

TECHNOLOGY IN THE GLOBAL ECONOMY

Reading list

READINGS: The principal textbook used in this course is Vernon W. Ruttan, *Technology, Growth, and Development* (2001). The book is available for purchase in the bookstore and also available at the Reserve Desk. In addition, various articles and book excerpts, listed below are available through ERES, the Brandeis Library's electronic reserve system on the World Wide Web. See handouts from the Library on how and where to access ERES. The password for this course is "technology".

REQUIREMENTS: This course includes the following requirements: Three in-class exams [September 24, October 25, and December 3], each of which counts for 20% of the course grade, five 2-3 page "essays", which together count for 25% of the course grade, and class participation, including an occasional take-home problem set, which counts for the final 15% of the course grade. The journal entries are intended to convey critical perspectives on readings and in-class discussions. An entry, for example, may contrast two readings. Each entry should also incorporate at least one outside reading, i.e. anything ranging from a relevant newspaper article to a journal article.

Also:

You are expected to be honest in all of your academic work. The University policy on academic honesty is distributed annually as section 5 of the Rights and Responsibilities handbook. Instances of alleged dishonesty will be forwarded to the Office of Campus Life for possible referral to the Student Judicial System. Potential sanctions include failure in the course and suspension from the University. If you have any questions about my expectations, please ask.

If you are a student with a documented disability on record at Brandeis University, and if you wish to request a reasonable accommodation for this class, please see me immediately. Please keep in mind that reasonable accommodations are not provided retroactively.

Course reading:

I. INTRODUCTION AND HISTORICAL PERSPECTIVES ON TECHNOLOGICAL PROGRESS

Ruttan, Ch. 1, "Is Economic Growth Sustainable," pp. 3-14.

Smith, Adam. 1776, Excerpts from *The Wealth of Nations* in Putterman, Louis, ed. *The Economic Nature of the Firm*, Ch. 1, pp. 33-39.

Ricardo, David. 1817, *The Principles of Political Economy and Taxation* (Everyman's edition), Ch. 31, pp. 263-271.

Rosenberg, Nathan. 1982, "Marx as a Student of Technology," *Inside the Black Box*, Cambridge University Press. Ch. 2, pp. 32-43.

II. MEASURES OF TECHNICAL CHANGE AND MODELS OF ECONOMIC GROWTH

Ruttan, Ch. 2, "The Convergence Controversy," pp. 15-23.

Ruttan, Ch 2, "Accounting for Economic Growth," pp. 29-44. Also, pp. 49-52 and Box A2.1 (Definitions of Neutrality).

Solow, Robert M. 1957, "Technological Change and the Aggregate Production Function." *Review of Economics and Statistics*, August. pp. 312-320.

Mansfield, Edwin. 1968, *The Economics of Technological Change*, Ch.2, pp.10-21

Fagerberg, J. 1988. "Why Growth Rates Differ" in Dosi. G. et. al., *Technical Change and Economic Theory*. New York. Columbia University Press, pp. 432-457.

Ruttan, Box 2.1 (The Harrod-Domar and Solow-Swan Growth Models), pp. 26-27.

Jefferson, Gary H. 2001, "Malthus, Technical Change, and The Industrial Revolution," working paper.

Carter, Anne, P. 1996. "Measuring the Performance of the Knowledge-Based Economy" in D. Foray and B-A. Lundvall, eds., *Employment and Growth in the Knowledge-Based Economy*. Paris, OECD.61-68.

III. SOURCES OF TECHNICAL CHANGE AND ENDOGENOUS GROWTH

Ruttan, Ch. 3, "The Process of Invention and Innovation," pp. 63-95.

Schumpeter, Joseph. 1942, *Capitalism, Socialism and Democracy*. Ch.7, pp.81-86.

_____. *The Theory of Economic Development*, pp.81-85.

Rosenberg, N. 1982, "Learning by Using," *Inside the Black Box*, Cambridge University Press. Ch.6. pp. 120-129.

Von Hippel, Eric. 1987, *The Sources of Innovation*, pp.3-10.

Schmookler, Jacob, 1961, "Changes in Industry and in the State of Knowledge as Determinants of Industrial Invention," in R. Nelson, ed., *The Rate and Direction of Economic Activity*. pp. 195-216 and 224-228.

Romer, Paul M. 1994, "The Origins of Endogenous Growth" *Journal of Economic Perspectives*, 8,1: 3-22.

Von Hippel, Eric. 1987, *The Sources of Innovation*. New York. Oxford University Press, pp.76-91.

_____. 1994, "Sticky Information and the Locus of Problem Solving: Implications for Innovation," *Management Science*. 40. April, pp. 429-439.

Carter, Anne P. 1987, "Know-how Trading as Economic Exchange," *Research Policy*, 18:155-163.

IV. THE ECONOMICS OF R&D AND PATENTS

Carleton, D. and Perloff, J. 1990, "Patents and Technological Change," *Modern Industrial Organization*, (Chapter 20), pp. 653-682.

Mansfield, Edwin. 1987, "R&D and Innovation: Some Empirical Findings," in Z. Griliches (ed.) *R&D, Patents and Productivity*. NBER. Chicago. ch. 6. pp.127-129; 131-133 135-146.

Teece, David J. 1986, "Capturing Value from Technological Innovation". Unpublished. Center for Research in Management, University of California at Berkeley. pp.1-43.

Grabowski, Henry and John Vernon. 1986, "Longer Patents for Lower Imitation Barriers: the 1984 Drug Act." *American Economic Review*, May, pp.195-198.

Levin, Richard C. 1986. "A New Look at the Patent System." *American Economic Review Papers and Proceedings*, pp. 199-202.

*Seabrook, John, 1993. "The Flash of Genius: annals of Innovation," *The New Yorker*, January pp. 38-52.

V. TECHNICAL AND INSTITUTIONAL INNOVATION

Ruttan, Ch 4, "Technical and Institutional Innovation," pp. 100-137.

Abernathy, William J. and Kim B. Clark. 1985, "Mapping the Winds of Creative Destruction. *Research Policy*. 14. pp 3-22.

Arthur, W. Brian. 1988, "Competing Technologies: an Overview." in Dosi, G. et.al.,eds. *Technical Change and Economic Theory*. London and New York, Pinter Publishers. pp. 590-607.

Tushman, Michael L. and Anderson, Philip. 1986. "Technological Discontinuities and Organizational Environments," *Administrative Science Quarterly*, 31, pp. 439-465.

Besen, Stanley M. and Farrell, Joseph. 1994, "Choosing How to Compete: Strategies and Tactics in Standardization". *Journal of Economic Perspectives*, Spring, pp. 117-131.

VI. INNOVATION AND THE FIRM

Mowery, David C. 1995, "The Boundaries of the U.S. Firm in R&D". in Lamoreaux and Raff eds. *Op. Cit.* pp.147-172.

Prahalad, C.K. and Hamel, Gary.1990, "The Core Competence of the Corporation," *Harvard Business Review*, May-June, pp. 79-91.

*Pisano, Gary. 1991, "The Governance of Innovation: Vertical Integration and Collaborative Arrangements in the Biotechnology Industry." *Research Policy*. 20. pp. 237-249.

*Saxenian, Anna Lee. 1991, "The Origins and Dynamics of Production Networks in Silicon Valley." *Research Policy*, 20. pp. 423-437.

VII. TECHNOLOGY TRANSFER (Wednesday, Nov. 20, 6:30 pm)

Ruttan, Ch. 5, "Technology Adoption, Diffusion, and Transfer," pp. 147-172.

Rosenberg, Nathan.1982, Ch. 11."The International Transfer of Technology," in Rosenberg, N. *Inside The Black Box*,. pp.245-260 and 275-277.

Braga, Helson and Larry Willmore. 1991, "Technological Imports and Technological Effort: An Analysis of their Determinants in Brazilian Firms, *Journal of Industrial Economics*, 39,4:421-432. (available on e-reserve and in Brandeis Library/electronic journals/jstor)

VIII. COMPARISONS OF NATIONAL INNOVATION SYSTEMS (Friday, Nov. 22)

Ruttan, Ch. 11. "Technical Innovation in Three Systems," pp. 425-473.

Westphal, Larry. "Korea's Technological Development".(5 pages, source unknown)

Mansfield, Edwin. 1988, "Industrial Innovation in Japan and the United States." *Science*, September 10. pp.1769-1774.

Each of the readings with an asterisk (*) is an acceptable topic for a class essay assignment.