

Technology Choice, Spillovers, and the Concentration of R&D

Todd Lensman*

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Abstract

The direction of innovation shapes both current technologies and future innovation opportunities, as firms acquire expertise and create public knowledge through discovery. But how do firms choose which technologies to develop, and why might they fail to exploit new technological paradigms? I study these questions in a tractable new model of directed innovation and firm dynamics, highlighting a novel connection between market structure, the direction of innovation, and economic growth: Expertise in a current technology gives incumbents a comparative advantage at innovating it relative to entrants, who instead favor a new technology with higher growth potential. Each firm's innovation decisions influence others through knowledge spillovers, which can inefficiently delay or prevent the emergence of the new technology. Concentrating R&D resources in a small number of firms can exacerbate this problem by amplifying the influence of incumbents, even though it accelerates growth in the absence of a technology choice. I provide empirical evidence for the theory using data on firm patenting and R&D expenditures, and I apply it to explain the historical development of mRNA vaccines.

JEL Classification: L16, L25, O31, O33, O41

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*Massachusetts Institute of Technology, Department of Economics (email: tlensman@mit.edu).

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