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Citation: Helmers, C., Lefouili, Y., Love, B. & McDonagh, L. (2016). The Effect of Fee Shifting on Litigation: Evidence from a Court Reform in the UK (16-740). Toulouse School of Economics.

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“The Effect of Fee Shifting on Litigation: Evidence from a Court Reform in the UK”

Christian Helmers, Yassine Lefouili, Brian Love, Luke McDonagh

The Effect of Fee Shifting on Litigation: Evidence from a Court Reform in the UK*

Christian Helmers^{a†}

Yassine Lefouili^{b‡}

Brian Love^{a§}

Luke McDonagh^{c¶}

^a Santa Clara University

^b Toulouse School of Economics, University of Toulouse Capitole

^c City, University of London

December 5, 2016

ABSTRACT

We study a U.K. court reform that established a cap on the amount of costs that a successful litigant may recover in a case litigated in the Patents County Court (PCC, now the IP Enterprise Court). We first build a theoretical model showing that the introduction of a costs cap is equivalent to an intermediate cost allocation rule falling between the English and American Rules. Our model suggests that the impact of the introduction of such a fee-shifting rule on the number of claims filed and the settlement rate is ambiguous. It shows, however, that the effect of the costs cap on IP holders' incentives to file a claim is stronger for smaller IP holders. Our empirical analysis of the impact of the costs cap takes advantage of our ability to compare IP litigation in the PCC with IP litigation in the High Court of England and Wales, which was not directly affected by the reform. Contrary to the existing literature, we find that the costs cap increased the number of cases filed by smaller companies and decreased the rate of settlement.

KEYWORDS: Litigation, fee shifting, intellectual property, court reform, U.K.

*We acknowledge financial support from the UK Intellectual Property Office for the construction of the data. We are grateful to Louis Kaplow and Rosa Ferrer for very useful comments and discussions. We also thank Shane Burke, Francesco Dionisio, Leslie Lansman, Manuel Rey-Alvite Villar and Paula Westenberger for outstanding research assistance.

[†]chelmers@scu.edu

[‡]yassine.lefouili@tse-fr.eu

[§]blove@scu.edu

[¶]luke.mcdonagh@city.ac.uk

1 Introduction

We contribute to the theoretical and empirical literature on the effect of litigation cost shifting regimes by studying a court reform recently implemented in the U.K. (in the jurisdiction of England and Wales). Among the possible ways to allocate the cost of adjudication between the two sides in a lawsuit, the so-called American Rule and English Rule generally serve as the foundation for economic analysis. Under the American Rule, it is assumed that each party will bear its own costs, which reflects the typical (though by no means exclusive) practice in U.S. courts. Under the English Rule, it is assumed that the party on the losing end of a lawsuit will pay its own costs as well as all costs incurred by the winning party, which is also referred to as fee-shifting. This assumption again reflects the approximate, but by no means exact, practice applicable in British courts.¹

The existing theoretical literature on the distinction between the American and English Rules suggests that the practice of shifting costs to the losing party has four primary effects.² First, existing models predict that fewer suits will settle in a legal environment where the English Rule applies. Assuming that the parties have asymmetric information about the likely outcome of a case, the English Rule will tend to exaggerate their disagreement about the expected value of their respective recovery or payout by adding litigation costs to the total amount at stake in the case. Second, with similar reasoning, the literature predicts that the English Rule will tend to increase the overall rate of litigation. For the same reason that fewer cases will settle once filed, fewer disputes will settle before a lawsuit is filed. Third, the literature shows that the English Rule will likely affect the types of cases that are brought. When the parties share relatively symmetric information, the English Rule will tend to deter the filing of weak, i.e., low-probability-of-winning, cases by reducing the plaintiff's total expected recovery and, conversely, under the same circumstances, the English Rule will tend to encourage the filing of strong, i.e., high-probability-of-winning, cases by increasing the plaintiff's expected total award.³ In effect, the risk of paying the defendant's costs acts as potential penalty for bringing weak claims, while the prospect of having one's own costs covered by the defendant serves as a reward for bringing strong claims. Finally, the literature predicts that the English Rule will lead parties to litigate their cases more intensely. Because the prospect of fee shifting raises the stakes of litigation, it likewise raises the marginal benefit of additional spending. At the same time, the potential for a cost-recovery award decreases the marginal cost of devoting additional resources to litigation by introducing some likelihood that one's opponent will wind up covering that additional cost.

Despite general consensus in the theoretical literature that the English Rule should have these four effects, relatively little empirical evidence has been collected in an effort to confirm (or refute) their existence in real-world litigation.⁴ The relative lack of empirical evi-

¹Neither the U.K. nor the U.S. legal systems actually enforce rules as rigid as those economic analysis typically analyzes. In the U.K. a successful party is likely to recover a good deal less than its actual costs total. For example, prevailing parties in patent cases generally recover about half to two-thirds of their actual costs (Forsyth and Watts, 2011). In the U.S. various common law rules and statutory provisions permit fee awards in certain circumstances, especially when a litigant has acted in bad faith (see, for example, Cohen, 2008).

²For an overview, see Spier (2007).

³As Polinsky and Rubinfeld (1998) show, the English Rule can also have the opposite effect when the parties have asymmetric information.

⁴For an overview of the relevant empirical literature, see Kritzer (2002).

dence can be explained by the difficulty inherent in making comparisons of litigation behavior across jurisdictions, as well as by a general lack of (quasi-)experimental data in the area of litigation that would allow such analysis. As a consequence, much of the available empirical evidence focuses on litigation in two idiosyncratic U.S. states: Alaska, the only state that routinely awards attorney's fees to prevailing parties, (Di Pietro, et al., 1995; Rennie, 2012) and Florida, which applied the English rule in medical malpractice cases between 1980 and 1985 (Snyder and Hughes, 1990; Hughes and Snyder, 1995; Helland and Yoon, 2016). Most other studies examine the impact of similar, but distinct, cost-recovery rules, including one-way fee shifting provisions applicable to certain causes of action in the U.S. (Schwab and Eisenberg, 1988), offer-of-judgment statutes applicable in various U.S. jurisdictions (Yoon and Baker, 2006), and the effect of various fee shifting regimes aggregated across causes of action and jurisdictions (Williams, 2001; Fournier and Zuehlke, 1989). Finally, scholars have gathered experimental results (Anderson and Rowe, 1995; Rowe and Anderson, 1996; Inglis et al., 2005) and survey data (Kritzer, 1984; Pfennigstorf 1984; Genn, 1987; Shapard, 1995) on the impact of the various fee shifting regimes.

The empirical literature on cost-recovery rules, in addition to being thin relative to its theoretical counterpart, has also produced inconsistent findings. While studies of Florida have found significant effects, those of Alaska have not. The results of experimental simulations are similarly at odds. Moreover, even among studies that produced significant results, only some have found effects consistent with the existing theoretical literature. This lack of consistency further underscores the need for additional analysis.

In this paper, we study a series of court [reforms](#) implemented in the U.K. between 2010 and 2013.⁵ Chief among these reforms for purposes of our analysis is the introduction of a £50,000 cap on the amount of costs recoverable in intellectual property (IP) suits filed in the Patents County Court (PCC, recently reconstituted as the IP Enterprise Court or IPEC), one of only two venues for litigating IP disputes in England and Wales. Post-reform, winning parties can recover at most £50,000 in costs from their opponents (and in practice generally much less). Any additional costs they incurred during litigation they must bear on their own. In effect, then, the introduction of a cap on the recovery of litigation costs establishes a new intermediate cost-recovery regime that shares characteristics of both the English and American Rules. This means that the costs cap limits the extent to which fee-shifting is permitted.

To study the costs cap's effect on litigation behavior, we first build a theoretical model in which heterogeneous IP holders need to decide whether to file a claim against an alleged infringer. When the claim is filed, the IP holder makes a settlement offer to the alleged infringer which can be accepted or turned down. In the latter scenario, a decision regarding the infringement is issued by the court. Our model generalizes the seminal litigation model by Bebchuk (1984) in two directions. First, we consider a set of heterogeneous plaintiffs while Bebchuk (1984) deals with the case of a single plaintiff. This feature of our model is crucial for the investigation of the effect that the costs cap has on the number of claims filed. Second, we consider a general class of cost-recovery rules allowing us to study the effect of any one-sided or two-sided fee-shifting rule and, in particular, a costs cap like the one that has been implemented at the IPEC.

Our theoretical analysis concludes that the effects of a shift away from a pure English

⁵The U.K. comprises separate legal systems: England & Wales, Scotland, and Northern Ireland. Our data focus on England & Wales where the overwhelming majority of cases occur.

Rule to the hybrid regime resulting from the costs cap are in fact ambiguous. More precisely, we show that a decrease in the alleged infringer's recoverable costs has an ambiguous effect on the IP holder's incentive to file a claim. This implies that the overall effect of the costs cap on the number of claims filed is also ambiguous. We show, however, that this effect is stronger for smaller IP holders, regardless of its sign. We also uncover an important and heretofore unrecognized source of ambiguity for the effect of fee-shifting rules on the settlement rate. The effect on the settlement rate consists of a direct effect (i.e., the effect holding for a *given* set of plaintiffs) and an indirect effect resulting from the effect of the costs cap on the set of plaintiffs. This indirect effect, which has been ignored in the existing theoretical literature, makes the overall effect of fee shifting on the settlement rate ambiguous. Finally, we show that the way this overall effect depends on the plaintiff's size is also ambiguous.

Second, we collect empirical evidence of litigants' reactions to the PCC's costs cap to study the impact fee-shifting has on litigation behavior in actual suits. In carrying out this analysis, we take advantage of our ability to compare IP litigation in the PCC with IP litigation in the High Court of England and Wales (HC), which was not directly affected by the reform and thus acts as a control group that allows us to isolate the causal effect of the costs cap from other unobservable time-varying factors. Our empirical analysis – based on data from over 2,000 suits (covering the period 2007-2013) hand collected from physical court records at the PCC and HC – shows that the shift from the English towards the American Rule led to an increase in the number of cases filed by smaller companies and a decrease in the rate of settlement. With respect to the latter finding, we see a statistically significant drop in settlements only in patent cases, where the effect of the costs cap is likely more binding due to higher average litigation costs. These findings stand in contrast to the existing literature on fee shifting.

Our analysis contributes directly to the literature on the design of litigation systems, in particular the question of how to allocate litigation costs. In the last two decades, the cost of litigation has played a prominent role in legal policy discussions, including those concerning access to justice and tort or other civil justice reforms. There are a few existing policies in the U.S. that cap legal fees similar to the IPEC, such as a cap on fees that legal representatives can claim after successfully litigating claims for social security disability benefits (Hoynes et al. 2016). But there are no studies of the effect of such caps on litigation behavior. In the context of intellectual property litigation, the topic of litigation costs has played a particularly prominent role in recent policy debates. In the U.S. policymakers are actively debating legislative reforms that if enacted would make fee awards routine in patent suits.⁶ In addition, calls for the establishment of a 'small claims' court for IP disputes – one that would resemble the IPEC in many regards – have drawn the attention of U.S. policymakers twice since 2013.⁷ Meanwhile, in Europe, policymakers stand on the

⁶For a summary of patent reform legislation proposed in the last two sessions of the U.S. Congress, see Patent Progress (2016). In addition, in a pair of cases decided in 2014, the Supreme Court of the United States modified the test that U.S. courts apply when deciding whether to award attorney's fees in patent suits in a way that many anticipate will make fee awards more common. *Octane Fitness, LLC v. Icon Health & Fitness, Inc.*, 134 S. Ct. 1749 (2014); *Highmark Inc. v. Allcare Health Management System, Inc.*, 134 S. Ct. 1744 (2014).

⁷In 2013, the Judiciary Committee of the U.S. House of Representatives commissioned a report on the topic of creating a small claims court for copyright disputes prepared by the U.S. Copyright Office, which endorsed the idea. In 2015, patent reform legislation that passed the House again called for further study on

precipice of establishing a Unified Patent Court (UPC), the primary function of which will be to significantly reduce the cost of enforcing patent rights continent-wide (McDonagh, 2016). In addition, the UPC will alter the way fee shifting rules apply in many patent cases by introducing costs caps that vary with the value of the case and, at the low end, establish ceilings on recovery even lower than the one applicable in the IPEC.⁸

The remainder of this paper is organized as follows. We first describe briefly the IP litigation system in the U.K. and the IPEC reforms. Section 3 describes the theoretical model and predictions. Section 4 describes the data used in our empirical analysis and Section 5 presents our analysis. Section 6 offers a few concluding remarks.

2 Legal background and reforms

There are two courts of relevance to our analysis: (i) the Patents County Court (PCC) – since 2013 reconstituted as the Intellectual Property Enterprise Court (IPEC) – and (ii) the High Court (HC) and Patents Court (PHC), which operate within the the Chancery Division of the High Court of Justice of England and Wales. The PCC (IPEC) only hears IP cases of low value and complexity. All other IP cases are heard in the Chancery Division of the High Court, either in the general HC, which hears cases concerning copyright, trade marks (U.K./Community) and passing off, and unregistered designs (U.K./Community), or at the specialist PHC, which hears cases that involve patents, and registered designs (U.K./Community).⁹

The PCC underwent comprehensive procedural reforms between 2010 and 2013.¹⁰ The reforms consisted of several stages, and were staggered over a span of four years. The most important change for the purposes of our analysis was the introduction in October 2010 of a recoverable costs cap of £50,000 for trials on substantive liability (with an additional cap of £25,000 relating to subsequent hearings concerning damages).¹¹ Alongside the costs cap, a number of other procedural changes took effect as well, including the introduction of active case management and a limit on the time to be taken at trial. In June 2011, a £500,000 damages cap was introduced for cases enforcing patents and designs, and this rule was subsequently extended to all IP cases four months later. Further, between October 2012 and April 2013, the court introduced a Small Claims Track (SCT), which is available for cases enforcing copyrights, trade marks, and rights to databases or unregistered designs – but not cases concerning patents or registered designs. SCT claims are limited to a value of £5,000 and costs recovery is set at a level of £260. In April 2013, the SCT Claims limit was raised to a value of £10,000. Finally, in October 2013 the PCC was reconstituted from a county court into a specialist court – the IPEC – within the Chancery Division of the High

the topic.

⁸If established, the UPC will make it possible for patent rights to be enforced across 25 European member countries with a single suit. Under current law, enforcement must take place separately in each country. In addition, the UPC's proposed rules for cost shifting awards include caps on the amounts recoverable (Preparatory Committee for the Unified Patent Court, 2016). Current rules propose a €38,000 cap for cases valued at or below €250,000 and a €56,000 cap for cases valued up to €500,000.

⁹For a more detailed description of the U.K. IP litigation system see Cremers et al. (2016).

¹⁰For more details see Fox (2014) and Helmers et al. (2015).

¹¹Separate hearings on damages occur in the courts of England and Wales after the conclusion of the trial on substantive matters.

Court of England and Wales.

Our focus is on the introduction of the costs cap in October 2010, which is widely perceived by practitioners to have been the most impactful element of the PCC/IPEC reforms described above. As noted by one attorney: “Key [to the reforms] was the costs cap of £50,000, so parties knew the maximum that could be awarded against them from the other side’s costs.” (Managing IP, April 2013: 56). Though the damages cap could also have affected litigation behavior, the damages cap was set so high that in practice it is generally not binding. Helmers et al. (2015) show that the damages cap indeed had no effect on litigation behavior. We also confirmed this through extensive qualitative interviews conducted with 17 legal practitioners (judges, solicitors, barristers, patent attorneys, trade mark attorneys) and 18 companies that litigated at either the PHC or IPEC. Interviewees unanimously viewed the damages cap as ineffective because it was set at a non-binding level. In contrast, all interviewees regarded the costs cap as the most influential component of the reform.¹² More details on the legal background and reforms are provided in appendices A and B.

3 Model

This section describes a model that analyzes the effects of the costs cap on the number of claims filed with the IPEC as well as the settlement rate of cases after filing.

3.1 Setup

Consider a dispute between an IP holder and an alleged infringer. The defendant is assumed to have some private information about whether he does, in fact, infringe the plaintiff’s IP. On the basis of his information, he estimates the likelihood of the IP holder prevailing in trial to be p . This probability can be interpreted as the ‘type’ of the alleged infringer. The IP holder does not know the alleged infringer’s type p but only that p is distributed over an interval $[\underline{p}, \bar{p}]$ with a differentiable cumulative distribution function $F(\cdot)$. We denote $f(\cdot)$ the corresponding density function, which we assume to be differentiable too, and make the standard assumption that the hazard rate $\frac{f}{1-F}$ is increasing.

Let $D \in (\underline{D}, \bar{D}]$ be the value of the damages that the defendant (i.e. the alleged infringer) has to pay to the plaintiff (i.e. the IP holder) if the latter prevails at trial. D can be interpreted as the ‘type’ of the plaintiff and is assumed to be common knowledge. We denote $G(\cdot)$ the cumulative distribution function for the damages and $g(\cdot)$ the corresponding density function. Moreover, for the sake of simplicity, we assume that D and p are independent variables so that the density of a pair (p, D) is given by $f(p)g(D)$.

Denote $s \in [\underline{s}, \bar{s}]$ the patent holder’s size and $m(\cdot)$ the corresponding density function. We assume that the conditional distribution of damages with respect to size has a decreasing hazard rate, i.e., $\frac{g(D|s)}{1-G(D|s)}$ decreases with s for any $D \in (\underline{D}, \bar{D}]$. This assumption captures the idea that damages are less likely to be high for smaller IP holders.

Denote c_p the cost of filing a claim and C_p the additional litigation costs that the plaintiff has to incur if he does neither drop the case nor settle. Also, denote C_d the alleged infringer’s litigation costs. We consider a general cost allocation rule under which a winning plaintiff recovers an amount $R_p \in [0, c_p + C_p]$ while a winning defendant recovers an

¹²For detailed discussion see Helmers et al. (2015).

amount $R_d \in [0, C_d]$. Finally, we assume that litigation costs are common knowledge and that the plaintiff and defendant are risk-neutral.

Let us consider the following game:

Stage 1: The IP holder decides whether to file a claim, which costs c_p . If he does not, the game ends. Otherwise, it proceeds to the next stage.

Stage 2: The IP holder makes a take-it-or-leave-it settlement offer to the alleged infringer.

Stage 3: The alleged infringer decides whether to accept the settlement offer. If he does, the game ends. Otherwise, the IP holder incurs additional litigation costs C_p while the defendant incurs litigation costs C_d , and a decision regarding the infringement is issued by the court.

To ensure that the IP holder's litigation threat in case settlement fails is credible¹³ (as is implicitly assumed in Stage 3) we assume that¹⁴

$$\underline{p} \geq \frac{C_p + C_d}{c_p + C_p + C_d + \underline{D}}. \quad (1)$$

3.2 Equilibrium analysis

Consider Stage 3. The alleged infringer knows that if he rejects the settlement offer, there will be a trial that will cost him in expectation:

$$p(D + C_d + R_p) + (1 - p)(C_d - R_d)$$

Thus, he accepts to pay the amount S to the IP holder if and only if

$$S \leq p(D + C_d + R_p) + (1 - p)(C_d - R_d)$$

or, equivalently,

$$p \geq \frac{S - C_d + R_d}{D + R_p + R_d} \equiv \hat{p}(D, R_p, R_d, S)$$

Consider now the IP holder's choice of the amount S requested from the alleged infringer at Stage 2. The IP holder knows that if his settlement offer involves a payment S , there is a probability $1 - F(\hat{p})$ that it will be accepted and a probability $F(\hat{p})$ that it will be turned

¹³In doing so we follow Bebchuk (1984) and the vast majority of screening models in the settlement literature (see Spier, 1992). A notable exception is Nalebuff (1987).

¹⁴To see why this condition implies that the plaintiff will never find it optimal to drop the case if settlement fails, note that his continuation value from not dropping the case is

$$p(D + R_p - C_p) - (1 - p)(C_p + R_d)$$

The latter is positive for any values $p \in [\underline{p}, \bar{p}]$, $D \in (\underline{D}, \bar{D}]$, $R_p \in [0, c_p + C_p]$ and $R_d \in [0, C_d]$ if Condition (1) is satisfied.

down. If the offer is accepted then the IP holder's payoff is $S - c_p$. If the offer is turned down there will be a trial and the IP holder's expected payoff will be

$$\hat{\rho} (D - C_p + R_p) - (1 - \hat{\rho}) (C_p + R_d) - c_p$$

where

$$\hat{\rho} = \frac{1}{F(\hat{p})} \int_{\underline{p}}^{\hat{p}} p f(p) dp$$

is the average probability that the IP holder prevails in court conditionally on the settlement offer being turned down by the alleged infringer. Therefore, the IP holder's expected payoff if he files a claim and makes a settlement offer involving a payment S is given by

$$\begin{aligned} \hat{\Pi}(D, R_p, R_d, S) &= (1 - F(\hat{p}))S + F(\hat{p}) [\hat{\rho} (D - C_p + R_p) - (1 - \hat{\rho}) (C_p + R_d)] - c_p \\ &= (1 - F(\hat{p}))S - F(\hat{p}) (C_p + R_d) + (D + R_p + R_d) \int_{\underline{p}}^{\hat{p}} p f(p) dp - c_p \end{aligned}$$

Differentiating $\hat{\Pi}$ with respect to S yields

$$\begin{aligned} \frac{\partial \hat{\Pi}}{\partial S} &= 1 - F(\hat{p}) - f(\hat{p}) \frac{\partial \hat{p}}{\partial S} (S + C_p + R_d) + (D + R_p + R_d) \frac{\partial \hat{p}}{\partial S} \hat{p} f(\hat{p}) \\ &= 1 - F(\hat{p}) - f(\hat{p}) \frac{C_p + C_d}{D + R_p + R_d} \end{aligned}$$

This leads to the following lemma:

Lemma 1. *The equilibrium settlement amount $S^*(D, R_p, R_d)$ and the corresponding threshold $p^*(D, R_p, R_d) = \hat{p}(D, R_p, R_d, S^*(D, R_p, R_d))$ above which an alleged infringer accepts the settlement offer are given by*

$$\frac{f(p^*(D, R_p, R_d))}{1 - F(p^*(D, R_p, R_d))} = \frac{D + R_p + R_d}{C_p + C_d} \quad (2)$$

$$S^*(D, R_p, R_d) = p^*(D, R_p, R_d) (D + R_p + R_d) + C_d - R_d \quad (3)$$

Thus, the IP holder's payoff if he files a claim is

$$\begin{aligned} \Pi^*(D, R_p, R_d) &\equiv \hat{\Pi}(D, R_p, R_d, S^*(D, R_p, R_d)) \\ &= S^* - F(p^*) (S^* + C_p + R_d) + (D + R_p + R_d) \int_{\underline{p}}^{p^*} p f(p) dp - c_p \end{aligned}$$

Considering now Stage 1, the IP holder files a claim against the alleged infringer if and only if

$$\Pi^*(D, R_p, R_d) > 0.$$

3.3 Comparative statics

In this section we study the effects of a change in recoverable costs on the equilibrium number of claims and the equilibrium settlement rate. This allows us in particular to derive the effects of implementing a (binding) costs cap which amounts to a decrease in recoverable costs for both the plaintiff and the defendant.

Let us consider first the effect of a change in recoverable costs on the number of claims filed by IP holders. The following lemma is useful for the subsequent analysis:

Lemma 2. *There exists a unique threshold $D^*(R_p, R_d) \geq \underline{D}$ such that an IP holder files a claim against the alleged infringer if and only if:*

$$D > D^*(R_p, R_d)$$

Proof. See Appendix C. □

Normalizing the total mass of potential plaintiffs to 1, the equilibrium number (mass) of claims is given by

$$\int_{D^*(R_p, R_d)}^D g(D) dD = 1 - G(D^*(R_p, R_d))$$

To investigate the effect of a change in recoverable costs on the number of claims filed, we need to study how $D^*(R_p, R_d)$ depends on R_p and R_d . Assume that $\underline{D} < D^*(R_p, R_d)$ so that not all potential plaintiffs file a claim. Then, $D^*(R_p, R_d)$ is such that

$$\Pi^*(D^*(R_p, R_d), R_p, R_d) = 0$$

Differentiating the latter with respect to R_p yields

$$\frac{\partial \Pi^*}{\partial D} \frac{\partial D^*}{\partial R_p} + \frac{\partial \Pi^*}{\partial R_p} = 0$$

which leads to

$$\frac{\partial D^*}{\partial R_p} = - \frac{\frac{\partial \Pi^*}{\partial R_p}}{\frac{\partial \Pi^*}{\partial D}}$$

Since Π^* is increasing in D , the sign of $\frac{\partial D^*}{\partial R_p}$ is the opposite of the sign of $\frac{\partial \Pi^*}{\partial R_p}$. We use this result to prove the following proposition:

Proposition 1. *The equilibrium number (mass) of claims filed $1 - G(D^*(R_p, R_d))$ is (weakly) increasing in the plaintiffs' recoverable cost R_p , and is ambiguously affected by the defendants' recoverable cost R_d .*

Proof. See Appendix C. □

Let us now examine how the effect of a change in recoverable costs is affected by the plaintiff's size. Denote $M(s, R_p, R_d)$ the mass of claims filed by plaintiffs of a given size s . From Lemma 2 it follows that

$$M(s, R_p, R_d) = m(s) \int_{D^*(R_p, R_d)}^{\bar{D}} g(D|s) dD$$

and, consequently,

$$\frac{\partial M}{\partial R_p}(s, R_p, R_d) = -m(s) \frac{\partial D^*}{\partial R_d} g(D^*(R_p, R_d) | s)$$

Therefore, the relative variation in the mass of claims filed by plaintiffs of a given size is

$$\frac{\frac{\partial M}{\partial R_p}(s, R_p, R_d)}{M(s, R_p, R_d)} = -\frac{\partial D^*}{\partial R_p} \frac{g(D^*(R_p, R_d) | s)}{\int_{D^*(R_p, R_d)}^{\bar{D}} g(D | s) dD} = -\frac{\partial D^*}{\partial R_p} \frac{g(D^*(R_p, R_d) | s)}{1 - G(D^*(R_p, R_d) | s)}$$

Consider two sizes s and s' such that $s < s'$. Since the hazard rate $\frac{g(D | s)}{1 - G(D | s)}$ is decreasing in s then

$$\frac{g(D^*(R_p, R_d) | s)}{1 - G(D^*(R_p, R_d) | s)} > \frac{g(D^*(R_p, R_d) | s')}{1 - G(D^*(R_p, R_d) | s')}$$

and, therefore,

$$\frac{\frac{\frac{\partial M}{\partial R_p}(s, R_p, R_d)}{M(s, R_p, R_d)}}{\frac{\frac{\partial M}{\partial R_p}(s', R_p, R_d)}{M(s', R_p, R_d)}} > 1$$

This means that the effect (in relative terms) of a change in R_p on the number of claims filed is stronger for plaintiffs of smaller size.

Similarly,

$$\frac{\frac{\partial M}{\partial R_d}(s, R_p, R_d)}{M(s, R_p, R_d)} = -\frac{\partial D^*}{\partial R_d} \frac{g(D^*(R_p, R_d) | s)}{1 - G(D^*(R_p, R_d) | s)}$$

which implies that

$$\frac{\frac{\frac{\partial M}{\partial R_d}(s, R_p, R_d)}{M(s, R_p, R_d)}}{\frac{\frac{\partial M}{\partial R_d}(s', R_p, R_d)}{M(s', R_p, R_d)}} > 1$$

Thus, even if $\partial D^* / \partial R_d$ has an ambiguous sign (contrary to $\partial D^* / \partial R_p$) we are again able to conclude that the effect (in relative terms) of a change in R_d on the number of claims filed is stronger for plaintiffs of smaller size.

These results can be summarized as follows:

Proposition 2. *The effect (in relative terms) of a change in recoverable costs on the number of filed claims decreases with the plaintiff's size.*

Let us now turn to the effect of a change in recoverable costs on the settlement rate. The following proposition provides the effects of R_p and R_d on the probability of settlement for a given plaintiff that files a claim, i.e.,

$$q^*(D, R_p, R_d) \equiv 1 - F(p^*(D, R_p, R_d))$$

Lemma 3. *The probability of settlement for a given plaintiff decreases with both his recoverable cost and the defendant's recoverable cost:*

$$\frac{\partial q^*}{\partial R_p} < 0 \quad \text{and} \quad \frac{\partial q^*}{\partial R_d} < 0$$

Proof. See Appendix C. □

This lemma only captures part of the effect of the costs cap on the settlement rate. The reason is that the mass (or more generally the set) of filed claims is also affected by recoverable costs. More precisely, the equilibrium settlement rate is given by

$$\theta^*(R_p, R_d) = \frac{\int_{D^*(R_p, R_d)}^{\bar{D}} q^*(D, R_p, R_d) g(D) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} g(D) dD}$$

Let us first consider the effect of R_p on the settlement rate. Differentiating θ^* with respect to R_p and rearranging terms leads to

$$\begin{aligned} \frac{\partial \theta^*}{\partial R_p} = & \underbrace{\frac{\int_{D^*(R_p, R_d)}^{\bar{D}} \frac{\partial q^*}{\partial R_p}(D, R_p, R_d) g(D) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} g(D) dD}}_{\text{direct effect } > 0} + \\ & \underbrace{\frac{\frac{-\partial D^*}{\partial R_p} g(D^*(R_p, R_d))}{\left[\int_{D^*(R_p, R_d)}^{\bar{D}} g(D) dD \right]^2} \int_{D^*(R_p, R_d)}^{\bar{D}} [q^*(D^*(R_p, R_d), R_p, R_d) - q^*(D, R_p, R_d)] g(D) dD}_{\text{indirect effect } < 0} \end{aligned}$$

This shows that a change in the plaintiff's recoverable cost has two effects: a *direct* effect (i.e., for a *given* set of plaintiffs), and an *indirect* effect resulting from the change in the set of plaintiffs who file an infringement claim. It follows from Proposition 3 that the direct effect is positive. However, the indirect effect is negative. To see why, note first that D^* is decreasing in R_p (as shown in the proof of Proposition 1). Moreover, it follows from expression (2) and the assumption that the hazard rate $f/(1-F)$ is increasing that $p^*(D, R_p, R_d)$ is decreasing in D . This implies that $q^*(D, R_p, R_d)$ is increasing in D and, in particular, that

$$q^*(D^*(R_p, R_d), R_p, R_d) - q^*(D, R_p, R_d) > 0$$

for any $D \in (D^*(R_p, R_d), \bar{D}]$.

Let us now consider the effect of a change in R_p on the equilibrium settlement rate. Differentiating θ^* with respect to R_d yields

$$\begin{aligned} \frac{\partial \theta^*}{\partial R_d} = & \underbrace{\frac{\int_{D^*(R_p, R_d)}^{\bar{D}} \frac{\partial q^*}{\partial R_d}(D, R_p, R_d) g(D) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} g(D) dD}}_{\text{direct effect } > 0} + \\ & \underbrace{\frac{\frac{-\partial D^*}{\partial R_d} g(D^*(R_p, R_d))}{\left[\int_{D^*(R_p, R_d)}^{\bar{D}} g(D) dD \right]^2} \int_{D^*(R_p, R_d)}^{\bar{D}} [q^*(D^*(R_p, R_d), R_p, R_d) - q^*(D, R_p, R_d)] g(D) dD}_{\text{indirect effect of ambiguous sign}} \end{aligned}$$

This shows that a change in the defendant's recoverable costs has also both a direct and an indirect effect on the settlement rate. As in the case of a change in the plaintiff's recoverable costs the direct effect is positive. However, the indirect effect is now ambiguous because the sign of $\partial D^*/\partial R_d$ is ambiguous.

We summarize the effects of recoverable costs on the equilibrium settlement rate in the following proposition.

Proposition 3. *An increase in the plaintiffs' (defendants') recoverable costs has two effects on the settlement rate: a direct effect, i.e. for a fixed set of filed claims, which is negative, and an indirect effect, resulting from the change in the number of claims, which is positive (ambiguous).*

This proposition implies in particular that the overall effects of R_p and R_d on the settlement rate are ambiguous in general.

Let us now turn to the effect of the plaintiff's size on the impact of a change in R_p on the settlement rate. Denoting

$$\theta^*(R_p, R_d | s) = \frac{\int_{D^*(R_p, R_d)}^{\bar{D}} q^*(D, R_p, R_d) g(D|s) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} g(D|s) dD}$$

the settlement rate for plaintiffs of a given size s , we have

$$\begin{aligned} \frac{\frac{\partial \theta^*(R_p, R_d | s)}{\partial R_p}}{\theta^*(R_p, R_d | s)} &= \frac{\int_{D^*(R_p, R_d)}^{\bar{D}} \frac{\partial q^*}{\partial R_p}(D, R_p, R_d) g(D|s) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} q^*(D, R_p, R_d) g(D|s) dD} + \\ &\quad \frac{\frac{-\partial D^*}{\partial R_p} g(D^*(R_p, R_d) | s) \int_{D^*(R_p, R_d)}^{\bar{D}} [q^*(D^*(R_p, R_d), R_p, R_d) - q^*(D, R_p, R_d)] g(D|s) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} g(D|s) dD \int_{D^*(R_p, R_d)}^{\bar{D}} q^*(D, R_p, R_d) g(D|s) dD} \end{aligned}$$

which can be rewritten as

$$\begin{aligned} \frac{\frac{\partial \theta^*(R_p, R_d | s)}{\partial R_p}}{\theta^*(R_p, R_d | s)} &= \underbrace{\frac{\int_{D^*(R_p, R_d)}^{\bar{D}} \frac{\partial q^*}{\partial R_p}(D, R_p, R_d) g(D|s) dD}{\int_{D^*(R_p, R_d)}^{\bar{D}} q^*(D, R_p, R_d) g(D|s) dD}}_{\text{direct effect}} + \\ &\quad \underbrace{\frac{\partial D^*}{\partial R_p} \left[\frac{g(D^*(R_p, R_d) | s)}{1 - G(D^*(R_p, R_d) | s)} - q^*(D^*(R_p, R_d), R_p, R_d) \frac{g(D^*(R_p, R_d) | s)}{\int_{D^*(R_p, R_d)}^{\bar{D}} q^*(D, R_p, R_d) g(D|s) dD} \right]}_{\text{indirect effect}} \end{aligned}$$

The way this expression depends on the plaintiff's size s is ambiguous in general. To see why, notice that the indirect effect does not depend only on the hazard rate $g(D|s) / (1 - G(D|s))$ (which decreases with s) but also on $g(D|s)$. Since $\partial g(D|s) / \partial s$ cannot be the same for all $D \in [\underline{D}, \bar{D}]$,¹⁵ the indirect effect is ambiguously affected by the plaintiff's size.¹⁶

A similar reasoning applies if we consider the effect of the defendant's recoverable cost R_d . We therefore get the following result:

¹⁵This follows from the fact that $\int_{\underline{D}}^{\bar{D}} g(D|s) dD = 1$ for any $s \in [\underline{s}, \bar{s}]$.

¹⁶For the same reason, the impact of the plaintiff's size on the direct effect is also ambiguous.

Proposition 4. *The effect (in relative terms) of a change in recoverable costs on the settlement rate is ambiguously affected by the plaintiff's size.*

Since implementing a (binding) costs cap amounts to reducing the recoverable costs for both the plaintiff and the defendant, we can derive from Propositions 1 to 4 the following theoretical predictions that can be tested with our data:

Prediction 1. *The effect of the costs cap on the number of claims filed is ambiguous. However, any effect of the costs cap on the number of claims filed is stronger for smaller IP holders.*

Prediction 2. *The effect of the costs cap on the settlement rate is ambiguous. Moreover, this effect depends ambiguously on the plaintiff's size.*

4 Data

This section describes the detailed information collected from from physical IP case court records at the IPEC and the PHC/HC for 2007-2013.

4.1 PCC/IPEC

We collected information on all IP cases filed at the IPEC for the entire period 2007-2013. In order to do this, we compiled the physical IPEC court records/files and associated information for all cases filed 2007-2013, extracted the relevant information, and compiled it into a single database. Because the record keeping at the IPEC is largely paper-based, there are a very small number of cases for which we were unable to obtain any information except for the case number. Nonetheless, we are confident that we have collected information on every possible physical IPEC case file for 2007-13. We double checked our data in September 2014 with the available IPEC judgments for 2007-2013 online (via court document repository BAILII); reassuringly, we did not find any cases that we did not already have a record of from our search of the physical files (for more details on the data collection see appendix D).

For IPEC cases, the information that we collected for all types of IP contains detailed information on the start date of the case, the initial and counter claims (infringement, revocation etc.), the names of the litigating parties, information on the relevant IP right (including patent numbers, trademark numbers etc.), and the outcomes of the cases. We also gathered information on whether cases were transferred from the IPEC to the PHC/HC or vice versa to analyze any potential spillover effects of the reform on the PHC/HC. These data were collected during the period September 2013-July 2014 and are up to date in terms of outcomes (decided cases, settlements etc.) up to July 2014.

4.2 PHC/HC

In contrast with the IPEC records from 2007-2013, the PHC/HC IP case files are not held in a unique location, but are shuffled within the general Chancery section that hears a large range of claims, including insolvency claims, business and property disputes etc. There is no list of IP-specific case numbers which are attributable to the various IP Chancery cases.

In order to identify IP cases, we had to physically go through each of the estimated 5,000 Chancery Division case files for each year, one-by-one, to check if it is an IP-related claim or another Chancery matter. For the PHC patent cases, we collected the same set of information as in the case of the IPEC for all PHC patent cases filed 2007-2013. However, to keep the data collection manageable, for the other types of IP rights (copyright, designs, database rights, and trademarks), we collected information only on basic case characteristics, such as the names of the parties, filing date, claims, etc. (see appendix D).

Note that court records for patent cases were available for the entire 2007-2013 period, whereas for all other IP rights, court records were only available for the period 2009-2013.¹⁷ Regarding the patent data, there is a caveat for 2007, however. According to the U.K. Courts & Tribunals Service (HMCTS) some 2007 Chancery files were destroyed in a fire during 2008. As a result our PHC numbers for 2007 have to be treated cautiously as it is likely some PHC claims were destroyed before we could examine them. That said, it is reasonable to assume that files were randomly destroyed by the fire and hence it should not necessarily affect case characteristics in 2007 (including case outcomes). Similar to the IPEC data collection, we undertook a number of checks to ensure the completeness of the patent data which are described in appendix D.

4.3 Firm-level data

We obtained the names of all litigating parties from the court records as described above. We first cleaned and standardized these names as they often appear in different ways on different court records. In a second step we classified litigants into 3 categories: (i) companies, (ii) individuals, and (iii) government, universities, and not-for-profit entities. In a third step, we identified non-U.K. litigants where possible (e.g. through information available in the court records, or corporate designators such as ‘inc’). Finally, we searched for all U.K. companies on Companies House’s online [WebCheck](#) as well as Bureau van Dijk’s FAME database. We obtained basic information on companies from Companies House (SIC code, incorporation date, current status etc.) and detailed financials from FAME (assets, turnover, employees etc.). The combination of information from Companies House and financials from FAME allowed us to classify companies into size categories (micro/SME, large).¹⁸ We also used the firm-level information in combination with additional information from web-searches to consolidate litigants at the business group level. This avoids double-counting litigants when for example the U.K. subsidiary appears as a plaintiff together with the U.S. holding company. Finally, using the matched firm-level data as well as information from court records, we determined whether litigants were based in the U.K., elsewhere in Europe, or outside of Europe.

¹⁷The pre-2009 files had been moved into external storage where they could not be retrieved.

¹⁸We follow the standard [EU definition](#), which relies on information on a firm’s number of employees, turnover, and total assets.

5 Empirical analysis

5.1 Case counts

Table 1 shows the total case counts by IP right for the IPEC as well as the PHC/HC during the period 2007-2013.¹⁹ The largest number of cases concerns trade mark/passing off claims (332 cases) followed by copyright (245) and design (159) cases. Regardless of the type of IP, there is a notable jump in case numbers that occurs between 2010 and 2011 which coincides with the introduction of the costs cap in October 2010. It is tempting to conclude from these figures that case numbers for all IP rights have substantially increased at the IPEC as a result of the costs cap. However, the corresponding figures for the PHC/HC caution against hasty conclusions. As expected, for all IP rights (except designs), total case counts are significantly larger than at the IPEC. For some IP rights, in particular patents, we also see large increases in case counts between 2010 and 2011. Patent case counts increased between 2010 and 2011 by 97%. Case counts for other IP rights, however, increased only moderately or even dropped. In fact, if we take all IP rights into account, total case counts at the IPEC increased by nearly 50% and at the PHC/HC by only 11% between 2010 and 2011. This suggests on the one hand that the costs cap has led to a large increase in case filings at the IPEC, on the other, it also suggests that factors other than the IPEC reforms might have affected specifically patent case filings during the critical time period.

Table 1: PCC/IPEC an PHC/HC case counts, 2007-2013

Year	Patent		Trade mark		Design		Copyright		Database		Total	
	IPEC	PHC	IPEC	HC	IPEC	HC	IPEC	HC	IPEC	HC	IPEC	HC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2007	5	30	3		3		8		0		19	30
2008	4	64	14		3		29		0		50	64
2009	8	43	61	63	15	14	28	54	2	4	114	178
2010	8	44	43	105	17	41	33	68	2	16	103	274
2011	25	87	51	101	26	21	48	74	3	21	153	304
2012	22	84	76	94	37	13	41	50	1	7	177	248
2013	17	56	84	58	44	19	58	69	4	6	207	208
Total	89	408	332	421	159	108	245	315	12	54	823	1,306

Notes: Note: For PHC/HC no data available for trade marks, design, copyright, and database rights prior to 2009; trade mark case count includes passing-off claims; design cases includes registered and unregistered design rights. Copyright case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited).

Figure 1 investigates this issue further. It plots all cases by filing date of the claim over time (in quarterly intervals). Since we only possess data on patent cases at the PHC/HC

¹⁹We exclude SCT cases throughout our analysis as they differ substantially in observable and presumably unobservable characteristics from the main IPEC multi-track cases. For the same reason we also exclude all copyright cases filed by the music licensing company PPL (Phonographic Performance Limited) at both the IPEC and PHC/HC. These cases account for the large majority of copyright cases at the PHC. Note also that as explained in appendix D.2, for the PHC we only have data for the entire 2007-2013 period for patents. For all other IP rights, our PHC/HC data are limited to 2009-2013.

before 2009, we only show PHC/HC case counts from 2009 onward (see also Table A-1 in the appendix).²⁰ The vertical line represents the introduction of the costs cap in October 2010. We see a clear increase in filings at the IPEC during the quarter following the introduction of the costs cap and a continued increase in case filings over the remainder of the time period for which we have data. This finding is in-line with the evidence we gathered from qualitative interviews and surveys where respondents indicated that they regarded the costs cap as the key reform. That said, Figure 1 also shows an increase in case filings at the PHC during the second quarter of 2011. We know from Table 1 that this increase was mainly due to an increase in patent filings. This could imply that the increase at the IPEC was to some extent the result of a general trend towards more patent case filings.²¹ Nonetheless, a crucial point can be observed: the average growth rate of case filings during the first three quarters of 2011 is zero at the PHC/HC whereas it is over 35% at the IPEC. In other words, the IPEC saw substantial growth in case filings following the introduction of the costs cap even when compared to the PHC/HC.

As mentioned above, we have data on patent cases at both courts for the entire 2007-2013 period. Figure A-3 in the appendix shows the number of patent cases (by filing date of the claim form) by quarter. The figure shows a clear difference in the levels of patent litigation at the PHC and the IPEC. We see a noticeable increase in patent cases following the introduction of the costs cap in October 2010 (from 2 case filings in the last quarter of 2010 to 6 in the first quarter of 2011). However, as noted above, case counts at the PHC also increased substantially between October 2010 and early 2011 (from 10 cases in the last quarter of 2010 to 22 in the second quarter of 2011). Nonetheless, as stated above, it is likely the PHC litigation rate increased due to additional factors, such as generally increased litigation in information and communication technologies (for example Nokia filed 4 cases in the first half of 2011 compared to just 1 case in the first half of 2010).²²

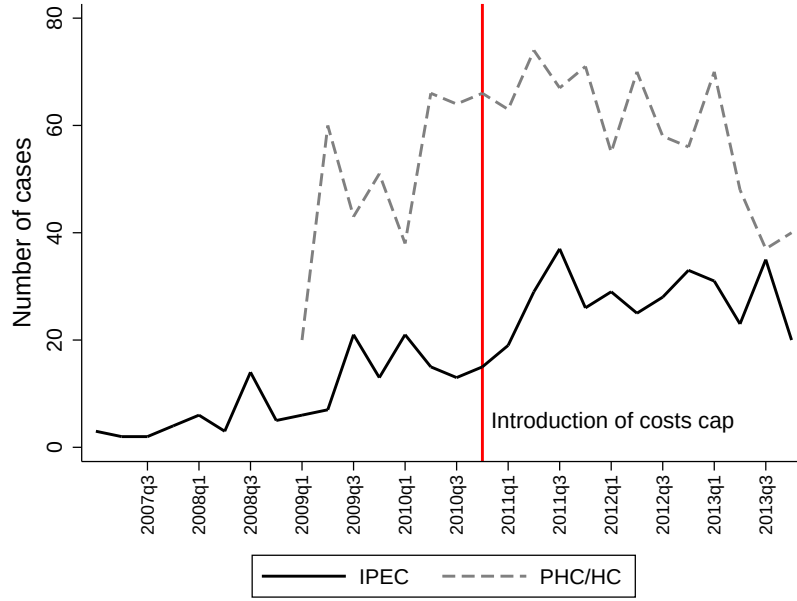
Examining this issue in further detail and in order to test theoretical Prediction 1, Table 2 shows regression results from OLS regressions where we regress the total number of cases by month on a dummy (0/1) variable that is equal to one for all cases heard at the IPEC (*IPEC*) – a dummy variable that indicates when the costs cap was introduced at the IPEC (*Postreform*) which is equal to one from October 2010 onward and their interaction

²⁰Note that for this figure, we drop all cases at the IPEC and PHC (patents) that were dropped by the plaintiff or for which only the claim form but no response by the defendant was filed – which are also the data used in our settlement analysis in Section 5.2 in accordance with our theoretical analysis in Section 3.

²¹There is a possibility that the IPEC reforms immediately pushed high value and highly complex IP cases into the PHC rather than the IPEC. However, given the relatively low rate of patent litigation at the PCC prior to the reforms coming into force, it seems unlikely that this effect would be large enough to explain the large increase in case filings at the PHC after the IPEC reforms set in. Moreover, Figures A-1 and A-2 in the appendix show actual case transfers between the two venues before and after the reforms. As shown in Figure A-1, the absolute number of cases transferred out of the IPEC to the PHC/HC is negligible and the number of cases transferred from the PHC/HC to the IPEC is also very low, especially in the period following the reforms compared to overall case counts. This is reflected in the share of cases transferred from the PHC/HC to the IPEC shown in Figure A-2. The share decreases from an average of 14.5% before the introduction of the costs cap to 8.1% following the reform. Therefore, there is no evidence for any significant increase in transfers immediately following the reforms either from the IPEC to the PHC/HC or vice versa.

²²It is possible that the PHC patent case count is a poor control because different factors affect litigation in both courts. It is possible that the factors that have led to the large increase in patent case filings at the PHC did not affect the IPEC to the same extent and hence the increase observed at the IPEC can in fact be largely attributed to the reforms. If this is indeed the case, we would *underestimate* the increase in case filings at the IPEC due to the introduction of the costs cap.

Figure 1: Comparison IPEC-PHC/HC: all cases



Note: Copyright case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited).

($IPEC \times Postreform$). The coefficient on the interaction term captures the differential effect of the costs cap on case filings at the IPEC. Note that in general it is impossible to assess changes in plaintiffs' propensity to file a claim with the court because this would require information not only on observed court cases but also the total underlying legal disputes (i.e. court cases plus disputes that never make it to court). However, in our setting we are able to identify a change in the filing propensity because we identify it off changes in the number of cases filed at the IPEC following the introduction of the costs cap relative to changes in the number of cases filed at the PHC/HC. This is a distinct advantage of our quasi-experimental setting over analysis relying on purely observational data.

We begin by showing simple before-and-after comparisons for both the IPEC and PHC/HC in columns (1) and (2). In both cases, we see a positive coefficient on the *Postreform* dummy variable, which implies that the number of cases increased at both the IPEC and the PHC/HC following the reforms. In column (3) we use both the IPEC and PHC/HC data and add monthly fixed effects as well as dummy variables for the different types of IP rights (patents, trademarks, copyright, registered designs, database rights). The PHC/HC data controls for any unobservable confounding factors that could have affected IP litigation in the U.K. more generally and hence allow us to isolate the impact of the costs cap on case counts. In column (3) we observe a large negative and statistically significant coefficient on the IPEC dummy which reflects the level differences in litigation shown in Figure 1. The *Postreform* dummy is positive but not statistically significant. The coefficient on the interaction term $IPEC \times Postreform$ is positive, but small in magnitude and not statistically significantly different from zero. This means that there has been no overall increase in case filings at the IPEC as a reaction of the introduction of the costs cap. However, in columns

(4)-(6) we distinguish between cases where the plaintiff/defendant is a SME. If multiple parties appear as plaintiff/defendant, we classify the plaintiff/defendant as large if at least one party is a large firm.²³ If we split the sample into cases with a SME plaintiff/defendant and all other cases in column (4), we find a large positive coefficient on the interaction term that is statistically significant; it suggests that the number of cases that were brought before the IPEC that involve SMEs has increased significantly following the reforms, even relative to the PHC/HC. Proposition 2 derived above focused on the effect of the size of the plaintiff on the number of claims filed. The corresponding empirical results are shown in column (5) where we look specifically at cases with SME plaintiffs. We see again a positive coefficient on the interaction term which indicates that the number of cases that involves SMEs as plaintiffs has increased following the introduction of the costs cap. Moreover, neither the coefficient on the IPEC dummy variable nor on the postreform dummy variable are statistically significant. These findings support our model's prediction that the impact of the costs cap is greater on smaller plaintiffs. Finally, column (6) focuses on SME defendants, where we again see a positive coefficient on the interaction term.

5.2 Settlements

In this section, we investigate any potential changes to the settlement rate following the introduction of the costs cap. To do this, we estimate the following probit regression at the case-level:

$$settle_{it} = \beta_0 + \beta_1 IPEC_i + \beta_2 Postreform_t + \beta_3 IPEC_i \times Postreform_t + \gamma X_{it} + \delta_t + \varepsilon_{it} \quad (4)$$

where $settle_{it}$ denotes whether case i filed in quarter t was settled (the variable is equal to one if the case was settled),²⁴ $IPEC_i$ denotes whether case i was brought before the IPEC (the variable is equal to one if the case was brought before the IPEC and zero if it was brought before the PHC), and $Postreform_t$ is equal to one after the introduction of the costs cap in October 2010. The specification in (4) contains also a large number of case- and litigant-level, as well as IP right specific characteristics X_{it} to account for observable heterogeneity among cases (for details see appendix E). Note that the sample of cases at the PHC is limited to patent cases since we were unable to collect detailed information on case outcomes for all other IP rights at the HC. For the settlement analysis, we restrict the sample to cases that involve at least one corporate party. Further, we drop all cases at the IPEC and PHC that were dropped by the plaintiff, for which only the claim form but no response by the defendant was filed, or which were still pending in first instance.

Before discussing the results, Table A-2 in the appendix shows a comparison of means of a number of case and litigant characteristics as well as settlements between cases at the IPEC and the PHC. First, there are no significant differences in settlements between the two courts, regardless of whether we include all IP cases at the IPEC or limit the sample to patent cases. Second, PHC patent cases differ significantly in many ways from cases heard at the IPEC. IPEC cases are more likely to have been transferred to the IPEC (from local courts),

²³The most common case is that a subsidiary and its holding company appear together before the court. Note that the sample in columns (4)-(6) consists only of companies which excludes a small number individual plaintiffs and defendants, institutions, universities, and government bodies.

²⁴Note that our results are robust to the choice of time interval for our analysis, i.e., by quarter or year.

Table 2: IPEC and PHC/HC: total number of court cases by month, 2009-2013

	<u>IPEC</u>	<u>PHC/HC</u>	<u>IPEC & PHC/HC</u>			
	All litigants			SME		
				All	Plaintiff	Defendant
	(1)	(2)	(3)	(4)	(5)	(6)
IPEC			-0.575*** (0.170)	-0.405*** (0.142)	-0.301 (0.212)	-0.429*** (0.159)
Postreform	0.557*** (0.150)	0.229** (0.113)	0.546 (0.377)	-0.106 (0.373)	-0.449 (0.416)	0.045 (0.412)
IPEC×Postreform			0.205 (0.187)	0.409** (0.173)	0.584** (0.239)	0.369* (0.185)
IP type FE	NO	NO	YES	YES	YES	YES
Month FE	NO	NO	YES	YES	YES	YES
R2	0.241	0.078	0.745	0.669	0.557	0.644
Number obs.	60	60	120	120	120	120

Notes: OLS regression. Dependant variable $\log(\text{number of cases by month} + 1)$. All regressions include a constant. Time period for all IP is 2009-2013 because no data are available for trademarks, design, copyright and database rights at the PHC/HC prior to 2009; data for patent cases for 2007-2013; trademark case count includes passing-off claims; design cases includes registered and unregistered design rights. Case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). IP type FE: dummy variable for each type of IP right (patent, trademark, copyright, registered design, database). Robust standard errors. * significant at 10%, ** at 5%, *** at 1%.

infringement claims are a lot more frequent at the IPEC, litigants are more often U.K. based companies and a lot more likely to be SMEs. These differences are to be expected given the different mandates of the two courts. In other words, Table A-2 confirms that cases at the IPEC involve a lot more U.K. SMEs than cases at the PHC. This suggests that controlling for observable case and litigant characteristics is important in the estimation of equation (4). That said, there are no differences in average settlement shares between the two courts over the entire sample period.

Tables 3 and 4 show the results where we report marginal effects for our probit estimates (for descriptive statistics see Tables A-3 and A-4 in the appendix). In Table 4 we restrict the sample to cases that involve SMEs, whereas in Table 3 we use all available cases. In columns (1)-(3) of Table 3 we use data on all IP cases at the IPEC and patent cases at the PHC. We add more case, litigant, and IP level control variables (appendix E contains a detailed description of each variable). We see that regardless of the specification, the $IPEC_i \times Postreform_t$ interaction term is negative but not statistically significant. In columns (4)-(6) we restrict the sample at the IPEC to patent cases. This makes IPEC cases slightly more comparable in terms of observable characteristics to the PHC control sample (see Table A-2 in the appendix). Moreover, one might also expect the costs cap to be more binding for patent cases which tend to be more expensive than other IP cases due to increased underlying technological complexity. However, the estimates on the interaction term are still insignificant at reasonable significance levels. Next, in Table 4, we focus on cases that involve SMEs as plaintiff and/or defendant. Here we see that the coefficient on the interaction term is still negative but now statistically significant (except for column (1)) regardless of whether we include all IP cases or only patent cases at the IPEC. This suggests that the introduction of a costs cap and hence the shift away from the English towards the American rule has led to a decrease in settlements. This empirical finding supports the fact that the indirect effect on the settlement rate we identified in our theoretical analysis is significant enough to outweigh the direct effect emphasized in the existing literature.

There is a concern that the settlement rate might be upward biased during the last few quarters of the sample period due to pending cases. That is, if pending cases are less likely to settle, having more pending cases in the sample will lead to a seemingly higher settlement rate. In the case of the IPEC, this effect would work in the opposite direction of the effect found in Tables 3 and 4, and hence imply that we underestimate the negative effect. However, in the case of the PHC, this effect could mean that we overestimate the negative IPEC effect relative to the PHC – the settlement rate at the PHC would increase relative to the IPEC. To investigate these concerns, Tables A-5 and A-6 in the appendix show results when we drop all cases filed in 2013, as they are the ones most likely to be pending at the time the data were collected. The results are very similar to those shown in Tables 3 and 4 and in fact suggest that we might have underestimated the negative effect of the shift from the English towards the American rule on settlements.

6 Conclusion

This paper contributes to the theoretical and empirical literature on the effect of fee shifting in civil litigation. We first develop a theoretical model to analyze the effect that fee shifting rules have on IP holders' decisions to file suit. Our analysis expands on existing models in

Table 3: IPEC and PHC: settlement decision by quarter, 2007-2013

	All IP			Patents		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Costs cap</i>						
IPEC	-0.022 (0.084)	-0.052 (0.085)	-0.141 (0.086)	-0.059 (0.166)	-0.056 (0.162)	-0.089 (0.158)
Postreform	0.297 (0.235)	0.288 (0.237)	0.252 (0.236)	0.998*** (0.001)	0.999*** (0.001)	0.999*** (0.002)
IPEC×Postreform	-0.087 (0.077)	-0.087 (0.076)	-0.112 (0.080)	-0.191 (0.191)	-0.201 (0.187)	-0.281 (0.182)
<i>Case characteristics</i>						
Case transferred	0.068 (0.050)	0.076 (0.050)	0.063 (0.050)	0.048 (0.141)	0.049 (0.139)	-0.003 (0.050)
ln case value	0.030 (0.021)	0.031 (0.021)	0.028 (0.021)	0.018 (0.046)	0.028 (0.046)	0.052 (0.045)
Infringement claim		-0.016 (0.071)	0.025 (0.077)		-0.014 (0.101)	-0.265*** (0.041)
Invalidity claim		-0.103 (0.079)	-0.049 (0.079)		-0.102 (0.107)	-0.324*** (0.081)
<i>Litigant characteristics</i>						
Plaintiff SME	-0.078** (0.039)	-0.070 (0.043)	-0.094** (0.045)	0.107 (0.064)	-0.065* (0.039)	-0.069 (0.076)
Defendant SME	0.119*** (0.036)	0.088** (0.039)	0.080** (0.040)	0.098* (0.056)	0.099** (0.036)	-0.013 (0.073)
Plaintiff Europe		0.054 (0.051)	0.053 (0.053)		0.061 (0.046)	0.080 (0.062)
Plaintiff World		0.040 (0.046)	0.007 (0.050)		0.051 (0.042)	0.021 (0.064)
Defendant Europe		-0.079 (0.068)	-0.089 (0.068)		-0.077 (0.066)	-0.144* (0.077)
Defendant World		-0.086 (0.065)	-0.102 (0.068)		-0.144** (0.065)	-0.118* (0.073)
NPE		0.043 (0.069)	-0.108 (0.088)		0.038 (0.059)	-0.094 (0.095)
IP characteristics	NO	NO	YES	NO	NO	YES
Technology FE	NO	NO	YES	NO	NO	YES
IP type FE	YES	YES	YES	NA	NA	NA
Quarter FE	YES	YES	YES	YES	YES	YES
Pseudo R2	0.071	0.080	0.128	0.120	0.147	0.236
Number obs.	884	884	884	386	386	386

Notes: Probit regression. Marginal effects reported. Dependant variable equal to one if case settled. All regressions include a constant. Time period is 2007-2013; PHC/HC data contain only patent cases; IPEC trademark case count includes passing-off claims; IPEC design cases includes registered and unregistered design rights. Case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). IP type FE: dummy variable for each type of IP right (patent, trademark, copyright, registered design, database). IP characteristics not reported include: patents – patent and non-patent backward citations, forward citations (in first 3 years), number of International Patent Classification (IPC) subclasses, patent family size, and a dummy variable equal to one if EP patent; trademarks – dummy variables equal to one if registered community, U.K., or Madrid (WIPO) trademark filing litigated, omitted category is unregistered trademark/passing off; design rights – dummy variables equal to one if registered community or U.K. design right litigated, omitted category is unregistered design. Regressions include a dummy variable equal to one if the case value is missing and a dummy variable equal to one if no patent information is available for a patent case. Technology effects for patent cases include indicators for each main technology area (electrical engineering, instruments, chemistry, mechanical engineering, other). Robust standard errors clustered at the case-level. * significant at 10%, ** 5%, *** at 1%.

Table 4: IPEC and PHC: settlement decision by quarter – only cases involving SMEs, 2007-2013

	All IP			Patents		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Costs cap</i>						
IPEC	-0.034 (0.100)	-0.015 (0.106)	-0.001 (0.113)	-0.004 (0.156)	0.028 (0.152)	0.108 (0.092)
Postreform	-0.863*** (0.061)	-0.850*** (0.068)	-0.768*** (0.117)	0.535* (0.291)	0.142 (0.366)	0.880*** (0.148)
IPEC×Postreform	-0.179 (0.116)	-0.230* (0.116)	-0.392*** (0.117)	-0.456** (0.224)	-0.539** (0.118)	-0.934*** (0.081)
<i>Case characteristics</i>						
Case transferred	0.046 (0.054)	0.051 (0.054)	0.055 (0.054)	0.051 (0.143)	0.066 (0.142)	0.029 (0.090)
ln case value	0.028 (0.023)	0.033 (0.023)	0.030 (0.024)	0.127* (0.065)	0.148** (0.063)	0.055 (0.043)
Infringement claim		-0.105 (0.084)	-0.073 (0.094)			0.088 (0.170)
Invalidity claim		0.002 (0.116)	0.033 (0.119)			-0.032 (0.152)
<i>Litigant characteristics</i>						
Plaintiff SME	-0.087* (0.049)	-0.079 (0.054)	-0.079 (0.056)	0.102 (0.114)	0.133 (0.122)	0.338*** (0.140)
Defendant SME	0.104* (0.057)	0.103* (0.060)	0.098* (0.060)	0.012 (0.115)	-0.027 (0.139)	0.122 (0.137)
Plaintiff Europe		-0.033 (0.091)	-0.139 (0.110)		0.087 (0.105)	-0.121 (0.141)
Plaintiff World		0.087 (0.068)	0.082 (0.073)		0.121 (0.104)	0.088 (0.051)
Defendant Europe		-0.178 (0.134)	-0.166 (0.143)		-0.181 (0.154)	-0.045 (0.117)
Defendant World		0.008 (0.118)	0.019 (0.123)		-0.012 (0.148)	0.009 (0.088)
NPE		-0.012 (0.158)	-0.089 (0.199)		-0.202 (0.218)	-0.666** (0.258)
IP characteristics	NO	NO	YES	NO	NO	YES
Technology FE	NO	NO	YES	NO	NO	YES
IP type FE	YES	YES	YES	NA	NA	NA
Quarter FE	YES	YES	YES	YES	YES	YES
Pseudo R2	0.096	0.104	0.139	0.132	0.167	0.335
Number obs.	552	552	552	123	123	123

Notes: Probit regression. Marginal effects reported. Dependant variable equal to one if case settled. All regressions include a constant. Time period is 2007-2013; sample contains only cases involving at least one SME as either plaintiff or defendant or both; PHC/HC data contain only patent cases; IPEC trademark case count includes passing-off claims; IPEC design cases includes registered and unregistered design rights. Case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). IP type FE: dummy variable for each type of IP right (patent, trademark, copyright, registered design, database). IP characteristics not reported include: patents – patent and non-patent backward citations, forward citations (in first 3 years), number of International Patent Classification (IPC) subclasses, patent family size, and a dummy variable equal to one if EP patent; trademarks – dummy variables equal to one if registered community, U.K., or Madrid (WIPO) trademark filing litigated, omitted category is unregistered trademark/passing off; design rights – dummy variables equal to one if registered community or U.K. design right litigated, omitted category is unregistered design. Regressions include a dummy variable equal to one if the case value is missing and a dummy variable equal to one if no patent information is available for a patent case. Technology effects for patent cases include indicators for each main technology area (electrical engineering, instruments, chemistry, mechanical engineering, other). Robust standard errors clustered at the case-level. * significant at 10%, ** at 5%, *** at 1%.

two respects. First, rather than modeling the decisionmaking process of a single plaintiff, we model the effect of fee shifting rules on a set of heterogeneous potential plaintiffs. Second, rather than studying just the American and English rules, we study a series of cost recovery rules, including a regime that places a cap on the amount of costs that a party may recover. Importantly, our analysis reveals a new source of ambiguity not included in prior models: the effect that a change in cost recovery rules has, not just on individual plaintiffs, but also indirectly on the set of plaintiffs. Taking these novel considerations into account, our model suggests that the net effect of fee shifting on the incentives to file a claim and the settlement rate are ambiguous. We also analyze how the impact of fee shifting depends on the plaintiff's size. More precisely, we show that the effect on the number of claims decreases with the plaintiff's size while the effect on the settlement rate is ambiguously affected by the plaintiff's size.

Next, relying on a recent reform of rules for awarding fees in IP suits brought in the U.K. we present an empirical analysis of the effect of fee shifting. Our analysis takes advantage of the introduction of a cap on the amount of costs recoverable in suits litigated in the U.K.'s Patents County Court. We study a set of more than 2,000 IP cases filed between 2007 and 2013 in either the PCC or the High Court, which does not employ a costs cap. Our findings, which use data from the HC to control for unobservable time-varying factors, suggest that the introduction of a costs cap at the PCC increased the number of suits filed in that court but decreased the settlement rate, particularly in cases involving SMEs. The former finding, but not the latter, is consistent with conventional wisdom in the existing theoretical literature.

In addition to underscoring the need for further theoretical and empirical research in this area, our findings are directly relevant to a number of legal developments unfolding across the globe. In the U.S. policymakers have on several occasions in recent years considered legislation that would make two-way fee awards routine in patent suits. In addition, U.S. policymakers have recently considered establishing one or more venues modeled after the PCC for litigating relatively small patent and copyright claims. Finally, despite being home to the "American Rule," the U.S. legal system has already adopted a variety fee shifting rules applicable in certain jurisdictions or in cases enforcing certain statutory or constitutional rights. Important civil litigation reforms are underway in Europe as well, particularly in the arena of IP enforcement. Europe stands on the precipice of establishing a Unified Patent Court that would drastically decrease the cost of enforcing patent rights across the continent and, moreover, place caps on the recovery of litigation expenses much like current practice in the IPEC. Our findings suggest that policymakers should, among other considerations, pay particular attention to the effect that such reforms may have on SMEs. A future shift toward the English Rule in the U.S. may well reduce the overall rate of patent litigation, including the number of weak suits filed by patent "trolls," but may also do so at the expense of SMEs' ability to enforce legitimate patent rights. If so, the creation of "small claims" options for IP assertion may be able to offset this effect. Conversely, our findings also suggest that the use of costs caps in a European Unified Patent Court may well increase the overall rate and complexity of patent litigation, but in the process may open the courthouse door for many SMEs that previously found patent assertion prohibitively costly.

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A Appendix: Legal background

A number of key aspects of the procedures of the IPEC and the PHC/HC are described here in order to give more information about the legal background of the reforms:

Disclosure: Within the PHC/HC there is a wide-ranging disclosure requirement under the Civil Procedure Rules parts 31-35, which is on-going throughout the duration of the case, and gives parties the ability to inspect documents belonging to the other side, perform experiments, call expert witnesses and to engage in extensive cross-examination. These requirements were present at the pre-reform PCC as well - however, post-reforms, in line with the active case management (ACM) that now takes place at the IPEC – which includes the limiting of claims/submissions – both the requirement of disclosure and the use of expert evidence are now much more limited at the IPEC level than at the PHC/HC level. This represents a profound change from the pre-2010 situation. Interestingly, in October 2015 the PHC began a two-year trial run of a 'Shorter Trial Scheme' which allows for disclosure and submissions to be limited along the lines of IPEC trials ([Practice Direction 51N – Shorter and Flexible Trials Pilot Schemes](#)). - at time of writing it was not possible to assess the success, or not, of this trial, which falls outside of the period of our study.

Appellate Structure: Where permission is granted, appeals from the PHC/HC are heard at the Court of Appeal, where the costs of litigation can easily reach the same level as the PHC. Meanwhile, depending on the nature of the order being appealed, the destination of an appeal from the multi-track of the IPEC is either the Court of Appeal or the PHC/HC - final orders are appealed to the Court of Appeal whereas interim orders are appealed to the PHC/HC ([HMCTS, The Intellectual Property Enterprise Court Guide, July 2016](#)). IP case appeals from the IPEC to the Court of Appeal are rare due to the cost involved (if parties have chosen the IPEC due to its limited costs structure, they are rarely willing to spend hundreds of thousands of pounds appealing the initial ruling at the Court of Appeal). Moreover, appeals are much more likely in complex cases i.e. cases suited to the PHC/HC, not the IPEC. Finally, the destination of an appeal from a decision on the IPEC small claims track is to the IPEC multi-track judge.

Remedies: All the remedies available in the PHC/HC are available in the IPEC multi-track including preliminary and final injunctions, damages, accounts of profits, delivery up, disclosure, search and seizure and asset freezing. In other words, there are no differences in the remedies each court can award (apart from the damages cap, which restricts the level of damages available at the IPEC). However, the remedies available in the IPEC small claims track are more limited - it has the power to order final injunctions, and final damage awards, but it does not have the power to issue preliminary injunctions, search and seizure orders or asset freezing orders.

Case transfers: With respect to the relationship between the IPEC and the PHC/HC, the various jurisdictional changes in place at the IPEC between the period of our study – 1 January 2007-31 December 2013 – are detailed below (and are further outlined below in appendix B). A key aspect of this relationship relates to transfers: the IPEC may transfer cases to the PHC/HC of its own accord (and the PHC/HC

may do likewise by transferring cases to the IPEC), in consideration of the size and resources of the parties and the value and complexity of the claim(s) (Fox, 2014: 169-172). Importantly, parties cannot contract out of the IPEC fee regime while staying within the IPEC. In this regard, if a party wants to have unlimited costs/damages then filing at the PHC is the only option. If a case is too complex for the IPEC, and thus would not work within its strict cost/case management structures, it would typically be transferred to the PHC in the above described manner.

Cost allocation: In England and Wales the substantive legal issues and the issues of costs and damages are dealt with separately, and the losing party will typically bear the brunt of the costs of the case on an issue-cost basis – the so-called ‘loser-pays rule’ (McDonagh and Helmers, 2013a). This issue-based approach works such that each party will have to pay the costs of the issues he/she lost at trial. For instance, if a patent infringement trial concludes with a two-part ruling that (i) the claimant’s patent was invalid and (ii) the defendant’s activities would have infringed the claimant’s patent if it had been valid, the claimant would have to pay the costs of the part of the trial dedicated to the validity issue, and the defendant would have to pay the costs of the part of the trial dedicated to the infringement issue.

Legal representation: At the IPEC and the PHC/HC litigants may be represented before courts by appropriately qualified and certified barristers, solicitors, patent attorneys and trade mark attorneys.²⁵ Legal representation is not required at the IPEC small claims track level, though parties are free to obtain it if they wish.

B Appendix: Summary of legal changes

The following description shows the range of rights that could be litigated at the PCC prior to September 2013 and at the IPEC post 1 October 2013. It is notable that prior to the reconstitution of the PCC as the IPEC in October 2013 the court’s ability to hear certain matters was restricted in comparison with the list of matters that could be heard at the PHC/HC during the same period. For example, its jurisdiction to hear patent matters (special) was different in form than its power to hear copyright matters (ordinary). This distinction restricted to some extent the types of remedies - such as asset freezing orders and orders for search and seizure - that were available in different types of cases (it depended on the type of jurisdiction the case fell into). One of the main reasons to highlight the information below is to emphasize that the PCC was not merely ‘re-named’ as the IPEC – the court was completely reconstituted in a manner that allows it to share jurisdiction with the PHC/HC in virtually all IP matters, as shown below.

- 1 Jan 2007-30 September 2013 - PCC Jurisdiction (County Court with split jurisdiction):
 - Patents (special jurisdiction)
 - Registered designs (U.K. and Community) (special jurisdiction)

²⁵See [Right to Conduct Litigation and Rights of Audience 2012](#).

- Copyright (ordinary jurisdiction)
- Trade marks and Passing Off (U.K. and Community) (ordinary jurisdiction- though with restrictions on invalidity actions with respect to CTMs)
- Unregistered designs (U.K. and Community) (ordinary jurisdiction)
- Databases (sui generis and Copyright)
- Ancillary matters such as Breach of Confidence - only where linked to claim within special or ordinary jurisdiction)
- 1 Oct 2013-31 December 2013 - IPEC Jurisdiction (Specialist Court within Chancery Division)
 - Patents
 - Registered designs (U.K. and Community)
 - Plant Variety rights and Semiconductor Topography rights
 - Copyright
 - Trade marks and Passing Off (U.K. and Community - though with restrictions on invalidity actions with respect to CTMs)
 - Unregistered designs (U.K. and Community)
 - Databases (sui generis and Copyright)
 - Breach of Confidence
 - Ancillary matters (including breach of contract, breach of fiduciary duty, and malicious falsehood)
- 1 January 2007-31 December 2013 - HC Jurisdiction (Chancery Division)
 - Copyright
 - Trade marks and Passing Off (including Appeals from the Comptroller of Trade Marks) (U.K. and Community - though restrictions on invalidity actions with respect to CTMs)
 - Unregistered Designs (U.K. and Community)
 - Databases (sui generis and Copyright)
 - Breach of Confidence
 - Ancillary matters (including breach of contract, breach of fiduciary duty, and malicious falsehood)
- 1 January 2007-31 December 2013 - PHC Jurisdiction (Specialist Court within Chancery Division)
 - Patents (including Appeals from the Comptroller of Patents)
 - Registered Designs (U.K. and Community) (except for Appeals from the Comptroller within jurisdiction of Registered Designs Appeal Tribunal)
 - Plant Variety Rights and Semiconductor Topography rights
 - Ancillary matters (including breach of contract, breach of fiduciary duty, and malicious falsehood)

C Appendix: Model

Proof of Lemma 2

This result follows from the fact that the function $D \rightarrow \Pi^*(D, R_p, R_d)$ is continuous and increasing. The continuity results from the differentiability of $F(\cdot)$ and $f(\cdot)$. The monotonicity of the function is established below.

Assume that D and D' are such that $\underline{D} < D < D' < \bar{D}$ and let S' be such that $\hat{p}(D', R_p, R_d, S') = p^*(D, R_p, R_d) (= \hat{p}(D, R_p, R_d, S^*(D, R_p, R_d)))$. From the fact that $\hat{p}$ is increasing in S and decreasing in D , and $D < D'$ it follows that $S' > S^*(D, R_p, R_d)$. Thus, denoting

$$\rho^* = \frac{1}{F(p^*(D, R_p, R_d))} \int_{\underline{p}}^{p^*(D, R_p, R_d)} p f(p) dp$$

we have:

$$\begin{aligned} \hat{\Pi}(D', R_p, R_d, S') &= (1 - F(p^*(D, R_p, R_d)))S' + F(p^*(D, R_p, R_d)) \times \\ &\quad [\rho^*(D' - C_p + R_p) - (1 - \rho^*)(C_p + R_d)] - c_p \\ &> (1 - F(p^*(D, R_p, R_d))S^*(D, R_p, R_d) + F(p^*(D, R_p, R_d)) \times \\ &\quad [\rho^*(D - C_p + R_p) - (1 - \rho^*)(C_p + R_d)] - c_p \\ &= \Pi^*(D, R_p, R_d) \end{aligned}$$

Since $\Pi^*(D', R_p, R_d) = \max_S \hat{\Pi}(D', R_p, R_d, S)$ then $\Pi^*(D', R_p, R_d) \geq \hat{\Pi}(D', R_p, R_d, S')$ which, combined with the inequality $\hat{\Pi}(D', R_p, R_d, S') > \Pi^*(D, R_p, R_d)$ leads to

$$\Pi^*(D', R_p, R_d) > \Pi^*(D, R_p, R_d).$$

This proves that $\Pi^*(D, R_p, R_d)$ is increasing in D . Then, defining $D^*(R_p, R_d)$ as the unique solution to $\Pi^*(D, R_p, R_d) = 0$ if $\Pi^*(\underline{D}, R_p, R_d) < 0$ and as $\underline{D}$ if $\Pi^*(\underline{D}, R_p, R_d) \geq 0$, we get that an IP holder of type D files a claim against the alleged infringer if and only:

$$D > D^*(R_p, R_d).$$

Proof of Proposition 1

Consider R_p and R'_p such that $R_p < R'_p$. Let S' be such that $\hat{p}(D, R'_p, R_d, S') = p^*(D, R_p, R_d)$. From the fact that $\hat{p}$ is increasing in S and decreasing in R_p , and $R_p < R'_p$ it follows that $S' > S^*(D, R_p, R_d)$. Thus, denoting

$$\rho^* = \frac{1}{F(p^*(D, R_p, R_d))} \int_{\underline{p}}^{p^*(D, R_p, R_d)} p f(p) dp$$

we have:

$$\begin{aligned} \hat{\Pi}(D, R'_p, R_d, S') &= (1 - F(p^*(D, R_p, R_d)))S' + F(p^*(D, R_p, R_d)) \times \\ &\quad [\rho^*(D - C_p + R'_p) - (1 - \rho^*)(C_p + R_d)] - c_p \\ &> (1 - F(p^*(D, R_p, R_d))S^*(D, R_p, R_d) + F(p^*(D, R_p, R_d)) \times \\ &\quad [\rho^*(D - C_p + R_p) - (1 - \rho^*)(C_p + R_d)] - c_p \\ &= \Pi^*(D, R_p, R_d) \end{aligned}$$

Since $\Pi^*(D, R'_p, R_d) = \max_S \hat{\Pi}(D, R'_p, R_d, S)$ then $\Pi^*(D, R'_p, R_d) \geq \hat{\Pi}(D, R'_p, R_d, S')$ which, combined with the inequality $\hat{\Pi}(D, R'_p, R_d, S') > \Pi^*(D, R_p, R_d)$, leads to

$$\Pi^*(D, R'_p, R_d) > \Pi^*(D, R_p, R_d).$$

Therefore,

$$D^*(R'_p, R_d) \leq D^*(R_p, R_d)$$

Hence, $\frac{\partial D^*}{\partial R_p} \leq 0$, which implies that

$$\frac{\partial(1 - G(D^*(R_p, R_d)))}{\partial R_p} \geq 0.$$

Consider now the effect of R_d on the number of filed claims. A similar reasoning shows that the sign of $\frac{\partial D^*}{\partial R_d}$ is the opposite of the sign of $\frac{\partial \Pi^*}{\partial R_d}$. However, the sign of the latter is generally ambiguous, which leads to the second part of the proposition.

Proof of Lemma 3

From expression (2) and the assumption that the hazard rate $\frac{f}{1-F}$ is increasing it follows that $p^*(D, R_p, R_d)$ increases in R_p and R_d . Therefore, $1 - F(p^*(D, R_p, R_d))$ decreases with R_p and R_d .

D Appendix: Data

D.1 IPEC 2007-2013

We collected information on all IP cases filed at the IPEC for the entire period 2007-13. In order to do this, we first compiled the physical IPEC court records/files and associated information for all cases filed 2007-13; secondly, we used a set of specially devised IP right-specific spreadsheets to extract and organize the relevant information gathered from these often extremely detailed and complex records; thirdly, we compiled the different files into a single database. Nonetheless, because the record keeping at the IPEC is largely paper-based, it is not uncommon for case files to be misfiled, or to go missing altogether. For this reason there are a very small number of cases for which we were unable to obtain any information except for the case number. Nonetheless, we are confident that we have examined every possible physical IPEC case file for 2007-13. To double check, in September 2014 we examined the available IPEC judgments for 2007-13 online (via BAILII); we did not find any cases that we did not already have a record of from our search of the physical files.

For IPEC cases, the information that we collected on IP cases filed 2007-13 contains detailed information on the start date of the case, the initial and counter claims (infringement, revocation etc.), the names of the litigating parties, information on the relevant IP right (including patent numbers, trademark numbers etc.), and the outcomes of the cases. We also gathered information on whether cases were transferred from the IPEC to the PHC/HC or vice versa. These data were collected during the period September 2013-July 2014 and these spreadsheets are up to date in terms of outcomes (decided cases, settlements etc.) up to July 2014.

D.2 PHC/HC

We collected the same set of information on patent cases at the PHC as for the IPEC for the entire 2007-2013 period. For all other IP rights (trademark, design, copyright, and database related disputes), we collected only the following streamlined data for all PHC/HC cases filed 2009-2013:

- Case numbers;
- Parties to the claim;
- Initial claim(s);
- Type of IP right(s) litigated – noting differences within IP rights where relevant – for instance, whether the right was a Community TM, or a U.K. TM (registered or unregistered), or a U.K. or Community unregistered/registered design right.

Similar to the IPEC data collection, we undertook a number of checks to ensure the completeness of the patent data:

- For the years 2011 and 2012, we were able to cross-reference patent cases via a list that the law firm Powell-Gilbert had provided us of case file numbers drawn from a physical search of files they had undertaken during early 2013.
- We used the Patents Court Diary in order to cross-reference the listed cases with what we found in the physical records to ensure no cases were missed.
- We liaised with HMCTS regarding their published records for the amount of PHC cases filed per year. However, on completion of the search what we found was that the published HMCTS statistics are not an accurate reflection of the amount of cases actually filed per year.
- As with the IPEC, from September-October 2014 we examined the available PHC patent judgments for 2007-13 online (via BAILII). Thus, as with the IPEC, while there are a very small number of patent PHC cases for which we are missing data, we are confident that our PHC dataset comprehensively includes all available physical and online records.

E Appendix: Variable Description

This appendix describes the construction of the variables used in our analysis.

- **Dependent variables**

- *Settlement*: the outcome of a case is coded as settlement if the court does not hand down a decision. Settlements include court settlements as well as out-of-court settlements.

- **Case characteristics**

- *Case transferred*: the variable is equal to one if a case was transferred to the PCC/IPEC from another court or cases were transferred between the PCC/IPEC and the PHC.
- *Case value*: the litigating parties specify the value of the case on the claim form.
- *Infringement claim*: the variable is equal to one if the plaintiff alleges infringement of the IP right.
- *Invalidity claim*: the variable is equal to one if the plaintiff alleges that the IP right is invalid.

- **Litigant characteristics**

- *Size*: we categorized companies according to the EU definition into four size categories using a combination of the number of employees, turnover, and total assets. If several companies from the same business group appeared as co-plaintiffs or co-defendants, we allocated the entire business group into the size category of its largest member.
- *Residence*: we identified a company's origin using information available in the court records, Bureau van Dijk's FAME and Amadeus databases, as well as web searchers. We then allocated companies into three categories: domestic (U.K.), Europe, and rest of the world.
- *Non-practicing entity (NPE)*: we identified NPEs by identifying the patent holder in each case and we then determined manually, using web searches, news reports, court filings, and the existing academic literature on NPEs and PAEs whether a patent holder was an NPE at the time of the court case. For more details see Love et al. (2016).

- **IP characteristics**

- *Forward citations (in first 3 years)*: we counted the number of patents citing the focal patent within the first three years after the earliest publication.
- *Backward citations (patents)*: we counted a patent's number of citations to other patents.
- *Backward citations (non-patent)*: we counted a patent's number of citations to non-patent literature.
- *IPC subclasses count*: we counted the number of unique IPC subclasses of the patent.
- *Family size (DOCDB)*: we counted the number of patents that belong to the same family (according to the DOCDB definition) of the patent.
- *EP patent*: we created a binary variable that indicates whether a patent is a European patent (EP).
- *Registered Community Design*: we created a binary variable that indicates whether a registered design right is a community design registered with the EU IPO.
- *Registered U.K. Design*: we created a binary variable that indicates whether a registered design right is a U.K. design registered with the U.K. IPO.

- *Registered Community Trademark*: we created a binary variable that indicates whether a registered trademark right is a community trademark registered with the EU IPO.
- *Registered UK Trademark*: we created a binary variable that indicates whether a registered trademark right is a U.K. trademark registered with the U.K. IPO.
- *Madrid Trademark*: we created a binary variable that indicates whether a registered trademark right was filed via WIPO (the Madrid system).

F Appendix: Figures

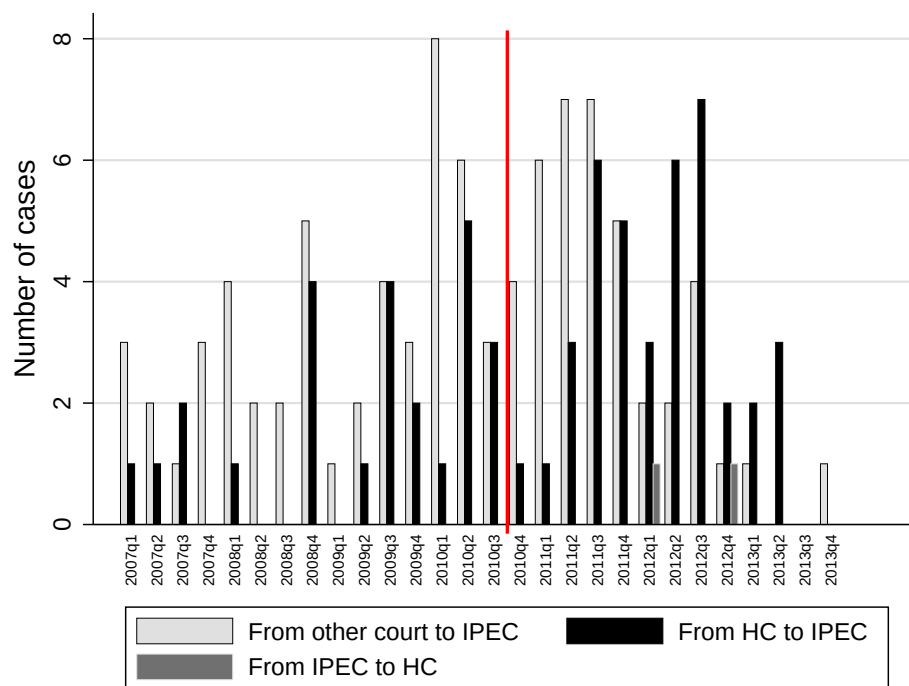


Figure A-1: Case transfers: case counts by quarter

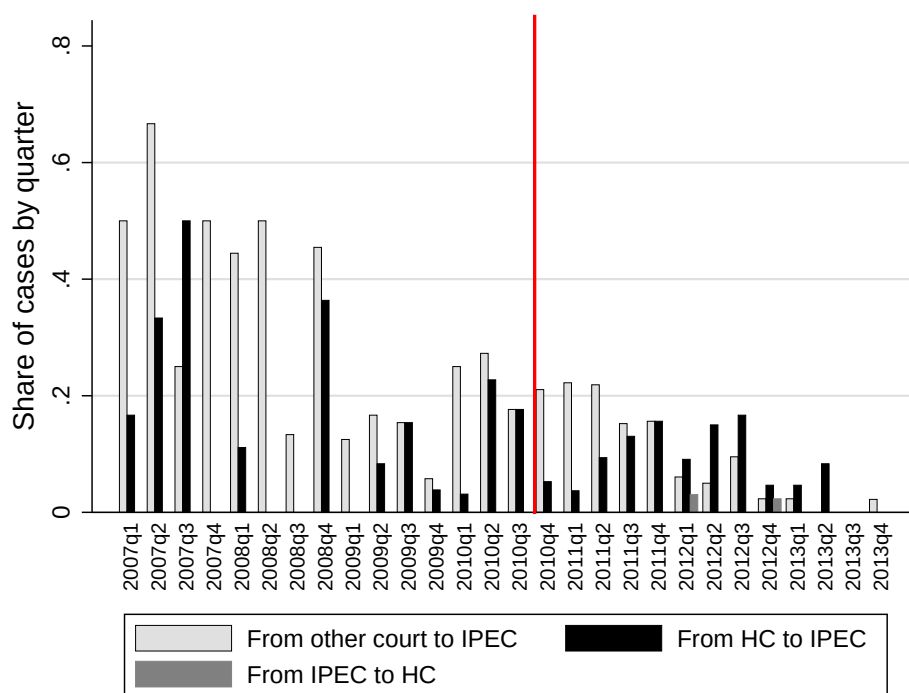
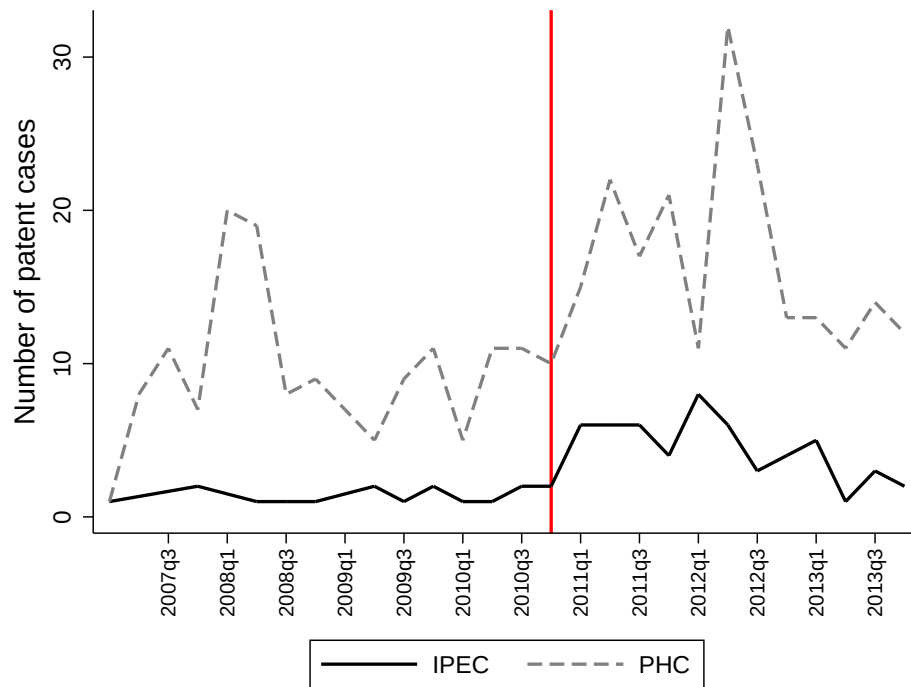


Figure A-2: Case transfers: share of transferred cases in total number of cases by quarter

Figure A-3: Comparison IPEC/PHC: patent cases



G Appendix: Tables

Table A-1: IPEC an PHC/HC case counts excluding dropped cases, 2007-2013

Year	Patent		Trade mark		Design		Copyright		Database		Total	
	IPEC	PHC	IPEC	HC	IPEC	HC	IPEC	HC	IPEC	HC	IPEC	HC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
2007	3	26	1		2		6		0		12	30
2008	2	57	13		3		20		0		38	64
2009	6	32	22	63	11	14	15	54	2	4	56	178
2010	6	37	28	105	16	41	28	68	2	16	80	274
2011	23	75	43	101	21	21	35	74	3	21	125	304
2012	19	79	60	94	31	13	33	50	1	7	144	248
2013	12	50	64	58	36	19	46	69	2	6	160	208
Total	71	356	231	421	120	108	183	315	10	54	615	1,254

Notes: Note: For PHC/HC no data available for trade marks, design, copyright and database rights prior to 2009; trade mark case count includes passing-off claims; design cases includes registered and unregistered design rights. Copyright case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). Cases at the IPEC and PHC (patents) excluded if the plaintiff dropped the case unilaterally (no settlement) or only a claim form was filed and there is no response by the defendant or other actions by the plaintiff.

Table A-2: IPEC and PHC differences in means, 2007-2013

Year	Mean		Diff.	# Obs.	
	PHC	IPEC		PHC	IPEC
	(1)	(2)	(3)	(4)	(5)
All IP cases					
Settled	0.694	0.692	-0.001	321	563
<i>Case characteristics</i>					
Case transferred	0.003	0.222	0.218***	321	563
ln case value	10.975	10.491	-0.484**	37	295
Infringement claim	0.492	0.943	0.450***	321	563
Invalidity claim	0.429	0.046	0.383***	321	563
<i>Litigant characteristics</i>					
Plaintiff SME	0.146	0.536	0.389***	321	563
Defendant SME	0.233	0.596	0.363***	321	563
Plaintiff Europe	0.311	0.060	-0.251***	321	563
Plaintiff World	0.345	0.119	-0.226***	321	563
Defendant Europe	0.336	0.026	-0.309***	321	563
Defendant World	0.302	0.024	-0.277***	321	563
Patents					
Settled	0.694	0.676	-0.017	321	65
<i>Case characteristics</i>					
Case transferred	0.003	0.153	0.150***	321	65
ln case value	10.975	11.531	0.555	37	23
Infringement claim	0.492	0.753	-0.261***	321	65
Invalidity claim	0.429	0.153	-0.276***	321	65
<i>Litigant characteristics</i>					
Plaintiff SME	0.146	0.630	0.484***	321	65
Defendant SME	0.233	0.661	0.427***	321	65
Plaintiff Europe	0.311	0.138	-0.173***	321	65
Plaintiff World	0.345	0.076	-0.268***	321	65
Defendant Europe	0.336	0.076	-0.259***	321	65
Defendant World	0.302	0.138	-0.163***	321	65

Notes: Note: For PHC no data available for trade marks, design, copyright and database rights prior to 2009; trade mark case count includes passing-off claims; design cases includes registered and unregistered design rights. Copyright case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). Cases at the IPEC and PHC (patents) excluded if the plaintiff dropped the case unilaterally (no settlement) or only a claim form was filed and there is no response by the defendant or other actions by the plaintiff.

Table A-3: IPEC and PHC: Descriptive statistics, 2007-2013

	Mean	Std. Dev.	Min. Max.	Obs.	
All IP cases					
Settled	0.693	0.461	0	1	884
<i>Case characteristics</i>					
Case transferred	0.142	0.349	0	1	884
ln case value	3.960	5.175	0	14,508	884
Infringement claim	0.779	0.414	0	1	884
Invalidity claim	0.185	0.388	0	1	884
<i>Litigant characteristics</i>					
Plaintiff SME	0.394	0.489	0	1	884
Defendant SME	0.464	0.499	0	1	884
Plaintiff Europe	0.151	0.358	0	1	884
Plaintiff World	0.201	0.401	0	1	884
Defendant Europe	0.139	0.346	0	1	884
Defendant World	0.125	0.331	0	1	884
NPE	0.050	0.219	0	1	884
<i>IP characteristics</i>					
Patent family	9.574	17.523	0	136	884
Forward citation count (3 years)	1.722	5.681	0	65	884
Backward citation count	1.929	4.612	0	87	884
Non-patent backward citation count	1.203	6.858	0	132	884
IPC subclass count	1.538	2.950	0	36	884
EP patent	0.361	0.480	0	1	884
Registered Community Design	0.037	0.189	0	1	884
Registered U.K. Design	0.022	0.148	0	1	884
Registered Community Trademark	0.085	0.280	0	1	884
Registered U.K. Trademark	0.159	0.366	0	1	884
Madrid Trademark	0.006	0.082	0	1	884
Patents					
Settled	0.691	0.462	0	1	386
<i>Case characteristics</i>					
Case transferred	0.028	0.166	0	1	386
ln case value	1.739	4.102	0	13,815	386
Infringement claim	0.536	0.499	0	1	386
Invalidity claim	0.383	0.486	0	1	386
<i>Litigant characteristics</i>					
Plaintiff SME	0.227	0.420	0	1	386
Defendant SME	0.305	0.461	0	1	386
Plaintiff Europe	0.282	0.450	0	1	386
Plaintiff World	0.300	0.459	0	1	386
Defendant Europe	0.292	0.455	0	1	386
Defendant World	0.274	0.446	0	1	386
NPE	0.116	0.321	0	1	386
<i>Patent characteristics</i>					
Patent family	21.777	20.925	0	136	386
Forward citation count (3 years)	3.943	8.077	0	65	386
Backward citation count	4.308	6.166	0	87	386
Non-patent backward citation count	2.738	10.181	0	132	386
IPC subclass count	3.502	3.615	0	36	386
EP patent	0.816	0.387	0	1	386

Table A-4: IPEC and PHC: Descriptive statistics – only cases involving SMEs, 2007-2013

	Mean	Std. Dev.	Min. Max.	Obs.	
All IP cases					
Settled	0.701	0.458	0	1	552
<i>Case characteristics</i>					
Case transferred	0.190	0.392	0	1	552
ln case value	4.940	5.341	0	14,508	552
Infringement claim	0.920	0.271	0	1	552
Invalidity claim	0.045	0.208	0	1	552
<i>Litigant characteristics</i>					
Plaintiff SME	0.632	0.482	0	1	552
Defendant SME	0.744	0.436	0	1	552
Plaintiff Europe	0.086	0.282	0	1	552
Plaintiff World	0.108	0.311	0	1	552
Defendant Europe	0.038	0.191	0	1	552
Defendant World	0.038	0.191	0	1	552
NPE	0.012	0.111	0	1	552
<i>IP characteristics</i>					
Patent family	4.485	12.557	0	136	552
Forward citation count (3 years)	0.713	3.055	0	37	552
Backward citation count	1.188	2.815	0	17	552
Non-patent backward citation count	0.318	1.783	0	25	552
IPC subclass count	0.706	1.978	0	20	552
EP patent	0.181	0.385	0	1	552
Registered Community Design	0.043	0.204	0	1	552
Registered U.K. Design	0.034	0.182	0	1	552
Registered Community Trademark	0.103	0.304	0	1	552
Registered U.K. Trademark	0.211	0.409	0	1	552
Madrid Trademark	0.005	0.073	0	1	552
Patents					
Settled	0.723	0.449	0	1	123
<i>Case characteristics</i>					
Case transferred	0.081	0.274	0	1	123
ln case value	3.149	5.169	0	13,815	123
Infringement claim	0.772	0.421	0	1	123
Invalidity claim	0.105	0.308	0	1	123
<i>Litigant characteristics</i>					
Plaintiff SME	0.593	0.493	0	1	123
Defendant SME	0.788	0.409	0	1	123
Plaintiff Europe	0.195	0.397	0	1	123
Plaintiff World	0.170	0.377	0	1	123
Defendant Europe	0.113	0.318	0	1	123
Defendant World	0.130	0.337	0	1	123
NPE	0.040	0.198	0	1	123
<i>Patent characteristics</i>					
Patent family	16.097	19.035	0	136	123
Forward citation count (3 years)	3.048	5.889	0	37	123
Backward citation count	4.227	4.201	0	17	123
Non-patent backward citation count	1.308	3.592	0	25	123
IPC subclass count	2.560	3.097	0	20	123
EP patent	0.642	0.481	0	1	123

Table A-5: IPEC and PHC: settlement decision by quarter, 2007-2012

	All IP			Patents		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Costs cap</i>						
IPEC	-0.058 (0.086)	-0.102 (0.087)	-0.198** (0.090)	-0.058 (0.168)	-0.060 (0.165)	-0.095 (0.158)
Postreform	0.160 (0.224)	0.387* (0.206)	0.369* (0.202)	0.999*** (0.000)	0.999*** (0.000)	0.996*** (0.009)
IPEC×Postreform	-0.075 (0.082)	-0.070 (0.081)	-0.083 (0.085)	-0.241 (0.193)	-0.261 (0.189)	-0.342* (0.181)
<i>Case characteristics</i>						
Case transferred	0.078 (0.051)	0.084 (0.051)	0.069 (0.052)	0.076 (0.140)	0.080 (0.136)	0.084 (0.132)
ln case value	0.022 (0.024)	0.021 (0.024)	0.016 (0.025)	0.012 (0.049)	0.023 (0.049)	0.047 (0.049)
Infringement claim		-0.085 (0.075)	-0.033 (0.082)		-0.101 (0.110)	0.038 (0.126)
Invalidity claim		-0.175** (0.089)	-0.110 (0.090)		-0.190 (0.118)	-0.058 (0.126)
<i>Litigant characteristics</i>						
Plaintiff SME	-0.113*** (0.042)	-0.124*** (0.047)	-0.159*** (0.050)	0.106 (0.069)	0.109 (0.075)	0.037 (0.085)
Defendant SME	0.144*** (0.039)	0.104** (0.043)	0.096** (0.044)	0.099 (0.059)	0.014 (0.076)	-0.030 (0.081)
Plaintiff Europe		0.020 (0.057)	0.030 (0.057)		0.103 (0.065)	0.068 (0.067)
Plaintiff World		0.033 (0.051)	0.010 (0.054)		0.066 (0.065)	0.0002 (0.069)
Defendant Europe		-0.117 (0.075)	-0.120* (0.075)		0.151* (0.083)	-0.175** (0.083)
Defendant World		-0.098 (0.073)	-0.109 (0.077)		-0.079 (0.078)	-0.111 (0.080)
NPE		0.028 (0.077)	-0.137 (0.097)		0.045 (0.083)	-0.150 (0.107)
IP characteristics	NO	NO	YES	NO	NO	YES
Technology FE	NO	NO	YES	NO	NO	YES
IP type FE	YES	YES	YES	NA	NA	NA
Quarter FE	YES	YES	YES	YES	YES	YES
Pseudo R2	0.083	0.095	0.152	0.118	0.146	0.236
Number obs.	731	731	731	352	352	352

Notes: Probit regression. Marginal effects reported. Dependant variable equal to one if case settled. All regressions include a constant. Time period is 2007-2013; PHC/HC data contain only patent cases; trademark case count includes passing-off claims; design cases includes registered and unregistered design rights. Case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). IP type FE: dummy variable for each type of IP right (patent, trademark, copyright, registered design, database). IP characteristics not reported include: patents – patent and non-patent backward citations, forward citations (in first 3 years), number of International Patent Classification (IPC) subclasses, patent family size, and a dummy variable equal to one if EP patent; trademarks – dummy variables equal to one if registered community, U.K., or Madrid (WIPO) trademark filing litigated, omitted category is unregistered trademark/passing off; design rights – dummy variables equal to one if registered community or U.K. design right litigated, omitted category is unregistered design. Regressions include a dummy variable equal to one if the case value is missing and a dummy variable equal to one if no patent information is available for a patent case. Technology effects for patent cases include indicators for each main technology area (electrical engineering, instruments, chemistry, mechanical engineering, other). Robust standard errors clustered at the case-level. * significant at 10%, ** at 5%, *** at 1%.

Table A-6: IPEC and PHC: settlement decision by quarter – only cases involving SMEs, 2007-2012

	All IP			Patents		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Costs cap</i>						
IPEC	-0.061 (0.100)	-0.035 (0.107)	-0.048 (0.111)	-0.007 (0.153)	0.072 (0.135)	0.096 (0.071)
Postreform	-0.850*** (0.083)	-0.930*** (0.043)	-0.841*** (0.135)	-0.040 (0.252)	0.578* (0.266)	0.214 (0.301)
IPEC×Postreform	-0.198 (0.131)	-0.291** (0.132)	-0.497*** (0.138)	-0.548** (0.218)	-0.735*** (0.179)	-0.989*** (0.021)
<i>Case characteristics</i>						
Case transferred	0.045 (0.056)	0.054 (0.056)	0.053 (0.055)	0.083 (0.129)	0.119 (0.109)	0.054 (0.038)
ln case value	0.019 (0.026)	0.026 (0.027)	0.017 (0.027)	0.140** (0.065)	0.166** (0.062)	0.070** (0.041)
Infringement claim		-0.115 (0.088)	-0.064 (0.100)			0.065 (0.137)
Invalidity claim		0.001 (0.124)	0.057 (0.120)			-0.026 (0.123)
<i>Litigant characteristics</i>						
Plaintiff SME	-0.126** (0.052)	-0.127** (0.056)	-0.146** (0.057)	0.068 (0.114)	0.111 (0.125)	0.243** (0.124)
Defendant SME	0.125** (0.063)	0.126** (0.066)	0.123* (0.066)	0.001 (0.113)	0.012 (0.146)	0.127 (0.129)
Plaintiff Europe		-0.092 (0.106)	-0.205* (0.127)		0.087 (0.105)	-0.138 (0.158)
Plaintiff World		0.126 (0.069)	0.125 (0.074)		0.180 (0.080)	0.091* (0.038)
Defendant Europe		-0.244* (0.154)	-0.204 (0.172)		-0.205 (0.163)	-0.102 (0.139)
Defendant World		0.072 (0.114)	0.121 (0.099)		-0.132 (0.091)	0.077* (0.032)
NPE		-0.077 (0.181)	-0.219 (0.265)		-0.279 (0.238)	-0.806*** (0.211)
IP characteristics	NO	NO	YES	NO	NO	YES
Technology FE	NO	NO	YES	NO	NO	YES
IP type FE	YES	YES	YES	NA	NA	NA
Quarter FE	YES	YES	YES	YES	YES	YES
Pseudo R2	0.114	0.131	0.186	0.158	0.223	0.395
Number obs.	455	455	455	119	119	119

Notes: Probit regression. Marginal effects reported. Dependant variable equal to one if case settled. All regressions include a constant. Time period is 2007-2013; sample contains only cases involving at least one SME as either plaintiff or defendant or both; PHC/HC data contain only patent cases; trademark case count includes passing-off claims; design cases includes registered and unregistered design rights. Case counts exclude cases brought by performance rights organisation PPL (Phonographic Performance Limited). IP type FE: dummy variable for each type of IP right (patent, trademark, copyright, registered design, database). IP characteristics not reported include: patents – patent and non-patent backward citations, forward citations (in first 3 years), number of International Patent Classification (IPC) subclasses, patent family size, and a dummy variable equal to one if EP patent; trademarks – dummy variables equal to one if registered community, U.K., or Madrid (WIPO) trademark filing litigated, omitted category is unregistered trademark/passing off; design rights – dummy variables equal to one if registered community or U.K. design right litigated, omitted category is unregistered design. Regressions include a dummy variable equal to one if the case value is missing and a dummy variable equal to one if no patent information is available for a patent case. Technology effects for patent cases include indicators for each main technology area (electrical engineering, instruments, chemistry, mechanical engineering, other). Robust standard errors clustered at the case-level. * significant at 10%, ** at 5%, *** at 1%.