The Noncompetitive Theory of International Trade and Trade Policy

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This paper reviews recent theoretical developments in the analysis of trade structure and policy. It emphasizes how understanding monopolistic (noncompetitive) market structures and elements can help explain trade flows and the relation between trade and growth, and can be useful in evaluating tariffs, quotas, and research and development subsidies in noncompetitive markets. Noncompetitive trade theory identifies testable relations that have already received empirical support in various studies. Once their significance is recognized, it is important to take them into account in designing policy. Policies exist that raise welfare, but simple policy prescriptions do not. Theory helps to identify situations in which particular policies work, but under only slightly different circumstances opposite policies may have to be implemented. Recent studies have shown that long-run growth rates depend on an economy's structural features and the country's trading partners. So policy can affect long-run growth—but identifying useful policies requires an understanding of market structure and conduct, entry constraints, intersectoral links, and the like. More empirical studies are needed to elicit this information. Meanwhile, policy should be designed on a case-by-case basis and—because good policies improve welfare only slightly—no intervention (free trade) remains a good rule of thumb. All the more so when one takes into account the competitive pressure of a free trading world system, the probability of retaliation, and the political economy of protection.

A decade of intensive research on increasing returns to scale and market structure has generated a host of insights about their role in international trade and trade policy and narrowed the existing gap between theory and application. The new approach offers explanations for a number of empirical regularities, and provides new tools for policy analysis. Its findings underline the need for a case-by-case approach to policy design. The vitality of this work is by no means exhausted, and the research has recently been redirected to deal with dynamic concerns.

The new line of research began with models of monopolistic competition designed to explain intraindustry trade. The point of departure was the observation that many industrial products are differentiated, not homogeneous. If countries have a taste for such product differentiation—a typical example would

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be demand for variety in consumer electronics or cars—and if variety-specific economies of scale exist in manufacturing, we may expect intraindustry trade in differentiated products (see Balassa 1967). Variety-specific economies of scale ensure specialization in brands; the demand for a wide spectrum of products ensures a market for them in every country. Under these circumstances, every country specializes in certain brands and imports brands produced by its trading partners. This leads to intraindustry trade.

The formal theory that was developed on the basis of this insight is consistent with three observations. First, it is consistent with the factor proportions view of the factor content of net trade flows: that is, it predicts that a country exports embodied factor services of inputs with which it is relatively well endowed, and imports embodied factor services of inputs with which it is relatively poorly endowed (see Leamer 1984 for evidence). Second, the theory explains large trade volumes between similar countries—a well-documented phenomenon (see, for instance, Linnemann 1966) which the traditional theory failed to explain. Third, it explains the determinants of the composition of the volume of trade (that is, intraindustry versus intersectoral), which the traditional theory again could not address. The predictions of the new theory are supported by empirical findings (see Balassa 1986, Helpman 1987). The theory applies to consumer as well as producer goods (see Ethier 1982a and Helpman 1985).

Because space is limited, I do not review the above line of work or other theories of trade structure based on oligopolistic competition (for a recent review, see Helpman 1989). Instead, with an eye toward application, I survey the developments that followed the static theories of monopolistic and oligopolistic competition as applied to trade structure. My hope is that economists who work on applied issues of trade and development will find useful guidance in the results, though the coverage is necessarily selective.

The next section deals with recent studies of structural issues related to dynamics of international trade, long-run growth, and product cycles. Section II reviews arguments for an activist trade policy in noncompetitive economies, first in a static framework, which permits consideration of the role of one-sided market power and strategic trade policy, and second in a growth context. The paper closes with a short section of concluding comments.

I. Trade Dynamics

The static model of monopolistic competition that was designed to study intraindustry trade in a framework consistent with the factor proportions view of intersectoral trade (as described, for example, in Helpman and Krugman 1985, chapters 7–8), has been extended by Grossman and Helpman (1988) to a dynamic framework. In the static model, brand-specific fixed costs are often associated with product development and design. A proper treatment of such costs requires, however, a dynamic model in which costs are incurred before actual manufacturing takes place, and are gradually recovered over time as the
entrepreneur collects monopoly profits. This Schumpeterian view of dynamic competition can be combined with Chamberlin's view of monopolistic competition to shed light on trade issues such as the dynamic evolution of trade when technology changes over time, the role of technological leadership, the role of product imitation, and the like.

The decision to develop a new product is a central ingredient in this line of inquiry. An entrepreneur needs to hire resources at cost $c_n(t)$ in order to design a product. He or she then needs to estimate the future flow of profits $\pi(\tau), \tau \geq t$, that can be derived from the ownership of the exclusive knowledge or right to manufacture and market the product. (Naturally, product-specific monopoly power may be lost at some future point, as I will discuss below; at this stage assume that it lasts forever). Then the entrepreneur will choose to develop the product if, and only if, the present value of these profits does not fall short of the research and development (R&D) costs. If there is free entry into this line of business and there are no indivisibilities (strictly speaking, the number of products is a continuum), the present value of profits just equals product development costs in an equilibrium with active R&D. In this case, the instantaneous profit rate $\pi/c_n$ plus the capital gain on R&D costs (the rate of increase in $c_n$) equals the interest rate. This dynamic relation combines pricing of the firm on the stock market together with absence of arbitrage between the cost of product development and the value of the firm. It can be embodied in a complete model in which (a) consumers use prevailing interest rates to allocate spending and saving optimally over time; (b) full employment of resources takes account of their use in R&D; and (c) all markets clear, which also implies equality of saving and investment.

Grossman and Helpman (1988) have done just that in the framework of a simple, two-country, two-sector, two-factor model with fixed coefficients of production and no factor accumulation, so that all dynamics result from product development. In their model one sector supplies differentiated products while the other supplies a homogeneous product.

The Evolution of Trade

In the dynamic framework it is useful to think about capital as human capital rather than machines and equipment, which makes it natural to suppose that R&D is the most capital-intensive activity. Also, assume manufacturing of differentiated products (that were developed) to be more capital intensive than production of the homogeneous product. Finally, assume for the moment that factor prices are the same in both countries at every instant of time (even though factor prices change over time). Then if no country begins with a relative advantage in the number of products (a) the relatively capital-rich country develops relatively more products; (b) the trade pattern at each point in time resembles the pattern that emerges in the static model of trade in differential products (that is, the capital-rich country imports the homogeneous product, it is a net exporter of the differentiated product, and intraindustry trade exists in differentiated
products); and (c) the volume of trade grows faster than world gross domestic product (GDP) (a well-established phenomenon in the postwar period). The world converges to a steady state in which product development ceases. The steady state looks very much like an equilibrium of a static world.

In a South-North interpretation, where the North is taken to be the country relatively rich in capital, these results suggest that in a free trade environment the North’s technological leadership lasts forever, as do its net exports of manufactured differentiated products. This conclusion rests on the particular model, which is restrictive in many ways, but it does point out a realistic mechanism at work. More mechanisms need, however, to be considered.

The model can also be used to predict the point at which multinational corporations will emerge. As investment in R&D declines and employment in the manufacturing of differentiated products rises, the capital-labor ratio employed in these two activities declines. For this reason, a world structure that, in the early stages of development, permits factor price equalization without multinationals may reach a point at which it can do so no longer. This happens necessarily when the capital-labor ratio in manufacturing of differentiated products exceeds the endowed capital-labor ratio of the country relatively rich in capital. Then, from the point at which total capital per worker in the differentiated product sector (R&D plus manufacturing) exceeds the capital-rich country’s capital-labor ratio, multinationals emerge. The degree of multinationality—as measured by employment in subsidiaries, their volume of output, or the number of brands produced by subsidiaries—increases over time until a steady state is reached. The steady state resembles a static world with multinational corporations (see Helpman 1984b).

No long-run dynamics exist in the scenario described above. Recent research has concentrated on discovering mechanisms that generate such long-run dynamics. Trade and development theories that explore implications of economies of scale have joined forces with new approaches to economic growth (for the latter, see Romer 1986, 1988; Lucas 1988; Helpman 1988). At the heart of these approaches are dynamic economies of scale (such as the product development process) coupled with externalities associated with knowledge capital. Thus, in Grossman and Helpman (1988) growth peters out because the profit rate falls over time as more and more brands crowd the differentiated product sector. This reduces the return on R&D until it stops being profitable. If, however, knowledge capital serves as an input in R&D and this capital stock rises over time as a result of experience (that is, learning by doing à la Arrow 1962), it may counteract the effect of product crowding on the profitability of R&D and thereby sustain product development and growth in the long run.

Multiple Equilibria

Before discussing the effects of knowledge capital on long-run growth, I would like to pause to set it in the context of the emergence of multiple equilibria. The
tendency of product-specific learning by doing to perpetuate every initial pattern of specialization introduces persistence into trade patterns. Krugman (1987), for example, constructed a model with product-specific learning by doing in which every historically determined pattern of trade and specialization lasts forever. Under such circumstances temporary shocks—whether from technology, policy, or other sources—have permanent effects.

The observation that temporary events have lasting effects arises from two sources that have been widely studied. One is a case in which the long-run equilibrium depends on initial conditions, for which Krugman's model of learning by doing provides an instance. Here, shocks that change initial conditions extract long-run effects. The other is a case in which more than one long-run equilibrium exists, and the economy can converge to each of them from the same initial conditions, depending on expectations. This phenomenon has been recognized in international trade at least since Graham's (1923) famous argument for tariff protection.

Graham envisioned a two-sector economy whose opening to international trade may lead to resource migration from the industry in which returns to scale are increasing, to the industry in which they are decreasing, thereby depressing GDP so much that the usual gains from trade are outweighed. This observation led to a heated debate between Graham and Knight (see Helpman 1984a for a review of the debate). Graham was vindicated by Ethier (1982a), who studied countries that have an industry with external economies of scale and perfect competition (that is, a firm's productivity depends on aggregate output, but the firm treats productivity as an exogenous parameter). In this type of economy a number of trading equilibria may differ in the degree of specialization in the increasing-returns industry. In the absence of intersectoral adjustment costs, the instantaneous allocation of resources relies entirely on expectations about factor rewards, and several sets of self-fulfilling expectations exist, each one leading to a different outcome. These outcomes can be Pareto ranked (see Helpman and Krugman 1985, chap. 3).

As an illustration, consider a two-sector economy with a single resource, say labor, that faces constant terms of trade and a constant labor-output ratio in the non-increasing-returns sector. The firm's perceived marginal product value of labor in the increasing-returns sector (sector X), depends on the industry's output level; the larger aggregate employment and output, the larger the marginal value product. Suppose also that the perceived marginal value product equals zero when the industry's output equals zero, and that the marginal value product in X is larger than in the alternative use when X employs all resources. Two self-fulfilling-expectations equilibria will then exist with complete specialization. In one, all labor works in the constant-returns-to-scale industry and the wage rate equals its marginal value product in that sector. Labor's marginal value product in X equals zero, so that there are no incentives to produce in X. In the other equilibrium, all labor works in X and the wage rate—which equals the marginal value product in X—exceeds labor's marginal value product in the
constant-returns industry. The country is clearly better off in the latter equilibrium.

Recently Krugman (1989) has extended this analysis to an economy with adjustment costs in factor reallocation. As usual, the adjustment costs bring about gradual intersectoral adjustment in response to economic incentives. He finds that, given some initial conditions, the economy converges to one steady state, while with others it converges to another. In yet other initial conditions it may converge to either one of those possible steady states, depending on expectations (self-fulfilling expectations are assumed throughout). In this last case the resulting dynamics involve cycles of rising amplitude. Expectation-driven equilibria are of course not peculiar to international trade; they play a prominent role in other areas, such as macroeconomics (see, for example, Diamond 1982; Shleifer 1986; Cooper and Jones 1988; Murphy, Shleifer, and Vishny 1988).

All this implies that in certain circumstances an economy's trajectory is unpredictable, because it may follow more than one equilibrium trajectory, or that small shifts in initial conditions may have dramatic long-run effects. In either case it may be possible to use policies to shift initial conditions or to influence expectations, to force the economy to follow a desired path. An appealing feature of such policies is that often they need to be applied for only a short time. As usual, however, they are formidably difficult to design, because the required information is seldom available. The long-standing debate about infant industry protection represents well those difficulties (see Baldwin 1969).

Long-Run Growth

We now return to long-run growth. Suppose that current experience with product development reduces R&D costs to all future product developers. The product developer has thus generated a twofold output: an appropriable blueprint that can be used to acquire future monopoly rents, and a contribution to knowledge capital that is not appropriable. The contribution to knowledge may disseminate equally quickly to all future entrepreneurs, or faster to entrepreneurs from his own country. Suppose also that the differentiated-product sector provides intermediate inputs that are used in the manufacture of final consumer goods (as in Ethier 1982b). Each country has the technology to produce a different consumer good, and trades in both intermediate and final goods.

Grossman and Helpman (1989a) have studied a two-country world of this type. In their framework both countries converge to the same long-run growth rate, even if they differ in size and sectoral productivity levels. The long-run growth rate depends on the size of each country and the composition of demand for their final goods. When knowledge gets disseminated at an equal speed to both countries, the larger the country with comparative advantage in R&D and the smaller the relative demand for the final good in which it specializes, the faster the common growth rate. The growth rate may be increasing or decreasing with the size of the country that has comparative disadvantage in R&D, but it
is definitely higher the larger the relative demand for the final good in which that country specializes.

The last point identifies a mechanism of more general relevance. The larger the relative demand for the final good of the country that has comparative advantage in R&D, the larger the demand for its resources and the lower the demand for resources in the other country (other things being equal). Under these circumstances, the intermediate-product sector and the R&D sector contract in the former and expand in the latter. Given the structure of comparative advantage, aggregate effective employment in product development declines in the world economy, thereby slowing growth (because the growth rate depends on the equilibrium size of the R&D sector).

If we interpret this model in a South-North context—where the country with comparative advantage in R&D is the North—this analysis suggests, for example, that the South grows faster the larger the North, but that the North's growth rate may be slowed down by a larger South. It also suggests that a shift of demand from Northern to Southern final goods raises the world's growth rate.

So far, our discussion has relied on what may be termed "natural" comparative advantage in R&D, which builds on endowed differences in technology. We have seen that it is an important determinant of long-run growth (and of policy effects, as I discuss in the next section). If, however, the diffusion of knowledge is faster within countries than across them, then natural comparative advantage does not fully determine a country's long-run comparative advantage overall—because these differing learning speeds give a country that does more R&D to begin with a lasting cost advantage. In this instance the final position of comparative advantage depends also on the relative size of the country's resource base and the derived demand for its resources for other uses. Thus, other things being equal, long-run comparative advantage in R&D is larger the larger the resource base and the smaller the demand for the country's final goods.

*Innovation and Imitation*

Comparative advantage in R&D has been prominent in discussion of North-South trade problems. It is manifested in an extreme form in Vernon's (1966) product cycle and its later elaborations. In this approach only the North is capable of developing new products. Immediately after a product is developed the North has also the cost advantage in its manufacturing, until the production techniques are standardized. Afterward, the cost advantage—and with it production—shift to the cheap labor region, that is, the South.

Vernon's approach was formalized by Krugman (1979; see also Dollar 1986; Jensen and Thursby 1986, 1987), who assumed that the rate of growth of new products g (rate of innovation) and the rate at which the South imitates products in which the North has monopoly power μ (rate of imitation) are constant. This specification suffices to describe the evolution of products that are manufactured in every region without specifying additional details of economic structure. In
the steady state, the South produces a proportion $\mu/(\mu + g)$ of the available products. By imposing on these dynamics a model of oligopolistic price competition in differentiated products with labor as the only primary input, Krugman showed that the long-run relative wage of the South is increasing in $(\mu/g)(L_N/L_S)$, where $L_S$ stands for the South’s labor force and $L_N$ for the North’s labor force. Hence, the South’s relative wage is larger the larger the rate of imitation, the smaller the rate of innovation, and the smaller its relative labor force.

Grossman and Helpman (1989b) have reexamined the long-run implications of the product cycle approach in light of the fact that both the rate of innovation and the rate of imitation result from the interaction of market forces with the explicit decisions of Northern entrepreneurs to innovate and Southern entrepreneurs to imitate. Imitators invest resources in learning and reversed engineering in expectation of future monopoly profits, just as innovators invest resources in R&D in expectation of future monopoly profits. But the innovators, uncertain as to when their product will be imitated—and hence when their monopoly profits will cease—discount profits with an interest rate that includes a risk premium, the risk premium being equal to the rate of imitation.

In this environment the long-run rates of innovation and imitation depend on country size and sectoral productivity levels. Innovation is faster the larger the North or the South (with one minor exception), whereas the rate of imitation is larger the larger the South and the smaller the North. Both regions grow faster when they trade with each other than in autarky. Now the relative wage of the South rises with the South’s relative labor force (taking account of the endogenous response of innovation and imitation). This is just the opposite of Krugman’s (1979) finding. It shows how crucial the explicit decisions to innovate and imitate are in bringing into full play the dynamic economies of scale.

To illustrate the point, consider Grossman and Helpman’s “wide gap” case. Here the relative wage of the South is low enough for a Southern imitator to charge his monopoly price without risking undercutting by the Northern original innovator. In the wide gap case the South’s relative wage is increasing in $(\mu/g)(L_N - g)/L_S - g)$ (using a suitable normalization). Hence, for constant $g$ and $\mu$, this relative wage increases with the North’s labor force and declines with the South’s labor force, as in Krugman. But when the effects of labor on $g$ and $\mu$ are taken into account, the results are reversed. That is, the indirect effects that changes in labor have on innovation and imitation are stronger than the direct effects.

II. Policy

In competitive economies two efficiency considerations may exist for trade policy: improvement in the terms of trade and a second (or third) best improvement in resource allocation in the presence of domestic distortions. Both exist
in noncompetitive environments. In fact, imperfect competition necessarily involves a domestic distortion because firms do not engage in marginal cost pricing. For both objectives various different policies might be helpful (at least from the point of view of a single country). But can any broad policy conclusions be drawn, such as “whenever domestic firms compete against foreign oligopolistic firms in export markets we should subsidize their exports” or “whenever domestic import competing firms face noncompetitive foreign exporters in the domestic market we should impose import restrictions”? The answer turns out to be negative; no policy conclusion of this sort can validly be drawn. To design successful policies, instruments must be tailored to particular industries on the basis of their degree of concentration, the conduct of firms, the position of domestic firms relative to foreign, the industry’s links with other sectors of the economy, and the like. In short, to exploit imperfect competition for policy purposes one requires detailed information about the economy. Such information is seldom available (see Helpman and Krugman 1989); furthermore, experiments with actual data reveal that the potential gains to be derived from such policies are rather small (see Helpman and Krugman 1989, chap. 8). On the other hand, existing tariff structures go much too far in terms of protection relative to optimal policies (see Harris and Cox 1984). The implication is that, given the current state of knowledge, a government that engages in a deliberate welfare-increasing policy takes significant risks; it stands to gain little but may cause significant losses.

The profusion of cases that need to be considered is described in figure 1 for a single market that can be either domestic or foreign (thereby immediately doubling the number of cases). There can be perfect competition, one of two cases of one-sided market power, or a case of two-sided market power. When market power is one sided, it of course makes a great deal of difference whether domestic or foreign suppliers own market power. In addition, a matrix of this sort applies to different types of conduct: one matrix for single firms with monopoly power, one for Cournot oligopolies (in which a small number of firms compete in quantities), one for Bertrand oligopolies (in which a small number of firms compete in prices), one for a cartel of a particular form (in which the allocation of benefits among members results from a particular solution to a bargaining problem), and so on. Then there are links with other industries that matter—we need to know how each policy affects entry, and so on.

The task of sorting and integrating the variables to elicit results that will be useful for policy is not as hopeless as it sounds: a number of the results described below reveal important considerations for a successful policy and indicate the information that will be required to make it effective.

In the first two subsections I discuss situations in which the number of firms is constant and all firms minimize costs. This state of affairs ensures efficiency of production (that is, output is on the transformation surface) although the composition of output need not be efficient. If we restrict attention to homo-
Considerations for Trade Policy: Competitiveness and Market Power

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Source: Author’s typology.

geneous products and trade taxes only, the change in aggregate welfare can be measured by

\[ dU = -m \cdot dp^* + t \cdot dm + (p - c) \cdot dX, \]

where \( m \) is the vector of net imports (a negative component represents exports), \( p^* \) stands for the foreign price vector and \( p \) for the domestic price vector (for consumers and producers), \( t = p - p^* \) represents the vector of trade taxes (a positive component represents an import tariff if the good is imported and an export subsidy if the good is exported), \( c \) is the vector of marginal costs, and \( X \) stands for the output vector.

The first term on the right-hand side of the equation represents the usual terms of trade effect: a country gains when the price of its exports rises or the price of its imports declines. The remaining two terms represent considerations of efficient supply. The last term says that an expansion of domestic output of goods that are priced above marginal cost raises welfare. Competitive industries price according to marginal cost, so that their contribution to this term equals zero. In noncompetitive sectors price exceeds marginal cost, which implies that expansion of their output is desirable (because domestic valuations exceed supply costs). Hence, other things being equal, policies that lead to an average expansion of noncompetitive sectors improve welfare. A similar interpretation can be applied to the second term in relation to imports. The marginal cost of imports equals the foreign price. If the domestic price exceeds the foreign price (as a
result of a tariff or a quota, for example) an expansion of imports is desirable. Much of the welfare analysis of various policies concerns the tradeoffs among these three considerations.

One-Sided Market Power

Bhagwati in his famous (1965) paper analyzes a tariff in the presence of a domestic monopolist and fixed foreign supply price. He shows that in the situation depicted in figure 2—where the foreign price $p^*$ is below the prohibitive domestic price $P$—gradual tariff increases (beginning from zero) that raise the domestic price toward $P$ induce the monopolist to expand output. In this range he chooses output by equating price to marginal cost. Hence, the contribution of the third term in the equation above equals zero and welfare declines, because imports contract and the domestic price exceeds the foreign price (the contribution of the first term also equals zero because the foreign price does not change). When the domestic price reaches the prohibitive price $P$, imports cease and are never renewed for further tariff increases. Further tariff increases, however, induce the monopolist to reduce output, because now he equates price with demand until the monopoly price $p_M$ is reached. In this case the second term in the equation equals zero (there are no imports), but welfare declines owing to the third term, because price exceeds marginal costs and output declines. This example also shows that with imperfect competition import protection can be effective even when imports equal zero. Here the effect of the mere threat of imports is not negligible.

In this instance a tariff is more restrictive than a quota in the following sense. Suppose we replace the tariff with a quota that equals the import volume under the tariff. The monopolist responds by cutting back output. Quotas thus lead to lower consumption and a higher price. The reasoning here needs to be clearly understood. A quota reduces the elasticity of demand perceived by the monopolist. In its absence a price increase leads him to lose sales to consumers on account of the downward-sloping demand curve and to importers who replace his sales (when imports are imperfect substitutes for his output; otherwise he loses all sales to importers). In its presence he does not lose sales to importers, and so his effective demand curve becomes steeper. This lowers his marginal revenue, and he responds by contracting output. The same reasoning applies to Cournot oligopolies. It can also be used to show that a quota equal to the free trade level of imports leads the monopolist or a Cournot oligopoly to contract output. Hence, whereas in a competitive environment a quota at the free trade level of imports has no effects, here it does. With monopoly power, moreover, quotas that exceed the free trade level of imports (up to a limit) also lead to lower consumption and a higher price. So for an oligopoly the quota leads to a more collusive outcome.

The question of whether quotas (or quantitative restrictions) facilitate collusion is of great interest. The previous analysis suggests that they do, and I
think that this is a reasonable presumption. But there are exceptions, one of which serves to illustrate additional considerations.

The previous analysis relied on a static environment. Recently, however, much of oligopoly theory has been reformulated in order to allow firms to interact repeatedly. Repetition brings in important new elements, such as the possibility of implicit, as opposed to explicit, collusion. (Explicit collusion, in the form of a binding agreement, is often impossible because such a contract cannot be specified for all relevant circumstances or is illegal.)

Implicit collusion of repeatedly interacting firms may force an oligopoly to charge a price lower than the monopoly price (see Tirole 1988, chap. 6). That is, implicit collusion may not suffice to achieve the fully cooperative outcome attainable if it were possible to write a binding contract, for the following reasons.

In order to sustain an implicit agreement it has to be in the interest of each member: the present value of profits to be obtained from the cartel must not fall short of the present value of profits derived by deviating from the implicit
agreement. It is then usually supposed that if a member deviates, the cartel falls apart in the next period and the noncooperative equilibrium (say, Cournot) gets established forever (this equilibrium is time-consistent in the sense that at each point in time every firm finds it desirable to follow the specified strategy). Hence, a potential deviator has to compare the one-period gains from choosing his best deviant strategy when everyone else obeys the implicit agreement with the present value of future losses that will result from the noncooperative outcome. The comparison depends on the size of the one-period gains, on how bad the noncooperative outcome is relative to the cooperative outcome, and on the rate at which future profits are discounted. Naturally, the smaller the one-period gains from a deviation and the worse the noncooperative outcome, the less likely it is that a deviation will pay off.

For these reasons an implicit agreement sometimes needs to specify a price below the monopoly price in order to sustain collusion. The lower price reduces the gains from deviation to the point at which collusion is viable, while at the monopoly price the gains from deviation are too high to sustain collusion (because when everyone restrains output in order to achieve the monopoly price, the deviant can make large one-period profits). Rotemberg and Saloner (forthcoming) have shown that under those circumstances a quota at the free trade level may restrict collusion rather than facilitate it. In their example, the quota raises the noncooperative equilibrium profit level (which is possible, as we have seen above, even though the quota exceeds the noncooperative import level). This forces the cartel to reduce price in order to prevent profitable deviation. Their example (even if not realistic) shows how important repetitive interactions can be for policy considerations (see also Davidson 1984 on tariffs).

We turn now from import-competing markets in which domestic firms have market power to those in which the domestic firms are competitive and foreign suppliers have market power. Here a desirable trade policy may consist of import subsidies rather than tariffs.

Suppose a monopolist foreign supplier who chooses a strategy that equates marginal revenue of the import demand function to his marginal costs. Now suppose that we impose a small tariff. If foreign supply were competitive and upward-sloping, the tariff would have improved the terms of trade and would have raised welfare. With the foreign supply controlled by a monopolist, there is no guarantee that a small tariff improves the terms of trade, and the terms of trade are the only relevant consideration. To illustrate the last point, observe that under those circumstances the last two terms on the right-hand side of the equation above are zero, because domestic firms price according to marginal costs and the initial tariff rate equals zero. Hence, we only need to consider the effect of a small tariff on the terms of trade. Now, the tariff, of say $1 per unit imports, raises the monopolist's marginal costs of supplying the domestic market by $1. Assume for simplicity that his tariff-exclusive marginal costs are constant. Then the contraction of sales equals the inverse of the slope of the marginal revenue curve, because he equates marginal revenue to marginal costs. The
increases in the domestic price equals the contraction of sales times the slope of the demand curve. Therefore the domestic price rises by less than $1 if, and only if, the marginal revenue curve is steeper than the demand curve. If the domestic price rises by less than $1, the terms of trade improve. The terms of trade worsen when the domestic price rises by more than $1 (because the import price $p^i$ equals $p - 1$). For example, when the demand curve is linear it is flatter than the marginal revenue curve and a tariff improves the terms of trade. Conversely, when the demand curve has a constant elasticity that exceeds 1 it is steeper than the marginal revenue curve and a tariff worsens the terms of trade. In the latter case an import subsidy improves the terms of trade. We have therefore a simple condition on the relative slopes of the demand and marginal revenue curves that determines whether a tariff or an import subsidy is desirable (see Brander and Spencer 1984).

An important point about this type of one-sided market power is that even in cases in which a tariff improves welfare its replacement with a quota reduces welfare below the free trade level. This does not result from differences in the level of domestic production. Indeed, if the quota equals the import level that prevails under the tariff, both policies lead to the same levels of imports, domestic production, and domestic price. The difference arises from the fact that under the quota the foreign monopolist exploits the quantitative restriction to charge the consumer price. Therefore instead of improving the terms of trade the quota worsens them. Alternately, under a quota the equivalent of the tariff revenue (which translates into quota rents under competition) accrues to the monopolist rather than to domestic owners of import licenses (see Shibata 1968). This result applies also to foreign oligopolies (which compete with imperfect substitutes) as long as the quota exceeds a minimal level. Helpman and Krugman (1989, chap. 4) show that for sufficiently small quota levels domestic owners of import licenses collect rents, but that in the linear demand case these are never sufficient to compensate for the initial losses (see also Krishna 1988a, 1988b). Whether circumstances exist in which a quota can bring about a less collusive outcome that would be preferable to free trade remains an open question.

Strategic Policy

In the presence of two-sided market power, economic policy has a strategic value as well: it changes the terms on which domestic noncompetitive firms interact with foreign noncompetitive firms. The best-known examples in international trade concern precommitment strategies. In particular, in situations in which domestic firms do not have the means to precommit to a particular course of action—even though that is desirable—the government can sometimes act to ensure (albeit indirectly) the desired precommitment. This typically requires the government to have the first-mover advantage—to be able to announce or execute a reliable policy before firms complete their strategic choices.

For instance, suppose that a domestic firm competes against a foreign firm in a third-country market. (We are concerned only with our firm's gross profits.)
Competition takes place in two stages. In the first stage, firms decide whether to enter the market. This may involve the development of a product or the setting up of a marketing network. In the second stage, the firms produce and compete in either price or quantity. Now, suppose that the market is small, so that when only one firm enters its second-stage profits exceed its first-stage entry costs, and when both enter, second-stage profits fall short of entry costs in each one of them. In this case two equilibria exist: one in which only the domestic firm enters and the other in which only the foreign firm enters. Clearly, the domestic firm and the home country prefer the former.

Because the two equilibria exist, the domestic government may want to force establishment of the preferred equilibrium. The following strategic policy could achieve this. Before the firms make their entry decisions the government provides the domestic firm with an entry subsidy that exceeds the loss that materializes when both firms enter. Under these circumstances the domestic firm chooses to enter independently of the foreign firm’s decision. Consequently, the foreign firm does not enter and this is the unique equilibrium. The same can be achieved by a government commitment to a lump-sum export or production subsidy as long as the commitment is made before the entry decision and a mechanism is in place to make it good. Second-best policies in the form of ad valorem export subsidies can also be used for this purpose. Naturally, the foreign government has an equal incentive to engage in a strategic policy, and so the outcome may be a three-stage game in which governments choose policies in the first stage, firms make entry decisions in the second, and production and sales take place in the third (see Dixit and Kyle 1985).

Strategic policies do not apply exclusively to entry; they can also be used effectively when domestic and foreign firms have established themselves in a market. Consider an export market with one established domestic and one foreign firm that compete in prices with imperfectly substitutable products. Let each firm’s profit maximization require a price rise in response to its rival’s price increase. In this case the domestic government can raise its firm’s gross profit level (and therefore welfare) by taxing exports (see Grossman and Eaton 1986). This result can be shown as follows (Helpman and Krugman 1989, chap. 5): the firm equates perceived marginal revenue to marginal costs, where perceived marginal revenue is calculated for a fixed price of the rival. When the domestic firm reduces price, however, the rival responds with a price reduction of his own. Nevertheless the home firm cannot take advantage of this information as long as both set prices simultaneously. If one could exploit this information, one would recognize that true marginal revenue is lower than perceived marginal revenue, because the foreign firm’s price response to the home firm’s price reduction brings about an increase in home sales that is smaller than the perceived sales increase. For this reason it is desirable to induce the home firm to charge higher prices and limit sales. An export tax achieves just that. The government can exploit the first-mover advantage by establishing an export taxation program that acts as a precommitment device. Then the firms compete with the program
in place and the outcome is higher prices for both products. Here—unlike the entry promotion programs discussed previously—both countries gain higher profits, because the best response of a firm leads to higher profits the higher the rival's price. In this case a two-stage game in which both governments choose taxation programs in the first stage and firms choose prices in the second leads to a time-consistent equilibrium in which both countries are better off than under free trade.

Strategic policies thus need not lead to a conflict of interest. Although in the entry-intervention case one government's successful policy harmed the rival country, in the export-intervention case one government's successful policy brought a positive benefit to the other country. The inference to be drawn is more subtle, however, than a simple distinction between entry and export policies. In the first example entry decisions were strategic substitutes (when one firm entered, the other abstained from entering), whereas in the second prices were strategic complements (when one firm raised its price, the other responded with a price increase). The distinction between strategic substitutability and complementarity is key in understanding these results. The same distinction is also central in understanding the direction of desired policies.

These points can be demonstrated by means of an alternative example of two established firms that compete in an export market where governments intervene in foreign trade. But this time instead of competing in prices (à la Bertrand) the domestic and foreign firms compete in quantities (à la Cournot). Assume—as would be most likely—that a firm responds with an output contraction to an output expansion of its rival, thus ensuring strategic substitutability. The critical difference from the previous example is not the strategy space of the firms but rather the strategic relationship. Now an export subsidy rather than an export tax proves to be desirable (see Brander and Spencer 1985).

The argument can be made as follows (see Helpman and Krugman 1989, chap. 5). The domestic firm chooses output that equates perceived marginal revenue with marginal costs. It calculates perceived marginal revenue for a fixed output of the rival. The rival, however, responds with an output decline to an output increase of the domestic firm. Consequently, true marginal revenue exceeds perceived marginal revenue and the firm would earn higher profits if it could precommit to a larger output level. Unfortunately it cannot, because both firms play simultaneously. The government can improve the outcome by providing the necessary precommitment. To raise output the government should subsidize exports. The subsidy has to be in place (or be committed to be put into place) before the firms make their decisions. The firms can then choose outputs recognizing the existence of the export promotion program and end up in an equilibrium in which the domestic firm sells more and the foreign firm sells less.

Two points need to be underlined. First, in contrast to the Bertrand case, here export subsidies are required rather than export taxes. Second, countries face a conflict of interest in their trade policies. When one country engages in export
promotion the other loses, because the policy-active country forces its rival to contract output, and output contraction as a best response to the domestic firm's output expansion leads to lower profits for the foreign firm. This conflict of interest leads to a Prisoners' Dilemma in the policy game. For suppose that there are two stages: governments choose their export policies in the first, and firms choose quantities in the second. For simplicity, also assume symmetry and constant marginal costs. Then in the resulting time-consistent equilibrium both governments subsidize exports and both firms sell more than under free trade. Observe, however, that even under free trade a Cournot duopoly produces too much, in the sense that joint output exceeds the output level of a single monopolist so that a further output expansion reduces profits per firm. Hence, the two countries are better off in the free trade equilibrium than in the equilibrium with active policies. The problem is that when one country does not promote its exports it pays the other to do so. Consequently, free trade is not an equilibrium unless policies are coordinated (that is, governments cooperate in the first stage).

We have seen that one can make a case for export taxation as well as export promotion on strategic grounds, depending on circumstances. In either set of circumstances the existence of more than one domestic firm strengthens the need for taxation—because the policymaker cares about aggregate profits of the exporting firms while each firm cares only about its own profit level (see Dixit 1984). Naturally, when a single domestic firm considers the effects of its price or output decisions on perceived marginal profits it does not take into account the effects on profits of other firms. Therefore, other things being equal, prices are too low and output levels too high when a number of domestic firms participate in the oligopolistic market. To offset this negative externality, an export tax is called for. Clearly, in the Bertrand case this strengthens the need for export taxation. In the Cournot case it conflicts with the need to subsidize exports on strategic grounds. The net result may be the need either for lower export subsidies or for taxation.

Entry

So far the discussion has concentrated on cases in which the number of firms is assumed to be fixed, or more to the point, in which firms do not enter or exit in response to policy measures. This is not, however, a safe assumption. Export subsidies may lead to entry, whereas export taxes may lead to the exit of domestic firms, independently of conduct. This is a significant consideration whenever there are firm-specific increasing returns to scale. For example, when fixed entry costs exist one must take account of the resource loss from entry of new firms (see Helpman and Krugman 1989, chap. 5). This consideration weakens the case for an export subsidy and strengthens the case for an export tax. In the presence of free entry that drives to zero tax- and subsidy-inclusive profits, export promotion damages welfare while a small export tax raises welfare (see Horstman and Markusen 1986).
The last point applies to all forms of conduct. If—as has been assumed so far for the industry under discussion—domestic firms export but do not sell in the local market, the change in welfare equals the change in aggregate gross profits. Conversely, aggregate gross profits equal aggregate net profits plus tax revenue minus the subsidy bill. Free entry ensures zero net profits. Therefore the change in welfare equals the change in net revenue. The imposition of a tax raises revenue, and thereby welfare. The provision of a subsidy reduces revenue, and thereby welfare.

All this suggests that if anything there is a presumption in favor of export taxation rather than export promotion. Export promotion is desirable only when a firm's choice variables are strategic substitutes, the number of firms is rather small, and the scope for entry in response to export subsidies is limited.

**Intersectoral Links**

To evaluate the response of resource allocation to policy we need to use correct measures of marginal costs. Much of the previous discussion relied on the assumption that firms use social marginal costs in their profitability calculations. This supposition is correct when all other sectors are competitive, but it is typically incorrect when some are noncompetitive. For this reason policymakers need to know the difference between true and perceived marginal costs as well as the difference between true and perceived marginal revenue. In other words, one cannot design a successful policy without properly taking account of intersectoral links (see Dixit and Grossman 1986). For example, when true marginal revenue in an export sector exceeds perceived marginal revenue it does not guarantee that export promotion will increase welfare. In order to see this point, suppose that the subsidized sector expands in response to the policy incentive by drawing resources from another export sector in which true marginal revenue exceeds perceived marginal revenue. If the divergence in the latter sector is large enough, the net result will be a decline in aggregate profits.

**Differentiated Products**

In the presence of product differentiation, a variety effect exists along with the terms of trade and the efficient supply effects that appear in the equation above, that has a bearing on policy design. Before discussing it, however, I would like to make two points.

First, the supply of many brands does not eliminate a country's market power even when the country is very small. Gros (1987) has demonstrated this in the following way (see Helpman and Krugman 1989, chap. 7, for a simple exposition). In a one-sector, one-factor, two-country world with product differentiation and a constant elasticity of substitution across brands (see Dixit and Stiglitz 1977), output per product does not depend on country size. The reason is that with Dixit-Stiglitz preferences the elasticity of demand does not change with the number of products. In addition, the number of brands is proportional
to country size. Thus ad valorem trade taxes, which do not affect the elasticity of demand, cannot change the number of brands that each country produces, or output per brand. If they affect anything at all it must be the terms of trade.

Calculating the optimal tariff for the home country, one finds that it equals $1/(1 - s)(e - 1)$, where $s$ represents the share of world spending allocated to the home country's products and $e$ represents the constant elasticity of demand. The smaller the country the smaller $s$ and the smaller the optimal tariff. But even when the relative size of the country shrinks to zero, the optimal tariff remains positive. For no matter how small a country is, it specializes in a range of products in which it maintains monopoly power; the demand for a variety is downward sloping, and even a small country can affect its terms of trade.

The second point concerns the production efficiency effect. Consider a case in which the number of products and relative prices are constant but output per brand can change (see Helpman and Krugman 1989, chap. 7, for a model that ensures it). Then the imposition of import duties on brands that compete with domestic products shifts domestic demand from foreign to domestic varieties and shifts demand away from all varieties. Output per domestic brand may thus expand or contract and welfare may increase or decline (see Flam and Helpman 1987; Helpman 1989).

To return to the effect of variety on welfare: other things being equal, consumers prefer more variety. One can, in fact, think about a consumer price index that is lower the larger the variety choice. If a tariff reduces this price index by raising the available variety choice (as in Flam and Helpman 1987) or by changing the composition of products in favor of the home country at the expense of the foreign country (as in Venables 1987), it necessarily improves home welfare. But the increase in variety is not guaranteed (see Markusen 1988; Helpman 1989). A tariff may shift demand away from differentiated products so much that available variety is reduced. This contraction of variety choice may bring a decline in welfare. Conversely, in some circumstances the tariff raises available variety and welfare (for example, see Flam and Helpman 1987; Venables 1987). Consequently, it is not clear a priori whether small tariffs are desirable; all the effects mentioned above have to be taken into account. Large tariffs lead to additional welfare losses that stem from the undersupply of imports (the second term in the equation above). Moreover, even where tariffs are desirable they correct only indirectly the distortion that emerges from monopolistic or oligopolistic competition. Direct correction of the distorted price-cost margins, if feasible, would be preferable.

Promotion of Growth

In a dynamic economy the static issues reviewed so far have to be augmented by explicit consideration of the links between policy and growth. In the growth models described in section 1, commercial policy and other forms of industrial policy affect long-run growth rates, exerting strong influences on welfare. But
the resulting relations are far from simple. For example, in the world studied by Grossman and Helpman (1989a)—where both countries develop new intermediate products and one of them has a comparative advantage in R&D—an import tariff on final consumer goods slows down world growth if imposed by the country with a comparative advantage in R&D and speeds up world growth if imposed by the country with a comparative disadvantage in R&D. The intuition behind this result reveals a channel of influence that is not specific to the model.

When a country imposes a tariff on imports of final goods, it shifts the composition of demand toward its own final goods. The expansion of the final goods sector draws resources from the manufacturing of intermediate products and product development. Opposite shifts in resource allocation take place in the other country. In particular, its product development sector expands. Whether these changes accelerate or slow down growth depends on whether the contraction of the R&D activity in the tariff-imposing country is smaller or larger than the expansion of the R&D activity in the other country. The answer depends on comparative advantage in R&D; world output of R&D declines only if the tariff-imposing country has a comparative advantage in R&D.

In this type of world one expects R&D subsidies to speed up growth—as indeed turns out to be so when the subsidy is provided by the country whose R&D is relatively more efficient, or when both countries subsidize at an equal rate. When the country with relatively less efficient R&D subsidizes product development, however, it may lead to slower growth. The outcome depends on structural features that cannot be spelled out in the available space.

Conversely, in the North-South model with a product cycle that was discussed in section I (Grossman and Helpman 1989b) innovation subsidies in the North and imitation subsidies in the South speed up growth. However, they each affect the rate of imitation differently, and thereby the average length of the first phase of the product cycle. Innovation subsidies reduce the rate of imitation and the average length of the first phase, whereas imitation subsidies raise the rate of imitation and shorten the average length of the first phase.

Grossman and Helpman (1989c) study a small-country variant of their growth models with a focus on the consequences of various policies for welfare. The resulting equilibrium differs from the first-best because, first, of markup pricing in the differentiated intermediate product industry, and second, of the externality that a product developer imposes on future product developers through his contribution to knowledge capital. Small R&D subsidies raise welfare. Larger subsidies accelerate growth more, but eventually reduce welfare. A small tariff that speeds up growth may either raise or reduce welfare. But whether it speeds up or slows down growth depends on the factor intensity of the import-competing sector relative to the exporting sector and the product development activity. Here, quotas also affect growth and welfare. They are particularly damaging relative to tariffs if they induce rent seeking that uses up entrepreneurship in which product development is relatively intensive.
III. Concluding Comments

The new theory of international trade and trade policy evidently encompasses numerous relevant elements. Although judgments may differ as to the relative importance of each, I believe there should be no controversy over the significance of the package as a whole. Existing empirical evidence on trade structure (see, for example, Havrylyshyn and Sivan 1984; Balassa 1986; and Helpman 1987) support the new view, and “calibration” studies of policy experiments (see Helpman and Krugman 1989, chap. 8, for a review) give quantitative support to many of the considerations that were discussed in section II. The most recent studies that embody those elements in a dynamic setup should make the approach even more useful.

One major conclusion emerges from both theory and the “calibration” studies: there are no simple answers to many important questions. This conclusion applies with particular force to policy concerns. Proper evaluation of outcomes requires detailed information about conduct, market structure, entry constraints, intersectoral links, and the like; we need more empirical studies designed to reveal this information. Such studies, as in the past, will also help to identify weaknesses in the theory and point out directions for future research. In any case, since (a) the information needed for a successful policy design is not available; (b) the policy recommendations are very sensitive to this information; and (c) the “calibration” studies indicate that good policies improve welfare only slightly; free trade remains a good rule of thumb—the more so given retaliation, the competitive pressure of a free trading world system, and the political economy of protection.

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COMMENT ON “THE NONCOMPETITIVE THEORY OF INTERNATIONAL TRADE AND TRADE POLICY,” BY HELPMAN

T. N. Srinivasan

Roughly a decade ago some perceptive trade theorists saw an intellectual arbitraging opportunity in applying developments in industrial organization to the theory of international trade and policy. Pioneer arbitrageurs, including Professor Helpman, reaped handsome returns by imaginatively combining insights of industrial organization and traditional factor proportions theory to explain such stylized facts as intraindustry trade, trade between countries with similar factor endowments, and a positive correlation between country size and volume of trade.

Their new theory suggested a more active role for government policy in trade. In some cases it appeared to provide an intellectually respectable economic argument for such not-so-respectable policies as protection. Those die-hard development economists who were loath to give up their intellectual investment in an inward-oriented development strategy—despite mounting evidence of its failure—latched on to the new theory in hopes of salvaging their intellectual investment.

Professor Helpman, in the manner that we have all come to expect from him, has given us a balanced, masterful survey of this literature without making any exaggerated claims for it. Since he is unlikely to make an analytical error, there is nothing that I can criticize about the internal logic of his models. I propose instead to place the inward-oriented-based theory in the perspective of traditional trade theory; to emphasize the extreme fragility of its conclusions and their lack of robustness; to point out the inherent conceptual and econometric problems that arise when you try giving the theory empirical content, or use calibration-cum-simulation methods to evaluate empirically alternative strategic policy interventions; and to argue that the fragile policy conclusions are likely to be of limited relevance to developing countries.

To begin with, almost all the problems analyzed by new trade theory have their counterparts in traditional theory: increasing returns, monopoly power, intraindustry trade, multiple equilibriums, and even the possibility that countries with access to identical technology, identical factor endowments, and identical tastes may trade in equilibrium. Traditional theory analyzes increasing returns

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in a competitive equilibrium among atomistic firms and consumers by postulating that scale economies are external to a firm but internal to an industry. Similarly, market power exists only at the national level. Because firms do not perceive scale economies or national market power, they cannot reflect them in their profit maximizing decisions. A policy intervention in the form of an appropriate subsidy, tax, or tariff ensures that external scale economies or markets are reflected in the profit maximizing calculus internal to the firm. Put another way, policy in effect makes firms do what they cannot do by themselves. Traditional theorists also recognize that one government's intervention may invite retaliation by other governments. Three decades ago Harry Johnson explicitly modeled a Nash tariff policy equilibrium in a two-government world. Subsequent writers have extended his analysis to quotas.

The new theory postulates increasing returns at the firm level and hence has to consider noncompetitive market structures and equilibria. In the small group case, oligopolistic firms that perceive their market power will behave strategically. Nevertheless they may not be able to precommit themselves credibly to actions that will improve their profits given other firms' reactions. Government policy intervention in such cases achieves what the firms cannot credibly do by themselves. Once again reaction to one government's policy intervention by other governments has to be allowed for. The new theory explicitly analyzes the issues of time consistency and credibility, issues that are either irrelevant or are not raised in traditional theory. But that under these circumstances free trade is not optimal, and that suitable intervention can improve welfare over free trade, is not a particularly novel conclusion nor unique to the new theory.

The new theory explains intraindustry trade in terms of product differentiation and increasing scale economies. The traditional explanation for intraindustry trade is to trace it to one or more of three problems: aggregation over commodities, over space, or over time. Obviously, if the level of aggregation of commodities in defining an industry is high, even though two countries exchange commodities that are different at a disaggregated level, the exchange will show up as intraindustry trade in the aggregate statistics. A large country may export and import the same commodity because it is cheaper to export its production at one end of the country rather than transport and sell it to the other end where it may be cheaper to import it from abroad. Similarly, within a year a country may export a commodity in one season and import it in another. I am not entirely persuaded that, after careful disaggregation, much of what is shown in statistics as intraindustry trade will be left to explain.

The possibility of multiple equilibria in models involving nonconvexities is well-known. Let me take just two textbook examples from traditional theory. Given scale economies or externalities at an industry level, the production possibility curve of the economy may include convex and concave stretches, and multiple competitive equilibria are possible. What is more, under such circumstances it is easy to depict an equilibrium with nonzero trade between two identical countries because each is producing at a different production point.
even though they face the same prices. In a dynamic context, more than thirty years ago Solow showed in his famous growth model paper that if the production function is not concave, multiple steady state equilibria are possible given the same saving rate—some of which are stable, and to which the economy will converge, given the appropriate initial condition. Even an argument based on the Solow model for “big push” in savings and investment can be found in the development literature. Although hysteresis and multiple equilibria in the new theory are based on different dynamics, qualitatively the results are similar.

Let me turn now to the policy implications of the new theory. Professor Helpman points out that one of the major implications of the new theory is the need for a case-by-case approach. This is somewhat understated. In fact the policy conclusions are extremely fragile and unrobust to changes in the oligopolistic model: not only the levels at which policy instruments are set but even their signs can be changed by changes in modeling. Take the partial equilibrium, duopoly model in which the home and foreign firms have no domestic sales but compete only in the third market. Under the same set of assumptions about demands, costs, and foreign government nonintervention, if each firm has consistent conjectures about the other’s response to its change in sales, optimal policy is laissez-faire. If the conjectures are Cournot, the optimal policy is an output subsidy; if the conjectures are Bertrand, the optimal policy is a tax. This lack of robustness points to the need in devising policy for empirical work on the structure of competition in the industry.

Before I turn to the empirical issues, let me point out that this literature rarely takes on board an important insight of the theory of distortions and the second best: that a policy that is optimal in the presence of a single distortion—say, a noncompetitive structure in the market for one good—need not be optimal when several other distortions are present. It goes without saying that no economy in the world, developed or developing, is characterized by a single distortion. Indeed, traditional theory has analyzed trade policy in the context of several distortions, especially factor market distortions.

A number of conceptual and econometric issues arise in attempting empirical work in this area. Conceptually, many of the game-theoretic formulations of strategic policy choice assume common knowledge among participants about payoffs, strategic space, and the like. That is to say, each participant knows the others’ payoffs, the others know his payoffs, he knows that the others know his payoffs, others know that he knows their payoffs, and so on ad infinitum. In my view, common knowledge is what is called in Sanskrit Swayam Bhava or self-being—it comes to existence by itself. There is no process by which common knowledge can come about. It has to be viewed as an untested and untestable hypothesis.

Leaving this thorny issue aside, econometrically speaking the Lucas critique applies with great force in this context: if, before formulating policy, the necessary parameters (other than the so-called deep ones relating to technology and taste) are estimated, those parameters are virtually useless for policy change
because they are by definition dependent on existing policy. Even if the Lucas critique is ignored, one has to recognize that the relevant market structure has to be part of the model specification if the estimated parameters are to be used. It is not easy to infer the strategies and responses that oligopolistic firms are using for collecting data on market outcomes.

Another empirical problem is that what constitutes an industry for the purpose of analysis is debatable, since the elasticities of substitution both for supply and demand can be substantial between products produced by different industries under any classification. What does fee entry—or for that matter, absence of entry—mean in such a context? Once again this problem was recognized long ago. Soon after Chamberlin published his *Monopolistic Competition*, Triffin (1940) examined it in a general equilibrium context. Those who avoid full-blown econometric estimates but use the so-called literature-based estimates of some parameters, while choosing others to calibrate their model to reproduce a given data set, also encounter serious problems, because there are many ways to choose the parameters for which literature estimates are to be used and those that are to be calibrated. And this choice can drastically alter the policy recommendations, as Kala Krishna recently showed by reexamining an earlier calibration exercise of Avinash Dixit (Krishna, Swagel, and Hogan, forthcoming).

As for the relevance of the new theory to development, Professor Helpman rightly noted that in neoclassical growth theory of the 1960s, the steady state growth rate of the economy equals the natural rate of growth of labor force and the rate of labor augmenting technical progress. But both these rates were assumed to be exogenous, not because there was any compelling empirical evidence to support the assumption, but because the economic determinants of fertility and technical progress, theoretical and empirical, were not well established. Considerable progress has been made since then, particularly about changes in fertility. It is fair to say that the determinants of technical progress are still unsettled. Despite considerable progress in formalizing Schumpeter's theory of innovation and market structure and testing it empirically with data from developed countries, no strong support has emerged either for or against the Schumpeterian hypothesis.

Long ago, in the framework of a neoclassical optimal growth model of an open economy, Bardhan (1970) introduced learning by doing à la Arrow. Because, except for this externality, Bardhan's model was of a small, open, competitive economy, strategic policy intervention as such did not arise. In this respect the new theory is richer.

But how important learning or, for that matter, scale economies are relative to global market demand is an empirical issue. For example, Benhabib and Jovanovic (1989) reexamined the aggregate data for the United States for the postwar period on growth of output, labor, and capital and found that the data were consistent with the absence of externalities and increasing returns to scale. Anecdotal evidence suggests that learning effects are important, but rigorous econometric studies showing economically significant learning effects are almost
nonexistent. The Indian passenger automobile industry began assembling cars more than four decades ago, for example. One of the firms that began manufacturing cars (and still produces them) was established at roughly the same time as Toyota. As recently as ten years ago India was producing more passenger cars than the Republic of Korea. Yet until the entry of Suzuki was allowed recently, the industry was stagnant. There is not much evidence of learning associated with cumulative output in this industry in India! Korea, however, has achieved a significant toehold in the U.S. auto market. It seems that an industry established and nurtured by policy, heavily protected from competition from imports and from entry by other domestic firms, is not likely to generate much learning.

It is dangerously simplistic, because markets in many developing countries appear to be oligopolistic, to decide that the policy conclusions of the new theory apply. First, many of these oligopolies are creations of inappropriate public policy and not the result of increasing returns or externalities in production. Second, the capacity of governments to gather information, arrive at appropriate policies, and implement them—without at the same time unleashing resource-wasting rent seeking—is extremely limited. And the character of appropriate policies can change drastically depending on whether rent seeking is significant or not. Social welfare may be higher without government intervention than with possibly inappropriate intervention. It is therefore essential to take explicit account of a country’s policymaking and rent-seeking realities. The new theory has yet to take this step, and until it does the traditional arguments for limited or no intervention in trade will remain unchallenged.

References


When Dennis de Tray asked me to participate in this session I had to ask myself why. I've come to the conclusion that it is because of my well-known capabilities as a troublemaker and perhaps to provide some comic relief but certainly not because of my known competence as a theoretician of either the old or the new trade policy. Perhaps it is also because I am one of a number of people in this room that have been mucking about with these issues over the last fifteen years in at least fifteen countries: issues of industry, trade, and finance. So perhaps I can make some remarks about the relevance of the new trade theory. So as not to disappoint Dennis, these comments will be cantankerous and heretical and do not represent his views or those of the World Bank.

I have reviewed the new trade theory, including the paper that is being discussed today, and I find overall that the new trade theory seems to be a timid departure from the old trade theory. Most of it appears to be tinkering with the two-by-two-by-two model, usually one assumption at a time. As such, I do not find the new trade theory to be particularly better at simulating realities, predicting performance, or prescribing policy.

I also find the new trade theory literature somewhat disappointing. It seems to be a set of tremendous talents talking to each other—rather than getting closer to the realities that are being faced in both developed and developing countries. I would like to talk about a few of those realities because I think the purpose of this seminar is to deal efficiently with growth and development in the Bank's member countries.

I think it is clear that OECD countries are rapidly liberalizing everything but trade. It is also clear that most trade is taking place among like countries. And it is clear that a tremendous amount of game playing is taking place, with strategic alliances being formed among the main players, who recognize how much needs to be invested in research and development and how development costs quickly reap the benefits. The concept of a production function is rapidly disappearing, given rapid technology change.

The other phenomenon that seems obvious is that the real success stories of the 1980s are Japan, the Republic of Korea, and Taiwan. We may try to rewrite

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that history, but it is clear these economies have several things in common. And one of them is that they have been factor endowment makers—not factor endowment takers. They have really sat down and said, “Where is the world going to be in the year 2000, where do we want to be in that world, and what are the pieces that we don’t have that we need to get?” And that type of thinking has been in the context of using international competitiveness, present and future, as the litmus test. The strategies pursued place the East Asians apart from other developing economies—not in the level of government intervention but in the purposes of that intervention.

Now, looking at the realities of our member countries, the developing countries—be they the poorest of the poor or the next-in-line newly industrializing countries—it seems that most countries have got themselves tied in terrible knots—which means that a free trade model is not terribly informative, and that most of these countries are not in a position to do strategic game playing.

In fact, it could be argued that most countries that the Bank works in have developed comparative advantage in backing the losers. So the concept of trying to pick winners—where you have a convergence of vested interests in the public sector, business as usual in the private sector, and insulation from the dynamic processes—has very real risks.

What seems to matter in these settings? Clearly, competition matters, and progress on that front—trade liberalization, deregulation, or unraveling of all the subsectoral incentives that create rigidities and inability to respond to change—is urgently needed.

It is also clear that building capabilities matters. I have a hard time believing on a commonsense basis that we can really say that learning does not matter. What the whole East Asian experience has been about is learning, entering global markets at the low end, moving up, and taking advantages of the learning which comes with playing in the global market.

It is also clear that dynamic processes matter and that within those processes, organizations and people—the created endowments—increasingly explain who is competitive. In our research work we need to give a lot more attention to those functions.

In my view, therefore, what we should not do over the next ten years, in research and policy work, is try to figure out to what extent the new trade theory or the old trade theory applies to developing countries. We should not try to squeeze data and realities into theoretical models. We need to focus on how to unravel all of the ties that are binding our client countries; on how to combine these incentives for competition and competitiveness with the building of endowments; and on how to deal with the transitional issues—that it is less important whether you think that free trade or strategic trade is the ideal than how you get out of the mess you are in now. And we need to focus on how countries and companies get on the bandwagon of one thing leads to another—human resource development, catalysts, direct foreign investment—how
countries can be in as opposed to out of what is admittedly a very unfair global game.

I agree that the last portion of Professor Helpman's discussion is potentially the most interesting because what we are really dealing with in all of our countries is market takers, technology takers, but potential endowment makers. I think that the Bank needs to understand and deal in the "missing middle"—not in firm size but in thinking about innovation systems, of closing the gap even between best and worst practice within a country.

So I am advocating that in the next five years we deal much more with the how tos—how to promote effective competition policies, capability buildup programs, and commercial links in countries at different levels of development.
Observing that it would be as unfair to take credit for all the developments in strategic trade theory in the last ten years as it would be to take the blame for them, Helpman began the discussion by responding to the panelists. He could understand Barry’s (discussant) feeling that the literature was doing too little too late, and he would be the first to admit that the answers they had come up with were unsatisfactory, but, he argued, they were working in the directions she indicated. Strategic trade theorists were focusing on the very elements she had highlighted—acquired comparative advantage, dynamic competition, learning by doing, and so on.

After concurring with Srinivasan’s (discussant) point about the fragility of the policy conclusions—indeed, this was a central point in Krugman’s and his recent book on trade policy—Helpman observed that the fragile empirical content was not unique to the new trade theories but applied to economics in general. Conclusions depend on assumptions about conduct, and economists do not know how to pinpoint precisely behavior in a particular industry. For example, with calibration models, using the data and parameters we have, we assume one type of conduct and adjust the remaining parameters to fit the data. If we change our assumptions about conduct, we get a different remaining set of parameters, and we calculate different answers to our policy experiments. Does that mean economists should abandon their work and go home? Presumably not. It means more work is needed. Srinivasan countered that to apply the conclusions of strategic trade policy one needed far more information than one needed to apply traditional trade theory.

Responding to Srinivasan’s comment about the need for common knowledge, Helpman responded that it really does not matter much. He agreed that going through the process Srinivasan described in his panel comments, one would discover that common knowledge is a stringent requirement, but he would argue that without assuming common knowledge the analytical problems would be even more severe.

Nor did Helpman consider the problem of externalities and spillovers as cited by Srinivasan unique to trade policy. It occurs also in public finance, urban economics, rural development, and so on. Data in recent studies, he felt, point to spillovers and externalities explicitly related to technology. Was this enough for the new trade theories? Probably not. But both theoretical and empirical
Finally, Helpman disagreed that there was nothing new in the new trade theories. However, he also did not argue that these developments broke entirely with tradition; he had worked hard to show continuity.

Referring to the debate between the new and old theories as a Jekyll and Hyde phenomenon, a participant said Helpman was the Dr. Jekyll in this case because his paper was so logical and precise. This was not true of everyone who tried to persuade the U.S. Congress that finally we have invented a new argument for protection and export promotion. He argued that this was not the first argument for protection—it was simply an important extension of older arguments. In confining his attention to noncompetitive product markets, Helpman had ignored the huge literature (from development economics) on factor market imperfections, sector-specific minimum wages, sticky wages, generalized sticky wages, and wage differentials—all of which apply to imperfect competition. He felt that by concentrating only on noncompetitive product markets Helpman understated the case for appropriate intervention. Helpman agreed that there were many other arguments for protection—but explained that he was asked to discuss only this particular line of research.

The participant also felt Helpman had neglected the institutional side of the problem. In presenting the case for intervention, economists should also consider the solid empirical and theoretical work done on commercial policy, rent-seeking, and tariff formation. Recommendations for intervention, in other words, should be qualified by indicating not only what they might capture, but also what possible wrong outcomes might ensue. He particularly urged the World Bank to view the theory in its entirety, not just compare the old and new.

Helpman was asked if he had general recommendations. On balance, did he feel there should be a free trade orientation, with some exceptions made according to simple decision rules? Or should we introduce a blanket policy of import substitution and let people argue for free trade on a case-by-case basis? The participant emphasized the importance of investigating what happens when you actually use strategic trade policy.

Helpman responded unequivocally to the question of policy recommendation. Krugman and he, in the last chapter of their recent book, conclude that given current knowledge about strategic trade policy—or general trade policy built on market imperfections—the best bet is not to intervene, for two reasons. First, the policy conclusions of the new theories are still fragile. Second, empirical or semiempirical studies that evaluate the consequences of optimal strategic trade policy have come up with small potential gains from those policies in the framework of calibration models using existing parametric estimates. In other words, one stood to gain little, but if one made a serious mistake, one could lose a lot.

Pursuing the question further, a participant asked Helpman to be as specific as he could about the sorts of policy conclusions he thought this literature might yield when all the empirical work he called for was done, ten or fifteen years from now. For example, one sort of policy conclusion might be that government
should have a discrete, ever-changing policy for each significant industry (as had already happened with civil aviation). A second policy conclusion might be that one needs a general sort of policy rule but that the way it operates should change. Citing antidumping measures as a policy system designed largely to deal with strategic trade concerns, he asked how Helpman might design a strategic policy in the future to deal with the perceived problem of dumping. To this specific query about antidumping measures, Helpman responded that in his view the current models that support such measures are far more fragile than the others, because all the arguments rely on market segmentation supposedly brought about by the behavior of firms, and Helpman did not believe this was a reasonable description.

Another participant asked what process Helpman could imagine that would give both the rule by which you could decide on an intervention and at the same time insulate it from the political process. Many countries are persuaded to lower tariffs, but when they try, those who are adversely affected by the tariff protection find five thousand good reasons not to lower it.

Concurring with most of the views expressed by previous participants, Srinivasan felt that it was important to set up institutions and transparent rules that were as politically unmanipulable as possible, rather than deal with trade policy on a case-by-case, discretionary basis. For example, he considered strengthening multilateral trade arrangements through the Uruguay Round negotiations more important than any gains from unilateral actions of the Super 301 type introduced by the recent U.S. trade legislation, for which the new trade theory seemed to be providing a rationale. Generally, Srinivasan found that this literature assumed the oligopolistic or noncompetitive market structure as given, and then looked to see how a nation could benefit from the structure—rather than question whether the international structure itself could be changed. He regretted the tendency in U.S. trade policy to relax antitrust laws, permit mergers and acquisitions, and promote what earlier would have been considered noncompetitive behavior—in order to give U.S. firms competitive advantage in the rest of the world. It seemed to Srinivasan that one should, on the contrary, extend the antitrust laws globally rather than relax them domestically to gain perceived advantages in international competition.

A participant said he would like to raise a very specific question about the allocation of quotas. In his discussion of tariffs and quotas in the context of the new theories, Helpman had seemed to draw conclusions regardless of how quotas were allocated. It seemed to the participant that the method of allocating quotas would affect the degree of competition. The Japanese, for example, assign their beef quotas to the producers' cooperatives, which have monopoly power in Japan.

Another participant pleaded with trade theorists and empirical economists to use less technical jargon and make their results more transparent, so that policy and country analysts could have an effective policy dialogue with developing countries on the new developments in trade policy. He then asked the panel if,
in line with what Singh had said in his keynote address, new capital-intensive and skill-intensive technologies and the extensive use of nontariff barriers and strategic alliances had rendered obsolete the operational notion of comparative advantage, even for such traditionally labor-intensive products as textiles. How should we apply the notion of “new comparative advantage”? Can we replace the “old” notion of comparative advantage with something else, or should economists simply fly by the seat of their pants in discussing trade policy?

Barry responded that technological change, particularly in electronics, is making traditional concepts of comparative advantage increasingly obsolete. In mature industries (automotive, textiles and garments) and in the “high-tech” industries, it is changing the entire definition of a product and dramatically increasing the possible combinations of factor use and the importance of the transformation of process technology itself. Scale economies no longer matter so much on the shop floor. Technological change requires a different kind of organization within the company, of everything from sourcing to distribution. The whole system is a product, and the issues of technology accumulation and learning make it ill-suited to modeling.

Helpman agreed that economists must look beyond traditional comparative advantage. The new trade policy literature, he felt, does exactly that. He concurred with a point made earlier about rent-seeking behavior, which he thought was even more important for Schumpeterian dynamic competition and strategic trade.

In response to the broad question about the overall policy message of strategic trade theories raised by several participants, Helpman said that the more forceful global competition is, the less room it leaves for single-economy trade policy. On average, this works in everyone’s interest, because it typically reduces market power in every country—and therefore reduces the price-cost margin globally. This is good from an international point of view, so economists should try not to segment economies and isolate them from international markets. At this stage it seems reasonable to recommend a global approach, with global competition and little intervention. In any international system, however, a prisoner’s dilemma situation could arise—where it is good for everybody to adopt one policy, but if everybody does, it pays one country to deviate. Therefore, it may well be that a good case for intervention could be made in some isolated industries—in which research and development are important and there are externalities within the industry, or across industries, or over time. The intervention need not be in trade policy, however. With research and development (R&D) competition, for example, the best policy might be to subsidize R&D or provide venture capital.