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# Process Innovation, Product Differentiation, and Channel Structure: Strategic Incentives in a Duopoly

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## Abstract

In this paper we analyze the joint implications of two effects: (a) inserting independent profit-maximizing retailers into the channel system provides “buffering” to the manufacturers from price competition when their products are highly substitutable and intrachannel contracts are observable (as shown by McGuire and Staelin 1983 under the assumption of constant marginal production costs), and, (b) lack of channel coordination results in a reduction in manufacturer’s incentives to invest in efforts to reduce production costs (as shown by Jeuland and Shugan 1983 for the case of bilateral monopoly). We show that both these results are robust in the sense that the first holds even in the presence of the vertical externality of manufacturer’s effort reduction in a noncoordinated channel, and the second holds regardless of the degree of substitutability between the competing channel’s products.

Specifically, we analyze a four-stage game with two manufacturers and two retailers, where the intrachannel contracts are linear and observable and manufacturers make investments in process improvements to reduce their production costs. We find that the optimal channel structure decision depends on interactions between two parameters: the degree of substitutability between products and the level of investments required to achieve production cost reduction. These parameters represent what have been widely interpreted in the management literature as the two primary “generic strategies” that most organizations follow in order to gain competitive advantage: cost leadership and product differentiation (Porter 1980). Thus, our analysis brings out the strategic and interdisciplinary nature of the channel structure decision that can significantly affect firm profitability.

Our main results are as follows. First, we find that decentralized, noncoordinated channels appear as more profitable equilibrium than integration (or perfectly coordinated channels) at high product substitutability even when process innovation dimension is accounted for, in agreement with the

literature. However, the range of substitutability over which decentralization is an equilibrium strategy is smaller the easier it is to reduce production costs. Intuitively, the easier the cost reduction, the larger the cost penalty that the channel incurs as a result of not coordinating investment and pricing decisions between channel members, and thus smaller the range over which decentralization is an equilibrium. This implies that there is an explicit tradeoff between efficiency and strategic incentives in distribution channel design.

Second, we show that decentralized manufacturers invest less in process innovation than integrated manufacturers do, regardless of the structure of the competing channel and the degree of substitutability between products. Consequently, a decentralized channel has higher costs, charges higher prices, and produces lower quantities than an integrated channel does. Moreover, these differences get larger the easier the cost reduction. The effect on manufacturer profits, however, is not that clear. Manufacturers make higher profits by decentralizing if products are highly substitutable, in agreement with McGuire and Staelin (1983) and Coughlan and Wernerfelt (1989). However, we also find that the relative profitability of decentralization at high substitutability (and of integration at low substitutability) increases the easier the cost reduction. Moreover, the range of substitutability over which decentralization is more profitable than integration is itself larger the easier the cost reduction (though decentralization is an equilibrium strategy over a smaller range). Thus, process innovation accentuates the profit difference between integrated and decentralized channels and makes the Prisoner’s Dilemma situation worse in the choice of distribution channel structure.

Finally, we analyze two examples of coordinated decision making in a channel: a divisional integrated system and franchising. In the first case, we find that decentralization can emerge as a unique (and more profitable) equilibrium at high product substitutability, in contrast to McGuire and Staelin (1983). In the second case, we find that decentralization is not