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STUDYING THE IMPACT OF EBAY ON INJUNCTIVE RELIEF IN PATENT CASES

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Studying the Impact of *eBay* on Injunctive Relief in Patent Cases

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I. Introduction

The U.S. Supreme Court's 2006 decision on *eBay Inc. vs MercExchange LLC* (the *eBay* ruling) marked a turning point in the history of patent enforcement and policy. Prior to 2006, a perception in the legal community was that the lower courts faced with patent infringement cases frequently granted injunctions almost as a matter of course to those who sought them.³ In its *eBay* ruling, the Supreme Court called for a stop to this kind of automatic granting of injunctions and asked the lower courts to adhere to a common law four-part test for granting injunctive relief.⁴ A concurring opinion with the *eBay* ruling connected the rejection of a general rule regarding injunctions to concerns regarding so-called "patent trolls," also referred to as non-practicing entities (or NPEs).⁵ However, a unanimous U.S. Supreme Court sought to balance the idea of denying injunctions solely because of a plaintiff's willingness to license its patents, combined with the plaintiff's lack of commercial activity practicing those patents, and warned against "expansive principles suggesting that injunctive relief could not issue in a broad swath of cases."⁶

Yet, since the Supreme Court issued its opinion on *eBay*, some commentators have noted that district courts have consistently denied permanent injunctions in cases where an infringer contested the patent holder's request for such relief, as well as in instances when the patent holder and the infringers

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³ See, John L. Dauer, Jr. & Sarah Elizabeth Cleffi, "Trends in Injunctive Relief in Patent Cases Post-*eBay*." The Metropolitan Corporate Counsel, Feb 2007, at 16; Kimberley A. Moore, "Judges, Juries and Patent Cases: An Empirical Peek inside the Black Box." 99 *Michigan Law Review*. 365 (2000).

⁴ Mulder, Jeremy, "The Aftermath of *eBay*: Predicting When District Courts Will Grant Permanent Injunctions in Patent Cases." *Berkeley Tech. LJ* 22 (2007): 67.

⁵ Jones, Miranda, "Permanent Injunction, A Remedy by Any Other Name is Patently Not the Same: How *eBay v. MercExchange* Affects the Patent Right of Non-Practicing Entities." *Geo. Mason L. Rev.* 14 (2006): 1035.

⁶ *Id.*

were not direct competitors in a product market.⁷ If these statements are accurate, the district courts' practice may be in conflict with the U.S. Supreme Court's warning about any "categorical denial of injunctive relief" to a broad class of patent holders. Since then, however, there have been concerns regarding the potential patent hold-up caused by patent owners and their ability to derive higher royalties under the *threat of an injunction*. Indeed, several researchers continued to call for limiting injunctive relief further and, specifically, for entities that are not manufacturers⁸.

In short, almost a decade after the *eBay* ruling, there is still significant confusion about the implications and impact of this decision. Some of the questions that emerge are: Has the rate of injunctions been impacted by *eBay*, and if so, by how much? And, which types of parties are impacted - practicing (PEs) or non-practicing entities (NPEs)? There has not been a systematic empirical study that explores whether the *eBay* ruling impacted practicing and non-practicing patent holders differentially, by examining an exhaustive set of motions and rulings on both preliminary and permanent injunctions and comparing the rates pre-*eBay* and post-*eBay*, while also controlling for patent quality, judge and judicial district.

With the help of case studies and smaller sample data sets, some studies assessed how the courts' treatment of injunctions changed since *eBay* and how the characteristics of patent holders and patents could have been a factor. Some scholars have claimed that post-*eBay* case law seems to be leaning towards a one-sided approach that favors a manufacturing licensee's point of view with little consideration given to the impact on firms with other kinds of legitimate business models, such as innovators with limited or no presence in downstream markets ("non-manufacturing" or "non-practicing")

⁷ See, e.g., Denicolò, Vincenzo, et al. "Revisiting injunctive relief: Interpreting *eBay* in high-tech industries with non-practicing patent holders." *Journal of Competition Law and Economics* 4.3 (2008): 571-608; see, also, Mulder, Jeremy. "The Aftermath of *eBay*: Predicting When District Courts Will Grant Permanent Injunctions in Patent Cases." *Berkeley Technology Law Journal* 22.1 (2007); Chao, Bernard. "After *eBay, Inc. v. MercExchange*: The Changing Landscape for Patent Remedies." *Minnesota Journal of Law, Science & Technology* 9.2 (2008); Ellis, Douglas, et al. "The Economic Implications (and Uncertainties) of Obtaining Permanent Injunctive Relief After *eBay v. MercExchange*." *The Federal Circuit Bar Journal* 17.4 (2008).

⁸ See, e.g., Mark Lemley & Carl Shapiro, "Patent Hold-Up and Royalty Stacking." *Texas Law Review* 85 (2007); Carl Shapiro, Injunctions, Hold-Up, and Patent Royalties, (1 Aug. 2006) (unpublished manuscript, on file with the Univ. of California-Berkeley) <http://faculty.haas.berkeley.edu/shapiro/royalties.pdf>.

patent holders).⁹ Furthermore, various studies have noted that the institutional status of the patent holder strongly influenced the decision of the courts to issue a permanent injunction. Specifically, the rate of denial for NPEs was significantly higher.¹⁰ In particular, Seaman (2015) analyzes the rate of permanent injunctions for 218 U.S. District Court (USDC) decisions in patent cases after *eBay*. He finds that while the overall grant average rate of permanent injunctions post-*eBay* was 72.5%, it was only 16% for NPEs. Prior work by Peterson analyzed 33 U.S. district court decisions on a motion for permanent injunctions post *eBay* as well, for patent cases between May 2006 and February 2008. He found that in 24 (out of the 33) cases, a permanent injunction was granted, and that NPEs were less likely to be granted an injunction.

In this study, we analyze an exhaustive set of all patent cases filed in the United States District Courts (USDC) from 2000-2012 when there was a motion for either a preliminary or a permanent injunction. In this way, this study significantly extends previous studies by analyzing a set of *all* patent cases (regardless of whether injunctive relief was sought or not) filed in a balanced time-period pre- and post-*eBay*, rather than studying a specific sample-subset of cases. We also extend extant studies by investigating the rate of both preliminary and permanent injunctions. We believe that each of these points is important. First, an analysis of all the cases filed in a balanced time period pre- and post- *eBay* removes a potential of selection bias in terms of the sample size that is chosen by researchers. Second, since permanent injunctions are usually rare, an analysis of the rate of preliminary injunctions is crucial for measuring the impact of the *eBay* decision on injunctions. In addition, we try to identify whether there was a difference in the likelihood of obtaining an injunction based on the type of patent plaintiff, operating (PEs) or non-operating (NPEs), after controlling for patent quality. We further try to unpack whether different types of NPEs faced a difference in their likelihood of obtaining an injunction. This

⁹ Golden, John M. "Patent Trolls and Patent Remedies." *Texas L. Rev.* 85 (2006): 2111.

¹⁰ See, e.g., Peterson, Benjamin, "Injunctive Relief in the Post-*eBay* World." *Berkeley Technology Law Journal* 23.1 (2008); Beckerman-Rodau, Andrew, "The Supreme Court Engages in Judicial Activism in Interpreting the Patent Law in *eBay, Inc. v. MercExchange, L.L.C.*" *Tulane Journal of Technology & Intellectual Property* 10.1, (2007); Hand, Rebecca, "*eBay v. MercExchange*: Looking At The Cause And Effect Of A Shift In The Standard For Issuing Patent Injunctions." *Cardozo Arts & Entertainment Law Journal* 25.1 (2007); Tang, Yixin, "The Future of Patent Enforcement after *eBay v. MercExchange*." *Harvard Journal of Law & Technology* 20.1 (2006).

exercise requires the enormous step of hand-coding all the plaintiffs involved in all the patent cases in our study, which we describe in Section IV.

To summarize, the goal of this study is to identify: (1) The difference in the rate at which both preliminary and permanent injunctions were granted for cases where an injunction was requested, based on the rate at which these motions were filed pre- and post- *eBay*; (2) Whether the rate of injunctions granted was different based on patent ownership (practicing versus non-practicing entities), and whether there was a difference within the different types of non-practicing entities. In addition, any outcome of patent cases must take into account the quality of the patents asserted. Therefore, while studying whether injunctions were granted or not, we control for proxies for patent quality based on the received citations and other metrics.

The *eBay* ruling was a measure to mitigate the frequent granting of injunctions, arguably ones that specifically target non-practicing entities. The ruling was an exogenous shock to both practicing and non-practicing entities. If it is true that the *eBay* ruling had an impact on non-practicing entities versus on the practicing entities, the ruling resembles a natural experiment. Consequently, we employ a differences-in-differences strategy to compare the group that was treated (non-practicing entities) versus the group that was not (practicing-entities) in our outcome variable of interest: the change in rate of injunctions granted.

If it is true that, controlling for the quality of patents involved, the courts provide preferential treatment to practicing entities over non-practicing entities, then there are important policy implications. First, penalizing all “non-manufacturing” patent holders may not be optimal, as many truly innovative research-oriented (and non-manufacturing) firms, inventors, and university labs operate in high-tech markets today. Recent studies revealed how critical it is to unpack the definition of NPEs, as various

diverse types of entities are often collapsed into this definition.¹¹ Second, this finding will have implications for current patent legislative reform that is trying to curb patent litigation by so-called “patent trolls.” If the courts are stacked in favor of practicing entities, in terms of the likelihood of granting an injunction, then non-practicing entities have lower bargaining power in litigation (and therefore in licensing negotiations) than the proposers of the current reform are concerned about. If, however, findings show that there is no differentiation based on who owns the patents at issue and that the rate of injunctions has reduced for everyone, it would imply that the alleged risk of potential “patent hold-up” under the threat of an injunction has been mitigated¹².

This paper is organized as follows. Section II discusses the important and unique role of injunctions as a remedy in patent cases, and why there is no clear economic substitute to such a remedy, therefore highlighting the importance of understanding the impact of *eBay* on the availability of injunctions as a remedy. Section III explores the impact of *eBay* on the behavior of firms for seeking preliminary and permanent injunctions, as well as case outcomes in the courts. Section IV discusses the methodology for categorizing plaintiffs as practicing or non-practicing entities, and discusses the impact of *eBay* on the behavior of different types of plaintiffs with respect to seeking preliminary and permanent injunctions, as well as the differences in the case outcomes in the courts for practicing vs. non-practicing entities. Section V measures how the likelihood of being granted an injunction varies based on whether the plaintiff is a practicing or a non-practicing entity, based on the impact of the *eBay* decision, and whether the *eBay* decision had a differential impact on practicing vs. non-practicing entities. We present our conclusions in Section VI.

II. Background: Injunctive Relief in Patent Cases

¹¹ See, Cotropia, Christopher Anthony, Jay P. Kesan, and David L. Schwartz. “Unpacking Patent Assertion Entities (PAEs).” 99 *Minnesota Law Review* 649 (2014). See also, Mazzeo, Michael J., Jonathan H. Ashtor, and Samantha Zyontz. “Do NPEs Matter? Non-Practicing Entities and Patent Litigation Outcomes.” *Journal of Competition Law and Economics* 9.4 (2013): 879-904.

¹² Lemley, Mark A., and Carl Shapiro. “Patent Holdup and Royalty Stacking.” *Tex. L. Rev.* 85 (2007).

In this section, we summarize various scholarly points of view regarding the importance and appropriate triggers for obtaining injunctive relief in patent litigation. While injunctive relief remains an important part of the panoply of remedies in patent cases, there is significant policy debate about the showing required to obtain injunctive relief, including the type of patent plaintiff (practicing vs. non-practicing entity) involved in the infringement dispute. To the patent holder seeking to enforce his or her patent rights, the law has traditionally provided two remedies. The first, monetary damages, comes in compensatory and punitive flavors, and can take the form of an award of lost profits or payment of a reasonable royalty from the infringer to the patentee. Monetary damages have been traditionally used in cases where monetary relief is ostensibly sufficient to make the patentee whole. But what about scenarios where granting a monetary award is not adequate? In such cases injunctive relief has traditionally been available. Historically, a patentee who prevails in an infringement case was granted an injunction against the infringer as a general rule drawn from the exclusionary rights associated with property, a practice that largely continued until the U.S. Supreme Court's 2006 decision in *eBay v. MercExchange*.¹³ In *eBay*, Justice Thomas, writing for a unanimous court, held that a patentee was not entitled to an injunction as a general rule, but rather only upon satisfaction of "well-established principles of equity."¹⁴

Though injunctive relief is accurately understood as an equitable remedy, it is provided for statutorily in the patent context.¹⁵ The traditional equitable prong of irreparable harm to the plaintiff was therefore presumed in cases where infringement had been shown.¹⁶ As such, courts adjudicating patent

¹³ *eBay Inc. v. MercExchange, L.L.C.*, 547 U.S. 388 (2006); Stephen E. Noona & Kristan B. Burch, *A Modern-Day Fairy Tale*, 56 FED. LAW. 20 (2009) ("[I]t was the birthright of all intellectual property owners . . . to wield the mighty Excalibur sword of injunction against all who infringed.").

¹⁴ *eBay*, 547 U.S. at 390-91 ("[A] plaintiff seeking a permanent injunction must satisfy a four-factor test . . . a plaintiff must demonstrate: (1) that it has suffered irreparable injury; (2) that remedies at law, such as money damages, are inadequate to compensate for that injury; (3) that, considering the balance of hardships between plaintiff and defendant, a remedy in equity is warranted; and (4) that the public interest would not be disserved by a permanent injunction.").

¹⁵ 35 U.S.C. § 283 ("[C]ourts having jurisdiction . . . may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable.").

¹⁶ *Smith Intl., Inc. v. Hughes Tool Co.*, 718 F.2d 1573, 1581 (Fed. Cir. 1983).

infringement disputes prior to *eBay* granted injunctions "in the vast majority" of cases.¹⁷ Likewise, compulsory licensing and court-enforced royalty agreements were a historical oddity, granted only in a small number of cases.¹⁸ As a court-backed mechanism to enforce a patentee's exclusive right, injunctive relief was considered "the very essence of the right conferred by the patent" ¹⁹ But just what makes injunctive relief so powerful, and why is it so meaningful for a patent holder?

One important role for injunctive relief is as a complement to monetary damages, which can be challenging to calculate. Professor John Golden lays out five basic problems that complicate the determination of patent remedies: frustration, which considers that no remedy regime is capable of addressing the numerous possible behaviors that could be ideally optimized by patent remedies; baseline indeterminacy, the idea that there is no "generally agreed value . . ." or method of calculation for what a patent holder should be entitled to receive; economic contingency, which addresses the exogenous factors that modify what a patent owner will actually receive; technological contingency, which describes varying value of incentives under the patent system as a function of technological dependence; and information scarcity, which refers to the absence of data about patent rights transactions.²⁰ These problems, Golden asserts, complicate efforts to establish a cogent and effective system of patent remedies, and frustrate the determination of applying a remedy in a given case.²¹

An example of this case-by-case difficulty is the issue of determining, where a court chooses to deny injunctive relief, what amount or type of money damages are sufficient in lieu of an injunction. Professor Gómez-Arostegui takes a strong position: that calculated money damages are never sufficient, and that federal courts lack the authority to deny an injunction in favor of an award of mandatory

¹⁷ *eBay*, 547 U.S. at 395 (Roberts, C.J., concurring); *see also* *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 842 F.2d 1275, 1281 (Fed. Cir. 1988) (announcing the Federal Circuit's general rule favoring the grant of injunctions to patentees who prevail in infringement litigation).

¹⁸ *See Dawson Chem. Co. v. Rohm & Haas Co.*, 448 U.S. 176, 215 (1980) ("[35 U.S.C.] § 271(d) permits such licensing, but does not require it [T]he essence of the patent grant is the right to exclude others Compulsory licensing is a rarity in our patent system.").

¹⁹ *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405, 428-29 (1908).

²⁰ John M. Golden, *Principles for Patent Remedies*, 88 TEX. L. REV. 505, 527 (2010).

²¹ *Id.*

prospective royalties, absent consent of the parties.²² Indeed, the Federal Circuit has expressed trepidation about court-imposed ongoing royalties, suggesting that denial of an injunction be followed by negotiations among the parties, with court rendered calculations being a last resort.²³

The calculation of what constitutes a reasonable royalty has become more difficult as technology and intellectual property schemes have increased in complexity. Professor Christopher Seaman describes the difficulties of applying the *Georgia-Pacific* factors to increasingly complex patented products, noting that the factors cannot adequately address technology with a "wide array of high-tech components or features," and that the test provides little help for juries seeking to weight the factors and calculate a royalty amount.²⁴ For example, *Georgia-Pacific* does not allow for an adequate assessment of potential "royalty stacking" concerns, which occurs when a product contains components covered by more than one patent, thus potentially incurring numerous "royalty burdens."²⁵ The risk for the individual patent holder is apparent; that the damages he or she is entitled to are so unclear that he or she does not obtain effective redress for the infringement. The availability of injunctive relief is thus critical to the patentee in order to avoid disenfranchisement.

The challenges of determining adequate damages in lieu of permanent injunctive relief is underscored by the difficulty of calculating the value of a permanent injunction.²⁶ A court-imposed licensing agreement as a damage award in lieu of a permanent injunction may not always be purely inadequate, but it can be unpredictable and indefinite in a post-*eBay* world. Some commentators argue that while the *Georgia Pacific* factors and their like were reasonably adapted to the retrospective focus of

²² H. Tomás Gómez-Arostegui, *Prospective Compensation in Lieu of a Final Injunction in Patent and Copyright Cases*, 78 *FORDHAM L. REV.* 1661 (2010).

²³ *See Paice LLC v. Toyota Motor Corp.*, 504 F.3d 1293, 1314-15 (Fed. Cir. 2007). In *Paice*, the District Court denied *Paice's* request for a permanent injunction, instead imposing an ongoing royalty of \$25 per unit. The court did not expound on its reasoning for the damage amount, and the Federal Circuit remanded for a more thorough calculation. The Federal Circuit did not, however, articulate how a better calculation might be performed.

²⁴ Christopher B. Seaman, *Reconsidering the Georgia-Pacific Standard for Reasonable Royalty Patent Damages*, 2010 *B.Y.U. L. REV.* 1661 (2010).

²⁵ *Id.* at 1689.

²⁶ *See Paul M. Schoenhard, Who Took My IP? Defending the Availability of Injunctive Relief for Patent Owners*, 16 *TEX. INTELL. PROP. L.J.* 187, fn 179 (2008) (suggesting that one viable measure of the value of a permanent injunction could be the settlement amount parties agree upon to avoid imposition of an injunction).

reasonably royalty calculations before *eBay*, the necessarily prospective focus of post-*eBay* compulsory ongoing license agreements requires a more nuanced analysis.²⁷ Ellis *et al.* lay out four issues: the scope of the prospective license, the shifting incentives of would-be infringers without the threat of a permanent injunction²⁸, the potentially changing nature of infringement before trial compared with infringing activity thereafter, and the question of how patent infringement damages should be assessed going forward.²⁹

While the availability of injunctive relief as a remedy is important as an end, the specter of a permanent injunction is equally useful to a patent holder.³⁰ The Federal Circuit had no qualms with the influence of the threat of a permanent injunction on licensing negotiations, explaining in *MercExchange v. eBay* that "additional leverage in licensing . . . is a natural consequence of the right to exclude and not an inappropriate reward to a party that does not intend to compete in the marketplace with potential infringers."³¹ The loss of a credible threat (or, at least, a compelling likelihood) of injunction against infringing use may thus compromise the position of a patentee in licensing negotiations.³² Professor Golden models the risk/benefit analysis of a would-be infringer mathematically by determining the "expected cost" of an infringement suit, which incorporates the "expected cost of complying with a permanent injunction"³³ Professor Ryan Holte discusses the "winners and losers" in the wake of the *eBay* decision (and its ostensible impact on the rate of denial of injunctive relief).³⁴ Small entities and inventors suffer as a result of the loss of reliable injunctive relief as large corporations can now more easily appropriate patented technology that they have the resources to exploit more rapidly and

²⁷ Douglas Ellis, John Jarosz, *et al.*, *The Economic Implications (and Uncertainties) of Obtaining Permanent Injunctive Relief After eBay v. MercExchange*, 17 FED. CIRCUIT B.J. 437, 465-66 (2008).

²⁸ Other commentators have addressed this as well; later this section discusses the effect of removing the threat of permanent injunctions on incentives for prospective infringers.

²⁹ *Id.* at 465-70.

³⁰ See generally Lily Lim & Sarah E. Craven, *Injunctions Enjoined; Remedies Restructured*, 25 SANTA CLARA COMPUTER & HIGH TECH. L.J. 787 (2009).

³¹ *MercExchange, L.L.C. v. eBay, Inc.*, 401 F.3d 1323, 1339 (Fed. Cir. 2005).

³² See John M. Golden, *"Patent Trolls" and Patent Remedies*, 85 TEX. L. REV. 2111, 2125 (2007) ("Licensing agreements are . . . shaped by the concerns and expectations of both patent holders and infringers . . .").

³³ *Id.*

³⁴ Ryan T. Holte, *The Misinterpretation of eBay v. MercExchange and Why: An Analysis of the Case History, Precedent, and Parties*, 18 CHAP. L. REV. 677, 731-33 (2015).

efficiently.³⁵ Without the threat of injunctive relief against such would-be infringers, inventors (particularly those with fewer resources) lack one strong incentive to "engage in the toils of scientific and technological research."³⁶

Professor Tim Carlton asserts that the threat of permanent injunctive relief is powerful enough that patentee's would be "*systematically undercompensated*" if the threat were removed.³⁷ Carlton assesses the curtailment of injunctive relief as having a strong net chilling effect on the ability of patent holders to retain leverage in the bargaining process, and reduces the value of patents because enforcement becomes less predictable.³⁸ Carlton argues that the absence of a credible threat of injunctive relief also encourages litigation where licensing negotiation would once have been sufficient.³⁹ One potential solution Carlton articulates is the grant of a permanent injunction, followed by a temporary stay in order to allow the infringer to remove itself from the market (or permitting the infringer time to "design around" the patent such that it is no longer infringing).⁴⁰

III. Injunctive Relief Pre- and Post- *eBay*

The goal of this study is to answer the following questions: First, how did the rate of seeking and granting of preliminary and permanent injunctions by the district courts change due to the *eBay* ruling? Second, did the ruling affect the granting of injunctive relief for practicing vs. non-practicing entities differentially? And if so, then what type of non-practicing entities were most affected – were the courts able to differentiate between firms investing and engaging in R&D, individual inventors, universities, versus patent aggregators? This section addresses the first question.

³⁵ *Id.*

³⁶ *Telequip Corp. v. The Change Exchange*, No. 5:01-CV-1748(FJS/GJD), 2006 WL 2385425 at *1, *2 (N.D.N.Y. Aug. 15, 2006).

³⁷ Tim Carlton, *The Ongoing Royalty: What Remedy Should a Patent Holder Receive When a Permanent Injunction Is Denied?*, 43 Ga. L. Rev. 543 (2009) (emphasis added).

³⁸ *Id.*

³⁹ This may be particularly true where the infringer assesses the patent to be weak, and thinks it can limit its costs to the price of litigation. See "Patent Trolls", *supra* note 5, at 2128.

⁴⁰ Carlton, *supra* note 7 at 571.

In order to study the impact of the *eBay* ruling, we analyzed all patent cases⁴¹ filed at in U.S. District Courts from 2000-2012, for which there was a motion for an injunction, thereby obtaining a symmetric sample of rulings pre- and post- *eBay*. We aimed to identify the names of the plaintiffs and defendants for these cases, the patents involved in the cases, whether a motion for an injunction was requested, and whether there was a ruling for an injunction, among other relevant fields, in order to study the questions of interest.

We constructed a universe of patent cases in which most likely have a motion for injunction via a query in Lex Machina. The query consisted of terminated patent cases filed between 01/01/2000 and 12/31/2012 which have the words “motion” and “injunction” within three words of each other.⁴² The search resulted in a total of 2,639 patent cases for which a motion for preliminary or permanent injunction was likely to be filed. After careful examination, 456 cases were removed from the dataset due to “false positives” and incorrect case type (*i.e.*, cases that were recorded as patent cases but actually were not).⁴³ Based on a search of the 39,229⁴⁴ patent cases that were filed between the years 2000-2012, we identified a total of 2,183 patent cases for which a motion for a preliminary or a permanent injunction was filed, and these cases formed the basis of this study.

We are interested in cases that have a motion filed for an injunction, and dismiss cases that simply mention injunctive relief in the complaint. For every case, we reviewed the docket to search for key pieces of information regarding the motion for injunction. In many instances, the information was not directly available in the docket text, and in those situations, the actual documents were downloaded and reviewed. By manually sorting the docket of each case, we collected and coded the following pieces of information: (i) the type of the motion for injunction (if filed), that is, whether the motion was filed for a

⁴¹ We used the Nature of Suit code 830 in PACER.

⁴² These cases were identified by text search in Lex Machina for the keywords “motion” and “injunction,” such that they appear three or less words apart from each other. We purposely designed our keyword search to be overly inclusive, so that we can remove any false positives after manually reviewing the dockets for each of these cases.

⁴³ 336 cases were removed since they did not have a motion for injunction, 97 cases were not the correct NOS code of 830 (*i.e.*, patent cases), and 23 cases were removed as having an incorrect type of injunction.

⁴⁴ 367 false marking cases were removed.

preliminary or a permanent injunction, (ii) the date the motion was filed, (iii) the decision of the motion, (iv) the date the decision was made, and (v) damages information, when available.

We also obtained the following pieces of information for these cases directly via PACER: (i) filing date of the case, (ii) the names of the plaintiffs and defendants, and (iii) the publication numbers of the patents involved in each case. We further obtained information about the entity based on the patents involved in their associated litigation. In order to create a “quality index” for the patents involved in each case, we utilized the Thomson Patent database for obtaining the forward (received) citations, backward citations, claim count, geographical coverage of the patent, and prosecution period.

The summary statistics for the 2,183 U.S. district court cases filed between 2000-2012, for which a motion for a preliminary or a permanent injunction was sought, are listed in Table 1.

Table 1: Summary statistics for injunctions pre and post *eBay* (case level)

	Pre <i>eBay</i>	Post <i>eBay</i>
Number of USDC patent cases filed	16,617	22,979
Number of cases with motion for injunction	1,275	908
Number of cases with motion for preliminary injunction	1014	645
Number of cases with consent motion for preliminary injunction	6	11
Number of cases with motion for permanent injunction	317	254
Number of cases with consent/default motion for permanent injunction	169	147
Number of cases with preliminary injunction granted	216	115
Number of cases with permanent injunction granted	230	175

Note that each case can have more than one motion for an injunction; therefore, we also list the summary statistics based on counting the number of motions for injunctions (not at the case level) in Table 2.

Table 2: Summary statistics for injunctions pre and post *eBay* (counting motions, not cases)

	Pre <i>eBay</i>	Post <i>eBay</i>
Number of motion for injunction	1569	1096
Number of preliminary injunction motions	1059	663
Number of consent preliminary injunction motions	6	11

Number of permanent injunction motions	334	272
Number of consent/default permanent injunction motions	170	150
Number of preliminary injunction motions granted	219	115
Number of permanent injunction motions granted	239	180

Based on these summary statistics, we calculate two rates of interest. First, we calculate the rate of injunctions sought, *i.e.*, the number of motions for injunctions filed as a percentage of the total number of patent cases filed. Figure 1 shows that the total number of patent cases filed has been increasing over time, while the number of preliminary and permanent injunctions sought has been decreasing. The vertical dashed line represents the date when the petition for *certiorari* was granted in the *eBay* case (Nov. 28, 2005) and the solid vertical line represents the date of the U.S. Supreme Court *eBay* decision (May 15, 2006) to demarcate the pre-*eBay* and post-*eBay* timeframe windows, including the period of uncertainty between Nov. 2005 and May 2006, in Figure 1, and in each of the figures that follow in this article.

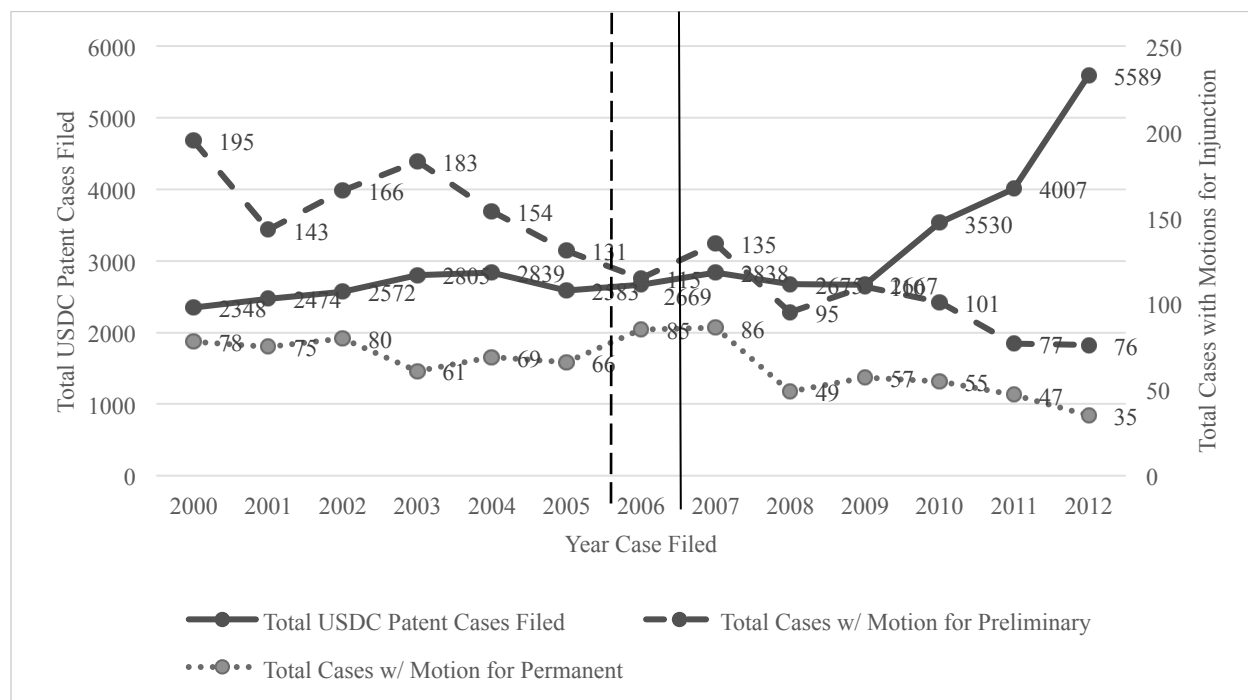


Figure 1: Total number of patent cases filed versus number of injunctions sought

By dividing the number of injunctions sought by the total number of cases by year, Figure 2 demonstrates that the overall rate at which injunctions have been sought has decreased since the *eBay* decision.

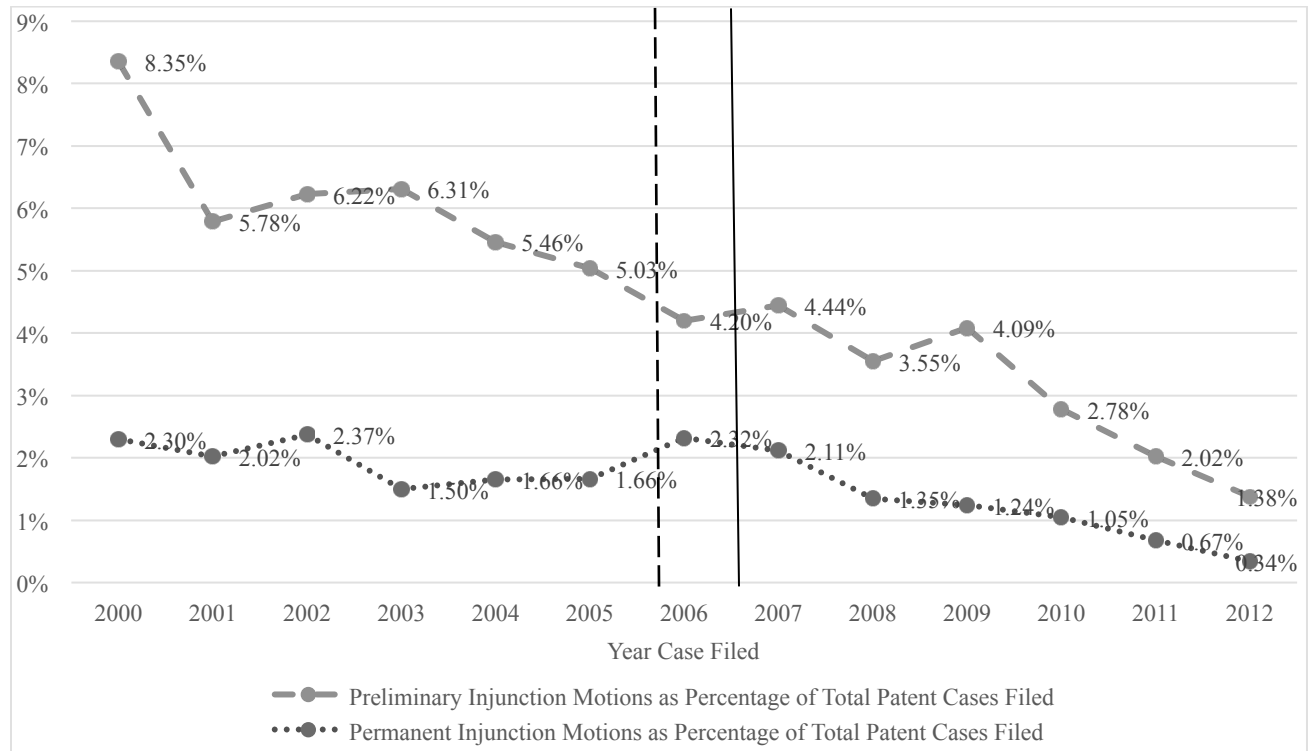


Figure 2: Rate of injunctions sought pre and post eBay

Second, we calculate the rate at which injunctions have been granted. The number of injunctions granted is calculated as a percentage of the total number of motions for injunctions that were filed. Our analysis shows that the rate of injunctions granted does not reduce significantly. This finding is consistent with past studies that have calculated the rate of permanent injunctions granted based on the number of times injunctions were sought (Seaman (2015)).



Figure 3: Rate of injunctions granted pre and post eBay based on injunctions sought

However, since the total number of times an injunction is sought has reduced after the *eBay* decision, the actual rate of injunctions granted as a percentage of the total number of cases filed has reduced significantly. Essentially, patent owners are not filing for a motion for an injunction nearly as often as they did prior to the *eBay* decision. Therefore, if one looks only at the rate of injunctions granted based on the times that injunctions were sought, one gets a partial and somewhat misleading picture that the number of times the injunctions were granted did not fall significantly. This is because such a calculation does not take into account the potential self-selection (*i.e.*, patentee restraint in seeking an injunction) by firms that are seeking injunctions.⁴⁵ After the *eBay* decision, firms are likely to seek an injunction only in cases where they may have a strong reason to do so.

Figure 4 demonstrates the number of injunctions granted as a percentage of the total number of patent cases filed, and it shows a clear declining trend.

⁴⁵ In future work, we plan to test this selection bias based on the patent characteristics for which the injunctions were sought pre and post *eBay*.

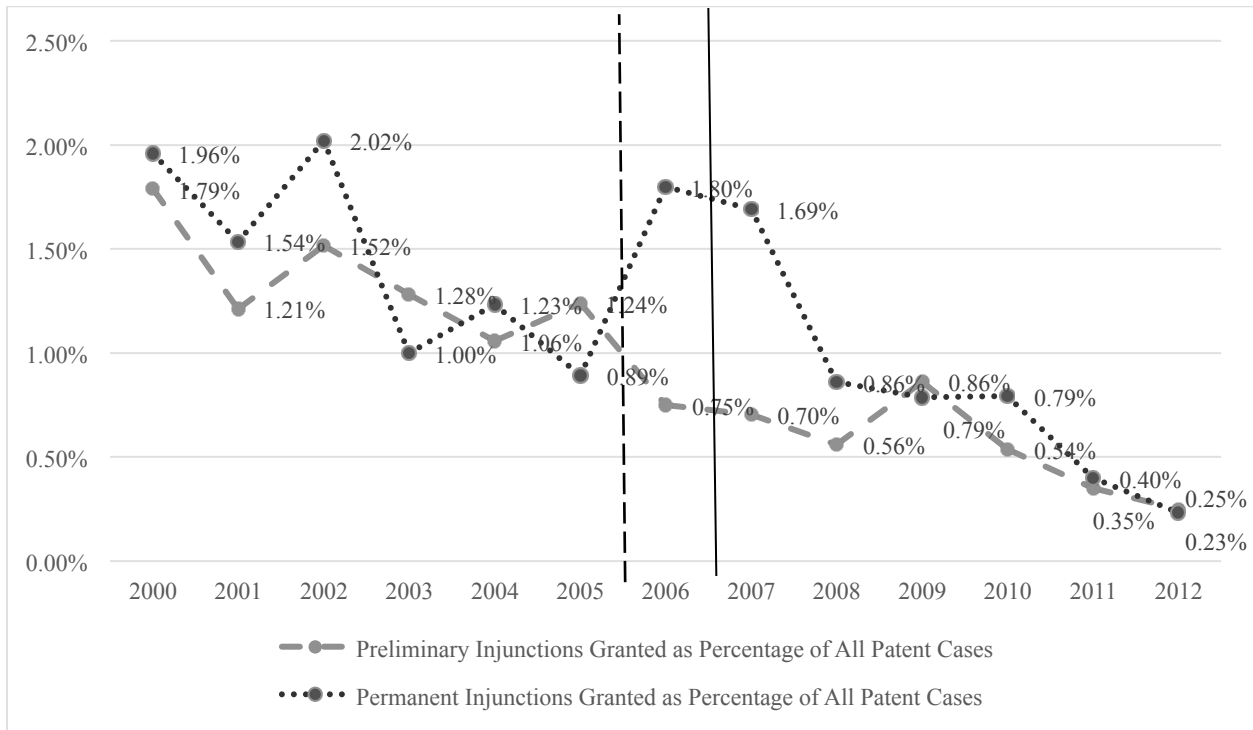


Figure 4: Rate of injunctions granted pre and post eBay based on total patent cases

Thus, we conclude that the overall rate of preliminary and permanent injunctions, measured as a percentage of the total number of cases filed has decreased post- *eBay*, and that this drop has primarily resulted from fewer plaintiffs seeking an injunction in the first place.

IV. Injunctions Pre- and Post- *eBay* for Practicing and Non-Practicing Entities

This section moves on to the next question in our study: Did the *eBay* decision affect the seeking and granting of injunctions for practicing vs. non-practicing entities differentially? And if so, then what type of non-practicing entities were most affected? In other words, were the courts able to differentiate between firms investing in R&D, individual inventors, universities, versus patent aggregators?

A. Defining NPEs

An important part of this study is to code patent plaintiffs in all the patent cases filed between 2000-2012 in the U.S. district courts as a manufacturing or a non-manufacturing entity. This data created for this study has generated a rich data-set in and of itself for any study on practicing and non-practicing

entities. We utilize a systematic methodology for identifying potential non-manufacturing entities, as explained by Cotropia, Kesan and Schwartz. We further hand coded non-manufacturing entities as follows: university, individual inventor, technology development company, failed start-up, or patent holding company. This categorization involves multiple steps. We first review the complaint to identify the appropriate company and the address of that company. The complaint is also reviewed for any information regarding a plaintiff's business model and associated products. Once this information is collected, a web-search for each entity is conducted to identify the company's homepage. Information about the company's products and business model are obtained from each webpage. Business databases were also reviewed if webpages were not available or lacked sufficient information. In particular, we searched Bloomberg, Dun & Bradstreet, OneSource Business Browser, and Manta.

For each of these patents, we obtained reassignment information from the USPTO regarding whether the patent was filed by and/or transferred to the focal entity. Information about whether the company was an original inventor or if they received the patent through reassignment was collected. This allows us to distinguish between, for example, patent-holding companies and technology-development companies. The main distinction where we found the need to exercise the most caution is when coding "individual inventors" versus a "patent holding company." In some cases, individuals reassign their patents from themselves to an entity or corporation that they created for liability reasons. Since these companies do not, in fact, manufacture products, it is not always easy to determine if it is solely an individual inventor using an LLC, for example, to protect himself from legal liability or if it is truly a patent-holding company that obtained the patent from the individual inventor. In-depth research of these companies is necessary, and identification of ownership of the focal entity by the individual inventor is important for accurate classification. When the individual inventor created the entity, is the owner of that entity, and is the original inventor of the patents being litigated, we classify the entity as an "individual inventor."

Based on this methodology, we ended up hand-coding 16,387 number of unique plaintiffs⁴⁶ that were identified for the 39,229 patent cases that were filed between 2000-2012 in the district courts. Table 3 displays the summary statistics for the categorization of the patent plaintiffs. Out of the 16,387 plaintiffs categorized, we found 75% (12,220) were operating companies and the rest 25% (4,167) were broadly categorized as “non-practicing” entities. Of the NPEs, roughly 70% (2,932) are patent holding companies and the rest of the 30% comprise other types of entities, such as individual inventors, technology development companies, universities, and failed start-ups.

Table 3: Categorization of plaintiffs as PEs or different types of NPEs

Category	Number of Unique Firms/Individuals Categorized (All 830 Cases)
Operating company	12,220
Patent holding company	956
Individual inventor	2,932
Technology development company	148
University	86
Failed start-up	45
Total	16,387

⁴⁶ Companies were rolled up to their parent company.

It is also worth noting the time-trends for the types of plaintiffs involved in these lawsuits, as displayed in

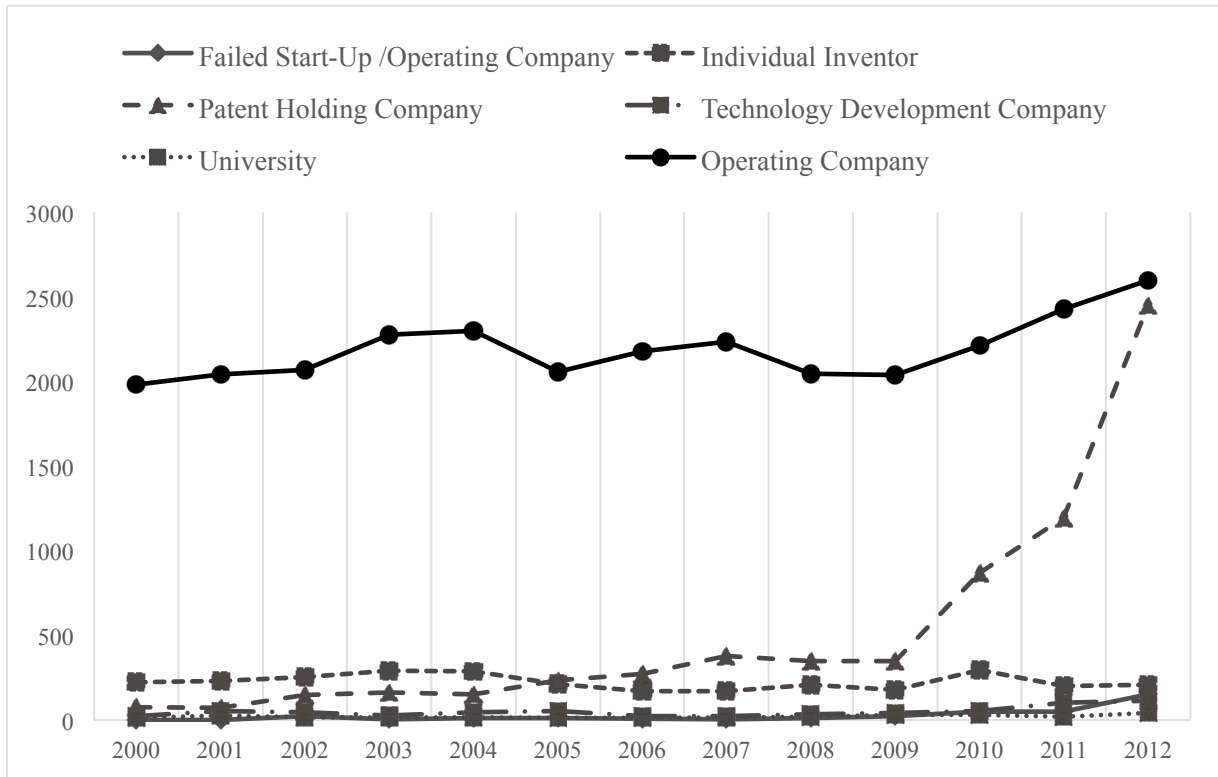


Figure 5. The large majority of patent litigation has always been driven by lawsuits filed by practicing entities in the entire time period captured here from 2000-2012.

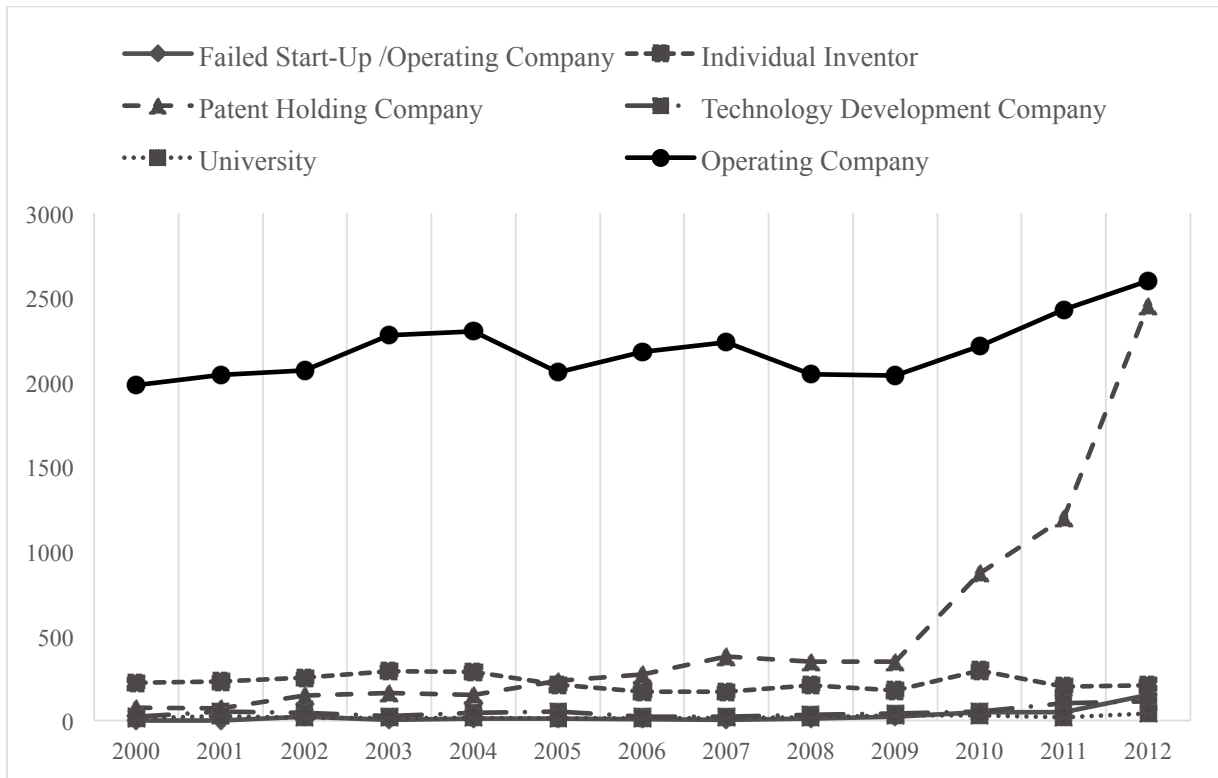


Figure 5: District court patent cases filed by PEs and different types of NPEs (2000-2012)

Note that until 2009, individual inventors, technology development companies, failed start-ups, and universities barely filed any patent lawsuits. This is noteworthy, when compared against the statistic that ~60% of the patents in the United States are filed by small firms, inventors, and universities. In other words, it is likely that the “small entities” are unable to bring forth law-suites because of the asymmetric opportunity cost of litigation for the parties involved, *i.e.*, it is much more expensive for a small firm or an inventor to bear the cost of a lawsuit. A notable increase in the lawsuits filed by NPEs starts to show up in 2009, driven by patent holding companies. One potential explanation of this rise is that as new business models and market intermediaries arise for monetization of patent portfolios, the small firms and inventors are able to leverage these players to aggregate costs and file lawsuits that there were previously unable to. A conclusive answer to this potential explanation, however, can only be established by unpacking the data on what type of individuals and entities the patent holding firms are acquiring their patents from, *i.e.*, individual inventors or failed start-ups on one hand, as opposed to large operating companies on the other hand, raising the question of privateering by operating companies. Another sharp

increase in the number of lawsuits filed by patent holding companies occurs right after 2011, when the American Invent Act (AIA) was passed and the new joinder rules (35 U.S.C. §299) mandated that plaintiffs file a separate lawsuit for every defendant.

B. Patent Characteristics for Practicing Entities vs. Non Practicing Entities

As the debate on the role of NPEs and their economic impact rages, one of the seminal questions is whether NPEs or patent holding companies are simply an alternative business model for monetization of patent portfolios, or whether the patent system is abused by asserting lower quality patents. In this paper, we focus on the study of injunctions, and therefore, we compare the patent quality of practicing vs. non-practicing entities for the patents involved in cases *for which a motion for an injunction was filed*. We rely on various indicators of patent quality that have been utilized in the economic and legal literature, namely: number of received (forward) citations, number of claims, and the number of countries a patent has been filed in (geographic coverage). We also calculate predicted forward citations over the entire lifetime of a patent based on the patent's age and to-date received citations, following the methodology in Jaffe and Trajtenberg (1996), in order to correct for the fact that patents of a higher age would necessarily have more received citations than the younger patents, *ceteris paribus*. For this analysis, all design patents were removed because they have different patent quality metrics that would then skew the statistics⁴⁷.

Figure 6 lists the patent quality comparisons for 2,881 unique utility patents asserted by 1,767 operating companies and the 496 unique utility patents asserted by NPEs for which a motion for an injunction was filed. Since there is a large difference in number of patent for the two groups, a means test was used to determine if there is truly a difference in the means.

⁴⁷ Design patents only have one claim and are filed in fewer geographic regions compared to utility patents.

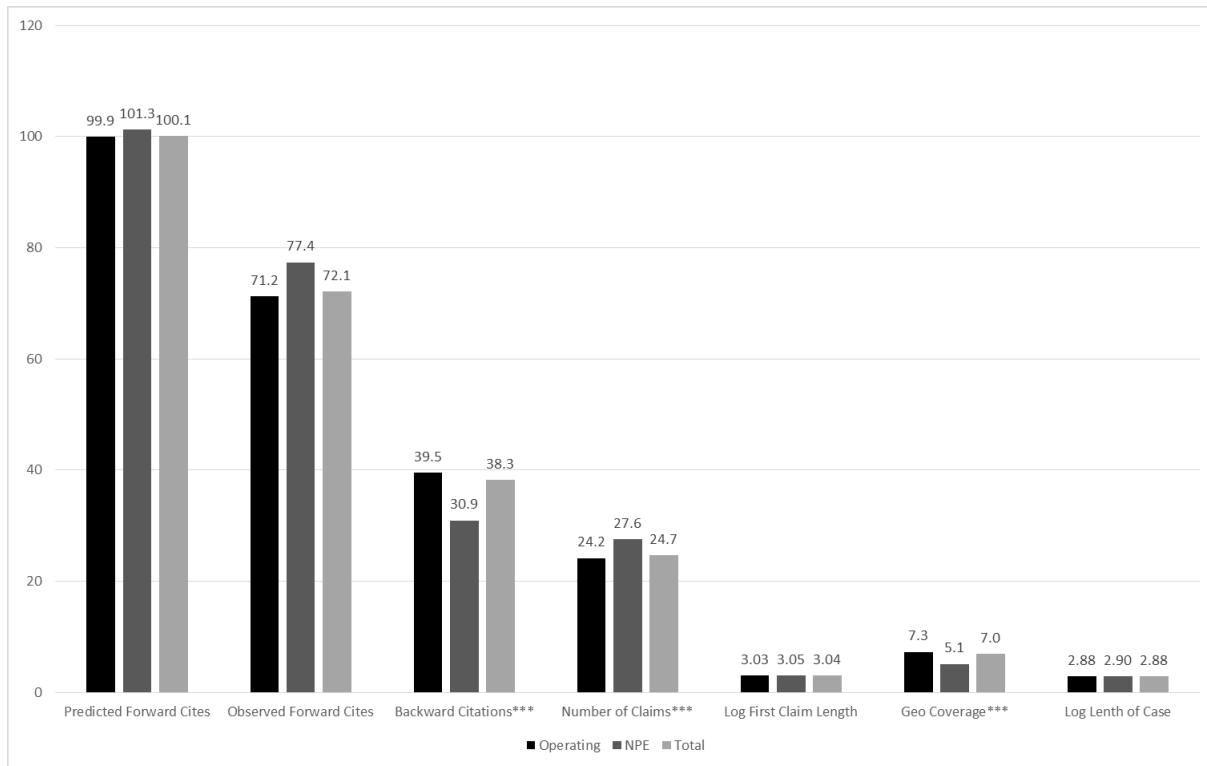


Figure 6: Patent characteristics for PEs vs. NPEs for district court patent cases (2000-2012) for which a motion for an injunction was filed

We do not find a notable or a systematic difference in the patent characteristics as we would have expected, based on the narrative that NPEs assert weaker patents. If anything, the quality of NPEs is slightly higher in the dimension of forward citations and number of claims, however, the geographical coverage of patents asserted by operating companies is higher. We note the important caveat from this comparison – we are only observing patents that were selected by respective plaintiffs for seeking an injunction – it may be the case that NPEs are not seeking an injunction for “weaker” patents asserted by them, and instead hoping to settle quickly.

We also record and compare the age of the patents for which a motion for an injunction was sought, in order to check if there is any difference in the age of such patents for PEs vs NPEs, in order to address the previous literature suggesting that NPEs are far more likely assert older patents closer to their expiration date. At least for the patents for which an injunction was sought, we do not find nearly as large a difference in age of the asserted patents as in previous studies – for operating companies, the mean age

of asserted patents was 14.56 years, while for the NPEs, the mean age of the asserted patents was 15.37 years, and the difference was statistically significant.

Finally, we also compare the length of the case for PEs versus NPEs.⁴⁸ We find that on-average, the cases involve NPEs take longer to terminate than the cases involving operating companies.

C. Summary Statistics on Injunctive Relief Pre- and Post- *eBay* for Practicing Entities vs. Non-Practicing Entities

In order to understand the differential effect of *eBay* on practicing vs. non-practicing entities, we first present the summary statistics for the case-level and motion-level statistics for each type of entity.

Table 4 displays the total number of district court patent cases filed between the years 2000-2012, broken down by operating companies and NPEs. While the total number of filed cases grew before and after *eBay* overall, the difference between PEs and NPEs is significant – the operating companies filed 14,963 cases from 2006-2012, up from 13,544 cases in the pre-*eBay* era from 2000-2006, while NPEs filed 7,815 cases from 2006-2012, significantly higher than the 2,907 cases in the pre-*eBay* period. It is clear that as the total number of cases increased, the total motions for seeking an injunction dropped – that is, the rate of seeking an injunction dropped both for PEs (by 67%) and NPEs (by 93%).

⁴⁸ Filing date minus termination date.

Table 4: Summary statistics for injunctions pre and post *eBay* (case level) – for PEs vs. NPEs

	Operating		NPE	
	Pre <i>eBay</i>	Post <i>eBay</i>	Post <i>eBay</i>	Post <i>eBay</i>
Number of USDC patent cases filed	13,544	14,963	2907	7815
Number of cases with motion for injunction	1,106	813	169	95
Number of cases with motion for preliminary injunction	892	577	123	68
Number of cases with consent motion for preliminary injunction	6	11	0	0
Number of cases with motion for permanent injunction	265	227	52	27
Number of cases with consent/default motion for permanent injunction	147	139	22	8
Number of cases with preliminary injunction granted	191	101	20	9
Number of cases with permanent injunction granted	190	150	34	15

The statistics at the motion level instead of the case level (as multiple motions may be filed in a single case) paint a very similar picture. For the sake of completion, we include them in Table 5.

Table 5: Summary statistics for injunctions pre and post *eBay* (motion level) – PEs vs. NPEs

	Operating Entities		NPEs	
	Pre <i>eBay</i>	Post <i>eBay</i>	Post <i>eBay</i>	Post <i>eBay</i>

Number of motion for injunction	1,265	989	204	107
Number of preliminary injunction motions	931	594	128	69
Number of consent preliminary injunction motions	6	11	0	0
Number of permanent injunction motions	280	242	54	30
Number of consent/default permanent injunction motions	148	142	22	8
Number of preliminary injunction motions granted	198	106	21	9
Number of permanent injunction motions granted	203	164	36	16

In order to clearly understand how the rate of filing a motion for an injunction changes for PEs and NPEs before and after *eBay*, we plot the yearly rate of filing for a motion from 2000-2012 in Figure 7. From the rates plotted in the figure, we calculate that the proportion of cases for which an injunction is sought have been reducing throughout the period, but an accelerated decrease starts after *eBay*. For example, from 2000-2006, operating companies experience a 32% reduction in the rate at which injunction is sought, while NPEs experience a 52% reduction. After *eBay*, operating companies experience a 52% reduction in the rate at which injunction is sought, while NPEs experience an 86% reduction. Therefore, the drop in the rate at which an injunction is sought by NPEs appears to be steeper.

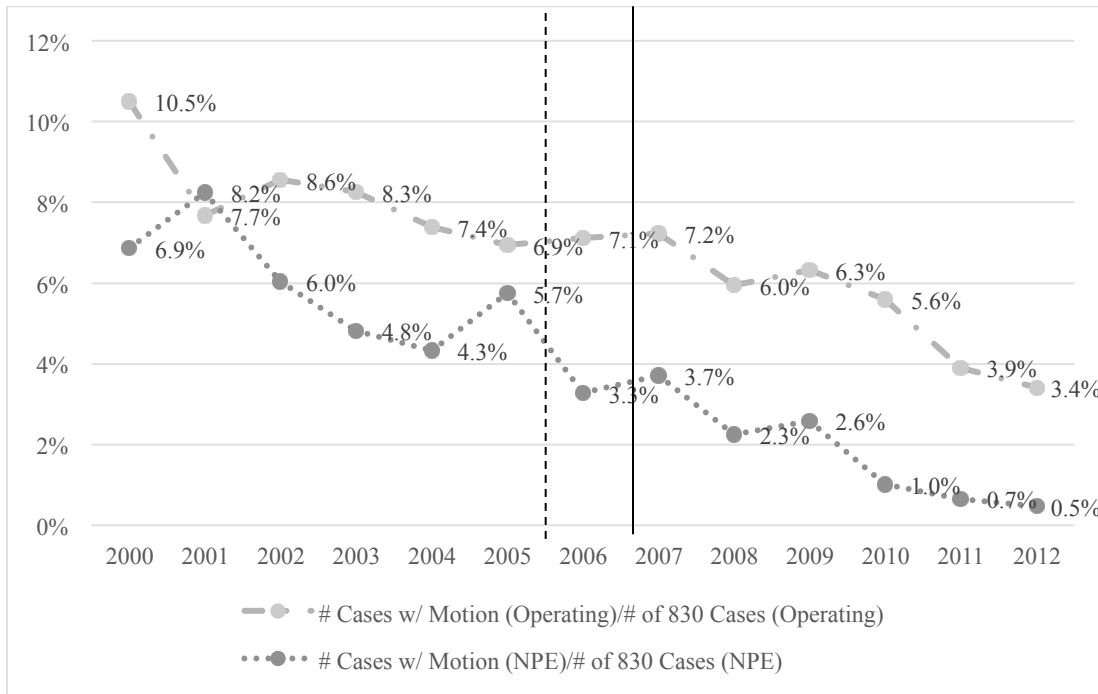


Figure 7: Rate at which injunctions are sought pre and post *eBay* – PEs vs. NPEs

Recall that we calculate the rate of injunctions granted as a percentage of the total number of motions for injunctions that were filed, as shown in Figure 3. Our analysis shows that the rate of injunctions granted calculated in this way does not reduce significantly -- this is because the total number of times an injunction is sought -- that is, the denominator in this calculation of the rate of granted injunctions -- has reduced after the *eBay* decision. Breaking down this rate across PEs and NPEs, Figure 8 and Figure 9 demonstrate the rate of preliminary and permanent injunctions granted as a percentage of the total number of motions filed. Although there is volatility, we can see that the rate of injunctions granted for NPEs is always lower than PEs.

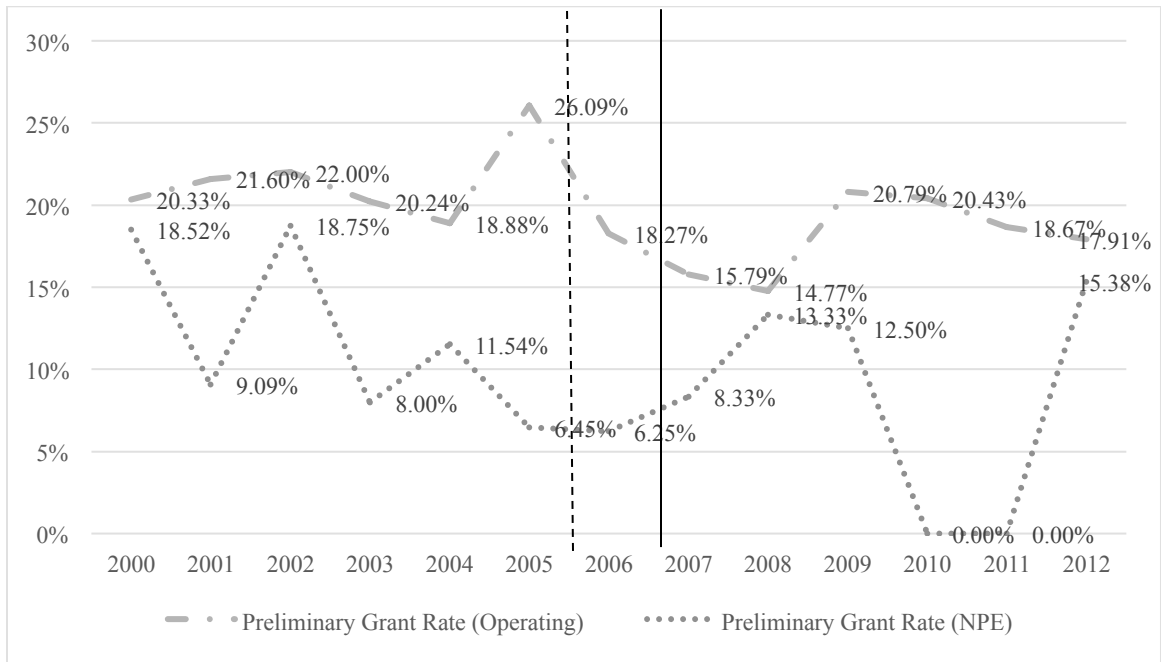


Figure 8: Rate at which preliminary injunctions granted pre- and post- *eBay* as a ratio of injunctions sought

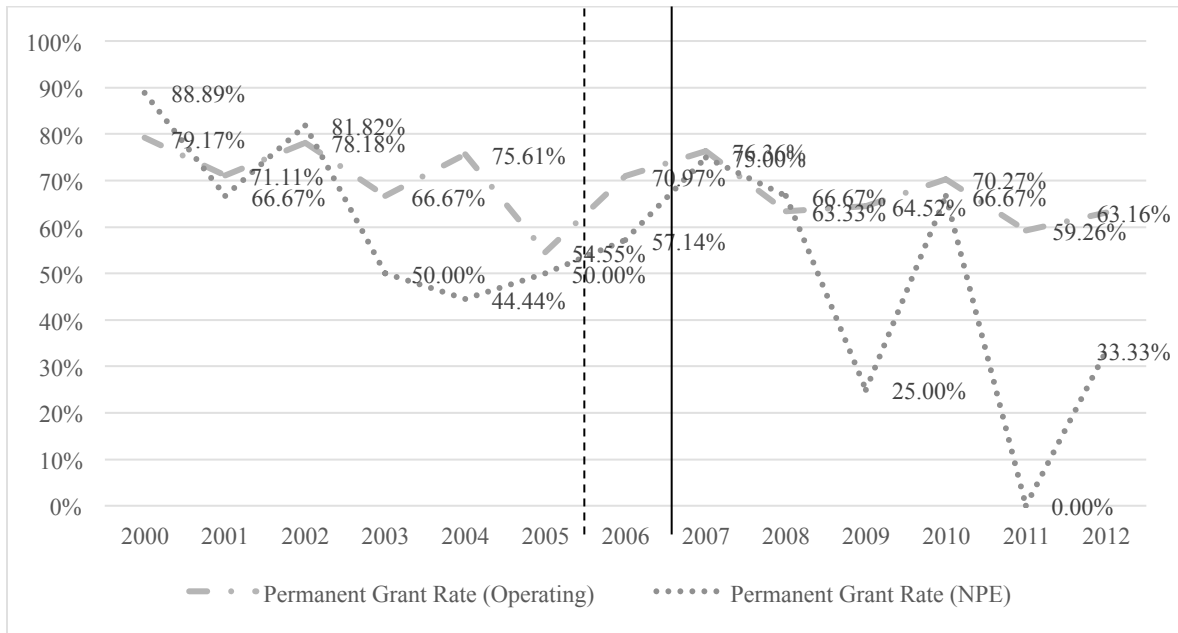


Figure 9: Rate at which permanent injunctions granted pre- and post- *eBay* as a ratio of injunctions sought

When we calculate the actual rate of injunctions granted as a percentage of the total number of cases filed, we find that this rate has reduced significantly, more so for NPEs than for PEs. Figure 10 and Figure 11

demonstrate the rate at which preliminary and permanent injunctions were granted as a percentage of the total number of cases filed, and it shows a clear declining trend for both PEs and NPEs.

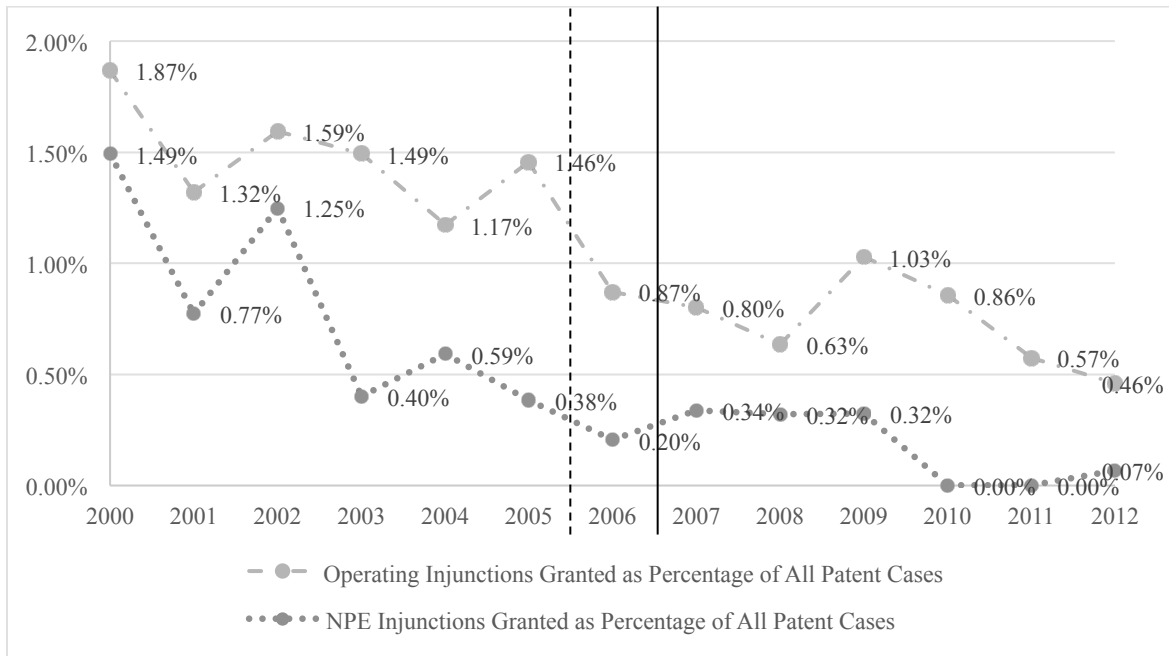


Figure 10: Rate at which preliminary injunctions granted pre- and post- *eBay* based on total patent cases filed

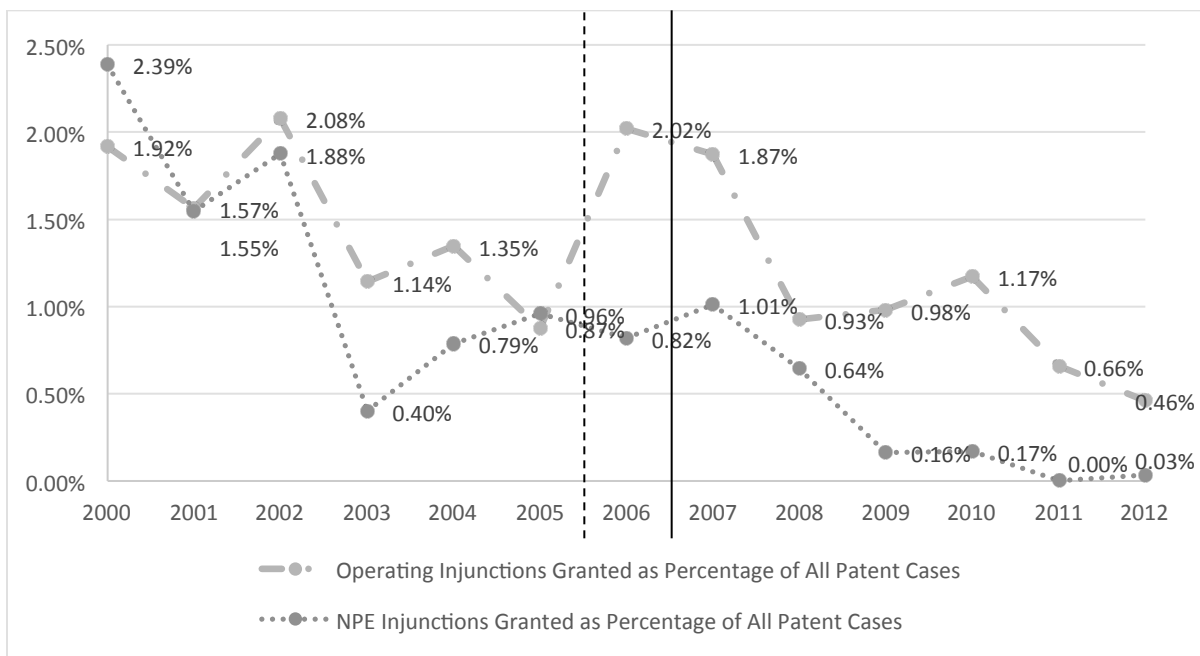


Figure 11: Rate at which permanent injunctions granted pre- and post- *eBay* based on total patent cases filed

V. Difference-In-Difference Analysis Pre- and Post- *eBay*

We first conduct a straightforward analysis to measure whether the differences in the rate of injunctions that were granted declined post-*eBay* and if so, by how much. We start by a simple logistic regression to understand whether or not the likelihood of an injunction being granted is impacted by the *type* of entity – NPE or PE, after controlling for patent quality, and furthermore, whether or not *eBay* had an impact on that likelihood.

We run two regressions on a motion level – for preliminary and permanent injunctions -- the outcome variable is coded as a “one” if the preliminary [or permanent] injunction was granted. We control for aggregate average quality characteristic of all the patents involved in the case for which the motion is filed, specifically, the number of predicted forward citations, number of backward citations, number of countries in which the patent is filed, total number of claims, and length of the first claim. We also control for the total length of a case, because it may be an indicator of how important the case is for the parties involved. It is often argued that the venue at which a case is filed and heard has some impact on its outcome, in other words, some judicial districts are considered to be relatively “patent friendly” while others are not. We include judicial district dummies in our regressions to control for the variations in the outcome of an injunction being granted or not, related to the choice of venue. We also included the dummies for judges to control for any variations on the outcome of an injunction being granted or not based on random assignment of the judge for that case.⁴⁹ Increasing the dummies for the judges and the judicial district increases the explanatory power of our model, and interestingly, we find that the increase in power is more marked for the control of the judicial districts than for specific judges, suggesting “forum shopping” as an important factor in case outcome. For purposes of simplicity, we will be drawing results and conclusions from the most robust model in terms of R^2 , which is the model controlling for judicial district. We note that the patent cases which involve no patents or design patents only have been

⁴⁹ Note that due to the large number of judges (522) in our data-set, we include dummy variables for judges with five or more cases assigned through the period from 2000-2012.

removed from the regressions. There are a few motions for which it cannot be clearly determined whether or not the motion was filed before or after *eBay*, and those motions have been removed from these regressions (48 motions removed).

In order to estimate whether the *eBay* ruling had a differential effect on PEs versus NPEs, we utilize the difference-in-differences methodology by setting the group of PEs as the baseline or the control group, and setting the group of NPEs as the treatment group. Therefore, our null hypothesis is that the *eBay* ruling affected the injunction rates equally for both groups, and we can reject this hypothesis if we find the difference between the treatment and the control group to be statistically significant due to the *eBay* ruling. To measure the impact of the *eBay* ruling on the rate of injunctions, we begin with the following equation:

$$Y_{it} = \beta_0 + \beta_1 * TREAT_{it} + \beta_2 * \alpha_i + \beta_3 * \delta_t + \varepsilon_{it}$$

Where Y_{it} is the rate of injunctions in group $i \in \{\text{Treatment, Control}\}$ at time t (prior to and after 2006). On the right side, $Treat_{it}$ is the dummy representing the *eBay* ruling, and it takes the value of 0 prior to 2006, and the value of 1 for the treatment group post 2006. α_i is a vector of group specific effects (such as different incentives to litigate etc...), and δ_t is a vector of common time trends across the two groups (such as changes in the legal regime in general, litigation filing trends, etc...). The level of treatment is at the group level. The first difference within the group eliminates the group-specific effects, and the second difference eliminates the common time trends, leaving the treatment dummy alone.

$$\Delta(\bar{Y}^{Treat} - \bar{Y}^{Control}) = \beta_1 * TREAT_{it} + \Delta(\varepsilon^{Treat} - \varepsilon^{Control})$$

Thus, β_1 measures the isolated impact of the *eBay* ruling, if any, on the change in the outcome variable of interest. Alternatively, adding time and group dummies implies that the coefficient on the interaction between the time and group dummy variables identifies the treatment effect, or the impact of the *eBay* ruling on the change in the rate of injunctions. In order to create the outcome variable, the rate of

injunctions in each group, we calculate the rate at which an injunction is granted for all the patent cases that were filed on a monthly basis.

The results from the logistic regression for preliminary injunctions is listed in

Table 6. We find that when controlling for similar characteristics of patent and case level, the *eBay* decision plays a role in the likelihood of a preliminary injunction being granted⁵⁰. Specifically, post the *eBay* decision, controlling for patent quality, case length, and the judicial district, preliminary injunctions are 31% less likely to be granted to anyone seeking an injunction – with all else being equal⁵¹. The interaction term is not statistically significant, meaning the likelihood of receiving a preliminary injunction reduced for all types of patent plaintiffs post-*eBay* and it did not differentially reduce for NPEs as compared to PEs⁵².

Table 6: Logit for Preliminary Injunctions

Outcome Variable = Preliminary Injunction Granted (1)

Variables	(1)		(2)		(3)	
Average Predicted	0.000	0.000	0.001	0.001	0.001	0.001
Forward Cites	(0.001)	(.001)	(0.001)	(0.001)	(0.001)	(.001)
Average Geo Coverage	0.024**	0.026***	0.017	0.018	0.034***	0.035***
	(0.011)	(.011)	(0.012)	(0.012)	(0.012)	(.012)
Average 1st Claim Length	0.000	0.000	0.000	0.000	0.000	0.001
	(0.000)	(.000)	(0.000)	(0.000)	(0.000)	(.000)

⁵⁰ We also ran the same logistic regressions only for motions in cases that were adjudicated by the courts on the merits, i.e., only motions with a decision of granted, granted in part/denied in part, or denied will be included in the model. We find that the results are consistent with the ones for all motions as listed in Table 6, and those results are listed in the appendix A1. The magnitude of the effect of *eBay* on the likelihood of being granted an injunction is lower in magnitude is to be expected, as few cases go all the way through trial. The effect of *eBay* on the likelihood of being granted an injunction is still statistically significant is important for corroborating the claim that *eBay* had a negative impact on the grant of a preliminary injunction.

⁵¹ Interpretation based on the exponential value of the logistic coefficient.

⁵² Since the interaction was not significant, the regressions were re-run without the interaction term.

Average # of Claims	-0.010** (0.005)	-0.009** (.005)	-0.007 (0.005)	-0.007 (0.005)	-0.011** (0.006)	-0.011** (.006)
Average Backward citations	0.000 (0.002)	0.001 (.002)	0.000 (0.002)	0.000 (0.002)	0.001 (0.002)	0.002 (.002)
Length of Case	0.000** (0.000)	0.000** (.000)	0.000*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.001** (.000)
Operating (0)/NPE(1)	-0.391 (0.244)	-0.402* (.245)	-0.335 (0.253)	-0.347 (0.254)	-0.353 (0.269)	-0.367 (.270)
Pre eBay (0)/Post eBay (1)		-0.312** (.146)		-0.331** (0.153)		-0.372*** (.159)
Constant	-1.582*** (0.169)	-1.435*** (.182)	-1.644*** (0.176)	-1.491*** (0.189)	-1.278*** (0.304)	-1.109*** (.312)
Judicial District Dummy Included	No	No	No	No	Yes	Yes
Judge Dummy Included	No	No	Yes	Yes	No	No
N	1278	1278	1278	1278	1278	1278
Pseudo R squared	0.025	0.031	0.072	0.077	0.141	0.148
Chi-Square	20.623 Sig. 0.004	25.191 Sig. 0.001	58.937 Sig. 0.079	63.635 Sig. 0.043	118.896 Sig. 0.007	124.396 Sig. 0.003

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

The diff-in-diff coefficient, seen in

Table 7, reveals that plaintiffs were not treated differently post *eBay*. Consistent with the results in

Table 6, the interaction term reveals that the NPEs were not less likely to be granted a preliminary injunction compared to PEs due to the *eBay* decision, although the NPEs preliminary injunction grant rate was always lower throughout the observed time period (2000-2012).

Table 7: Diff-in-Diff Analysis for Preliminary Injunction Grant rates

Outcome Variable = Grant Rate of Preliminary Injunctions for PEs and NPEs pre-post eBay

Independent Variables	β (S.E)	
Operating (0)/NPE(1)	-0.434***	(0.142)
Pre eBay (0)/Post eBay (1)	-0.055	(0.130)
Interaction Term	-0.111	(0.184)
Constant	0.815***	(0.099)
Number of observations	312	
Pseudo R squared	0.095	

Note: * indicates statistical significance at 10% level, ** indicates statistical significance at 5% level, *** indicates statistical significance at 1% level

The results from the logistic regression for permanent injunctions are listed in Table 8, and we find a similar result as for preliminary injunctions, with a slightly larger effect⁵³. The *eBay* decision plays a role in the likelihood of a permanent injunction being granted. Based on interpreting the logit coefficients from the regression in Table 8, post the *eBay* decision, permanent injunctions are 44.1% less likely to be granted.

⁵³ We also ran the same logistic regressions only for motions in cases that were adjudicated by the courts on the merits, *i.e.*, only motions with a decision of granted, granted in part/denied in part, or denied were included in the model. The results for this regression are less meaningful because we are focusing on cases with a ruling by the judge which suffers a strong selection bias. We see that neither the indicator for *eBay* nor the indicator for NPE are statistically significant, as listed in Appendix A2. One would assume that if the party moving for a permanent injunction believed strongly that they would satisfy the 4-factor test and be granted a permanent injunction, they would push for a ruling by the court on the motion – and that proves to be true with a permanent injunction grant rate for adjudicated motions at 76%.

Table 8: Logistic Regression for Permanent Injunction Grant rates

Outcome Variable = Permanent Injunction Granted (1)

Variables	(1)		(2)		(3)	
Average Predicted Forward Cites	-0.001 (0.001)	-0.001 (.001)	-0.001 (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (.001)
Average Geo Coverage	0.024 (0.018)	0.025 (.018)	0.030* (0.019)	0.032* (0.019)	0.014 (0.020)	0.016 (.021)
Average 1st Claim Length	0.000 (0.000)	0.000 (.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (.000)
Average # of Claims	-0.006 (0.005)	-0.005 (.005)	-0.005 (0.005)	-0.005 (0.005)	-0.004 (0.006)	-0.004 (.005)
Average Backward citations	-0.003* (0.002)	-0.003 (.002)	-0.003 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.002 (.002)
Length of Case	0.000 (0.000)	0.000 (.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (.000)
Operating (0)/NPE(1)	-0.393 (0.267)	-0.429* (.269)	-0.434 (0.282)	-0.508* (0.286)	-0.419 (0.321)	-0.509 (.327)
Pre eBay (0)/Post eBay (1)		-0.375* (.216)		-0.534** (0.239)		-0.582* (.254)
Constant	0.914*** (0.264)	1.147 (.298)	0.931 (0.274)	1.27*** (0.318)	2.314*** (0.670)	2.7*** (.692)
Judicial District Dummy Included	No	No	No	No	Yes	Yes
Judge Dummy Included	No	No	Yes	Yes	No	No
N	583	583	538	538	538	538
Pseudo R squared	0.034	0.042	0.138	0.15	0.260	0.272
Chi-Square	13.284 Sig. 0.065	16.363 Sig. 0.037	55.373 Sig. 0.000	60.567 Sig. 0.000	110.039 Sig. 0.002	115.464 Sig. 0.001

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

The diff-in-diff coefficient reveals that plaintiffs were in fact treated differently post *eBay* for permanent injunctions. The interaction term reflects the differential impact of *eBay* on NPEs (vs PEs) and shows that *eBay* reduced the rate at which permanent injunctions were granted for NPEs compared to PEs at a statistically significant level.

Table 9: Diff-in-Diff Analysis for Permanent Injunction Grant rates

Outcome Variable = Grant Rate of Permanent Injunctions for PEs and NPEs pre-post eBay

Independent Variables	β (S.E)	
Operating (0)/NPE(1)	0.022	(0.205)
Pre eBay (0)/Post eBay (1)	0.739***	(0.189)
Interaction Term	-0.787***	(0.268)
Constant	0.599***	(0.144)
Number of observations	312	
Pseudo R squared	0.079	

Note: * indicates statistical significance at 10% level, ** indicates statistical significance at 5% level, *** indicates statistical significance at 1% level

VI. Analyzing the Impact of *eBay* on NPEs

One of the goals of this study is to understand whether the *eBay* decision differentially affects the seeking and granting of injunctions for practicing vs. non-practicing entities. And if so, then what type of non-practicing entities were most affected. The results from the diff-in-diff analysis in Section IV demonstrate that the rate of the permanent injunctions granted for NPEs (relative to PEs) reduced post-*eBay*. More specifically, post *eBay* the permanent injunction grant rate dropped 13% as oppose to operating companies only dropping 5%. Also, post *eBay*, NPE’s grant rate was 15% lower than operating companies. In this section, we unpack the “NPE” category into the various types of entities that are usually categorized as NPEs. Was there a difference in the likelihood of injunctions being granted between different types of entities, *e.g.*, firms investing in R&D, individual inventors, universities, versus patent aggregators?

To answer this question, we ran a logistic regression to understand whether or not the likelihood of an injunction being granted is impacted by belonging to different categories of NPEs, as coded in Section IV – failed start-ups, individual inventors, patent holding company, technology development company, or university (with the operating company as the base category). We ran two regressions on a motion level – for preliminary and permanent injunctions -- the outcome variable is coded as a “one” if the preliminary [or permanent] injunction was granted. We control for the aggregate average quality

characteristic for all the patents involved in the case for which the motion is filed, specifically, the number of predicted forward citations, number of backward citations, number of countries in which the patent is filed, total number of claims, and length of the first claim. We also control for the total length of a case because it may be an indicator of how important the case is for the parties involved. It is often argued that the venue at which a case is filed and heard has some impact on its outcome, in other words, some judicial districts are considered to be relatively “patent friendly” while others are not. We include judicial district dummies in our regressions to control for the variations in the outcome of an injunction being granted or not, related to the choice of venue. We note that the patent cases which involve no patents or design patents only have been removed from the regressions. There are a few motions for which it cannot be clearly determined whether or not the motion was filed before or after *eBay*, those motions have been removed from these regressions (48 motions removed). The results in Table 10 demonstrate that failed startups were 8.03 times more likely to obtain a preliminary injunction compared to operating companies. In contrast, individual inventors were 60.7% less likely to obtain a preliminary injunction relative to operating companies. The patent holding companies do not show a difference relative to operating companies. Post *eBay*, the likelihood of obtaining a preliminary injunction reduces by 32% (consistent with our previous results in

Table 6).

Table 10: Logit for Preliminary Injunctions – NPEs broken out

Outcome Variable = Preliminary Injunction Granted (1)

Independent Variables	(1)		(2)	
Average Predicted Forward Cites	0.001 (0.001)	0.001 (.001)	0.001 (0.001)	0.001 (.001)
Average Geo Coverage	0.017	0.018	0.033***	0.035***

	(0.012)	(.012)	(0.012)	(.012)
Average 1st Claim Length	0.000	0.000	0.001	0.001
	(0.000)	(.000)	(0.000)	(.000)
Average # of Claims	-0.007	-0.007	-0.011**	-0.011**
	(0.005)	(0.005)	(0.006)	(.006)
Average Backward citations	-0.001	0.000	0.001	0.002
	(0.002)	(.002)	(0.002)	(.002)
Length of Case	0.000***	0.000***	0.001**	0.001*
	(0.000)	(0.000)	(0.000)	(.000)
Failed Start-up	1.609*	1.575*	2.188**	2.083**
	(0.939)	(0.948)	(1.003)	(1.006)
Individual Inventor	-0.700*	-0.705*	-0.907**	-.935**
	(0.394)	(0.394)	(0.421)	(.422)
Patent Holding Company	0.253	0.273	0.252	0.301
	(0.433)	(0.435)	(0.446)	(.447)
Tech Development Company	-1.182	-1.253*	-0.992	-1.053
	(0.763)	(0.764)	(0.769)	(.770)
University	-0.351	-0.3	-0.003	0.042
	(1.113)	(1.119)	(1.113)	(1.121)
Pre eBay (0)/Post eBay (1)		-0.340**		-0.381***
		(0.154)		(.160)
Constant	-1.632***	-1.474***	-1.278***	-1.076***
	(0.177)	(0.190)	(0.307)	(0.315)
Judicial District Dummy Included ⁵⁴	No	No	Yes	Yes
Judge Dummy Included ⁵⁵	Yes	Yes	No	No
N	1278	1278	1278	1278
Pseudo R squared	0.082	0.088	0.154	0.16
Chi-Square	67.47	72.382	130.067	135.772
	Sig. 0.041	Sig. 0.021	Sig. 0.002	Sig. 0.001

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

This result is interesting and entirely consistent with results from a recent paper by Cotropia *et al.* (2015), where the observations from all the patent lawsuits filed in the district courts in 2010 reveal that

⁵⁴ Statistically significant court districts include D. Conn., D. Del., D. Mass., D. Me., and M.D. Fla.

⁵⁵ Statistically significant judges include Stanley Chester and Florence Marie Cooper.

that individual inventors lose a majority of the lawsuits as plaintiffs while the failed startups win a majority of their lawsuits⁵⁶.

The results in Table 11 demonstrate that patent holding companies are 82.2% less likely to obtain a permanent injunction. Post *eBay*, the likelihood of obtaining a preliminary injunction reduces by 41.4% (consistent with our previous results in Table 8).

Table 11: Logit for Permanent Injunctions – NPEs broken out

Outcome Variable = Permanent Injunction Granted (1)

Independent Variables	(1)		(2)	
Average Predicted Forward Cites	-0.001 (0.001)	-0.001 (.001)	0.001 (0.001)	0.001 (.001)
Average Geo Coverage	0.030 (0.019)	0.032* (.019)	0.017 (0.020)	0.019 (.021)
Average 1st Claim Length	0.000 (0.000)	0.000 (.000)	0.001 (0.000)	0.001 (.000)
Average # of Claims	-0.003 (0.005)	-0.002 (.005)	-0.001 (0.006)	-0.001 (.006)
Average Backward citations	-0.003 (0.002)	-0.002 (.002)	-0.002 (0.002)	-0.002 (.002)
Length of Case	0.000 (0.000)	0.000 (.000)	0.001 (0.000)	0.001 (.000)
Failed Start-up	-0.785 (1.425)	-0.633 (1.431)	-1.491 (1.284)	-1.430 (1.285)
Individual Inventor	0.118 (0.402)	0.015 (.405)	0.578 (0.538)	0.443 (.543)
Patent Holding Company	-1.429*** (0.557)	-1.433*** (.560)	-1.700*** (0.656)	-1.724*** (.659)
Tech Development Company	-1.082* (0.632)	-1.238** (.639)	-0.723 (0.637)	-0.829 (.642)
University	0.707	0.780	0.502	0.569

⁵⁶ Cotropia, Kesan and Schwartz, “Heterogeneity among patent owners in litigation: An empirical analysis of settlement, case progression, and adjudication”, forthcoming.

	(1.278)	(1.303)	(1.289)	(1.317)
Pre eBay (0)/Post eBay (1)		-0.528** (.243)		-0.534** (.257)
Constant	-0.825*** (0.279)	-1.166*** (0.324)	2.094*** (0.674)	2.481*** (.701)
Judicial District Dummy Included	No	No	Yes ⁵⁷	Yes ⁵⁸
Judge Dummy Included ⁵⁹	Yes	Yes	No	No
N	538	538	538	538
Pseudo R squared	0.156	0.167	0.282	0.291
Chi-Square	63.085	67.984	120.048	124.475
	Sig. 0.000	Sig. 0.000	Sig. 0.001	Sig. 0.000

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

VII. Implications and Conclusions

We find that the U.S. Supreme Court decision in *eBay v. MercExchange* has had a significant impact on injunctive relief in patent cases. Contrary to earlier empirical studies involving small sample datasets, our extensive analysis with a significant dataset involving thousands of patent cases both pre- and post- *eBay* shows that the *eBay* decision has reduced, rather dramatically, both the level at which injunctive relief is sought in patent cases and the rate at which they are granted, particularly for preliminary injunctions. We find that all entities – practicing and non-practicing – are less likely to file for a motion of an injunction after *eBay*, and that this likelihood of filing for an injunction reduces at a higher rate for NPEs compared to PEs. Therefore, the fact that the rate at which injunctions are granted – calculated as a proportion of the total number of patent cases filed – is decreasing is clearly occurring due to the self-selection by patentees who are moving less often for an injunction.

We also study the impact of the *eBay* decision on the quality of patents for which injunctive relief is sought and the nature of the patent plaintiff (operating company vs. non-operating company) and their

⁵⁷ Statistically significant court districts include D.Del, D. Mass, D. Minn, E.D. Mich, E.D. Tex, E.D. Va, M.D. Fla, N.D. Cal, N.D. Ga, N.D. Ill, S.D. Cal, W.D. Mich, W.D. Okla, W.D Pa, W.D Tex, and W.D. Wis.

⁵⁸ Statistically significant court districts include D.Del, D. Mass, D. Minn, E.D. Mich, E.D. Tex, E.D. Va, M.D. Fla, N.D. Cal, N.D. Ga, N.D. Ill, S.D. Cal, S.D. Fla, W.D. Mich, W.D. Okla, W.D Pa, W.D Tex, and W.D. Wis.

⁵⁹ Statistically significant judges include Sue Lewis Robinson, Leonard Philip Stark, Joseph James Farnan, Avern Levin Cohn, David Folsom, and Claudia Ann Wilken.

relative success rates with obtaining injunctive relief. We do find a statistically significant difference between some of the observable patent quality characteristics of the patents held by PEs vs. NPEs, for which a motion for an injunction is filed, but we find that NPEs tend to file a motion for an injunction for higher quality patents on average. We do not find that the overall quality characteristics of patents for which a motion for an injunction is filed has increased after *eBay*, which could have served as one potential mechanism of the self-selection by firms to seek injunctions only for slightly higher quality patents post-*eBay*.

By controlling for various patent and case level observable characteristics, we estimate whether or not the likelihood of obtaining an injunction varies across PEs and NPEs. We find that both for preliminary and permanent injunctions, NPEs are not less likely to obtain an injunction, after controlling for patent characteristics and the length of the case (from filing to termination) throughout the 2000-2012 time period. We also find that the *eBay* ruling reduced the likelihood of all firms receiving either preliminary or permanent injunctions.

In order to understand whether or not the *eBay* ruling had a differential impact on PEs vs. NPEs, we utilize a difference-in-difference model. We find that the *eBay* ruling did not have a differential impact on the likelihood of NPEs to be granted a preliminary injunction as compared to PEs – in other words – the likelihood of being granted a preliminary injunction reduced equally both for NPEs and PEs post *eBay*. However, we do find a differential impact of the *eBay* ruling on PEs vs. NPEs for permanent injunctions. We find that NPEs are less likely to be granted a permanent injunction post-*eBay* compared to PEs, after *eBay*.

This study raises important policy questions about the current diminished role for injunctive relief in patent cases. First, not only does the likelihood of receiving an injunction reduce for cases for which a motion for an injunction is filed, firms do not seek an injunction as often in the first place. Second, the *eBay* ruling impacts NPEs more than PEs, in terms of reducing the likelihood of NPEs receiving a permanent injunction post *eBay*.

Further study of this topic should analyze why NPEs are receiving differential treatment both before and after *eBay*. Classic legal and economic theory suggests that patent courts should be agnostic regarding who owns the patents but rather rule upon the quality of the patents at issue and their infringement. Is the differential conduct due to patent quality, difference in litigation conduct by PEs vs. NPEs, or a bias in the courts? Regardless of the differential impact on PEs vs. NPEs and its reason, we find significantly reduced use of an injunction as a remedy, with systematic declines for both PEs and NPEs after *eBay*. Given the non-substitutable nature of injunctions as a remedy in patent disputes, this result has important consequences for patent policy.

APPENDIX

Appendix A1: Logit for preliminary injunctions – court decisions only

Outcome Variable = Preliminary Injunction Granted (1)

Variables	(1)		(2)		(3)	
Average Predicted Forward Cites	0.000 (0.001)	0.000 (.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.001 (.001)
Average Geo Coverage	0.027** (0.011)	0.028*** (.012)	0.02 (0.012)	0.021* (0.012)	0.034*** (0.013)	0.035*** (.013)
Average 1st Claim Length	0.000 (0.000)	0.000 (.000)	0.000 (0.00)	0.000 (0.00)	0.001 (0.000)	0.001 (.000)
Average # of Claims	-0.009* (0.005)	-0.009* (.005)	-0.008 (0.005)	-0.007 (0.005)	-0.011* (0.006)	-0.011* (.006)
Average Backward citations	-0.001 (0.002)	0.000 (.002)	-0.001 (0.002)	0.000 (0.002)	0.001 (0.002)	0.002 (.002)
Length of Case	0.000 (0.000)	0.000 (.000)	0.000 (0.00)	0.000 (0.001)	0.001 (0.000)	0.001 (.000)
Operating (0)/NPE(1)	-0.336 (0.257)	-0.342 (.258)	-0.310 (0.261)	-0.318 (0.262)	-0.255 (0.287)	-0.270 (.396)
Pre eBay (0)/Post eBay (1)		-0.274* (.155)		-0.320** (0.161)		-0.310* (.181)
Constant	-0.815*** (0.187)	-0.690 (.199)	-0.833*** (0.192)	-0.692*** (-0.204)	-0.733** (0.314)	-0.594* (.324)
Judicial District Dummy Included	No	No	No	No	Yes	Yes
Judge Dummy Included	No	No	Yes	Yes	No	No
N	874	874	874	874	874	874
Pseudo R squared	0.019	0.024	0.054	0.06	0.154	0.159
Chi-Square	11.449	14.582	33.296	37.284	99.576	102.893
	Sig. 0.120	Sig. 0.068	Sig. 0.187	Sig. 0.113	Sig. 0.059	Sig. 0.043

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix A2: Logit for permanent injunctions – court decisions only

Outcome Variable = Permanent Injunction Granted (1)

Variables	(1)		(2)		(3)	
Average Predicted Forward Cites	-0.001 (0.001)	-0.001* (.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (.001)
Average Geo Coverage	0.022 (0.020)	0.023 (.018)	0.029 (0.021)	0.030 (0.21)	0.012 (0.023)	0.013 (.023)
Average 1st Claim Length	0.000 (0.000)	0.000 (.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (.000)
Average # of Claims	-0.005 (0.005)	-0.005 (.005)	-0.005 (0.006)	-0.005 (0.005)	-0.005 (0.006)	-0.005 (.006)
Average Backward citations	-0.004** (0.002)	-0.004* (.002)	-0.004** (0.002)	-0.004** (0.002)	-0.004 (0.002)	-0.003 (.002)
Length of Case	-0.000* (0.000)	0.000 (.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (.000)
Operating (0)/NPE(1)	-0.497* (0.300)	-0.514* (.302)	-0.572* (0.311)	-0.604** (0.131)	-0.473 (0.363)	-0.510 (.366)
Pre eBay (0)/Post eBay (1)		-0.215 (.241)		-0.291 (0.261)		-0.272 (.280)
Constant	1.640*** (0.302)	1.770*** (.337)	1.604*** (0.313)	1.779*** (0.353)	2.661*** (0.689)	2.821*** (.708)
Judicial District Dummy Included	No	No	No	No	Yes	Yes
Judge Dummy Included	No	No	Yes	Yes	No	No
N	490	490	490	490	490	490
Pseudo R squared	0.034	0.051	0.118	0.122	0.249	0.252
Chi-Square	13.284 Sig. 0.065	17.118 Sig. 0.029	40.453 Sig. 0.002	41.724 Sig. 0.002	89.534 Sig. 0.034	90.49 Sig. 0.036

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix B1: Diff-in-Diff for preliminary injunction rate – court decisions only

Outcome Variable = Monthly preliminary injunction rate		
Independent Variables	β (S.E)	
Operating (0)/NPE(1)	-0.117***	(0.045)
Pre eBay (0)/Post eBay (1)	-0.056	(0.037)
Interaction Term	0.084	(0.061)
Constant	0.24***	(0.028)
N	270	
Pseudo R squared	0.03	

Note: * indicates statistical significance at .1 level, ** indicates statistical significance at .05 level, *** indicates statistical significance at .01 level

Appendix B2: Diff-in-Diff for permanent injunction rate – court decisions only

Outcome Variable = Monthly permanent injunction rate		
Independent Variables	β (S.E)	
Operating (0)/NPE(1)	-0.142	(0.092)
Pre eBay (0)/Post eBay (1)	-0.086	(0.062)
Interaction Term	-0.041	(0.116)
Constant	0.786***	(0.050)
N	208	
Pseudo R squared	0.03	

Appendix C1: Logit for preliminary injunction (NPEs broken out) – court decision only

Outcome Variable = Preliminary Injunction Granted (1)

Independent Variables	(1)		(2)	
Average Predicted Forward Cites	0.000 (0.001)	0.000 (.001)	0.001 (0.001)	0.001 (.001)
Average Geo Coverage	0.018 (0.012)	0.020 (.012)	0.033*** (0.013)	0.034*** (.013)
Average 1st Claim Length	0.000 (0.000)	0.000 (.000)	0.001 (0.000)	0.001 (.000)
Average # of Claims	-0.009 (0.005)	-0.008 (.006)	-0.011* (0.006)	-0.011* (.006)
Average Backward citations	-0.001 (0.002)	0.000 (.002)	0.001 (0.002)	0.001 (.002)
Length of Case	0.000 (0.000)	0.000 (.000)	0.001 (0.000)	0.001 (.000)
Failed Start-up	1.142 (0.950)	1.107 (0.960)	1.825* (1.010)	1.732* (1.013)
Individual Inventor	-0.788** (0.402)	-0.797** (.403)	-0.893** (0.436)	-0.923** (.438)
Patent Holding Company	0.205 (0.443)	0.219 (.444)	0.355 (0.483)	0.374 (.482)
Tech Development Company	-0.695 (0.795)	-0.739 (.798)	-0.659 (0.817)	-0.702 (.822)
University	0.082 (1.310)	0.13 (1.304)	0.413 (1.250)	0.481 (1.254)
Pre eBay (0)/Post eBay (1)		-0.323** (.161)		-0.317* (.172)
Constant	-0.800*** (0.193)	-0.657*** (0.206)	-0.689** (0.307)	-0.547* (.327)
Judicial District Dummy Included ⁶⁰	No	No	Yes	Yes
Judge Dummy Included ⁶¹	Yes	Yes	No	No
N	874	874	874	874
Pseudo R squared	0.062	0.069	0.167	0.172
Chi-Square	38.925	42.955	108.670	112.07
	Sig. 0.155	Sig. 0.093	Sig. 0.031	Sig. 0.022

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

⁶⁰ Statistically significant court districts include D. Conn and M.D. Fla.

⁶¹ Statistically significant judge includes Stanley Chester.

Appendix C2: Logit for permanent injunctions with NPEs broken out– court decisions only

Outcome Variable = Permanent Injunction Granted (1)

Variables	(1)		(2)	
Average Predicted Forward Cites	-0.001 (0.001)	-0.001 (.001)	-0.001 (0.001)	-0.001 (.001)
Average Geo Coverage	0.028 (0.021)	0.030 (.021)	0.015 (0.023)	0.016 (.023)
Average 1st Claim Length	0.000 (0.000)	0.000 (.000)	0.001 (0.000)	0.001 (.000)
Average # of Claims	-0.003 (0.006)	-0.003 (.006)	-0.002 (0.006)	-0.003 (.006)
Average Backward citations	-0.004** (0.002)	-0.004* (.002)	-0.004 (0.002)	-0.004 (.002)
Length of Case	0.000 (0.000)	0.000 (.000)	0.001 (0.000)	0.001 (.000)
Failed Start-up	-1.636 (1.279)	-1.567 (1.280)	-1.639 (1.301)	-1.615 (1.301)
Individual Inventor	-0.159 (0.431)	-0.203 (.433)	0.220 (0.598)	0.164 (.602)
Patent Holding Company	-1387** (0.610)	-1.385** (.611)	-1.533** (0.703)	-1.542** (.705)
Tech Development Company	-0.809 (0.728)	-0.893 (.735)	-0.318 (0.744)	-0.363 (.751)
University	0.175 (1.240)	0.221 (1.251)	0.188 (1.292)	0.219 (1.3)
Pre eBay (0)/Post eBay (1)		-0.267 (.265)		-0.226 (.283)
Constant	1.512*** (0.317)	1.674*** (0.358)	2.475*** (0.693)	2.619*** (.716)
Judicial District Dummy Included ⁶²	No	No	Yes	Yes
Judge Dummy Included ⁶³	Yes	Yes	No	No
N	490	490	490	490
Pseudo R squared	0.130	0.133	0.263	0.264
Chi-Square	44.686	45.72	94.895	95.536
	Sig. 0.003	Sig. 0.003	Sig. 0.031	Sig. 0.033

Note: Standard errors in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

⁶² Statistically significant courts include -D.Del, D. Minn, E.D. Mitch, M.D. Fla, N.D. Cal, N.D. Ga, W.D.N.C., W.D Pa, and W.D. Wis.

⁶³ Statistically significant judges include Sue Lewis Robinson, Leonard Philip Stark, and Avern Levin Cohn.