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Spatial competition and merging incentives when firms produce complements ☆

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ABSTRACT

In a model of spatial competition, we show that complementarities can benefit the parties to a merger more than any outsiders thus leading to higher concentration. The driving force is the negative demand externality imposed by the merging firms on the non-merging units in the same locations, which tends to counteract the increase in the composite price (or overall cost of shopping) in the locations with a merger. Since however some of the outsiders are harmed, we also consider how the possibility of a subsequent merger by the initially harmed outsiders may change the incentives for the first integration. Our results show that if the number of firms is sufficiently large, then the initial merger will still be carried through. It follows then that there would be a real need for regulation: market power and market interactions may provide firms with incentives to merge, just like efficiency gains do.

1. Introduction

Market concentration may be harmful for competition and consumers: it may result in higher prices, restricted consumer choice, limited local competition. Despite these anti-competitive effects, we observe that many industries/sectors are highly concentrated.[1] A possible reason for merging is that firms incur larger fixed costs as the market size increases. From this perspective, highly concentrated industries may simply have grown to exploit scale economies in research/production or to overcome the increasing fixed costs in the context of internationally growing markets. In some sectors, higher concentration may have been fuelled by several tax and regulatory advantages. Mergers may also be motivated by a desire to diversify investment portfolios, to gain fast access to new technologies and markets or simply to exploit market power. Of course, most mergers are driven by more than one motive. However we are interested in developing a setting where, in the absence of cost reductions, the merging firms gain more from the merger than the non-merging firms.

A robust result in traditional models of oligopolistic behaviour, (under both quantity and price competition), is that, absent efficiency gains, the main beneficiaries of a merger are the excluded firms.[2] This is due to the presence of strategic interactions but is independent of the sign of the slope of the reaction functions of the players. When prices are the strategic variables, the reaction curves are upward sloping and the excluded firms increase their price by less than the participants and hence benefit from an increase in both the demand and the price for their products.[3] When quantities are the strategic variables, the reaction functions slope downwards and the merger-induced reduction of output by the participants ends up offsetting the strategic advantage of the firms merging first.[4] The literature that has built on these models appears to reinforce these results,[5] (see for a discussion Pepall et al., 1999). If the predictions of these models were correct, there would be fewer mergers motivated by market power.[6] But firms can still have incentives to merge (even in the absence of efficiency gains) if this means preempting undesirable mergers among other firms. For instance, in a model of spatial competition, Brito (2003) shows that although mergers are more profitable for some outsiders, other outsiders gain less; thus, if there is uncertainty about the future, firms may still have incentives to participate, to avoid being the least benefitted outsiders. Nilssen and Sorgard

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[1] Concentration appears to be most evident in the agri-food system and in some chemicals, electrical, engineering and vehicles industries.

[2] This result can be reversed in the presence of various cost savings generated by the merger activity, as shown, for instance, by Perry and Porter (1985).

[3] See Deneckere and Davidson (1985).

[4] See, for instance, Salant et al. (1983) and Lommerud and Sorgard (1997).

[5] For instanceKwoka (1989) uses a model of conjectural variations, to show that mergers are more likely to be profitable for the participating firms in relatively competitive markets; while Ziss (2001) proves that the profitability of a merger may be increased by delegating the output decision to an agent with appropriate incentives. In both scenarios, however, the principal beneficiaries from a merger are the outsider firms.

[6] Kamien and Zhang (1990) show that, in this type of setting, there is always an incentive to defect from a proposed merger, unless the merger size is sufficiently large compared to the market size.

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(1998) and Fridolfsson and Stennek (2002) argue that evaluating a potential merger in isolation can lead to misleading conclusions as there can be interdependence of merger decisions over time. Thus we have to look at how subsequent mergers by other firms would affect the profitability of the initial merger. From this perspective, even mergers that are unprofitable in isolation can still be carried through, if they trigger (discourage) subsequent mergers that increase (reduce) the profitability of the initial mergers.

Building on this literature, we investigate whether mergers can benefit the participating firms more than any outsiders in the absence of efficiencies or synergies. The approach we follow is based upon a model of spatial competition, when there are complementarities between firms producing at the same location. The complementarities between firms work through consumers' demand for bundles of goods available at the same location (e.g. dress shops and shoe shops in malls).[7]

In markets where the spatial dimension is important, the costs and benefits of a merger to different groups of firms depend on their locations. For instance, Braid (1999) shows that a merger between two neighbouring stores increases the prices and profits of all stores, but by different amounts for different stores. In the circular city model Brito (2003) shows that the gain from remaining a close outsider exceeds the gain from merging but that the profit gains for the outsiders decrease with their distance from the participating firms.

Drawing upon this literature, we introduce local complementarities within the circular city model. We show that mergers can benefit the participating firms more than any outsiders thus leading to higher concentration. In particular, for the case of only one bilateral merger, mergers not only are more beneficial for the merging parties but also are harmful for the outsiders selling the local complement. Thus, in comparison with the canonical models of oligopolistic competition, there is no free-rider incentive that could stop two firms from merging and the "merger paradox" is reversed. This occurs because of the negative demand externality imposed by the merging units on the outsiders selling the local complement, that actually counteracts the increase in the overall cost of shopping in the locations with a merger. We also investigate whether the incentives for a first merger are robust to a subsequent merger by the initially harmed units.[8] We show that when the number of firms is sufficiently large, this subsequent merger, although reducing the profits of the initially merged units, doesn't alter the incentives for the initial units to merge. However, when the number of active firms is smaller, the strategic disincentive to merge can survive even with extreme complementarities.

Our results are in sharp contrast with the predictions of the standard oligopoly models with linear demands and exogenous costs and help understand why firms may be willing to merge even in the absence of efficiency gains. Our findings have also important implications for antitrust policy. They suggest that, when judging the anti-competitive effects of mergers, antitrust authorities should also take into account how market interactions between firms affect the incentives to merge.

On a more general level, the model analysed in this paper may be applied, not only to situations where firms sell complements that final users combine into a bundle, but also to situations where the existence of shopping costs implies that products sold within the same location (e.g. the same mall) are complementary (even if not in the usual sense).[9] If there are shopping costs, in the form of commuting or search costs, then consumers might prefer to concentrate their purchases at shopping malls that bring many stores together in the same location, (Stahl, 1982). In this case, the relevant price for the consumer will be the composite or overall price of the bundle of goods he/she wishes to buy rather than the price of the individual products. In this context, even shops selling unrelated products might be harmed by a price increase from a shop at the same location .[10] This happens because, when deciding to raise its price, an individual firm doesn't take into account the negative externality that its pricing behaviour imposes, (through the effect on the overall cost of shopping at a mall/location), on the firms/shops in the same location. Our results suggest that a regulator could indeed limit this negative demand externality through the use of zoning/planning regulations that restrict mergers between shops in neighbouring malls and/or opening up of new branches in neighbouring locations.

2. The model

In this section, we extend the model of spatial competition[11] used by Vickrey (1964, 1999) to the case in which there are complementarities between firms at the same location. There are n firms producing good y and n firms producing good z, symmetrically located around a circumference of unitary length; the distance between any two firms producing the same good is thus $d=1/n$ and, at any location, there is one firm producing y and one firm producing z; goods y and z are perfect complements.[12] A graphical representation of this market configuration is offered in Fig. 1, for the case of $n=8$.

Consumers (uniformly distributed around the circumference) buy one unit of good y and one unit of good z from the firms with the lowest composite supply cost, $BP+T$, where $BP=P^y+P^z$ is the composite or bundle price (the sum of the prices of the two goods, y and z) and T is the transport cost.[13] Transport costs are assumed to be quadratic, so that a consumer located at a distance x from its supplier incurs transport costs tx^2. Without loss of generality, we normalise t to unity.[14] If x_i denotes the position of firms i_y and i_z on the circumference,[15] a consumer located at x_i^*, with $x_i<x_i^*<x_{i+1}$, will be indifferent between buying at firms i_y and i_z or $(i+1)_y$ and $(i+1)_z$ if:

$$BP_i+\left(x_i^*-x_i\right)^2=BP_{i+1}+\left(x_{i+1}-x_i^*\right)^2.$$

By analogy, a consumer located at x_{i-1}^*, with $x_{i-1}<x_{i-1}^*<x_i$, will be indifferent between buying at location i or at location i-1 if:

$$BP_{i-1}+\left(x_{i-1}^*-x_{i-1}\right)^2=BP_i+\left(x_i-x_{i-1}^*\right)^2.$$

[7] The idea is similar to that of "customer complementary clusters", geographical concentrations of independent enterprises that produce and sell a range of complementary products or services. Typical examples include: auto care cluster, with independent businesses providing for instance tyres, car wash, auto repair and insurance; women's apparel, with independent businesses providing clothing, shoes, jewellery, leather accessories, hair salon.

[8] As we will argue, this is the merger most feared by the insiders in the first merger and hence the merger most likely to determine whether the initial merger will be carried through.

[9] For instance, these could be unrelated goods which consumers wish to purchase together to save on shopping costs (Beggs, 1994).

[10] In fact, if consumers wish to buy unrelated products together to save on shopping costs, a price increase by a shop in the mall will raise the overall cost of shopping at the mall. Beggs (1994) argues that similar qualitative results could be obtained under the assumptions of substitutability between goods (or varieties of the same good, e.g. clothing) sold within the same mall when consumers have uncertain tastes and need to visit the mall to find out which variety they would like to purchase. Provided the degree of substitutability between varieties is not too great, then a price increase by a shop selling one variety will raise the average price of the varieties of the good sold within the mall, thus inducing some consumers to buy at different malls.

[11] Also referred to as the model ofSalop (1979).

[12] We could assume that the ratio of the demand for product y to the demand for product z is different from one. But for the type of mergers we are considering, the results would be unchanged if there was a common complementarity rate between firms in each location different from one.

[13] It can be shown that it is optimal for the consumers to buy both goods in a single location in order to economise on transport costs. Without any merger and complete symmetry this is evident, but it is also true if firms, in only some locations, merge.

[14] Note that if one goes beyond the geographical interpretation of the transport cost and thinks in terms of product differentiation over varieties, then the transportation cost parameter might be different for the two goods.

[15] For the sake of clarity, i_y is the firm located at x_i and producing good y; $(i+1)_y$ is the firm located at x_{i+1} and producing good y.