A Romerian contribution to the empirics of economic growth

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Abstract

Mankiw, Romer, and Weil (1992) made the Solovian set up widely used to test the determinants of economic growth and the speed of convergence. In accordance with the nature of the Solow framework, almost all empirical growth studies considered technological progress constant and identical across countries and over time, and hence underemphasized its role. In this study, in order to overcome this weakness, we propose that the Mankiw, Romer, and Weil (1992) set-up should be replaced by the Solovianized Romer (1990) framework, thus allowing the role of technology to be considered in the empirical analysis. In particular, within this framework, the growth rate of technology varies across economies and over time. We estimate the convergence equation derived from Solovianized Romer model for 31 OECD countries for the period 1980–2008 by applying the system GMM approach. The empirical findings of the model support the conditional convergence hypothesis, but reveal a lower convergence rate than that predicted by the existing literature. As a policy implication, we argue that, investment in R&D and human capital are important determinants of convergence, and in cases where economies are unable to allocate sufficient resources to R&D, policy makers should ease the diffusion of technology (e.g., via FDI or trade) in order to retain a high convergence rate.

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1. Introduction

Empirical studies on economic growth have expanded rapidly since the early 1990s. In 1990, only one publication appeared in SSCI-indexed economics journals with key words "empirical" and "economic growth" in topic search. By 1995, this had risen to 49. After this, the number increased over successive five year periods to 71, 131, and 225 and, by January 2012, a total of 2223 articles in this area had been published in SSCI-indexed economics journals. The rapid development of the new economic growth theory, the availability of richer databases, and improvements in econometric techniques, which provide a higher degree of precision and greater confidence in the analysis and findings, have all contributed to the rapid expansion of the empirical studies in that direction.

The neoclassical growth theory (i.e., Solow framework), under the assumptions of constant returns to scale and diminishing marginal returns to capital, reveals that the investment rate is the major determinant of economic growth in the transitional period, and that technological progress, which is regarded exogenous to the system, is the determinant of the long run growth. Two (interrelated) empirical research strands have emerged from this theory. The first strand aimed to determine the sources of international differences in income per capita. Even though the findings were not fully conclusive, a wide range of studies have demonstrated that investment in physical and human capital, innovation and R&D, as well as macroeconomic policies, trade openness, the institutional framework, geography, demographic trends, political and socio-cultural factors are all likely to have important impacts on the process of economic growth.[1]

The second strand investigated whether low-income economies grow faster than the high-income ones, in line with the neoclassical growth theory, which conjectures that countries having identical characteristics but lower initial physical capital will grow at a higher rate due to diminishing marginal returns premise. This argument has quickly become dubbed 'Convergence Analysis'. Early works in this direction were Baumol (1986), Abramovitz (1986) and De Long (1988). Research in this area dramatically increased, however, after Mankiw, Romer, and Weil (1992), which rapidly emerged as the fundamental empirical framework to test for convergence, as their suggested equation was very well-fitted for empirical research.[2] MRW (1992) estimates an augmented Solow model, which includes human capital stock in addition to physical capital stock. Their model reveals that convergence in income per capita is determined by population growth, and the accumulation of physical and human capital. Within this set up, they find strong evidence for (conditional) convergence: countries with similar technologies and rates of physical and human capital accumulation converge in income per capita. Given the Solovian set up, and the fact that technology is exogenous, a simplification adopted by MRW (1992) was to assume no variation in technological growth across countries.[3] Following MRW (1992), most empirical studies concerned with the convergence issue or on sources of international differences in income per capita, not only treated technology as an exogenous component, but in addition, regarded it

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[1] See, for example, Sala-i-Martin (1997) and Levine and Renelt (1992).

[2] Henceforth, MRW (1992).

[3] In particular, it was taken as 0.02. In contrast, there are many TFP studies such as Fagerberg (1994), Young (1994) and Young (1995), showing country-specific TFP growth. Howitt (2000) documents that technology differences are significant across countries.