

excellent work done on decollectivization and changing urban-rural relationships by Japanese experts on contemporary China.² In addition, the author's term "developmental communities" is strikingly similar to Jean C. Oi's concept of "local state corporatism,"³ with all the dangers of stereotyping relationships between local authorities and TVEs for all of rural China. Presently, collectivized TVEs in Jiangsu are experiencing tremendous changes in their relations with local government due mainly to the introduction of the joint-stockholding system (*gufen hezuo zhi*).

Another point that deserves mention here involves some problems with the author's empirical approach to the data he collected. For example, in spite of great emphasis on changing resource allocations, we see little attempt to touch upon either fiscal conditions in the villages surveyed or income distribution among their residents, and there is a serious paucity of opinion surveys from his informants. Such a research style that places analytical framework before a firm grasp of the facts certainly lies in stark contrast to the work being done in Japan on rural China;⁴ nevertheless, *Freeing China's Farmers* is a volume filled with excellent research results that will without a doubt stimulate, if not bother somewhat, Japanese students of the Chinese rural economy.

(Du Jin)

² See especially Katsuji Nakagane, *Chūgoku keizairon—Nōkō kankei no seijikeizaigaku* [The political economy of agro-industrial relationships in contemporary China] (Tokyo: University of Tokyo Press, 1992).

³ Jean C. Oi, "Fiscal Reform and the Economic Foundations of Local State Corporatism in China," *World Politics* 45, no. 1 (1992).

⁴ For example see Katsuji Nakagane, ed., *Kaikaku igo no Chūgoku nōson shakai to keizai* [Society and economy in rural China since rural reform] (Tokyo: Tsukuba Shobō, 1997).

Introduction to Economic Growth by Charles I. Jones, New York, W. W. Norton & Co., 1998, xii + 200 pp.

Recently economic growth has become an issue that needs to be touched upon in courses on development economics for undergraduate students. This is because the new growth theories initiated by Paul M. Romer and Robert E. Lucas Jr.¹ imply policy recommendations within the context of economic development in developing countries, something which was not done by the previous versions of growth theories. Now many economists investigate appropriate development strategies for developing countries, applying the new growth theories.

Excellent textbooks on the new growth theories, written by Gene M. Grossman and

¹ Paul M. Romer, "Increasing Returns and Long-run Growth," *Journal of Political Economy* 94, no. 5 (1986); Robert E. Lucas Jr., "On the Mechanics of Economic Development," *Journal of Monetary Economics* 22, no. 1 (1988).

Elhanan Helpman, Robert J. Barro and Xavier Sala-i-Martin, and Philippe Aghion and Peter Howitt,² have already been published. However, all of them require readers to have knowledge of advanced mathematics, making them too difficult for undergraduate students. By contrast, this new book by Charles I. Jones is written for undergraduate students and general readers. Descriptions in the book is quite simple and easy, and many case studies are cited in order to explain economic models. Mathematics used in the book is not too advanced, and a meticulous "Mathematical Review" is attached as an Appendix. Most students reading this book will be fascinated by the cited anecdotes and well-reasoned presentation of economic growth theories.

There are three features about economic growth which the author presents in this book. First, he utilizes the results of empirical studies recently conducted by himself and others which criticize endogenous growth theories which have formed the core for the new growth theory. Paul Romer initiated endogenous growth theory, inspired by one of Kaldor's stylized facts that there have been wide differences in the rate of growth of per capita products across countries since World War II.³ Romer and other scholars, expanding the frontier of growth theory, implicitly supposed that a half century after World War II is long enough for the growth rate over such a long period of time to now be regarded as the "steady state." Therefore, they sought out models where policies affect the long-run growth rate of per capita products in the steady state. These people dubbed their ideas the "endogenous growth theory." Thus, in endogenous growth theory, policies have a permanent influence on economic growth by construct. Jones argues that such a long-lasting effect of policy change is unreasonable, and that we should regard the current situation of an economy as transitional toward a steady state. The author instead proposes models where in the long-run growth rate is determined by exogenous technological progress and which have rich transitional dynamics. Such growth models have an advantage over endogenous growth theory in explaining observed economic growth in countries by enabling scholars to investigate how long growth rates will remain high after a favorable policy has been taken.⁴ This approach is quite interesting and persuasive at least on the empirical ground.

The second feature of this book is that the author emphasizes invention as the engine of economic growth. Early endogenous growth theories were categorized under three types of models featuring: (1) externality, e.g., learning-by-doing, (2) human capital accumulation, and (3) invention. But the author emphasizes invention as the most promising engine among the three for promoting economic growth.

This reviewer agrees that invention should be taken as the most important. Elucidating the mechanism of invention (including technology, diffusion, imitation, etc.) seems to be much more important than using externality and human capital investment without consid-

² Gene M. Grossman and Elhanan Helpman, *Innovation and Growth in the Global Economy* (Cambridge, Mass.: MIT Press, 1991); Robert J. Barro and Xavier Sala-i-Martin, *Economic Growth* (New York: McGraw-Hill, 1995); Philippe Aghion and Peter Howitt, *Endogenous Growth Theory* (Cambridge, Mass.: MIT Press, 1998).

³ See Paul M. Romer, "Capital Accumulation in the Theory of Long-Run Growth," in *Modern Business Cycle Theory*, ed. Robert J. Barro (Cambridge, Mass.: Harvard University Press, 1989).

⁴ This argument is developed in Section 8.4.

ering the mechanism with which externality is exhibit and skills of workers are developed.⁵

The third feature is the author's emphasis on "infrastructure" as the most powerful determinant of people's investment behavior, which determines the growth rate of an economy. Infrastructure in his terminology does not mean physical infrastructure; rather he means institutional frameworks which favor production over diversion, e.g., rules, regulations, and institutions which enhance productivity, induce invention, and prevent corruption, bribery, theft, and expropriation. Episodes from economic history research by Douglass North and others are quoted to convince readers of the importance of such infrastructure.

Examining the contents of the book, Chapter 1, the introduction, lays out the facts of economic growth with both time-series and cross-country data on production, income, population, labor, capital accumulation, trade, and the like. These "facts" can be regarded as the latest version of the stylized facts of economic growth begun by Nicholas Kaldor.⁶ What is emphasized most among the facts is that both income levels and rates of economic growth vary substantially across countries. This serves as the motivation for investigation throughout this book. Most data used not only in this chapter but in this book as a whole are cited from Penn World Tables.⁷

Chapter 2 is devoted to explaining the Solow model, a typical neoclassical growth model. Using this model, important concepts of growth theories are introduced, i.e., the steady state, transition dynamics, level effect, growth effect, exogenous technological progress, etc. Finally, the logic and examples of growth accounting are demonstrated.

The Solow model is examined empirically in Chapter 3. Firstly, human capital is introduced in addition to physical capital. It is shown that once human capital is introduced to the original Solow model and the share of income of this capital is one-third, the deduced steady state per capita products are similar to actual per capita products across countries. Moreover, if the deduced technology level is also taken into account, deduced and actual per capita products across countries get much closer. That implies that the improved Solow model has considerable explanatory power for actual economic growth.

The chapter then defines the concept of "convergence" and provides corresponding empirical evidence. Using diagrams on the negative relationship between initial income levels and the growth rates of income, the author shows that convergence is observable among countries whose steady state income seems to be similar, and that convergence is not observable if we take all available world country altogether. The author then shows that if some variables which are supposed to dictate the steady state income levels are con-

⁵ An endogenous growth theory which depends exclusively on human capital accumulation was criticized in Paul M. Romer, "Two Strategies for Economic Development: Using Ideas and Producing Ideas," in *Proceedings of the World Bank Annual Conference on Development Economics 1992*, Supplement to *The World Bank Economic Review* and *The World Bank Research Observer*, ed. Lawrence H. Summers and Shekhar Shar (Washington, D.C.: World Bank, 1993).

⁶ See Nicholas Kaldor, "Capital Accumulation and Economic Growth," in *The Theory of Capital*, ed. Friedrich A. Lutz and Douglas C. Hague (New York: St. Martin's Press, 1963).

⁷ For details about this table, see Robert Summers and Alan Heston, "The Penn World Table (Mark 5): An Expanded Set of International Comparisons, 1950–1988," *Quarterly Journal of Economics* 106, no. 2 (1991), and/or home pages whose URLs are <http://www.nber.org/pwt56.html> and <http://arcadia.chass.utoronto.ca/pwt/>.

trolled, such a negative relationship between initial income levels and the growth rates of income holds "partially," and this is called "conditional convergence."

In Chapters 4 and 5, an endogenous growth model featuring invention is fully explained. First, the features of ideas as economic goods is described narratively in Chapter 4. The author points out that since ideas are non-rivalrous and unexcludable as typical public goods, an invention involves a fixed cost which brings about increasing returns. In order to compensate for the fixed cost, the inventor need to take monopoly profit which implies that the corresponding market equilibrium will not be optimal. Institutional infrastructure, e.g., intellectual property rights, is necessary for people to actively invent new ideas. Lastly, the chapter provides data representing invention, e.g., the number of scientists and engineers and patents issued.

In Chapter 5 a complete endogenous growth model featuring invention formulated by Paul Romer⁸ is thoroughly explained. In contrast with the previous chapter, a mathematical model is used, and readers will find mathematical counterparts to what are explained narratively in Chapter 4. Romer's model has three production sectors: final goods, intermediate goods, and inventions. When a new kind of intermediate good is invented by a firm, the firm will monopolistically produce the new good (or it can sell the right to someone else) in order to raise profits to compensate for invention costs.

In Chapter 6 the invention model introduced in the previous chapter is applied to technology adoption by developing countries.⁹ Technology adoption is similar to invention in the sense that it requires an initial fixed cost for adoption, and that once the technology is adopted, monopoly profits are expected to be earned at least for a certain period.

The importance of institutional infrastructure is emphasized in Chapter 7. Fixed costs for investment (including invention) and profits from the investment are keys to determine whether and how much investment is undertaken. Institutional frameworks will fatally affect both fixed costs and profits making the institutional infrastructure crucial for economic growth. Empirical evidence is given using diagrams in order to show the positive effects of stability and openness on physical and human capital investment and total factor productivity (TFP) growth. But it seems that the use of these diagrams makes the whole exposition of section 7.5 less persuasive.¹⁰

⁸ Paul M. Romer, "Endogenous Technological Change," *Journal of Political Economy* 98, no. 5, part 2 (1990).

⁹ Jones applied a model in the following paper: William Easterly, Robert King, Ross Levine, and Sergio Rebelo, "Policy, Technology Adoption and Growth," in *Economic Growth and the Structure of Long-Term Development*, ed. Luigi L. Pasinetti and Robert M. Solow (New York: St. Martin's Press, 1994). This literature is cited as a working paper in the references of this book.

¹⁰ Figures 7.1–3 exhibit cross country data of physical and human capital investment and TFP growth on the sum of openness and stability indicators (which is represented as GADP in the text) weighted by the estimated corresponding coefficients. For example, in Figure 7.1, $(I/Y)_i = a + b \cdot \text{GADP}_i + c \cdot \text{OPENNESS}_i + \text{residual}$ (a , b , c are estimated coefficients) is estimated, and the diagrams were made with $(I/Y)_i$ on the vertical axis and $b \cdot \text{GADP}_i + c \cdot \text{OPENNESS}_i$ on the horizontal axis. Thus, the implied slope in the diagrams is identical to one by construction, because the actual values are plotted against the fitted values. However, the author argues the positive relationship between physical investment, and stability and openness from this diagram. These diagrams are not sufficient to show those positive relations. Even if scatters in the diagram seem upward-sloping, either b or c can be negative.

In Chapter 8 other endogenous growth theories are briefly introduced. This is followed by an explanation of why typical endogenous growth models are not introduced from the beginning of this book. The reason goes back to the first feature of this book mentioned at the beginning of this review, i.e., the author criticized endogenous growth theories.

Chapter 9 neatly summarizes the author's arguments in this book. This chapter will be helpful to readers who want quick survey of the author's views of economic growth.

The mathematics used in this book which exceed the high school level are picked up in Appendix A. Useful Web sites related to economic growth are provided in Appendix B along with a table of country profiles from Penn World Tables, Mark 5.6.

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