A discusión

HORIZONTAL MERGERS FOR BUYER POWER*

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ABSTRACT

Salant et al. (1983) showed in a Cournot setting that horizontal mergers are unprofitable because outsiders react by increasing their output. We show that this negative effect may be compensated by the positive effect that horizontal mergers have on the buyer power of merging firms in input markets.

JEL classification: L11, L20

Keywords: buyer power; mergers; input markets.

1. Introduction

There has been a long debate on merger profitability in Cournot settings since the seminal paper by Salant et al. (1983). They show in a symmetric linear Cournot model that mergers that do not include 80% of the active firms are unprofitable. They explain their result by pointing out that mergers have the negative strategic effect of increasing production of non-participating firms.

Several extensions have tried to increase merger profitability by reducing the extent of the reaction of outsiders to a merger. This can be obtained by allowing either more convex demands (Faulí-Oller (1997)) or more convex costs (Perry and Porter (1985)).

Here we take another approach. We consider that firms not only sell the final good, but must also buy an input in an imperfectly competitive market. Therefore firms not only care about market profits, but also about how these rents are shared with input suppliers. We show that mergers increase the share of profits that downstream firms can appropriate. This positive effect on firms' profits of mergers must be evaluated against the negative strategic effect of increasing production of non-participating firms.

We obtain that mergers are profitable when the positive effect is important enough. This is the case when the monopolistic power of upstream firms is so high that they are able to extract most of the rents of the vertical relationship. In this case, downstream firms strongly need to create buyer power from mergers.

2. The model

There is an upstream firm U that produces an intermediate input at marginal cost $\underline{c} \geq 0$. There exists also a competitive supply of the input at marginal cost $\bar{c} > \underline{c}$. In the downstream sector there are n firms that transform one unit of input into one unit of final product without additional costs of production. The final product is homogeneous and its demand is given by $P(Q) = \alpha - Q$.

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Upstream and downstream firms set vertical contracts that establish the terms under which inputs are transferred. We model this vertical relationship following the framework in Rey and Tirole (forthcoming), where contracts are secret (or unobservable) and firms have passive conjectures. After contracts are set, competition downstream is à la Cournot.

We want to address how mergers of downstream firms affect the process discussed above. Mergers change both the buyer power of downstream firms in the intermediate market and their market power in the final market. Salant et al (1983) showed that mergers solely to increase market power are seldom profitable. We will see that, when achieving buyer power is very important to increase profits, because competition upstream is very low (high $\bar{c}$), the results on merger profitability are reversed.

More specifically the situation is modelled according to the following timing:

Stage 1: The efficient upstream firm secretly offers each downstream firm i a two-part supply contract $T_i(q_i) = w_i q_i + F_i$; each downstream accepts or refuses the deal. If he refuses, he may use the alternative supply. If he accepts, he orders a quantity of input and pays accordingly.

Stage 2: Downstream firms transform input into final product and compete in the final market à la Cournot.

We are going to study the Perfect Bayesian Equilibrium of this game. We have multiplicity of equilibria if no restriction is imposed on the off-the-equilibium beliefs of firms about the contracts received by competitors. As in Rey and Tirole (forthcoming) we restrict attention to the case where those beliefs are unaffected by the off-the-equilibrium contract a firm receives. Then firms are said to have passive conjectures.

The upstream firm offers to each downstream firm i the supply contract he would offer to a monopolist downstream facing (residual) demand $\alpha - Q^c_{-i} - q_i$, where Q^c_{-i} is the output sold by competitors in equilibrium. Then the variable part of the supply tariff is set equal to marginal cost, $w_i^* = \underline{c}$, whereas the fixed fee will be set to extract all the rents from firm i, except the amount he can obtain using the competitive supply of the input.

Hence, the fixed fee is given by $F_i^* = \left(\dfrac{\alpha - Q_{-i}^c - \underline{c}}{2}\right)^2 - \underset{q_i}{Max}\{(\alpha - Q_{-i}^c - q_i - \bar{c})q_i\}$. As

all firms operate in equilibrium at marginal cost $\underline{c}$, each firm produces $q^c(n) = \dfrac{\alpha - \underline{c}}{n+1}$.

Then the net profits of a downstream firm will amount to

$\underset{q_i}{Max}\{(\alpha - (n-1)q^c(n) - q_i - \bar{c})q_i\}$. If we define $\theta \equiv \dfrac{\bar{c} - \underline{c}}{\alpha - \underline{c}}$, profits of downstream firms can

be written as:

$$
\pi(n,\theta) = \begin{cases} (\alpha - \underline{c})^2 \left(\dfrac{1}{n+1} - \dfrac{\theta}{2}\right)^2 & \text{if} & \theta < \dfrac{2}{n+1} \\[4mm] 0 & \text{otherwise} \end{cases}
$$

θ parametrizes the monopolistic power of the upstream firm and will play an important role in our analysis. Observe that θ is increasing in $\bar{c}$ and decreasing in $\underline{c}$. The smaller the cost gap, the higher the competition faced by the upstream firm and lower the value of θ. Correspondingly, profits of downstream firms are decreasing in θ. We then have that, at one extreme, when $\theta = 0$ there is perfect competition upstream, and we are back to the standard Cournot model. At the other extreme, when $\theta \geq \dfrac{2}{n+1}$, the upstream supplier is *de facto* a monopolist because the competitive supply is so inefficient that does not constitute a valid alternative; as a consequence downstream firms obtain zero profits and all the rents are appropriated by the upstream firm. The "monopolistic" nature of the input supply, however, depends not only on the level of production costs but also on the number of firms n that compete downstream. We will concentrate below our analysis to the case where $\theta \in \left[0, \dfrac{2}{n+1}\right)$, and the results we obtain will allow us to address straightforwardly what happens when $\theta \geq \dfrac{2}{n+1}$.

Profits from a horizontal merger of $k+1$ downstream firms is defined[1] as the difference between post-merger and pre-merger profits of participating firms:

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[1] Vertical mergers are addressed in the original paper of Rey and Tirole (forthcoming).

$$\pi(n-k,\theta) - (k+1)\pi(n,\theta) \tag{1}$$

A merger is said to be profitable if (1) is non-negative. It is useful to rewrite the profitability of mergers condition the following way:

$$\frac{\pi(n-k,\theta)}{\pi(n,\theta)} \geq k+1 \tag{2}$$

We can identify the effect of θ on profitability through the effect of changes of θ on the left hand side of (2), which is strictly increasing in θ. This analysis yields to the following result:

Proposition 1 _A merger of k+1 firms is profitable for_ $\theta \in \left[max\{0, \underline{\theta}(k,n)\}, \frac{2}{n+1} \right),$

where $\underline{\theta}(k,n) \equiv \frac{2}{n+1} \frac{n-k-\sqrt{k+1}}{n+1-k}.$

Salant et al. (1983) obtained in a Cournot setting that mergers are profitable only if the number of participating firms is high enough.[2] In proposition 1, we show that mergers of any size are profitable, provided that θ is high enough.[3]

The intuition of the result is interesting but not straightforward. A graphical illustration is useful to explain it. Figure 1 illustrates the situation in the standard Cournot setting ($\theta = 0$). Figure 1.a plots the pre-merger residual demand of a firm, and figure 1.b the post-merger residual demand. The reduction in rivalry moves the residual demand to the right, even though in equilibrium non-participating firms expand their production. Salant et al. (1983) show that, unless k is high enough, the profits obtained after the merger (area B) are lower than $k+1$ times the profits obtained before the merger (area A).

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[2] They consider $\theta = 0$. Then, a merger is profitable only if $\underline{\theta}(k,n)$ is negative. This amounts to $k + \sqrt{k+1} > n$, which only holds if k is high enough.

[3] Observe that $\underline{\theta}(k,n) < \frac{2}{n+1}$, and therefore the interval in proposition 1 is non-empty. For θ in the interior of this interval, the merger is strictly profitable.
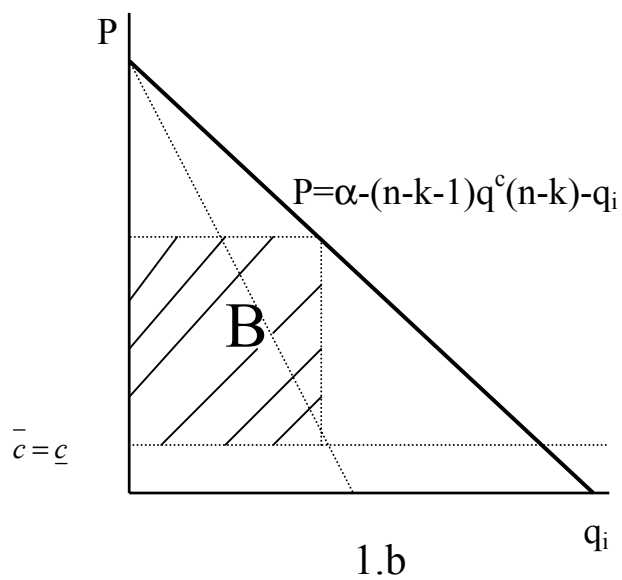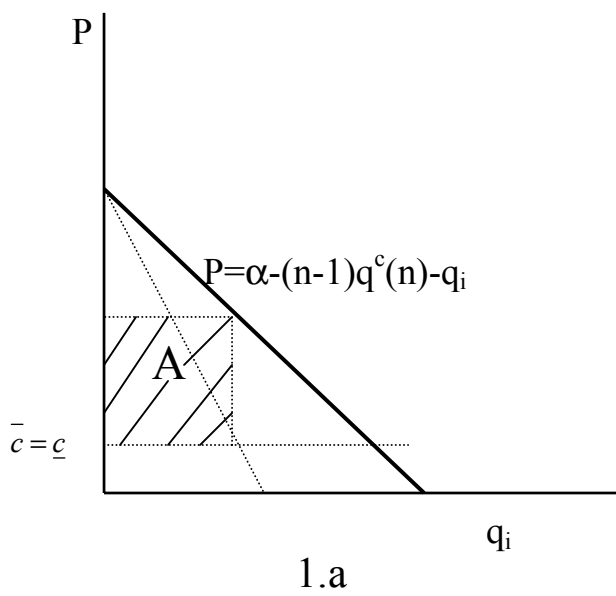
P

$P=\alpha-(n-1)q^c(n)-q_i$

A

$\bar{c}=\underline{c}$

q_i

1.a

P

$P=\alpha-(n-k-1)q^c(n-k)-q_i$

B

$\bar{c}=\underline{c}$

q_i

1.b

Figure 1

P

$P=\alpha-(n-1)q^c(n)-q_i$

A'

$\bar{c}$

$\underline{c}$

q_i

2.a

P

$P=\alpha-(n-k-1)q^c(n-k)-q_i$
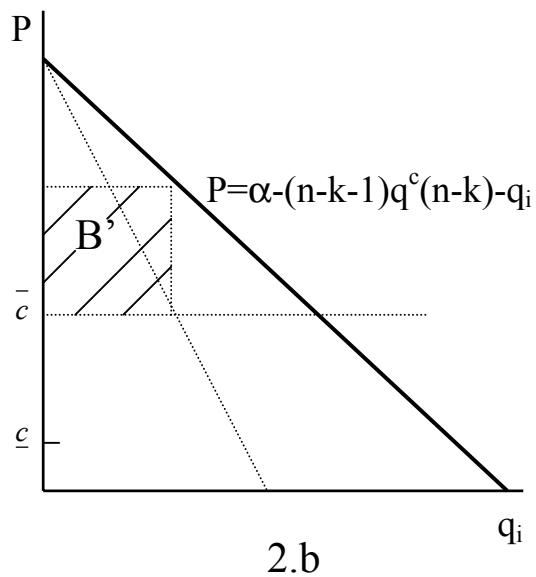
B'

$\bar{c}$

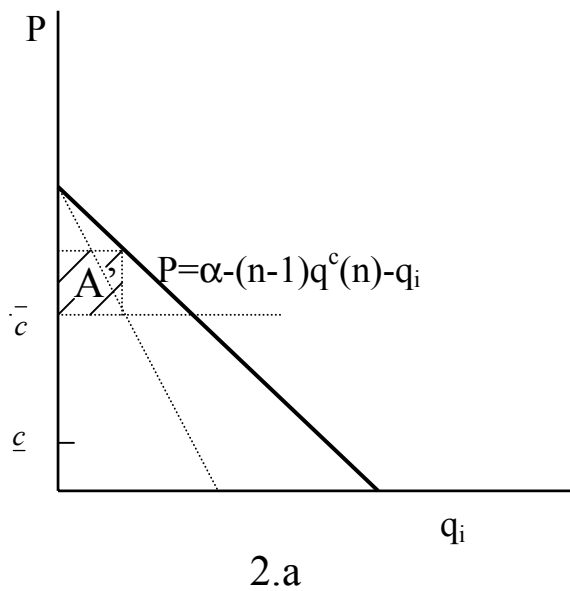$\underline{c}$

q_i

2.b

Figure 2

Figure 2 considers what happens when $\bar{c}$ increases while $\underline{c}$ stays constant[4]. In equilibrium, downstream firms will still be supplied by the efficient upstream firm at marginal cost. Therefore the sales of firms do not change. This implies that the pre-merger (post-merger) residual demand in Figure 2a (2b) is like the one in Figure 1a (1b). However, the profits downstream firms obtain change because they depend on the possibility to use the competitive supply: as it has become less efficient they will obviously obtain less profits (A>A' and B>B'). But the main point is that a firm is more affected in its profits by an (absolute) increase in costs, the lower its (residual) demand. In graphical terms, the ratio between post-merger and pre-merger profits has increased ($\frac{B}{A}$ is lower than $\frac{B'}{A'}$). Therefore it is more likely that a merger is profitable, the higher the value of $\bar{c}$ (and hence of θ).

Salant et al. (1983) showed that (given n) mergers larger that a certain minimal size were profitable. In our model, the same result is obtained for any θ. The existence of the minimal size comes from the fact that the left hand side of (2) is increasing and convex in k. Furthermore, the minimal size is decreasing in θ. It comes from the fact that the left hand side of (2) is increasing in θ. This highlights the positive effect θ has on merger profitability.

Combining the existence of a minimal profitable merger size and Proposition 1, we can obtain the values of θ for which mergers of any size are profitable. Consider a merger of two firms (i.e. a merger for which $k = 1$); Proposition 1 tells us that it is profitable for $\theta \in \left[\max\{0, \underline{\theta}(1,n)\}, \frac{2}{n+1} \right)$. If a two-firm merger is profitable then mergers of larger size are also profitable, because a minimal profitable merger size exists. Hence, all mergers are profitable in this interval. When θ is high enough, the increase in the residual demand (through a merger) is the only way to obtain significant profits. Imagine that in figure 2.a we had set $\bar{c}$ slightly below the intercept of demand. Then pre-merger profits would be so close to zero that mergers would be profitable. If any merger is profitable although firms are obtaining positive (even if small) profits before the merger, it is obvious that mergers will also be profitable when firms do not obtain profits at all, i.e. when $\theta \geq \frac{2}{n+1}$.

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[4] It is the change that increases θ that can be represented more easily.

3. Concluding Remarks

Rey and Tirole (forthcoming) showed that vertical mergers are profitable when supply contracts are secret. In the same setting, we have shown that horizontal mergers are also profitable. Therefore, in future work, it would be interesting to study the interaction between both types of mergers.

We have considered secret contracts. We are going to devote future research to see if the main intuitions still hold when one assumes instead that contracts are observable.

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