The Diffusion of Technology and Inequality Among Nations

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Abstract

This paper accounts for the variation in GNP over countries by positing that they differ in how fast they implement new technology. The model implies that countries that are slow to adopt will end up with lower GNP and that their growth rates will be more persistent and less variable. It also implies that diffusion lags should not affect long-run growth. We lack the necessary comparable micro data on diffusion to make an extensive cross-country comparison of diffusion speeds with macro performance. Nevertheless, the data that we do look at suggest that differential rates of implementation are related to world inequality.

We start with Romer's formulation of a production function that relates a society's output of final goods to its use of intermediate-good inputs. We then add some further assumptions, and end up with a six parameter model. We estimate four parameters from the Gort-Klepper data on the growth of new products in the U.S. The other two parameters represent the world's long-run growth-rate, and the share of physical capital. We use these parameter-estimates to project the extent of world inequality. The projections match the Heston-Summers data on levels well if one lets diffusion speed differ by country. The theory does less well in matching the behavior of growth rates.

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