

Decisions on Pricing, Capacity Investment, and Introduction Timing of New Product Generations in a Durable-good Monopoly

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Abstract: When a firm decides about the price of its product, this choice affects demand. To be able to fulfill demand, a firm must sufficiently invest into capacities. The launch of a new generation of a product attracts new customers. However, only a certain fraction of the production capacities can be used for the new version of the product, adaptations of the production facilities are necessary to fulfill demand.

The aim of the present paper is to analyze how firms that sell durable goods combine continuous-time operational-level planning (continuously deciding on capacity investment) with discrete decision making (when to launch a new generation of the product, how to price a generation of the product). For this, we use methods from multi-stage modeling and impulse control.

We find that a firm should invest most into its production capacity upon the introduction of a new product. Then the stock of potential customers is the largest, so most capacities are needed then. The extent to which existing capacity can still be used in the production process for the next generation has a non-monotonic effect on the time when a new version of the product is introduced as well as on its price. We show that the optimal price declines with each product generation.

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