Structural Estimation of the Stochastic Solow Model for Chinese Provinces

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Abstract:

We propose a novel model to study the convergence process in the tradition of neoclassical growth theory. We employ a stochastic Solow set-up with shocks to capital and labour and obtain equilibrium dynamics for output. We obtain the speed of conditional convergence directly from the equilibrium dynamics. Inference on the structural parameters of the model is done using a maximum-likelihood approach.

Our work contributes to the recent debate that is taking place in the academic literature on the topic of economic convergence. Traditionally, standard tests are derived from a deterministic Solow model which involves investigating the relation between the growth rate and initial income level (see, e.g., Mankiw, Romer and Weil (1992, QJE), and Barro and Sala-i-Martin (1992, JPE)). A negative relation between the two implies economic convergence. More recent literature shows that taking the stochastic feature of the Solow model into consideration the convergence estimates from these traditional cross-section or panel data regressions are biased (see, e.g., Lee, Pesaran and Smith (1998, QJE)). We take an alternative approach and from the outset consider a stochastic set-up, rather than looking at a deterministic model to which shocks are added.

We study this model using growth and population data for China's provinces from 1978 to 2010. The high speed of economic growth in China over the past 30 years is characterised by an increased Gini coefficient and regional inequality. This raises a number of questions that our work seeks to address: Will the richer coastal areas and the lagged-behind in-land areas converge to the same steady state one day or will they eventually reach different wealth levels? How quickly will they converge to their steady states? Is there scope for government policies to affect the steady states and the speed of convergence?

Preliminary results show limited convergence for the Chinese provinces. The traditional approaches provide mixed results: The cross-section set-up from Mankiw, Romer and Weil (1992, JPE) and Barro and Sala-i-Martin (1992, QJE) indicate significant convergence, but the panel approach of Islam (1995, QJE) does not give a significant estimate. A further exploration, a comparison between the traditional approach and our new approach using the dynamic structure of the Solow set-up and the estimation of various alternative specifications is on our research agenda.