

Innovation and Diffusion of Medical Treatment*

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ABSTRACT: This paper develops and estimates a dynamic structural model of demand for a multi-attribute product. The demand side equilibrium supports a product spectrum, the characteristics of which evolve over time in response to supply innovations induced by the composition and extent of aggregate demand. The direction and speed of innovation is inefficient because individuals create an externality by not accounting for their influence on the discovery process. We apply the model to drugs invented to combat the HIV epidemic, during which frequent, incremental innovations in medication were punctuated by sporadic breakthroughs. In this application products differ in their efficacy and their propensity to cause side effects. Our biennial data on four American cities track a replenished panel of individuals for over twenty years, from when drugs were not only ineffective but also created debilitating side effects, to when the market matured. We find that the externalities are quantitatively important and that even a temporary subsidy would have improved average social welfare and been more equitable.

KEYWORDS: Innovation, Experimentation, Demand Pull, Demand Externalities, Dynamic Demand, Structural Models, Clinical Trials, HIV/AIDS.

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