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A General Model of Technical Change with an Application to the OECD Countries

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Abstract:

In the neoclassical production functions model technical change (TC) is assumed to be exogenous and it is specified as a function of time. However, some exogenous external factors other than time can also affect the rate of TC. In this paper we model TC via a combination of time trend (purely non-economic) and other observable exogenous factors, which we call technology shifters (economic factors). We use several composite technology indices based on appropriate combinations of the external economic factors which are indicators of different aspects of technology. These technology indices are embedded into the production function in such a way that they can complement to different inputs. By estimating the generalized production function, we get estimates of TC which is decomposed TC into a pure time component as well as several producer specific external economic factors. Furthermore, the technology shifters allow for non-neutral and biased shifts in TC. We also consider a simple model in which the technology shifters are aggregated into one single index. The empirical model uses panel data on OECD, accession and enhanced engagement countries observed during 1980-2006.

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