

EC547:
INDUSTRIAL ECONOMICS ESSAY

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Mergers: A Theoretical and Empirical Analysis

Introduction

A “merger” can be defined as a consolidation between two firms where one has joined the other and together they become one entity. Nowadays we are witnessing a relevant increase in the number of mergers in many different markets. In this paper, we will analyse the theory behind mergers, with appropriate models and take in consideration various relevant papers (such as “Anticompetitive Vertical Integration by a Dominant Firm” and “Chain-Store Pricing Across Local Markets”) and real-life examples in order to determine whether mergers can be profitable and socially desirable. Due to the vastness of the argument and the word limit, we will focus mainly on horizontal mergers, we will not be able to analyse in detail the models from the papers and we will study in depth only few real-life examples.

The order of our research is very simple: we will start with a brief analysis of vertical mergers, followed by a more detailed analysis of horizontal mergers with appropriate models. We will then conclude by talking about relevant papers and the issues with food retailing sector and the recent merger between Disney and 20th Century Fox.

Vertical and Horizontal Mergers

First of all, we will consider the consolidation between two firms in the same product line but at different levels of production: a vertical merger. These kinds of combinations can create many issues. Even if they can be beneficial for firms and consumers, by eliminating the deadweight-loss induced by the double marginalization, they may block other rivals from entering the up or downstream markets and ease price discrimination. Unfortunately, it is very difficult to estimate the results but it is commonly claimed that the negative impact of the possible vertical market block, could force the remaining independent firms to merge as well. However, the vertically merged firms could prevent other firms from merging and even if there is a market block and a price decrease for rivals, this could increase the consumer surplus and make the merger socially desirable. Therefore, even if a vertical merger can be disadvantaging for other firms, this should not prevent them from happening, since they could be profitable and socially beneficial. Nowadays, we do not have much evidence that shows that vertical mergers increase monopoly power, on the contrary, a recent study of the ready-mixed concrete industry suggested that vertical integration increase productive efficiency and reduces consumer prices. A recent example is the acquisition of Time Warner by AT&T which is, according to the Washington Post: “one of the most powerful combinations of content and distribution America has ever seen.”.

According to the paper “Anticompetitive Vertical Integration by a Dominant Firm”, on the other hand, it is shown that, in the dominant firm model, the dominant firm, following a vertical integration, has an even bigger incentive to acquire capacity to commit to a lower marginal cost. This results in higher prices, a potential lower social welfare and a block against other rivals that are forced to buy less capacity.

Therefore, the extent to which vertical mergers improve or reduce social welfare, still has to be properly defined.

Passing on to the horizontal mergers, we will analyse three different merger markets: Cournot, Stackelberg and Salop.

A horizontal merger is a consolidation between two firms that compete in the same industry. Here it becomes more complicated, since the union between firms can give rise to a monopolistic market. But the main concern in this case is the phenomenon called

“merger paradox”: this states that the merger is not profitable for the merging firms (unless it is a merging to a monopoly), while the ones who gains from it are the rival non-merging firms.

To analyse better this paradox, we will start with the first type of market. With Cournot competition, we have quantity-setting firms that compete simultaneously on quantities produced. Let us consider n firms with identical costs that produce homogeneous goods:

$$C(q_i) = cq_i \text{ for } i = 1, \dots, n$$

The market demand is:

$$P = A - BQ = A - B(q_i + Q_{-i})$$

Therefore, the profit of firm i would be:

$$\pi_i(q_i, Q_{-i}) = (A - Bq_i - BQ_{-i} - c)q_i$$

We have then optimal quantity, price and profit (pre-merger Cournot equilibrium):

$$q_i^* = \frac{(A - c)}{B(n + 1)}$$

$$Q^* = \frac{n(A - c)}{B(n + 1)}$$

$$P^* = \frac{A + nc}{n + 1}$$

$$\pi_i^* = \frac{(A - c)^2}{B(n + 1)^2}$$

If m merge, industry will be $(n-m+1)$ firms and the merged firm choose q_m output to maximise profits:

$$\pi_m(q_m, Q_{-m}) = (A - Bq_m - BQ_{-m} - c)q_m$$

Now we see how post-merger Cournot equilibrium looks like:

$$q_m^* = \frac{(A - c)}{B(n - m + 2)}$$

$$\pi_m^* = \frac{(A - c)^2}{B(n - m + 2)^2}$$

Therefore, the real gainer from the merger is the non-merging firm which will have an increase in equilibrium output and profits. In order to be profitable, the merging firm needs this condition:

$$\pi_m^* \geq m\pi_i^*$$

$$\frac{(A - c)^2}{B(n - m + 2)^2} \geq m \frac{(A - c)^2}{B(n + 1)^2}$$

$$(n + 1)^2 \geq m(n - m + 2)^2$$

$$m \geq \frac{1}{2}(3 + 2n - \sqrt{5 + 4n})^2$$

Which basically means that around 80% of the firms need to merge in order for the merger to be profitable. Although this is prohibited by law, so in real life we will never witness it, there are other ways for the merger to be profitable. For instance, if the merging will save costs, or the firms are competing in prices or the merged firm becomes a Stackelberg leader, then we have solved the paradox.

In the case of a Stackelberg competition, let us consider N firms with L leaders and $N - L = F$ followers:

$$Q^F = (N - L)q_f^* = \frac{(N - L)(A - c)}{B(N - L + 1)} - \frac{(N - L)Q^L}{(N - L + 1)}$$

The residual demand is:

$$P = [A - B(Q^F + Q_{L-1})] - Bq_l$$

The leader's demand is:

$$P = \frac{A + (N - L)c - BQ_{L-1}}{(N - L + 1)} - \frac{B}{(N - L + 1)}q_l$$

The leader's best output response is:

$$MR_l = \frac{A + (N - L)c - BQ_{L-1}}{(N - L + 1)} - \frac{2B}{(N - L + 1)}q_l = c$$

$$q_l^* = \frac{(A - c)}{2B} - \frac{Q_{L-1}}{2}$$

Total leader output:

$$Q^L = Lq_i^* = \frac{L(A - c)}{B(L + 1)}$$

Individual and total follower output:

$$q_f^* = \frac{A - c}{B(L + 1)(N - L + 1)}$$
$$Q^F = Lq_i^* = \frac{(N - L)(A - c)}{B(L + 1)(N - L + 1)}$$

Final equilibrium output and price:

$$Q^T = Q^L + Q^F = \frac{(N + NL - L^2)(A - c)}{B(L + 1)(N - L + 1)}$$
$$P^* = \frac{A + (N + NL - L^2)c}{(L + 1)(N - L + 1)}$$

The price-cost margins and the profits for leaders and followers are:

$$P - c = \frac{A - c}{(L + 1)(N - L + 1)}$$
$$\pi^L(N, L) = \frac{(A - c)^2}{B(L + 1)^2(N - L + 1)}$$
$$\pi^F(N, L) = \frac{(A - c)^2}{B(L + 1)^2(N - L + 1)^2}$$

Therefore, a two-firm merger that creates a Stackelberg leader will be profitable. This model also shows that in the event of a second merger, this one will be profitable if the following condition is satisfied:

$$\pi^L(N - 1, L + 1) = \frac{(A - c)^2}{B(L + 1)^2(N - L + 1)^2} > 2\pi^F(N, L) = \frac{2(A - c)^2}{B(L + 1)^2(N - L + 1)^2}$$

Meaning that the profit of the new merger must exceed the combined profit earned by the two followers prior to the merger. This condition is always met; therefore, “an additional two follower firms always wish to merge”. But can they be beneficial for the consumers?

$$\frac{A - c}{(L + 2)(N - L - 1)} < \frac{A - c}{(L + 1)(N - L + 1)}$$

$$(L + 1)(N - L + 1) < (L + 2)(N - L - 1)$$

$$N - 3(L + 1) > 0$$

$$N > 3(L + 1)$$

$$L < \frac{N}{3} - 1$$

This answers the question, hence “a two-firm merger that increases the number of leaders, benefits consumers only if the current group of leaders contains fewer than a third of the total number of firms in the industry”. This is an important point that we will analyse further.

Another important case of mergers is the one in the Spatial Market. According to the Salop’s Circular City Model, where customers are distributed around a circular market, where the dots show the location of firms:

In this model, we have a perimeter equal to 1, n firms, the distance between two firms is $1/n$, V is the flight valuation, utility is: $V - tX - P$ and between 2 firms there will be an x customer:

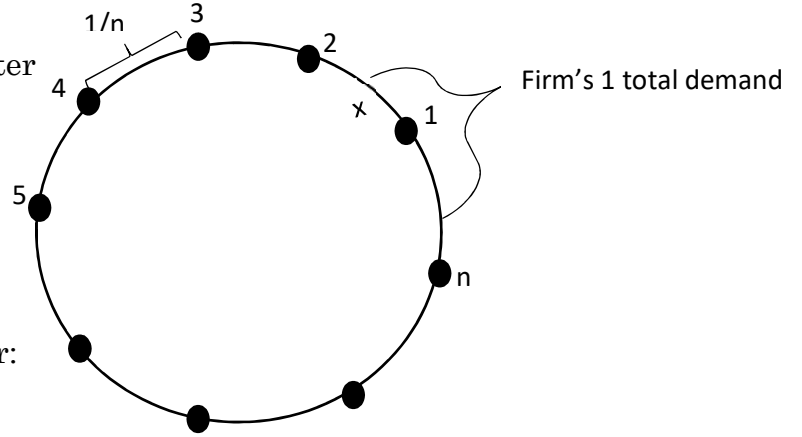
$$V - tX - P_1 = V - t\left(\frac{1}{n} - X\right) - P_2$$

Firm’s 1 total demand will be:

$$D_1 = \frac{P_2 - P_1 + \frac{t}{n}}{2t} + \frac{P_n - P_1 + \frac{t}{n}}{2t}$$

Assuming fixed costs plus marginal costs ($C = F + cq$) the profit max. of firm 1 is:

$$Max\pi_1 p_1 = (P_1 - c) \frac{P_2 - P_1 + \frac{t}{n}}{2t} + (P_1 - c) \frac{P_n - P_1 + \frac{t}{n}}{2t} + F$$



Differentiating we get: $P^* = c + \frac{t}{n}$ which means that the higher is the number of firms, the lower is the optimal price. This is negative for firms but positive for consumers, therefore a merger could be profitable in decreasing n .

$$n^* = \sqrt{\frac{t}{F}} > 2n^s$$

This condition shows that: if firms want to make a non-negative profit, the number of firms has to be equal to $\sqrt{\frac{t}{F}}$. This means that more mergers decrease the number of firms, increasing market power and therefore optimal price. This model is an example of a market with too much entry that is good for firms but bad for consumers.

Overall, we have seen that higher market concentration corresponds to higher profits for firms but bad news for consumers. But what does the literature say about it?

Dobson and Waterson have analysed in depth the food retailing sector and drew some interesting conclusions: in their first analysis (1999) a very interesting point was “Exclusivity should be seen as desirable only when it delivers clear benefits”. In this paper they were assessing the increasing concentration of the food industry in Europe. The fact that a merger delivers an exclusive service must be carried out with some benefits, too. As they rightly underlined, merging is not always undesirable, but it has to guarantee a certain degree of improvement in efficiency, both for firms and consumers. For instance (2001) if a merger occurs between two big buyer powers, this has a strong impact over the market, against smaller firms but also over the consumers, which would experience a “lack of choice” for products. The paper from 2003 reassures these concerns by showing that the increase in the market concentration has led to many improvements, such as increase in efficiency, lower prices and a wider choice for consumers. However, there has been a shift from “local convenience” to “greater homogenisation of retailing”, at the point where the choice of store is becoming very limited. With further consolidation, the problem of absence of competition could become more and more widespread. This, in turn, can cause some policy choices, such as uniform pricing (2005), that are not socially desirable.

Another interesting market to observe, which has become increasingly important in recent years, is the Entertainment one. More specifically, the recent merger between Walt Disney Studios and 20th Century Fox has raised many concerns. First of all, is this merger legally possible? According to the Antitrust it is, but the norms and regulations for mergers are not clear. For instance, there is a big potential merger on the way between Asda and Sainsbury that would not be legally possible since together they would own 60% of the market, but it is likely to happen. Very similarly, if we consider the calculation of the Herfindahl-Hirschman index (HHI), which is a measure of market concentration, we obtain these results:

Domestic box office market share of the six major film studios in Hollywood from 1995 to 2018								
Pre-Merging	Disney	Warner	Sony	20th C. Fox	Universal	Paramount	Total	CR4
	16,23	15,12	12,10	11,56	11,45	10,69	77,15	55,01
HHI	263,41	228,6144	146,41	133,6336	131,1025	114,2761	1017,45	
After-Merging	Disney	Warner	Sony	Universal	Paramount		Total	CR4
	27,79	15,12	12,10	11,45	10,69		77,15	66,46
HHI	772,2841	228,6144	146,41	131,1025	114,2761		1392,69	
							HHI Increase:	CR4 Increase:
							375,24	11,45

Data Source: Statista.com

According to this data, after the merger, Disney would own almost 28% of the market share. Unfortunately, is very difficult to get the exact market share for each firm and the exact number of firms in this industry as there are hundreds of sub-firms and very small ones, but from gathering the data from the “big 6” (now “big 5”) we can see that there is an increase in HHI of more than 100 and in CR4 of more than 10%. The Antitrust policy assert that a merger should result in less than 100 increase in HHI and less than 10% increase in market share. It is possible that they have a full set of data from which to determine whether the merger is possible or not, but nonetheless, the impact of this merger is too big to not have been analysed in depth. It is also interesting to observe that, according to a newspaper article (deadline.com), earnings in the short-run are likely to be very flat, mainly because of the cost of the merger and the high debt, but they are also likely to increase in the long-run. Also, according to an article of

Forbes, the impact on consumers will be very big over time, but once again, the extent to which it will improve or reduce social welfare is still relative.

Conclusions

Following the analysis of vertical, horizontal, Cournot, Stackelberg and Salop's mergers and evidence from the literature and other examples, we have found different results. After a vertical integration, the merged firm is almost always profitable but it is not clear if it is socially desirable. The Cournot merger is rarely profitable and good for consumers, especially in a real-case-scenario that excludes a merging to a monopoly. A Stackelberg merger, on the other hand, seems the best compromise, since it guarantees profits for the merging leader and it can be socially desirable. On the contrary, the Salop's model is very negative for consumers and very positive for firms. In the literature and real-life examples, we have found that mergers almost always succeed in making profits but in the majority of cases, the losers are the consumers. Therefore, we can assert, on average, that mergers are profitable for the combining firms but detrimental for rivals and consumers.

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