Trade Policy and Market Structure

Elhanan Helpman and Paul R. Krugman

Trade Policy and Market Structure

Elhanan Helpman and Paul R. Krugman

The MIT Press Cambridge, Massachusetts London, England

First MIT Press paperback edition, 1992

© 1989 Massachusetts Institute of Technology

All rights reserved. No part of this book may be reproduced in any form by any electronic or mechanical means (including photocopying, recording, or information storage and retrieval) without permission in writing from the publisher.

Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Helpman, Elhanan.

Trade policy and market structure.

Includes bibliographies and index.

1. International trade. 2. Commercial policy.

ISBN 0-262-08182-2 (HB), 0-262-58098-5 (PB)

I. Krugman, Paul R. II. Title.

HF1379.H45 1989

382'.3

88-32609

To Ruthi To Robin

A garden inclosed is my sister, my spouse; a spring shut up, a fountain sealed. Song of Sol. 4:12

Preface

The past decade has seen a major change in the theory of international trade. The traditional theory of trade based on comparative advantage has been complemented, and to some extent supplemented, by a new theoretical view in which increasing returns are a major independent source of trade. A world economy characterized by increasing returns will normally be one that is characterized by imperfect competition; thus the new approach to international trade has had as one of its key elements the integration of trade theory with industrial organization.

Now like any major change in theory, the rethinking of international trade was at first characterized by a proliferation of seemingly inconsistent models. While this proliferation is interesting and exciting, eventually it becomes important to take stock: to sort out the common elements among the profusion of alternative formulations, and to isolate the reasons for differences in results.

Four years ago we undertook to systematize and integrate the positive side of the new trade theory; that is, to present in a common framework as much as we could of the reasons why trade occurs and of its effects. The result of that effort was our book *Market Structure and Foreign Trade* (1985). Our feeling at that time was that the effort had been highly rewarding. The underlying commonality among different models was stronger, and the resulting framework greater in its reach, than we expected. The book has, we believe, also served a useful function as a core source for economists who wish to get an overview of the new developments in international trade.

In this book we endeavor to provide a similar service for the normative side of international trade. That is, we attempt here to systematize and present an overview of models of the effects of trade policy in imperfectly competitive markets. The aim is to provide a Preface xii

compact guide to the current state of thinking in this field. We hope that the resulting survey will be helpful both to researchers and to those who simply want to keep abreast of this dynamic area.

By its nature, a book like this one is for the most part not original. Nearly all of the main arguments presented here have their origin in the work of the major contributors to the policy application of the new international economics. These include Jagdish Bhagwati in the sixties, and James Brander, Avinash Dixit, Jonathan Eaton, Gene Grossman, Richard Harris, Barbara Spencer, and Anthony Venables in the eighties. Our own contribution, apart from the work of synthesis, is largely one of filling in a few gaps and offering as much of a unified approach as this diverse field allows.

Although the models of trade policy presented in this book are novel to those brought up in an older trade theory tradition, they are for the most part quite simple in their essential message. We have tried to take advantage of this underlying simplicity by pitching the bulk of the book at a relatively nontechnical level. Most of the book relies on verbal exposition, diagrams, and simple algebra; the more technical sections are indicated by asterisks. We envision this work as a useful handbook not only for researchers and graduate students but for advanced undergraduates and policymakers trained in economics.

We wish to thank Gene Grossman and a number of anonymous reviewers for comments on a preliminary draft. Most of the book was written when Helpman was a visiting professor at MIT.

Trade Policy and Market Structure

Contents

References 10 2 Trade Policy under Perfect Competition 11 2.1 Tariff Analysis 2.2 Import Quotas 14 2.3 Export Subsidies and Taxes 2.4 Optimal Trade Taxes 2.5 A Note on General Equilibrium 2.6 Domestic Distortions and Trade Policy 2.7* Algebra for Small Policy Changes 22 References 25 3 Protection and Domestic Market Power 27 3.1 The Case of an Import-Competing Monopolist 27 3.2 Noncooperative Domestic Oligopoly 38 3.3 Collusive Domestic Oligopoly References 46 4 Foreign Market Power 49

4.1 Optimal Policies against a Foreign Monopolist 50

Preface xi

1 Introduction

1.2 Strategic Effects 51.3 Production Efficiency 7

1.5 Organization 9

4.2 Trade Taxes 53

1.1 Trade Policy and Market Power 4

1.4 The Political Economy of the New Theory 8

Contents viii

	4.3 Quotas 56 4.4* Optimal Trade Taxes 58 4.5 Kinked Demand 60 4.6 Cournot Oligopoly 61 4.7* Bertrand Oligopoly 63 4.8 Ad Valorem Trade Taxes 65 4.9 Quotas under Oligopoly 69 4.10* Appendix to Section 4.9 77 References 80
5	Strategic Export Policy 83 5.1 Competitive Foreign Conduct 84 5.2 Profit Shifting 88 5.3 Price Competition 97 5.4 Entry with Increasing Returns 102 5.5 Resource Constraints 104 5.6 Two-Way Export Policies 108 5.7 Consumption Effects 112 References 115
6	Strategic Import Policy 117 6.1 Tariffs: The Cournot Case 117 6.2 Tariffs: The Bertrand Case 123 6.3 Import Quotas 125 References 131
7	Intraindustry Trade 133 7.1 A Basic Monopolistic Competition Model 134 7.2 Tariffs and the Terms of Trade 137 7.3 The Production Efficiency Effect 140 7.4 Tariffs That Lower Prices: The Home Market Effect 145 7.5 Tariffs and Segmented Markets 149 References 153
8	Quantification 155 8.1 Problems of Quantification 155 8.2 Models with Fixed Numbers of Firms 165 8.3 Models with Free Entry 169 8.4 General Equilibrium Modeling 177 8.5 Conclusions 178 References 179

Contents ix

9 Conclusions 181

- 9.1 Methodology 182
- 9.2 Surprising Effects of Policy 184
- 9.3 The Welfare Effects of Trade Policy 185
- 9.4 Where Do We Go from Here? 186 References 188

Index 189

Relatively few markets for industrial products and services meet the assumptions of perfect competition. Except in markets for a limited number of standardized commodities, firms do not usually view themselves as pure price-takers. Indeed, in many if not most markets there are only a limited number of important competitors, and these competitors are aware of the interdependence among their actions.

What is true of the economy as a whole is true of international trade as well. More than half of world trade is in manufactured goods, where markets are often oligopolistic rather than competitive. Markets for minerals are also often oligopolistic (or oligopsonistic, where the processing stage is highly concentrated). Even in agricultural products the pervasive roles of such institutions as marketing boards mean that the relevant players are not always price-takers. In other words, the study of international trade should be in part a study of international industrial organization.

Once stated, this observation seems obvious. Yet until a decade ago the theory of international trade was almost completely dominated by models in which perfect competition was assumed to prevail in all markets. This was true both of the positive theory of international trade—the explanation of why trade happens and what effect it has—and of the analysis of trade policy. With only a few exceptions, the international economist's toolbox contained models where all firms took prices as given and set their own prices equal to marginal cost.

Recently all this has changed. International trade theory has gone through a quiet but fundamental revolution in which a new approach has supplemented and, in some cases, supplanted the traditional analysis. The change began with a new theory of trade in which increasing returns played a coequal role with comparative advantage

Chapter 1 2

in giving rise to trade. Since increasing returns are normally inconsistent with perfect competition, this approach necessarily modeled markets as imperfectly competitive. Traditionally, trade theorists had avoided dealing with imperfect competition because they expected it to prove intractable and barren of useful insights. As work by a number of authors showed, however, this need not be the case; drawing on new developments in industrial organization theory, it proved possible to develop models of international trade in the presence of increasing returns and imperfect competition that rivaled orthodox models in their elegance and suggestiveness. Furthermore it became clear over time that what had at first appeared to be a proliferation of inconsistent models could be subsumed under a common framework that showed a fundamental commonality of concept. We can now talk with more or less justification of the theory of trade under increasing returns and imperfect competition as a coherent body of ideas. Indeed, this theory has now received widespread acceptance and has become part of the standard view.

Although the positive theory of trade under imperfect competition has now reached a certain maturity and acceptance, the same cannot be said of the theory of trade policy under imperfect competition. It is clear that changing one's view of why trade happens, and how international markets work, ought to change one's view of what kind of trade policy is appropriate. To oversimplify slightly, traditional competitive trade models provided support for free trade as part of the general case for the optimality of laissez-faire in a competitive economy. Allow that markets for traded goods and services are not typically perfectly competitive, and one opens the door for a variety of arguments for government intervention. That much is clear. But beyond this very little has been clear. As models of trade policy under imperfect competition have proliferated, the field has begun to take on some of the less attractive attributes of industrial organization theory. Instead of a convergence around some basic set of principles, there seems to be ever increasing diversity; cynics have been heard to remark that nowadays a bright graduate student can construct a model to yield any desired policy conclusion. Partly as a result, the policy implications of new trade theory have not received anything like the wide acceptance given to the descriptive side.

Our purpose in this book is to achieve some progress in this state of affairs by bringing at least some order to the variety of models that have appeared in the analysis of international trade policy in Introduction 3

imperfectly competitive markets. In a previous book (Helpman and Krugman 1985) we offered a synthesis of the new positive theory of trade that we believe played a useful role both in solidifying the emerging consensus in that area and in communicating the developments to a wider audience of economists. What we would like to achieve here is the same thing for the policy side. Admittedly, the task is harder here. The analysis of trade policy under imperfect competition cannot be purged of all ambiguity and uncertainty because many of the conflicting results of different models are rooted in fundamental ambiguities in the underlying economics. The welfare effects of, say, a tariff levied against a foreign monopolist or any export subsidy to an oligopolistic industry are truly uncertain because they depend sensitively on market structure and aspects of behavior that cannot be determined a priori. What we can do, however, is isolate the main effects of trade policy in imperfectly competitive industries; where these effects conflict, we will at least know precisely where the source of uncertainty lies.

In presenting this analysis, we have chosen to focus narrowly on those issues in the analysis of trade policy that arise specifically from the prevalence of imperfect competition. This book is not a general treatise on trade policy. There is a huge and highly sophisticated literature that analyzes the implications for trade policy of external economies, of factor market distortions, of national (as opposed to individual) market power in trade, and so on. We briefly review some of the basic implications of this literature in chapter 2, but only as a backdrop. In reality trade policy for, say, the aircraft industry probably involves just about every consideration that has ever been mentioned, whether in traditional trade theory or its newer incarnation: externalities, wage differentials, national market power, noneconomic objectives, rent seeking, tit-for-tat international rivalry, and oligopoly. We do not try to get it all in but focus on what is analytically new and different—namely, the role of imperfect competition.

Also through most of this book we rely on partial equilibrium models. This is a strategic decision. There are of course cases where general equilibrium effects could sharply alter conclusions; we point them out, and on occasion demonstrate them, where this seems necessary. For the most part, however, it seemed to us that at this point it was more important to present as concisely as possible an analysis of how trade policy works in particular markets than to

Chapter 1 4

invoke all the extra machinery needed to embed our analysis in a general equilibrium framework.

What, then, are the main themes in the economics of trade policy under imperfect competition? To some extent the themes are best expressed in terms of models rather than words, but it may be useful to state three basic issues that recur in much of the new trade literature, and in our book as well. These are the effects of trade policy on market power, the strategic effect of trade policy on competition, and the effect of trade policy on consumer choice.

1.1 Trade Policy and Market Power

The defining feature of imperfect competition is that firms do not take prices as given. As a result they do not regard the sole effect of selling another unit of output on their revenue as being the price of that unit; they have some conjecture about what effect selling more (or cutting their price in order to sell more) will have on the revenue they get from inframarginal sales. The end result is that price does not equal marginal cost, and normally exceeds it.

The ratio of price to marginal cost is one measure of market power. A distinctive feature of trade policy under imperfect competition—something that connot happen in perfectly competitive markets—is that a trade policy may alter the markup of price over marginal cost in ways that are either beneficial or harmful to the country that initiates the policy.

The most familiar argument here is that protection of domestic industries is anticompetitive, allowing domestic firms to increase their markups at the expense of domestic consumers. Economists have also long argued that the extent of this anticompetitive effect depends on the form of protection as well as its level. A tariff makes imports more costly, but they can still increase. A domestic industry that raises its prices too much will still find customers turning to imported substitutes. An import quota, on the other hand, prevents such substitution. Thus there is a familiar argument that quotas are in some sense more anticompetitive than tariffs (see Bhagwati 1965). At a formal level, however, this argument has been made only for the case of a pure monopolist confronted by import competition. In chapter 3 we review the argument that protection creates market power and that quotas are worse than tariffs, and we examine how

Introduction 5

well the argument holds up when the domestic industry is an oligopoly rather than a monopoly.

A more uncertain area is the effect of protection on the market power of foreign firms selling into the domestic market. An occasionally popular argument about tariffs is that they will be largely absorbed through a decline in foreign markups rather than passed on to consumers—"the foreigner pays the tariff." On the other hand, economists have often warned that import quotas simply cartelize foreign producers, inducing them to raise prices and actually benefiting foreigners at domestic expense. Chapter 4 treats both issues, asking in particular how the results depend on the market structure of the foreign industry.

A particularly interesting but problemataic question is how trade policy affects competition when both foreign and domestic suppliers are imperfectly competitive. On one side, such protection may in effect help domestic and foreign firms form a cartel, jointly exploiting domestic consumers. On the other hand, protection may serve as a strategic policy, of the kind discussed below, that shifts the game between foreign and domestic firms to the domestic firms' advantage. Or it may reallocate consumption in a socially desirable way from the point of view of the domestic country (also see below). These issues are treated in chapter 6.

Clearly, there are many issues involving the effects of trade policy on market power. One thread that ties them together is that of analytical method. What we show is that a surprisingly wide variety of problems involving market power can be analyzed by focusing on perceived marginal revenue—the increase in revenue that a firm expects to receive by producing one more unit, which is always less than the price (because of the effect on intramarginal sales) but may exceed the true marginal revenue that would prevail if the industry acted in concert. As we will see, a simple apparatus that compares the demand curve with the perceived and actual marginal revenue curves has applicability to many topics.

1.2 Strategic Effects

One of the most widely noticed and controversial aspects of the new literature on trade policy under imperfect competition is the possibility that interventionist trade policies may have beneficial "strategic" effects. A strategic move, as it is defined in modern industrial Chapter 1 6

organization theory, is an action that is not profitable viewed in isolation but that alters the terms of subsequent competition to a firm's benefit. For example, a firm may invest in excess capacity that it does not intend to use, but whose presence deters potential competitors from entering the market. An implication of the new trade theory is that government trade policies may serve the same kind of role.

The now-famous example is the so-called Boeing-Airbus case (any resemblance to the real firms with those names may be purely coincidental). Suppose that there is an aircraft that either Boeing or Airbus could produce profitably but that—owing to the fixed costs of developing the plane-if both enter the market, both will lose money. Then there is a game of mutual deterrence between the firms in which each tries to convince the other that it is committed to produce; if it succeeds in making the commitment credible, a firm will deter its rival from entering and reap the profits. Firms may, however, lack any credible way to make a commitment to produce. In this situation government policy can make the difference. If European governments make a promise to pay Airbus a subsidy for production that is large enough to induce entry even if Boeing enters as well, then Boeing will find entry unprofitable and leave the field to Airbus. The result will be profits to Airbus that include not only the subsidy but also the profits from sole possession of the world market. Ignoring consumer costs, this will raise European national income at American expense (see Dixit and Kyle 1985).

Since it was first enunciated by Spencer and Brander (1983), the strategic trade policy argument has received wide attention. The Boeing-Airbus story seems at first sight to provide exactly the kind of argument for aggressive national trade policies that protectionists have always wanted, and it has been picked up in some variant in semipopular discussion. Yet from the start economists have been cautious. Does the strategic argument really offer a presumption in favor of aggressive policies or is this just a special case? Are there likely to be offsetting effects in the kind of industry to which the strategic trade argument might apply? How likely is it that a government will be able to have the information necessary to conduct a successful strategic policy?

In chapter 5 we offer a synthesis of the strategic trade policy debate as it has evolved over time. Interestingly, it is both possible and

useful to apply to this debate the analytical method of contrasting perceived and actual marginal revenue; this helps us to offer a fairly compact and straightforward review of the main arguments. The basic result is to reinforce the skepticism about the general applicability of Boeing-Airbus type examples: on balance, the case for aggressive trade policies is relatively weak.

As we have noted, strategic issues also arise in the context of protection when both domestic and foreign firms have market power. Thus chapter 6, which studies such two-sided situations, also touches on strategic effects.

1.3 Production Efficiency

There is a quotation often attributed (we hope wrongly) to Abraham Lincoln, to the effect that when an American purchases a coat from a foreigner, the American gets the coat but the foreigner gets the money; when the coat is purchased from an American, the buyer still gets the coat but an American gets the money. The usual response of economists is that there is no such thing as a free coat: to make an all-American coat requires using resources that might more productively have been used to make something else (say, a Boeing).

Once one recognizes the importance of imperfect competition, the usual economist's response loses something of its force. Making a coat is costly, to be sure; but if its price exceeds marginal cost, then the resources used to make it might not have an equally productive use elsewhere. In principle, at least, policies that induce consumers to buy domestic goods whose price exceeds marginal cost may raise national income.

In this book we emphasize this theme in the context of intraindustry trade, where countries are exchanging goods in which neither has a comparative advantage. But we treat it also in other cases. We show that the argument has some validity. Perhaps even more surprising, protection can under some circumstances induce an increase in domestic production that actually lowers prices to consumers. However, the analysis also makes clear that this is not fundamentally an argument about trade policy, but rather one about how to handle the general problem of pricing under imperfect competition. When we turn to quantitative analysis of trade policy in