Trade and Idea Flows

Fernando Alvarez* Francisco J. Buera† Robert E. Lucas‡

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Abstract

This paper extends the work in Alvarez, Buera, and Lucas (2007) to a collection of open economies linked by trade flows. We model the technology of an economy as described by a probability distribution of available costs – in the sense of labor or other resource requirements – for producing different goods. Following Kortum (1997), we call such a distribution a technology frontier. An individual potential producer is characterized by his current cost level – a random variable drawn from the frontier distribution – and is also subject to a stochastic flow of new ideas – new cost levels. When he receives a cost idea that is better than the one he is able to produce with he adopts it and this new cost becomes his state. If he receives a higher cost idea, or no idea at all, his cost state remains unchanged. The flow of new ideas-new cost levels are random draws from the distribution of sellers to the market where a potential producer is located. As in Eaton and Kortum (2002), the distribution of sellers to a particular market is a function of the world technology frontier, the matrices of trade costs and trade barriers, and the world-wide vector of factor prices. We show that the evolution of the world technological frontier can be described by a system of delay differential equations, and present an algorithm that can be used to solve for the world technological frontier. We present numerical examples where trade barriers lead to a worse distribution of ideas, in that the technology frontier in a world with high trade barriers is stochastically dominated but the technology frontier in a world with low trade barriers.

*University of Chicago
†UCLA
‡University of Chicago