

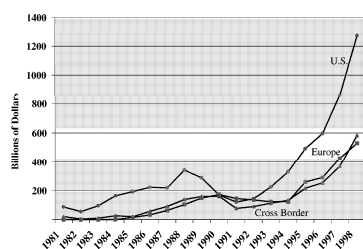
Lecture 18: Mergers (Pepall, Ch 16, except 16.4.2 and 16.5)

Today's Agenda

- Horizontal Mergers.
 - Motivation: some statistics
 - Why bad for welfare?
 - The Merger Paradox
 - "Solving" the Merger Paradox:
 - * Cost synergies.
 - * The merged firm becomes a Stackelberg leader.
 - * Bertrand competition with differentiated goods.

Motivation

- Figure 23.2 taken from the book by Church and Ware shows the level of merger activity in the US and Europe.
 - A merger boom during the 1980s.
 - Strong merger wave during latter part of the 1990s.
 - Peak in 2000; thereafter decline and then flattening out at the 1995 level (not shown in this figure).
- Some questions:
 - Should mergers be regulated and can we use economic theory to understand when a competition authority should block a proposed merger?



Why might a merger be bad for welfare?

- Two reasons why a merger could hurt welfare:
 1. Collusion among the (remaining) firms in the market may be easier after the merger than it was before. [The **coordinated effects**.]
 - This is what the repeated game theory of collusion would predict: a smaller number of firms makes it easier to sustain collusion as an SPNE.
 2. Even if the merger does not facilitate collusion, the fact that there is a smaller number of firms in the market will give each of them more market power [the **unilateral effects**]:
 - => consumer surplus and total surplus become smaller.
- The discussion below is most relevant for the second point (the unilateral effects).

The Merger Paradox

- In real life, mergers are quite common.
- Presumably, the firms that merge do that because they expect that their joint profits will increase due to the merger.
- The merger paradox:
 - Simple economic models of a merger often yield the result that the merger is *unprofitable* for the merging firms.
 - One obvious exception: a merger to monopoly is always profitable. [Why is this true?]
- We'll illustrate the paradox using the Cournot model.

- Model:
 - Homogeneous good, quantity competition, n identical firms.
 - Linear inverse demand:

$$P = a - bQ.$$
 - Constant marginal cost: c .
 - The firms choose their outputs independently and simultaneously.

- Result:
 - As we have shown in earlier lectures and seminars: each firm's equilibrium profit is

$$\pi^* = \frac{(a - c)^2}{b(n + 1)^2}.$$

- Now suppose that m ($\leq n$) of the n firms merge.
 - After the merger, there are $n - m + 1$ firms.

– Also, after the merger, *the merged firm becomes just like any other of the firms in the industry.*

– This means that the Cournot model predicts that, after the merger, each firm earns a profit according to π^* above, but with $(n - m + 1)$ instead of n . That is, each firm's profit is

$$\pi^{**} = \frac{(a - c)^2}{b[(n - m + 1) + 1]^2} = \frac{(a - c)^2}{b(n - m + 2)^2}.$$

- What are the effects of the merger?
 - The firms that are not merging benefit from the merger, because $\pi^{**} > \pi^*$.
 - The consumers are hurt by the merger, because market price will be higher with a smaller number of firms.
 - The merging firms' joint profit is larger after the merger if and only if

$$\pi^{**} > m\pi^*.$$

Or

$$\frac{(a - c)^2}{b(n - m + 2)^2} > m \frac{(a - c)^2}{b(n + 1)^2}.$$

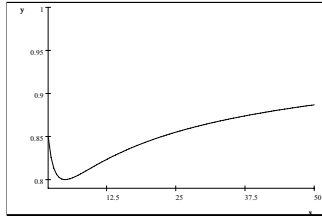
Or

$$(n + 1)^2 > m(n - m + 2)^2. \quad (1)$$

- Suppose that m is a fraction s of n : $m = sn$.
- One can then plug $m = sn$ into (1) and solve for s .
- You don't need to learn how to do this (it involves solving a quadratic equation), but the book gives us the result:

$$s(n) > \frac{3 + 2n - \sqrt{5 + 4n}}{2n}.$$

- * That is, for mergers that involve at least the fraction $s(n)$ of the firms in the market, the merger will be profitable.
- * Plotting this function yields



- Conclusion: at least 80% of the firms must merge for the merger to be profitable.

"Solving" the Merger Paradox

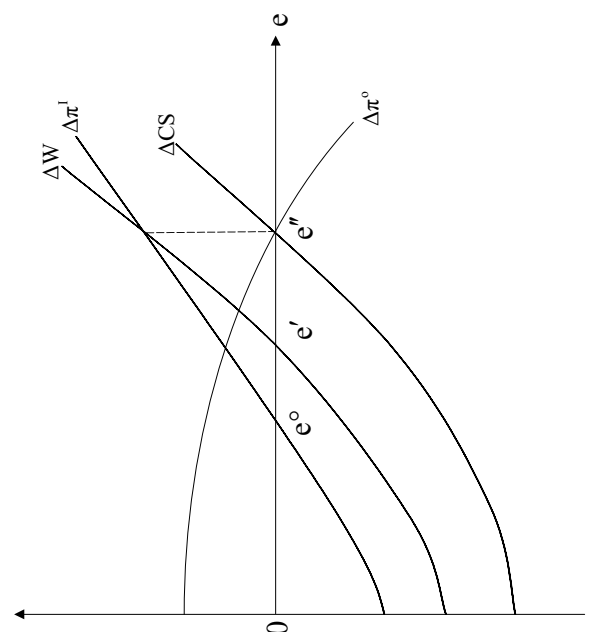
- The book discusses several ways of getting around the merger paradox.
 1. Cost synergies.
 2. The merged firm becomes a Stackelberg leader.
 3. Product differentiation (in particular, Bertrand competition with differentiated goods).

Cost synergies

- Suppose the merging firms get a lower (constant) marginal cost thanks to the merger.
 - Two versions of this:
 1. Prior to the merger, the merging firms have different marginal costs, and after the merger the merged unit uses the lowest one of these.
 2. There are truly *synergies*, so that the new marginal cost may be lower than any of the pre-merger marginal costs.
- The book shows in an example that the first kind of cost saving can make the merger profitable.
 - However, the price rises and consumers are made worse off.
- The second kind of cost saving can also make the merger profitable.

- In addition, for large enough cost savings, consumers are better off, and the non-merging firms are worse off.
- See the figure (taken from Lagerlof and Heidhues, IJIO 2005), based on a linear Cournot model.
 - * In the figure, e is a measure of the cost saving (i.e., $e = 0$ means no cost saving at all).
 - * I stands for Insiders (= the merging firms) and O stands for Outsiders (= the other firms).
 - * ΔW is the difference (post-merger minus pre-merger) in total surplus.
 - * ΔCS is the difference in consumer surplus.
 - * $\Delta \pi^I$ is the difference in the insiders' profit.
 - * $\Delta \pi^O$ is the difference in the outsiders' profit.
 - * For cost savings larger than $e = e''$, market price will go down thanks to the merger.

Figure 1: Gains and losses for different parties due to the merger.



The merged firm becomes a Stackelberg leader

- Suppose the merged firm becomes a Stackelberg leader.
 - Pre-merger there are N firms.
 - Pre-merger, L of the N firms are Stackelberg leaders (choosing their outputs simultaneously with each other but before the rest of the firms).
 - The remaining $N - L$ firms in the pre-merger market are Stackelberg followers (choosing their outputs simultaneously with each other but after the leaders).
 - If two of the firms in the follower group merge, then these firms join the leader group.
- Justification of the key assumption:
 - If two firms merge, they should have a combined capacity that is greater than without the

merger, which should give them an advantage. We try to capture this advantage by assuming that they become a Stackelberg leader.

- The book solves a version of this model (with linear cost and demand).
- Result:
 - Two firms in the follower group always want to merge.
- Conclusion:
 - The model offers one way to resolve the merger paradox.
- Criticism:
 - The main assumption is a bit arbitrary. As the book puts it, “the precise mechanism by which any firm acquires the leadership mantle is not fully specified.”

Bertrand competition with differentiated goods

- Bertrand competition with a *homogeneous* good wouldn't solve the merger paradox.
 - This would yield zero profit both before and after the merger (as long as we don't have merger to monopoly, of course).
- Suppose we have Bertrand competition with *differentiated* goods.
- In the book they show in an example that this model also solves the paradox: the merger is profitable for the merging firms (and also for the non-merging firms).
- Intuition:
 - One reason why we obtained the paradox in the Cournot model is that there the firms' choice variables are *strategic substitutes*:

- * When two firms merge, they will reduce their joint output compared to pre-merger, in order to exploit their greater market power and thereby increase their profit.
- * The non-merging firms will respond by *increasing* their outputs.
- * This undermines the effect of the merger.
- In the Bertrand model, however, the firms' choice variables are *strategic complements*:
 - * When two firms merge, they will increase their price compared to pre-merger, in order to exploit their new market power and thereby increase their profit.
 - * The non-merging firms will respond by increasing their prices too (which is helpful for the merging firms).
 - * Thus, the response of the rivals strengthens the effect of the merger.