Licensing in a Differentiated Product Duopoly with Price and Quantity Contracts

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Abstract

In this paper, we extend the differentiated product duopoly model of Singh and Vives (1984) to a model where the firms are asymmetric with respect to their marginal costs and the more efficient firm (firm 1) can license its technology to the other firm (firm 2). Our model involves a noncooperative game with three stages. In stage one, firm 1 decides on whether or not to make a licensing offer (with a fixed fee) to firm 2, which has to either accept or reject this offer. At the end of stage one, the marginal costs are finalized. In stage two, each firm chooses a price or a quantity contract binding with consumers. Finally, in stage three, the firms engage in price competition, quantity competition, or mixed competition depending upon the contracts they have chosen in stage two. Our numerical computations show that the unique (subgame perfect Nash) equilibrium of this three-stage game involves price competition whenever the products of the firms are complements. However, whenever the products are substitutes, either quantity competition or price competition may arise as part of an equilibrium depending upon the size of the cost asymmetry and the degree of substitution. Moreover, whenever the products are complements, both consumers and the firms become better off if licensing occurs. In contrast, whenever the products are substitutes, licensing can make both consumers and the firms better off only if the degree of substitution and the size of cost asymmetry are sufficiently small.

Keywords: Licensing, differentiated goods, duopoly, cost asymmetry, contracts.

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