



Explaining the “unpredictable”: An empirical analysis of U.S. patent infringement awards



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ABSTRACT

Patent infringement awards are commonly thought to be unpredictable, which raises concerns that patents can lead to unjust enrichment and impede the progress of innovation. We investigate the unpredictability of patent damages by conducting a large-scale econometric analysis of award values. We begin by analyzing the outcomes of 340 cases decided in US federal courts between 1995 and 2008 in which infringement was found and damages were awarded. Our data include the amount awarded, along with information about the litigants, case specifics and economic value of the patents-at-issue. Using these data, we construct an econometric model that explains over 75% of the variation in awards. We further conduct in-depth analysis of the key factors affecting award value, *via* targeted regressions involving selected variables. We find a high degree of significance between award value and *ex ante*-identifiable factors collectively, and we also identify significant relationships with accepted indicators of patent value. Our findings demonstrate that infringement awards are not systematically unpredictable and, moreover, highlight the critical elements that can be expected to result in larger or smaller awards.

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1. Introduction

Patent infringement awards are commonly thought to be unpredictable. Patents are often characterized as “volatile” assets with the potential to give rise to blockbuster awards and “bet-the-company” liabilities.² This sentiment is also echoed in the most recent Federal Trade Commission report on the patent system, which highlights a “lottery ticket mentality” toward patent

litigation outcomes.³ Congressional reports have also accepted patent damages to be “untethered” from economic underpinnings.⁴ This accepted belief of unpredictability contributes to a fear of patent litigation in many sectors.

Moreover, the specter of unpredictability casts doubt on the legitimacy of the patent grant itself. Fundamentally, the incentives to innovate that patents are intended to provide are predicated on a patent holder’s ability to predictably defend his or her patent. If the rewards conferred by the patent system are unpredictable, then their attendant incentives fail to function and the system itself is suspect. Accordingly, discovering whether or not infringement

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² As a recent New York Times article observed, “Patents are a volatile, spot market . . . a market that is more like art than stocks or oil,” *With Smartphone Deals, Patents Become a New Asset Class*, New York Times, September 24, 2012 (quoting Ronald S. Laurie, managing director of Inflexion Point Strategy).

³ Federal Trade Commission, *The Evolving IP Marketplace, Aligning Patent Notice and Remedies with Competition* (March 2011), Available at www.ftc.gov/os/2011/03/110307patentreport.

⁴ Senate Report on the patent reform Act of 2009, S. Rep. 111-18, at 8 (May 12, 2009) (“damage awards . . . are too often excessive and untethered from the harm that compensatory damages are intended to measure”) pdf [hereinafter “2009 Senate Report”].

awards are predictable is crucial to both validating and critically analyzing the patent system and its real-world costs and benefits.

This study provides a direct empirical assessment of the unpredictability of patent damages. We analyze the behavior of patent infringement awards over a 14-year period. In our study, we systematically catalog the size of damage awards and explore factors that contribute to the observed dollar amounts, using economic value as a benchmark.⁵ We find that *ex ante*-observable factors of the litigants, case specifics and patents-at-issue explain over 75% of the variation of resulting infringement awards. We further study the significant factors influencing award value and show that many are also factors known to influence rates of patent litigation.

Our data comprise 340 patent infringement damage awards granted by a judge or jury in United States district courts from 1995 to 2008. These data were derived from a proprietary dataset owned by PricewaterhouseCoopers (“PwC”), which PwC licensed to us for use in this study. The PwC dataset, which has been an important resource for patent policy and reform efforts,⁶ contains over 1300 final patent decisions in US district courts from 1995 to 2008. We supplement the PwC dataset by reviewing the original case records for data regarding the damages theories used, patents asserted and procedural disposition, as well as venue and party characteristics. We then code these data into over 120 variables describing various aspects of the cases and awards. We perform several regression analyses on the data, seeking in the first stage to demonstrate that the data can explain a large portion of the variation in award size and in the second stage studying significant regressors to identify key drivers of damage amounts. The result is a comprehensive empirical evaluation of the nature and characteristics of patent infringement damage awards in US district courts during this 14 year period.⁷

Our key findings include the following. The distribution of award levels is skewed, with a small number of very high dollar valued awards relative to the bulk of the distribution. Specifically, the largest eight awards comprised over 47% of the aggregate awards amount over the time period studied. The explanatory variables we include do a very good job at explaining the size of infringement damages. Our econometric model accounts for over 75% of variation across the dataset. Our analysis of significant factors influencing patent awards finds that the following tend to be associated with *higher* award values: more patents per case; more mature patents; patents with more claims and patents with more forward citations; cases decided by juries; and more complex cases (as measured by longer times to trial).

Section 2 addresses relevant prior scholarship and legal background. Section 3 outlines the research methodology employed in this article and presents descriptive statistics about the dataset. Section 4 provides the results of the empirical analysis. Finally, Section 5 concludes by discussing policy implications and questions for future study.

Also, to avoid confusion, we emphasize that this paper does not make (or attempt to make) out-of-sample predictions of patent value. The data represents only a small fraction of patents issued, licensed or enforced in a given year. We discuss certain other limitations in the data in Section 3.1. We do explore in the theoretical discussion some of the implications of what we observe

about infringement awards, and query possible links to underlying “patent value”. Yet, we are also interested in the extent to which observed court-awarded value might be fundamentally different than agreed-upon value (e.g., in licenses or patent transfers), marketplace value (e.g., in commercialized inventions), capital value (e.g., as represented in the patent-holder’s equity value), etc.

2. Background

The principal justification for granting a patent is to encourage the creation and disclosure of inventions *via* the reward of temporary exclusive rights over their practice.⁸ This incentive structure is so core to our society that it is codified in the U.S. Constitution (Article I, Section 8). The holder of a patent may exclude others from making, using, selling, offering for sale or importing the invention defined by its claims.⁹ In turn, one held to be infringing patent rights may be liable for damages and/or an injunction against the accused activity. As exemplified by the recent Apple-Samsung verdict, patents can be tremendously valuable. Their value gives rise to significant economic effects and implications for the progress of technological advancement.¹⁰

Two necessary components of the patent system’s incentive structure are the credible threat of litigation and availability of remedies. Section 284 of the Patent Act of 1952 provides a right to obtain damages for patent infringement. Pursuant to Section 284, a successful claimant is entitled to receive “damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer.”¹¹ A losing defendant may also be enjoined against engaging in the infringing activity, most commonly when the plaintiff and defendant are direct competitors.¹²

Yet, as ever-greater numbers of patents are granted and more infringement suits are filed, patent litigation and patent remedies have increasingly become an object of concern.¹³ One core fear is that patent litigation (and the threat thereof) frustrates the innovation process. This fear is exacerbated by the complexity of patent cases and the perceived unpredictability of resulting outcomes. If litigation outcomes are random, the risk to the accused infringer of proceeding with a suit, and *ex ante* engaging in activity that could be claimed to be infringing, intensifies. Accordingly, over-deterrence could occur, and productive innovation efforts could be forestalled.

The fear of unpredictability has also pervaded policy debates and fueled patent reform efforts in the legislative and other arenas. Before passage of the America Invents Act, the leading proposal on damages reform sought to bolster the judge’s role as the “gatekeeper” of evidence,¹⁴ with the explicit aim of preventing jury

⁸ The Supreme Court has articulated the reward theory underpinnings of the patent grant as follows: The patent laws promote [the “progress of science and the useful arts”] by offering a right of exclusion for a limited period as an incentive to inventors to risk the often enormous costs in terms of time, research, and development. The productive effort thereby fostered will have a positive effect on society through the introduction of new products and processes of manufacture into the economy, and the emanations by way of increased employment and better lives for our citizens. *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 480–81 (1974).

⁹ 35 U.S.C. § 271. In addition to other requirements, there is often a domestic territorial restriction on infringing conduct.

¹⁰ On August 24, 2012, a jury awarded Apple \$1.05 billion in damages in its patent infringement suit against Samsung. See *Apple Wins Big in Patent Case*, Wall Street Journal, August 25, 2012.

¹¹ § 284.

¹² *eBay, Inc. v. MercExchange, L.L.C.*, 547 U.S. 388, 391 (2006).

¹³ For example, a recent New York Times article discussed the perceived “destructive use of software patents” at length. *The Patent, Used as a Sword*, New York Times, October 7, 2012.

¹⁴ The “gatekeeper” proposal would have augmented the judge’s role as evidentiary gatekeeper by requiring the judge to exclude all methodologies and factors used in calculating infringement damages that are not supported by “sufficient”

⁵ We refer to the economic literature on patent valuation to build a statistical model based on factors that have been shown to affect the economic value of patents.

⁶ See, e.g., 2009 Senate Report, *supra* note 3, at 9 n.40 (citing 2007 PwC Study).

⁷ Our analysis may miss some patent infringement damage awards from cases where relevant information was not reported (though we believe the impact on our conclusions to be minimal). Further, as the dataset only contains awards in US district courts before appeal, we cannot make definitive statements about the effect of the higher courts’ decisions on final patent damage awards. Caveats regarding our findings are discussed further in subsequent sections.

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