

The Impact of Reverse-Payment Settlements on Competition

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The patent holder is Firm A. The potential entrant is Firm B. The remaining patent lifetime is T . For simplicity, assume no time discounting. The patent holder places a probability P on winning the patent litigation, i.e., that the patent will be found valid and infringed. For this base case, the patent holder is assumed to be risk neutral. Significant risk aversion will alter these results.

Monopoly profits for Firm A are M_A . Duopoly profits for Firm A are D_A . Duopoly profits for Firm B are D_B . Consumer surplus is higher under duopoly, S_D , than under monopoly, S_M . All profits and consumer surplus are per unit time.

The two firms can settle or litigate. A settlement involves two parameters: the entry date E for the potential entrant and a reverse payment X from the patent holder to the potential entrant. Litigation costs for the two firms are C_A and C_B .

Firm A's payoff from settling on terms $[E, T]$ is $EM_A + (T - E)D_A - X$. Firm A's expected payoff from litigating is $T[PM_A + (1 - P)D_A] - C_A$. If we observe a settlement, we may reasonably infer that it was better for Firm A than litigating, so we can infer that $EM_A + (T - E)D_A - X > T[PM_A + (1 - P)D_A] - C_A$. Simplifying, this can be written as

$$P < \frac{E}{T} - \frac{X - C_A}{T(M_A - D_A)} .$$

This inequality is important and intuitive. In the absence of any reverse payment or litigation costs, $X = C_A = 0$ and this becomes $P < E/T$. For example, if the settlement allowed the potential entrant to enter after 80 percent of the remaining patent lifetime, we could infer that the patent holder estimated patent strength as no greater than 80 percent. Large reverse payments push down the upper bound on patent strength. Note that reverse payments and litigation costs are best measured in proportion to the extra profits over the remaining lifetime that the patent holder stands to gain from keeping out the potential entrant.

How do consumers fare under the settlement compared with litigation? Under the settlement, consumer surplus is $ES_M + (T - E)S_D$. Under litigation, expected consumer surplus is $T(PS_M + (1 - P)S_D)$. Consumers are worse off under the settlement if and only if $T(PS_M + (1 - P)S_D) > ES_M + (T - E)S_D$. Simplifying, and using $S_M < S_D$, this can be written as

$$P < \frac{E}{T} .$$

We consider the settlement anti-competitive if it leads to more monopoly and less duopoly, thereby harming consumers, compared to litigation. This is the standard used in Shapiro (2003). Under this standard, the settlement is anti-competitive if $P < E/T$. This is precisely the inference we can make, using the previous inequality, if (but only if) $X > C_A$, i.e., if (but only if) *the reverse payment exceeds the patent holder's avoided litigation costs*. We do not need to know the absolute level of patent strength to reach this conclusion.