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Chapter Author: Dani Rodrik

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5 Imperfect Competition, Scale Economies, and Trade Policy in Developing Countries

Dani Rodrik

To many policymakers in developing countries, the "new" trade theory, with its emphasis on imperfect competition and returns to scale, must appear as a vindication of sorts. For the recent literature has led to a considerable weakening of the traditional neoclassical presumption against policy intervention in foreign trade.[1] The journals are now filled with examples of governments "creating" comparative advantage by exploiting imperfections in markets for goods and technologies and increasing returns to scale. This new emphasis on the indeterminacy of comparative advantage contrasts starkly with the advice these policymakers have typically received regarding the necessity to specialize in unsophisticated, labor-intensive commodities. Indeed, by focusing on learning effects, the new literature has provided some of the best arguments for infant-industry protection since Alexander Hamilton and Friedrich List. The diehard import substituters may now legitimately wonder if the learning processes so important to the U.S. semiconductor industry (see Baldwin and Krugman 1986) are not equally relevant to a wide spectrum of basic industries in developing countries.[2]

As the last example illustrates, the new literature is also a frustrating reminder to the South that too often ideas become intellectually respectable only when they become congruent with the interests of major Northern countries. Hence it is more than a little ironic that the new trade theory has developed against the backdrop of trade conflicts among *developed* countries, and between the United States and Japan, in particular. Market imperfections of the sort analyzed in this context

Dani Rodrik is assistant professor of public policy at the John F. Kennedy School of Government, Harvard University.

would appear to be, if anything, more serious in the developing countries. Yet the new insights have still to penetrate the vast literature on trade policy in *developing* countries.[3] Anne Krueger's (1984) survey of the field, for example, found no applications to developing countries worthy of mention. The predominant approach to trade policy in developing countries remains based on intuition and insights deriving exclusively from models with perfect competition.

In practice, of course, the actual policy debates between import substituters and liberalizers have long been carried outside the confining framework of perfect competition. The import substituters remain suspicious of trade liberalization for reasons, not always well articulated, having to do with technological externalities and scale effects. They fear that resources will be reallocated away from the more modern, capital- and knowledge-intensive sectors with unexploited scale economies. The liberalizers, on the other hand, have long proceeded in syncretic fashion. In their role as academic economists, they typically build models in which perfectly competitive markets guide the allocation of resources along lines of comparative advantage. But in their role as policy advocates, they have been driven by the discouragingly small size of the Harberger triangles their models yield to fortify their arguments by appeal to the procompetitive and beneficial scale effects of more open trade regimes. Hence the great advantage of the new approach: it may bring theory and policy much closer than they have so far stood.

In truth, there are elements in the new theories of trade that give comfort to both camps. In the presence of imperfect competition and increasing returns to scale, trade liberalization is compatible both with a magnification of the welfare gains *and* with welfare losses. It all depends on how the economy is expected to adjust, which in turn depends on the frustrating ambiguities of oligopoly theory. At one extreme, we could imagine that free entry eliminates all excess profits and that liberalization rationalizes industry structure by reducing the number of firms and forcing the remaining ones down their average cost curves. In such a view of the world, the benefits of trade liberalization can easily amount to several times the usual Harberger triangles. Harris's (1984) calculations with such a model of Canada show that industry rationalization reduces manufacturing costs to such an extent that the net outcome is an *expansion* of the manufacturing sector—a sector in which Canada has prima facie a "comparative *dis*advantage." This kind of story suggests a wonderful way to sell trade liberalization to policymakers in developing countries: liberalization may actually help expand the modern sectors! But at the other extreme, we can imagine a world in which the contracting sectors tend to be those

with supernormal profits and unexploited industrywide scale economies. The protectionists' fears may then well be justified.

My purpose in this chapter is to chisel away at some of these ambiguities. To do so I limit myself to a relatively narrow question: To what extent does the presence of increasing returns to scale and imperfect competition at home alter the received wisdom on the benefits of trade liberalization in developing countries? My focus is on *domestic* market structures only; I ignore imperfect competition in world markets and its consequences for trade strategies. Neither do I have much to say on product differentiation and consumers' taste for variety. Both of these omissions are serious ones. Developing countries frequently face highly oligopolistic structures in their import and export markets alike. And arguably a major source of benefit from trade liberalization in such countries is the greater availability of imported goods to consumers starved for variety. I have no excuse for these omissions but that of keeping the analysis manageable. I also ignore the possibility of dynamic learning-by-doing effects. Here, it is fair to say that the new literature has added little that is new to the concerns with temporary technological backwardness of the traditional infant-industry literature. The new aspects come into play with strategic interactions among firms, and these form the core of the present chapter.

The plan of the chapter is as follows. Section 5.1 reviews some of the salient aspects of market structure in developing countries, and argues that the concern with imperfect competition and scale economies is, if anything, more germane in developing-country contexts than in developed countries. Section 5.2 develops a general equilibrium framework in which the sources of potential gains/losses from partial trade liberalization can be assessed, and discusses their likely relative importance. Section 5.3 carries out partial-equilibrium numerical simulations for a number of industries (calibrated using Turkish data) to gauge the welfare implications of partial liberalization under alternative assumptions regarding the nature of oligopolistic interactions and the ease of entry/exit. Finally, section 5.4 provides a summary and concluding remarks.

5.1 Market Structure in Developing Countries

How important is imperfect competition in developing countries? Stylized facts and casual empiricism suggest that it is very important indeed. Outside peasant agriculture and some services, perfect competition—or any recognizable semblance thereof—is typically conspicuous by its absence. In a wide range of manufacturing sectors, a few firms tend to dominate and, one assumes, make liberal use of their

market power. Of course, the same could be said for the developed countries as well. It appears, however, that imperfect competition is in fact more pervasive in the industrial sectors of the developing countries than of the developed ones.

The evidence at hand is necessarily sketchy. Aside from the usual problems with data availability, conceptual uncertainties abound regarding the appropriate measurement of monopoly power. But for our purposes a less discriminating approach will have to suffice. Table 5.1 contains some comparative figures on average concentration ratios in the industrial sectors of a number of countries. All six developing countries included turn out to have very high four-firm concentration ratios, ranging from an average of 50 percent in Chile (with a 41-sector breakdown) to 73 percent in Mexico (with a 73-industry breakdown). The table includes, for comparison, two developed countries—the United States and France. Significantly, all six developing countries have concentration ratios that exceed the relevant figure for the United States, even though the U.S. average has been calculated at a much greater level of disaggregation of industries and is therefore biased upward relative to those for the other countries. The numbers for France and Pakistan are the most directly comparable since their respective levels of disaggregation are similar: the ratio for Pakistan is more than twice as large as that for France (66 percent versus 28 percent).

To be sure, these concentration ratios ought to be taken with a grain of salt, since on their own they cannot tell us how collusive the behavioral outcomes in particular industries or countries are. The latter also depend on conjectures entertained by individual firms regarding their

Table 5.1 **Comparison of Four-Firm Concentration Ratios in Industry**

Country	Year	Unweighted Average of Four-Firm Concentration Ratios (%)	Number of Industries
Brazil	1972	72	68
Chile	1979	50	41
India	1968	55	22
Mexico	1972	73	73
Pakistan	1968	66	51
Turkey	1976	67	125
U.S.	1972	40	323
France	1969	28	48

Sources: For Brazil, India, Mexico, and Pakistan: from original sources cited in Leff 1979, table 1; for Chile: Melo and Urata 1986; for Turkey: calculated from Tekeli et al., n.d.; for the U.S.: Scherer 1980, 70; for France: Jacquemin and de Jong 1977, table 2.9.

rivals' actions and on the ease of entry and exit. Nonetheless, these numbers would seem broadly indicative of the extent of imperfect competition. There is by now ample evidence for the developing countries that concentration ratios are positively correlated with the measured level of profits. A survey by Kirkpatrick, Lee, and Nixson (1984, table 3.10) summarizes the findings of sixteen major studies on the concentration-profitability relationship in developing countries. Typically, measures of concentration are found to be a statistically significant determinant of "profitability"—measured as price-cost margins or rates of return on capital—once the appropriate controls are introduced.

Moreover, these concentration ratios probably *under*estimate the extent of market power enjoyed by leading oligopolists. This is so for a number of reasons. First, and most obvious, is the absence of serious antitrust policies in most developing countries. Even where antitrust legislation does exist, its implementation is rarely a serious bar to the actions of firms collusively inclined. Second, developing-country industrial policies have typically been biased toward restricting entry, as investment in many manufacturing sectors are subject to complex licensing and financing arrangements. Newcomers to preferred sectors often benefit from special incentive packages, of which latecomers are deprived. Third, the trade regimes tend to be highly protective—effectively eliminating foreign competition—with a bias toward quantitative restrictions rather than tariffs. As Bhagwati (1965) showed long ago, quotas are conducive to higher levels of price-cost margins domestically than are tariffs that generate an identical volume of imports. Fourth, in many developing countries industrial power is concentrated in the hands of minority ethnic groups, such as the Chinese in Southeast Asia and the Indians in East Africa. The common cultural background of these entrepreneurial groups may well facilitate collusion by providing easy reference to a shared set of norms and focal points, thus reducing the severity of the coordination problem. Fifth, the weakness of capital markets in developing countries means that investment funds are typically internally generated. This too acts as a barrier to entry by outsiders into sectors that are generating supernormal profits. Last but not least, the concentration ratios cited above are biased downward insofar as they do not take into account the predominance of conglomerates that span a large number of industrial, commercial, and financial activities (see Leff 1978). These groups have an anticompetitive effect in at least one respect: the close linkages between incumbent firms and their affiliated banks raise the entry costs to outsiders.

In this connection, two special institutional aspects of market structure in developing countries are particularly noteworthy. The first is that the leading oligopolists frequently coexist with a large fringe of small, competitive firms that are in a subordinate relationship to the

former. The fringe is typically made up of suppliers and subcontractors whose manufacturing techniques exhibit constant returns to scale and tend to be labor intensive. Entry into this lower end of the industrial spectrum is relatively free. Several studies, surveyed by Kirkpatrick, Lee, and Nixson (1984, 49–52), provide evidence of the pervasiveness of this sort of dualism in the industrial sectors of the developing countries. Unlike the large firms, which are sheltered from economic misfortunes by their price-cost margins, these small-scale establishments are particularly sensitive to changes in their environment. Competition and relative ease of entry are prima facie evidence of their efficiency.[4] This coexistence of the large with the small has some interesting implications for trade policy, which I discuss briefly later on.

The second feature of importance is that many sectors in developing countries—automobiles, chemicals, energy, and so forth—are inhabited by a mixture of firms with different ownership structures. Public firms compete with private firms, and local firms exist side by side with subsidiaries of multinational corporations.[5] Ownership structure matters in industries that are competitive, but it matters even more in industries that are not. State-owned enterprises typically have objective functions which are a mess to contemplate and in which profitability plays at best a minor role. Their interaction with private firms in the same industries provides an interesting area of study in which the industrial-organization theorist has yet to enter. The behavioral response to trade liberalization in such contexts is anybody's guess. The presence of foreign-owned firms alongside domestic ones, on the other hand, introduces an opportunity for strategic trade policy with which to extract rents from the former. In fact, it could be argued that the performance requirements commonly imposed on the local subsidiaries of multinationals perform precisely this role.[6] In any case, the ultimate destination of excess profits—domestic or foreign—makes a difference in the formulation of desirable policies in the presence of imperfect competition.

This discussion indicates that indexes of concentration leave much to be desired as sufficient statistics for market structure and conduct in developing countries. Yet it also suggests that imperfect competition is important and ought be of concern whenever trade reform is contemplated. What the implications may be for trade liberalization is the subject of the next two sections of the chapter. I now turn briefly to scale economies.

There is practically no direct evidence on the importance of scale economies in specific industrial sectors of the developing countries. The available studies are exclusively for the developed countries (Pratten 1971; Scherer et al. 1975). For most manufacturing activities, these studies are probably indicative for the developing countries as well.

But some caution in extrapolation is warranted insofar as differences in relative factor prices lead to the choice of technologies with different scale characteristics. For concreteness, assume—not too unrealistically—that entrepreneurs treat labor costs as variable cost and capital costs as fixed cost. Then the extent of scale economies is determined completely by the choice regarding the capital intensity of the technique selected, itself presumably determined in part by labor costs relative to capital costs. This line of argument would imply that lower relative labor costs in developing countries tend to diminish the importance of scale economies. There is some evidence for this view. In her study of the automobile components industry in India, Krueger (1975, 68–69) reports that the manufacturers she interviewed did not believe larger scale of output would yield substantial cost savings; many thought that a switch in technology would be necessary before such savings would occur.

With this caveat in mind, what can we say about the importance of scale economies in developing-country markets? The fact that developing countries tend to have small internal markets, combined with the domestic orientation of much of industry, would argue for a significant role for scale economies as yet unexploited. The relatively high concentration rates cited above would go some way in the other direction, but probably not too far along. Conventional wisdom says that in a large number of manufacturing industries, too many firms have typically coexisted behind protective walls, official licensing policies to the contrary, at production levels far below minimum efficient scale. This is consistent with models in which a high level of profitability generated by trade protection leads to excessive entry, driving incumbents up their average cost curves (Horstmann and Markusen 1986). In addition, many government policies—such as the allocation of import licenses on the basis of production capacity—induce excess industrial capacity. At times, industrial policy in developing countries has explicitly promoted the establishment of industries that neither domestic market size nor export prospects quite warranted—the so-called white elephant syndrome.

Among horror stories, perhaps the best known center around the automobile industry. This is one industry in which scale economies are widely believed to be important. Estimates of minimum efficient scale in the industrialized countries vary, but most studies put it in the range of 200,000–300,000 cars (per annum) at the final assembly stage.[7] Even if we discount these numbers for the different circumstances in the developing countries—more labor-intensive techniques, fewer model changes, and so forth—average production runs in these countries are commonly inadequate to reap the full advantages of scale. This can be seen in table 5.2, which provides some evidence on production levels

Table 5.2 **The Automobile Industry in Developing Countries**

Country	Number of Firms[a]	Number of Basic Models[a]	Average Output per Model (per year)[b]
Argentina	4	6	20,357
Brazil	4	4	182,539
Chile	2	5	1,872
India	4	4	20,807
South Korea	3	3	70,494
Taiwan	6	6	19,783
Turkey	3	3	19,123
Venezuela	4	4	17,731

Source: Automobile International 1986.

Note: This survey excludes models with an output of less than 100 units in 1985.

[a]1985.

[b]1984–85 average for models produced in both years.

in selected developing countries. With the exception of Brazil and South Korea, the countries included have average production runs of around 20,000 (per annum) or below per model. This number can be put into perspective by considering that the average production level for the BMW—hardly one of the highest-volume cars—is larger than 400,000. From the economic standpoint, the question of interest is the magnitude of the cost savings forgone by low-volume production of this sort. The very high level of protection that has to be put in place in order to make these automotive industries financially profitable provides some indirect evidence of these costs.

5.2 A General Framework for Trade Policy Analysis

How do the features discussed in the previous section affect trade policy, and the case for trade liberalization in particular? The answer depends partly on how "structural" these features really are. Clearly, many aspects of market structure summarized above cannot be taken as data. These features will be affected by government policies, among which trade policies are often of key importance. As pointed out above, high levels of protection and reliance on quantitative restrictions have served to solidify oligopolistic structures in the manufacturing sectors of developing countries.[8] Often they have also stimulated inefficient levels of production.

But we should also be aware that the processes behind these market structures need not be neatly symmetric. In the real world, as opposed to our models, well-entrenched patterns of imperfect competition may be quite difficult to remove. An oligopoly engendered by trade protec-

tion will not necessarily go away when that protection is removed, especially if trade liberalization is only partial, as it is likely to be. The strength of the reverse linkage between liberalization and competition will depend on the extent of hysteresis of this sort. Here, I avoid these difficult questions and concentrate on relatively small changes in the trade regime. The endogenous changes in market structure likely to follow *partial* trade liberalization are easier to conceptualize and handle.

I proceed in two steps. The first question I ask is the extent to which the presence of these new features alters our conceptions about the desirable patterns of resource reallocation. The second question, analyzed in the next section, is the extent to which imperfect competition hampers, or facilitates as the case may be, these resource-pulls in the wake of trade liberalization.

To answer the first question, it is useful to start with a general formulation. Shunting income distribution issues aside, let the consumer side of our economy be represented by an expenditure function $E(p_1, p_2, \ldots, p_l, W)$, where p_i stands for domestic prices and W is an index of welfare. This function represents the minimum expenditure necessary to attain the level of welfare denoted by W, and its partial derivatives with respect to prices yield in usual fashion the compensated demand functions for the relevant good. Denoting consumption of good i as C_i, we have

$$C_i = E_i(\cdot). \tag{1}$$

On the production side we let v_j denote the (fixed) supplies of productive factors and w_j their competitive levels of renumeration. For simplicity, each industry i is assumed to be made up of n_i *identical* firms,[9] with x_i and X_i denoting firm- and industry-level outputs, respectively, in that industry. By construction,

$$n_i x_i = X_i \tag{2}$$

for each i. For the moment, we do not have to specify (1) whether n_i is fixed or determined by free entry, and (2) under what conditions of oligopolistic interaction, if any, x_i is determined.

Technological conditions are summarized by *unit* cost functions which we can write generally as $c_i(\mathbf{w}, x_i)$, with $\mathbf{w}$ standing for the vector of factor prices. The inclusion of x_i in $c_i(.)$ leaves open the possibility of increasing returns to scale, in which case $\partial c_i(.)/\partial x_i < 0$.[10] It is helpful to summarize the scale characteristics of technology in each sector by the variable θ_i, representing the ratio of average cost to marginal cost:

$$\theta_i = c_i/[\partial(c_i x_i)/\partial x_i]. \tag{3}$$

In industries with locally increasing returns to scale, $\theta_i > 1$. Factor markets are assumed to be perfectly competitive. By Shephard's lemma,

factor demands per unit of output are given by the partial derivatives of $c_i(.)$ with respect to the relevant factor prices, so that

$$v_j = \Sigma_i X_i[\partial c_i(\cdot)/\partial w_j], \quad \forall j. \tag{4}$$

This equation states that the sum of the sectoral demands for each factor equals its (fixed) supply. I assume full employment throughout.

The trade regime in place is protective, but the form of protection—tariffs or quotas or any combination—need not be specified as yet. Whatever the actual policies, protection will insert a wedge between world prices p^*_i and domestic prices p_i for commodities that are importables. Net imports are in turn given by the difference between consumption and production of each commodity:

$$M_i = C_i - X_i, \quad \forall i. \tag{5}$$

For nontraded goods, $M_i = 0$. Since my focus is on domestic market imperfections only, I take world prices to be exogenous.

An initial equilibrium in this economy can be represented by making use of the equality between national expenditures and national income. Income here is made up of three components: (1) "pure" profits; (2) factor income; and (3) quota rents and/or tariff revenues. Therefore, we can write the income-expenditure equality (in domestic prices) as follows:[11]

$$E(\cdot) = \Sigma_i[p_i - c_i(\cdot)]X_i + \Sigma_j w_j v_j + \Sigma_i(p_i - p_i^*)M_i. \tag{6}$$

The three terms on the right-hand side correspond to the components of income just mentioned. This framework is general in that it allows oligopoly and excess profits (in those sectors where p_i exceeds c_i), increasing return to scale, and diverse forms of protection. Intermediate goods are not taken into account explicitly, but they could by interpreting X_i in the first term on the right-hand side as "net" output. Similarly, foreign ownership can be incorporated into this framework by subtracting from the right-hand side payments to foreigners—both in the form of factor payments and as oligopoly profits that accrue to foreign firms.

Now consider a partial trade reform. What kind of resource reallocations are going to be welfare increasing? The answer can be obtained by taking the total differential of equation (6) around this initial equilibrium. After appropriate substitutions from equations (1) – (5), the exercise yields

$$E_W dW = \underset{(a)}{\Sigma_i(p_i - p_i^*)dM_i} + \underset{(b)}{\Sigma_i(p_i - c_i)dX_i} + \underset{(c)}{\Sigma_i n_i c_i[1 - (1/\theta_i)]dx_i}. \tag{7}$$

This expression gives us the aggregate welfare effect of the general equilibrium changes induced by trade reform (or any other policy for that matter).[12] Since E_W is the inverse of the marginal utility of income, it simply translates the real-income effects on the right-hand side into welfare units. The three effects labeled (*a*), (*b*), and (*c*) each correspond to a particular source of market imperfection. The first of these is the familiar one that relates directly to trade protection: it states that it is desirable to expand imports of commodities that are protected (and conversely to expand exports of commodities subject to trade taxes). The welfare effect of such an expansion will be directly proportional to the magnitude of the protection-induced wedge between the relevant domestic and world price. For small changes, this is the usual source of gains from trade liberalization.

The second term relates to "excess" profits and is relevant in the case of industries in which barriers to entry shield incumbent oligopolists from effective competition. In these industries prices will exceed average costs of production, so $p_i - c_i > 0$. Notice that for trade liberalization to be welfare enhancing on this account, total output in such industries must *increase*. The reasoning is that ceteris paribus a reallocation of resources to sectors in which there are excess profits is desirable. This is a new desideratum, and in fact it creates some conflict with the above. Consider that import-competing sectors, for reasons discussed above, tend to be more oligopolistic than export-oriented ones. Then the effect labeled (*a*) tells us that the former ought to contract in order to make room for expanded imports, whereas (*b*) suggests quite the opposite. Which way the scale tips will naturally depend on the relative strength of the excess-profits versus protection-distortion effects. The question can be fully resolved only by empirical analysis.

Fortunately, it is possible to say a bit more. Ignoring (*c*) for the moment—which amounts to assuming that $c_i(.)$ stands also for *marginal* costs—the terms (*a*) and (*b*) can be combined to write equation (7) as

$$E_W dW = \Sigma_i(p_i - p_i^*)dC_i - \Sigma_i(c_i - p_i^*)dX_i. \tag{8}$$

Hence, in the final analysis the desired output response depends on a comparison of domestic (marginal) costs of production with world prices. As long as domestic (marginal) costs are higher than border prices, it is welfare enhancing to reduce the output of import-competing sectors, *irrespective* of the magnitude of excess profits in those sectors.[13] Provided this condition on costs holds, the presence of imperfect competition per se does not alter the desirability of moving resources out of protected sectors.[14] However, it does affect the size of welfare gains from doing so: as expression (8) shows, the output effects are multiplied

by $(c_i - p_i^*)$ rather than $(p_i - p_i^*)$ as in the usual analysis. For protected sectors that are imperfectly competitive, this *reduces* the welfare benefits of contraction by exactly the price-cost margin.

The intuitive explanation is as follows. Think of output in import-competing sectors being subject to two distortions. The first of these is due to trade protection, and its size depends on the margin between domestic and world prices. Taken on its own, this distortion would argue for a reduction in output. The second distortion is the monopoly one and is measured by the margin between domestic prices and costs. It would argue for an expansion of output. Now since both distortions are measured by a metric in the same space, it is conceptually straightforward to figure out which dominates. The answer depends on the relative sizes of c_i and p_i^*. Contraction of output in import-competing sectors remains desirable provided costs of production exceed border prices.

How likely is this condition to hold? In practice, highly protected sectors tend to be indeed high-cost ones. More or less direct evidence on this can be obtained by looking at data on effective rates of protection (ERP) and domestic resource costs (DRC) for specific industries in developing countries. In the presence of intermediate goods, these are the direct analogues of our $(p_i - p_i^*)$ and c_i, respectively. By and large these two indicators tend to be highly correlated with each other. Of course, in the absence of imperfect competition (and of factor-market distortions), the ERP and DRC would be linked by the relation DRC = ERP + 1. But the possibility of differential levels of excess profits across industries de-links the two measures. Table 5.3 presents some evidence of this sort for Turkey. Not surprisingly, the most heavily protected industries—chemicals, iron, and steel—turn out to be also the ones whose costs of production exceed world costs by a wide margin: by a factor of 7 in iron and steel, and by a factor of 35 in chemicals! The rank correlation between effective rates of protection and domestic resource costs for sixty-six subsectors is 0.77. Hence the strong presumption that a contraction of protected sectors will be welfare-enhancing, excess profits or not. The conventional analysis of comparative advantage is unlikely to go too wrong here.

Now return to equation (7). The last term (*c*) here captures the influence of possible scale effects. In industries with increasing returns to scale, the term in square brackets is going to be positive. For trade liberalization to be welfare increasing on this account, therefore, an expansion of average firm output will be called for. To put the same point differently, trade reform may prove harmful if it leads to a large enough contraction of firm size in industries with returns to scale. If such industries tend to be predominantly the protected ones, the stage is set for another potential conflict in objectives.

Table 5.3 Structure of Protection and Costs in Turkish Manufacturing, 1981

Sector	Effective Rate of Protection	Domestic Resource Costs
Food	0.19	1.29
Textiles	0.26	0.85
Leather products	0.62	1.47
Wood and paper products	1.25	3.17
Chemicals	−4.49[a]	35.39
Rubber and plastics	1.25	1.20
Cement and glass	−0.12	0.58
Iron and steel products	5.50	7.48
Nonferrous metals	1.10	1.91
Metal products	0.32	0.94
Machinery	0.67	1.01
Electrical machinery	0.41	0.87
Transport equipment	0.85	1.07
Measuring equipment	−0.19	0.44
Manufacturing total	0.81	1.82

Source: Yagci 1984, tables 4.1 and 5.5.

Note: Rank correlation coefficient between ERP and DRC for 66 subsectors is 0.77.

[a]Indicates negative value added at world prices.

What does the empirical evidence suggest? On a priori grounds, we would expect many sectors such as agriculture, clothing, and light manufactures that are generally the least protected in the developing countries to also rank low in terms of scale economies. Many consumer durables, which tend to be highly protected, have technologies with declining unit costs. Table 5.4 displays data on rates of protection (in Turkey) and scale characteristics (in developed countries) for a sample of industries. These industries were chosen on the basis of availability of information on scale economies and protection jointly, and while there may be some selection bias it is unclear which way it would go. The measure of scale economies used here is the ratio of minimum optimal scale to the size of the corresponding domestic market in the United States and, alternatively, in the EEC. As the discussion in the previous section indicated, the absolute level of these numbers may overstate the importance of scale effects in developing-country markets. Nonetheless, the relative standing of the industries included in table 5.4 would probably remain the same.

The evidence portrayed displays a clear correlation between the extent of scale economies and the level of protection. All the industries classified as low-scale economies have ERPs below 100 percent, among which three (plastic shoes, glass bottles, and cement) have negative

Table 5.4 **Relationship between Economies of Scale and Protection**

Industry	Minimum Optimal Scale: % of U.S. Demand, c. 1967	Minimum Optimal Scale: % of EEC Output, c. 1968	ERP in Turkey, 1981
Low-scale economies			
Shoes (nonrubber)	0.2		−0.52 (plastic) 0.79 (leather)
Cotton and synthetic fibers	0.2		0.04 (cotton textiles)
Glass bottles	1.5		−0.22
Paints	1.4		0.55
Portland cement	1.7		−0.47 (all cement)
Medium-scale economies			
Auto tires	3.8		1.96
High-scale economies			
Nitrogenous fertilizers		6.0– 7.0	1.46 (all fertilizers)
Washing machines		10.0–11.0	1.19
Automobiles	11.0		2.18
Electric motors	15.0		1.24
Diesel engines	21.0–30.0		1.40

Sources: For economies of scale: Scherer 1980, tables 4.2 and 4.3; Jacquemin and de Jong 1977, table 2.3. For original sources, see the references therein. For ERP measures in Turkey, Yagci 1984, tables B.1 nd C.1.

ERPs. By contrast, all other industries with medium- or high-scale economies have ERPs that exceed 100 percent. This pattern of correlation presents an apparent conflict with the usual policy advice that the developing countries should liberalize their capital- and technology-intensive sectors.

To some extent, the conflict can be alleviated if domestic firms can respond by exporting, or if entry and exit are relatively free. In the case of free exit, a contraction of the protected sectors—as the trade distortion would dictate—would no longer conflict with an expansion of firm-level output in those same sectors, *provided* a sufficient number of firms left the industry. In fact, with industry rationalization of this sort, the benefits of trade reform can be magnified greatly (Harris 1984). I leave a discussion of the likelihood of this outcome to the next section. For the moment, let me underscore the conclusions that (*a*) an expansion of average firm output will be required in industries with important scale economies, and (*b*) many of these industries will be the highly protected ones that traditional comparative-advantage models have suggested ought to contract. In the absence of free exit, the requirement translates into an expansion of the entire industry, and here the conflict is the clearest. Notice that the conflict is also strengthened in the pres-

ence of additional scale effects external to firms but internal to the industries concerned. We would then have the additional term $-\Sigma_i X_i(\partial c_i/\partial X_i)dX_i$ on the right-hand side of equation (7), and the presumption that resources should move into protected sectors which also happen to possess unexploited scale opportunities would be stronger.

To conclude this discussion, excess profits per se do not alter much our notions about the desirable direction of resource movements in developing countries. Expansion of imports and contraction of protected sectors continue to remain as worthy objectives, even though the magnitude of gains may be reduced. Hence the presence of domestic oligopolies is not a good argument for why neoclassical prescriptions about comparative advantage ought not be taken seriously. Scale economies are a somewhat different matter. The desirability of expansion of firm output in industries with significant scale economies may clash seriously with the objective of pulling resources out of protected sectors. How important this conflict is in practice can be ascertained only by empirical analysis. A beginning on this is made in the next section.

5.3 The Consequences of Trade Liberalization: Some Simulations

So far the analysis has covered only part of the task set. We still have to worry about the following positive question: What are the resource allocation effects of trade reform under conditions of imperfect competition? In a decentralized economy the government does not have the ability to ensure that the desirable resource-pulls, as outlined above, actually materialize. The effects of policies are mediated through markets, and in our case, through imperfect ones. While the presence of oligopolies might not matter much for the ultimate objectives of trade policy, it may affect critically whether those objectives are attained or not. In other words, what are the signs of dX_i/dt, dx_i/dt, and so forth, where t stands generically for trade policy? Are these expressions "large" or "small"? How do they compare with their better-known counterparts under perfect competition?

It is impossible to provide definite answers to these questions at any acceptable level of theoretical generality. Even abstracting from the usual general equilibrium complications, the resource allocation effects of trade liberalization will depend on (1) the type of the trade restriction (tariff or quota), (2) the nature of oligopolistic interactions (the conjectural variation parameter), and (3) the ease of entry and exit. A recent paper by Buffie and Spiller (1986) analyzing this issue in a partial equilibrium framework shows that the range of theoretical possibilities is unbounded. Practically anything can be made to happen by rigging the model appropriately. Domestic output can increase or decrease, as can the domestic price.

Given that the search for theoretical generality is a dead end, an alternative is to carry out numerical simulations under assumptions that seem realistic and sensible. Then the sensitivity of the outcomes can be ascertained by altering key features. This is essentially the approach that has been taken in a number of recent papers by Dixit (1986), Baldwin and Krugman (1986), and Venables and Smith (1986) that analyze trade policy issues for the developed countries under conditions of imperfect competition. The calculations to follow are in the same spirit. Using Turkish data for three industries, I estimate the resource allocation and welfare effects of a partial liberalization of quota restrictions. For the purpose of this exercise, there is no harm in thinking of Turkey as a "typical" developing country, so that the conclusions will have broader applicability. Somewhat surprisingly, the simulations do yield some general conclusions, despite the multitude of scenarios about firm behavior and entry to be experimented with. Of course, a partial equilibrium approach has all the usual limitations, especially when it is used to shed light on across-the-board trade liberalization. But the simplicity of the framework has the advantage that the implications of alternative assumptions regarding technology, market structure, and conduct are easier to ascertain.

The simulations are based on a simple model of industry behavior. The industry is composed of n firms (assumed to be identical), each of which maximizes profits independently. The first-order conditions for the average firm yield a direct relationship among the price-cost margin, the market share, the conjectural variation parameter, and the market elasticity of demand:

$$(p - c)/p = \eta[1 + v]\epsilon, \tag{9}$$

where η is the market share of each firm ($x/[nx + M]$), v is the firm's conjecture of the output response by the rest of the industry to a unit change in own output, and ϵ is the (positive) inverse elasticity of market demand. I assume that marginal costs (c) are constant. Increasing returns to scale are modeled by assuming a fixed cost of production. Notice that equation (9) is capable of generating a wide array of firm behavior, depending on the magnitude of the conjectural variation parameter v. This parameter will equal 0, -1, and $n - 1$, respectively, for Cournot, competitive, and perfectly collusive behavior.

To put flesh on equation (9), I have used a 1976 survey of the manufacturing industry in Turkey (Tekeli et al., n.d.) which provides data at a fairly disaggregated level on price-cost margins and the number of firms. These data have their share of problems. The price-cost margins, in particular, suffer from two shortcomings. First, they do not include a competitive rate of return on capital. Second, they do not reflect that part of supernormal profits appropriated by workers.[15] Since these two factors go in the opposite direction, I assume, for lack of any better

procedure, that they offset each other. With data on $(p - c)/p$ and η at hand, equation (9) leaves us with one degree of freedom. We can either select a demand elasticity and then let v take up the slack between the two sides of the equation, or we can impose a particular conjecture and let the implied elasticity reveal itself. In the simulations to follow I have used both methods. For each industry, three sets of simulations are run. In the first of these, a "reasonable" elasticity of demand for the industry in question is selected. The remaining two assume a particular conjecture on the part of the firms: Cournot and fully collusive, respectively. In the fully collusive case, the conjectural variation parameter is adjusted endogenously when and if the number of firms changes; it remains fixed in the other two cases.

The industries selected are all protected by quantitative restrictions.[16] Domestic consumption equals domestic output (nx) plus the binding level of the quota (M). The consumers are parameterized by assuming a demand function with a constant elasticity, $1/\epsilon$. The inverse demand function is given by

$$p = k(nx + M)^{-\epsilon}, \tag{10}$$

where k is a scaling factor. For a given n, equations (9) and (10) jointly determine p and x as a function of the quota level, among other things. Therefore a no-entry equilibrium can be simulated by solving these two equations. With free entry, a third equation is needed to determine the equilibrium number of firms. This is given by the zero-profit condition. Under our technological assumptions, it can be written as

$$(p - c)x = F, \tag{11}$$

where F is the fixed cost. In the simulations with free entry, the data on initial levels of the price-cost margin and output are taken to reveal F indirectly. A reduction in profits from one equilibrium to the next is then a signal for firms to exit until a pair of p and x can be found such that the incumbents make nonnegative profits. The integer constraint on the number of firms implies that a substantial level of profits is in fact compatible with free entry, as we shall see.[17]

Aggregate welfare in this framework is the sum of consumers' surplus, profits, and quota rents. Under our assumption of a constant elasticity demand curve, the utility function can be written as $U(C) = [1/(1 - \epsilon)]kC^{1-\epsilon}$, so that consumers' surplus is simply $[\epsilon/(1 - \epsilon)]pC$. Welfare is then given by

$$\begin{aligned} W = {} & [\epsilon/(1 - \epsilon)]p(nx + M) \\ & + n[(p - c)x - F] + (p - p^*)M. \end{aligned} \tag{12}$$

Data on the wedge between world and domestic prices are taken from Yagci (1984), who provides disaggregated estimates of implied nominal protection coefficients ($[p - p^*]/p^*$).[18]

I present in tables 5.5–5.7 the results of the simulations for three industries: automobiles, tires, and electrical appliances.[19] In each case, the policy experiment considered consists of a relaxation of the quota by an amount corresponding to 10 percent of the base level of consumption. The tables list the outcomes under three sets of assumptions regarding conjectures (or elasticities), and under two polar cases regarding entry.

The first column in each table assumes a demand elasticity of 1.50 for the industry concerned. The second column assumes instead Cournot conjectures and derives the implied market elasticity in the manner explained above. For all three industries, the results listed in these two columns are very similar. This suggests that, under the maintained hypothesis that the true market elasticity is close to 1.50, Cournot

Table 5.5 **Automobile Industry: Simulated Effects of Trade Liberalization**

	Nature of Conjectures		
	"Free"	Cournot	Collusive
Initial parameters			
Price-cost margin ($[p - c] / p$)	0.198	0.198	0.198
Number of firms (n)	3	3	3
Rate of protection ($[p - p^*] / p^*$)	0.63	0.63	0.63
Demand elasticity ($1 / \epsilon$)	1.50	1.40	4.21
Conjectural variation (v)	0.07	0	2.00
No-entry solution			
Change in price (%)	−2.6	−2.6	−2.2
Change in average firm output (%)	−7.2	−7.5	−0.2
Change in welfare (% of base consumption)			
Consumers' surplus	2.7	2.6	2.3
Profits	−3.2	−3.2	−1.9
Subtotal	−0.5	−0.6	0.4
Quota rents	3.2	3.2	3.3
Total	2.6	2.6	3.7
Free-entry solution			
Change in price (%)	7.1	7.2	−2.2
Change in average firm output (%)	14.5	15.3	49.7
Number of firms	2	2	2
Change in welfare (% of base consumption)			
Consumers' surplus	−6.7	−6.9	2.3
Profits	6.1	6.3	3.6
Subtotal	−0.6	−0.6	5.9
Quota rents	5.7	5.8	3.3
Total	5.1	5.2	9.2

Note: Trade liberalization consists of a relaxation of the quota by an amount equivalent to 10 percent of base consumption.

Table 5.6 Tire Industry: Simulated Effects of Trade Liberalization

	Nature of Conjectures		
	"Free"	Cournot	Collusive
Initial parameters			
Price-cost margin ($[p - c] / p$)	0.238	0.238	0.238
Number of firms (n)	4	4	4
Rate of protection ($[p - p^*] / p^*$)	0.29	0.29	0.29
Demand elasticity ($1 / \epsilon$)	1.50	1.05	4.20
Conjectural variation (v)	0.43	0	3.00
No-entry solution			
Change in price (%)	−2.9	−2.9	−2.7
Change in average firm output (%)	−5.6	−7.0	−2.2
Change in welfare (% of base consumption)			
Consumers' surplus	3.0	2.9	2.9
Profits	−4.0	−4.3	−2.2
Subtotal	−1.1	−1.4	0.6
Quota rents	2.0	2.0	2.0
Total	0.9	0.6	2.6
Free-entry solution			
Change in price (%)	6.2	6.3	−2.7
Change in average firm output (%)	8.5	11.7	36.2
Number of firms	3	3	3
Change in welfare (% of base consumption)			
Consumers' surplus	−5.9	−6.1	2.9
Profits	6.6	7.4	3.7
Subtotal	0.6	1.3	6.6
Quota rents	2.9	2.9	2.0
Total	3.5	4.1	8.6

Note: See table 5.5.

behavior is not a bad approximation to actual market conduct. The last column, on the other hand, assumes that firms act collusively so that they jointly produce no more than the monopoly level of output. This assumption is consistent with the observed price-cost margins only if the actual demand elasticity is considerably higher than 1.50. In fact, the implied elasticity turns out to be around 4 for autos and tires and 6 for electrical appliances. These are probably too high to take seriously, so there is reason to take the results of the collusive scenario with more than the usual grain of salt.

Irrespective of conjectures and in all three industries, free entry leads to better outcomes in terms of aggregate welfare than no entry. Indeed, trade liberalization turns out to be beneficial under all free-entry scenarios considered here. The main reason is that under free entry the output of the average firm rises as one firm, it turns out in each case, leaves the industry. With a fixed number of firms, by contrast, import

Table 5.7 **Electrical Appliances: Simulated Effects of Trade Liberalization**

	Nature of Conjectures		
	"Free"	Cournot	Collusive
Initial parameters			
Price-cost margin ($[p - c] / p$)	0.164	0.164	0.164
Number of firms (n)	8	8	8
Rate of protection ($[p - p^*] / p^*$)	0.10	0.10	0.10
Demand elasticity ($1 / \epsilon$)	1.50	0.76	6.10
Conjectural variation (v)	0.97	0	7.00
No-entry solution			
Change in price (%)	−1.9	−1.9	−1.7
Change in average firm output (%)	−7.1	−8.5	1.0
Change in welfare (% of base consumption)			
Consumers' surplus	1.9	1.9	1.8
Profits	−2.9	−3.1	−1.5
Subtotal	−1.0	−1.2	0.2
Quota rents	0.7	0.7	0.7
Total	−0.3	−0.5	1.0
Free-entry solution			
Change in price (%)	0.5	0.6	−1.7
Change in average firm output (%)	2.0	2.3	11.5
Number of firms	7	7	7
Change in welfare (% of base consumption)			
Consumers' surplus	−0.5	−0.6	1.8
Profits	0.7	0.9	0.5
Subtotal	0.2	0.3	2.3
Quota rents	1.0	1.0	0.7
Total	1.2	1.2	3.0

Note: See table 5.5.

liberalization translates into typically substantial reductions in average production levels. For reasons discussed earlier, the former outcome adds to the usual welfare gains while the second subtracts from them.

Still, except in the collusive case, the welfare gains under free entry are not significantly higher than what we would expect under perfect competition (see Harris 1984). Had perfect competition prevailed, the gains would approximately equal the increase in imports multiplied by the initial price wedge between domestic and world prices. In autos this amounts to $0.10 \times 0.63 = 6.3$ percent of base consumption, compared to the 5.2 percent calculated here under the Cournot assumption. The other two industries yield similar comparisons. Under the collusive scenario, the gains are indeed much higher: 9.2 percent in autos, for example. The explanation has to do with the much greater expansion of average firm output in this scenario. That in turn is the consequence

of the higher demand elasticity implied by collusion: as long as there is some exit, the incumbents can expand considerably with minimal damage to their price-cost margins.

Notice that under free entry the domestic price *rises* in all three industries when conjectures are taken to be "free" or Cournot. This may seem counterintuitive, even though it is a theoretical possibility demonstrated by Buffie and Spiller (1986). In this case, the "perverse" effect is due to the integer constraint on the number of firms. Consider what happens as firms exit. Initially, with the number of firms unchanged, average firm output and price are both lower. This means that at least one firm has to leave the industry. At their existing output levels, the incumbents now make large profits as the price jumps up. The firms respond by increasing output, but with the kind of elasticities assumed here, the domestic price remains higher than its initial level. In the final equilibrium, the incumbents are making sizable profits, but entry is blocked by the fact that a discrete jump in the number of firms by one would yield losses for all. This explains why the free-entry simulations are all distributionally partial to producers as opposed to consumers. Domestic prices would fall eventually as the quantitative restrictions are relaxed further.

The aggregate welfare consequences of liberalization look much less appetizing when entry is blocked. In automobiles and tires, the net benefits tend to be small (under "free" and Cournot conjectures). In electrical appliances, liberalization actually results in some small welfare *losses* on the order of 0.3–0.5 percent of base consumption. It is easy to see why. The nominal protection rate in this industry is the lowest among the three considered here: 10 percent as compared to 63 percent in autos and 29 percent in tires. Hence we expect the gains on conventional grounds to be small in the first place. In addition, the industry's price-cost margin of 0.164—while lowest among all three—implies that its costs of production are well below border prices. In this context, the factors discussed in the previous section come into play in full force. By contrast, the much higher level of protection in the other two industries dominates quantitatively the effects of imperfect competition.

Notice also that in autos and tires what turns the welfare effects positive are the substantial quota rents that accrue postliberalization. These changes in quota rents are positive and substantial because the quotas in the industries selected are excessively restrictive prior to liberalization. This introduces an important caveat to the calculations presented here insofar as rent seeking may dissipate some or all of these gains. For that reason, tables 5.5–5.7 include a subtotal in the welfare calculations which leaves out quota rents. By this measure,

liberalization leads to losses in all three industries in the absence of free entry (as well as in autos under free entry).

What general conclusions can be drawn from these simulations? First, the potential for perverse welfare effects appears to be a serious one only when entry and exit are problematic. But, paradoxically, even when exit is free, the primary beneficiaries of trade liberalization can turn out to be the import-competing firms rather than the consumers. Moreover, the availability of gains in the aggregate depends on the government's ability to dispose of quota rents in a manner that does not lead to wasteful rent-seeking activities. Finally, even when entry is not free, liberalization is unlikely to prove welfare worsening in industries where the nominal protection rates exceed, say, 25 percent. If this last conclusion can find support in more general models than I have considered here, it would be an important one indeed. Much of manufacturing in developing countries is protected at levels that far exceed this. The analysis would then provide license for substantial amounts of trade liberalization, with little fear from imperfect competition.

The results also show that the ease of entry/exit is likely to be a more important determinant of outcomes than market conduct as captured by the conjectural variations parameter. This requires that we form some opinion on the likelihood of industry rationalization via market forces. I do not know of any systematic empirical evidence that would help settle this issue. Obviously, in the longest of runs everything is flexible. The question of interest is the extent to which firms are able to move frictionlessly in and out of industries within the relevant time horizon.

In one important respect, the free-entry case almost certainly overstates the ease of exit from affected industries. Taken literally, this scenario implies that whole factories are dismantled, sold piecemeal at full economic value in perfect markets, and ultimately used to enhance the productive capacity of expanding firms in the same sector or in others. While the presence of multiproduct firms will generally help in easing the transition, the costs of bankruptcy and idle capacity are likely to be substantial in developing countries. Formally, this can be modeled by assuming that exiting firms continue to pay a portion of their fixed costs, $(1-\delta)F$. The parameter δ can be interpreted as the resale value of the fixed capital stock as a proportion of its current value. The free-entry simulations above assume that $\delta = 1$, that is, that exiting entrepreneurs can capture the *full* value of their fixed investment in secondary markets. More generally, δ will lie between zero and one. This affects both the exit decisions of firms and the ultimate welfare effects. Now firms will exit when profits fall below the (positive) cost of going out of business, that is, when

$$(p - c)x - F < -(1 - \delta)F, \tag{13}$$

or when

$$(p - c)x - \delta F < 0. \tag{14}$$

This reduces the likelihood of exit as some firms will prefer to run losses rather than incurring the costs of exit.[20] Also, for any given amount of industry rationalization (via exit), social welfare benefits are reduced by $(1-\delta)F$ times the number of exiting firms. Hence, when exit is costly in this manner, the magnitude of gains from trade liberalization will lie in between the no-entry and free-entry cases above.[21]

Empirically, arguments about the ease of exit could be made either way. For example, the automobile industry of Latin America during the early 1960s provides a case with great fluidity: in Argentina, the number of automakers was reduced from 21 to 13 in no more than four years (1960–64); in Chile, the number went from 20 to 14 within a year (1962–63), jumped to 18 in 1964, and then plunged to 10 in 1966 (Jenkins 1977, 146–48). The skeptic would point out that once these industries became well established, the numbers stayed more or less constant. That was the case for both Mexico and Argentina, whereas in Chile some degree of "rationalization" took place only under the heavy prodding of governments. A study on India by Ghosh (1975) finds considerable amount of entry in new and expanding industries, but very little exit in the traditional sectors. A recent study on Chile by de Melo and Urata (1986) reports substantial exit subsequent to trade liberalization.

Indirect evidence on the prevalence of entry barriers is obtained from the studies already mentioned which document a close positive relationship between concentration ratios and profitability. In the absence of barriers to entry, it would be difficult to provide a rationale for this finding. To be sure, there are few barriers in the informal sectors where capital requirements tend to be small and technology is widely available. But the relative ease of entry and exit in such sectors may present its own problems. The common view seems to be that production in these informal activities is organized efficiently and much more in line with the developing countries' underlying comparative advantage in labor-intensive commodities than in some of the imperfectly competitive sectors. Then, to the extent that oligopolistic firms can pass their troubles on to these small-scale producers, which often act as suppliers or ancillary producers, the resulting mix of exit may be biased against the latter. Very little will be gained from such exit if the informal sector is in fact competitive and efficient.

Finally, notice that protection in the form of quota restrictions acts as a facilitating device for collusion on the part of home firms. In all

three industries analyzed here, firms would be forced to resort to marginal cost pricing were the quotas to be transformed into tariffs. This is an important argument for utilizing tariffs in lieu of quotas. But tariffs do not make the problem of imperfect competition go away entirely. First, in industries with substantial scale economies, marginal cost pricing will prove impossible, and the consequent elimination of the home industry may result in welfare losses. Second, even in the absence of declining costs, domestic producers will retain market power as long as imports are an imperfect substitute for their output.

5.4 Concluding Remarks

My purpose in this chapter was to evaluate the received wisdom on the benefits of trade liberalization in developing countries in the presence of imperfect market structures typically prevailing in such contexts. Once imperfect competition enters the picture, any argument one way or the other is naturally subject to all sorts of qualifications. But if one conclusion can be drawn from the analysis it is the following: the levels of protection observed in the manufacturing sectors of most developing countries vastly exceed any that could be justified by the presence of imperfect competition. The case for partial trade liberalization stands up well against the new features considered here.

This though should provide little comfort to those who would analyze trade policy in developing countries in models—or mind-sets—of perfect competition. Oligopolistic markets create new conditions which the policymaker would ignore at his own peril. First, actual welfare gains may obtain under patterns of resource allocation quite different from those anticipated on the basis of intuition deriving from the competitive paradigm. For example, the expansion of certain import-competing sectors may be interpreted as perverse and hence be resisted, whereas it is the source of efficiency benefits. Second, certain sectors with strong scale economies and/or large price-cost margins may still present problems against the background of overall gains. A trade reform package sensitive to this asymmetry will likely prove more successful than one that is not. Finally, the *distributional* consequences of liberalization may diverge considerably from the anticipated pattern, and policymakers who are oblivious to this will be in for some unwelcome surprises. Some of the simulations above revealed, for example, that liberalization may benefit the producers in the protected sector rather than consumers. Also, the nature of industrial dualism discussed above suggests that, to the extent the labor-intensive informal sectors are more sensitive to their economic environment than are the oligopolistic sectors, the distribution of gains along factor lines may prove to be much less favorable to labor than anticipated.

There is something paradoxical about these kinds of considerations. As suggested above, imperfect market structures are frequently the direct consequence of the trade and industrial policies followed by governments in the first place. From this perspective, import substitution policies look doubly bad. Not only do they lead to the usual static inefficiencies, but they also create market structures that, unless quick to evaporate, render the future liberalization of the trade regime more problematic. This raises the possibility that in certain sectors the initial protection and its eventual removal may both prove harmful. Fortunately for the economies concerned, the analysis in this chapter suggests that this paradoxical outcome is unlikely to be the case for more than a few industries.

Appendix

This appendix describes in greater detail the data used in the simulations of section 5.3 and some of the procedures followed.

For the tire and electrical appliances industries, data on price-cost margins, sales, and number of firms were taken from the 1976 survey of Tekeli et al. (n.d.). Since some of the firms included were very small compared to others, I have confined the analysis to the large, oligopolistic part of the industry. The four firms (out of eight) in the tire industry that I consider constitute 96.8 percent of total output. In the electrical appliances industry, eight firms (out of eighteen) constitute 91.5 percent of total output. Since the price-cost margins given in Tekeli et al. are average ones, we might conclude that there is a small downward bias in my use of these numbers for the restricted set of firms. I have been unable to find directly relevant information on quantitative restrictions in these sectors. Prior to the reform of the 1980s, the trade regime was extremely restrictive in both sectors, so I have taken quotas that are completely prohibitive (i.e., no imports) to characterize the base level of protection in each case. The resulting nominal protection coefficients (i.e., the margin between domestic and world prices) are taken from Yagci (1984), which covers the same industries but a smaller sample of firms for 1981. In the simulations, the domestic price is initially taken to be 100, with the demand equation scaled appropriately so as to yield the observed level of domestic sales. The world price p^* and the domestic (marginal) cost can then be calculated with the information at hand.

The same procedures were followed for the automobile industry, with some small changes. Tekeli et al. provide information only on a more

aggregate category of "motorized vehicles." I have taken the price-cost margin for this sector to apply to autos as well. Sales figures are the average for 1980–81, taken from *Cumhuriyet* (November 12, 1986, 9). The quota has been taken to equal the average volume of imports during the same two years (data are from International Road Federation 1985). This assumes that the volume of imports allowed in 1976, as a proportion of total consumption, was the same as in 1980–81.

Notes

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1. For surveys, see Dixit 1984, Grossman and Richardson 1985, Helpman and Krugman 1985, and Venables 1985.

2. Krugman argues that the small size of markets in developing countries diminishes the importance of the "privileged access of domestic firms to the home market . . . [as a] significant strategic asset" (1986, 25). Helleiner replies that the potential for product differentiation, as well as the apparent successful case of Korea, suggests that small markets are not a disadvantage in this respect (1986, 9).

3. Some surveys oriented toward the developing countries have begun to appear, however. See Helleiner 1985, Krugman 1986, and Srinivasan 1986. Krugman suggests that developing countries have not yet received enough attention because "advanced-country issues have temporarily preempted the limited supply of economists working on these issues" (1986, 3).

4. See, however, Little 1987 for a more nuanced argument.

5. For summary data on the importance of state ownership in manufacturing in a number of developing countries, see Dervis and Page 1984, table 2, and Kirkpatrick, Lee, and Nixson 1984, table 3.4. For data on the importance of foreign ownership, see Kirkpatrick, Lee, and Nixson 1984, table 3.2. Evans 1979 provides a stimulating sociological account of the interactions of local, state, and foreign capital in Brazil.

6. This argument is made in Rodrik 1987. On performance requirements generally, see Guisinger 1985.

7. See the summary of the evidence in Owen 1983, table 4.12.

8. See Katrak 1980 for a study on India which shows that, after controlling for capital intensity and concentration levels, protection tends to increase price-cost margins, while import penetration has the opposite effect.

9. This is to simplify the notation only; the model can be easily generalized to encompass asymmetries in firm size.

10. Returns to scale that are *external* to firms but internal to the industry can be handled by inserting X_i in these unit cost functions. I return to this type of scale economies at the end.

11. To keep things simple, I assume that tariff revenue or quota rents are distributed in lump-sum fashion, with no additional distortions thereby engendered.

12. Notice that the terms (*b*) and (*c*) can be combined and expressed equivalently as a function of the difference between price and marginal cost and of the number of firms: $\Sigma_i(p_i - MC_i)dX_i + \Sigma_i c_i x_i[(1/\theta_i) - 1]\, dn_i$.

13. Eldor and Levin 1986 makes a similar point in the context of partial equilibrium models of monopoly and Cournot oligopoly.

14. Notice that in practice this comparison between domestic costs and world prices has to be undertaken using the "equilibrium" exchange rate. To the extent that the current exchange rate is overvalued (because of either preexisting protection or fixed exchange rates), it biases domestic costs (relative to world prices) upward. Many industries not "competitive" in this sense may become so after liberalization.

15. For an empirical examination of this issue in the Turkish context, see Çagatay 1986.

16. The features of the trade regime discussed here are meant to apply to the Turkish economy of the 1970s (as well as to a large number of other developing countries presently). In Turkey, trade liberalization during the 1980s has eliminated the great majority of quotas.

17. I assume, however, that the initial equilibrium is one with zero profits. Otherwise, a reduction in profits need not necessarily require exit.

18. For more information on the data, see the appendix.

19. The simulations were carried out for a larger sample of industries. But unlike the industries that it purports to study, the present approach is one with rapidly decreasing returns to scale, at least with the data at hand. The simulation results presented here are representative of the rest.

20. How these losses are financed is an important matter in practice. In developing countries, as well as in developed ones, bailouts by commercial banks (perhaps affiliated with the firms) or by the state are not uncommon. Where economic rationality prevails, such rescue efforts can be seen as a means of averting the costs of bankruptcy.

21. Since firms do not exit unless it is profitable to do so, welfare gains under this scenario can not lie below the no-entry case.

References

Automobile International. 1986. *World automotive market*. New York: Johnston International Publishers.

Baldwin, Richard, and Paul Krugman. 1986. Market access and international competition. NBER Working Paper No. 1936.

Bhagwati, Jagdish. 1965. On the equivalence of tariffs and quotas. In Robert E. Baldwin, ed., *Trade, growth, and the balance of payments*. Chicago: Rand McNally.

Buffie, Edward F., and Pablo T. Spiller. 1986. Trade liberalization in oligopolistic industries: The quota case. *Journal of International Economics* 20: 65–81.

Çagatay, Fatma Nilufer. 1986. The interindustry structure of wages and mark-ups in Turkish manufacturing. Ph.D. dissertation, Stanford University.

Dervis, Kemal, and John M. Page, Jr. 1984. Industrial policy in developing countries. *Journal of Comparative Economics* 8: 436–51.

Dixit, Avinash K. 1984. International trade policy for oligopolistic industries. *Economic Journal* (supplement), 1–16.

———. 1986. Optimal trade and industrial policies for the U.S. automobile industry. Mimeo.

Eldor, Rafael, and Dan Levin. 1986. Trade liberalization and imperfect competition: A welfare analysis. Mimeo.

Evans, Peter. 1979. *Dependent development: The alliance of multinational, state, and local capital in Brazil.* Princeton: Princeton University Press.

Ghosh, A. 1975. Concentration and growth of Indian industries, 1948–68. *Journal of Industrial Economics* 23: 203–22.

Grossman, Gene M., and J. David Richardson. 1985. *Strategic trade policy: A survey of issues and early analysis.* Special Papers in International Economics No. 15. NJ: Princeton University Press.

Guisinger, Stephen, and Associates. 1985. *Investment incentives and performance requirements.* New York: Praeger.

Harris, Richard. 1984. Applied general equilibrium analysis of small open economies with scale economies and imperfect competition. *American Economic Review* 74: 1016–33.

Helleiner, G. K. 1985. Industrial organization, trade and investment: A selective literature review for developing countries. Mimeo.

———. 1986. Comments on Paul Krugman paper. Mimeo.

Helpman, Elhanan, and Paul Krugman. 1985. *Market structure and foreign trade.* Cambridge: MIT Press.

Horstmann, I., and J. R. Markusen. 1986. Up the average cost curve: Inefficient entry and the new protectionism. *Journal of International Economics* 20: 225–48.

International Road Federation. 1985. *World road statistics 1980–1984.* Geneva: International Road Federation.

Jacquemin, Alexis, and Henry W. de Jong. 1977. *European industrial organization.* New York: John Wiley.

Jenkins, Rhys Owen. 1977. *Dependent industrialization in Latin America: The automotive industry in Argentina, Chile, and Mexico.* New York: Praeger.

Katrak, H. 1980. Industrial structure, foreign trade and price-cost margins in Indian manufacturing industries. *Journal of Development Studies* 17: 62–79.

Kirkpatrick, C. H., N. Lee, and F. I. Nixson. 1984. *Industrial structure and policy in less developed countries.* London: George Allen and Unwin.

Krueger, Anne. 1975. *The benefits and costs of import substitution in India: A microeconomic study.* Minneapolis: University of Minnesota Press.

———. 1984. Trade policies in developing countries. In R. W. Jones and P. B. Kenen, eds., *Handbook of international economics,* vol. 1. Amsterdam: North-Holland.

Krugman, Paul. 1986. New trade theory and the less-developed countries. Mimeo.

Leff, N. H. 1978. Industrial organization and entrepreneurship in the developing countries: The economic groups. *Economic Development and Cultural Change* 26: 661–75.

———. 1979. Monopoly capitalism and public policy in developing countries. *Kyklos* 32: 718–38.

Little, I. M. D. 1987. Small manufacturing enterprises in developing countries. *World Bank Economic Review* 1: 203–35.
Melo, Jaime de, and Shujiro Urata. 1986. The influence of increased foreign competition on industrial concentration and profitability. *International Journal of Industrial Organization* 4: 287–304.
Owen, Nicholas. 1983. *Economies of scale, competitiveness, and trade patterns within the European community.* Oxford: Clarendon Press.
Pratten, C. F. 1971. *Economies of scale in manufacturing industry.* Cambridge University Press.
Rodrik, Dani. 1987. The economics of export-performance requirements. *Quarterly Journal of Economics* 102: 633–50.
Scherer, F. M. 1980. *Industrial market structure and economic performance.* 2d ed. Boston: Houghton-Mifflin.
Scherer, F. M., Alan Beckenstein, Erich Kaufer, and R. Dennis Murphy. 1975. *The economics of multi-plant operation*, Cambridge: Harvard University Press.
Srinivasan, T. N. 1986. Recent theories of imperfect competition and international trade: Any implications for development strategy?" Mimeo.
Tekeli, Ilhan, Selim Ilkin, Ataman Aksoy, and Yakup Kepenek. N.d. *Türkiye' de sanayi kesiminde yoğunlaşma* (Concentration in the manufacturing industry in Turkey). Middle East Technical University, Ankara, Turkey.
Venables, Anthony J. 1985. International trade, trade and industrial policy and imperfect competition: A survey. Center for Economic Policy Research, Discussion Paper No. 74.
Venables, Anthony J., and Alasdair Smith. 1986. Trade and industrial policy under imperfect competition. *Economic Policy: A European Forum*, no. 3.
Yagci, Fahrettin. 1984. Protection and incentives in Turkish manufacturing. World Bank Staff Working Paper No. 660.

Comment

Harry P. Bowen

This chapter analyses the effect of trade liberalization on national welfare under the assumption that domestic markets are imperfectly competitive and that production is subject to economies of scale (EOS). At issue is whether the presence of imperfect markets and EOS imply that the resource reallocations attendant to liberalization could run counter to national interest. A general answer to this question is provided by performing a comparative statics analysis of a change in protection in the context of a general equilibrium model. It is shown that a change in welfare can be decomposed into three components: the usual protection component given by the difference between internal and external prices; an "excess profits" component reflecting imperfect

Harry P. Bowen is assistant professor of economics and international business at the Graduate School of Business, New York University, and a faculty research fellow and Olin Fellow, National Bureau of Economic Research.

competition and given by the difference between price and average cost; and finally a component reflecting economies of scale which depends, among other things, on the level of average firm output. Examination of these components indicates that while the traditional protection component requires output of protected sectors to decrease, the imperfect market and EOS components require an increase in output. Hence, liberalization could decrease welfare if protected sectors are imperfectly competitive and subject to EOS.

Since the presence of imperfectly competitive markets and EOS requires resource movements opposite those of the traditional protection component, the question is then the extent to which these factors are important characteristics of the restricted sectors in developing countries. Using data on Turkey, evidence on the extent of imperfect competition is presented in the form of four-firm concentration ratios and effective rates of protection. Leaving aside the debate over concentration ratios as indicators of market power, the comparison shows a positive correlation between concentration and rate of protection. Likewise, a comparison of minimum efficient scale and the rate of protection also indicates a positive correlation between protection and the extent of scale economies.

Having set the stage for potential conflicts in resource movements, the chapter then presents partial equilibrium simulations of the effects of a partial removal of a quota under alternative assumptions about the nature of oligopolistic interaction and the ease of entry and exit. Overall, the results indicate positive net gains in welfare. However, what is interesting about these simulations is not the net effect on welfare but rather the insight they provide about the distributional effects of liberalization. In particular, the presence of imperfect markets and EOS suggests gains and losses that are usually opposite those suggested by the competitive model, namely, consumers lose while producers gain. Equally interesting, if not also disturbing, is that in many cases the net change in consumer-plus-producer surplus is actually negative so that the net increase in national welfare is due almost entirely to an increase in quota rents. As the chapter notes, the crucial contribution of quota rents to the net increase in welfare is particularly disturbing since one could imagine that these gains could easily be dissipated by rent-seeking activity.

As the above remarks suggest, I think the insight concerning the distributional effects of liberalization under conditions of economies of scale and imperfect markets is one of the major contributions of this chapter. As Rodrik notes, the possibility that distributional effects may run counter to those expected on the basis of the competitive model alerts policymakers to the need to exercise caution in blocking apparently undesirable income effects. Moreover, it underscores that lib-

eralization policies would need to address the potentially damaging effects of rent-seeking activity. In this context, the analysis also raises an issue particularly germane to developing countries. Since a large fraction of import-competing firms in developing countries are foreign-owned, attention needs to be given to the possibility that the welfare gains of producers could be siphoned off through repatriation of profits. This latter possibility suggests that a study of ownership structure in developing countries may show that it has importance over and above its role in shaping oligopolistic behavior.

Although admittedly I am enthusiastic about the distributional effects uncovered by the chapter, there are some troubling aspects of the analysis. First, and as the author admits, the data on price-cost margins do not include returns to capital which we might presume to be higher in developing countries. While this is unlikely to change the conclusion about distributional effects, it does suggest caution in accepting both the magnitude and the sign of the overall welfare effect. Second, the simulations, while admittedly a first pass, are nonetheless partial and not general equilibrium. In consequence, the simulations are potentially misleading about the overall effect of trade liberalization since other sectors of the economy may be subject to greater degrees of imperfect competition and EOS than are the protected sectors. The partial equilibrium analysis also ignores the potentially large benefit on the consumption side that would result from world price declines. Note that international price effects become particularly relevant under conditions of imperfect competition and EOS since such effects act to offset the negative distributional effect on consumers.

Another issue is that admitting EOS into the analysis leads us into the realm of nonconvex economies and the domain of second-best calculations. In this context, the issue of local versus global optima raises concern about the appropriateness of marginal analysis and thus the extent to which conclusions would be altered if a discrete change, as would occur under actual liberalization, were considered. In this regard, it would have been interesting if the author had also examined the case of complete elimination of the quota. Not only would this exercise have been in line with the numerous analyses of liberalization under conditions of perfect competition, but one could imagine that a discrete change would lead to entirely different conclusions about the distributional effects of liberalization. For example, under complete removal, quota rents would necessarily disappear and we might expect industry rationalization to result in at most one firm. The welfare effect of such extreme rationalization would be similar to that found for the collusive case considered in the chapter in which both producers and consumers gain. Of course, the reason for joint gains is that industry rationalization leads to a reduction in domestic price since the mode

of oligopolistic interaction is closest to the ideal situation under EOS, namely, a single firm. Note that the potential for joint gains from such extreme rationalization further underscores the need to consider the effect of international price declines. For example, one could imagine the even more extreme case in which domestic production ceases altogether and domestic consumption is entirely satisfied by imports produced by a single "superfirm" which reaps scale advantages commensurate with the size of the world market.

Notwithstanding the above remarks, the analysis in the chapter points to the possibility of net welfare losses from liberalization. But does the apparent prevalence of imperfectly competitive markets in developing countries together with the existence of EOS then suggest that attempts to argue for liberalization may be futile? Stated differently, is the bewildering pattern of potential resource effects so confusing as to make the validity of arguing for liberalization rest on the computation of a detailed general equilibrium model? I think the answer is no, and the basis for this belief comes directly from the analysis presented.

As stated earlier, the chapter decomposes a welfare change into three components: protection, excess profits, and EOS. But, as the author states in a footnote, the latter two components can actually be combined into one component: the difference between world price and domestic marginal costs. This implies that a welfare increase is associated with output decreases in sectors where domestic marginal costs exceed world price, regardless of the extent of excess profits or EOS. This simple statement of desired resource reallocations is reassuring since it coincides with what we are accustomed to arguing on the basis of the standard competitive model—that is, that resource movements should be guided by opportunity costs, and in particular, that the relevant comparison is between domestic and international opportunity costs.

The above remarks indicate that one need only assume that an economy's protected sectors have marginal costs in excess of world prices in order to argue that trade liberalization would imply an increase in welfare. Since under normal circumstances the "need" for protection was precisely because domestic costs exceeded international prices, it would appear safe to assume that liberalization would necessarily lead to the "right" resource reallocations. Sadly, a qualification to this happy state of affairs seems warranted in the case of the developing countries, where rent-seeking activity is widespread. That is, protection may have been granted to shelter excess returns and not to compensate for differences in domestic costs and international prices. Only further study can resolve this issue.

In summary, Dani Rodrik has examined a set of provocative questions about the effects of liberalization, particularly when considered

in the context of developing countries. While the model is admittedly restrictive in its scope, the finding of contrary distributional effects underscores the need to explore further the implications of imperfect markets and alternative production structures for traditional policy prescriptions.

Comment

Beth V. Yarbrough

This chapter attempts to address a very important question: What are the implications of the "new" developments in trade theory for the trade policies of developing countries? The question is particularly timely as the early stages of the Uruguay Round of GATT may well determine the degree of involvement of the developing countries in the current liberalization efforts.

One of the things I like most about the chapter is its political savvy and insight. It admits up front that the "new" learning will be used by policymakers as a justification for the import substitution policies they have always followed, a fact that makes this conference—and the work it is meant to encourage—particularly important. Policymakers who have ignored economists' policy recommendations for decades may suddenly begin to use economic justifications for their policies. I sense that we all feel a little uneasy about this; in fact, I think there is almost a tendency to want to have some of the work "classified" as "for economists' eyes only" until we have time to assess the full implications.

In chapter 5 Rodrik asks, "To what extent does the presence of increasing returns to scale and imperfect competition at home alter the received wisdom on the benefits of trade liberalization in developing countries?" He argues that imperfect competition is probably more prevalent in developing than in developed countries. The evidence he uses to support his argument is that four-firm concentration ratios are higher and that there is a positive correlation between concentration and profits. He also argues that economies of scale may be an important consideration even though the labor abundance of many developing countries can lead to the choice of less capital-intensive production technologies, generally less subject to economies of scale.

Given the informal evidence that imperfect competition and economies of scale may be important in developing countries, Rodrik develops a three-term expression for the welfare effects of trade liberalization. The first term captures the traditional efficiency benefits

Beth V. Yarbrough is associate professor of economics at Amherst College.

based on the differential between domestic and world prices. These benefits stem from the contraction of a domestic industry in which the domestic price exceeds the world price.

The second term reflects imperfect competition in terms of price-cost margins. Rodrik claims that, to increase welfare, the output of industries with positive price-cost margins must increase and that this is an "entirely new desideratum." But this is a standard result in the domestic distortions literature. It has been widely recognized for a number of years that a domestic distortion in the form of a monopolized industry can cause a country to overspecialize or even to specialize in production of the "wrong" good under unrestricted trade. The relevant question then becomes whether maintaining protection is the first-best policy response. The traditional domestic distortions literature suggests that it is not and finds policies such as production subsidies generally superior. This chapter does not appear to provide a new theoretical answer. Likewise, the result that the key to determining the welfare effects of production changes lies in the comparison of domestic costs and world prices is not really new. In our conversations, Rodrik has shown that he has some interesting new ideas on the tariff-versus-production subsidy choice from a political economy perspective, but those ideas are not contained in the current chapter. However, the empirical work provides some new insights even if the theoretical results do not.

The third term of Rodrik's formulation introduces the possibility of economies of scale. The chapter emphasizes the conflict between economies of scale and trade liberalization. If liberalization leads to a decline in industry output and there is, for one reason or another, inadequate exit from the industry, then per firm output must decline and average costs rise. To gauge informally the extent of this problem, the chapter looks at the relationship between economies of scale in an industry and the effective rate of protection and finds a positive correlation; that is, highly protected industries, the presumed targets of liberalization efforts, appear to be characterized by substantial economies of scale. The lesson drawn is the existence of an "apparent conflict" between economies of scale and trade liberalization.

The relationship between economies of scale and liberalization highlights the crucial role of the specific policy perspective taken in the chapter. The policy being evaluated is the partial elimination of protection already in place. Given this perspective, call it the ex post policy choice, the conflict between liberalization and economies of scale does exist, by definition.

However, would it not be more useful to draw an ex ante lesson concerning the desirability of instituting import substitution through protectionism? If a developing country enters an industry of compar-

ative disadvantage characterized by extensive economies of scale, high levels of effective protection are going to be required. This type of import substitution and trade liberalization *are* in conflict. But does one want to conclude that the appropriate policy response is to not liberalize trade? This is related to Harry Bowen's comments about the propensity of developing countries to enter industries such as steel. The point is also related to Avinash Dixit's comments on chapter 8. In making ex ante policy decisions, one wants to take account of the possibility of ex post changes in circumstances. One of those possible changes would be future removal of the protection itself.

In the empirical section of the chapter Rodrik asks, "What are the resource allocation effects of trade reform under conditions of imperfect competition?" The simulations suggest that liberalization is beneficial under conditions of free entry and exit. This finding is consistent with recent developments in industrial organization theory that imply that entry restrictions may be a more serious cause for concern than imperfect competition per se. Here it is exit that is crucial. Rodrik makes an important point by highlighting the role of free exit in capturing the benefits from trade liberalization. However, in the chapter he seems to lay the responsibility for lack of exit at the feet of the market. This seems inappropriate given the array of mobility restrictions typical in many developing countries.

Rodrik also tries to make a point about the dualistic structure of industry in developing countries. Many industries are characterized by a few oligopolistic firms along with a competitive fringe. He seems to say that the oligopolistic firms will force their small suppliers and subcontractors out of the market, thereby avoiding the need to exit themselves. This part of the chapter is the least clear and well developed. It seems to tread close to the "exploitation hypothesis" concerning the interaction of large and small firms, a notion that has fallen from favor with most industrial organization theorists.

In summary, I enjoyed reading this chapter. I especially liked its political awareness and its clear, simple approach to well-defined questions. The empirical results pointing to the role of unrestricted exit in achieving gains from trade liberalization are important. These should prove useful in arguments concerning the appropriate form of trade adjustment assistance policies. The major weakness of the chapter is inadequate attention to the distinction between ex ante and ex post policy choices. In other words, I would like to see more emphasis on the role of developing countries' import substitution policies in creating the problems that Rodrik, in this chapter, is endeavoring to understand and solve.

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