

**SPECIAL PAPERS IN INTERNATIONAL ECONOMICS**

**NO. 15, APRIL 1985**

**STRATEGIC TRADE POLICY: A SURVEY  
OF ISSUES AND EARLY ANALYSIS**

**GENE M. GROSSMAN  
AND  
J. DAVID RICHARDSON**

**INTERNATIONAL FINANCE SECTION  
DEPARTMENT OF ECONOMICS  
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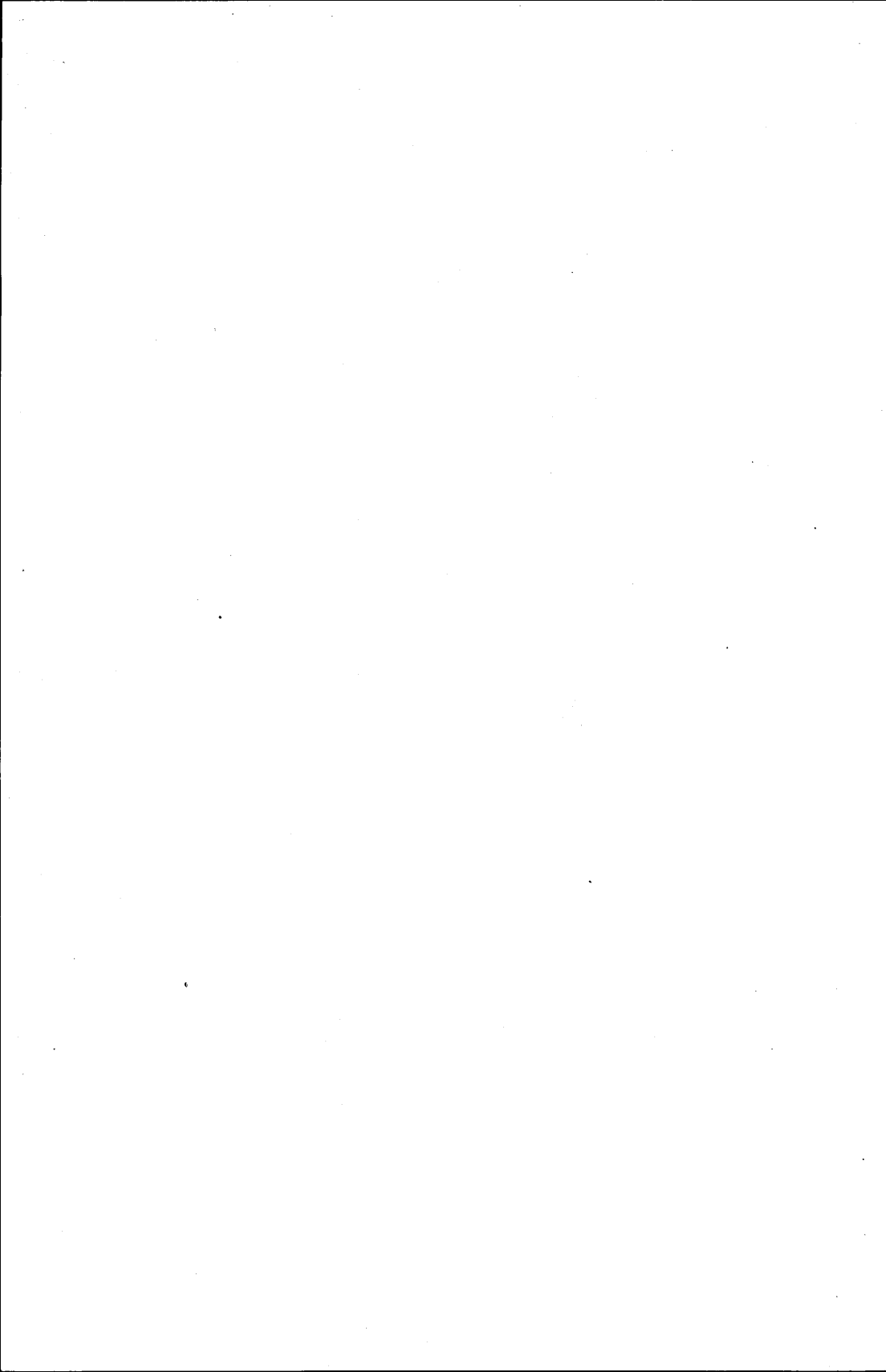
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# 1 Introduction

A well-defined literature has developed recently on the conduct of trade policy in strategic environments. This paper surveys the research reported there and discusses its implications. Strategic environments are those in which a relatively small number of economic agents make interdependent decisions. Strategic environments contrast with the more familiar perfectly competitive environment in which a large number of agents make independent decisions because each agent considers itself too small to influence market outcomes. Until recently, most research on trade policy dealt with the perfectly competitive environment. Governments were deemed to act in the belief that their policies affect market equilibrium, but without regard for the effects of their actions on the behavior of other governments. When agents take the actions of their rivals to be immutable, strategic behavior plays no role.

It is increasingly important to analyze trade policy in the context of strategic environments, because circumstances do not fit the orthodox paradigm. Firms have grown multinationally over the past few decades. The development of the European Community, of co-production and joint ventures, and of ambitious national development plans has encouraged firms to assume a global identity. In some national markets, a few firms compete for a "prize" that is essentially control of the whole nation's industry. In such oligopolistic environments, firms clearly recognize the effect that their actions have on the behavior of other firms, and each firm must conjecture about its rivals' reactions to its decisions. These same features cause governments to play strategic "games" among themselves. Their choices regarding trade policy influence global market decisions and may induce either retaliation or cooperation by rival governments.

Strategic economic conflict over markets and policy can involve threats and promises, bluffs and commitments. These are familiar features of games and war, and make for rich and complex analyses. None of them has any place in competitive environments. Their object is always to influence the outcome of a conflict in one's own favor. This may imply that the outcome will become more unfavorable for one's opponents—but not necessarily. In some cases, if participants are competing for shares of a pie of roughly fixed

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size, trade policy is bound to be contentious. In other cases, strategic behavior may dictate cooperation that can lead to mutual benefit. In all cases, however, the standard tenets of the orthodox theory of trade policy may fail to apply. Or, if they apply, it may be for new reasons.

Strategic trade policy is topical in the United States because of the perception that governments abroad are taking unfair advantage of the U.S. commitment to open trade and of their countries' relatively small size. This perception underlies support for a new and aggressive "reciprocity" requirement in U.S. trade policy.<sup>1</sup> It is also topical because strategic moves by foreign firms, often with the support of their governments, seem to some observers to be placing U.S. firms under unprecedented pressures. These pressures lie behind many of the recent demands for a U.S. industrial policy. Strategic trade policy is controversial, too. Critics of recent initiatives and proposals wonder whether strategies designed to deter foreign governments will end in mutually destructive trade wars, and whether industrial targeting may merely stimulate unproductive rent seeking by special-interest groups. They wonder further whether the conduct of trade policy along strategic lines will require a case-by-case approach that the U.S. government may be ill-equipped to carry out.

This paper aims to survey only "early" analysis of these matters, because that is all there is. The strategic approach to trade policy is a new, or—perhaps more accurately—reborn, area.<sup>2</sup> Much more research must be undertaken. Some of it will no doubt develop thoughtful counterarguments to those favoring strategic trade policy. Much of it should be empirical and historical.<sup>3</sup>

<sup>1</sup> Sympathetic and unsympathetic descriptions of this new form of "reciprocity" include presentations by William Reinsch, Chief Legislative Aide to Senator John Heinz (e.g., "Reciprocity and Trade-Policy Activism: Is This the Time?", oral remarks, Aug. 9, 1982) and Cline (1983), respectively.

<sup>2</sup> Its roots extend back into U.S. economic history (e.g., David, 1970, and Williamson, n.d.) and into familiar arguments for protection aimed at development based on infant industries, backward linkages, etc.

<sup>3</sup> For example, one group of researchers, in cooperation with the U.S. Trade Representative's Office, is attempting to assess the applicability of various analyses of strategic trade policy to U.S. competitiveness in five global industry groups: aircraft, autos, semiconductors, steel, and telecommunications (see Branson and Klevorick, 1984).



## 2 A Stylized Overview

A useful way to organize an examination of strategic trade policy is outlined in equations (1), (2), and (3), using the United States as point of reference. Equation (1) declares the obvious—that U.S. national welfare, however defined, is dependent on its own trade policy and that of its trading partners (among many other things, of course, the rest of which are irrelevant for present purposes):

$$W_{us} = W(P_1, \dots, P_n, P_{us}), \quad (1)$$

where  $W_{us}$  is U.S. welfare and  $P$  is a trade policy. The subscript “us” denotes the United States; the subscripts 1, . . . ,  $n$  denote other countries.

If equation (1) evaluated at one point in time were to be subtracted from equation (1) evaluated at some other point, one could calculate the way U.S. welfare had been changed by changes in U.S. trade policy, *ceteris paribus*. An approximation<sup>1</sup> to the calculation is

$$(\Delta W_{us} / \Delta P_{us}) = W'_{us} + \sum_{i \neq us} W'_i (\Delta P_i / \Delta P_{us}), \quad (2)$$

first  
effect

second  
effect

where  $W'_{us}$  and  $W'_i$  denote the changes in U.S. welfare per unit change in its own and foreign trade policies, respectively, if all trade policies except the one in focus ( $us$  or  $i$ ) are held constant. The left-hand side of (2) is a measure of the effectiveness of U.S. trade policy. Those who doubt that trade policy can increase the national welfare suspect that its value is zero or negative.<sup>2</sup> In any case, the effectiveness of U.S. trade policy is always the sum of the two parts on the right-hand side of (2). The first is the effect of a change in U.S. policy by itself ( $W'_{us}$ ). The second is the effect of all changes in foreign policies undertaken in reaction or retaliation.

The first effect has been thoroughly discussed and estimated for the perfectly competitive environment, where firms behave atomistically rather than strategically. The government can calculate the impact of its policy options on the market outcome, evaluate the attendant welfare consequences, and set policy accordingly. Only if there are specific market fail-

<sup>1</sup> Technically, equation (2) is a linear approximation to a time-differenced version of equation (1), divided by  $\Delta P_{us}$ ; so is equation (3) below, but it is divided by  $\Delta P_j$ .

<sup>2</sup> For a gathering together of many reasons why trade policy may be less effective than it seems initially, see Baldwin (1982).

ures or if the government can exploit some global monopoly power can its trade policy improve upon the free-trade outcome in the perfectly competitive environment.

This first effect has been less thoroughly examined in imperfectly competitive environments. Here, firms behave strategically toward one another and are conscious of the influence of their own actions on market behavior. Policy may increase welfare for two reasons. First, the free-trade outcome is likely to involve a wasteful allocation of resources in an imperfectly competitive market, and trade policy can be used in a standard, second-best way to mitigate the effects of monopoly distortions. Second, and more novel, policy may alter the "rules of the game" among oligopolistic firms. The resulting shift in the market outcome may be to the advantage of domestic participants and thus contribute to overall domestic welfare.

In sum, the sign and size of the direct effect of trade policy on national welfare, identified as  $W'_{us}$  in equation (2), depend importantly on just how perfectly or imperfectly competitive markets really are.<sup>3</sup> Chapter 3 explores their dependence in detail.

The second effect in equation (2) is often mentioned as the effect of retaliation, but it is rarely discussed in detail and is almost never calculated. Strategy has a role through this effect whether markets are perfectly or imperfectly competitive. The effect's sign and size depend on other governments' responses to U.S. initiatives.

In the past, the United States could frequently afford to neglect this second effect in shaping its trade policy. The neglect was justified because the  $W'_i$  terms were made small by the dominance of the United States in the world economy and its relatively slight dependence on world markets. Recently, the United States has been forced to pay attention to the strategic counterresponses of its trading partners. The  $W'_i$  terms have grown larger as U.S. dominance has declined and its international dependence has deepened.

The evolution of equation (1) over time can also be used to calculate the way U.S. welfare changes as a result of changes in the trade policy of any one of its partners (e.g., partner  $j$ ). An approximation to the calculation is

$$(\Delta W_{us} / \Delta P_j) = W'_j + \sum_{i \neq us, j} W'_i (\Delta P_i / \Delta P_j) + W'_{us} (\Delta P_{us} / \Delta P_j). \quad (3)$$

third effect

<sup>3</sup> Even the measurement of national welfare,  $W$  itself, depends on the competitiveness of market structure. As shown in Chapter 3, national welfare as traditionally defined (national purchasing power or the average standard of living) ought to include the domestic firms' share of supernormal profits on sales abroad. These supernormal profits are zero in perfectly competitive environments but positive and welfare-increasing in imperfectly competitive environments.

The left-hand side of (3) is a measure of U.S. exposure to the influence of trade policy abroad. Those who believe that most trade policy is aimed at "begging thy neighbor" suspect that its value is on balance negative. In any case, U.S. exposure is always the sum of the three parts on the right-hand side of (3). The first two are comparable to the first and second effects in equation (2). The third effect measures the extent to which the United States could offset any tendency to be "begged" by adjusting its trade policy in response to that of its trading partner. Examples of such strategically reactive trade policies include antidumping and countervailing duties.

This third effect has not been carefully examined or calculated despite its importance for such matters as the case for aggressive "reciprocity" outlined above. Nor has a closely related strategic measure been investigated: the U.S. policy response,  $\Delta P_{us}$ , that would make foreign beggar-thy-neighbor policies ineffective in influencing foreign welfare (i.e., that would make  $\Delta W_j / \Delta P_j$  zero in the relevant foreign equations). The threat of such a strategic response might by itself be enough to undermine the incentive for aggressive policy abroad.

To be effective, any threat must be credible. Credibility can derive either from reputation or from precommitment. If a government's threats are not to be dismissed as inconsequential bluffs, either it can develop a reputation for actually carrying out threats when circumstances dictate or else it can institute a mechanism that, once established, will make it optimal to carry out the threat *ex post*. That is, it is often strategically advantageous for an agent to constrain its own future actions by some form of total or partial precommitment. Opponents will then perceive at an early stage that later on it will be optimal, or perhaps unavoidable, for the agent to act as stipulated in the threat.<sup>4</sup>

In the past, the United States could frequently afford to neglect this third effect in shaping its own trade policy. The neglect was justified, again, because the  $W'$  terms were small. Even when foreign governments did adopt policies harmful to the United States, the injury was sufficiently minor to be swamped by more welcome trends, such as reduced costs of transportation and communication. As U.S. dominance has declined and as its international dependence has deepened,  $W'$  terms have grown larger. The issue of strategic counterresponse in U.S. trade policy has gained importance, especially with the slowdown of overall economic growth. With slower growth, a larger slice of the pie for its trading partners may mean

<sup>4</sup> Precommitment is illustrated in the story of Odysseus, who recognized that a mere promise not to jump after the Sirens would not be credible. To establish credibility, he had himself tied to the mast, and thereby made not jumping the only feasible action. See also Brito and Richardson (1984), where stocks of reserves serve to make threats credible.

not merely a smaller increase for the United States, as it has in the past, but an actual decline in its absolute welfare.

In Chapters 3 and 4, we discuss these matters at greater length. In Chapter 3 we describe analyses of trade policy in oligopolistic market environments. The common features of these analyses are that firms do not act as price takers and that the market equilibrium is treated as the outcome of a game involving two or more private agents. In this research, the government is considered to be a strategically advantaged player in the sense that firms do not take into account the influence that their behavior might have on the parameters of public policy. This is in keeping with the traditional treatment of government in economic analysis as a Stackelberg leader. In this chapter, then, the government is a player in the game only in the trivial sense that it moves first to set the "rules of the game." Conflict between the firms themselves is central. In Chapter 4, conflict between the governments as full-fledged players is taken up. Here we summarize the literature on the second and third effects of equations (2) and (3). Here the government is an equal player in a policy game. Although most of this literature has considered only instances of rivalry among sovereign governments, it would in principle be possible, and for some purposes interesting, to analyze conflict between the government of one country and private firms in another, using a similar framework.

In Chapter 5, we raise some unanswered questions concerning trade policy in strategic environments and suggest some directions for future research.

### 3 Trade Policy in Imperfectly Competitive Market Environments

When the behavior of foreign nations, firms, and individuals is sufficiently competitive, there are only weak arguments for trade-policy intervention. In the absence of market distortions, market-determined trade wastes fewest resources; in the presence of market distortions, correctives other than trade policy waste fewest resources. But that may not be the case in imperfectly competitive settings, where trade policy can alter the entire economic environment in which firms make their strategic decisions.

The economics of trade policy in an imperfectly competitive environment is scarcely developed by comparison with its exhaustive development in a competitive environment. Such policy is almost certainly more complex than competitive policy. One reason is that the characterization "imperfectly competitive" can take on many different meanings. The specific trade-policy implications may depend on whether static or dynamic scale economies are important, on whether competition in research and development (R&D) plays a major role in industry development, on the ways in which advertising and promotional activities affect the type of competition, on whether competing firms regard quality or product characteristics as strategic variables, and so on. The literature has only just begun to explore the trade-policy implications of these many forms of competition.

#### *Supernormal Profits*

A common feature of imperfectly competitive environments is the existence of supernormal profits (sometimes described as "pure" or "economic" profits, or, pejoratively, as "excess" profits). These are profits larger than the minimal amounts necessary to provide an incentive for entrepreneurial activity. The source of supernormal profits is often market power, which may be identified with the existence of significant barriers to entry or may arise in an R&D-intensive environment from the application of patent-protection laws.<sup>1</sup> Supernormal profits may be ongoing or transitory and in either case have important implications for trade policy.

In a series of papers, Brander and Spencer (Brander and Spencer, 1984a, 1984b, and Spencer and Brander, 1983) have pioneered a line of research

<sup>1</sup> Supernormal profits also accrue to firms (or individuals) that adjust most rapidly to structural change, even in competitive environments (to be exact, between the equilibria of a structurally shocked competitive system). Furthermore, quick capture of supernormal profits is analytically the same as quick escape from subnormal profits. On the obvious importance of defining equilibrium and characterizing extra-equilibrium phenomena in these matters, see footnote 3 and Chapter 5 below.

that investigates the conditions under which "our" country can use trade policy to capture (or preserve) a larger share of these supernormal profits.<sup>2</sup> They consider an oligopolistic global industry with a fixed number of firms and assume that, at least temporarily, barriers to entry prevent economic profits from being driven to zero. Other things being the same, we would prefer that "our" producers had a larger share of the total industry profit pool than "theirs." That preference seems compelling whether such a pool is ongoing or transitory (because new entrants could eventually compete it away). And it seems compelling whether we are consciously aggressive (out to maximize our share of the spoils from oligopoly, much as we might maximize our share of the gains from trade by setting an optimal tariff) or conservatively and honorably defensive (out to prevent our oligopolistic trading partners from maximizing *their* share at our expense).

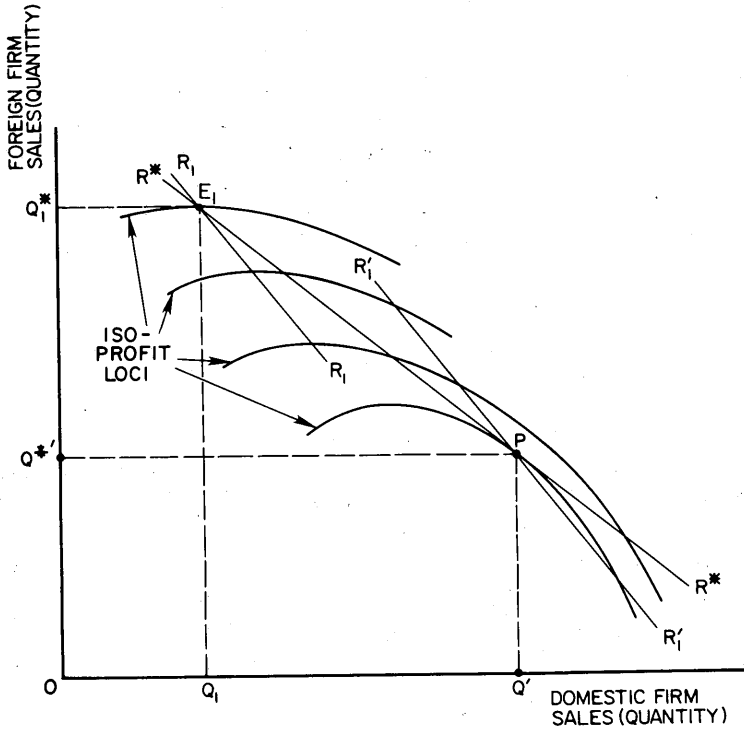
The basic Brander-Spencer point is very simple. If oligopolistic profit is inevitable, then trade patterns that give "us" greater access to it are economically superior to other trade patterns, given everything else. Policy would seem at first blush to have no place here, and especially not trade policy. "Our" private oligopolists would seem to have exactly the same goals as outlined above and to be perfectly capable of taking care of themselves if they are given the market freedom to do what comes naturally to oligopolists. The Brander-Spencer contribution is to show that this intuition is misleading in some cases. Depending on the nature of the strategic competition among firms, policy may have a role. Depending on the degree of segmentation among national markets, even trade policy may be appropriate.

In the simplest setting they consider, Brander and Spencer examine a duopoly consisting of one home firm and one foreign firm, with competition taking place only in a third-country market. If domestic consumption is zero, the only effect the third market has on national economic welfare is as a source of "producer surplus"—the difference between export revenue and the opportunity cost of resources devoted to production. When factor prices accurately reflect opportunity cost in the home and foreign economies, producer surplus is nothing other than the profit of the exporting firm.

When the two firms compete in the absence of policy intervention, each firm can be deemed to calculate a range for quantity sold by its foreign competitor. For each conceivable foreign quantity sold, the home firm can calculate its optimal response on the assumption that foreign sales remain constant. We can depict this behavior graphically. In Figure 1 we show a

<sup>2</sup> Freeman (1982), Ordoover and Willig (1983), Dixit (1984), and Eaton and Grossman (1983) share this orientation in asking what policies a country can use to augment its share of the industry profit pool.

FIGURE 1  
BEST-RESPONSE CURVES AND COURNOT EQUILIBRIUM



series of iso-profit loci for the home firm. Along any one of these curves the home firm earns constant profits. The level of profits increases as we move southeasterly from one iso-profit locus to the next, since the home firm's market share increases in this direction. If the home firm assumes that the foreign firm's sales are given, say at  $Q_1^*$ , it maximizes profits by setting its own output at  $Q_1$ . For each level of the foreign firm's sales, we can find the optimal response by the home firm. The collected points form a "best response" curve for the home firm— $R_1R_1'$  in the figure. It generally slopes downward because the more the foreign firm offers for sale in the third-country market, the lower will be the marginal revenue for any quantity sold by the home firm, and therefore the less the home firm will wish to offer. Similarly,  $R^*R^*$  illustrates the best response of the foreign firm to any home-firm quantity when the foreign firm takes the home firm's sales as given. The intersection  $E_1$  is a market equilibrium in the sense that each

firm's strategy (its choice of export quantity) is optimal given the other firm's choice.

The home firm would actually earn higher profits at a point such as  $P$  than it does at  $E_1$ . At points like  $P$ , it has a larger market share, and this more than offsets any fall in the price of its product caused by the expansion of its output. (Notice that foreign output is lower at  $P$  than at  $E_1$ , which *ceteris paribus* increases the market price of the home firm's good.) So the home firm might threaten to produce an amount  $Q'$  "no matter what," in which case the optimal foreign response would appear to be  $Q^{*'}.$  However, such a threat is not credible. The foreign firm knows that the home firm would not actually want to carry out its threat if the foreign firm continued to offer  $Q^*_1$  rather than deviating to the optimal response to the threatened quantity.

### *Policy Precommitments*

In an equilibrium without policy, information that every oligopolist has about others deprives each of any credible new threat. That information is that each oligopolist has already chosen optimally in light of the underlying environment. This knowledge removes any incentive for further alteration in oligopolist instruments. Price, quantity, quality, investment, R&D, etc., are already at their optimal values when there is genuine equilibrium.<sup>3</sup>

Credible policy, however, may be able to change the underlying environment and shift the equilibrium. Suppose that the home government acts first and announces a subsidy for exports. Suppose further that the policy declaration is taken to be credible, in the sense that foreign competitors take the subsidies into account as a precommitment—an inhospitable aspect of the competitive environment. It may be credible because the government has developed a reputation for sticking to its announced policies, or because the trade-policy mechanism has sufficient inertia that once a subsidy is in place foreign firms do not expect it to be removed. In either case, the curve  $R_1R_1$  is no longer the optimal response function for the home firm once the export subsidy has been enacted. Instead, it should want to supply more at every level of foreign output than it would without the subsidy. The export subsidy will thus shift the home firm's response function to  $R'_1R'_1$ , and the new oligopolistic equilibrium would indeed be at  $P$ , with a permanently higher share of the industry's pool of supernormal profits accruing to the home firm.

Why can the government do for its firm what the firm cannot do for itself? Intuition suggests that the firm *can* undertake such a strategic "first strike" or precommitment, as demonstrated in the literature on preemptive

<sup>3</sup> The point made here and the power of policy throughout this chapter depend crucially on the definition of equilibrium, and on firms' ability to recognize it. In Chapter 5, we discuss the need for further refinement of the concept of equilibrium.



capacity formation and corporate innovation (Prescott and Visscher, 1976; Spence, 1977, 1979; Dixit, 1980; Eaton and Lipsey, 1980). In equilibrium, however, all such actions that are in the firm's interest have already been taken, and threats of further thrusts by one firm are dismissed by other firms as mere bluffs. The government, by contrast, may have the ability to threaten and credibly precommit even after the firms attain oligopolistic equilibrium, shifting the equilibrium to obtain a nationally desirable distribution of profits. Therein lies the key asymmetry between governments and firms in the Brander-Spencer conception.

There are, of course, conditioning factors. Dubious or inscrutable policies have no influence, because influence stems from both credibility and public transparency. Recurrent policy may also lose strategic effectiveness. It may become so regularized that it, too, can be described by a stable policy-reaction function. When that happens, firms will be able to predict policy accurately, treat government as just another equal player in the game, and dismiss any discretionary policy divergence from regular rule-based patterns.<sup>4</sup>

Brander and Spencer have thus provided an *example* of how trade policy can improve national welfare. Eaton and Grossman (1983) extend this analysis to consider a wider range of potential behavior by oligopolistic market participants. Their aim is to determine whether there is any presumption favoring trade intervention and what its optimal form might be. Eaton and Grossman first study alternative specifications of the firms' decision-making process. One such specification, used above, is that each firm chooses its optimal export quantity on the assumption that its rival will not respond by further altering its own quantity choice. In other words, each firm conjectures a zero response from its opponent to its own optimal choice. More general specifications allow nonzero conjectures about opponent behavior. Each nonzero conjecture generates a different best-response function and, consequently, different equilibria.

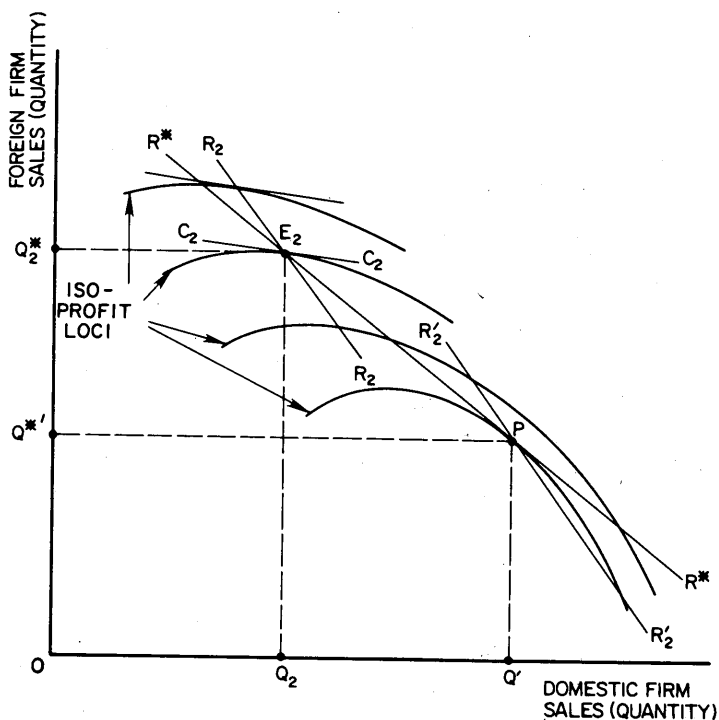
Eaton and Grossman first show that the Brander-Spencer conclusion holds for a broad set of alternative conjectures. Consider Figure 2, where we have reproduced the iso-profit loci from Figure 1. Suppose now that the foreign firm is producing at  $Q^*_2$ , and the home firm at  $Q_2$ . Let the slope of the line  $C_2C_2$  indicate the home firm's conjecture about the foreign firm's response to any change in the home firm's output. In the case illustrated, the home firm conjectures that an increase in its own offering to the market will induce a small reduction in the output of the foreign firm. Starting at point  $E_2$ , the home firm will expect any deviation of its output from  $Q_2$  to reduce its profits once the conjectured response of its rival is taken into account. Therefore,  $E_2$  lies on the home firm's best-response

<sup>4</sup> Increasingly, governments own some or all of a firm's equity. In such cases, they are closer to being just another player.

curve. The entirety of this curve, labeled  $R_2R_2$ , is found by connecting all points where the home firm's iso-profit loci have slopes equal to that of line  $C_2C_2$ .

In Figure 2, equilibrium in the absence of policy is at  $E_2$ . As is evident, an export subsidy that shifts the home firm's best-response curve to  $R'_2R'_2$  is welfare-improving once again. The distinctive feature of the case depicted in Figure 2, which is critical to this result, is that the home firm conjectures a more aggressive foreign response to its actions than the foreign firm actually makes.<sup>5</sup> This is qualitatively the same as in the zero-conjecture, or Cournot, equilibrium, where each firm believes its rival's output will remain constant but, in actuality, each firm cuts its output in response to a rival's increase. In Figure 2, the conjectured response, given

FIGURE 2  
BEST-RESPONSE CURVES AND EQUILIBRIUM  
WITH "PESSIMISTIC" CONJECTURES



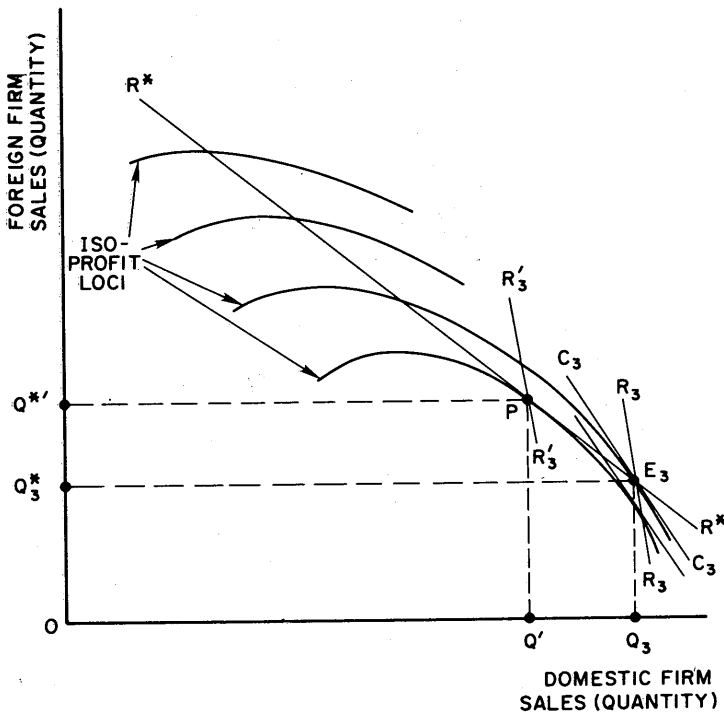
<sup>5</sup> By "aggressive" we mean here a response on the part of the foreign firm to an increase in home-firm output that concedes a smaller share of the market than otherwise.

by the slope of  $C_2C_2$ , is a smaller decline in foreign output per unit increase in home output than the actual foreign response, given by the slope of  $R^*R^*$ .

The opposite case is illustrated in Figure 3. Here the home firm holds conjectures that underestimate the true aggressiveness of its rival's response ( $C_3C_3$  is steeper negatively than  $R^*R^*$ ). In this instance, the home government can raise domestic welfare by causing the home firm's best-response function to shift to the left, from  $R_3R_3$  to  $R'_3R'_3$ . An export tax is indicated as the optimal policy.<sup>6</sup>

Finally, it is possible that the home firm's conjectures will be "consistent," in the sense that its beliefs about the foreign firm's response to its

FIGURE 3  
BEST-RESPONSE CURVES AND EQUILIBRIUM  
WITH "OPTIMISTIC" CONJECTURES

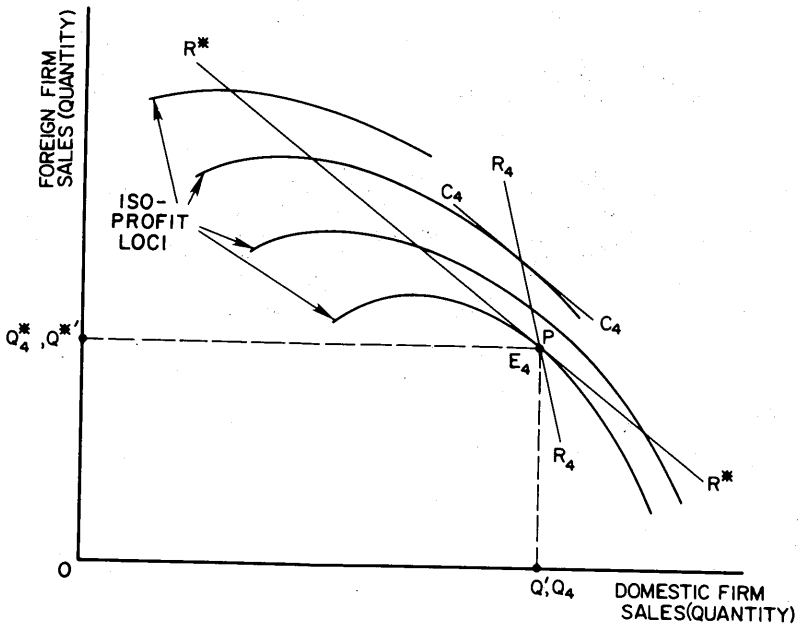


<sup>6</sup> Such is usually the case in Bertrand equilibrium, where each firm sets a price for its output in the belief that its rival has set a price that is given and unresponsive to the first firm's choice.

own initiatives are exactly borne out by the foreign firm's actual response (when, for example, a subsidy causes the home firm to alter its output).<sup>7</sup> When such conjectures are held by the home firm, the equilibrium is at  $E_4$ , coincident with  $P$ , in Figure 4. In this case, free trade is the optimal policy.

Eaton and Grossman demonstrate that there is no guarantee that any specific trade policy, such as an export subsidy, will shift supernormal profits toward the country's own firms in oligopolistic markets. The case for active trade policy in an imperfectly competitive environment rests crucially on the behavior of oligopolistic firms. One might even say it rests uneasily, since the behavior in question has to do with intrinsically subjective conjectures. It is worth recalling from the earlier discussion that the

FIGURE 4  
BEST-RESPONSE CURVES AND EQUILIBRIUM  
WITH "CONSISTENT" CONJECTURES



<sup>7</sup> Bresnahan (1981) and Perry (1982) have studied the properties of this concept of oligopoly equilibrium, which they have termed a "consistent-conjectures equilibrium."

case also rests on the firms' view that the government is not a wholly predictable market participant and that when it enacts trade policy, that policy is immutable.

*Extensions: More Than Two Firms, Consumption Effects, Several Oligopolies*

Other extensions of the Brander-Spencer analysis provide additional insights into the potential roles for trade policy in imperfectly competitive trading environments. Dixit (1984) and Eaton and Grossman (1983) study oligopolies with more than two firms. In the framework that underlies Figure 1 (the Cournot model), Dixit shows that the efficacy of an export subsidy continues to apply so long as the number of home firms is not "too large." Eaton and Grossman (1983) show, however, that when behavior is characterized by consistent conjectures, as in Figure 4, an export tax is always indicated whenever the number of home firms exceeds one. These two results are mutually consistent and intuitive. These are two potential motives for export policy in these regimes. The profit-shifting motive for policy intervention remains when there is more than one domestic firm as long as firms conjecture aggressive rival responses by foreign competitors in the market. Against this is the more familiar "externality" motive for an export tax. When home firms do not take into account the effect of their actions on the profits of other home firms, they produce more than the amount called for by a coordinated or collusive production plan. Since the government aims at increasing total national welfare, and hence the *sum* of profits from exports to third-country markets, it will wish to move the equilibrium toward the collusive outcome. This can be accomplished with an export tax. The larger the number of domestic firms, the greater will be the externality effect and the larger will be the tax necessary to offset it. Thus, the profit-shifting motive for a subsidy in Dixit's work will be outweighed by the externality motive for a tax when the number of firms is large. If the profit-shifting motive is absent, as in the consistent-conjectures equilibrium examined by Eaton and Grossman, only the externality motive for taxation remains. If the externality motive is absent because there is just one home firm, only the profit-shifting motive remains—for subsidies, free trade, or taxes, depending on the nature of the firm's conjectures, as outlined above.

Dixit (1984) and Eaton and Grossman (1983) have also considered the implications of relaxing the assumption that there is no domestic consumption of the exported good. Along with Brander and Spencer (1984a), they also analyze instances where the home country is a net importer of the product of the oligopoly. When transport costs and cultural differences effectively segregate national markets, the discussion above continues to ap-

ply to the optimal treatment of export sales, and policy toward domestic sales can be analyzed separately. Alternatively, if world markets are integrated, so that arbitrage limits the firms' independence in setting prices, policy toward export profits cannot be evaluated without consideration of effects in the home market.

Two additional motives for intervention are present when domestic consumption takes place, independent of whether markets are segmented or integrated (although the exact form of optimal intervention will vary according to this distinction). First, by using tariffs the government may be able to shift into the domestic treasury some of the profits earned by foreign oligopolists at the expense of home consumers (Brander and Spencer, 1984a). Second, the existence of supernormal industry profits implies a wedge between the consumer valuation and the resource cost of producing an extra unit; the value of home consumption exceeds the value of the resources that would be needed to produce it. Eaton and Grossman (1983) discuss trade policy as a second-best substitute for antitrust policy in this case, but they show that optimal intervention for this purpose can involve either taxing or subsidizing trade.

All of the work discussed thus far rests on a convenient but restrictive conception of general equilibrium. Attention is focused on one imperfectly competitive industry, and it is assumed that this industry can expand by drawing resources from perfectly competitive industries elsewhere in the economy. This approach begs the central question of industrial targeting—namely *which* sectors merit government support among the many that might satisfy the Brander-Spencer criteria. Dixit and Grossman (1984) have studied this question in a less restrictive general-equilibrium structure. They conceive of an economy with one large competitive sector and many small oligopolistic industries comprising an imperfectly competitive high-technology sector.

Dixit and Grossman assume that all the industries in the high-technology sector draw on a common scarce resource that they call "scientists." To highlight their argument, they assume initially that scientists are in fixed supply in the short run and that they are required in a fixed proportion to output by each oligopolistic industry. They assume the Cournot behavior of Figure 1 to generate a profit-shifting motive for subsidizing exports. But they note that, in this structure, a subsidy to one such industry will cause the salaries of all scientists to rise as more are needed by the expanding industry, and that this change in factor prices acts as an implicit *tax* on the rest of the domestic oligopolists. In a symmetric situation, where each industry is a duopoly with one domestic and one foreign firm and where all domestic firms are similar with respect to demand and cost conditions, the optimal policy is free trade. The profit-shifting gains from targeting any one

industry are dissipated by the profit-shifting losses of the other industries in the high-technology sector. When the industries are not symmetric, the government could sensibly seek to target those with the largest potential for profit shifting (i.e., those in which it can expect the largest induced change in the foreign firm's behavior per unit of scientific labor expended). There is some additional scope for successful industry promotion when the supply of scientists can respond to its rate of return, or when other factors can be substituted for scientists in the production of high-technology goods. Nevertheless, Dixit and Grossman conclude that the potential benefits from strategic trade policy are exaggerated when the analyst considers only a single imperfectly competitive industry against a backdrop of an otherwise perfectly competitive economy.

### *Trade Policy and Market Structure*

All of the studies above have treated market structure as exogenous—determined, for example, by barriers to entry. Market structure has not been directly affected by the trade policies under consideration. Yet trade policy can reasonably be expected to influence market structure, as measured by the number of firms participating in an imperfectly competitive industry and by the number of those that will be domestic firms. For example, protection of a domestic market may induce a new domestic firm to enter the industry. Export subsidies can have the same effect.<sup>8</sup> Furthermore, a country with an incumbent in an industry might close off its home market to foreign firms in order to deter entry that would threaten its own oligopolists. Or it might threaten retaliation if a foreign government attempted to promote entry by subsidizing its own firms. (Retaliation is discussed again in the next chapter.)

Dixit and Kyle (1984) have studied the use of trade policy as a means of promoting and deterring entry. In a simple framework, they find that a country gains from protectionist entry promotion whenever entry would occur with such a policy but not without it. Such protection for entry promotion is generally harmful to world economic welfare, however, and countermeasures by other governments that discourage entry-promoting protection are thus beneficial. In contrast, subsidies for entry promotion may be desirable from a world perspective, and successful countermeasures against them are thus harmful to world welfare.

Venables (1984) considers a different role for trade policy when market structure is endogenous. Entry is unimpeded in his framework, and it con-

<sup>8</sup> A possible instance of the use of trade policy for this purpose is the European consortium to manufacture the Airbus. It can be argued that protection of the Airbus's home market and subsidies from the partner governments were necessary to allow the consortium to recover enough of the huge costs sunk in development and thus enter into competition against Boeing.

tinues in each country until supernormal profits are driven to zero. In equilibrium, the excess of revenue over variable cost is just sufficient to cover fixed cost. In this case, the profit-shifting motive for trade policy is absent. Nevertheless, tariffs and export subsidies can be used to narrow the wedge between price and marginal cost and hence the extent of suboptimal consumption. This welfare effect operates through a mechanism that is simply described in a symmetric environment (with identical technology, factor prices, and demands at home and abroad) in which there are transport costs. First, home tariffs and export subsidies increase the number of home firms relative to the number of foreign firms servicing the global market for the commodity, for any given total number of firms. This implies, in turn, that the country will be able to avoid some of the transport costs it was paying in the symmetric free-trade equilibrium—specifically those paid on purchases from foreign firms that would exit the industry because of the trade-policy intervention. Venables shows, perhaps surprisingly, that the effect of replacing foreign firms by home firms is sufficiently large to more than offset the direct home-price-augmenting effects of tariffs and export subsidies. The resulting decline in the equilibrium price causes home consumption to expand and thus increases welfare. Of course, production subsidies, and especially consumption subsidies, are more direct ways of correcting the distortion implicit in the existence of a wedge between price and marginal cost.

#### *Other Distortions and Economies of Scale with Imperfect Competition*

Imperfectly competitive environments have been identified thus far principally by the existence of supernormal profits. Such supernormal profits are often associated with positions of “natural monopoly” or market power due to economies of scale. When markets are also imperfect—perhaps even “missing,” owing to informational deficiencies, aversion to risk, or both—then policy may have at least a potential for ameliorating these other market distortions.

Krugman (1984) has described the effects of trade policy in competitive environments made imperfect by static and dynamic scale economies, but he does not undertake to determine whether or not trade policy is sensible in such environments. Some discussion of the issue is made possible, however, by considering imperfections in competitive markets for insurance and finance.

Krugman considers several alternative sources of scale economies. Cost curves may decline as output increases. Cost curves may be flat but nevertheless shift down when larger outputs justify larger R&D spending. They may be flat but shift down when larger cumulative output imparts improved



productivity through learning-by-doing. Krugman's conclusions are the same irrespective of the source of scale economies. He argues that protection of domestic markets and promotion of export markets can reduce unit costs, thereby saving resources. Cost and resource savings improve the international competitive position of "our" producers in *all* markets, not only those protected or promoted. The source of the increase in national welfare is the same as the discussion above—a larger share of global oligopolistic profit—but the mechanism for achieving it is different. In Krugman's work, trade policy is directly a demand-side policy but ultimately a supply-side policy. The sizes of markets facing our producers directly influence the productivity of their resources and effort.

Stable equilibria in each national market would imply an ongoing oligopolistic equilibrium. Yet Krugman's equilibria need not be stable. When they are not, a small policy change can be predatory. One firm may succeed in driving others out of the market, thus establishing a monopoly.

The existence of scale economies and opportunities for learning-by-doing provides only a potential for policy, not a case for it. The scale economies described by Krugman are internal to the firm, so its own incentive to exploit them corresponds perfectly with the government's reason for wanting to have it do so. When information is reasonably complete, and when insurance and financial markets work reasonably well, there will be no scope for policy.<sup>9</sup> The financial market will correctly identify the firm with the best prospects in each market and will underwrite its ventures to the exclusion of its competitors. The insurance market will underwrite any risk. The most competitive firm will become a "natural monopolist" in its market. Markets will have made sure that all scale economies are captured, leaving none for trade policy to seize.<sup>10</sup>

When private information is imperfect, when risks are very large, or when certain externalities are present, the potential for policy may be restored. This observation is trivially true, of course, whether scale economies are present or not. But scale economies can increase the practical relevance of these causes of market failure by creating multiple market equilibria (Helpman, 1983, pp. 26ff.). Some of these equilibria will be pref-

<sup>9</sup> This observation is familiar from the literature on infant-industry protection (see, for example, Baldwin, 1969).

<sup>10</sup> Yet the possibility for strategic trade policy of the Brander-Spencer sort might remain under these circumstances. Credible government policies might alter assessments by firms and by the capital markets of the international competitive environment, which would alter the equilibrium configuration of natural monopolies and oligopolies. Each government will prefer those configurations that give the largest share of supernormal profits to its national firms.

erable to others from the perspective of national economic welfare. Yet the economy may be stuck at an inferior equilibrium if lenders and insurers are unable or unwilling to underwrite a dramatic change in resource allocation, even when the expected reward is quite high.<sup>11</sup> Good information about the immediate neighborhood of a stable equilibrium helps keep the economy there; poorer information about more distant equilibria and neighborhoods may be heavily discounted by risk aversion and institutional limits to the size of downside risk that any firm can accept. Once again, these observations establish only a potential case for policy. And it is a potential that rests on the assumption of superior government information and risk management. When markets do badly, governments may do worse.

### *Policy Alternatives*

*Voluntary export restraints.* The foregoing discussion has taken taxes and subsidies to be the instruments of trade intervention. Krishna (1983), building on prior analyses of trade policy under monopoly (e.g., Bhagwati, 1965, and McCulloch, 1973), has shown that taxes and quantitative restrictions are not equivalent when markets are imperfectly competitive. In a model of the Brander-Spencer type with domestic consumption, Krishna demonstrates that voluntary export restraints act as "facilitating" devices for greater implicit collusion between duopolists at the expense of consumers in the importing country. Their effect on market equilibrium is best understood in the light of our earlier discussion. Each firm would like to cut back its sales toward the monopoly level if its rival were willing to do so too. The firms would certainly restrict output if they could collude and move to a cooperative equilibrium. But the mere promise by one to refrain from aggressive marketing behavior is not credible. A voluntary export restraint can make it credible. By preventing the exporting firm from expanding its export sales beyond the agreed-upon limit, the firm in the importing country can raise its price, knowing that its rival will not be able to expand its market share. The result is that voluntary export restraints can raise the profit levels of *both* firms in a duopoly at the expense of consumers in the importing country. Tariffs do not generally have this property.

*Domestic policies.* Trade policies are not the only tools available to governments for altering equilibrium in imperfectly competitive environments. Other instruments can be superior to trade intervention, whether the aim is to compensate for market failures implicit in imperfect competition or to shift profits when this objective is achievable.

The argument for trade policy is strongest when national markets are not

<sup>11</sup> This observation has a long and full history in the analysis of trade policy. For a summary, see Caves (1960, pp. 161-174). Panagariya (1982) analyzes the conditions under which market equilibria will be stable.

well integrated. Then trade policy, and especially discriminatory trade policy, allows governments to treat the home market and the various foreign markets separately and devise intervention appropriate to the state of the oligopolistic competition in each market. When, instead, transport costs are low and arbitrage opportunities are easily exploited, it may be best to conceive of the oligopolistic competition between "our" firms and "theirs" as one integrated conflict. Trade policy may remain an attractive instrument, since the objective of raising national welfare implies concern for home but not foreign consumers. Yet a nondiscriminatory trade policy that ignores source and destination is more likely to be indicated in this case.

Spencer and Brander (1983) have noted that policies other than trade policy may have a natural place in industrial stages that precede international competition for sales. They may aid in a first-stage thrust to install capacity, promote products, or reduce production costs through R&D. (That would seem to be what commentators have in mind when they describe policy's ability to influence "dynamic comparative advantage.") Strategic precommitments at early stages in industry competition in the form of capacity, marketing, and R&D investment can alter the nature of the later stages of output and sales competition, because they shift marginal cost and marginal revenue curves (see Brander and Spencer, 1983, and Eaton and Grossman, 1984). A government may wish to shift the best-response functions in the first stage to yield an outcome at a later stage that is more favorable to home participants. This objective, which is similar in its justification to the case for policy precommitments at the later output stage, suggests a potential motive for such policies as investment tax credits, R&D subsidies, and research joint ventures. (As in the case of market-share competition, however, the form of the optimal policy response, which may be no response at all, will depend upon firms' conjectures about their rivals' reactions in the early-stage games.)

*Antitrust policies.* Dixit (1984) and Ordover and Willig (1983) have noted the close interdependence of trade and antitrust policies when market environments are imperfectly competitive. When domestic firms earn supernormal profits at the expense of foreign consumers, antitrust policy aimed at preserving competition at home generates a by-product welfare cost reflecting a loss of market power in international markets. Dixit and Ordover and Willig find that a merger of two home firms in an oligopolistic industry confers a welfare gain that outweighs the consumer losses attending the reduction of domestic competition, provided that the share of imports in home consumption is small. If the home and foreign markets can be separated for purposes of antitrust policy, as by allowing the establishment of "export trading companies" or cartels, then the welfare effect of allowing domestic firms to exploit their monopoly power abroad is unambiguously

positive. Such a policy is clearly predatory, however, and begins to resemble the use of monopoly tariffs, forcing the issue of foreign retaliation that we examine below.

### *Summary*

The arguments for policy intervention discussed in this chapter were of two sorts. The more familiar type emerged from consideration of the market distortions that are frequently encountered in imperfectly competitive environments. Trade-policy analysts are familiar with this second-best motive for policy intervention and, in principle, accept it.

More novel was the argument for policy intervention as "preemption" or "precommitment," an argument that government should become a facilitator in the global competition for supernormal profits. This chapter has demonstrated that such policy may or may not be justified, depending upon the credibility of governments, the expectational behavior of firms, and the structure of the market (the number of firms, whether they are quantity or price setters, and so on).

There are many reasons for care in applying these conclusions. For example, a key requirement for all the strategic trade policies discussed is that "our" firms and projects be distinguishable from "theirs." Many real firms are transnationally owned, and many real projects are joint ventures by firms of different nationalities. Trade policies that redistribute profits toward some favored firm or project will fail to aid "us" significantly unless "our" residents have disproportionate stakes and shares in the favored firm or project. Global integration of capital markets seems to be moving the world closer to an extreme in which all profit earners hold comparable portfolios of investments. In this extreme, national trade policies would be completely ineffective in capturing or preserving supernormal profits for "us."

Furthermore, all the strategic trade policies discussed redistribute income from foreign firms, and from consumers worldwide, to large national corporations. Even if this redistribution yielded an increase in overall national welfare, it might be opposed on income-distributional grounds. The oft-noted tension between the efficiency and equity objectives of trade policy becomes all the more dramatic when the beneficiaries of policy are those firms already earning supernormal profits.

One might argue in response that global supernormal profits should be taken as given. Nations compete over their international distribution. The larger the share that "our" policy can claim for "us," the larger is "our" national purchasing power and economic welfare. The division of the gains among "us" can be settled separately. Furthermore, given the imperfectly competitive global market structure, no nation need lose absolutely when

“we” claim a larger share of the rents. Other nations lose only the opportunity to enjoy a larger windfall share for themselves. And the defensive version of the counterargument is even less objectionable. “We” would not sensibly choose as a nation to encourage foreign oligopolists, possibly with the assistance of their governments, to collect supernormal profits at “our” expense.

Many practical and conceptual objections temper the conclusions outlined in this chapter. One might question the information requirements for implementing a sensible preemptive policy. There is also the risk that self-serving, rent-seeking, special-interest groups will use these conclusions for exploitative purposes. More conceptual reasons for caution are discussed in Chapter 5.

## 4 Response and Counterresponse in a Strategic Trade-Policy Environment

Analysts of trade policy frequently assume that trade policy abroad, like technology and consumer preferences, is predetermined. "Our" optimal policy is calculated taking "their" policy as exogenous. It is not surprising, therefore, that most early studies of trade policy under imperfect competition have maintained this familiar assumption.

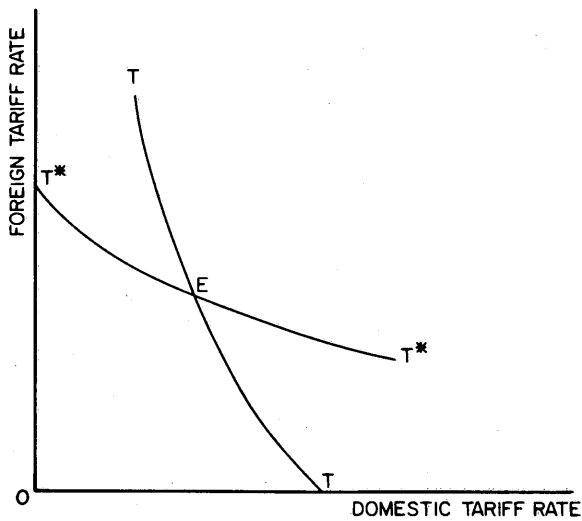
Yet recognition of strategic interplay among firms of different nationalities leads naturally to a consideration of strategic interplay among governments. Even in a perfectly competitive market environment, "we" can use policy to shift in "our" favor the terms on which others calculate optimal policy. "We" may be able to choose some active policy or menu of active policies, contingent on foreign response, that would shift optimal policy abroad and generate outcomes more desirable to "us" than those obtaining under policy independence. In an imperfectly competitive market environment, the potential may be even stronger. Being first with policy precommitments may reduce the ability or willingness of foreign governments to conduct the same sorts of policies and may also deter firms abroad from similar attempts at market preemption.<sup>1</sup>

The classic analysis of strategic trade policy as a reactive "game" between governments is Johnson's (1954) study of the optimum (monopoly) tariff in the presence of retaliation. We summarize it here, since recent analysis has built upon it. Johnson analyzes retaliatory tariff conflict in a perfectly competitive market environment that can be depicted in a diagram similar to Figures 1-4. In Figure 5,  $TT$  represents the best response of the home government to each tariff rate that the foreign government might set. If the tariff abroad is zero (and is not expected to change), the optimal home response is to set the familiar optimal tariff ( $OT$ ). This tariff best exploits the home nation's market power in the world market (power that competitive firms cannot capture). If, instead, the tariff abroad is at some positive level, it is generally optimal for the home government to choose a lower tariff, since the foreign tariff diminishes the demand for the home country's exports and fewer monopoly rents can be extracted.<sup>2</sup>  $T^*T^*$  shows a similar

<sup>1</sup> See, for example, reflections along these lines by former U.S. Deputy Trade Representative David Macdonald (1983, pp. 13-15). Opponents of this viewpoint accept the potential for strategic trade policy but find its complexity and unpredictability to be compelling defects. Baldwin (1979, p. 236) draws together the kinds of things said by a representative opponent.

<sup>2</sup> It is actually the elasticity of foreign import demand, not its level, that determines how the level of the given foreign tariff influences the optimal home tariff. Johnson (1954) has

FIGURE 5  
 BEST-RESPONSE CURVES AND NASH EQUILIBRIUM  
 FOR TWO TARIFF-SETTING GOVERNMENTS



best response of the foreign government to alternative home-country tariffs. It, too, is generally downward sloping, by analogous reasoning. At point  $E$ , each government has chosen a trade policy that is optimal given what the other has chosen. If each believed that the other's policy was immutable, neither would have any incentive to change. In fact, each would find the conjectured stubbornness of its opponent confirmed.  $E$  would be an equilibrium.

One problem with this equilibrium is that each country can be worse off there than at  $O$ , where both would forswear the use of trade policy entirely.<sup>3</sup> This unfortunate property of a noncooperative conflict is known as

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pointed out that an increase in the given foreign tariff need not always reduce the home country's optimal tariff (the situation we have drawn), although this is the likely configuration for most demand structures. Furthermore, since the optimal home tariff is necessarily positive when the foreign tariff is zero, and it approaches zero as the foreign tariff approaches the prohibitive level, the best-response curve must be downward sloping over at least part of its range.

<sup>3</sup> Note that at least one country must be worse off at  $E$  than at  $O$ , since free trade maximizes world welfare in perfectly competitive environments.

the "prisoner's dilemma." Each government would agree to an alternative outcome (free trade) if the other were able to make a credible promise not to cheat. Thus, there is a role for a forum to establish cooperation, a role that the General Agreement on Tariffs and Trade (GATT) is intended to play.

Mayer (1981) has studied the incentives governments face to negotiate tariff settlements—cooperative equilibria—in just such a tariff game.<sup>4</sup> He argues that two reasonable conditions for a negotiated tariff settlement are (1) that neither nation should be worse off at the cooperative equilibrium than at the noncooperative equilibrium  $E$ , and (2) that no combination of changes in tariffs should exist after the settlement that could raise the welfare of both nations. Mayer shows that free trade by both countries satisfies these conditions for "reasonableness." But so do many other policy combinations, all of which have the property that, under the agreement, one government protects its home market while the other engages in export subsidization. The exact outcome will depend upon the bargaining abilities of the respective negotiators and the bargaining positions they bring to the negotiating table. A country will be in a weak bargaining position if it stands to be harmed more in the event that the talks break off and the noncooperative equilibrium at  $E$  is restored.<sup>5</sup>

One problem with the cooperative equilibrium is that after a negotiated settlement is reached, the incentive remains for each government to "cheat." This certainly has its counterpart in reality. Governments may seek alternative policies that accomplish their original goals (exploitation of national monopoly power, in this case). For example, domestic taxes or quantitative trade restrictions may be implemented by each government independently to restore an equilibrium similar to  $E$ . For each policy tool that is ruled out by cooperative negotiation, another may spring up in its place.

This dilemma has led Jensen and Thursby (Jensen and Thursby, 1983, and Thursby and Jensen, 1983) to ask whether Johnson's treatment of government behavior is plausible (and the only plausible treatment) in the short and long run. They introduce consistent, optimistic, and pessimistic "conjectures" of the sort discussed in Chapter 3. In the short run, a government might expect from its foreign counterpart a reaction other than the "zero-response conjecture" employed in the Johnson analysis. Thursby and Jensen consider a range of conjectured responses and find that, so long as marginal propensities to import are sufficiently small, increases in conjectured retaliation result in lower equilibrium tariffs.

In a longer-run analysis, governments may recognize that setting trade

<sup>4</sup> Riezman (1982) considers similar issues in a similar framework.

<sup>5</sup> See the discussion of "threat sets" in Brito and Richardson (1984, pp. 15-16).



policy is a "repeated game," involving *sequences* of equilibria like those discussed above. They might adopt more sophisticated strategies, such as "follow free trade unless and until the foreign government deviates, then respond in kind for one, two, or many periods."<sup>6</sup> Strategies might involve threats and promises of other kinds. (Of course, only those that are credible will be given weight.)

The analysis of dynamic, repeated games is still in its infancy. Applications to trade policy are few. Jensen and Thursby (1983), for example, have considered the outcome of a repeated tariff-setting game in which each government follows a "trigger strategy." A trigger strategy is one where a cooperative option, in this case free trade, is played for the first  $k$  years (where the government chooses  $k$  optimally) or until the opponent acts noncooperatively, whichever comes first. Jensen and Thursby find that if each government correctly evaluates the incentives facing its rival, each will then choose its noncooperative strategy (implement its optimal tariff) in *every* play of the sequence. Essentially, the process unravels from the end. Each government has a clear incentive to act noncooperatively in the final period. Therefore, in the second-to-last period each will conjecture a noncooperative outcome in the final period and will have no reason to take a cooperative initiative in the second-to-last period, since it can have no effect on future outcomes. The second-to-last period becomes just like the last period, and so on, leading to noncooperation in all periods.

The results are somewhat more sanguine if each government is imperfectly informed about the motives of the other. In particular, if each government believes there is some probability that its rival will be "a nice guy" or be willing to try out a cooperative stance until and unless it is exploited, then free trade can prevail for some part of the repeated game. It is interesting that if each government merely believes that its opponent may act cooperatively (contrary to its strategic incentives), the outcome will validate these beliefs.

Future research might consider practical questions and dynamic strategies. How can a government make credible its threats of retaliation? Equally important, how can credibility be vested in promises not to engage in beggar-thy-neighbor policies? International institutions that affect the rules of the game may help in this regard. For example, a negotiated trade-policy settlement might rest on firmer ground if dispute-settlement procedures under the GATT could be streamlined and improved still further.<sup>7</sup>

All the discussion in this chapter has dealt with optimal tariff policy in a

<sup>6</sup> See Axelrod (1983) and Hofstadter (1983) for discussions of the merits of this kind of "tit for tat" strategy in a repeated "prisoner's dilemma" environment.

<sup>7</sup> For a discussion of the current GATT dispute-settlement procedure and the need for further reform, see Hudec (1980).

perfectly competitive market environment. The same principles apply to nontariff trade policies and to the imperfectly competitive environments discussed in Chapter 3. Brander and Spencer (1984b), for example, have shown that if each government can use a preemptive export subsidy to shift a duopolistic equilibrium in favor of its own firm's profits, then both will actually do so. Each government will choose a subsidy that is the best response to the subsidy chosen by the other. But each country will be worse off in the resulting equilibrium than if both had agreed not to intervene at all. The general point is that many countries' trade policies beggar their neighbor. What is gained by one country is lost by another, and even the initial gain may be dissipated by retaliation. In such settings, it may be most sensible for trade practitioners to devise mechanisms for cooperation that are credible, enforceable, and verifiable rather than to plot new and strategically effective thrusts.

## 5 Unresolved Issues and Research Extensions

Research into trade policy and industrial organization in strategic environments is in an early stage. Some directions for subsequent stages are outlined below.

1. In frameworks with only two governments, there are two broad classes of equilibria: cooperative and noncooperative. When additional governments are introduced, there are many classes of intermediate equilibria. These spring from formation of cooperative coalitions among some, but not all, participants. Many practical policy questions seem to rest on the ranking of these mixed equilibria in terms of their effects on economic welfare, their stability, their susceptibility to cheating, etc. Among such practical questions are the following: Should trade negotiations be aimed at bilateral, regional, or multilateral cooperation? Will the United States be injured by preferential expansion of the European Community? Are developing countries really better off acting as a coalition that pursues noncooperative strategies vis-à-vis developed trading partners? Research of both an abstract and practical kind seems useful in considering multi-country policy games.

2. Cooperative equilibria had a more prominent place in the discussion of strategic policy competition among governments (Chapter 4) than in the discussion of strategic market competition among firms (Chapter 3). Yet illustrations of corporate cooperation abound: joint ventures, global sourcing, licensing of technology, and international mergers and conglomeration. There is need for research on preconditions for cooperative equilibria among firms. What aspects might trade policy choose to sanction, perhaps even encourage? What aspects might better be labeled cartellike collusion and be regulated by policy? Chapter 3 summarized work on the use of policy to shift noncooperative market equilibria. Research seems needed on the use of policy to shift cooperative equilibria of various types.

3. The concept of equilibrium needs refinement in additional research on imperfectly competitive environments. In Chapter 3, supernormal profits were implicitly assumed to persist in those environments. This may be true for some truly natural monopolies. In many industries, however, supernormal profits will eventually be competed away by entry, so that the long-run environment is monopolistically competitive even if the short run is oligopolistic. Preemptive trade policy may then have different short-run and long-run effects, including potentially permanent impacts on market structure (see Dixit and Kyle, 1984) and transitional effects on incentives to expand, merge, and collude. Furthermore, industrial stages may be even more complex, making the design of trade policy more complicated. The early stages of conflict among firms may be highly competitive (e.g., com-

petition in R&D, competition in experimental testing of new products and processes). Expected profits may be zero in those stages, with current profits subnormal rather than supernormal. As industries mature, supernormal profits may develop as the payoffs to the successful participants at the earlier stages. Late-stage profits may provide the incentive necessary for firms to undertake further research and product development. As maturation continues, "late" new entrants may arrive (perhaps using the standardized technology that was established in the competitive first stage), and supernormal profits may shrink again toward zero. Research is needed to test and refine these intuitive conjectures.

4. Trade policy interacts with R&D policy to determine the dynamic evolution of technology-intensive industries. The promise of a protected home market (secured by import barriers or closed government-procurement practices) may be necessary to induce firms to undertake research projects involving large risks and substantial "up front" outlays. Conversely, a subsidy to R&D or a more stringent patent-enforcement policy may enhance competition in later production and trade stages. Future research might spell out policy interdependence more exactly. Important questions must also be answered about trade in technology itself. Should a domestic enterprise be permitted to license new technology to foreign firms who will use it to compete vigorously with other domestic firms? Would a government licensing board be able to improve the terms on which a country buys and sells technology, as could be done by restricting or eliminating competition among its country's own firms in bidding for or offering what is essentially a public good? How does policy regarding trade in technology affect the incentives firms have to innovate?

5. The conjectured responses of rivals conditioned the particular conclusions drawn in much of the work summarized. The consistency, or accuracy, of conjectures was one important influence; the credibility of threats and promises, explicit or implicit, was another. Both consistency and credibility are usually judged by whether conjectured responses match equilibrium responses; those that do not are labeled inaccurate or not credible. But these observations beg two important questions. One has to do with the way equilibrium is defined—with or without supernormal profits and in terms of quantities, prices, or some other measure. The second has to do with the way equilibrium is recognized by participants—whether or not there is some learning process that has its own technology and strategic dynamics. More research is needed on these questions.

6. The concept of scale economies also needs refinement. Helpman (1983a) distinguishes economies of scale that are internal to firms only, internal to nations but not to firms, and internal to global industries but not to firms or nations. Spillovers can also cross industry lines, either within or

between countries. The precise form of the scale economies can perhaps be derived from an examination of basic microeconomic structures, but this has not yet been done. Helpman (1983a) and Markusen (1984) also distinguish economies of scale from those of "scope"—aspects of the production process that allow a single organization to provide several product lines at lower cost than independent producers. Such economies of scope gave rise to multiproduct firms and, when different products are produced most cheaply in different locations, to multinational multiproduct firms. The trade-policy implications of globalization based on economies of scope have yet to be explored.

7. Games that pit firms against government have been neglected in this survey. Chapter 3 focused instead on conflict among firms in the presence of government policy, Chapter 4 on conflict among governments. We do not know how trade policies—and specifically performance requirements such as export targets and local-content rules—influence large, self-conscious multinational firms. A crucial aspect of research on this subject would concern the way small numbers of multinationals behave strategically against governments, perhaps by playing some off against others to extract tax advantages and other forms of preferential treatment.

The opportunities for research outlined in this and previous chapters are numerous. Some of them should be taken up urgently, because the structure of international trade and policy is becoming increasingly "strategic"—more concentrated among small numbers of interdependent multinational firms and groups of governments. Over the longer term, we should learn as much about the costs and benefits of trade policy in strategic environments as we know about its costs and benefits in perfectly competitive environments.

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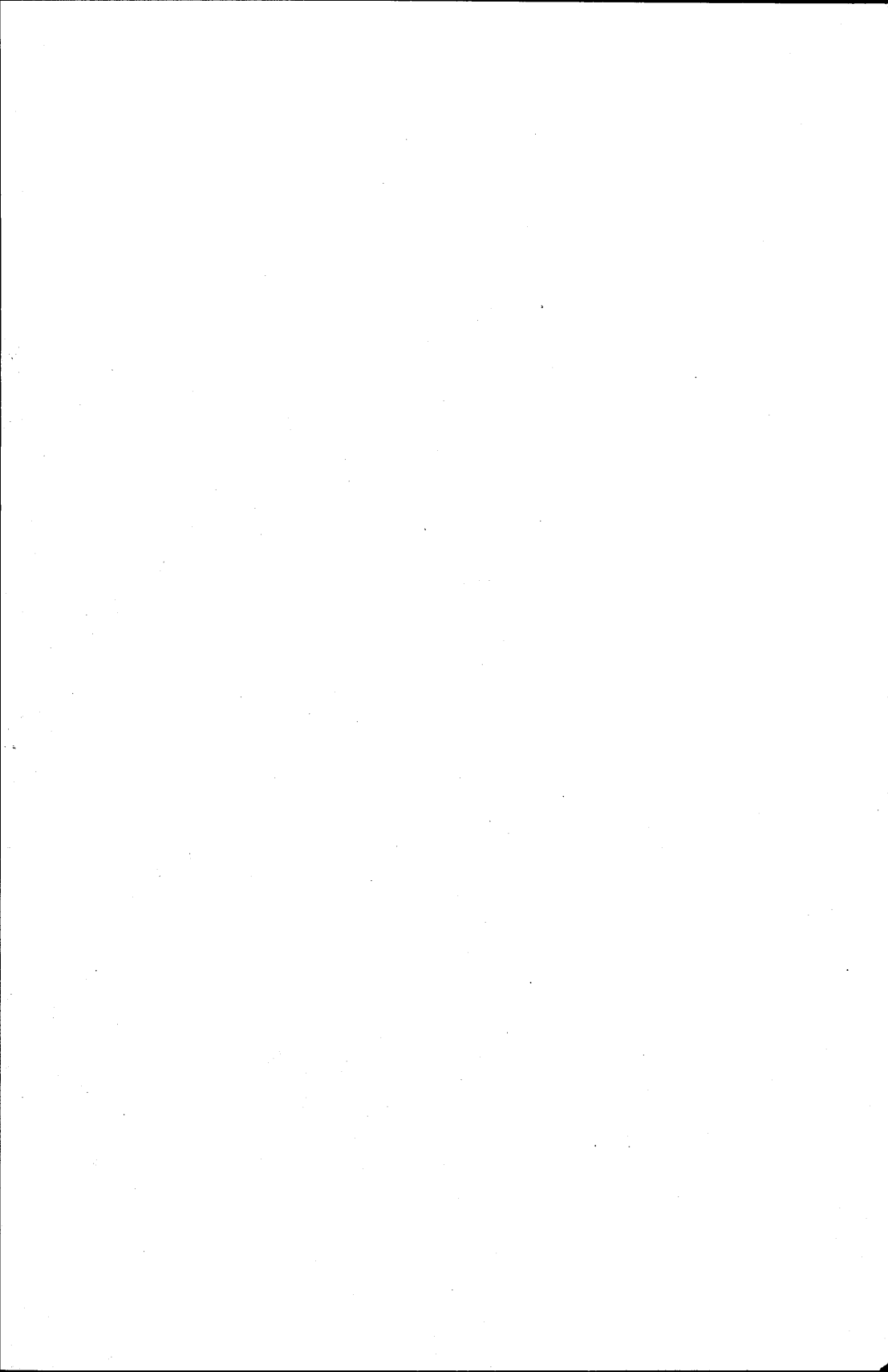
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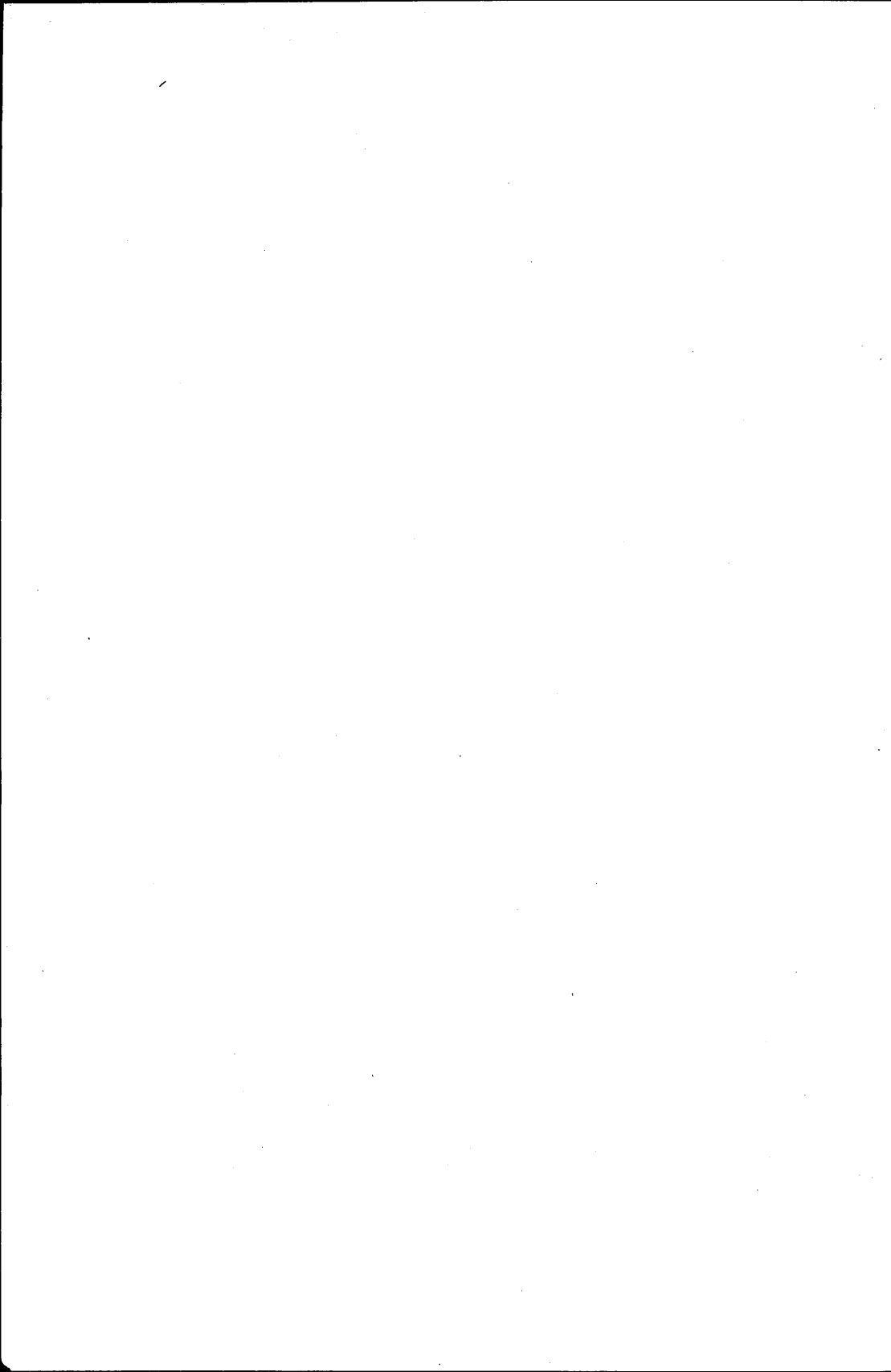
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