Proposals for Economic Growth

The Positive Sum Strategy. Harnessing Technology for Economic Growth. RALPH LANDAU and NATHAN ROSENBERG, Eds. National Academy Press, Washington, DC, 1986. xvi, 640 pp., illus. $35. Based on a symposium, Stanford, CA, March 1985.

As every Baby Boomer knows, the first 20 years after World War II were the Golden Age. The United States assumed and retained a position of world technological leadership and experienced rapid growth in productivity and real per capita income. Without losing primacy in its area of long-term comparative advantage—agriculture and natural resources—America enjoyed growth and prosperity in most of its manufacturing industries, from the smokestacks of Lake Erie to the diffusion furnaces of Santa Clara.

The next 20 years have been a different story. Productivity growth has been markedly slower, and real income growth has been modest. America has lost its technological and economic leadership in most of the smokestack industries, and its rivals have reached parity in at least several areas of high technology. In this ambitious volume, 43 distinguished academic and industrial contributors ask why, and what can be done.

With the exception of the editors' overview chapter, none of the contributions attempts to answer these big questions comprehensively. Some papers focus on particular elements of the diagnosis and offer partial prescriptions; others provide useful background. A handful of the best papers in the latter category would alone suffice to make this volume worthy of attention. James Watson offers an incisive capsule history of DNA research, and William Baker, former chairman of Bell Labs, provides a fascinating account of the contributions of basic research in the physical sciences to modern materials technology. Harvey Brooks recounts the history of public policy toward science and technology in the postwar period, and he summarizes succinctly and fairly the arguments for and against a variety of forms of government intervention. The book also contains two unusually balanced and illuminating discussions of Japan, in which Masahiko Aoki, an economist at Stanford and Kyoto universities, and Daniel Okimoto, a Stanford political scientist, assess in detail the weaknesses, as well as the strengths, of America's principal competitor for economic and technological leadership.

These are just a few of the many fine contributions to this volume, but the question remains: what does this distinguished collection of economists, scientists, engineers, and business leaders have to say about the American malaise and its remedy?

In a faithful summary of the volume's contents, the editors identify four principal obstacles to U.S. economic growth and technological competitiveness. The first is an unfavorable macroeconomic climate, by which the editors seem to mean high real interest rates that impede investment. The second is a tax regime that favors consumption over savings and provides (or threatens to provide if pending revisions become law) insufficient incentives for capital formation and industrial research. The third obstacle is inadequate public support for technical and general education, as well as for university research. And the final obstacle is an excessive concern with equity and fairness, manifested in particular by affording too much protection (via regulation) of public health and safety and too much compensation (via the legal system) to those injured by industrial accidents, exposure to hazardous substances, or faulty products.

The remedy flows from this diagnosis. Echoing the views of numerous contributors, the editors recommend that the government should: (i) lower real interest rates; (ii) preserve R&D tax credits and favorable treatment of capital gains and, more generally, tax consumption and subsidize saving and investment; (iii) increase public expenditure for basic and generic applied research; and (iv) "adopt sensible regulatory policies and work to ease excessive public fears about poisons, illnesses, and other hazards." To these prescriptions, which correspond one to one to the elements of the diagnosis, the editors add for good measure: "reduce the rate of increase in government expenditures" and "avoid excessive government intervention in markets."

To the cynical observer, this might look like a brief for the National Association of Manufacturers, with a bone (research funding) thrown in to attract some academic fellow travelers. Recall, however, that these are proposals for economic growth, not a platform for the Good Society.

Nonetheless, this characterization of diagnosis and remedy can be faulted on grounds other than parochialism. Some elements of this diagnosis are not well supported by evidence, and certain elements of a proper diagnosis are underemphasized or altogether neglected by the contributors. Moreover, there is a worrisome confounding of ideology and scientific method in this volume that does disservice to the legitimate efforts of economists and other social scientists to understand the sources of productivity decline and the links between government policy and private-sector economic performance.

Consider the claim, made by several contributors to the volume and given emphasis by the editors, that an undue concern with fairness and equity is a hindrance to U.S. economic growth and technological progress. Now there is no disputing the specific argument, carefully documented in excellent papers by Milton Katz and Peter Huber, that the case law of torts has evolved to favor compensation of parties whose losses would have earlier been dismissed as inevitable if perhaps unfortunate by-products of economic progress. But it is a long leap from the specific conclusion that developments in tort law have increased the risks associated with industrial innovation to the general conclusion that a high level of fairness and equality are harmful to economic progress. Income and wealth are more evenly distributed in Japan than in the United States, and in Japan as well as in those European countries with a better productivity record than the United States government spending on social programs represents a larger share of gross national product than it does here. That equality is harmful to growth is an article of faith, not a confirmed hypothesis.

The editors' recommendation that we "avoid excessive government intervention in markets" may be nothing more than empty rhetoric, since we should obviously avoid anything "excessive." But if we take the proposal seriously as a warning against government intervention, as a great many of the contributors do, it would also seem to rest on belief rather than evidence. There are successful and unsuccessful interventions, and a substantial body of economic research is devoted to analyzing and empirically estimating the effects of government policy on efficiency of resource allocation, productivity growth, and the distribution of income. Indeed, one can easily imagine circumstances in which many of the contributors to the book would support intervention. It would surely be interesting to poll the contributors concerning their support for the recently negotiated resolution of the semiconductor trade dispute between the United States and Japan, which guarantees U.S. firms a share of the Japanese market. I imagine that the "nays" would have it, but the vote would be far from unanimous.

There is also a surprisingly weak empirical foundation for what the editors and numerous contributors assume to be a straightfor-

ward linkage between economic incentives in the form of low interest rates and low taxes on capital, on the one hand, and capital formation and productivity growth, on the other. Of course, economic theory tells us that lowering the price of capital services by means of lowering interest rates or taxes will lead to more capital formation. But it remains one of the great puzzles of economic science that, after more than 20 years of careful econometric research, the data simply do not provide strong confirmation for this proposition. And the more complex linkage between capital taxation and productivity growth is even more difficult to confirm empirically. In an otherwise excellent paper, Dale Jorgenson claims that there is an inverse correlation between effective corporate tax rates and productivity growth. But he clearly has read his own tables through rose-colored lenses; my calculator tells me that the correlation is +0.39. Productivity performance has been dismal since 1973, despite effective corporate tax rates that have been substantially lower since 1975 than at any time during the postwar period.

If excess egalitarianism and insufficient willingness to subsidize capital formation are given too much emphasis by the contributors to the volume, the failure of the government to provide adequate funding for higher education and basic research is given perhaps too little. The point is, quite understandably, not missed by Donald Kennedy, president of Stanford University, who notes that federal funding for graduate fellowships, traineeships, and research facilities peaked in the mid-1960's. Perusal of the National Science Board's most recent issue of *Science Indicators* reveals that federal funding for basic research also declined in constant dollars after 1969 and did not begin to rise again until 1976. The 1969 level of funding was not again equaled until 1978, according to the published data. If the more accurate R&D price deflators developed by Edwin Mansfield, another contributor to this volume, are applied, the peak was not reached until 1983.

Another potentially important source of the poor U.S. economic performance is given only passing attention in this volume: our failure to adopt and rapidly diffuse several key organizational innovations of the Japanese. These innovations in quality control, inventory management, and "flexible" manufacturing are only now becoming widely visible in the United States. They may yet have a significant impact on productivity.

Although the contributors to this volume do not provide a wholly satisfactory explanation for what ails the United States, they offer some valuable insights about the obstacles confronting Japan in making the transition from technological follower to leading innovator. Although government "targeting" has often been successful in traditional manufacturing industries, Okimoto reminds us that in high technology targeting has failed at least as often as it has succeeded. The successes of consumer electronics and semiconductors have not been matched in lasers, commercial aviation, and software. Aoki adds that the effectiveness of government targeting of high-technology industries is likely to diminish in the future, owing to increased budgetary stringency, growing jurisdictional conflicts among ministries concerned with economic development, and changes in the Japanese political environment that render government agencies less able to mediate interest-group conflicts without the intrusion of electoral politics. In any event, Okimoto argues that substantial institutional changes will be required for Japan to assume a leading position in technologies that are heavily dependent on basic research or creative design. Although some of the traditional rigidities in labor and capital markets that might impede innovation are beginning to give way, the educational system remains inflexible in responding to market demands for technical training in emergent fields, and research funding remains considerably less meritocratic in Japan than in the United States.

Ordinarily, if a conference volume contained a dozen first-rate papers (as this volume does), one would judge it a success. But this book sets higher standards for itself. The editors insist that we should regard the work as a complex whole, and it is in this respect that it is most disappointing. We have 43 distinguished commentators wrestling with an issue of vast importance under the auspices of a national academy. What is most distressing is that the conclusions on which there is widest agreement, the elements of the book's "positive sum strategy" for economic growth, are founded as much on ideology as on analysis and evidence. Many of the contributions deal carefully and competently with particular pieces of the larger puzzle, but many others are more akin to congressional testimony than to scientific papers. Unfortunately, the editors, in a generous but ill-conceived effort to be even-handed, accord to the mere opinions of some participants a weight roughly equal to that given the closely reasoned arguments and empirically grounded findings of others.

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Biological Oxygenation

Circulation, Respiration, and Metabolism. Current Comparative Approaches. R. GILLES, Ed. Springer-Verlag, New York, 1985. xviii, 568 pp., illus. $102. Proceedings in Life Sciences. From a symposium, Liège, Belgium, Aug. 1984.

The enormous variety of approaches to and levels of analysis of oxygen transport and utilization in animals is amply illustrated by the contributions to this volume stemming from the first International Congress of Comparative Physiology and Biochemistry. The book is a collection of 45 invited papers from seven symposia of this meeting. There is something in it for almost every comparative biochemist or physiologist. The symposia cover topics ranging from intracellular metabolism and *p*H to red blood cells to organ system physiology to hibernation to racing greyhounds. Most of the chapters are well written and succinct.

A recurrent theme of the contributions is the evolution of physiological and biochemical strategies of adaptation to a wide variety of environmental and organismal conditions. Despite the diversity of species and levels of analysis in these chapters, many commonalities emerge, as do nice illustrations of August Krogh's principle that for a particular problem of interest to biologists there is usually a species better suited for study than others. This is exemplified in the comparative approaches to exercise covered in symposia 1 and 3. Physiologists and biochemists who do not often browse outside the human literature will marvel at the metabolic and physiologic lessons to be learned from flying insects, running dogs, and diving mammals.

Principles of respiratory gas exchange are universal, but the ways in which they are applied have a fascinating dependence on the respiratory medium (air *versus* water), the respiratory exchange organ (lungs, gills, or skin), the "plumbing" of the circulatory system (whether the respiratory exchange organs are in series or in parallel or both with the heart), and the "plumbing" of the gas exchanger (open-pool lungs, countercurrent gills, cross-current bird lung). The principles for solving these problems are presented clearly and comprehensively in symposium 2.

Symposium 7 covers a topic of universal interest to comparative biologists, adaptations to temperature. One of the most impressive solutions to facing a long, cold winter without available food is mammalian hibernation, to which two papers are devoted. There are also fascinating solutions at the cellular level that involve membrane structure. One paper describes how polar fishes have solved the problem of living in