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## Trade Theory versus the Real World

*Empirical Methods for International Trade. Edited by Robert C Feenstra Cambridge, MA MIT Press, 1988, 322 pp, \$30*

Reviewed by Chinkook Lee

Because international trade theory typically deals with  $2 \times 2 \times 2$  models (two countries, two goods, and two inputs), empirical analysts face difficulties with non-homogeneous data across countries and problems of data aggregation. The US current account trade deficit has recently soared. Yet economists' efforts to use theory to shed light on real world issues flounder because of the lack of solid empirical work.

Feenstra's book is timely, dealing with theory, research methods, and empirical analysis. It brings together a wide range of empirical studies applied to three main topics of trade: (1) a cross-country analysis of testing the Heckscher-Ohlin-Vanek (HOV) trade models, (2) differentiated products and imperfect market structure, and (3) the use of duality in extending the estimation of production and cost functions to incorporate trade flows.

The theoretical and methodological analyses in each article are followed with empirical studies and comments by well-known trade economists. This format of empirical methods, empirical studies, and comments provides a helpful guide to the usefulness and shortcomings of research methods in empirical studies. The references focus on empirical studies of international trade.

Four studies test the HOV model of international trade theory. Brecher and Choudhri, who examine the HOV model for Canada and the United States, find no empirical support for it. Although their empirical findings are contrary to the received theory of international trade, their study is still a welcome addition to the limited number of studies that have actually tested the theorem. Dollar, Wolff, and Baumol find evidence contradicting the HOV model of trade as well. They find that, for the average industry, the cross-country labor productivity differential is strikingly large. U.S. labor productivity, for example, exceeds the United Kingdom's productivity in all but one of 28 industries examined. In 14 industries, the U.S. advantage is greater than 50 percent,

and the productivity differential is more than 100 percent in 5 industries. This evidence suggests that the factor price equalization model is not a useful way to think about the issue of cross-country differences in labor productivity, because when one draws a connection between productivity and living standards, a 50-percent differential is clearly a large one.

Empirical studies are particularly deficient regarding the effects of trade barriers on income distribution. Addressing this deficiency, Leamer proposes a cross-section econometrics study that could reveal the output effects of tariff barriers. It could also be used to infer the effects of explaining trade flows based on taste differences across countries by relaxing one of the standard HOV assumptions: no taste differences between countries.

The papers include Section I—Cross-Country Analysis: The Heckscher-Ohlin Model and Beyond (1) "The Factor Content of Consumption in Canada and the United States: A Two Country Test of the Heckscher-Ohlin-Vanek Model" by Richard A. Brecher and Ehsan U. Choudhri, (2) "The Factor-Price Equalization Model and Industry Labor Productivity: An Empirical Test across Countries" by David Dollar, Edward N. Wolff, and William J. Baumol, (3) "Cross-Sectional Estimation of the Effects of Trade Barriers" by Edward E. Leamer, (4) "Per Capita Income as a Determinant of Trade" by Linda C. Hunter and James R. Markusen.

Section II—Industry Studies: Product Variety and Imperfect Competition (5) "Gains from Trade in Differentiated Products: Japanese Compact Trucks" by Robert C. Feenstra, (6) "Optimal Trade and Industrial Policies for the U.S. Automobile Industry" by Avanash Dixit, (7) "Market Access and International Competition: A Simulation Study of 16K Random Access Memories" by Richard E. Baldwin and Paul R. Krugman.

Section III—Dual Methods: Aggregate Technology, Prices, and Trade Flows (8) "Export Supply and Import Demand Functions: A Production Theory Approach" by W. Erwin Diewert and Catherine J. Morrison, (9) "International Factor Mobility and the Volume of Trade: An Empirical Study" by Kar-yiu Wong, (10) "Multilateral Index Numbers" by Bee Yan Aw and Mark J. Roberts, (11) "Productivity Growth and Changes in the Terms of Trade in Canada" by Alexandra Cas, W. Erwin Diewert, and Lawrence A. Ostensen.

The reviewer is an agricultural economist with the Agriculture and Rural Economy Division, ERS.

Four more studies deal with what Krugman calls "new theories" of trade among industrial countries. Although the factor-endowment model continues to play a prominent role in trade theory, it does not adequately account for world trade flows, particularly for manufactured goods. Thus, economies of scale, market imperfection, and other theories drawn from industrial organization literature have been used in empirical studies.

Baldwin and Krugman considered competition between the United States and Japan in random access memories (RAM's) in computers. Recent work on international trade policy in the presence of imperfectly competitive markets has pointed out a number of theoretical possibilities for strategic trade policy with potential benefits for the United States. Among these benefits is the possibility that, for a dynamic industry such as semiconductors, where US firms have economies of scale, import protection may have been the key to Japanese success. If Japan and the United States had engaged in a "trade war" in RAM's, firms would have been smaller and would have had higher marginal costs. The resulting higher prices in both markets, especially in the smaller Japanese market, would have reduced welfare in both nations because of the increased costs of RAM's.

Four studies deal with duality theory, measuring aggregate relationships among technology, prices, and trade flows. Cas, Diewert, and Ostensoe measured the growth in Canada's total productivity and changes in the terms of trade for 1961-80 by using the Canadian input-output table. Two applied welfare questions interest the authors. First, how did productivity growth enhance Canada's total welfare? Second, and more important, how did total welfare change as a result of shifts in Canada's terms of trade? The authors' empirical findings indicate that Canadian welfare increased about 48 percent. During the sixties, welfare growth was based entirely on productivity growth. During the seventies, however, welfare growth was split, 40 percent came from productivity growth and 60 percent from favorable terms of trade.

I think the relative factor endowment and factor-price equalization theory continues to play a prominent role in trade theory. Thus, I found the first section of the book the most interesting. Suppose that we are interested in testing this theory empirically. Then, we are immediately faced with a formidable aggregation problem. Each good in the two-by-two model is not literally a single good, but is usually interpreted as an aggregate, such as agriculture, manufacturing, or

imports and exports. Because of the difficulty of constructing such aggregate data, even the most diligent researchers hesitate to do an analysis. One reason why Leontief's empirical study became famous was because he was the first to tackle this problem.<sup>1</sup> Leamer's landmark study of the empirical analysis of international trade<sup>2</sup> is also a major addition to the study of the importance of factor endowment and factor-price equalization theory. A recent article by Bowen, Leamer, and Sveikauskas further demonstrates the continued interest in the factor endowment and factor-price equalization theory of trade.<sup>3</sup>

The studies in the first section of Feenstra's book cover the theoretical development of HOV, modifying and refining the model in light of constraints posed by data availability for many countries. Each author confesses that the constraints posed by the data limit the findings, which shows how difficult it is to test the HOV model empirically. Assumptions made by HOV are hard to apply to real world situations. However, we have not found enough evidence to deny that the *sources* of international comparative advantage are in relative factor endowments. Thus, the heart of empirical work is still the cross-country analysis of net export commodity trade and resource endowments, which is why the studies in the book's first section are so interesting.

A major limitation of the book is its lack of coverage of how macroeconomic shocks affect international trade and terms of trade. Such shocks include large changes in world capital flows, major swings in balance-of-payments accounts, and major changes in world trade patterns. A few questions remain: Are exchange rates excessively volatile? How does currency depreciation affect relative prices, export and import demand, and US competitiveness in international trade? Many of these shocks have altered the composition of demand and supply. It now appears there are wide gaps among theory, methodology, and empirical practice. A treatment of computable general equilibrium models, which can be used to sort out the direct and indirect links through which macro shocks affect the system, would have been a useful addition to the book. Nevertheless, students of international trade will find much of value in it.

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<sup>1</sup> W. W. Leontief, "Domestic Production and Foreign Trade: The American Capital Position Re-examined," in *Proceedings of the American Philosophical Society*, Vol. 97, Sept. 1953, pp. 332-49.

<sup>2</sup> Edward E. Leamer, *Sources of International Comparative Advantage*, Cambridge, MA: MIT Press, 1984.

<sup>3</sup> Harry Bowen, Edward E. Leamer, and Leo Sveikauskas, "Multi-country, Multifactor Tests of the Factor Abundance Theory," *American Economic Review*, Vol. 77, p. 5, Dec. 1987, pp. 791-809.