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Christian Helmers and Luke McDonagh*

Abstract: We construct a dataset that contains the complete set of patent cases filed at the courts in England and Wales during the period 2000-2008. The data cover all types of patent-related cases brought before the Patents County Court, the Patents Court at the High Court, the Court of Appeal, as well as the House of Lords/Supreme Court. We combine the detailed information on court cases with information on the patents in dispute as well as firm-level data for the litigating parties. We employ the dataset to analyse characteristics of the (a) court cases, (b) litigating parties, as well as (c) the contested patents. We also provide detailed discussion of the cases that were heard by the House of Lords/Supreme Court as well as of the costs involved in patent litigation before the courts in England and Wales.

Key Words: Patent Litigation, UK

“IP litigation may be expensive but, if you look after it properly, it will ultimately look after you.”

Jeremy Philips (2006)

“[...] [I]here are unlikely to be winners when an issue reaches court. Use of a court to reach a decision is probably the most expensive way to reach a decision and one that the system should be designed to avoid.”

Greenhalgh et al. (2010)

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1. INTRODUCTION

Patent litigation has risen to dubious worldwide fame ever since the ‘global patent wars’ broke out between the giants in the information and communication technology (ICT) industry.¹ Moreover, while the patent wars have clearly led to a surge in patent court cases in all major markets,² it is also clear that the publicity surrounding these court battles has shed light on the fact that in some industries patent litigation is rapidly becoming a primary mechanism for moving issues of competition from the product market into the court room. Concern about the disruptive potential of patent litigation has also increased in recent years due to the increased participation in litigation of so-called ‘patent trolls’, sometimes referred to as ‘patent assertion entities’ (PAEs) or ‘non-producing entities’ (NPEs) (Bessen et al., 2011). The prominence of these cases in the eyes of the media has reinforced a broader public debate concerning innovation within the patent system and the role of litigation.

The functioning of the patent system fundamentally depends upon the ability of patentees to enforce their rights, if necessary with the help of courts. In particular, the role of patents in the dissemination of information by requiring the disclosure of detailed technical information relies on enforceable patent rights in order to provide firms with the incentive to make this information publicly accessible. Patents are also designed to encourage transactions via licensing and assignment; there is no doubt that enforceability is crucial for enabling these transactions. In this regard, Bessen and Meurer (2005) suggest that the value of patenting springs entirely from the threat of litigation, rather than the taking of actual legal proceedings. Empirical evidence by Lanjouw and Schankerman (2004) supports this hypothesis for the US. At the same time, the recent global patent wars within the ICT industry, including the increased involvement of PAEs, have also shown the potential for patent litigation to become a disruptive force with respect to product market competition and innovation.

While the state confers the legal right to exclude third parties from the use of intellectual property (IP), the state does not directly enforce this right itself. Instead, right-holders are required to enforce their rights through the institutions established by the state for this purpose. This implies that right-holders are tasked

¹ There has been extensive media coverage of the ‘global patent wars’. See for example *The Wall Street Journal* (Crovitz, Gordon ‘Google, Motorola and the Patent Wars,’ August 22, 2011), the *Financial Times* (Oberlander, Marissa, Martin Stabe and Steve Bernard, ‘The Smartphone Patent Wars,’ October 17, 2011), the *Washington Post* (Basulto, Dominic, ‘Patent Wars 2012: Here’s What to Expect,’ January 4, 2012).

² The *Boston Globe* (Bray, Hiawatha, ‘High Stakes Fueling Patent Wars,’ December 26, 2011) reported that Apple, Samsung, Google, and Microsoft were engaged in over 100 patent suits in at least 10 different countries at the end of 2011. The figure is likely to have substantially increased since then. The *Guardian* (Halliday, Josh and Charles Arthur, ‘Microsoft Sues Motorola over Android – and all the Other Mobile Lawsuits, Visually,’ October 5, 2010) published a table showing the various criss-cross lawsuits in the ICT sector; accessible at <http://www.guardian.co.uk/technology/2010/oct/04/microsoft-motorola-android-patent-lawsuit>.

with monitoring every potential infringement of their rights. Once a potential infringement has been identified, right-holders must decide whether to seek remediation. Consequently, full legal action/proceedings will not be taken with respect to every infringement of an existing IP right. A decision to take legal action inevitably depends on an assessment of the benefits and costs associated with monitoring infringement and taking legal action. Factors determining whether the owner of a potentially infringed patent takes legal action include (Weatherall et al., 2009): (1) the amount of sales foregone due to the existence of IP infringement; (2) the degree of competitive disadvantage which accrues when a comparison is made with those enterprises that are able to free-ride on the R&D and marketing expenses of the right-holding firm; (3) the potential for loss of goodwill and prestige with regard to a brand, if counterfeits are freely available; and (4) the expense of monitoring the market and instituting legal proceedings. Obviously, all of these factors are difficult to measure, not least because of the absence of the counterfactual. For example, the issue of what a product's market share might have been in the absence of infringement is a difficult factor to measure accurately. The overall costs of undertaking litigation are due to a host of factors including: (a) the effort undertaken in order to observe and assess potential incidences of infringement, (b) the ability to identify the infringer(s), (c) an assessment of whether the IP right is likely to stand up in court e.g. the validity of a patent, and (d) the (substantial) direct and indirect financial costs of the litigation itself. The complex interplay between these factors may explain why existing research as well as anecdotal evidence suggests that only a tiny proportion of patent disputes eventually end up in court (Greenhalgh et al., 2010).

Furthermore, infringement of patent rights often occurs when firms are unaware of existing rights which they are in fact infringing.³ Alternatively, infringement may be undertaken wilfully, either for strategic purposes or because firms learn about the infringed patent only when the sunk cost for a research project has already been paid (Bessen and Meurer, 2006). In fact, Lemley (2008) suggests that firms in the IT and biotech industry in the US ignore existing patent rights on purpose in order to avoid wilful infringement. Cockburn and Henderson (2003) provide survey evidence collected from company IP managers. This research shows that only a third of respondents conduct a prior art search before starting new R&D or product development.

From the point of view of right-holders, owners of infringed rights may possess one or more of a variety of motives for taking litigation. Most importantly, a right-holder can seek to use litigation to exclude its competitors from using a patented technology. Alternatively, a right-holder can force its competitors to acquire a licence for the patent right. A law suit also provides the possibility for the negotiation and collection of settlement payments, which could be used to

³ This is illustrated by the famous settlement in the case *New Technologies Products (NTP) vs Research In Motion (RIM)* in March 2006 where RIM agreed to pay NTP US\$ 612.5 million for the infringement of five patents that it was unaware of when developing the software protected by the patents enforced by NTP.

weaken a competing firm or could even be used to push smaller firms out of the market. Litigation may also be used for more strategic motives, such as the case of a dominant incumbent firm which threatens to sue smaller, actual or potential competitors to prevent market entry.

The existing empirical literature on patent litigation overwhelmingly uses US court data, supposedly because US data are relatively easily accessible. Much less is known about patent litigation in other jurisdictions. Given the in part substantial differences in the enforcement systems across countries, empirical findings for the US may not carry over directly to other jurisdictions. The aim of this article is to provide empirical evidence on the enforcement of patents within the UK, and the legal system of the Patents Court (PHC)⁴ of England and Wales in particular as it is the venue where the majority of patent litigation in the UK takes place.

Courts in the UK are widely regarded as ‘thorough’, a description which has given the UK courts an ‘anti-patent’ reputation. This reputation has led potential claimants in infringement cases to seek to avoid litigation in the UK, whereas potential defendants and other parties regard the UK as a propitious jurisdiction for challenging the validity of patents and/or claiming non-infringement (Moss et al., 2010). Legal procedures in the UK are also reputed for their costs (Weatherall et al., 2009; Burdon, 2010; see also Section 3.3), but the UK courts are also considered to be relatively fast-working. However, so far there is little factual empirical evidence supporting these claims. This article provides factual empirical evidence, based on a study of all patent cases filed at the Patents Court (PHC) from 2000 to 2008 as well as the Patents County Court (PCC) for 2007 and 2008.

Our analysis shows that patent litigation is extremely rare: we only observe 255 patent cases at the PHC over the nine-year period studied. While the media coverage on the patent wars and PAEs may create the impression that patent litigation concerns only the ICT giants and patent trolls, our data show that patent cases in pharma/chemicals are far more frequent and cases involving PAEs accounted for less than 6% of all cases.⁵ The concentration of litigation at the PHC in pharma/chemicals is also reflected in the share of pharmaceutical and chemical companies in the population of companies involved in litigation before the PHC. Our data show that a third of all litigating companies are in the pharmaceutical and chemical industry. Our data also reveal the number of foreign litigants by far exceeds domestic parties. Most patents are aged between six and ten years at the moment they are litigated. A comparison of the set of litigated patents with a matched sample of control patents that have not been litigated shows that litigated patents are considerably more valuable as measured by standard patent-value metrics. They are also broader and contain more references to prior art including the non-patent literature. About 43% of all court cases are filed alleging the infringement of a patent whereas around 31% of cases seek the

⁴ The Patents Court is referred to within this article as the Patent High Court (PHC) in order to distinguish it from the Patents County Court (PCC).

⁵ We analyse litigation involving PAEs in a companion paper (Helmets and McDonagh, 2012).

revocation of a patent. Only about half of all cases proceed to final judgment. Among those cases that ended with a judgment, we find that the by far the most likely outcome is the revocation of a patent – regardless of whether the case was filed as an infringement or revocation action. This confirms the widely shared view based on anecdotal evidence that the PHC is likely to invalidate patents in court. We also have some evidence on the costs of litigation. Our data indicate that most cases involve total costs for both claimant(s) and defendant(s) at the order of £1 million to £6 million, which also confirms the view that patent litigation before courts in England and Wales is extremely costly.

The remainder of the article is organised as follows. Section 2 briefly discusses the available empirical evidence for the UK. Section 3 provides a thorough description of the legal system for the enforcement of patents in the UK. Section 4 describes the data used in Section 5 for the analysis of patent litigation in the UK. Section 6 provides a brief summary and conclusion.

2. EXISTING EMPIRICAL EVIDENCE ON PATENT LITIGATION IN THE UK

Weatherall et al. (2009) provide a comprehensive literature review with a focus on the UK in which they note the general lack of evidence with respect to the UK regarding the initial analysis of IP infringement by firms and the subsequent actions taken by firms when they find that their patents are being infringed. This lack of evidence is also apparent with regard to information concerning the use of formal, as well as informal, enforcement procedures and with respect to firms' motives for either settling cases out of court or for pursuing infringement cases up to a court judgment.

To the best of our knowledge, the only previous empirical study on the subject of patent litigation in the UK is Moss et al. (2010). The authors examine the outcomes of 47 validity and infringement cases between January 2008 and August 2009 by the Patents County Court, the Patents Court, the Court of Appeal, and the House of Lords (for an explanation of the division of these courts see Section 3). 18 out of these 47 cases (38% success rate) were won by the patentee, i.e. the patent was considered to be infringed and/or valid.

Greenhalgh et al. (2010) collect survey evidence on about 100 patenting and non-patenting firms (alive between 2002 and 2009) to investigate the IP litigation activity of micro firms and SMEs in the UK. According to their survey, approximately 40% of patent holding firms have been involved in some kind of IP dispute during the five years before the survey. In addition, firms that do not hold patents are much less likely to be subject to legal action due to alleged infringement (7% report a dispute). Greenhalgh et al. (2010) also note that firms were generally as likely to be involved in a dispute with another firm of the same or smaller size as they were with a larger company. Furthermore, with regard to

infringement micro firms and SMEs are more likely to be complainants, rather than defendants. The survey also offers some insight with regard to disputes that never made it to court - the “litigation iceberg that lurks under water”. Greenhalgh et al. (2010) find that the vast majority of firms first attempt to resolve a dispute through the exchange of letters between solicitors, which appears to resolve a substantial fraction of the disputes. According to their study, only about 13% of disputes end up in court. The study also offers some insights with regard to the obstacles to litigation. For example, firms stated that financial costs, in particular legal fees, were the principal obstacle to litigation. On top of the direct financial costs, firms expressed concerns regarding the time that managers and engineers who are involved in R&D would be forced to devote to litigation, effectively diverting scarce resources from more productive activities. Despite the high costs of litigation, only about 25% of firms have IP insurance as ex ante; it is considered too costly by firms and some firms also expressed concerns that insurers might press for early settlement if the chances for winning the case were perceived as not sufficiently large.

3. LEGAL FRAMEWORK

3.1 OVERVIEW

There is no unified legal system for the UK. England and Wales, Scotland, and Northern Ireland have separate legal systems and courts.⁶ In England and Wales, there are two courts of relevance to this study, the Patents County Court (PCC), which deals with low-value claims, and the Patents Court (PHC), which is a specialist court of the Chancery Division of the High Court of Justice of England and Wales.⁷ As previously noted, in principle the PCC hears cases of lower value and complexity, such as disputes involving SMEs.⁸

In practice, however, nearly all cases are heard by the PHC, which is the principal subject of our study (see Section 5). At both the PCC and the PHC, each case is tried by a single judge who possesses IP-specific expertise. In England and

⁶ While IP infringement can also be enforced through criminal law, we focus on the civil enforcement procedures because the criminal courts are rarely relevant in the context of patent litigation.

⁷ The Queen’s Bench Division may hear cases related to patent licensing. The Technology and Construction Court may incidentally also deal with patents. In practice, however, most cases are heard by the PHC. In addition, the Comptroller of the UK Intellectual Property Office may also deal with patent infringement disputes, although in practice the Comptroller deals mostly with appeals against the UKIPO’s refusal to grant a patent.

⁸ In response to concerns that SMEs were less able to avail of patent litigation primarily because of costs concerns (Intellectual Property Court Users Committee Working Group, 2009: 6), a new ‘small claims track’ procedure for the PCC, aimed at facilitating claims by SMEs, has recently been proposed by the UK Government. It is due for implementation in October 2012 (UK IPO, 2012). Nonetheless, Thambisetty states that ‘the proposition that SMEs face an unmet need for a less expensive forum to litigate’ is not without its critics (2010: 143).

Wales, appeals are made from the PHC to the Court of Appeal (CA). Leave to appeal must be granted by the PHC or by the CA itself. Regarding leave to appeal, a recent study (Freshfields 2011: 3) notes:

“In principle, this will be granted only where there is a real prospect of success or there is another compelling reason – for example, a point of public interest. In practice, however, the Patent Court will normally grant leave to appeal and will almost always do so if it orders a patent to be revoked.”

The three-person panel at the Court of Appeal is generally not entirely composed of IP specialists, although it usually contains one IP specialist. The decision of the CA can be challenged at the Supreme Court (formerly the House of Lords). Once again, leave must be given for appeal to the Supreme Court (SC), either by the CA or the SC itself. According to the Judicial and Court Statistics 2008, the number of IP related cases heard by the House of Lords/Supreme Court is typically negligible – there were none in 2006, there was only one out of 45 total cases in 2007, and only one out of 74 total cases in 2008 (Judicial and Court Statistics 2008; see also Section 5.2.2). This makes cases that proceeded to the Supreme Court especially interesting as they usually involve legal questions of fundamental character that can have a direct effect on future court cases.

3.2 THE CHRONOLOGY OF A TYPICAL PHC CASE

The process of litigation at the PHC is guided by the UK Civil Procedure Rules (CPR). The structure and timeline of a patent case is illustrated by Figures 1 and 2. Every claim begins with a ‘claim form’ in accordance with CPR part 7.2, which must be served within four months of issue, or six months if service is out of the jurisdictions under CPR part 7.5. After the claim form is served, the defence has to be filed.⁹ The claimant must apply for a case management conference (CMC) within 14 days of the date when all defendants who intend to file and serve a defence have done so.¹⁰ At the CMC, directions may be given with regard to disclosure of information or experiments, and a full hearing date is usually set.

Given the various time limits for action, cases filed before the PHC often take a year or more to make it to full trial. The most recent Freshfields study (2011: 6) notes that 12 months is the average wait for a large case to reach full trial. Furthermore, the study notes that urgent cases can sometimes reach trial within six months and smaller cases can be expedited if necessary. Following the

⁹ Under CPR part 15.4 the general rule is that the period for filing a defence is either (a) 14 days after service of the particulars of claim; or (b) if the defendant files an acknowledgment of service under Part 10, 28 days after service of the particulars of claim. There is a modification to rule 15.4(1)(b) in CPR part 63.7 – regarding a claim for infringement under rule 63.6, the period for filing a defence where the defendant files an acknowledgment of service under Part 10 is 42 days after service of the particulars of claim.

¹⁰ CPR part 63, Practice Direction 5.3.

conclusion of a full hearing, a first-instance judgment will usually be handed down within 3-6 months (Freshfields 2011: 1).

If a claimant in the case believes that there is no realistic prospect of the defence succeeding, an application for summary judgment can be made. A hearing for summary judgment ‘can take place within six weeks of commencement of the action’ (Freshfields 2011: 10). However, due to the complexities involved in patent claims concerning the issues of validity and infringement, summary judgments are said to be rare (Freshfields 2011: 10), which is also supported by our data.

In April 2003, a streamlined procedure was introduced with the aim of speeding up litigation and reducing associated costs. The key differences between the normal and streamlined procedures are: (a) no disclosure, (b) no experiments, (c) restriction of cross-examination, and (d) the trial date is fixed when the order for a streamlined trial is made (around 8 months from commencement to trial at first instance). According to Moore (2006), litigating parties have found the speedy process propitious, particularly when they are engaged in multi-jurisdictional patent litigation and they seek to use the judgment in parallel proceedings. Parties can request the streamlined procedure, or if they fail to do so, and it can be so ordered by the court. One objective of the streamlined procedure is to encourage the settlement of disputes by means of alternative dispute resolution, such as via mediation and conciliation. Moore (2006) claims that the streamlined procedure has the drawback that firms have little time to explore outside-court settlement options, something which could lead to relatively fewer settlements.

3.3 CHARACTERISTICS OF THE ENFORCEMENT SYSTEM OF ENGLAND AND WALES

In this section we discuss a number of characteristics of the legal system in England and Wales:

Firstly, within the common law legal system of England and Wales, lower courts are bound by the decisions of higher courts via the system of precedent. As noted above, the PHC is part of the High Court of England and Wales, which has jurisdiction to deal with civil claims.

Secondly, the courts in England and Wales deal simultaneously with patent validity and infringement, which is a major difference compared for example to the legal system in Germany.¹¹ This can have a major impact on the remedies granted by courts and the behaviour of litigating parties.¹²

¹¹ The system in Germany is bifurcated, meaning that validity and infringement are tried by separate courts. See Klink (2004) for a discussion of the differences in procedures between the UK and Germany.

¹² At a recent House of Commons committee hearing, Henry Carr Q.C. stated that an injunction for infringement is more easily obtained in a German court than the PHC precisely because the German court grants injunctions before hearing whether a patent is valid (House of Commons European Scrutiny Committee, 2012).

Thirdly, within the legal system of England and Wales, litigants are represented before court by barristers, solicitors, and patent attorneys. Barristers have the right of audience in the courts, which means that they are authorised to represent litigants in judicial proceedings. They usually do not interact directly with clients but instead act exclusively as instructed by solicitors on their client's behalf. Solicitors, in contrast, are in direct contact with clients and thus are authorised to act as the client's attorney.¹³ Patent attorneys are usually involved in the filing and administration of patent applications, the granting of, opposition to, cancellation of, or rectification of, patents. Nevertheless, patent attorneys may also represent litigants before court. As noted below, this division between solicitors and barristers likely has a direct effect on the costs of legal representation in court cases.

Fourthly, unlike other European jurisdictions, such as France where most patent cases are infringement cases, it is common for a claimant in a case before the PHC to merely argue that a patent is invalid, e.g. due to anticipation or lack of inventive step. Alternatively, or in tandem with an invalidity claim, a complainant may seek a declaration of non-infringement. In the PHC it is expected that a competitor should attempt to 'clear the way' before e.g. releasing a product which could infringe another company's patent. If a competitor does not do this, it is more likely that the PHC will grant an interim injunction preventing the sale of the potentially infringing product upon the commencement of infringement proceedings. Cases involving a complainant who alleges infringement and a defendant who counter-claims for invalidity are also commonplace. A patentee may apply to amend a patent at the PHC. Patent ownership disputes sometimes arise, as do licensing disputes.

Fifthly, with regard to restitution, patent litigation has the objective to provide the holder of an infringed IP the right to legal relief. This includes the following remedies (Greenhalgh et al., 2010: 50): (a) a (public) declaration that what the defendant has been doing is an act of infringement; (b) disclosure of information related to the allegedly infringing product; (c) an injunction to stop infringement; (d) the delivery or destruction of infringing goods; (e) damages, which may be compensatory and which may reflect not only trading losses but other forms of damage suffered; (f) receipt of the profits earned by the infringer which can be attributed specifically to the infringing act. Typically, an injunction may be stayed pending an appeal and 'an order for revocation is always stayed pending appeal' (Freshfields 2011: 3). With regard to the possibility of obtaining a stay of PHC proceedings, it is usually the case that the PHC will not grant a stay pending foreign proceedings. However, with regard to EPO opposition proceedings, the PHC will sometimes grant a stay, depending on the circumstances of the case (Freshfields 2011: 4; see for example the case of *Hunt v Don & Low*¹⁴ which is part of our dataset). Depending on the specific facts of each

¹³ Solicitors may also have the same rights of audience as barristers (so-called Higher Court Advocates). However, in practice, in the context of patent litigation there seem to exist very few such advocates.

¹⁴ *Hunt Technology Limited v Don & Low Limited* [2005] EWHC 376 (Ch); [2005] All ER (D) 61 (Mar).

case, the PHC may consider that there are pressing commercial concerns for one party within the UK which require an expedited hearing in the UK, rather than a delayed one.

Sixthly, 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. Analysis of issues concerning this separation between the substantive hearing and the costs hearing, and the subject of the allocation of the costs burden is undertaken below at 5.2.3.

Seventhly, regarding the actual costs of patent litigation at the PHC there is little doubt that litigation at the PHC is highly expensive. In 5.2.3. we analyse the available costs data as well as recent studies undertaken by Freshfields (2011, 2007) and Duncan (2010) on the subject of litigation costs at the PHC.

On the subject of disclosure, an eighth point can be made - within the legal system of England and Wales, the disclosure requirement is particularly strong in comparison to other European jurisdictions such as Germany. This requirement is on-going throughout the duration of the case (Freshfields 2011: 12). In the case of litigation concerning process patents, the disclosure requirement is especially relevant, in particular with regard to chemicals/pharmaceuticals and ICT. Despite this requirement, one party may still dispute the supposed relevance of certain information, and there are cases where courts have to rule on whether specific disclosure must be made.

4. DATA

We collected data on all court cases filed between 2000 and 2008 at the PHC, the Court of Appeal and the House of Lords/Supreme Court. Due to the possible long lag time between the filing of a case and a final decision, in particular if the decision rendered by the first instance is appealed, we can only include court cases that were filed before 2009 to avoid the presence of a substantial number of potentially still pending cases in our dataset. Given our interest in patent litigation, we exclude all cases that represent an appeal to an administrative decision taken by the UKIPO. We complemented the data with data from court cases heard before the PCC (Central London County Court) which we obtained from the UKIPO. Because the information on cases at the PCC had to be collected directly from the PCC, we only have detailed information on cases heard in 2007 and 2008.

We collected the data on court cases at the PHC from a range of sources. Our starting point was the Patents Court Diary which lists all cases which are scheduled for a hearing or an application including, for example, a case management conference.¹⁵ This means, in principle, the Diary contains all cases

¹⁵ http://www.hmcourts-service.gov.uk/cms/list_patents_diary.htm.

for which the claim form has been served and to which the defence has responded. The Diary provides basic information on court cases, including the case number, the names of claimants and defendants (usually only the first claimant and defendant), their legal representatives, the date the hearing was fixed, as well as the hearing dates and the duration of the hearing. In a number of cases, the Diary also notes additional information, such as whether a case was discontinued because of a settlement or stay. We use the information from the Diary to search for court records on the website of the British and Irish Legal Information Institute,¹⁶ the case database of Lexis Nexis,¹⁷ as well as Thomson Reuters's Westlaw database.¹⁸ However, these sources did not offer any records for a number of cases (mostly those settled at an early stage). For these cases we searched additional sources, such as media websites, blogs or the websites of legal representatives for information.

The most basic information that we collected for all cases includes the names of all litigating parties, their country of residence (the country in which a firm is registered), the type of litigating party (e.g. company, individual, etc.), the year the claim form was served, and the type of IPR in dispute. Additional detailed information on the case was collected for all court cases that involved a patent. The information was collected and input into a standardised format.¹⁹ The standardised template contains information on the proceedings/decision type, litigating parties, the IPR in dispute, the claims made in the case, the relief applied for, the outcome/content of the judgment, and any information on the value, costs, and potential damages associated with the case. We also include information on related cases within the England and Wales jurisdiction as well as abroad if mentioned in the available court records.

While our datasets represent the most comprehensive database gathered so far on the subject of patent litigation in the UK,²⁰ at least two caveats are in order. Firstly, obviously the court data provides us only with data on cases that have made it to court. Relying on the court diary, however, means that we only observe cases that not only have been filed to the court, but were allowed to proceed at least to the case management stage. There is no information available on the number of cases that are dropped between the serving of the claim form and the case appearing on the diary. However, informal conversations we conducted with practitioners lead us to believe that this figure is negligible. Secondly, since we had to assemble the information with regard to each court case, often relying on different sources, in many cases the available court records are incomplete. For example, while we may have the judgment of the PHC, we may not have records for all preceding applications. This implies that part of the analysis is limited to a core set of variables which we were able to obtain for all cases. However, the

¹⁶ <http://www.bailii.org>.

¹⁷ <http://www.lexisnexis.co.uk>.

¹⁸ <http://www.westlaw.co.uk>.

¹⁹ The standardised case template was created in collaboration with Ulrike Till.

²⁰ The data used by Moss et al. (2010) only contain court cases between January 2008 and August 2009 heard by the Patents County Court, the Patents Court, the Court of Appeal, and the House of Lords.

investigation of certain specific aspects of patent litigation, such as the issue of costs, focuses on the subset of court cases for which more detailed information is available.

As part of our analysis we combine the information obtained from court records with detailed information on the parties as well as the specific patents involved in the law suits. The names of the litigating parties were matched to Compustat, Bureau van Dijk's FAME and AMADEUS, and the ICC British Company Directory databases in order to obtain information on firms' characteristics and financials. Detailed information on the litigated patents was obtained from EPO's Espacenet and PATSTAT (version October 2011). We also draw on PATSTAT to construct a control sample of patents that have not been litigated. The control sample consists of non-litigated patents that share the same priority year, priority filing authority, and IPC subclasses with litigated patents. This control sample allows us to compare the characteristics of litigated patents with those of patents that were not subject of litigation at the invention level (the priority filing).

5. ANALYSIS AND RESULTS

In this section, we show descriptive evidence on court cases before the different courts in England and Wales, principally distinguishing between activity at the PCC and the PHC. We also include a discussion of cases that were heard by the House of Lords due to the potentially wider importance of these judgments on litigation behaviour before the courts in England and Wales. This section also contains a discussion of costs involved in litigation.

5.1 LITIGATION AT THE PATENTS COUNTY COURT

As described in Section 4, we only possess detailed information on litigation at the PCC for the years 2007 and 2008. Table 1 shows the total number of cases that came before the PCC in these two years and provides an overview of the type of IPR that was at dispute. There were a total of 64 IP-related cases in 2007 and 2008. Less than a fifth of these cases involved a patent; most cases (42%) centred on a trademark dispute, followed by cases which primarily involved copyright and then cases which focused on (un)registered designs. Hence, patents are the least litigated type of IP at the PCC. This is most likely explained by the higher complexity of cases involving patented technology and the resulting higher cost of litigation, making the PHC relatively more attractive than the PCC for patent cases. Potential damages may also be more important in cases involving patents.²¹

²¹ Nonetheless, the recent case of Apple enforcing its registered Community Design against its competitor Samsung on Samsung's Galaxy tablet computer shows that the potential infringement of

Table 2 explores the characteristics of the patent cases, that is, we limit the sample to the 12 cases that involve a patent. The table shows the number of claimants and defendants and cross-tabulates this with information on the nationality and type of litigant. The first point to note is that the cases involve few parties (as will become clear when we describe the cases before the PHC). In all except one case there is only a single claimant. The claimants are all companies and either registered in the UK or abroad, i.e. there is no case that involves a UK and international claimant (which is rather the rule than the exception before the PHC, as noted below). The number of defendants ranges from one to three, where most cases involve two defendants. In three cases, the defendants include individuals.

While this is not shown in the table, all patent cases are about the infringement of the patents in question. Half of all cases ended with a judgment, where five out of the six cases that ended with a judgment were decided in favour of the claimant(s). The other six cases were settled, dismissed, or discontinued.

Figures 3 and 4 as well as Table 3 examine the characteristics of the 13 litigated patents (one case covers two patents).²² Figure 3 shows the age distribution of the litigated patents; age is computed as the difference between the priority year of a patent and the year in which the law suit started. Most patents are fairly young at the beginning of the law suit with priority years for seven out of 13 patents ranging between 2000 and 2005. Figure 4 shows the technologies covered by the litigated patents. We constructed technology classes by mapping patents' IPC codes into technologies based on a concordance table.²³ The figure shows that few patents cover chemical and pharmaceutical patents, whereas most patents concern inventions related to mechanical engineering.²⁴ The lack of patents on pharmaceutical or ICT related inventions reinforces the view that these patent disputes are of lower value, and due to the mostly mechanical nature of the underlying inventions most likely also easier to resolve. Table 3 supports the view that most patents are of lower value as the median number of forward cites (as of April 2012) is zero with only four out of 13 patents reporting a positive number of forward citations. We also possess some direct estimates of the value of a number of the disputes. The values range from £5,000 to £100,000, with most cases located at around £50,000. The relatively low value of these cases is also shown by the information on cost orders that is available for two cases, for which costs awarded amount to only £10,000.

Finally, we also take a closer look at the characteristics of the litigating companies. Table 4 shows the distribution of companies across industries. Note

other forms of IP can have important effects even on such high-tech products as a handheld computer. Yet, cases that involve IP other than patents of such importance are also brought before the PHC instead of the PCC, as is also the case with *Apple vs Samsung* (HC11C03010).

²² Note that one patent was litigated twice in separate cases. For the purpose of these simple descriptive statistics we allow the patent to appear twice in our dataset.

²³ The concordance table that maps IPC class symbols to technology categories was developed by the Fraunhofer ISI and the Observatoire des Sciences et des Technologies in cooperation with the French patent office (see Schmoch, 2008).

²⁴ The "Other" category contains mostly patents related to civil engineering.

that the table only shows UK companies for which a minimum of firm-specific information is available.²⁵ Table 4 shows that most companies are involved in business services. Others include companies within the metals and machinery sectors, which accords with the information on technologies displayed in Table 2. Surprisingly, there are a substantial number of large companies, although closer inspection of the data (not shown in Table 4) reveals that six out of the eight large companies are defendants. Small companies clearly dominate the claimant category with six out of nine claimants being in the small size category. The table also contains some information on the age of the litigating companies; the main insight that emerges from the age distribution is that most firms are well-established and there is no significant difference in the age distribution between claimants and defendants (not shown in Table 4).

5.2 LITIGATION AT THE PATENTS COURT, COURT OF APPEAL, AND HOUSE OF LORDS (SUPREME COURT)

Table 5 shows the number of cases at the Patents Court by year, where year refers to the starting date of the initial claim in the case. The average number of cases per year is 45 with little variation over time (the median is 46 cases). Patents are by far the most litigated IP accounting for over 60% of all cases. Nevertheless, an average number of 28 patent cases per year indicates that patent litigation in court is an extremely rare event considering that even leaving the EPO aside, the UKIPO alone granted more than 2,000 patents in 2008 (UKIPO Facts and Figures 2008). Within the scope of PHC cases, (un)registered design rights represent the second most important IP category, featuring in about 6% of all cases and trademarks account for 4% of cases with a median number of only two cases per year.²⁶ Regardless of the IP right at dispute, there is no visible trend in litigation behaviour over time with the number of law suits remaining steady over the nine years observed (possibly with the exception of cases involving trade secrets).

5.2.1. PATENT CASES

We limit the data for our detailed analysis to court cases that involve a patent-related dispute, which reduces the total number of cases to 255 (see Table 5). Our analysis looks at patent cases from three different angles: litigant-level, patent-level, and case-level.

Table 6 looks at the characteristics of the litigating parties. The table shows a cross-tabulation of the number of claimants and defendants and their nationality

²⁵ No data could be found for four UK based companies (in part because they are not registered with Companies House).

²⁶ Our data do not include High Court cases which involve trademarks or other IP rights, but which do not come within the scope of the PHC.

and type. There is a maximum of five claimants and twelve defendants. The median number of claimants and defendants is one, and the corresponding average numbers are 1.3 and 1.6 respectively. The table shows that there are more foreign claimants and defendants than UK companies. Cases that involve more than a single claimant or defendant frequently involve a mix of domestic and foreign companies. This is often explained by the foreign holding joining the domestic subsidiary in the lawsuit. There are also cases where a domestic importer of a potentially infringing product is joined by the foreign manufacturer of the product. The table distinguishes between two types of litigants: registered companies and others, where the “other” category includes individuals, non-for-profit organisations, government, the European Central Bank, and universities. Nearly all cases solely involve private companies. Interestingly we observe relatively more non-business entities appearing as claimants without a company as a co-claimant, than in a case in which they are defendants. In other words, individuals and universities are more likely to appear as co-defendants together with private companies than to be sued on their own.

Table 7 is based on the matched firm-level data, i.e. the names of companies that were matched to UK, European, and US firm-level data.²⁷ We use the firm-level data to create size categories and to tabulate these size categories across industries. The table shows that the by far largest number of firms is in the chemical and pharmaceutical industry (32%), followed by high-tech (18%) and metals and machinery (12%).²⁸ The cross-tabulation with firms’ size shows that about 60% of firms are large (conditional on firms reporting employment data that we require to compute a firm’s size category). There are relatively few small firms (<20%); most small firms are in the trade and high-tech sectors.

Figures 5 and 6 look at the characteristics of the litigated patents.²⁹ Figure 5 plots the age distribution of the patents (age is computed as the difference between the priority year of a patent and the year in which the law suit was initiated). The histogram shows that most patents are between six and ten years old; few patents are subject to litigation within five years after the priority date. There are also a few patents which are older than 20 years; these cases concern disputes over the validity of SPCs or disputes over infringement which allegedly occurred before the expiration of the patent. Figure 6 shows the frequency of the technologies protected by the litigated patents (see Section 5.1 for an explanation how we mapped patents into technology classes). The figure shows that chemical and pharmaceutical patents are most frequent, followed by patents concerning mechanical and electrical engineering.

²⁷ We do not have any firm-level data for non-European/non-US companies.

²⁸ High-tech is defined as SIC2 30 (Office Machinery and Computers), 31 (Electrical Machinery and Apparatus), 32 (Radio, Television and Communication Equipment and Apparatus), and 33 (Medical, Precision and Optical Instruments, Watches and Clocks).

²⁹ We have 210 patents for 160 cases. Patent numbers were not available in all other cases. Note that we were able to find only 209 of these 210 patents in PATSTAT. Hence, all statistics that are based on PATSTAT data are limited to 209 patents.

To gain more insight into the characteristics of the litigated patents, we construct a control sample of patents that have not been subject to litigation and which have been matched to the set of litigated patents based on the year and authority of the priority filing and the IPC subclasses of litigated patents (see Section 4 above). Table 8 shows a comparison of a number of patent characteristics that are commonly associated with the value of a patent between the litigated patents and the control sample.³⁰ The table shows that the number of citations received worldwide (as of October 2011) by litigated patents by far exceeds that of non-litigated patents. This measure is commonly considered as a proxy for patent value and thus suggests that litigated patents are more valuable than non-litigated patents.³¹ Similarly, the family size of litigated patents is considerably larger than that of non-litigated patents, which corroborates the evidence that litigated patents are more valuable than non-litigated patents.³² The comparison of the number of inventors listed on the patent shows that litigated patents have slightly fewer inventors. This is surprising if we interpret it as a measure of the amount of resources invested in the patented invention.³³ We also include two variables in our comparison that allow us to gauge the extent to which the patented invention is derivative of previous inventions. This is captured by the number of backward citations as well as the number of references to the non-patent literature. The number of non-patent references can also be interpreted as a proxy for closeness to (academic) research. These measures suggest that litigated patents are more derivative of existing patents and closer to science as reflected by the higher non-patent literature reference count. We also include a rough proxy for the breadth of a patent by counting the number of IPC subclasses. This comparison shows that litigated patents are broader than non-litigated patents. While the count of IPC subclasses is an imprecise measure of patent scope, the comparison still supports the received wisdom that patents with a broader scope are more easily infringed and hence also more likely the target of invalidation procedures. We also restrict the control sample to patents that belong to the companies that own any of the litigated patents (lower panel of Table 8). The results are very similar and thus support the findings for the whole control sample. The bottom line of this comparison is that litigated patents are indeed very different from comparable (at the invention-level) patents that have not been involved in litigation, even when compared to other patents held by the same

³⁰ The measures in Table 8 capture patent value rather than quality. While there is no single definition of patent quality in the literature, the existing definitions regard patent quality as the degree to which a granted patent satisfies the legal patentability requirements at a given patent office and is likely to withstand invalidity proceedings in court or before an administrative body (see Wagner, 2009; Graf, 2007). Hence, patent quality can be expected to correlate positively with patent value; patent value, however, is determined by a much broader range of factors than patent quality which are reflected in the different measures employed in our comparison.

³¹ See for example Hall et al. (2000).

³² See for example Lanjouw et al. (1998).

³³ See for example Sapsalis et al. (2006) who find the number of inventors to be positively correlated with patent value.

firms. They are more valuable, broader, and contain more backward cites and references to the non-patent literature.³⁴

In Tables 9, 10, and 11, we look at the characteristics of the law suits and their outcomes. Table 9 shows that only half of all cases are decided by judgment. Among the cases that ended without a final judgment, 56% were settled. While we do not specifically investigate the effect that the introduction of the streamlined procedure in 2003 has had on the propensity to settle, we do observe a drop in the number of settlements of cases filed between 2004 and 2006, although the number of settlements recovered from 2007 onward (not shown in Table 9). The table also provides a rough estimate of the average and median duration of the patent cases. The median number of years for a case to end with a judgment is three; we find a median of two years for cases that end without final judgment.³⁵ In Table 10, we show a cross-tabulation of the case outcome and the number of claimants and defendants in a given case. The table offers some evidence to suggest that cases that are characterised by a single claimant and/or a single defendant are less likely to end with a final judgment than cases with multiple claimants and/or defendants. Moreover, cases with more than three claimants mostly settled whereas cases with more than three defendants to an overwhelming extent ended with a judgment. Finally, Table 11 shows the issue at dispute as well as the corresponding outcomes. The largest share of cases for which we have information on the claim concerns the infringement of a patent (43%). Nevertheless, the share of revocation cases is substantial (31%). In most cases, the defending party counter-sues either for revocation in case of an infringement action, or infringement in case of an invalidation action (this explains why for example in the “infringement row”, the “revoked” cell contains a positive percentage). There is a small share of cases (11%) in which other patent-related claims are at dispute, such as patent entitlement or the amount of royalty fees due. The cross-tabulation with the eventual outcome of the case shows that in fact the by far most common outcome is the revocation of a patent. Infringement of a valid patent is found only in 15% of all infringement cases that end with a judgment, and in 4% of all revocation cases that end with a judgment. Settlement ratios do not differ between infringement and revocation suits (both around 25%).

Finally, we take a look at appeals. Figure 7 shows the share of PHC cases that proceed to the next higher instance, that is the Court of Appeal and in rare instances the House of Lords. The figure shows that there are proportionally more appeals for revocation actions (39%) than for infringement actions (30%).³⁶ Overall, a third of cases at the PHC proceed to the CA; the share of cases that

³⁴ These findings accord with previous findings in the literature. Cremers (2004), for example, finds litigated patents in Germany to have more forward and backward cites as well as a larger family size. For USPTO patents, Chien (2011) also finds litigated patents to have more forward cites than non-litigated patents.

³⁵ The duration is computed as the difference between the year in which the claim form was issued and the year in which the final judgment was given or the court case ended for other reasons such as a settlement.

³⁶ Note that appeals are limited to the set of cases that have ended with a judgment in the first instance.

proceeds to the House of Lords, in contrast, is tiny. As will be discussed in detail in the next section, only five cases were admitted to be heard before the House of Lords. We also have information on whether the CA upheld the judgment of the PHC. In nearly 80% of the cases heard by the CA, the court upheld fully or at least partially the judgment of the PHC. There is no discernible difference between revocation and infringement actions in the share of PHC judgments upheld by the CA. The next section takes a closer look at the cases that were heard by the House of Lords.

5.2.2. HOUSE OF LORDS/SUPREME COURT CASES

During the period 2000-2008, of cases filed at the PHC only five were heard on appeal at the House of Lords/Supreme Court.³⁷ These were all cases involving important points of patent law. Two cases, *Sabaf v MFI*³⁸ and *Conor v Angiotech*,³⁹ concerned the test for obviousness. One case, *Synthon v Smithkline Beecham*⁴⁰ concerned the test for novelty. One case, *Generics v Lundbeck*,⁴¹ was primarily concerned with the interpretation of 'insufficiency'. The final case, *Eli Lilly v Human Genome Sciences*,⁴² involved analysis of the criterion of 'industrial application'. In this section we discuss each case in detail.

Sabaf v MFI - The case hinged upon an analysis of the ground of obviousness with regard to 'collocation' - the question of whether two unrelated features could amount to an inventive step. The PHC noted that merely placing old integers side-by-side so that each performed its own function independently of the other did not amount to a patentable invention. The PHC therefore revoked Sabaf's patent for a gas burner. The CA overturned the High Court's finding of invalidity and found the patent to be valid, stating that the Patent Act 1977 did not refer to collocation. However, the House of Lords reversed the decision of the CA, reaffirming the existence of a law of collocation in UK law and noting that this was in accordance with EPO reasoning. In the House of Lords, Lord Hoffmann

³⁷ The House of Lords case *Kirin-Amgen, Inc. and Others v. Hoechst Marion Roussel Limited and Others* [2004] UKHL 46; [2005] R.P.C. 9 does not form part of the study since the case was filed in 1999.

³⁸ *Sabaf SpA v MFI Furniture Centres Limited and others; Sabaf SpA v MFI Furniture Centres Limited and others (Conjoined Appeals)* [2004] UKHL 45; [2005] RPC 10; on appeal from [2002] EWCA Civ 976; [2003] RPC 14; accessible at <http://www.publications.parliament.uk/pa/ld200304/ldjudgmt/jd041014/sabaf-1.htm>.

³⁹ *Conor Medsystems Incorporated v Angiotech Pharmaceuticals Incorporated and others* [2008] UKHL 49; [2008] R.P.C. 28; on appeal from [2007] EWCA Civ 5; [2007] RPC 20; accessible at <http://www.publications.parliament.uk/pa/ld200708/ldjudgmt/jd080709/conor-1.htm>.

⁴⁰ *Synthon BV v Smithkline Beecham plc* [2005] UKHL 59; [2006] R.P.C. 10; on appeal from [2003] EWCA Civ 861; [2003] R.P.C. 43; accessible at <http://www.publications.parliament.uk/pa/ld200506/ldjudgmt/jd051020/synth-1.htm>.

⁴¹ *Generics (UK) Limited and others v H Lundbeck A/S* [2009] UKHL 12; [2009] R.P.C. 13; on appeal from [2008] EWCA Civ 311; [2008] R.P.C. 19; accessible at <http://www.publications.parliament.uk/pa/ld200809/ldjudgmt/jd090225/gener-1.htm>.

⁴² *Human Genome Sciences Inc v Eli Lilly and Company* [2011] UKSC 51; on appeal from [2010] EWCA Civ 33; [2010] R.P.C. 14; accessible at http://www.supremecourt.gov.uk/decided-cases/docs/UKSC_2010_0047_Judgment.pdf.

noted that before undertaking an analysis of obviousness it was necessary to consider what the invention consisted of - two inventions would not become one invention merely because they were included within the same hardware. Regarding obviousness, the House of Lords held that because the two features did not interact, it was necessary to evaluate each one separately, and in this case neither one was inventive.

Synthon v Smithkline Beecham - The crucial legal point in this case concerned the concept of 'enabling disclosure' - the vital element for determining the novelty requirement. Smithkline Beecham held a patent for a pharmaceutical compound called paroxetine which was used in the treatment of depression. Synthon sought revocation of the patent on the basis of lack of novelty. The PHC had found the patent to be invalid due to lack of novelty, but this was overturned by the CA because the disclosure did not give clear and unmistakable directions to make the compound. Nonetheless, the House of Lords reversed the decision of the CA and found that the patent had been anticipated. The House of Lords noted that within the criterion of 'enabling disclosure' there was a distinction between 'disclosure' and 'enablement'. Furthermore, in assessing the adequacy of the enablement it can be assumed that the skilled person would use his skill as appropriate to the technical field, which in this case including making some 'trial and error' experiments.

Conor v Angiotech - In this case Conor sought revocation of Angiotech's patent for a stent coated with taxol on the basis of obviousness. Both the PHC and the CA found the patent to be obvious because at the time of the disclosure, the patentees had not known for certain that the taxol coating would have the desired effect. The parties then settled in 2007, before the appeal was due to be heard before the House of Lords. Nevertheless, Angiotech sought to have the judgment overturned. In order for the hearing to take place, notwithstanding the settlement, Angiotech agreed to pay for counsel to argue Conor's side of the argument. The House of Lords stated that the patent was not obvious and therefore was valid. All that was required with regard to obviousness was that the proposed invention was plausible at the priority date, and that it did in fact work. The following was noted by Lord Hoffmann in Paragraph 39 of the judgment:

"But there is in my opinion no reason as a matter of principle why, if a specification passes the threshold test of disclosing enough to make the invention plausible, the question of obviousness should be subject to a different test according to the amount of evidence which the patentee presents to justify a conclusion that his patent will work [...]"

Generics v Lundbeck - The case primarily concerned the application of the ground of 'insufficiency' with respect to the validity of a granted patent related to the anti-depressant drug Escitalopram. The House of Lords affirmed the decision of the CA that a product patent ought not to be revoked on the ground of insufficiency, even where the actual inventive step was in the method by which the product

could be made. The House of Lords distinguished on the facts its previous decision in *Biogen v Medeva*, a case which did not involve a pure product claim, but a class of products. The House of Lords therefore clarified the circumstances in which a patent ought to be revoked due to insufficiency.

Human Genome Sciences (HGS) v Eli Lilly - This Supreme Court case centred on the interpretation of 'industrial application' under Art.57 EPC and the application of this criterion to biotechnology patents. Eli Lilly sought revocation of a HGS patent covering the gene and protein sequences of a protein known as Neutrokine- α on the ground that HGS had not specified a use for the protein which was capable of industrial application. The Supreme Court overturned the decisions of the High Court and Court of Appeal, who had stated that the patent lacked industrial application. Referring to EPO Technical Board reasoning, the Supreme Court took a relaxed view of 'industrial applicability' with respect to gene patents and emphasised that the UK courts ought to follow the EPO decisions in this area. Specifically, the Supreme Court stated that there was no need for a disease indication to be identified for there to be industrial applicability.

All of the above cases featured points of law which required an assessment by the House of Lords/Supreme Court. *Sabaf v MFI* found the court making an important ruling on the relationship between 'collocation' and inventive step. *Synthon v Smithkline Beecham* saw the court re-defining the concept of enabling disclosure as containing two requirements – 'disclosure' and 'enablement'. *Conor v Angiotech* re-emphasised that the test for obviousness ought to assess the 'plausibility' of the invention as an important consideration. In *Generics v Lundbeck* the court distinguished the present case from one of its previous rulings, clarifying the extent to which 'insufficiency' applies to pure product claims as opposed to classes of products. In *Human Genome Sciences v Eli Lilly*, the SC ruling sought to bring UK jurisprudence concerning 'industrial application' in line with EPO rulings.

5.2.3. ASSESSING THE COSTS OF TAKING A CASE AT THE PATENT HIGH COURT

It is generally acknowledged that the costs of taking a patent case at the PHC are substantial. A recent report on civil litigation costs authored by Jackson L.J. (Final report, 2009: 250) quotes Dietmar Harhoff's comments on patent litigation costs within the EU (Final report, 2009: 250, referring to a paper by Harhoff presented at the IP forum) in order to summarise the conventional view on the costs involved in patent enforcement in the UK:

“The UK system is the most costly one, and this aspect is generally noted as negative. Costs are also considered to be a decisive factor in generating a large number of settlements in the UK system.”

As stated above, in England and Wales the substantive legal issues and the issues of costs and damages are dealt with separately. However, not all cases proceed post-trial to a full hearing on costs. In fact, in most cases parties settle the issue of costs once a judgment has been handed down (Freshfields, 2007; 1). For this reason, detailed cost hearing court records are not available for most PHC cases.⁴³ Nonetheless, it is possible based on the records found with regard to cases filed during the period 2000-2008 to extrapolate some figures and case studies which can illuminate the issue of costs. Before the costs data can be discussed, it must be noted that under CPR section 44 the unsuccessful party is required to pay the other party's costs. However, in the context of patent litigation, it is often the case that this rule is not strictly applied. On this point, Floyd J. states:⁴⁴

“In patent cases, an issue-based approach to costs is now the norm: see *Smithkline Beecham v Apotex* [2004] EWCA Civ 1703 ; *Actavis v Merck* [2007] EWHC 1625 (Pat); *Generics v Lundbeck* [2007] EWHC 1606 (Pat) and *Monsanto Technology v Cargill International* [2007] EWHC 3113 (Pat).”

Similarly, Goldberg (2010; para. 2) notes:

“In patent cases, the courts have deviated from the spirit of section 44 by granting parties costs only on the issues they have won. Generally, infringement claims are separate from invalidity. Both infringement and invalidity claims may be further itemised in terms of the various arguments advanced. Consideration is given to the general victor in commercial terms, the reasonableness of the issues argued, and the behaviour of the parties.”

Nonetheless, as a general rule it is the case that the losing party will usually bear the majority of the costs of the case. It is often the case that the successful party will recover about two-thirds of its legal fees, depending on how the issues were won and lost (Freshfields 2011: 8). Furthermore, once a party has lost on substantive grounds, the party may decide to ‘cut his losses’ and to settle out of court regarding the actual amount of costs and damages. For this reason, it is often the case that there are no court records available regarding the specific amount of costs and damages allotted to each side in each case. It is usually the case that it is only where the parties have been unable to ‘settle’ these issues that there will need to be a court hearing on costs or damages. Consequently, the

⁴³ Unless the costs are agreed between the parties, once the trial judge has made cost orders at the PHC costs hearing, the details of the costs themselves are usually ‘assessed separately by a costs judge (who does not have specialist patent knowledge) for reasonableness in detailed assessment (typically recovery is around 70%)’ (SJ Berwin, 2009; 1). It is important to note that the costs data discussed in this article are the ‘pre-assessment costs’, or ‘gross’ costs, before any separate assessment by a costs judge has taken place.

⁴⁴ See costs hearing in *Research in Motion UK Ltd v Visto Corporation; Visto Corporation v Research in Motion & Anor* [2008] EWHC 819 (Pat), at para. 6; costs hearing undertaken following full trial [2008] EWHC 335 (Pat); [2008] Bus. L.R. D89.

analysis of the costs/damages data undertaken here is based upon an evaluation of the records which are available, in conjunction with analysis of previous studies, including the Freshfields studies (2007, 2011).

Regarding specific cost sums, Jackson L.J. reviewed a small sample of 15 IP cases between 1999 and 2007 ‘settled or taken to first instance trial by a leading IP department from a City law firm’ (Final Report, 2009: 24). The sample reviewed the costs data from the point of view of one firm representing the claimant in 10 cases and the defendant in 5 cases. The costs data is therefore applicable only to one side of the dispute. The sample was comprised of 12 patent cases, 2 trademark cases and 1 design case (Final Report, 2009: Appendix 3). Within this sample of 15 IP cases, 3 patent cases were settled at an average cost of approximately £870,000 per case (Final Report, 2009: Appendix 3). Of the 12 remaining IP cases which reached a judgment, 9 of which were patent-related, the average cost was approximately £650,000, with the cost ranging from £200,000 to £1.2million (Final Report, 2009: Appendix 3). With respect to the reasons behind these high costs, Jackson L.J. (Final report, 2009: 24) notes:

“The costs incurred from the start of trial to judgment or settlement averaged nearly 20% of the total costs of the cases. The trial costs were a large proportion of the total costs due to the cross examination of the expert witnesses.”

Freshfields (2011: 8) note that if a patent case goes for a full hearing at the PHC, the total costs, accommodating the costs of both sides, will on average amount to £3 million i.e. £1.5 million for each side. A more conservative estimate is put forward by Duncan (2010; para. 10), who states that it is common for PHC cases to cost ‘in the region of £200,000 to £500,000 for straight-forward cases’, noting further that it can cost ‘up to and more than £1,000,000 for complex cases’. Our data on patent cases heard between 2000 and 2008 is supportive of the higher figures suggested by Freshfields (2011). While there are a few cost orders in the region of £50,000-100,000 that concern hearings on specific applications rather than a full trial that ended with a judgment, most cases that ended with a judgment, and for which we have data, report total costs in the region between £1million and £6million.⁴⁵ Reasons for the relatively high costs (compared to other jurisdictions such as Germany) lie in the specific features of the British legal system as noted in the Jackson report (2009) quoted above. In particular, high

⁴⁵ At the very high end of the costs scale, the costs arising from the joined cases involving *Research in Motion* and *Visto Corporation* are of significance - RIM's costs were estimated at nearly £6 million while Visto's costs were estimated at £1.6 million. This case is discussed in greater detail in a companion paper (Helmets and McDonagh, 2012). See *Research in Motion UK Ltd v Visto Corporation*; *Visto Corporation v Research in Motion & Anor* [2007] EWHC 900 (Ch); [2007] EWHC 1921 (Pat); [2008] EWHC 335 (Pat); [2008] Bus. L.R. D89; costs hearing [2008] EWHC 819 (Pat); stay application appealed to Court of Appeal [2008] EWCA Civ 153 (cases HC06C03912 & HC06C042270). See also HC08C02901 - the case of *Research in Motion UK Ltd v Visto Corp*; *Visto Corp v Research in Motion UK Ltd*.

costs are generated due to the existence of oral hearings, which require the expertise of solicitors and the advocacy of barristers, the need for extensive cross-examination of expert witnesses, as well as the requirements of the on-going duty of disclosure of any relevant documents (Freshfields 2011: 8; Jackson L.J. Final Report, 2009).

With regard to specific PHC case studies from our survey, it was noted above the case of *Eli Lilly and Co v Human Genome Sciences Inc*⁴⁶ eventually reached the Supreme Court. However, the available costs data only relate to the PHC hearing. Costs following the PHC trial were attributed at £1,380,000 (Eli Lilly) and £2,220,000 (Human Genome Sciences Inc). In consideration of the fact that it won the main issue at the HC hearing, the court held that the claimant, Eli Lilly, was entitled to 60% of its costs of the action (amounting to approximately £828,000). Similarly, in *Generics v Lundbeck*,⁴⁷ another case which eventually reached the Supreme Court, there was a PHC costs hearing. Regarding the claimants, Generics' costs were estimated at £886,000, Arrow's at £554,000 and Teva's at £624,000. Lundbeck, the defendant, estimated its costs to be about £1,815,000. Teva and Lundbeck agreed to settle costs, but a hearing was required to assess the apportionment of costs between Lundbeck and the remaining claimants. The PHC held that costs should be divided 60/40 - Lundbeck was ordered to pay to Generics and Arrow 60% of their costs of the trial and Generics and Arrow were ordered to pay to Lundbeck 40% of its costs. Given the fact that both *Human Genome Sciences v Eli Lilly* and *Generics v Lundbeck* eventually required a Supreme Court hearing, it is likely that the level of complexity in both cases was unusually high, which could partially explain the high level of costs in these cases. Nonetheless, other cases examined below suggest that costs are generally high in PHC cases.

In *Apotex v Smithkline Beecham*⁴⁸, which involved two separate cases, there were costs hearings at both the PHC and at the Court of Appeal. The PHC trial lasted 11 days. At the PHC, it was stated that Smithkline Beecham's total costs up to that point amounted to £3,367,918 while Apotex' costs amounted to approximately £2,700,000. At the PHC costs hearing the court ordered Smithkline Beecham to pay 76% of Apotex's costs. However, while the Court of Appeal upheld the original PHC decision on non-infringement, it reversed it with regard to validity.⁴⁹ With regard to costs, the Court of Appeal then stated that overall Apotex ought to have 16% of the costs arising from the first instance PHC case, and Smithkline Beecham ought to have 25% of the costs of the appeal. No further specific cost

⁴⁶ *Eli Lilly and Co v Human Genome Sciences Inc* [2008] EWHC 1903 (Pat); [2008] R.P.C. 29; costs hearing [2008] EWHC 2511 (Pat).

⁴⁷ *Generics (UK) Limited and others v H Lundbeck A/S* [2007] EWHC 1040 (Pat); [2007] R.P.C. 32; costs hearing.

⁴⁸ *Apotex Europe Limited and others v Smithkline Beecham plc and others Smithkline Beecham plc and others v Apotex Europe Limited and others* [2003] EWHC 2939 (Pat); [2004] F.S.R. 26; costs hearing [2004] EWHC 964 (Pat).

⁴⁹ *Apotex Europe Limited and others v Smithkline Beecham plc and others; Smithkline Beecham plc and others v Apotex Europe Limited and others* [2004] EWCA Civ 1568; [2005] F.S.R. 23; costs hearing [2004] EWCA Civ 1703; [2005] 2 Costs L.R. 293.

amounts were discussed at the Court of Appeal costs hearing. In *Abbott Laboratories v Evysio*,⁵⁰ Abbott applied for revocation of three of Evysio's patents, and also for declarations of non-infringement with regard to the three patents, which related to coronary stents. After a trial lasting 8 days, the PHC costs hearing attributed costs of £2.63 million (Abbott) and £1.46 million (Evysio). Costs were granted mostly in favour of Abbott, based on the issues it won at the PHC trial, which meant that Abbott was granted 75% of its costs (amounting to approximately £1,972,500).

In the case of *Generics (UK) Ltd v Daiichi*⁵¹ there was a PHC costs allocation hearing at which it was established that the claimant's costs of taking the case through 11 hearing days to a PHC judgment were approximately £1.3 million, whereas the defendants' costs were approximately £3.4 million. The defendants had won most of the substantive issues of the PHC case. In the circumstances, the claimant accepted that the defendants were entitled to a costs order in their favour but submitted (i) that the costs incurred by the defendants were wholly disproportionate and should be capped and (ii) that the costs should be reduced to reflect the fact that, even though the defendants could be described as being the overall winner, the defendants had lost on a number of issues. Regarding the first issue, the PHC did not allow the costs to be capped. With respect to the second issue, the PHC acknowledged that the defendants had won on most issues and were therefore entitled to 88% of their assessed costs of the action. As noted above, the defendants' pre-assessment costs were estimated at £3.4 million (of which 88% amounts to approximately £2,992,000).

In *Monsanto v Cargill*⁵² costs were granted by the PHC mostly in favour of Monsanto because it won on all claims except the issue of construction of infringement. The PHC trial lasted 13 days. Monsanto's total costs were estimated at £2.2million and Cargill's were stated to be £1.9million. After weighing up the issues won and lost, the PHC ordered that a rounded off sum of £800,000 ought to be paid by Cargill to Monsanto. In *Buhler AG v FP Spomax*⁵³ costs were granted in part to defendants at the PHC costs hearing Buhler AG were ordered to pay 40% of FP Spomax 's total costs of approximately £1million (amounting to approximately £400,000). In *Actavis UK Ltd v Merck*⁵⁴ the PHC made a costs order which ultimately favoured the defendant in the case. The PHC trial lasted 3 days. The claimant's costs were estimated at £500,000, while the defendant's costs were estimated at £600,000. Costs were divided in favour of Merck because it won the

⁵⁰ *Abbott Laboratories Ltd v Evysio Medical Devices ULC* [2008] EWHC 800 (Ch); [2008] R.P.C. 23; costs hearing [2008] EWHC 1083 (Pat).

⁵¹ *Generics (UK) Ltd v Daiichi Pharmaceutical Co Ltd; Daiichi Pharmaceutical Sankyo Ltd* [2008] EWHC 2413 (Pat); [2009] R.P.C. 4; costs hearing [2008] EWHC 2958 (Pat).

⁵² *Monsanto Technology LLC v Cargill International SA; Cargill plc* [2007] EWHC 2257 (Pat); [2008] F.S.R. 7; costs hearing [2007] EWHC 3113 (Pat).

⁵³ *Buhler AG v FP Spomax SA* [2008] EWHC 823 (Pat); [2008] All ER (D) 291 (Apr); costs hearing [2008] EWHC 1109.

⁵⁴ *Actavis UK Ltd v Merck & Co Inc* [2007] EWHC 1311 (Ch); [2007] All ER (D) 24 (Jun); costs hearing [2007] EWHC 1625 (Pat).

issue that the court spent most time on during the trial; although Actavis succeeded in getting the patent revoked at the PHC, it lost on the issue of obviousness and was ordered to pay these costs. After considering the various applicable percentages based on an issue-based approach, the PHC decided to make a single net order that Actavis ought to pay Merck a total of £100,000.

At the lower end of the costs scale, there was a PHC costs allocation hearing in *Ivax Pharmaceuticals (UK) Ltd v Chugai Seiyaku Kabushiki Kaisha*.⁵⁵ The PHC trial lasted for 4 hearing days. Ivax incurred costs totalling £300,000, whereas Chugai's costs were estimated at £700,000. Ivax won on most issues so at the costs hearing the PHC stated it should have 60% of its costs. In the case of *Schlumberger v Electromagnetic Geoservices (EMGS)*⁵⁶ the issue of interim costs was decided at the PHC stage. The PHC ordered that £1m ought to be paid by Electromagnetic Geoservices to Schlumberger as interim costs of the action. The PHC ruled that EMGS should pay 82.5% of Schlumberger's costs of the action – estimated at £2.286 million.

With regard to costs in the context of applications for injunctions or amendments, in *Hospira UK Limited v Eli Lilly*⁵⁷ a PHC judgment refused Hospira's application for leave to amend, and also refused an injunction to prevent commencement of an action. Hospira was ordered to pay the costs of the application. The total costs of the application hearing were £76,000. Hospira was ordered to pay Eli Lilly a total of £50,000. However, after the substantive matters of the case were resolved in Hospira's favour, Eli Lilly was ordered to make an interim payment of £125,000 to Hospira at a later costs hearing to reflect the costs expounded by the claimant. In *Mayne v Teva UK Ltd*⁵⁸ Mayne lost its application for an injunction at the PHC. As a result, Mayne was ordered to pay Teva's costs for the injunction hearing, amounting to £38,500. In *Arrow v Merck*⁵⁹ the PHC ruled against Merck's striking out action regarding the negative declaration it sought. Merck was seeking to establish that its product was, at the priority date of Merck's claimed patent (which had been applied for but not yet granted), non-inventive (as regards the features of the patent applications) and so could not infringe any granted patent of the defendant. Following the failure of Merck's application, Arrow sought costs of £65,000–£75,000. However, because Arrow did not succeed on every single issue, the PHC awarded the sum total of £35,000.

⁵⁵ *Ivax Pharmaceuticals (UK) Ltd v Chugai Seiyaku Kabushiki Kaisha* [2006] EWHC 756 (Pat); [2006] All ER (D) 131 (Apr); costs hearing [2006] EWHC 853 (Pat).

⁵⁶ *Schlumberger Holdings Ltd v Electromagnetic Geoservices AS* [2009] EWHC 58 (Ch); [2009] R.P.C. 19; costs hearing [2009] EWHC 773 (Pat).

⁵⁷ *Hospira UK Limited v Eli Lilly & Company* [2008] EWHC 1862 (Pat); costs hearing [2009] EWHC 3001 (Pat).

⁵⁸ *Mayne Pharma (USA) Inc; Mayne Pharma Plc; Mayne Group Ltd v Teva UK Ltd; Approved Prescription Services Ltd* [2005] EWHC 2141 (Pat); [2005] All ER (D) 116 (Oct); interim injunction hearing [2004] EWHC 3248 (Ch); costs hearing [2004] EWHC 2934 (Pat).

⁵⁹ *Arrow Generics Limited; Arrow Pharm (Malta) Limited v Merck & Co, Inc* [2007] EWHC 2387 (Pat); costs hearing [2007] EWHC 1900 (Pat).

6. CONCLUSION

We provide the first detailed description and analysis of patent cases heard by the Patents County Court (2007-2008) as well as the Patents Court (2000-2008) for England and Wales. The data also cover appeals made to the Court of Appeal and the House of Lords/Supreme Court.

Our analysis of the IP cases heard before the PCC indicates that patents are the least litigated IP right. Only 12 out of 64 IP cases concluded in 2007 and 2008 involved a patent. Upon looking further into these 12 patent cases, we find that they involve few litigating parties – most cases involved only a single claimant and defendant. Interestingly, all patent cases heard by the PCC are about the infringement of a patent, whereas only around half of all patent cases before the PHC are infringement actions. Our analysis of the patents litigated at the PCC shows that these patents are relatively young (most patents are less than 10 years old) and overwhelmingly protect inventions related to mechanical engineering. This stands in stark contrast to the cases heard by the PHC, where most patents protect pharmaceutical and chemical compounds and production processes. The mechanical, discrete nature of the inventions protected by the patents litigated at the PCC supports the view that patents of lower complexity and value are litigated before the PCC. Our data on the value of these court cases supports this further with values ranging from £5,000 to £100,000. The litigating parties are mostly in the business services and the metals and machinery sectors. It is also noteworthy that the vast majority of claimants at the PCC are small firms, whereas there are a disproportionate number of large firms among the defendants.

Our analysis of the court cases brought before the PHC shows that patents are by far the most litigated IP right. On average, 28 out of 45 annual cases involve a patent. The ratio of patent cases per year has remained remarkably stable throughout the nine-year period of our study. In our detailed analysis, we focus on the 255 patent cases, out of a total of 407 IP cases.

In our analysis, we look at characteristics of the litigating parties, the patents at dispute, as well as the relevant case-specific characteristics and outcomes. We find a substantial number of cases with more than a single claimant and defendant. Nevertheless, the median number of claimants and defendants is one. Our data also suggest that patent litigation in the UK is a highly internationalised service. We have a substantially higher number of foreign than domestic claimants and defendants. We also match detailed firm-level data to our case-level data - this allows us to look at the characteristics of the registered companies involved in the law suits. We find that most companies in our dataset are in the chemical and pharmaceutical industry, followed by companies involved in high-tech and metal and machinery. This confirms our analysis at the patent-level which indicates that most patents protect chemical and pharmaceutical inventions.

Looking in more detail at the patents involved in our PHC cases, we find that most patents are aged between 6 and 10 years, although we even have a few cases

that involve an expired patent. A comparison of the set of litigated patents with a sample of non-litigated patents that have been matched at the invention (priority filing) level reveals that the litigated patents tend to be different in several respects. Litigated patents are more valuable, broader in scope, and also contain more references to other patents, and the non-patent literature, than non-litigated patents.

Our dataset also allows us to look at the characteristics of the law suits and the corresponding outcomes. We show that only about 43% of all cases are filed alleging the infringement of a patent. In fact, around 31% of filed cases seek the revocation of a patent. Furthermore, we find that only half of all cases filed end with a final judgment. More than half of all cases that did not end with a judgment were settled. Cross-tabulating the information on the number of litigating parties and the outcome (final judgment yes/no) suggests that cases with a single claimant and/or defendant are more likely to settle than cases that involve a large number of litigating parties.

Regarding case outcomes, when we examine the cases which ended with a judgment, we find that the most likely outcome by far is the revocation of a patent – regardless of whether the case was filed as an infringement or revocation action. Finally, we show some evidence on appeals. We find that about a third of all cases proceed to the CA, where in 80% of cases the judgment of the PHC is upheld. We also provide a detailed discussion of the five cases that were allowed to proceed to the House of Lords, all of which featured an important point of law.

While detailed data on the costs involved in litigation is unavailable for the reasons explained in detail in Section 5.2.3, our data allow us, in combination with existing anecdotal evidence, to make some tentative statements about the magnitude of the costs involved in litigating before the PHC. Our data indicate that most cases feature total costs, encompassing costs for both claimant(s) and defendant(s), amounting to a sum between £1 million and £6 million.

In summary, this article provides a first assessment of patent law suits before the courts in England and Wales for the period 2000-2008. The above descriptive analysis indicates a number of angles from which the data could be analysed further in future.

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Figure 1: UK Patent Litigation System

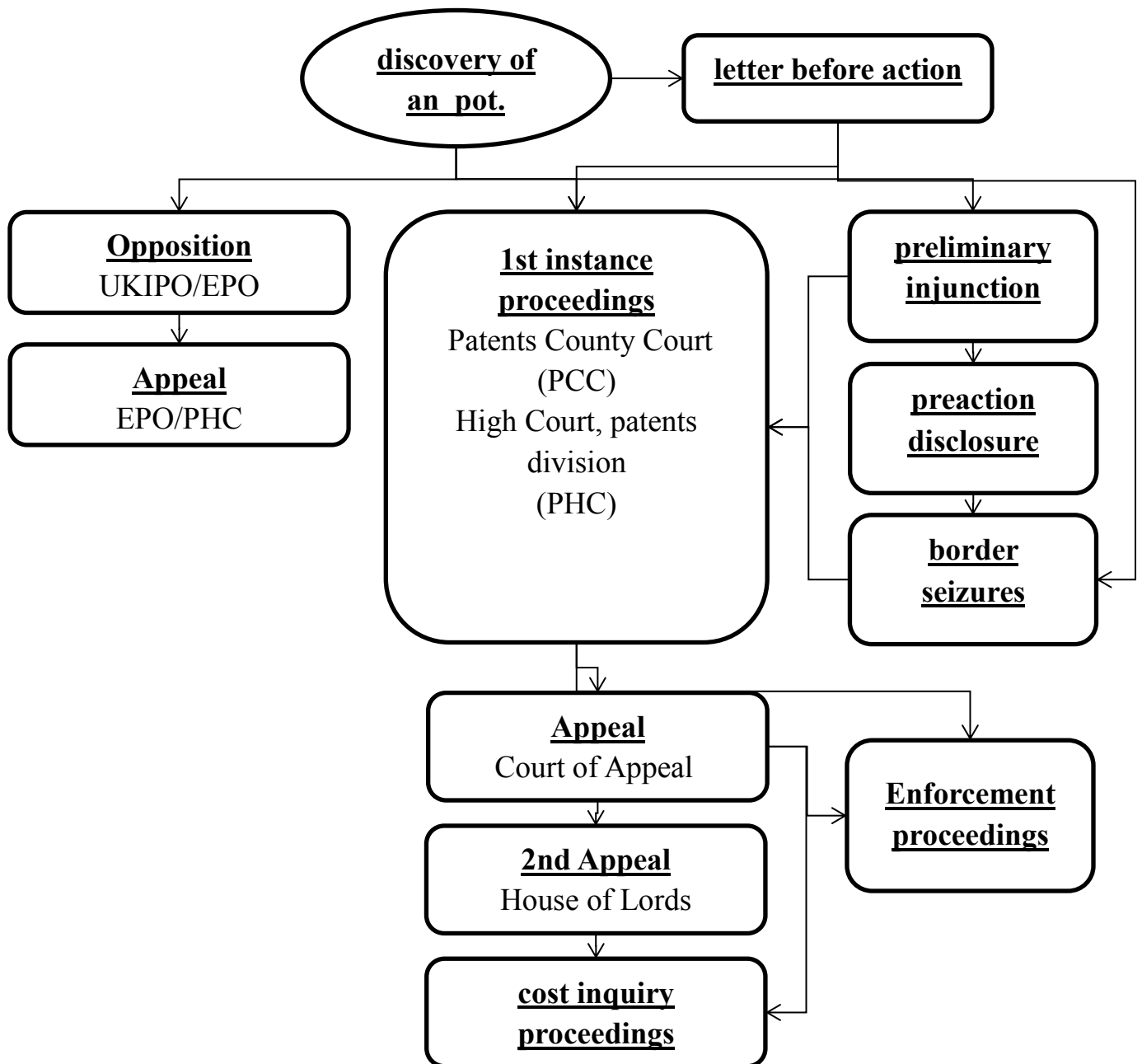


Figure 2: Case Timeline

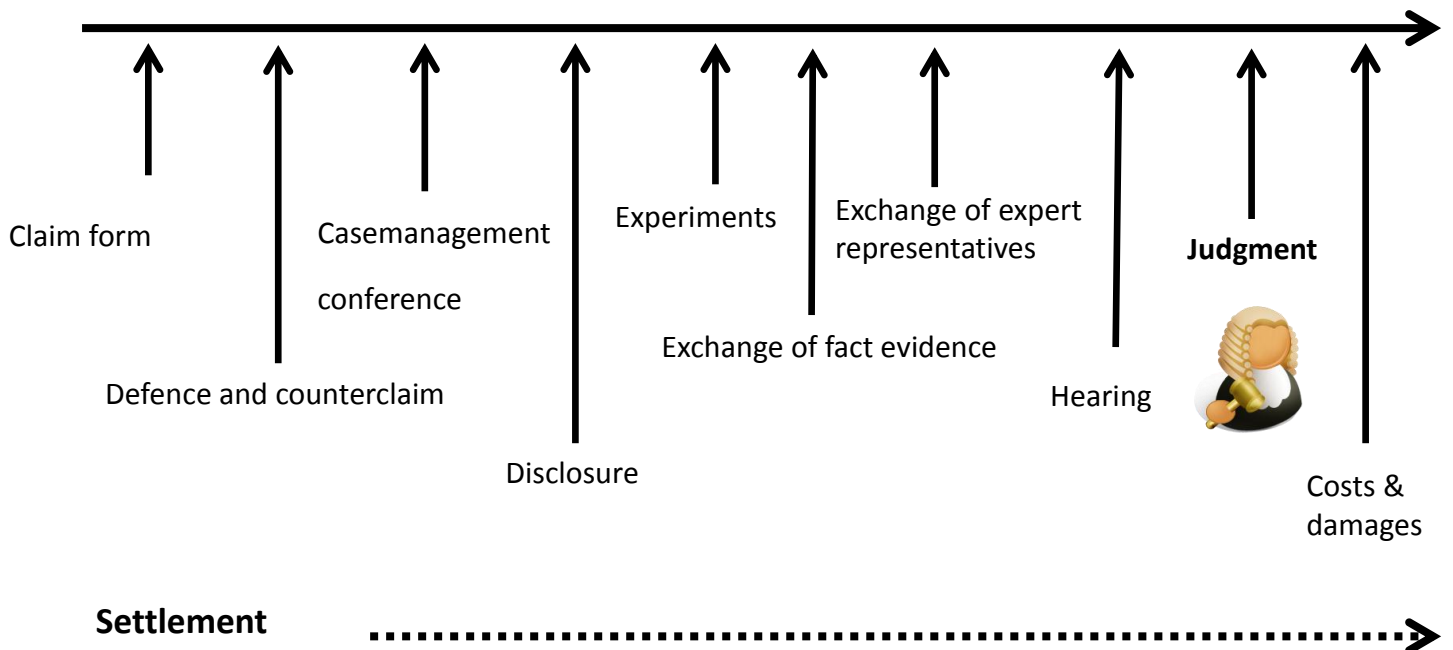


Figure 3: PCC – Patent age distribution (patent cases in 2007 & 2008)

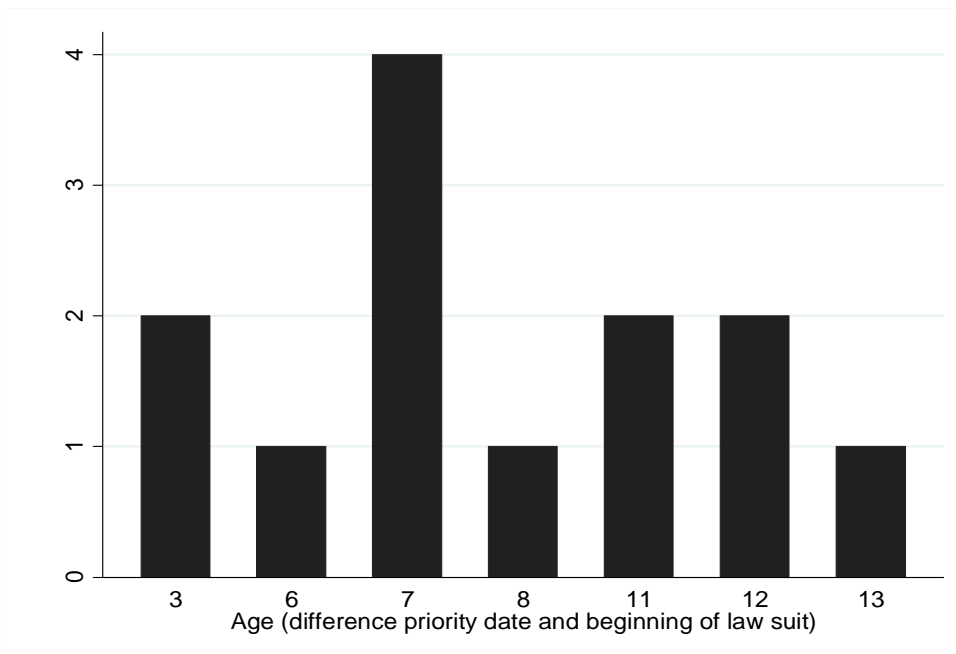
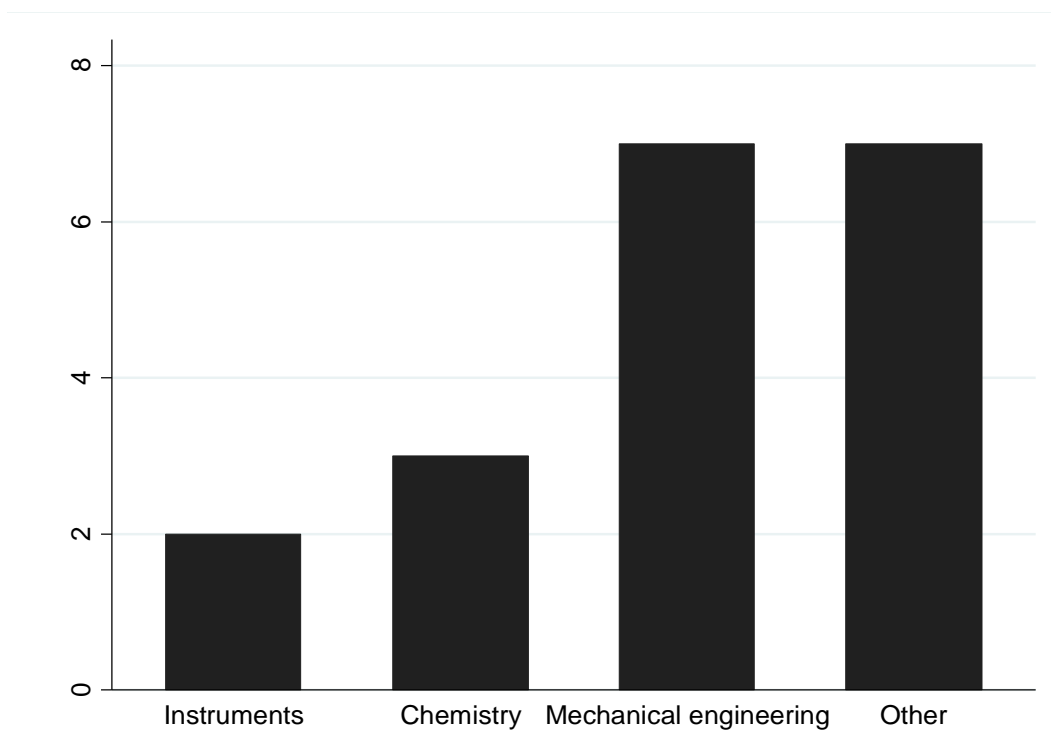


Figure 4: PCC – IPC/Technology distribution (patent cases in 2007 & 2008)



Note: Other includes: Furniture & games, other consumer goods, and civil engineering.

Figure 5: PHC – Patent age distribution (patent cases in 2000-2008)

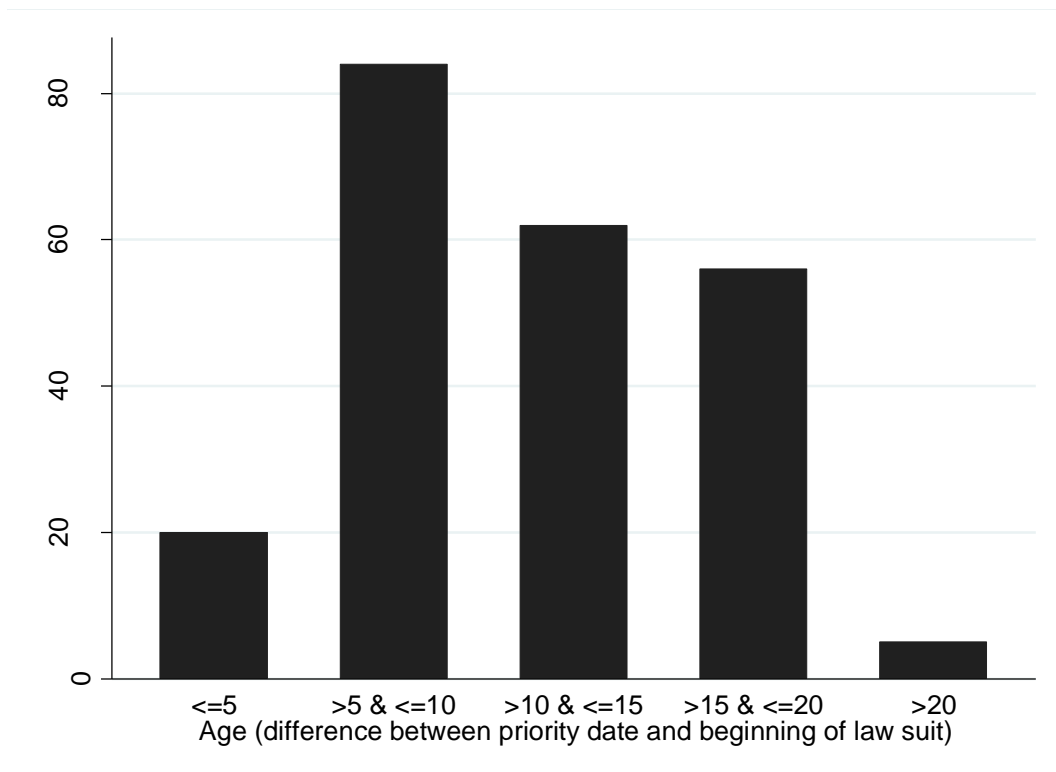
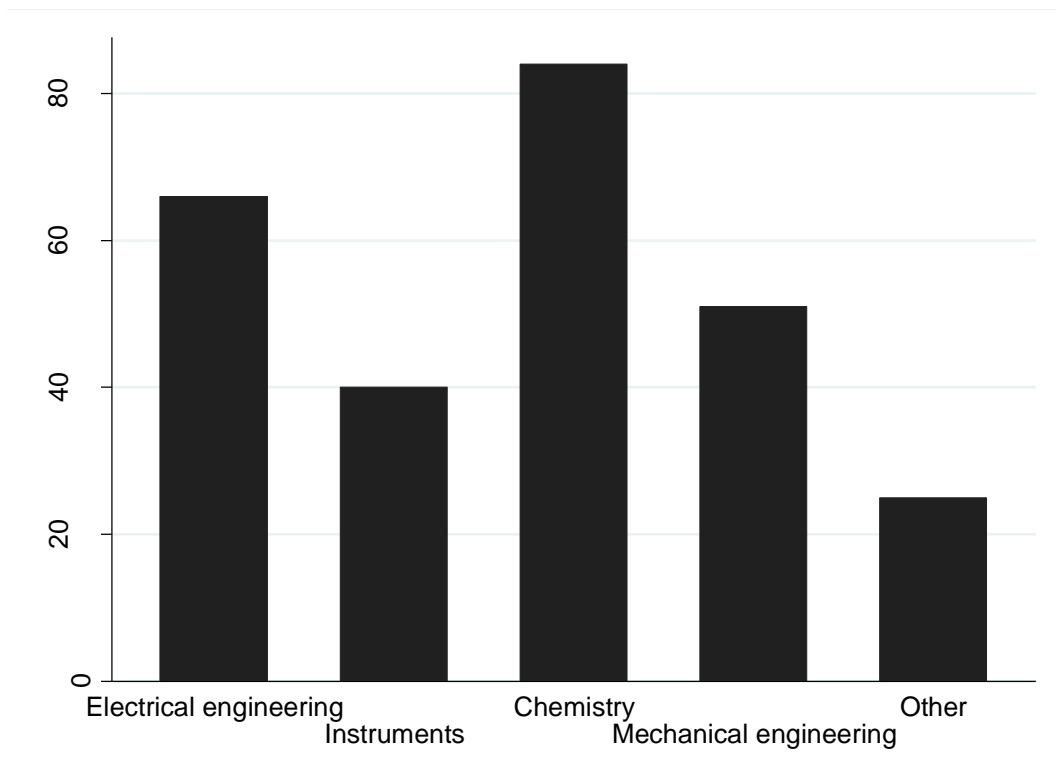
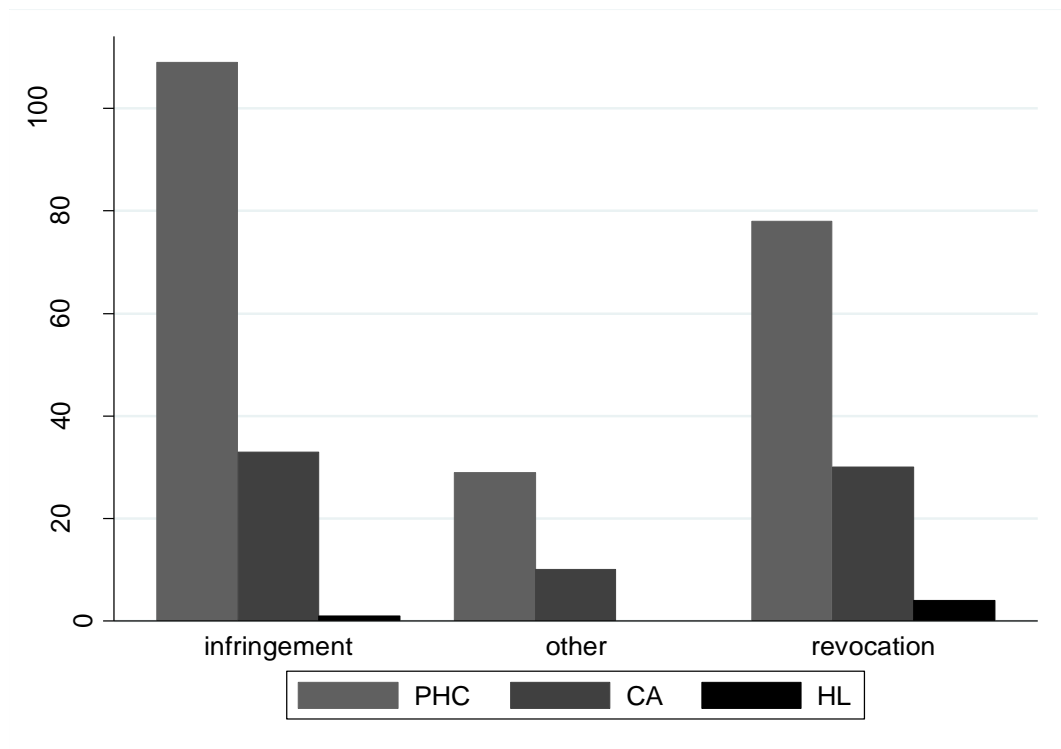


Figure 6: PHC – IPC/Technology distribution (patent cases in 2000-2008)



Note: Other includes: Furniture & games, other consumer goods, and civil engineering.

Figure 7: Appeals from the PHC (patent cases in 2000-2008)



Note: PHC: Patents Court; CA: Court of Appeal; HL: House of Lords/Supreme Court

Table 1: PCC -- Number of cases by year, 2007 and 2008

Year	Cases	Patent	Trademark	(Un)registered			Other
				Design	Tradesececy	Copyright	
2007	34	7	15	7	na	9	1
2008	30	5	12	6	na	10	1
Total	64	12	27	13	na	19	2

*Sum of cases by type exceeds total of cases (64) because individual cases can involve different types of IPRs

Table 2: PCC -- Characteristics of patent cases, 2007 and 2008

Number of parties	Claimant					Defendant				
	<i>Nationality</i>			<i>Type</i>		<i>Nationality</i>			<i>Type</i>	
	UK	Foreign	UK/Foreign	Firm	Firm/Individual	UK	Foreign	UK/Foreign	Firm	Firm/Individual
1	7	4	0	11	0	4	0	0	4	0
2	1	0	0	1	0	4	2	1	4	3
3	0	0	0	0	0	0	0	1	1	0
Sum	8	4	0	12	0	8	2	2	9	3

Table 3: PCC -- Patent characteristics (2007 and 2008)

	Mean	Median	St. dev.	Min	Max
Backward citations	4.154	4	3.647	0	10
Forward citations	0.769	0	1.301	0	3

Table 4: PCC -- Litigating companies by sector

Sector	Total	Size			Age		
		Small	Medium	Large	<10	≥10 & <50	≥50
Business services	5	1	0	4	4	1	0
Chemicals	1	0	1	0	0	1	0
Construction	2	0	0	2	1	1	0
Hightech	1	0	1	0	0	1	0
Metals & machinery	4	3	1	0	0	1	2
R&D services	1	0	0	1	0	1	0
Trade	5	4	0	1	1	3	1
Total	19	8	3	8	6	9	3

* Only shows data for 19 UK companies for which data was available

Table 5: PHC -- Number of cases by year, 2000 to 2008

Year	Patent	Trademark	(Un)registered			Other	NA***
			Design	Tradesececy	Copyright		
2000	18	1	0	0	0	3	22
2001	22	2	2	0	0	1	9
2002	24	1	1	0	1	2	20
2003	28	2	2	0	0	1	7
2004	27	1	1	0	0	1	16
2005	28	4	6	0	2	0	11
2006	40	0	6	1	1	0	4
2007	31	3	3	1	0	0	3
2008	37	3	3	2	0	2	1
Total	255	17	24	4	4	10	93

* Sum of cases by type exceeds total of cases (374) because individual cases can involve different types of IPRs

** Excludes all cases that involve the UKIPO (appeals of administrative decisions)

*** No information found in either court records or other sources

Table 6: PHC -- Characteristics of patent cases, 2000-2008

Number of parties	Claimant						Defendant					
	Nationality			Type			Nationality			Type		
	UK	Foreign	UK/Foreign	Firm	Other	Mixed	UK	Foreign	UK/Foreign	Firm	Other	Mixed
1	94	106	0	193	7	0	76	95	0	170	1	0
2	7	9	24	36	3	1	16	15	23	44	1	9
3	4	1	6	10	0	1	3	1	10	13	0	1
4	0	0	3	1	0	2	2	1	6	7	0	2
5	0	0	1	1	0	0	0	2	1	3	0	0
6	0	0	0	0	0	0	1	0	1	1	0	1
>6	0	0	0	0	0	0	0	0	2	1	0	1
Sum	105	116	34	241	10	4	98	114	43	239	2	14

* Other/Mixed includes individuals, non-for-profit organizations, government, the European Central Bank, and universities

Table 7: PHC -- Litigating companies by sector

Sector	Total		Size			
	#	%	Small	Medium	Large	NA
Business services	25	4.7%	3	3	1	18
Chemicals/Pharma	171	32.4%	11	16	83	61
Computer services	24	4.5%	2	2	3	17
Construction	4	0.8%	1	1	0	2
FIRE	3	0.6%	0	0	2	1
Food etc	1	0.2%	0	0	0	1
Hightech*	94	17.8%	13	11	35	35
Metals & machinery	64	12.1%	8	8	29	19
Other mfg	26	4.9%	3	4	7	12
R&D services	13	2.5%	4	3	2	4
Textiles & apparel	4	0.8%	0	0	3	1
Trade	39	7.4%	13	8	8	10
Transportation	7	1.3%	0	2	2	3
Wood & paper	6	1.1%	0	1	4	1
Other services	18	3.4%	2	1	4	11
Telecommunications	19	3.6%	1	5	4	9
Petroleum & refining	10	1.9%	0	1	6	3
Total	528	100.0%	61	66	193	208

* High-tech includes SIC2 30 (Office Machinery and Computers), 31 (Electrical Machinery and Apparatus), 32 (Radio, Television and Communication Equipment and Apparatus), and 33 (Medical, Precision and Optical Instruments, Watches and Clocks).

Table 8: PHC -- Comparison litigated vs non-litigated patents

	Mean		Std. Dev.		T-test* difference	Min		Max		# Obs.	
	Litigated	Control	Litigated	Control		Litigated	Control	Litigated	Control	Litigated	Control
All control patents											
Backward citations	3.49	0.76	3.99	1.99	-19.36	0	0	21	61	209	17,343
Forward citations	10.06	1.67	21.69	8.13	-14.32	0	0	161	524	209	17,343
Non-patent references	1.83	0.46	3.75	1.89	-10.19	0	0	38	119	209	17,343
Family Size**	20.55	14.99	21.43	11.87	-6.64	1	1	140	246	209	17,343
Number of inventors	2.89	3.33	2.21	2.36	2.67	1	1	19	24	208	14,077
Number of IPC Subclasses	2.59	1.05	1.71	0.24	-72.98	1	1	9	3	209	17,343
Patents assigned to litigating parties											
Backward citations	3.49	0.74	3.99	1.94	-17.92	0	0	21	23	209	2,941
Forward citations	10.06	2.27	21.69	13.78	-7.53	0	0	161	524	209	2,941
Non-patent references	1.83	0.51	3.75	2.92	-6.14	0	0	38	119	209	2,941
Family Size**	20.55	17.93	21.43	15.43	-2.30	1	1	140	204	209	2,941
Number of inventors	2.89	3.53	2.21	2.51	3.54	1	1	19	22	208	2,467
Number of IPC Subclasses	2.59	1.06	1.71	0.26	-41.98	1	1	9	3	209	2,941

Non-litigated control patents matched to litigated patents on priority filing year and authority as well as IPC subclasses.

* All differences are statistically significant at <5% level.

** Defined according to EPO'S DOCDB family definition.

Table 9: PHC -- Outcome and duration, 2000-2008				
<i>Final Judgement</i>	<i># Cases</i>	<i>%</i>	<i>Duration*</i>	
Reason			Mean	Median
Yes	125	49.02	2.92	3
No	126	49.41	2.09	2
settled	70	55.56		
other	22	17.46		
na	34	26.98		
NA	4	1.57	na	na

* In years; computed as difference between year in which claim form was issued and final judgment or end of court case (if known)

Table 10: PHC -- Judgment and characteristics of patent cases, 2000-2008

Number of parties	Claimant			Defendant		
	<i>Final Judgment</i>			<i>Final Judgment</i>		
	Yes	No	NA	Yes	No	NA
1	46.0%	52.0%	2.0%	40.9%	56.7%	2.3%
2	55.0%	45.0%	0.0%	66.7%	33.3%	0.0%
3	90.9%	9.1%	0.0%	64.3%	35.7%	0.0%
4	33.3%	66.7%	0.0%	55.6%	44.4%	0.0%
5	0.0%	100.0%	0.0%	33.3%	66.7%	0.0%
6	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
>6	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Sum	49.0%	49.4%	1.6%	49.0%	49.4%	1.6%

Table 11: PHC -- Claim and judgment of patent cases, 2000-2008

<i>Claim</i>	<i>All</i>	<i>Outcome</i>					
		Infringed	Valid, not infringed	Revoked*	Settled	Other	NA
Infringement	109	14.7%	10.1%	25.7%	23.9%	11.9%	13.8%
Revocation	79	3.8%	19.0%	41.8%	25.3%	7.6%	2.5%
Other	29	6.9%	3.4%	3.4%	13.8%	58.6%	13.8%
NA	38	0.0%	0.0%	0.0%	52.6%	2.6%	44.7%

* Includes partial revocation