

Agricultural Productivity Differences and Directed Technical Change

Kazunari Tanabe

LSE

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Abstract

How much does environmental mismatch arising from directed technical change contribute to cross-country differences in agricultural productivity? To answer this question, I build a two-country endogenous growth model in which the direction of innovation is governed by market size, intellectual property protection, and differential R&D fixed costs. In equilibrium, innovation is directed toward frontier-country environments. As locally adapted technologies fall behind and farmers in developing countries abandon them, the market for appropriate innovation shrinks further, locking developing countries into mismatched frontier technology. Calibrating the model, I show that this channel is a quantitatively important source of cross-country agricultural productivity differences. A temporary R&D subsidy that redirects innovation toward developing-country environments acts as a big push. By rebuilding the market for appropriate technology, it permanently reverses the direction of innovation, narrows the productivity difference, and yields large welfare gains for developing countries. I also evaluate the complementary role of trade policy.