

Global Trade and Conflicting National Interests



Ralph E. Gomory
and
William J. Baumol

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The Lionel Robbins Lectures

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**Global Trade and
Conflicting National
Interests**

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William J. Baumol

with a contribution by
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To our wives, Lilian Gomory-Wu and Hilda Baumol, and
to our families whose interest and support were vital to the writing of
this book

To Lionel Robbins

In 1994 I was invited to give the annual Robbins lectures at the London School of Economics. At that time Ralph Gomory and I were in the midst of working out the theory that is the subject of this book, so I decided that our joint work would be the subject matter of those lectures. My long association with Lionel Robbins (later Lord Robbins) and with his delightful wife Iris, Lady Robbins, added a strong personal element, so when I was invited to give the Robbins lectures I naturally leaped at the opportunity to report our work in that respected forum.

A highlight of our trip to London for the lectures was the opportunity to introduce the Gomorys, sadly, not to Lionel and Iris, but to the next Robbins generation, with whom we have been close friends for the half century since I studied and taught at the London School of Economics. At that great school Lionel Robbins was my mentor, and he and his wonderful wife became close friends of my wife Hilda and myself. I can tell many anecdotes of our meetings over the years, but that would require a separate essay. Here, I need only quote from what I have written elsewhere of the unforgettable experience of association with Lionel

Central to that experience was the man himself. Tall, massive, stately, with a sonorous voice and a leonine mane. . . . It is sheer understatement to describe him as a man with a powerful personality. His students would find themselves unconsciously mimicking his style, the personal attributes and speech patterns that recalled an earlier, less mechanized age. Yet one soon learned that his was not a domineering personality. His sense of humor was profound, and his anecdotes riveting. He was invariably considerate and kind, particularly to younger people and particularly when few others were present to observe his acts. But even more striking were his command of the language, his clarity of mind, and his incredible erudition. . . . (From the foreword to Robbins LSE lectures, in *A History of Economic Thought*, S. G. Medina and W. J. Samuels, eds., Princeton: Princeton University Press, 1998)

There were many reasons, both personal and professional, for our giving these lectures, but one is particularly pertinent and relates to Lionel Robbins. Lionel Robbins had given much thought to trade issues, and had emerged with a predisposition toward the virtues of free and unimpeded trade. We share that view. This is worth mentioning because there is some danger that this book will be misunderstood as a protectionist argument, which it emphatically *is not*. Indeed in this book we only consider free trade. Our message, rather, is that under modern free-trade conditions, there is no longer one, but rather many possible free-trade outcomes, and a country is better off with some than with others. Knowing Lionel Robbins's receptivity to new ideas and logical argument, I am confident he would not have taken umbrage at our analysis or its conclusions, and would readily have understood our true intentions. Thus the association of this book with the Robbins lectures may perhaps contribute something to clarification of its purpose.

I have had the pleasure of dedicating a book to Lionel and to his wife, both of whom we loved deeply. And, predictably, he responded in kind. Only several weeks ago I needed to consult his materials in his several books on classical political economy. On opening one of them the dedication leaped out at me: "To William and Hilda Baumol who made glorious summer of a winter of discontent" and underneath, in his hand, is written "with love from Lionel."

I am happy that this book gives me another opportunity to express my affection and admiration for Lionel Robbins.

William J. Baumol

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Foreword

This important book has its origins in the Lionel Robbins Memorial Lectures given at the London School of Economics in 1994. William Baumol is a leading world economist and one of Lionel Robbins' most distinguished former students; Ralph Gomory is a distinguished applied mathematician.

They have chosen as their topic one of the most important issues in the new global economy. The issue is whether, when one country improves its production capacity, this necessarily benefits all other countries—in a world of free trade. The man in the street would answer no, and the authors explain why he is right. They show why, with economies of scale or with rapid changes in productivity, a gain to one country can sometimes hurt all others, and they also explain when this will be the result and when it will not. The conclusion is that the welfare of a country depends critically on the success of its internationally traded sector.

This book is a valuable contribution to the globalization debate. It should be a serious spur to research on critical new issues of trade in today's global economy.

Richard Layard

Preface

What the Book Is About

This book is about some of the ways in which trade theory needs to be modified from the theory provided by Ricardo and his contemporaries. In Ricardo's time trade is estimated to have constituted about 1 percent of world GDP. Since then, despite exploding world output, the volume of trade *relative to GDP* has risen more than thirteenfold.¹ This surely suggests that there have been major changes in the structure of trade that require analysis, and this book is intended to contribute to the very substantial and powerful recent literature dedicated to the purpose.

It is also clear that the nature of the goods entering into international trade has changed along with the quantities. Advantages based on natural resources still exist, as they did when England specialized in wool and Portugal in wine, but more dominant today are advantages that can be *acquired*. These can be the advantages conferred by being established in an industry and gaining thereby either specialized knowledge or economies of scale or scope. There is also the possibility, in industries where knowledge is easily transferred, and where economies of scale are not significant, of dispersing production around the world to use cheap labor or other special advantages, and then to exploit the cheapness of modern transportation to deliver these goods to global markets.

Especially in this latter case one might conclude that the location of economic activity today no longer matters since international companies can repatriate their profits from whatever part of the globe houses their actual economic activities. However, in almost all cases, most of the economic benefit stays where the value is added. Profits are usually only a small portion of the value added through economic activity, and most of the value added, such as wages, remains local. It matters to a

country to be the site of an economic activity, whoever may own the company.

Although the countries do not compete directly, in the way companies do, the amount of economic activity actually taking place within their borders is vital. As we will see in this book, it is vital not only for those engaged in a particular industry who may experience the ups and downs of activity directly but also for the country as a whole.

How the Book Came to Be Written

Our association now dates back four decades. It began soon after Albert Tucker, then chairman of the math department at Princeton, told WJB “There is a young man (REG) I think you should meet. He has just solved the integer programming problem.” Meet we soon did, and it was not long before we were happily puzzling over the economic interpretation of the integer solution, its relation to scale economies, and a variety of other fascinating subjects. The result was an article, one that has often been cited, and after many years we still recall that collaboration with affection.

Our paths parted when one of us (REG) left academe to go on to a career in the worlds of mathematical research, science, and business (as director of research at IBM), and most recently as president of the Sloan Foundation, a research sponsoring foundation. For many years we remained aware of one another but we were not collaborators.

However in 1992 we met again, and REG explained that from his experiences in industry, he had developed some ideas on the pervasive importance of scale economies, their connection with integer programming, and their implications for international trade theory. Actually it emerged that he had already worked out much of the basic analysis and had benefited importantly from instruction in equilibrium theory from another old friend, Herbert Scarf of Yale. Yet he felt strongly that to move forward he needed a continuing partner—an economist—and of course he remembered our previous authorship struggles with great pleasure. After much discussion, during which WJB objected that he had never worked on international trade theory or directly related subjects, we finally agreed to go forward together. The result has been years of happy argument, pleasant and stimulating puzzlement, or temporary disagreement, always followed by a manuscript or more.

On Our Debts . . .

Aside from those whom we have already mentioned, there is a profusion of creditors to whom we owe deepest thanks, for direct labors on our manuscript, for helpful suggestions, or for vital encouragement. Among colleagues, those to whom we owe profound gratitude include Jagdish Bhagwati, Avinash Dixit, John Geanopolis, Gene Grossman, Peter Kenen Dan Quah, Paul Samuelson, Karl Shell, Martin Shubik, Robert Solow, and Frank Stafford. Happily the list is too long to invite us to single out the contributions of each of these benefactors. Quite aside from these personal interactions, we owe a great debt to those whose research opened up the fields that this book discusses. We are thinking especially of Paul Krugman, Gene Grossman, Elhanan Helpman, Wilfred Ethier, Frank Stafford, and G. F. Johnson. Our reference list contain the names of many others, and our chapter on predecessors, chapter 10, tries to make clear the relation of this book to what has gone before, but we will never succeed in fully describing the intellectual debt that we owe to so many.

We owe special thanks to Ed Wolff of New York University for using his unique command of data to write an important chapter of this book. Chapter 11, which he has written, offers supportive empirical evidence for the persistence of specialization in industrialized countries.

The completion of any book is a collaborative effort involving the work of many people. Prominent among these are three friends and colleagues who participated in our work with faithfulness, helpful energy, and enthusiasm. Beverly DeMaggio Newman, at the Sloan Foundation, in effect, ran the enterprise and continually prevented order from becoming chaos, though occasionally it appeared that the chaos might win. Sue Anne Batey Blackman, at Princeton, read and improved much of the manuscript, bringing to it an eye that could detect opaque sentences and paragraphs and a pen that could render them into English. Finally, Janece Roderick Lewis, at New York University, made herself into a master of graphics and produced beautifully most of the diagrams that appear in this book. All three of these people, with whom it is so pleasant to work, helped in many other ways, but in singling out their most salient contributions, we hope we have suggested how much and how vital was the help they provided.

We must also thank our draftsman Mark Mamrega (yes, this art form does still exist) for transforming complex machine-generated graphs,

calculated from particular numerical models, into readable and aesthetically acceptable versions.

The debt that we owe to our wives in sustaining this enterprise is critical: There would have been no book without them. Their contribution has been many faceted. Both Hilda Baumol and Lilian Gomory-Wu endlessly contributed ideas, reactions, criticisms, and encouragement. They were patient with our preoccupations, and through their efforts they created a world around us in which the work could go forward. What more could anyone ask?

I

For the Nonspecialist: National Welfare and Trade in the Modern World

This book has been divided into two parts for easier reading. Part I tells the basic story—giving the ideas we are hoping to convey. We hope that this part of the book will be read both by professional economists and by noneconomists interested in issues such as global trade policy, the productivity achievements of different countries, and the contrasting stakes of a developed economy in its trade dealings with less developed countries and those with other industrialized economies.

We will not be disappointed, however, if part II of the book proves to be primarily of interest to economists. Part II addresses itself to some relevant analytic issues that have been left out of part I because they would have cluttered the discussion and made it more difficult to follow. In particular, part II deals with topics such as statistical evidence, pertinent earlier economic writings dealing with our subject, and the consequences of modification of some of the assumptions used in part I to simplify the exposition.

References

- Arthur, W. Brian. 1989. Competing technologies, increasing returns and lock in by historical events. *Economic Journal* 99: 116–31.
- Arrow, Kenneth. 1962. The economic implications of learning by doing. *Review of Economic Studies* 29: 155–73.
- Balassa, Bela. 1965. Trade liberalization and “revealed” comparative advantage. *The Manchester School* 33: 99–123.
- Baumol, William J., John C. Panzar, and Robert D. Willig. 1988. *Contestable Markets and the Theory of Industry Structure*, rev. ed. San Diego: Harcourt Brace Jovanovich.
- Bhagwati, Jagdish N. 1958. Immiserizing growth: A geometrical note. *Review of Economic Studies* 25: 201–5.
- Bhagwati, Jagdish, and T. N. Srinivasan. 1983. *Lectures on International Trade*. Cambridge: MIT Press, ch. 26.
- Chandler, Alfred. 1977. *The Visible Hand: The Managerial Revolution in American Business*. Cambridge: Belknap Press.
- Chichilnisky, Graciela, and Geoffrey Heal. 1986. *The Evolving International Economy*. Cambridge: Cambridge University Press.
- Chipman, John S. 1965. A survey of the theory of international trade: Part 2, The neo-classical theory. *Econometrica* 33: 685–760.
- Corden, Warner M. 1956. Economic expansion and international trade: A geometric approach. *Oxford Economic Papers* 8: 223–28.
- Cournot, A. A. 1838. *The Mathematical Principles of the Theory of Wealth*. English trans., New York: Macmillan Company, 1897.
- David, Paul. 1985. Clio and the economics of Qwerty. *American Economic Review* 35: 332–37.
- Dixit, Avinash K., and Victor D. Norman. 1980. *Theory of International Trade*. Cambridge: Cambridge University Press.
- Dollar, David, and Edward N. Wolff. 1993. *Competitiveness, Convergence, and International Specialization*. Cambridge: MIT Press.

- Dornbush, Rudiger W., Stanley Fischer, and Paul A. Samuelson. 1977. Comparative advantage, trade and payments in a Ricardian model with a continuum of goods. *American Economic Review* 67: 823–39.
- Edgeworth, F. Y. 1925. *Papers Relating to Political Economy*. London: Macmillan.
- Ethier, Wilfred J. 1979. Internationally decreasing costs and world trade. *Journal of International Economics* 9: 1–24.
- Ethier, Wilfred J. 1982. Decreasing costs in international trade and Frank Graham's argument for protection. *Econometrica* 50: 1243–68.
- Findlay, Ronald, and Harry Grubert. 1959. Factor intensities, technological progress and the terms of trade. *Oxford Economic Papers* 11: 111–21.
- Graham, Frank. 1923. Some aspects of protection further considered. *Quarterly Journal of Economics* 37: 199–227.
- Grossman, Gene M., and Elhanan Helpman. 1991. *Innovation and Growth in the Global Economy*. Cambridge: MIT Press.
- Hamilton, Alexander. 1791. *Report on Manufactures*. Communicated to the U.S. House of Representatives, December 5, 1791. Reprinted in S. McKee, ed. *Papers on Public Credit and Finance by Alexander Hamilton*. New York: Columbia University Press, 1934.
- Helpman, Elhanan. 1984. Increasing returns, imperfect markets, and trade theory. In Ronald W. Jones and Peter B. Kenen, eds., *Handbook of International Economics*, vol. 1. Amsterdam: North Holland, pp. 325–65.
- Helpman, Elhanan. 1994. Technology and trade. Working Paper 4926. National Bureau of Economic Research, Cambridge, MA.
- Helpman, Elhanan, and Paul R. Krugman. 1985. *Market Structure and Foreign Trade*. Cambridge: MIT Press, 1985.
- Hicks, J. R. 1953. An inaugural lecture. *Oxford Economic Papers* 5: 117–35.
- Hicks, J. R., and R. G. D. Allen. 1934. A reconsideration of the theory of value. *Economica* 1: 52–76, 196–219.
- Hume, David. 1741–42. *Essays, Literary, Moral and Political*. Edinburgh: Alexander Kincaid. Volume 1, 1741, volume 2, 1742; reprinted with corrections and additions, 1748.
- Hymans, S. H., and F. P. Stafford. 1995. Divergence, convergence, and the gains from trade. *Review of International Economics* 3: 118–23.
- Irwin, Douglas A. 1996. *Against the Tide: An Intellectual History of Free Trade*. Princeton: Princeton University Press.
- Johnson, G. E., and F. P. Stafford. 1993. International competition and real wages. *American Economic Review* 83: 127–30.
- Johnson, G. E., and F. P. Stafford. 1998. Technology regimes and the distribution of real wages. In Gunnar Elaisson and Christopher Green, eds., *Microfoundations of Economic Growth: A Schumpeterian Perspective*. Ann Arbor, MI: University of Michigan Press, pp. 348–68.
- Johnson, Harry G. 1955. Economic expansion and international trade. *Manchester School of Economic and Social Studies* 95–112.

- Johnson, Harry G. 1971. *Aspects of the Theory of Tariffs*. Cambridge: Harvard University Press.
- Kahn, Alfred E. 1988. *The Economics of Regulation*. Cambridge: MIT Press 2nd ed.
- Kaserman, D. L., and J. H. Mayo. 1995. *Government and Business: The Economics of Antitrust and Regulation*. Fort Worth, TX: Dryden Press.
- Kemp, M. C. 1964. *The Pure Theory of International Trade*. Englewood Cliffs, NJ: Prentice Hall.
- Knight, Frank H. 1924. Some fallacies in the interpretation of social cost. *Quarterly Journal of Economics* 38: 582–606.
- Krugman, Paul R. 1979. Increasing returns, monopolistic competition and international trade. *Journal of International Economics* 9: 469–79.
- Krugman, Paul R. 1983. Targeted industrial policies: Theory and evidence. *Industrial Change and Public Policy*. Kansas City, MO: Federal Reserve Bank, pp. 123–55.
- Krugman, Paul R. 1984. The U.S. response to foreign industrial targeting and the U.S. economy. *Brookings Papers on Economic Activity*, Spring: 77–121.
- Krugman, Paul R. 1985. A “Technology Gap” Model of International Trade. In K. Jungenfelt and D. Hague, eds., *Structural Adjustment in Developed Open Economies*. New York: St. Martin’s Press, pp. 35–49.
- Krugman, Paul R. 1987. Is free trade passé? *Journal of Economic Perspectives* 1: 131–44.
- Krugman, Paul R. 1991. History versus expectations. *Quarterly Journal of Economics* 106: 651–67.
- Krugman, Paul R., and Robert Lawrence. 1993. Trade, jobs and wages. Working Paper 4478. National Bureau of Economic Research. Cambridge, MA.
- Krugman, Paul R., and A. Venables. 1992. Integration, specialization and adjustment. Centre for Economic Performance, London School of Economics.
- Landes, David. 1969. *The Unbound Prometheus*. Cambridge: Cambridge University Press.
- List, Friedrich. 1841. *Die Theorie des Nationalen Systems der Politischen Öconomie*, Stuttgart Verlag der königl. hofbuchhandlung von Julius Weise, English trans., 1885.
- Marshall, Alfred. 1879. *Pure Theory (Foreign Trade—Domestic Values)*. Privately printed 1879, Reprinted, London School of Economics, 1930.
- Marshall, Alfred. 1890–1920. *Principles of Economics*. London: Macmillan. First edition published 1890, 8th edition 1920.
- Matthews, R. C. O. 1949–50. Reciprocal demand and increasing returns. *Review of Economic Studies* 17: 149–58.
- McCloskey, D. N. 1981. *Enterprise and Trade in Victorian Britain*. London: George Allen and Unwin.
- Meade, J. E. 1952. *A Geometry of International Trade*. London: George Allen and Unwin.
- Mill, John Stuart. *Principles of Political Economy*, rev. ed. New York: Colonial Press. First edition published 1848.

- Mishan, E. J. 1955. The long-run dollar problem: A comment. *Oxford Economic Papers* 7: 215–20.
- Nadiri, M. Ishaq, and Banani Nandi. 1999. Benefits of communications infrastructure capital in U.S. economy. (Forthcoming in *Economics of Innovation and New Technology*), December.
- Pigou, A. C. 1906. *Protective and Preferential Import Duties*. London: Macmillan.
- Pigou, A. C. 1932. *The Economics of Welfare*, 4th ed. London: Macmillan.
- Romer, Paul. 1994. New goods, old theory and the welfare costs of trade restrictions. *Journal of Development Economics* 43: 5–38.
- Roy, R. 1942. *De l'Utilité: Contribution a la théorie des choix*. Paris.
- Samuelson, Paul A. 1953. Consumption theorems in terms of overcompensation rather than indifference comparisons. *Economica* 20: 1–9.
- Scitovsky, Tibor. 1947. A reconsideration of the theory of tariffs. *Review of Economic Studies* 9: 89–110.
- Sharkey, W. 1982. *The Theory of Natural Monopoly*. Cambridge: Cambridge University Press.
- Spencer, Barbara J., and James A. Brander. 1983. International R&D rivalry and industrial strategy. *Review of Economic Studies* 50: 707–22.
- Smith, Adam. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*, Edwin Cannan, ed., London: Methuen, 1904.
- Summers, Robert, and Alan Heston. 1991. The Penn World Table (Mark 5): An expanded set of international comparisons, 1950–1988. *Quarterly Journal of Economics* 106: 327–68. Also available at: <http://pwt.econ.upenn.edu>.
- Tyson, Laura d'Andrea. 1992. *Who's Bashing Whom: Trade Conflict on High Technology Industries*. Washington, DC: Institute for International Economics.
- Viner, Jacob. 1931. Cost curves and supply curves. *Zeitschrift für Nationalökonomie* 3: 23–46.
- Viner, Jacob. 1937. *Studies in the Theory of International Trade*. New York: Harper.
- Viner, Jacob. 1950. *The Customs Union Issue*. New York: Carnegie Endowment for the International Peace.
- Wicksell, Knut. 1901. *Lectures on Political Economy*. London: Routledge. English translation of the third edition, 1934.