The Economics of Injunctive and Reverse Settlements

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This paper extends the economic literature on settlement and draws some practical insights on reverse payment settlements. The key contributions follow from the distinction drawn between standard settlements, in which the status quo is preserved, and injunctive settlements, w and under which reverse settlements will be observed among injunctive settlements. Reverse settlements are likely when the stakes associated with the injunction are large relative to damages and litigation costs. The analysis has broader implications for efficient remedies and legal rules. (*JEL* K10, K40, K41, D24, O34)

1. Introduction

This paper presents an economic analysis of injunctive settlements—settlements that implement the terms of an injunction sought by the plaintiff. The best-known examples are observed in disputes over the infringement of property rights, such as nuisance litigation or patent infringement litigation.

In the patent infringement context, a great deal of controversy today surrounds "reverse settlements." The reverse settlement involves a

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plaintiff (for example, a pharmaceutical company with a patent on a drug) paying the defendant (for example, a manufacturer of a generic drug) to settle the case. The reverse settlement typically includes an agreement to implement the terms of the injunction sought by the plaintiff (for example, that the defendant will restrict sales of the allegedly infringing generic drug). Reverse settlements are controversial because they involve settlement payments going in the reverse direction of that observed in routine litigation.

This paper aims to extend the economic literature on settlement and to draw some practical insights on reverse settlements. The key contributions to the economic literature on settlements follow from the distinction drawn below between standard settlements, in which the status quo is preserved, and injunctive settlements, which prohibit or constrain the defendant's activity. In many instances, both types of settlement are available to the parties. Consideration of both types greatly expands the zone of mutually agreeable settlement arrangements beyond that in traditional economic analysis of settlements (Landes–Posner–Gould framework). The analysis identifies the conditions under which injunctive settlements (rather than standard settlements) are likely to be observed and the conditions under which reverse settlements will be observed among the injunctive settlements. Reverse settlements are likely when the stakes associated with the injunction are large relative to damages and litigation costs.

The model challenges some of the established stories about the economics of settlement. The majority of cases settle in this framework not because the parties have the same beliefs regarding trial outcome, in addition to similar stakes, but because when the full range of potential settlement agreements is taken into account litigation is not a rational outcome in most cases. And when the parties have the same beliefs regarding trial outcome, settlement will occur no matter how divergent the stakes.

The analysis here applies to all types of litigation. One result is that the reverse settlement is part of a family of remedial dispositions that includes the compensated injunction of Calabresi and Douglas Melamed (1972). The injunctive settlements studied here could also describe settlements in which the parties agree to operate under alternative legal rules. Such settlements could minimize the scope of inefficient legal rules and lead

to the adoption of private norms in place of the law (Ellickson, 1991). Widespread adoption of private norms could explain a tendency toward efficient common law (Rubin, 1977).

2. Model

In this part, we examine the incentives driving parties to litigate and to settle when the lawsuit seeks both damages and an injunction (injunctive litigation). The standard economic analysis of litigation examines the lawsuit for damages (standard litigation). We will refer to the settlement of injunctive litigation as an *injunctive settlement* and to the settlement of standard litigation as a *standard settlement*.

Injunctive and reverse settlements can be observed in any area of litigation in which plaintiffs seek to enjoin some activity of the defendant. One common example appears in nuisance cases, where the plaintiff may sue for damages and to enjoin the defendant's nuisance-generating activity. A settlement could involve the defendant agreeing to discontinue his activity. Another example is patent infringement litigation. Since the economic analysis of litigation is familiar, we will refer to these examples as illustrations throughout this analysis.

The litigation process is one in which the plaintiff files a complaint, which is then either settled or prosecuted to a final judgment. The final judgment enjoins the defendant's activity.

Let P_p be the plaintiff's perception of the probability of winning its complaint, J_p the payoff to the plaintiff, and C_p the cost to the plaintiff. Complaints are filed when the net reward from litigation is positive, $P_pJ_p - C_p > 0$, a basic assumption in the economics of litigation (Shavell, 1982a). The plaintiff's perception of the probability of winning is determined by his prediction that the court will find that the defendant has violated the law. In the nuisance setting, that determination will be based on a balancing test that examines several economic factors (Hylton, 2008). In the patent infringement setting, the plaintiff's perception will be determined by his prediction that the court will find that infringement has occurred, which is both a function of the patent's validity and the nature of the defendant's conduct.

The plaintiff's judgment is made up of two components, the gain the plaintiff gets from the injunction, G_p, and the damage award D. A plaintiff will file a claim when the expected net gain from litigation is positive,

$$P_p(G_p + D) - C_p > 0. \tag{1}$$

A suit may be filed even though the anticipated damage award is zero, provided that the plaintiff values the injunction (or the precedent effect) highly enough. Conversely, a lawsuit may be filed even though the injunction, or precedent effect, is harmful to the plaintiff, provided the anticipated damage award is large enough to offset the harm. For example, a plaintiff might sue to shut down a nuisance-generating enterprise even though its shuttering actually harms the plaintiff (say, because he loses his job). Of course, the plaintiff could avoid the loss by not seeking the injunction. But the plaintiff may prefer to seek the injunction because of its effect on the settlement value of the case.

2.1. Continued Prosecution of Complaints

The defendant has to worry about the total cost of the lawsuit, which consists of the cost of an adverse finding and the cost of the process. Let P_d represent the defendant's prediction of the likelihood of a finding a violation, C_d the litigation cost borne by the defendant, and J_d the defendant's assessment of the cost of the judgment. The judgment consists of the loss to the defendant from the injunction and the damage award against him: $J_d = L_d + D$. The total cost of the lawsuit to the defendant is therefore

$$P_d(L_d + D) + C_d. \tag{2}$$

The total cost of litigation to the defendant may be substantial even if the anticipated damage award is negligible. In the context of patent infringement litigation, the cost of the judgment to the defendant consists of the loss that results from being forced to cede the market plus the amount the defendant will be required to pay as compensation to the plaintiff.

If the expected net gain to the plaintiff from the lawsuit (1) is less than the defendant's total cost of litigation (2), the parties will settle. Thus, settlement occurs when

$$P_pG_p - P_dL_d + (P_p - P_d)D < C_p + C_d, \tag{3}$$

which is the familiar settlement condition of the Landes–Posner–Gould model modified to take asymmetric stakes into account.[1] Litigation is essentially a bet with process costs. The left hand side of Equation (3) is the *ex ante* joint expected value of the lawsuit (the bet). The bet is maintained until the payoff event only if the joint value exceeds the process costs.

The joint value of the bet consists of two components: the injunction and the transfer of a fixed sum of money. Think of the injunction as a token transferred from the defendant to the plaintiff. The expected value of the token to the plaintiff is equal to his estimate of the probability of victory multiplied by the value of the token to him. The joint value of the token transfer game is positive only if the plaintiff's expected value exceeds the defendant's.

This analysis suggests that the economics of injunctive litigation are similar to the standard litigation analysis (Landes–Posner–Gould). In the standard litigation scenario, consistent beliefs (P_p=P_d) implies that all cases settle, unless the parties have asymmetric stakes.

However, the Landes–Posner–Gould framework is incomplete in this setting. In spite of the similarity between injunctive and standard litigation, there are substantial differences between the two. The prospects for settlement in the injunctive context are not explained entirely by the Landes–Posner–Gould model because the standard approach does not incorporate the incentives for a settlement in which the defendant agrees

1. This assumes that the probability of an injunction is the same as the probability of an award of damages. That may not be valid in all cases. For example, in nuisance litigation, courts are quicker to provide damages than they are to provide issue an injunction. If the probabilities of a damage award and an injunction differ, the settlement condition changes to $P'_pG_p - P'_dLd + (P_p - P_d)D < C_p + C_d$, where P'_p and P'_d represent the perceptions with respect to an injunction and P_p and P_d represent the perceptions with respect to damages. To keep the model simple, we will stick with the assumption that the probability of damages is the same as the probability of an injunction. The results are easily changed for the case in which the probabilities differ.

to forgo his preferred option (thus, forfeiting L_d) in order for the plaintiff to obtain his preferred outcome (obtaining G_p). We consider these types of settlement below.

2.2. Economics of Injunctive Settlements

The economics of settlement in injunctive litigation are not fully explained by the traditional Landes–Posner–Gould model because it ignores settlements that implement the injunction sought by the plaintiff. For example, in the patent infringement context, a settlement implementing the terms of the injunction sought by the plaintiff involves the defendant exiting the market to let the plaintiff firm sell at the monopoly price.

2.2.1. Settlement incentives: standard versus injunctive settlements. Recall that the plaintiff sues both to enjoin the defendant's conduct and to obtain a damage judgment from the defendant.[2] We will examine the standard settlement in which the defendant pays the plaintiff money in order to drop his lawsuit and the injunctive settlement that implements the terms of the injunction sought by the plaintiff.

Standard settlements. The standard settlement is achieved by the transfer of money from the defendant to the plaintiff in exchange for the plaintiff dropping his lawsuit. A standard settlement will be reached under the Landes–Posner–Gould condition in Equation (3). Since the settlement payment must exceed the expected net reward to the plaintiff from suing and since the expected net reward must be positive for the plaintiff to have a credible claim of suing, the standard settlement will involve a (positive) payment from the defendant to the plaintiff.

Injunctive settlements. In the injunctive settlement, the defendant agrees to accept the terms of the injunction sought by the plaintiff. The settlement results in a cost to the defendant that is equal to the sum of the settlement transfer and the defendant's loss from the injunction. Settlement is desirable to the defendant if the total cost of the settlement to the defendant is less than the total cost of the lawsuit:

$$S + L_d < P_d(L_d + D) + C_d \tag{4}$$

2. One case that we have not examined here is that in which the plaintiff brings a standard lawsuit for damages, and the parties reach an injunctive settlement. This is an easy case to examine and at the same time probably unlikely to occur. The additional complications and expanded space may not be a worthwhile effort.

Settlement is desirable to the plaintiff if the sum of the transfer and the gain from the injunction exceed his net payoff from the lawsuit:

$$S + G_p > P_p(G_p + D) - C_p. \tag{5}$$

It follows that the injunctive settlement will be observed if

$$(1-P_d)L_d - (1-P_p)G_p + (P_p - P_d)D < C_p + C_d. \tag{6}$$

Injunctive litigation remains equivalent to a bet with process costs, involving the transfer of a token and fixed sum of money. However, the joint valuation of the token (the injunction) changes in comparison to the standard settlement scenario. The reason is that the injunctive settlement involves a voluntary transfer of the token from defendant to plaintiff. Given this, the only thing that can happen of relevance in litigation is for the plaintiff to lose, leaving the token in the defendant's hands. The joint value of litigation is enhanced by this prospect only if the defendant's expected gain from having the token awarded to him exceeds the plaintiff's expected loss.

The individual settlement incentive conditions (4) and (5) imply that the injunctive settlement, unlike the standard settlement, may require a negative settlement payment—that is, from plaintiff to defendant. This is the case of a reverse settlement.

Example 1: Suppose the gain to the plaintiff (G_p) is \$500 and the loss to the defendant (L_d) is \$200. The cost of litigation is \$10 for the plaintiff and \$20 for the defendant. The plaintiff and the defendant both believe that the probability of plaintiff victory is 75%. The damage award is \$10. In order to accept a settlement, the defendant has to consider whether the cost of settlement, S + \$200, is less than the cost of litigation, (75%)(\$10) + (75%)(\$200) + \$20 = \$177.50. Since an injunctive settlement will cost the defendant at least \$200, he will prefer litigation unless the plaintiff pays him at least \$22.50 in settlement. Now consider the plaintiff. In order to prefer the injunctive settlement to litigation, the plaintiff considers whether the gain from the settlement, S + \$500, is greater than the expected payoff from litigation, (75%)(\$500) + (75%)(\$10) − \$10 = \$372.50. Since the injunctive settlement guarantees the plaintiff \$127.50 more than does litigation, the plaintiff is willing to pay as much as \$127.50 for the settlement. A settlement will be observed involving a reverse payment between \$22.50 and \$127.50 from the plaintiff to the

defendant. The key to the reverse settlement here is that the injunction is so costly to the defendant, relative to litigation, that he will not agree to it unless he receives a payment. At the same time, the injunction with certainty is so valuable to the plaintiff, relative to litigation, that he is willing to pay for it.

An injunctive settlement can be achieved by the plaintiff sharing his gain with the defendant, rather than through the transfer of the settlement payment. Such a settlement would be desirable to the plaintiff if the share of the gain from the injunction that the plaintiff retains exceeds his net payoff from the lawsuit—that is, if $(1-\alpha)G_p > P_p(G_p+D)-C_p$, where $(1-\alpha)$ is the share retained by the plaintiff. The settlement would be desirable to the defendant if his net loss in settlement is less than the total cost of the lawsuit to the defendant—that is, if $L_d - \alpha G_p < P_d(L_d+D) + C_d$.

Example 2: Return to the numerical assumption of Example 1, with α being the share of the plaintiff's gain offered to the defendant in settlement. The defendant has to consider whether $\$200-\alpha(\$500)<(75\%)(\$10) + (75\%)(\$200) + \$20$, or $-\alpha(500) < -22.5$. The plaintiff considers whether $(1-\alpha)(\$500) > \$372.5$. If the plaintiff offers the defendant a share of the gain between .045 and .255, they will settle.

Since the reverse settlement is particularly controversial, it is worthwhile to examine the conditions under which it will be observed. Using Equations (4) and (5), the reverse settlement will be observed when $L_d > P_d(D + L_d) + C_d$ and $G_p > P_p(D + G_p) - C_p$ or, equivalently, when $(1-P_d)L_d > P_dD + C_d$ and $(1-P_p)G_p > P_pD - C_p$. In less formal terms:

Observation 1. A reverse (injunctive) settlement will be observed when the plaintiff's gain from the injunction exceeds his expected net payoff from the lawsuit and the defendant's loss from the injunction exceeds the expected total cost of the lawsuit to the defendant.[3]

The reverse settlement is determined by the parties' predictions of the likelihood of plaintiff victory and the size of the stakes (i.e., the plaintiff's gain and the defendant's loss from the injunction). Reverse settlements are

3. If the probabilities of a damage award and of an injunction differ (see note 1 *supra*), then the conditions for a reverse settlement change to $(1-P'_p)G_p > P_pD - C_p$ and $(1-P'_d)L_d > P_dD + C_d$.

more likely when the parties think the plaintiff's likelihood of victory is low and when the stakes are high (relative to damages and litigation costs).

The intuition behind the reverse settlement is simple. Assume the defendant's loss from an injunction is large relative to the damages and litigation cost. An injunctive settlement requires the defendant to bear the loss from the injunction with certainty, while litigation involves only a risk of such a loss. Under these conditions, the defendant will often demand to be paid in order to accept the injunctive settlement. If he is not paid, he will prefer to take the gamble of litigation. Similarly, as the defendant becomes more optimistic (i.e., believes the plaintiff is more likely to lose), he will demand a payment in order to settle.

Reverse settlements may signal a weak claim on the part of the plaintiff. However, they may be observed even when the plaintiff has a strong claim if the stakes associated with the injunction are high. Alternatively, a reverse settlement may be observed, even though the plaintiff believes he has a strong case, when the defendant is optimistic about his likelihood of victory (so must be paid to settle) and the plaintiff's gain from the injunction is large.[4]

2.2.2. Comparing Injunctive and Standard Settlements. An injunctive settlement may be possible under conditions in which a standard settlement may not be possible and conversely. Consideration of the two types of settlement enhances the set of potential settlement agreements.

Intuition would suggest that that the injunction should be awarded to the plaintiff when the plaintiff's gain from the injunction is greater than the defendant's loss. This is equivalent to awarding a property right to the party who values it the most. It follows that a wealth-maximizing voluntary agreement would reach the same result. That intuition is borne

4. The defendant optimism explanation is emphasized in Schildkraut (2004). One example that may serve as an illustration of a case where the defendant is optimistic and the plaintiff's gain from the injunction is large is the trademark dispute between Microsoft and Lindows (Holman, 2007, 501). Microsoft sued Lindows for trademark infringement, alleging that the Lindows was confusingly similar to the Windows trademark. A pretrial ruling permitted the jury to be instructed to consider whether "windows" was a generic term before Microsoft introduced its operating system software (Holman, at 502). Rather than risk losing its trademark, Microsoft settled by making a reverse payment of $20 million to Lindows in exchange for Lindows agreeing to change its name (to Linspire) (Holman, at 502).

out in this model. In particular, *the injunctive settlement is more likely to occur than the standard settlement if the gain to the plaintiff from the injunction is greater than the loss to the defendant.* This is easily demonstrated: using Equations (3) and (6), an injunctive settlement is more likely than the standard settlement if

$$(1-P_d)L_d-(1-P_p)G_p < P_pG_p-P_dL_d, \tag{7}$$

which holds only when $L_d < G_p$.

Settlement incentives for injunctive litigation are greater than in the standard analysis in which the only issue is whether money will be transferred from the defendant to the plaintiff. Figure 1 shows the settlement incentive for different combinations of the plaintiff's gain from the injunction and the defendant's loss from the injunction.

Figure 1 examines the case in which the plaintiff's estimate of the probability of plaintiff victory exceeds the defendant's estimate of that probability and the dispute would settle if it were only about monetary damages.[5] The line ***SS*** shows the boundary on standard settlements. Standard settlements will occur in the shaded space above ***SS***. Injunctive settlements will occur in the shaded space below ***IS***. Both types of settlement will be observed for loss–gain combinations in the intersection of the two shaded areas. Litigation to judgment will occur in the white pie-shaped region of the diagram.

Incorporation of injunctive settlements in the analysis of litigation drastically reduces the set of outcomes in which litigation to judgment occurs. In the standard settlement model, litigation to judgment would be observed for all of the gain–loss combinations below ***SS***. With injunctive settlements taken into account, litigation occurs for only a fraction of those combinations.

Consider the broader implications. The standard analysis of settlement has led to the general view that the vast majority of cases settle because

5. Specifically, Figure 1 assumes $P_p > P_d$ and $(P_p - P_d)D < C_p + C_d$. There are two other parameter configurations to examine: (1) $P_p > P_d$ and $(P_p - P_d)D > C_p + C_d$; and (2) $P_p < P_d$ and $(P_p - P_d)D < C_p + C_d$. The "litigation cone" is larger in these two alternative diagrams. In the first, the slopes of ***SS*** and ***IS*** are the same, but their intersection occurs in the third quadrant. In the second configuration, the ***SS*** and ***IS*** curves switch places (in comparison to Figure 2), and the litigation cone covers the small positive and the negative values of L_d and G_p. The parameter configuration $P_p < P_d$ and $(P_p - P_d)D > C_p + C_d$ is infeasible.

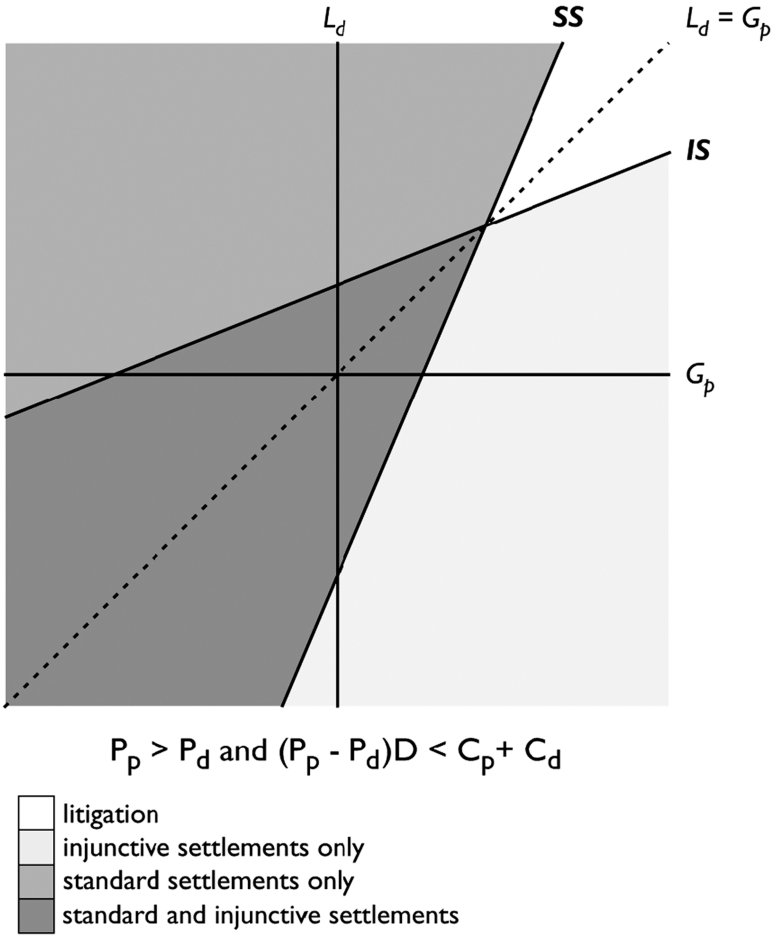

Figure 1. Diagram of Litigation and Settlement Areas for $Pp > Pd$ and $(Pp - Pd)D < Cp + Cd$.

trial outcome beliefs are similar and litigation stakes are similar.[6] But incorporating injunctive settlements upends that story. In this analysis, if trial outcome beliefs and stakes are randomly assigned, settlements should still greatly outnumber the disputes going to litigation. The

6. There is some controversy concerning the measurement of settlements. Eisenberg and Lanvers (2008) report lower settlement rates than the common 90% estimate and considerable variation in settlement rates across areas of litigation. The model of this paper provides an approach to explaining variation in settlement rates across areas of litigation.

observation that most cases settle does not necessarily imply symmetric stakes or similar trial outcome beliefs in this analysis.

2.2.3. Consistent beliefs. As we noted earlier, it has been argued that most legal disputes settle because the plaintiff and the defendant come to similar predictions of the likelihood of a plaintiff victory in the dispute. For this reason, we think it is important to examine the incentives for the different types of settlement in the case of consistent beliefs.

Given consistent beliefs ($P_p = P_d = P$), the standard settlement condition is $P(G_p - L_d) < C_p + C_d$, so that a standard settlement occurs when

$$L_d > G_p - (C_p + C_d)/P. \tag{8}$$

An injunctive settlement will occur when

$$L_d < G_p + (C_p + C_d)/(1-P). \tag{9}$$

These individual settlement conditions imply that some type of settlement is always feasible under. The general message is as follows.

Proposition 1. Under consistent beliefs, litigation to judgment will not occur. All disputes will settle, whether stakes are asymmetric or not.

This is not an implication of the Landes–Posner–Gould analysis. In addition, this ignores strategic interactions and transaction costs, either of which could generate litigation under the conditions in which this model predicts that litigation will not occur.

Before considering the detailed implications of Proposition 1, consider its implications for the literature on settlement and litigation. One view advanced in the literature is that when beliefs are consistent, litigation will not occur unless the parties have asymmetric stakes.[7] Deviations from the Priest and Klein (1984) theorem's 50% win rate prediction are often explained on this basis.[8] The argument runs as follows: when the trial outcome is least uncertain (not close to 50%), the parties' beliefs

7. This view is obviously supported by the Landes–Posner–Gould condition (3). If beliefs are consistent, the settlement condition simplifies to: $P(G_p -- L_d) < C_p + C_d$, and clearly asymmetry in stakes is necessary for litigation to occur.

8. For an empirical application of the asymmetric stakes theory, see Siegelman and Waldfogel (1999). An alternative to the asymmetric stakes theory is the asymmetric information theory explored in Hylton (2006).

will tend to be consistent most often, so litigation will not occur unless stakes are asymmetric. To elaborate, let trial outcome beliefs be generated according to $P_d = P + \varepsilon_d$, $P_p = P + \varepsilon_p$, where ε_d and ε_p have mean zero (Hylton, 2006).[9] Substituting into Equation (3), settlement occurs when $P(G_p - L_d) + \varepsilon_p G_p - \varepsilon_d L_d + (\varepsilon_p - \varepsilon_d)D < C_p + C_d$. Under the Priest–Klein analysis, when the trial outcome is least uncertain (i.e., P is not close to 50%), the error variances will be small. Thus, a significant deviation from the 50% win rate prediction would be due to the stakes asymmetry, where specifically $G_p > L_d$.

However, the analysis here shows that even if stakes are asymmetric, all disputes will settle when the parties have consistent beliefs. This implies that when the full panoply of settlement agreements are taken into account, deviations from the 50% prediction cannot be explained by the existence of asymmetric stakes.[10] To elaborate, if beliefs are generated according to $P_d = P + \varepsilon_d$, $P_p = P + \varepsilon_p$, then when injunctive settlements are taken into account, there are two conditions governing settlement: $P(G_p - L_d) + \varepsilon_p G_p - \varepsilon_d L_d + (\varepsilon_p - \varepsilon_d)D < C_p + C_d$, and $(1-P)(L_d - G_p) + \varepsilon_p G_p - \varepsilon_d L_d + (\varepsilon_p - \varepsilon_d)D < C_p + C_d$. Stakes asymmetry no longer provides an explanation, consistent with the Priest–Klein conjecture, for litigation that results in an average win rate that is different from 50%.

Figure 2 shows the distribution of settlement outcomes under consistent beliefs. Again, standard settlements occur in the region above ***SS***. Injunctive settlements occur in the region below ***IS***. Above ***IS***, only standard settlements will occur. Below ***SS***, only injunctive settlements occur. In the space between ***IS*** and the 45 degree line, both types of settlement can occur though standard settlements are more likely than injunctive settlements. The converse holds for the space between ***SS*** and the 45 degree line. It follows that for the consistent beliefs case:

Observation 2. As the probability of plaintiff victory approaches one, the likelihood of an injunctive settlement increases relative to that of a standard settlement. Conversely, as the probability of victory approaches zero,

9. Given this formulation, the error terms will have to come from a distribution truncated between one and negative one.

10. Rather than asymmetry in stakes, the explanation for litigation would have to be based on incomplete ownership or fragmentation of stakes, which is essentially a transaction cost theory. For further discussion, see the nuisance hypothetical in Example 3 of the text.

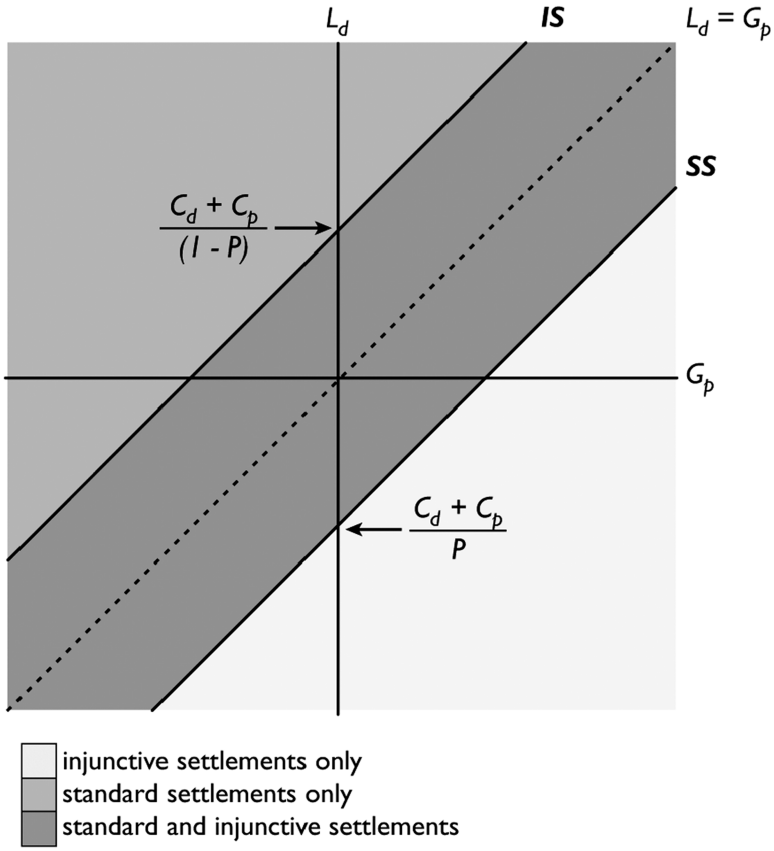

Figure 2. Diagram of Litigation and Settlement Areas for Consistent Beliefs Case.

the likelihood of a standard settlement increases relative to that of an injunctive settlement.[11]

Suppose the plaintiff's probability of winning at trial approaches one. Even if the plaintiff's gain is less than the defendant's loss, the injunctive settlement may be attractive because it avoids the cost of litigation. The defendant is almost surely going to lose anyway, and the court will impose the injunction. It follows then that as the plaintiff's probability of victory approaches one, the injunctive settlement becomes increasingly attractive

11. In Figure 3, as P approaches one, ***IS*** shifts upward, expanding the range of conditions in which the injunctive settlement is feasible. Similarly, as P approaches zero, ***SS*** shifts downward, expanding the range of conditions in which the standard settlement is feasible.

because it avoids litigation costs. A similar litigation-cost-avoidance argument applies to the case in which the plaintiff's probability of victory approaches zero.

3. Applications Of Model

The preceding analysis focused on the incentives for injunctive settlements and contrasting those incentives with the analysis of standard settlements. Allowing for injunctive settlements expands the range of potential settlement agreements and explains the observation of reverse settlements. Here, we discuss applications of the model.

3.1. Nuisance Example: Compensated Injunctions

The general results on injunctive settlements have implications for several areas of litigation. Consider, for example, a nuisance lawsuit. Suppose the defendant is a smoke-belching factory and the plaintiff is a class consisting of homeowners downwind from the factory. A standard settlement would involve a payment from the factory to the homeowners, permitting the factory to continue emitting pollution. This was the solution adopted as a remedy by the court in *Boomer v. Atlantic Cement Co*.[12] An injunctive settlement would involve the factory abating the pollution, perhaps by shutting down. In a reverse injunctive settlement, the homeowners would pay the factory to shut down. This is the remedial combination first suggested in Calabresi and Douglas Melamed (1972) and later observed as a court order in *Spur Industries v. Del E. Webb Development Co*.[13]

The results of the previous section imply that the injunctive settlement is more likely to be observed than the standard settlement when the gain to the homeowners from the injunction exceeds the loss to the factory. Thus, if the value of the homeowners' property exceeds the value of the factory by a substantial amount, the injunctive settlement is likely to be observed. The reverse settlement (voluntary compensated injunction) is likely to be observed, based on the analysis of the preceding section (Example 1 and Observation 1), when the stakes are high relative to the damages suffered by the homeowners.

12. 257 N.E.2d 879 (N.Y. 1970).
13. 108 Ariz. 178, 494 P.2d 700 (1972).

Example 3: Suppose the value of the homeowners' property declines from \$10 million to \$1 million because of pollution from the defendant's factory. An injunction would cause the property value to rise back up to the initial value of \$10 million. The gain from the injunction would therefore be \$9 million. Suppose also that the homeowners have suffered some adverse health effects amounting to \$1 million in damages. Assume consistent beliefs with $P = 0.6$ and that the cost of litigation for the plaintiffs is \$100,000. On the factory's side, assume the value of the factory is \$5 million and that the factory's cost of litigation is \$400,000. Given these assumptions, the homeowners' payoff from litigation is (0.6)(\$1 million) + (0.6)(\$9 million) − \$100,000 = \$5.9 million. The homeowners' gain from the injunction would be \$9 million. Hence, the homeowners would be willing to pay up to \$3.1 million for the injunctive settlement. For the defendant factory, the expected cost from litigation is (0.6)(\$1 million + \$5 million) + \$400,000 = \$4 million. An injunction imposed with certainty will cost the factory \$5 million, so it will demand a payment of \$1 million to accept the proposed injunction rather than continue to litigate. A reverse settlement payment between \$1 million and \$3.1 million will be observed. This is consistent with the model of this paper because the stakes are large relative to the damages and the litigation costs. The injunctive settlement effectively transfers the property right over local air quality to the party that places the greatest value on it.

One interesting difference between the nuisance example and other instances of litigation is that transaction costs could present an especially formidable obstacle to the reverse settlement in the nuisance setting. Suppose, in Example 3, that there are 1000 homeowners affected by the factory. An injunctive settlement secured through a reverse payment would require each homeowner to pay a minimum average of \$1000. Some homeowners might hold out on payment, hoping that others would pick up the difference. This is the familiar problem observed in the financing of public goods. Since the opposing parties have consistent beliefs in this example, *fragmentation of stakes*, not asymmetry in stakes, is the factor that could drive them into litigation.

The previous example assumes that the injunction in a nuisance dispute would be issued with the same probability that the court would find the existence of a nuisance. One lesson of *Boomer* is that this is not

necessarily so. When the losses to surrounding property owners are small relative to the cost of shuttering the factory, a damage payment to the surrounding property owners may be ordered by the court instead of an injunction.

If the probability of an injunction differs from that of a finding of a violation of the law, or if the finding of a violation leads to compensation rather than an injunction, the incentives governing the injunctive settlement change. Suppose the probability of an injunction being issued is less than the probability of the court finding that a nuisance exists. Then the defendant, aware that his factory is less likely to be shut down, will be more likely to demand a payment (or a larger payment) in order to agree to an injunctive settlement. The plaintiff, aware that he is less likely to get the gain from an injunction through litigation, will be more likely to pay for an injunctive settlement. To illustrate, suppose in Example 3 that the likelihood of a finding of a nuisance is 0.6 and the likelihood of an injunction being issued is 0.4, then the homeowners' payoff from litigation would be (0.6)($1 million) + (0.4)($9 million) − $100,000 = $4 million, which implies that homeowners would be willing to spend up to $5 million for the injunctive settlement. For the factory, the expected cost from litigation would be (0.6)($1 million) + (0.4)($5 million) + $400,000 = $3 million, which implies that the factory would need to receive $2 million in order to shut down voluntarily.

If the court provides compensation to the plaintiff rather than an injunction, the implications for a reverse injunctive settlement change significantly. When compensation based on the economic loss of the plaintiffs will be required, the conditions for a reverse settlement become $G_p > P_p(D + \beta G_p) - C_p$ for the plaintiff and $L_d > P_d(D + \beta G_p) + C_d$ for the defendant, where β is the percentage of the plaintiffs' economic value loss compensated. When the defendant evaluates the cost of litigation, he now considers the compensation payment based on the plaintiffs' value loss rather than the cost of the injunction to him. When the economic value loss is large relative to the factory value, the factory owner may prefer the injunctive settlement to litigation and may be willing to provide a payment to plaintiffs to avoid litigation. If, on the other hand, the factory value is large relative to the plaintiffs' economic value loss (or the compensation ratio is small), then this becomes similar to the case where the probability of the injunction is less than the probability of a

nuisance finding. As the compensation ratio declines, the factory owner demands a larger payment and the homeowners are more willing to pay it. To illustrate, return to the assumptions of Example 3 and let the compensation ratio (β) be 80%. The plaintiff homeowners' payoff from litigation would be (0.6)($1 million) + (0.6)(0.8)($9 million) − $100,000 = $4.82 million, which implies that homeowners would be willing to spend up to $4.18 million for the injunction. For the factory, the cost from litigation would be (0.6)($1 million) + (0.6)(0.8)($9 million) + $400,000 = $5.32 million. This implies that the factory will demand a payment to shut down only if the factory's value exceeds $5.32 million. If the factory's value is less than $5.32 million, it will prefer the injunctive settlement (shutting down) rather than continuing to litigate in the face of the risk of a large damage payment based on the plaintiffs' loss.

The structure of the nuisance problem considered here applies to many disputes. Consider the "fencing out" versus "fencing in" problem (Ellickson, 1991). Two neighbors own adjacent parcels. One owns cattle that roam about and damage the property of his neighbor. If the victim of the damage sues the cattle owner, he may seek an injunction that would effectively force the cattle owner to fence in his animals. Instead of seeking a settlement for money that preserves the status quo, the plaintiff could ask for an injunctive settlement. If the victim's property value is large relative to the value the cattle owner places on the animals' freedom to roam about, a reverse settlement may be observed.

3.2. Patent Infringement

The settlement model of this paper can be modified to take into account the considerations in patent infringement litigation. Patent infringement litigation can be distinguished from nuisance litigation in several ways. Most importantly, it is believed that there is a dynamic efficiency cost associated with patent infringement. If patents are infringed easily with no punishment to infringers, innovators will have weak incentives to invent new products and processes.

We will assume that there is a potential dynamic incentive cost resulting from the rejection of the plaintiff's infringement claim. Let the social cost of the dynamic incentive effect be Ψ. The portion of the social cost borne by the plaintiff will be represented by $\gamma\Psi$.

In the infringement setting, the gain to the plaintiff G_p represents the value to the plaintiff of the defendant's decision to discontinue the allegedly infringing activity. The loss to the defendant L_d represents the profits forgone by the defendant's decision to discontinue the activity.

The injunctive settlement will be desirable to the infringement plaintiff if

$$S + G_p > P_p(G_p + D) - C_p - (1 - P_p)\gamma\Psi \tag{10}$$

where the last term reflects the plaintiff's perception of the dynamic incentive cost of losing his patent monopoly. The condition determining whether the injunctive settlement is desirable to the defendant is the same as in the basic model:

$$S + L_d < P_d(L_d + D) + C_d. \tag{11}$$

An injunctive settlement will observed when

$$(1 - P_d)L_d - (1 - P_p)G_p + (P_p - P_d)D - (1 - P_p)\gamma\Psi < C_p + C_d \tag{12}$$

The likelihood of an injunctive settlement is greater than in the previous analysis because the plaintiff is willing to pay more in order to avoid the dynamic efficiency cost.

The dynamic efficiency concern is expressed in connection with infringement of intellectual property rights in general—with respect to patents, copyrights, trademarks, and trade secrets. The framework set out here applies to injunctive settlements in all of these areas. The economic analysis of the incentives for injunctive settlements, and for reverse settlements, does not differ substantially from what we have discussed earlier.

However, one important distinguishing characteristic of infringement litigation is the divergence between private and social incentives to settle (Shavell, 1982b). An injunctive settlement denies consumers the surplus that would be generated by the market entry of the alleged infringer (Shapiro, 2003). This is an element of social welfare that is not taken into account in the conditions governing the private incentives for settlement, shown in Equations (10) and (11). As a result, the private incentive for an injunctive settlement may be greater (or less) than the social incentive. Indeed, if W is the additional consumer welfare generated by the entry of the alleged infringer and P is treated as the

objective probability of infringement, an injunctive settlement will be socially desirable if and only if

$$(1-P)(W+L_d) < C_p + C_d + (1-P)\Psi \tag{13}$$

This means that the social gain from litigation, which is the value of the additional surplus and the gain to the defendant infringer, is less than the sum of the litigation costs and the expected social cost of permitting infringement.

Example 4: Suppose the value of the plaintiff's patent on an invention declines from \$100 million to \$20 million because of the defendant's infringement. An injunction would cause the value of the patent to increase to \$80 million, the discount from 100 reflecting the shorter remaining time on the patent grant. The gain to the plaintiff patentee from the injunction would therefore be \$60 million. Suppose also that the patentee has lost market share as a result of the infringement, resulting in \$10 million in damages. Beliefs are consistent with $P = 0.6$. The cost of litigation for the plaintiff patentee is \$1 million. On the defendant's side, assume the value of the infringing business \$30 million and that the cost of litigation for the alleged infringer is \$4 million. Given these assumptions, the patentee's expected award from litigation is (0.6)(\$10 million) + (0.6)(\$60 million) = \$42 million. However, if the patentee loses the litigation, his future incentives to invent, in connection with the existing patent or for new products, will be diminished as will be those of similar firms. Suppose the cost of that diminishment in incentives is \$10 million and the portion borne by the patentee alone is \$5 million, the expected cost to the patentee will therefore be (0.4)(\$5 million) = \$2 million. Given all of this, the patentee's expected payoff from litigation is \$42 million − \$2 million − \$1 million = \$39 million. The patentee's gain from the injunction would be \$60 million. Hence, the patentee would be willing to pay up to \$21 million for the injunctive settlement. For the defendant firm, the expected cost from litigation is (0.6)(\$10 million + \$30 million) + \$4 million = \$28 million. An injunction with certainty will cost the alleged infringer \$30 million, so it will demand a payment of \$2 million to accept the proposed injunction rather than continue to litigate. A reverse settlement payment between \$2 million and \$21 million will be observed. The settlement, however, will not be

socially desirable. Suppose the loss in consumer welfare from the exclusion of the alleged infringer is only $1 million. The social benefit from continued litigation would be equal to (0.4)($30 million + $1 million) = $12.4 million. The social cost of this patent litigation would be $1 million + $4 million + (0.4)($10 million) = $9 million. Society would be better off if the parties were *not* permitted to settle the dispute.

The problems illustrated here, and especially the divergence between private and social incentives to settle, are observed more generally in all types of competition-blocking litigation. Intellectual property infringement cases all fall within this category and so do administrative proceedings associated with efforts to block competition, such as antidumping proceedings (Cho, 2009).

3.3. Waivers

In addition to the settlement option, an injunctive settlement could be incorporated into negotiations over a predispute waiver agreement. In other words, before any event occurs that might lead to a lawsuit, the potential plaintiff could approach the potential defendant and negotiate an agreement in which he promises never to sue in exchange for the potential defendant's agreement to forgo the activity that might generate a lawsuit from the potential plaintiff. For example, a patentee could approach a firm that might potentially infringe on its patent and enter into an agreement in which the patentee promises not to sue for infringement and the firm agrees to forgo any future activity that the patentee alleges is an infringement. This type of *injunctive waiver* would be an alternative to the *standard waiver*, which involves just an agreement by the potential plaintiff to forgo his right to sue.

In the standard litigation framework, private and social incentives to sue diverge because of the costliness of litigation (Shavell, 1982b). In a low transaction cost setting, the standard waiver provides a Coasean solution to the inefficient litigation that arises because of this divergence (Hylton, 2000). Whenever the deterrence benefits from litigation are less than the expected litigation costs, standard waivers will be exchanged between potential plaintiffs and potential defendants. However, the standard waiver merely eliminates the risk of inefficient litigation. The waiving party still bears the losses caused by the potential defendant's activity. The injunctive waiver can increase social welfare by relieving the

waiving party of those losses when the waiving party attaches a greater value to the injunction than does the potential defendant.

3.4. Some General Implications

The model here has implications for the generation of efficient norms. Where the stakes attached to legal rules are high relative to the damages in litigation, the parties may adopt settlement agreements that reverse the law. Agreements of the sort examined in Ellickson (1991), sometimes reversing the law, are likely to be observed. Indeed, the parties may adopt litigation waiver agreements that reverse the law as between themselves.

Rubin (1977) focused on litigation as a primary force pushing the law toward efficient rules. Where the stakes are high, parties will challenge inefficient legal rules in court more often than efficient rules. This paper's model suggests that settlement and waiver agreements will have the same effect. Rather than challenge inefficient rules until they are overturned in court, this model shows that parties will sometimes have incentives to enter into settlement agreements that reverse the legal rule as between them. This suggests a stronger push toward common law efficiency than implied in Rubin's analysis.

4. Conclusions

This paper extends the economic analysis of settlements and draws some practical implications for injunctive and reverse settlements. It identifies the conditions under which injunctive settlements are likely to be observed and the conditions under which reverse settlements will be observed among the injunctive settlements. The design space for settlements is considerably broader than in the traditional analysis; settlements are more likely to occur than acknowledged in the standard model. Settlements may effectively reverse the law as between the litigants. Asymmetric stakes are not sufficient to stop settlements from occurring.

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