over less innovation and a higher cost of innovation, as small and large firms dedicate resources to filing applications to avoid litigation, rather than to promote innovation
4. Low quality patents diminish freedom to operate of those who don't have their own arsenals.
5. There are distributional consequences of weak applications and potential bias in examination - applications that name women with traditionally gendered names are less likely to issue, and so are the applications of discounted applicants.

FIG__ Differences in Allowance Rates of Male and Female-Lead Inventor Patent Applications by Country³



FIG__ Discounted Entity Shares Over the Patent Lifecycle⁴



³ Source: Author's analysis based on the methodology and data described in Jensen et al, to be published in a forthcoming article by the author. The author thanks Jenna Clark for statistical and graphical assistance with this Figure.

⁴ Source: Chien, *Innovation, Inequality and Patents* (working paper, posted to on SSRN)

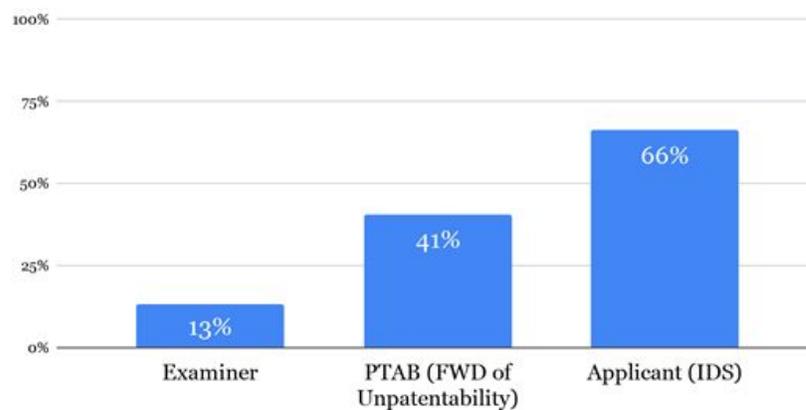
6. The impact of letting weak inventions get patents can be trivial or, in the case of secondary drug patents that extend the life of pharmaceutical exclusivities, enormously significant, literally a matter of life and death. Policymakers are debating “drastic” changes like expanded use of March-In rights and but in so doing they are overlooking the basic tool of patent quality and rigorous vetting of applications that marginal advances.

C. There is Much We Do Not Know but Comparative Views and Rigor Can Help.

“If I had an hour to solve a problem, I’d spend 55 minutes thinking about the problem, and 5 minutes thinking about the solution” - Albert Einstein (former Patent Examiner)

1. There are many unknowns in patent quality: how do we define it? How do we trade off quality and cost and timing?
2. One of the biggest challenges with patent quality is a lack of a consensus way of measuring it. But comparative approaches, as described in my *Comparative Patent Quality* can be used to elucidate, for example, the large gap in prior art.

Fig 1: Comparative NPL Citation Rates (N=906 Patents Invalidated in IPR)



3. To fill the gap in knowledge, the USPTO can continue doing what it’s doing, but with more rigor and a greater focus on its learning agenda, using the MATTER framework I lay out in my article, *Rigorous Policy Pilots*:

Framework for a Rigorous Policy Pilot

1. **M** Address questions that **matter**
2. **A** Consider what can be done within existing **authority** and agency resources
3. **T** Identify the **theory of change** behind the intervention and how it fits into a broader strategy
4. **T** Specify a **testing** strategy
5. **E** Specify the **evidence**
6. **R** Find/allocate adequate **Resources** for evaluation

4. The good news is that Patent Office has quietly put in place many of the needed elements to carry out rigorous piloting:
5. Data Thanks to the ongoing efforts of the USPTO Digital Services & Big Data (DSBD) team in collaboration with the USPTO Office of the Chief Economist (OCE), the office has a strong open data infrastructure in place for doing independent evaluations.
6. People We all know that one of the biggest legacies political leaders can leave behind are the dedicated civil servants - the creation of the Office of Patent Quality Assessment by Former USPTO Director Michelle Lee and led by Valencia Martin-Wallace has created capacity for assessment of quality. This office has done good work in negotiating pilots with the union, and I encourage Congress and the USPTO to continue to consider strongly the perspectives of internal examiners' - and not just external stakeholders - as described in my "Team" pilot suggestion - in trying different approaches. You also have many stakeholders, including academics and others, interested in seeing the USPTO succeed. The Edison Scholar program, PPAC and other mechanisms for bringing in outside talent allow the USPTO to access talent outside its borders.
7. Culture An openness to piloting, even rigorous randomized piloting (on the TM side), and continuous learning, combined with a relatively apolitical mandate, positions the USPTO well to lead among agencies in evidence-based policy formation advanced for example through the recently enacted Evidence Act. Though the USPTO is not a CFO Act agency, and not all of the Evidence Act applies to them through statute, OMB has encouraged all agencies to comply with the Act (see the Results for America [Evidence Act Resource Center](#) for more details).

Congress Can Take Several Steps to Promote Patent Quality.

“The country needs and, unless I mistake its temper, the country demands bold, persistent experimentation. It is common sense to take a method and try it: If it fails, admit it frankly and try another. But above all, try something.” - Franklin Delano Roosevelt, Address at Oglethorpe University, May 22, 1932

1. Keep paying attention. Following the oversight role that the IP Subcommittees played during patent reform from 2012-2014, the quality of software patent applications, in terms of unique and the quality of complaints filed in district courts, as measured by the presence of claim charts, has actually improved. See attached presentation to the FTC.
2. Focus is what is important, not just on what is urgent. 101 deserves serious attention but it only impacts 15% of cases. A much smaller share of cases is subject to IPR. But prior art is at issue in over 90% of patents. The USPTO recognizes this and has carried out numerous pilot programs focused on prior art including, in this year alone, the Peer Search Collaboration Pilot, the OPQA Feedback on Search Pilot, and, in continuing International Search Pilot. Ask them what they’ve learned, and what how these acts fit into their long term agenda.
3. Give the Patent Office more flexibility in meeting its budget requirements. The USPTO is not the only government agency that has to balance competing revenue pressures but it does have to worry about granting a certain number of patents to reach its budget. The EPO, like the USPTO, subsidizes examination renewal fees, and the office is also self-funded. But the EPO also owns substantial financial assets that are sometimes used to supplement the funding derived from patent fees. In addition, the European Patent Convention states that the Contracting States of the EPO must finance any deficit that the office faces, an important backup source of revenue. Some other permitting agencies receive significant funding as part of the federal budget. The USPTO’s ledger, in contrast, is substantially more balanced. To enable the USPTO to operate in a way that is dictated by its mission, rather than its finances, Congress could consider creating such buffers as well.
4. Encourage and expect the USPTO to engage in bold, persistent, and rigorous policy piloting and evaluation.

UPDATED 12/16/18
Changes shown in Blue

Flight from Quantity... Flight to Quality?

A **Differences in Differences** Analysis of Patent Applications and Complaints Following Patent Reform

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The Team



With Major Thanks to

 Lex Machina

AskAlice!



INNOGRAPHY



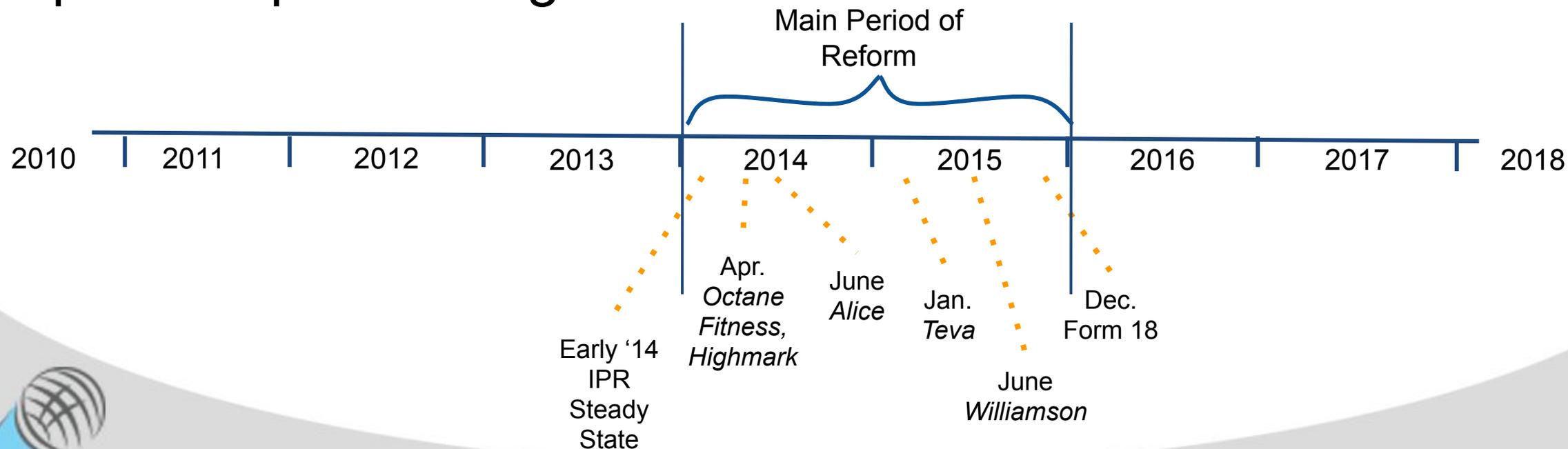
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Bill Sundstrom, Ben Dugan, Rocky Berndsen, Peter Glaser, Willian Gvoth, the Lex Machina Helpdesk, Robert Jain, Shawn Ambwani



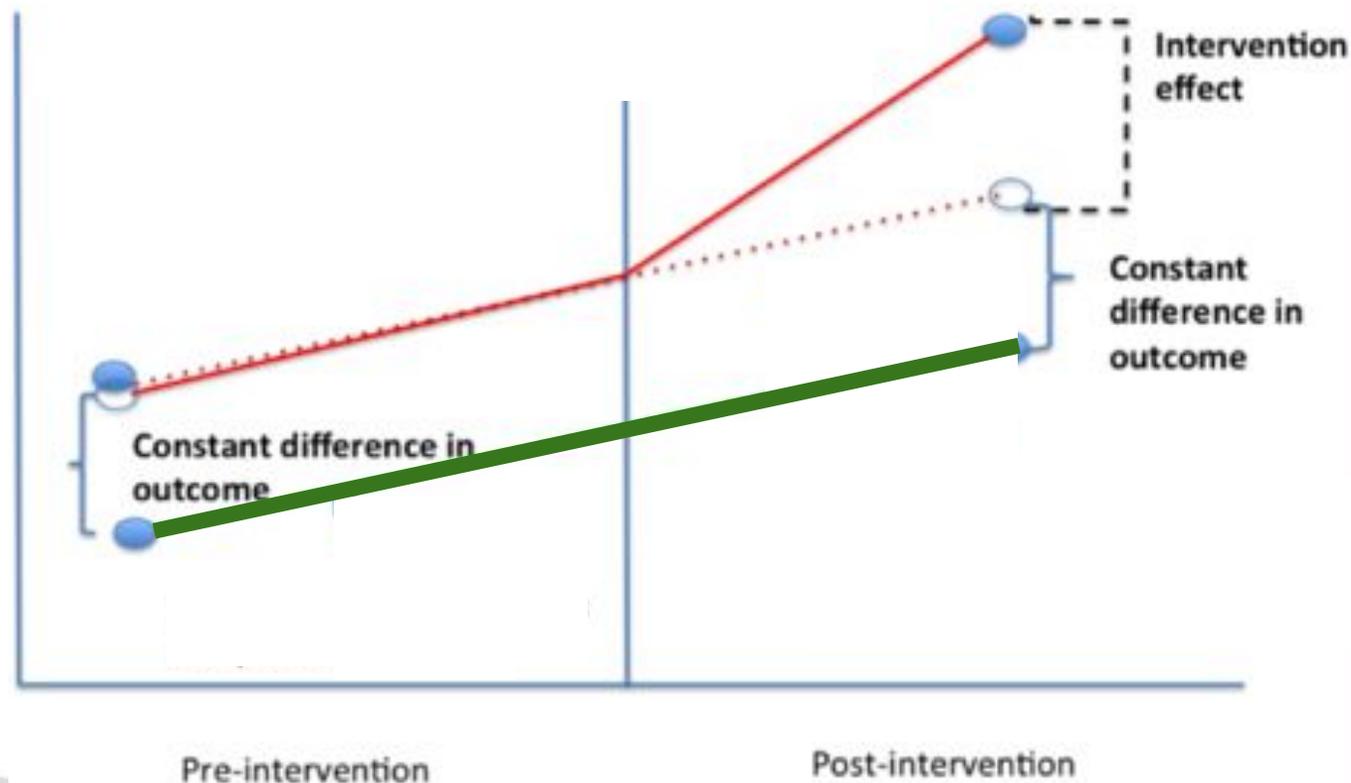
Study Motivation

Policymakers have enacted changes to the patent system that were intended to decrease abusive litigation and increase the quality of patents and assertions. Have they worked, based on looking at complaints and applications pre-and post-change?

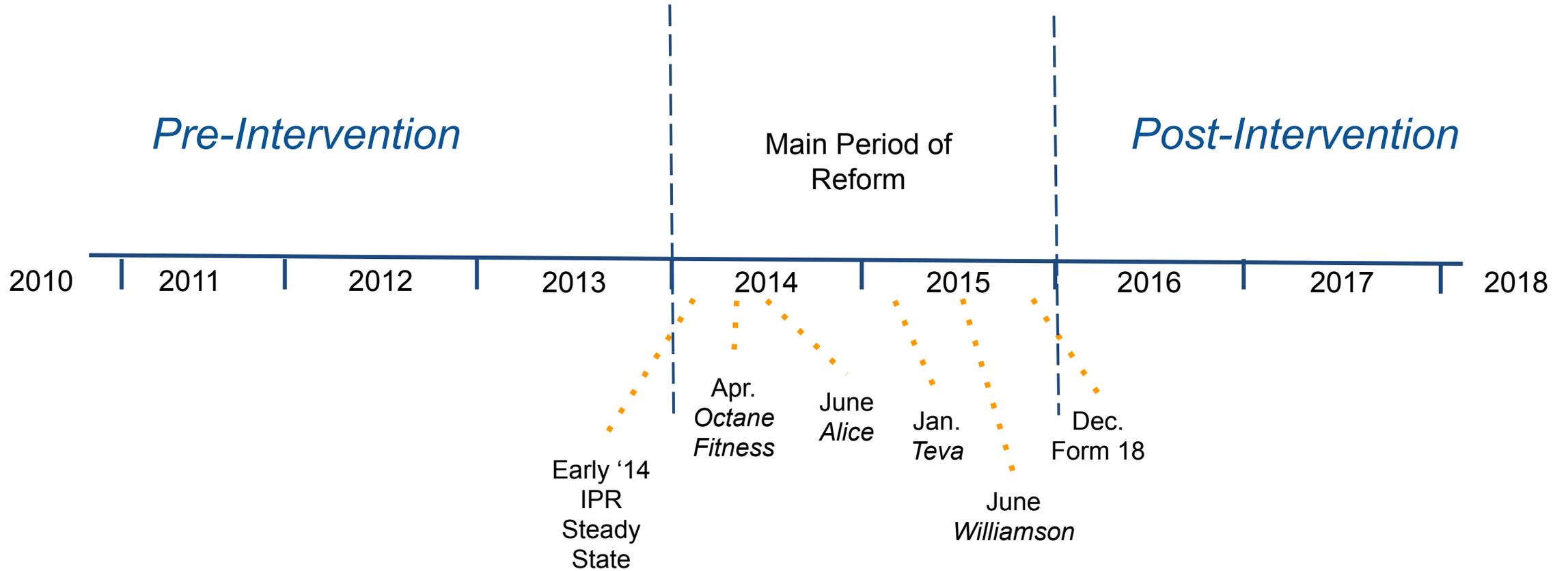


Methodology - Overview

Look for differences pre and post-reform among groups targeted and not targeted by reform using “Diff in Diff” approach



Methodology - Pre and Post Periods



Methodology - Control

The reforms targeted abusive litigation by NPEs based on software patents so we compared “treated” and “untreated” as follows:

- Tech control: Pure Software v. Non Pure SW or Chemistry
- Plaintiff control: “High Impact Patent Asserter” (HIPA = 10+ assertions of the patent) v. Non-HIPA; PAE v. Non-PAE NPE v. OpCo



Methodology - Traits

UPDATED 12/16/18
Changes shown in Blue

Complaints

- Presence of claim charts
- Presence of specific product details like screenshots, accused product descriptions

Patent Applications

- Total words
- **Words in claim 1**, Unique words in claim 1

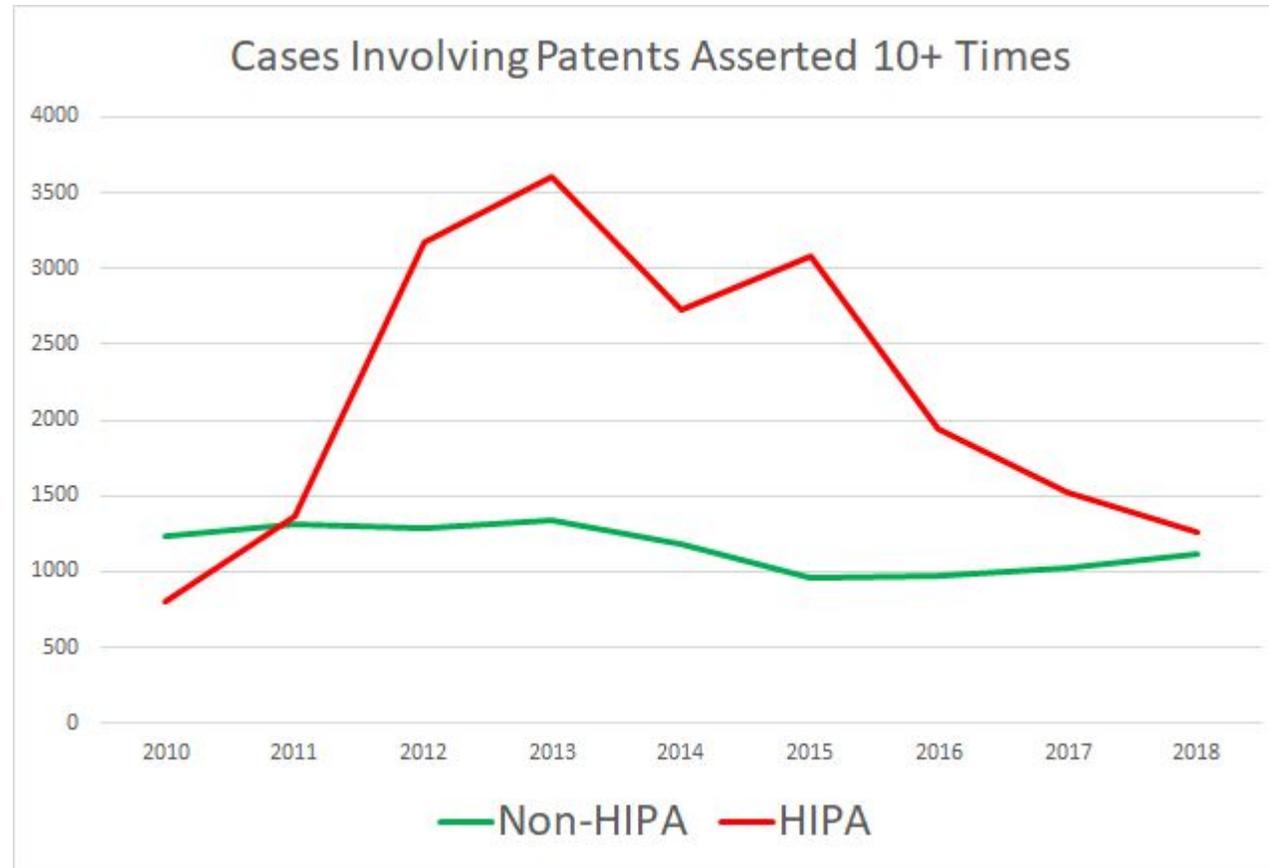
machine coded except for hand-coding of product details within complaints



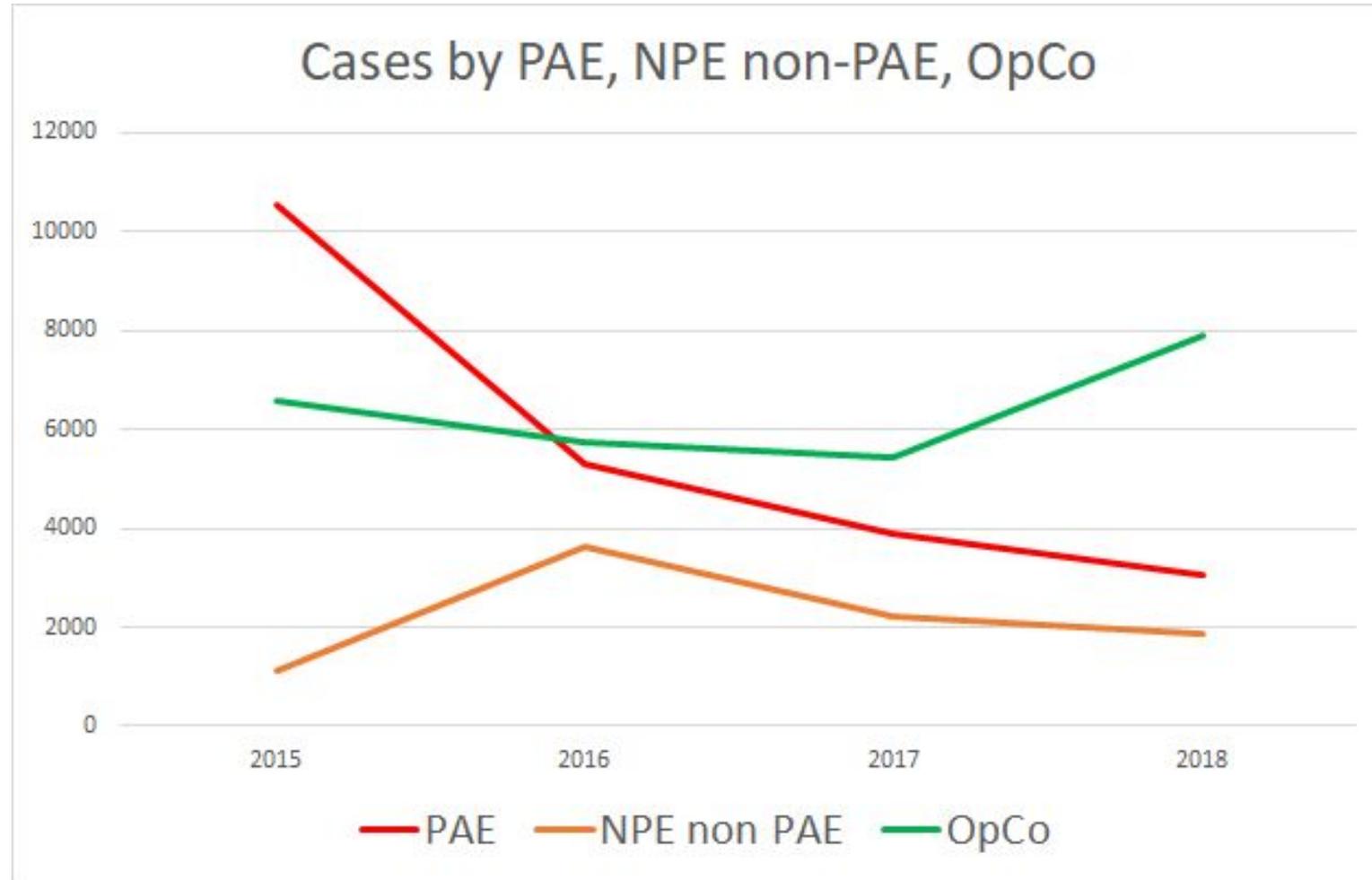
Has there been a flight from quantity?



R1: Cases Involving High Impact Patents (Asserted 10+ Times) are Down



R2: Cases by NPEs of all kind are down



Has there been a flight to quality?



Has there been a flight to quality?

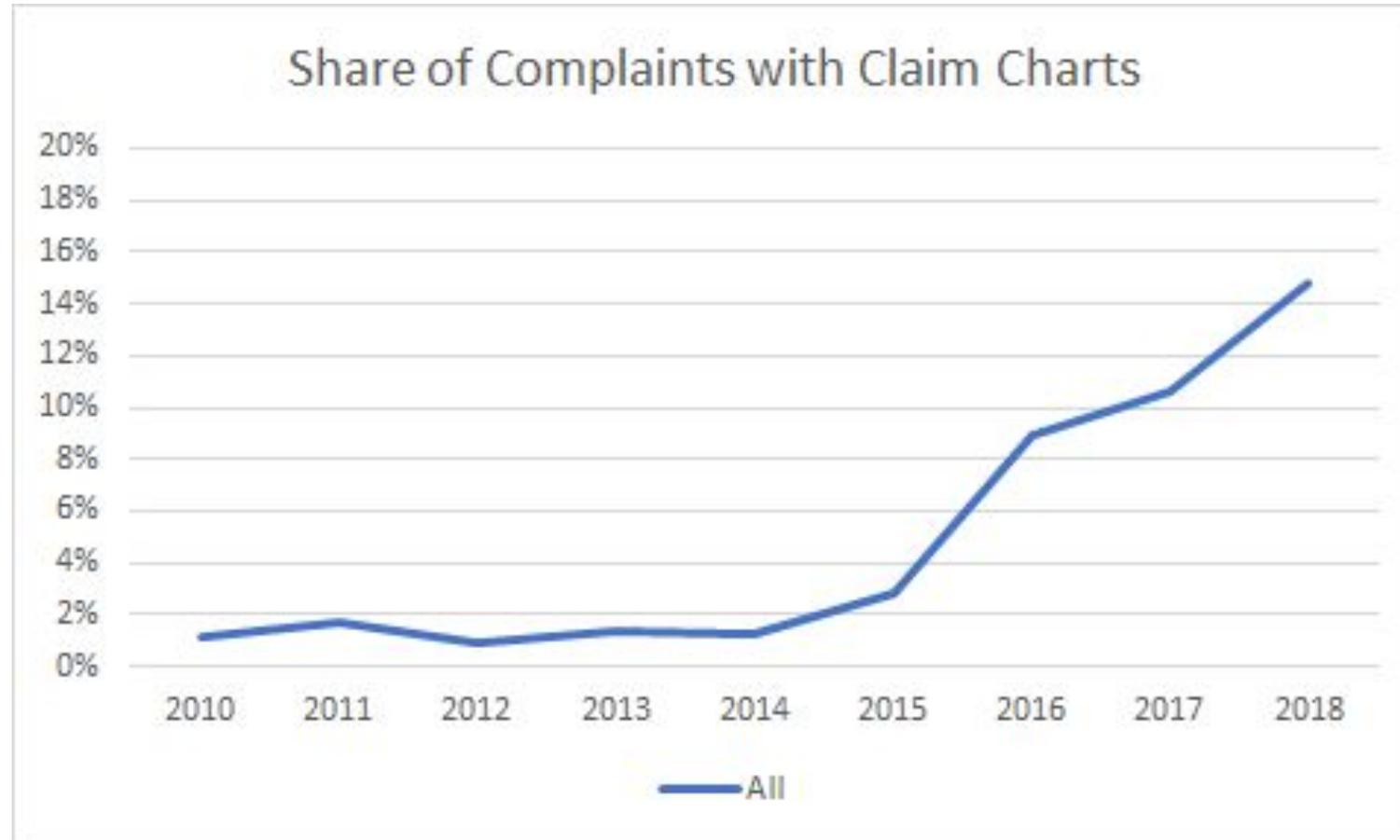
- Complaints



R3: Complaints are Longer



R4: Claim Charts are 10x More Common Than Before



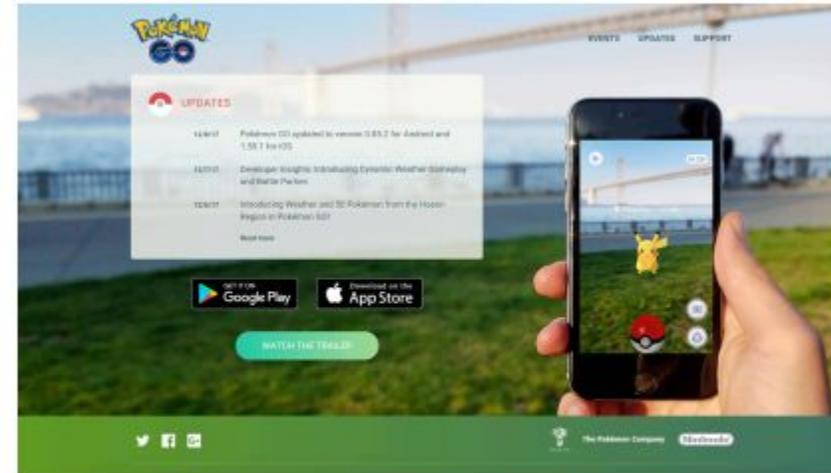
R5: Product Details Are More Common

Case 2:17-cv-07307 Document 1-2 Filed 09/20/17 Page 1 of 10 PageID: 17

EXHIBIT B
U.S. Patent No. 6,330,549 Claim Chart

Claim: 1	PRUDENTIAL FINANCIAL WEBSITE
<p>A method for protecting a computer program from unauthorized use independently of any methodology for distributing the computer program to prospective users, the computer program including an embedded protective code, the method comprising the steps of:</p>	<p><i>The Defendant utilizes a method to protect a computer program (e.g. Prudential Financial's web-based application) from unauthorized use independently of any methodology for distributing the computer program to prospective users, the computer program including an embedded protective code (e.g. the Prudential Financial Web Application is secured by embedded code requiring a HTTPS connection using TLS 1.2).</i></p> <p><i>The RSA, Diffie-Hellman, and Hashed-based message authentication code mentioned below are cryptographic functions required by TLS 1.2.</i></p>

Case 1:17-cv-01810-UNA Document 1 Filed 12/15/17 Page 5 of 9 PageID #: 5

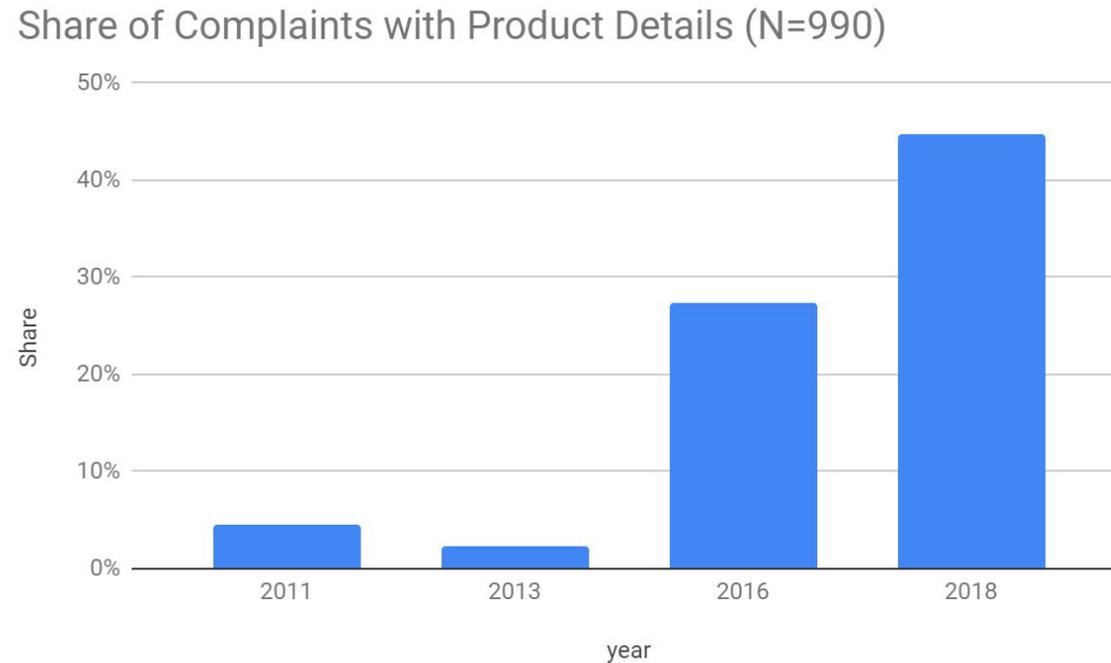


(Source: <https://pokemongo.nianticlabs.com/en> (last visited Dec. 12, 2017)).

19. Regarding claim element [1d]: As mentioned above, users of Pokémon Go navigate geographic areas during gameplay. As they do, the Pokémon Go video game application continues to receive position indicators indicating the user's current physical location.



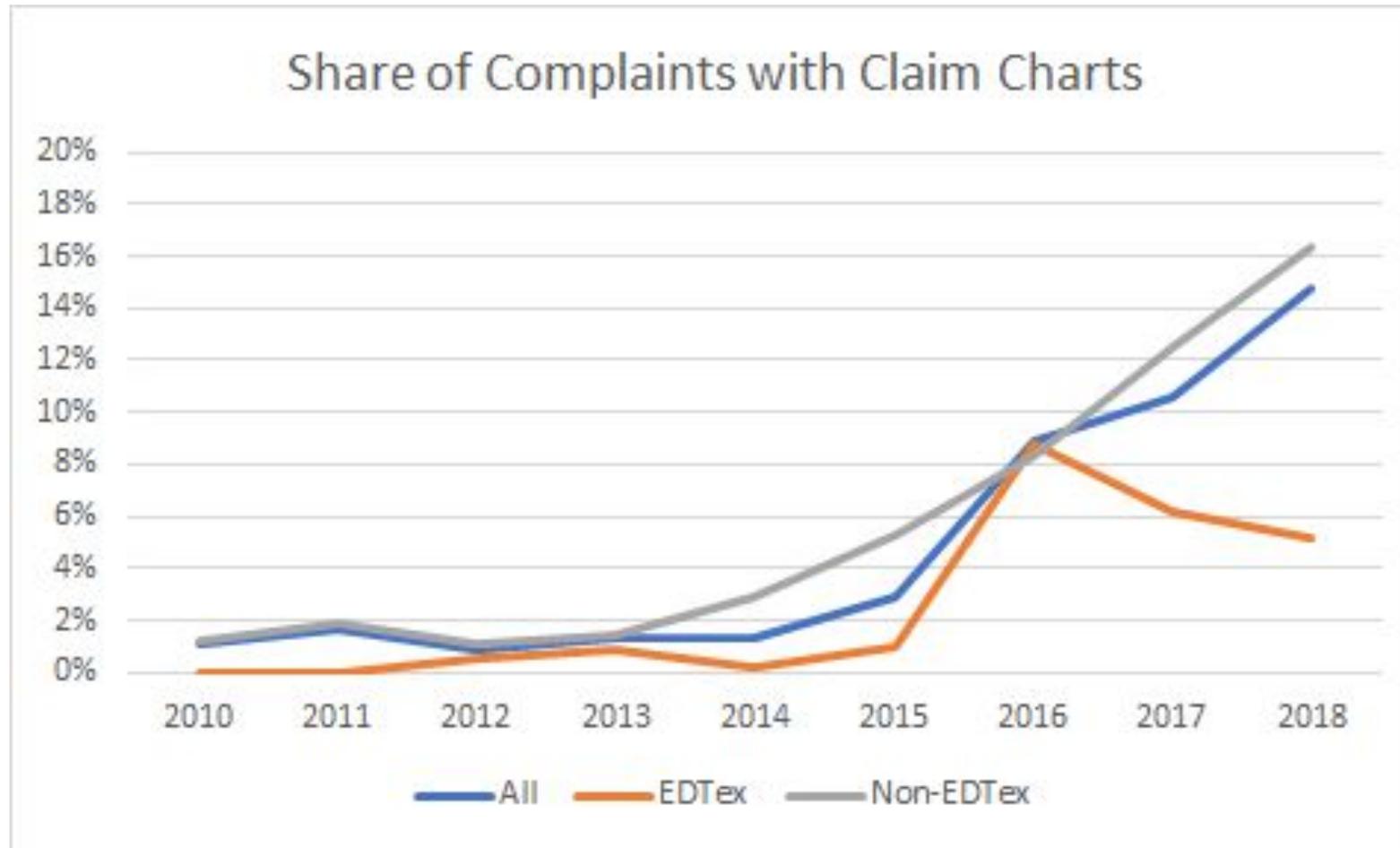
R5: Product Details Are More Common



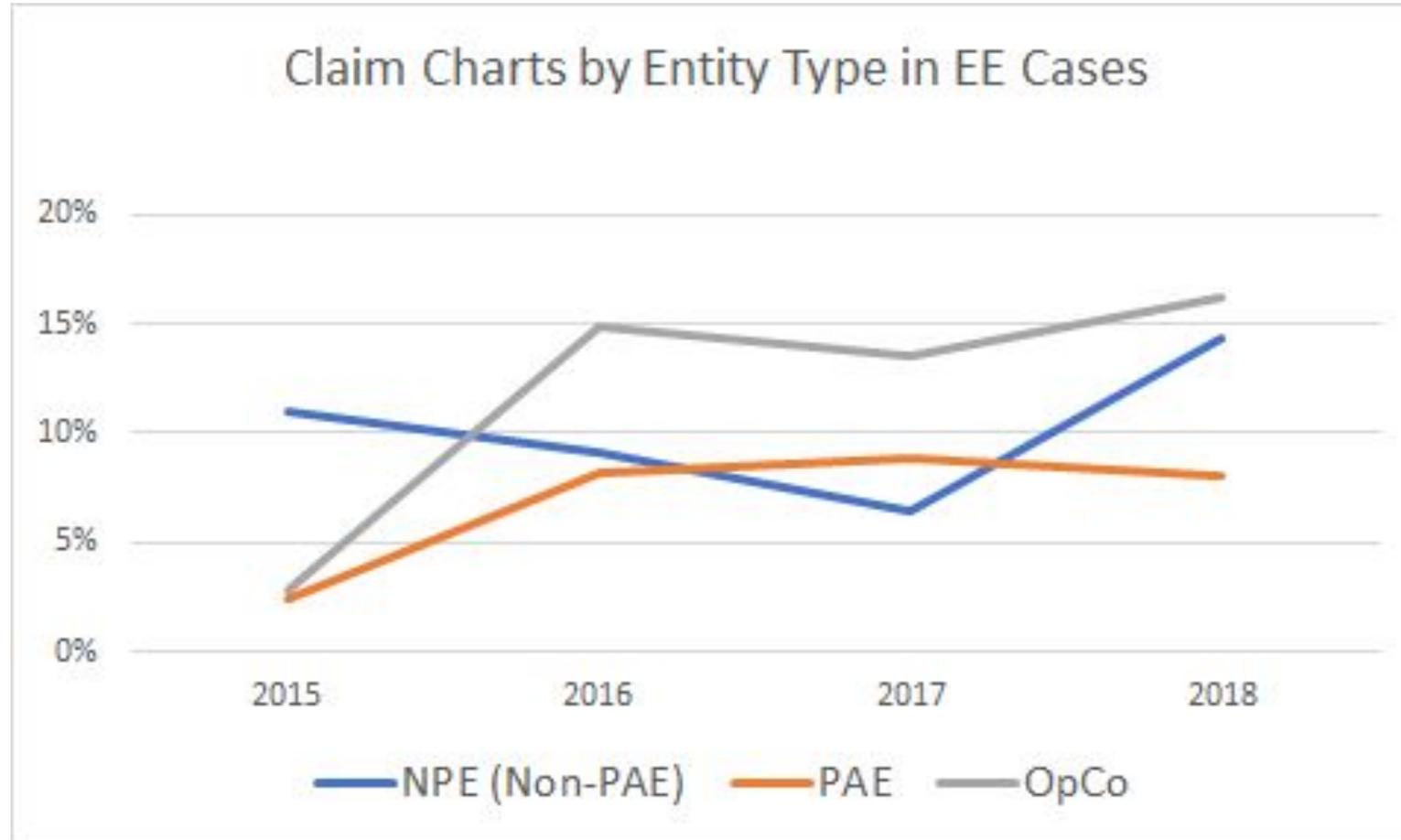
*Screen-shots, the names of accused products, and the recitation of elements and links to products



R6: Claim Charts are Much More Common but Not as Much in ED Tex



R7: Claim Charts are Much More Common but Not as Much by PAEs



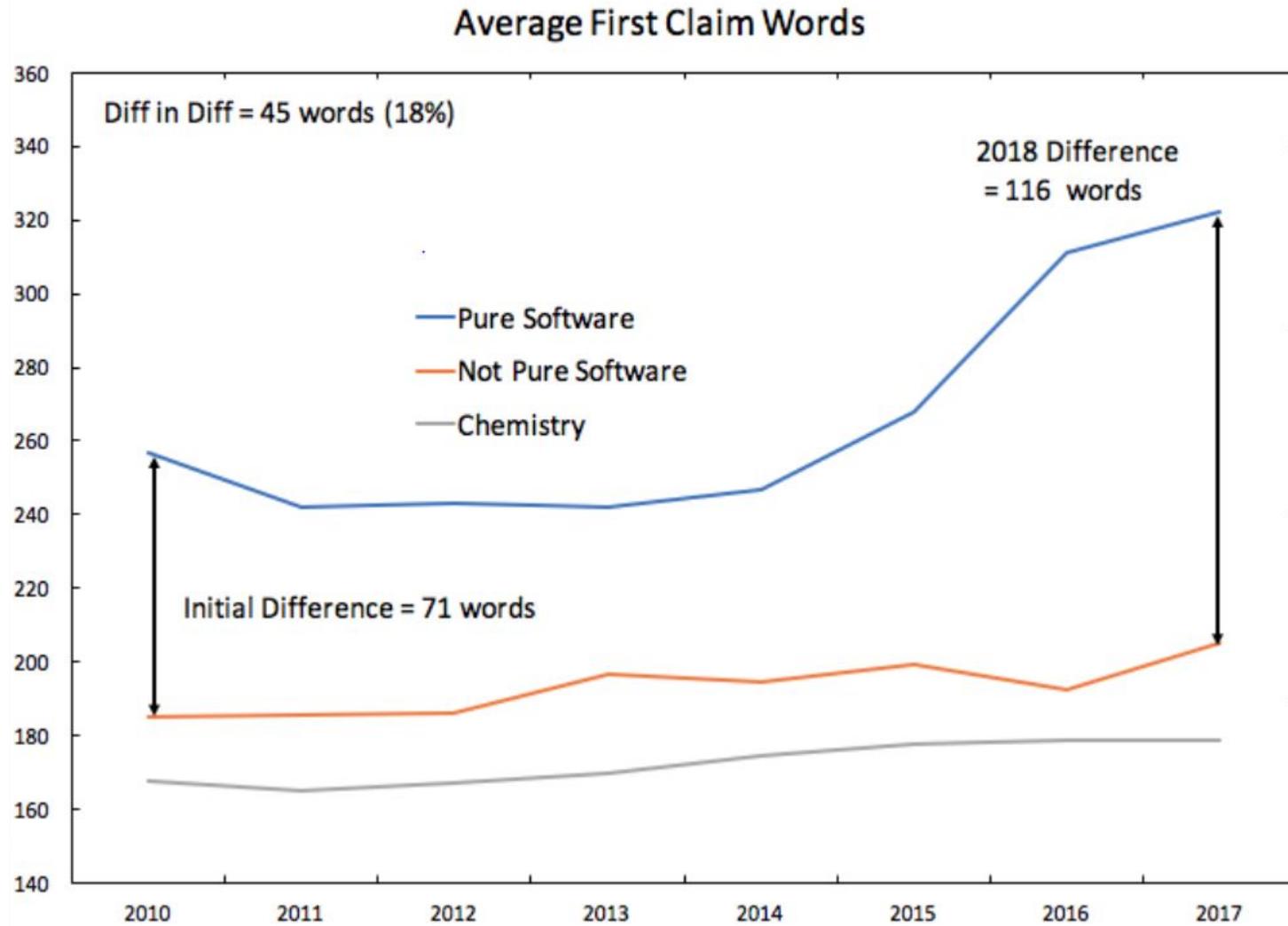
Has there been a flight to quality?

- Patent Applications

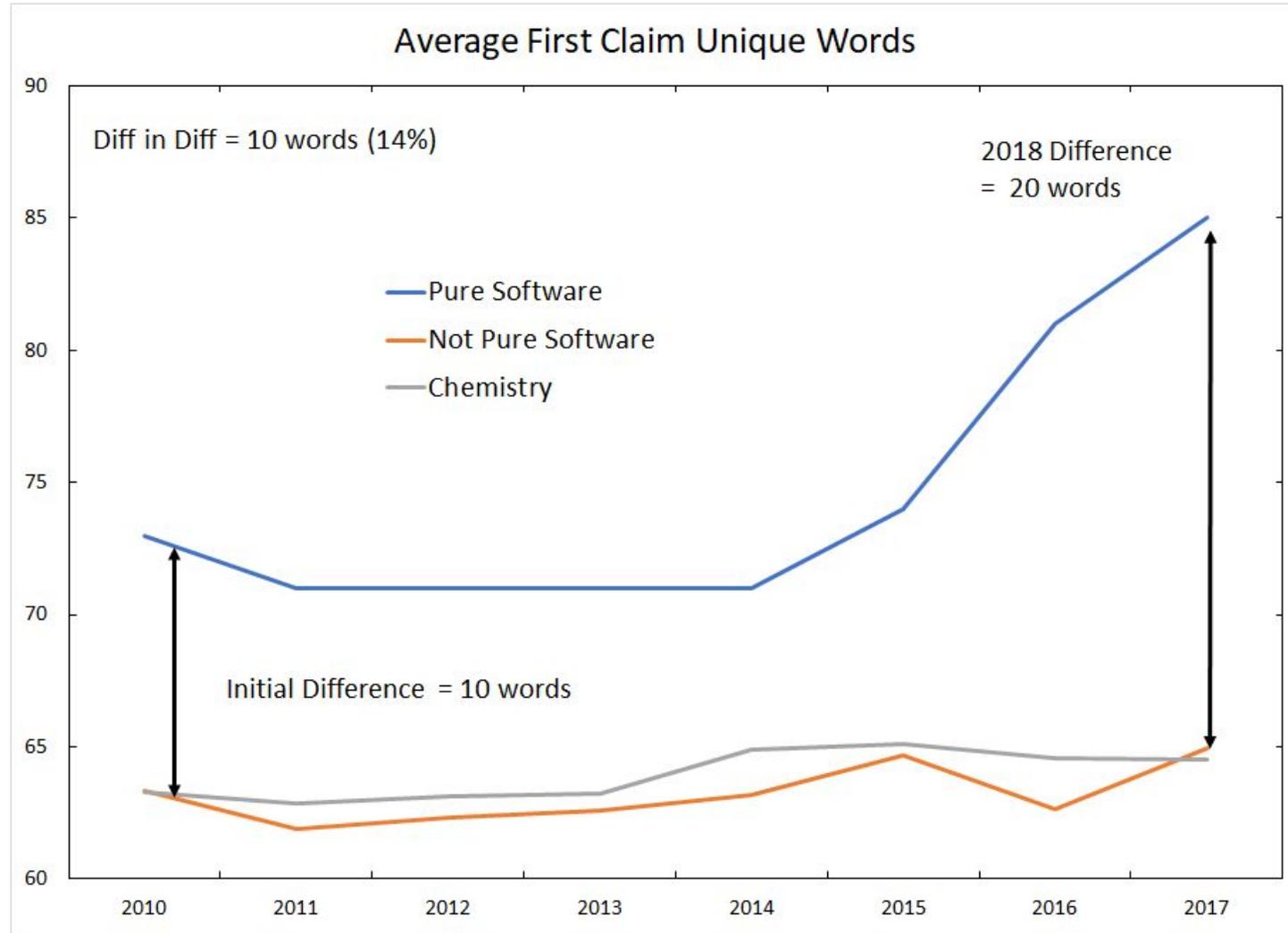


R8: S/W Claims Are Longer

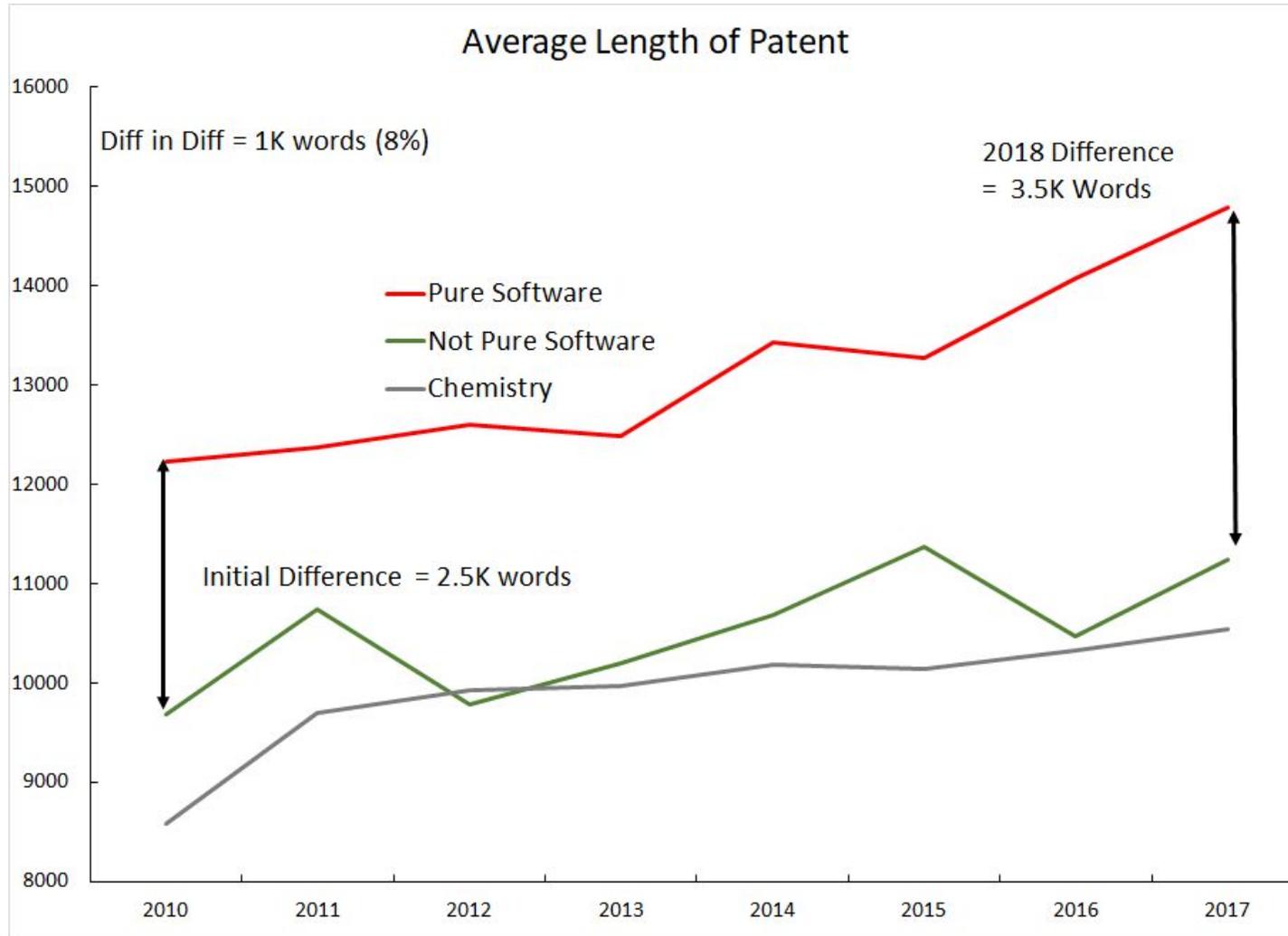
ADDED 12/16/18



R9: S/W Claims Are Becoming Narrower



R10:S/W Specifications Are Longer



In Sum

Fewer Scale (10+), PAE, Non-PAE NPE Assertions

More Detail in Complaints

More Unique Words in Patent Claims and More Detail in Specs



Backup



Methodology - sample sizes and sources

We used full populations or (randomized) sample sizes that would estimate the expected proportion of the trait with 5% absolute precision and 95% confidence ($N > 385$) unless otherwise noted.

Population	Metric	N and Technique/Technology used
Complaints	Claim Charts	All complaints over time (PACER) obtained from Lex Machina
Complaints	Accused Product Descriptions, Length	~500 (Handcoding for screen-shot and non-screen-shot product names, recitation of elements, links, screenshots), complaints obtained from Lex Machina
Patents	Unique Words, Word Counts	All patents during studied periods except for the random sample, which was of 4K patents, Analysis by Peter Glaser, Will Gvoth, Rocky Berndsen and team based on technology first described in Dec 2017 IP Watchdog Article



Methodology - sample identification

We identified tech groupings via validated AU mapping (see [Chien and Wu, 2018](#), WIPO Shmoch), used plaintiff codings of Unified Patents (supplemented by “high-impact patent” assertion HIP = more than 10 assertions from 2010-present analysis for missing data)

Population	AU Definition (use for complaints and WC analyses)	CPC Definition (used in 101 analysis)
“Pure Software” Patents and Apps/Complaints	362X, 368X, 369X, 3661, 3664	H04L, H04J, G06T, excluding H04W
Chemistry Patents and Apps/Complaints	TC17XX	B01B, B01D, B01F, B01J, B01L
Non-Pure S/W Patents/Complaints	Random Sample minus Software	

