



Market Structure and Foreign Trade

**Increasing Returns,
Imperfect Competition,
and the
International Economy**

**Elhanan Helpman
and
Paul R. Krugman**

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Preface

In the last few years trade theorists have finally begun to come to grips with the role of increasing returns and imperfect competition in the world economy. As participants in this effort, however, we have come to feel that new theoretical work in this area has left important gaps and that it has not had the effect it should have. We wrote this book in order to fill in some of the gaps and to present an integrated view of the theory. We hope that by presenting an integrated treatment of a variety of issues involving increasing returns, imperfect competition, and international trade, we can help make this branch part of the core of trade theory rather than merely a promising new area.

We offer here a monograph rather than a textbook. Although it reviews and restates known results, it also contains a good deal of new work. The chapters on contestable markets, oligopolies, welfare, and multinational corporations, for example, are entirely new. New insights and results are also available in chapters that cover older ground, such as the treatment of external economies, intermediate inputs, and trade composition. The book is suitable, however, as a supplementary graduate text and for advanced undergraduate courses. Some of the material is somewhat technical, but most of the main points are made with simple models.

The book was written at MIT during the academic year 1983–84. While we were writing it, Helpman was a visiting professor in the Department of Economics at MIT, on leave from Tel-Aviv University. We received helpful comments on drafts of the book from Richard Brecher, Avinash Dixit, Wilfred Ethier, Torsten Persson, Lars Svensson, and Martin Weitzmann. Gene Grossman and Assaf Razin provided valuable comments on chapter 4. In addition the work reflects suggestions made by participants in seminars at Columbia, Princeton, Harvard, MIT, Dartmouth, University of Western Ontario, and Michigan State. We remain of course fully responsible for any errors.

We would like to thank all those who provided comments, as well as the

gallant typists in the Sloan School of Management, the MIT Department of Economics, and the National Bureau of Economic Research who worked on portions of the book. Finally, we would like to thank our wives, who were tolerant and supportive through many months of nonstop shop talk.

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Introduction

Why do countries trade with each other? What are the effects of international trade? It may seem surprising that these questions are still the subject of debate, close to one hundred and seventy years after the publication of Ricardo's *Principles*. In the last few years, however, a long-standing undercurrent of discontent with standard trade theory has finally surfaced in the form of new models offering alternative approaches to international trade. These new approaches break with traditional analysis by stressing the importance of increasing returns to scale and imperfect competition in understanding how the international economy works. The impact of these new approaches on research has been substantial. It was not very long ago that discussions of the relationship between trade and industrial organization had to start by justifying the juxtaposition of such unrelated fields. Today the border country between the theory of international trade and the theory of industrial structure is one of the most active areas in international economics.

A somewhat disturbing feature of these recent developments, however, has been the proliferation of special models, each with its own assumptions, seemingly inconsistent not only with traditional trade theory but with each other. This proliferation is for the most part a healthy thing, an indication that old assumptions are being challenged and that innovation is taking place. At some point, however, it becomes necessary that we attempt a synthesis that defines the common elements in the variety of new models and at the same time reestablishes some continuity with older traditions.

Our purpose in this book is to provide an integrated approach to the analysis of trade in a world characterized by increasing returns and imperfect competition. By an "integrated approach" we do *not* mean a survey. What we have tried to do here is something more ambitious than simply restating a number of existing models in a common notation. Instead, we develop a new approach to trade theory (which of course builds on the earlier work of many economists), allowing us to treat a number of existing models as special cases

and to treat a number of additional issues as well. Most of the analysis in this book is new, in both analytical technique and substantive results. At the same time we believe that our approach reveals a similarity in “deep structure” among models that may look quite different on the surface, and it helps clarify the continuity between traditional trade theory and new approaches. We hope that our integrated approach will help move the study of increasing returns and imperfect competition from its current status as a promising new subfield of trade theory into a central position at its core.

Why We Need New Theories of Trade

The traditional general equilibrium approach to international trade is a powerful and elegant intellectual construct, capable of yielding many useful insights about a trading world economy. A proposal that this approach share its position as the central element of trade theory with alternative approaches is therefore not something to be offered lightly. The only good reason for challenging the traditional approach is that it does not seem to do an adequate job of explaining the world and alternative approaches seem to offer an opportunity to do better.

We can identify four major ways in which conventional trade theory seems to be inadequate in accounting for empirical observation: its apparent failure to explain the volume of trade, the composition of trade, the volume and role of intrafirm trade and direct foreign investment, and the welfare effects of trade liberalization. *Let us consider each of these in turn.*

Conventional trade theory explains trade entirely by differences among countries, especially differences in their relative endowments of factors of production. This suggests an inverse relationship between similarity of countries and the volume of trade between them. *In practice, however, nearly half the world's trade consists of trade between industrial countries that are relatively similar in their relative factor endowments. Further both the share of trade among industrial countries and the share of this trade in these countries' incomes rose for much of the postwar period, even as these countries were becoming more similar by most measures.*

If differences between countries were the sole source of trade, we would expect the composition of trade to reflect this fact. In particular, countries should export goods whose factor content reflects their underlying resources. This is in fact by and large true of countries' *net* exports. But to casual observation, and on more careful examination, actual trade patterns seem to include substantial two-way trade in goods of similar factor intensity. This “intraindustry” trade seems both pointless and hard to explain from the point of view of a conventional trade analysis.

When we turn to intrafirm trade and direct foreign investment, the problem with conventional trade theory is that it is simply an inappropriate framework. In the perfectly competitive, constant-returns world of traditional theory there are no visible firms and thus no way to discuss issues hinging on the scope of activities carried out within firms. Again, in reality much international trade consists of intrafirm transactions rather than arm's-length dealings between unrelated parties, and multinational firms are a prominent part of the international landscape. We would like to have a trade theory that can both explain why this is so and tell us what difference it makes.

Finally, studies of trade liberalization seem to suggest that conventional trade theory misses important aspects of the welfare effects of trade. Standard models associate trade with a reallocation of resources that increases national income in aggregate but leaves at least some factors with reduced real income. What seems to have happened in such important episodes of trade liberalization as the formation of the EEC and the U.S.-Canadian auto pact is quite different, however. Little resource reallocation took place; instead, trade seems to have permitted an increased productivity of existing resources, which left everyone better off.

These four empirical weaknesses of conventional trade theory are not its only problems. We emphasize them here, however, because they become understandable once economies of scale and imperfect competition are introduced into our analysis.

Increasing Returns and Imperfect Competition

In reality many industries do not seem to be characterized either by constant returns or perfect competition. By itself, however, this observation would not make a compelling case for introducing these considerations into trade theory, since all economic theories leave out many aspects of reality. The reason for emphasizing the role of increasing returns rather than something else, such as the role of consumer psychology, is that economies of scale seem to allow a straightforward explanation of our empirical puzzles.

Consider first the problem of trade between similar countries. If there are country-specific economies of scale, such trade poses no puzzle. Even if differences in factor rewards or technology do not create an incentive for specialization and trade, the advantages of large-scale production will still lead countries to specialize and trade with one another. We will show that specialization and trade will persist even when countries have identical relative factor endowments for a wide variety of models.

Increasing returns also provide a simple explanation of intraindustry trade.

It seems apparent that specialization which takes place to realize economies of scale rather than because of differences in factor rewards can easily involve two-way trade in goods with similar factor content.

In part III of this book we will develop an approach to trade in which intraindustry trade is well defined and show that the importance of this trade is greater, the more similar countries are in their resources.

The relationship between increasing returns, intrafirm trade, and direct foreign investment is more indirect, relying on less well formalized insights, but it still seems clear. Whenever there are inputs such as headquarters services and intermediate goods that are both produced under increasing returns and specific to particular users, there will be strong incentives to avoid the problems of bilateral monopoly by integrating upstream and downstream activities in a single firm. If at the same time there are incentives, such as differences in factor rewards, for locating upstream and downstream activities in different countries, the result will be multinational firms engaging in intrafirm trade.

Finally, the experience of trade liberalizations that produce all-round gains without significant resource reallocation is not all paradoxical in a world characterized by increasing returns, where intraindustry specialization and trade may produce gains in efficiency through an increased scale of production.

Increasing returns then, seem to be useful for explaining important features of the international economy. Yet they have only recently been integrated into the basic theory of international trade because except under very special circumstances increasing returns are inconsistent with perfect competition. Since there is no generally accepted theory of imperfect competition, this has seemed to prevent the study of trade in the presence of increasing returns from being more than a collection of special cases.

Even if this were true, it would not be a good reason to ignore the role of economies of scale and imperfect competition in trade. It is better to have a collection of examples that seem to capture what is actually going on than to restrict oneself to a fully integrated theory that does not. In any case, although recent theoretical work on international trade has been marked by a proliferation of special assumptions, the insights gained from this work often seem more general than the particular models that suggest them.

In this book we will try to develop an approach to the modeling of trade in a world of increasing returns and imperfect competition that confirms the impression of a fairly general set of insights behind the special assumptions of particular models. The result is still not a general theory—this is not possible until economists agree on a general theory of imperfect competition. But we

believe that we have developed an approach that does provide an integrating framework for a variety of special models.

Method of the Book

This book is built around the two classic questions of trade theory: First, what determines the pattern of international trade? Second, is international trade beneficial? These are not the only questions one might ask, or even the most relevant for policy. They have been valuable historically as a way of structuring discussion, however, and we use them in the same way here. To answer each question, we have a general method that we apply to a variety of particular models.

Our method for the analysis of the trade pattern is to begin by constructing a reference point, the “integrated economy.” This is a description of what the world economy would look like if factors of production were perfectly mobile; the description depends on the underlying assumptions about technology, the structure of production, the behavior of firms, and so on.

We then “carve up” this integrated economy into separate countries, and ask the following question: Under what conditions will the integrated economy be reproduced through trade? In answering this question, we find what we also learn a great deal about the pattern of international trade because we can determine what transactions are needed to offset the fact that the world is divided into countries.

For example, to reproduce the integrated equilibrium in a world of constant returns, countries must indirectly trade the services of productive factors by trading goods produced with different factor intensities—which is the essence of the factor proportions theory of trade. If we add to this world some goods produced with country-specific economies of scale, to reproduce the integrated economy, we must concentrate production of each such good in a single country, giving an additional source of specialization and trade. If there are intermediate inputs that are produced with economies of scale and are not tradable, then to reproduce the integrated economy the trading economy must concentrate production of each such input and all the sectors using that input into an “industrial complex” located in a single country. If the integrated economy contains multiactivity firms, but the distribution of resources in the trading world leads to a geographical separation of these activities, to reproduce the integrated economy, we must have multinational firms. In each case asking what is needed to reproduce the integrated economy is a way of revealing the essential role of an international economic linkage.

The method just described applies to any number of countries, factors, and

goods. The essential points can be made, however, with two-country, two-factor examples, which we use liberally throughout the book. These examples have a distinctive geometry; we have found the “parallelograms in a box” diagrammatic technique extremely useful for building our intuition and hope that others will find the same.

Unfortunately trade does not always lead to reproduction of an integrated economy, and we have no general analysis when it does not. What we can do is twofold: we can establish the conditions under which the integrated economy is reproduced, and we can explore what happens when it is not by special cases and examples. Some of these special analyses suggest points that have the appearance of being both more general than the examples and important in reality. For example, when markets are separated by transport costs, which of course prevents reproduction of the integrated equilibrium, we have examples suggesting both a tendency of oligopolistic firms to engage in dumping and a tendency for increasing-returns industries to concentrate in countries with large domestic markets.

Turning next to the welfare effects of trade, here we also have a general method. We know that in a world of constant returns and perfect competition gains from trade are ensured. Once increasing returns and imperfect competition are introduced, there are both extra sources of potential gain and risks that trade may actually be harmful. Our approach is to derive cost-oriented *sufficient conditions* for gains from trade. The form of these sufficient conditions typically reveals key welfare effects over and above those captured by traditional models. For example, in models with oligopolistic firms a sufficient condition for gains from trade is that an appropriately weighted average of output per oligopolistic firm rises as a result of trade; this condition reveals that increased competition in oligopolistic industries can be a source of gains. In models with differentiated products the sufficient conditions we derive reveal the role of diversity and scale of production at a global level.

For the most part, our sufficient conditions are stated in terms of *outcomes* of trade. In other words, we show that gains from trade are ensured if, for example, the *world* output from increasing-returns sectors is on average larger than the *domestic* output before trade. Ideally we would like to go beyond this to derive predictions about trade and welfare from “primitives”: tastes, technology, and factor endowments. This is more difficult; we study it where possible by special cases and examples.

The Book’s Structure

Part I of the book lays some groundwork for the analysis. It begins with a restatement of conventional factor proportions theory—a restatement that

uses the “integrated economy” as a reference point, however. It then describes several alternative strategies for modeling market structure when returns to scale are not constant.

Part II of the book develops approaches to trade based on three different ways of handling increasing returns. The first is based on the assumption that economies of scale are external to firms; the second instead assumes average cost pricing enforced in imperfectly competitive industries by the contestability of markets; the third assumes noncooperative behavior by oligopolistic firms.

Part III of the book introduces a particular approach that has proved very valuable as a tool for thinking about many aspects of international trade. This is the “differentiated products” approach. We begin with some necessary technical tools, then develop a basic analysis of the pattern of trade. We then use the basic analysis to analyze a series of topics: the volume and composition of trade, the welfare effects of trade, the effects of transport costs, and the role of *intermediate inputs*.

Finally, part IV turns to the theory of multinational firms and intrafirm trade. It begins with a minimal model of a world economy with direct foreign investment, then develops a more complex analysis with vertical integration and intrafirm trade.