

88-F-1

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Industrial Policy on International Trade

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February 1988

PREPARED UNDER
THE PROJECT ON APPLIED ECONOMICS
RESEARCH INSTITUTE FOR THE JAPANESE ECONOMY[#]

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THE IMPACT OF INDUSTRIAL STRUCTURE AND
INDUSTRIAL POLICY ON INTERNATIONAL TRADE*

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1. Introduction

Contemporary trade among the developed industrial countries is far removed from the world described by textbook or classical trade theory. According to textbook trade theory comparative advantage is determined by such exogenous factors as climatic conditions and factor endowments. But in such industries as semiconductors, computers, finance, and automobiles, the competitiveness of individual firms and the comparative advantage of individual countries are determined largely by the firms' experience and R & D activity, and by the governments' regulations and industrial policies. Exogenous conditions play a relatively small role.

Neither does the static nature of the world described by textbook trade theory correspond to reality. The industrial structure and trade patterns of individual countries are changing with lightning speed, and textbook economic theory does little to help us grasp the meaning of these changes. Japan's post-war experience offers some valuable insight into this subject. In the process of rapid economic growth, Japan's industrial structure has shifted first from an emphasis on textiles and other light industries to an emphasis on heavy and chemical industries, and then following the first oil shock, to a greater emphasis on machinery and other more sophisticated

products. Understanding this kind of rapid change in economic structure is essential for grasping the causes of Japan's rapid postwar economic growth.

To a greater or lesser degree, all countries go through this kind of change in their industrial structures. Today the frontier technologies are spewing out new products in rapid succession and fundamental changes are being predicted for the older industries as well. These technological changes are altering the industrial structures of individual countries, which in turn has an enormous impact on international trade and on the international economy.

Another area where textbook trade theory diverges from real-life trade is on the matter of oligopolistic industries. Textbook trade theory posits a world of perfect competition, but in the real world there are more than a few industries where oligopolistic firm behavior is a major problem. The expanding multinational corporations, for instance, show strong oligopolistic characteristics. The importance of this issue is underlined by the fact that it is precisely those industries which tend to produce trade disputes, such as aircraft, semiconductors, computers, and automobiles, that cannot be understood without taking into account their oligopolistic nature.

This paper will attempt to use economic theory to explore the kind of trade issues to be faced by the major countries in the world economy, Japan the United States, and West Germany, and the influence their trade policies and industrial policies will exert on the Western economies and on international trade. This kind of a topic obviously covers an enormously wide range of issues; I will limit my focus here to industrial structure and oligopolistic industries.

The structure of this paper will be the following. In Section 2 we will examine changes in industrial structure and trade patterns. We will consider what role R & D investment and experience by firms play in creating these kind of changes. We will then develop a simple economic model to analyze the influence which changes in industrial structure in individual countries exerts on world trade patterns, and the distribution of trade benefits among individual countries which arises from such changes. We will also analyze the effects of industrial policies carried out by individual governments.

In the third section we will examine trade and industrial policy for oligopolistic industries. In recent years there has been a great deal of research on the effects of policy toward oligopolistic industries. In this section, in addition to surveying the various studies done on the topic, I hope to suggest the implications these studies have for the policies of the three leading economies. In the fourth section we will consider the problems of the international trade system centered around the GATT, and the positions individual governments should take toward it, in light of the economic analysis in the preceding sections.

2. Change in Industrial Structure: What Causes It and What Difference Does It Make?

According to a textbook theory model of trade, each country's trade is determined by such exogenous conditions as climate and factors of production. This kind of a model depicts a static world in which industrial structures do not change. But in the real world, the industrial structures of individual countries change dynamically. Nor are the principal

determinants of corporate competitiveness and nations' comparative advantage factor endowments, but rather the economic activities of particular companies, such as their R & D investment and experience, that is to say, endogenous variables.

Let us try explaining this point in view of Japan's post-war experience. ¹ Table One shows changes in the sectoral make-up of Japan's post-war exports since World War II. As is clear from the table, Japan's exports have changed dramatically. Immediately after the war textiles figured importantly in Japan's exports, but then over the course of Japan's rapid growth phase and the first oil shock, there was an extremely rapid shift towards machinery exports such as automobiles and electronics goods. Even during the late 1970s, after the peak period of rapid growth had passed, exports continued their strong shift towards machinery.

It goes without saying that behind this change in the industrial structure was a rapid increase in the productivity of the fast growing sectors. It is pointed out by many people that it was the concentration of productivity increase in the machinery sector which gave the impetus for the shift in Japan's industrial structure. The reason Japan's productivity growth has been faster than that of the U.S. is of course not because of exogenous factors, but because of companies' R & D activities and efforts to improve their production systems, as well as because of technological skills developed through production experience.

Japan's experience suggests at least two important points. The first is that a country's industrial structure has an enormous influence both on its trade patterns and its economic welfare. The second is that in most industries competitiveness at the corporate level and patterns of comparative advantage at the national level are not determined by factor

endowments or climate, but by technological factors. Moreover, these technological factors are determined by enterprise activity and government policy, which are endogenous factors. Clearly, what is needed is a theory of comparative advantage which takes technological factors into account. Below we will look at both these issues in more detail.

2.1 Industrial Structure and Gains from Trade

First let us consider the relationship between industrial structure and economic welfare. We will use a simple model, sketched out in Diagram One to analyze this question.² The main body of the paper will be limited to an intuitive argument. (For a technical analysis, see Itoh-Kiyono paper cited in footnote 2.) Diagram One divides goods into three categories. The first category, "basic technology goods," are those goods, such as textiles and other light industrial goods, in which the late-developing countries have a strong comparative advantage. The second is "borderline technology goods," in which the late-developing countries are quite close to the leading countries in competitiveness. Steel, shipbuilding, and perhaps mass-market automobiles would currently fall into this category. The third category, "advanced technology goods," is made up of goods which only the advanced industrial countries can produce competitively. Some examples of these would be high technology goods like semiconductors and aircraft and services like finance and communications.

When advanced countries and late-developing countries trade with each other, the advanced countries export advanced technology goods, the late-developing countries export basic technology goods, and both compete in the area of borderline goods. With this type of

situation as a starting point, what happens if there are changes in industrial structure?

First let us think about what would happen if there is change in the late-developing countries' industrial structure. There are two possible patterns by which the late-developing countries may change their industrial structure. The first is a pattern of falling costs in basic technology goods which had previously established competitiveness. The second is through the development of competitiveness in the borderline industries.

A question which inevitably comes up in the process of industrialization is whether effort should be put into making preexisting export industries more competitive, or into broadening the industrial base by establishing new export industries. In the case of Japan in the 1950s there was serious policy debate over whether Japan should protect industries like automobiles and steel which were not internationally competitive at the time.³ If the pattern of industrial development is something which can be changed by government policy, then the choice between the two patterns of structural change outlined above is a legitimate matter for public policy consideration.

If late-developing countries choose the development path of reducing the production cost of basic technology goods they already produce, probably no great structural changes will follow. What would happen in this case is that both advanced and late-developing countries would receive the benefits of lower production costs for the basic technology goods. The improvement in technological conditions in the late-developing countries would thus provide equal benefits for the whole world in the form of lower prices.

I will briefly elaborate this point here; there is a more detailed explanation of this point in Itoh-Kiyono paper cited at footnote 2. In

order to see the change in distribution of income between the advanced and late-developing countries, let us hypothesize what would happen if the following type of trade balance were to develop. ⁴

$$\text{late-developing countrys' imports} = \text{advanced countrys' imports} \quad (1)$$

Here it is possible to express the imports of each country as the product of the average propensity to import times income. Since the average propensity to import (or more briefly, "propensity to import") is defined as the proportion of a country's income which it spends on imports, it can be expressed in the following equation.

$$\text{average propensity to import} = \frac{\text{spending on imports}}{\text{income}} \quad (2)$$

If we substitute equation (2) into equation (1), we come up with the following equation:

$$\frac{\text{advanced countries' income}}{\text{late developing countries' income}} = \frac{\text{late developing countries' average propensity to import}}{\text{advanced countries' average propensity to import}} \quad (3)$$

where the numerator of the right hand side of (3) is the late developing countries' average propensity to import from advanced countries and the denominator is the advanced countries' average propensity to import from late developing countries. As the above equation makes clear, the ratio

between the advanced and late-developing countries' incomes is equal to the ratio between their tendencies to import from one another.

This equation is simply the result of combining our definition of the average propensity to import with the condition of balanced trade, and does not indicate that either the left or right sides of the equation are causally related. Although we must use a model in which utility function is explicitly considered in order to examine the welfare implication of the industrial structure change rigorously, we choose a less rigorous approach below and give some attention to the relative income (See Itoh and Kiyono op. cit. (1987) for a more rigorous analysis). Looking at the distribution of income between advanced and late-developing countries can provide an important perspective on the complex economic relationships which exist between the two sets of countries. Considering the factors which determined the late-developing and advanced countries' average propensity to import can provide insight into the factors which determine the distribution of income between them.

As I have shown in an earlier paper using a mathematical analytic model,⁵ the trade and industrial structures of the advanced and late-developing countries are important determining factors behind their average propensities to import. The larger the menu of export goods a country can provide, the greater other countries' propensity to import from it will be. As a country's industrial structure becomes more sophisticated it will be able to offer a larger menu of export goods.

Let us go back and think a little further about the basic technology, borderline technology, and advanced technology goods model we presented earlier. Even if the late-developing countries are successful at the pattern of industrial development which reduces the production costs of

basic technology export goods, they won't have done anything to expand the menu of export goods and services they have to offer the advanced countries. Unless demand for the goods is particularly price elastic, there will not be much change in either the advanced or late-developing countries' propensity to import. Therefore, there will also be little impact on the ratio of late-developing to advanced countries' incomes. This point can be restated in a more general way:

Industrialization by late-developing countries which lowers production costs in pre-established export industries will change the ratio of late-developing to advanced countries' incomes in one of the following possible ways:

(1) If the price elasticity of demand for the basic technology good in question is less than one, the late-developing countries' income will decrease relative to that of the advanced countries. ⁶

(2) When the price elasticity of demand for the good is equal to one there will be no change in the ratio of advanced to developing-countries' incomes.

(3) If price elasticity of demand for the good is greater than one, developing country income will increase relative to advanced country income.

It is unlikely that the price elasticity of demand for the basic technology goods exported by late-developing countries will be very high.

Even if it were high, it would be difficult for the late-developing countries to raise their relative incomes by improving the productivity of already established industries. If the price elasticity of demand were less than one, then their relative income would actually decrease. Of course, since there would be the benefits of lower prices for the good, industrialization focussing on pre-existing export industries would only actually prove injurious to the late-developers' overall economic welfare if the price elasticity of demand for the good were extremely low.⁷

In contrast, late-developing countries' success at developing borderline technology industries will lead to a significant change in the distribution of income between the late-developing and advanced countries. By lowering the cost of production of a borderline technology goods, the late-developing countries can add it to their menu of export goods. As a result they will have less need to import the good from the advanced countries, thus reducing their propensity to import from the advanced countries. And since the advanced countries will now import the borderline technology good from the late-developing countries, their average propensity to import from the late-developers increases. By lowering the numerator and raising the denominator on the right side of equation (3), this form of industrialization increases the late-developers' income relative to that of the advanced countries.

Japan's post-war development pattern is an example of industrial development shifting the industrial structure toward borderline technology goods. In the period immediately following the war, the rest of the World had a low propensity to import from Japan, which could only export inexpensive textiles and other light industrial goods. Japan, which depended on foreign imports for machines, fuel, and raw materials, had a

potentially very high average propensity to import. Strict import controls prevented this potential demand for foreign goods from being realized. Subsequently, Japan's industrial structure changed dramatically, with shipbuilding, steel, electronics goods, automobiles, and machine tools being nurtured as export industries. As a result, foreign countries' average propensity to import Japanese goods increased. In comparison, Japan has been slow to increase its average propensity to import. It is this process of structural change which has been behind the relative increase in Japan's income level.

Thus, industrial development which moves the late-developing countries into the borderline industries serves to raise their relative income position vis-a-vis the advanced countries, in addition to giving the late-developing countries the benefits of lower prices for borderline goods. When borderline goods industry is subject to dynamic scale economies, on which we will consider more in detail in Section 2-2, the welfare impact of the change in the issue of industrial structure as discussed above has an important implication on infant industry protection policy. It can be proved that infant industry protection policy for borderline goods industries will increase the national welfare (Some theorems in Itoh and Kiyono op. cit. (1987) can be extended to prove this point).

Since welfare gains from the establishment of borderline goods spreads over entire economy (thus there is an external economy), there is a reason for the government to protect the borderline goods industry. The national gain from the establishment of the borderline goods industry is much larger than the private gain for the industry itself. This kind of general equilibrium impact of infant industry protection policy has not been discussed much in the traditional literature. However, this impact is one

of the most important feature of the postwar Japanese industrial policy. See Itoh, Okuno, Kiyono and Suzumura op. cit. for more details on this issue.

As for the effect of this kind of industrialization on the advanced countries' welfare, two factors are at work in opposite directions. On the one hand there is the benefit of cheaper borderline goods from the late-developing countries, but on the other hand, there is the disadvantage of a lower relative income. 8

The shift of late-developing countries into borderline industries often leads to trade conflict. Borderline industries have figured prominently in the numerous trade conflicts which have occurred between Japan and the Western countries, particularly the United States. Textiles in the 1950s, steel in the late 1960s, electronics goods in the 1970s, and automobiles since the late 1970s, all correspond to the borderline industries in our model. In order to succeed at economic development, late-developing countries must not only lower costs in already established industries, but must also expand into borderline industries. But since this kind of industrialization brings with it changes in the distribution of income between late-developing and advanced countries, it tends to create trade friction.

What policies should advanced countries adopt in the face of encroachment by late-developing countries into borderline industries? One possibility is trade protection and various forms of subsidies aimed at maintaining domestic firms' competitiveness in the affected industry. As we said earlier, it is unclear whether the expansion of late-developing countries into borderline goods improves the economic welfare of the advanced countries or not. It is therefore also unclear whether

protectionist policies by the advanced countries will benefit them or not. If protectionist policies by the advanced countries provoke the late-developing countries to also adopt protectionist policies, total world trade may shrink, thus hurting the interests of all parties.

Next let us consider the impact of changes in the industrial structure of the advanced countries. Industrial development in the advanced countries usually means the development of new products in advanced technology industries. What effects will this have on equation (3)? The development of new products will probably lead to some shift in demand from basic and borderline technology goods to advanced technology goods. This shift in demand will also cause expenditures to shift away from basic and borderline technology to advanced technology goods. This will increase the propensity to import goods produced by the advanced countries and decrease the propensity to import goods from the late-developing countries. As a result of this change in propensities to import, the advanced countries' income will grow relative to that of the late developing countries.

Thus, both the expansion of advanced countries into new areas and the expansion of late-developing countries into borderline industries will have the same effect of increasing the relative income of one of the two sets of countries. But the former has certain aspects which the latter lacks.

First, by increasing the variety of goods and services available, advanced countries' expansion into new areas contributes to the economic welfare of the late-developing countries as well as to their own. And second, the expansion of the advanced countries into new areas not only raises their incomes, but also raises their factor costs. This lowers the advanced countries' competitiveness in borderline goods and facilitates the late-developing countries' advance into those industries.⁹

Given these two points, the expansion of advanced countries into new fields clearly also brings significant benefits to the late-developing countries. But it is uncertain whether these benefits outweigh the drop in the late-developing countries' relative incomes. If the new products developed by the advanced countries simply serve to replace older products, then the drop in the relative income will overshadow the benefits. But if the new product serves new functions and provides new benefits, then these along with the new opportunities for competition in old industries, may be more important.

As we have seen, the structural changes which accompany industrial development have major effects, not only on the country undergoing the development, but on its trading partners' economic welfare as well. In order for their economic growth to produce international harmony by benefitting the other advanced and late-developing countries, it is imperative that the advanced countries expand into new fields. This will help the late-developing countries moving into the borderline industries without threatening the income of the advanced countries.

2-2 The Determinants of Industrial Structure: Dynamic Scale Economies

According to textbook economic theory, comparative advantage is determined by production factor endowments, which are exogenous conditions. But such factor endowments as land and labor (in its simplest meaning) do not go very far in explaining current patterns of international trade in industrial goods. The technology and know-how developed by private firms is much more important. This is a very important point when it comes to

explaining the competitiveness of different advanced countries in new areas of production.

The two factors which best explain how firms improve their technologies and lower their production costs are (1) production experience, and (2) investment in research and development. Economies of scale are important in both of these factors and to a great extent the combination of experience and R & D investment determine patterns of trade. ¹⁰

Let us explore this issue a little further. Firms acquire most of their know-how through actual production experience. For instance, the learning curve effect is said to be quite important in semiconductor production. ¹¹ By "learning curve effect" we mean the effect of an increase in the cumulative level of production leading to a decrease in the unit production cost. Since solutions to technical problems as they come up improve the production process, it makes sense that the more production experience, the lower the production costs. This kind of learning curve effect can be observed to some extent in most industries, and is especially marked in these frontier technology industries. Although it is not one of the frontier technology industries, Toyota's "just-in-time system" (kanban system) is an example of a production system which was only possible after Toyota had accumulated a great deal of experience.

In industries where production experience can lead to dramatic cost reductions, a firm can establish a cost advantage by getting a jump on other firms in building up its production volume and thus accumulating experience. These types of economies of scale, in which timing and cumulative production over time is important, are called "dynamic scale economies" by economists.

In industries in which companies' R & D investment is an important factor in developing competitiveness, the same kind of dynamic scale

economies arise. R & D investment is a fixed cost, which is to say that production of a larger volume of goods will reduce the R & D investment cost per unit.

In industries where dynamic scale economies are important, the patterns of trade and comparative advantage are determined by R & D investments and production experience. And since these determinants of trade are heavily influenced by both government policies and the market environment, it is easy for them to lead to difficult international political problems. For instance, let us assume that firms in two countries are technological equals in a given industry. What factors will determine which country's firms will develop a decisive advantage? If dynamic scale economies are an important factor in the industry, the country whose firms build up the most production experience and invest the most in R & D will become the most competitive. But if there is no difference between the environmental conditions faced by the two country's firms, it is possible that neither may develop a technological edge. But if the two governments adopt different policies toward the industry, these may create significant differences in the conditions faced by firms in the two countries.

Preferential policies by one government will give an advantage to its own domestic firms and this effect will be amplified by dynamic scale economies. Differences in market practices and market scale can also affect the competitiveness of firms in the two countries. For instance, if the firms in the two countries possess strong sales advantages in their own markets, the firms in the larger country will have an advantage in creating economies of scale. And even if there is no difference between the scales of the two markets, if consumers in one country have a strong preference for their own country's products that country's firms will have an advantage.

For the sake of optimal resource allocation on a worldwide level, it is essential that dynamic scale economies be utilized to reduce production costs. In order for this to occur the number of producers must be limited to some degree to enable them to achieve scale economies. From the point of view simply of optimal resource allocation, the question of which country's firms actually carry out production is irrelevant. But, as we saw in Section 2-1, the presence of a computer, semiconductor, aircraft, or other high technology industry in a given country may make a big difference in determining that country's income. Therefore each of the advanced countries will try to foster these key industries in their own countries. And once industries become a target of policy-making, a scramble for market shares is likely to ensue. ¹²

In industries where dynamic scale economies are important, government policies and market practices have a great influence on the competitiveness of individual firms, making it easy for international trade friction to arise. Of course, since the optimal size for achieving economies of scale in the leading technology industries is often smaller than the entire market of a single country, it can be quite possible for several firms to develop within a single country. It is also technologically feasible for a number of different countries to develop production capacity in the same industry simultaneously. But the free workings of the market may not lead to all countries developing a full set of high technology industries. Industrial policy can be used by individual countries to induce the development of these leading technology industries, but this use of industrial policy brings with it its own problems. First, there is the problem of industries manipulating government to wring subsidies and other benefits out of it (which we will discuss below in our section on game theoretic dynamics

between government and business). And second, each country's fostering a full set of leading technology industries can lead to worldwide overproduction.

It might be thought that, for the sake of fairness, there should be international agreements to prevent individual countries from adopting industrial policies to promote scale economies. But industrial policy may be necessary given that market failures are a problem in industries where learning curves and R & D investment are important. Leaving things up to the free actions of private firms in these industries will not necessarily bring about an efficient allocation of resources. It is to correct market failures and facilitate a desirable allocation of resources that it is necessary for individual governments to devise industrial policies.¹³ But since for a number of reasons, the type of industrial policy which different countries can carry out varies, it would be difficult to regulate industrial policy on an international basis.

Another difficult policy question in industries where dynamic scale economies are important is what the appropriate response to dumping should be. There are various possible definitions of dumping, but here we will consider dumping to be selling at a price below production cost.¹⁴ In industries where dynamic scale economies are important, there may be well some selling below cost in the initial stages of production. In many cases this may be justified for the sake of optimizing resource allocation, since lowering the price at the beginning makes it possible to expand production volume, and thus greatly reduce production costs. Whether this kind of behavior should be regulated as dumping or not is an important issue for study.

3. International Competition and Strategic Industrial Policy in Oligopolistic Industries

Both the problem of international competition between firms in oligopolistic industries, and the related issue of strategic industrial policy have attracted considerable attention in recent years. This interest has been strong both within the discipline of economics and in the broader society. Competition within an oligopolistic world has many fascinating facets which do not exist in a world of perfect competition. First of all, in oligopolistic industries the forms of competition are extremely varied and are not limited to price. Competition can take place in the area of R & D investment, plant investment, advertizing and marketing, or in developing a resource or manpower base. How much competition matters and how much influence government policy has on it depends greatly on the type of competition which prevails in a given industry. The questions of how the forms of oligopolistic competition are determined, and what influence various government policies have on them are extremely important for understanding present-day trade and international competition in oligopolistic industries. ¹⁵

Secondly, oligopolistic competition has many dynamic aspects. After all, competition over investment in equipment and R & D is nothing if not dynamic. Even price competition is commonly carried out in strategic fashion, based on readings of future trends. A typical example of this is the establishment of a "penetration price" to break into a new market. Dumping also has an important dynamic aspect. The theory of dynamic oligopoly, which has developed quickly in recent years, ¹⁶ sheds light on a number of dynamic aspects of oligopolies and provides a valuable

perspective on international competition in oligopolistic industries. Dynamic oligopoly theory can deepen our understanding of many aspects of such current issues as the changes in the aircraft industry resulting from the entry of the Airbus,¹⁷ and the trade conflicts in the semiconductor and computer industries.

A third reason why oligopolistic trade theory is interesting is that the distribution of oligopolistic rents arising from changes in international competition affects not only the benefits flowing to individual firms, but the distribution of benefits among nations as well. This issue of "oligopolistic rent transfer" has attracted much theoretical attention, and we will discuss it in detail in Section 3-1.

The fourth reason for interest in oligopolistic markets is that the policy-making process between governments and firms in such area takes on a game-like quality. The private sector does not simply sit back and take whatever policies the government decides on, but instead engages in active lobbying. And since the government's policy-making process itself influences private firms' behavior, policies can boomerang and produce results completely different from the government's original intentions. This government-business relationship is particularly complicated in the case of oligopolies. In Section 3-2 we will attempt a game theoretical analysis in order to provide some understanding of this dilemma.

3-1 Monopoly and Oligopoly Rents and Strategic Industrial Policy

Rather than attempt to explain the transfer of rents in oligopolistic industries theoretically, we will simply discuss it using some examples.¹⁸ In the early 1970s, there were negotiations between Japan and the United

States over whether Japan would abolish its import quotas on color film. At that time the American company, Eastman Kodak, had an extremely large share of the world market. In the course of the negotiations it came out that the price of Kodak color film was much higher in the United States and Australia than in Japan or West Germany. This was most likely because the existence of rivals in Japan and West Germany prevented Kodak from charging as high a price as it did in its home market.

In this situation, the Japanese and West German producers challenged Kodak's international monopoly. Thanks to the resistance offered by these companies, the rents which would have flowed to the United States as a result of the high price Kodak would have charged, instead stayed in the pockets of Japanese and German consumers.

This question of which country the profits of oligopolistic firms will accrue to, and how much consumers will pay for goods sold by foreign monopolies, is known as the problem of international transfer of monopoly rents. As in the above example of Japanese protection of its color film industry, government policy may increase international competition in an oligopolistic industry and thereby augment its own country's income by transferring monopoly rents back home. This point has been taken up in a number of mathematical analytic models in the papers cited at footnote 18.

This kind of analysis has an important contribution to make to the discussion of trade policy between advanced industrialized countries. If an oligopolistic firm's profits are an important part of national income, or if the commodities they sell are extremely important to consumers, then government policies may have a major role to play in increasing the country's economic welfare. But if one country adopts policies favoring its

own oligopolistic companies or challenging foreign oligopolies, policy may be reduced to a tug-of-war between governments over monopoly rents.

This kind of situation is reminiscent of the debate over optimal tariff levels in traditional trade theory. By taxing imports, each country can shift the terms of trade so that they are more beneficial to itself. But if all countries try to establish optimal tariff levels, the result would be a tariff war, a contraction in trade, and a drop in economic welfare.

In the case of oligopolies as well, if every country adopted import tariffs which benefitted its own firms the result would also be tariff war. But the effect would be quite different if government policies consisted of production or export subsidies. As with tariffs, subsidies will lead to a transfer of monopoly rents among oligopolistic firms. As long as this happens, an international scramble for monopoly rents will ensue, as we explained earlier. But subsidies will also benefit consumers, in addition to providing monopoly rents. The reason is that if subsidies lead to an intensification of competition among the oligopolistic companies, then prices will fall, thus benefitting consumers.

Even if the advanced industrialized countries do fall into a subsidy war, consumers will no doubt benefit. Oligopolies tend to lead to insufficient levels of production from the point of view of optimal resource allocation. That is, prices tend to be set at a level higher than marginal costs. Therefore, it is not all undesirable that a subsidy war drive prices down by increasing supply in an oligopolistic industry.¹⁹

Thus it is not a simple matter to evaluate the economic effects of government policies which use subsidies to favor domestic firms in oligopolistic industries. If one country alone uses subsidies, these will create an international transfer of monopoly rents and cause international

disputes. But if all countries establish subsidies in some kind of balanced fashion, subsidies may lead to a better resource allocation. Nevertheless, there are several reasons not to conclude that subsidies are always necessarily justified.

First of all, subsidies and other domestic preference policies will not necessarily lead to the desired goal of creating monopoly rent transfers. Eaton and Grossman (cited at footnote 18) showed that whether subsidies and import restrictions improve a country's economic welfare by providing monopoly rents depends entirely on the prevailing form of oligopolistic competition. Thus, using a model of simple static duopoly, if a Cournot type oligopoly prevails one would conclude that export subsidies increase the economic welfare of the subsidizing country, but the same model applied to a Bertrand type price competitive oligopoly leads to the conclusion that exports should actually be taxed.

As we said at the beginning of Section 3, there are many different kinds of oligopolistic competition. It is impossible to draw any general conclusion that subsidies make sense in all oligopolistic situations.

The second reason has to do with retaliation by trading partners. In some situations, retaliation among trading partners in the form of subsidies can actually improve the efficiency of resource allocation on a worldwide level. But if retaliation takes the form of import restraints it can distort resource allocation. Currently, restrictions on foreign imports are used to retaliate more than are domestic subsidies. Given the fiscal constraints on governments, it is much easier to use import restrictions than subsidies and therefore they are used much more frequently.

The third reason for hesitating to make a general endorsement for subsidies for oligopolistic industries has to do with the variety of

specific forms such subsidies can take. There are numerous types of subsidies which can be used: export subsidies, production subsidies, R & D investment subsidies, and temporary subsidies for start-up costs in leading edge industries. The effect of subsidies will vary depending on the type of subsidy which is used. For instance, export subsidies are generally undesirable because one of their most important effects is simply to take away market share from foreign companies. In contrast, one of the principal effects of subsidies for R & D investment is to make up for various market failures inherent in the development of new technologies.²⁰ Thus, rather than draw blanket conclusions about subsidies in general, we need careful analysis of the various types of subsidy.

A fourth factor is the question of whether the policy-making process itself may influence the behavior of private economic actors in unintended ways. We will return to this point in Section 3-2.

As we have seen, the issues of international competition in oligopolistic industries and the related problems of industrial policy are extremely important elements in discussing current and future trade problems among the advanced industrial countries. In view of the problems of market failure present in areas like technology development, it may be quite legitimate for governments to carry out some kind of industrial policy. But many issues regarding international oligopolistic competition, including this one, are still unclear.

3-2 The Policy-Making Process and Business's Response To It.²¹

It has been assumed in the discussion up to this point that private actors do not intervene at all in the government's policy-making process.

That is, private economic actors merely determine their own behavior based on conditions set down by government policy. In this sense we have treated government policy simply as "manna from heaven"²² from the point of view of private actors.

Of course, actual policy-making processes and business's response to them are not this simple. In actual practice all kinds of lobbying takes place and this has a great effect on policy decisions. Though of course lobbying is an extremely important area for study, much analysis of it has already been done and we will make no attempt to add to it here. Instead we will focus our discussion on the more implicit side of the relationship between the government's policy-making process and business's response to it.

Governments introduce policy measures in order to realize certain policy objectives. As long as private economic actors behave in a perfectly competitive manner, policy-making will be a fairly straightforward matter. All the government has to do is adopt a policy to meet its policy objectives, based on a certain amount of observation of private actors' behavior. But the task is not so easy if the private economic actors form a monopoly or an oligopoly. This is because the private actors are also busy trying to figure out the government's intentions, and making their own production and price decisions accordingly. In effect, a game theory-like situation develops between government and private actors.

As in the previous section, here too we will look at examples rather than at a model in exploring our problem. First, let us consider a situation where the government's policy goal is to nurture domestic industry. Let us say that the industry claims it is under such pressure from foreign import competition that it cannot mount a sufficient response

to enable it to continue domestic production without government subsidy or protection. In a case like this the government will most likely base its decision regarding the appropriate level of subsidies and import restrictions for an industry on various indicators of the domestic industry's performance.

If the government's decision-making process is extremely naive, the government may choose to look at such indicators of industrial performance as domestic production and employment levels. A common response to drops in such indicators is import tariffs and increases in domestic subsidies. But since private firms themselves play a major role in determining production and employment levels, government's use of these figures as a basis for its policy decisions may end up distorting the firms' behavior.

For instance, even if domestic firms might be able to respond to an import challenge by boosting their efforts and taking on risks to increase investment, they may not bother if they know government will step in to rescue them. As a matter of fact, business's way of thinking may become completely permeated by the feeling that the government will always come running when the going gets tough. ²³

The foreign firms who are the source of the troublesome imports will also probably respond to protective policies or subsidies. If they take an aggressive strategy of lowering prices and taking a bigger market share, the government may intervene to adopt import restrictions. But if the foreign firms want to avoid import restrictions, they may decide that it would be more prudent to restrain their exports and make their money by raising prices a little. ²⁴ If foreign firms take this kind of preventative action, the result is a de facto restriction of trade even without any formal trade restrictions being adopted.

An example of this kind of trade restriction has been the Japanese voluntary export restraints to the United States during the 1980s. In order to beat formal import restrictions to the punch, Japanese car companies voluntarily restricted their exports. Since this kind of voluntary export restraint has the same result as an international cartel, car prices in the United States for both Japanese and American cars rose dramatically. ²⁵ What is fascinating is that not only the United States car companies, but the Japanese companies as well, enjoyed enormous profit increases as a result of the export restraints.

Thus, as long as government policy is based on some kind of economic indicators, private economic actors will have an incentive to modify their own behavior in order to convince the government to adopt the kind of policies that suit their own interests. Actual government policy-making processes may be more sophisticated than the one we have outlined. For instance, government might look, not only at production and employment figures, but also at profit, cost, price and other indicators in deciding whether to protect a domestic industry or not. This will probably lead to an even more complicated game between government and the private sector. To make really effective policy government must first have a full grasp of the industry's situation and figure out to what degree its information about the industry reflects the private sector's own strategic response to government policy. Until governments can commit themselves to this kind of painstaking, in-depth investigation there will continue to be plenty of room for the private sector's responses to government policy-making to influence the government's decisions.

As a practical matter, it is impossible for the government to fully grasp all of the information on a particular industry. It is therefore not

easy for the government to figure out to what degree an industry's poor performance is due to its own lack of effort. This uncertainty often leads to the adoption of protective measures. ²⁶

And even when the government is completely on top of an industry's situation, the firms in the industry may prey on the government's weak points to distort its policies. Let us say, for instance, that a government is well aware that an industry's poor performance is the domestic firms' own fault. From a long-term perspective, the best policy would be for the government to stand firm and refuse to either grant subsidies or restrict imports. Without government protection, the threat of foreign imports will probably push the firms to work harder. But if the government is afraid of facing a difficult re-election campaign in two years if it does not achieve some economic results in the meantime, the situation may be quite different. In order to boost the domestic industry's production in the short term, the government may decide to go ahead and restrict imports.

The government in this case is quite constrained in the type of policies it can adopt. Private firms can easily take advantage of a government's vulnerability, move in, and distort its policies. The political influence of oligopolistic firms is especially strong, giving them considerable say over policy-making. The kind of game theory dynamics between private firms and government that we have discussed here can be observed in many, many instances.

4. In conclusion: The Possibilities for International Accords on Industrial Policy

Economic relationships between the advanced industrialized countries are growing ever closer and more complex. As we have seen in this paper, the growth in economic links among nations means that individual countries' policies can exert enormous influence on other countries, and differences in policy and economic systems often lead to friction. The GATT-centered international trade system, which has functioned relatively well since the Second World War, is not equipped to regulate the multitude of economic transactions that are developing within an increasingly interconnected world.

GATT's original main purpose was to do away with restrictions on cross-border trade. GATT's activities in abolishing import quotas and cutting tariffs both fell within this category. Behind GATT's original goals was the idea that as long as one could do away with restrictions at national borders, an optimal allocation of resources could be achieved even if domestic policies were left up to each country's discretion. Of course there have also been some international agreements made within GATT that have ventured into the territory of domestic policy. But GATT's real contribution has been limited to removing cross-border trade restrictions.

The phenomena described in this paper clearly indicate that one country's industrial policies have a great effect on others' industrial structures and economic welfare, and that so-called domestic policies have enormous significance for international trade and investment. It is becoming increasingly necessary for individual nations to make adjustments even in their domestic policies in order to further the development of healthy international economic relations.

In recent years there have been some stirrings in this direction within GATT and other international forums. The increasing interest in trade in

services and in intellectual property is an example of this. In the case of service trade, it is clear that any negotiations dealing effectively with this area must go beyond the level of mere border controls and into the realm of national economic systems and policies. Such service industries as finance and communications do not simply send ordinary commodities from country to country, but also work inside foreign countries through foreign subsidiaries established through direct investment, and through international joint ventures.

Therefore, as long as regulations on direct investment and immigration, as well as other national policies and regulations which are generally considered "domestic," are not dealt with in negotiations, it will be impossible to develop any meaningful international system for handling the service trade.

For example, the United States and Great Britain have recently protested against Japanese government requirements for bank self-capitalization (the ratio of owned capital to loans). They charge that although competition between banks now takes place on a worldwide basis, Japan's loose restrictions give its banks an unfair advantage. Regardless of whether they are right or not, this case is a good example of the way in which domestic regulations work to give particular countries a competitive advantage in the international arena.

If real negotiations are conducted on service trade, they are going to have to dig deep into these kinds of domestic regulations. The question of whether to make the worldwide system in services more uniform is on an entirely different plane from the original GATT idea of abolishing trade restrictions at the border. But, given the trend toward commodities taking

on more service-like qualities, these issues may increasingly apply not only to services, but to many different commodities as well.

Negotiations over intellectual property can be viewed as the same kind of problem. In the leading technology industries, intellectual property is an extremely important factor in determining firms' competitiveness in technology and product development. Patents and copyrights play an important role in protecting intellectual property rights to trademarks and technology. But patent and copyright systems vary from country to country, and some countries fail to acknowledge foreign intellectual property rights. This is a fairly important source of international friction.

If negotiations over intellectual property rights take place, they too will go beyond border controls and deal with individual countries' domestic systems. And if different countries' systems of intellectual property rights are discussed, there is no reason why negotiations should not move on to cover other regulations and policies, such as anti-monopoly policies and regulations on distribution and transportation, since these regulations have an enormous effect on trade. Thus, as a result of the diversification of trade and the internationalization of domestic economies, trade negotiations are being pushed beyond the dimension of mere border controls, to dealing with different countries' internal economic systems.

There are a number of difficult questions lurking in the issue of how far to go in internationally regulating the various domestic policies which affect service trade, intellectual property, and other issues such as anti-monopoly policy. This is because unavoidably such regulations would not only reform the international economic system, but also would introduce wrenching changes in domestic economic systems. Although the removal of tariffs and other trade restrictions also requires a certain level of

domestic adjustment, still their difficulty is limited since they are only concerned with flows across national borders.

Each country has its own goals and ideas about its economic system and regulations, and each of course has a sovereignty over them which must be respected. On the other hand, clearly there are now many cases where countries' attempts to assert their sovereignty raise obstacles to the beneficial flow of trade and investment.

But then, it is not as though we can say with any certainty at this stage how individual countries' systems should be adjusted to work smoothly in the international system. It is not even clear whether greater international homogeneity is the most desirable form of adjustment or not. Further work on this question is very much needed.

Footnote

* This paper is heavily dependent on the forthcoming book, Itoh, M., M.F. Okuno, K. Kiyono, and K. Suzumura, Sangyo Seisaku no Kezai Bunseki (Economic Analysis of Industrial Policy), (in Japanese, Tokyo: University of Tokyo Press, 1988).

1 On the post-war changes in Japan's trade policy and trade patterns see R. Komiya and Itoh M., "International Trade and Trade Policy of Japan: 1955-1984," in T. Inoguchi and D. Okimoto ed., The Political Economy of Japan, Vol. 2: The Changing International Context, (Stanford, Cal.: Stanford Univ. Press, 1988).

2 The analytical model used here is based on Krugman P., "A Model of Innovation, Technology Transfer, and the World Distribution of Income," Journal of Political Economy, Vol.87, No.2, (1979), pp253-66. and Itoh, M. and K. Kiyono, "Welfare Enhancing Export Subsidies," Journal of Political Economy, Vol.95, No.1(1987), pp115-37. Itoh M., K. Kiyono, M. Okuno and K. Suzumura op. cit. used this type of model to analyze the relationship between changes in the industrial structure and Japan's rapid post-war economic growth.

3 See Itoh, M. and K. Kiyono, "Trade and Direct Investment" in Komiya, R., M. Okuno, and K. Suzumura ed., Nihon no Sangyo-seisaku (Industry Policy of Japan), (Tokyo: University of Tokyo Press, 1984), English translation (forthcoming, New York: Academic Press, 1988) for a discussion of change in

Japan's postwar industrial structure and the policy debates which surrounded it.

4 I mean "trade balance" here in the broad sense of the word, that is including not only trade in goods, but also in services. If trade is not balanced one or the other party will accumulate foreign debt, unless there is a transfer of aid between countries.

5 Itoh, M. and K. Kiyono [1987] op. cit..

6 All other things being equal, lower relative income will also mean lower real, absolute income, since imported goods from the advanced countries will cost more because of higher real wages and other production costs in the advanced countries.

7 This case would fit the concept of "immiserizing growth" due to Bhagwati, J.N., "Immiserizing Growth: A Geometric Note," Review of Economic Studies, Vol.25, No.3 (June, 1958), pp201-5.

8 It is impossible to come to any definite conclusion on the positive and negative effects on the economic welfare of the advanced countries. According to the model in Itoh and Kiyono (1987) op.cit., the result of the expansion of the late-developing countries into borderline goods is that the advanced countries suffer an overall loss.

9 It is beyond the scope of this paper to develop the kind of analytic model on this point. The continuum of goods model in Itoh and Kiyono [1987] op.cit. does, however, provide such an analysis.

10 See Itoh, M., Boeki Masatsu to Seisakuteki Taio (trade friction and policy response), in Japanese (Tokyo, Ministry of Finance, 1984), and Krugman, P., "Import Protection as Export Promotion: International Competition in the Presence of Oligopoly and Economies of Scale," in H. Kierzkowski (ed.) Monopolistic Competition and International Trade (New York: Oxford University Press, 1984) on the importance of economies of scale in learning curves and R & D investment.

11 For an economic analysis of the experience curve effect see Spence, A.M., "The Learning Curve and Competition," The Bell Journal of Economics, Vol.12, No.1 [1981].

12 See Panagalya, A., "Variable Returns to Scale in Production and Patterns of Specialization," American Economic Review, 71: pp221-230 [1981] on the issue of the distribution of the trade benefits of economies of scale.

13 See Itoh, M., M.F. Okuno, K. Kiyono and K. Suzumura, Sangyo Seisaku no Keizai Bunseki (Economic Theory of Industrial Policy), in Japanese, (Tokyo: University of Tokyo Press, 1988) on this point.

14 In some countries price discrimination in the form of pricing export goods cheaper than in the domestic market is also considered dumping.

15 We will not deal with these questions in any detail in this paper. Let us, however, bring up one example which illustrates the significance they hold for changing industrial structures and for inter-firm competitiveness.

If price competition in an oligopolistic industry is too stiff, each firm will either only barely meet its costs, or sell below cost. Since firms will thus not make any operating profit they will lack funds for investment. If price competition is fierce, then banks will not lend to such firms since there can be no hope of high operating profits in the future either. There will thus be a tendency for little investment to occur in industries where there is heavy price competition.

On the other hand, competition can also take the form of investment competition. Under this mode of competition, firms may not engage in heavy price competition and thus be able to make high operating profits, but instead compete with each other to maximize investment, and use up their operating profits in this way.

The long-term performance of an industry will vary greatly depending on which of these two patterns of competition prevail. It can generally be assumed that long-term performance will be better in an industry in which investment competition is dominant. Itoh, M., "Industrial Policy and Corporate Growth in the Automobile Industry: Japan's Postwar Experience," A Paper Presented at the MITI conference at Tokyo [1987] showed that the fact that competition in Japan's post-war automobile industry was investment rather than price competition made a great contribution to its development.

16 Fudenberg, D. and J. Tirole, Dynamic Models of Oligopoly (Chur, Switzerland: Harwood Academic Press, 1986) provide a useful survey of dynamic oligopoly theory.

17 Dixit, A.K. and A.S. Kyle "The Use of Protection and Subsidies for Entry Promotion and Deterrence," American Economic Review, 72: pp139-52 [1985] do an interesting analysis of the Airbus case. Krugman's valuable analysis Krugman, P., "The U.S. Response to Foreign Industrial Targeting," Brooking Papers on Economic Activities, 1: 77-132 [1984] also touches on these issues.

18 For a theoretical analysis of this topic see Itoh, M., "A Theory of Imperfect Competition in International Trade and Investment," unpublished Ph.D. Dissertation, University of Rochester [1978] , Itoh, Okuno, Kiyono, and Suzumura, op. cit., Brander, J.A. and B.J. Spencer, "Tariffs and the Extraction of Foreign Monopoly Rent under Potential Entry," Canadian Journal of Economic, Vol.14: 371-99 [1981], Krugman [1984] op.cit., and Eaton, J., and G.M. Grossman, "Optimal Trade and Industrial Policy under Oligopoly," Quarterly Journal of Economics, Vol.101: pp383-406 [1987].

19 Of course, it goes without saying that subsidies become pointless if they are provided with such abandon that they actually lead to overproduction.

20 Much research has indicated that simply leaving technology development to the free workings of the market does not make for favorable resource allocation. But it is impossible to make any general statements on whether the best policy to correct this is subsidy or regulation. This is because R & D investment activities in a laissez-faire environment may be either excessive or insufficient. For an insightful analysis of this problem see Dixit [1986].

21 There is a more detailed analysis of the subject dealt with in this section in Itoh, M., T. Honda, and K. Kiyono, "Policy Formation and Response: The Case of Trade Policies," A Paper Presented at N.B.E.R. Summer Institute, 1986.

22 The "manna" metaphor is from Bhagwati.

23 A similar kind of problem is discussed in macroeconomic theory under the heading of "the problem of discretion vs. rules in policy." For example, see Kydrand, F.E., and E.C. Prescott "Rules rather than Discretion: The Inconsistency of Optimal Plans," Journal of Political Economy, Vol.85: 473-491, [1977]. But, the issue is treated differently by the macroeconomic literature since macroeconomics does not deal with the problem of oligopoly. See Itoh, Honda and Kiyono op. cit. for a treatment of the relationship between oligopolistic firms and government policy-making.

24 Bhagwati, J.N. and T.N. Srinivasan, "Optimal Trade Policy and Compensation under Endogenous Uncertainty: The Phenomenon of Market Disruption," Journal of International Economics, Vol.6: 317-330, [1976]

describe participation by the exporting side's government in such unilateral export restrictions.

25 When voluntary export restraints are adopted, even if the import ceiling is set at the level of export volume which has prevailed under free trade, prices will rise significantly. On this point, see Itoh, M. and Y. Ono "Tariffs, Quotas and Market Structure," Quarterly Journal of Economics, Vol.17: pp359-373, [1984].

26 Itoh, Honda and Kiyono op. cit. use a game theory model of incomplete information to analyze this phenomenon.

5

(Metals and metal products)
 (Iron and steel)
 (Automobiles)

(Nonmetal minerals and products)
 (Chemicals)

Year	(Nonmetal minerals and products) (Chemicals)			(Metals and metal products) (Iron and steel)			(Automobiles)			
	Food (Cotton textiles)	Textiles and apparel	Others	Ships Banker	Machinery	Others	Ships Banker	Machinery	Others	
1960	6.3	30.2	4.2	4.5	14.0	25.5	7.1	25.5	15.3	
1965	4.1	18.7	3.1	20.3	8.8	35.2	2.8	35.2	12.1	
1970	3.4	12.5	6.4	19.7	7.3	46.3	6.9	46.3	9.9	
1975	6.7	7.0	22.5	10.8	11.1	53.8	7.4	53.8	7.4	
1979	4.5	5.9	17.9	16.5	61.3	7.5	61.3	7.5	7.5	
1983	4.5	4.75	12.50	17.78	67.76	8.07	67.76	8.07	8.07	
0	10	20	30	40	50	60	70	80	90	100

TABLE ONE

6

