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Abstract:

We compare patent litigation cases across four European jurisdictions – Germany, France, the Netherlands, and the UK – covering cases filed during the period 2000-2008. For our analysis, we assemble a new dataset that contains detailed information at the case, litigant, and patent level for patent cases filed at the major courts in the four jurisdictions. We find substantial differences across jurisdictions in terms of case loads. Courts in Germany hear by far the largest number of cases in absolute terms, but also when taking country size into account. We also find important between-country differences in terms of outcomes, the share of cases that is appealed, as well as the characteristics of litigants and litigated patents. A considerable number of patents are litigated in multiple jurisdictions, but the majority of patents are subject to litigation only in one of the four jurisdictions.

Key words: Patent litigation, Europe

JEL codes: O34, K11, K41

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1 Introduction

At present, the European patent system is undergoing a series of major reforms centered on the idea of "unifying" (or rather defragmenting) the European patent system. These reforms are currently moving ahead briskly - in December 2012 the European Parliament approved the so-called *EU unitary patent package*.[1] One major reason for reforming the current enforcement system was the existence of some duplicative, and even in some cases contradictory, patent enforcement decisions across jurisdictions within Europe.[2] Once ratified by the individual member states, the agreement will create a European patent with unitary effect (or *unitary patent*) in all jurisdictions which have acceded to the measure. This will allow patent protection for all participating EU Member States on the basis of a single application and validation, i.e., there will no longer be a need to separately validate the patent once granted by the European Patent Office (EPO) in each state via the payment of validation fees at the national patent offices.[3]

The unitary patent complements the existing patent system in Europe, a system which allows the co-existence of patents granted by national patent offices as well as patents granted by the EPO, which can be validated in one or more countries which are signatories to the European Patent Convention (EPC). In contrast to European Patents (EP) granted by the EPO which then are validated in the member states of the EPC where they are subject to national law (Art. 2(2) EPC and Art. 64(1) EPC), the unitary patent will be subject to the same legal conditions in all member states. Toward this aim, an integral part of the new package is the creation of the *Unified Patent Court* (UPC). The UPC will have exclusive jurisdiction with respect to unitary patents as well as (after a transitional period) European (i.e. EPO-granted) patents designating one or more member states. The court consists of a central division as well as local and regional divisions. The agreement places the seat of the UPC's central division in Paris. Specialized units of the UPC's central division will be set up in London (chemical and pharmaceutical patents) and Munich (mechanical engineering). Generally, claimants will bring actions for revocation before the central division, and will bring actions for infringement before a local/regional division in a member state in which the infringement has occurred, or where the defendant is domiciled. One aspect of the reform that marks a considerable change for some jurisdictions is that the system allows for a choice between bifurcation and an integrated process for hearing infringement and invalidity cases. Currently, bifurcation, i.e., the separation of infringement and validity claims into separate court actions, is used in few European countries. By giving local or

[1] See http://www.europarl.europa.eu/sides/getDoc.do?type=IM-PRESS&reference=20121210IPR04506&format=XML&language=EN (last visited 23.09.2013). For the relevant legislation see: http://ec.europa.eu/internal_market/indprop/patent/documents/index_en.htm (last visited (25.09.2013); for an explanation of the changes see: http://www.epo.org/law-practice/unitary.html (last visited 25.09.2013).

[2] See Harhoff (2009, p. 38-40).

[3] Spain and Italy are the only EU member countries not participating in the Unitary Patent package.

regional courts of the new UPC the discretion to refer counterclaims for revocation to the central division, either bifurcation or integrated treatment of cases may be used.

The approval by parliament was preceded by a drawn-out, highly controversial debate involving policy makers, academics, and practitioners. The main concerns commentators had with the proposed reform centered on the ability of the package to actually reduce the fragmentation of the European patent system and to in practice lower the costs for judicial proceedings (thereby making access to courts easier for smaller companies) without creating incentives for welfare-reducing litigation activities. Some of these issues remain controversial, especially the issue of choice of venue, which is to be taken by claimants, and the issue of which official language ought to be used during the action. There are also a number of practical issues that need to be resolved, such as the number of local divisions in each jurisdiction and the composition of judiciary panels.[4]

It is clear that the debate concerning the UPC is characterized by the presence of an enormous amount of often controversial anecdotal evidence and conversely, an astonishing lack of insights derived from actual empirical data analysis. To some extent this is explained by the fact that systematic and comparable data concerning patent litigation in Europe has been thus far unavailable. This stands in stark contrast to the U.S. where extensive empirical evidence on patent litigation exists. However, up to this point there exists no systematic comparison of litigation across European jurisdictions which would allow a proper evaluation of the need for specific reforms or the likely impact such reforms may have on outcomes. For example, an important argument put forward by the proponents of the UPC is that it will reduce forum shopping[5] in Europe.[6] Nonetheless, it is plausible that the UPC may give rise to a new type of forum shopping if local divisions differ systematically in their willingness to grant pan-European injunctions and/or to separate the infringement and validity proceedings. However, to date no comprehensive statistics exist on the pervasiveness of cross-border litigation and forum shopping that would enable a proper assessment of the merits of the argument in favor of creating the UPC in the first place. Nor is it clear that the creation of the UPC will necessarily improve welfare.

We aim to address this lack of empirical evidence by shedding light on patent litigation within the fragmented patent enforcement systems in Europe over the period 2000-2008.[7]

[4] For a current draft of the Rules of Procedure see http://www.unified-patent-court.org/images/documents/draft-rules-of-procedure.pdf (last visited 23.09.2013).

[5] Forum shopping refers to the strategic choice of court venue by litigants to obtain a favorable outcome (see Moore (2001), p. 899). This also includes the strategic choice to litigate in several jurisdictions and to use favorable judgments in one jurisdiction to influence the outcome in another jurisdiction.

[6] See for example EPO http://www.epo.org/law-practice/unitary/patent-court.html (last visited 22.04.2013).

[7] The objective of this study is to cover all patent cases filed at the courts covered by our investigation during the period 2000-2008. These cases may have been decided after 2008; since our data collection occurred between 2010 and 2012, decisions after 2008 are covered. In its current form, the data for the Netherlands and France do not cover all cases filed, but are largely restricted to cases that were adjudicated.

We draw a direct comparison between patent litigation in four legal systems in Europe: Germany, the UK (England and Wales), France, and the Netherlands. These countries handle the majority of all patent cases in Europe, and are therefore the most relevant ones for this study.[8]

It is notable that there are important differences in the legal systems across these jurisdictions, something that makes assembling a comparative analytical report a challenging task. The most obvious difference among these four systems is that the German system is bifurcated whereby infringement and validity are handled separately at different courts. The other three systems combine both issues in the same court action. Since the UPC allows for bifurcation, as briefly described above, insights from a comparison of litigation in Germany with litigation in the other countries, which do not feature bifurcation, ought to yield some useful insights with regard to the overall functioning of the UPC. There are also important institutional and procedural differences across jurisdictions, which account in part for the concentration of cases involving certain technologies in a given jurisdiction. For example, we show that pharmaceutical cases and technologies related to telecommunication and digital data transmission are litigated disproportionately more frequently in the UK (i.e. as a share of the total caseload in the UK) whereas cases related to machinery and engineering more broadly are litigated mostly in Germany.

For our analysis, we have collected case-level patent litigation data directly from court records and a range of other sources in all four countries for the period 2000 to 2008. We have collected the data in a harmonized way to ensure comparability, which is a major challenge in the analysis of litigation data across jurisdictions. We further added information on the characteristics of the litigated patents and litigating parties from external databases to complement our case-level analysis.

The results point to a number of differences in litigation patterns and outcomes across the four jurisdictions, some of which challenge the conventional wisdom derived from anecdotal case-by-case evidence. Note that due to concerns over the completeness of the data for France and the Netherlands, we emphasize the comparison between Germany and the UK throughout our analysis.

With regard to case-level analysis, we show that the number of court cases differs substantially across jurisdictions. Although comparing case counts across jurisdictions is difficult, especially between a bifurcated and a non-bifurcated system, the data still indicate that a substantially larger number of patent cases is heard by regional courts in Germany than in any of the other jurisdictions. Depending on how cases are counted in Germany, the

[8] For an overview of the number of cases see European Council 2007 WD 11622/07 PI 135. For the relevance of the four jurisdictions for patent litigation in Europe see Taylor Wessing 2009 Global Intellectual Property Index Report at http://www.taylorwessing.com/ipindex (last visited 23.09.2013).

total caseload in Germany is between 12 and 29 times larger than in the UK.[9] The data for different regional courts in Germany reveal that caseloads differ enormously even within a single jurisdiction. The regional court in Düsseldorf hears more than seven times as many cases as the regional court in Munich.

Our data also allow us to compare across jurisdictions how long it takes courts to reach a first decision on the merits of the case. Proceedings take around two years in France, but are substantially faster in the other three jurisdictions. Median durations for infringement cases are 9 months in Germany, 10 months in the Netherlands, and 11 months in the UK. The fact that we possess detailed information for cases in the UK allows us to gauge whether decisions in Germany are relatively fast because of the fact that in the German system courts decide only on either infringement or revocation. This is done by looking only at cases in the UK where no attack on the validity was raised (neither as defense nor as a counterclaim) and hence, where the court focused solely on the claim brought by the claimant. Interestingly, our results indicate that focusing on a single issue does not appear to have any substantial effect on the median duration of a case in the UK. Nevertheless, if the validity of a patent is challenged in Germany at the Federal Patent Court, the judgment of the validity case is commonly handed down with a substantial lag relative to the judgment of the infringement case. Therefore, the total length of an infringement case in Germany if the alleged infringer challenges validity at the Federal Patent Court takes a lot longer (on average 24 months) because the invalidity challenge is usually filed a few months into the infringement case.[10]

The data also reveal substantial differences across jurisdictions in the outcomes of cases that were decided by a judgment on the merits of the case. For example, the UK stands out with a relatively large share of revoked patents, even when the original claim is for infringement. In Germany, the share of patents involved in an infringement suit that were revoked by the Federal Patent Court is low, at a mere 6%. However, this reflects partly the fact that only in around a third of infringement cases the defendant files a claim for revocation with the Federal Patent Court.

Another interesting finding of our case level analysis is the relatively large share of first instance cases in the UK that is appealed. We find that almost 50% of revocation and infringement cases proceed to the Court of Appeal. But the 1st instance decision is overturned only in a quarter of such appeals in the UK. In Germany, by contrast, the share of cases that proceed to the higher regional courts is a lot lower (15% of infringement and 10%

[9] However, as discussed in the Conclusion, data on recent case filings in the UK in 2012 point to a very substantial increase of the caseload in the UK.

[10] The fact that invalidity claims can only be filed at the Federal Patents Court after an opposition at the German Patent and Trademark Office (DPMA) or the EPO (or after the period for an opposition has expired) may further delay the decision on validity.

of revocation cases) and the share of judgments that is overturned is with 16% even lower than in the UK.

Our analysis also offers evidence on the fragmentation of the European patent system. In UK and the Netherlands we find a relatively high number of cases that are litigated in several jurisdictions (26% and 15% of all cases litigated in the UK and the Netherlands respectively). These shares are a lot lower in Germany (2%) and France (6%). The lower shares are also explained by the fact that the overwhelming share of patents litigated in the UK and the Netherlands are national parts of EP patents (81% and 73% respectively) that have also been validated in Germany and France. The share of litigated EP patents is a lot lower in Germany and the Netherlands (42% and 39% respectively). If we restrict attention to EP patents only, overall the incidence of duplication is small: only 8.4% of all litigated EP patents are subject to litigation in more than one country. Of course, the patents affected by duplicated litigation are likely to be particularly important, and the cases will be more resource-intensive than those for other patents.

Regarding analysis at the litigant level, the detailed information on the litigating parties we possess enables us to compare their characteristics across jurisdictions. In all jurisdictions we find that litigants are distributed over a wide range of industries. Nevertheless, pharmaceutical companies are overrepresented as litigants within the UK legal system. In Germany, there are disproportionately many litigants in the machinery industry. In the Netherlands the presence of many companies in the finance and insurance business is notable. In France, by contrast, litigation does not appear to be concentrated in any specific industry. The sector distribution of litigants matches the distribution of litigated patents across broad technology areas. Thus, it can be said that most patents litigated in the UK are related to chemicals and pharmaceuticals (31%), whereas most of the litigated patents in Germany are in the areas of mechanical and civil engineering (33%).

Finally, with respect to patent-level analysis, a comparison of patent characteristics across jurisdictions reveals that the patents litigated in the UK appear to be more valuable (according to patent characteristics widely used in the literature such as family size and the number of inventors) and broader (measured by the number of IPC subclasses) than the patents litigated in the other jurisdictions. This fact is especially significant in light of the high revocation rate in the UK.

The remainder of this paper is organized as follows. Section 2 contains a review of the existing empirical evidence on patent litigation in Europe. Section 3 describes the enforcement systems in all four countries. Section 4 discussed differences in the legal systems in more detail. In Section 5 we describe the collection of our litigation data and the construction of the dataset used in our analysis. Section 6 contains our comparison of litigation across European jurisdictions. Section 7 offers some brief concluding thoughts.

2 Literature review of empirical evidence on patent litigation

In this section, we briefly review the available evidence on patent litigation in Europe. As will become evident from reading the descriptions below, the available evidence on patent litigation is scarce, especially in comparison to the empirical evidence available for the U.S. Nonetheless, as shown below, it is clear there are significant jurisdictional differences between the various legal systems which may have important implications for patent enforcement in practice.

Germany

For Germany, the first attempt to systematically analyze patent infringement cases was made by Stauder (1983 and 1989). He collected data on patent and utility model cases filed between 1971 and 1973 in Germany and described litigation patterns, their outcomes and duration from a comparative law point of view. Meanwhile, Hase (1992; 1993; 1994) obtained data on patent cases at nine regional courts for 1990, 1991, and 1994.[11] Hase's objective was to show the absolute number of cases and their distribution across courts. The data reveal a highly skewed distribution of the caseload: in 1990, Düsseldorf and Munich account for 35% and 22% of all patent cases, respectively; that is two out of nine courts account for slightly less than 60% of cases. More recently, Kühnen and Claessen (2013) collected information on case counts at the regional courts in Düsseldorf and Mannheim for 2009-2011. Their data suggests that Düsseldorf and Mannheim are the most important courts in Germany for patent infringement. The authors estimate that they accounted for almost 40% of all infringement cases in Germany in 2011.

Cremers (2007) collected data from court archives of the specialized intellectual property (IP) chambers in Mannheim and Düsseldorf for the case filing years 1993-1995. Her sample contains a total of 715 patent cases concerning 910 litigated patents and utility models. The filing dates of these patents range between 1978 and 1993. Cremers analyzes the determinants of patent litigation by comparing the litigated patents to a control sample of non-litigated patents. Cremers demonstrates that the most valuable patents are more likely to be the subject of litigation. In addition, she finds smaller firms are more likely to be involved in litigation, and further to this, that the litigation probability decreases with the portfolio size of the patentee. Using the same database as in her 2007 paper, Cremers (2009) investigates the settlement decisions in patent infringement suits. She shows that legal differences between the regional courts have a significant impact on the settlement rates during trial. Cremers further finds that, at later stages of the trial, the use of invalidity suits positively affects the settlement probability, while the fact that a patent has survived an opposition procedure generally increases the settlement probability. Cremers and Schliessler (2012) use data on patent litigation at the three most important regional courts

[11] The data differ across years. Whereas the data for 1990 refer to cases concluded in 1990, the data for 1991 and 1992 refer to the number of cases filed in that year.

Mannheim, Munich and Düsseldorf in 2000-2008 (see Section 3.1 below)[12] to find that new information revealed during trial has a positive effect on settlement probability. Further research on the effects of litigation on companies' behavior and strategies is provided by Schliessler (2013). She looks at the effect of litigation outcomes on firm value. Her results suggest that litigation has a measurable impact on firm value, but that this effect depends on the characteristics of the parties and the outcome of trial. Defendants are negatively affected by a loss or a settlement, while a win leaves the value unchanged.

UK

Regarding existing empirical evidence in the UK, Moss et al. (2010) examine the outcomes of 47 validity and infringement cases between January 2008 and August 2009 by the Patents County Court (PCC), the Patents Court (PHC), the Court of Appeal (CA), and the House of Lords. 18 out of these 47 cases (38% success rate) were won by the patentee, which means that the patent was considered to be infringed and/or valid.

Meanwhile, Greenhalgh et al. (2010) collect survey evidence on about 100 patenting and non-patenting firms (active between 2002 and 2009) to investigate the IP litigation activity of micro firms and small and medium-sized enterprises (SMEs) in the UK. They find approximately 40% of patent holding firms to have been involved in some kind of IP dispute during the five years before the survey. Firms that do not hold patents are much less likely to be subject to a patent dispute due to alleged infringement (7% report a dispute). Greenhalgh et al. (2010) also demonstrate that firms were as likely to be involved in a dispute with another firm of the same or smaller size as they were with a larger company. The survey also offers some insight with regard to disputes that never made it to court, i.e. regarding the size of the "litigation iceberg that lurks under water." Greenhalgh et al. (2010) find that the vast majority of firms first attempts to resolve a dispute through the exchange of letters between solicitors, which appears to resolve a substantial fraction of the disputes. Only about 13% of disputes ended up in court. The study also offers some insights with regard to the obstacles to litigation. 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 managers and engineers involved in R&D have 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 where, on balance, the odds for winning the case were not sufficiently in their favor.

Helmers and McDonagh (2013a) use the data for England and Wales described in more detail in Section 3.2 below to provide a more comprehensive analysis of all patent cases

[12] Their data and the data used by Schliessler (2013) orginate from an earlier version of the dataset used in this paper.

heard by the PCC (2007-2008) as well as filed at the PHC (2000-2008). Their data also cover all appeals made to the CA and the House of Lords/Supreme Court. The analysis of the IP cases heard before the PCC indicates that patents are the least litigated IP right at the PCC. Only 12 out of 64 IP cases concluded in 2007 and 2008 involved a patent. Interestingly, all patent cases heard by the PCC are about the infringement of a patent, whereas only half of all patent cases before the PHC are infringement actions (i.e. where the claimant alleges infringement). 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. At the PHC Helmers and McDonagh (2013a) find 256 patent cases out of a total of 407 IP cases filed 2000-2008 (63%), of which 125 resulted in a judgment. They find that about 50% of all cases are filed alleging the infringement of a patent and around 37% of filed cases seek the revocation of a patent.[13] With respect to the 125 judgments, the data show that revocation was the most likely outcome regardless of the initial claim – there was an overall invalidation rate of approximately 50%. Helmers and McDonagh (2013a) find that most litigating companies are in the chemical and pharmaceutical industry and consequently most litigated patents protect chemical and pharmaceutical inventions.

In a companion paper Helmers et al. (2013) use an extension of the data which also includes 2009 and 2010 to study litigation involving so-called patent trolls (or non-practicing entities – NPEs) at the PHC. The authors show that NPEs are relatively uncommon when compared to other jurisdictions such as the U.S.: only 11% of patent cases filing during 2000-2010 involved a NPE, where a substantial number of these cases were between the same parties. In most cases, NPEs did not sue for infringement but manufacturers attempted to "clear the way" by bringing patent revocation cases before the court. Given the fact that revocation of the patent is the most likely outcome of a patent case which reaches judgment in the UK (as shown in Helmers and McDonagh, 2013a, Table 12) this indicates that NPEs may seek to avoid litigation before the PHC, while companies that are sued by NPEs in other jurisdictions may find it advantageous to challenge the validity of the NPE patent at the PHC. In NPE cases, ICT-related companies are overwhelmingly involved and NPE patents tend to be ICT-related.

France

Véron (2001) presents data on patent litigation in France for the period 1990-1999. According to his data, around 50% of all patent cases during that period are heard by the Paris court. Véron (2001) analyzes the data for Paris in more detail to show that 82% of patent cases claim infringement, the remainder is mostly related to employee inventions and breach of contract. Almost three quarters of litigating parties are French; German and U.S. litigants dominate the group of foreign litigants. His data also reveal that disproportionately many patents on electronics and instruments are litigated in the Paris

[13] In 61% of infringement actions the defendants file a counterclaim for revocation and in around 41% of revocation actions the defendants file a counterclaim for infringement.

court. The data on case outcomes show that in around 50% of cases the patent is held valid and infringed, revocation occurs only in 23% of French and 15% of EPO patents. Véron (2001) has also information on damages. These data show that most damages awarded are below Euro 80,000, although there are also eight cases with damages above Euro 1,000,000. In a follow-up study, Véron (2010) presents data for 2000-2009. The data indicates that on aveage around 335 cases were filed annually between 2004 and 2009 across all courts in France that deal with patent cases. Véron finds that 81% of claims filed between 2000 and 2009 are for infringement. The remainder is relatively evenly distributed across a range of other claims such as invalidity or employee inventions. More detailed information on decisions on infringement claims at the TGI Paris reveals that infringement was found in 33% of decisions, in 40% the patent was upheld but not infringed, and in 27% the patents was revoked. Again, French patents were considerably more likely (31%) to be revoked than EP patents (21%). Relative to the 1990-1999 period, the more recent data suggests overall an increase in revocations and in decisions that upheld the patent but do not find infringement at the expense of the share of decisions that find infringement.

Europe

Mejer and van Pottelsberghe (2012) describe the patent litigation system in Europe and discuss its implications for business. Because they lack data on patent infringement cases, they rely largely on anecdotal and case evidence on the broad differences in costs, duration, and intensities of patent litigation in four European countries: Germany, France, the Netherlands and the UK. The case studies described by Mejer and van Pottelsberghe (2012) suggest the existence of substantial differences in litigation outcomes on the same patent across European jurisdictions. Harhoff (2009) focuses on the costs and benefits of the fragmented patent litigation system in Europe and assesses potential welfare implication of a unified pan-European enforcement system. Similarly to Mejer and van Pottelsberghe (2012), the main limitation in the analysis is the lack of data on patent cases in the various European jurisdictions. The absence of case-level data means that various assumptions about the incidence, outcomes, and costs of patent litigation in the different jurisdictions have to be made. Nevertheless, the results suggest that the current fragmented litigation system leads to costly duplication of cases across Europe, albeit not quite in the extent assumed by the European Commission. The case-level evidence by Mejer and van Pottelsberghe (2012) confirms this view. According to Harhoff (2009), a low-cost unified litigation system might also provide better access to enforcement for companies that currently cannot afford litigation in multiple jurisdictions. However, he also lists potential downsides of harmonization.

In the absence of case-level data, Arundel et al. (2003) collect survey data on patent litigation for a small sample of less than 450 European SMEs that were granted patents at the USPTO or EPO between 1994 and 1997.[14] The authors investigate the effect of the

[14] 67% of firms in the sample are from Germany, the UK, and the Netherlands.

relative size of the infringer compared to the patent holder on the action taken against the infringer. They find that when small firms face infringement by a larger firm, they are less likely to take legal action than when faced with infringement by a firm of equal or smaller size despite the fact that the damage caused by infringement is reported to be much larger when the infringer is larger. While the analysis provides interesting insights with regard to the balance of powers between SMEs and larger companies when it comes to patent litigation, the data is limited in informing us about representative patterns of infringement or litigation because of selection bias in terms of responding to the survey and item-non response, which the authors do not take into account in their descriptive analysis. Rodwell et al. (2007) offer another survey-based analysis of 140 European SMEs, although the study faces the same sample selection problem as Arundel et al. (2003). Rodwell et al. (2007) find that 75% of sampled firms are affected by IP infringement (most commonly design rights, 44%). The data reveal that about 20% of sampled companies subject to infringement reported not to have taken any action in response.

To the best of our knowledge, the only study using case-level data for various European jurisdictions is van Zeebroeck and Graham (2011). They rely on private data on IP litigation collected by data from Darts-IP to provide descriptive evidence on the incidence and character of patent litigation in seven European countries: Belgium, France, Germany, Italy, Spain, the Netherlands, and the UK. They observe significant differences in the likelihood of reaching a final decision in patent litigation across jurisdictions, with much larger relative frequencies of decisions in some countries (e.g., the Netherlands) than in others (e.g., the UK). They also find litigation intensities to vary substantially across technological areas.

While these studies have cast some light on litigation in Europe, they have suffered from various shortcomings, perhaps most importantly, the lack of comprehensive data on court cases across jurisdictions. The advantage of the dataset used in this study is that we observe additional information and that – at least for Germany and the UK – we also have data on cases that were settled.

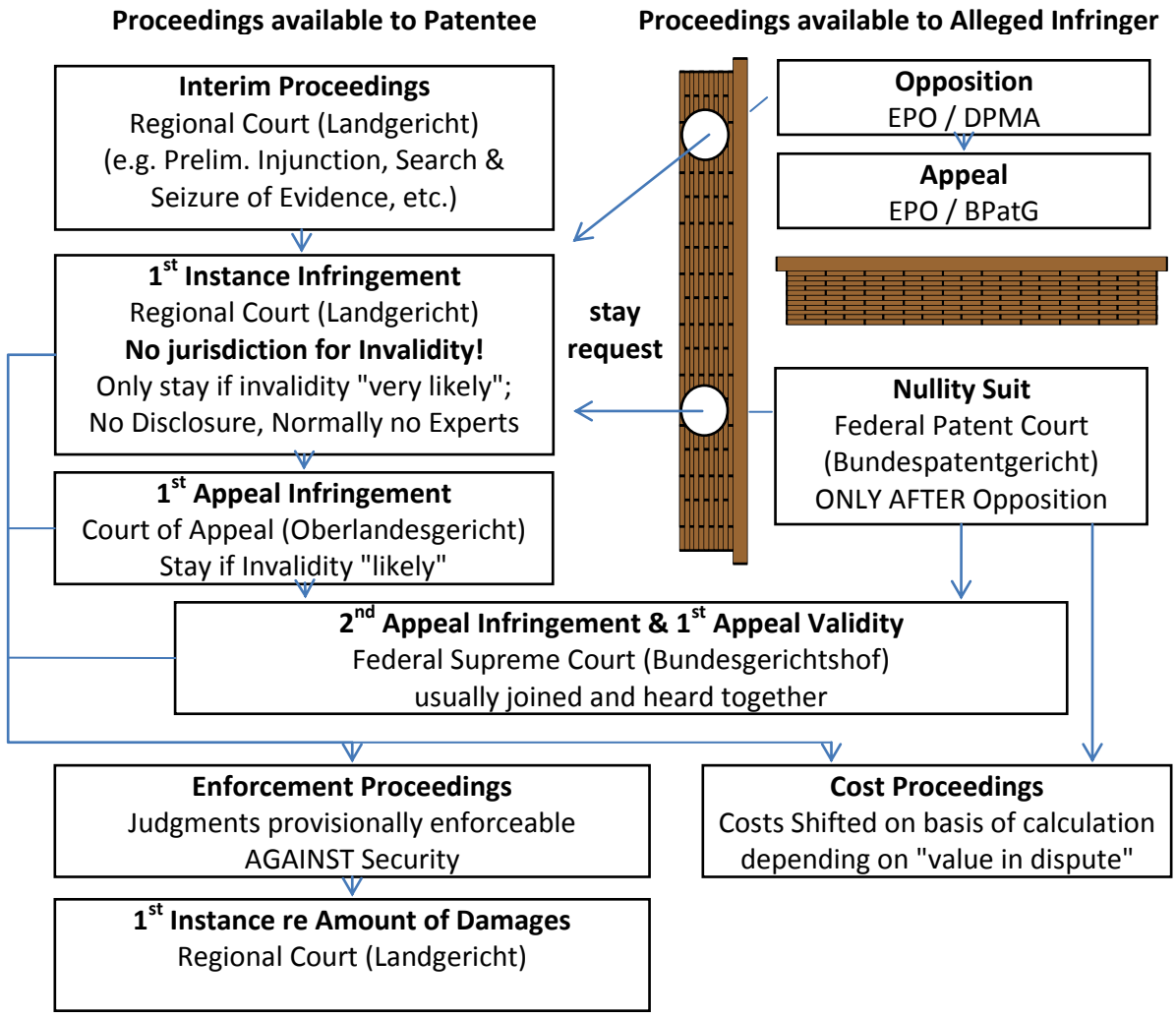
3 Enforcement Systems

This section describes the enforcement systems in the four countries covered by our analysis. We separately discuss the most important differences and commonalities across the different jurisdictions which inform our empirical analysis.

3.1 Germany

The German patent system is illustrated in the following Figure and further explained below.

Figure 1: Overview of Patent Litigation System in Germany



3.1.1 Applicable Law

European Patents are granted on the basis of the European Patent Convention (EPC).[15] The EPC contains the rules for the granting procedure of European patents (EP) and the validity

[15] English version at: http://www.epo.org/law-practice/legal-texts/html/epc/2010/d/index.html (last visited 30.08.2013).

proceedings before the EPO. However, according to Art. 2 and 64 EPC, the rights conferred by the respective national parts of an EP and the infringement and validity proceedings before the national courts, are governed by the law in the respective countries in which the patent was validated.

Therefore, likewise to German national (DE) patents, the rights conferred by the German part of a European patent and the options for challenging the validity of the patent are stipulated in the German Patent Code (*Patentgesetz – PatG*)[16] and the Law on International Patent Treaties (*Gesetz über internationale Patentübereinkommen – IntPatÜG*).[17] With utility models (*Gebrauchsmuster*), Germany has a second type of technical intellectual property right. The rights conferred by utility models and the options for challenging the validity of utility models are set forth in the German Utility Model Code (*Gebrauchsmustergesetz – GebrMG*).[18]

The main rules for the legal procedures regarding infringement, validity and costs are set out in the Code for Civil Procedures (*Zivilprozessordnung – ZPO*), the court cost code (*Gerichtskostengesetz – GKG*) and the lawyers remuneration code (*Rechtsanwalts-vergütungsgesetz – RVG*).[19]

3.1.2 Competent Court for Infringement Action

In Germany twelve regional courts, *Landgerichte* (LGs), are competent to hear patent and utility model infringement cases: Berlin, Braunschweig, Düsseldorf, Erfurt, Frankfurt, Hamburg, Leipzig, Magdeburg, Mannheim, Munich I, Nuremberg-Fürth and Saarbrücken.[20] Each of these LGs has one or more designated patent chambers (*Kammern*). A case is heard by a panel of three judges. In Düsseldorf, Mannheim and Munich the chambers hear predominantly patent-related cases.[21]

Appeals against the decisions of the LGs are heard by the higher regional courts (*Oberlandesgericht – OLG*).[22] There is no need for an express leave to appeal. Against the decisions of the higher regional courts, a second appeal can be brought before the Federal

[16] English translation at: http://www.wipo.int/wipolex/en/details.jsp?id=6128 (last visited 30.08.2013).

[17] English translation at: http://www.gesetze-im-internet.de/englisch_bgb/ (last visited 22.09.2013)

[18] English machine translation at: http://www.wipo.int/wipolex/en/details.jsp?id=10002 (last visited 22.09.2013)

[19] English translation partly available at: http://www.gesetze-im-internet.de/Teilliste_translations.html (last visited 30.08.2013).

[20] See § 143 PatG and § 27 GebrMG and the relevant regulations of the respective federal states.

[21] See §§ 253 ZPO seq. for the main rules governing the infringement proceedings.

[22] See §§ 511 ZPO seq. for the main rules governing the appeal proceedings.

Court of Justice (*Bundesgerichtshof – BGH*). Leave for the second appeal can be granted by either the OLG or the BGH.[23]

3.1.3 Options for challenging the validity of a patent

The LGs have no jurisdiction to decide on the validity of a patent – neither in form of a defense against a patentee's claims for patent infringement nor in form of a (counter-) claim for declaratory judgement of invalidity (this is referred to as bifurcation of infringement and validity proceedings). The situation is different for infringement suits on the basis of utility models in which the defendant is allowed to raise an invalidity defense. [24]

In both patent and utility model infringement proceedings the infringement court has the discretion to stay the proceedings until parallel invalidity proceedings before EPO, DPMA (*Deutsches Patent- und Markenamt*) and BPatG (*Bundespatentgericht*) have been terminated.[25]

As in all contracting states of the EPC, the validity of an EP patent can be challenged by filing an opposition before the EPO. Only the EPO is competent for invalidating the EP with effect for all contracting states of the EPC. The decisions of the EPO can be appealed before the EPO's board of appeals.[26] The validity of a DE patent can be challenged by filing an opposition before the DPMA[27] German Utility models can be challenged in cancellation proceedings (*Löschungsverfahren*) before the DPMA.[28] The decisions of the DPMA can then be appealed before the Federal Patent Court.[29]

Only after the deadline for filing an opposition against a DE or EP patent have lapsed and all pending opposition and appeal proceedings against the patent have been terminated, an invalidity action against an EP and DE patent can be filed before the BPatG.[30] The decisions of the BPatG can be appealed before the BGH. Therefore, the BGH is the only court in Germany which has jurisdiction to decide on both infringement and validity. Within the BGH only the X. (Roman ten) and the Xa. senates are competent to hear patent cases.[31]

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[23] See §§ 542 ZPO seq. for the main rules governing the second appeal proceedings.

[24] See BGH, Opinion dated June 5, 1997 – X ZR 139/95, BGHZ 136, 40, 42 – Leiterplattennutzen (English translation not available).

[25] See § 148 ZPO.

[26] See Art. 99 EPC seq.

[27] See §§ 21 and 59 PatG seq.

[28] See § 25 GebrMG seq.

[29] See § 73 PatG seq.

[30] See §§ 65, 81 PatG seq. and Art. II § 2 IntPatÜG.

[31] The Xa. senate was created to decrease the backlog of the X. senate and existed only from January 1, 2009 until December 31, 2010.

3.1.4 Structure of Proceedings

Traditionally, German law foresaw only very limited claims for disclosure of information and/or inspection of potentially infringing products.[32] Since the implementation of the enforcement directive in 2008[33] German procedure foresees new and more efficient claims for inspection and production of information which can be initiated before or in parallel to the first instance proceedings by way of preliminary proceedings without notice to the defendant.[34] In practice, such proceedings are still the exception.

German infringement proceedings start with filing a complaint substantiating the alleged infringement at a LG. The claimant is relatively free to choose the LG for the case since he can choose the jurisdiction of the defendant or the jurisdiction where (part of) the potential act of infringement, such as an offer of the allegedly infringing embodiment, has taken place.

The court then serves the complaint to the defendant. With regard to the first instance infringement proceedings before the LGs, practitioners talk about the Düsseldorf-, Mannheim- and Munich models.[35] The models differ in the timing and number of oral hearings (one or two) and the matters dealt with during these hearings (substantial questions or only case management). In all "models" the proceedings are mostly written and governed by extensive obligations of substantiation (*Substantiierungspflichten*). [36] Further, first instance proceedings are relatively quick (as also borne out by our data) since the parties are usually allowed to put forward only two writs each, and expert opinions are ordered only in exceptional cases. The first oral hearing is usually scheduled after 6-12 months.

Oral hearings are usually brief; they almost never exceed one day and often last for only 2-4 hours. Hearings start with an introduction of the presiding judge who gives the court's preliminary opinion based on the writs exchanged before the hearing. Afterwards the presiding judge leads the lawyers with specific questions regarding open issues. During the

[32] In principle § 142 ZPO and § 809 BGB allowed for inspections and exchange of written evidence but the German courts were very hesitant to apply these rules.

[33] See Directive 2004/48/EC, available at: http://ec.europa.eu/internal_market/iprenforcement/directive/index_en.htm and the German implementing law: Gesetz zur Verbesserung der Durchsetzung der Rechte des Geistigen Eigentums, BGB part I dated July 11, 2008, pages 1119-1211

[34] See. § 140 c PatG and 24 c GebrMG and Kühnen (2013) recitals 304 seq.

[35] The Munich model, known for its early hearing, rigid deadlines and the option for mediation, was introduced in 2009. During the time of our data collection, practices in Munich and Mannheim had been quite similar. See Herr and Grunewald (2012) for more discussion on the differences between the courts of Düsseldorf, Mannheim, and Munich.

[36] For example, a defendant is not allowed to simply deny allegations of the claimant but has to explain why the allegation is wrong (especially in view of infringement) – otherwise the allegations of the claimant are upheld undisputed, see § 138 ZPO; for the details see Kühnen (2013) recitals 295 seq.

proceedings the lawyers mainly answer the questions. A decision is handed down 1-3 months after the (second) oral hearing. Usually this decision is the final judgment.

Nullity actions are often a reaction of the defendant to an infringement action brought before a LG and therefore filed a couple of months after the infringement action has been initiated. Invalidity decisions by the BPatG take on average 18 months after the filing of the invalidity action before the BPatG (see Table 3 below).Therefore, if the LG does not stay the infringement proceedings, the claim for injunctive relief is commonly granted at least a year before the question of validity is addressed.

The LG grants the stay of a case only if it is of the opinion that the revocation action, on the basis of a preliminary assessment, is predominantly likely to succeed. On appeal, the OLG uses a more lenient standard and commonly stays the proceedings if the revocation action is "likely" to succeed.[37]

3.1.5 Preliminary Injunction

Preliminary proceedings for asserting claims for injunctive relief are very rare in patent cases and not necessary under normal circumstances due to the speed of the normal infringement proceedings. The decision on the amount of any damages to be paid by the infringer will be decided in a separate suit afterwards.

3.1.6 Enforcement

The decisions of the LG are enforceable against the provision of a security. The latter ensures that the defendant will be able to recover damages if the patent is held invalid and/or not infringed in the second instance. The decision in the second instance is enforceable without security.[38]

The winning party has to start enforcement proceedings (including an injunction) on its own initiative. Usually the winning party writes a formal letter and submits a bank guarantee as security. The winning party can choose which of the claims it enforces. In most cases the winner chooses to enforce only the claim for rendering of accounts and waits with the enforcement of the injunction until the validity has been confirmed or the judgement of the second instance has been handed down. If the winning party enforces a first instance judgment and the patent is later revoked, the patentee is liable for the damages it has caused to the defendant.[39]

[37] For details see Kühnen (2013), recitals 1574 seq.

[38] See sec. 704, 708, 709 and 717 (2) ZPO.

[39] See § 717 (2) ZPO.

3.1.7 Costs and Fee Shifting

In all proceedings before the German courts, the court and attorney fees are calculated according to a formula based on the estimated value of the dispute.[40] These fees are the basis for the reimbursement of costs which the winner of a case can demand from the loser.

The court fees are usually higher than in other jurisdictions and range between Euro 25 and Euro 91,456.[41] The attorney fees do not represent the true legal costs but only a lower bound to which the attorney is entitled. Clients and their attorneys often agree to payment schemes based on an hourly rate which leads to attorney costs well above the legal fees. As a result, the costs are often not fully shifted to the loser.[42]

Since German proceedings do not foresee extensive pre-trial disclosure of information and only short hearings usually without experts, proceedings are usually considerably less expensive than in other jurisdictions even if the same hourly rates for attorneys apply. Practitioners estimate the average costs to range between Euro 40,000 and Euro 100,000 per party.[43]

3.1.8 Availability of Decision/Statistics

Whereas the number of cases before the LGs and OLGs are not published, comprehensive summary statistics for the BPatG and the BGH are published each year.[44]

3.2 UK (England and Wales)

The patent litigation system in the UK is illustrated in the following figure and further explained below.

[40] The value in dispute (VID) is set by the court and can range from 300 Euros to 30 Million Euros (see § 39 (1) Litigation cost act (GKG)). Practitioners estimate the average value in dispute to be typically between Euro 500,000 and Euro 5 million, see Bardehle (2013, p. 12).

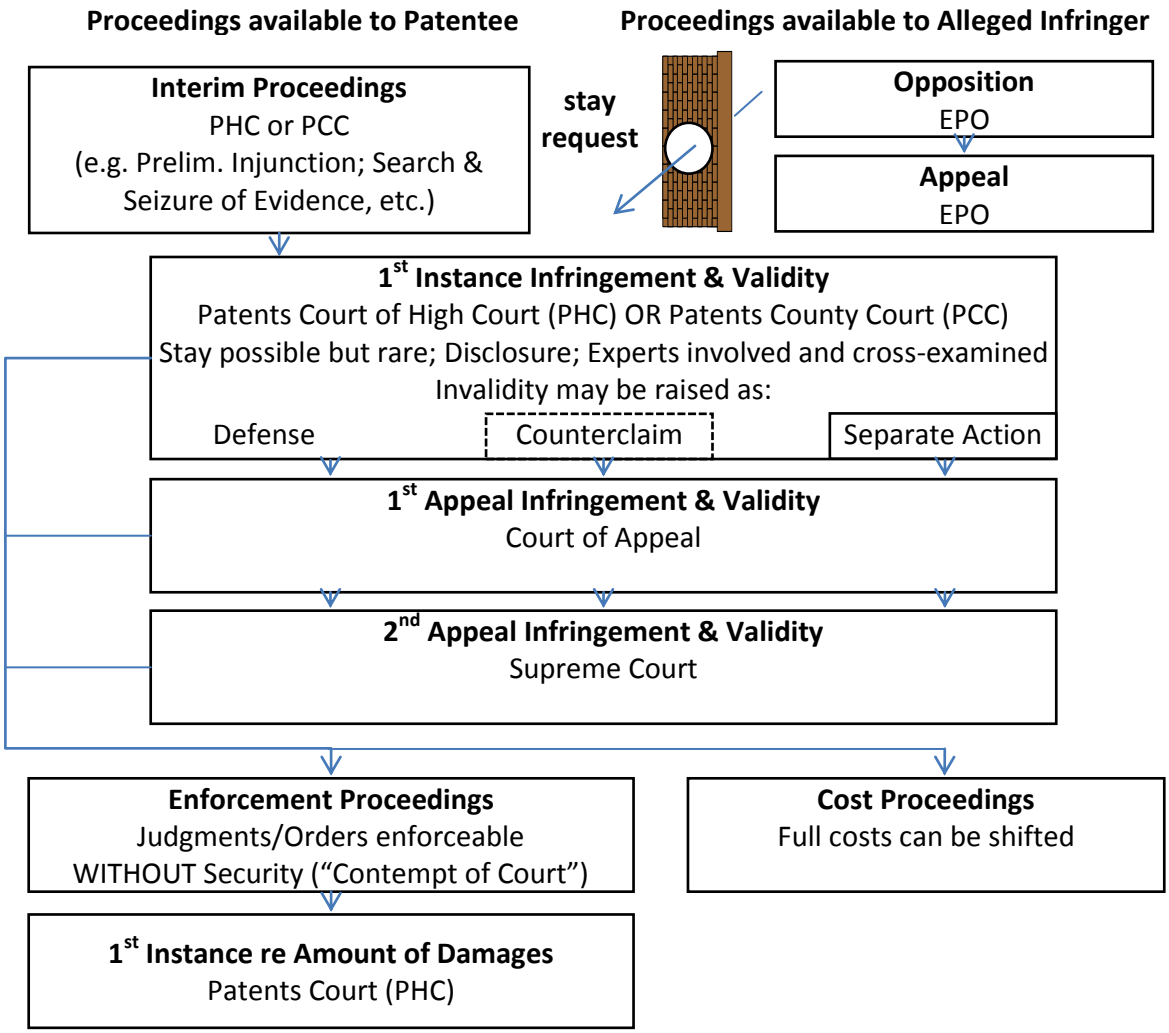
[41] Depending on the outcome of the case (judgment, settlement, withdrawal, etc.), the court demands multiples of a "1.0 court fee" (see § 3 (2) GKG). The amount of a "1.0 court fee" depends on the value in dispute and ranges from Euro 25 (if the value in dispute is up to Euro 300) to Euro 91,456 (if the value in dispute is Euro 30 million). If the case ends with a judgment, the court requests the payment of 3.0 fees, i.e. Euro 4,456 * 3 = Euro 13,368 if VID = Euro 1,000,000 and up to Euro 91,456 * 3 = Euro 274,368 if VID is Euro 30,000,000. Since German courts commonly consider each patent as a separate "case", a suit based on several patents costs a multiple of the 3.0 court fees and can therefore exceed the costs of Euro 274,368.

[42] The reimbursement of the attorney fees is also calculated on the basis of multiples of a "1.0 attorney fee" which in turn depends on the VID. If the court renders a judgment after an oral hearing the reimbursement is 2.5 fees per lawyer. Therefore, on average the reimbursement per lawyer is 2.5 * Euro 4,496 = Euro 11,240 (if VID = 1,000,000) and up to 2.5 * Euro 91,456 Euros = Euro 228,640 (at VID = Euro 30,000,000).

[43] See CMS (2013, p. 47) and Bardehle (2013, p. 12).

[44] The statistics of the BGH can be accessed at: http://www.bundesgerichtshof.de/DE/BGH/Statistik/statistik_node.html; the statistics for the BPatG are published in the journal *Blatt für Patent-, Muster- und Zeichenwesen*.

Figure 2: Overview of Patent Litigation System in England and Wales



3.2.1 Applicable Law

There is no unified legal system for the UK; England and Wales, Scotland and Northern Ireland have separate legal systems and courts. We focus on the enforcement system of England and Wales, which is by far the most important of the three jurisdictions in the context of patent litigation.

As is the case in Germany, noted above in 3.1.1, the EPC system applies in the context of the UK. The primary piece of UK legislation is the Patents Act 1977.[45] The actual processes of litigation at the courts in England and Wales are guided by the Civil Procedure Rules (CPR).[46]

[45] available at http://www.ipo.gov.uk/patentsact1977.pdf (see 25.09.2013).

[46] http://www.justice.gov.uk/courts/procedure-rules/civil (last visited 23.09.2013).

3.2.2 Competent Court for Infringement Action

There are two courts of relevance to our analysis, the PCC, which deals with low-value claims, and the PHC, which is a specialist court of the Chancery Division of the High Court of Justice of England and Wales. In principle, the PCC hears cases of lower value and complexity, such as disputes involving SMEs. Nonetheless, in practice the overwhelming majority of patent cases during the period 2000-2008 were heard by the PHC.[47] At both the PCC and the PHC, each case is tried by a single judge who possesses IP-specific expertise.

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. The appeal is decided by a three-person panel at the Court of Appeal, which is generally not entirely composed of IP specialists (although it usually contains at least 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, if the CA refuses permission, the SC itself. Moreover, the case must be of significant legal or constitutional importance in order for permission to be granted.[48]

3.2.3 Options for challenging the validity of a patent

As noted above in 3.1.3, the validity of an EP can be challenged by filing an opposition before the EPO. There are no opposition proceedings against UK patents before the IPO.

In England and Wales there is a combined system of filing infringement and invalidity claims to the same court. This means that the PCC and the PHC have jurisdiction to determine both infringement and the validity of a UK patent, including the UK part of a European patent.

The jurisdiction for validity is independent of the question whether the deadlines for opposition against an EP patent have not lapsed and/or opposition proceedings are pending. However, the courts can stay the proceedings until the EPO has decided about an opposition. In the past, the PHC rarely granted a stay pending EPO proceedings, but a recent decision of the UK Supreme Court may have the effect of changing this policy in favor of granting a stay in such circumstances.[49] Decisions on validity can be appealed to the Court of Appeal and Supreme Court, as noted above in 3.2.2.

[47] See Helmers and McDonagh (2013a), Table 1 and Table 5.

[48] 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 1 out of 45 total cases heard in 2007, and only 1 out of 74 total cases heard in 2008 (Judicial and Court Statistics 2008).

[49] Virgin *Atlantic Airways Ltd v Zodiac Seats UK Ltd (formerly known as Contour Aerospace Ltd)* [2013] UKSC 46

3.2.4 Structure of Proceedings

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.[50] After the claim form is served, an acknowledgement of service, and then the defense, must be filed. The claimant then must apply for a case management conference (CMC) within 14 days of the date when all defendants who intend to file and serve a defense have done so.[51] At the CMC, directions are given for the further conduct of the action, including disclosure of information or experiments, and the hearing date for trial is usually set.

The courts in England and Wales provide a large number of options for the obtaining of evidence.[52] In appropriate cases, the court may order disclosure of internal documents, the preparation of a product or process description (with the required level of detail specified), inspection of factory processes, provision of samples or ingredients and experiments (to be repeated in the presence of the other party). Once documents have been read out or referred to in open court they can then normally be used in proceedings elsewhere.[53]

Cases filed before the PHC can take around a year to make it to full trial. If proceedings are expedited, however, cases can sometimes reach trial within six months. Practitioners estimate that 12-18 months is the average wait for a large case to reach full trial.[54] Our data suggests that cases take on average slightly less than a year to reach a decision in first instance.

At trial both parties present their full case, relying on evidence by witnesses and experts who are cross-examined by both parties, and thehe trial concludes with closing statements by counsel. Practitioners estimate that PHC trials can last between two days and several weeks, depending on the complexity of the case and the amount of witnesses/experts cross-examined.[55] Following the conclusion of a full hearing, a first instance judgment will usually be handed down within 2-12 weeks.

If a claimant in the case believes that there is no realistic prospect of the defense succeeding, an application for summary judgment can be made. A hearing for summary judgment can take place once the defense has been filed. Nevertheless, due to the

[50] Particulars of claim, which set out the claimant's case in more detail, must be served within 14 days of service of the claim form (CPR 7.4).

[51] See CPR part 63, Practice Direction 5.3.

[52] See CPR Part 63, Practice Direction 6.

[53] See Hogan Lovells (2013).

[54] See CMS (2013), p. 96; Freshfields (2011), p. 6.

[55] See CMS (2013), p. 96; Hogan Lovells (2013), part "UK".

complexities involved in patent claims concerning the issues of validity and infringement, summary judgments are said to be rare,[56] a finding which is also supported by our data.

The first trial deals only with establishing liability. If the claimant is successful, separate proceedings start to determine the amount of financial compensation. According to practitioners these hearings are rarely pursued because cases generally settle once liability is determined and an injunction has been handed down.[57]

3.2.5 Preliminary Injunction

English law permits a patentee or an exclusive licensee to apply for an interim injunction to restrain the defendant from carrying out the allegedly infringing act for the period until trial. A threat of infringement can be a sufficient basis for an application which must be made promptly. Where justified by the circumstances (for example, urgency or secrecy), an interim injunction can be applied for without notice to the other side.

3.2.6 Enforcement

Following the conclusion of the judgment on the merits of the validity/infringement issues a separate hearing takes place where the consequences of the judgment are discussed. Various factors are taken into account in order to find the correct enforcement method, including the assets belonging to the infringing company, and its geographical location. Usually the court grants at least an injunction and orders the defendant to render accounts both without asking the plaintiff to provide a security.

3.2.7 Costs and fee shifting

Practitioners estimate the costs of a case which reaches trial to be at £1.5 million for each side.[58] These estimates are supported by the research undertaken by Helmers and McDonagh (2013b) which show costs often ranging between £1million and £6million (encompassing the costs from both sides) for cases initiated during 2000-2008.[59] The main reasons for the existence of high costs are the disclosure requirement, the length of trial, the requirements for the carrying out of experiments and the cross-examination of expert witnesses.

The *loser pays* costs system applies in this context - the company which loses must pay not only its own costs, but also the costs of the other side. However, it is also important to note that such costs are allocated via an issue-based approach; depending on who lost which

[56] See Freshfields (2011), p. 10.

[57] See Freshfields (2011), p. 2.

[58] See Freshfields (2011), p. 8.

[59] See Helmers and McDonagh (2013b), p. 384.

issue in the case, and taking into account how much court time the issue took to resolve, the court allocates the costs to each side on a proportionate basis.[60]

3.3 France

The patent litigation system in France is illustrated in the following Figure and further explained below.

3.3.1 Applicable Law

As for the UK and Germany, the European Patent Convention (EPC) applies to EP patents validated in France.[61] The rights conferred by the French part of a European patent and the options for challenging the validity of the patent are manifested in the French Intellectual Property Code (*code de la propriété intellectuelle - CPI*).[62] The procedural rules are set forth in the French Code of Civil Procedure (*code de la procédure civile - CPC*)[63] and the Judicial Organisational Code (*Code de l'organisation judiciaire – COJ*).[64]

[60] For more discussion see Helmers and McDonagh (2013b), p. 387-392.

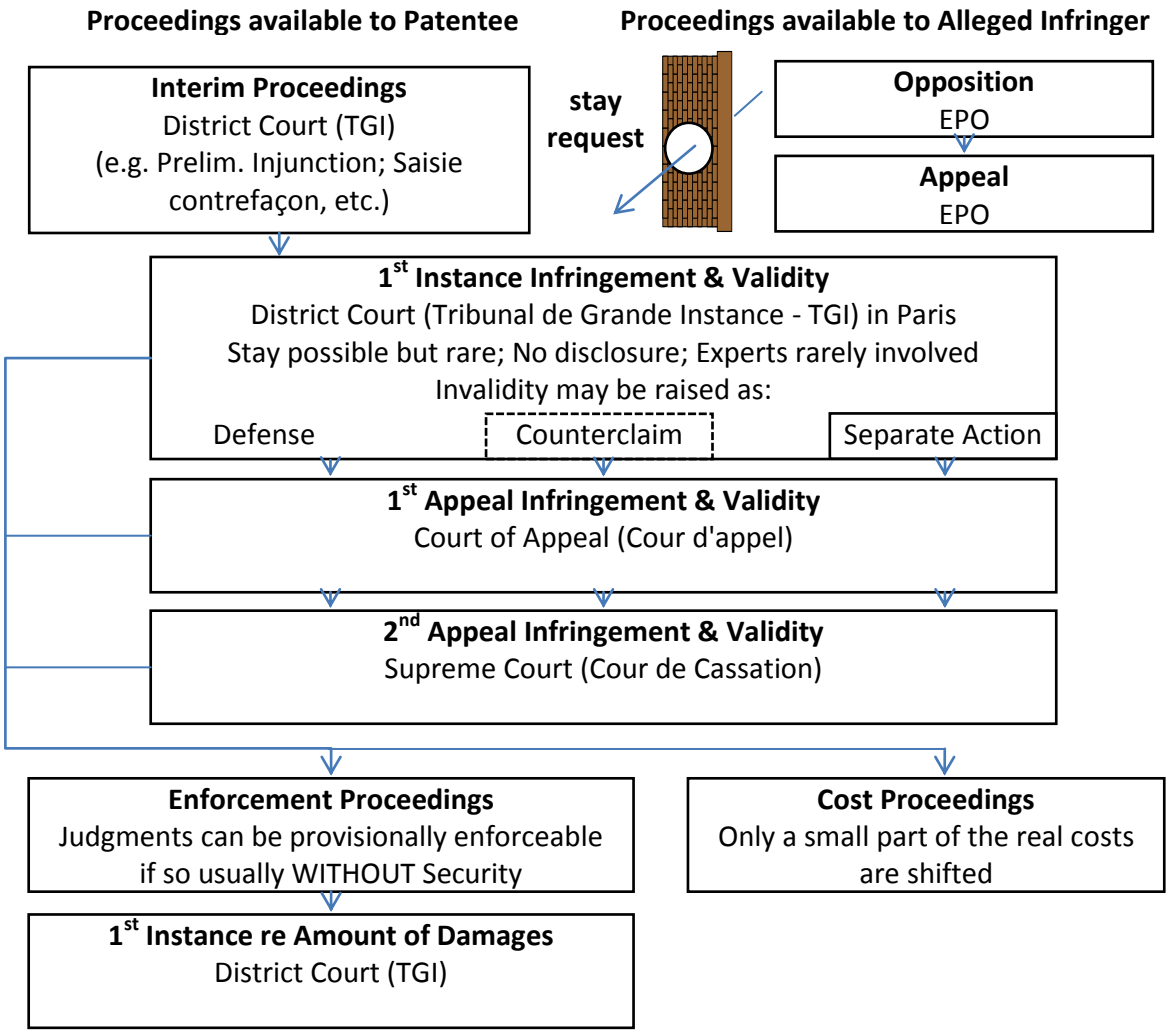
[61] English version available at: http://www.epo.org/law-practice/legal-texts/html/epc/2010/d/index.html (last visited 30.08.2013).

[62] English translation available at: http://www.wipo.int/wipolex/en/details.jsp?id=5563 (last visited 06.09.2013).

[63] English translation at: http://www.legifrance.gouv.fr/Traductions/en-English/Legifrance-translations (last visited 06.09.2013).

[64] French version at: http://legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006071164 (last visited 22.09.2013) (English Translation not available).

Figure 3: Overview of Patent Litigation System in France



3.3.2 Competent Court for Infringement Action

Until June 2008, there were 10 specialised courts (*Tribunaux de Grande Instance – TGI*) that deal with actions involving patent infringement and the related issue of unfair competition. Out of the 10 courts that heard patent cases until mid-2008, only two (Paris and Lyon) had specialist patent judges. These two courts, together with the court in Lille, heard the vast majority of patent actions.[65] The decisions of the TGIs could be appealed before the Court of Appeal (*Cour d'Appel – CdA*) which had the territorial jurisdiction for the relevant TGI.[66] Since 2009 the TGI in Paris has the exclusive jurisdiction for all patent cases.[67] Therefore, the

[65] See Ladas and Parry (2002) and Véron (2002), p. 388.

[66] See Art. R 211-1 COJ.

[67] See Art. L615-17 CPI and D211-6 COJ (decree dated 9th October 2009).

only competent CdA is now the CdA in Paris. The decisions of a CdA can be appealed to the Supreme Court (*Court de Cassation - CdC*).[68]

3.3.3 Options for challenging the validity of a patent

As explained with regard to Germany above (3.1.3) European patents can be challenged before the EPO. There is no opposition procedure to challenge French patents at INPI.[69]

In France, like the UK, there is no specialized court for revocation actions. If infringement proceedings are already pending, the invalidity can be raised as counterclaim or defense for revocation.[70] However, the validity of FR patents and the French part of EP patent can also be challenged in an isolated revocation action.[71] According to practitioners, isolated action for revocation and the defense for revocation are very rare. In most cases (>90%) the validity issues are raised as a counterclaim for revocation.[72] The revocation of a patent has general effect (*erga omnes*).[73] The courts have wide discretion to stay proceedings during a pending opposition at the EPO but do so only if they find that the likelihood of success of the opposition is high.[74]

3.3.4 Structure of Proceedings

Infringement proceedings are in the large majority of cases preceded by a request for search and seizure of evidence (*saisie contrefaçon*).[75] The patentee can file such a request before the President of the Tribunal de Grande Instance of the location where the infringement has taken place to obtain the authorization to carry out a search and seizure. The President is not entitled to refuse the authorization if a patent is at issue which is in force. The only power of the President is to determine the extent of the search and seizure.[76]

The search and seizure is carried out by a bailiff (*huissier de justice*) chosen by the plaintiff. On the day of the search and seizure he may arrive with a person skilled in the art,[77] a police

[68] See Art. L 111-2 COJ.

[69] See Véron (2002), p. 387.

[70] There is an important difference between the defense for revocation and the counterclaim for revocation. A counterclaim constitutes a claim of the defendant and results, when it is admitted, in the revocation of the patent. The defense for revocation is only a defense means and results only in the dismissal of the claim for infringement and the patent remains in force, see Véron (2002), p. 387 for the details.

[71] See Art. L613-25 and L614-12 CPI.

[72] See Véron (2002), p. 387, who estimates inter alia that only 5% of the actions are isolated actions.

[73] However, as before the BPatG, the claim for revocation cannot be pursued further by the court *ex officio* if the claim is withdrawn (Véron, 2002). In EPO post-grant opposition procedures, in contrast, the EPO can decide to prosecute the claim regardless of a settlement between the parties.

[74] See Hogan Lovells (2013).

[75] See Véron (2002), p. 392.

[76] See Art. L615-5 CPI.

[77] *Homme de l'art*, in general the patent attorney (conseil en propriété industrielle) of the patent owner.

officer, or any person whose technical skills can be useful. These persons can enter into the premises of the alleged infringer, examine the allegedly infringing product, device or process, describe it, be supplied with a few examples thereof, and make copies of technical, accounting and financial documents relating to the infringement, even if they are confidential.[78]

Within two weeks after the search and seizure has been carried out the plaintiff has to serve a writ of summons on the alleged infringer. If he fails to do so, the *saisie* will be declared invalid (the description part of the protocol remaining valid) and the patentee may be held liable by the alleged infringer for any damage or cost caused by the seizure.[79]

The writ of summons is the act, which starts the proceedings, and includes the plaintiff's claims, which is generally formulated relatively summarily. Once the writ of summons has been served, the plaintiff has to register it in the register of pending cases at the court office (*placer l'affaire*).[80] The procedure before the TGI is largely in writing. The statute sets no limits for the number of writs to be exchanged between the parties. According to practitioners, three or four written pleadings are usually communicated.[81]

The hearing is conducted by a panel of three judges. During the oral hearing witnesses are questioned only exceptionally: their testimonies are usually recorded in writing, then submitted to the court as exhibits. Since the exhibits are introduced in the proceedings only shortly before the hearing, the judges often are not able to study the patent at issue. Therefore, the judges usually do not present a preliminary opinion and do not lead the lawyers with questions.[82] Therefore, the lawyers usually plead in order to supply the Court with a first clarification on the case. Usually, the pleadings take between one and three hours. Only in exceptional cases the hearings take more than one day.[83]

A few weeks after the hearing, the court hands down a decision. In rare cases, the decision is an order for an expert report regarding a fact related to infringement and disputed by the defendant. In most cases it is the final decision that is handed down.[84] Practitioners estimate that first instance proceedings usually take between 18 and 22 months from filing the writ of summons to the decision.[85]

[78] See Véron (2002), p. 393.

[79] See Véron (2002), p. 393 and Ladas & Perry (2002).

[80] See Véron (2002), p. 394.

[81] See Véron (2002), p. 397.

[82] See Véron (2002), p. 399.

[83] See CMS (2013), p. 40; Véron (2002), p. 399.

[84] See Véron (2002), p. 399 seq.

[85] See CMS (2013), p. 40.

3.3.5 Preliminary Injunction

After a claim for infringement has been submitted to the court, a plaintiff can request the President of the court, who adjudicates in preliminary proceedings, to order a preliminary injunction until the judgment is handed down.[86] According to practitioners, such interlocutory injunctions are very rare.[87] An interim injunction can also be obtained before filing an action on the merits following which the claimant has 20 working days or 31 calendar days to file such an action.[88]

3.3.6 Enforcement

In France the provisional enforcement is not a right; it is granted only on the request of a party and if the circumstances justify it. The provision of a security is rarely required.[89]

3.3.7 Costs and fee shifting

In French proceedings the involvement of the court is entirely free.[90] Most of the time, the attorney fees are calculated according to an hourly rate agreed with the client. The usual costs of the proceedings are estimated to range between Euro 50,000 and Euro 200,000.[91]

In principle, the French system shifts the costs to the loser.[92] However, in practice the fees are shifted only to a very limited extend. For example, practitioners estimate that the sum of the granted *litigation costs* are on average between Euro 200 and Euro 300 and the lawyer's fee granted are on average about Euro 3,000.[93]

3.4 The Netherlands

Figure 4 shows the Dutch patent litigation system schematically.

[86] See L615-3 CPI.

[87] According to Véron (2002), less than five preliminary injunctions are handed out each year compared to 300 to 500 infringement cases on the merits.

[88] See Hogan Lovells (2013).

[89] See Véron (2002), p. 400.

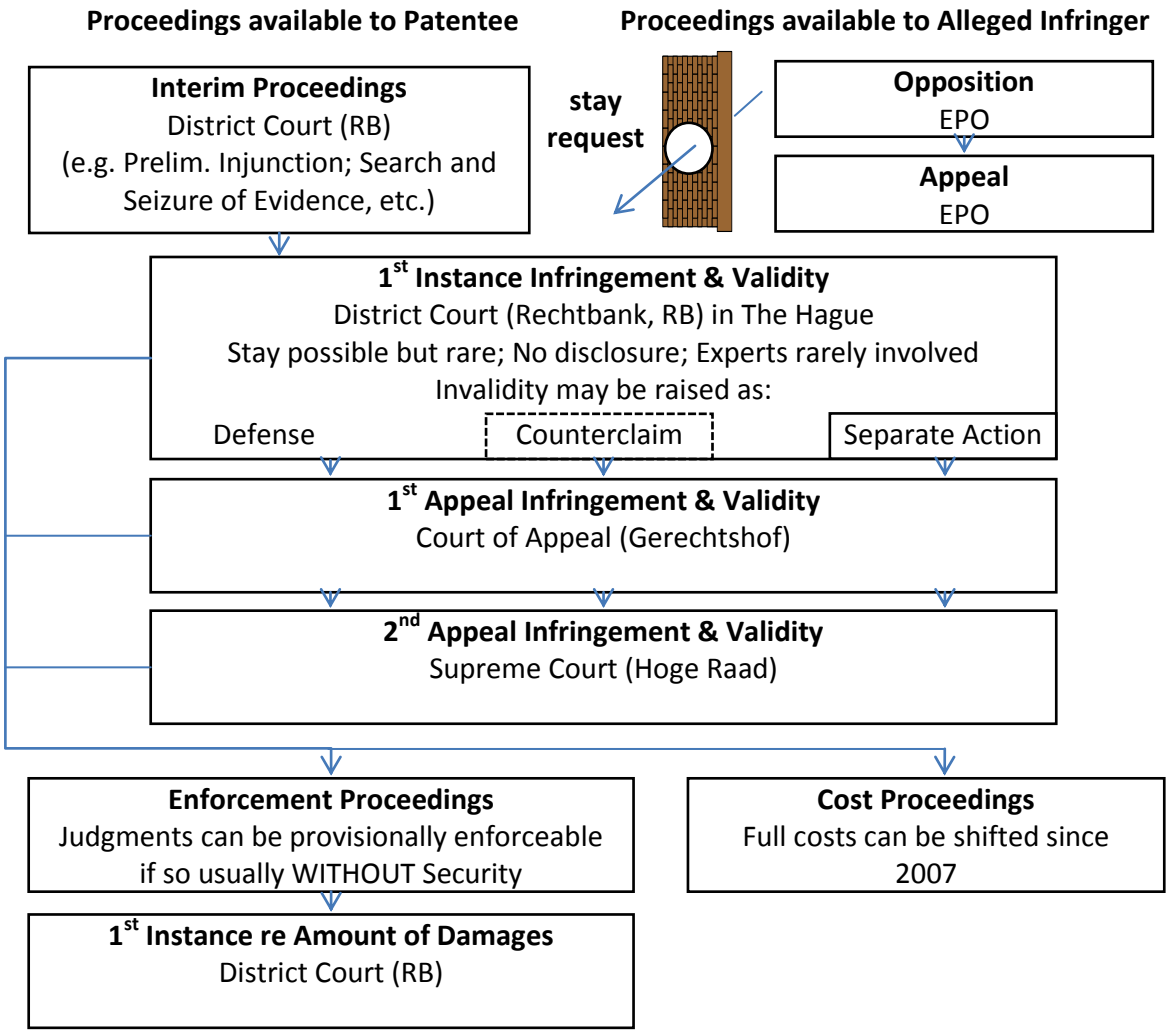
[90] See Art. L. 111-2 Code de l'organisation judiciaire (COJ); Véron (2002), p. 400.

[91] See van Pottelsberghe (2009).

[92] See Art. 696 and 700 CPC, for details see Reimann (2012), p. 143 seq.

[93] See Véron (2002), p. 401.

Figure 4: Overview of Patent Litigation System in the Netherlands



3.4.1 Applicable law

As for Germany, France and the UK, the European Patent Convention applies to EP patents validated in the Netherlands.[94] The rights conferred by the national part of a European patent and the options for challenging the validity of the patent in the Netherlands are laid out in the Dutch Patent Act of 1995 (*Rijkswet van 15 december 1994, houdende regels met betrekking tot octrooien – DPA*).[95] The procedural rules are set forth in the Dutch Code of Civil Procedure (*Wetboek van Burgerlijke Rechtsvordering - Rv*).[96]

[94] English version available at: http://www.epo.org/law-practice/legal-texts/html/epc/2010/d/index.html (last visited 30.08.2013).

[95] English translation available at: http://www.ivir.nl/legislation/nl/patentact1995.html (last visited 19.09.2013).

[96] English translation available at: http://www.wipo.int/wipolex/en/details.jsp?id=3226 (last visited 19.09.2013).

3.4.2 Competent Courts for Infringement Action

Since 1987 the Netherlands have a highly centralized system of patent enforcement.[97] All patent matters must be brought before the courts in The Hague (*s'Gravenhage*) which have exclusive jurisdiction.[98] First instance actions must be filed at the patent chamber of the district court (*Rechtbank*) and an appeal may be taken to the patent chamber of the court of appeal (*Gerechtshof*). Judges in both courts receive technical as well as legal education, and past Dutch patent office employees may serve in the patent chamber of the courts. Appeal decisions may be subject to final judgment at the Supreme Court (*Hoge Raad*).

3.4.3 Options to challenge the validity of a patent

As explained with regard to Germany above (3.1.3) European patents can be challenged before the EPO. There is no opposition procedure for Dutch patents.

Infringement and validity are dealt with by the same court, either in the same proceedings (when invalidity is raised as a means of defense), in separate but simultaneous proceedings (an invalidity action by way of a counterclaim), or in separate revocation proceedings.[99] The validity of a Dutch patent can always be challenged.[100]

If the validity of the Dutch part of a European patent is challenged while opposition proceedings are pending, the validity proceedings are usually stayed. Infringement proceedings are normally not stayed while pending opposition proceeding.[101]

3.4.4 Structure of proceedings

Before 2007 neither a French type of *saisie* nor a UK type of disclosure was available.[102] Since the enforcement directive was implemented in 2007, the Dutch system has a new procedure for securing evidence.[103] In these proceedings, the patentee files a written request with the Preliminary Relief Judge. These proceedings are usually conducted *ex parte*.[104]

Actions on the merits may be initiated without the involvement of the court. A writ of summons must be served on the defendant by a bailiff. Once the writ is served, the proceedings are considered to be pending. The court may be notified of the action at a later date. The writ is the

[97] Before 1987 all 19 district courts had the jurisdiction to hear patent infringement cases, see Brinkof (2000), p. 707.

[98] See Sec. 80 DPA.

[99] See CMS (2013) p. 61.

[100] See Art. 75 DPA.

[101] See Swens (2011), p. 4.

[102] See Brinkhof (2000), 716.

[103] See Art. 1019(a) – 1019(i) Rv.

[104] See Swens (2011), p. 12 seq. for the details.

written statement of the plaintiff's case and must contain a full description of the case (including the defendant's arguments if known to the plaintiff) and indicate the evidence that the plaintiff will rely upon. The defendant's statement must contain a written statement of its case and indicate all the evidence it intends to rely on. The statement of defense may also contain a counterclaim in the action.[105]

In accelerated proceedings on the merits the claimant may then submit a statement of defense in the counterclaim. In such accelerated proceedings, no further statement will be filed by parties. In regular proceedings on the merits the court may give an interim order to the parties to appear in court to provide additional information, to plead their case (interactively) before the court, to investigate the possibility of a settlement or for case management purposes. In patent litigation it is customary to provide the court with an oral explanation of the arguments.[106] The courts may appoint an independent expert to give an opinion on technical matters and file a report in court. According to practitioners it is rare that the courts rely on independent experts.[107]

Practitioners estimate that accelerated proceedings on the merits lead to a decision within 10 to 11 months while the normal proceedings on the merits are decided within 16 to 20 months.[108]

A special aspect of the Dutch litigation system is that during the mid-1990s, Dutch judges began imposing cross-border injunctions.[109] Subsequently, it became common practice for Dutch patent judges to forbid infringement on litigated patents both in the Netherlands and abroad. Given the existence of single, fast, and affordable legal actions in the Netherlands, patent holders began using the Dutch system to stop infringement of their patents all over Europe. However, the availability of cross-border injunctions was considerably limited by decision GaT/LuK of the European Court of Justice in 2006. Since 2006 cross-border injunctions have only been available in preliminary relief proceedings.

3.4.5 Preliminary Injunction

The Dutch litigation system offers two types of preliminary proceedings. First, the Dutch system offers preliminary relief proceedings, called the *KortGeding*, for urgent cases. The plaintiff serves a writ of summons for the defendant to appear at a certain date before the President of the court. The writ of summons itself is concentrated: it contains the claim of the claimant and a brief indication of the basis of the claims. During the hearings there is an oral explanation from the claimant where the defendant can defend himself. The presiding judge gives his written decision with the grounds therefore within one or two weeks. Appeal

[105] See CMS (2013), p. 61.

[106] See CMS (2013), p. 61.

[107] See CMS (2013), p. 62.

[108] See Swens (2011), pp. 8 and 9.

[109] See Bertrams (1995), p. 618 seq.

and final appeal are possible.[110] Therefore, a patentee may obtain a preliminary injunction within 2 to 3 months after filing a case. In these proceedings the Dutch courts still grant cross-border injunctions.[111]

Second, since the implementation of the Enforcement Directive in 2007, the court might grant *ex parte* injunctions if there is no reasonable doubt of infringement and the patentee shows an urgent interests. These *ex parte* injunctions are exceptional but may be awarded especially in case of repeated infringement or against a distributor when infringement against the manufacturer has already been decided. However, no cross border injunction is available in these proceedings.[112]

3.4.6 Enforcement

Typically Dutch courts grant an injunction if they find infringement. In addition, the infringer usually also has to pay a fine to the patentee for every day he acts in contempt of the injunction, or every infringing product manufactured or used in contempt of that injunction.[113]

In principle, an appeal against a first instance decision has suspensory effect. However, the plaintiff can request to declare the decision provisionally enforceable and the courts usually grant such a request.[114] If the plaintiff enforces a decision in *kort geding* and subsequently gets the case dismissed in proceedings on the merits is responsible for any damages.[115]

3.4.7 Costs and fee shifting

Patent Litigation in the Netherlands is estimated to cost on average between Euro 60,000 and Euro 200,000.[116] In principle, the Netherlands shift the cost to the loser. Before the enforcement directive was implemented in 2007, the courts had usually shifted only a small amount of the fees.[117] However, since then full costs may be shifted.[118]

[110] For further details see Brinkhoff (2000), p. 709 seq.

[111] See Swens (2011), p. 7.

[112] See Swens (2011), p. 8.

[113] See Sec.3 DPA; Sec. 296 Civil Code and Sec. 611a Rv.

[114] See Brinkhoff (2000), p. 721.

[115] See Brinkhoff (2000), p. 721 and Supreme Court, November 16, 1984, 1985 Nederlandse Jurisprudentie 547 (Ciba Geigy v. Voorbraak).

[116] See Harhoff (2009, p. 31).

[117] See Brinhoff (2000), p. 721.

[118] See § 1019h Rv and Danisco A/S v. Novozymes A/S, Court of Appeal The Hague, 26 February 2013, Case no. 200.094.921/01, Dutch version availabe at http://www.eplawpatentblog.com/eplaw/2013/03/nl-danisco-v-novozymes-litigation-costs-post-bericap.html (last visited 22.092.2013) and Land (2010).

4 Main Differences between the Enforcement Systems

This section highlights briefly some of the differences that exist between the jurisdictions. As noted below, there are both substantive and procedural differences between the systems, something which must be taken into account when undertaking comparative analysis.

4.1 Bifurcation

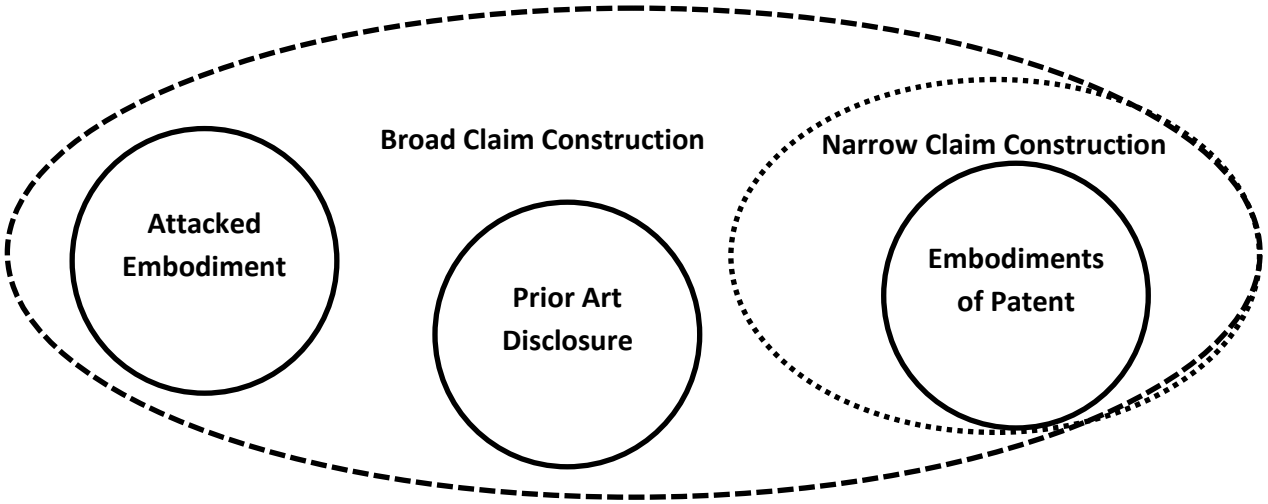
The first main difference between the four legal systems is that Germany uses a bifurcated system. This is not present in any of the other three legal systems covered by our analysis. Moreover, the existence of bifurcation is a significant and somewhat controversial issue, particularly since the proposed unified patent system also allows for bifurcation. Criticism of the bifurcated system is based on the fact that due to the existence of the bifurcated system it is possible for a regional court in Germany to grant an injunction against a potential infringer of a patent which is later found to be invalid by the EPO or the Federal Patent Court.[119]

Another potential issue is that regional courts, which decide on infringement, and the Federal Patent Court that decides on validity construct claims independently of each other. This might lead to inconsistent claim constructions in the infringement and revocation procedures. This is often referred to as the *Angora cat* problem where patent claims are interpreted as broadly as possible in infringement procedures (a fluffy, blow-dried cat) and as narrowly as possible in revocation proceedings (a wet, rolled-up cat). This creates the problem that an infringement court might issue an injunction against a defendant on the basis of a broad claim construction which would inevitably lead to the invalidation in view of a certain piece of prior art.[120] A the Federal Patent court, in contrast, the patentee uses the narrow interpretation, which leads to the patent being upheld. This situation is illustrated in Figure 5.

[119] For more discussion and empirical evidence see Cremers et al. (2013).

[120] A patent claim must be novel over the whole breadth of the scope of protection.

Figure 5: Claim construction



Furthermore, there could be fewer counterclaims for revocation in the bifurcated system as costs involved in engaging in an additional, separate court action may be prohibitive especially for smaller, resource-constrained companies.

On the other hand, exclusive jurisdiction on patent validity offers the advantage of specialization. The Federal Patent Court charged with validity cases can train and deploy technical judges and accumulate experience specifically in the assessment of patent validity, facilitating coherent and well-founded claim construction and therefore increase legal certainty regarding the validity of patents. Since separate patent revocation proceedings increase the costs and risks for the alleged infringer, the separation of infringement and revocation procedures may lead alleged infringers to refrain from filing a revocation action if they have relatively low chances of success. Moreover, the strong presumption of validity, which puts considerable faith in the examination of the patent offices, could allow for a fast assessment of infringement claims, because validity does not need to be assessed simultaneously.

4.2 Number of Competent Courts

Another major difference between the legal systems is that in Germany several regional courts are competent to hear patent cases; by contrast the UK, France (since 2009) and the Netherlands all make use of centralized systems for patent litigation.

This means that claimants in Germany can usually choose among several regional courts where to file an infringement claim, whereas in the UK, depending on the size and value of the claim, the filing will be either at the PCC or the PHC (both are located in London); in

France, since 2009 patent cases must be taken at the TGI in Paris; in the Netherlands, first instance actions must be filed at the patent chamber of the district court.

4.3 Duration of the Proceedings

Regarding time limits, in the UK first instance cases filed before the PHC often take 12 months to reach full trial, but urgent cases can sometimes be heard within 6 months. The first instance judgment will usually be handed down within 2-12 weeks. Therefore there is a typical overall length of around 12-14 months from filing to judgment. Similarly, in France first instance actions take on average about 18-24 months from claim to judgment.

In Germany, proceedings before the LG tend to be relatively speedy with the (first) oral hearing scheduled after 6-12 months, and judgment 1-3 months after the (second) oral hearing. Invalidity decisions by the BPatG take usually at least 18 months after the filing of the invalidity suit before the BPatG. In this respect it is important to recall that invalidity actions are usually reactive actions and therefore filed after the infringement action has been initiated. Similarly, in the Netherlands it is said that proceedings are comparatively speedy.

These differences in the lag between the filing of a claim and the corresponding judgment provide incentives for the strategic filing of patent actions in faster jurisdictions. Patentees might want to try to obtain a favorable judgment in Germany and use an enforceable injunction to obtain a favorable settlement in other jurisdictions.

4.4 Preliminary Injunctions

With respect to preliminary proceedings, in Germany such proceedings are very rare in patent cases due to the speed of the normal infringement proceedings. Instead, injunctions can be granted by the LG based exclusively on an assessment of the infringement claims. As noted above with regard to bifurcation, if the LG does not stay the infringement proceedings, the claim for injunctive relief is granted at least a year before the question of validity is even considered by the Federal Patent Court.

In France, preliminary proceedings – the *saisie-contrefaçon* -- are commonly used to initiate infringement actions. As noted above, the court in France may order the seizure of the defendant's goods within a few weeks of the action. Nevertheless, preliminary injunctions tend to be rare in France. This is also the case in the system of England and Wales, where preliminary injunctions are relatively uncommon. This might be partly explained by the practice of "clearing the way". As discussed earlier, in the UK 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.[121] If a competitor does not do this, it is more likely that

[121] Jacob J. (as he then was) noted: "Where litigation is bound to ensue if the defendant introduces his product he can avoid all the problems of an interim injunction if he clears the way first. That is what the procedures for

the PHC will grant a preliminary injunction preventing the sale of the potentially infringing product upon the commencement of infringement proceedings. In the Netherlands, the Kort Geding, a system of preliminary relief proceedings, comes into play. A preliminary injunction to halt infringing activities may be obtained within two weeks after filing a case. It also used to be commonplace in the Netherlands for a cross-border injunction to be granted with respect to infringement actions.

revocation and declaration of non-infringement are for." - *SmithKlineBeecham v Apotex* [2002] EWHC 2556(Pat) at para. 68.

5 Data collection

The data were collected from court records in the four countries. There were some important differences in the way the data were collected in the different jurisdictions – these methods are described below. Apart from access to court records, the main challenge in the data collection was to achieve comparability while still accounting for the legal differences across jurisdictions. To this end, we designed a common template that accounts for the differences in the legal regimes which ensures the information extracted from court records can be compared across jurisdictions. We collect data for cases filed during the period 2000-2008. This captures relatively recent cases and avoids having a large number of pending cases in the dataset (if we included cases filed after 2008, most of them would have still been pending in first or second instance during the time period the data was collected).

5.1 Germany

Due to the existence of the bifurcated system, the data on infringement and invalidity disputes had to be collected separately.

With regard to data collection of infringement cases, there is a fundamental challenge: regional courts do not publish any court records and they do not systematically list cases and types of cases heard before the chambers. Moreover, the ability to obtain access to court records hinges crucially on the approval of the judge that presides over a given regional court.

To cover the largest number of court cases possible while observing our resource constraints, we chose the three most prevalent courts of the 12 existing regional patent courts in Germany: Düsseldorf, Mannheim, and Munich.[122] The identification of the relevant patent cases – including both invention patents and utility models (*Gebrauchsmuster*) – among other IP related cases such as trademark or design cases, inventor employee issues and pure licensing issues, was done by screening all cover pages of written case files in Mannheim and Düsseldorf: In Munich, the identification of patent cases was done based on handwritten lists created by judges. The relevant information on the cases is stored in paper format in the court dockets. That means all case-related information had to be collected manually for each individual case by physically accessing the court dockets at each regional court. These obstacles made the collection of data on court cases in Germany very resource-intensive.

We started the data collection in Mannheim in spring 2010. We proceeded with Munich in December 2010 and Düsseldorf in December 2011. On average, seven trainee attorneys were hired in each court location to collect the data from court files and to digitize the information. The trainee attorneys were trained in general law and in most cases had

[122] See Ann (2009).

already obtained their law degree (*2. Staatsexamen*). They were trained for the data collection to become familiar with the subject of patent cases, court records as well as with the data template.

The information extracted from the case files is organized into three main categories: information on the proceedings, the litigating parties, and the patent(s) involved. The first category covers a brief description of the stages of the infringement case. It includes the dates of filing, the oral hearing, and the ruling. Almost all case files reported the outcomes (which includes settlement), including the outcomes of any first and second appeal. Cost figures, when available, were also collected, with paid damages added to the costs. The second category covers the names and addresses of the litigating parties as well as of their legal representatives involved in the trials. We also collected the patent numbers of all patents involved in a dispute. Our data on patent infringement actions before the German courts in Mannheim, Düsseldorf, and Munich cover around 80% of all patent related cases during the period 2000-2008.[123]

We also have information on revocation proceedings before the BPatG and its appeal court, the BGH. Both courts publish all decisions on validity since 2000 on their websites. Apart from these judgments, we also obtained information on withdrawn revocation actions from the German Patent and Trademark Office (*DPMA*). The available data for invalidity suits are complete for the period from 2000-2008.

German procedural law requires claimants of infringement disputes to combine all patents involved in the alleged infringement in one action.[124] However, for practical handling, the infringement courts may split up an action into several cases, one for each patent involved.[125] In addition, requests for preliminary injunctions and the calculation of damages are mostly decided in antecedent or, respectively, subsequent proceedings.

To facilitate a cross-jurisdictional comparison of the number of legal patent disputes, we distinguish case numbers in the following way. Firstly, since in the UK we could only access cases that were scheduled for a hearing, we try to level the playing field by generating a subsample of German cases that excludes very early settlements.[126] Secondly, we distinguish between cases that involve both invention patents and utility models and cases that involve only invention patents. Thirdly, we also consolidate cases if there is reason to

[123] This estimation is supported by Harhoff (2009, p. 26). Having information from all regional courts for 2009, Klos' (2010, pp. 72 seq) numbers suggest a share for the regional courts of merely 70% of total court cases. However, Klos (2010), pp. 72 seq) includes all patent related disputes instead of only infringement cases. In line with Stauder (1983), we assume this divergence is due to a varying distribution of cases according to subject-matter among courts.

[124] See sec. 145 PatG.

[125] See sec. 145 ZPO.

[126] We excluded all cases that settled in the first 6 weeks after the first statement of claim, roughly coinciding with the defendant's reply.

assume that several case numbers are in fact part of the same legal patent dispute. We combine cases that were separated at the patent-level by identifying all parallel proceedings in which exactly the same parties (claimants and defendants) litigate on basis of different patents at the same time. Temporally separated proceedings that belong to the same case are combined by identifying consecutive proceedings in which the same parties (claimants and defendants) litigate on basis of the same patent. A revocation action, which is filed at the BPatG, represents another separate case even when the case represents a reaction to the alleged infringement of a patent. Revocation actions rarely involve more than one patent. This means that if an infringement case involves several patents, not only the infringement case possibly unfolds into several cases, but also a separate invalidity case is filed for each patent. Thus, we also combine infringement proceedings with their corresponding revocation proceedings.[127]See Section 5.9 below for more details.

5.2 UK

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 which involved a patent.[128] We exclude all cases that represent an appeal to an administrative decision taken by the UK Intellectual Property Office (*UK IPO*).[129]

In contrast to Germany, court records in patent cases are generally, albeit selectively, published. We therefore collected the data on court cases at the PHC from a range of online sources. Our starting point was the Patents Court Diary which, in principle, lists all cases which are scheduled for a hearing or an application including, for example, a case management conference.[130] This means the Diary contains all cases which have been scheduled for a hearing.

It is important to emphasize that any case which settles after filing, but before it is scheduled for a hearing,[131] including a CMC, would not appear on the Diary, and therefore does not form part of our dataset. Nevertheless, cases which settle after they have been

[127] Using the same definition as in Cremers et al. (2013), we identify infringement and revocation proceedings as being parallel, if both proceedings are filed on the basis of the same patent(s) and if cases are filed simultaneously.

[128] We exclude cases heard at the PHC which did not involve a patent e.g. designs cases. We also have data for cases that were heard at the PCC in 2007 and 2008. However, the data for the PCC which was made available to us by the UK IPO has been anonymized, which means we cannot include it in the analysis.

[129] We also have data on court cases heard before the PCC (Central London County Court) which we obtained from the UK IPO. 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. Moreover, the data were anonymized due to confidentiality restrictions. For this reason, we exclude the PCC data in this analysis (for more details see Helmers and McDonagh, 2013).

[130] http://www.hmcourts-service.gov.uk/cms/list_patents_diary.htm.

[131] Essentially, these are cases which settle after filing, but before any action is actually taken by the court.

scheduled for a hearing, regardless of whether the hearing eventually took place, are listed, and therefore form part of our study.

The Diary typically 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*,[132] the case database of *Lexis Nexis*,[133] as well as *Thomson Reuters's Westlaw database*.[134] Nonetheless, these sources did not offer any records for a number of cases (presumably 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 IP right 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 the standardized template. We recorded information on the proceedings/decision type, litigating parties, the IP right 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 taken within the England and Wales jurisdiction, as well as in jurisdictions abroad, if such cases were mentioned in the available court records. The inclusion of information on the mentioned cases taken abroad facilitated the identification of parallel disputes, as explained below in more detail.

While our datasets represent the most comprehensive database gathered so far on the subject of patent litigation in the UK,[135] at least three caveats are in order. Firstly, relying on the court diary means that we only observe cases that not only have been filed to the court, but which were also allowed to proceed at least to the case management stage. There is no information available on the number of cases which are dropped between the serving of the claim form and the case appearing on the diary. The number of cases within our dataset is comparable with the official UK Ministry of Justice (MoJ) statistics on case numbers at the

[132] http://www.bailii.org (last visited 23.09.2013)

[133] http://www.lexisnexis.co.uk. (last visited 23.09.2013)

[134] http://www.westlaw.co.uk. (last visited 23.09.2013).

[135] 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.

PHC, once the cases which do not form part of our study, i.e. appeals from the IPO and the non-patent PHC cases, are removed.[136]

Secondly, since we had to assemble the information with regard to each court case, often relying on different sources, the available court records are in many cases incomplete. For example, while we may have the judgment of the PHC, we may not have records for all preceding applications. A particular concern relates to the patent numbers of litigated patents because even when a case is decided through judgment, the published judgment may not identify the disputed patents. This means that we only have patent numbers for 165 out of the 256 patent cases between 2000 and 2008.

Thirdly, with regard to the counting of UK cases, for the purpose of clarity it is important to note that where a number of separately filed cases involving the same parties were joined and heard together we considered these cases to be "one case."

5.3 France

The French dataset contains patent cases at the Court of Paris in first and second instance (*Tribunal de Grande Instance – TGI* and *Cour d'Appel*). While Paris has exclusive jurisdiction over patent disputes in France since 2009, ten courts were sharing jurisdiction over patent disputes during the period 2000-2008 covered by our data. According to Véron (2002), the TGI in Paris accounted historically for around 60% of all patent cases in the country.[137]

Our data for France originate from a private company, *Darts-IP*, which specializes in IP case law. The company collects data on IP disputes directly from records published by the courts. *Darts-IP* was helpful mainly for two reasons: first, the TGI is not specialized in patent cases and court registers do not record patent cases in a specific way that would allow filtering them from the huge collections of all cases filed at the court. *Darts-IP* collects decisions from all cases and manually identifies the nature of the main action, allowing us to filter patent cases. Similar to the UK, information can be obtained from published court records because in the French litigation system, as soon as an action is filed at a given TGI, the court quickly issues an official document called an *Ordonnance de mise en état*, which summarizes the claims filed by the claimant and sets the calendar for the case. These documents reveal

[136] For the PHC in 2007 the MoJ lists 55 actions and for 2008 it lists 61 actions. See Ministry of Justice, *Judicial and Court Statistics 2007* (The Stationery Office, September 2008) and *Judicial and Court Statistics 2008* (The Stationery Office, September 2009); accessible at http://www.official-documents.gov.uk/document/cm76/7697/7697.pdf and http://www.official-documents.gov.uk/document/cm74/7467/7467.pdf. Recently we examined the paper PHC case files at the court. The physial PHC files are mixed in with regular Chancery Division files, which makes the case-counting extremely challenging and time-consuming. Nevertheless, counting records for cases filed at the PHC in 2007 revealed that there were an additional 7 cases filed which did not appear in the diary or elsewhere in the online records available to us. Nonetheless, we judge that there is unlikely to be a substantial number of missing (early settled) cases filed in 2007 for which we lack information.

[137] Véron (2002, p. 388) notes that the distribution of patent cases among the ten courts was highly skewed as seven out of the ten courts dealt with less than 15 cases per year.

most of the features of the case (names of the parties, patent numbers, filing dates, etc.). *Darts-IP* obtains data also from the French patent office (INPI) and Véron & Associés (a prominent law firm) that also collect data on patent cases at the Paris court. Secondly, *Darts-IP* analyzes court records and manually retrieves the information on the litigating parties, patent numbers, filing and judgment dates, and some other features of the case.

We complement the *Darts-IP* data with additional variables that we extracted manually including the type of first action, outcomes, appeals, etc. As in the case of the UK, we then exclude appeals to administrative decisions of the INPI (the Court of Paris also has jurisdiction as an appellate level to decisions of the French patent office, but this is not the focus of our dataset). Once the analysis at the individual decision level was completed, we grouped all court records into unique cases. This grouping is done in several steps: (1) *Darts-IP* links every decision to its antecedent, forming a chain of decisions relating to the same case, (2) we use case references attached to each decision to identify further decisions belonging to the same case that were not linked by *Darts-IP*, (3) we look for all dockets that have at least 2 parties and 1 patent family in common and manually check whether these belong to the same action, in which case we merge them into a single case record. This aggregation is presumably the main reason why the figures presented in Table 2 below differ significantly from the case counts in Véron (2010) for the TGI Paris for the same time period. Case-level variables are then computed or aggregated based on decision-level variables. Settlements are identified through the issuance of *Desistments* or *Revocation* orders, in which the court acknowledges that the charges are dropped by the claimant.

5.4 The Netherlands

The dataset for the Netherlands was collected and constructed in the same way as the French dataset, with two main differences. First, one court has exclusive jurisdiction over all patent cases in the Netherlands throughout our period of interest: the Court of The Hague (*s'Gravenhage*).

Second, in contrast to France, in the Dutch system there is almost no automatic release of court records once a case is filed (e.g. *ordonnances de mise en état*). Neither is there a court diary as in the case of the PHC in England and Wales. As a result, our dataset may miss a substantial number of cases that were settled before any court decision was made, and may fail to identify some settlements as the court does not publish anything once a case is dismissed.

5.5 Patent information

To obtain additional information on litigated patents, we matched the litigation database with EPO's Patstat (version April 2012), which contains data on the German Patent Office (*DPMA*), the UK Intellectual Property Office, the French Intellectual Property Institute (*INPI*), the Dutch Patent Office, and the European Patent Office (EPO). The patent information

extracted from Patstat includes information on application dates, IPCs, applicants and inventors, equivalents, forward and backward references. We rely on legal status information from Patstat to identify the countries in which an EPO patent was validated.

5.6 Litigant information

We combine the information obtained from court records with detailed information on the parties. The names of the litigating parties were matched to firm-level databases including *Compustat*, *Bureau van Dijk's FAME* (UK), *AMADEUS* (Europe), *QIN* (China), and the *ICC British Company Directory* (UK) in order to obtain information on firms' characteristics and financials.

5.7 Identification of cases litigated in multiple jurisdictions

To identify parallel cases, we proceed as follows. We use all available patent numbers of court cases in all four countries and construct their patent families to obtain German, UK,[138] Dutch, French, as well as EPO equivalents.[139]

We then match patent families across the four jurisdictions to identify patents litigated in several jurisdictions. In case we found a patent (family) to be involved in disputes in more than one jurisdiction, we also cross-check litigating parties' names to ensure the assignee is the same (either as claimant or defendant). For example, we consider a case where patent X is litigated in jurisdiction Y by parties A and B to be parallel to a case in jurisdiction Z where patent X is litigated by parties A and B.

The search for parallel cases is partly facilitated by data that we collected from UK court records that provide information on the existence of parallel cases outside of the UK, including Germany, France, and the Netherlands. This information is only available when judges refer explicitly to parallel cases in their judgments. Hence, this information is far from complete. It nevertheless provides additional information that we use to assist the identification of parallel cases.

5.8 Comparison sample

We also draw on Patstat to construct a control sample of patents and utility models that have not been litigated. The control sample consists of non-litigated patents and utility models 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 and utility models with those of patents that were not subject of litigation at the invention level (the priority filing).

[138] Note that we do not have patent data for all cases (for example in the case of the UK, we have data for only 65% of all cases).

[139] We use the extended INPADOC patent family definition in Patstat.

5.9 Case counts

Counting court cases and comparing case counts across jurisdictions is a challenge because of the differences in litigation systems described above – notably a bifurcated vs. a non-bifurcated system – as well as procedural differences. However, also missing data poses a challenge. To still allow for a meaningful comparison, we present case counts using a number of different ways of counting cases and using different assumptions about missing information. Table 1 summarizes the different ways in which we count cases. In Table 1, gray shaded cells indicate that the data necessary to adjust case counts is available in a given jurisdiction, whereas white cells mean the data are not available and black cells mean the adjustment is not applicable in a given jurisdiction.

For each jurisdiction, we count all available patent cases regardless of the underlying claim. Since we are primarily interested in infringement and revocation cases, we also compute case counts when limiting case counts to those claims. Further, we adjust the number of cases for missing data due to courts not covered by our data collection in each jurisdiction. In Germany, this concerns nine LGs, in the UK this concerns the PCC, and in France 9 TGIs. No such adjustment is necessary for the Netherlands as there is only a single court that hears patent cases. Since only the German data includes utility models, we also provide case counts when we restrict the data to cases involving invention patents.[140]

As described above, cases that involve several patents are often split by courts in in Germany such that there are separate case numbers for each patent. One way of accounting for this is to assume that one patent corresponds to one case. Hence, we count each case once for each patent that it involves. Another way to adjust the data for this problem is to consolidate actions that can be assumed to belong to the same case. The consolidation includes different actions that occur at the same time (e.g. there are different case numbers of each patent in cases that involve several patents) as well as actions over time (e.g. an application for a preliminary injunction and the final judgment). This means we consolidate the data to also account for the possibility that several separate actions are recorded which in reality form part of the same case.

As discussed in Section 5.2 above, since we collect the data for the UK principally from the court diary, cases that settle before they are scheduled for a CMC or a hearing are not covered by our data. To make the data comparable, we drop all cases in Germany that also settled very early on before the court takes action on the case.

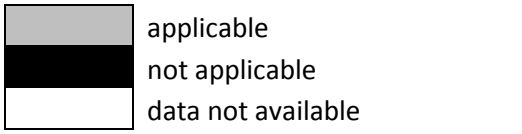
Finally, in the German bifurcated system infringement and revocation cases constitute separate cases even when the revocation case is a direct reaction to the infringement case (or vice versa). One way to replicate this set-up in a non-bifurcated system is to count

[140] Note that utility models are widely used in Germany and can also be used as substitutes for invention patents. Hence, it is possible that an invention patent covers a given invention in France whereas the same invention is covered by a utility model in Germany.

counterclaims for both revocation and infringement as separate cases. These data are available only for the UK.

Table 1: Modifications of case counts

Adjustment	DE	UK	FR	NL
Only infringement and revocation claims				
Missing cases (courts not covered)*				
Only invention patents♣				
Cases counted once per patent♦				
Consolidated at case-levelℜ				
Eliminate early settled cases♠				
Count counterclaims for revocation and infringement as separate cases				



Notes: * 9 LGs not covered in DE, PCC not covered in UK, 9 TGIs not covered in FR

♣ excludes utility models for DE

♦ Use average number of patents for UK where for 35% of cases patents are not available

ℜ For UK, NL, FR cases available only at the consolidated level

♠In UK cases settled before CMC scheduled not covered -- exclude cases in DE that settled within 42 days after receipt of claim.

6 Comparison of patent litigation in UK, Germany, France and the Netherlands

This section presents the results of our analysis. We compare patent cases across Germany, the UK, France and the Netherlands. We separate our analysis into the case-, litigant-, and patent-level.

6.1 Case-counts

Table 2 shows the total of patent cases for all four jurisdictions over the period 2000-2008.

Table 2: Case overview

	Jurisdiction								
	DE					*FR*	*NL*	*UK‡*	*Total*
Year claim filed	DU	MA	MU	BPatG (revocation)	Total				
2000	279	97	21	171	568	106	42	19	735
2001	321	129	33	165	648	126	40	22	836
2002	3	139	37	129	308	125	31	24	488
2003	310	148	62	144	664	85	19	28	796
2004	436	205	59	170	870	120	45	27	1062
2005	492	197	47	196	932	118	40	28	1118
2006	383	189	45	197	814	129	35	40	1018
2007	477	249	69	195	990	106	36	31	1163
2008	437	209	48	251	945	87	38	37	1107
Total	3,138	1,562	421	1,618	6,739	1,002	326	256	8,323

DU: Düsseldorf; MA: Mannheim; MU: Munich; BPatG: Federal Patent Court

* Missing case files at the regional court in Düsseldorf for the year 2002

‡ England and Wales

By far the largest number of cases is heard by German courts. Of the total of 6,739 cases in Germany, 5,121 are infringement cases heard by the three regional courts covered by our study whereas 1,618 are revocation cases heard by the BPatG. 683 of these revocation cases are reactions to infringement suits in our period of observation. By far the largest number of infringement cases is heard by the regional court in Düsseldorf (3,138 cases). Mannheim comes second with less than half as many cases (a total of 1,562 cases), while the regional court in Munich has heard only 421 cases over the entire 2000-2008 period.[141] Table 2, therefore, suggests that Düsseldorf has the largest number of patent cases in Europe. For decades the Düsseldorf regional court has been for the primary court for patent

[141] The low number in Munich is partly due to missing documents in the court archive and the deletion of court records.

infringement cases in Germany (Stauder 1983; Hase 1992; 1993; 1994). Its technical expertise and reputation presumably make it an attractive choice for claimants. Note that the dip at the Düsseldorf court in 2002 is due to the deletion of case files from the archive.[142] All older documents, going back to 2000, could be retained.

Table A1 in the appendix shows case counts for Germany if we use alternative ways of defining a case (see Table 1 for an overview). If we restrict the case count to cases that claim infringement or invalidity, the count falls by around 8% to 6,220. In contrast, if we adjust the count for the fact that we covered only the three most important regional courts, case counts jump up to 8,809. Next, we systematically count each case once for each patent that is at issue (e.g. a case with three patents is counted three times). As shown in Table A1, this way the number of cases increases from 6,739 to 8,134 (an increase of 30%). This underscores that not all German courts do systematically split cases according to the number of patents involved. Reducing the case count to cases that only involve invention patents means the count drops to 3,700. However, given the widespread use of utility models in Germany, often as a substitute to invention patents, looking only at invention patent cases might be too narrow a focus. Perhaps the most direct comparison with case counts from the other jurisdictions is shown in Column [F] of Table A1. It shows consolidated case counts and hence accounts for any potential over-counting due to case-splitting. The resulting case count is only slightly less than 70% of the original count. Finally, we drop all cases that settled very early on, essentially before the court took any action (within 42 days counting from the filing date of the claim, which is the period where parties had to file their first response to the court). This accounts for the concern that such cases might be missing from the UK case count. However, we see that the number of cases that drop out at such an early stage of proceedings is very low in Germany.

We find the lowest number of cases in the UK with only 256 cases over the 9-year period. There is a moderate increase in filings over the period covered, but the case count in 2008 is still only 37. Table A2 in the appendix shows case counts for the UK after making different adjustments. When we add the available data for the PCC in 2007 and 2008, we see that the case count increases by slightly less than 20%. Nevertheless, if we assume that the PCC heard on average 20% of patent cases during 2000-2008, the total case count would increase to 307. Column [D] shows that if we counted each case once per patent at issue, we would end up with a count of 363 cases. Mimicking a bifurcated system, Column [E] counts counterclaims for infringement and invalidity as separate cases. This results in a total count of 356. One might argue that combining [D] and [E] produces a case count that is most directly comparable with the German figures. However, as discussed above, this is not entirely true because in Germany cases are not systematically split according to the number

[142] The drop of cases in Germany in 2002 is due to an internal decision at the regional court in Düsseldorf to remove and destroy files and only store decisions in the court archive.

of patents at issue. In any case, even if we combine [D] and [E], the total case count reaches only slight more than 500 cases.

The total caseload in France is 1,002. In contrast to Germany and the UK, there is no increase in case filings over time. Due to more limited data, Table A3 in the appendix shows only a few variations of the case count for France. Multiplying case counts by the number of patents involved (Column [D]) results only in a modest 10% increase in case counts. However, adjusting for cases that were heard by courts not covered by our data, we obtain a count of 1,503 cases.

Finally, the caseload in the Netherlands with 329 cases is only slightly larger than in the UK. Since all cases are heard by a single court, in principle, no adjustment for missing cases is needed. If we count cases once for each patent at issue, the case count increases to 339 cases.

In summary, depending on how we count cases, Germany has between 12 and 29 times as many cases as the UK. The difference is similar with regard to the Netherlands. Compared to France, Germany has around six times as many cases. Hence, although there are important differences in case counts depending on how cases are defined, the number of cases hard by German courts by far exceeds the combined number of cases in all three other jurisdictions.

6.2 Case-level analysis

Table 3 cross-tabulates claims and information on whether a cases ended with a court decision. We distinguish between infringement and invalidity claims and an “other” category that contains other types of patent related claims such as entitlement, royalty payments etc. There are some interesting differences both within and across countries with regard to whether a case ends with a judgment on the merits.

In France and Germany there is hardly any difference between the settlement rate of infringement and revocation cases (the settlement rate is approximately 100% minus the share of cases decided by judgment). In the UK, interestingly, a larger share of revocation than infringement cases is litigated through to judgment. In the Netherlands, almost all infringement cases are decided by the court, but only half of revocation cases are. However, the data for the Netherlands should be interpreted with caution. It is likely that some settled cases are missing from the data, which would help explain the unrealistically large share of adjudicated infringement cases.

Table 3: Case outcome and duration, 2000-2008

Jurisdiction		*Final Judgement reached*		*Duration in months**			
	Claim	# Cases	%	Mean	Median	Mean	Median
	infringement	1,982	37.5%	11.5	9.2		
	revocation	1,107	37.2%	18.2	15.0		
DE	other	887	31.5%	15.1	13.8		
						*No counterclaim***	
	infringement	68	62.4%	11.7	11.0	8.6	11.0
	revocation	59	72.8%	10.8	11.2	10.3	11.2
UK‡	other	20	66.7%	10.0	8.2	13.0	8.2
	infringement	704	83.7%	23.5	19.8		
	revocation	56	82.4%	19.4	19.8		
FR	other	151	68.3%	16.8	19.8		
	infringement	254	97.3%	13.9	9.8		
	revocation	40	49.4%	17.2	11.4		
NL	other	0	0.0%	na	na		

* Computed as difference between date when case was filed and first judgment.

** Restricted to cases where either infringement or revocation at issue (no invalidity defense or counterclaim).

Other claims include disputes over employee inventions, royalty payments, the ownership of patents etc.

‡ England and Wales

There are also substantial differences between jurisdictions: in Germany less than 40% of infringement and revocation actions end with a judgment on the merits, the share in France is more than twice as large (although again caution is in order in interpreting the data for France). Also settlement rates in the UK and the Netherlands are a lot lower than in Germany regardless of the claim brought by claimants.

Table 3 also shows average and median durations of cases until a first judgment on the merits of a case is handed down. We choose the first enforceable decision on the merits of the case to ensure time lags are comparable across jurisdictions. Decisions to appeal are endogenous to the differences in appeal procedures across countries.

The figures suggest that the median duration of an infringement case is shortest in Germany (9.2 months), followed by the Netherlands (9.8 months), and the UK (11 months). Infringement cases take a lot longer in France (19.8 months). Invalidity actions take a lot

longer to decide in Germany (15 months) than in the UK (11.2 months) and the Netherlands (11.4 months). Again, invalidity cases in France take significantly longer (19.8 months) than in any other jurisdiction.

The relatively fast decisions in infringement cases in Germany could be the outcome of courts focusing on the issue of infringement, relying on the assumption of validity. We have data on counterclaims for the UK that allow us to compare the duration of cases in the UK where only infringement or revocation were at issue (i.e. no counterclaims). However, the defendant's decision not to file a counterclaim is obviously an endogenous choice which means that the set of cases where no counterclaim is filed might have characteristics that are correlated with the duration of the case (and hence the figures may not be reliable). Regardless, Table 3 shows that the case length for cases where only either infringement or revocation were at issue does not differ relative to the broader set of cases that includes counterclaims (emphasis should be put on the median duration due to the small number of observations).

Table 4 cross-tabulates claims and their corresponding outcomes. There are large differences across jurisdictions with regard to case outcomes.

Table 4: Outcomes for infringement and revocation claims

Claim		Outcome							
		Infringed		*Not infringed*		*Revoked*		*Settled*	
		#	% **	#	%**	#	%**	#	%
Infringement	DE	1165	22.0%	521	9.9%	296	5.6%	2,434	46.1%
	FR*	47	5.6%	630	74.9%	27	3.2%	137	16.3%
	NL*	94	36.0%	137	52.5%	23	8.8%	7	2.7%
	UK‡	16	14.7%	11	10.1%	28	25.7%	36	33.0%
Revocation	DE	208	7.0%	298	10.0%	574	19.3%	1059	35.6%
	FR*	0	0.0%	45	66.2%	11	16.2%	12	17.6%
	NL*	0	0.0%	11	26.8%	29	70.7%	1	2.4%
	UK‡	3	3.7%	15	18.5%	34	42.0%	21	25.9%

* Data not available or incomplete for FR and NL.

** percent of decided cases

‡ England and Wales

In Germany, about a fifth of infringement cases that end with a decision ends with the judge holding a patent infringed (regardless of whether the patent is eventually held invalid by the

BPatG).[143] This share is a lot larger in the Netherlands (36%). In France, in contrast, only a small share (5.6%) of patents is held infringed (of cases that end with a judgment). Most patents are held valid (including cases where validity was not challenged) but not infringed. One explanation could be that a *saisie-contrefaçon* reveals that patents are stronger than assumed and potential claimants fail to pursue the case further (See Section 3.3).

In the UK, the large share of revoked patents of cases that allege infringement is striking. Helmers and McDonagh (2013a) show that in about 60% of cases alleging infringement, the defendant counter-claims for revocation. This helps explain the relatively large share of 26% of infringement cases that end with revocation. The relatively lower share of infringement cases (that are decided by judgment) in Germany that end with revocation has to be interpreted with caution, however. Only around a third of alleged infringers file a claim for revocation with the BPatG. This partly explains why the share of allegedly infringed patents that are eventually revoked is a lot lower in Germany than in the UK.

Also outcomes of invalidity actions differ considerably across jurisdictions. Whereas in the UK 42% of patents are revoked if the case if decided by the judge, less than half as many invalidity cases end with revocation in Germany and France. The table also shows that the risk of infringing a patent that forms the subject of a revocation action is very low in all jurisdictions (4% in the UK and 7% in Germany).

Table 5 looks at appeals. Data on appeals are only available for the UK and Germany. We show the share of cases that was appealed from the first instance (the PHC in the UK and the regional courts on infringement and the BPatG on revocation in Germany) and then heard by the Court of Appeal and the Supreme Court/House of Lords in the UK or the Higher Regional Courts (for appeals from the regional courts in infringement cases) and the Federal Court of Justice (for appeals from the higher regional courts in infringement cases and appeals from the BPatG in revocation cases) in Germany.

The table shows that only a small fraction of infringement (15%) and revocation (10%) decisions are appealed in Germany. In the UK, the share of decisions appealed at the Court of Appeal is around 46% for both infringement and revocation decisions. The share of decisions for revocation cases that are overturned by the Court of Appeal and the higher regional courts is similar in the UK and Germany (slightly less than 30%). Only a very small

[143] In Germany some infringement proceedings contain more than one patent and all of the patents could be challenged individually in multiple revocation proceedings. This means that we summarize case outcomes such that there is only a single outcome for potentially several revocation cases corresponding to an infringement outcome. If there were more than one revocation proceeding on one particular patent with varying outcomes, we used the latest available outcome. If there were different outcomes in revocation proceedings on several patents that were all related to a single infringement case, we defined the outcome "revoked" when at least one patent was revoked. If there were multiple outcomes for the different patents, we always chose the court decision if available instead of a settlement (i.e. if one patent revocation action was settled and the other decided with a revocation, we code the case outcome as revocation).

number of cases proceed to the Supreme Court or the BGH (infringement cases).[144] Cases heard by the Supreme Court and the BGH involve fundamental question of the law and usually have importance beyond the issues at stake in a given case.[145]

Table 5: Share and outcome of appeals

		1st Instance		*2nd Instance*		*3rd Instance*	
Country	Claim	judgment	# cases	% 1st instance	% overturned	# cases	% 2nd instance
DE	infringement	1982	298	15.0%	11.1%	13	4.4%
	revocation**	1107	114	10.3%	29.8%		
UK‡	infringement	69	32	46.4%	18.8%	3	9.4%
	revocation	59	27	45.8%	29.6%	4	14.8%

* Data not available for FR and NL.

** The 2nd and final instance is the Federal Court of Justice (BGH).

‡ England and Wales

Our data also allow us to identify cross-border litigation, that is, cases that were litigated in multiple jurisdictions. That is, the same patent and the same claimants/defendants are involved in separate court cases in different jurisdictions. Table 6 tabulates the number of parallel cases across the four jurisdictions.[146] Because patents granted under the EPC turn into national property rights, they have to be enforced and invalidated in each jurisdiction separately (Articles 2 and 64(3) of the EPC). This raises concerns regarding the efficiency and costs of the system. Even more worryingly, despite the fact that all national parts of an EP have (at least initially)[147] the same claims, court outcomes have often differed across jurisdictions.[148]

[144] For revocation cases in Germany, there is only one court of appeal, the Federal Court of Justice and hence the 3rd instance cells in Table 5 are empty.

[145] See Helmers and McDonagh (2013a), p. 1455 for a discussion of the cases heard by the Supreme Court in the UK.

[146] This analysis is conducted on the patent level accompanied by identification of at least one common litigant in each of the jurisdiction.

[147] After the opposition deadline has lapsed, the national parts of an EP patent can only be attacked separately before the national courts. Therefore, the claims of the national parts of the EP might change during these proceedings when certain claims are revoked.

[148] Mejer and van Pottelsberghe (2012, p. 226-232) report several case studies showing the diverging (inconsistent) decisions in different European jurisdictions regarding the same patent. Perhaps the most well-known case is that of *Epilady v. Remington* where infringement of Epilady's patent was found in Germany and the Netherlands but not in the UK and France.

Table 6: Parallel cases* (2000-2008)

	DE	FR	NL	UK‡	cases with parallel case**	total cases**	share
Parallel cases (same patent, either same claimant or defendant)							
DE		102	71	61	1,009	6,427	16%
FR	816		33	27	113	840	13%
NL	517	31		38	92	302	30%
UK‡	505	24	41		84	165	51%
*Parallel cases (same patent & **same** claimant and defendant)*							
DE		34	24	21	127	5,121	2%
FR	68		16	13	51	840	6%
NL	46	16		18	44	302	15%
UK‡	35	14	19		43	166§	26%

* Based on patent numbers

** For which patent numbers available

‡ England and Wales

§ Exceeds number of cases where patents are available because 1 cases was retrieved from references in UK court records to parallel cases in other jurisdictions.

Table 6 shows parallel cases according to two definitions as explained in Section 5.7 above. The first type of parallel cases is less restrictive and means that the assignee of a patent is involved in law suits in several jurisdictions with potentially different adversaries. The second definition only captures cases where the claimant and defendant face each other in multiple jurisdictions over the same disputed patent. Table 6 shows that the share of parallel cases is considerably larger for the broad definition of parallel cases. But even when we restrict the set of cases to the second, more restrictive definition, we still find for the UK and the Netherlands a relatively large share of cases that are litigated in several jurisdictions (26% in the UK and 15% in the Netherlands). Conversely, the rate of duplication among patents litigated in Germany is tiny (2%). However, the number of cases in the UK and the Netherlands is considerably lower than in Germany, which determines the upper bound for the share of duplicated cases in Germany.[149]

The larger share of duplicative cases in the UK and the Netherlands is partly explained by a considerably larger share of EPO patents among litigated patents that have also entered into force in the other three jurisdictions. This is shown in Table 7 which lists the share of litigated patents according to the patent office that published/granted the patent right. Domestic patents account for 58% in Germany but for only 16% in the UK. The table also

[149] Roughly, even if every case litigated in France, the Netherlands, and the UK were duplicated in Germany, the share of duplicated cases would not exceed 25%.

shows the share of litigated EP patents that was validated in any of the four jurisdictions.[150] The figures reveal that most EP patents are validated in all four jurisdictions. The highest validation rate is found for Germany (93% on average), which reflects the relatively large market size of the German economy within Europe. The lowest validation rate (63%) is found for the Netherlands, which again reflects the relative (lower) importance of the Dutch economy. The large share of patents validated in all four jurisdictions underscores the fragmentation of the European patent system. While the same patent right is granted in several European jurisdictions, it has to be litigated in each jurisdiction separately.

Table 7: Patent type and national validations

	Domestic	*EPO*					*Other*
	%	%	Also validated in				%
			DE	FR	NL	UK‡	
DE	57.6%	42.4%		88.6%	57.7%	85.5%	0.0%
FR	58.8%	38.7%	89.3%		59.6%	84.3%	2.5%
NL	25.8%	72.6%	96.0%	91.7%		89.9%	1.6%
UK‡	16.2%	80.6%	94.8%	96.0%	72.4%		3.2%

‡ England and Wales

Note: validations in country where a patent is litigated may be less than 100% because in some cases, patents that have not yet been granted are subject to litigation.

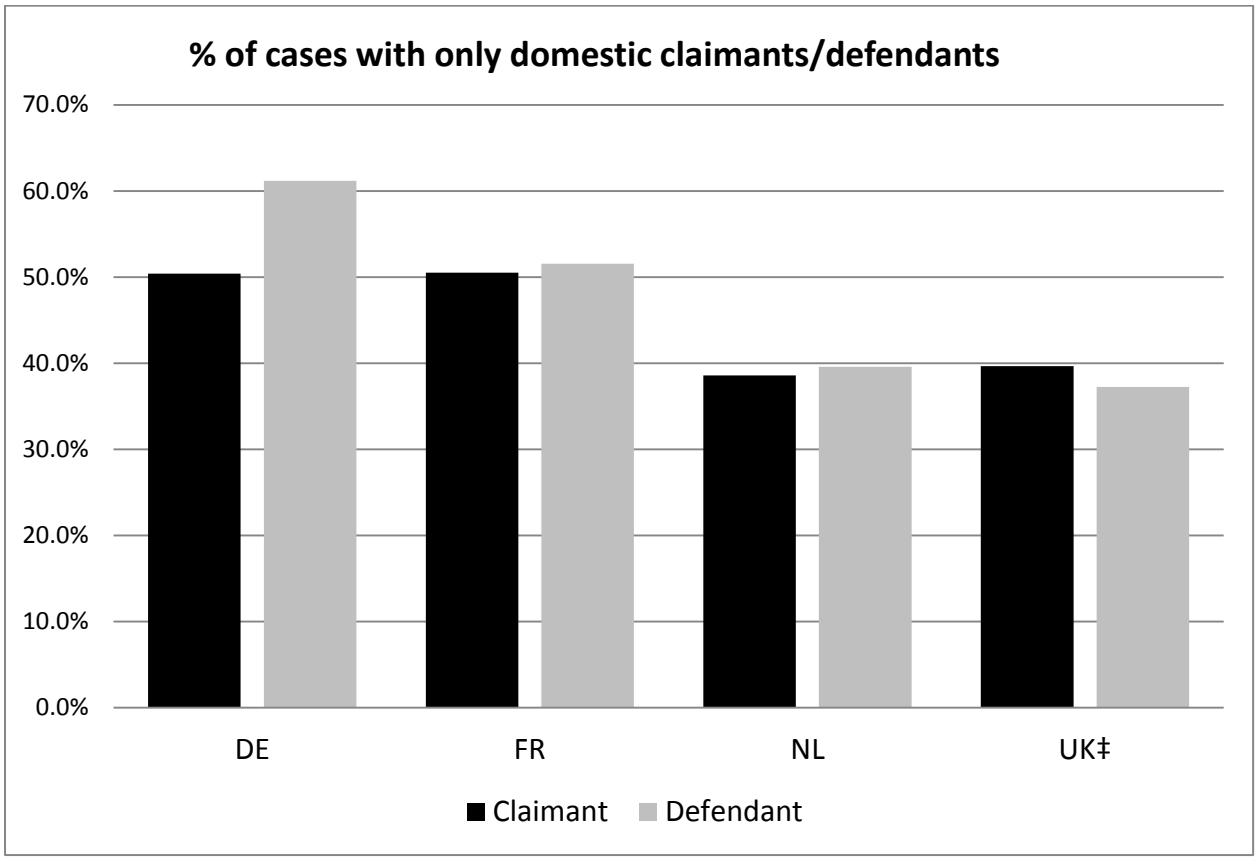
6.3 Litigant-level analysis

Next, we take a look at the characteristics of parties involved in the patent cases. Figure 6 looks at the nationality of litigants at the case-level. We distinguish between domestic and foreign litigants.[151] The figure shows that half of all cases involve only domestic claimants in Germany and France. The share of cases with only domestic claimants drops below 40% for the UK and the Netherlands. The data look similar for defendants, with the exception of Germany where the share of cases with only domestic defendants exceeds 60%.

[150] We use legal status information to distinguish designation from validation; hence, we are able to tell whether a patent that was granted by the EPO became effective in an EPC member state.

[151] The nationality of a litigating party was obtained in two ways. For companies that were matched to any of the firm-level datasets discussed in Section 5.6, the nationality was determined based on the firm-level data. We searched for the nationality of all other litigants manually online.

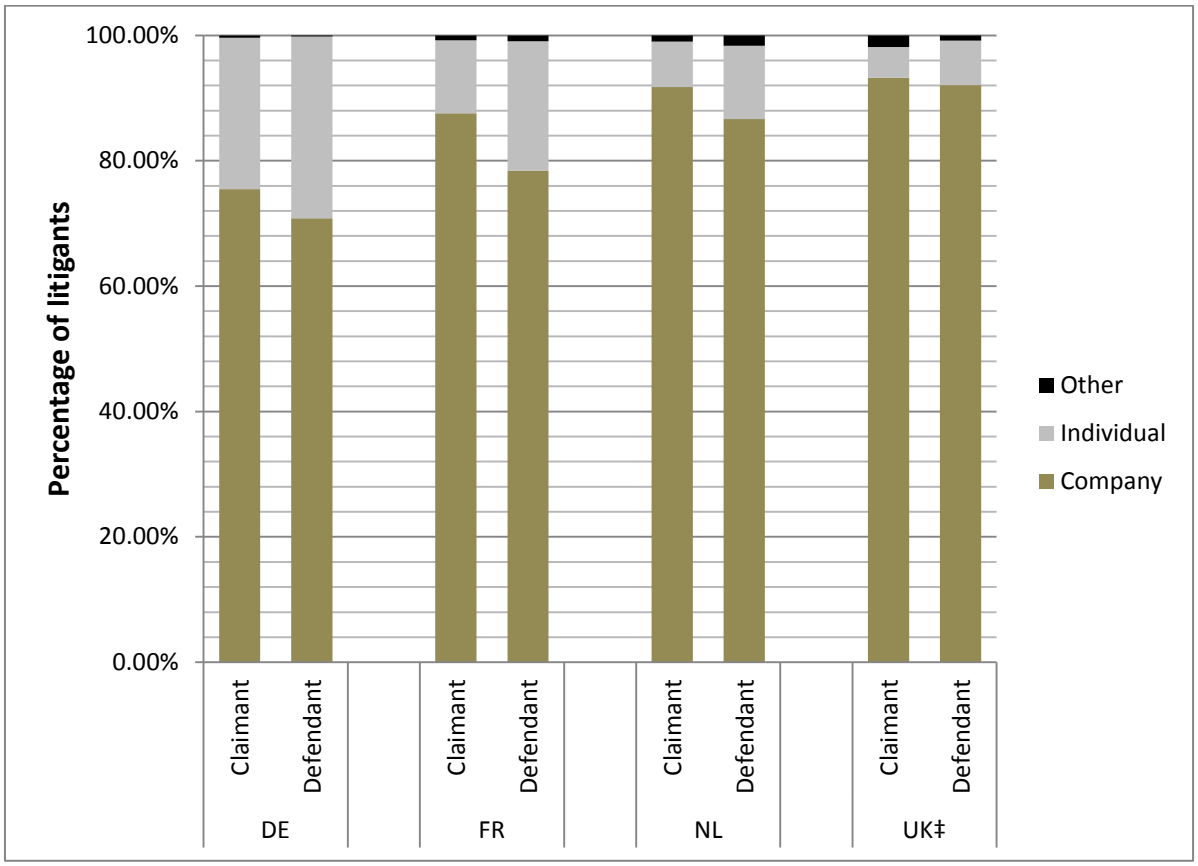
Figure 6: Nationality of claimants/defendants



‡ England and Wales

Figure 7 shows a breakdown of litigants by type, where we distinguish between companies, individuals, and others, where the latter category comprises universities, public research institutes, government, as well as international institutions/organizations (such as the European Central Bank). The largest differences in the shares of companies and individuals involved in patent cases are found across jurisdictions rather than between claimants and defendants – perhaps with the exception of France where there are almost twice as many individuals as defendants than there are claimants. Overall the share of companies as claimants or defendants is smallest in Germany. The large number of individuals involved in lawsuits may indicate that a large number of small companies (where owners appear in court) or inventors (as co-claimants) are involved in patent actions. We investigate the issue of company size further in Figure 8.

Figure 7: Type of claimants/defendants

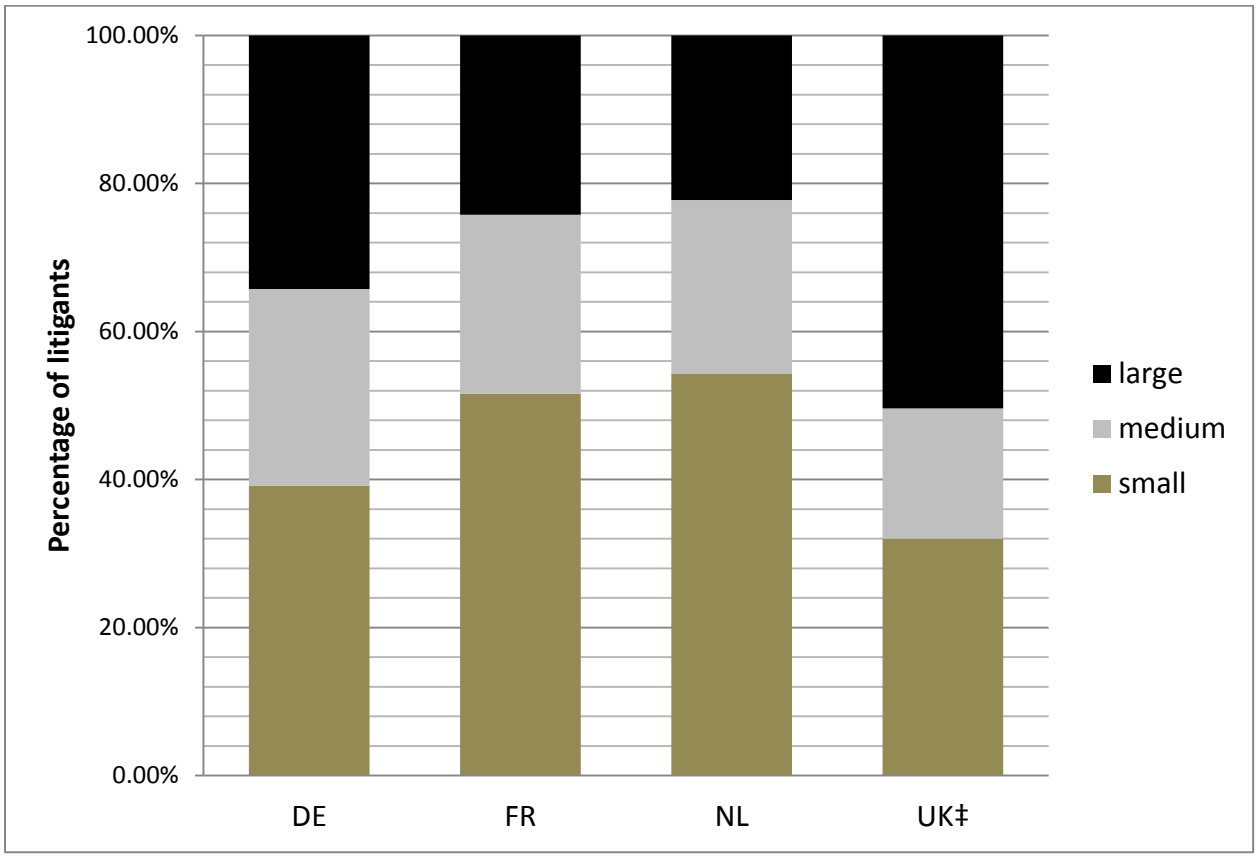


‡ England and Wales

Figure 8 shows a breakdown of corporate litigants by size category: micro and small, medium-sized and large. Since companies are allocated into the size categories based on employment data, total assets, or turnover, the table is limited to companies that report at least one of those variables. There are some notable differences across jurisdictions. The greatest share of litigants in the UK falls into the "large" category. This reflects the fact that disproportionately many pharmaceutical companies litigate in the UK (see next paragraph) and the fact that litigation at the PHC is relatively expensive.[152] In all other jurisdictions, micro- and small companies represent the largest share of litigants. In France and the Netherlands, the share of small companies even outstrips the combined share of medium-sized and large companies.

[152] Helmers and McDonagh (2013b), p. 384.

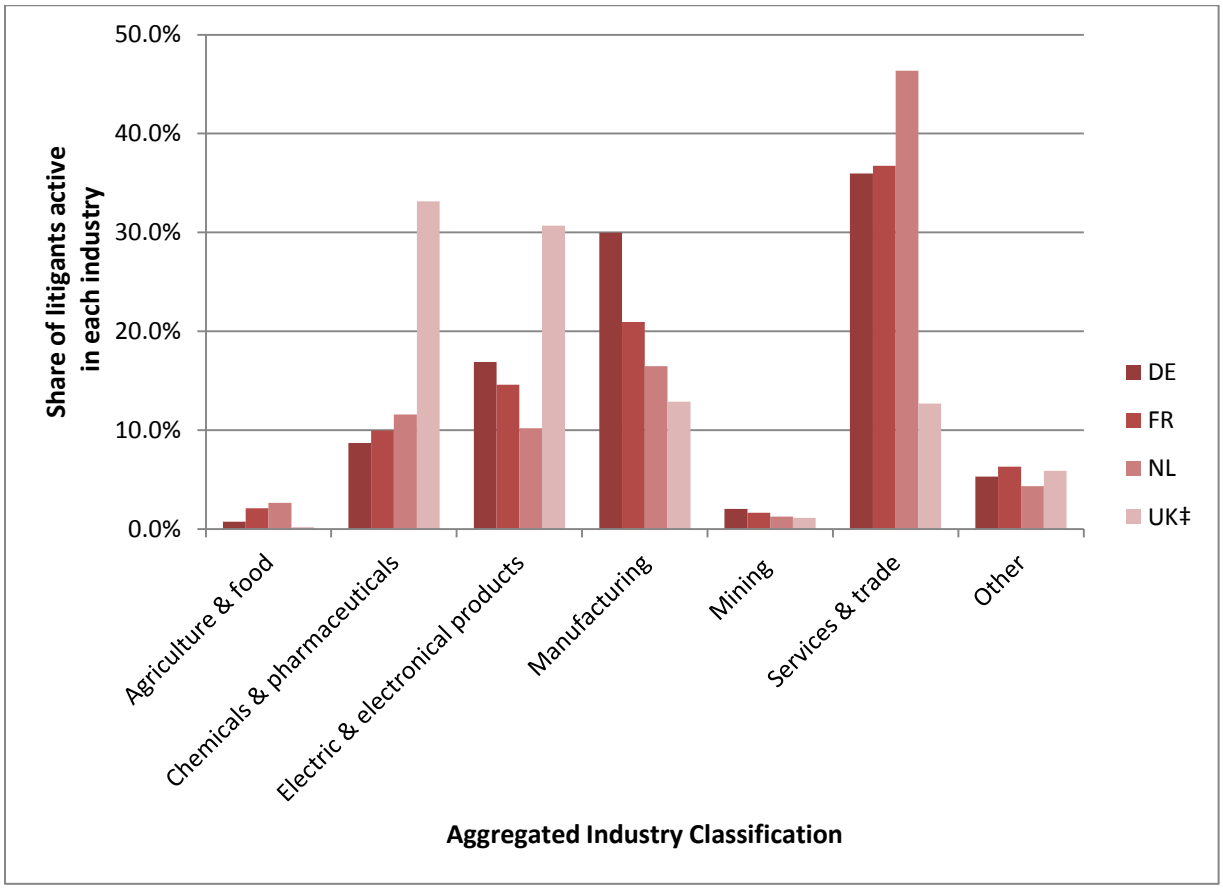
Figure 8: Size of claimants/defendants



‡ England and Wales

Figure 9 shows a breakdown across broad sectors. A few things stand out. First, the share of pharmaceutical companies in the UK of 30% exceeds the share of pharmaceutical companies involved in patent litigation in any other jurisdiction. This confirms the widely held view that the UK is an important venue for pharmaceutical patent litigation in Europe. This is probably partly explained by strong, ongoing disclosure requirements and the important role attributed to expert witnesses in High Court proceedings. In Germany, in contrast, companies are concentrated in manufacturing, notably the machinery and engine industry, which comprises a wide range of engineering-based industries. In the Netherlands, the share of companies in the services industry (especially finance, insurance, and real estate) stands out.

Figure 9: Sector distribution of claimants/defendants



‡ England and Wales

6.4 Patent-level analysis

It is well known in the literature that patents in certain technology areas, notably complex technologies such as digital data transmission, are far more likely to be involved in litigation. Table 8 shows a breakdown of litigated patents across five broad technology areas. The most striking difference is the share of cases involving chemical/pharmaceutical patents heard by the PHC in the UK and the regional courts in Germany (31% compared to 19%). The share of patents in mechanical engineering is relatively large for Germany (33%) and the Netherlands (38%).

The share of patents related to electrical engineering, which comprises ICT related technologies, is remarkably large for the UK (26%). Since these technologies have recently received a large amount of attention due to litigation involving so-called patent trolls, and the "patent wars" between the giants in the smartphone industry such as Google, HTC, Nokia, or Microsoft, we provide a breakdown of this broad category. The detailed

breakdown reveals that the large share in the UK is largely due to patents on digital data transmission and telecommunication. The share of patents in these technologies is relatively low in Germany.

Table 8: Technology classes of litigated patents

		Share of technology (based on IPCs)			
		DE	FR	NL	UK‡
Electrical engineering		15.4%	18.2%	9.1%	25.8%
	Electrical machinery, energy	26.5%	24.6%	17.5%	6.2%
	Audio-visual technology	20.9%	24.6%	36.8%	14.0%
	Telecommunication	12.4%	7.3%	8.8%	24.8%
	Digital communication	10.8%	12.6%	5.3%	27.1%
	Basic communication processes	5.6%	3.0%	10.5%	7.0%
	Computer technology	16.5%	21.8%	14.0%	15.5%
	IT methods for management	1.7%	4.9%	5.3%	5.4%
	Semiconductors	5.7%	1.2%	1.8%	0.0%
Instruments		13.6%	12.8%	14.3%	15.4%
Chemistry		18.6%	21.8%	25.5%	31.1%
Mechanical engineering		33.4%	28.8%	38.1%	18.7%
Other*		19.0%	18.3%	13.0%	9.0%

* Contains furniture and games, other consumer goods, and civil engineering.

‡ England and Wales

To gain additional insight into the characteristics of the set of litigated patents, we compute a number of patent characteristics that are commonly interpreted as proxies for the breadth and value of patents in the literature.

Table 9: Comparison litigated patents across jurisdictions

	Mean				Std. Dev.			
	DE	FR	NL	UK‡	DE	FR	NL	UK‡
Backward citations	2.49	3.22	2.78	4.19	3.32	3.61	3.73	4.42
Forward citations	5.08	2.00	2.28	3.94	12.45	4.63	4.87	13.59
Non-patent references	0.57	0.66	0.89	1.26	1.65	1.34	1.42	3.72
Family Size*	8.07	8.92	14.81	20.35	11.28	12.68	17.36	21.15
Number of inventors	1.72	1.84	2.04	2.84	1.47	1.59	1.83	2.20
Number of IPC Subclasses	1.91	1.90	2.11	2.55	1.25	1.28	1.59	1.71

* Defined according to EPO'S DOCDB family definition.

‡ England and Wales

Table 9 suggests that patents litigated in the UK are most valuable (measured by a combination of family size, forward citations, and the number of inventors). If the number of IPC subclasses is interpreted as a measure of patent breadth, patents litigated in the UK are considerably broader than the patents litigated in any of the other jurisdictions. Moreover, the number of non-patent references that are cited by a patent suggests that patents involved in court cases in the UK are potentially more closely related to scientific discoveries. This may simply reflect the large share of pharmaceutical patents among all litigated patents in the UK. In any case, the figures support the view that cases litigated in the UK involve particularly valuable inventions which justify the relatively more expensive litigation costs.

To allow also for a comparison of the litigated patents relative to a set of similar, but un-litigated patents, we draw a control sample of patents that have not been involved in litigation and that match litigated patents with respect to the type of IP (invention patent or utility model), priority filing year, filing authority and the IPC subclasses – i.e. that protect similar technologies. The results are shown in Table 10.

Table 10: Comparison litigated vs. non-litigated patents

	Mean		**Std. Dev.**		**T-test***	**# Obs.**	
	Litigated	Control	Litigated	Control	difference	Litigated	Control
Backward citations	2.77	0.94	3.34	2.14	**-67.38**	7,667	80,764
Forward citations	5.01	1.42	13.12	5.62	**-45.39**	7,667	80,764
Non-patent references	0.63	0.35	1.75	1.37	**-16.38**	7,667	80,764
Family Size**	8.43	11.59	11.68	12.07	**21.98**	7,667	80,764
Number of inventors	1.98	3.05	1.44	2.24	**38.30**	6,739	67,684
Number of IPC Subclasses	1.91	1.11	1.26	0.36	**-0.01**	7,667	80,764

Non-litigated control patents and utility models matched to litigated patents and utility models 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 10 compares the entire set of litigated patents to a set of control patents that protect inventions similar in terms of priority year, priority filing office, as well as the patent's IPC classes. We find that the number of forward citations received worldwide is significantly higher for the litigated patents compared to the group of non-litigated patents. As forward citations are generally considered an indicator for patent value we find support for the conjecture that litigated patents constitute particularly valuable patents. This result is somewhat contradicted by the family size variable, indicating the number of countries the

patent has been applied for.[153] Again, if the number of IPC-classes covered by the patent is interpreted as a broad measure of patent scope, we see that patent scope is significantly larger for litigated patents. This can be explained by the fact that infringement is more likely if the patent has a broader applicability and thus more potential infringers. Regarding two different measures of the extent to which the patent relies on prior art, we find both the number of backward citations and the number of non-patent backward citations (denoting closeness to basic academic research) to be significantly higher for the litigated patents. A surprising result is that the litigated patents on average have a lower number of inventors than the non-litigated patents.

[153] Family size is measured by using the broad DOCDB family definition in EPO's Patstat.

7 Conclusion

The European patent system is currently undergoing fundamental changes. The institutional reforms that are being implemented are controversial. The discussions concerning the reforms of the European patent system, and especially the discourse regarding changes to the legal and procedural framework of patent enforcement have been characterized by a striking lack of representative quantitative evidence. Our analysis seeks to contribute to the debate new and comprehensive empirical evidence based on a novel dataset covering patent enforcement in the four most important jurisdictions in Europe: Germany, UK (England and Wales), France, and the Netherlands.

For a variety of legal and procedural reasons, European legal systems are not set up to provide easy access to case information. Therefore, these data had to be collected from a wide range of sources, including information from handwritten case records at regional courts in Germany, online case repositories and private data providers. Being the first study of this kind, we developed a methodology that allowed us to transform largely qualitative information collated from court records into quantitative measures that are comparable across jurisdictions. The analysis of this novel dataset uncovers a number of interesting differences in patent litigation patterns across the different jurisdictions.

With respect to the results of the study, we show that the number of cases heard by German regional courts exceeds by far the number of cases heard in the other three jurisdictions. Even when we account for the over-counting of cases due to bifurcation, idiosyncratic practices at regional courts and procedural differences, the number of cases in Germany exceeds the combined number of cases in the other three jurisdictions over the same time period. We also demonstrate that the number of cases has increased in the UK and Germany over time, but there is no evidence for an upward trend in case filings in France and the Netherlands.

Regarding the settlement of disputes, our analysis also reveals significant differences across countries. More than 60% of cases in Germany end with a settlement, whereas this is true for only around 40% of cases in the UK. When cases are decided by a judge, outcomes differ across jurisdictions. In the UK, revocation is the most likely outcome regardless of whether the initial claim is for infringement or revocation. Infringement is most likely to be found by German and Dutch courts. In France, the large share of patents that is held not to be infringed (but valid) stands out.

The data also allow us to compare the time it takes to obtain a judgment in the first instance. The time lag that lapses between the filing of a claim for infringement and a first decision is less than one year in Germany, the Netherlands, and the UK. Infringement cases take almost one year longer in France to reach a decision. Claims for invalidity are decided fastest in the UK (within less than a year), but take considerably longer in Germany (on

average 18 months). Moreover, our evidence indicates that the PHC in the UK does not decide faster when there is only either infringement or validity at issue.

We also obtain insights regarding one of the main motivations for the current reforms of the European patent system: fragmentation. We show that most EPO-granted patents that are litigated in a given jurisdiction have also been validated in all other jurisdictions (possibly with the exception of the Netherlands). This means that there is scope for parallel litigation of the same patent in multiple jurisdictions. However, our data reveals that the share of duplicated cases (cases that involve the same patent and litigating parties in multiple jurisdictions) is low in Germany (2%) and France (6%). Nevertheless, the share attains 26% in the UK and 15% in the Netherlands. This provides mixed evidence for fragmentation and the resulting need for parallel litigation in multiple jurisdictions. Quantifying the cost of duplication that arises from such parallel litigation deserves further work. However, we note that the vast majority of patents are litigation only once.

Our data also allow us to look at the characteristics of the litigating parties across the four jurisdictions. We find large shares of claimants and defendants that are domestic entities. The share of only domestic entities is largest in Germany (over half of claimants and defendants) and smallest in the UK (less than 40%). Most of the litigating parties are registered companies, although there is a significant share of individuals involved in the disputes, in particular in Germany (24% among claimants and 29% among defendants). Looking at the distribution of litigating companies across industries, we note a concentration of companies in pharmaceuticals/chemistry and in electronic products in the UK, whereas litigating companies in Germany are concentrated mostly in the areas of machinery and engines. The distribution of companies across economic activities is also reflected in the distribution of patents across technology areas. Most litigated patents in the UK protect pharmaceutical and chemical inventions, as well as inventions related to telecommunication and digital data transmission. In Germany, most patents are in the area of mechanical engineering.

A few caveats are in order in interpreting these findings and assessing the potential of the currently used dataset. First, our data cover only cases that were filed between 2000 and 2008. It is possible that the case numbers have changed significantly since then. In fact, more recent data for the UK for both the PCC and the PHC suggest that case counts have increased substantially. In 2012, there were 86 patent cases at the PHC and 162 IP cases at the PCC.[154] If we assume that approximately 20% of IP cases at the PCC are patent related (Helmers and McDonagh, 2013a, Table 1), this would imply that around 30 patents cases were filed at the PCC in 2012. Hence, the number of patent cases would have increased from 42 in 2008 to 116 in 2012. Moreover, the 2012 data for the PHC suggests that the composition of cases has changed; 31 of the 86 PHC cases (36%) involve smartphone

[154] The 2012 PHC data were generously provided by Powell and Gilbert and IPLA. We collected the 2012 data for the PCC directly from court records.

producers HTC, Nokia, and Apple.[155] In the case of Germany, the evidence is slightly less conclusive. Kühnen and Claessen (2013, p. 593) suggest that 475 cases have been filed at the Düsseldorf court in 2011 (compared to 437 in 2008). Whereas this is a modest increase (9%), the increase at the LG Mannheim between 2008 and 2011 is more substantial (27%) albeit still relatively modest in absolute terms (56 cases) in light of the large overall annual caseload in Germany. Second, and presumably more importantly, the data for France and the Netherlands are subject to important limitations. For France, we have at best only around 60% of cases and even the set of cases heard at the Paris TGI might be incomplete. Similarly, the low settlement ratios at the Hague court in the Netherlands suggest that we might be missing cases that were settled. Hence, the figures for France and the Netherlands have to be interpreted with caution which is why we emphasize the comparison of Germany and the UK. Having said this, statistics that are conditional on adjudication may not be affected by this limitation.

Regardless of these caveats, the provision of our case-level data and our analysis of this data shed new light on the extent of patent litigation in Europe and further illustrate how enforcement systems vary in the European jurisdictions which account for the lion's share of patent litigation. We hope that the evidence provided here proves to be useful in informing the current academic and policy debates on the creation of a unified pan-European litigation system.

[155] These cases involve on average 1.4 patents and it appears that the parties filed separate cases for individual patents that might be in fact related. This could imply that the case filing behavior at PHC has to some degree assimilated the filing behavior at German regional courts.

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9 Appendix

Table A1: DE

Year	A	B			C	D	E	F	G	H
	All patent cases	Only infringement and revocation			Including courts not covered*	Cases counted once per patent***	Only invention patents	Consolidated at case level	Drop early settled cases** Not consolidated	Drop early settled cases** Consolidated at case level
		Infringement	Revocation	Sum						
2000	568	348	171	519	710	686	243	366	562	361
2001	648	430	165	595	810	782	332	446	644	442
2002	308	154	129	283	770	372	110	169	306	168
2003	664	463	144	607	830	801	374	470	646	453
2004	870	636	170	806	1,088	1,050	456	637	856	626
2005	932	633	196	829	1,165	1,125	525	640	921	632
2006	814	575	197	772	1,018	983	447	542	791	523
2007	990	726	195	921	1,238	1,195	668	705	939	662
2008	945	637	251	888	1,181	1,141	545	612	914	583
Sum	**6,739**	**4,602**	**1,618**	**6,220**	**8,809**	**8,134**	**3,700**	**4,587**	**6,579**	**4,450**

* Courts not covered by the survey include: Berlin, Braunschweig, Erfurt, Frankfurt, Hamburg, Leipzig, Magdeburg, Nuremberg-Fürth and Saarbrücken

** All cases that settled within 6 weeks dropped

*** Number of cases multiplied by average number of patents per case (1.207) over entire 2000-2008 period

Table A2: UK

	A	B			C	D	E	D+E
Year	All patent cases	Only infringement and revocation			PCC patent cases added*	Cases counted once per patent♦	Count counterclaims as separate cases**	
		Infringement	Revocation	Sum				
2000	19	10	3	13		27	27	38
2001	22	11	5	16		31	28	40
2002	24	9	6	15		34	28	40
2003	28	10	6	16		40	31	44
2004	27	15	5	20		38	39	55
2005	28	9	12	21		40	38	54
2006	40	19	12	31		57	63	89
2007	31	8	16	24	38	44	44	62
2008	37	18	16	34	42	52	58	82
Sum	**256**	109	81	**190**		**363**	**356**	**505**

* Data available only for 2007 & 2008

♦ Number of cases multiplied by average number of patents per case (1.418) over entire 2000-2008 period

** Includes only counterclaims for infringement and revocation

Table A3: FR

	A	B			C	D
Year	All patent cases	Only infringement and revocation			Courts not covered*	Cases counted once per patent***
		Infringement	Revocation	Sum		
2000	106	79	6	85	159	212
2001	126	89	8	97	189	252
2002	125	82	7	89	187.5	250
2003	85	57	3	60	127.5	170
2004	120	95	8	103	180	240
2005	118	80	8	88	177	236
2006	129	103	4	107	193.5	258
2007	106	81	12	93	159	212
2008	87	68	7	75	130.5	174
Sum	**1002**	**734**	**63**	**797**	**1503**	**1101**

* Courts not covered by the survey include: Lyon, rennes, Lille, Marseille, Bordeaux, Strabourg, Toulouse, Nancy, Limoges, Autres

*** Number of cases multiplied by medium number of patents per case (2.00) over entire 2000-2008 period

Table A4: NL

	A	B			C
Year	All patent cases	Only infringement and revocation			Cases counted once per patent***
		Infringement	Revocation	Sum	
2000	42	36	3	39	56
2001	40	33	1	34	54
2002	31	29	1	30	42
2003	19	13	4	17	26
2004	45	33	8	41	61
2005	40	30	7	37	54
2006	35	34	1	35	47
2007	36	27	6	33	48
2008	38	24	9	323	51
Sum	**326**	**259**	**40**	**299**	**339**

*** Number of cases multiplied by average number of patents per case (1.345) over entire 2000-2008 period