Journal of Public Economics 148 (2017) 43–56

Contents lists available at ScienceDirect

Journal of Public Economics

journal homepage: www.elsevier.com/locate/jpube

# Why weak patents? Testing the examiner ignorance hypothesis

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ARTICLE INFO

*Article history:*
Received 20 January 2015
Received in revised form 9 February 2017
Accepted 9 February 2017
Available online 11 February 2017

*Keywords:*
Patent office
Patent quality
Patent examiner
Weak patent
Intellectual property

ABSTRACT

There is a widespread impression, reflected in recent legislation, that US Patent Office examiners issue many patents of dubious validity, and are insufficiently informed to distinguish these from other valid applications. We address this issue using related application outcomes at the European Patent Office as indicators for patent weakness. We create a proxy for potentially citable prior art using latent semantic analysis of US patent documents, and use this to construct a measure of examiner search effort. We find that US examiners tend to devote more search effort to weaker patents, implying that they can identify a substantial portion of the weak patents that they issue. Why the patent system fails to make better use of examiners' ability to identify weak patents is a question that merits further investigation.



**JEL codes**

O34
O31
D83
D73

## 1. Introduction

Among lawyers, economists, policy makers and businessmen there is a widespread belief that patent examiners at the United States Patent Office (USPTO) have allowed the grant of too many patents that do not satisfy the statutory criteria for allowance. Such "weak patents" impose social costs associated with increased uncertainty and abusive litigation without commensurate social benefits associated with increased innovation incentives.[1,2]

There is also a related impression that USPTO patent examiners allow many weak patents because they do not distinguish them from other applications that meet the patentability criteria. Given the resources at their disposal, examiners are ignorant of the quality of the patents they issue. In this paper, we empirically address this examiner ignorance hypothesis.

It is important to distinguish the question of examiner ignorance from the ongoing debate regarding its causes, and what, if anything, should be done about it. Most adherents of the examiner ignorance hypothesis see a need to augment the time and financial resources allocated to the application process. The Leahy-Smith America Invents Act, signed into law in September 2011, addressed the perceived inadequacy of examination with provisions restricting the practice of diverting money from the USPTO, empowering the Office to set fees to hire more examiners and upgrade infrastructure, and instituting pre-grant submission of prior art or post-grant review by third parties. Others see the incentive structure for examiners as the main problem (for example Merges, 1999; Long, 2009).

However, not all supporters of the ignorance hypothesis assume such ignorance to be problematic. One influential legal scholar, in a stimulating contribution to the debate, postulated that US examiners "are 'rationally ignorant' of the objective validity of patents." (Lemley, 2001). Given the skewed distribution of patent value, he argues that society is better off economizing on USPTO examinations and reserving a rigorous determination for the small subset of patents that enter litigation.

A lack of relevant empirical evidence constrains discussions of this topic. We have in particular found little empirical evidence regarding the ability, given the resources at hand, of examiners to distinguish

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[1] Five United State Senators indicate continuing concern with this issue in their letter to the United States Secretary of Commerce (August 14, 2014), stating that abusive litigation by patent trolls "raises questions about whether too many illegitimate patents are being issued …" (https://www.merkley.senate.gov/download/letter-to-uspto-on-patent-quality-8-6-2014, last accessed August 21, 2016).

[2] See National Academies of Science, "A Patent System for the 21st Century.", et al. (2004) and Jaffe and Lerner (2004). Also see Farrell and Merges (2004), Shapiro (2004), Choi (2005), Bessen and Meurer (2008), Farrell and Shapiro (2008), Kieff (2009), Lemley and Shapiro (2005), Petherbridge (2009), Harhoff and Wagner (2009), Lemley (2012), Picard and de la Potterie (2013) and Schuett (2013). For a contrary view that US patents should be weaker see Hubbard (2013).

http://dx.doi.org/10.1016/j.jpubeco.2017.02.004
0047-2727/

the strong from the weak among the patents they issue. Frakes and Wasserman (2016a) present evidence that time constraints on subsets of examiners explain the grant of at least some weak patents, and several studies on examiners' behavior and examination outcomes cast doubt on the notion that patents are granted without much scrutiny at the USPTO (Lemley and Sampat, 2008; Carley et al., 2014).

This paper addresses the claim that weak US patents are issued by examiners who are ignorant of the relative strength of patents they grant, focusing on the relationship between an individual examiner's efforts in searching for prior art for each of a set of patents he issues and the relative strength of those patents.

Our sample is a set of US patents with a USPTO filing date between 1990 and 1995, for which applications were also filed in the Europe Patent Office (EPO). We use outcomes from the EPO application process, reflecting not only European laws but also procedures and traditions distinct from those at the USPTO, as indirect indicators of the strength of the related US patents.[3] For 36% of US patents in our sample, the related applications at the EPO failed to result in a patent grant.

We use the number of prior patents cited on the front page of a given US patent *i* as a (noisy) measure of prior art identified by its examiner.[4] Applying a Latent Semantic Analysis (LSA) algorithm to USPTO patent data, we approximate the set of *potentially citable prior art* for each patent in our dataset. Our measure of the examiner's prior art search intensity is the share of this potentially citable prior art that is actually cited in the patent.

Our empirical analysis indicates that this measure of search intensity for a US patent is significantly related to the probability of failure (withdrawal or rejection) of the related application at the EPO. Our findings are quite robust. The most convincing result is from a panel data model with *US examiner by technology by US application year* fixed effects, which allows us to study variations in a US examiner's search intensity within the subset of patents that have the same examiner, the same technology field and the same application year.

We find that most of the examiners in our sample exhibit bimodal search effort, and among patents issued by an examiner, search effort is significantly positively correlated with failure of related applications at the EPO. An increase in our search effort measure by 0.4, roughly the average distance between the two modes, is associated with a rise in the rate of failure at EPO by at least 4.3 percentage points. We cannot meaningfully relate this rise to the total incidence of weak patents because estimates of the latter vary widely. Nevertheless our findings suggest that examiners are aware of the weakness of a substantial number of the weak patents they issue, and devote extra search effort to their examination.

To understand our results, it is important to recognize that "One of the oddest things about the US patent system is that it is impossible for the USPTO to ever finally reject a patent application. While patent examiners can refuse to allow an applicant's claim to ownership of a particular invention, and can even issue what are misleadingly called 'final rejections,' the applicant always gets another chance to persuade the patent examiner to change his mind" (Lemley and Moore, 2003). Frakes and Wasserman (2015, 2016a) present empirical evidence suggesting that this inability encourages this resource-constrained agency to allow additional weak patents.

One interpretation of our results is that if an examiner identifies an application he believes to be weak, he searches harder for prior art that would support a final "rejection" of the application, hoping to convince the applicant of the difficulties, delay and cost she can avoid by abandoning the application. Should the applicant nevertheless persist, the USPTO examiner cannot ensure a truly final rejection. Though he can increase the costs to the applicant by further delaying disposal of the application, by doing so he increases his own workload with no increase in the "counts" that measure his productivity and eligibility for a bonus. Hence the examiner often ultimately concedes. Interviews with examiners, ex-examiners and patent attorneys support our inference that examiners do attempt to build a case against allowance of a weak application by conducting more intensive searches for prior art.[5]

Our results are consistent with, though they do not directly address, an alleged *pro-applicant* bias of policies and procedures at the USPTO (Jaffe and Lerner, 2004). Supporters of this view have proposed changes in rules that would increase the relative bargaining power of examiners.[6,7] Our results also complement the empirical literature addressing the effects of incentives and constraints at the USPTO on examiner performance (Cockburn et al., 2003; Lemley and Sampat, 2012; Frakes and Wasserman, 2013, 2014, 2015, 2016a, 2016b). Finally our work complements the research of others who focus on inter-examiner heterogeneity of performance levels, which we ignore here, as a source of weak patents in need of attention at the USPTO (Feng and Jaravel, 2016; Frakes and Wasserman, 2016a). Here, we focus on the wide and typically bimodal distribution of the individual search effort of US examiners, and its correlation with failure at the EPO as evidence of their ability to identify a substantial number of the patents they issue as weak. Their grant, not obviously attributable to lack of incentives or access to resources, merits investigation at the USPTO.

In the following Section we offer some relevant institutional details about the USPTO. Section 3 sets out our hypothesis. We describe the data in Section 4 and present our empirical strategies and results in Section 5. Section 6 discusses the policy implications of our findings and concludes.

## 2. Patent examination procedures and incentives at the USPTO

Why do examiners grant (allow) so many weak applications? Patent examination is a complex process involving examiners' understanding and evaluation of the patentability of an application based on personal knowledge of the field and information from various sources. These include, in particular, searches for prior art and interactions with the applicant, conducted within constraints and incentives imposed by the institutions and policies in the USPTO.

To furnish a foundation for our empirical test of the ability of US examiners to distinguish the weak from the strong in the patents they grant, in this section we briefly review some institutional details about patent examination procedures and incentives at the USPTO.[8] Since we use outcomes of "related" applications, applications at the EPO in the same "family" (with the same priority as the US patent), we also briefly discuss the examination process at the EPO.

### 2.1. Examiners and their burden of proof of non-patentability at the USPTO

At the USPTO, patent examiners work in art (technology) units, each consisting of 10–15 primary and assistant examiners, led by a Supervisory Patent Examiner. Primary examiners, with at least 5 years of

[3] This indicator of patent strength has recently been adopted by other studies (see De Rassenfosse et al., 2016). Note that we do not need to assume that EPO examination outcomes are without error.

[4] In the sample period, citations of applicants and examiners are not distinguished on published patent documents. We discuss this issue further below.

[5] We have checked the claims made here in interviews with ex-examiners and patent attorneys over the past several years, and at a meeting with a group of current patent examiners from various fields at the USPTO, kindly arranged by the chief economist, Dr. Stuart Graham, November 22, 2010. We also checked these claims in meetings arranged by the European Patent Office with examiners and other personnel at the PATSTAT conference, Vienna, Austria, November 16–18, 2010.

[6] A former patent attorney for a major United States electronics corporation told us in an interview that in his years in that position he never withdrew a patent application.

[7] In 2007 the USPTO adopted constraints on applicants' rights to use continuations; they were rejected by the Court of Appeals of the Federal Circuit in *Tafas* v *Doll* in 2009.

[8] See Cockburn et al. (2003), Lemley and Sampat (2012) and Frakes and Wasserman (2015) for detailed discussion of patent examination at the USPTO. Also see Seymore (2012) for a description of the presumption of patentability and current allocation of burdens of proof at the USPTO.