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Demand Uncertainty in a Cournot-duopoly

In this article we investigate the effect of de- mand uncertainty on the timing of production decisions of two competing firms. A firm that enters the market early makes a risky decision. If demand turns out low market price is low too, and the firm does not make large profits. If demand turns out high the market price is high, and there is plenty of room for the competitor. The entrant has a trade-off between capturing a large share of the market and leaving it to the competitor. The follower risks losing a large market share by waiting but gains by entering the market with good information about demand. This kind of situation is quite common. Perhaps the most important case is that of new products. Many firms have prototypes of products but they do not know if they should bring them onto the market or not. Another case is a new location; should a fast food chain establish a new restaurant in a new district or not? A third case is a seasonal product whose demand varies from year to year. A travel agency, for example, does not know the demand for skiing holidays at the time it makes hotel reservations and other arrangements.

We use a traditional duopoly model in which firms choose quantities that they bring to the market. The firms may choose to produce simultaneously or one of them may enter the market before the other. The firmstimal decisions result in sequential entry. The entrant makes the decision under uncertainty while the follower knows the demand and the entrantroduction level. With no uncertainty the first mover has an unambiguous advantage. With uncertainty one of the firms chooses to take advantage of being the first mover, and the other firm chooses to take advantage of better information. Depending on the magnitude of uncertainty either one of the firms may have greater profits. The expected profits of the follower are increasing in uncertainty because the followernformational advantage grows with uncertainty. With large uncertainty it is the follower that earns higher profits. In no case do the firms enter the markets simultaneously since then both of them face uncertain demand with no advantage over the other.

There are two standard approaches to two competing firms. One is to model them as Cournot-competitors who choose their production levels independently and simultaneously. The other is to model them as Stackelberg-competitors who make their production decisions sequentially. The choice of the appropriate model and the question about the determination of the firmshaviour has been widely studied in the literature. We show that when firms are allowed to choose the order of entrance to the markets introduction of arbitrarily small demand uncertainty destroys equilibria with simultaneous entry decisions