

Inappropriate Technology: Evidence from Global Agriculture

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Abstract:

An influential explanation for global productivity differences is that frontier technologies are adapted to the high-income, research-intensive countries that develop them and “inappropriate” elsewhere. We study this hypothesis in the context of global agriculture by using mismatch in the presence of crop-specific pests and pathogens (CPPs) as a shifter of technology’s inappropriateness and investigating its effect on global innovation, technology diffusion and productivity. We find that (i) technology development is biased toward CPP threats in high-income countries; (ii) CPP mismatch reduces plant-variety transfer at the crop-by-country-pair level, particularly from innovation-intensive origins; and (iii) CPP mismatch with innovation-intensive countries reduces crop production, both statically in the modern cross-section and dynamically in response to historical events that have altered the geography of agricultural innovation. Our estimates, combined with a model, imply that the inappropriateness of technology reduces global productivity by 58% and increases cross-country disparities by 15%. We use our framework to explore how global productivity gaps would be affected by counterfactual changes both to the geography of innovation, for example from the rise of R&D in emerging markets, and to environmental differences across countries, for example due to climate change. Together, these findings provide support for each pillar of the inappropriate technology hypothesis and demonstrate how the direction of innovation underlies disparities in global agricultural productivity.