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International coordination of different countries' industrial policies¹ is viewed entirely differently from international coordination of their macroeconomic policies. Although many argue for active international coordination of domestic macroeconomic policies, the general attitude toward industrial policy has been that, while barriers to trade should be removed, domestic economic policies should be left to the discretion of individual countries. Although the post-war GATT system has contributed greatly to the efficiency of the international economic system by removing quotas and cutting tariffs, it has made almost no effort to develop any broader international coordination of domestic industrial policies.

This naive and somewhat passive approach to international coordination of industrial policy worked quite effectively in the 1950s and 1960s, and contributed greatly to the growth of the world economy by expanding trade among non-communist countries. But as trade conflicts heated up in the 1970s, and as various countries adopted increasingly protectionist policies, a number of people began to question whether such a passive international approach to industrial policy was really sufficient. Many began to argue that, in addition to agreements on tariffs and quotas, it was necessary to begin some kind of international coordination of such domestic policies as patent systems, commercial

regulations, subsidies for R & D investment, and anti-trust policies.

Scholars have undertaken a broad range of studies on strategic industrial policy in recent years. They have taken up such issues as the strategic competition between domestic and foreign enterprises in oligopolistic industries and the effects of government intervention on this competition; the problem of calculated "game playing" between government and private firms in the public policy making process; and strategic behavior by firms and the role of government intervention in industries where learning through the production process and R & D creates dynamic scale economies. These studies have led to a number of research conclusions different from those arrived at by using conventional competitive trade models. These studies of oligopoly trade have not made the concept of free trade obsolete, but they have shown that the influence of industrial policy on trade is quite complicated and that it is not as easy to maintain a free trade system as was once thought. It has become increasingly clear that if nations want to maintain a free trade system in the future, they will have to undertake careful studies of the effects of domestic industrial policies on international trade, and begin to coordinate these industrial policies internationally.

This paper will review this new literature on international trade, examine the real-world problems of trade friction which have arisen in recent years, and consider the possibilities for

international coordination of industrial policies. Given that the limits of space prevent an analysis of particular forms of industrial policy coordination here, we will instead focus on a general re-examination of the conventional notion that "restrictions on trade should be removed, but other policies should be left to the discretion of individual countries."

In Section 1 we will consider some of the problems caused by shifts in different countries' industrial structures. The rapid change in the industrial structures of Japan and the Asian NICs has introduced instability into the free trade system. The shifts in comparative advantage which have caused these shifts in industrial structure have not been due to factor endowments in the simple sense of the word so much as to the accumulation of technology through R & D and production experience. Given the importance of these technological factors, industrial policies may serve as an important determinant of patterns of comparative advantage, and thus create problems of international policy coordination.

In Section 2 we will review and comment on recent developments in the study of patterns of firm behavior and international trade in oligopolistic industries, and in the study of strategic industrial policy. In Section 3 we will explore the factors behind the increasing diversity of international transactions and its implications for international policy coordination.

Section 1. Industrial Policy and Changes in Industrial Structure

The rapid change in Japan's industrial structure has certainly been an important cause of the trade friction which has developed between Japan and its major trading partners in North America and Western Europe. At different times explosions in Japanese exports of such goods as textiles, steel, color television sets, cars, machine tools, semiconductors, and copiers have touched off heated trade conflicts with the United States and the Western European countries. Behind the soaring export figures for these particular products has been a fundamental restructuring of the Japanese economy. This same type of structural change is also behind the rapid growth in exports by the various NICs.

To an important degree, these structural changes are the result of the process and product innovations developed in the course of both R & D activities and production experience. A naive textbook trade theory explanation would have it that patterns of comparative advantage between different countries are the result of exogenously determined factor endowments. But the technology and know-how which are accumulated both by individual firms and by whole industries are a critical factor in determining comparative advantage in trade in manufactured goods between the advanced industrialized countries. These technological factors are not determined exogenously, but by such factors as investment and production experience which economic models usually treat as endogenous variables.

Let us, for instance, consider the accumulation of experience through the production process. Such an accumulation of experience can often produce a strong "learning curve effect."² Simply stated, the learning curve effect takes place when increases in cumulative output are accompanied by reduced production costs. An example of a case where the learning curve effect has been particularly strong is in the production of the 64 and 256 kilobyte generation of integrated circuits, for which prices dropped by 90% in just a few years. This kind of powerful learning effect can be observed in most of the advanced technology industries.

In industries where the learning curve effect is strong, those firms which build up production and accumulate production experience the quickest will put themselves in the most competitive cost position. The type of cost-reducing benefits which result from this process are known as "dynamic scale economies." For the sake of optimal resource allocation, it is desirable that firms achieve dynamic scale economies in order to reduce their costs. In order to achieve these economies, the number of producers must be limited to some extent in order to be able to establish a sufficiently large scale of production. If the goal is simply to achieve dynamic scale economies, it does not matter in which countries production takes place. But many countries want to have their own advanced technology industries, such as computers, semiconductors, and aircraft because of the

belief that the existence or absence of these industries will have a great impact on their economies.

We can observe similar dynamic scale economies in industries where R & D activities play an important role because R & D spending is a fixed cost. Because of this, dynamic scale economies are very important in the advanced technology industries where R & D spending is heavy.

The dynamic scale economies created by learning curve effects and R & D spending have two important implications for international coordination of industrial policies. First, if it is the case that accumulated production experience and technology exert an important effect on a particular firm's or a particular country's competitiveness,³ then direct government R & D or production subsidies, indirect government subsidies in the form of military procurements, and anti-trust, patent, and licensing regulations, may all have an important effect on competitiveness. And the effects of such subsidies or other policies may extend far beyond the specific time period when they were actually implemented.⁴ As international competition between firms intensifies, this point becomes increasingly important. Ideally, an international trade regime should take such domestic policies into consideration. We will discuss this point in Section 3.

Second, in order to support the further development of the world economy, policies should be adopted which respond positively to changes in industrial structures rather than attempting to repress such changes. Although space limitations

prevent a detailed discussion here, at certain points in time the "borderline" industries in the late-developing countries, that is, those which are challenging established industries in the more advanced countries, naturally expand their exports rapidly.⁵ The changes in industrial structure which result from the rapid growth of these industries are essential for the economic development of the late-developing countries.⁶

Although the rapid expansion of exports by the late-developing countries in borderline industries creates reduced earnings and employment problems for firms in these same industries in the importing countries, it provides the developed countries with some great economic benefits as well. One immediate benefit is lower prices for consumers, but another important benefit is the stimulation to the industry offered by the competition from late-developing nation enterprises. This increased competition often spurs the firms in the importing countries on to increased efforts to improve product quality and productivity.⁷

Yet in spite of these benefits, the importing countries often respond with protectionist policies, which once introduced, often become permanent. The history of Japanese-American trade relations shows clear and ample evidence of this pattern of protectionist responses. In the 1950s a flood of Japanese cotton goods ultimately led to Japanese acquiescence to American demands for export restraints, which later evolved into the Multi-Fiber Arrangement (MFA), a global system of managed trade. Then, in

the 1960s a rapid increase in Japanese steel exports again led to the imposition of export restraints, which continue to this day, albeit in a different form of trade restraint. Since the 1970s, import restrictions have been placed on Japanese exports of color television sets, automobiles, and semiconductors, in succession. This kind of import restrictions have steadily expanded to where they now cover a wide range of industries. These restrictions are not only an obstacle to the economic growth of the developing countries, but to industrial adjustment within industrially advanced countries as well.

The question of how to respond to changes in different countries' industrial structures will be an increasingly key question in the management of the world economy. Operating under the present absence of any general guidelines, countries tend to wind up restricting trade. Attempts must be made to come up with a better policy approach to trade problems.

2. Trade in Oligopolistic Industries and Strategic Industrial Policy

In recent years there have been some remarkable advances in oligopolistic trade theory and in the theories of strategic industrial policy which are based on it.⁸ Oligopolistic industries have also been in the spotlight in the non-academic world because of the fact that it is precisely these industries, such as aircraft, computers, semiconductors, and automobiles,

which have produced the most trade friction, and which are most often brought up in discussions of industrial policy.

At the core of the discussion of oligopolistic trade is the issue of the transfer of monopoly rents. The reason this issue is of such interest is that when there is competition between domestic and foreign firms, the amount of profits that accrue to domestic or foreign firms has a major impact on the economic welfare of a particular country.⁹

The question of monopoly rents in oligopolistic industries is similar to the problem of optimal tariffs under a traditional competitive trade model. In the case of competition over monopoly rents, the governments of different countries each use policies to favor their own domestic firms in order to make monopoly rents accrue to their own economies. In the case of optimal tariffs, entire countries act as monopolists and adopt policies to maximize monopoly profits by improving their terms of trade. In both cases, there is a strong danger that individual governments' adoption of import restrictions to maximize their own profits will lead to a tariff war which keeps any country from benefitting.¹⁰

The oligopolistic trade model has some implications which are different from the competitive model and which are important in considering the question of international coordination of industrial policy. First, oligopolistic trade is not Pareto efficient. Since under conditions of perfect competition, the absence of government intervention is Pareto efficient, if one

country uses government intervention, then either that country or other countries will suffer a decline in economic welfare. Therefore, any industrial policy introduced in order to raise the welfare of the domestic economy is necessarily a beggar-thy-neighbor policy.

But in the case of oligopolistic industries, intervention by one country's government may benefit not only that country itself, but its trading partners as well. Within a static conceptual framework, production under oligopolistic conditions is necessarily lower than would occur under an optimal allocation of resources.¹¹ Thus, if subsidies in a number of different countries lead to a general increase in production, this will improve the efficiency of the allocation of resources in the world economy as a whole. In this sense, a subsidy war is different from a tariff war.

The results of studies on subsidies based on a static model of oligopoly trade should not be too broadly interpreted, but they do have some important implications for evaluating government policy. The entrance of the Airbus into the aircraft market and of Japanese automakers into the world automobile market may have reduced the monopoly rents of American firms, but they also benefitted American consumers by lowering prices. Not only that, but the benefit to consumers may be larger than the loss to the producing firms.¹² It is important to remember that our discussion here is simply about the possibility that subsidies given to oligopolistic industries may have a welfare

enhancing effect, and that extreme caution must be used in attempting to use this idea in dealing with real-world situations. It would be especially dangerous to use analysis based on a model of oligopoly in order to justify government intervention in trade.

The second advantage of using an oligopolistic trade model is that it sheds light on the strategy and timing of enterprise behavior in a dynamic oligopoly. Many aspects of oligopolistic competition are dynamic. After all, competition in R & D activities and equipment investment is nothing if not dynamic. Even price competition is commonly carried out strategically, taking into account how competitors are likely to respond to future trends. It would be meaningless to try to analyze the changes in the aircraft industry around the time Airbus entered the industry, or the issues of trade friction and government intervention in the semiconductor and computer industries, without paying attention to the dynamic characteristics of these industries. And although dumping is also an issue which has important dynamic elements, it has not really been studied with these dynamic elements in mind.¹³ Although study of dynamic oligopoly theory has burgeoned in recent years, the theory could also fruitfully be used to shed light on protectionist infant industry policies towards oligopolistic industries.¹⁴

The third way in which oligopolistic trade differs from the traditional competitive trade model is in the importance of the patterns of strategic interaction between firms. According to

Brander and Spencer [1984], governments can enhance the welfare of their own countries by subsidizing domestic firms in situations where these are in competition with foreign firms in an oligopolistic market. Eaton and Grossman[1986] pointed out that the reason Brander and Spencer's conclusions were completely different from those which would be reached using a competitive model was because of the importance they gave to the strategic responses of foreign firms. If this pattern of responses changed, their conclusions would also change.

The possibility that government policy can have completely different effects depending on the type of inter-firm competition which takes place is one of the most striking characteristics of oligopolistic models. It is this kind of analysis of the strategic interaction among firms which is needed in order to understand present day trade issues in oligopolistic industries.

There can be many different forms of strategic reactions in an oligopolistic industry, but the issue of strategic interaction between government and oligopolistic firms in the policymaking process is particularly important for understanding industrial policy. Government policies are not simply "manna from heaven" which private economic actors receive passively.¹⁵ Instead, business plays an extremely active role in shaping government policies through a variety of lobbying activities, and oligopolistic and monopolistic firms tend to be particularly politically influential. Though of course lobbying by business is an extremely important area for study, much analysis of it has

already been done and we will make no effort to add to it here. Rather, we will attempt to respond to the macroeconomic debate over "rules vs. discretion" by discussing the issue of private actors' "game-playing" in the policymaking process, since this issue would take on extreme importance if international coordination of industrial policy were to progress to the stage of rule-making.¹⁶

Governments implement policies in order to achieve specific goals. If private economic actors have either monopolistic or oligopolistic power, then they will base their production and pricing decisions on government rules and on their readings of government intentions. As a result, a game theory-type situation develops between government and business.

To explain this point somewhat more concretely, let us consider for a moment the case of a declining industry buffeted by foreign competition. Let us assume that the government's objective is to protect the industry and maintain its employment levels. In the course of pursuing these goals it will undoubtedly devise some sort of statistical indicators for production and employment. If these indicators fall, then administrators may well respond by restricting imports or providing domestic firms with subsidies. Although this kind of policymaking process may seem extremely naive, there are innumerable cases where the policy process has followed exactly this pattern. Emergency escape clauses which are created for industries faced with a

sudden flood of imports are inevitably implemented in this extremely simple way.

This kind of naive policymaking process can produce a variety of distortions in private economic behavior. For instance, in cases where domestic firms could respond perfectly effectively to foreign competition on their own by working a little harder or taking on a little more risk in the form of additional investment, they may not bother if they know that government will come to their rescue. Or competition among domestic firms may be dulled by applying protection rigidly to all domestic industries.¹⁷ Another effect of excessive reliance on protectionism may be to create a chilling effect on foreign competition in general. Foreign firms might refrain from aggressive price-cutting and voluntarily hold back exports somewhat if they fear that the government might respond by imposing import restrictions.¹⁸ In other words, to forestall government intervention, they may choose to take the path of reaping immediate gains by raising prices a little. By producing this kind of preventative behavior the effect of restrictive import policies may occur without such policies actually being implemented.

In this fashion, once a government begins to base its policies on certain fixed economic indicators or establish specific rules for business to follow, private economic actors will modify their own behavior in order to get government policies to suit their own interests. Government policymakers

who are establishing rules for oligopolistic industries cannot ignore the strategic nature of business responses to government policies.

We have discussed here several issues raised by oligopolistic trade models. Although further research in this field will certainly teach us a great deal more about the problems of oligopolistic trade, at this point we are not in a position to make any simple generalizations. Krugman is quite correct in indicating the need for this kind of research:

. . . [W]e have become more sophisticated about the way markets actually work. . . [T]he point is that although economists continue to advocate free trade, they will have to update their arguments if they expect to retain their credibility."¹⁹

Section 3. The Increasing Diversity of International Economic Transactions and the Possibilities for International Agreements on Industrial Policy

As we have seen, a given country's domestic industrial policies affect international trade and other countries' economies in a number of ways. But these influences are complex, and in many ways still unclear. There is much theoretical and empirical work left to be done on the various issues we have discussed here relating to dynamic scale economies in oligopolistic industries.

It is difficult to accept that current international economic transactions are simply "international exchanges of goods and services based on comparative advantage," as

conventional international trade theory holds. Although it is true that this form of trade based on comparative costs continues to be very important, international transactions have expanded to include a number of forms, which do not fit well into the concepts of conventional trade theory, such as overseas production through direct investment, international joint ventures, intra-firm trade within multinational corporations, and sales of intellectual property. This diversity of new types of international transactions is of course an important reason for the current proposals for international agreements on industrial policy coordination.

The recent interest within such arenas as GATT in the issues of services trade and intellectual property is one manifestation of this trend toward coordination of domestic industrial policies. Precisely because the activities of such service industries as finance, information, and communications include a wide range of operations, such as those of overseas subsidiaries and joint ventures, trade in services is completely different from ordinary goods trade. Any thorough negotiations over international accords on services trade would have to go beyond the mere lifting of trade restrictions at national borders, to include such domestic regulations as tax policies and regulations on commerce and direct investment since these have such an important effect on trade in services.

The same argument can be made in the case of intellectual property. Technology and product development are both extremely

significant for firms' competitiveness in the advanced technology industries. Since licensing and copyright systems both play such an enormous role in protecting rights to such forms of intellectual property as technology and trademarks, international differences in these systems create many problems. Negotiations to establish international accords on intellectual property rights would necessarily go beyond the removal of border restrictions and intervene in individual countries' domestic policies.

The areas of services trade and intellectual property are only two of the areas of domestic policy to be internationally coordinated. As international transactions become more complex, the need is developing for international accords covering an increasingly broad range of domestic policies. Industrial, anti-trust, and tax policies, as well as financial and commercial regulations all effect international economic transactions, and this effect will grow in the future. There is no particular reason why international coordination of domestic economic systems should stop at services and intellectual property.

One important reason for the need for international coordination of domestic economic policies is that international transactions are becoming more sophisticated. To put it another way, economies are becoming more service-oriented. Trade in the kind of completely standardized goods that Ricardo theorized about is straightforward: each nation produces the goods in which it holds a comparative advantage, puts them out on the

international market, and market forces run their course. But many of the goods and services currently traded among advanced industrialized nations are not this kind of standardized product.

In the case of such goods as aircraft, computers, automobiles, and semiconductors, the service component is extremely large, and the quality of the service is an important part of transactions. By service here we mean not simply such services as after-service, or the services which accompany distribution and advertising, but also such various services as the activities involved in product and technology development, and technology transactions with other enterprises. Obviously the service content of trade in such services as finance and communications is extremely high.

As various studies in the field of transaction cost economics²⁰ have argued, because it is difficult to transact at arms length for unstandardized goods and services with a high service content, transactions for them tend to take apparently complex forms. In the case of international economic transactions, these take such forms as overseas production through direct investment, overseas research and development activities, international joint ventures, upstream and downstream vertical integration, international mergers and acquisitions, and development of a system of affiliated suppliers and distributors (keiretsu-ka). These kinds of international economic transactions will continue to become increasingly important. The kind of international coordination used up until now which was

limited to dealing with border restrictions will be insufficient for facilitating the development of these transactions. Instead, there is a need for international accords on domestic economic policies in order to make individual countries' economic systems fit together better.

Nevertheless, at this point we cannot say with any certainty exactly how the economic systems of individual countries should be adjusted to work together more smoothly. 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.

ENDNOTES

1. "Industrial policy" has been defined in a number of different ways by different people. Here we will consider industrial policy to include trade policies, in the usual sense of the word, such as tariffs, subsidies, and quotas, as well as such direct and indirect intervention in business activities as production and R & D subsidies, industrial adjustment policies, and government-led cartels.
2. Spence [1981] has done a very interest analysis of learning curve effects.
3. There are strong similarities between the way in which trade patterns are determined by dynamic scale economies, and the way in which they are determined by static scale economies. See Panagaria [1980], and Helpman and Krugman [1985] for discussions of static scale economies.
4. For instance, the experience which firms build up as a result of the expansion of production due to government subsidies will remain even after the subsidies have been withdrawn. Krugman [1984] and Baldwin and Krugman [1986] analyze the effects of this phenomenon, which they call "hysteresis."
5. As Spence [1979] makes clear, in rapidly growing oligopolistic industries firms compete intensely in order to reap the advantages of being the "first mover." This mechanism was an important factor behind the rapid growth of Japanese car and semiconductor exports. Matsuyama and Itoh [1986] analyze Japan's protectionist infant industry policies with this issue in mind. Itoh [1987] explores this phenomenon in an analysis of the development of the Japanese automobile industry.
6. In order for the late-developing countries to achieve rapid growth it is better for them to develop a comparative advantage in the "borderline industries" than to increase their exports in already established industries. See Krugman [1979], and Itoh and Kiyono [1987] for discussions of the relationship between developing countries' expansion into new borderline industries and the distribution of income between developing and developed countries.
7. The case of the automobile industry is a good example of this. The voluntary export restraints which Japan adopted in the early 1980s led to a big price increase on both Japanese and American cars. This shows that, prior to the restraints, the entrance of Japanese cars into the American market had kept car prices down. Moreover, it is likely that competition from Japanese automobiles

not only kept prices low, but also contributed to the revitalization of the American car manufacturers.

8. The discussion in Krugman [1986] as well other sources cited there are valuable on this topic.

9. Though in form it differs somewhat from the phenomenon of transfer of rents between firms, the following is a typical example of monopoly rents in oligopolistic industries. It is a statement by a Japanese Ministry of International Trade and Industry official on Japan-United States negotiations over color film, quoted in Yanagida [1983].

You have said, Mr. Everly [correct transliteration?], that if Japan liberalizes its imports of color film, cheap film will come into Japan because of the United States' superiority in this area, and Japanese consumers will benefit. But do you know what Kodak charges for film in different countries of the world? The price in Australia, for instance, is much higher than it is in Japan, and in West Germany much cheaper than in Japan. Why should consumers pay such different prices for the same roll of film? The reason is that since there are no competitors in Australia, Kodak sells for the maximum price to make the highest possible profit. Since Japan has limited its import quota to 30% and has Fuji and Sakura as competing companies, prices in Japan are lower. And since West Germany has even stronger competitors, its prices are much lower. Though you are putting forward a "theory of optimal production when there are no products to offer resistance, the economic theory says that the good will be sold at the maximum price. Isn't this the kind of strategy that American global corporations are actually following?

10. See Johnson [1953-54] on tariff wars.

11. But this may not be true, depending on the pattern of competition within an oligopoly. For instance, competition between oligopolistic firms may be so heated that they actually put excessive resources into R & D activities. A number of studies, including Barzel [1968] have arrived at this conclusion.

12. I cannot say anything conclusive about the relationship between these benefits and losses.

13. In industries where dynamic scale economies are important, there may well be 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.

14. Spence [1979] has pointed out that the behavior of firms in industries which are in a growth phase tends to be growth oriented. This observation has important implications for the protectionist infant industry policies which post-war Japan has applied to its automobile and other industries. See Matsuyama and Itoh on this issue. Fudenberg and Tirole [1986] provide a usefully survey of dynamic oligopoly theory.

15. The "manna" metaphor is from Bhagwati.

16. See Itoh, Honda and Kiyono [1986] for a detailed analysis of this point.

17. This tendency is particularly strong in Japanese protectionist agriculture policies.

18. See Bhagwati and Srinivasan [1983] for a discussion of a case of a government of an exporting country are faced with the decision of whether to impose voluntary export restraints or not.

19. Krugman [1986], p. 5.

20. See, for instance, O.E. Williamson [1985].

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