Invest or Fall Behind: Maintaining Quality in Hotelling Markets

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Abstract

I investigate dynamic duopoly competition in quality and price. The firms face exogenous horizontal differentiation from consumer preferences and endogenous vertical differentiation from evolving product quality. Depending on the cost of quality investment, firms either sustain low quality levels through upgrading deterrence or engage in fierce competition. These two modes of competition generate non-monotonic patterns in upgrading frequency and investment efficiency. I also show that horizontal and vertical differentiation interact in cost-dependent ways: when upgrading is cheap, they are substitutes – greater horizontal differentiation strengthens market power, raises profits, and intensifies quality rivalry while keeping qualities balanced. When upgrading is expensive, they are complements – greater horizontal differentiation makes leadership less profitable, softening quality rivalry and sustaining vertical gaps. My results provide a parsimonious framework for non-monotonic investment incentives and highlight how horizontal and vertical differentiation jointly shape the dynamics of competition and welfare in markets where dynamic quality upgrades are an essential feature of the competitive landscape.

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