Follow or join the Leader?

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Abstract:

Introduction and model description

Consider a market that is characterized by one large player ('the leader') which is a merger of K separable individual firms, and a continuum of J follower firms. A transport application we have in mind is the taxi market, where there is one big leader firm and many individual follower firms. This paper analyses the case where the size of the leader firm is endogenously determined taking into account the behavior of a competitive fringe. We analyze two cases: first we assume that entry in the follower market is free and therefore the size of the fringe is endogenously governed by the zero profit condition. This corresponds to a long run situation where firms will enter the market as long as there are profits to gain. Second, we analyze the case where the number of followers is exogenous which is more in line with the short run, or with a situation where market entry is fixed. Customers in our model respond to firms' prices, but also face search costs, which are decreasing in the number of firms operating at the market, meaning that the probability to find a firm belonging to the leader (follower), increases in K (J).

An essential ingredient of our model is that we consider a situation of profit-sharing at the leaders firm: each individual firm belonging to the leader firm receives the same share of the total profit pie. The leader firm therefore optimizes average profits taking into account the price and entry behavior of the fringe. The leader firm decides on the size of the alliance and therefore seeks to optimize K. Because customers' search costs decrease in K, an increase in K increases demand for the leaders firm. However, an increase in K may decrease average profit for members of the leader firm because the leaders profit pie must be shared with more individuals. This set-up acknowledges that with an endogenous size of the fringe, follower firms have an incentive to join the leaders firm as long as the average profits are larger than zero. However, the leader firm may put a limit on the number of individual firms entering. The model therefore predicts positive equilibrium average profits for individuals belonging to the leader firm. When there is free entry there will be zero profits for followers. Therefore followers will have an incentive to become part of the leader firm, up to the average profit-optimal firm size K.

Research results

Our research results can be summarized as follows. First, we derive (implicit) solutions for follower and leader prices in an unregulated Cournot equilibrium using Lagrangian techniques (see for example Van Dender (2005) for such an approach). Here we show how prices of followers and the leader relate to

demand related parameters, search costs and the size of the leader firm. When the leader and follower firms are considered to be imperfect substitutes, the leader firm accounts for the fact that total follower demand will respond to optimal quantity setting by the leader firm.

Because there are search costs externalities involved, the unregulated equilibrium is sub-optimal in welfare terms and there is scope for welfare improvements using taxes or via the regulation of market entry using entry fees. We first investigate welfare optimizing first-best policies as a natural benchmark. Here the regulator has control over the size of the fringe (J), the follower and leader prices (for example via taxes or subsidies) and the size of the leader firm (K). We then proceed with the analytical analysis of second-best policies where the government can only control the size of the fringe and the prices, or where only entry regulation in the follower market is possible. The endogeneity of the size of the leader firm (K) results in different first-best and second-best solutions than for the standard Stackelberg model with exogenous leader size.

Research contribution in relation to existing literature

Through it application, our paper also in the first place seeks to contribute to the literature on taxi market regulation, where we pay special attention to the industry structure of the market and allow for potential mergers at the leader firm.

Furthermore, despite its importance for existing markets in various industries, leader-follower models with endogenous entry are not widely studied in the literature. Etro (2008) provides an in-depth analysis of Stackelberg competition with endogenous entry. He finds that the leader faced with endogenous entry and differentiated products, behaves in an aggressive way by setting lower prices and higher output than the followers. Zigic (2012) confirms that endogenous entry reverts the standard Stackelberg results.

Our analysis shares some similarities with the previous two studies, but we introduce consumer search cost externalities, profit sharing at the leader firm (which is of endogenous size), and offer an insightful analytical framework to analyze the strategic behavioral rules of the actors for fairly general properties of the demand structure and the search costs. The paper can therefore be linked to the ongoing debate about mergers in Stackelberg markets (Huck et al., 2001); our leader allows followers to join the leader firm only if average profits increase, which in turn depends on the consumer externalities.

References:
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