



Separating patent wheat from chaff: Would the US benefit from adopting patent post-grant review?



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ABSTRACT

This article assesses the impact in the US of adopting a patent post-grant review (PGR) procedure similar to one provided in the America Invents Act (AIA) of 2011. We employ novel methods for matching US patents to their European counterparts to find that opposition rates are about three times higher among European Patent Office (EPO) equivalents of US litigated patents as against control-group (unlitigated) patents. Contingent on reaching a final judgment in EPO post-grant opposition, we find that about 70% of these equivalents have challenged claims that are either completely revoked or amended. Using our empirical findings to inform a series of welfare estimates, we calculate benefit-to-cost ratios that the US may expect from implementing PGR in the range of 4:1–10:1. We also discover that these large social benefits result primarily from eliminating unwarranted market power in the current stock of granted patents, and much less so from litigation cost savings per se. Our results provide evidence that the US may benefit substantially from adopting the AIA post-grant review, but only provided that costs are controlled and that administration and appeals are not allowed to become too costly.

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1. Introduction

In the ongoing quality debate concerning the roughly quarter million patents issued in the United States each year, one of the most anticipated elements of patent reform is the establishment – by the American Invents Act of 2011 (AIA)¹ – of a post-grant review (PGR) process similar to one commonly used in Europe. Many scholars (Merges, 1999; Hall et al., 2004; Levin and Levin, 2004), the National Academies of Science (Merril et al., 2004), and the US Federal Trade Commission (2003) supported introducing a relatively inexpensive, quick process to allow competitors to challenge the validity of US patents soon after they grant. A common view is that low quality patents mistakenly granted by the US Patent & Trademark Office (USPTO) impose a large social cost, and that the only practical method for testing validity – in the US federal courts – is far too expensive and usually becomes available too late to be an effective means of weeding out bad patents from the system.

The new PGR process does not apply retroactively, but instead is available only to test the validity of US patents with applications filed after March 15, 2013. Since the USPTO takes on average about three years to examine a patent, we cannot expect large numbers of patents to be available for PGR review until 2015 and beyond. It remains today largely uncertain what impact the PGR will have upon patent quality, or its costs and benefits to society.

In this article, we examine whether the US can expect benefits from the PGR when fully implemented. Specifically, we explore what the effects will be upon both patent quality and rates of patent litigation. Moreover, we investigate whether society can anticipate welfare gains from (potentially) less patent litigation and a (potentially) more cost-effective and rapid resolution of uncertainty concerning patent validity, after netting out anticipated costs.

By employing novel data and methods, we conduct a twin-study design to examine the “opposition career” of European Patent Office (EPO) equivalents of a large sample of US patents litigated between 1976 and 2003. This comparative design allows us to examine how equivalent patents fared in these two different systems. Unlike in the US, Europe has used patent post-grant reviews for decades, and in fact the PGR now available at the USPTO was principally modeled on this European experience.

Our empirical results show that the EPO opposition rates of the twins of US litigated patents are about three times higher than

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¹ America Invents Act, Pub.L. 112–129 (September 16, 2011). Technical corrections to the Act can be found in Pub.L. 112–274 (January 14, 2013).

those of the twins of non-litigated control patents. We also find that outcomes in EPO opposition do not differ radically between the samples, with challenged patent claims being revoked completely in about one third of cases, partially amended in about a third of instances, and unaffected only in about one quarter of cases. We also demonstrate that EPO twins of US litigated patents tend to have a *higher* grant rate at the EPO than the equivalents of non-litigated patents. Accordingly, our overall results support the notion that the European patent system excludes from protection the equivalents of litigated US patents due to an *increased likelihood of PGR-type opposition*, and not by virtue of lower grant rates or less favorable opposition outcomes.

Our study also suggests that the United States can achieve substantial net welfare gains from its adoption of the PGR. After generating a set of cost and benefit equations, we apply estimates from our empirical analysis and conduct several sensitivity analyses, finding typically large benefit-to-cost ratios on the order of 4:1–10:1 for a number of realistic scenarios. In another novel showing, we find that the main effect influencing this estimate is not PGR substituting for expensive litigation, but instead PGR reducing the social costs imposed by the (many) invalid patents that have previously never been tested in litigation in the US system. We estimate that reducing such consumer loss dominates – by an order of magnitude – the benefits from avoided litigation. Our findings are unique because, for the first time we are aware, we consider and empirically investigate not only the PGR benefits that may flow from substituting for costly patent litigation, but also those that come from a reduction in consumer deadweight loss by combing out patents that would otherwise impose unwarranted monopoly power. We offer one important caveat to our results, however: As the per-unit cost of the PGR rises, net social benefits tend to degrade quickly. Accordingly, our findings have important policy implications in that they emphasize the need for making the new PGR proceedings affordable and accessible to any party with information regarding a patent's (in)validity.

We organize the remainder of this article as follows. Section 2 offers motivation for our study and formalizes our research questions. In Section 3, we compare and contrast relevant attributes of the US and European patent systems. Section 4 follows with descriptive statistics and a discussion of data issues. In Section 5, we use these statistics to provide an estimate of the welfare flowing from the introduction of PGR in the US. Section 6 summarizes our results and concludes.

2. Motivation and research questions

The optimal design of national patent systems has been a topic of recurring interest (Kahn, 1940; Gilbert and Shapiro, 1990; Jaffe and Lerner, 2004). A well-functioning patent system is considered an effective means of spurring inventiveness, technological advancement and economic growth – but social benefits can be substantially eroded by poorly designed systems that produce, among other costly outcomes, low patent quality and high uncertainty (Hall et al., 2004). On the heels of recommendations that the US patent system would benefit from the adoption of PGR, the United States Congress passed, and President Obama signed, the America Invents Act in 2011, including Section 6 titled “Post-grant Review Proceedings.”

Strong arguments were made against and in support of its adoption. In a report commissioned by the Manufacturing Alliance on Patent Policy, Shane (2009) suggests that potential costs to society are an increase in the length of patent pendency, greater uncertainty about patent validity, increasing the costs of achieving patent validation, and boosting strategic patenting behavior by large, established firms to the disadvantage of smaller firms and

independent inventors. Among the perceived benefits to society are greater certainty over the boundaries and validity of patents, a reduction in the costs spent in patent litigation, a hastening of the pace of innovation, and a limitation on unwarranted grants of market power (Hall et al., 2004).

Uncertainty over the validity of property rights may be particularly pernicious because unwarranted market power may deter the entry of competitive products, while blocking the development of cumulative downstream technologies. Uncertainty associated with lack of complete information may also encourage bad bets, with agents misallocating investment away from promising technologies or into technologies that turn out to be infringing *ex post*. Associated benefits of the PGR may include an improvement in patent quality and facilitating an early feedback mechanism to patent examiners as regards the quality of their work.

PGR offers a relatively low-cost opportunity for parties with superior knowledge to challenge the validity of patents early in the life of the patent. Product-market competitors of the patentee can launch a challenge, disclosing private (negative) information about the patentability of the invention. Such parties, who may have superior information to patent examiners, can provide more effective policing of the system, promoting a mechanism that improves patent quality in the system as a whole.

Despite these assessments, open questions remain as to the efficacy and possible shortcomings of PGR, particularly as it may apply in the United States. Adding another layer of review to the US patent system may raise administrative costs, a relevant concern given persistent inadequate funding at the Patent Office (Hegde, 2012). Moreover, given that the expected cost of PGR is significantly less than litigation, more frequent challenges may impose additional burdens on patentees. Such costs might substantially change the *ex ante* expected returns to patenting for inventors, thereby lowering incentives and possibly negatively affecting the amount of innovation society receives.

Very little meaningful evidence was produced prior to passage of the AIA. Accordingly, substantial questions remain about the expected benefits and costs, and other possible system-wide effects of introducing the PGR. In order to help fill this gap, we turn now to comparing the different institutions associated with the US litigation and EPO opposition system, focusing on those attributes relevant to our study.

3. Institutional background

3.1. Litigation in the US

In the United States, patent validity may be challenged after grant in two forums: Within the administrative agency (USPTO) or in the judicial branch (courts). Prior to the passage of the AIA, limitations in the usefulness of USPTO options resulted in litigation at US federal courts being the dominant means used to challenge patent validity (Graham et al., 2003; Farrell and Merges, 2004; Shang, 2009). But US federal court is an extremely costly mechanism and imposes significant barriers.

Direct legal costs of a typical patent lawsuit are estimated to range between \$1.6 and \$6.0 million on average per side (AIPLA, 2011),² imposing a substantial disincentive to test patents of questionable validity, particularly when the would-be challenger is resource constrained. Procedurally, the patent owner enjoys a number of strong advantages in US litigation. First, courts

² AIPLA (2011) offers a range of costs from its survey of attorneys. For suits with \$1–\$25 million at risk, costs (i) through discovery and (ii) final judgment average \$1.6 and \$2.8 million, respectively. For suits with more than \$25 million at risk, these figures are \$3.5 and \$6.0 million, respectively.

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