

**Strategic Trade Policy and
the New International
Economics**

edited by
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Contents

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What Should Trade Policy Target?

Barbara J. Spencer

Recent developments in international trade theory have shown that there may be domestic gains from trade policy targeted to particular industries facing foreign competition. Governments and firms are seen as being engaged in a strategic game to gain profits in world markets. The theory indicates that policies such as export subsidies can affect the underlying structure of the game so as to allow domestic firms to achieve extra profits from exports that exceed the amount of the subsidy. If this is the case, the policy will have resulted in a net gain to the domestic economy.¹ In theory some of the additional profits could be redistributed by taxation so that the general taxpayer does not lose from the cost of the subsidy and still allow the owners and workers in the targeted industry to be better off.

In policy circles there has been a perception that some foreign governments such as the French and Japanese have chosen to target certain sectors of the economy.² This has led to a current debate about whether the United States should also join the targeting game. There are many difficult issues that arise from this debate, including philosophical questions about the appropriate role of government. Supposing this issue were decided in the affirmative, there is also a considerable difference of views as to which types of industries should be targeted. For example, should the government attempt to revitalize declining industries, support existing profitable high-technology industries, or somehow pick the winners of the future? This paper is not concerned directly with the first major issue. Rather it has the more limited objective of addressing some aspects of the second question as to the types of industries to be targeted. In particular, the aim is to describe the implications of the recent trade theory for the broad characteristics of industries most likely to lead to a national benefit from targeting.³

Identification of these characteristics is a preliminary step toward translating theory into practical policy proposals, but there remain serious practical problems of implementation. For example, some characteristics indicated by the theory require information that is not readily available, such as the nature and level of costs in both domestic and foreign firms. Furthermore accurate prediction of the behavior of foreign firms and governments, which is important for some of the characteristics, is likely to be extremely difficult to obtain. These problems and others may well make a policy of targeting particular export industries undesirable. Nevertheless, even without domestic implementation of an industrial targeting policy of this sort, it seems useful to see what economic theory has to say on the subject. This should lead to more informed debate as well as perhaps to some better understanding of the effects of foreign industrial policies.

In this paper I take a broad view of what is meant by trade policy targeting. In some discussions the word targeting is restricted to policies that promote some narrow group of products within an industry or even a single firm. Although trade theory does indicate some of the issues that might arise in deciding on how specific to a firm, product, or group of products a targeting policy should be, this question is very much affected by the particular nature of the industry or group of industries being considered and would require both more theoretical analysis and detailed industry studies. I also take a broad view as to the nature of the targeting instruments. Clearly export subsidies and tariffs are two possible instruments. However, other policies such as subsidization of R&D and plant and equipment could well have a greater long-run impact on profits earned from export sales and would need to be considered as part of any policy to promote industrial exports.

Industry Profitability and Barriers to Entry

The argument for export subsidies found in the recent theory is based on extracting additional profits from foreign producers and consumers. For an export subsidy to be domestically welfare improving, it must increase the profits to be earned by the industry on export sales by an amount exceeding the cost of the subsidy to the taxpayers. Apart from dynamic considerations of product innovation and development, and the possibility of extreme economies of scale, a net gain requires that the sale price exceed the opportunity cost of inputs

determined without the subsidy. This cannot be the case unless there is some barrier or cost of entry to the industry, both to make subsidization initially beneficial and to preserve the gain in profits for a reasonable length of time. Common barriers to entry would include high capital or R&D requirements as well as legal barriers such as patent laws.

Traditional trade theory assumed that there were no barriers to entry so that an industry would consist of a large number of small firms earning only the normal profit required to remain in business. In such a purely competitive industry, price is equal to each firm's private marginal cost of production, so an export subsidy of, for example, \$1 per unit, would lead to a price that is \$1 less than the real marginal cost of production. In this situation an export subsidy can only reduce domestic welfare, at best acting as a gift to foreign consumers.

This requirement for profitability would appear to rule out subsidization as a method to "save" unprofitable or so-called declining industries and still benefit the country as a whole. This is generally the case, although some seemingly unprofitable industries might earn above-normal returns from exports if the hidden returns in the form of wages and salaries above their opportunity cost are counted.

The first requirement for an industry to be appropriate for targeting is summarized as characteristic 1:

Characteristic 1 The industry or potential industry must be expected to earn additional returns (expressed in profits or greater returns to workers) sufficient to exceed the total cost of the subsidy. This requires that at least for a period there be substantial barriers to entry.

Restrictions in Sales of Foreign Firms

For an export subsidy to be appropriate, increases in domestic exports must lead to a reduction in the output levels of rival foreign firms. Indeed, an export subsidy is more likely to improve domestic welfare, the greater is this effect or the more the domestic expansion is at the expense of sales of foreign rivals. Without a loss in sales by foreign firms, the increased domestic exports induced by a subsidy would normally result in a fall in price sufficient to make the additional sales unprofitable. A reduction in foreign output mitigates the price fall

from domestic expansion, allowing the possibility that domestic profits will increase.

This requirement clearly rules out intervention in the case of a true monopoly where a domestic firm does not face competition or potential competition in export sales. A true monopolist will be in a position to price and make investment choices so as to maximize its own profits.

Whether an export subsidy will cause foreign firms to cut back output depends on the nature of the oligopolistic rivalry between firms and on the nature of the response, if any, by foreign governments. The effect of oligopolistic rivalry in pricing decisions has been explored in Eaton and Grossman (1983). They show that the opposite industry response, often associated with tacit collusion models, is certainly possible. If one firm raises price by cutting back output, this may cause other firms to follow suit and also cut back output, increasing prices closer to the joint profit-maximizing monopoly level. Conversely, a rise in exports by domestic firms brought about by an export subsidy could lead to an increase in output by other firms and a further fall in prices, reducing the profitability of the domestic industry. Such would be the case under what is called Bertrand competition, in which each firm assumes that if it changes its own price, other firms will maintain their price even in the face of loss of sales. In this case an export tax rather than a subsidy would increase domestic profits from exports.

On the other hand, the Eaton and Grossman (1983) analysis applies most easily to short-run pricing decisions after capital is in place. In the earlier stages of product development, there may well be a prior game between rival firms as to the level and timing of capital investments. In highly capital-intensive industries, capacity decisions will condition the nature of future price rivalry, exerting an important influence on overall profitability and market share at the future production stage. For example, if an industry has a large and inflexible capital requirement, once the foreign firms are at capacity, an expansion of domestic output cannot induce an immediate expansion in foreign output as is implied by Bertrand price behavior. Theoretical work by Kreps and Scheinkman (1983) supports this view.⁴

In such industries it would seem likely that an early and large domestic investment would tend to preempt the foreign competition leading to the lower foreign investment and output in the long run, which is required if targeting is to be domestically beneficial. Govern-

ment policies that increase domestic capacity are likely to serve as signals to foreign governments and firms that domestic output will be higher so that the return on investment to foreign firms will be lower. Such policies are likely to be most effective in reducing foreign capacity if they occur relatively early in the product life cycle before plans for foreign capacity have been finalized.

This discussion should make clear that one of the problems in implementing targeting is that the nature of the reaction of the foreign firms and governments may not be known. Further study of this complicated question would be needed on an industry by industry basis. In effect, this discussion implies the following requirements for successful use of targeted subsidies:

Characteristic 2 The domestic industry must be subject to serious foreign competition or potential competition. Subsidy of the domestic industry should lead foreign rival firms to cut back capacity plans and output. Although they are not necessary, large and inflexible capital requirements are likely to increase the chances of this type of behavior.

Industry Concentration

As indicated in the previous section, an export subsidy will increase domestic welfare only if the enhancement of domestic exports from a subsidy is not "too large" in relation to the reduction in sales or rival foreign firms, so the fall in price associated with the subsidy is kept to a minimum. Assuming that the industry satisfies characteristics 1 and 2, some factors are likely to magnify the tendency for domestic expansion to be at the expense of foreign rivals, making the industry a better prospect for domestic targeting.

Dixit (1984) and Eaton and Grossman (1983) have shown that the price fall associated with an export subsidy is likely to be lower, the more concentrated is the domestic export industry relative to the foreign competition. Hence this consideration tends to favor subsidization of those industries or parts of industries that consist of fewer domestic than foreign firms. The exact form of this result does require some special assumptions on the nature of the industry, but the direction of effects should still remain.⁵

Considering the foreign industry first, a given increase in domestic

output tends to reduce foreign output more, the greater the number of foreign firms or the less concentrated the foreign industry. With a greater number of foreign firms each firm may tend to cut back less, but the total reduction in output tends to be higher for a given expansion in domestic output induced by a subsidy.

Also declining marginal costs, both short and long run, magnify the tendency for foreign output to fall in response to domestic expansion. In the short run a cutback in output then raises marginal costs, reducing the profitability of output at the margin so that output is reduced more than if marginal cost were constant. In the long term foreign firms would move to plants designed for a lower level of output, raising their average costs because they are able to take less advantage from economies of scale.

Turning to the question of concentration in the domestic industry, for any one domestic firm the response of rival domestic firms to an industry subsidy is just as important for profits as the response of rival foreign firms. As expressed by Eaton and Grossman (1983), there is a kind of pecuniary negative spillover between domestic firms, in the sense that each firm in choosing its output considers only the effect of that output choice on its own price and profits and does not take into account the way its actions may affect other firms in the domestic industry. An increase in sales by any one domestic firm tends to reduce the price and profits received by other domestic producers. One normally applauds this effect, which leads to more competitive pricing as being in the best interest of domestic consumers, but if sales are mainly to foreigners, the country's best interest lies in keeping monopoly profits high. This negative effect of the expansion of other domestic firms on the price and profit earned by any one domestic firm tends to be smaller the more concentrated is the domestic industry, since there are then fewer firms to which the externality applies. Of course, as indicated earlier, even if there are a large number of domestic firms, the existence of an equally large number of foreign firms can offset this effect, so that an export subsidy can still be advantageous.

Assuming that firms have Cournot behavior and each firm produces the same product at the same cost of production, the effect of industry concentration on whether a domestic export subsidy would reduce foreign sales sufficiently to raise welfare is summarized in characteristic 3:

Characteristic 3 The domestic industry involved in exporting should be more concentrated or equally as concentrated as the rival foreign industry.

This advantage from domestic concentration points toward an argument for relaxation of antitrust laws for firms that are heavily engaged in export sales. This could facilitate the internalization of the negative spillovers from independent pricing of export sales by domestic firms. The cost of all this, of course, is that the same cartel-like pricing behavior could carry over to the domestic market.

Factor Price Effects

The rent extracted from export sales includes rents received by workers as well as total profit. Workers receive rent if they earn more than the opportunity cost of their labor. As explained by Krugman (1984), if an export subsidy results in an increase in employment so as to increase the total rent earned by workers in industry, this is a benefit to the economy just as much as an increase in industry profit. On this basis the existence, for example, of high worker rents due to unionization might be used as an indication that the industry could be a candidate for targeting by the government.

However, the existence of a union brings an additional player into the strategic game between firms and governments, and government subsidy policies rather than just increasing employment would under normal conditions result in an increase in the union wage.⁶ This increase in the wage with the same or higher employment level would increase the total rent earned by workers. However, this is not just a transfer of profit from shareholders to workers, leaving the total surplus earned by the industry unchanged. An increase in the wage by increasing marginal costs affects the result of the strategic game, reducing the level of exports as well as the total rent earned by the industry. To the extent that a subsidy is reflected in a higher wage level, this undoes the strategic effect of the subsidy, making each subsidy dollar less effective.

Of course the impact of a union on the effectiveness of targeting depends on both the nature of the union bargain and the nature of the subsidy or protection tool. If the union contract depends partly on profit sharing, then the union will have an incentive to raise wages

less in response to a subsidy, increasing the bonus payments of workers from profit sharing. In the extreme, if the union set wages at the competitive level so that all transfers of rent to workers comes from profit sharing, then the union would have no effect on the total domestic rent earned from government intervention.

Also certain means of subsidization are more likely to result in an increase in the union wage than others. My conjecture here is that a subsidy tool that reduces the negative impact of a wage increase on employment more than other tools is likely to lead the union to be more aggressive in raising wages. For example, direct and permanent wage subsidies would likely have the least restraining effect on the union. Wages would have to increase by more than the subsidy per worker in order to reduce employment. In the case of a capital or R&D subsidy an increase in the wage bill equal to the total amount of the subsidy would tend to lead to a substitution of capital for labor and intensify the search for labor-saving innovations. This prospect may lead a union to be more moderate in its wage demands.

If inputs are not easily substitutable in production, a production subsidy or subsidy per unit of output would affect the union wage in the same manner as a wage subsidy. This effect would be reduced if the subsidy were restricted to export sales, as is the case with the current interest rate subsidy to purchaser financing which is provided by the Export-Import Bank. Most exporting firms also produce for the domestic market, and the union wage bargain covers both domestic and export sales. The prospect of a reduction in domestic sales and employment from a wage increase should mitigate the tendency for wages to rise.

A further factor price effect to be considered is the possibility that there is a fixed amount of some critical input used in a group of exporting industries. Dixit and Grossman (1984) show that in this case an export subsidy to one of the exporting industries would increase production of that industry, but mainly at the expense of the profits and sales of other exporting industries. Dixit and Grossman suggest that such an input might be scientists or engineers of a particular kind. It is clear that this could be a problem, particularly in the short run. In the long run, inputs are not generally fixed in supply. Given the demand, more engineers and scientists would be trained in the United States, and additional skilled workers would emigrate to the United States from other countries.

These considerations lead to characteristic 4 of industries most likely to be suitable for targeting:

Characteristic 4 Factor prices should not increase much in response to domestic targeting. This is more likely if

- i. the industry does not have a strong union;
- ii. worker incomes are at least partly based on profit sharing;
- iii. no key input is in fixed supply.

Cost Advantages

Another question is whether subsidy money is better directed toward those industries where a country already has an initial advantage, such as cheaper raw materials or better-trained workers, or whether the money would be better spent in some way compensating for higher costs of production relative to the foreign competition.

If the nature of the industry is such that an export subsidy is beneficial, it can be shown that the lower the initial domestic cost relative to foreign marginal cost, the greater is the domestic gain from a given amount of subsidy. There is a greater return in increased profit from each subsidy dollar if the domestic industry already has a natural advantage relative to the foreign competition.

In addition the very nature of imperfect competition leads it to be associated with scale economies, which provide a barrier to entry and thus maintain the industry profitability. In this case government intervention, particularly in the form of subsidies to capital, can lead to a lowering of marginal cost sufficient to create a domestic advantage where otherwise it might not have existed. Of course it does not follow that such a policy is necessarily in the country's best interest. Rather, this consideration indicates that if an industry has a natural cost advantage in production such as cheaper raw materials or location advantages, and if in addition it is subject to learning economies or other scale economies, then it is a better candidate for targeting than otherwise. This idea is expressed as characteristic 5:

Characteristic 5 Targeting is more effective if

- i. the domestic industry has a fundamental cost advantage relative to the foreign competition;

ii. there are substantial scale or learning economies from increased production.

More fundamentally, innovation in products or processes can lead to the creation of an initial absolute advantage in the production of a product. It has been argued that because of spillover effects of R&D or transfer of technology to other firms, an innovating firm will be unable to appropriate fully the return from R&D. Patent protection can help to overcome this problem, but it has proved less than fully effective, particularly in the international arena. In those industries where there are major problems from appropriation of returns from R&D, private incentives can lead to too little R&D from the viewpoint of the best resource allocation within a society.⁷ Transfer of technology to other firms confers benefits to society that are not taken into account by the innovating firms.

This traditional argument for government subsidization of R&D arising from the existence of substantial spillover effects of R&D depends on taking a world view of welfare, rather than the more national view in which the gains and losses of other nations are not taken into account. From a domestic viewpoint it is important whether the externalities are conferred on domestic or foreign firms. If there is oligopolistic rivalry between foreign and domestic firms, any spillover of domestic R&D to the foreign firms is likely to reduce the rents earned by domestic firms in international markets. This effect could lower the domestic benefit from R&D subsidies. Domestic policies can be designed to reduce the extent of spillovers of domestic R&D to foreign firms. For example, the law could be amended to reduce the ease of licensing of U.S. innovations to foreign firms.

Even if a firm is not first in innovating a product, it may still do well if it is in a position to copy and improve on major innovations being made elsewhere. If there is international rivalry, this means that a domestic industry will be better off if it is in a position to take maximum advantage of spillovers of R&D from foreign firms. For example, it has been suggested (e.g., Weinstein et al. 1984) that the Japanese semiconductor industry has benefited substantially from U.S. R&D in basic technologies. By concentrating on process technology, the Japanese were able to replicate or adapt U.S. designs at low cost. This enabled them to capture in a relatively short time a large share of the market in consumer products using semiconductors. Government support of activities that speed the transfer of foreign

technology to domestic firms can be domestically beneficial. These considerations lead to characteristic 6:

Characteristic 6 A domestic industry will be a better candidate for targeting by R&D subsidies if

- i. there is a minimum of spillover of new domestic technology to rival foreign firms;
- ii. the government intervention aids the transfer of foreign technology to domestic firms.

On the other hand, if there are no spillovers of R&D so that domestic firms can appropriate the full return from R&D, an increase in domestic R&D due to government subsidies can set the stage for an increase in profits from export sales, which more than exceeds the cost of the R&D subsidy. Just as in the case of capital subsidies, this policy is effective to the extent that it leads foreign firms to reduce their R&D levels (see Spencer and Brander 1983). Domestic firms alone may not be in a position to achieve such a response. If a domestic firm announces that it is substantially increasing its expenditure on R&D, this may not be entirely convincing or credible to foreign firms who may decide to continue with their R&D plans, making the domestic increase in R&D unprofitable. On the other hand, increased domestic expenditure on R&D would be expected as a natural response to a domestic subsidy to R&D and could well indicate to foreign firms that their research in this area is less likely to pay off. Hence supporting R&D-intensive industries could be one way of obtaining a greater share of future winning industries.

There also may be a connection between government support of R&D and capital investment in the early stages of a product's development and the future structure of the industry in terms of the eventual number of firms in the industry and the timing of their entry. In the early stages of a product's life cycle, an initial innovating firm may have a temporary monopoly of the product. After a time imitators enter, reducing the profits of the innovating firm and bringing the industry into what is often called its "mature phase." Government subsidies to investment by the original firm can allow it to enjoy greater economies of scale, making entry by other firms less profitable. There may be a domestic gain if such policies reduce the number of foreign entrants or delay the entry of foreign firms. These ideas are summarized in characteristic 7:

Characteristic 7 If a domestic industry is involved in rivalry with foreign firms, it will be a better candidate for targeting by R&D and investment subsidies if

- i. R&D and capital costs form a significant proportion of industry costs, indicating they are important factors in firm rivalry;
- ii. a likely winning product is in the early stage of development or production and R&D, and capital subsidies will raise entry barriers to foreign firms.

Targeting and Import Protection

Tariffs and quotas can also be used to target domestic industries. If there are significant scale economies or dynamic learning economies from moving down the experience curve, the closing or partial closing of the domestic market to foreign competition can in theory lead to a lower marginal cost of production which then promotes success in exports (see Krugman 1984). Indeed, it has been argued that the existence of a closed domestic market in Japan allowed Japanese firms to gain sufficient experience in modern technology so as to become a force in international competition. Also, if the domestic market is large, protection, by taking away potential sales by foreign firms, may inhibit foreign entry in industries with high entry cost. This would leave the market clear for a domestic firm to enjoy maximum scale economies (see Dixit and Kyle 1984).

However, this method of promoting exports is rather indirect and can easily lead to the reverse result. For example, in economies such as Australia and Canada, high tariff walls in certain industrial fields have led to the development of too many small plants which do not have sufficient scale economies to compete successfully on the world market.

Even if tariffs and quotas allow achievement of some scale economies by domestic firms, commonly they will still have the effect of raising prices in the domestic market, to the detriment of consumers. In comparing protection with subsidy measures of industrial promotion, one must always keep in mind that protection normally reduces world trade, whereas subsidies are generally trade enhancing. Broadly speaking, subsidy measures have a better chance of improving world welfare (including consumer benefits) than do protection measures.

This is not to say one should accept foreign subsidization of rival firm production as a gift. Foreign subsidies may help domestic consumers, but if they reduce the profits earned by domestic producers, in many cases the economy will lose as a whole. Tariffs in the form of antidumping duties can therefore be an appropriate measure to offset the effects of foreign targeting practices on the domestic economy.

Targeting by Other Governments

An important question is the way targeting by other governments might affect the criteria for domestic targeting. It has been argued that the U.S. government should match foreign subsidies so that U.S. industry is not put at a disadvantage by foreign governments. This is the so-called "level playing field" argument.

It should be clear from the criteria for targeting that have been presented that such a policy is not likely to be generally advantageous. In the first place the very fact that an industry or product group has been targeted by a foreign government reduces the expected rent to be earned by other firms in the industry (see characteristic 1). Even if the domestic return from subsidization is still positive, if foreign targeting has been successful in reducing foreign marginal cost, the domestic return from a subsidy will be lower than otherwise (see characteristic 5). In other words, although matching foreign subsidies may make a "level playing field," the playing field is now at a lower level than before. Prices and profits in each country are likely lower after subsidization by both governments than if there had been no government intervention (see Brander and Spencer 1984).

Also the industries that are most suitable for targeting by foreign governments may not always satisfy the criteria for a national gain from domestic targeting. For example, if the industry is highly concentrated in the foreign country but not in the United States, this asymmetry will tend to favor a foreign subsidy but will make the optimal U.S. subsidy low or perhaps even negative, implying that an export tax would be appropriate.

On the other hand, a domestic government should not necessarily be dissuaded from supporting certain industries that meet the required characteristics, just because a foreign government has decided to target the same industry. An important consideration is the nature of any foreign subsidy program. For example, it is important whether the foreign subsidy program and the proposed domestic program are

directed toward a broad or a very narrow group of products and whether the foreign subsidy program is fully committed in the sense that it cannot be changed by domestic actions.

If a foreign government targets a narrowly defined product such as the 250K semiconductor chip, then similar domestic targeting of the same product is not likely to be beneficial. The domestic government would be better off being first to promote some other likely growth product, although even this is a highly risky policy. If one basically believes in private enterprise, a domestic response to foreign subsidization in the form of subsidization of a broad group of industries such as the semiconductor industry as a whole would have the advantage of allowing private domestic firms to continue to choose the specific products to be developed, presumably taking into account the likely foreign developments. Unless a product promoted by a foreign government had exceptional potential, the domestically chosen products are likely to be significantly different from those of their foreign rivals, making the foreign subsidization of the industry less relevant.

Some types of foreign subsidies can more easily be reduced by negotiation and other domestic actions. A foreign subsidy program that has already resulted in increased R&D and capital expenditure in specific products will have long lived effects on the distribution of any rents earned on those products, even if domestic government pressure reduces future subsidy levels. On the other hand, subsidies such as those that reduce the cost of export financing have less of a long-lived effect on the profitability of exporting industries and may also be more amenable to bargaining tactics. A domestic policy of matching such a subsidy set by a rival producing nation could in the short run allow domestic firms to achieve a major sale and, by nullifying the advantage from the foreign government action, could be an important bargaining tool to reduce subsidy levels. This appears to be the situation with the type of help to export financing which is provided by the U.S. Export-Import Bank.

Targeting of Export-Oriented Industries versus Purely Domestic Industries

The question has been raised as to why subsidize exports when the tax money could equally be spent on subsidizing domestic sales. For example, Baron (1984, p. 79) argues that both policies could help the industry achieve economies of scale, lowering prices, but a subsidy to

domestic sales would have the advantage of being kept at home rather than becoming a gift to foreign consumers.

First, the reasons for subsidizing exports or export-oriented industries imply very different policies from those associated with helping the domestic consumer. If it is the domestic consumer the government has in mind, targeting policies could well include efforts to increase entry of new firms into the industry, reducing the degree of industry concentration, which tends to lower prices and profits. This policy is just the opposite of those implied by the theory of export targeting. The logic of targeting of exports is based on raising the profits of domestic firms at the expense of the sales and profits of foreign rivals. Consumers will not necessarily benefit much, since an increase in domestic profits depends on prices not falling too far.

Also, if there is but one monopoly or oligopolistic industry within an otherwise perfectly competitive economy, one can say that the output of the monopoly is too low relative to the optimal product mix from the viewpoint of consumers. This is not the case in an economy with a large number of monopoly and other types of distortions. The theory of the second-best indicates that unless all distortions are undone by domestic policies, an attempt to remove a few distortions by subsidizing domestic sales of some oligopolistic industries may not result in a net improvement in consumer welfare. Some industries may expand too much, relative to other monopolistic industries that are not subsidized or do not respond in the same way to the subsidy program.

For both the preceding reasons, the direct inclusion of consumer preferences in a targeting program is likely to distort and complicate the application of such a program, making it less likely that increased domestic benefits would be achieved. However, if domestic consumer preferences are not taken into account, then the same kind of argument that has been presented in support of subsidies to exporting firms would also apply to domestic sales. Because of imports, domestic firms may well face competition from foreign firms at home as well as abroad. To the extent that a subsidy will increase sales of domestic firms at the expense of imports, the country can gain from the transfer of profits from foreign firms.

This does not mean, however, that whenever it is advantageous to subsidize exports, it will also be advantageous to subsidize domestic sales. If, as we have been assuming, the domestic and foreign markets are separate in the sense that different prices can be charged

in the two markets, the structure of competition could well be different at home than abroad. For example, there may be a higher proportion of domestic to foreign firms serving the domestic market than foreign markets, which reduces the chances that a subsidy on domestic sales will be socially beneficial. Some types of policies, such as subsidies to capital and R&D or encouragement of research joint ventures, naturally apply to both foreign and domestic markets. Since these types of policies could well be particularly helpful in the long-run strategic game between firms, consideration of their effects on both the domestic and foreign markets would be required.

An Example

One example of targeting of an industry that broadly fits the criteria of this paper is provided by the development of the European Airbus consortium. Indeed, government support of the European Airbus consortium may be one case in which a government subsidy program has proved effective. The consortium is approximately 70 percent government owned and enjoys substantial subsidies from the French and German governments, which on some calculations amount to about 20 percent of the airplane price. Airbus has managed to capture a substantial portion of the commercial wide-body jet aircraft market at the expense of sales of U.S. competitors, such as Boeing and McDonnell-Douglas. It seems clear that government subsidization has allowed the Airbus to obtain a larger share of the world market than it otherwise would. Indeed it is rather unlikely that an unsupported private European firm would have entered the market at all.

Whether government subsidization will translate into economic success in the sense that the additional profits earned from the Airbus are more than sufficient to pay for the subsidy is not yet clear. However, the aircraft industry does satisfy a number of the criteria that theory indicates are likely to be important for a successful targeting program. The industry has substantial barriers to entry because of large capital and R&D requirements increasing the chances of good returns on investment. From the European perspective there is substantial foreign competition (from the United States) so that European sales are at the expense of the sales and profits of foreign firms. Indeed, since the European Airbus consortium is the only European contender in the wide-body aircraft market, subsidization is particu-

larly effective since additional sales cannot reduce sales of other domestic firms.

Apparently the Japanese are also interested in targeting their aircraft industry, although the Japanese are not yet a major force in this industry. Whether the Japanese can also be successful remains to be seen. As indicated in the previous section, the theory of industrial targeting indicates that as more governments subsidize the same industry, the possible gains from subsidization are reduced. Countries could benefit from mutual agreements not to subsidize.

Conclusion

Fundamentally the possibility of a domestic gain from a government subsidy program targeted to a particular industry depends on the way in which government intervention affects the strategic interplay between foreign and domestic firms. This argument therefore depends first on the existence of imperfect competition in the targeted industry and on the nature of that competition. There is general agreement that many industries are not perfectly competitive, but it would be much harder to get agreement that any particular industry fit the somewhat abstract requirements indicated by the theory. Nevertheless, theory in industrial organization and trade does give some guidance as to the broad characteristics one would need to look for in developing a targeting program of a type that might have some chance of conferring a net domestic benefit.

For example, one should look toward those industries in which the domestic country is likely to have a natural advantage relative to the foreign competition even if there were no government intervention. Lower existing domestic marginal costs tend to increase the impact of each dollar spent on a subsidy program in raising domestic export profits (characteristic 5, part i). Also factor prices in the industry should not tend to increase much in response to targeting. This is more likely to be the case if the industry does not have a strong union or, if the industry is unionized, that worker incomes be at least partly based on profit sharing (characteristic 4, parts i and ii). Furthermore no key input should be in fixed supply (4, part iii).

More important, a number of the conditions for profitable targeting of export-oriented industries point toward industries that have large capital or knowledge requirements. Such requirements provide bar-

riers to entry that help to ensure that domestic firms at least have a potential for earning substantial profits from export sales (characteristic 1). Commitment to heavy expenditures on capital and R&D can play a central role in the strategic game between firms (characteristics 2 and 7, part i). This strategic game in capital and R&D which naturally occurs in the early stages of a product's life cycle has a major influence on the eventual profitability of the product in the mature production stage of the industry (see characteristic 7). Among other things this game also affects the eventual concentration of the domestic industry relative to the foreign industry, which is a factor in the effectiveness of any continuing government promotion of the industry (see characteristic 3). Finally, we associated decreasing average costs of production and dynamic learning economies with heavy capital and knowledge requirements for production. As indicated in characteristic 5, part ii, these scale economies tend to magnify any advantage from a government subsidy program.

This emphasis of the economic theory on large capital and knowledge requirements strongly point toward the encouragement of the development of new products and processes as part of any targeting program that might hope to lead to a national benefit rather than just favor some special interest group. The enhancement of the ability of domestic firms to pick up quickly on new advances being made elsewhere could also be important.

However, even if it had been decided that a targeting policy of this kind were desirable, many more theoretical as well as practical issues remain. For example, it should be clear from this paper that an advantage from targeting can depend not only on the right choice of industry to target but on the nature of the targeting instruments themselves. Although we know that a direct production subsidy is likely to have different effects than a wage subsidy or certainly than a capital or R&D subsidy, very little study has yet been done on this question.

In particular, given that the creation and maintenance of high profits is a key requirement of the theory, more information is needed on the likely effects of various methods of targeting on both foreign and domestic entry into a targeted industry. For this purpose the question as to whether a targeting policy should be narrowly focused toward a single firm or product, or broadly focused toward an industry as a whole, is also important. The answer to this can partly depend on the nature of the targeting instruments. For example, an

industrywide export subsidy may create entry of domestic firms, reducing the domestic advantages from the subsidy, but a broadly based R&D subsidy applied to the same industry may lead to the creation of new products for which the innovating domestic firm has at least a temporary world monopoly. Even if it is decided that an active U.S. industrial targeting policy is not appropriate, research on the likely effect of various targeting policies within different industries could help us understand foreign targeting practices and the best methods to counteract them.

As a final concluding remark I would like to emphasize that I believe it is important that policy discussion on industrial targeting proceed so far as possible from facts concerning particular industries and the likely effects of targeting policies, rather than from preconceived notions arising, for example, from the traditional competitive trade model, which may not be very relevant in many real industrial situations. Also it would appear that the tax code in the United States already has many provisions that have the effect of promoting some industries relative to others. For example, rules for depreciation of commercial real estate tend to promote real estate development. One would hope that a better understanding of which types of intervention are more likely to improve rather than worsen overall domestic welfare could at least modify the distribution of government expenditure and tax relief in the right direction relative to the present somewhat haphazard system.

Notes

1. See Spencer and Brander (1983, 1984) for the basic theoretical argument.
2. See, for example, USITC publications No. 1437, October 1983, and No. 1517, April 1984.
3. This paper should not be viewed as an overall survey of the literature on industrial targeting. Other criteria as to which industries should be targeted have been suggested. Krugman (1983) provides an excellent discussion and critique of some of these.
4. Kreps and Scheinkman (1983) show that if firms play a two-stage game in which capacity is chosen prior to output and if capital requirements are inflexible, then under some mild assumptions on demand, the unique outcome is a Cournot equilibrium. Under this structure a higher domestic capacity should reduce the equilibrium levels of capacity and output of the foreign firms.
5. This result does depend on some specific assumptions concerning the

nature of the industry. For example, firms are assumed to have Cournot behavior, implying that in equilibrium each firm will have chosen the level of output that maximizes its own profits given the level of outputs of the other firms. Also it assumes that each firm produces the same product at the same cost of production.

6. See Brander and Spencer (1984) for a model of the strategic interplay between firms and a union in a partially unionized industry. It can be shown that a subsidy on exports of the unionized firm would be substantially absorbed in higher wages, reducing the effectiveness of the subsidy.

7. There is an opposite argument: that excessive duplication of research effort by competing firms will lead to an excessive use of resources for R&D. If this is the case encouragement of research joint ventures by domestic firms could solve this problem by allowing R&D dollars to be spent more effectively (see Grossman and Shapiro 1984).

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