PATENT ENFORCEMENT UNDER STRONG INTELLECTUAL PROPERTY RIGHTS: THE LIABILITY OF FOREIGNNESS IN US PATENT LITIGATION

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Abstract

We study the settlement and non-settlement outcomes of foreign and US patent holders in US patent litigation. We argue that foreign patent holders may be systematically more likely to settle, and less likely to win patent lawsuits relative to their US counterparts, for two reasons: First, US adjudicators may be xenophobic, either in reality or as perceived by foreign patent holders. Second, foreign patent holders may have to incur systematically higher litigation costs than US plaintiffs. We test these two explanations in the context of patent litigation in the US during the period 2000-2013. Controlling for a variety of observed and unobserved factors, we find that foreign patentees are +/- 6%-points more likely to settle, and +/- 55% less likely to win patent lawsuits than US patentees. We also show that the likelihood of settlement increases and the likelihood of a plaintiff win decreases with larger differences in IPR protection between the foreign plaintiff's country and the US. We argue that this is consistent with the notion that litigation costs for foreign patentees are higher.

Keywords: Patent litigation, liability of foreignness, xenophobia, patents, innovation, multinationals

INTRODUCTION

Overcoming the competitive disadvantages of foreignness is a precondition for MNEs' effective expansion strategies (Bhanji & Oxley, 2013; Johnson, Yin, & Tsai, 2009). IB scholars have argued that foreign firms and their subsidiaries are typically at a disadvantage when competing with domestic firms, due to "all (the) additional costs a firm operating in a market overseas incurs that a local firm would not incur'' (Zaheer, 1995, pp. 342–343). This "liability-of-foreignness" (LOF) stems from the structural and relational costs of institutional distance, as well as the social costs of access and acceptance in overseas markets (Bell, Filatotchev, & Rasheed, 2012). Because of these disadvantages, foreign firms and their subsidiaries should possess or develop assets, capabilities or advantages that give them a competitive edge over local firms. Alternatively, they could attempt to mimic local firms' practices as a way of adapting to the local environment, and adopting revealed best practices (Zaheer, 1995).

Most studies investigating the existence and impact of LOF study the topic in a market setting. For example, earlier research has investigated LOF in terms of foreign market entry (Zhou & Guillen, 2015), foreign market exit (Mata & Freitas, 2012), location choice (Lamin & Freitas, 2013), capital market access (Bell, Filatochev & Rasheed, 2012), stock market investment (Baik, Kang, Kim, & Lee, 2013), and the development of CSR activities (Campbell, Eden, & Miller, 2012). Yet there is substantially less research on LOF in non-market settings. This is an important omission, because oftentimes market disputes are resolved outside of the market. For instance, dumping complaints are handled by the International Trade Commission (in the US) or the WTO, and US labor disputes are taken up by Federal District Courts (Mezias, 2002a). If decision-making in these non-market institutions is biased against foreign firms, what

starts out as a LOF in the market may be exacerbated through non-market resolution mechanisms.

The current study fills this gap by studying the existence of a LOF in patent enforcement. Existing research in this area has argued and demonstrated that strengthening national systems of Intellectual Property Rights (IPR) protection is conducive to the inflow of FDI, the rate of innovation, and the extent of knowledge diffusion (Javorcik, 2004; Branstetter, Fisman, & Foley, 2006; Allred & Park, 2007; Bilir, 2014). However, patent infringement might occur even under strong IPR protection, in which case a patent can only be enforced outside the market, through the judiciary. The question that then arises, and that we aim to answer, is whether foreign firms are at a disadvantage when legally enforcing their patent(s) in foreign markets. In particular, we study patent litigation in the US, a country with one of the strongest systems of *de jure* and *de facto* IPR protection in the world (Ginarte & Park, 1997; Park, 2008). Our research question is therefore: *Is there a liability of foreignness in US patent litigation?*

We develop hypotheses regarding the existence of LOF in the context of patent litigation, both in terms of settlement decisions as well as non-settlement (i.e. trial) outcomes. In particular, we argue that foreign plaintiffs (i.e. patent holders) may be more likely to settle, and less likely to win at trial than domestic plaintiffs for two reasons: First, adjudicators in patent litigation (i.e. judges and juries) may discriminate against foreigners, either as perceived by foreign plaintiffs and/or in reality (Moore, 2003). We argue that this effect is more salient for plaintiffs from countries that are viewed as less favorable by the US. Second, foreign plaintiffs are likely to have imperfect knowledge of US patent legislation and litigation, which can only be partially mitigated by their US-based counsel. This increases their litigation costs vis-à-vis US plaintiffs, which in turn leads to a lower probability of winning *ceteris paribus*. We argue that these costs

increase with the difference in systems of IPR protection between the plaintiff's home country and the US.

We test these predictions using a novel dataset of patent litigation by foreign and US public firms in the US during the period 2000-2013. Consistent with our predictions, we find evidence of a systematic foreign firm bias in US patent litigation. First, controlling for a host of observed and unobserved factors, the likelihood of settlements is approximately 6%-points higher for foreign firms than US firms. Second, the likelihood of a plaintiff win after non-settlement is approximately 55% lower for foreign firms than US firms. Both these effects are driven by the difference in IPR protection between the US and the foreign plaintiff's home country, which we argue is related to litigation costs.

Our contributions to the literature are twofold. First, by extending the literature on LOF to a non-market setting, our results suggest that foreign firm disadvantages may extend beyond mere market forces. In some cases, this could imply that foreign firms may experience a "compounded" LOF, e.g. if foreign firms are also at a systematically higher risk of patent infringement in host countries. Second, we contribute to the literature on systems of IPR protection and FDI, by demonstrating that effective patent enforcement is not automatic even under strong IPR. The distinction between *de jure* and *de facto* IPR protection may therefore be insufficient: Even if both forms of protection are strong, there could still be a bias in enforcement (i.e. *de facto* protection), implying that domestic firms experience systematically more effective enforcement than foreign firms.

THEORY & HYPOTHESES

Liability of foreignness

The liability of foreignness – or LOF – can be defined as the disadvantage of operating in a foreign market (Hymer, 1976). Four main sources of LOF have been identified (Zaheer, 1995; Mezias, 2002b): First, due to the spatial distance between a foreign firm's home and host market, it will incur some degree of travel, transportation, and coordination costs. Second, unfamiliarity with the local environment will create costs of adaptation and learning. Third, compared to domestic firms, foreign firms may experience a lack of legitimacy, and may thus be confronted with (economic) nationalism by local stakeholders. Finally, legal restrictions by the foreign firm's home country on trade and investment may also increase the costs of doing business.

The literature on LOF has consistently shown that foreign affiliates of MNEs are at a disadvantage in their host markets (Baik, Kang, Kim, & Lee, 2013; Bell, Filatotchev, & Rasheed, 2012; Bhanji & Oxley, 2013; Campbell, Eden, & Miller, 2012; Mata & Freitas, 2012; Zaheer, 1995). Yet existing research mainly focuses on LOF in market settings. That is, the majority of studies ask if and how cost asymmetries between domestic and foreign firms have an impact on their comparative performance in a variety of market settings. However, market-based disadvantages are often resolved outside of the market. It is therefore important to know to what extent the LOF is limited to market settings, or whether it also extends to non-market interactions between foreign firms and local stakeholders.

One example of such an approach is Mezias (2002a). He considers the extent to which foreign firms in the US are more likely to be involved in labor lawsuits, due to their comparative lack of knowledge of US labor regulations. His results illustrate that they are indeed at a higher risk than US firms, but his study does not reveal a potential bias in lawsuit outcomes. Webster,

Jensen, & Palangkaraya (2014) demonstrate such a bias in non-market outcomes in the context of the European patent system. They find that foreign inventors are less likely to be granted a patent than domestic inventors at both the European Patent Office (EPO) as well as the Japanese Patent Office (JPO).

Yet even after a patent is granted, the rights it confers are not absolute, but probabilistic (Lemley & Shapiro, 2005). This is because true opposition to the validity of a patent typically only arises in case of an alleged infringement complaint.[1] In order to enforce a patent in the event of (alleged) infringement, the patentee will eventually have to rely on the judicial system. A strong system of (*de jure* and *de facto*) IPR protection will enhance this process. However, it does not guarantee that there is no bias against foreign patent holders in patent enforcement (Moore, 2003). As we will argue below, there is indeed reason to believe that a LOF exists in patent litigation.

Legal patent enforcement

Patent litigation typically proceeds in three phases (Cooter & Rubinfeld, 1989; Somaya, 2003): First, the patent holder – i.e. the plaintiff – identifies an alleged infringement of her patent(s). She will typically issue a cease-and-desist letter, demanding that the alleged infringer – i.e. the defendant – stops the infringing activities, possibly also requesting damage payments. The alleged infringer may either comply with or ignore the patentee's demands.

In the latter case, litigation proceeds to the second stage, which involves a formal filing of the infringement complaint at a court. This usually also leads to a counter-claim of patent

[1] This is only true in the US. In the European patent system, there is a period for opposition built into the patent application procedure (Harhoff & Reitzig, 2004).

invalidity by the defendant, which is then incorporated in the same lawsuit. After an official filing, a number of events may develop. The litigants can argue their positions in preliminary court hearings, the parties may engage in discovery, and the court may conduct a process of claim construction. This latter process is an important part of patent litigation: Through it, the court will establish a definite interpretation of the claims listed on the patent, which may differ significantly from the intended interpretation by the patentee (Lemley, 2005). At any point in these pre-trial motions, the plaintiff and defendant can decide to settle their dispute. This often happens (in +/- 75% of the cases in our sample), in particular after the process of claim construction, when any potential ambiguity in the interpretation of the patent claims is resolved.

If the parties do not settle, the litigation process will proceed to the third stage. This final stage involves resolution of the dispute though adjudication on the merits of the case, i.e. a ruling in favor of the plaintiff or defendant. These rulings either result from a summary judgment – a court ruling without a trial – or a trial, either before a judge or a jury.

Settlement and non-settlement outcomes

The law & economics literature on patent litigation typically identifies a number of possible drivers of the decision (not) to settle a lawsuit (Bebchuk, 1984; Lanjouw & Lerner, 1998; Somaya, 2003). As we will argue below, two of these drivers have a natural relationship with the sources of LOF discussed above. Our main interest is in comparing domestic (i.c. US) plaintiffs with foreign plaintiffs, to establish if there are systematic differences in the likelihood of settlements and plaintiff wins.

First, there could be *divergent expectations* between the plaintiff and defendant regarding the plaintiff's odds at trial. In particular, if the plaintiff has a more negative assessment of her

litigation success than the defendant, the likelihood of a settlement increases. After all, the plaintiff does not want to risk a patent invalidity ruling, whereas the defendant does not want to risk an infringement ruling.

Systematic differences between foreign and domestic patent holders' odds of winning at trial may arise, *ceteris paribus*, if there is a systematic bias in judicial decision making. That is, in the language of the LOF literature, if the relevant local stakeholders (i.e. judges and juries) demonstrate some degree of nationalism in their decision-making. Members of the judiciary typically exert great effort in avoiding such bias; indeed, the very notion of impartial decision-making is codified in the Judicial Code of Conduct (Irwin & Real, 2011). However, *unconscious* biases may still arise, and there is a growing body of empirical to suggest that they do. For example, Shayo & Zussman (2011) demonstrate that Israeli judges are more likely to rule in favor of Jewish plaintiffs than Arab plaintiffs, in particular when there was Arabic terrorist activity in the vicinity of the court. Abrams, Bertrand & Mullainathan (2012) show that there are systematic differences between US judges in terms of their incarceration rates of African American vs. Caucasian defendants. Danziger, Levav & Avnaim-Pesso (2011) find that the likelihood of a favorable parole ruling by US judges systematically decreases with the time since their last break, only to jump up again after the next break.

In the context of foreign firms in patent litigation, Moore (2003) refers to Social Identity Theory (SIT) to motivate why adjudicators – i.e. judges and juries – may be biased against foreign plaintiffs. According to SIT, people classify themselves (and others) into social groups. This gives them a sense of belonging and helps them define who they are. Moreover, through this process, they also identify with both the successes as well as the failures of the group (Ashforth & Mael, 1989). To the extent that adjudicators identify themselves more strongly with

a plaintiff of the same nationality, this could induce biased decision-making in favor of domestic plaintiffs, in particular when they oppose a foreign defendant (and conversely, against foreign plaintiffs, in particular when opposing a domestic defendant). Moore (2003) further argues that "Foreign corporations involved in US litigation routinely express concern about the susceptibility of the US jury to xenophobic bias and are quick to blame their losses on such prejudice" (p. 1498). This means that both actual and perceived odds of winning at trial are likely lower for foreign plaintiffs than for domestic plaintiffs, increasing their likelihood of settlement, and lowering their success at trial.

The second driver of settlement decisions is litigation costs. Specifically, higher litigation costs will increase a litigant's incentives to settle. Settlements, by virtue of averting a trial, take less time and effort to establish. In particular, in settlement agreements, significantly less money is spent on attorney fees (Kesan & Ball, 2006; Somaya, 2003). Following the LOF literature, we expect that foreign plaintiffs have higher litigation costs than domestic plaintiffs, due to a combination of higher coordination costs and a comparative lack of institutional knowledge.

The biggest chunk of litigation costs concerns the costs of outside legal services (Bessen & Meurer, 2014). In a recent survey, AIPLA (2013) reports median legal costs of 350,000 USD at the end of pre-trial motions and 700,000 USD at the end of trial, in cases with less than 1 mln USD in liabilities. In cases with more than 25 mln USD in liabilities, these numbers are 3 mln USD and 5 mln USD, respectively.

However, many large (multinational) firms typically do not have to rely heavily on outside legal counsel, since they have in-house counsel available. Not only does this reduce legal costs (Bower & Stagg, 1988), it may also create performance benefits, as in-house IP counsel is highly specialized in the firm's technology portfolio (Somaya, Williamso & Zhang, 2007).

Moreover, in the context of patent litigation, having in-house IP counsel does not just reduce financial costs, but also the cost of human capital reallocation. Without the presence of in-house IP counsel, the burden of dealing with external counsel during the litigation process falls heavily on company management and R&D personnel (Shane & Somaya, 2007; Bessen & Meurer, 2008). This creates high opportunity and coordination costs.

Most multinationals retain the majority of their in-house counsel in their home countries. Moreover, even if they operate a legal department abroad, it tends to be relatively small and non-specialized (Bower & Stagg, 1988; Longchamp, 2008). Taken together, this implies that foreign plaintiffs in patent litigation will likely incur higher litigation costs than domestic plaintiffs for at least three reasons. First, they have to rely more extensively on external legal counsel, increasing their monetary litigation costs. Second, external legal counsel will take more time to get acquainted with the foreign plaintiff's patents and technology, due to a lack of specialization. This will require extensive coordination with corporate R&D personnel. Third, more coordination is required between in-house counsel at home and external counsel and corporate management abroad to determine the appropriate litigation strategy.[2]

Taken together, we hypothesize that foreign plaintiffs have lower expectations about their odds at trial, as well as higher litigation costs than domestic plaintiffs. Given the impact of divergent expectations and litigation costs on settlement decision, we argue that:

[2] In addition to divergent expectations and litigation costs, two other drivers of (non-)settlement outcomes are asymmetric stakes, and asymmetric information about the value and validity of the asserted patent(s) (Bebchuk, 1984; Lanjouw & Lerner, 1998). However, it has been argued that asymmetric information will quickly be resolved during the litigation process, in particular after discovery (Somaya, 2003). Further, in the empirical analysis below we control for a host of factors to capture potential differences in litigation stakes between foreign and domestic plaintiffs.

Hypothesis 1a: Foreign plaintiffs are more likely to settle in US patent litigation than US plaintiffs

Lawsuits that do not settle will proceed to summary judgment or trial, with an adjudication in favor of the plaintiff or the defendant. In the event that domestic adjudicators actually identify more strongly with domestic plaintiffs, foreign plaintiffs are less likely to win at trial than domestic plaintiffs (Moore, 2003). Moreover, another important driver of litigation success is the effort exerted in the litigation process (Cooter & Rubinfeld, 1989). In particular, the likelihood of success at trial will increase with the level of effort, *ceteris paribus*. However, exerting effort is costly, as it involves more legal activity on behalf of the firm's legal counsel. As argued above, litigation costs will be higher for foreign plaintiffs than for domestic plaintiffs, due to the general absence of specialized in-house IP counsel in the country of litigation. It then follows that, in order to exert the same level of litigation effort, foreign firms will have to incur higher litigation costs. Taken together, this yields our second hypothesis, on the impact of LOF on non-settlement outcomes:

Hypothesis 2a: Foreign plaintiffs are less likely to win in US patent litigation than US plaintiffs

Adjudicator bias vs. litigation costs

Hypotheses 1 and 2 are both based on a combination of two arguments: First, an (expected) bias against foreign firms by adjudicators, and second, higher litigation costs for foreign firms

relative to their domestic counterparts. In what follows, we will elaborate on both mechanisms, which should allow us to disentangle them empirically.

According to SIT, group identification by people is of a relational and comparative nature (Ashforth & Mael, 1989). This means that people define themselves relative to individuals in other categories, e.g. young vs. old, rich vs. poor, or domestic vs. foreign. In the context of patent litigation, Moore (2003) frames the bias against foreign firms in terms of xenophobia, i.e. the dislike of individuals or entities from other countries. It is unlikely, however, that the extent of this dislike is equally strong towards all foreigners. A ruling in favor of a foreign plaintiff will consequently be less likely, *ceteris paribus*, if the animosity of the adjudicator(s) towards the foreign plaintiff is stronger. Moreover, anticipating such a bias, foreign plaintiffs that are looked upon as less favorable by US adjudicators will be more likely to settle. This yields our first two sub-hypotheses in relation to Hypotheses 1a and 2a:

H1b: Plaintiffs are more likely to settle in US patent litigation as perceptions of their favorability decrease

H2b: Plaintiffs are less likely to win in US patent litigation as perceptions of their favorability decrease

As we argued above, litigation costs for foreign plaintiffs will be higher because they rely more heavily on and have to coordinate more with external legal counsel than their domestic counterparts. In particular, the coordination between local legal counsel and management, R&D personnel, and in-house counsel in the foreign plaintiff's home country will add substantial costs and complexity. Yet the degree to which this will happen is not likely to be uniform across

different foreign plaintiffs. One aspect that seems particularly salient in this respect is the difference in the system of IPR protection between the home country of the foreign plaintiff, and the (host) country of patent litigation.

A nation's system of IPR protection covers a host of issues, ranging from the effectiveness of instruments of IP protection (such as patents), to the effectiveness of its enforcement, to the extent to which it acknowledges foreign IP (Ginarte & Park, 1997; Park, 2008). If the home and host country's IPR systems are very similar, local external counsel and home-country in-house counsel and management can focus their interactions on the substance of the case, without the need to elaborate on and make sense of the differences in the legal aspects of the two countries' IPR systems. However, the larger these differences are, the more time and money will be spent on dealing with them, understanding them, and translating litigation strategies from one institutional context to another. This in turn will add to the total litigation costs, increasing the likelihood of settlement and reducing the plaintiff's odds at trial. This yields our second set of sub-hypotheses:

H1c: Plaintiffs are more likely to settle in US patent litigation the larger is the difference in IPR systems

H2c: Plaintiffs are less likely to win in US patent litigation the larger is the difference in IPR systems

DATA & METHODOLOGY

Data

In order to test the hypotheses derived in the previous section, we need data on US patent litigation, the foreign and domestic corporate plaintiffs in these lawsuits, the asserted patents, measures of institutional differences in their respective IPR regimes, as well as US perceptions of foreign firms.

We collected litigation data from Lex Machina. This is a commercial provider of so-called "legal analytics", established as a spin-off the Stanford University Intellectual Property Litigation Clearinghouse. From this database, we initially obtained all patent infringement complaints filed at any of the 94 US district courts between 2000 and 2013. For all these complaints, we collected information on the names of the plaintiff (i.e. patent holders) and defendants (i.e. alleged infringers), the filing date of the complaint, the district court at which the complaint was filed, whether or not the case was settled, whether or not the case proceeded to trial and the resulting outcome if it did, the duration of the lawsuit, the patent(s) asserted in the lawsuit, as well as the number of legal documents filed in the litigation process (more on this below).

Since our main interest is in identifying the effect of foreignness on litigation outcomes, we need to identify corporate plaintiffs, as well as their nationality. We use the Compustat database to identify public US firms, and Bureau van Dijk's Osiris database to identify public foreign firms. In particular, we first standardized all the company names in Lex Machina, Compustat, and Osiris. We then performed a combination of perfect matching and fuzzy matching techniques, matching all the plaintiffs involved in the patent lawsuits to both either Compustat or Osiris. We manually checked all the cases matched through the fuzzy matching

algorithm.[3] In some cases, a plaintiff may match with both databases, either because a (US or foreign) firm is cross-listed on multiple stock markets, or because a US (foreign) firm has a listed foreign (US) subsidiary. In all these cases, we manually resolved the conflict through an online search (e.g. through Bloomberg's businessweek, company websites). Finally, using the information on ultimate ownership provided in Osiris, we further checked if any of the foreign firms have an ultimate (global) owner in the US, in which case we identified the firm to be of US origin. Our final sample includes 755 unique corporate plaintiffs, 536 (71.0%) from the US and 219 (29.0%) from abroad.[4]

Variables

The two dependent variables of interest are the occurrence of a settlement (Hypothesis 1), and the plaintiff winning the lawsuit, conditional on non-settlement (Hypothesis 2). Settlements are identified as those cases that end in a "stipulated dismissal". Out of the 960 unique cases in the dataset, 724 (75.4%) end in a settlement. Plaintiff wins are identified as those cases ending in a ruling in favor of the plaintiff, i.e. either patent validity and/or patent infringement. Out of the 236 cases that were not settled, 148 (62.7%) end in a plaintiff win, whereas the remaining 88 cases (37.3%) are defendant wins. Defendant wins include rulings of non-infringement as well as patent invalidity.[5]

[3] For fuzzy matching, we follow the methodology developed in Thoma et al. (2010) which develops the so-called J-distance index. This index computes the likelihood of an accurate match, controlling for the relative occurrence of the different parts of company names in both databases.

[4] The foreign countries represented in our sample are Australia, Belgium, Canada, China, Denmark, Finland, France, Germany, Iceland, India, Ireland, Israel, Italy, Japan, Netherlands, Norway, Singapore, South Korea, Sweden, Switzerland, Taiwan, and the United Kingdom.

[5] 56 cases had no outcome at the time of data collection, either because they were still pending or because the outcome was not recorded in Lex Machina. These were dropped from the sample. Another 103 cases had miscellaneous outcomes (e.g. procedural dismissals, contested dismissals, or stayed) which are not easily classified

For all the litigated cases in our sample, we manually identified the nationality of the defendants through online searches. Using this information, we can distinguish four types of litigation in our sample: (1) US plaintiff vs. US defendant, (2) US plaintiff vs. foreign defendant, (3) foreign plaintiff vs. US defendant, and (4) foreign plaintiff vs. foreign defendant. Table 1 presents the descriptive statistics on the likelihood of settlement and plaintiff wins in each of these four litigation types.

<< INSERT TABLE 1 ABOUT HERE >>

The differences in unconditional probabilities of settlement and plaintiff wins between US and foreign plaintiffs – presented in the bottom row of Table 1 – are consistent with the two hypotheses of this paper: The likelihood of settlement is higher for foreign plaintiffs (78%) than for US plaintiffs (74%), whereas the likelihood of a plaintiff win is lower for foreign plaintiffs (56%) than for US plaintiffs (65%). Although two sided t-tests suggest that these differences are not statistically significant, the difference in the odds of a trial win is marginally significant ($p<0.1$) using a one-sided test.

In order to measure differences in national IPR systems, we use the Ginarte and Park (1997) (G&P) index of IPR protection. This measure primarily measures the *de jure* strength of IPR protection, but it is one of the few available metrics with sufficient cross-country and over-time coverage. In particular, we compute the simple Eucledian distance between the US and each

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as settlements, plaintiff wins or defendant wins. These were also dropped from the sample. Finally, we dropped two cases with mixed outcomes, i.e. both a plaintiff win and a defendant win. This can happen because infringement complaints may eventually center around a subset of a patent's claims, so that a ruling of infringement may be applied to some claims, and a ruling of non-infringement to others.

of the countries in our sample. As the US is the country with the strongest IPR protection, an increase in this metric thus indicates a weaker extent of IPR protection relative to the US.[6] Further, to capture US perceptions of foreign plaintiffs, we use the results from a Gallup survey regarding US perceptions of foreign countries.[7] In this survey, US respondents are asked about their overall opinion of a country. The answer categories are "very favorable", "mostly favorable", "mostly unfavorable", and "very unfavorable". We use the share of respondents that answer either "very favorable" or "mostly favorable" to obtain a measure of the extent of positive perceptions that US citizens have of a foreign plaintiff's country. Moreover, we use this variable as a metric of both plaintiffs' *expectations* of positive perceptions (which matters for settlement outcomes) as well as *actual* positive perceptions (which matters for non-settlement outcomes).

Figures 1 and 2 illustrate the relevance of Hypotheses 1b/c and 2b/c at the country level.[8] Figure 1 shows the correlation between aggregate settlement rates and either the favorability rating (panel *a*), or IPR distance between the US and the plaintiff's country (panel *b*). Consistent with Hypothesis 1b, panel *a* shows a negative relationship between a plaintiff's country favorability rating and the likelihood of settlement. As can be seen by the two fitted lines, this negative relationship is not induced by the US; in fact, it becomes stronger when excluding the US. Further, in line with Hypotheses 1c, panel *b* presents a positive relationship between a

[6] We use the updated dataset that runs until 2010, available on Walter Park's website. Since the index is available for every five years, we use the value in 2000 for the years 2000-2003, the value in 2005 for the years 2004-2007, and the value in 2010 for the years 2008-2012.

[7] http://www.gallup.com/poll/1624/perceptions-foreign-countries.aspx. Data for the US are not available in recent years, so we impute the US score at the maximum (100). A drawback of the survey is that it only covers half of our sample countries. Nonetheless, lawsuits involving firms from the covered countries constitute 93% of the settled cases and 94% of the non-settled cases.

[8] To account for the fact that some countries are more strongly represented than others, the fitted lines in Figure 2 and 3 are weighted by the number of observations (i.e. lawsuits) per country.

plaintiff's country IPR distance relative to the US, and the likelihood of settlement. Again the relationship becomes stronger when excluding the US from the sample.

<< INSERT FIGURE 1 ABOUT HERE >>

Figure 2 shows similar graphs for plaintiff win probabilities. In panel *a* we see that there is a weak positive relationship between foreign plaintiff country favorability ratings and the likelihood of a foreign plaintiff win, but only if we exclude the US from the sample. This is weakly consistent with Hypothesis 2b. Panel b shows stronger evidence in favor of Hypothesis 2c, i.e. a negative relationship between the likelihood of a plaintiff win and the IPR distance of the plaintiff's country relative to the US.

<< INSERT FIGURE 2 ABOUT HERE >>

To further gauge the robustness of our results below, we also adopt two alternative measures to capture IPR distance and plaintiffs' favorability. In particular, we use two cross-country distance measures developed by Berry, Guillen, & Zhou (2010). First, we use their knowledge distance measure to capture IPR distance. This measure incorporates the difference in the number of granted patents and the number of published scientific articles between the US and the foreign countries in our sample. Compared to the G&P IPR distance measure, it thus better captures the actual (*de facto*) use of formal means of IP protection. Second, we use their cultural distance measure to capture more informal and intangible differences between the US and the foreign countries in our sample. This measure incorporates the four dimensions of Hofstede

(individualism, power distance, uncertainty avoidance, and masculinity), but they are derived from several waves of the World Values Survey (WVS). Existing research argues and finds that higher levels of cultural distance create more potential for conflict. We therefore expect higher levels of cultural distance to also induce more animosity on behalf of US adjudicators.

In addition to their value as robustness checks to our original variables, these distance measures have at least two additional benefits (Berry, Guillen, & Zhou, 2010). First, they both incorporate multiple dimensions of distance, which is achieved by adopting the Mahalanobis distance rather than the Eucledian distance. Second, the pairwise correlation between these two distance measures (0.48) is significantly lower than that between the G&P IPR measure and the favorability ratings (-0.75). We can therefore include them in our model simultaneously without having to worry about multicollinearity.[9]

In both settlement and plaintiff win models, we use a combination of case-level, patent-level, and firm-level characteristics to control for possibly confounding factors that affect either of these two outcomes. We will first discuss the variables included in both models. Following the logic in Table 1, we include a dummy variable indicating whether or not the defendant is of foreign origin. At the level of the asserted patents, we include the age of the patent, i.e. the number of years between its application date and the start of litigation. Extant research suggests that conflicts on older patents are more likely to be settled, and less likely to be won by the plaintiff (Somaya, 2003). We also include the number of claims as a metric of patent value, the number of backward citations to proxy the extent to which the patent builds on prior art, and the number of forward citations as an alternative patent value indicator (Lanjouw & Schankerman,

[9] Two drawbacks are that, first, both knowledge and administrative distance could not be compute relative to Taiwan due to missing data, and second, knowledge distance (cultural distance) data relative to the US are only available up until 2009 (2010).

2001). At the level of the firm, we include the share of fixed assets relative to total assets, since Bessen and Meurer (2008) argue that firms with high fixed capital shares are more likely to settle in order to prevent idleness of their fixed capital stocks. We also include the number of employees as a measure of firm size, as well as the R&D intensity (R&D expenditures as a share of net sales). Large and R&D intensive firms are less likely to settle, since their relative litigation costs are lower, but their opportunity costs of not winning the lawsuit are higher. For those reasons, they are also more likely to win. All the monetary firm-level variables are adjusted for inflation using 2-digit industry-level deflators obtained from the Bureau of Labor Statistics. For foreign firms, we use (average) annual real exchange rates to convert metrics denominated in local currencies to USD.

In both the settlement model and the non-settlement model, we have to include proxies of litigation costs, since Hypothesis 2 is based on a *ceteris paribus* assumption regarding these costs. In the settlement model, we include the total number of asserted patents as a control variable to capture these costs, since asserting more patents will increase the costs of litigation by increasing the length of the process of claim construction. Hence, the opportunity costs of non-settlement increase as well, making settlement more likely. Further, we include cash and short term investments as a share of total assets to capture firm-level liquidity constraints (Brown, Fazzari, & Petersen, 2009; Brown & Petersen, 2011). The lower this share, the more likely settlement will be.

In the plaintiff win model, we include two alternative proxies for litigation costs (doing so allows us to use the settlement cost variables as exclusion restrictions in a selection model – see below). The first is the number of legal documents filed in the litigation process (Kesan & Ball, 2006). Legal documents are produced in various instances during a lawsuit, and pertain to a

wide variety of events, such as magistrate orders, suggested motions, claim constructions, discovery, etc. They are considered a good proxy for billable hours of attorney time (Kesan and Ball, 2006). Moreover, longer lawsuits should be expected to be more costly in both monetary and non-monetary terms. Therefore, we also include the duration of the lawsuit (in days) as a cost control variable.

Table 2 presents means and standard deviations of these variables separately for US firms (column 1) and foreign firms (column 2), together with t-tests (column 3) to identify whether the differences are statistically significant. Of the four case-level variables (foreign defendant, number of documents, duration, and number of asserted patents), only the share of foreign defendants faced by US and foreign plaintiffs is statistically significantly different. In particular, foreign plaintiffs are much more likely to take on a foreign defendant than US plaintiffs.

<< INSERT TABLE 2 ABOUT HERE >>

In contrast, the averages of the patent-level variables (patent age, number of claims, backward citations, and forward citations) are all significantly different between US and foreign plaintiffs. In particular, foreign plaintiffs assert older patents, with fewer claims and fewer citations (in either direction) than US plaintiffs. It is important to note that extant research suggests that this should make foreign plaintiffs more likely to settle and less likely to win a lawsuit. In other words, the differences in unconditional settlement and plaintiff win probabilities between US and foreign plaintiffs shown in Table 1 may actually be induced by these patent-level differences. It will therefore be important to control for them.

Finally, of the firm-level characteristics (fixed asset share, number of employees, R&D intensity, and cash share), US and foreign plaintiffs are different on all except R&D intensity. Specifically, foreign plaintiffs have higher fixed asset shares, are larger, and have lower cash shares than US plaintiffs. The differences in fixed asset shares and cash shares should make foreign plaintiffs more likely to settle. Therefore, it will also be important to control for these variables.

<< INSERT TABLE 3 ABOUT HERE >>

Table 3 presents pairwise correlations between all the variables (note that settled cases cannot end in plaintiff wins by definition, so that a correlation coefficient cannot be computed between these two variables). Note that the fixed asset share is rather strongly correlated with all the country-level distance variables. This due to the fact that all of the distance variables are 0 for US firms, while they have a significantly lower fixed asset share than foreign firms (cf. Table 2).

Methodology

We aim to estimate the impact of foreignness on the likelihood of settlement, as well as the settlement of a plaintiff win in case of non-settlement. Given that both of these dependent variables are dummy variables, estimating a probit or logit model is preferred. However, the disadvantage of estimating these models is that perfectly predicted outcomes are dropped from the sample. In our case, this is problematic due to the inclusion of an extensive set of dummy variables to capture unobserved heterogeneity (see below). In many cases, this leads to a

substantial drop in observations. Therefore, we estimate linear probability models, which does not suffer from this problem.[10] The estimating equation is:

$$(1) \qquad Outcome_{ilp} = \beta_0 + \beta_1 Foreign\ Plaintiff_i + X_l'\gamma + Y_p'\delta + Z_i'\gamma + \varepsilon_{ilp}$$

$$s.t. \quad \varepsilon_{ipl} = \eta_i + \mu_p + \nu_l + \epsilon_{ipl}$$

where *i*, *l*, and *p*, index firm (i.e. plaintiff), lawsuit, and patent respectively. *Outcome* is either the settlement or plaintiff win, and the independent variable of interest is *Foreign Plaintiff*. *X* captures the case-level controls, *Y* the patent-level controls, and *Z* the firm-level controls. The error term in (1) is composed of unobserved heterogeneity at the firm, patent, and case level, as well as a remaining component that we assume is IID. To account for the fact that different lawsuits litigated by the same plaintiff are likely not independent, we cluster the error term at the plaintiff-level.[11] To test sub-hypotheses 1b/c and 2b/c, we replace *Foreign Plaintiff* by the country favorability rating (*Favorability*) and/or IPR distance (*IPR distance*).

The unobserved heterogeneity in the error term in (1) poses a problem, since including fixed effects at all three levels (i.e. firms, patent, and lawsuits) will absorb most of the variation, leaving nothing to be explained by either *Foreign Plaintiff*, nor any of the control variables. Instead, we include a set of dummy variables that should go some way towards addressing the

[10] Also, as argued by Angrist & Pischke (2009), using linear models to explain binary variables should not pose any fundamental problems. Nonetheless, the results reported below are robust to applying probit estimation of all models (available upon request). Given this consistency, as well as the fact that the linear probability models often use substantially more observations, we use the linear probability models as the baseline estimation.

[11] Different asserted patents litigated in the same lawsuit are also not independent, suggesting that we should also cluster the standard errors at the level of the lawsuit. However, since all lawsuits only involve on plaintiff, clustering standard errors at the level of the plaintiff automatically takes care of this potential dependence structure in the data.

most important pieces of unobserved heterogeneity at each level, while still leaving sufficient variation in the dependent variable.

First, to proxy firm-level heterogeneity η, we include a set of 2-digit industry dummies. These dummies will capture systematic differences in settlement and plaintiff wins between industries. Second, to capture patent-level heterogeneity μ, we also include a set of 2-digit technology class dummies as listed on each of the asserted patents. Third, to capture case-level heterogeneity v, we include a set of district court dummies. The literature on patent litigation has found some evidence for so-called "forum shopping", i.e. that fact that plaintiffs will choose to file their lawsuits at district courts that they feel will be most favorable to their complaint (Somaya & McDaniel, 2012). Also, due to substantial differences in case-loads, the duration of cases can vary significantly between courts, possibly influencing settlement decisions. For these reasons, cases filed at different district courts may show systematic differences in the likelihood of settlement and plaintiff wins, which will be captured by these dummies.

Considering the theoretical discussion above, the model for plaintiff wins potentially suffers from a selection bias, since cases can only proceed to adjudication on the merits when they are not settled. That is, a plaintiff or defendant win is conditional on non-settlement. As is well known, if there are unobserved factors that affect both settlement decisions and plaintiff wins, the error terms in both models will be correlated, leading to biased coefficient estimates in the plaintiff win model (Heckman, 1979). In that case, rather than estimating these models separately, they should be estimated simultaneously in a selection model that accounts for the interdependencies. However, we find no evidence of a selection bias. That is, running various specifications of the estimating equations applying a Heckman selection model, we cannot reject

the hypothesis that the error terms in the settlement and plaintiff win models are not correlated. Therefore, below we will present estimates of both models estimated separately.[12]

RESULTS

Settlement

Table 4 presents the baseline estimates of the settlement model. The first column only uses the foreign plaintiff dummy, whereas the subsequent columns add different sets of control variables in a stepwise fashion. All models include full sets of the industry, technology class, and district court dummies discussed above.

The first row in Table 4 presents the main result: Regardless of the specification, the foreign plaintiff dummy has a positive and statistically significant effect on the likelihood of settlement, consistent with Hypothesis 1a. As we add control variables, the estimated coefficient generally becomes somewhat smaller, which is consistent with the facts described above, i.e. that foreign plaintiff characteristics and their asserted patents make settlement more likely. In the fully specified model presented in column (4), the conditional settlement probability is 6.9%-points higher for foreign plaintiffs than for US plaintiffs. This is substantially higher than the unconditional difference of 4.0%-points presented in Table 1.

<< INSERT TABLE 4 ABOUT HERE >>

[12] Note that this does not necessarily imply that selection bias does not exist, only that there are no *unobserved* factors that induce this bias. Results from various specifications of the selection model are available upon request.

To the extent that the control variables are statistically significant, they carry the expected signs. The total number of asserted patents in a lawsuit increases the likelihood of settlement, consistent with the notion that asserting more patents increases the opportunity costs of non-settlement. Similarly, disputes on older patents are also more likely to be settled, but disputes on more valuable patents – as proxied by the number of forward citations – are less likely to be settled. Finally, more R&D intensive plaintiffs are also less likely to settle. This could be because the opportunity costs of settlement increase with R&D intensity, or because these firms feel they are better positioned to win a lawsuit at trial. The model performs reasonably well with an adjusted R-squared of approximately 0.28 in column (4).

Table 5 explores these settlement results further. In order to test Hypothesis 1b, instead of using the foreign plaintiff dummy, we incorporate our measure of favorable plaintiff country perceptions in column (1). The estimated coefficient is negative and statistically significant, as expected. Column (2) incorporates the difference in (G&P) IPR protection between the plaintiff's home country and the US, to test Hypothesis 1c. Here we also observe the expected and statistically significant positive effect. Finally, column (3) incorporates both variables in the model. In this case, favorability is no longer statistically significant, whereas IPR distance is (at $p<0.1$). However, the pairwise correlation between the two metrics is rather high between these two variables (0.72), implying that multicollinearity could be an issue.

<< INSERT TABLE 5 ABOUT HERE >>

To test the robustness of these results, and to deal with the problem of multicollinearity, columns (4)-(6) in Table 5 repeat these analyses, now using Cultural Distance instead of Favorability

(their pairwise correlation is -0.81), and Knowledge Distance instead of IPR distance (their pairwise correlation is 0.74). Cultural distance has the expected positive effect in column (4), but it is not statistically significant. On the contrary, knowledge distance in column (5) is statistically significant and positive. Combining them in column (6) confirms this pattern.

The average IPR distance between the US and the foreign countries in the sample underlying Table 5 is 0.40. Hence, the estimated coefficient on IPR distance in column (3) (0.108) implies that the difference in average (conditional) settlement probabilities between US and foreign firms is 4.3%-points. The average knowledge distance between the US and the foreign countries in the sample is 13.3. The estimated coefficient on knowledge distance in column (6) (0.005) thus implies that the difference in average (conditional) settlement probabilities is 6.7%-points. These numbers are close to the estimated impact in Table 4, which implies that IPR/knowledge distance goes a long way toward explaining the systematic differences in conditional settlement probabilities.[13]

Litigation success

Table 6 presents the results of the litigation success model. In this case, the plaintiff win dummy is the dependent variable. The first row in the table presents the main result: Regardless of the specification, foreign plaintiffs are statistically significantly less likely to win at trial than US

[13] There are two remaining concerns regarding the results in Table 5. First, as demonstrated in Table 3, the correlations between the country-level distance variables and company-level fixed asset shares are rather high. This could induce multicollinearity. We therefore ran all the models in Table 5 excluding fixed asset shares from the model. All the results carry over. Second, given that the US has a 0 score on all the country-level distance measures, together with the fact that the majority of firms in our sample are from the US, we worry that the identification in the distance measures is driven by the US vs. all foreign countries, rather than the additional variation in distance levels among foreign countries. To investigate this concern, we also ran the models in Table 5 while only including foreign plaintiffs. All the results carry over in this case as well, although now the positive impact of cultural distance in column (6) also turns positive and significant. However, in this case, there is a high degree of correlation with knowledge distance (-0.70), again causing problems of multicollinearity. Results are available upon request.

plaintiffs. The coefficient estimate in column (5) suggests that foreign plaintiffs are 35.0%-points less likely to win at trial than US plaintiffs. This is approximately four times the difference in the unconditional success probabilities presented in Table 1. Stated differently, controlling for the various sources of observed and unobserved heterogeneity, foreign plaintiffs are approximately 55% less likely to win at trial than US plaintiffs (whose unconditional win probability is 65%).

<< INSERT TABLE 6 ABOUT HERE >>

Virtually none of the control variables are statistically significant, except for two of the firm-level controls in column (5). Large plaintiffs are more likely to win than small plaintiffs ($p<0.1$), but R&D intensity affects the likelihood of winning negatively ($p<0.1$). Despite the poor performance of the control variables, the model still performs well with an R-squared of 0.55 in column (5). The reason for this is that many of the dummy variables significantly predict variation in litigation success.

Table 7 extends the plaintiff win model along the same lines at the settlement model in Table 5. Column (1) shows a statistically significant and positive effect of Favorability on a plaintiff's likelihood of winning, consistent with Hypothesis 2b. Column (2) includes the IPR distance measure. We find a negative and statistically significant effect (at $p<0.1$), consistent with Hypothesis 2c. Column (3) adds both the favorability and IPR distance measure to the model. They both still carry the expected signs, but in this case neither of them is statistically significant. As before, the most likely explanation for this is that in this sample too, the correlation between the two measures is very high (0.82), causing multicollinearity. As a result, none of the two variables are statistically significant anymore.

<< INSERT TABLE 7 ABOUT HERE >>

As before, columns (4)-(6) use the cultural and knowledge distance variables to get around the multicollinearity issue. In this case, we observe no statistically significant impact of cultural distance (column 4), but a negative and significant impact of knowledge distance in both columns (5) and (6).

In this sample, the average IPR distance between the US and the foreign countries is 0.23. Hence, the estimated coefficient on IPR distance in column (3) (-0.869) implies that the difference in average (conditional) win probabilities between US and foreign plaintiffs is 20.0%-points. The average knowledge distance between the US and the foreign countries in the sample is 11.3. The estimated coefficient on knowledge distance in column (6) (-0.015) thus implies that the difference in average (conditional) win probabilities is 17.0%-points. These numbers are substantially lower than those implied by the coefficient estimate of column (5) in Table 6. This implies that in addition to IPR/knowledge distance, other (unmeasured) factors drive the difference in US-foreign plaintiff win probabilities.[14]

DISCUSSION & CONCLUSION

In this study, we find broad support for a liability of foreignness (LOF) in US patent ligation. Foreign patent holders are systematically more likely to settle, and this effect is stronger with

[14] As before, we also ran all the models in Table 7 while excluding fixed asset shares. All the results carry over, and they are available upon request. Unfortunately, running the models for foreign plaintiffs only leaves an insufficient number of observations to reliably estimate the model.

bigger differences in IPR regimes. Further, we also find evidence that foreign plaintiffs are substantially less likely to win in case of non-settlement. This effect also appears to be driven by differences in IPR protection, although the estimates suggest that other (unmeasured) factors are also at play.

These results have important implications for our understanding of LOF. First, our study shows that a LOF may arise in non-market contexts. This is an important result, as it suggests that resolving a market-based LOF through non-market mechanisms may result in a "compounded" disadvantage for foreign firms.

Our research further contributes to the IPR literature. Our results show that, even in the context of very strong and supposedly unbiased IPR systems, a LOF may still exist. This suggests that the traditional distinction between *de jure* and *de facto* protection of (intellectual) property rights may not be sufficient. Even if both *de jure* and *de facto* protection are strong, decision-making biases in enforcement can make *de facto* protection systematically more effective for domestic firms than foreign firms.

For the broader research in IB, our results hint at a topic that has so far been underexplored, i.e. the potential risks of investing in high quality institutional environments. We find evidence that such risks are particularly salient for investors from weak institutional environments. Business practices may be very different under weak institutions, inducing costs of learning to operate under strong institutions. Given the increased importance of emerging country multinationals' activities in developed host countries (Awate, Larsen, & Mudambi, 2015), this issue is likely to become more salient as well.

Our results also have important implications for multinational managers. They underline that even in a system of strong (*de jure* and *de facto*) IPR protection such as in the US, patent

protection is not a corollary of patent attainment. In the legal enforcement of such rights, a liability of foreignness appears to exist, at least for some foreign patent holders. However, the upshot of our results is that an important driver of this bias is the difference in IPR protection between the two countries. This implies that foreign plaintiffs may be in a position to (partly) overcome it. In particular, following our theoretical discussion above, one specific solution may be to expand in-house legal departments overseas, and recruit specialized local IP attorneys with extensive litigation experience. Also, in order to reduce coordination costs between foreign and domestic legal counsel and management, such overseas legal departments should be granted sufficient autonomy to develop litigation strategies.

In terms of avenues for future research, one stands out in particular in the context of our findings. To our knowledge, no study so far has investigated whether foreign patentees are at a higher risk of patent infringement than domestic patentees. If this is the case, this would imply that foreign patent holders may indeed suffer a "compounded LOF": Their patents are more likely to be infringed abroad, yet they are less able to successfully enforce them subsequently through the host-country judiciary. Future research that investigates this issue would therefore be very welcome.

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Table 1: Frequencies, settlement and plaintiff wins per case type

	US plaintiff	**Foreign plaintiff**	
US defendant	495 (N) 0.73 (Settle) 0.65 (Win)	164 0.80 0.58	849 0.75 0.63
Foreign defendant	182 0.78 0.68	119 0.75 0.53	301 0.77 0.61
	677 0.74 0.65	283 0.78 0.56	960 0.75 0.63

Table 2: Descriptive statistics

	US firms	Foreign firms	T-test
Foreign defendant[a]	0.27	0.42	-4.46***
	(0.444)	(0.495)	
(Log) documents[a]	3.85	3.94	-0.946
	(1.42)	(1.46)	
(Log) duration[a]	6.26	6.18	0.944
	(1.12)	(1.17)	
(Log) # patents[a]	0.732	0.747	-0.281
	(0.713)	(0.779)	
(Log) patent age[b]	2.12	2.19	-3.25**
	(0.552)	(0.534)	
(Log) # claims[b]	2.94	2.74	5.67***
	(0.799)	(0.859)	
(Log) backward citations[b]	2.66	2.54	2.51**
	(1.07)	(1.05)	
(Log) forward citations[b]	2.77	2.28	8.68***
	(1.38)	(1.24)	
Fixed asset share[c]	0.004	0.278	-21.8***
	(0.036)	(0.184)	
(Log) employment[c]	7.13	8.36	-6.73***
	(2.16)	(2.33)	
R&D share[c]	0.982	0.111	1.36
	(14.9)	(0.239)	
Cash share[c]	0.295	0.211	5.32***
	(0.241)	(0.177)	

Notes: *** p<0.01; ** p<0.05; * p<0.01. Standard deviation within parentheses. (a) Comparisons at the case level; (b) comparisons at the patent level; (c) comparisons at the firm level.

Table 3: Pairwise correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Settlement																		
2. Plaintiff win																		
3. Foreign plaintiff	0.06	-0.14																
4. Foreign defendant	0.07	-0.02	0.09															
5. G&P IPR distance	0.10	-0.15	0.72	0.09														
6. Favorability	-0.07	0.07	-0.88	-0.09	-0.74													
7. Know. distance	0.06	-0.16	0.80	0.02	0.74	-0.73												
8. Cult. distance	0.03	0.00	0.89	0.07	0.69	-0.81	0.48											
9. (Log) # docs	-0.16	-0.29	0.10	0.00	0.09	-0.13	0.09	0.07										
10. (Log) case length	-0.28	-0.28	0.05	-0.03	0.00	-0.09	0.13	0.10	0.65									
11. (Log) # patents	0.23	0.03	0.07	0.09	0.04	-0.05	0.04	0.09	0.13	-0.03								
12. (Log) patent age	0.05	-0.02	0.06	-0.04	0.02	-0.04	-0.04	0.06	-0.06	-0.16	0.02							
13. (Log) # claims	-0.04	0.06	-0.13	-0.08	-0.09	0.12	-0.07	-0.12	0.04	0.02	-0.01	-0.10						
14. (Log) back cits	0.00	-0.05	-0.06	-0.06	-0.05	0.07	-0.03	-0.07	0.07	0.02	0.08	-0.28	0.22					
15. (Log) forw cits	-0.1	0.03	-0.17	-0.05	-0.13	0.12	-0.12	-0.08	-0.02	0.11	-0.02	0.31	0.14	-0.1				
16. Fixed asset share	0.03	-0.02	0.75	0.13	0.53	-0.69	0.59	0.73	0.05	0.03	0.08	0.07	-0.14	-0.08	-0.16			
17. (Log) empl.	0.00	-0.16	0.30	0.07	0.12	-0.30	0.17	0.37	0.01	0.02	0.10	0.09	-0.14	-0.16	-0.04	0.30		
18. R&D share	-0.04	0.04	-0.03	-0.03	-0.02	0.02	-0.02	-0.02	0.01	0.02	-0.03	-0.01	0.06	-0.04	0.01	-0.03	-0.08	
19. Cash share	0.00	0.03	-0.23	-0.07	-0.09	0.20	-0.18	-0.26	0.06	-0.01	0.01	-0.02	0.12	0.04	0.06	-0.31	-0.54	0.08

Table 4: Baseline settlement model

	(1)	(2)	(3)	(4)
Foreign plaintiff	0.081**	0.076**	0.053**	0.069**
	(0.033)	(0.033)	(0.026)	(0.033)
Foreign defendant		0.043	0.044*	0.039
		(0.030)	(0.026)	(0.029)
(Log) # patents			0.073***	0.088***
			(0.014)	(0.016)
(Log) patent age			0.082***	0.080***
			(0.020)	(0.023)
(Log) # claims			0.008	-0.000
			(0.011)	(0.013)
(Log) backward citations			0.000	-0.008
			(0.009)	(0.011)
(Log) forward citations			-0.049***	-0.047***
			(0.008)	(0.009)
Fixed asset share				-0.060
				(0.094)
(Log) employment				-0.009
				(0.007)
R&D share				-0.001***
				(0.000)
Cash stock share				-0.025
				(0.076)
Constant	-0.592***	-0.634***	-0.632***	-0.552**
	(0.220)	(0.225)	(0.208)	(0.217)
Industry dummies	Yes	Yes	Yes	Yes
Technology dummies	Yes	Yes	Yes	Yes
District court dummies	Yes	Yes	Yes	Yes
Observations	2,699	2,699	2,699	2,699
R-squared	0.226	0.228	0.274	0.276

Notes: The dependent variable in all models is settlement (1) or not (0). All models are estimated using OLS. Standard errors clustered at the level of the firm (i.e. plaintiff) are reported within parentheses. * p<0.1; ** p<0.05; *** p<0.01.

Table 5: Extended settlement model

	(1)	(2)	(3)	(4)	(5)	(6)
Favorability	-0.004***		-0.002			
	(0.001)		(0.002)			
IPR distance		0.156***	0.108*			
		(0.039)	(0.063)			
Cult. distance				0.002		0.001
				(0.002)		(0.002)
Knowl. Distance					0.005**	0.005**
					(0.002)	(0.002)
Foreign defendant	0.056*	0.052*	0.053*	0.028	0.029	0.030
	(0.030)	(0.030)	(0.030)	(0.031)	(0.031)	(0.031)
(Log) # patents	0.083***	0.083***	0.083***	0.085***	0.085***	0.086***
	(0.017)	(0.017)	(0.017)	(0.019)	(0.019)	(0.019)
(Log) patent age	0.083***	0.082***	0.082***	0.091***	0.096***	0.096***
	(0.024)	(0.025)	(0.024)	(0.025)	(0.024)	(0.024)
(Log) # claims	0.001	0.002	0.002	-0.003	-0.003	-0.003
	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)
(Log) backward cits	-0.006	-0.005	-0.006	-0.007	-0.007	-0.007
	(0.011)	(0.011)	(0.011)	(0.012)	(0.012)	(0.012)
(Log) forward cits	-0.049***	-0.048***	-0.049***	-0.054***	-0.055***	-0.055***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)
Fixed asset share	-0.143	-0.098	-0.151	0.026	-0.044	-0.093
	(0.097)	(0.100)	(0.096)	(0.119)	(0.109)	(0.109)
(Log) employment	-0.006	-0.002	-0.004	-0.004	-0.004	-0.005
	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)	(0.009)
R&D share	-0.001***	-0.001***	-0.001***	-0.001***	-0.001**	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash stock share	-0.031	-0.024	-0.029	0.011	0.012	0.009
	(0.079)	(0.079)	(0.079)	(0.082)	(0.082)	(0.082)
Constant	0.260	-0.129	0.067	-0.641***	-0.721***	-0.713***
	(0.179)	(0.140)	(0.244)	(0.207)	(0.225)	(0.226)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Tech dummies	Yes	Yes	Yes	Yes	Yes	Yes
Court dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,512	2,512	2,512	2,307	2,307	2,307
R-squared	0.280	0.281	0.282	0.320	0.323	0.323

Notes: The dependent variable in all models is settlement (1) or not (0). All models are estimated using OLS. Standard errors clustered at the level of the firm (i.e. plaintiff) are reported within parentheses. * p<0.1; ** p<0.05; *** p<0.01.

Table 6: Baseline litigation success model

	(1)	(2)	(3)	(4)	(5)
Foreign plaintiff	-0.305***	-0.309***	-0.299***	-0.283***	-0.350**
	(0.086)	(0.087)	(0.089)	(0.092)	(0.173)
Foreign defendant		0.035	0.033	0.028	0.006
		(0.079)	(0.082)	(0.082)	(0.083)
(Log) # of documents			-0.045	-0.030	-0.050
			(0.035)	(0.037)	(0.038)
(Log) duration			-0.050	-0.073	-0.034
			(0.057)	(0.062)	(0.062)
(Log) patent age				-0.043	-0.034
				(0.073)	(0.073)
(Log) # claims				-0.019	-0.026
				(0.033)	(0.033)
(Log) backward cits				-0.018	-0.025
				(0.031)	(0.032)
(Log) forward cits				0.029	0.020
				(0.026)	(0.025)
Fixed asset share					0.095
					(0.096)
(Log) employment					0.704*
					(0.424)
R&D share					-0.032*
					(0.017)
Constant					0.001
					(0.001)
Foreign plaintiff	0.443	0.428	1.949**	2.188***	1.995**
	(0.339)	(0.344)	(0.816)	(0.835)	(0.843)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Technology dummies	Yes	Yes	Yes	Yes	Yes
District court dummies	Yes	Yes	Yes	Yes	Yes
Observations	491	491	491	491	491
R-squared	0.511	0.511	0.532	0.536	0.553

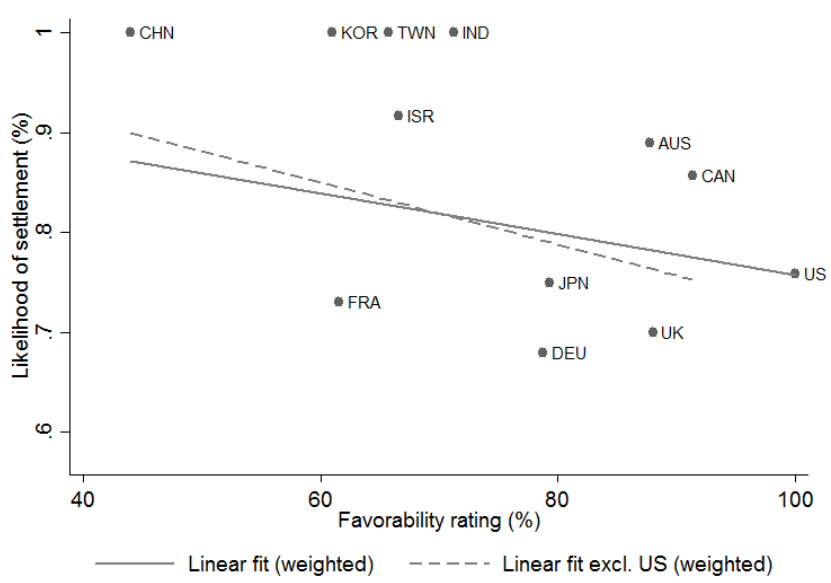
Notes: The dependent variable in all models is plaintiff win (1) or defendant win (0). All models are estimated using OLS. Standard errors clustered at the level of the firm (i.e. plaintiff) are reported within parentheses. * p<0.1; ** p<0.05; *** p<0.01.

Table 7: Extended litigation success model

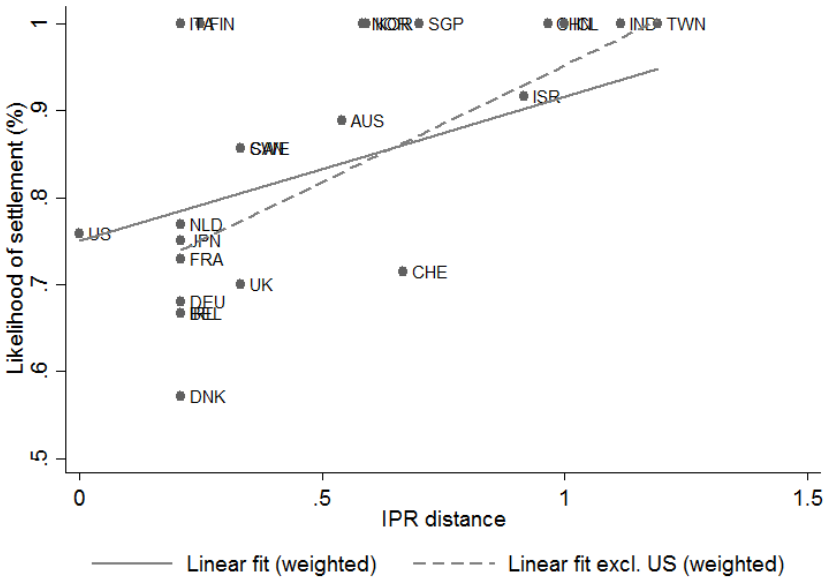
	(1)	(2)	(3)	(4)	(5)	(6)
Favorability	0.012**		0.009			
	(0.005)		(0.006)			
IPR distance		-0.869*	-0.523			
		(0.481)	(0.547)			
Cult. distance				-0.006		-0.002
				(0.007)		(0.007)
Knowl. Distance					-0.016**	-0.015**
					(0.007)	(0.007)
Foreign defendant	0.107	0.092	0.100	0.082	0.101	0.100
	(0.094)	(0.092)	(0.093)	(0.097)	(0.097)	(0.096)
(Log) # of documents	-0.030	-0.022	-0.028	-0.016	-0.015	-0.017
	(0.041)	(0.041)	(0.041)	(0.051)	(0.050)	(0.050)
(Log) duration	-0.032	-0.045	-0.036	-0.049	-0.057	-0.052
	(0.068)	(0.066)	(0.068)	(0.077)	(0.074)	(0.076)
(Log) patent age	-0.027	-0.026	-0.026	0.033	0.031	0.028
	(0.089)	(0.091)	(0.090)	(0.095)	(0.093)	(0.093)
(Log) # claims	-0.032	-0.032	-0.032	-0.025	-0.026	-0.025
	(0.035)	(0.034)	(0.035)	(0.035)	(0.035)	(0.035)
(Log) backward cits	-0.001	-0.003	-0.004	0.019	0.022	0.020
	(0.037)	(0.037)	(0.037)	(0.033)	(0.033)	(0.033)
(Log) forward cits	0.035	0.035	0.033	0.011	0.011	0.010
	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)	(0.032)
Fixed asset share	0.566	0.414	0.672*	0.383	0.527	0.616
	(0.360)	(0.367)	(0.368)	(0.429)	(0.347)	(0.389)
(Log) employment	-0.043**	-0.045**	-0.043**	-0.052**	-0.048**	-0.049**
	(0.019)	(0.019)	(0.019)	(0.020)	(0.020)	(0.020)
R&D share	0.001	0.001	0.001	0.001**	0.001**	0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	1.364	2.676***	1.720	2.106***	2.343***	2.319***
	(1.006)	(0.707)	(1.073)	(0.705)	(0.691)	(0.694)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Tech dummies	Yes	Yes	Yes	Yes	Yes	Yes
Court dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	412	412	412	391	391	391
R-squared	0.568	0.567	0.571	0.600	0.606	0.606

Notes: The dependent variable in all models is plaintiff win (1) or defendant win (0). All models are estimated using OLS. Standard errors clustered at the level of the firm (i.e. plaintiff) are reported within parentheses. * p<0.1; ** p<0.05; *** p<0.01

Figure 1: Settlements vs. favorability ratings and IPR distance

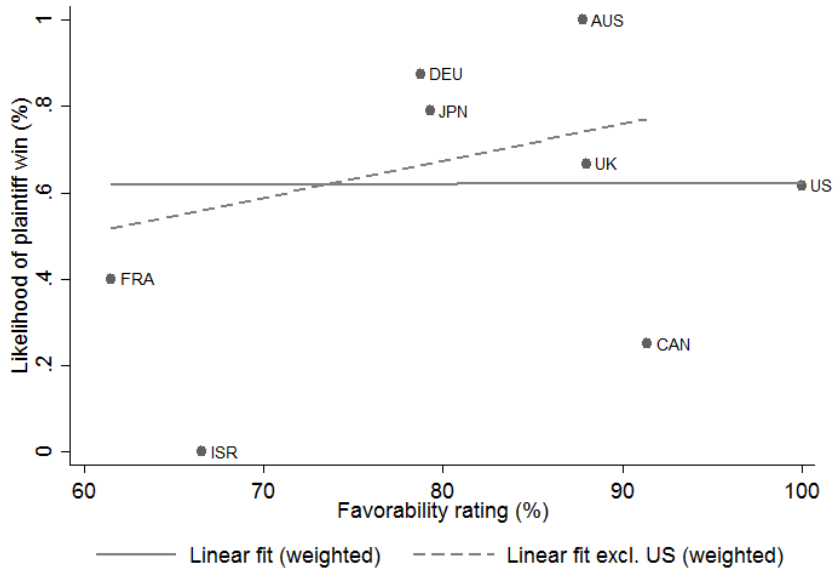


(a) Settlements and favorability ratings

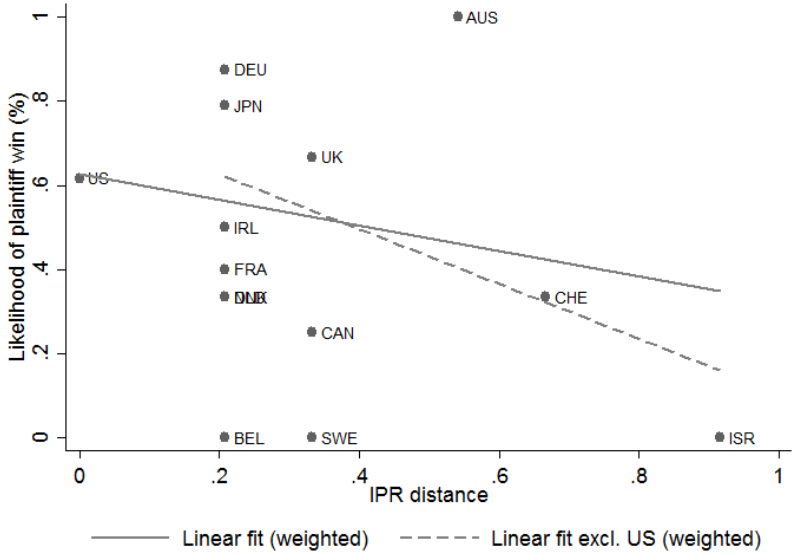


(b) Settlements and IPR distance

Figure 2: Plaintiff wins vs. favorability ratings and IPR distance



(a) Plaintiff wins and favorability ratings



(b) Plaintiff wins and IPR distance