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Introduction

Takatoshi Ito and Andrew K. Rose

This volume contains papers from the thirteenth annual East Asian Seminar on Economics, which took place on June 20–22 in Melbourne, Australia. We are grateful to the local sponsor, the Australian Productivity Commission, an appropriate choice considering the topic of conference, productivity.

The productivity of a country as a whole is one of the most important determinants of its quality of life, and the rate of productivity growth is one of the most important long-run issues studied by economists. Countries with highly productive citizens tend to have high life expectancy and literacy rates, low rates of mortality and disease, lots of freedom, ample education and leisure, and considerable purchasing power. Studying the determinants of productivity levels and how they vary across countries and industries is thus an important task for economists, and one that was much discussed in EASE-13. But growth rates matter too. In just the same way that small differences between rates of interest matter a lot over long periods of time, tiny differences in sustained growth rates can accumulate quickly to make a large difference in income levels. Hence it is important for economists to study productivity growth rates and how they vary across time and countries, even if only by small amounts. Appropriately, a number of the conference papers are concerned with studying productivity growth.

Growth theory was pioneered by Robert Solow in the mid-1950s. There

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were then many papers dedicated to explaining what determines growth and what kind of technological innovation is most likely to explain the long-run movement of macroeconomic economic variables, including the capital-labor ratio and the real wage rates. Growth accounting was a statistical exercise to attribute economic growth into contributions from capital (machines, plants, with quality being adjusted) and labor (employment, hours, with education being adjusted). What is not explained by these contributions was called total factor productivity (TFP). In many estimates, TFP growth was very high for economies that were growing exceptionally fast (like Japan from the mid-1950s to mid-1970s). A standard criticism is that productivities are assumed in theory to be exogenous and measured in empirical research to be residuals.

Then, there was a substantial hiatus in the study of economic growth and productivity between the late 1960s and the late 1980s. At that point a series of influential theoretical pieces appeared, the most important being those by Paul Romer, Paul Krugman, Robert Lucas, and others. The "new" growth theory was distinguished from the "old" theory in that productivity growth was generated by economic activities themselves, thus being "endogenous." (See EASE-4 for new growth theory applied to East Asian macroeconomic experiences.) Somewhat afterward, the discussion turned toward investigations of the empirics of productivity and growth; initially this work was largely macroeconomic in nature (the work by Robert Barro comes to mind quickly). After an initial round of seemingly strong results concerning the nature of economic growth conducted from cross-country regression exercises (e.g., work by Barro, Mankiw, Romer, and Weil among others), a flood of contradictory and confusing research results followed. As a result, the work in this area has become increasingly microeconomic in nature.

Many of the papers in EASE-13 continue this trend and are both empirical and microeconomic. However, we have striven to present a wide-ranging array of work on the area, and accordingly we include a number of theoretical and/or macroeconomic pieces below.

The first paper is a lucid summary by Steve Dowrick of recent developments in macroeconomic theory concerning the determinants of long-run growth and productivity change. The dust has only recently settled on the debate between those who believe in neoclassical growth models of the sort pioneered by Robert Solow, and advocates of endogenous growth (Romer and colleagues). In endogenous growth models, high rates of productivity and growth can continue indefinitely because of investments in research and development, which yield a continuing stream of inventions. The roles of education and human capital in generating productivity growth though ideas are accordingly large, and the survey by Dowrick is apposite. After providing a clear survey of the theoretical and empirical issues, he applies the results to Australia. He arrives at the startling conclusion that Aus-

tralia's long-run productivity growth rate could rise by as much as a third of a percentage point annually in return for a relatively small one-year investment in schooling and knowledge creation.

Dean Parham picks up the issue of Australian productivity growth in his paper. He focuses on the 1990s, a period that is not only recent but also unusually interesting in that TFP growth picked up by over one percentage point annually. A number of alternative hypotheses have been advanced to explain this important acceleration in productivity growth, and Parham's paper is in essence a horse race between them. The explanations include (1) the wide-ranging policy reforms initiated somewhat earlier; (2) the general improvement in the quality of labor (of exactly the sort discussed and recommended by Dowrick); and (3) the somewhat notorious effect of information technology (IT). Throughout, Parham is careful to use as a benchmark of comparison the "new economy" experience of the United States during approximately the same period. (He dismisses the possibility of external shocks, given the strength and duration of the boom.)

The results are strikingly clear for an empirical economics paper, especially for an empirical project in the productivity literature: Australia's policymakers are to be congratulated for their far-sighted microeconomic reforms. Parham comes to this conclusion as a residual explanation; it is the only one that cannot be easily rejected. One would be happier with more direct evidence. Still, there is simply no evidence of sufficiently large changes in either workforce skills or IT to plausibly account for the substantial change in TFP growth. Moreover, the American productivity boom followed the Australian boom, further reducing the likelihood of an IT-driven "new economy" productivity surge in Australia. Parham's results are obviously significant for policymakers. They also have an intriguing political-economy aspect, which is worthy of further work. Parham's view is that the lags to the productivity benefits of reforms are long, at least compared to the length of electoral cycles; but reforms usually also bear a short-run political cost.

Parham's lags from policy reform to macroeconomic benefit are in the order of years, perhaps even a decade. But the consequences of *institutions* can be even longer-lived, as the fascinating paper by Daron Acemoglu, Simon Johnson, and James Robinson shows. In an interesting and influential series of studies, these authors have shown that the propensity of European colonists to establish solid macroeconomic institutions in a colony depended inversely on the difficulty of colonizing. In countries close to the equator that were (and still are) riddled by tropical disease, European powers chose—or were forced—not to encourage migration. Instead they simply set up institutions to extract resources from the populace for Northern enrichment. In more temperate climates with lower population densities (such as North America, South Africa, and the Antipodes), European powers instead established institutions with solid property and political

rights to induce mass migration. The consequences of these differing institutions are large and persist for hundreds of years. In particular, Acemoglu, Johnson, and Robinson show that weak institutions (such as few political constraints on the executive) are associated with substantially higher macroeconomic volatility. For instance, output is more volatile in countries with weak institutions, even controlling for a number of alternative factors. This instability is also manifest in a number of other dimensions, including the prevalence of currency, banking, and political crises. Good news for Australia but, given the persistence of institutions, a crucial area for further work for Africa and Latin America.

David D. Li and Chanqi Wu share the same sweeping interest in macroeconomic phenomena and institutions, while also pursuing a novel empirical strategy. They are interested in assessing the impact of accession to the World Trade Organization (WTO) and its predecessor the General Agreement on Tariffs and Trade (GATT). These institutions are widely considered to be one of the three legs of the postwar multilateral international economic system (the others being the International Monetary Fund [IMF] and the World Bank). Li and Wu's focus on the WTO is intrinsically important, given the alleged (but disputed) importance of openness for productivity and growth. It is also an issue of topical import, given the fury that surrounds the entire globalization debate. Li and Wu use a large sample of macroeconomic data covering almost 100 developing countries between 1960 and 1998. Some 60 of these countries acceded to the GATT/WTO during the period. One might expect that entry into the multilateral trade system should bring substantial benefits in the form of increased productivity levels and/or growth rates, as well as increased openness to trade, foreign direct investment (FDI), faster growth, and increased investment. Yet the results are anything but clear. Even using an event-study methodology that focuses attention on the periods surrounding GATT/WTO accessions, Li and Wu are forced to split their sample in order to tease out positive results. Although they find do find some effects of GATT/WTO accession, these are nor particularly large, and they vary substantially with country characteristics. We hope this fascinatingly weak result will inspire others to pursue the topic further.

Assaf Razin is also concerned with the impact of external phenomena on the domestic economy. He focuses on information advantages that foreign managers may have that encourage FDI. As he notes, much FDI does not involve any (substantial) capital flow. His microeconomic model instead focuses on the role of FDI in "cream-skimming" high-productivity investments that result from the informational advantage that foreign managers have. He derives a rich set of predictions that show that FDI should behave differently from loans or portfolio capital flows, which are plagued by traditional principal-agent problems. What is especially notable about his work is the fact that he actually takes the model to the data, constructing a

"gravity" model of capital flows, which he uses to test predictions about FDI and portfolio flows. Razin finds that, consistent with his model, FDI has a larger effect on both investment and output than either loans or portfolio flows. That is, FDI investors seem to raise both the quantity and the quality of investment productivity.

Many of the interesting consequences of productivity growth are macroeconomic. Nevertheless, it is often difficult to determine the causes of productivity without peering into the microeconomic data that lie underneath the aggregates. A number of the contributors to EASE-13 exploit data sets that make up in depth what they lack in scope. Happily, sometimes no substantial trade-off at all is required, as in the paper on sectoral productivity by Kyoji Fukao, Tomohiko Inui, Hiroki Kawai, and Tsutomu Miyagawa. This article is a first peek at a remarkable new database, which covers eighty-four Japanese sectors over the past thirty years. One of the best features of this data set is that it covers a large number of sectors outside manufacturing. Another is that it includes extremely detailed information on the type of inputs—for instance, separating IT from other capital. Fukao et al. have a number of findings; for instance, they document that reallocation of resources across sectors in the 1990s actually lowered TFP growth. But the real importance of their paper is in presenting the new data set to the world. It is hard to overstate the potential value of this resource (especially given the ongoing Japanese slump), and we look forward to more work in this vein.

Similar painstaking efforts were made by Keiko Ito, who analyzed foreign ownership of productivity in the Indonesian automobile industry. Using the establishment data, Ito calculates the TFP growth rate for multinational corporations (MNCs). In the literature and casual observations, MNCs are considered to be superior to local firms in managerial resources. Ito's paper empirically studies the difference in productivity between MNCs and locally owned establishments. Results show that both MNCs and local establishments experienced increasing returns to scale in the 1990s. The scale effect is found to be higher for foreign establishments. Surprisingly, TFP growth rates were negative for both local and MNC establishments. Among the TFP growth, the scale effect and the capital utilization effects were important, while technological change effect was very small. It is important to understand why the Indonesian automobile industry remains relatively inefficient. Ito suggests that too much protection is the culprit.

An example of the sort of careful painstaking empirical work that represents real progress in the area is the paper by Jiann-Chyuan Wang and Kuen-Hung Tsai. The authors collect data for over 130 Taiwanese firms and use them to examine the impact of research and development (R&D) on productivity. There are limitations to their data set; the firms are all large, publicly traded, manufacturing firms, and the data set only extends

back to 1994. Such are often the handicaps associated with disaggregated data sets. Yet the results are provocative. When Wang and Tsai split their sample of firms into high-tech and conventional, they find a dramatically higher impact of R&D on productivity in the high-tech sample. Perhaps even more intriguing is their rejection of Schumpeter's much-quoted (but little tested!) hypothesis that larger firms benefit more from R&D.

A well-governed economy encourages the efficient use of resources and discourages inefficient firms; it should smile on the good and frown on the bad. While much public policy discussion centers on the barriers to *entry* of new firms, it is also important to understand barriers to *exit* of failing firms. Plants that used resources inefficiently but were not shut down were a major reason for the low level of productivity of the former centrally planned economies. Since legal barriers to exit are probably the most important obstacles, it is accordingly important to understand the effects of bankruptcy law. Youngjae Lim and Chin Hee Hahn do exactly that, taking full advantage of the change in Korean law that followed Korea's financial crisis of late 1997. They develop an extensive microeconomic data set. They use data at both the firm level (which is needed to discuss bankruptcy issues) and at the plant level (to examine the effects on productivity through resource reallocation). Reassuringly, they find that the post-crisis improvement in bankruptcy law has improved performance in the sense that productivity problems *before* bankruptcy are less persistent.

Jong-Il Kim's paper analyzes the effects of IT investments in Korea. Results based on firm-level data show that IT investments enhance productivity. IT capital is valued more highly in the financial market than the book value. He concludes that part of contribution from IT capital to production is not measured in traditional growth accounting.

Finally, Andrew Caplin and John Leahy built a model of discrete investment using an Ss framework and compare that to a representative agent model with continuous investment. Often IT investment needs a large fixed cost. The result of the paper shows that under some conditions, both models are observationally equivalent. Since investment is associated with much productivity and real economic growth, this paper shows that the results from two disparate streams of modeling can be combined easily (under certain circumstances), thereby simplifying the modeling of underlying sources of growth.

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Macro Productivity