R&D Allocation and Aggregate Productivity*

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Abstract

This paper develops a tractable model of directed R&D in an environment of monopolistic competition with heterogeneous product varieties. Entrepreneurs choose how to allocate their R&D efforts across different varieties, giving rise to an equilibrium R&D allocation. The nature of the R&D allocation depends on both the elasticity of substitution between varieties and the curvature of the R&D cost function. Aggregate productivity (TFP) growth depends on both the aggregate level of innovation intensity and the degree of productivity dispersion across the economy. In particular, I show that aggregate productivity growth is increasing (decreasing) in the degree of current productivity dispersion if the R&D cost elasticity is less than (greater than) the profit elasticity. I characterize the evolution of the cross-sectional productivity distribution and provide conditions for productivity convergence and a simple expression for the long-run rate of convergence. The rate of productivity convergence depends on the elasticity of substitution between varieties, the R&D cost elasticity, and the tail index of the Pareto distribution of techniques.

Keywords: Aggregate productivity, TFP, productivity dispersion, R&D, innovation, productivity growth, productivity convergence, extreme value theory, Pareto distribution, Fréchet distribution

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