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THE TRADE AND INDUSTRIAL POLICIES OF POST WAR JAPAN:
A THEORETICAL PERSPECTIVE

Motoshige Itoh
University of Tokyo

and

Kazuharu Kiyono
Gakushuin University

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Motoshige Itoh*, University of Tokyo

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I. Introduction

Postwar economic growth has been stimulated worldwide by the remarkable development of capital or technology-intensive industries that produce such goods as steel, automobiles, machinery, chemicals, semiconductors and computers. These industries are often characterized as exhibiting various types of large economies of scale, both static and dynamic. Their growth, often entailing a vast amount of capital or R&D investment, reduces production costs and induces demand expansion, which in turn yields greater incentives for investment.

However, this mechanism of accelerated economic development is set in motion only after industries with economies of scale have been established. Countries trying to catch up with the advanced economies are seriously disadvantaged drawbacks in this respect, since industries in the advanced economies have already gained enough cost advantage compared with the potential newcomers. The presence of economies of scale, as often pointed out in industrial organization theory, results in entry barriers. And even should they successfully enter the market, newcomers will find it very difficult to expand their market share due to the cost disadvantage, which also hinders a more rapid growth of the national economy.

The postwar history of resource-poor Japan has been one in which it has overcome those entry barriers to the leading industries at that time and equipped itself with an advanced trade and industrial structure. From Figure 1, which traces this development, it is clear that the heavy and chemical industries and, subsequently, machinery industries have increased their shares at a remarkable speed. Without such changes in its trade and industrial structure, Japan, which had to reconstruct an economy devastated by the war, would have been unable to achieve such a high growth rate throughout the postwar periods.

[Figure 1 about here]

Many factors have contributed to Japan's rapid industrial growth: a high saving propensity and rapid capital accumulation, an efficient use of borrowed technology from the advanced countries, diligent and industrious workers, and various policy measures introduced by the government to mention a few. There are a number of different views regarding the relationship between Japan's industrial policies and its rapid industrial growth. There is on the one hand, the view that Japan's industrial policies did not contribute to its growth at all and, moreover, these policies were actually detrimental to a healthy functioning of the economy. There is the opposite view, however; namely that Japan's rapid economic growth was derived from its industrial policies.

Our view deffers from these two extremes. There can be no doubt that Japan's industrial policies had enormous effects on its economic performance, both positive and negative. In that sense, it is impossible to disregard these effects when one discusses Japan's rapid postwar growth. However, since a large number of policy measures were introduced by

government, and their effects were even more varied, it is almost impossible to provide an overall evaluation of Japan's industrial policies.

These policies include a wide range of measures, such as border restrictions (tariffs and quotas), intervention in production activities such as production subsidies, R&D promotion such as the formation of a government-led R&D cooperation group, adjustment assistance towards declining industries, and so-called industry rationalization such as government-supported cartel and merger measures.

It would prove impossible, even meaningless, to attempt to cover this wide range of policy measures in the limited space of this paper. We have therefore restricted our discussion to trade-related policy measures, particularly infant industry protection policy, since we believe that infant industry protection policy was the core of Japan's industrial policies in the postwar period until the mid-1970s.

Many countries have attempted to implement an infant industry protection policy, but in most cases these have been unsuccessful in promoting industrial growth. The Japanese experience in the postwar era is quite exceptional in this respect. If Japan's infant industry protection policy effectively promoted industrial growth, what kind of mechanism lay behind that growth? An answer to this, in terms of the Japanese experience, is important not only for evaluating Japan's industrial policies but also for a better understanding of infant industry protection policy in general.

A recent increase of interest in trade and industrial policies in general invites an evaluation of those implemented by Japan. (#1) In this paper, we will explore from a theoretical perspective how Japan's trade and industrial policies in the postwar era contributed to and affected its economic welfare and industrial growth pattern. (#2)

Section II provides a brief overview of the policy measures that were introduced by the Japanese government to protect its infant industries; Section III discusses the economic implications of so-called selective protection policy (sometimes called industrial targeting); Section IV deals with the issue of increasing returns and Marshallian externalities; Section V explains how the temporary nature of Japan's protection policy accelerated investment by domestic firms; and Section VI discusses some aspects of oligopoly. Brief concluding remarks are provided in Section VII.

II. A Brief Overview of Infant Industry Protection Policy

Soon after the war, the government had to confront the challenge of reconstructing and reinforcing the economy in order to survive international competition. But, for this purpose, it first had to overcome two great obstacles: a shortage of domestic resources, physical as well as non-physical, and a lack of foreign currency reserves to finance a rapid expansion of import demand for goods necessary to industrialization, such as raw materials, machinery, and new technology. These two obstacles made for a vicious circle of foreign exchange shortage: its lack of domestic resources means that Japan had to import raw materials from abroad. While these could be purchased with foreign exchange obtained by export, this was impossible when any increase in production demanded the availability of sufficient raw materials. This vicious circle continually threatened the Japanese economy as it moved towards industrialization, and it was faced with an adverse international balance of payments situation for a long time after the war. The situation was more serious immediately after the war than in any other period in the history of Japan's modernization, because

the devastation of its production facilities jeopardized its economy, producing a great shortage of necessities and massive unemployment.

This critical situation impelled the government to formulate a comprehensive policy program to reinforce and refine Japan's trade and industrial structure. Its policy program consisted of:

A. Trade restrictions to secure the home market for domestic industries through:

- A-i quantitative import restrictions
- A-ii import tariffs
- A-iii regulation of inward direct investment

B. Subsidization to promote market expansion for domestic industries through:

- B-i export promotion by export tax credit, special depreciation allowances and preferential loans
- B-ii production and investment subsidization by tax credit, special depreciation allowances and preferential loans

Employing several well-known criteria for choosing industries that would receive special protection, such as "income elasticity" and "productivity growth", the government applied the above policies to a specified group of industries producing such goods as steel, non-ferrous metals, petroleum, chemicals, machine tools, (electric, transport and electronic) machinery, and, subsequently, semiconductors and computers.

It should be mentioned that the focal point of industrial policy was gradually shifted away from the above to the more selective infant industry protection policy. However, the above policy measures continued to be used, although in a more selective and less comprehensive manners than before.

The first group of policy measures prevented established foreign firms from exercising strategic entry deterrence against potential new entrants from Japan and capturing the Japanese market. As Figures 2 and 3 indicate, the leading industries at that time were initially protected by quantitative restrictions up to 1965 (up to the 1970s in the case of some high-tech goods), but later by high tariffs up to the first half of the 1970s. With regard to specific industries, Figure 4 shows that the import tariffs on major machinery industries, which received special attention for promotion of indigenous industries, were relaxed only after this sector became internationally competitive enough and its export/production ratio had risen.

[Figures 2, 3 and 4 about here]

Japan's border protection policy was quite comprehensive, covering a large portion of import goods industries up to the mid-1960s, but, since then, it has become more selective. It is interesting to note also that the level of tariff protection in Japan is not significantly higher than in the United States and the EC(#3).

The second group of policy measures helped domestic industries to secure a market for their growth, especially when it appeared that the domestic market would be too small for them to make the best of economies of scale. As regards the magnitude of sectoral disbursement of subsidies in the postwar era, agriculture, forestry and fisheries accounted for more than 80% of the total subsidies provided for private industry, while the high-technology, transport machinery, medical equipment and other such industries comprise a rather small portion of that amount (#4).

Table 1 indicates government involvement in export promotion through the figures showing the reduction in gross tax receipts, which measure the

size of the incentives that were provided by four major tax schemes designed to promote exports. Even though the policy authorities were actively involved in export promotion, the figures reveal that the incentives actually resulted in less than 2% of the total value of exports.

[Table 1 around here]

Our review of Japan's trade and industrial policies reveals the following features:

- (i) The Japanese government provided little direct subsidization to indigenous manufacturing industries through the post-war era; and
- (ii) A crucial role during the establishment of Japan's major industries-- that is, up to the 1970s-- was played by the protection of the domestic market against foreign competition through restrictions on imports from, and inward direct investment by, foreign competitors.

We will now consider what kind of economic mechanism was working behind the policy measures described in Sections I and II.

III. Selective Protection and the Change in Japan's Trade and Industrial Structure

Infant industry protection by the Japanese government has relied heavily on border restriction policies. Under the slogan "the sophistication of industrial structure", the government nurtured the heavy and chemical industries, such as the steel, shipbuilding, and petrochemical industries. but gradually moved its attention to the machinery and high-tech industries.

The government selected a particular group of industries based on several specific criteria and directed its protection to them. Most of these have successfully become the country's leading industries: textiles in the 1950s, steel in the late 1960s, electronic goods and automobiles in the 1970s, and other high-tech industries since the mid-1970s. The development of each of these industries resulted in serious trade friction in each of these decades with other advanced countries, such as the United States. Like the success stories of other late-developing countries, the postwar history of Japan is characterized by its assimilation of the least competitive industries of the advanced countries. We will now inquire into the mechanism of advanced-industry assimilation from the viewpoint of trade and industrial structure.

Figure 5 shows three categories of goods traded between advanced and late-developing countries (#5). The first category is comprised of "basic technology goods", such as textiles and other light industrial products, in which the late-developing countries have a strong comparative advantage. The second is comprised of "borderline technology goods", in which the international competitiveness of the late-developing countries is quite close to that of the advanced countries. Steel, shipbuilding and, perhaps, mass-produced automobiles would fall into this category. The third category is comprised of "advanced technology goods", which denotes goods that only the advanced industrial countries can produce competitively. An example of these would be high technology goods, such as semiconductors, aircraft, and services like finance and communication.

[Figure 5 around here]

When the advanced 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. What happens then if the late-developing countries protect any of their industries?

A question which inevitably arises in the industrialization process is whether effort should be put into making pre-existing export industry more competitive or to broaden the industrial base by establishing new export industries. In Japan, there was serious policy debate in the 1950s over whether it should protect industries which were not internationally competitive at the time, such as automobile and steel industries. If the pattern of industrial development is something which can be changed by government policy, then this question is a legitimate one for industrial policy.

If industrial policy protects the basic technology goods industries so as to reduce their production costs, then insofar as the economy is under perfect competition, the late-developing countries will gain little from such a policy. They may even lose from the policy as a result of it. This is because protection-- subsidization, say-- leads only to a deterioration in the late-developing countries' terms of trade as well as the protection cost incurred by them.

However, if industrial policy protects borderline goods industries, the result is somewhat different, for by the protection of these industries, the late-developing countries can snatch the foreign market, which expands the world demand for their primary factors of production and thus raises their prices. The rise in the factor prices impacts unfavorably on the basic technology goods industries and causes their prices to rise. However, this price increase amounts to an improvement in the terms of trade for the late-developing countries.

As already mentioned, the pattern in Japan's postwar development was to shift the industrial structure towards borderline technology goods. Industrial development which moves the late-developing countries into borderline technology goods serves to raise their relative income position vis-a-vis advanced countries through the change in the factor prices mentioned above. Since the welfare gains from the establishment of borderline technology goods spread to the entire economy, the national gains from the establishment of the borderline goods industry are much larger than the private gains for the industry itself. Thus, there is a reason for government to protect borderline technology goods. This kind of general equilibrium impact resulting from infant industry protection policy has received little attention in the traditional literature. It is, however, one of the most important features of Japan's postwar industrial policy.

It is quite clear that the industrial development of late-developing countries towards borderline technology goods may have adverse effects upon the welfare of the advanced countries, since the terms of trade are changing against the advanced countries. This may explain why there has often been trade friction related to borderline technology goods between Japan and the United States in the postwar period.

IV Setup Costs of Industry and Marshallian Externalities

This review of postwar trade and industrial policies shows something that runs contrary to the widespread view on Japanese industrial policies, and that is the success of economic development when backed up with a deep involvement in industry protection. However, even a small subsidy on production or exports, if concentrated on a suitably chosen group of

industries, can have a significant protection effect in the presence of certain industry-wide economies of scale. This also accords with the argument of infant industry protection and thus is welfare enhancing in national economic terms, even if it is not in international terms.

There are several factors through which industry expansion leads to its cost reduction, which can be roughly classified into the following three types. The first is industry-wide externalities in which the overall expansion of the industry yields an improvement in the technology conditions of each firm, often associated with development of a parts-suppliers network, as in the automobile and the household electrical goods industries. These industries require numerous parts, and their productivity greatly depends on the efficiency of parts production, which can be improved by promoting a division of labor among parts suppliers.

But as Adam Smith once argued, such division of labor is often limited by the extent of the market. It is sometimes possible to coordinate such division of labor internationally, and in that case the size of each national market does not matter. However, it is often difficult to achieve this, for complicated and frequent information exchanges are necessary to coordinate such division of labor effectively.

With market growth, a trained labor force or workers with higher technological knowledge move actively in the parts sector seeking higher rewards. This movement of human capital promotes a dissemination of higher technological knowledge throughout the sector and thus raises the production efficiency of parts production. In addition, demand growth will be helpful for each parts supplier in overcoming the barriers of fixed costs for specializing in the production of more specialized parts. It will also be conducive to enhancing the productivity of final goods production.

The second type of factor through which industry expansion leads to cost reductions is related to more dynamic sources of increasing returns to scale. such as learning by doing or the accumulation of experience and improved production know-how, which are typically observed in the integrated circuit, computer and other high-technology industries. In these industries, output expansion leads a firm to much lower unit production costs, with a downward movement along the so-called learning curve. The semi-conductor industry is prominent among those industries that exhibit a substantial learning curve effect: its unit production cost is observed to have been halved within a couple of years. These gains from learning effects are limited by the size of the market which a firm can secure. Put another way, unless firms are able to obtain a sufficient market they do not have an incentive to enter the market, for the massive production and the already reduced cost level entertained by foreign incumbents become high barriers to entry and growth.

The last type of factor involves more intricate effects of information externalities in the presence of firm or plant specific internal economies of scale, which, coupled with oligopolistic interaction among firms, leads to coordination failures in production and investment (#6). Typical examples are steel and petrochemicals. These industries are directly or indirectly related to other industries through transactions of goods and services. This interrelation is particularly close among vertically-related industries.

Suppose that some of the interrelated industries exhibit internal scale economies and that the markets therefore are oligopolistic. Since each firm in an oligopolistic market can exercise its market power, one cannot expect God's guidance or a price mechanism to achieve efficient resource

allocation. Price does not convey all the information on the scarcity of the goods and services in question. Oligopolistic firms decide what price they will quote and what amount they will produce and sell by taking into account the shapes of their demand functions.

However, the production level of other industries affects their own productivity. But a lack of coordination among the industries tends to trap them in low productivity. For example, in the case of the steel and shipbuilding industries, an expansion of steel production reduces the unit cost of steel due to economies of scale, but output expansion incentive hinges critically on the demand for steel by the shipbuilding industry, which is one of the biggest buyers of steel. On the other hand, the cost for the shipbuilding industry depends on the price of steel, which in turn depends on the amount of steel production.

If the two industries look ahead, understand the above situation and can coordinate their production, they both expand their output and realized cost reduction along with a great increase in profits. However, since they cannot coordinate their production, such cost reduction gains from simultaneous mutual output expansion are unlikely to eventuate. And the social gains from economies of scale in each industry are again limited by the extent of the market.

These three types of increasing returns to scale share the property that the average cost of the industries or the sector consisting of closely related industries is decreasing in the total output. This is why those phenomena are often attributed to Marshallian externalities. Let us consider the role played by temporary domestic industry protection in the presence of such Marshallian externalities by using Figure 6.

[Figure 6 about here]

In the figure, the curve AC is the long-run industry supply curve, which also designates the average cost curve of the individual firm (#7). p^* is the international price of the good which the industry faces in free trade. the horizontal line p^*F is the foreign export supply curve, and the curve DD' represents the domestic demand curve for the goods in question.

Let us first assume that free trade initially prevails. Then the domestic output is zero and all the domestic demand of x_2 is supplied by imports from abroad. The domestic industry cannot produce any positive output, for its marginal costs which is higher than the international price, does not induce each firm to engage in production. If each firm could understand the global nature of the long-run industry supply curve and most producers could coordinate to expand the overall output up to x_1 , then they could take off and gain sufficient profits. However, individual producers are able to neither see that far ahead nor attain an output greater than x_1 in cooperation.

To a government facing this situation, there are several alternative policies available for establishing the industry in question, such as temporary measures involving production subsidies and import restrictions. In the case of production subsidies, the government is required to provide the industry with an amount of unit production subsidy slightly exceeding Ap^* . With this subsidy an individual firm finds an incentive for positive production, which initiates a cumulative process of Marshallian externalities and soon expands the industry output beyond the critical level x_1 . Note that along with development of the industry the government can reduce the required unit production subsidy rate, so that the total subsidy expenses can be limited to a certain low level. And once the industry

overcomes the threshold of establishment. it can achieve self-sustained development and consolidate its international competitiveness. The imposition of tariffs, though entailing an additional cost on consumers, has similar protection effects to constantly adjusting tariff rates.

V Temporary Nature of the Protection Policy and the Mode of Oligopolistic Competition(#8)

Generally, when the domestic market is cut off from competition from abroad, domestic firms base their structures and business procedures on protection. As a result, they often lack an aggressive interest in investment and growth. After all, when protection to some degree is expected to continue, there is no merit in sharply increasing capital investment. That a domestic industry protected from overseas competition never adopts a policy of redoubling capital investment and expanding its R&D program at a rapid rate is a fact observed in many countries. Under certain conditions, the policy of protecting the domestic industry may discourage domestic firms from investing.

A salient feature in Japan's postwar protection policy was the awareness of industries of the fact that the import and direct investment restriction policies would never in effect be permanent. Japan joined the GATT in 1955 and gradually lifted one trade restriction after another. Although the Japanese government at that time did not consider it the most desirable policy to lift trade restrictions, it had to do so if Japan was to be accepted as a full member of the GATT and IMF by the "Club of Advanced Industrial Nations".

External and internal pressures for liberalization also contributed greatly to the view that Japanese protection of manufacturing industries would not last long. As the 1960s got underway, pressure on Japan from the United States and other countries to open its market began mounting, and the magnitude of such pressure became a critical factor in determining the pace at which Japan opened its market.

Once liberalization became an established fact, corporative behavior, especially incentives for investment, was subject to its influence in a substantial way. Many of the indigenous industries, such as the automobile, computer and other machinery industries, were considerably less competitive than their American and European counterparts. Each firm was quite aware of sustaining a possible defeat in the event of the liberalization of the Japanese market. Consequently, the major concern of each firm, under a temporary protection policy certain to be lifted in the future, must have been how to gain a sufficiently competitive edge prior to liberalization.

The above feature of temporary protection is particularly important when the industry is oligopolistic. As made clear by Spence [1979], the behavior pattern of firms in an oligopolistic market is quite different depending on whether the market is in a growth phase or a stable phase. When the market is growing rapidly, as in the case of many industries in Japan during the high-growth era, the short-term profit is not as significant as it appears. The primary target of each firm should be in fact to obtain as much competitive strength as possible during the growth period so that as much profit as possible and as stable a share of the market as possible can be secured in the long run.

The share ranking of firms in an industry established during a growth phase in the industry tends to be stable in the later stages. This is because capital equipment and technology accumulated in each firm during the growth stage become a commitment, weakening the incentives to invest by other firms. The levels of capital equipment and technology of rival firms affect the incentive to invest by each firm, for if the rivals have strong competitiveness provided by a large amount of capital equipment and a high technology level, the return to invest will be low. In this situation an early commitment to investment is important in order to gain a larger profit in the later stages. Competition under these conditions bears a strong resemblance to an investment race.

In Japan, this investment race was strengthened by the threat of foreign firms entering the Japanese market. The existence of overseas manufacturers was regarded as a major threat even in the protected market.

The above argument brings to mind the question of the dynamic inconsistency of temporary protection policy. In most countries, once protection measures are introduced, they have a tendency to become permanent, even if they were initially intended to be temporary. Temporary protection policy can be dynamically inconsistent in that, if domestic firms simply ignore an announcement to remove protection measures in the future, the government would observe that the domestic firms have not accumulated enough capital by the end of the protection period and would be tempted to postpone liberalization. Unless the government finds a way of making a credible commitment to the temporary protection, there is no way it can avoid extending the protection period.

Many countries face this inherent inconsistency in temporary protection policies. Japan's experience has been rather unique in this respect. As

already mentioned, Japan was unable to avoid opening its markets. This did not result from a voluntary commitment to do so on the part of the Japanese government, but rather from a pressure imposed by the international environment.

VI. Industry Promotion under Oligopolistic Interactions

With a serious lack of physical and financial capital, private industries found it very difficult to raise capital to establish new plants. The problem was acute in the capital-intensive industries, such as the steel, chemical and automobile industries, for these industries had already been established in the United States and Europe, and their large economies of scale constituted high entry barriers to new entrants. Since such capital investment entails sunk costs in general, the incumbent firms have a great incentive to strategically deter new entrants by committing to a large investment for the purpose of securing their monopoly position. Under these circumstances, the government of an underdeveloped country is expected to restrain the incumbent's entry deterrence in order to promote entry and raise the country's economic welfare.

To see how this is possible, let us suppose, for the sake of simplicity, that the industry in question is initially monopolized by a foreign firm and that a potential new entrant in the home country is considering entering into the industry. The production technology is assumed to be identical between the two firms and characterized by economies of scale. The economies of scale work owing to the investment on specific capital in advance of entry, which, once invested, becomes sunk costs. The two firms, when they operate simultaneously, play Cournot quantity

competition in the market. Here, for the purpose of highlighting the foreign firm's first-mover advantage as an incumbent, we simply assume that the domestic entrant, once it enters, acts as a Stackelberg follower (in other words, it chooses its output based on the foreign firm's output so as to maximize its profit), while the foreign incumbent acts as a Stackelberg leader (in other words, it maximizes its profit with respect to its own output by fully predicting the domestic firm's reaction curve) (#9).

The equilibrium of the present duopoly market is described by a well-known reaction curve diagram shown in Figure 7. The horizontal axis measures the output of the foreign firm X , while the vertical axis measures that of the domestic firm x . The kinked curves $rr_0 X_0 X$ and $RR_0 x_0 x$ represent the reaction curves of the domestic and foreign firms respectively.

[Figure 7 about here]

Two remarks are in order here. First, the reaction curves have a kink, because a sufficiently larger output by the rival (for instance, for domestic firm, more output than X_0 by the foreign firm) sufficiently lowers the market price, and neither firm is able to raise a positive profit due to large fixed costs.

Second, the reaction curve of each firm, when producing a positive amount of output, is assumed to be downward sloping with respect to the rival's output. This is because the marginal revenue of each firm is assumed to be decreasing along with the rival's output.

Since the foreign firm has the first-mover's advantage as an incumbent, it will strategically choose its output level. Roughly speaking, there are two alternatives for the foreign firm: one is to accommodate the entry, the other is to deter it. When the foreign firm chooses to accommodate the entry, the best point for it is the Stackelberg leader point S , realized by

producing X_L units of output to gain profit Π_L . In the figure, the corresponding iso-profit curve is described by the curve Π_L . When it chooses to deter entry, it must produce up to the level X_0 and obtain the profit Π_D , the iso-profit curve of which is represented by the curve Π_D . Since the profit of the foreign firm increases as the iso-profit curves approach the horizontal axis along the reaction curve, in the situation described by Figure 7 the foreign firm finds it more advantageous to deter entry. Hereafter, we assume $X_0 > X_L$.

Let us first consider the welfare effect of quantitative import restriction. This policy has a remarkable effect on the entry deterrence strategy of the foreign incumbent. Even when the quantitative restriction is slightly less than the initial limit output X_0 , the foreign incumbent is dissuaded from strategically deterring entry. The equilibrium switches from X_0 to the Stackelberg equilibrium: the foreign incumbent's threat of producing X_0 for entry deterrence becomes empty or not credible, and the domestic firm produces x_L and the foreign firm X_L .

The domestic firm, by capturing some portion of the market, obtains some positive profit, while the foreign firm, losing some portion of the market, loses profit. The change in the total output is usually ambiguous, but it is generally the case that the total output becomes greater after the entry of the domestic firm, as illustrated in the figure. Not only does the price then decline to enhance the consumers' welfare, the domestic industry also entertains an increase in profit. As a result, even slight quantitative import restriction, along with an extraction of the foreign

firm's monopoly rent, improves the domestic country's economic welfare in this case.

One remark is in order here. As far as the foreign country's producer is concerned, the present quantitative import restriction policy amounts to a "beggar-thy-neighbor" policy. However, in the presence of foreign consumers, it does not necessarily have the same implication, for the foreign consumers also benefit from the price reduction. In fact, unless the cost condition of the domestic firm is sufficiently inferior to that of the foreign firm, such an import restriction will reduce the world's oligopolistic distortion and improve world economic welfare.

It is worthwhile comparing this result with the effects of import tariffs and production subsidies. The imposition of import tariffs or the provision of production subsidies affects the location of the firms' reaction curves: tariffs, by raising the effective cost of exports by the foreign firm, shift its reaction curve inward, while the production subsidy to the domestic firm, by reducing the marginal cost of the domestic firm, shifts its reaction curve outward.

It is quite clear that slight pecuniary incentives towards the domestic firm's potential entry, either direct (production subsidy) or indirect (import tariffs), never removes the foreign firm's entry deterrence threat. Sufficiently high rates of pecuniary incentives are needed to promote the domestic firm's entry.

VII Summary and Conclusion

We have seen that there are various features of infant industry protection policy can be explained from a discussion of postwar Japan's

experience in industrial policy. The features that we have observed may be summarized as follows:

(1) The changes in industrial structure and trade pattern and their impact on the gains from trade are critical to an evaluation of infant industry protection policy. One of the salient feature of Japan's postwar infant industry protection policy was the rapid expansion of its industrial base to borderline technology goods. This kind of broadening of the industrial base impacts considerably on the distribution of gains from trade among countries.

(2) We can think of several different types of increasing returns to scale which are relevant for infant industry protection policy. The underlying mechanism varies somewhat depending on the type of scale economies, and a careful analysis of each case is necessary to obtain any concrete policy implications.

(3) A considerable number of infant industries have some oligopolistic character. Competition within an oligopolistic world has many fascinating facets which do not exist in a world of perfect competition. The forms of competition are extremely varied and not limited to price. Competition can take place in the area of R&D investment, plant investment, marketing and so on. 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. We have seen how temporary protection policy accelerated the investment race. We have also seen that temporary protection policy may prevent foreign incumbent firms from deterring the entry of domestic firms.

We are not, by any means, advocating postwar Japan's infant industry protection policy. An overall evaluation of its policy is extremely

difficult, since so many different types of economic players are affected by the policy, and affected quite differently depending on their positions. Furthermore, the effects of the policy are far more complicated than indicated by the static and partial equilibrium theory of infant industry protection.

Notes

*. This paper is heavily dependent on a recently published book, Itoh, M., K. Kiyono, M. Okuno and K. Suzumura, Sangyo-Seisaku no Keizai Bunseki (Economic Analysis of Industrial Policy) (in Japanese, Tokyo: University of Tokyo Press, 1988). We owe many of our ideas and insights to Professors Okuno and Suzumura.

1. For instance, see Krugman [1984] and Komiya et.al. [1988].

2. We have undertaken a more empirical and descriptive evaluation of postwar Japan's trade and industrial policy in other works. See Komiya and Itoh [1988] and Itoh and Kiyono [1988].

3. It should, however, be noted that the tariff burden ratio presents many difficulties as a measure of the level of tariff barriers.

4. See Ogura and Yoshino [1988], p.123.

5. The following argument is a simplified discussion of the analysis in Itoh and Kiyono [1987]. See the original article for a more detailed and rigorous analysis.

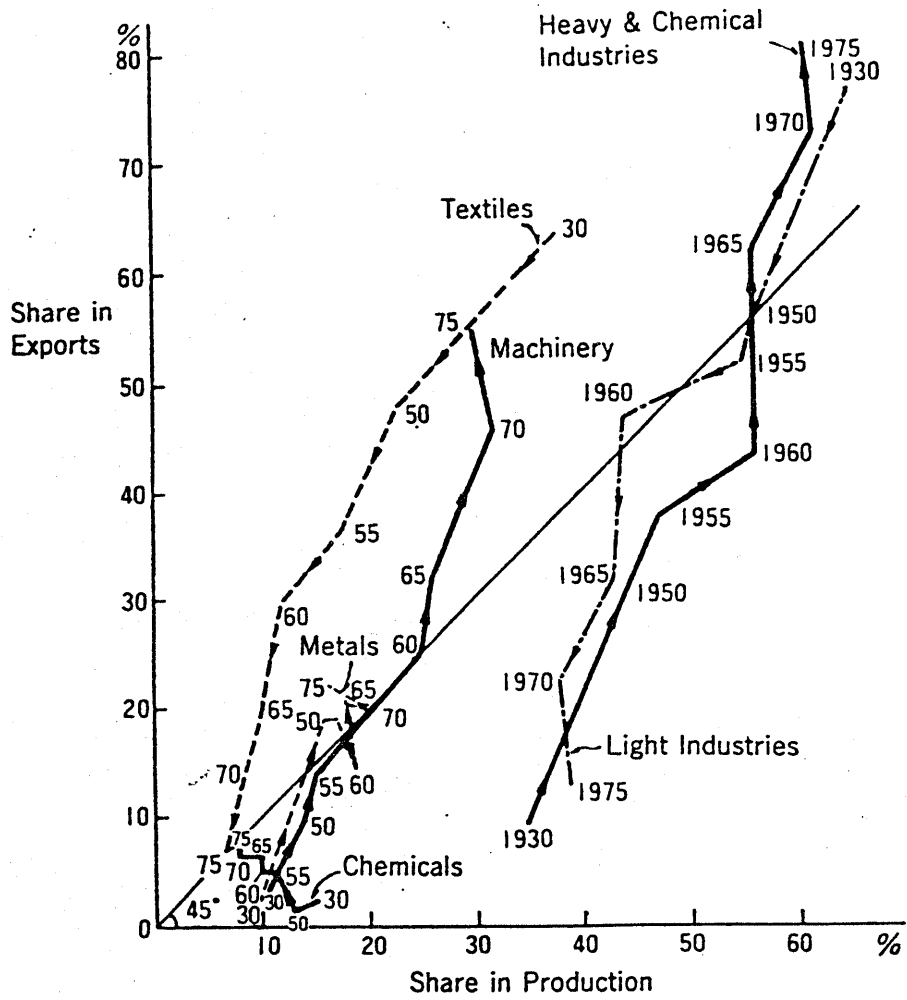
6. For more detail, see Okuno-Fujiwara [1988].

7. The average cost curve of the individual firm is assumed to be increasing, but due to Marshallian external economies the curve shifts downward along with the overall output expansion of the industry.

8. See Matsuyama and Itoh [1985] for a more detailed discussion of this section.

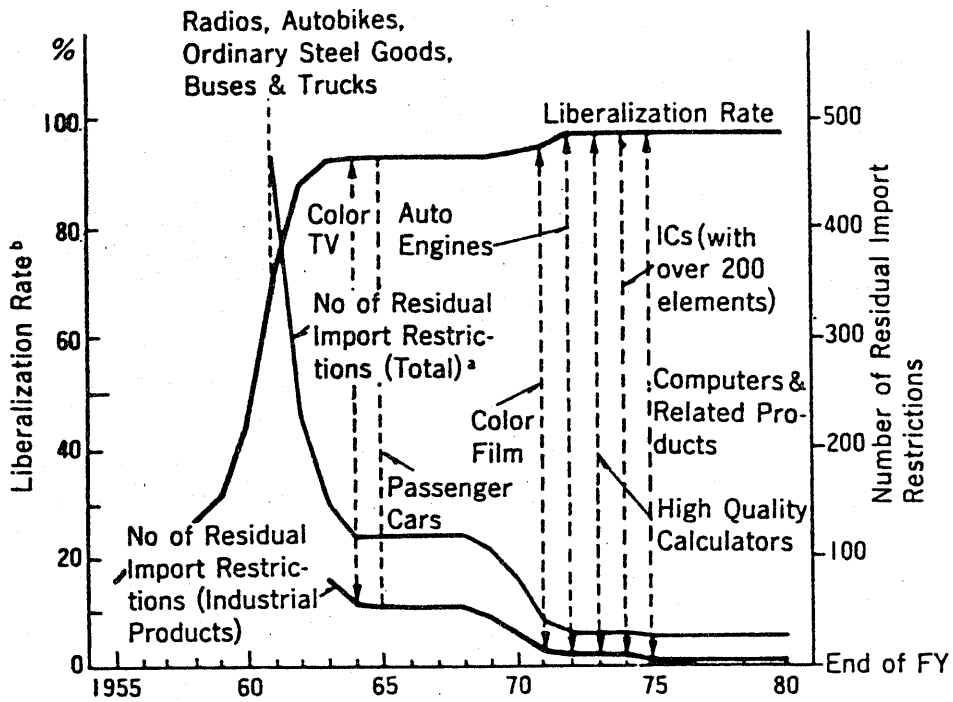
9. See Dixit [1979] for a more complete analysis of entry deterrence using this type of model.

Figure 1



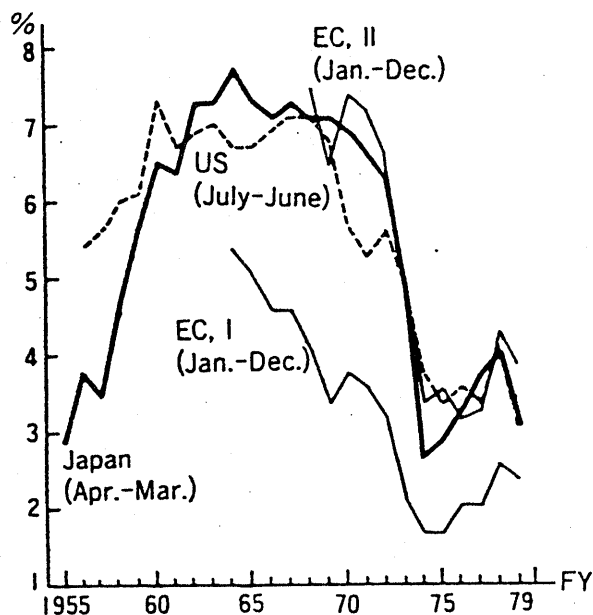
Shifts in industrial structure and pattern of trade. From *Nenji Keizai Hokokusho* (Annual Economic Report), Fiscal 1978.

Figure 2



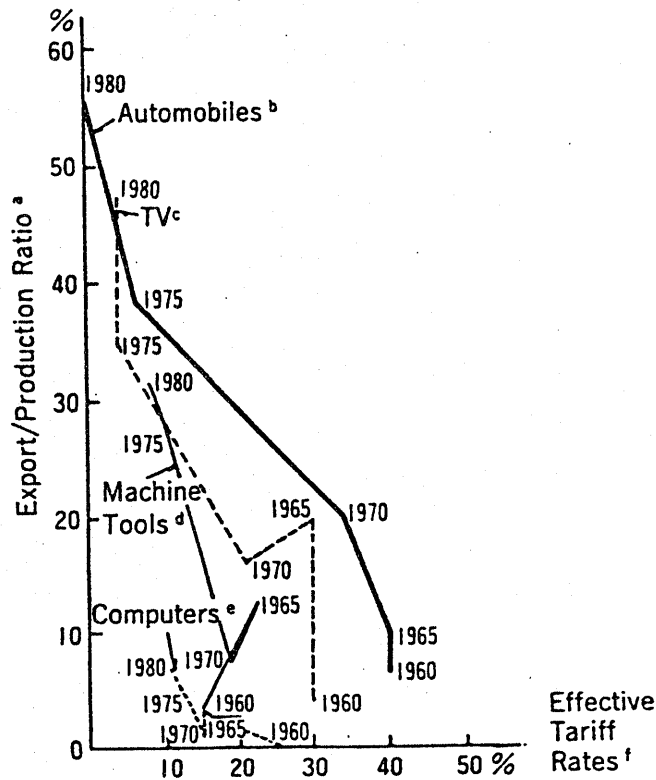
Trade liberalization in Japan. From Tsusansho, (1980), p. 55; Naikai, (1961), p. 37. Joined IMF and WB (1952), GATT (1955); Trade and Exchange Liberalization Guidelines (1960); Inclusion into Article 8 Countries of the IMF (1964); Kennedy Round (1967).^a Figures for 1961 are those for April, 1962.^b Calculation discontinued now.

Figure 3



Tariff burden in major countries. From Nihon Keizai Kenkyu Senta (1979); Tsusansho (1982). The EC figures up to 1977 include six old EC member countries viz. W. Germany, France, Italy, Netherlands, Belgium, and Luxembourg. For 1978 and 1979, UK, Denmark, and Ireland have also been included. Tariff burden in case of EC includes agricultural surcharges. EC I represents the tariff burden on total imports including intraregional imports. EC II gives the tariff burden on imports from outside the EC.

Figure 4



Export/production ratios and effective tariffs. ^aExport/Production Ratio = Amt. of Expts./Prod. × 100. In case of automobiles, number of units is used. ^bAutomobiles include passenger cars, buses, trucks, and three wheelers. ^cTelevision includes black-and-white and color TVs. Effective tariffs refer to color TVs only. ^dIncluding NC and others. Effective tariff rate pertains to NC machine tools only after 1970. ^eIncludes analog type. Effective rate of tariff is for digital type only. Computers include not only the main-frame but accessories and other related equipment as well. Tariffs are applied in the following order: (1) Preferential Tariffs, (2) GATT rates, (3) Temporary rates, and (4) Basic rates. The one that is actually applied is called effective tariff rate. (2) is used only if it is lower than (3) or (4). Since we are concerned with effective tariffs on trade with developed countries only, (1) has been ignored.

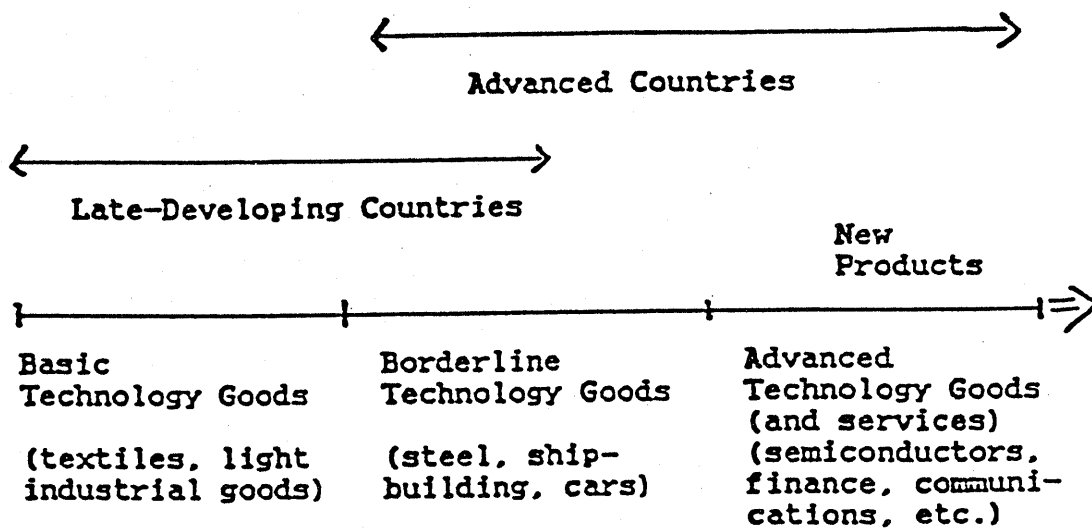


Figure 5

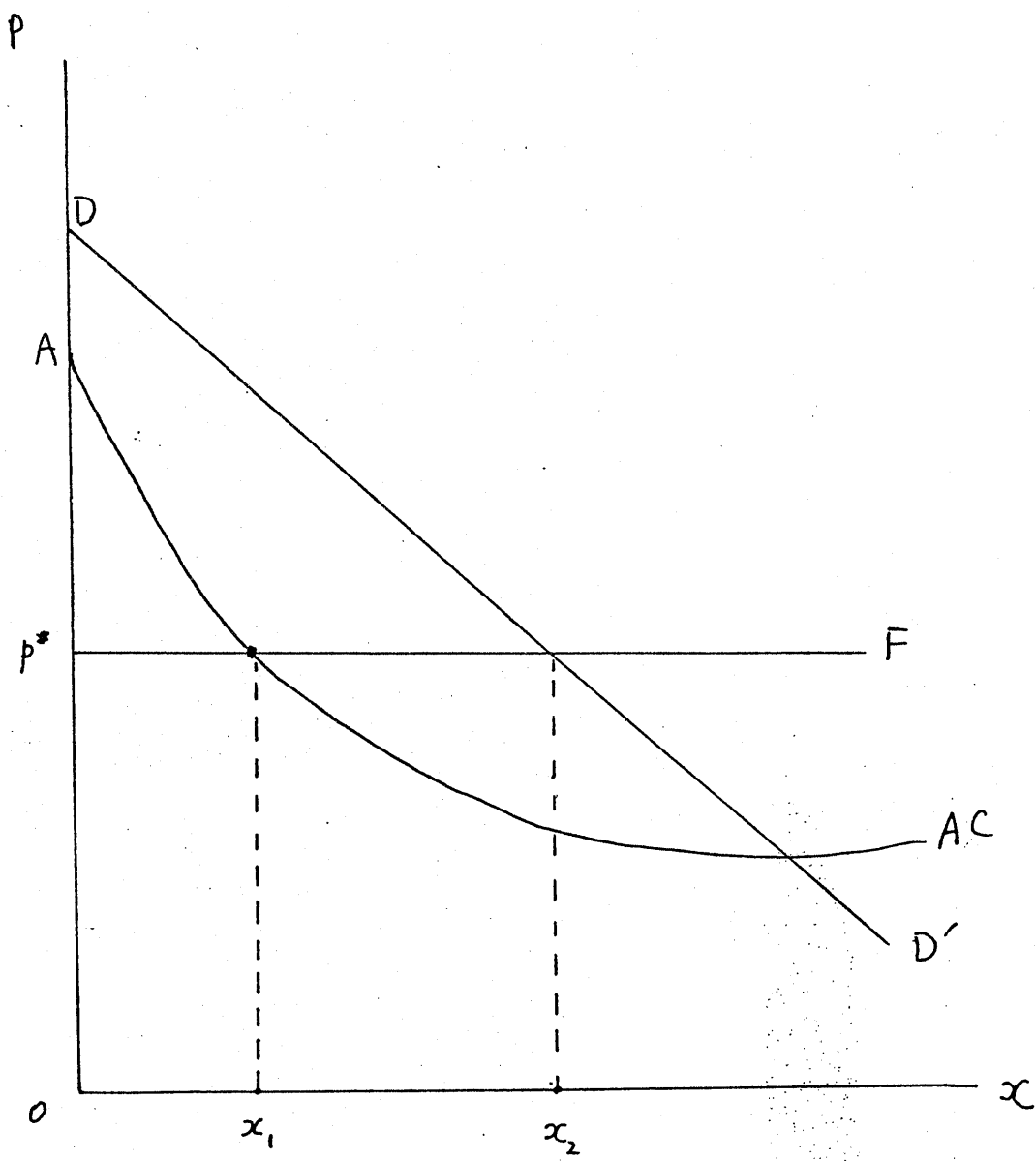


Figure 6

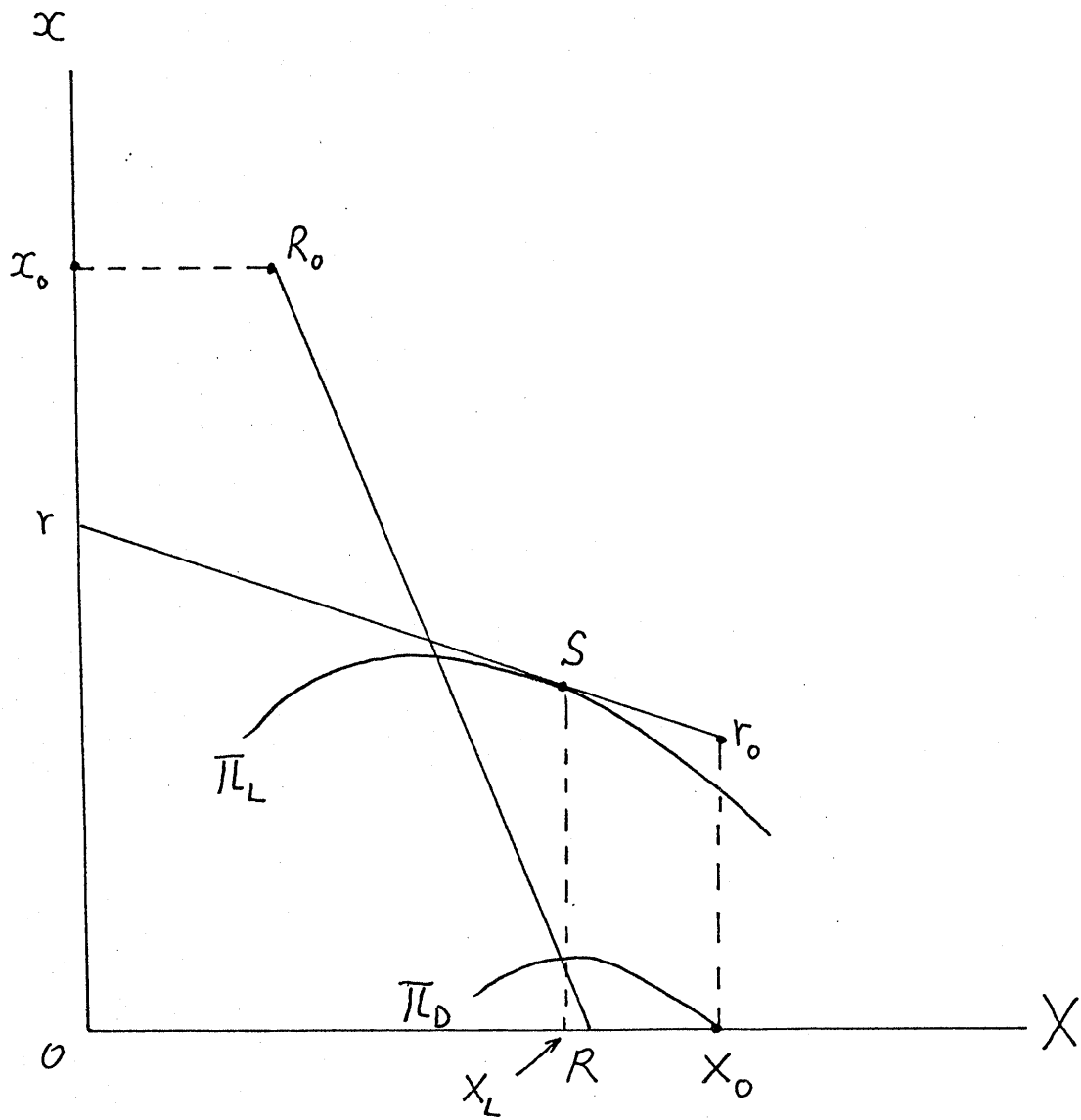


Figure 7

Table 1

Effect of Export Promoting Tax System (million \$, %)

Year	Revenues Lost on Account of Export Promoting Tax System (A) ^a	Revenues Lost Due to Special Tax Measures (B)	A/B	Amount of Exports (C)	A/C	Rate of Export Subsidies in Korea ^b
1953	13.1	162.5	8.0	1,275	1.0	—
54	11.1	191.7	5.8	1,629	0.7	—
55	9.7	259.4	3.7	2,011	0.5	—
56	12.5	264.7	4.7	2,501	0.5	—
57	20.8	204.2	10.2	2,858	0.7	—
58	34.7	197.5	17.6	2,877	1.2	2.3
59	27.8	229.7	12.1	3,456	0.8	2.5
60	31.9	280.8	11.4	4,055	0.8	1.9
61	30.6	284.7	10.4	4,236	0.7	6.6
62	59.7	349.4	17.1	4,916	1.2	16.5
63	65.3	471.1	13.9	5,452	1.2	15.1
64	66.1	596.7	11.1	6,673	1.0	12.8
65	68.3	613.3	11.1	8,452	0.8	14.8
66	72.5	650.3	11.1	9,776	0.7	19.0
67	71.6	635.8	11.3	10,442	0.7	23.0
68	104.2	720.8	14.5	12,972	0.8	28.1
69	139.7	879.2	15.6	15,990	0.9	26.1
70	210.8	1,040.8	20.3	19,318	1.1	27.8

Sources: Zeisei Chosakai (Tax System Council), [1972], p. 187; Keizai Kikakucho, *Keizai Yorin* (Handbook of Economic Statistics), various issues; C. R. Frank et al. [1975], pp. 70–71.

^aIncludes accelerated depreciation for exports, special deductions on overseas incomes, and reserves for opening up of overseas markets.

^bTotal export subsidies/total exports. Export subsidies include direct subsidies, domestic tax concessions, tax rebates on exports, and interest subsidies.

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