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Pay-for-Delay, Licensing and Litigation[3]

"It is like a poker game: we have been dealt a mediocre hand – no aces, a couple of queens and some small uneven cards. But we have a large pile of $$$ at our side. We call it – the art of playing a loosing hand slowly."[4]

Introduction

The underlying idea of the patent system is to encourage innovation by granting the inventor a legal monopoly for a limited period. After the patent expires, competition drives prices down to the benefit of consumers. For instance, in the pharmaceutical industry, once the branded drug company loses its main chemical patent, generic producers of bio-equivalent medicines are free to enter the market, leading to lower drug prices. Or at least this is how the patent system should work.

The reality is often different. The incumbent, the branded drug company, has a strong incentive to block entry and extend the monopoly period. A common practice is to apply for a new patent, which is related to the original one, but instead of protecting the main chemical compound, for example, it protects the manufacturing process. Although such secondary patents are typically weak and can be successfully challenged in court, they act as a cover leaf for settlement deals, which potential challengers are willing to sign to avoid costly litigation.[5]

Settlements involving weak patents have spurred a great deal of controversy. Around the world large pharmaceutical companies have signed so-called "pay-for-delay" settlements, where the generic

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[3] This article is based on our game-theoretic paper "Pay-for-Delay with Settlement Externalities", which won the AdC Competition Policy Award in 2018.
[4] Lundbeck's business development document. See paragraph 131 of the European Commission's decision 19.6.2013, C (2013) 3803.
[5] Farrell, Joseph and Shapiro, Carl, "How Strong Are Weak Patents?", American Economic Review 98, 4 (2008), pp. 1347-69.

producer agrees to stay out of the market, in exchange for financial compensation from the incumbent.

In the US, pay-for-delay agreements are often considered a consequence of the so-called Hatch-Waxman Act (the Drug Price Competition and Patent Term Restoration Act of 1984), which intends to promote generic entry by granting the first challenger exclusivity among the generic drugs. Hence, the incumbent needs to settle with only one generic producer to avoid litigation over the validity of the patent. It is a profit-maximizing strategy to share the monopoly profit between the two firms, by using a pay-for-delay agreement.

Such agreements, however, raise antitrust concerns: tackling them has been a top priority for the Federal Trade Commission (FTC) over the past few years. According to the FTC, pay-for-delay agreements cost American consumers and taxpayers $3.5 billion a year in higher drug prices.[6] In the landmark case *FTC vs. Actavis*[7], the US Supreme Court ruled that pay-for-delay agreements are subject to a rule of reason analysis, and thus not illegal *per se*.

In Europe, where the Hatch-Waxman Act does not apply, the incumbent typically needs to settle with multiple entrants at a time to avoid litigation. So, one might think that pay-for-delay is only an American curiosity, created by specific legislation. But this is not the case: the European Commission (EC) has investigated several pay-for-delay agreements. Among the most debated cases are *Lundbeck*[8] and *Servier*[9]. In both cases the EC has imposed hefty fines on several pharmaceutical companies, asserting that pay-for-delay agreements are restrictions to competition by object. Both are currently pending before the EU Court of Justice.

At first sight, it is unclear that pay-for-delay settlements should be banned altogether. They fall at the intersection of intellectual property rights, which are legal restrictions to competition, and antitrust policy, which promotes competition. In his seminal article, "*Antitrust Limits to Patent Settlements*", Carl Shapiro argues that patent settlements should not make consumers worse off compared to the alternative, which is litigation.[10] The analysis simplifies to comparing the agreed entry date to the expected entry date through litigation. In this framework, when the payment from the incumbent is higher than the cost of litigation, exclusion due to the settlement will exceed the expected delay from litigation, independently of the strength of the patent (the probability that a court would uphold the patent). This result is remarkable, because antitrust agencies and courts do not need to assess the validity of a patent to decide upon an antitrust case.

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[6] Pay-For-Delay: How Drug Company Pay-Offs Cost Consumers Billions: A Federal Trade Commission Staff Study. Available at https://www.ftc.gov/reports.
[7] FTC v. Actavis, Inc., 133 S. Ct. 2223, 570 U.S. 136, 186 L. Ed. 2d 343 (2013).
[8] European Commission, decision 19.6.2013, C (2013) 3803.
[9] European Commission, decision 9.7.2014, C (2014) 4955.
[10] Shapiro, Carl, "Antitrust Limits to Patent Settlements", RAND Journal of Economics 34, 2 (2003), pp. 391-411.

Unfortunately, the result relies on the assumption that there is only a single entrant, which is not the case outside the US. When there are multiple challengers, concluding a pay-for-delay agreement with all of them is not always optimal for the incumbent, especially if they are numerous. This is due to *settlement externalities*: if the incumbent signs a pay-for-delay agreement with one entrant and the entrant stays out, there is less competition, which increases the expected profit the rival entrants may attain through litigation. Thus, a pay-for-delay agreement with one entrant imposes a positive externality on the others, increasing their incentives to litigate, and strengthening their position while bargaining for a settlement.

To extend the monopoly period by delaying all entrants, the incumbent must compensate each of them for withdrawing from litigation. However, the expected profit of starting litigation when all the other entrants are delayed is high, because invalidation of the patent opens the door to a duopoly (delaying agreements signed with others stay in force). Therefore, to delay all entrants, the incumbent must pay each of them the expected duopoly profits attainable by challenging the incumbent in court. When there are sufficiently many potential entrants, the cost of delaying entry exceeds the gain from monopolization. To reduce the reverse payments, the incumbent must then resort to other types of settlement deals, namely licensing, or even pursue litigation.

This is exactly what has happened in Europe, where pay-for-delay agreements constitute only a minority of the settlement deals reached in the pharmaceutical industry. Figure 1 shows that 11% of patent settlements in 2016 were pay-for-delay deals, whereas the rest either involved no reverse payment or did not limit generic entry.[11]

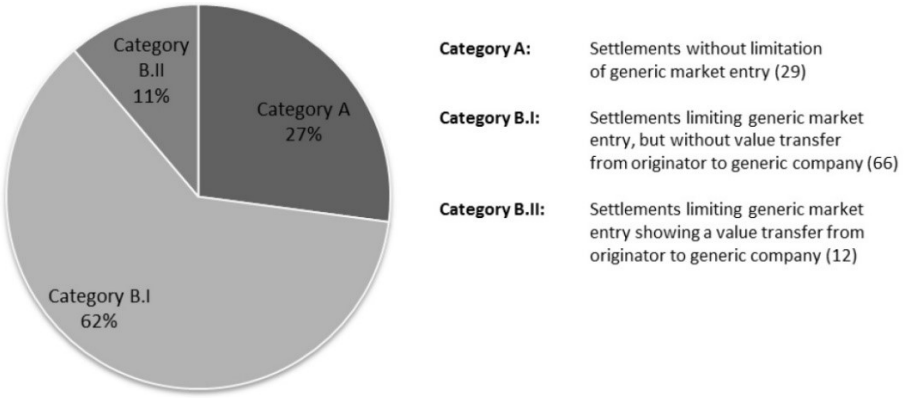

Figure 1: Patent settlements per category (January 2016 – December 2016). Source: European Commission, 8th Patent Settlement Monitoring Exercise, available at http://ec.europa.eu.

[11] Over the past few years the share of pay-for-delay agreements has been 3-12%. See the EC's Pharmaceutical Sector Inquiry, available at http://ec.europa.eu.

In fact, different types of settlement agreements often coexist, because the incumbent has an incentive to treat similar entrants differently. As we will explain, by licensing the patent to some entrants, the incumbent can reduce the cost of delaying the others.

The rest of the article is organized as follows. We will next shortly discuss the European landmark cases and then study the competitive effects of generic entry in more detail. After this we explain the role of settlement externalities and the logic of the negotiation game using a stylized example with two entrants. Finally, we use our example to derive a couple of policy implications and conclude.

The Lundbeck case

In the 1970s and the 1980s, *Lundbeck*, a Danish pharmaceutical company, developed the antidepressant drug citalopram, launching it very successfully in the 1990s. It became a blockbuster drug, giving Lundbeck 80 to 90% of its over €1 billion revenue in 2002. Before the expiry of the main chemical patent, Lundbeck had applied for several weaker patents related to more efficient or alternative ways of manufacturing the drug. Once the main patent expired, producers of bio-equivalent versions of citalopram questioned these secondary patents, which during 2002 and 2003 lead to several patent settlements, including pay-for-delay and licensing deals. For example, in the UK, Lundbeck offered a license to one firm but paid and delayed another one. In Iceland, it allowed market entry without litigation.

The Servier case

The Servier case involves a French pharmaceutical manufacturer, *Servier*, and producers of generic versions of perindopril, a medicine for treating high blood pressure developed by Servier in the 1980s. Perindopril became its most successful product with annual global sales exceeding $1 billion in 2006 and 2007, accounting to 30% of the company's global turnover with average operating margins beyond 90%. After the key patent protecting the main compound expired in May 2003, generic entry started to impose a credible threat to Servier. Anticipating this, Servier had started applying for new, weaker, patents from the late 1990s. In the shadow of litigation, between 2005 and 2007 Servier signed settlement agreements with five different entrants. Four of these agreements were pay-for-delay settlements, whereas the fifth one was a licensing deal. In the UK, following litigation by one entrant, Servier's patent was annulled.

Competitive effects of generic entry

Unlike in the US, where the entry of generic drugs is regulated by the Hatch-Waxman Act, in the EU several generic producers can launch their products at once. Figure 2 shows how, after the loss of patent protection, the number of entrants increases rapidly:

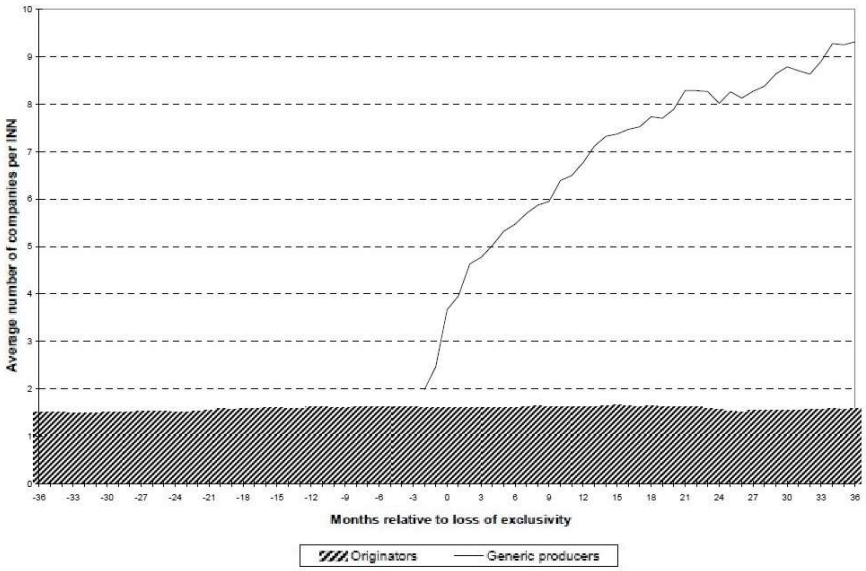

Figure 2: Average number of companies per pharmaceutical substance per country, depending on the month relative to the loss of exclusivity. Source: the EC's Pharmaceutical Sector Inquiry.

The Hatch-Waxman Act offers six months of exclusivity to the first challenger; at this moment in the EU there are typically more than five generic products per market.

When generic versions of a patented drug become available, there are typically two major changes in the market: prices decrease significantly, and volumes shift from the incumbent to the generic producers. For instance, when Servier lost its patent in the UK, generic entry decreased prices by almost 90% from the original price of a branded drug.[12] Figure 3 shows that in markets with generic products prices fall immediately after the loss of exclusivity and continue decreasing for the next three years.

[12] See paragraph 2107 of the Servier decision.

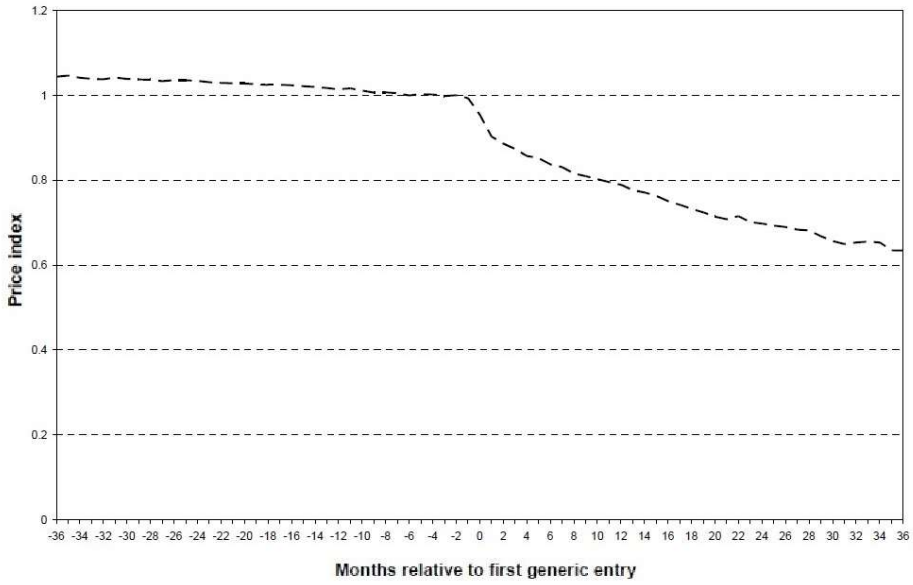

Figure 3: Average price per pharmaceutical substance per country, depending on the month relative to the first generic entry. Source: the EC's Pharmaceutical Sector Inquiry.

Importantly, the incumbent is not the only market player concerned about the competitive effects of entry: rival entrants also suffer from competition. The expected payoff from successful litigation against the incumbent is greatly reduced when there is a competitive threat from other entrants, free-riding on the litigation effort. Litigation is a problematic strategy, because the revocation of the patent opens the market for everybody, not merely for the one incurring, often a significant, litigation cost.

According to a legal counsel of Niche, one of the generic producers in the Servier case, *"it was in the interests of neither party to engage in litigation on the validity and infringement of Servier's patents in open court. If Niche was successful in revoking Servier's patents, this would obviously be damaging for Servier. However, it would also not be particularly advantageous for Niche, given that it would open the way for other generic entrants into the market."*[13] Hence, Niche did not want to "win the battle but lose the war" due to follow-up entry to the market.

Due to high litigation costs and free-riding between the entrants in their litigation efforts, even a weak patent can be useful for the incumbent. As the quote from the legal counsel of Niche indicates, the incentives to settle the patent dispute are particularly pronounced when rival entrants are waiting in the shadow of the litigation.

[13] See paragraph 493 of the Servier decision.

For a sufficiently strong patent, the incumbent needs no settlements to avoid litigation, because the litigation threat is not credible: the probability that a court declares the patent invalid is so small that no entrant finds it profitable to engage in costly litigation to challenge the incumbent. But for weaker patents the litigation threat is credible, and the incumbent must settle with every potential entrant to avoid litigation over the validity of the patent.

Settlement externalities

For a settlement to be reached, the terms must reflect the competitive situation in the market and the strength of the patent, which the parties should agree upon. To have a good assessment of the strength of the patent, pharmaceutical companies perform laboratory tests and consult third parties.[14] Hence, assuming the strength of the patent is common knowledge between the incumbent and potential entrants, seems to be a good approximation.

The existence and nature of the settlement externalities between potential entrants depend on whether the settlement agreements are conditional on the validity of the patent. Unless a settlement agreement includes a term that explicitly states otherwise, the legal principle of *pacta sunt servanda* requires that agreements must be kept even if there is an expected change of environment. Thus, an entrant accepting a pay-for-delay agreement should be bound by it even if another entrant litigates over the validity of the patent and a court declares the patent invalid. If so, a pay-for-delay agreement with one entrant creates a positive externality on the other entrants: they face reduced competition.

Due to this positive externality, the incumbent's cost of delaying all entry increases quickly in the number of potential entrants, exceeding the gains from monopolization. Instead of delaying all entrants, the incumbent must then find alternative strategies to maximize its profits. It can either start licensing the patent to some of the entrants or take the patent dispute to court, facing the risk of invalidation. Licensing and litigation are substitutes in reducing the cost of entry delay: going to court is costly, but tempting, because it involves a chance of monopolizing the market if the court upholds the patent.

Our analysis shows that more entrants are delayed when the competitive effect of entry is intense, litigation is costly, and the patent is strong. Even if the entrants are identical, the incumbent may treat them differently by licensing to some of the entrants or taking them into court, while delaying the others. Patents of uncertain validity are litigated, weak patents are licensed, and strong ones lead to entry delay. As one would expect, the scope of litigation increases

[14] See paragraph 709 of the Servier decision and 522 of the Lundbeck decision.

when the costs of litigation decrease. In the implausible case of zero litigation costs the incumbent will always take its chances in court, unless competition is extremely intense.

This picture changes completely if settlement agreements are made conditional on the patent staying valid. If entrants accepting pay-for-delay agreements can nevertheless enter the market after the patent is invalidated following a litigation started by another entrant, the positive externality of pay-for-delay deals is eliminated, and the cost of entry delay is dramatically reduced. Indeed, if a delayed entrant were to reject the settlement deal and go to court instead, invalidation of the patent would open the market to all entrants, including the ones who have signed a delaying agreement. As a result, it is enough for the incumbent to pay each entrant the expected payoff from litigation with all other entrants waiting to free-ride on the litigation effort. This reduces the cost of entry delay to the extent that the incumbent will find it profitable to delay all entry to the market, regardless of the strength of the patent.

A stylized example with two entrants

Consider a simple example with one incumbent and two identical entrants, A and B. The incumbent owns a patent and enjoys a legal monopoly until the patent expires, unless one of the entrants litigates and a court declares the patent invalid. Litigation costs C to each party. If at least one of the entrants litigates, the court will declare the patent invalid with probability $1 - \theta$ and uphold the patent otherwise; thus, θ reflects the strength of the patent. If both entrants litigate, the outcomes from litigation are perfectly correlated.

The patent starts at date zero and expires at date one. After that, free entry to the market drives all profits down to zero. At date zero, the firms negotiate over patent settlements. The incumbent may offer two types of deals: licensing and pay-for-delay agreements. A licensing deal asks the entrant to pay a licensing fee in return to entry at date zero, whereas a pay-for-delay deal offers the entrant a reverse payment for delaying entry until date one. Instead of accepting the settlement offered by the incumbent, the entrant may reject it and either litigate or wait for the market to open.

The firms are competitors. Absent entry at date zero, the incumbent makes a monopoly profit $M = 100$ while both entrants make zero profit. If only A enters the market at date zero, A and the incumbent each get a duopoly profit $D = 45$, whereas entrant B makes zero profit. If all firms are active in the market at date zero, each firm

obtains a triopoly profit $T = 25$. As such, the industry profit is decreasing in the number of firms in the market: $M > 2D > 3T$.[15]

The first observation is that there is no credible litigation threat for a sufficiently strong patent, namely, if $\theta > 1 - 0.04C$. To see why, imagine A challenges patent validity in court, while B waits and free rides on this effort. Then, A wins with probability less than $0.04C$ and faces tough competition, obtaining a smaller expected profit than the cost of litigation: $0.04CT = C$. Thus, A is better off dropping the case. It follows that, when the patent is strong enough, by making no settlement offers, the incumbent ensures that the patent is never challenged: both entrants wait until it expires.

The negotiation game becomes interesting when the litigation threat is credible: $\theta \leq 1 - 0.04C$. Under this condition, avoiding litigation requires settlements with both entrants, because each entrant has an incentive to litigate even if the rival entrant waits.

There are essentially three alternative ways the incumbent can settle with both entrants. By delaying both, the incumbent obtains

$$M - 2 \times \overbrace{[(1-\theta)D - C]}^{\text{reverse payment}} = 10 + 90\theta + 2C.$$

The individual reverse payment equals the expected payoff an entrant would obtain by going to court while the other entrant stays out.

By licensing to both entrants, the incumbent gets

$$T + 2 \times \overbrace{[\theta T + C]}^{\text{licensing fee}} = 25 + 50\theta + 2C.$$

The individual licensing fee equals the expected payoff an entrant would forego by rejecting the licensing deal and going to court while the rival buys a license and enters the market.

Finally, the incumbent may adopt a divide and conquer strategy, where one entrant gets a license while the other one is delayed. The incumbent's payoff from this strategy is

$$D + \overbrace{[\theta D + C]}^{\text{licensing fee}} - \overbrace{[(1-\theta)T - C]}^{\text{reverse payment}} = 20 + 70\theta + 2C.$$

The reverse payment equals the expected payoff the delayed entrant would obtain by litigating while the other entrant buys a license. Thus, competitive pressure from the licensee makes it possible for the incumbent to reduce the reverse payment. Furthermore, the incumbent

[15] The specific values for the profits result from the symmetric Cournot quantity-setting game with an inverse demand $p = 20 - Q$ (industry output) and zero marginal costs of production. This specification is chosen for expositional reasons only. An interested reader may plug in other values for the profits to obtain different outcomes.

receives the licensing fee, which equals the expected payoff the licensee would miss by rejecting the licensing deal and litigating while the rival entrant stays out. Therefore, by offering exclusivity, the incumbent can raise the licensing fee.

By comparing the incumbent's payoffs from the three alternative settlement strategies, we may calculate two important thresholds of patent strength: 0.5 and 0.25. If the patent is strong, $\theta > 0.5$, delaying both entrants is the best strategy to avoid litigation. If instead the patent is weak, $\theta < 0.25$, the incumbent offers two licensing deals. For patents of intermediate strength, $0.25 \leq \theta \leq 0.5$, the incumbent finds it profitable to divide and conquer.

The intuition for this monotonicity is two-fold. First, the incumbent would like to monopolize the market, because the industry profits and therefore the profits attainable through licensing are decreasing in the number of active firms. Second, the cost of entry delay is decreasing in the strength of the patent.

But interestingly, settling with both entrants is not always the optimal strategy for the incumbent. Litigation has a clear advantage over licensing: by going to court the incumbent monopolizes the market with probability θ, whereas licensing accommodates entry to the market with certainty. The downside of litigation is its cost.

Again, there are three alternative ways the incumbent can pursue litigation over the validity of the patent: it may offer one of the entrants no deal, a licensing deal or a pay-for-delay agreement while the other entrant goes to court. By licensing, the incumbent obtains

$$\overbrace{[\theta D + (1-\theta)T]}^{\text{own expected profit}} + \overbrace{\theta D}^{\text{licensing fee}} - C = 25 + 65\theta - C.$$

Now the licensing fee equals the expected profit the licensee would forego by rejecting the licensing deal and free-riding on the litigation effort taken by the rival entrant.

By offering no deals instead, the incumbent obtains

$$\overbrace{[\theta M + (1-\theta)T]}^{\text{own expected profit}} - C = 25 + 75\theta - C,$$

which is always higher than the payoff from licensing, regardless of the strength of the patent, by the assumption $M > 2D$. Thus, the incumbent is better off by making no deals at all than licensing the patent to one entrant while the other one litigates. In other words, licensing and litigation are *substitutable* strategies.

By delaying one of the entrants while the other one litigates, thus adopting a divide and conquer strategy, the incumbent gets

$$\overbrace{[\theta M + (1-\theta)D]}^{\text{own expected profit}} - \overbrace{(1-\theta)T}^{\text{reverse payment}} - C = 20 + 80\theta - C.$$

In this case the reverse payment equals the expected profit the delayed entrant would obtain by rejecting the deal and free-riding on the litigation effort taken by the rival entrant. However, with our numerical example, $D < 2T$, implying that the incumbent is still better off by making no deals at all.[16]

We have now gone through all relevant strategy combinations. Figure 4 depicts the outcome of the negotiation game as a function of the strength of the patent and the costs of litigation. For zero litigation costs, going to court is always the profit-maximizing strategy for the incumbent, and for sufficiently high litigation costs, there is never litigation. In general patents of intermediate strength are litigated, whereas sufficiently weak patents are licensed, and strong ones used to delay entry to the market. If the patent is very strong and the litigation cost high, there is no credible litigation threat and both entrants wait for the patent to expire.

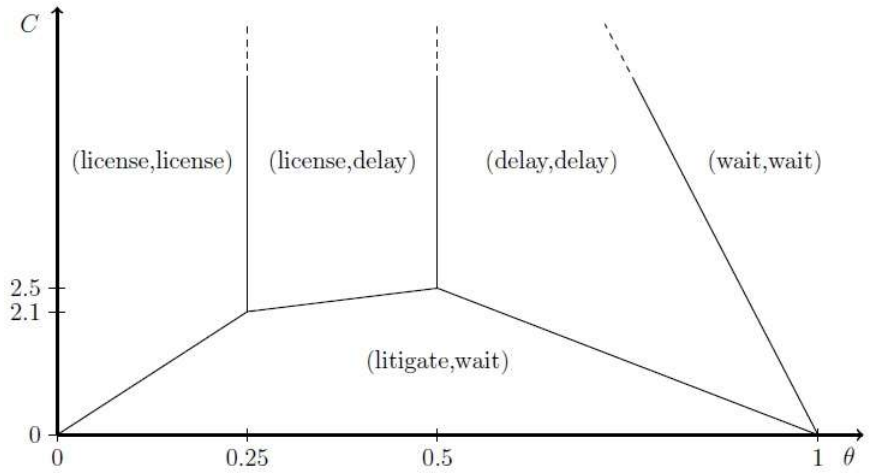

Figure 4: The outcome of the negotiation game, as a function of the strength of the patent, θ, and the cost of litigation, C.

There is a trade-off between litigation and avoiding it. Litigation is a more attractive strategy, because the incumbent has a chance of monopolizing the market without paying the entrants. But not going to court saves on the costs of litigation.

If the patent is strong, the entrants are likely to lose in court and are therefore willing to accept pay-for-delay agreements with small reverse payments. Thus, for a sufficiently strong patent, the incumbent prefers to avoid costly litigation by delaying both entrants. If instead the patent is weak, the incumbent's chance of monopolizing the market through litigation is small and the entrants have a strong

[16] In general, there are parameter values for which delaying one entrant, and litigating against the other one, constitute an equilibrium.

bargaining position. Therefore, for a weak enough patent, the incumbent offers licensing deals to save on the costs of litigation.

For patents of intermediate strength, the incumbent has a real chance of monopolizing the market through litigation, whereas delaying entry is not cheap. The incumbent will then take its chances and pursue litigation, unless the litigation costs are too high, in which case it is better to divide and conquer by offering a licensing deal to one of the entrants while delaying the other.

Conditional settlements

One of the most basic legal principles is that agreements must be kept (*pacta sunt servanda*). According to this principle, a contract should stay in power despite an expected change of environment. Hence, we have so far assumed that the settlement deal with one entrant stays in force even if the other entrants litigates and the court declares the patent invalid. Indeed, when parties negotiate over a settlement to a patent dispute, they have a belief about the strength of the patent, and this influences the terms of the settlement. If the patent is later declared invalid by a court, following litigation by a third party, the parties have been aware of this risk when agreeing to the settlement. It is the ex-ante view of the strength of the patent that matters for reaching a settlement, not the validity of the patent resolved ex-post.

Even so, the parties could explicitly formulate a settlement agreement conditional on the validity of the patent. In the Servier case, for example, firms argued that conditional pay-for-delay agreements are less harmful to consumers, because the delayed entrant can enter the market if the patent is declared invalid. Although this logic seems intuitive, it is false: conditional settlements reduce the cost of entry delay to the extent that all entrants are delayed in equilibrium.

To see this, let us revisit our example with one incumbent and two identical entrants. By delaying both entrants on the condition that the patent stays valid, the incumbent gets

$$M - 2 \times \overbrace{[(1-\theta)T - C]}^{\text{reverse payment}} = 50 + 50\theta + 2C.$$

The individual reverse payment equals the expected payoff an entrant would obtain by going to court knowing that the rival enters the market if the court declares the patent invalid. The catch is that delaying one of the entrants no longer imposes a positive externality on the other entrant, because entry is delayed only if the patent stays valid.

We thus have a stark policy implication: settlements conditional on the validity of the patent should not be allowed, as they reduce the

cost of delaying, making it profitable for the incumbent to block all entry to the market, regardless of the strength of the patent.

Should pay-for-delay agreements be banned?

From the perspective of the patent system, the outcome of the negotiation game, as described in Figure 4, is reassuring. First, strong patents are not challenged in court and result in a monopoly. This is the point: a patent grants its owner the right to exclude rivals from the market, and it would be a waste of resources if firms spent money and time on arguing about the validity of ex-ante strong patents. Second, weak patents are licensed; therefore, they do not prevent entry to the market, benefiting consumers. Third, patents with uncertain validity are litigated, hence correcting the legal uncertainty created by imperfect screening of patents.

By banning pay-for-delay agreements we risk changing this picture dramatically, most likely by increasing the scope of litigation, which is not necessarily socially optimal. To see how things could play out, let us again revisit our example with two entrants. Figure 5 describes the outcome of the negotiation game when pay-for-delay agreements are illegal and thus outside the incumbent's toolkit.

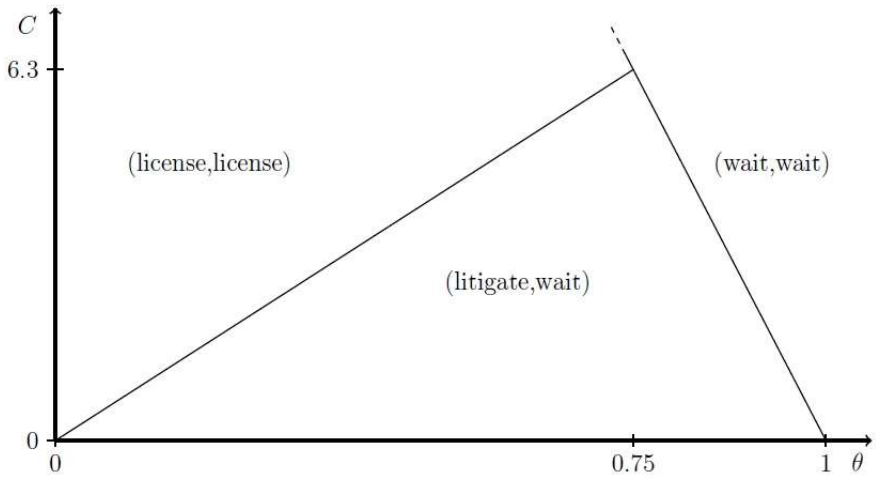

Figure 5: The outcome of the negotiation game when pay-for-delay agreements are banned, as a function of the strength of the patent, θ, and the cost of litigation, C.

Indeed, when pay-for-delay agreements are not allowed, even strong patents end up challenged in court, because this is the only way for the incumbent to monopolize the market. Delaying both entrants would save on the costs of litigation, while still resulting in the same market outcome with a high probability. Furthermore, the scope of licensing increases, because offering both entrants a license is the only way the

incumbent can avoid litigation, if litigation is too expensive. This means that even strong patents are licensed.

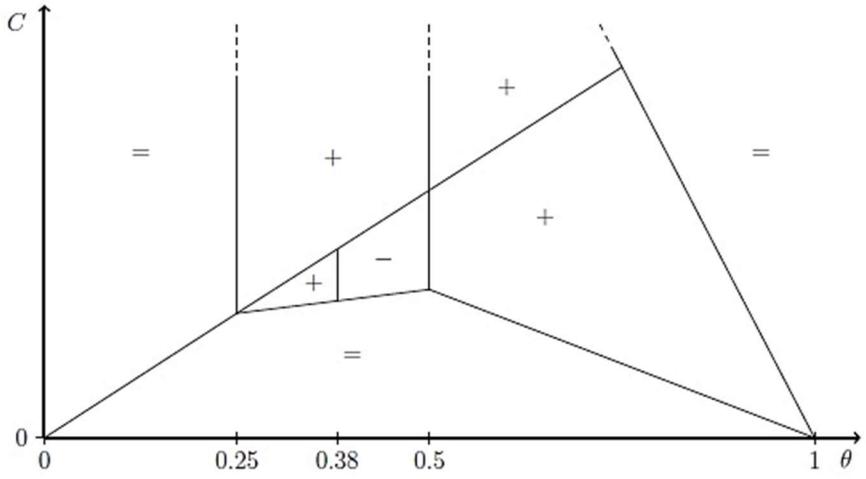

Figure 6: The change in expected consumer surplus (ex-post, not considering the incentives to innovate) following a ban on pay-for-delay agreements.

The possibility of entering into pay-for-delay agreements may encourage the incumbent to license the patent. Figure 6 shows how a ban on pay-for-delay agreements influences the consumer surplus ex-post. The key take-away is that, even if we abstract away from the incentives to innovate, consumers do not always benefit from an outright ban on pay-for-delay agreements. In the area with the negative sign the incumbent stops licensing the patent and goes to court instead, although the expected consumer surplus from litigation is lower than the one in duopoly, which would prevail if pay-for-delay agreements were allowed.[17] This highlights a more general point: due to the interdependency between pay-for-delay and licensing incentives, the analysis of the welfare consequences of prohibiting pay-for-delay settlements should not look at them in isolation, but account for the decreased incentives to license the patent.

Conclusion

Consumer welfare in markets protected by patents depends to a large extent on entry. Thus, from the perspective of antitrust policy, patent

[17] The consumer surpluses from in the Cournot competition model with an inverse demand $p = 20 - Q$ (industry output) are 50 in monopoly, 89 in duopoly and 113 in triopoly. When $\theta 50 + (1 - \theta)113$ is less than 89, the expected consumer surplus is lower under litigation than when one entrant obtains a license and the other one is delayed. Hence the threshold 0.38 of patent strength.

settlements that result in entry delay raise concerns. In this article, we provide a more nuanced view of the functioning of these settlements and their potential consequences.

Prior work has focused on providing easy to use statistics that could guide decisions of antitrust authorities. Carl Shapiro argues for blocking all settlements that delay entry beyond the expected entry date through litigation. In their article, "*Solving the Patent Settlement Puzzle*", Einer Elhauge and Alex Kruger propose prohibiting reverse payments that are higher than litigation costs.[18] With more than one entrant such a test might deliver a false positive. A high payment necessary to delay entry might be accompanied by a licensing deal to another entrant, and together the two of them can lead to a higher consumer surplus than litigation.

In Europe, where the regulatory framework differs from that in the US, we should not directly apply conclusions reached on the other side of the Atlantic but account for the interdependency between pay-for-delay, licensing and litigation.

[18] Elhauge, Einer, and Krueger, Alex, "Solving the Patent Settlement Puzzle", Texas Law Review 91, (2012): pp. 283.