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Strategic incentives when supplying to rivals with an application to vertical firm structure[☆]

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ABSTRACT

We consider a vertically integrated input monopolist supplying to a differentiated downstream rival. With linear input pricing, at the margin the firm unambiguously wants the rival to *expand*—unlike standard oligopoly with no supply relationship—for either Cournot or Bertrand competition. With a two-part tariff for the input, the same result holds if downstream choices are strategic complements, but is reversed for Cournot with strategic substitutes. We analyze vertical delegation as one mechanism for inducing expansion or contraction by the rival/customer.

1. Introduction

Vertically integrated firms often supply inputs to other firms with whom they compete in a downstream market. To cite just a few examples, Qualcomm makes chips

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used in smartphones and licenses key patents to rival chip manufacturers (Benoit and Clark, 2015); Samsung supplies components for iPhones and produces competing devices; Comcast-NBCU supplies programming to video distributors and competes with them in video distribution (Rogerson, 2013); and the US Post Office supplies last mile distribution services of packages to private competitors such as FedEx and UPS (Panzar, 2015).

Tougher behavior or "expansion" by a rival/customer—an output increase or a price decrease—then has opposing effects on the integrated firm's profit: downstream profits fall, the *competition effect*, but input sales and upstream profits rise, the *supply effect*. At the margin, would the integrated firm gain or lose from expansion by its rival/customer? Specifically, consider the following thought experiment. Hold constant the integrated firm's downstream choice and the equilibrium input contract with the other firm, and suppose the integrated firm could change the other firm's downstream choice, anticipating how this affects input orders. Would it prefer to set a (marginally) higher quantity (or lower price) than the other firm chooses in equilibrium or the reverse, i.e. for the other firm to become more aggressive than in the actual equilibrium or less aggressive?

The question is relevant because the integrated firm may have additional ways beyond the input contract to elicit the desired change in the rival/customer's choice. For example, post contract the integrated firm may discover a way to lower the other firm's marginal cost, such as by sharing an innovation, or to raise it by engaging in a new form of non-price discrimination. Its attitude toward the other firm's marginal cost will hinge on whether it prefers that firm to become more or less aggressive relative to the equilibrium choice. Additionally, the integrated firm might alter the other firm's choice—without necessarily changing the input contract—by making observable commitments that change its own strategic posture in downstream competition, as discussed in the extensive literature on strategic commitments in oligopoly (surveyed by Shapiro, 1989). (We shall analyze one such mechanism, vertical delegation.) There, a firm may adopt a tough or soft posture depending on whether the competitive choice variables are strategic substitutes or strategic complements (Fudenberg and Tirole, 1984; Bulow et al., 1985)—but the goal throughout is to induce softer behavior by a rival. In our setting, the downstream rival is also an input customer, which introduces an opposing incentive.

We consider an unregulated and vertically integrated input monopolist that chooses to supply the input also to a downstream firm selling a differentiated substitute product. With enough differentiation, or a sufficient cost advantage for the other firm, the input monopolist indeed will prefer not to foreclose entirely the other firm. Downstream competition may be Cournot or Bertrand, and we do not impose a functional form on demand. Despite the tradeoff between downstream profits and input profits, we are able to characterize under fairly general conditions the integrated firm's incentive regarding a marginal expansion by its rival/customer starting at the equilibrium contract.

When the input is sold under linear pricing, at the margin the integrated firm necessarily benefits from expansion by the rival/customer (Proposition 1). This sharp result holds whether downstream competition is in prices or quantities, and whether these