

The Development and Testing of Heckscher-Ohlin Trade Models by Robert E. Baldwin, MIT Press

Book Review by Stephen J. Redding, London School of Economics

In this splendid book, one of the pioneers of empirical research in international trade reviews the theoretical development and empirical testing of Heckscher-Ohlin (HO) trade models, which emphasize the interaction of cross-country differences in factor abundance and cross-industry differences in factor intensity as the determinant of international trade.

The core of the book is structured around the four central theorems of HO trade models: the HO and Heckscher-Ohlin-Vanek (HOV) Theorems concerning trade in goods and factor services, the Rybczynski Theorem relating to production, the Stolper-Samuelson Theorem linking goods and factor prices, and the Factor Price Equalization Theorem in which goods trade equalizes factor prices. Chapter 2 develops these four theorems in the canonical two-good, two-factor HO model and considers theoretical generalizations of them to richer settings with many goods and factors. Chapter 3 reviews early empirical tests of the HO and HOV theorems, while Chapter 4 examines the more recent empirical literature, which is distinguished by its use of empirical specifications derived rigorously from theory and data on multiple countries and factors of production. Finally, Chapter 5 surveys the less extensive empirical literatures on the other three central theorems of the HO model.

Running through the book are a number of interesting themes. One is the interplay between theory and empirics: the role of theory in supplying the correct empirical specification and the role of empirical evidence in spurring the development of theory. Perhaps the classic example of this comes from Leontief (1953)'s apparent rejection of the HOV Theorem with his finding that U.S. imports in 1947 were more capital-intensive than US exports. As noted by Leamer (1980), Leontief's specification was not well-grounded in theory, and therefore his results were not necessarily a rejection of HO theory. Only with Bowen, Leamer and Sveikauskas (1987) was the correct theory-based empirical specification estimated using the three sets of data suggested by the model: trade flows at the sectoral level, countries' factor endowments and factor intensities at the sectoral level.

The early results of such theory-based estimation were themselves disappointing, with the HOV model failing to outperform the flip of coin in predicting the sign and rank of net trade in factor services, and these early results spurred further theoretical and empirical analysis. Important strides were made in Trefler (1995), which identified systematic departures between the data and the predictions of the model: the "case of the missing trade" (net trade in factor services is much smaller than predicted by the model) and the "endowments paradox" (rich (poor) countries appear to be scarce (abundant) in most factors). Subsequent empirical work has either shown that the model performs more successfully in contexts where its assumptions are more likely to be satisfied (e.g. within countries in Davis et al. 1997) or once the strict assumptions of identical technologies and factor price equalization underlying early empirical tests of the HOV model are relaxed (e.g. Davis and Weinstein 2001). As Baldwin discusses, while the model performs

much more successfully once these assumptions are relaxed, it is no longer the strict version of the HOV model that is being estimated.

Another theme running through the book is that the elegance of the HO model stimulated a substantial body theoretical and empirical work, which neglected other potential determinants of trade, such as economies of scale, even though these featured in Ohlin's own work. Despite this initial neglect, economies of scale and imperfect competition can be incorporated into the framework of neoclassical trade theory using the analysis of integrated equilibrium, as in the path-breaking work of Helpman and Krugman (1985). More recent research following Melitz (2003) has emphasized heterogeneity across firms within industries, and again this can be incorporated into the framework of neoclassical trade theory using the analysis of integrated equilibrium, as in Bernard, Redding and Schott (2007).

Despite the generality of neoclassical trade theory and its success in incorporating these other considerations, there remain many areas for further research, as highlighted by the stimulating final chapter in the book. Theoretical and empirical research in international trade increasingly focuses on firms and products in addition to countries and industries. Comparative advantage and specialization are now thought to not only operate at the level of final goods but also at the level of individual tasks and stages of productions. Insights from these new layers of analysis have the potential to change our understanding of the determinants of trade at the level of countries and industries, which have been the traditional focus of studies of the HO model.

While recent empirical research on the HO model has allowed for technology differences, these technology differences could be given micro-foundations within for example theories of endogenous innovation and growth, as highlighted by Baldwin. Such technology differences were the focus of the earlier Ricardian model of trade, and have received renewed attention in international trade with the development of the stochastic multiple-good, multiple-country Ricardian model of Eaton and Kortum (2002). As also highlighted by Baldwin, the dynamics of trade and development were a key theme in Ohlin's own work, and there remains much scope for further research on trade dynamics and their relationship to development and growth.

Taken together, this book is an outstanding synthesis of theoretical and empirical research on HO models of trade, and highlights how the creative dialogue between theory and empirics has been central to deepening our understanding of trade. The book is essential reading for those interested in empirical research in international trade and will be a welcome addition to both undergraduate and graduate reading lists in international trade.

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