Economic Cost-Benefit Analysis of a Unified and Integrated European Patent Litigation System

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Executive Summary

The patent system in Europe is still incomplete. Appropriating returns from patented technology is impaired by the fact that patent-holders may have to enforce their patent rights in multiple courts. Moreover, third parties interested in showing that particular patent rights have been granted erroneously are disadvantaged by having to initiate revocation proceedings in multiple jurisdictions.

Given that the successful pursuit of these two objectives can generate welfare gains for the European economy, a unified European patent litigation system has immediate appeal.

The current study seeks to provide approximate cost and benefit calculations in order to inform policy-makers in Europe about the choices they face in this important field of public policy. The study groups cost and benefit effects into the following categories: (i) effects from avoiding duplication of litigation; (ii) effects from changes in the demand for litigation, induced by changes in the cost structure; (iii) effects from changed incentives for patenting.

Towards performing an assessment of the first two effects, the report collects data from a variety of sources in order to support the estimates and to test the plausibility of a number of necessary assumptions. Given that no official data on the incidence, outcomes and cost of patent litigation exist, an effort is made to triangulate data and estimates in order to demonstrate that the approximations are justified.

The following results are particularly important. Avoiding duplication of infringement and revocation cases is likely to generate large benefits for the European economy. The results obtained here suggest that *currently*, between 146 and 311 infringement cases are being duplicated annually in the EU Member States. By 2013, this number is likely to increase to between 202 and 431 duplicated cases. Total private savings from having access to a unified Patent Court in 2013 would span the interval between EUR 148 and 289 million.

An assessment of the operating costs of the proposed Patent Court is obviously subject to a large number of caveats. Based on data from earlier efforts (in particular the EPO's Working Party on Litigation), an upper-bound estimate for the operating costs of a court with a capacity of 940 cases indicates that the Court would cause operating costs of EUR 27.5 million.

Hence, the cost-benefit assessment focusing on avoided duplication leads to a highly positive evaluation of the proposal. Even if the low estimate of savings (EUR 148 million) is taken, the new system would create substantial benefits and reach a benefit-cost ratio of 5.4. However, this view may be unduly conservative, and the benefit-cost ratio could be as high as 10.5.

Additional benefits could flow in case of additional litigation activity, be it in terms of infringement or revocation actions. The availability of a low-cost litigation path offered by a unified Patent Court is likely to lead to additional activity from parties in countries which currently do not use the European patent system extensively. Moreover, the cost level of

litigation in the unified Patent Court system is likely to be below the cost levels currently observed in some Member States and parties in these Member States are also likely to engage in more litigation activity in the medium-run. These effects will also contribute to generate private and public benefits.

The above estimates and considerations are based on the assumption that the unified Patent Court will offer litigation at roughly the same cost level as the three largest low-cost national systems. In a robustness check, the report explores to what extent the gains from saved duplication would be dissipated if the cost level were higher. The computations show that even with a substantial average cost increase, benefit-cost ratios remain above one, and for most scenarios considerably above one.

It is more difficult to predict cost-induced changes in the demand for litigation. The relevance of such changes will depend on the level and type of costs imposed on users of the new system. These will be mostly determined by the private costs for legal support and advice, but also by the fees levied by the Court itself. Measures to contain the private costs to parties in litigation are important, and the Presidency's proposal includes a number of such measures which are discussed in the report with respect to their impact. A particularly promising measure is to admit representation of parties by specialized European Patent Attorneys. Another measure of importance is the contribution from the Community budget and from States which are not EU Member States to the Court's budget, in order to keep fees at low levels.

The report also discusses – in a qualitative manner – effects which emerge from changes in patenting and litigation incentives. It is argued that effects will be beneficial if the unified patent litigation system puts emphasis on fast and low-cost proceedings, high quality judgement, and a fair balance between the legitimate interests of patent holders and alleged infringers. It is emphasized that particularly strong positive welfare contributions can be expected if an effective and rapid, low-cost *revocation procedure* is available. The latter feature should provide an effective means against strategic and (possibly) frivolous litigation activity which could be mounted in the future by "patent trolls". The report also comments on particular design choices in the Presidency's proposal.

To summarize, this report recommends strongly that the Presidency should proceed in its efforts to establish a unified and integrated patent litigation system for European patents and future Community patents. For conservative estimates of the relevant parameters, the economic benefits from such a system are likely to exceed the costs of the establishment and operation of the new court by a large multiple of between 5.4 and 10.5. Moreover, with prudent design choices it should be possible to implement a litigation system that will be balanced and supportive of overall efforts to improve the quality of patents in Europe.

1 Objective and Structure of the Report

1.1 Objective

Over the last four decades, Europe has achieved a considerable degree of harmonization in its patent systems. Despite some problems, the examination and grant system operated by the European Patent Office (EPO), based upon the European Patent Convention (EPC), represents a high-quality system that is currently not available in other regions of the world. With the opposition and appeal proceedings at the EPO, a first level of litigation-type system for validity issues has been established. Yet, despite a number of promising efforts undertaken in the past at Community or intergovernmental level, a unified and integrated patent litigation system is still not available in Europe.

At this point it is not fully clear what the overall costs and benefits of the creation of such a system would be, and how they would be impacted by the choice of various crucial design parameters for a unified litigation system. In order to inform the policy debate, it is of considerable importance to estimate the economic impact of a unified patent litigation system in Europe. Such a study should seek to give policy-makers guidance in their choice of policy parameters and present evidence concerning the economic impact of such a system. Within its tender MARKT/2006/06/D, the European Commission has asked for such an assessment. The current report summarizes the analysis and efforts undertaken in the course of this project.

The overall objectives of this report are according to the tender as follows:

- The report is to lay out a systematic framework for the assessment of economic effects from a unified patent litigation system.
- It will discuss qualitatively the comparative advantages of various system designs, based on the experience of various European and non-European countries;
- It will identify in a systematic way the different costs and benefits associated with such a unified system (and with particular parameters of the system's design).
- It is to quantify (to the best extent possible) the costs and benefits from the introduction of a unified European patent litigation system.

1.2 Structure of the Report

The remainder of this report is structured in seven sections which are followed by a detailed bibliography and two annexes.

Section 2 discusses the results from a detailed literature review which captures important theoretical and empirical insights on patent litigation as well as salient results of the studies that have been undertaken in various attempts to propose unified European patent litigation systems. The review itself is attached in Annex I of the report.

Section 3 provides an assessment of the shortcomings of the current litigation systems in Europe. The discussion takes up arguments from the academic literature as well as assessments put forth by practitioners and users of the system. The section then briefly summarizes the Presidency's proposal for the establishment of a unified Patent Court.[1] Finally, the section describes a conceptual framework for the simplified welfare assessment pursued in the report.

Section 4 collects information about the frequency and cost of patent litigation in Europe from various sources. While some survey data are available for the most important European countries, most surveys do not distinguish between litigation activity concerning European or national patents. Moreover, there is no data that would allow the computation of the extent of duplication of litigation cases. The section describes the data sources in order to provide a consistent basis for quantitative assessments.

Section 5 provides estimates of the operational costs of the unified Patent Court. The estimates should be taken as a first approximation. They are based on assumptions, data and cost structures already employed in similar calculations for the EPLA Patent Court.

Section 6 seeks to establish conservative estimates on the extent to which the unified litigation system would reduce duplication. The salient feature of the unified system would be to offer users of the system a non-duplicating litigation path – for both revocation and infringement procedures. Several scenarios are developed in order to provide reasonable estimates of the duplicated share of patent litigation cases, both for 2008 and for 2013. The immediate effects from avoiding duplications are then estimated.

In **Section 7**, the more complex selection and incentive effects are addressed. As the cost of litigation may change (relative to the cost level now present in many Member States) after the establishment of the unified Patent Court, the impact of these changes needs to be considered. Moreover, the establishment of the Court may have important incentive effects which are hard to quantify but ought to be discussed at least on a qualitative level in the policy debate.

In **Section 8**, the results are summarized, and various caveats, which are unavoidable given the incomplete database and lack of structural studies, are discussed. The section concludes that – with proper attention being paid to a number of important design decisions – the future unified system is likely to generate large benefits for Europe's inventors, businesses and society at large.

Section 9 contains the bibliography. **Annex I** contains the detailed literature survey. **Annex II** contains the documentation of scenario computations summarized and discussed in section 6.

[1] The terminology adopted in this report will abbreviate the official term "European and Community Patents Court" with "unified Patent Court". The court system proposed in the European Patent Litigation Agreement (EPLA) will be referred to as the "EPLA Patent Court".

2 Results of the Literature Review

This section of the report summarizes the most pertinent results from a detailed literature review which captures important theoretical and empirical insights on patent litigation as well as salient results of the studies that have been undertaken in various attempts to propose unified European patent litigation systems. The review itself is attached in Annex I of the report.

- A comprehensive theoretical or empirical welfare balance of the patent system and of patent litigation is not available at this point. Hence, an assessment of the impact of a unified litigation system cannot be conducted from first principles, e.g. by first computing costs and benefits of the current system and of a unified one, and then assessing the differences.
- A large-scale simulation analysis (which would be a conceivable alternative) has not been attempted either (and would be beyond the scope of this study).
- It is a well-established result in the litigation literature that private and social incentives for litigation deviate. This is due to the fact that when one party engages in litigation it takes its own private costs and benefits into account, but not the costs and benefits incurred by other parties. Yet, litigation is beset with external effects, some of which are listed here:
  - Patent litigation can resolve uncertainty about the extent of patentability and the scope of protection conferred by patents. Since valuable patents are most likely to the subject-matter of disputes, the economic impact of uncertainty is potentially large in these cases.
  - Patent litigation judgments may provide patent offices with precedence information and help to consolidate divergent patent office practices.
  - Patent litigation limits the scope of strategic patenting by imposing limits on opportunistic behavior while safeguarding the rights of owners of valid patent rights.
  - Patent litigation corrects distortions in incentives for research and development (R&D) by providing patent-holders whose rights have been harmed with proper recourse and compensation or damages.
- But patent litigation can also cause negative effects, such as delay for the other party and uncertainty. To the extent that a court will not compensate the parties for these effects, a complex mix of positive and negative effects will be present.
- The theoretical literature has emphasized three different mechanisms that may lead parties to fight a dispute through in court. These are:
  - divergent expectations, which arise when uncertainty leads parties to different expectations about facts of the case or the law;
  - asymmetric information, which arises when one party has superior information on particular aspects of the controversy and seeks to exploit this information in order to extract rents;

- asymmetric stakes, which arise when the defendant in a suit is unable to adequately compensate the patent-holder or the stakes are contingent on the outcome of litigation.[2]

- Patent litigation will become more prevalent (i) as costs of litigation decrease, (ii) as the stakes become higher and (iii) as divergence of expectations and asymmetry of information increase.
- Patent litigation can generate considerable externalities – negative as well as positive. This is particularly true for revocation suits because the outcome determines the extent of entry barriers.[3]
- While there has been little empirical research on patent litigation in Europe, the US system has been scrutinized in some detail.
  - The main finding of recent empirical studies is that, on aggregate, litigation in the USA has increased in line with patenting.
  - Another important finding is that in the USA small firms are more likely to be involved in either the defence of their own patents (relative to patents) or as alleged infringers of others' patents (relative to R&D expenditure) than large firms.[4] The literature points to problems for SMEs in settling disputes out of court.
  - There is a host of studies which show – again mostly for the USA – that patent litigation presents a serious and elevated cost to firms with small patent portfolios relative to firms with large patent portfolios. Small firms appear to face substantially higher marginal costs when protecting their patents than larger firms, and these costs seem to have increased recently.[5] Small biotechnology firms even appear to avoid patenting in certain patent classes strongly affected by patent litigation.[6] Thus, the concerns of SMEs need to be taken into account when considering design options for the unified Patent Court
  - There is evidence that repeated interaction reduces the likelihood of litigation.[7]
  - Several studies have pointed out that new business models involving patents as assets or as legal threats are of importance, and that the litigation system is likely to play an important role in how these models will develop further. One such business model is sometimes referred to as "patent troll" activities. A patent troll is a company that acquires patents of failed companies or independent innovators and uses these to threaten suit against alleged infringers, without having the intention of actively using the patent they assert.[8] Patent trolls can obtain high quasi-rents in the USA because many of those they attempt to hold up are unwilling or unable to fight a patent infringement case through to a judgement in order to have the patent invalidated. Cost

[2] This case will arise, for example, if the patent in dispute has a value to the patent-holder which goes beyond the market in dispute. Somaya (2003) provides a good discussion of such cases.
[3] See Graham and Harhoff (2006), Shapiro (2003), Farrell and Shapiro (2008).
[4] See Lanjouw and Schankerman (2004), Meurer and Bessen (2005).
[5] See Lanjouw and Schankerman (2004), Meurer and Bessen (2005).
[6] See Lerner (1995).
[7] See Lanjouw and Schankerman (2004).
[8] This definition is quite slippery as patents are created in order to allow inventors to recoup fixed outlays on R&D. Typically a suit will be classified as being brought by a patent troll if the patent being asserted is of dubious quality; this often means that the patent is also very broad.

allocation rules and the cost of litigation are important aspects in this realm. The extent of "troll activity" is uncertain in Europe, but recently patent funds have acquired several thousand patents and may seek to enforce them.

- A large number of studies have focused on the creation of the CAFC (Court of Appeals First Circuit) in the USA which was established in 1982 in order to counteract the fragmentation of appeals courts. Some assessments are quite critical and point to the CAFC as being responsible for the extension of patentable subject-matter and for the overly pro-patent court posture in the USA. However, the analogy to the situation in Europe is limited, since the USA never faced a problem of duplication of patent litigations in various national courts. Nonetheless, important lessons can be learned from the US case, and these are discussed in detail in section 7 of the report.

Taken together the literature gives some qualitative suggestions for the design of an unified Patent Court system. The ideal patent litigation system operates at low cost levels for the parties involved and generates precise and reliable judgements quickly. It is clear that these objectives may have to be traded off against each other, but it is worthwhile repeating why these aspects are important.

- First, patent litigation can exert positive external effects – these will not come about if settlement is chosen instead of adjudication. But the choice between settlement and adjudication is largely determined by the cost of litigation.
- Second, the cost level of litigation determines to what extent a potential for hold-up exists. As a US judge noted, high litigation costs distort patent trade and the patent system.[9]
- A third dimension of hold-up emerges from delayed proceedings – literally, "time is money". Delays in proceedings translate into advantages for some of the parties involved. Therefore, proceedings may be delayed for strategic purposes.

In a fast and low-cost litigation system with precise judgements, almost no potential for hold-up and strategic behavior is left. These considerations have a number of important implications which are considered in the section 7.

For the quantitative assessment of the impact of a unified patent litigation system in Europe, a suitable framework has not been presented as yet. The next section first considers the status quo of patent litigation in Europe and studies the features of particular systems from an economic perspective. It then presents a concept for an approximate assessment of costs and benefits of a unified system.

[9] Ellis, T.S. (2000): "(...) It is, simply put, that the escalating, indeed skyrocketing litigation costs of the 1970's and 1980's have distorted patent markets and patent economics." This comment concerns the development in the United States.

3 Status Quo of Patent Litigation in Europe and the Presidency's Proposal

In section 3.1, the current system of patent litigation in Europe is briefly described. Strengths and weaknesses of selected national systems are summarized. In section 3.2, the most recent proposal made by the Presidency for the establishment of a European and Community Patents Court is briefly summarized. Then, in section 3.3, the conceptual approach of the report is summarized which will be used to assess the costs and benefits of a unified patent litigation system.

3.1 The Current System and Its Shortcomings

3.1.1 Patent Litigation Systems in EU Member States

Patent litigation systems in EU Member States have evolved over several decades. During this process, they have developed their own characteristics and features. The heterogeneity in the utilization of patents, in the number of actions initiated before national courts and in system designs (single vs. dual system regarding infringement and validity issues) is striking and reflects the fact that, in the field of patent litigation, Europe is still lacking an integrated jurisdiction taking full account of the single market.

Some countries have developed refined, specialized systems which attract a large number of cases; among these are France, Germany, the Netherlands and the United Kingdom . Typically, these are also the countries which have developed a strong propensity to generate European (or national) patents. Specialized patent litigation courts have also been set up in countries like Austria, Finland, Italy, and Sweden, *inter alia*. Specialized litigation systems are favourable, since they allow for relatively fast court proceedings and for low error rates in first instances, as well as fast feed-back from the jurisdictional to the administrative part of the patent system, in particular patent examination. Heterogeneity in litigation systems is also apparent in the extent to which different systems make use of technical expertise. While some systems involve technical judges, others draw on extensive use of technical experts without bringing the dedicated technical expertise "into judges' chambers".

As this report will document in the following sections, one crucial aspect of heterogeneity concerns the costs of litigation. Costs will differ according to type, complexity and technical field of the case, but may also differ significantly by jurisdiction, with particularly high costs in common law countries. While a case with value of EUR 250,000 may cost each party in first (second) instance proceedings EUR 50,000 (90,000) in Germany (and similar amounts in France and the Netherlands), the costs of litigation can be at between EUR 150,000 and EUR 1,150,000 (150,000 to 1,000,000) in the United Kingdom.[10] Since procedures differ across countries, the potential for economies of scale in duplicated proceedings is limited.

[10] See Table 4.6 below for details.

3.1.2 Features of the Most Frequently Used Systems

No detailed comparison of all national systems has been undertaken in the literature. However, both academics and practitioners have engaged in studies and assessments of the most frequently used patent litigation systems in Europe.[11] This report draws on these assessments in order to identify system components that offer particular advantages in terms of efficiency, cost effectiveness and precision. For the purpose of this report, four national court systems are particularly interesting since litigation in these courts accounts for about 90% of all patent litigation activity in the EU.[12]

The **German system**[13] is considered particularly appealing for a large number of users. Germany is said to attract anywhere between 50 and 70% of all patent litigation activity in Europe. While it sets relatively high thresholds for injunctions and (up to the recent past) for the collection of evidence by the plaintiff, practitioners emphasize the following advantages: (i) the fast resolution of cases; (ii) the relatively low costs of litigation which allows SMEs to participate in litigation; (iii) the high level of technical competence, and the "technical quality" of decisions; (iv) concentration on a few, highly specialized courts; (v) the parsimonious use of expert opinions (which elsewhere often lengthen procedures); infrequent settlements and thus frequent adjudication of cases; rules that allow the winning party to recover costs and fees; and an adequate level of damages. The presence of technically qualified judges in revocation proceedings is seen as a positive feature. Clearly, as Leroux and Bourguet point out, Germany also profits from stringent national standards in patent examination. The bifurcation principle (i.e., the split between infringement and revocation actions which are dealt with by different courts) is considered as both a shortcoming in some respects, and as an advantage in others.

The **Dutch system**[14] also has a rather positive image regarding patent litigation. However, it is noted that it mainly accommodates large firms and that it offers less opportunity to the winning party of cost recovery. Moreover, securing evidence is more burdensome to the plaintiff than – for example – in France. On the positive side, Dutch proceedings work quickly, there is a rather strict time framework for the cases, efficient summary proceedings are available, and the level of damages to compensate patent-holders for actual infringement is adequate.

The **UK system**[15] is the most costly one, and this aspect is generally noted as negative. Costs are also considered to be a decisive factor in generating a large number of settlements in the UK system. The rarity of preliminary injunctions is also noted as a drawback by practitioners. On the positive side, the UK courts are considered highly competent and experienced,

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[11] In the following sections, the report draws in particular on a comparative assessment prepared by Leroux and Bourguet (2006) at Bird & Bird and on seminar materials authored by Dr. Sabine Rojahn and colleagues for Taylor Wessing.

[12] See Annex 1, paragraph 2 of WPL/11/05 "Assessment of the impact of the European Patent Litigation Agreement (EPLA) on the litigation of European patents", dated 1.12.2005.

[13] Cf. Leroux and Bourguet (2006, pp. 17-25)

[14] Cf. Leroux and Bourguet (2006, pp. 26-30)

[15] Cf. Leroux and Bourguet (2006, pp. 31-35)

proceedings are very fast, the timetable is organized very strictly, there are satisfactory means of cost recovery and adequate damage awards. To some parties, the availability of a coercive method of securing evidence ("disclosure") is attractive.

In **France**[16], another "popular" litigation forum in Europe, the main comparative advantage was for many years the *saisie-contrefaçon* which allowed plaintiffs to secure evidence in a highly effective manner. Enforcement measures like the *saisie-contrefaçon* are now included in Directive 2004/48/EC on the enforcement of intellectual property rights[17] and should by now be available in all EU Member States. Moreover, the relatively low costs, the unitary design of the litigation proceedings (validity and infringement are dealt with in one proceeding), and the experience of judges are emphasized as contributing to the status of the French courts. Potential weaknesses are, according to Leroux and Bourguet, the duration of proceedings and the relative lack of technical expertise in courts.

Several national systems have seen reforms lately, some of these in the context of the implementation of Directive 2004/48/EC which covers remedies available to owners of intellectual property rights in civil courts. Examples are the introduction of a disclosure-style instrument for obtaining evidence in Germany, of a similar instrument in the Netherlands since 2002, and of a streamlined procedure in the UK. These reforms reflect efforts to increase the efficiency of patent litigation, but they are also due to the fact that there is competition among the various systems to attract "business" into the respective national forum.

The next section turns to patent litigation in the overall system. The discussed features of the four most prominent litigation forums play a role in these considerations, but the most important aspect is the impact of fragmentation on the decision-making of parties engaging in litigation and on economic outcomes and welfare.

3.1.3 Litigation in a Fragmented System

Patent litigation in a fragmented system with large institutional and cost differences leads to a proliferation of litigation tactics and strategies which may cause hold-up problems and wasteful duplication. Moreover, the overall working of the patent system is affected by these aspects. Despite the infrequent occurrence of patent litigation (in particular at appeal and supreme court level), the importance of cases can be considerable. Patent litigation cases occur in two basic forms: either as revocation proceedings challenging the validity of patents granted by the respective patent authority or as infringement proceedings seeking to enforce patent rights. The likelihood of a patent being involved in litigation is estimated as between 1% and roughly 3% of granted patents in most patent systems, with some variation across technical domains, industries and countries. Patent litigation is known to occur particularly frequently (i) for valuable patents, (ii) in the presence of divergent assessments of case quality and (iii) in the presence of asymmetric information. Patent litigation is thus "the tail that wags

[16] Cf. Leroux and Bourguet (2006, p. 49ff.)
[17] Directive 2004/48/EC of 29.4.2004, OJ EU L 157, 30.4.2004 (corr. in OJ EU L 195, 2.6.2004, p. 16).

the dog of the patent system" – litigated cases provide legal precedence and important signals to patent holders, potential infringers and third parties seeking to steer free of patent conflicts. A well-designed litigation system is therefore the capstone of any patent system, and conversely, a flawed litigation system may effectively counteract any welfare gains from such a system or cause welfare losses of its own.

Duplication.[18] Since infringement and validity of European patents fall under the jurisdiction of national courts, patent-holders and parties seeking to revoke granted patents may have to enter into litigation in multiple countries. The exact extent of duplication is unknown. While there are a number of high-profile cases with extreme duplication and heterogeneous outcomes[19], there are currently no reliable statistics that would allow us to compute with precision the incidence and costs of duplication.

Divergent outcomes. Case duplication may lead to divergent outcomes as has been observed in practice. In a fragmented court system, the divergences may never be consolidated (e.g., in a second instance ruling). Instead, they may persist. The impact of divergent outcomes is complex. *Per* se, fragmentation does not necessarily lead to uncertainty – unless the rulings in the courts duplicating the case are subject to enhanced uncertainty themselves (which may very well be the case if non-specialized courts are involved, as is currently the case in Europe). The interpretation of claims and the assessments in "product clearing" or in private settlement negotiations may thus become ambivalent and uncertain if conflicting legal precedents co-exist. Moreover, divergent outcomes contribute to a fragmentation of the patent system since the geographic scope of a European patent now depends on the divergent national interpretations of patent law. Leaving aside the increased cost of litigation, the non-IP cost of doing business in the EU is raised significantly, since investments as well as production and distribution decisions may have to be tailored to the respective national extent of patent protection. Thus, divergent outcomes of national patent litigation proceedings clearly hamper a smooth operation of the EU's Single Market.

Private Consolidation of Court Proceedings. Duplication is costly, and the parties to legal disputes regarding patent rights tend to seek reductions of the cost of conflict resolution. The parties may agree on one court location and on abiding by that court's decision. In this case, an efficient solution to the legal controversy can be found. Indeed, if all of the disputes would be guided by a court judgement (in one Member State) and followed by settlement (in other Member States), then this would constitute a reasonable solution without the cost of

[18] Duplication as referred to in this report does not require that exactly the same legal matter is brought by identical parties into different national courts. For the purpose of the computations below, we can speak of duplicated cases if the introduction of the unified Court would render one or several of the cases unnecessary, i.e. if the different national cases are substitutes in a legal and economic sense.

[19] In the *Epilady* case (EP0101656), infringement suits of the patent-holder were successful in Belgium, Germany, Italy and the Netherlands, but not successful in Austria, France and the United Kingdom. In *Securities System Inc. vs. ECB* (EP0455750), the German and Dutch courts upheld the patent, while it was revoked in France and the UK. In the *Senseo* case (EP0404717), initial divergent rulings have been issued by Belgian and Dutch courts, but several other national cases are pending. In the *Monsanto* case (EP0546090), the District Court The Hague gave an interim judgment on March 19th, 2008 and referred the case to the European Court of Justice for an interpretation of Directive 98/44/EC of 6.7.1998 on the legal protection of biotechnological inventions; several parallel cases are pending in different Member States.

duplication. In terms of economic theory, one court judgement can be taken as an indicator of future rulings; and thus the extent of diverging expectations or informational asymmetries would be reduced. It is unclear to what extent such settlements take place in the current fragmented system.

However, it would be unrealistic to assume that parties will always want to forego the strategic manoeuvring space that the existence of multiple forums gives them. When the stakes are high, a patentholder will always want to enforce the patent right in at least some of the multiple jurisdictions in Europe; similarly, an alleged infringer will always seek to revoke the patent in at least some jurisdictions. Nonetheless, it is important to keep in mind that in some cases both parties will try to find a cost-efficient solution to a controversy. Such tendencies will also persist in a unified system. In other cases, litigation in multiple forums may not be necessary. In industries with relatively concentrated production, an infringement suit in one country may suffice to lead to resolution of the conflict. However, to the extent that commerce in Europe becomes increasingly border-crossing, such cases may become less important in the future. To summarize, not all cases will automatically be duplicated, and the extent of duplication becomes an important empirical parameter for the analysis in this report.[20]

Patent Revocation for Market Access. The converse is true in some sectors where stakes are high and where patent protection has a major impact on the entry decisions of producers. An example of considerable economic importance is the pharmaceuticals sector where two types of firms are active: originator firms with extensive R&D operations and generics producers who rely mostly on efficient manufacturing capabilities in order to produce generic pharmaceuticals which are no longer protected by patents. The European Commission (DG Competition) presented on 29.11.2008 a preliminary report with results of its Pharmaceutical Sector Inquiry (DG Competition 2008[21]). The preliminary results suggest – *inter alia* – that there is a high degree of duplicated litigation in this sector. Frequently, revocation actions are successfully resorted to by generics firms in order to obtain access to national health markets, but market entry by generics firms is impeded by the need to enter into revocation proceedings in multiple jurisdictions.

Strategic Litigation and "Forum Shopping". The efficiency of private settlements is also reduced by strategic behavior. The fragmentation of the litigation system has led to the development of refined strategies where the attacking party may file a case in a strategically selected court system first and enter into settlement negotiations afterwards. Naturally, the plaintiff will usually choose the most convenient and privately beneficial forum for first litigation actions. "Forum shopping" occurs not only where courts in *different* countries have

[20] It is important to realize that in cases where a dispute is resolved by an adjudication in one court, considerable costs of private settlement may still be felt by the parties if they seek to settle in other jurisdictions. Ideally, a cost-benefit assessment should take such costs into account as well, but the costs of private settlements are even harder to assess than the costs of court proceedings. Note that accounting for these costs would affect the cost-benefit computation largely in favour of the unified system.

[21] The preliminary report is available at http://ec.europa.eu/competition/sectors/pharmaceuticals/inquiry/preliminary_report.pdf

jurisdiction but *within* countries with multiple entry points for litigation, such as Germany and France. But European "forum shopping" can clearly exploit a much wider heterogeneity of systems than "forum shopping" between, for example, the Munich and the Düsseldorf courts.

Cross-Border Injunctions and Litigation. In the late 1990s, some courts began to issue injunctions which reached beyond the territorial boundaries of the respective jurisdiction. This "legal innovation" started in the Netherlands and was subsequently picked up by courts in various other countries. Patent-holders were allowed to start infringement proceedings in a Dutch court, not only based on a European patent validated in the Netherlands but also on other national patents derived from the same European patent. The Dutch court would assume jurisdiction in cases in which the infringer was domiciled in the Netherlands or when the Dutch patent was being infringed. The court would then apply the respective law of the country where the patent was in force and where the plaintiff sought to obtain an injunction and would possibly grant a cross-border injunction. The approach was based on Article 5(3) of the Brussels Convention (now Regulation 44/2001 on jurisdiction and the recognition and enforcement of judgments in civil and commercial matters[22]) which allows for proceedings in the country of infringement. A subsequent development was the "spider in the web" concept which led Dutch courts to assume jurisdiction where the main defendant (the "spider") was located in the Netherlands and other defendants (e.g. subsidiaries) were part of a group of enterprises (the "web") acting in concert. This judicial practice soon became highly controversial, with some national courts following the Dutch example (e.g. in Germany) while other courts (e.g. in the UK) refused to assume jurisdiction over foreign patents. From the perspective of patent-holders, cross-border injunctions were highly attractive since they lowered the cost of litigation and opened new avenues in terms of litigation strategy.

On July 13, 2006 the European Court of Justice (ECJ) ruled in two important cases, effectively putting an end to the practice of cross-border injunctions.

- In GAT v. LuK,[23] the ECJ ruled on the interpretation of Article 22(4) of Regulation 44/2001. The ECJ declared that the national courts of the State of registration of a patent have exclusive jurisdiction over all proceedings relating to the validity of that patent, and that courts of other Member States have no jurisdiction.

- The decision of the ECJ in *Roche v. Primus and Goldberg*[24] effectively ended the possibility of national courts granting cross-border injunctive relief for infringement of European patents, even against related companies acting in concert. The legal innovation of cross-border injunctions which – from the perspective of many patent-holders and practitioners – had held the promise of reducing the costs of patent infringement litigation was thus removed, and the need to duplicate proceedings may in future be felt more strongly than prior to these ECJ rulings. These rulings therefore

[22] Regulation (EC) 44/2001 of the Council, 22.12.2000, OJ EC L 12, 16.1.2001.
[23] Case C-04/03, Gesellschaft für Antriebstechnik mbH & Co. KG v. Lamellen- und Kupplungsbau Beteiligungs KG, ECJ Report 2006, I, 6509.
[24] Case C-539/03, ECJ Report 2006, I, 6535.

inevitably raise the cost of litigation because they force the party seeking to enforce a patent to initiate actions in multiple countries.[25]

Delay Strategies and "Torpedoes". The fragmentation of the system has also created opportunities for a number of delay strategies. The best-known among these are "torpedo motions" – actions for declaration of non-infringement in court systems which are known or alleged to work very slowly. According to Article 27 of Regulation 44/2001, any court not first seized with an action must decline jurisdiction or stay the proceedings when another action is filed subsequently. Thus, while the action for declaratory statement is pending in the "slow" court, an infringement action in other courts is essentially blocked. Delays of this kind can conceivably be turned into settlement conditions favourable to the party that initiated the delay. In the Member States where "torpedo tactics" were employed, there have been a number of reform measures attempting to make "torpedoes" less effective. Moreover, some courts have become reluctant to accept motions that are clearly meant to merely delay an infringement case. But some potential for these and other forms of strategic litigation remain present in a fragmented system.

Summary. The main aspects of the discussion can be summarized in three points:

- *wasteful duplication*: whenever multiple litigation is undertaken, resources are wasted on duplication without generating concomitant benefits;

- *raising the cost for appropriating returns from patented inventions in Europe*: leaving aside the cost of litigation, cross-border commerce is made more difficult and costly when diverging outcomes (patent protection in some, no patent protection in other EU Members States) prevail;

- *delay and hold-up*: the system can be used to delay decisions in infringement cases or to raise the costs of entrants seeking access to the market; this may either reduce innovation incentives or the level of competition in a way that is welfare-reducing.

The creation of a unified court system could lead to improvements along all three dimensions. Of these three, the first lends itself most easily to a quantitative treatment. The next subsection describes the basic features of the most recent proposal made by the Czech Presidency of the European Council. This summary is helpful since unification and integration are abstract terms – the actual outcomes of policy measures depend crucially on the institutional design that is used to implement those abstract concepts.

3.2 The Presidency's Proposal

3.2.1 Elements of the Proposal

The Czech Presidency, in Working Document 5072/09 (Draft Agreement on the European and Community Patents Court and Draft Statute, dated January 8th, 2009) has put forth a new

[25] Cf. Luginbühl and Stauder (2006).

proposal for a unifed Patent Court, to be named "European and Community Patents Court".[26] Essentially, the proposal foresees the establishment of a unified patent litigation system – the unified Patent Court - which will cover both European patents as well as future Community patents. This proposal has revived the policy discussion after the EPLA proposal did not find sufficient support in the Council.

Jurisdiction. The proposed Court will have jurisdiction over Community patents and European patents which are in force when the Agreement enters into force or granted thereafter, as well as any applications pending at that date. Article 58 of the draft Agreement provides for two opt-out clauses. Most importantly, during a transitional phase of seven years after entry into force, proceedings concerning European patents may still be initiated before the respective national courts.

Design of the Court System. The Court will consist of a Court of First Instance, a Court of Appeal and a Registry. The Court of First Instance will consist of a central division as well as local and regional divisions. Local divisions may be set up in any Member State. A Member State may decide to have up to three local divisions if the annual number of litigation cases is sufficiently high.[27] The seats of local divisions are determined by the respective Member States which also provide the facilities. Regional divisions allow Member States not hosting a local division to participate in the court system via regional divisions which may sit at multiple locations. The seat of the central division and the seat of the Court of Appeal are still to be determined.

Composition of Panels. All first instance court panels will have a multinational composition and will consist of three judges. In local divisions, two of the three judges will be permanent judges, a third one will be from a Pool of Judges. In certain situations, the third judge will be permanent as well. Two of the three judges at a regional division will be nationals of the participating Member States, the third will be seconded from the Pool of Judges. The panels of the Court of First Instance will include technically qualified judges who are specialized in the relevant technical field. The panels of the Court of Appeal will consist of five judges, three legally qualified ones and two technically qualified ones.

Registrar and Advisory Committee (Articles 8-9). The Registry of the Court will be set up at the location of the Court of Appeal and will have the usual "house-keeping" obligations. It is supported by sub-registries at each court divisions of the first instance. The registry is also charged with publishing reports containing statistical data. The proposal foresees the setup of an Advisory Committee comprised of experienced judges and practitioners.

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[26] The following overview focuses on particular aspects and does not intend to present a full summary of the draft Agreement. Various elements of the proposal are still under discussion. A recent progress report notes that these include "(...) the composition of the judicial panels, the language arrangements, jurisdiction on validity, control exercised by the Court of Justice, the financing of the judicial system and the transitional arrangements" (see Council Progress Report 15674/08 of 14.11.2008, available at http://register.consilium.europa.eu/pdf/en/08/st15/st15674.en08.pdf)

[27] The proposal requires that more than one hundred litigation cases have been initiated during three successive years in the Member State in order to set up an additional local division.

Selection of Judges (Articles 10-12) and Pool of Judges (Articles 13-14). Appointment is a multi-stage process by which a list of candidates is established by the Advisory Committee, the Council then selects nationals of Member States who it proposes to the Mixed Committee, and the Mixed Committee decides by common accord on the appointment. The proposal foresees the setting up of a Pool of Judges, comprised of all appointed judges from the Court of First Instance. Allocation of judges from the Pool to local or regional divisions is made by the Court's President, based on the judges' legal, technical and language skills. A training framework is to be implemented in order to maintain and build expertise in technical and legal aspects as well as in civil procedures among appointed judges and candidate-judges.

Substantive Law (Article 14). As in the case of courts which had assumed jurisdiction in cases with cross-border litigation aspects, the unified Patent Court will have to apply the EPC, Community law, national law implementing Community law and national law. The Court will also have jurisdiction over Community patents and will thus have to apply the future Regulation on the Community patent.

Jurisdiction and Effects of Decisions (Articles 15-16). Actions for revocation or declaration of non-infringement have to be brought before the central division. Such actions do *not* have to exhaust opposition at the EPO first. Actions for actual or threatened infringement shall be brought before either the local or regional division of the Member State or Member States where the infringement occurs, or the respective regional division or the local division hosted by the Member State where the defendant resides. Cases are heard by the central division if no local or regional division exists in the respective location.

Patent Mediation and Arbitration (Article 17). The proposal includes provisions for setting up a mediation and arbitration center. This can be seen as a measure towards the reduction of the cost of litigation for the parties involved. For good reasons[28], validity issues are exempt from the mediation or arbitration process.

Financing of the Court (Articles 18-21). The budget of the court is to be financed from fees and other incomes *as well as* contributions from the Community budget and from non EU Member States which are Parties to the Agreement.

Organization and Procedures (Part III, Articles 21-34). For the purposes of this report, it is noteworthy that the Presidency proposal includes various measures that attempt to allow for relatively low litigations costs. Among these are provisions for case management (Article 24) and the representation of parties by European Patent Attorneys who have specialised in patent litigation (Article 28). Experts may be appointed by the Court, and the Court may impose provisional or permanent injunctions. Moreover, the Court can order corrective measures. The Court can revoke patents, fully or in part, or amend them following a direct action for revocation or a counterclaim for revocation. The award of damages is supposed to restore the infringed party to the position it would have been in without infringement. Damages are not

[28] If one party has private evidence that may lead to the revocation of the patent, a private settlement may be an attractive outcome in which a duopoly of the two parties could be maintained – albeit at some cost to the public. A similar comment applies to Article 52 of the proposed agreement.

supposed to be punitive. Costs are generally borne by the unsuccessful party, unnecessary costs caused by one party shall be borne by that party. Legal aid shall be available to parties unable to meet the costs of the proceedings.

Mixed Committee (Article 57). A central governance body is the Mixed Committee in which each Contracting Party has one vote and the Community is represented by the Commission. Decisions are generally made by a three quarter majority of the represented Contracting Parties. The Mixed Committee has influence on the setup of the Advisory Committee, the selection of judges, amendments of the Statute, the determination of court fees, the rules for legal aid and the determination of financial regulations and the budget.

Transitional Period (Article 58). During seven years after the establishment of the Patent Court, infringement and revocation proceedings may still be initiated before the national court which currently has jurisdiction.

3.2.2 Relevance for the Estimation of Costs and Benefits

Several elements of the proposal have important implications for the level of litigation costs. From the proposal, it becomes clear that the Presidency is seeking to set up a system with relatively low costs of litigation. Among the cost-reducing elements in the proposal are: (i) the utilization of existing infrastructure and human resources, in particular experienced judges; (ii) mediation and arbitration schemes; (iii) contributions from the Community and from States which are not EU Member States; (iv) active case management; (v) representation by experienced and specialized European Patent Attorneys.

It is beyond the scope of this report to consider the efficacy of these measures. Yet, in order to anchor the scenario computations in section 6 around reasonable priors, it is important to relate the future level of litigation costs to those in the current fragmented system.

Discussions in the Working Party on Litigation in 2005 yielded the result that litigation costs in proceedings before the EPLA Court would be 2 to 3 times higher (due to high court fees and high representation fees) than costs in the national systems in Germany, France and the Netherlands. The Presidency's proposal for a unified Patent Court clearly attempts to install a system with lower litigation costs, and two of the most important steps towards this end would be (i) contributions from public budgets to financing of the Court and (ii) representation of parties by specialized patent attorneys. Hence, the initial benchmark in the cost-benefit estimations will be based on the assumption that the unified Court will offer patent litigation at the relatively low cost levels comparable to the current German system. Possible implications of a deviation from this baseline will then be explored in separate calculations in order to demonstrate the impact of the level of litigation costs on the cost-benefit balance of the unified court system.[29]

[29] Moreover, beyond the negative effect that relatively costly litigation has on the computed savings from avoided duplication, there is also a strong incentive effect best captured by Ellis (2000, 24): "In sum, then, the pernicious effect of the escalating expense of patent litigation is that it artificially discourages court challenges to patent validity and thereby contributes to the risk that invalid patents will pollute the market."

3.3 A Conceptual Framework for an Economic Assessment of Costs and Benefits

This report seeks to shed light on the costs and benefits of the establishment of a unified and integrated Patent Court system in Europe. To do so, it is helpful to consider the impact of the proposed Court on different types of parties engaging in litigation. The immediate impact of the new system would be threefold:

1. The establishment of a unified Patent Court would effectively eliminate the need for engaging in litigation regarding the same legal matter in multiple jurisdictions. The benefit from the new system is then the savings from avoiding duplication. Duplication occurs particularly frequently in industries such as the pharmaceutical industry where stakes are high and where access to markets is highly regulated and contested.

2. The private costs of litigation under a unified Patent Court will differ – at least in some countries – from the currently prevailing cost level. Since the Presidency's proposal seeks to establish a court system with low private costs, this report will initially assume that private costs of litigation in the unified Patent Court will correspond to the relatively low costs of patent litigation in the current German, French and Dutch systems. Effectively, this means that with the introduction of the unified Patent Court, the cost of litigation would become *lower* for parties now undertaking litigation in high-cost countries such as the United Kingdom. Under the stated assumption, there would thus be cost savings from the establishment of the Patent Court.

3. Moreover, various demand effects might occur due to (i) changes in the geographic reach of the rulings of the Court, (ii) changes in the quality of the court system and (iii) "price" changes.

   (i) The geographic reach of court rulings will increase – outcomes do no longer apply to one country only, but to all the Member States where the patent at stake is in force.

   (ii) For several countries, the establishment of the unified Patent Court will mean improvements in the quality of the court system. At given costs of litigation, these effects will make litigation more attractive for some parties.

   (iii) Changes in the costs of litigation will also impact the demand for litigation: lower costs will induce parties to prefer litigation in court over settlements or no action; higher costs will have the inverse effect.

The cost savings from the first two effects will be estimated in section 6 of the report. Due to the lack of precise data, it will be necessary to employ scenario techniques and parameter estimates to establish an estimate of the benefits from avoiding duplicated litigation. The demand effects described above are even more difficult to quantify. A qualitative assessment is again provided in section 6, following the derivation of the data framework in section 4 and estimates of the operational costs of the unified Patent Court in section 5. Additional qualitative aspects are then dealt with in section 7.

4 Incidence and Cost of Patent Litigation in Europe

Currently, no official statistical data on incidence and cost of patent litigation in Europe exist. In this section the report collects and describes data which – together with a number of simplifying assumptions – will permit the estimation of the overall litigation activity in Europe as well as the degree of duplication that is currently present in the system. Towards that objective, various partial datasets are described and compared below, before settling on a number of plausible scenarios.

4.1 Survey Data from a Study carried out under German Presidency

A particularly interesting and comprehensive source for the calibration and triangulation of the scenarios to be developed below is the statistical data contained in a survey undertaken under the German Presidency[30]. This survey delivers the most comprehensive data in terms of Member States surveyed.

The data are summarized in Table 3.1 below.

- An estimate of the number of litigation cases is given in the second column.
- The third column indicates if the respective court system makes use of technically qualified judges.
- The extent to which inventors and companies in the particular country generated European patent applications in 2005 is indicated in the forth column.

While Table 3.1 is highly informative about the heterogeneity of national patent litigation systems, its incidence estimates include both national patents *and* European patents, but no data on the extent of duplication.

[30] See Council document WD 11622/07 PI 135, dated 12.7.2007, available at http://register.consilium.europa.eu/pdf/en/07/st11/st11622.en07.pdf.

Table 4.1 – Characteristics of National Patent Litigation Systems in EU Countries

Country		Number of Cases (first instance only, European *and* national patents)	Specific Comments	EP Patent Applications from Country in 2005
Austria	**(AT)**	2005: 25 (V), 17 (I), 2006: 12 (V), 19 (I)	dual system, technical judges	1,728
Belgium	**(BE)**	≈ 30 cases p.a.	single system, no technical judges	1,760
Bulgaria	**(BG)**	<5 p.a.	dual system, no technical judges	22
Cyprus	**(CY)**	n.a. (very few)	single system, no technical judges	13
Czech Republic	**(CZ)**	2005: 4 (V), 5 (I)	dual system, no technical judges	167
Denmark	**(DK)**	10-15 cases p.a.	single system, technical judges (1st instance)	1,321
Estonia	**(EE)**	n.a. (very few)	single system, no technical judges	16
Finland	**(FI)**	≈ 15-20 cases p.a.	single system, no technical judges	1,761
France	**(FR)**	2005: 459 cases, 2006: 487 cases	single system, no technical judges	9,891
Germany	**(DE)**	220 (V), 600-700 (I) p.a.	dual system, technical judges	27,584
Greece	**(GR)**	n.a.	single system, no technical judges	101
Hungary	**(HU)**	<10 (V), 15-20 (I)	single system, technical judges	218
Ireland	**(IE)**	≈ 1-2 cases p.a.	single system, no technical judges	338
Italy	**(IT)**	n.a.	n.a.	5,429
Latvia	**(LV)**	≈ 1-2 cases p.a.	single system, no technical judges	18
Lithuania	**(LT)**	n.a. (very few)	single system, no technical judges	11
Luxembourg	**(LU)**	n.a. (very few)	single system, no technical judges	121
Malta	**(MT)**	n.a. (very few)	single system, no technical judges	7
Netherlands	**(NL)**	≈ 50 cases p.a.	single system, no technical judges	4,268
Poland	**(PL)**	≈ 20 cases p.a.	dual system, no technical judges	160
Portugal	**(PT)**	≈ 20 cases p.a.	dual system, no technical judges	89
Romania	**(RO)**	2005: 20 cases, 2006: 13 cases	dual system, no technical judges	36
Slovak Republic	**(SK)**	5 (V) p.a., 5 (I) p.a.	dual system, no technical judges	46
Slovenia	**(SI)**	3-6 p.a.	single system, no technical judges	138
Spain	**(ES)**	n.a.	single system, no technical judges	1,752
Sweden	**(SE)**	≈ 30-50 cases p.a.	single system, technical judges	2,949
United Kingdom	**(GB)**	2004: 153 cases, 2005: 54 cases	single system, no technical judges	7,353

Source: Annex of WD 11622/07 PI35 – Patent application counts based on own computations using PATSTAT 2008-10 and EPASYS databases. A total of 67,297 EPO applications were filed by inventors and companies located in the tabulated countries.

Legend: V- validity, I – infringement.

4.2 Data from Regional Courts in Germany (infringement actions)

In Germany, 12 Regional Courts (Landgerichte, LG) have jurisdiction to deal with the infringement of German patents and of European patents validated in Germany. In practice, only three of them – the Regional Courts in Düsseldorf, Mannheim and Munich – are of major importance and attract between 80% and 90% of all patent infringement cases in Germany.

While the Courts do not provide any official statistics, judges at the courts have been collecting data[31] and an estimation of the actual number of patent cases can be made. Table 4.2 presents the distribution of cases at the Mannheim Regional Court according to subject-matter. Between 84.9% and 91.6% of the cases are patent cases, the remainder being concerned with utility models and inventor compensation issues. These data, while not originating from the largest patent court in Germany, will allow us to estimate the share of genuine patent cases at other Regional Courts.

Table 4.2 – Cases at the Mannheim Court by Subject-matter

	Year					
Subject-matter	**2005**	**%**	**2006**	**%**	**2007**	**%**
patent cases	197	84.9%	207	90.0%	273	91.6%
utility model cases	23	9.9%	20	8.7%	18	6.0%
inventor compensation cases	12	5.2%	3	1.3%	7	2.3%
Total	**232**	**100.0%**	**230**	**100.0%**	**298**	**100.0%**

Source: Prof. Dr. Christoph Ann - personal communication

These data allow us to correct the actual number of patent infringement actions initiated at the three Regional Courts of Düsseldorf, Mannheim and Munich (assuming that the above distribution holds for the two other Courts as well). Moreover, we will assume that these three Courts attract 5/6 (83.3%) of all infringement actions initiated in Germany. This figure is an estimate that was discussed with a number of practitioners. Under these assumptions the number of infringement cases can be estimated to be as displayed in Table 4.3.

Table 4.3 – Estimated Patent Infringement Cases by Court and Year

	Year		
Court	**2005**	**2006**	**2007**
LG Düsseldorf	530	444	555
LG Mannheim	232	230	298
LG München I	89	95	117
Total	**851**	**769**	**970**
Estimated Patent Cases (90%)	766	692	873
Total - Patent Cases in Germany	**919**	**831**	**1048**

Source: Prof. Dr. Christoph Ann - personal communication, own estimates for estimated patent cases and total patent cases in Germany

[31] I would like to thank Prof. Dr. Christoph Ann (Technische Universität München), former judge of the Mannheim Court, for making these data available.

Note that these cases include actions relating to national patents granted by the German Patent and Trademark Office (DPMA) as well as actions relating to EPO-granted patents.

4.3 Data from the German Federal Patent Court (revocation actions)

Official statistics are available for the number of revocation cases at the Federal Patent Court in Germany (Bundespatentgericht) (see Table 4.4).

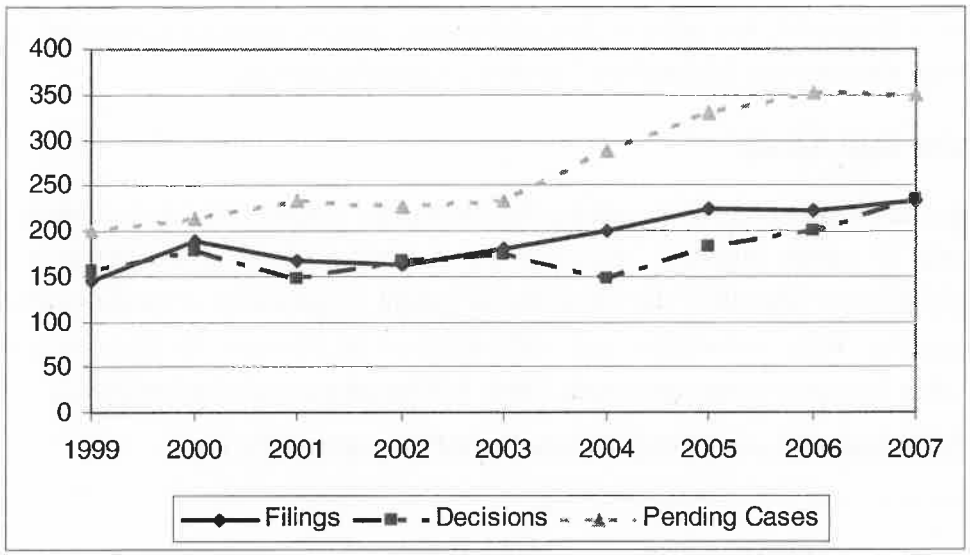
Table 4.4 – Revocation Cases at the Federal Patent Court - 1998-2007

Year	Cases	Decisions	Pending Cases
1998	172	138	211
1999	146	156	201
2000	189	177	213
2001	166	147	232
2002	163	168	227
2003	181	174	234
2004	200	147	287
2005	225	183	329
2006	221	199	351
2007	234	235	350

Source: Annual Reports of the Federal Patent Court (2000-2007)

Again, the filing numbers do not distinguish between DPMA- and EPO-patents, but additional micro-data (see below) will be used to derive the distribution. It is evident from Table 4.4 that the incidence of revocation cases has been increasing over the time period from 1998 to 2007. Figure 4.1 displays the upward trend in filings and in the number of pending cases and decisions.

Figure 4.1 – Revocation Cases, Decisions and Pending Cases at the Federal Patent Court



Source: Annual Reports of the Federal Patent Court (2000-2007)

4.4 Data from the Cremers and Harhoff Studies

As described in the literature survey below (Annex II), Cremers (2006) obtained data on a sample of litigation cases at the Düsseldorf and the Mannheim Court. Harhoff (2004) used data provided by the Federal Patent Court to study outcomes of revocation proceedings and their relationship to opposition proceedings. These data can be used to estimate the following parameters: (i) the share of EPO-granted patents among patents under litigation and (ii) the distribution of cases over technical fields.

Cremers (2006) used information on all litigation cases filed between 1993 and 1995 at the Mannheim and Düsseldorf Courts. Of the 824 patents involved in litigation, 26% had been granted by the EPO and 77.1% were owned by German proprietors. Moreover, in 25% of the cases, a revocation action had been initiated. In the case of EPO-granted patents, revocation ctions were initiated in 33% of all litigation cases. Since the Cremers study deals with cases filed in the early 1990s, the data are likely to be non-representative for the first decade of the 21st century. In particular, one would expect that the share of EPO-granted patents in patent litigation proceedings has risen steadily over the years.

This is indeed the pattern that the data from the Federal Patent Court suggest. Using two micro-level datasets[32] on revocation proceedings, one for DPMA-granted patents and one for EPO-granted patents, we can show that by 2003, 60% of revocation actions initiated at the Federal Patent Court related to European patents. Assuming that 33%of all European patent litigation cases trigger revocation cases (while only 25% of litigation cases against DPMA granted patent do), we estimate that approximately 50% of all litigation cases in German

[32] The datasets were kindly provided by the Federal Patent Court in 2004. I would like to thank Lutz von Raden and Thomas Baumgärtner for their support.

courts are concerned with EPO-granted patents. Note that together with the "hard data" from Table 4.3, this implies that we should expect a total of about 525 infringement cases relating to European patents in Germany. We will use this implication later on in order to demonstrate that the various partial datasets can be combined to give a coherent picture.

4.5 Data from the CJA Study

In 2003, CJA Consultants was commissioned by the European Commission to undertake a study on the potential of patent litigation insurance. In the course of the investigation, CJA constructed a set of estimates regarding the incidence of patent litigation in several European countries. For countries with revocation and infringement procedures in two separate proceedings[33], separate estimates were presented. Table 4.5 summarizes this information.

Table 4.5 – CJA Estimates of Case Filings Related to EPO-granted Patents

Country	Patent Stock at Risk	CJA Estimates for 2004
Germany*	307,488	500+500
France	252,798	50
UK	257,600	120
Netherlands	121,337	50
Spain	97,146	50
Belgium	84,621	30
Austria	83,636	10
Sweden	82,125	15
Denmark	45,067	15
Greece	27,963	20
Finland	18,239	10
Poland*	12,457	15+15
Total (Filings)*	**323,672**	**1,228**

Source: Appendix 1 and Appendix 2 in CJA Consultants (2003). Patent estimates refer to 2004.
* Note: In Germany and Poland, the first number refers to infringement, the second to revocation cases. In the aggregate (TOTAL), 833 German and 25 Polish cases were assumed to have been initiated, taking into account that some revocation cases would not cause separate litigation in a court system without separation of infringement and revocation proceedings.

Clearly, for Germany, some of these estimates are in contradiction to the statistics from the German Courts, summarized in Table 4.3 and Table 4.4. German patent infringement cases are underestimated in the CJA data, while revocation cases are apparently overestimated. Moreover, the data for France are highly inconsistent with those of the Survey carried out under German Presidency (referred to in section 4.1) and of the Working Party on Litigation (see Table 4.6 below). The overall likelihood of litigation in the CJA data appears

[33] The separation of infringement and litigation proceedings is often referred to as bifurcation of proceedings.

underestimated for some, and overestimated for other countries.[34] Leaving aside the distribution of cases by country, the CJA data imply that about 68% of all actions are initiated in Germany.

4.6 Practitioner Estimates

In several discussions, estimates of the incidence of patent litigation were elicited from a number of practitioners, both judges and attorneys. Moreover, some estimates are published in internet sources.

Véron (2001) provides a detailed study of litigation activity in France over the time period 1990 to 1999. The share of European patents involved grows from 17.5% to 30.8% from 1990 to 1999. Véron reports that 24% of the plaintiffs (mostly from DE and US) and 30% of the defendants are foreign entities (mostly from IT, DE and US). Comparing the case filings, he has 455 cases in Germany, 350 in France, 120 in the Netherlands and 100 in the UK. Italy leads in terms of case filings (650), but supposedly very few of these concern European patents.

Holzer (2005) estimates the following annual filing number for 2003: 85 (UK), 700 (DE), 300 (FR), 70 (NL), 15 (DK), 40 (SE), 20 (FI) 30 (CH), 40 (AT). For Germany, he suggests that 60% of all cases pertain to EPO-granted patents, for the Netherlands 80%, for Switzerland 90% and for Sweden 30%. He estimates that 500 to 600 cases (in 2004) pertained to European patents. This assessment is broadly in line with the detailed estimates used below. Implicitly, the high concentration of infringement cases in the German judicial system provides us with a first estimate as to how many cases are duplicated. If – as Holzer's estimates suggest – between 70% and 80% of all infringement cases in Europe are dealt with in German courts, then at a maximum 20% to 30% of all cases can be duplications.[35]

In personal discussions, other practitioners confirmed the order of magnitude of the above estimates. Estimates ranged between 550 and 650 for infringement cases in Germany in the years 2003 and 2004, with an additional 180 revocation cases. Moreover, it was estimated that between 75% and 80% of all infringement cases were located in Germany.

[34] The data actually imply that four out of thousand patents in the stock will be involved in litigation. Note that this also leads to an estimate of a patent having a likelihood of 4% of being involved in litigation over an average life time of ten years. This implicit estimate is not consistent with most of the literature or the data.

[35] In some practitioner publications, both a high concentration and a high incidence of duplication are mentioned. That is logically infeasible. Let x (in %) be the share of litigation cases going to court in Germany (or – the country with the largest case number). Then the maximum share of duplicated cases is 100-x. As the subsequent sections show, duplication costs are however a first-order problem even if German courts were to account for 70% of all infringement cases.

4.7 2003 Survey of the Working Party on Litigation

The Working Party on Litigation undertook a survey in 2003 in order to obtain an estimate of the number of patent litigation cases related to European patents.[36] The survey yielded the following results for the year 2000:

- 700 cases in Germany (of which 420 related to European patents);
- 300 cases in France;
- 105 cases in the United Kingdom; and
- 70 cases in the Netherlands (of which 56 related to European patents).

The survey assesses that litigation in these four countries represent 90% of all patent litigation activity in Europe in 2000. The implied share of cases tried in Germany would be 59.5%. Given that over the last decade, concentration of litigation on Germany has increased according to practitioner statements, this statistic is not inconsistent with the more recent data and estimates.

Another study[37] – the 2006 EPLA Impact Assessment prepared by the EPO as Secretariat of the Working party on Litigation – includes data on average costs of patent litigation in the four countries considered. Table 4.6 summarizes the data from both sources.

Table 4.6 – Incidence and Costs of Patent Litigation of European Patents in 2000

		First Instance Proceedings		Second Instance Proceedings	
Country	**Litigation Cases (EP)**	**"Small-Medium Case"**	**"Large Case"**	**"Small-Medium Case"**	**"Large Case"**
DE	420	50,000 €	250,000 €	150,000 €	190,000 €
FR	210	50,000 €	200,000 €	40,000 €	150,000 €
GB	105	150,000 €	1,500,000 €	150,000 €	1,000,000 €
NL	56	60,000 €	200,000 €	40,000 €	150,000 €
Total	791	63,982 €	399,115 €	113,009 €	284,071 €

Sources: WPL/4/03 and 2006 EPLA Impact Assessment.

The estimates in Table 4.6 are subject to a number of uncertainties – as the WPL study notes "they must be viewed with due circumspection." The row labelled "Total" contains the incidence-weighted averages across the four countries. The costs reflect the *costs per party* (including court fees, fees for hearing witnesses, and attorney costs). However, they do not include a mark-up for private, internal costs of the parties which accrue in addition to cost of representation and fees (e.g., costs for providing documents, securing evidence, own

[36] See WPL/4/03 "Workload and Cost of the European Patent Judiciary", 31.10.2003.

[37] Available at http://www.epo.org/patents/law/legislative-initiatives/epla/assessment.html. See in particular Annex 1.

personnel involved in settlement negotiations etc.). These data will be used later to assess the cost savings from avoided duplication and from cost reductions.

4.8 Incidence Data from the Pharmaceutical Sector Inquiry

The pharmaceutical sector is of special interest to the current study. First, it is well-known that the impact of patent protection is particularly pronounced in the field of pharmaceuticals. Patent protection is highly valuable to originator pharmaceutical firms. At the same time, generics producers are likely to see high value in a court institution that allows them to effectively challenge patents and to see those rights revoked that have been granted erroneously. Given the high private value of patents and patent revocation, litigation is also likely to have strong effects. Both types of litigation cases – infringement and revocation – are also likely to be duplicated in this sector since access to national markets will be strongly contested. Moreover, companies are likely to see strategic value in a multiplication of litigation.

The Commission's preliminary report on the Pharmaceutical Sector Inquiry (DG Competition 2008)[38] confirms these expectations. Patent litigation in this sector is frequent, cases are taken to multiple jurisdictions, and costs of litigation are high. Given the particular importance that a unified patent litigation system may have for this sector, pharmaceuticals will be treated as a separate technical field in the estimation exercise in section 6 of this report.

The Sector Inquiry generates the following results of interest to this report:

1. The survey data collected in the course of the Sector Inquiry cover approximately 80% of the relevant EPO-granted patents in the field of pharmaceuticals.[39]

2. In the period between 2000 and 2007, a total of 698 cases of patent litigation were initiated in the EU between originator companies and generics makers.[40]

3. 54% (378) of the 698 cases were initiated by originator companies, 46% (320) were initiated by generic companies.[41]

4. The incidence of litigation is growing, from 36 cases in 2000 to 132 in 2007. The development over time is not monotonic, but clearly systematic.[42]

5. Most of the cases are brought to German courts (90), but the country distribution does not confirm the expectation that Germany accounts for the lion's share of cases in pharmaceuticals. UK (71) and Spain (70) are close followers. Other countries also see a high incidence of patent litigation: Italy (59), Austria (59), Sweden (54), Portugal (43) and Denmark (40). The Netherlands and France, in many studies named as important countries

[38] Available at http://ec.europa.eu/competition/sectors/pharmaceuticals/inquiry/preliminary_report.pdf
[39] See DG Competition (2008), paragraph (338). The survey collected data on 28,750 patents (applications and grants), compared to a total of 30,010 filings (as in Table 16).
[40] See DG Competition (2008), paragraph (468).
[41] See DG Competition (2008), Figure 62.
[42] See DG Competition (2008), paragraph (471) and Figure 63.

for patent litigation do not play the pronounced role that one would expect based on aggregate statistics and estimates (33 cases in NL, 31 in FR).[43]

6. Originator companies typically initiate infringement actions, while generics firms initiate revocation actions or actions for declaratory judgements of non-infringement.[44]

7. The 698 cases concerned 68 pharmaceutical substances (as classified under their International Non-Proprietary Name, INN). There appears to be considerable duplication or potential for duplication. All of the 20 most litigated INNs were subject to litigation in at least 3 Member States, the top 6 INNs were subject to litigation in at least 5, some even in 8 and 9 Member States.[45]

8. The top six INNs accounted for 49% of all reported litigation.[46]

9. Of the final outcomes reported in 149 litigation cases, generics companies won a large share of cases. In cases which they had initiated, they won 73% of the cases. When originator firms had initiated a case (and a final judgement was reported), they were successful in 51% of these cases and not successful in 49%.[47]

10. The Sector Inquiry states explicitly: "(...) generic companies won overall nearly two thirds of all patent litigations initiated in the EU from 2000 to 2007 in which a final judgment was given. However, this outcome was achieved at the expense of the multiplication of costly and often lengthy litigation before different national jurisdictions, thus entailing a significant burden and legal uncertainty for generic companies."[48]

11. Average costs of originator companies amounted to EUR 230,000 per case. It is estimated that the total cost of litigation amounted to EUR 420 million for all 698 cases.[49]

12. The Sector Inquiry also contains an assessment to what extent court rulings were contradictory. In 11% of the final judgements reported by the surveyed companies, two or more different courts in EU Member States gave conflicting final judgements.[50]

13. As to litigation between originator companies, the incidence figures are far smaller. The study only report 66 cases in the time period between 2000 and 2007. 39% of these actions were initiated in Germany. Two thirds of the cases were revocation actions. Only 13 cases went to a final judgement.[51] The report does not give cost estimates for these cases.

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[43] See DG Competition (2008), paragraph (474) ff.
[44] See DG Competition (2008), paragraph (478) and Figure 65.
[45] See DG Competition (2008), paragraph (482) ff. and Figure 67.
[46] See DG Competition (2008), paragraph (483).
[47] See DG Competition (2008), paragraph (502) ff.
[48] See DG Competition (2008), paragraph (505).
[49] See DG Competition (2008), paragraph (532) ff. Total costs per case are estimated to amount to EUR 600,000 on average. This figure include internal costs and fees.
[50] See DG Competition (2008), paragraph (536).
[51] See DG Competition (2008), paragraph (1006).

Returning to the dominant group of cases between originators and generics companies, the Sector Inquiry does not state the number of infringement cases that are actually duplicated. Some cases may concern the same INN, but different patents. Some may concern the same patent, but cases may be initiated by multiple parties and concern different aspects or claims of the patents. These cases may be filed in a harmonized system as well as in a fragmented one. However, it is also clear that there is substantial duplication. For the estimates reported below, a range of duplication parameters will be used. Given the country distribution by INN litigation[52], it seems justified to assume that between 25% and 50% of all patent litigation cases in the field of pharmaceuticals would not be filed under a unified patent litigation system. Furthermore, the incidence of litigation (132 cases in 2007) will be used later on in the cost-benefit estimates. Taken together, these results and estimates suggest that legal costs on the order of between EUR 19.9 million and EUR 39.7 million[53] were spent in the year 2007 in this sector alone on duplication (respectively multiplication) of patent litigation. The legal cost borne by the public (costs of court operations not covered by fees) would have to be added to this figure, but the study does not report data on the public costs of these litigation cases.

[52] See DG Competition (2008), Figure 67.
[53] Computed as (132/698) x EUR 420 million x 0.25 (respectively 0.5).

5 Estimates of the Operational Costs of the Unified Patent Court

This section provides estimates of the operational costs of the unified Patent Court. The computations build largely on assumptions developed by the Working Party on Litigation in various publications. Moreover, it uses the caseload data from Annex II, Table II.2d as the capacity requirement for the Court in year 2013. Thus, for the purpose of this section, the number of (non-duplicated) cases is assumed to be 940 cases.[54] The cost structure of the Court is composed of three main components: (i) judges' salaries, (ii) staff salaries, and (iii) additional costs for facilities, IT and other expenses.

It is important to keep in mind that none of the cost estimates below have normative content: they are not meant as recommendations. They merely serve as conservative approximations in order to obtain an upper-bound estimate of the operational costs of the proposed unified Patent Court.

5.1 Judges' Salaries

The estimation of total judges' salaries is based on a number of assumptions regarding capacity, salary levels and work organization.

For the Court of First Instance, the following assumption are made:

1. A judge rapporteur can deal with 25 cases per annum.[55]
2. The average annual gross wage costs per judge are EUR 225.000.[56]
3. Regional capacity adjustment can be managed by employing judges partially, e.g. in part-time positions while they also serve on national courts.
4. A full-time equivalent of 39 judges (13 panels) will handle first-instance cases (maximum case capacity: 975 cases).

Furthermore, for the Court of Appeal, it is assumed:

1) The appeal rate is 25% of all first instance cases, calling for an appeal capacity of 235 cases per annum.[57]
2) A judge rapporteur can deal with 20 cases per annum.[58]
3) The average annual gross wage costs per judge are EUR 250.000.[59]
4) Three panels will be set up for a maximum case capacity of 300 cases.

The total costs in terms of judges' wages would then be 39 x EUR 225.000 plus 15 x EUR 250.000, i.e. equal to EUR **15.5 million .**

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[54] Rounded from 941 cases in Table 6.2.
[55] See WPL/4/03 "Workload and cost of the European Patent Judiciary", of 31.10.2003, p. 17.
[56] The amount would be roughly equivalent to the cost of a judge of the ECJ's Civil Servant Tribunal.
[57] COM(2003) 828 final, p.51 gives 25% as an estimate for the appeal rate.
[58] See WPL/4/03 of 31.10.2003, p. 17
[59] COM(2003) 828 final, p. 58 gives EUR 275.000 as the cost of a judge of the ECJ's Court of First Instance.

5.2 Staff Salaries

This assessment is based on the estimates provided in the 2003 Legislative Financial Statement[60] which applied to a fully centralized court system without arbitration centre and training program. The 2003 assessment called for a staff of about 100 FTE, with annual gross wage costs of EUR 108.000 per person on average. The staff includes registrars, legal and clerical secretaries, translators and interpreters, staff for training and arbitration.

For the unified Patent Court, a staff requirement of 120 is estimated to be required, since decentralization and additional task definitions require more resources. The total costs of staff are thus EUR **13.0 million**.

5.3 Facilities, Information Technology and Other Costs

The costs of facilities (court rooms, offices, ...), IT, telecommunications etc. can be approximated as between 6 and 10 % of wages.[61] It is assumed that this cost category can be estimated at 8 % of total wage costs. Hence, total costs relating to facilities etc. will be EUR **2.0 million.**

5.4 Total Annual Operating Costs

In total, the operating costs for the proposed Patent Court with capacity for 940 cases per annum is estimated to be at EUR **27.5 million.** Thus the average operational costs per case are estimated to be at EUR **29.280.**

5.5 Caveats

The following costs have not been taken into account: costs for experts according to Article 36 and costs for legal aid according to Article 44 of the draft Agreement.

[60] See COM(2003) 828 final, p. 52.
[61] Assumption: rented premises. See for example Report of the Working party to the Interim Committee for the Community patent, Brussels Oct. 10, 1985 - CIBC/835/85, p. 10.

6 Benefits from Avoiding Duplicated Litigation

6.1 Patents at Risk

In order to quantify the potential for patent litigation and its duplication across Europe, it is necessary to estimate the actual stock of European patents in force. Since incidence of patent litigation differs considerably by technical field, the calculations are undertaken by main technical field.[62] Moreover, we will break out calculations and estimates for Germany, since this country has attracted most of the European patent litigation cases in the past, and since the data on Germany allow us to arrive at more precise overall estimates of the cost-benefit balance of the proposed court system.

A calculation of the patent stock as of March 2008 can be based on factual data, rather than estimates. Using the March 2008 EPASYS database of the EPO and the PATSTAT database of April 2008, the patent stock data summarized in Table 6.1 (column (1a)) were computed. Moreover, while more than 90 % of EPO-granted patents within a technical field are usually validated in Germany, there are slight differences across technical fields. Column (2b) tabulates the patent stock for Germany only.

A prediction of patent stocks for future dates, such as March of 2013 as chosen here, must be based on estimates. While there are some uncertainties, the number of patent applications and and grants can be predicted relatively well. The estimates in Table 6.1, columns (1b) and (2b) were obtained using the following approach. Starting from the factual data describing the patent stock and stock of filings in March of 2008, we (i) added an estimate of newly granted patents for each of the following years up to 2013, (ii) subtracted patents that would (factually) have expired by that time after reaching the statutory limit of 20 years, and (iii) subtracted patents that were predicted to have lapsed by virtue of non-renewal by that date. A proportional factor (specific to the technical field) was applied to arrive at an estimated number of patents valid in Germany in 2013.[63]

Long-term developments in the patent system are currently difficult to predict. Several aspects need to be considered in this context.

- First, while filings at the EPO are still increasing, the EPO has initiated a policy of "raising the bar". The impact of this new policy is likely to be felt in the medium- to long-run, but not immediately. The impact could be a *reduction* of the grant rate, but it is unclear how pronounced the reduction will be. A similar comment applies to new policies regarding the use of divisional filings at the EPO. A less generous granting policy and stronger sanctions on patent filing tactics will ultimately lower incentives to file marginal patent applications.

[62] The report assumes no differences between technical fields with the exception of the pharmaceutical field. The data by technical field should nonetheless give a rough indication of case incidences by technology.
[63] The predicted number of grants is derived from the actual number of applications filed at and published by the EPO by applying the historical grant rate. Details of the calculations are available upon request.

- Second, countering the first effect, the entry into force of the London Protocol on May 1st, 2008 will effectively lower the cost of patent protection in Europe. This will lead to an *increase* in the number of validations per granted patent, and it will also lead to an increase in the number of patent filings at the EPO.[64]

- Finally, the proposed unified Patent Court will also have jurisdiction to deal with litigation relating to Community patents. But an estimation of the incidence of Community patent applications and the subsequent impact of the Community patent on the use of the EPO system is well beyond the scope of this study.

Table 6.1 Estimates of the Stock of Valid Patents by Technical Area – 2008 and 2013

Technical Area	(1a) EPO Granted Patents in Force in At Least One EPC State - March 2008	(1b) EPO Granted Patents in Force in At Least One EPC State - March 2013	(2a) EPO Granted Patents in Force in Germany - March 2008	(2b) EPO Granted Patents in Force in Germany - March 2013
Electrical Engineering	98,337	147,900	92,677	139,400
Instruments	67,294	92,600	63,293	87,100
Chemistry (excl. Pharmaceuticals)	82,751	93,000	78,888	88,600
Pharmaceuticals	17,583	36,500	16,648	34,500
Process Engineering	66,883	85,200	63,324	80,600
Mechanical Engineering	82,411	129,200	77,795	122,000
Consumption and Construction	30,537	43,100	28,089	39,600
All Technical Areas	**445,796**	**627,500**	**420,714**	**591,800**

Source: Own computations based on EPASYS data (March 2008) and PATSTAT (April 2008).

6.2 Estimating the Incidence of Duplication

In this section, four scenarios are being developed and the stock of patents in force is computed for 2008 and for 2013. The purpose of this step is to describe reasonably supported data constellations and to use them to derive an estimate of the benefits from introducing the unified court system. In all scenarios, we perform the following operations.

[64] See Harhoff, Hoisl and van Pottelsberghe (2008) for a study of the impact of the London Protocol on validations. Mejer and van Pottelsberghe (2008) have studied the impact of the London Protocol on the total number of patent filings and conclude that these are likely to rise by 12%. This development will not impact the predictions for 2013 in a major way, but it will lead to even longer backlogs at the EPO.

1. We first compute the stock of European patents "at risk" for 2008 by broadly defined technical groups.

2. We then focus on German data since the available estimates and actual statistics for litigation are best developed for Germany. This stock is computed from first taking all granted patents within a technology group and then subtracting all patents that have expired or have not been renewed in Germany.

3. We then estimate the extent of German patent litigation. We use the available statistics to estimate the number of infringement actions by broadly defined technical field. These should be consistent with the data discussed previously.

4. We then estimate the number of cases likely to emerge in other countries in Europe and the share of cases which duplicate other national litigation proceedings. The "duplication share" is quintessential for the estimation of the direct benefits of a unified system of patent litigation.

5. The parameters chosen for the scenarios are as follows. It is assumed that

   - per annum, 0.125% of the patents in the stock (and at risk) will be involved in infringement litigation in Germany. It generates the best fit with the data in Table 4.3 and is therefore used to calibrate the scenarios. This parameter is maintained throughout in the remainder of the report.

   - the second parameter assesses the concentration of patent infringement litigation and measures the share of cases prosecuted in Germany. This parameter ranges between 60% and 70%. There is no clear evidence favoring one or the other. The data in Table 4.6 suggest that this share was as low as 50% in 2000, but subsequent developments have led to greater concentration, possibly as high as 70%. Since the recent rulings of the ECJ may have increased the need for multiple litigation again, a plausible estimate is 60%.

   - the third parameter measures the extent to which the cases not prosecuted in Germany reflect outright duplication. This parameter ranges between 60% and 70%, with the former being again the preferred parameter value.

6. For pharmaceuticals, we assume a set of particular parameters.

   - We assume that in 2008, 150 cases are filed, that 30 of these are prosecuted in Germany, and that the duplication rate of the remaining cases ranges between 25% (Scenario 1a) and 50% (Scenario 1d) and is 37.5% for the intermediate cases (Scenario 1b and 1c). The scenarios for 2013 follow the same assumptions, but they use the projections for the future patent stock as tabulated in Table 6.1. In pharmaceuticals, we replicate the sector specific litigation rate from 2008, albeit at the higher incidence numbers of 2013.

The results of the computations are documented in Annex II. A summary is included in Table 6.2.

Table 6.2 – Scenario Analysis of Duplication Incidence

Year		a - Litigation Incidence	b – Concentration in DE	c – Duplication Rate	Total Number of Cases	Duplicated Cases Pharma	Duplicated Cases Other Fields	Duplicated Cases - Total	Non-Duplicated Cases
2008	1a	0.125%	0.7	0.5	872	38	108	146	726
2008	1b	0.125%	0.7	0.6	872	56	130	186	686
2008	1c	0.125%	0.6	0.6	992	56	202	258	734
2008	1d	0.125%	0.6	0.7	992	75	236	311	681
2013	2a	0.125%	0.7	0.5	1,206	53	149	202	1,004
2013	2b	0.125%	0.7	0.6	1,206	79	179	258	948
2013	2c	0.125%	0.6	0.6	1,372	79	279	358	1,014
2013	2d	0.125%	0.6	0.7	1,372	106	325	431	941

Source: Own computations based on Table I and II (see Annex II). Case filings and duplications are annual figures.

The initial setup of scenarios is consistent with the relatively hard evidence of the number of cases in Germany. Table 4.3 implies that roughly 1,050 infringement actions would be initiated in Germany in 2008 of which 52% would concern European patents. That yields a total number of infringement cases of roughly 525 while Annex II (Table II.1a) specifies 535 cases. The assumptions in the three basic scenarios reflect this data constellation for Germany, but allow for variation in concentration and duplication (and thus in the number of cases in other countries). Table 6.2 summarizes the parameters, the total number of litigation cases and the number of duplicated cases, separately for pharmaceuticals and for other technical fields.

For 2008, the estimated number of duplicated cases ranges between 146 and 311; for 2013 (the year in which a steady state of the unified Patent Court is assumed to be reached) the range is between 202 and 431 cases.

6.3 Benefits from Avoiding the Costs of Duplication and from Cost Reductions

Towards a monetary assessment, the duplicated cases need to be valued at their cost. Given that duplicated cases are likely to be linked to particularly valuable patents, it does not appear reasonable to apply a representative value and cost distribution. Estimates in the 2006 EPLA Impact Assessment are based on the assumption that two thirds of all litigation cases (in the German, French and Dutch courts) are "small to medium" and that one third is "large". Due to self-selection, the distribution is likely to be reversed for cases in the United Kingdom. For the assessment here we will assume that 50% of the duplicated cases are "large" and 50% are "small to medium". Moreover, we assume that appeals occur not in 25% of the cases (which would reflect the overall population of cases) but in 30% of the cases. Using these parameters and the overall estimates in Table 4.6, the cost per duplicated case per party is estimated at EUR 291,000.[65] For both parties, the total private costs are then EUR 582,000 per case. We do not add a mark-up here for internal costs to the party, since we also do not take costs

[65] That is, 0.5*EUR 63,982 + 0.5*EUR 399,115 + 0.3*(0.5*EUR 113,009 + 0.5*EUR 284,071).

savings from duplication into account. For pharmaceutical cases, we assume that cases that are duplicated are again more costly to the parties, in this case by 15% in excess of the average.[66]

The results of the assessment are tabulated in Table 6.3.[67] Currently, the parties to patent litigation are estimated to spend between EUR 89 and 189 million on duplication of litigation. Due to the increase in the stock of patents "at risk", the private costs of duplication would range between EUR 148 and 289 million in 2013. The b and c scenarios reflect particularly likely constellations, but even at the relatively conservative estimates (with high concentration of litigation in Germany and low duplication rates of the remaining cases), duplication clearly is very costly to the European economy.

Table 6.3 also includes an estimate of additional cost savings arising from the assumption that the unified Patent Court will offer litigation at the cost level currently observed in Germany, France and the Netherlands. In effect, the implementation of such a cost level across the EU would profit parties in the United Kingdom and in other countries with relatively costly systems. To approximate this benefit figure conservatively, we assume that for each of the remaining (non-duplicated) cases in the United Kingdom, there is a total cost saving of EUR 250,000, i.e., of EUR 125,000 per party. In the second but last column of Table 6.3 the aggregate benefits are then tabulated.[68]

Table 6.3 – Estimates of Private Benefits from Avoided Duplication and Cost Reduction

Year	Scenario	Total Number of Cases	Duplicated Cases Pharma	Duplicated Cases Other Fields	Duplicated Cases - Total	Private Benefits from Avoided Duplication (EUR Mill.)	Additional Private Benefits from Cost Reduction (EUR Mill.)	Total Private Benefits (EUR Mill.)	Benefit-Cost Ratio
2008	1a	872	38	108	146	89.1	17.5	106.6	3.9
2008	1b	872	56	130	186	114.3	16.6	130.9	4.8
2008	1c	992	56	202	258	156.2	21.1	177.3	6.4
2008	1d	992	75	236	311	189.1	19.6	208.7	7.6
2013	2a	1,206	53	149	202	123.3	24.3	147.6	5.4
2013	2b	1,206	79	179	258	158.7	22.9	181.6	6.6
2013	2c	1,372	79	279	358	216.9	29.2	246.1	8.9
2013	2d	1,372	106	325	431	262.3	27.1	289.4	10.5

Source: Own computations based on Table I and II (see Annex II). Benefits and case filings are given as annual figures.

[66] EUR 300,000*1.15 per party per case = EUR 690,000 per case.

[67] The figures for 2013 should be interpreted as estimates in nominal 2008 Euro. Attorneys' fees and other costs components have been increasing above the rate of inflation, but since the estimate is meant to be conservative no projected price changes are included in the computation.

[68] Cases after duplication were estimated by assuming that case filings in France, United Kingdom, the Netherlands and other countries are distributed in the ratio of 4:2:1:1. This is roughly commensurate with the distribution in Table 4.6. The number of cases in Great Britain was between 70 and 78 in the 2008 scenarios, and between 97 and 109 in the 2013 scenarios. These case numbers were multiplied with the stated cost reduction.

To compute a benefit-cost ratio, the above results need to be compared to the estimates of operating costs computed in section 5 of this report which puts the operating costs of the unified Patent Court with capacity for 940 cases per annum at EUR 27.5 million. Thus the average total costs per case are estimated to be at EUR 29,280. The computed benefit-cost ratio is shown in the final column of Table 6.3.

Clearly, the total savings from avoiding duplication and from cost reduction are considerably larger than the operating costs, even for the most conservative scenarios. For 2013, the benefit-cost ratios range between 5.4 and 10.5. In other words, duplication of litigation combined with high costs of litigation in some countries costs firms about 5.4 to 10.5 times more than the establishment and annual operation of the unified Patent Court. Since the Court itself substitutes some of the existing national court capacity (or, to put it differently, not all court capacity will have to be financed anew), the benefit-cost ratios would be even more favourable if the substitution were taken into account.

6.4 The Impact of Litigation Costs

The preceding considerations were based on the assumption that the unified Patent Court will allow parties to litigate at the relatively low cost levels which characterize the national systems in low-cost litigation countries such as Germany, France and the Netherlands. A close reading of the Presidency's proposal shows that several cost-reducing measures are planned. As has been pointed out in the discussion already, the cost of litigation is a central parameter which affects not only the extent of litigation, but also settlement activities and the potential for strategic behavior in the patent system. To strive for a low-cost system is therefore important. At the center of the positive results in the preceding section were savings from avoided duplication and from cost reduction. It is simple to see that these savings could be reduced substantially if the unified Patent Court system were to come with an increase in the cost of litigation beyond the level now present in Germany, France and the Netherlands.

In order to explore how strongly the benefit-cost ratios are affected by litigation cost levels, Table 6.4 performs the following experiments. First, a critical cost increase is computed, i.e., the level of costs which would dissipate the total benefits computed in Table 6.3 completely. As the results show, under the assumptions of scenario 2a, an increase of average litigation costs of EUR 147,012 (EUR 73,506 per party) would dissipate the benefits of EUR 147.6 million. Moreover, an increase of average litigation costs (cumulative to both parties) of EUR (147,012 – 29,280) = EUR 117,732 would yield a benefit-cost ratio of unity. Table 6.4 also tabulates a revised benefit-cost ratio after a EUR 50,000 increase in average litigation costs per party. Such an increase can be called drastic – the average cost level per party in the low-cost countries Germany, France and the Netherlands is EUR 145,000.[69] This means that even in this robustness check, the Presidency's proposal performs well. It would take roughly a 50% increase in average litigation costs to dissipate the private benefits computed above completely. However, it needs to be noted that this thought-experiment disregards demand

[69] Computed from Table 4.6 as a weighted average if two thirds of cases are "small-medium" and one third is "large", and if one quarter of all cases enter the appeal stage.

effects – clearly, at the increased cost levels, many of the parties may no longer want to undertake litigation and are forced into potentially more costly private settlements.

Table 6.4 –Testing the Impact of Litigation Costs

Year	Scenario	Cases without Duplication	Total Private Benefits (EUR Mill.)	Critical Cost Increase (EUR)	Revised Benefit-Cost Ratio after EUR 50,000 Cost Increase (per Party)
2013	2a	1,004	147.6	147,012	1.7
2013	2b	948	181.6	191,561	3.2
2013	2c	1,014	246.1	242,702	5.3
2013	2d	941	289.4	307,545	7.1

Source: Own computations based on Table I and II (see Annex II). Benefits and case filings are given as annual figures.

To conclude this discussion, the estimates in Table 6.3 form the core of the results. For 2013, the benefit-cost ratios range between 5.4 and 10.5. The computation summarized in Table 6.4 affirms the robustness of this result. It also becomes clear that offering litigation at the new Patent Court at levels close to the ones in the current low-cost countries is advantageous. Cost increases lead to dissipation of benefits.

6.5 Further Effects from a Unified Patent Court

The discussion in this section assumes again that the unified Patent Court system will allow parties litigate at the relatively low cost levels of the three Continental European systems. The purpose is to discuss medium- to long-term consequences of the introduction of the unified court system.

Impact on infringement suits. The purpose of the unified Patent Court is – *inter alia* – to reduce the variety of interpretations of patent scope and claim interpretation in Europe, especially at non-specialized courts. Economic theory suggests that this will ultimately reduce the extent of divergences and asymmetric information regarding patents.[70] In the course of this process, parties that would decide in favor of litigation in a fragmented system will again revert to settlement because settlement costs will be reduced over time[71] and parties' expectations and information will become more homogeneous. In the long-run, it will then be a hallmark of success if (relative) litigation activity will decrease despite of a low-cost litigation path. Based on the currently available data, it is not possible to predict when these effects would set in.

Moreover, the above development may not become fully visible due to other effects of the unified system. The unified Patent Court system will be more attractive than the fragmented one (for most users) because it offers the resolution of legal conflicts for the *whole* EU. Utilizing the Court will also become necessary for an increasing number of parties which may

[70] See the discussion in Lanjouw and Lerner (1998) and Priest and Klein (1984).
[71] See Galasso and Schankerman (2008) for empirical evidence that settlement lags were reduced substantially after the introduction of the CAFC in the USA.

in future make more frequent use of the European patent or the Community patent. Currently (as Table 4.1 has documented), firms in the new EU Member States use European patents infrequently. As these economies grow and as their commerce gets more intertwined with other Member States, there will be increasing demand for litigation involving parties in these States. Finally, in countries in which the current national system is very expensive, a shift from settlements to litigation may occur, since litigation offers the more cost-effective way of dealing with the legal conflict once the unified system has been introduced.

The development of the demand for litigation will therefore reflect three aspects: (i) a potential long-term reduction in demand for litigation due to the Court's impact on divergent expectations and asymmetric information; (ii) increasing use of European patents in some Member States which are not particularly active in patenting at this point; and (iii) increasing use of litigation in Member States whose national litigation system is more costly than the one offered by the future unified Patent Court. All three developments are positive. Under (i), parties will resort to settlement, but under more homogeneous expectations. In most cases, this shift to private negotiations will be positive since these occur under greater certainty regarding the scope of patent rights. Tendency (ii) simply reflects economic growth in new Member States, and the ensuing need for an efficient patent litigation system. Fast and low-cost resolution of legal controversy should support that process. And (iii) is a reaction to the implementation of the low-cost litigation system (from the perspective of parties in formerly high-cost national systems). The first two tendencies will be observed in the long run. They cannot be quantified easily, but they would affect the overall analysis positively.

The third aspect could be felt relatively soon after the establishment of the Patent Court. The effect is not taken into account in Table 6.3, since the computations there are guided by the assumption that all other litigation activity beside duplications will be maintained at the original levels (inelastic demand for litigation). A quantitative benefit-cost framework cannot be developed easily here, but as a robustness check for the previous calculations, it is assumed that 200 additional cases are filed as a result of the (relative) cost reduction perceived by parties in currently high-cost litigation systems.[72] These cases are initiated because, with the establishment of the unified system, litigation has become more appealing than settlement or no action. Hence, parties must have the expectation of private benefits from switching to litigation. As an order of magnitude, consider the case in which each infringement case generates an additional private surplus to both parties of half of the cost reduction achieved by implementing the unified system. For "small to medium" cases in the UK, the reduction is on the order of EUR 100,000 per party[73] and thus EUR 200,000 per case. Hence, for our assumed 200 additional cases, a private gain of EUR 10 million[74] could be expected. The additional court costs would have to be held against this effect. Given that the cases were assumed to be "small to medium", operational costs would consume on the order of half of the gains (about

[72] This figure can be roughly thought of as the current difference between the level of cases in the United Kingdom and in France.
[73] See Table 4.6 and the above discussion. We take as the relevant difference EUR 150,000 for a small case in the United Kingdom vs. EUR 50,000 for a small case in Germany, both times in first instance.
[74] 200 cases multiplied with half of the reduction in private costs to both parties (EUR 200.000).

EUR 5 million). Hence, the overall private benefit from additional infringement suits is likely to be small in comparison to the overall cost savings tabulated in Table 6.3. In any case, the impact of these cases would *raise* the benefit-cost ratio further. The above estimates are thus robust to the inclusion of this additional effect.

Revocation proceedings. Somewhat different results emerge from a discussion of revocation proceedings. These have found relatively little attention in the literature, presumably because the US system does not offer a particularly effective way of revocation in cases of erroneously granted patents.[75] The results of the Commission's Pharmaceutical Sector Inquiry indicates that revocation has considerable public benefits because, if successful, it allows firms to enter the market. The Presidency's proposal foresees a highly attractive revocation path which does not have to exhaust opposition at the EPO first. Opposition at the EPO used to involve more than 10% of granted patents in the early 1980s, but has declined to a level around 5%.[76] One reason for the declining attractiveness may be the long delays in resolving opposition and any subsequent appeal cases. The unified Patent Court would offer an interesting alternative.

Suppose that the unified Patent Court would attract new additional invalidity suits[77] and that the average private value of patents attacked in invalidity suits is EUR 2,0 million if maintained in the proceedings. Assume further that roughly 25% of patents would be revoked or partially revoked in revocation proceedings (as at the German Federal Patent Court). Each case leading to revocation could then cause total benefits of approximately EUR 1,0 million[78], since the erroneously granted patents can no longer impede competition. Suppose that a case with these stakes would cause total litigation costs of EUR 50,000. Per case, a net benefit of EUR 200,000 accrues *to society*.[79] Thus, 200 revocation cases would lead (under these assumptions, without appeal stage) to a net benefit of EUR 40 million in addition to the benefits computed before. The effect is clearly larger for infringement cases (see above), but there is again a positive contribution. It is important to keep in mind that the societal gain from revocation will in all likelihood not be fully internalized by the party or parties initiating a revocation action, while the gains from a successful infringement action will be internalized to a much greater degree.

Fast and low-cost revocation proceedings are also a good defense line against "patent trolls" seeking to extort licensing fees from other parties based on weak or questionable patent rights. If the parties concerned can have the validity status of the patents involved examined by the unified court for all EU Member States at relatively low costs, the promise of the "troll" business model would deteriorate considerably – at least to the extent that it builds on weak

[75] A revocation action can be initiated in the US only after a party has been named as a presumed infringer. A proactive revocation action is not possible. Moreover, re-examination at the USPTO has not become an effective means comparable to the European opposition proceedings. See Graham and Harhoff (2006) for details and a study of welfare effects that would emanate from the introduction of post-grant reviews in the US patent system.
[76] See Graham and Harhoff (2006).
[77] For concreteness, we assume an incidence figure of 200 cases (this is only about one sixteenth of the 3.293 notices of opposition filed in 2006 at the EPO, see EPO Annual Report (2007), p. 76).
[78] With linear demand, the welfare loss from a patent is equal to one half of its value (i.e., equivalent to the Harberger triangle). See Graham and Harhoff (2006) for a detailed discussion.
[79] (EUR 1,0 million – 4 x EUR 50,000)/4.

patent rights. Conversely, markets for technology would again profit from the reduction in uncertainty, and licensees could be more confident that they are obtaining rights that are reliable and strong. It appears therefore that the revocation path (which is often neglected in public discussions of patent litigation) serves as a particularly important safe-guard against potential abuses of patent rights. The fact that revocation generates substantial external effects is a clear and strong argument in favor of not having private parties pay fully for the operational costs of the unified Patent Court.

7 Additional Welfare Effects and Design Considerations

A number of additional considerations cannot be turned into quantitative estimates easily. They are discussed in the section below. While some of them elaborate on additional welfare effects that are likely to be positive (and potentially substantial), others also point to design considerations that would help to counter possible negative effects.

7.1 Changing Character of Patent Litigation

In the pursuit of a unified Patent Court system, it is important to set expectations correctly. There is a frequently held view according to which, in patent litigation, a bad-faith infringer is confronted in court with a patent-holder with noble motives. This is entirely possible in some cases, but the view may be entirely misleading in other cases for a number of reasons.

- Not all actions by patent-holders may be innocuous – in extreme cases, patent-holders may rely on erroneously granted patents which are utilized to extort payments from other businesses.

- Moreover, there is likely to be a growing number of cases in which the presumed infringer did not intentionally infringe upon the other party's patent rights. In a world with (i) quickly growing patent and application stocks, (ii) densely populated technology domains and (iii) (possibly) declining patent examination quality, infringement may very well become the modern analogue to a trivial traffic accident. Bringing the likelihood of patent infringement to zero may have become too expensive or technically impossible for many businesses. Patent litigation is therefore becoming a *standard conflict resolution* process in which the interests, positions and motives of the plaintiff and the presumed infringer need to be considered carefully.

Notions of the heroic inventor defending his rights against wilful actions may therefore be appropriate in some cases, but certainly not across the board.[80] Patent litigation has become a complex process that needs to be governed by legal, but also by technical and economic expertise in order to generate satisfactory outcomes.

7.2 Incentives for Innovation and Investment

The patent system is an important instrument to create incentives for inventions and innovation. It works best when demands on inventive step criteria are sufficiently high, when the scope and nature of claims is transparent and when patents are well-delineated from each other and other state to the art, e.g., scientific results and publications. When ambiguous interpretations exist, uncertainty prevails (see below). As the report has pointed out at various occasions, the litigation system does not only correct harm imposed by infringers on patent-holders. It also reduces uncertainty and provides an environment for low-cost business

[80] A similar comment applies to revocation proceedings.

decisions and transactions. The impact of this particular quality is difficult to quantify, but nonetheless a qualitative aspect that deserves attention.

7.3 Quality Effects in the Patent System

It has been pointed out in the report that the EPO has embarked on a policy of "raising the bar" in order to counter the effects of increasing filing number and strategic patenting. This policy foresees stricter implementation of standards of novelty and inventive step, and a sanctioning of application strategies that are generally thought of as abuse of the patent system. Towards reaching these objectives, the fee structure is currently being amended (e.g. fees for claims), examiners have been provided with stronger incentives to refuse applications, and divisional applications as well as delays induced by applicants in the examination process have been identified as a means of intentional creation of uncertainty in the patent system. While one can expect that these measures will have some success, they cannot completely assure that patent examination occurs flawlessly. The revocation path at the unified Patent Court will have an important role to play in securing the quality standards intended for the patent system in Europe. Again, a substantial positive welfare effect would emerge from an integrated system since not all European countries have effective revocation proceedings available for post-grant quality control and since the opposition proceedings at the EPO have become unattractive for many parties.

7.4 Substitution between Litigation and Other Instruments of Conflict Resolution

Research on recent developments in patent systems has emphasized the growing incidence of patent thickets. Patent thickets are comprised of complementary patent rights. Appropriation of the returns to innovation requires access to many of such rights. Bilateral licensing can become costly, in particular when patent rights are not well-delineated. Given these circumstance firms in many industries are increasingly employing cross-licensing and patent pools in order to manage patent thickets. These instruments have rightly raised concerns among competition authorities. Cross-licensing and patent pools can potentially be abused to support anticompetitive behavior. Since they are substitutes of patent litigation, the implementation of a low-cost unified Patent Court will alleviate – to some degree – the need to engage these substitutes. The concomitant welfare impact should be positive. Conversely, increases in litigation costs would have the opposite effect as they would encourage the use of the alternative instruments.

7.5 Limiting Strategic Behavior

Detailed discussions and examples of strategic patenting behavior have been put forth in von Graevenitz et al. (2007) as well as in DG Competition (2008). From the results of the recently published Pharmaceutical Sector Inquiry, it is clear that patent tactics and strategic behavior can have strong negative welfare consequences. The most important element in the future patent litigation system that would be well-suited to limit such behavior will be the revocation

procedure before the unified Patent Court. A fast and low-cost revocation procedure would have a number of advantages, both for patent-holders and for parties seeking revocation.

- First, from the "attacker's" point of view, a fast revocation of an improperly granted patent would resolve uncertainty and thus allow quick entry into markets. This is essentially the logic that promotes entry in markets for generics once the originator's patents have expired.

- Second, since the Court would also uphold valid patents, a quick resolution of such cases would immediately benefit the patent-holder who could then negotiate licenses or ask for injunctions on the basis of a stronger property right.

7.6 "Trolls" and Abuse of Litigation

While in most parts of this report it is argued that patent litigation may be the result of divergent assessments or asymmetric information, some recent developments make it necessary to consider the case in which patent litigation procedures can be abused to extort licensing payments even if the validity of the patent(s) is questionable. The ideal outcome of such litigation would be a revocation of the patent and – if the plaintiff (patent-holder) has been successful in holding-up the presumed infringer – compensation of harm caused by the plaintiff to the presumed infringer. This section briefly discusses under which conditions the ideal outcome can be achieved, and under which conditions the patent system can become a source of extortion. Using the patent system to extort license payments has been referred to in the literature as "trolling".[81] "Trolling" as such is not illegal, but it seeks to exploit structural and procedural weaknesses of the patent and judicial system to earn rents. Since these rents are not compensated by welfare gains, trolling is welfare-reducing. An optimally designed patent litigation system must minimize the room for such behavior.

Various features of the US patent and litigation system may contribute to the widespread occurrence of trolling in the US. The following aspects have been named as supportive of patent trolling:

- high costs of legal proceedings;
- cost allocation rules in court (both parties bear their own costs);
- contingency fee payments for lawyers, creating incentives for lawsuits;
- high damage awards and risk of treble damages in the case of "wilful infringement";
- pro-patentee posture of US courts and juries;
- low examination quality creating uncertainty about the scope of protection;
- general and broadly defined extension of patentable subject matter to software and business method.

In May 2006, the US Supreme Court decided to put and end to quasi-automatic injunctions in the US litigation system.[82] These were one of the major instruments used by trolls to exert pressure on presumed infringers.

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[81] See Reitzig et al. (2007) for a detailed analysis of the "troll" business model.
[82] eBay Inc v. MercExchange, L.L.C., 547 U.S 388(2006).

The exact extent of "trolling" in Europe is unknown. Certainly, the practice has not played the prominent role that is has in the US. On the other hand, several patent funds have purchased several thousands of patents, and the first court actions by "trolls" may already be pending in Europe. The weaker presence of "trolls" is presumably due to the fact that the patent system in Europe deviates from the US system in several crucial points. In Europe, (i) court proceedings are much less costly, (ii) cost allocation favours the winning party, (iii) damage awards are not excessive, (iv) most courts have sought a careful balance between the rights of the parties and have not followed a blind pro-patent posture, (v) injunctions are not issued automatically, and (vi) the quality of patent examination has been considerably better than in the US, despite some weakening. However, one should not assume that the European system is troll-proof. In particular, when it comes to the design of the unified Patent Court, the danger of "trolling" should be taken seriously. With its emphasis on revocation, low costs and cautious use of injunctions, the Presidency's proposal includes the right design elements to counter "trolling" activities.

7.7 Reduction of Uncertainty

Reduction of uncertainty has a number of functions in the context of the patent system. Uncertainty favors asymmetric information and divergent expectations, two key drivers of litigation activity. But uncertainty over patent rights is itself caused by contradictory or ambiguous outcomes of patent litigation or contradictory examination practice in patent offices.

The increase or reduction of uncertainty in the context of patent systems is hard to quantify. However, one study does so in the context of the US system, suggesting that consistent rulings from patent courts support parties in coming to fast resolutions of settlements. This is the result that Galasso and Schankerman (2008) obtain from an analysis of the development of the US appeals courts system. Following the establishment of the CAFC, the time for arriving at a settlement was reduced by 7.8 months (which is, depending on the type of patent involved, roughly one third to one half of the ex ante settlement time). This effect may be present in the future European system as well. Currently, uncertainty is likely to be driven by the fact that some non-specialized patent courts lack experience. In this regard, the unified Patent Court might achieve a similar improvement for private negotiations in Europe as the CAFC in the US.

Galasso and Schankerman emphasize that this result is independent of the direction that a court might take in its adjudication of litigation cases. This is – given the example of the CAFC – presumably a particularly controversial aspect, because by affecting the win rate in patent litigation, incentives for patenting might be affected. Given a situation in which patent offices such as the EPO express concerns about "global patent warming", a relaxation of standards or extension of patentable subject-matter would not be welfare-enhancing. This is not a matter of court design per se, but rather of prudent choices in the appointment of judges so that recent attempts made by the EPO and national patent offices to "raise the bar" and enhance quality of examination ca be effectively supported at judicial level. The unified

Patent Court thus has the potential to become an important element in efforts to improve the quality of patents in Europe.

7.8 Benefits for SMEs and YICs

It is important to realize that the parties most likely to suffer from economic uncertainty are SMEs (small and medium-sized enterprises) and young innovative companies (YICs) since they typically lack the financial resources to fight extended litigation battles. The preferred litigation forum for these types of enterprises is a low-cost system that generates resolution quickly. Since SMEs and YICs play an important role in European innovation policy, a unified and integrated patent litigation system is undoubtedly beneficial for them.[83] It may be possible to take the situation for SMEs and YICs further into account by implementing in the rules and procedures of the court fast-track proceedings or other elements that would improve the cost situation and generate rapid resolutions. The latter is particularly important for fast-growing high-technology firms.

7.9 Particular Design Elements of the Presidency Proposal

Specialization. The design of the unified Patent Court takes into account that patent litigation is complex and technically as well as legally demanding. The establishment of a Europe-wide specialized court, using the expertise of technically qualified judges, will let those Member States without specialized patent courts profit in particular.

Representation by specialized patent attorneys. Undoubtedly, the proposal to allow for representation by specialized and experienced European patent attorneys will be controversial. From an economics point of view, however, it is a suitable measure to limit the cost of litigation by allowing for more competition among representatives.

Centralisation vs. Decentralisation. The present proposal for a unified Patent Court follows a decentralized approach. This choice is again correct given the result of this report that it is imperative to keep litigation costs low. The local presence and proximity to users of the system is important for SMEs. Moreover, the existing national infrastructures and institutions are in some cases of outstanding quality. Making good use of them in the context of the Court of First Instance is again favouring low cost levels and high quality.

Arbitration and Mediation. Article 17 of the Presidency's proposal provides for the establishment of a mediation and arbitration center. The setting up of such a center is a further step towards reducing the cost of litigation for the parties involved.

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[83] To quote Judge Robin Jacob (statement at the Strasbourg Conference on Industrial Property Rights in the Internal Market, 16/17.10.2008, available at http://ec.europa.eu/internal_market/indprop/docs/conf2008/robin_jacob_en.pdf): "Patent litigation is not an inherently good thing. Far from it. In practice the patent system works by people being able to predict likely outcomes. People should be able to tell whether a patent covers what they intend to do without going to court. Or whether a patent is likely to be held valid or not. Litigation is for the marginal cases. The wider the margin, the greater the uncertainty, the more litigation is likely. This is particularly bad for smaller companies – they cannot afford the risk of being wrong and will have to stay outside any margin of uncertainty – the wider that is the more their activities are hampered."

Pool of Judges and Training. The concept of "pool of judges" addresses the prevailing heterogeneity across European countries. Since there are few qualified patent judges, training a new generation of judges will be very important. Loose arrangement such as Judges' symposia and the Venice meetings could find a supportive institutional framework. The pooling of judges is likely to enable many States with little experience in patent litigation to build up expertise within a European scheme. Moreover, the use of technically qualified judges is likely to introduce a high degree of technical expertise in the decision-making process.

7.10 Impact on Further Harmonization of EU Patent Law

The unified Patent Court could effectively contribute to further harmonization of European patent law and thus to the resolution of the legal problems surrounding the European bundle patent. As regards the Community patent, the Court could be an essential building-block of a fully-fledged patent system in the EU. Finally, although the Court would not be directly linked to national courts with jurisdiction over national patents, the case law developed by the Court would in all likelihood rebound to national courts systems and thus contribute to harmonization in procedure and substance.

8 Summary

This report undertook a broad literature review on issues of patent litigation and the unification and integration of the patent litigation system in Europe. It developed a framework for assessing the impact of the recent proposal for a unified Patent Court. The report quantified (to the extent possible) the costs and benefits from the introduction of a unified patent litigation system. The quantitative assessment was accompanied by a qualitative discussion of various design options.

The proposed unified Patent Court affects stake-holders in a different manner, and these heterogeneous effects need to be taken into account. The report considered various sources of benefits, in particular the benefits from avoiding the duplication of litigation in multiple jurisdictions. Avoiding duplication of infringement or revocation cases is likely to generate large benefits for the European economy. The results obtained here suggest that *currently*, between 146 and 311 infringement cases are being duplicated in the Member States. By 2013, this number is likely to increase to between 202 and 431 cases. Total private savings in 2013 would span the interval between EUR 148 and 289 million. Comparing the benefits to operating cost of EUR 27.5 million shows that the benefit-cost ratio ranges between 5.4 and 10.5 in 2013. Hence, the cost-benefit assessment focusing on avoided duplication leads to a highly positive evaluation of the proposal. Various checks confirm the robustness of this result in the presence of additional infringement or revocation litigation. The results also show that the level of litigation costs at the new unified Patent Court will play a crucial role for access and for the monetary benefits from avoided duplication. Given that litigation before the unified Patent Court should be feasible at the low-cost levels currently present in the continental patent litigation systems, the financing of the Patent Court should not be purely private. The fact that litigation, in particular revocation, yields external effects is a clear argument in favor of supporting the Court's budget with public funds.

The report also discusses - in a qualitative manner - effects which emerge from changes in strategic incentives. It is argued that detrimental effects can be controlled reasonably well if the unified patent litigation system puts emphasis on fast and low-cost proceedings, and if an effective revocation procedure is implemented. The latter feature of the system is presumably an important design element as it is an effective means against strategic and (possibly) frivolous litigation activity which could be mounted in the future by "patent trolls".

Particular attention needs to be given to the future posture of the Court – a pro-patent view could easily lead to dysfunctional effects as have been apparent in the USA after the introduction of the CAFC. This means that the selection of judges needs to be performed prudently so that recent attempts made by patent offices in Europe to "raise the bar" and enhance quality of examination are followed-up at judicial level.

To summarize, this report recommends strongly that the Presidency should proceed in its efforts to establish a unified and integrated patent litigation system for European patents and future Community patents. For highly conservative estimates of the relevant parameters, the economic benefits from such a system are likely to exceed the costs of the new Court and

operations by a large multiple of between 5.4 and 10.5. Moreover, with prudent design choices it should be possible to implement a litigation system that will be balanced and supportive of overall efforts to improve the quality of patents in Europe.

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10 Annex I - Economic Studies of Patent Litigation and Litigation Systems

10.1 Fundamental Economic Studies

Economic analyses of patent litigation are frequently based on the by now classical model developed by **Priest and Klein (1984)**.[84] Building on the logic that cases will go to trial only if ex ante settlement efforts are not successful, **Lanjouw and Lerner (1998)** sketch a simple model and provide an excellent exposition of the theory. They summarize most of the empirical studies that have appeared by the end of the 1990s. Lanjouw and Lerner consider four main aspects: (i) that patent litigation fluctuates according to the anticipated litigation benefits, (ii) that patent enforcement is dependent on the litigation costs, (iii) that patent enforcement costs change the perceived private value of patent rights, and (iv) that the innovation process is affected by litigation of intellectual property.

Models in the Priest and Klein tradition are based on the assumption of divergent expectations – litigation typically requires that the two parties have *different* assessments of case quality. If litigation costs are sufficiently low, and if the stakes are sufficiently high, then litigation becomes more likely. In a simple litigation case, e.g. in torts, the stakes will be symmetric – what one party has to pay, the other party gains. In patent litigation, this is frequently not the case, and where stakes are asymmetric, litigation may become more likely again. **Meurer (1989)** has pointed out that the stakes of the parties may themselves be a function of the outcomes of litigation. Hence, more than just a transfer payment from one party to the other is at stake. If settlement with licensing is reached, then total industry profits will be less than the monopoly level. If a patent is revoked in litigation or opposition, stakes may again be very different from the simple transfer payment in the case of a standard litigation model (see **Harhoff and Reitzig 2004**).

The presence of asymmetric information (as opposed to diverging expectations) is likely to lead to an even greater incidence of litigation. When one party is known to have better information, it may want to make offers for signalling purposes. But some of these offers will be unacceptable and thus lead to litigation even if – with symmetric information – a settlement would have been reached (see **Bebchuk 1984, Png 1983**).[85] The more accurate information the parties have, the less likely litigation becomes, at least under reasonable assumptions (see, e.g., **Spier and Spulber 1993**).

[84] See the introduction and summary by Cooter and Rubinfeld (1989).

[85] While many theoretical researchers have preferred models with asymmetric information, the empirical evidence in Waldfogel (1998) supports the view that the divergent-expectations model is a more appropriate foundation for an analysis of litigation.

While there is no single model that captures all possible situations in which litigation would occur, some conclusions can be drawn from the above and the literature. In particular, one would predict that the likelihood of observing litigation increases as

i) expectations increasingly diverge;

ii) information is distributed more asymmetrically;

iii) the stakes increase, i.e., as the level of profits rises;

iv) the costs of trial decrease in comparison to the costs of settlement.

These predictions have been confirmed in a large number of empirical studies. Some will be discussed briefly here.

Lanjouw and Schankerman (2001) provide an important analysis of the general features of patent litigation in the USA. They compare the characteristics of litigated patents and their owners to those of a control group of patents. Litigation risk is distributed in a heterogeneous manner across firm types and technologies. They establish the following empirical results: (i) more valuable patents are more likely to become involved in litigation; (ii) parties with large portfolios are attacked less often, i.e., are presumably able to use settlements instead of litigation; (iii) foreign (non-US patent holders) are less likely to be involved in US litigation; (iv) litigation risk is much higher in pharmaceuticals than in other technologies.[86] Another analysis by **Lanjouw and Schankerman (2004)** shows again that the risk of litigation for patents owned by individuals or firms with small patent portfolios is much higher. The authors argue that holders of relatively large patent portfolios are more prone to trade licenses and may engage in other forms of "cooperative" dispute resolution. Hence, these types of patent owners will be much less likely to pursue infringement suits in court. The authors argue that there is a significant disadvantage for smaller firms – they face a high risk of litigation, and are less well positioned to resolve cases amicably. As an instrument to mitigate these risks, they strongly advocate the development of patent litigation insurance.[87]

An important consideration is the uncertainty regarding outcomes of litigation. **Siegelman and Waldfogel (1996)** have used a Priest-Klein-type model to estimate the extent of

[86] The average incidence of infringement litigation is about one case per 100 patents. But the rate varies between 0.5 cases in chemicals to 2 cases per hundred patents for pharmaceuticals. Lerner (1995) estimates a likelihood of six cases per hundred patents in biotechnology in the time period 1990-1994. Generally, these authors point out that the frequency of litigation decreases as a technical sector matures.

[87] See also the studies by Buzzacchi and Scellato (forthcoming) and Kumar (2008) on patent litigation insurance.

uncertainty for cases initiated in the District Court for the Southern District of New York after 1979 and resolved by 1989. They find that intellectual property right (IPR) cases have relatively low uncertainty when compared to civil rights, labor, torts and other cases. **Siegelman and Waldfogel (1999)** also find that IPR cases have a relatively high win ratio of 35% for the plaintiff.[88] **Lanjouw and Lerner (1998)** point out that the win rates of plaintiffs in patent cases rose substantially after the introduction of the CAFC in 1982: "(...) Plaintiff win rates at trial increased from an average 61% in the years just before the establishment of the new court to 70% by 1987 (in conjunction with a 50% increase in the number of cases tried)." They quote evidence collected by **Koenig (1980)**: between 1953 and 1978, 62% of district court cases appealed to circuit courts with first instance decisions holding patents to be valid and infringed were upheld and confirmed, while 12% of the cases holding patents invalid were reversed. For the time period between 1982 to 1990, **Merges (1992)** shows that the CAFC confirmed 90% of judgements in favour of plaintiffs, and reversed 28% of the invalidity judgements. Clearly, a "pro-patent" tendency of the CAFC becomes apparent in these statistics.

10.2 Extensions of Basic Models

Aoki and Hu (1999a) have analyzed the legal system and its effect on patent protection and innovation incentives. Their findings show that firms increase their R&D intensities in the presence of a legal system that guarantees monopoly power for the patentee. Firms do also increase R&D and preserve ex post efficiency when the legal system induces licensing. Litigation behavior, R&D, and patent licensing in the USA and in the United Kingdom are also compared in the light of the legal cost allocation rules in both countries.

Crampes and Langinier (2002) consider the possibility of entry into a market if the market is occupied by a patent-holder who has the right to sue identified intruders. The patentholder must observe the market. If infringement occurs, the patent-holder must choose a reaction: to go to court, settle out of court, or accept the entry. Part of the analysis is to measure how much monitoring should be done and its influence on the entry decision. The patent-holder, in a simultaneous game, may settle instead of going to trial although the penalty paid by a liable infringer is high. Entry probability may increase parallel to the penalty. Entry occurs comparatively less often in subsequent games than in the simultaneous game regardless of who plays first.

Choi (1998) argues that patent litigation serves to reveal important information for potential entrants. The patent litigation process tests the validity of a patent. This information is an informal externality that affects the entry dynamics of a market when potential entrants are present. The potential entrants will either wait or pre-empt others dependent on the level of patent protection. As a result, the patent-holder and the initial imitator receive discontinuous

[88] The probability is unconditional on trial, but conditional on filing.

pay-offs related to patent protection. Increasing intellectual property rights may also not be desirable for the patent-holder. The practice of delaying patent suits is also addressed in this analysis.

A broad survey of intellectual property litigation in the USA is provided by **Hoti et al. (2006)**. Public opinion is changing in relation to the robust enforcement of highly valuable intellectual property rights (IPRs) such as patents, trademarks, copyrights or trade secrets. The USA is used as an example of a natural laboratory because of the long term litigation battles over patents, trademarks and copyrights taking place there. The changes in IP litigation activities in the USA are also empirically analyzed. As IP value recognition increases, so do IP litigation and policy actions which are focused on the manifestation and form of that protection. An empirical analysis of how the IP litigation activity in the USA has changed over time is also presented.

Llobet (2003) analyzes patent enforcement through litigation when firms have private information. Future innovations concerning entry, settlement and litigation decisions are influenced by the courts when they grant patent protection. Recent empirical evidence is reflected broadly in the model used for this paper. As a result of this analysis the evidence suggests that infringers who would license a patent do not do so if the patent is highly protected. The arguments show that large improvements and large litigation costs are more likely to show this effect than others. Pre-emptive injunctive relief on innovation and litigation are compared and discussed in their paper.

Marco and Walsh (2007) investigate the effect of uncertain patent rights of an incumbent patent-holder on entry decisions of an infringement firm. The entry dispute that is risked results in either a settlement (licensing) or litigation and trial. By using a Priest-and-Klein type litigation model to anticipate dispute resolution, the authors hypothesize about the entrant's pre-dispute behavior. The analysis shows that the entry decision is affected mostly by the entrant's expectation of the patent holder's beliefs about patent enforceability. The authors explain entry decisions by developing a simple taxonomy of entrant and incumbent types.

Meurer (1989) has developed a licensing model for patent litigation. When litigation relating to patent validity is undesirable, licensing is induced. The private validity information of the patent-holder influences him to make a take-it-or-leave-it offer to a single potential rival. If out-of-equilibrium beliefs are restricted appropriately, an essentially unique sequential equilibrium exists. According to the model, the probability of settlement and litigation is affected by the probability of patent invalidity, antitrust policy, and litigation-cost allocation rules.

Forum shopping is a frequently observed phenomenon, not only in the USA but also in Europe. **Moore (2001)** has undertaken the first empirical analysis on a large scale to consider patent enforcement in the district courts. The database includes all patent cases terminated between 1995 and 1999, in all district courts (9615 cases). The article focuses on three major themes: (i) can it be proved that there is variation in patent case resolutions between jurisdictions? (ii) is variation between court and the following forum shopping good or efficient? (iii) can forum shopping be reduced or eliminated? The empirical data show that patent cases are not evenly distributed among the 94 judicial districts. There seem to be a few select jurisdictions. The analysis of the ten most frequently selected courts confirms the procedural and substantive differences in the adjudication of the patent cases. The lack of uniformity in patent enforcement is also pointed out as a problem. Plaintiffs can take their cases into any court/forum they wish. The conclusion is that the patent system would benefit from the predictability of a specialised trial court or a more limited venue statute.

Raghu et al. (2008) use event study methodology to explore the impact of litigation actions on market value. IPRs portfolios that include unique inventions and discoveries are potentially inimitable resources that provide strategic leverage to Information Technology (IT) firms. Because patent litigations have become economically significant, the authors have studied the economic impact of patent infringement litigation on both plaintiff and defendant firms in the IT industry. The effect of litigation can be noted through an event study methodology assessment using stock market returns changes around the date of litigation announcement and the date of settlement/termination. The results of the study show that the information of the litigation affected the plaintiff stock market values positively. Whereas the information of litigation affected the defendants stock market values negatively. The authors conclude that patent litigation effects are not zero sum effects because the sums of the abnormal returns for both firms are negative. Market returns are more likely to be influenced by electronic/electric patents than they are by computer/communications patents. The more often a patent is cited the more important it is for this paper. This importance contributes to the market's evaluation of a patent litigation's impact.

In a somewhat surprising analysis, **Robledo (2005)** shows that "wasteful" litigation about IPRs may be welfare enhancing. The aim of an IPRs system is to solve the trade-off between ex-ante innovation incentive and ex-post monopoly welfare loss. IPRs litigation decreases the expected IPRs rent which in turn reduces initial innovation incentives thus causing a negative effect on social welfare. On the other hand, litigation may positively affect the situation by monopoly breaking and allowing entrance of competitors. This in turn could lower prices and reduce the loss of welfare from the monopoly. If the welfare effect of competition increase is higher than the first effect of research reduction, then the litigation process increases welfare.

Schankerman and Scotchmer (2001) compare the two doctrines of damages, lost profit (lost royalty) and unjust enrichment. In the case of proprietary research tools, unjust enrichment

protects the patent-holder better than lost royalty. Depending on how much delay is permitted before infringement is enjoined, both can be better than a property rule. For other proprietary products (end-user products, cost-reducing innovations), these conclusions can be reversed.

Given the tendency in many European countries of following the example of the US Bayh-Dole Act and installing strong incentives for universities to engage in patenting, the impact of litigation on academic patenting may be important. **Shane and Somaya (2007)** study this issue for the USA. One effect of increased patenting by universities over the past 20 years has been a rise in lawsuits to enforce university patent rights. Shane and Somaya investigate what effect patent litigation has on university efforts to license technology. Based on secondary data, they find both qualitative and quantitative evidence that patent litigation has an adverse effect on university licensing activity. The interview information shows that this occurs because litigation disrupts overall technology licensing office (TLO) activity, and reduces the time and resources available for marketing technologies and establishing licenses.

Shapiro (2003) points out that competition is influenced more than ever by patents, patent litigation and patent settlements. Patent dispute resolution takes many forms, including licensing and cross-licensing agreements, patent pools, mergers, and joint ventures. Hence, there are quite a number of substitutes to a court adjudication of patent disputes. While frequently in favour of competition, settlements can inhibit competition and disadvantage consumers. As pointed out by Shapiro (2003), one alternative to litigation in court is the establishment of patent pools. **Lerner et al (2003)** study these arrangements. Their analysis yields five results which are largely consistent with theory-based expectations: (a) patent pools that include substitute patents have a low propensity of permitting pool members to license patents unilaterally; (b) the likelihood of independent licensing grows as the number of members in the pool increases; (c) pools that are relatively large tend to exert control over litigation, (d) in larger pools third party licensing is more common; and (e) recent patent pools (which were frequently scrutinized by antitrust authorities) include more important patents.

Evidence provided by **Meurer and Bessen (2005)** shows that the likelihood of litigating and of becoming a defendant in a patent suit is particularly high (relative to expenditure on R&D) in the electronics (SIC 36) and instruments (SIC 38) industries, both of which are classified as complex product industries. The evidence is reproduced in the table below.

Litigation Hazards					
		As Patentee Litigant		As Alleged Infringer	
	Suits per $billion R&D	Expected Suits per year	Suits per 1000 patents	Expected Suits per year	Suits per $billion R&D
All Firms	3.0	0.223	11.8	0.185	2.5
1987	2.9	0.198	10.5	0.116	1.7
1999	3.1	0.271	11.7	0.256	2.9
Small firms (emp.<500)	15.2	0.079	42.5	0.064	12.3
Large firms (emp.>=500)	2.7	0.304	10.7	0.254	2.2
New firms	7.1	0.114	30.3	0.095	5.9
BY INDUSTRY					
chem/pharma	3.1	0.334	14.4	0.229	2.1
mach/computer	2.9	0.217	13.0	0.170	2.3
electronic	3.7	0.202	8.8	0.194	3.6
SIC 3674	3.1	0.216	7.8	0.225	3.2
instrument	7.2	0.216	17.6	0.191	6.4
other manu	2.2	0.230	10.3	0.188	1.8
bus svcs inc sw	1.3	0.108	8.4	0.103	1.3
retail/wholesl	2.0	0.021	5.9	0.111	10.9
oth non manu	1.9	0.141	8.0	0.152	2.1

Source: Meurer and Bessen (2005)

10.3 Specific Problems Related to "Bad and Weak Patents"

Kesan and Gallo (2005) formally demonstrate that improperly granted patents can survive in the market without judicial review, even when the invention is neither novel nor non-obvious. They develop a game theoretic model which focuses on the interaction between the patent-holder and a presumed infringer or challenger and demonstrate the impact of the transaction costs in the patent system. The model demonstrates the inability of the US patent system to mount effective challenges to improperly granted patents. The authors suggest that a low-cost, post-grant opposition process based primarily on written submissions might function as an effective instrument for improving the quality of patents.

Leslie (2006) pursues a similar line of thought and considers the potentially detrimental effect of unenforced invalid patents. The legal system assumes that an invalid patent cannot distort competition unless the patent-holder enforces the patent by initiating infringement action or explicitly threatens to do so. The author argues that invalid patents can destroy competition - even without such enforcement efforts - by (i) creating legitimate fears of litigation, (ii) increasing the costs of market entry, (iii) delaying market entry, (iv) scaring away competitors' customers and business partners, and (v) deterring research. Neither patent law nor antitrust law does an effective job of ridding the marketplace of invalid patents, although there are anticompetitive risks posed by them. The Sherman Act is not violated until a monopolist actually enforces an invalid patent. Therefore, a monopolist can unfairly exclude

competitors without exposing itself to antitrust liability. Finally, the author argues that the enforcement requirement should be eliminated from antitrust claims based on invalid patents. This would be a better way to accomplish the goals of both antitrust law and the patent system.

The "patent troll" business model has been much discussed over the last years. The problem of patent trolls is more likely to arise as the quality of patent examination decreases. More weak patents mean that there is more ammunition to fuel the process of hold-up. Indeed, the ideal patent for the purpose of trolling is typically vague but covers an extremely lucrative process. **Reitzig, Henkel and Heath (2006)** argue that a troll's business model works best in industries in which patents are complements. This is due to the fact that in such industries products are often based on very large numbers of patents and no firm can ever be absolutely certain that it has ruled out the risk of infringement entirely. In such settings, it is profitable for firms to acquire obscure patents and wait for these to be infringed. The authors point out that the strategy of being infringed is profitable because of the threat of injunctions and because the damage awards that are attainable are usually very large. They argue that courts generally refuse to consider the costs of inventing around a patent, that the infringer would have had, had they been aware of the patent, as a basis for damages. They provide examples in which these costs are almost zero and yet the damages awarded are very large. If the costs of inventing around were taken into account, then the marginal value added to a product by the patent in dispute would become the main issue in court. This would doubtless be so low that many cases would no longer come to court.

This argument is an interesting one, but it potentially disregards the high costs faced by a defendant in the process of coming to a court decision on a litigated patent. These costs may include the effects of injunctions (Hall and Ziedonis 2001). At present there is limited evidence of the activities of patent trolls in Europe. However, it is apparent that patent funds financed by private equity have acquired patent portfolios consisting of (in total) several thousand patents, largely European ones. A patent system that would favour the attacker, possibly one owning only weak patents, would immediately constitute a problem. But even "troll activities" in the United States may be costing European firms large amounts of money as the following quote found by Reitzig, Henkel and Heath (2006) reveals: "From an IP management perspective, patent sharks [the same as patent trolls] currently pose one of the great challenges to our firm" (Peter Halkjaer, Senior IP Manager, Mobile Phones at Nokia).

10.4 Studies on the US Court of Appeals for the Federal Circuit

While the literature on the creation and impact of the CAFC in the USA can yield interesting insights, it is important to keep differences between the situation in the EU and in the USA in mind. Before the creation of the CAFC in 1982, the USA had a patent litigation system with thirteen appeals courts to which appellants could take their case. Extensive forum shopping occurred, and legal precedents tended to be contradictory. Through centralization of the appeals stage in one court (the CAFC), the USA removed the multitude of appeals' paths.

The situation in the EU is different in that one of Europe's problems is the national fragmentation of litigation and the resulting divergent interpretations of substantive patent law. The duplication problem was not present in the USA prior to the creation of the CAFC. But the reforms currently discussed in Europe would also go some way in terms of centralization. With respect to this change, some lessons may be learned from the CAFC example.

Changes in the US patent litigation system have been studied by a large number of authors. These studies are instructive for European policy-makers because of their focus on *centralization* which – in many aspects – will also occur in the course of unification and integration of patent litigation as currently planned for Europe. In 1982, the US Congress established the CAFC as the *sole* appellate court for patent cases. Previously, cases had been appealed to various courts. As is currently the case in Europe, practitioners and academics had argued in the 1960s and in the 1970s that the non-centralized system generated contradictory rulings, high costs and high uncertainty.[89] Hence, the CAFC was created to eliminate inconsistencies in the application and interpretation of patent law across federal courts. It was also supposed to reduce the incentives of patent-holders and alleged infringers to engage in "forum shopping", i.e., the search for a preferred court venue which would be favourable to the plaintiff's view of the case.

Atkinson et al (forthcoming) study the economics of centralizing the appeals judiciary. They analyze the extent of non-uniformity and forum shopping in the years prior to the establishment of the CAFC and the CAFC's impact on these aspects. One of the advantages of this study is that it distinguishes between patent infringement and revocation cases. There is strong evidence that, prior to the establishment of the CAFC, significant non-uniformity and forum shopping existed in validity issues across the respective appellate courts, and that the CAFC helped to reduce heterogeneity. In cases where the patent-holder is the defendant, the authors cannot detect significant non-uniformity of validity rates across circuits or significant forum shopping.

[89] It should be emphasized that the analogies are far less than perfect. Nonetheless, the literature on the CAFC experience contains some valuable lessons.

Henry and Turner (2006) also study the impact of the CAFC, but focus on patent litigation, patenting and inventive activity. They consider separately various aspects of validity and infringement when comparing the tendencies of the CAFC with those of its predecessor appeals courts. Their data cover the time period from 1953 to 2002. The authors confirm a "pro-patent" attitude of the CAFC in infringement cases. Moreover, the court has tended to be reluctant in confirming decisions of invalidity. These results confirm the assessment of Lanjouw and Lerner (1998). Henry and Turner also argue that district courts have followed the precedent set by the CAFC – the lower courts have decided patents to be invalid significantly less often than in the time period prior to the CAFC. Subsequently, patentees have appealed decisions of invalidity significantly more often, and infringement suits have increased in frequency.

Kortum and Lerner (1999) investigate the cause of the unprecedented surge of US patenting starting in the mid 1980s. Conventional wisdom points – under the label of the "friendly court hypothesis" to the establishment of the CAFC by Congress in 1982. However, the authors do not find strong evidence that this institutional change explains the burst in US patenting. They conclude that the statistical evidence is not particularly favourable to the conventional view. Instead they argue that the jump in patenting was caused by an increase in US innovation efforts, which were spurred by changes in the management of research activities. While Kortum and Lerner (1999) do not favour the "friendly court" hypothesis, **Turner (2005)** provides results that support such an interpretation. He argues that, under the standard view of patents, the patent explosion puzzle cannot be explained. Turner sketches an alternative theory, based on a growing legal literature, where patents confer additional value by minimizing asymmetric information between patentees and observers. He also points out that time series of US patent applications, new patent litigations and patent litigation outcomes have similar structural breaks supporting the "friendly court hypothesis".

A rather critical, but innovative assessment of the CAFC comes from **Nard and Duffy (2007)** who question the value of uniformity altogether. As the authors point out, the establishment of the CAFC was motivated by a congressional desire for greater uniformity in the application of patent law. While uniformity is a virtue, Nard and Duffy argue, it is not the only virtue and centralization has its costs. They discuss several criticisms levied against the CAFC: that it maintains excessive insularity, is path-dependent in its case law, and produces inadequately nuanced jurisprudence.

Another important assessment of the CAFC is provided by **Petherbridge and Wagner (2004)**. The CAFC is a remarkable exception in the US court system since as an appellate body, it is demarcated by subject-matter rather than geography. The authors point to the dominant position that the CAFC has reached in matters of patent law within only two decades. The court was founded on the premise that centralization of legal authority would result in a clearer and less incoherent, predictable legal infrastructure for the patent law. According to these authors the CAFC has had a mixed success. Moreover, this analysis

concludes that the court's rulings have become highly panel-dependent: claim construction analysis is strongly affected by the composition of the three-judge panel that hears and decides the case.

10.5 Empirical Studies of Litigation in Countries Other than the USA

Unfortunately, there are only very few studies on patent litigation for countries other than the USA. The lack of studies is mostly due to missing data – most court and judicial systems do not systematically generate data and statistics on the characteristics of cases and the content of the legal conflicts they are faced with. Some exceptions from this rule will be considered here.

Dinwiddie (1995) focuses on the difficulties of US patent-holders to obtain infringement damages in Japan. Agreements struck between the United States and Japan in the 1990s were helpful in reducing the difficulties US applicants had in obtaining patents in Japan. However, US companies obtaining Japanese patents were faced with a difficult patent enforcement system in Japan that allows for limited judicial remedies only. The high costs of litigation generate additional disincentives for seeking judicial enforcement of patent rights. While a patent was relatively easy to obtain in Japan in the 1990s, foreign patent holders were frustrated by the litigation system.

Subsequent changes in the litigation approaches of Japanese patent-holders are emphasized by **Rahn (2001).** The traditional attitude of Japanese industry towards patent litigation has been changing quickly. In the past, Japanese companies were primarily interested in obtaining patents rather than enforcing them by litigation. Recently, exploitation through licenses and the enforcement of rights in court have become important objectives. Japan has developed an effective and relatively cost-efficient litigation system.

Weatherall and Jensen (2005) analyze patent enforcement in Australia. As in many other countries, proponents of a growing patent system had expressed concern that courts entrusted with patent enforcement have not been sufficiently supportive of patent holders. The authors note that a naïve interpretation of court outcomes can be deceiving. Even if the observed level of success in patent litigation disputes may be low for patent proprietors, cases go through complex selection processes. Outcomes may simply reflect that patents with weak validity get selected more frequently than those with strong claims. The authors have constructed a database of all patent enforcement suits at Australian courts for the period 1997-2003. They report descriptive statistics on patent litigation, e.g. on the duration of cases.

Vandermeulen (2005) comments on the situation in Europe in 2005 and on the lack of unified litigation. The paper concedes the advanced level of harmonization of IP laws, but criticizes the lack of harmonization in enforcement. Speed, type of relief, costs and potential

drawbacks of a legal action vary tremendously across EU Member States. As a consequence, forum shopping is being pursued extensively by owners of IPRs and their adversaries. Moreover, the current situation gives rise to parallel litigation in a number of countries. Swift prosecution of cases is prevented by tactics such as "torpedo" actions and others. Leaving aside the cost implications, Vandermeulen emphasizes that for IP owners with sufficient means, the system offers advantages. Conversely, one can conclude that SMEs and other parties with fewer resources at their disposal are disadvantaged in the current system. That conclusion is also implicit in the work by **Urbanchuk and Tumbridge (2008)** who summarize information on patent litigation in some of the more important jurisdictions in Europe.

Lutz (2000) analyzes patent enforcement and litigation in Switzerland where 26 Cantonal Courts are competent for patent enforcement. Unfortunately, these courts (with the exception of the five Courts of Commerce in Zurich, Bern, Aargau, St Gallen and Geneva) do not have the technical knowledge and legal experience to deal with patent litigation. Patent enforcement in Switzerland is often very slow and exhibits little reliability and continuity of jurisprudence because the courts must rely on outside expert witnesses for all (including injunction) proceedings. The Supreme Court cannot impose any degree of uniformity of patent law jurisprudence. This is due to the fact that the Supreme Court is bound to only re-examine cases that have already been considered by the Cantonal Courts. This limits the allowed information to that which the Cantonal Court has established. Lutz argues that the enforcement of patent law in Switzerland should be concentrated in a Federal Patent Court with panels of technically trained judges composed by a Court of First Instance (possibly with two Chambers for the German and French part of the Country) and a Federal Court of Appeals following the US example.

In her dissertation on patent litigation in Germany, **Cremers (2006)** studies a number of empirical issues pertaining to the German system which is characterized by a number of particular features, such as the bifurcation principle and the use of technically qualified judges. The performance advantages of the German litigation system in terms of time and costs have attracted large demand – clearly, Germany is the most "popular" litigation battle ground in Europe. Cremers' thesis offers a unique empirical investigation of the enforcement of German patent rights. For Germany there is an estimated litigation rate of about 1% of all patents in force at any given time which is considerably lower than the litigation rate estimated for the USA in the same time period. Given the much lower cost of litigation in Germany, there appears to be a puzzle which can conceivably be resolved by pointing to a historically better quality of examination and the ex ante filtering of cases in opposition proceedings, either at the EPO or the DPMA. As noted before, the enforcement of patents in Germany is strictly separated into infringement disputes before the Regional Courts (where the validity of the patent is not questioned) and invalidity disputes before the Federal Patent Court . The thesis of Cremers builds on a unique data set which was collected by the author

using information retrieved from written court files. The data set contains data on all patent litigation suits filed between 1993 to 1995 at the two Regional Courts in Mannheim and Düsseldorf. These two courts currently attract the largest number of cases in Germany and are jointly responsible for more than half of the total number of actions. 715 litigation cases involving more than 900 patents were identified for this time period. Cremers estimates first the determinants of patent litigation at the two courts. Following the example of Lanjouw and Schankerman, Cremers uses a broad set of exogenous variables which reflect characteristics of the patent, market conditions, and characteristics of the patent-holder. Not surprisingly, there is a significant higher probability of litigation for patents which are more valuable than the average. Small firms are more often involved in patent litigation cases than larger ones which points (i) to the high relative value the litigated patent has for small companies compared to larger ones and (ii) to the lack of settlement options available to small firms. In Germany, individual patent-holders are *not* more likely to be involved in patent suits than other types of patent holders. The discrepancy between this result and US findings may be driven by the pre-eminent role of independent inventors in the USA.

In a second essay – **Cremers (2008)** – Cremers investigates settlement decisions in patent infringement cases. Settlement in patent litigation cases is a frequently observed phenomenon. Parties have the opportunity of reaching an agreement during the first negotiation round. In spite of this, they often only reach one later during trial. Game theoretic models suggest that, after a first bargaining round, there may be additional or differently evaluated information available that triggers a settlement. Cremers evaluated a data set of 824 patent infringement actions in Germany between 1993 and 1995. Based on this data, Cremers finds legal differences in the Regional Courts that have a significant impact on the trial settlement rates. The data also show that the probability of settlement is positively affected by invalidity suits used as a defense only in the later stages of a trial. Probability of settlement is always affected negatively by prior opposition to litigated patent. The tendency to forum shop observed in German patent litigation is possibly driven by the heterogeneity among the courts.

In a third analysis, Cremers seeks to shed light on how the duration of trials is determined: the speciality of the infringing action may result in efforts being made to terminate the suit, or its duration may be affected by the general characteristics of the patent or of the patentee. The analysis goes one important step further than the existing literature by using detailed information about the course of the case. Cremers takes the means of defense into consideration: initiating a revocation action, the procedural details of a hearing and requests of suspension. The results reveal that revocation actions as a means of defense of the alleged infringer delay court adjudication, but *not settlement* in German patent litigation cases. Thus, the analysis can effectively counter the claim that bifurcation can make arriving at amicable outcomes more difficult. The results suggest that the courts are experienced in handling complex litigation claims and expert reports. They therefore do not delay decisions. Complex

cases (e.g., with a large number of claims in the contested patent) lower the likelihood of court adjudication.

In a hitherto unpublished presentation at the Richterakademie Trier, **Harhoff (2004)** uses data from the German Federal Patent Court (BPG) to study the relationship between opposition activity and revocation suits. Using a database covering all German revocation suits filed between 1993 and 2002 against EPO-granted patents (794 patents), he finds the following results: (i) 29.9% of patents attacked in revocation proceedings had been subject to oppositions before; (ii) in 16.8% of the revocation cases, there had been a previous opposition with appeal (56.1% of the opposition cases); (iii) in 35.3% of these cases, one of the opponents was also a plaintiff in the revocation proceedings.

Hence, revocation proceedings function as a sequel to opposition in only 10.5% of all revocation cases. This statistic is interesting because it indicates that well-functioning opposition and revocation proceedings are largely independent, presumably because the information at the time of grant is not sufficient for potential opponents, or too opaque, to anticipate the later need for entering into revocation proceedings. The data also show that roughly one third of infringement cases also lead to revocation proceedings.

The datasets used by Cremers and Harhoff are important micro-level data which can cast some light on the characteristics of cases. They have been used in the present report (see section 4.4). The dearth of such analyses is caused by the fact that there is no systematic compilation of litigation cases in Europe. Unfortunately, the lack of data makes it impossible to apply structural modelling with subsequent econometric analysis to the key question of welfare effects from the introduction of a unified Patent Court. Section 3.3 describes how nonetheless an approximate assessment can be undertaken.

10.6 Specific Issues in Pharmaceuticals

Patent litigation has assumed a particularly important role in the field of pharmaceutical. The European Commission recently published the preliminary report on its Pharmaceutical Sector Inquiry - which contains vast amount of data on the incidence, outcomes and characteristics of patent litigation, in particular between generics producers and originators using patent protection to appropriate a return from R&D investments. The particular importance of patents, and thus of patent litigation to this industry has been known for some time (see Lanjouw and Schankerman 2001). Not surprisingly, litigation activity occurs more frequently in this industry than in any other broadly defined sector (save biotechnology, if it is considered separately from pharmaceuticals). Since the preliminary results of the Sector Inquiry are considered in detail in the body of the report, we focus here on literature that allows for conceptual insights into litigation in the field of pharmaceuticals. Particular

attention is being given to licensing contracts specifying reverse payments by which cooperative arrangements between originators companies (manufacturers of patented pharmaceuticals) and generics producers are established. In some cases, these contracts emerge in the context of patent litigation and settlements. **Ecer and Higgins (2005)** compare the short-run welfare effects of different types of settlement agreements, some of which are barred by the Hatch-Waxman Act. Similar issues are studied by **Hemphill (2006).**

While much of the literature in this field focuses on settlements, the Pharmaceutical Sector Inquiry also studies opposition and litigation activities. Several results stand out and are important for the purpose of this report:

i) opposition cases filed by generics producers are relatively often successful, leading to the revocation or limitations of patents of originators companies. Many of these oppositions are directed at secondary patent filings of originators companies which seek to extend patent protection beyond the initial 20 years awarded for primary patents on new clinical entities;

ii) generics producers are also relatively successful in revocation actions against originators companies which suggests that the patents attacked are often of low or marginal relevance and should not have been granted ex ante;

iii) market entry of generics producers can be impeded by the filing of secondary patent applications, divisionals and other tactically deployed patent applications; the onset of competition following the expiry of the statutory term of patent protection often depends on having access to reasonably fast revocation proceedings.

The Pharmaceutical Sector Inquiry is unique in that it shows the impact of litigation on competition and innovation rather directly. Moreover, its data are extremely useful, in particular for the welfare assessment in the report (see section 4.8).

11 Annex II – Scenario Computations

The following tables summarize scenario computations described in section 6 of the report. The purpose of the calculations is to approximate – under current litigation cost levels – the extent to which duplication of litigation occurs in 2008 and in 2013.

Table II.1a

Scenario 1a - Status Quo (Year 2008)

Scenario Parameters: a= 0.125%, b=70%, c=50%, special assumptions for pharmaceuticals

			0.00125	*0.7*		*0.5*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	98,337	92,677	116	50	165	25
Instruments	67,294	63,293	79	34	113	17
Chemistry (excl. Pharmaceuticals)	82,751	78,888	99	42	141	21
Pharmaceuticals	17,583	16,648	30	120	150	38
Process Engineering	66,883	63,324	79	34	113	17
Mechanical Engineering	82,411	77,795	97	42	139	21
Consumption and Construction	30,537	28,089	35	15	50	8
All Technical Areas	**445,796**	**420,714**	**535**	**336**	**872**	**146**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.1b

Scenario 1b - Status Quo (Year 2008)

Scenario Parameters: a= 0.125%, b=70%, c=60%, special assumptions for pharmaceuticals

			0.00125	*0.7*		*0.6*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC Stte**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	98,337	92,677	116	50	165	30
Instruments	67,294	63,293	79	34	113	20
Chemistry (excl. Pharmaceuticals)	82,751	78,888	99	42	141	25
Pharmaceuticals	17,583	16,648	30	120	150	56
Process Engineering	66,883	63,324	79	34	113	20
Mechanical Engineering	82,411	77,795	97	42	139	25
Consumption and Construction	30,537	28,089	35	15	50	9
All Technical Areas	**445,796**	**420,714**	**535**	**336**	**872**	**186**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.1c

Scenario 1c - Status Quo (Year 2008)

Scenario Parameters: a= 0.125%, b=60%, c=60%, special assumptions for pharmaceuticals

			0.00125	*0.6*		*0.6*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	98,337	92,677	116	77	193	46
Instruments	67,294	63,293	79	53	132	32
Chemistry (excl. Pharmaceuticals)	82,751	78,888	99	66	164	39
Pharmaceuticals	17,583	16,648	30	120	150	56
Process Engineering	66,883	63,324	79	53	132	32
Mechanical Engineering	82,411	77,795	97	65	162	39
Consumption and Construction	30,537	28,089	35	23	59	14
All Technical Areas	**445,796**	**420,714**	**535**	**457**	**992**	**258**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.1d

Scenario 1d - Status Quo (Year 2008)

Scenario Parameters: a= 0.125%, b=60%, c=70%, special assumptions for pharmaceuticals

			0.00125	*0.6*		*0.7*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	98,337	92,677	116	77	193	54
Instruments	67,294	63,293	79	53	132	37
Chemistry (excl. Pharmaceuticals)	82,751	78,888	99	66	164	46
Pharmaceuticals	17,583	16,648	30	120	150	75
Process Engineering	66,883	63,324	79	53	132	37
Mechanical Engineering	82,411	77,795	97	65	162	45
Consumption and Construction	30,537	28,089	35	23	59	16
All Technical Areas	**445,796**	**420,714**	**535**	**457**	**992**	**311**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.2a

Scenario 2a - Year 2013

Scenario Parameters: a= 0.125%, b=70%, c=50%, special assumptions for pharmaceuticals

			0.00125	*0.7*		*0.5*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	147,900	139,400	174	75	249	37
Instruments	92,600	87,100	109	47	156	23
Chemistry (excl. Pharmaceuticals)	93,000	88,600	111	47	158	24
Pharmaceuticals	36,500	34,500	42	169	211	53
Process Engineering	85,200	80,600	101	43	144	22
Mechanical Engineering	129,200	122,000	153	65	218	33
Consumption and Construction	43,100	39,600	50	21	71	11
All Technical Areas	**627,500**	**591,800**	**739**	**467**	**1,206**	**202**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.2b

Scenario 2b - Year 2013

Scenario Parameters: a= 0.125%, b=70%, c=60%, special assumptions for pharmaceuticals

			0.00125	*0.7*		*0.6*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	147,900	139,400	174	75	249	45
Instruments	92,600	87,100	109	47	156	28
Chemistry (excl. Pharmaceuticals)	93,000	88,600	111	47	158	28
Pharmaceuticals	36,500	34,500	42	169	211	79
Process Engineering	85,200	80,600	101	43	144	26
Mechanical Engineering	129,200	122,000	153	65	218	39
Consumption and Construction	43,100	39,600	50	21	71	13
All Technical Areas	**627,500**	**591,800**	**739**	**467**	**1,206**	**258**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.2c

Scenario 2c - Year 2013

Scenario Parameters: a= 0.125%, b=60%, c=60%, special assumptions for pharmaceuticals

			0.00125	*0.6*		*0.6*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	147,900	139,400	174	116	290	70
Instruments	92,600	87,100	109	73	181	44
Chemistry (excl. Pharmaceuticals)	93,000	88,600	111	74	185	44
Pharmaceuticals	36,500	34,500	42	169	211	79
Process Engineering	85,200	80,600	101	67	168	40
Mechanical Engineering	129,200	122,000	153	102	254	61
Consumption and Construction	43,100	39,600	50	33	83	20
All Technical Areas	**627,500**	**591,800**	**739**	**633**	**1,372**	**358**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)

Table II.2d

Scenario 2d- Year 2013

Scenario Parameters: a= 0.125%, b=60%, c=70%, special assumptions for pharmaceuticals

			0.00125	*0.6*		*0.7*
Technical Area	**(1) EPO Granted Patents In Force in At Least One EPC State**	**(2) ... In Force in Germany***	**(3) EP Litigation Cases in Germany****	**(4) Litigation Cases in Other Countries****	**(5) Total Number of Cases****	**(6) Duplicated Cases**
Electrical Engineering	147,900	139,400	174	116	290	81
Instruments	92,600	87,100	109	73	181	51
Chemistry (excl. Pharmaceuticals)	93,000	88,600	111	74	185	52
Pharmaceuticals	36,500	34,500	42	169	211	106
Process Engineering	85,200	80,600	101	67	168	47
Mechanical Engineering	129,200	122,000	153	102	254	71
Consumption and Construction	43,100	39,600	50	33	83	23
All Technical Areas	**627,500**	**591,800**	**739**	**633**	**1,372**	**431**

Source: Own Computations based on PATSTAT 2008-04, EPASYS March 2008 and Litigation Data (see section 4)