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Competition in the Interwar Japan:
The Origin of the Developmental State?**

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I. Introduction

In spite of long-run debate on the role and characteristics of industrial policy in postwar Japan, the interwar experiences has not been seriously treated by the researchers thus far. There are at least remaining two crucial questions for further studies from the view point of economist or economic historians.

First one is whether industrial policy of interwar period really contribute to its economic development, if so under what mechanism. As is well known, the economic growth rate of interwar Japan was relatively higher than other advanced nations. Import substitution in the heavy-chemical industries was realized, while textiles industries kept high competitive edge in the world market. Concerning this points, it seems that previous literature tended to either exaggerate a role of government for development (the developmental state view) or attribute industrial success to factor endowments (the market friendly view). In order to overcome such dichotomy, the structural dynamics between government intervention and corporate behavior should be clarified in detail.

Second question is whether the experience of interwar period is really an origin of postwar industrial policy? There are growing literature considering on the prewar, wartime, and postwar period as a single evolutionary process or incremental process, stressing on the continuity of policy orientation, strategy, and measures taken by government.¹ What has often been overlooked is the international circumstances at that time and the relationship of industrial policy (hereafter I. P.) with other relevant economic institutions.

Of course, to answer such huge questions comprehensively is far beyond a single paper. The purpose of this paper is, keeping these questions in mind, to clarify the role of strategic government intervention against international competition, specifically concerning chemical industries such as dyestuff, soda ash and ammonium sulphate during interwar Japan.

In this period, import substitution of chemical industries grew rapidly along with the iron, steel and various machine industries. Its self-sufficiency ratio increased piecemeal

during the 1920s, and its import substitution goal was almost achieved by the time of the Great Depression despite the increasing exchange rate. Japan began to export to east Asian markets after the depreciation of the yen in the 1930s.

Interestingly, the success of this import substitution was not as easy to explain as it might seem. The comparative advantage of cheap labor indigenous to developing countries, which played an important role in the textile industry, was not a factor here, whereas the increasing returns to scale were much more important. As with other heavy industries, the fixed capital required was large. Furthermore, the technological level needed was higher than before, and for most companies the introduction of foreign technology was almost impossible under existing patent monopolies, so "learning by doing" proved most effective.

World War One (W.W.I) gave a big boost to Japanese companies by shutting out imports. However, after the war they could not help but face severe competition again. Being an Asian market center, Japan became one of the most attractive markets for European big businesses suffering from excess capacity as a result of rapid wartime expansion.

At this time, chemical big businesses -- Du Pont, IG Farben, ICI et al -- organized explicit and implicit international territorial cartels to determine, among other things, exclusive export rights to the Japanese and East Asian markets.² Facing the Japanese industries' emergence, the chosen company adopted a strategy of preventing Japanese companies from expanding their facilities as much as possible. Hence it followed two measures: (1) low price policy and (2) a bilateral agreement with Japanese companies or cartels defining price levels and sales allotments first for the Japanese and later for East Asian markets.

New private Japanese companies had a strong incentive to reach agreements with foreign big businesses, as they earned low profits and often suffered large losses under intense competition. However, taking part in the international cartel had negative effects on Japanese companies. Although they maintained domestic market shares, inevitably, their production capacity was restricted.

An oft-overlooked yet influential actor in this drama is government involvement, which further affected this reciprocal relationship. It prevented the oligopoly from instituting low prices by raising tariffs and enforcing anti-dumping measures. It also strengthened the negotiating power of domestic companies through subsidies, making cost reduction possible.

This game behind the scenes of Japanese import substitution during the interwar period was not two-player, with foreign big businesses and domestic companies, but rather three-player with the government. In other words, the environment under which import substitution of chemical industries advanced are not that of perfect competition, but close to monopolistic competition, where a few foreign and domestic oligopolies behave strategically while considering rival's behavior. In this monopolistic competition, government intervention which could affect the strategy of both sides, had a critical significance for developing countries.³ Within this framework, the government's strategic intervention in the reciprocal relationship between foreign big businesses and domestic companies for import substitution of the chemical industry will be clarified.

The reminder of this paper is organized as follows: The first section briefly sketches the rise of chemical industries compared with other heavy industries, paying attention to differences among chemical industries. The next section treats the reciprocal process among foreign and domestic companies and the government respectively, focusing on government intervention (industrial policy or I.P). The last section will provide some perspective on the character of the Japanese government's intervention, considering that it was a common phenomenon in this period.

II. The Characteristics of Three Chemical Industries

It will be convenient at first to review some basic facts about chemical industries in the context of the import substitution which took place. First we compare the selected chemical industries to other heavy industries which were also expanding during W.W. I. Unlike the iron, steel and machine industries, the selected chemical industries were

completely new. The self-sufficiency ratio of iron and steel in 1914 was already around 60% of pig iron, and 40% of finished steel due to the initiating role of the public enterprise, the Yawata Works. These industries had attained competitive edge even before W.W. I. The same ratio for machine industries was already over 60% by that time.⁴ Ship building was also almost completely self-sufficient, and several other sectors, including electric machinery and telecommunications, had high production levels. In these cases large businesses were established through cooperation with foreign big businesses. However, in the case of chemical industries, the self-sufficiency ratio in 1913 was quite low, and remained low until the early 20s, as is shown in **Table 1**.

Secondly, when private companies tried to pursue business opportunities in chemical industries after W.W.I, they faced the patent monopoly of foreign companies. Unlike the big electric companies such as General Electric, Westinghouse and Siemens, which agreed to licensing and directly invested in Japanese companies, chemical companies such as Höchst, BASF, Brunner, and Mond definitely preferred exporting to licensing. For instance, Brunner Mond's usual policy was not to set up factories overseas, but to rely on exports, establishing its own sales branch. It concluded that the natural resources for alkali industry were available near its factories and difficult to match elsewhere.⁵ The strategies of German chemical oligopolist were similar. They tried to enlarge their exports, establishing their own sales network and contact consumers directly, while deliberately retarding the development of Japanese companies' technology through avoiding licensing.⁶ In short, their strategy was to maximize exports and to monopolize the technology, and therefore they denied all appeals from Japanese companies for licensing before and during W.W. I.

Fortunately for Japanese companies, the general context for legal protection shifted as patent rights owned by foreign companies were largely canceled through the Wartime Industrial Property Rights Law. However, even under these favorable circumstances, Japanese firms did not easily and automatically seize upon the business opportunities presented. In the chemical sector, Japanese companies had accumulated little technical

knowledge.

----TABLE 1 ABOUT HERE----

Thirdly, as a result of these two points, the government targeted the chemical industries, along with iron and steel, as important or "key" industries, and played a significant role in transferring knowledge and developing indigenous capabilities.⁷ In dyestuff, a 1918 law aimed at channeling private capital into the dyestuff industry was enacted, incorporating Nihon Senryô Kaisha (NSK) with the government guaranteeing private shareholders a dividend payout of 8%.

In soda ash, where the core technology, an ammonia-soda process, was strictly monopolized by the Solvay Association, the Research Council for Chemical Industries in 1914 recommended public support for special national laboratories for the soda industries. Although the national labs were never established, the Research Council collected the available technical information and transferred this knowledge to Asahi Glass, thereby reducing its initial research costs.⁸

In the synthetic ammonium sulphate industry, the Special Nitrogen Research Laboratory (SNRL), established in 1918, was created by drawing upon resources from the Tokyo National Labs. Relying on published material, and cooperating with domestic machine makers, the SNRL endeavored to develop its own domestic technology as well.⁹

The government's orientation had not changed after W.W. I. In the 20s, the government selected these three industries as "key" industries and investigated promotional measures through organizing several councils, though the measures suggested were not necessarily implemented.¹⁰

Fourth and last, I would point out some differences between the three chemical industries in the early 1920s. As is shown in Table 1, the setting up of both dyestuff and soda ash during W.W. I was still not complete. The soda ash industry was composed of two companies, Asahi Glass and Nihon Soda, neither of whose plant size had reached "minimum

optimal size" yet.¹¹ The dyestuff industries, composed of NSK and Mitsui Mining, neither realized cost reduction nor produced high quality goods, including naphthol dye and indigo.¹² On the other hand, ammonium sulphate had relatively high self-sufficiency immediately after W.W. I. Two companies, Nihon Chisso and Denki Kagaku, both introduced foreign technology, and overcame the initial trouble.¹³

----TABLE 2 ABOUT HERE----

Another difference is the pressure from foreign oligopolist on the three industries. As is clear from the relative price (R. Price) shown in Table 1, in the case of both dyestuff and soda ash Japanese companies suffered from severe price competition. Therefore they had low profitability or even losses is shown in Table 2. In comparison, the market situation for ammonium sulphate was relatively stable. Here the pressure from foreign companies did not become threatening until the late 1920s.

Last difference is the manner in which companies in these industries dealt with their customers in related industries. The main consumer of dyestuff was, obviously, the textile industry, which was the largest export industry at that time. So supplying cheap and high quality dye to weavers was the main concern of industrial policy toward that sector. Soda ash, which was considered a fundamental material of the chemical industry, was not only basic to various industries centering on the glass industry, but also would become caustic soda through a technological metamorphosis. As the synthetic fiber industry advanced, and the demand for caustic soda increased, the importance of ammonium soda ash, which could produce caustic soda cheaper than the electrolytic process, rose accordingly. Both government and business thought that the ammonium soda process was the best way for making caustic soda in terms of quality and cost.¹⁴ That was one of the reasons why both were enthusiastic about the ammonium soda process. In contrast with these two industries as fundamental industries, ammonium sulphate was closely related to the agricultural industry, which occupied over 50% of Japanese employment. This is why the government considered low nitrogen prices to be important, and why there was no tariff on

ammonium sulphate.¹⁵

These differences caused a different government attitude towards each industry, although it regarded all three as "key" industries. Next, we will follow the story of each industry in detail and clarify the role of government intervention against international competition.

III. Case Studies for Reciprocal Negotiation Process

(1) The Success of Selective Protection and the Laissez-faire on International Cartels -- the Case of Dyestuff

In the early 1920s, the strategy adopted by BASF and Hoechst (which merged into IG Farben in 1925) for the Japanese market was obviously an aggressive one. The market segment of this industry was roughly composed of low, middle and high grade goods, graded according to their price and difficulty of production as summarized in **Table 3**. Here low grade means surfur dye like sulfur black and aniline dye and high grade means naphthol dye and indigo. The middle grade means the rest of direct, acid dye. Roughly speaking, the Japanese companies had almost full capacity for low grade goods and 50% capacity for middle grade goods. However, they did not have enough capability to produce high grade goods and were still trying methods of production in some experimental plants.¹⁶

The strategy of foreign oligopolist for this market segment called for low prices on low and middle grade goods, and high prices on high grade goods. As for direct sulfur black, the main product of Japanese companies, a government investigation confirmed that "the difference between German and domestic goods was quite slight, for example German direct black was 2.15 yen, while the Japanese product was 2.20 yen."¹⁷ German oligopolist tried to increase their sales volume by setting sales price slightly lower than Japanese goods. On the contrary, as for high grade goods and German monopoly goods, they set a relatively high price. Their actual sales price were much higher than estimated sales price calculated by domestic price in Germany plus transportation fees and tariffs.¹⁸ Therefore, German oligopolist exports to Japan severely affected Japanese dye producers. Also it caused the

large outflow of consumer surplus from Japanese dying and weaving industry.

As a result, both companies, NSK and Mitsui Mining, suffered large losses as is shown in **Table 2**. NSK required far greater subsidies than originally planned. Although the government estimated that three million yen would be enough for setting up this company, it reached over 14 million yen by 1925. The dyestuff division of Mitsui Mining became an object of reconsideration by both executive members of the main division (mining division) and Mitsui Gomei, holding company of Mitsui Mining. They seriously considered withdrawing their resources from this industry.¹⁹

In the mid 20s, instead of profit subsidies to NSK, the government, taking into account this serious situation, established selective protective measures using import restrictions, tariffs and product subsidies according to market segments. The basic set of industrial policies are summarized in the right-hand side column of **Table 3**. As for low grade goods, effective import restrictions were imposed on German products in 1924. They worked so well that imports from Germany dropped off to one third in value and one fourth in quantity. As for middle grade goods, in 1926 the tariffs were substantially raised by changing from a value-added basis to specific duties. As for high grade goods, naphthol and indigo, product subsidies, compensating for the difference between cost and market price for a limited time (normally three years), were introduced.

However, the import restrictions by licensing system imposed since 1924 were temporary measures, because Japan and Germany had no official trade treaty, hence Germany had no official most favored nation status. Therefore, signing a belated peace treaty between the two countries had been put on the agenda in 1926, after which a bilateral agreement had to be concluded. This timing was crucial for both sides. For the Japanese, the licensing system for low grade goods was critical in the selective protection system, because the main production of NSK and Mitsui comprised of low grade goods, and tariffs and subsidies did not have enough effect unless low grade goods were protected.

----TABLE 3 ABOUT HERE----

On the other hand, for IG Farben, this was a last chance to recover their export market. In fact, Farben's top management began investigating effective measures for abolishing import restrictions in Japan, and considered several concessions such as offering compensation and the supply of intermediate goods needed by Japanese companies.²⁰ However, Farben finally concluded a voluntary export restrictions with the Japanese government known as the "Saito and Waibel Agreement". The content was almost the same as the previous import restriction. The reason for it was the consistent attitude of Ministry of Commerce and Industry (MCI), which considered almost every measure conceivable to restrict imports from Germany. The plan suggested by MCI included :

- (1) a prohibitively high tariff,
- (2) a government monopoly, which made it possible to maintain import restriction, since the treaty was not good for a state monopoly,
- (3) the revision of treaties with other countries, which would be open to imposing import restrictions on all countries.²¹

Furthermore, MCI sought to strengthen the import restrictions on this occasion, through enlarging the list of restricted goods. Faced with this strong resolve of the Japanese government, IG Farben abandoned its previous strategy of recovering exports of low grade goods, and concentrated instead on hindering the government's intervention in high grade goods. In 1926 a voluntary export restriction, the Saito-Waibel Agreement, was concluded, and as a result, the previously predictable import restriction were stabilized.

Under this framework, for the first time, domestic cartels were concluded and this helped to stabilize the operation of both companies. In 1926 Mitsui Mining and NSK concluded a production and market sharing agreement, by which both companies specialized their intermediate products. Mitsui concentrated on aniline oil and NSK concentrated on aniline salt.²²

Hence, after 1926 high-grade goods became the one issue between both sides. Naphthol dye was given subsidies in 1926. However, determining the subsidy for indigo, technologically difficult to produce and the main revenue base of IG Farben, was delayed. The reason was that a "prisoner's dilemma" arose among the government and private

enterprises under IG Farben's pressure. In fact, IG Farben increased indigo exports to Japan from August 1926, when Indigo became the object of subsidy. As a result, the indigo market price went down from 5-7 yen in 1926 to under 4 yen. Under the aggressive strategy of IG Farben, although the government wanted to subsidize indigo, it was impossible unless a promising project was developed by a private company in advance. Conversely, private companies could not set up this industry unless they knew that they would receive subsidies, although Mitsui Mining eventually had already succeeded in producing at the pilot plant level.

This impasse was solved by an investigative council, the Council of Trade and Industry in 1927, composed of officials of MCI, company representatives and other parties. This council helped to solve the dilemma by promoting an information exchange and forming the consensus for giving subsidies. First, responding to the government requirement, Mitsui proposed a concrete indigo production plan as a reference for making promotion measures. It might have been a step for Mitsui to advance the indigo production from pilot plant level to business base, while the government got the needed evidence of real production being possible. It also confirmed the amount of subsidy needed. The promotion Plan for Indigo Production is shown in **Table 4**. Second, this council's confirmation of this plan was significant support for the decision on the subsidy. The government, especially MCI, got consensus through this council for indigo subsidy, which was a large amount and the benefit was limited to only one company.

Supported by these selective protective measures, the self-sufficiency ratio gradually increased in the late 20s. Import restrictions contributed to NSK and Mitsui's stable profits in their main fields through scale economies(**Table 2,3**). A specific duty was introduced in 1926, though it neither changed things drastically nor became effective in short terms. However, it had a gradual effect and it strengthened under the Great Depression (Shôwa Kyokô).²³ Subsidies prompted Japanese firms to enter the high-grade goods market, causing IG Farben to temporarily lower its prices in an effort to derail the Japanese competition.

----TABLE 4 ABOUT HERE----

In 1930, even for high-grade goods, IG Farben switched strategies to prevent Japanese companies from entering its lucrative export market by keeping sales volume and price levels constant while simultaneously preventing them from exporting to the Asian market. Another factor behind this strategy change was the signing of new international agreements, such as the German-French agreement and the German-French and Swiss in 1929, which included the concerned relations with Japan.²⁴

According to this strategy change, for the next stage Farben tried to reach a bilateral agreement with Japanese firms, taking initiative within the international cartel. This agreement was composed of two types. The first one divided the markets of high grade goods into which Japanese firms had just entered. The naphthol dye agreement between Farben and NSK in 1931 set the sales allotment for the Japanese market of blue salt for IG Farben at 68% and for NSK at 32%, and for naphthol, IG Farben 32% and NSK 68%. It also prohibited exports by NSK except for the Chinese market, set a price agreement for the Chinese market, and so on.²⁵ The indigo agreement concluded in 1934 was similar. It determined the allotment of exports to Japan from the international cartel, and Mitsui accepted an export allotment to China. The second agreement type was for low-grade goods such as sulphur which was reached between Mitsui and the three-party cartel in 1931 and concentrated on the division of the Chinese market. It lasted for three years, but in 1934 the renewal failed because the domestic cartel had already collapsed and Mitsui had lost interest in this cartel.²⁶

In the 1930s, Japanese dyestuff industries could almost reach self-sufficiency in the domestic market, which meant that the government's purpose had been realized, while under bilateral agreements, IG Farben succeeded in keeping its East Asian market. Hence, a stable situation was realized.

(2) Competition Against International Cartels supported by Credible Threat -- the Case of Soda Ash ---

In 1920, an international alkali cartel was organized, mainly by Belgian Solvey, with the participation of Brunner, Mond & Co., and United Alkali Co. As a result, market-control rights over the European mainland were given to Solvey, and for all other areas to the two British companies, which in 1926 merged to become Imperial Chemical Industries (ICI).²⁷ The most important markets for Brunner, Mond were the Asian markets centering on Japan, and the South American market. The percentage of the Japanese market for both companies' total exports was 33.3% and, excluding Great Britain's colonies reached 46.9% in 1923.²⁸

From 1921, magazi soda and lime were sold in Japan and a severe price competition continued until 1924. This dumping competition severely damaged domestic companies, whose cost level was still high. Therefore, they asked the government to take protective action including subsidies and anti-dumping measures.²⁹ However, the government left this industry competitive, since it decided that the low prices under international competition were more advantageous to related industries because the production capacity of domestic companies was too small, approximately 10% (Table 1). An official of the Ministry of Finance (MOF) advocated "to give up the import substitution of soda ash and to decrease the soda lime price through using the low price imported soda ash".³⁰

After 1924, when the "dumping" competition ceased with the victory of Brunner; Mond, the price of soda ash increased again. This situation had two effects: First, the government noticed that leaving the Japanese market under a foreign oligopoly was fairly disadvantageous. Not only Japan losing the producer's surplus, but monopoly pricing by the simple foreign exporter was reducing consumer surplus as well. The Ministry of Agriculture and Commerce, later MCI, once again began to seriously investigate protective measures, including a material subsidy for salt, originally suggested during W.W. I. Secondly, the new prices caused Japanese companies to expand their facilities. Asahi expanded gradually, eventually reaching the production levels required by its glass

operations. Nihon Soda began to operate its facility again as well.³¹

However, in the soda ash industry there was a "prisoner dilemma" situation similar to that of the dyestuff industry. The government, especially MOF, hesitated giving subsidies to the industry. MOF was still in doubt about the effectiveness of material subsidies to the soda ash industry. Its basic opinion was: Japanese soda ash industry had an absolute disadvantage in the production of salt with respect to Brunner; Mond (ICI). There was a high possibility that Brunner Mond would adopt an aggressive price policy again after the subsidy was given. Finally, the asymmetry of benefit and cost was too high, since the number of beneficiaries were quite limited.³² Therefore, it was a precondition in order for MCI to persuade MOF to adopt a subsidy policy in which private companies voluntarily enlarged their production capacities and decreased their cost level.

On the other hand, however, under the threat of "dumping" by Brunner Mond, Asahi and Nihon were leery of expanding their facilities, unless definite protective measures were promised in advance. Both companies' petition of August and December 1925 said:

"As both companies finally solved technical problems and reached the same technical level as other European companies, we could compete with foreign companies, provided that we enlarge our production capacity and reduce our cost level. If we get the guarantee for protective measures to predictable unfair dumping from foreign companies and the benefit for cheap supply of material salt, we could enlarge our facilities and contribute our economy"³³

In this situation, Asahi Glass's leadership was crucial. The top manager of this company, Iwasaki Toshiya, decided to expand Asahi's facilities.³⁴ In the end of 1925, the increase of existing plant capacity from 30 tons per day to 45 tons per day was realized, and immediately after the realization of the above mentioned petition, the plant reached 60 tons per day, which meant that the optimal plant size, according to the Honigmann technique used at that time, was finally realized.

This decision broke the stalemate, allowing the government to take necessary measures. First, in June 1926, the agenda of dumping activities was revised. Through this revision, the definition of "dumping" was clarified and the right of effected parties to apply for anti-dumping tariff was introduced.³⁵ Second, the government had begun to

consider the subsidy plan in early 1926 and finally decided to put it into action in August 1928 through the investigation of the Council of Trade and Industry. It is noteworthy that government was strongly aware of the behavior of the foreign oligopoly in this investigation process. In this Council, participants, composed of official and private companies, seriously considered the most appropriate way for granting a subsidy not so as to reveal the domestic companies' resulting competitive edge. If the yearly subsidy was decided in advance, foreign oligopolist could predict the competitive condition of Japanese companies. As a result, this Council proposed an elastic way for giving the subsidy, saying that "the subsidy should be decided, considering market price and cost every year".³⁶

It is also noteworthy that when these subsidies were granted, the government made it clear that its main purpose was to strengthen the competitive power of domestic companies and to free the domestic market from foreign companies' control. The law's explanation said that its aim was "to restrain the price increases caused by foreign companies' monopolistic practices through maintaining 57,000 tons of existing companies' capacity, which is half of the domestic demand of 120,000 tons".³⁷

Immediately after the law was enacted the two companies, having reduced the uncertainty they faced, voluntarily expanded their facilities beyond the government's expectations by changing their basic technology for synthesizing ammonium from the Honigmann technique to the Solvay process.³⁸ This decision was significance because there was a decisive differences between the Honigmann and Solvay techniques in terms of productivity, even though both techniques were categorized as similar ammonium soda process methods.

In response to these developments, ICI adopted a low price policy to prevent this capacity expansion in accordance with its basic strategy of maximizing its sales volume in the Japanese market. At this time, ICI controlled Chinese and American goods through its sales subsidiaries in Japan (Nippon Brunner Mond). It also adopted a policy of selling its manufactured goods in Europe and magazi soda east of Africa. Therefore, the supply of natural soda increased dramatically. As a result, soda ash prices sharply declined from

mid-1929 as is shown in **Figure 1**.

----FIGURE 1 ABOUT HERE

In June 1930 the price of soda ash was 61.7 yen per ton compared with 97 yen in June 1929. Then, Asahi Glass and Nihon Soda, convinced that ICI was dumping, asked the government to institute anti-dumping tariffs on ICI's products.³⁹ The government investigated soda ash prices and decided to apply the tariffs on ICI goods, mainly magazi soda. This government attitude decisively influenced ICI's strategy. Under the threat of increasing tariff rates, ICI proposed an agreement with Japanese companies at the end of November. Its proposal consisted of three points:

- 1) A 20-year sales allocation agreement for the Japanese market, with the sales agreement divided into five-year segments,
- 2) prohibiting Japanese companies from exporting to foreign markets, and
- 3) the price agreement.⁴⁰

The first five-year allotment was 40% for Japan and 60% for ICI, slightly exceeding Japan's 35% share in 1929. From ICI's point of view, the main purpose of the proposal was to perpetuate the existing situation. ICI's strategy shifted from preventing Japanese companies from expanding, to maintaining their sales volume and preventing them from exporting.

On the other hand, Japanese companies not only asked the government to apply the anti-dumping policy, but they also took a risk by expanding their facilities in a severe economic downturn. One reason why companies felt that they could take this risk was the existence of subsidies. Another was that they had experienced decreasing costs previously. Asahi decided to double its capacity as did Nihon Soda, first producing the caustic soda through metamorphosis using half of the total production of soda ash, reaching what had been the government and industry's goal since W.W.I.

The negotiations began in December 1930.⁴¹ The sales agreement mentioned above

was not acceptable from the Japanese companies' point of view, which were already set to expand their facilities. As a result, the negotiations could not reach consensus and only concluded a tentative price agreement, increasing existing prices by 11%. As for the result of this negotiation, it is important that ICI did not have effective measures to achieve its goal. As long as Japanese companies were expanding their facilities, and their low price strategy was aided by the government intervention, ICI's only option was to raise prices to maintain unit profit.

However, the price increase under this agreement afforded the Japanese companies time to realize their cost reductions. As is shown in **Figure 1**, Asahi Glass certainly reduced its unit costs step by step. This cost reduction became an important factor in competing with ICI's low prices. After England's ban on gold exports in September 1931, ICI tried to lower prices again, continuing to October 1932. But now, the Japanese companies which had reduced costs could compete with these low prices. Hence, ICI gave up on this aggressive policy, ending the competition with a Japanese victory. After that, Japanese companies were not willing to conclude any bilateral agreements with ICI, even when offered.

(3) The Cooperative Relationship under Administrative Guidance -- the case of Ammonium Sulphate

In the early 1920s, the Japanese market for nitrogen was not under fierce competition like the other two chemical industries mentioned above. The import prices were relatively high, and the import volume of the main exporters was stable. (Table 5) So it can be understood that there was implicit cooperation among the main exporters to the Japanese market, ICI and IG Farben, which later organized an international cartel known as DEN group. In this situation, the two Japanese companies, Nihon Chisso and Denki Kagaku enjoyed stable profits.

However, from the late 1920s, especially during the Great Depression, severe competition began. One of the reasons is the oversupply on the world market caused by (1) the expansion of ICI and IG Farben's production capacity, (2) the setting up of production in

peripheral countries and (3) the increasing supply of Chilean saltpeter. As a result, world production increased more than 70% from 1925 to 1929.⁴² The other reason on the Japanese side was a second wave of new entries of domestic companies, including six big companies, at that time.⁴³

In February 1930, the ten year agreement between I.G. Farben and ICI, which was basically an area-dividing agreement, was concluded. Under this, Japan, with China and Egypt, was divided according between IG Farben and ICI, being IG Farben 60% and ICI 40%.⁴⁴ In August 1930, the Convention International de l' Azote (CIA), was established. Most notably, it seriously threatened Japanese companies, since CIA declared its aim "to prevent the expansion of outsiders, including the process of expansion and plan of expansion".⁴⁵

The exports from ICI and IG Farben increased under this international agreement, considerably decreasing the export price to Japan. Faced with this competition, the Japanese companies organized a trade association, called the Nitrogen Council. It asked the government to use the anti-dumping tariff. Although the government was not so positive to this application because of its effect on consumers, this application became an opportunity to open negotiations. The threat of an anti-dumping tariff had influenced the attitude of IG Farben and ICI towards the Japanese market. Both companies which had already learned the attitude of the Japanese government in the negotiation process of dye and soda ash, suspected that maintaining a low price policy might induce further government intervention. On the other hand, as the Council realized that the government was not so eager to apply the anti-dumping clause to ammonium sulphate due to its difference from soda ash, it chose to join the international cartel instead of depending on anti-dumping tariffs.

In the mid-1930s, the negotiations began. The first agreement between CIA and Japanese companies is known as the Fujiwara-Bosch agreement.⁴⁶ The main points were:

- 1) prohibition of Japanese exports,
- 2) organization of a cartel and importing 200,000 tons from CIA,

- 3) a price agreement of 85 yen per ton, and
- 4) the Japanese group was to make every effort to ensure that no new nitrogen companies arose in Japan.

However, the government, composed of the MCI representing producers' interests and the Ministry of Agriculture and Forests (MAF) representing consumers' interests, opposed the content of this agreement. The MAF thought that farmers would be dissatisfied with the price of 85 yen -- at that time the price was around 70 yen -- and the MCI complained about the fourth point, which made it impossible for Japanese companies to expand their facilities. In short, this agreement was not acceptable as a long-term, stable supply of fertilizer.⁴⁷

----TABLE 5 ABOUT HERE----

As a result, the government considered applying for an anti-dumping clause in stead of its opposition to international agreements. In February 1931 the government decided to set up an anti-dumping committee. The organization of this committee and positive attitude of the government induced CIA to make a certain concessions not seen earlier. In the next stage of the negotiations, CIA offered a modest request advantageous to the Japanese side. This agreement, called the "Interim Agreement" after Noguchi-Bosch Agreement, was concluded in April 1931. It defined 1) the import allotment for three years, 2) ex ante discussions about exportation of Japanese goods, and so on. It did not include the clause hampering the expansion of Japanese companies.⁴⁸

However, this agreement had been in effect only for a short time, because CIA collapsed in August 1931 and ICI lowered its prices again after England abandoned the gold standard. As a result, the Nitrogen Council implored the government to enforce the anti-dumping clause again, which it did through import restrictions on December 8th 1931.⁴⁹ Furthermore, immediately after this restriction, Japan decided to ban the export of gold and the yen began to depreciate rapidly. Because of this non-tariff barrier, coupled with the cost

reduction of Japanese firms and the organization of distribution channels by general trading companies during the depression, the control the domestic market was moved from foreign big businesses to domestic oligopolist and the imports decreased significantly.(Table 5)

These change of circumstance meant that CIA lost its bargaining weapon. IG Farben and ICI finally gave up maintaining exports to the Japanese market and emphasized using international cartels to hold their east Asian markets away from Japanese companies.⁵⁰

In 1932 the Nitrogen Council developed a domestic cartel, called the Ammonium Sulphate Distribution Union (ASDU). It effectively controlled the domestic market. In July 1932, CIA was set up once more, and the core of CIA, IG Farben and ICI concluded an agreement about the Japanese market as a part of comprehensive sales quotas with a share of 40% to ICI and 60% to IG Farben as in the previous agreement.⁵¹ In July of the next year, ICI proposed the new agreement to ASDU. As a result, Domestic and Foreign Ammonium Sulphate Agreement (DFASA) was concluded in March 1934 and was revised in 1935 and 36. According to this agreement, the imports from a company belonging to CIA should be controlled by ASDU and exports of Japanese companies were restricted in terms of quantity, price and area.⁵²

After the Japanese companies escaped from foreign competition, the government shifted its policy orientation from protecting manufacturers to maintaining price levels. It carefully monitored and, under some circumstances, intervened in ASDU's and DFASA's activities affecting not only price but also import volume.

The basic framework of this intervention was thus: First, MCI and MAF aimed at stabilizing the ammonium market price within a certain range around a benchmark price of 97.5 yen per ton which was supposed to be a "reasonable price" in a terms of guaranteeing an appropriate profit to both producer and consumer. In this context, it is noteworthy that government had already known the exact cost level of each company through the process of application for import licenses.

Second, in order to anchor the market price to the benchmark price prior to the high

demand time in the spring (at the beginning of the "fertilizer" year), ASDU, MCI and MAF each estimated the next term's supply and demand. If ASDU's import estimate was lower than MCI and MAF's estimates -- a common occurrence --, ASDU was often persuaded to increase imports. Furthermore, should the prices actually increase due to a supply shortage, the government would immediately request ASDU to raise imports. Obviously, the activities of ASDU and its agreements with CIA came under increasing government administrative guidance.⁵³

Under this framework, the Japanese ammonium sulphate industry enjoyed a stable domestic market, and the CIA could keep their Asian market without worrying about Japanese exports. Also, prices stabilized and new entries boomed, desirable from the Japanese government's perspective.

IV. Concluding Remarks

Let us return to questions at introduction of this paper. As a conclusion, we could make the following three points, extending our aspect to other heavy chemical industries and comparing the I. P during the interwar period with the that of the high growth era (HGE); (1) the effect of the government strategic intervention, and (2) the factors supporting the "success" of I. P, (3) the relationship between interwar I.P and postwar I.P.

(1) The effect of the strategic intervention.

The government intervention against international competition can be seen as "success" in terms of promoting the import substitution of these chemical industries as is shown in **Table 1**. In judging the industrial policy as "success", there are two points to note.

First, the negative effect on consumer industries, which is often generated by introducing protective measures, relatively less happened. This point is clear from soda ash case in **Figure 1** as well as naphthol dye case in **Table 6**. The mechanism which helped avoid this negative effect could be understood as follows.

Interestingly, the application of the protective measures caused an initial price decline, due to an aggressive response from foreign oligopolist. Unlike expectations, this

industrial policy benefited the consumer industries. Next, intervention enabled Japanese companies to achieve economies of scale. As increasing returns were very prevalent in these chemical industries, the I.P. covered set-up costs, which were indispensable during the first phase. Because of this selective measure around 1930, domestic companies in all three industries realized minimum optimal scale. This became a basic condition for maintaining low price levels after the yen depreciated in the early 1930s. At that time, the textile industries, including cotton and rayon, developed rapidly, and one of the conditions for this rapid growth was the low-priced supply of these goods, which would have been impossible had they depended on imports.

----TABLE 6 ABOUT HERE----

Second, what is the cost and benefit of government intervention? The answer to this question depends on which industry we look at. In the case of the dyestuff industry, although subsidies made it possible for NSK to spend large amounts of money on R & D and investment, the total amount of subsidies expenditure during 1918-32 reached 18 million yen (see Table 2), which meant 14.6% of total product volume during the same period. However, it could be argued that the performance of subsidy to soda ash was fairly effective, as is shown in Table 7, which compares the amount of subsidy with the change of consumer surplus ([2] in Table 7) caused by price decreasing and producer surplus [3] caused by the change of share and cost level. The subsidy of only 1.6 million yen generated the largest economic surplus, initially increasing consumer surplus through price decline and then increasing producer surplus through realizing cost reduction and gaining the previous share of ICI.

----TABLE 7 ABOUT HERE----

(2) Why did industrial policy in Japan succeeded?

This paper has tried to show that government intervention contributed to import substitution in chemical industries during the interwar period.⁵⁴ However, government intervention was a common phenomenon in most countries faced with severe international competition at this time. European nations subsidized their own domestic companies in the 1920s and also had restrictive trade policies during the 1930s.⁵⁵ Therefore, the important question is: why could Japanese strategic intervention during the interwar period contribute import substitution? Of course, further investigation of international comparisons is needed to answer this question. However, it would be useful to tentatively suggest the following points:

As for government side, it should be noted that this intervention was free from any rent-seeking activities by the companies involved, which was often observed in many other countries applying I.P. Although this was mainly determined by internal factors, such as technological ability, corporate governance structure which discipline the management's behavior and so on, the government took a "performance standard principle" (Alice Amsden) which was worth noticing.⁵⁶ The principle of subsidizing industries introduced in the mid 1920s was to offset the difference between the costs of domestic companies and import prices. MCI estimated the expected cost of each project, considering the effect of scale economies on it, and tried to estimate a reasonable protective rate. The duration of the subsidies was very limited, normally three years, and cost conditions were closely monitored by the MCI. This procedure was valid for both tariffs and subsidies. The administrative guidance to ammonium sulfate cartels, ASDU and AFGAS, was also based on the same principle, such as to guide the price in the range of "medium" cost and "reasonable" profit.⁵⁷ Theirs carefully elaborated monitoring helped avoid rent seeking behavior of protected companies.

Although the paper tried to show that the government was a critical actor in the interwar development of chemical industries, it is important to note that the effectiveness of subsidies, tariff and so on fully depended on the capability of private firm. There are a lot of factors which could generate such capability. However, from the view point of this paper

focusing on the set up cost in the initial phase, one important point is the supply of “patient capital”, which means that a capital would not move to other field in short-term even if it faced low profitability; in another word, a capital with long-term time horizon.

Companies without NSK newly entered into the chemical industries during the W.W.I and kept their operation during interwar period belonged to broad sense of zaibatsu (old zaibatsu, new zaibatsu and family business). It is the case of iron and steel, and electric machine industries. They were supplied their initial fund from internal capital market or family own money, and therefore their ownership structure was quite concentrated. Although this is my further research agenda, this features of corporate finance and governance at the prewar period could be emphasized as one of factors for these companies to continue to operate and improve their technological capability, in spite of low profitability in the early 1920s.

(3) The Relation between Prewar I. P and Postwar I. P

Lastly, we should set a question; whether is the interwar industrial policy an origin of the postwar industrial policy?

The facts clarified in this paper seem to support the developmental state view. What the targeting discussed immediately after W.W.I could be understood as an origin for targeting policy; the information exchange in the council shown in the dye stuff and soda ash could be an proto-type of the information exchange pattern of postwar; the administrative guidance under “performance standard” toward the price policies of cartels might be understand as a origin of the postwar industrial policy. Furthermore, the attitude of anti-international cartel taken by MCI in the negotiation process between foreign oligopolist and domestic producers might be added to the list of continuation side.⁵⁸

However, there are a lot of conspicuous features of interwar industrial policy. First one is a strategy with consideration on free trade. As this paper traced, the government did not adopt exclusively protective measures, rather consistently sought a balance between protection and free trade, considering the benefits of trade. Its main concerns concentrated

on releasing the domestic market from control of foreign oligopolist under an international cartel. This feature was closely related to international circumstances at that time and existing industrial structure.

Second, the measures taken by government in the interwar period has some characteristics comparing to those of the HGE. Subsidies and moderate tariff was preferred rather than direct restriction, while financial measures such as a low interest loan from government financial institutions and tax reduction was not used. The usage of tariff and subsidies suggested that government intervention was not discretionary at that time yet. The less usage of financial measures was a reflection of corporate finance pattern at that time, where companies tended to rely their fund on internal fund, or capital market if external financing necessary.

Third, the mechanism of interwar I. P to contribute economic growth was different from that of postwar Japan. Comparing to the fact that postwar I. P played to encourage the investment competition among domestic producers under closed system (overall restriction over trade and capital), the interwar government's intervention mainly influenced on the strategy of both domestic and foreign oligopolist. On the one hand, functioning as a credible threat to foreign oligopolist, the government intervention induced a strategy change from competition, using a price policy which prohibited Japanese companies from entering and expanding, to cooperation. On the other hand, the government intervention or I.P., especially in the form of subsidies, helped increase Japanese companies' bargaining position vis-a-vis foreign big businesses, while being an incentive to take a "high fixed cost strategy".⁵⁹ The existence of protective measures guided the negotiation process to a favorable result for the Japanese in the case of the dye stuff industry. It also allowed Japanese companies to reject unfavorable bilateral agreements with ICI in the case of the soda ash industry.

Forth and last, the relationship between interwar government intervention and other relevant economic institutions was different from postwar. As often pointed out, I. P in the HGE was designed under the given corporate system characterized as a main bank relationship and keiretsu. The later corporate system in turn became a condition for the

function of I. P. As we mentioned before, the interwar industrial policy relied on the different corporate system often characterized by broad sense of zaibatsu.

In these regards, in spite of a lot of similarity between interwar and postwar I.P., the interwar industrial policy has characteristics peculiar to that period.

¹ Charmers Johnson, MITI and the Japanese Miracle, (1984); Richard Samuels Business of the Japanese State (1987); Bai Gao, "Arisawa Hiromi and His Theory for a Managed Economy", Journal of Japanese Studies, 20-1 (Winter 1994), pp.115-153.

² This pattern in chemical industries is quite different from the pattern in electric industries. In the later industries, foreign companies tended to invest directly in Japanese market, concluding international cartel among them. In detail, see A. Kudo and T. Hara, "International Cartel in Business History" in A. Kudo and T. Hara (ed.) International Cartels in Business History (Tokyo, 1992), pp. 12-13.

³ Concerning the theory behind this framework, see E. Helpman and P. R. Krugman, Trade Policy and Market Structure, (Cambridge, MA, 1989), ch. 3, 6 and 7; J. Eaton and G.M. Grossman, 'Optimal Trade and Industrial Policy under Oligopoly', Quarterly Journal of Economics, Vol. 101 (1987); M. Itô et al., The Economic Theory of Industrial Policy, (San Diego CA. 1991), ch. 9.

4. T. Okazaki, "Import Substitution and Competitiveness in Prewar Japanese Iron and Steel Industry" in E. Abe and Y. Suzuki (ed.), Changing Patterns of International Rivalry (Tokyo, 1991); M. Shinohara, Chôki Keizai Tôkei 2: Kô-kogyô [Long-term Economic Statistics 2: Mining and Manufacturing] (Tokyo, 1972).

5. W.J. Reader, Imperial Chemical Industries: A history, vol.1 The Forerunners 1870-1926 (Oxford, 1970), pp. 334-6.

6. A. Kudo, I.G.Farben no Tainichi Senryaku [I.G. Farben's Strategy towards Japan] (Tokyo, 1992), ch.1.

7. W. Mass and H. Miyajima, 'The Organization of the Developmental State: Fostering Private Capabilities and the Roots of the Japanese "Miracle",' Business and Economic History, second series, Vol.22, No.1 (1993).

8. E. Daito, 'The Development of Ammonia-soda Process in Japan' in A. Okôchi and H. Uchida (ed.), Development of Diffusion of Technology: Electric and Chemical Industries, (Tokyo, 1980), pp. 180-1.

9. In 1926 an experimental plant of one-half ton per day capacity was completed and the lab thereupon curtailed its industrial research activities. The technology was made available to and adopted by Shôwa Hiryo, one of a second wave of entrants into the industry. See J. Hashimoto, 'Ryôan Dokusentai no Seiritsu [The Establishment of the Monopolistic Structure in the Ammonium Sulphate Industry]', Keizagaku Ronshu, Vol. 45 (1980), p. 54.

10. In detail see, H. Miyajima, 'Japanese Industrial Policy during Interwar Period: Strategies for

International and Domestic Competition', Business and Economic History, second series, Vol.21 (1992); K. Motomiya, '1920 Nendai niokeru Kagaku-kogyô Hogo Seisaku [Protective Policy for Chemical Industry in the 1920's]', Shigaku Zasshi, Vol. 95-11 (1986).

11. For example, at that time the technician imagined that 60 ton per day was the "minimum size" of honigman process applied by Asahi. However, Asahi's initial plant was 20 ton per day. Although this plant was enlarged into 30 ton per day later, "the productivity was low and the collection efficiency of ammonium was also low, because of unplanned enlargement". (Mitsubishi Company, Research Division, Chôsa Hôkoku 1 [Research Report] No.1, 1924) Similarly, the production size of Nihon Soda per day was 40 ton per day, and its cost per ton was twice times of expected cost, 164 yen, since many problems happened in a initial phase of its operation. Tokuyama Soda Inc., Tokuyama Soda 70 Nen Shi, [70 years Companies History of Tokuyama Soda], Tokyo (1988), P.25.

12. H. Miyajima, '1920 Nendai no Jukagaku Kôgyo-ka to Sangyô Seisaku [Heavy Chemical Industrialization and Industrial Policy in the 1920s]', Annual Journal of Modern Japan Research, Vol. 11 (1991), PP. 82-3.

13. B. Molony, Technology and Investment : The Prewar Japanese Chemical Industry (Cambridge, MA. 1990).

14. Ministry of Agriculture and Industry (MAI), Rinji Zaisei Keizai Chosa-kai Giji Roku [The Record of Special Committee of Economic Problem], 1922.

15. S. Hasegawa and H. Miyajima, '1920 nendai no Jûkagaku Kôgyô-ka to Kanzei-seisaka [Tariff Policy and Heavy-chemical Industrialization in the 1920's.], in K. Ohishi (ed.), Ryotaisenkan-ki Nihon no Taigai-kankei [International Economic Relation during Interwar Period] (Tokyo, 1992).

16. Based on Osaka Egu Senryô Dogyo-kumiai, Egu Enryo Shô-Kô Shi [History of Dyestuff and Painting Industries], (Osaka, 1938); MAC, 'Senryô no Yunyu Kyoka [Materials about Import Licensing of Dyestuff]' in Ministry of Finance (MOF), Showa Zaisei-shi Shiryo [The Material of Fiscal History in Showa Era], micro film, No. 4-215.

17. Ministry of Agriculture and Commerce, 'Senryô Mondai ni-kanshi Shô-iin Kai ni-oite Tôgi seraretaru Hôroku [Measures investigated in Special Dyestuff Council]', in MOF., Showa Zaisei-shi Shiryo, micro No. 4-215.

18. The market price of indanthren blue, which was estimated as 5.95 yen by Japanese companies, was actually 12 yen. The calculation of 5.95 yen is based on 'Senryô Mondai Kankei Shorui [The Record of Dyestuff Problem]' (1926), in MOF., Showa Zaisei-shi Shiryo, micro film, No. 4-215. In detail, see H. Miyajima, 'Heavy Chemical Industrialization and Industrial Policy in the 1920s', Table 3.

19. H. Morikawa, ZAIBATSU: The Rise and Fall of Family Enterprise Groups in Japan (Tokyo, 1992), ch. 3.

20. A. Kudo, IG Farben no Tainichi Senryaku, p.74

21. MCI., 'Senryô Mondai nikanshi Shô-i-inkai nioite Rongi seraretaru Hôroku [Measures suggested in Special Dyestuff Council]'.

22. Itano Document. This material, which is stocked in Sumitomo Chemical Inc. was originally collected for writing its company history.

23. Basic mechanism was: at first, IG Farben shifted its export goods from relatively low price goods to relatively high price goods. This point is confirmed from the fact that the average import price of German dye increased from 2.6 in 1925 to 5.8 yen in 1927. (MOF., Gaikoku Boeki Nenpyô [Annual Report of Foreign Trade], 1926 and 1928) This shift gave a vacuum to domestic market of low price goods and Japanese companies increased their production, substituting this vacuum. Furthermore, under Great Depression (Shôwa Kyokô) from the late of 1929, the specific duty strengthened its effect, since this actual tariff rate increased under rapid price decrease phase.
24. Three parties uniformly raised their export prices by 5% in 1929. It gave a boost to Japanese firms' production expansion, since they chose not to follow this price increase. See H. Schröter, 'Cartels as a Form of Concentration Industry: The Example of the International Dyestuffs Cartel from 1927 to 1939' German Yearbook on Business History 1988 (1990), pp. 123-8; A. Kudo, IG Farben no Tainichi Senryaku, p.123-4.
25. Itano Document.
26. Concerning the bilateral agreement, see A. Kudo, and T. Hara, 'International Cartel in Business History', PP.13-4; Harm Schröter 'The International Dyestuff Cartel' in A. Kudo and T. Hara (ed.), International Cartels in Business History (Tokyo, 1992), pp. 43-47; A. Kudo, IG Farben no Tainichi Senryaku, pp. 141-160.
27. However, in 1919 the ALKASSO, Alkali Export Union was set up by American corporations, mainly those using the Solvay process, thereby forcing competition on the British companies in the world market. Both sides engaged in a desperate struggle to capture markets outside Europe until a truce was finally called in 1924.
28. W.J.Reader, Imperial Chemical and Industry, vol. I, pp. 332-3; Appendix 4.
29. Asahi Glass, 'Soda Bai Seizô ni kansuru Iken-sho [Petition for Producing Soda Ash]', August 1922, which is stocked in Asahi Glass Inc.
30. MOF., Rinji Zaisei Keizai Chôsa-ki Gijiroku [The Record of the Council of Fiscal and Economic Problem], (Tokyo, 1922).
31. Asahi Glass Inc., Asahi Garasu Kabushiki Kaisha-shi [Company History of Asahi Glass Inc.] (Tokyo, 1968), Ch.2; Tokuyama Soda Inc., Tokuyama Soda 70 nen-shi [70 years Company History of Tokuyama Soda], ch.1.
32. Nihon Sarasi-ko Dogyo Kumiai, Kaitei Zôho Nihon Soda Kôgyô Shi [Edited Version, History of Japanese Soda Industry] (Tokyo, 1938), p. 384.
33. Asahi Glass, 'Soda-bai Kôgyô Hogo ni kansuru Chinjô-sho [The Petition for Protection of Soda Ash Industry]', December 1925.
34. As for this decision making, see His biography, Iwasaki Toshiya Denki Hensankai, Iwasaki Toshiya (Tokyo, 1932), pp.92-4.
35. MOF., Zeikan 100 Nen-shi [One Hundred Years History of Tariff Office] (Tokyo, 1972), Vol.1, p.370.
36. MCI., Shôkô-shingi Kai Giji-roku [The Record of the Council of Trade and Industry], 1928.
37. MCI., 'Sôda-bai Shôrei-kisoku Haishi ni kansuru Ken [About the Abolishment of Promoting for Soda Ash Manufacturing]', 18 Feb. 1935 in National Archives.

38. In this technology change, the following fact should be added: as a technician, H. Arlqvist who had worked for the Solvay process companies, enabled Asahi to secure the Solvay technology in spite of the tight control of the international cartel. Asahi Glass, Company History, p. 86; E. Daito, 'The Development of Ammonia-soda Process in Japan', p.187.

39. In the midst of the depression and severe price competition, Mitsubishi Trading Inc., London office, reported on ICI's cost basis and strategy they expected to be deployed in competition with Asahi Glass.(Mitsubishi Shôji, 'Magazi Soda ni kansure ken [Report about Magazi Soda]', 1930) From this report, it was determined that ICI's Japanese market price could be regarded as "dumping". From it, Asahi also confirmed that ICI's aggressive policy was not necessary based on the competitive advantage of Magazi goods. In short, general trading companies provided strategic information that helped identify and negotiate the terms for transferrable technology and influence trade policy as well.

40. Asahi Glass, Company History, P.145.

41. Asahi Glass, Soda Jigyô Kanren Nenpyo [The Chronological Material about Soda Ash Division]; Asahi Glass, Company History, pp.128-45; Tokuyama Soda, 70 years History of Tokuyama Soda, pp. 78-85.

42. M.W. Watkins, Cartel in Action: Case Studies in International Business Diplomacy (New York, 1946), p.127.

43. Six companies are composed of 1) Miike Chisso (Mitsui line), 2) Dainihon Hiryo (the diversification from phosphatic fertilizer producing), 3) Sumitomo Hiryo (also diversification from phosphatic fertilizer producing), 4) Chosen Chisso (subsidiary of Nihon Chisso), 5) Chlode Chisso, and 6)Showa Hiryo, which is mentioned before. See note 9.

44. E. Hexner, International Cartels, (NC, 1946), pp.250-2.

45. The declaration of Stickstoff Syndicate (J. Hashimoto,'Ryuan DokusenTai no Seiritsu', p.56). However, it would be inappropriate to understand that ICI and IG Farben were exclusively aiming at restricting the production of Japanese companies. Rather, since Japanese companies started setting up their facilities for full capacity for the domestic market sooner or later, IG Farben's strategy was to maintain its Japanese market as much as possible and to restrain Japanese exports to the Asian market through concluding agreements. See T. Oshio, 'The International Nitrogen Cartel and Japan', in A.Kudo and T. Hara (ed.) International Cartels in Business History (Tokyo, 1992), p.87.

46. S.Terada, Hirvô no Tôsei ovobi Hikyu [Regulation and Distribution of fertilizers] (Tokyo, 1941), p. 71. Mr. Fujiwara was a board member of Denki Kagaku, which was the one of first mover companies, but the cost of producing ammonium was relatively high due to its application of electric process.

47. I. Kawasaki, Hirvô Mondai no Kaiko [The Remnenbering of Feterizer Problem] (Tokyo, 1951), PP.63-75.

48. For details of the negotiation process of this agreement, see T. Oshio, 'International Nitrogen Cartel and Japan', pp.84-7.

49. This import restriction system was abolished in December 1932.

50. IG Farben also began to consider the licensing strategy, giving up their previous patent monopoly policy, A. Kudo, IG Farben no Tainichi Senrvaku, ch.5.

51. W.J. Reader, Imperial Chemical Industries: A History Vol.II. The First Quarter-Century 1926-1952, Oxford, pp. 150-151.

52. E. Hexner, International Cartel, pp.327-8.

53. More in detail, see H. Miyajima, 'Hiryô Dokusen-seisaku no Tenkai to Juyô-hiryôgyô Tosei-hô no Seiritsu [The Development of Monopoly Policy and the Enactment of Control Law to Important Fertilizer]', Journal of Social Science, Vol.38 No.3 (1986).

⁵⁴ These findings demand a rethinking of the understanding that positive I.P. and its success in Japan belongs only to the postwar Japanese experience (C. Johnson, MITI and the Japanese Miracle: The Growth of Industrial Policy, 1925-1975, (Stanford, CA. 1984). A kind of targeting policy and a selective policy setting were confirmed even in the 1920's, and these measures contributed to promoting import substitution, although the government's targeting policy at that time was not tied into a larger plan and industrial policy did not include the fiscal and financial practices which became prevalent during the "high growth era".

⁵⁵ League of Nations, Commercial Policy in the Inter-war Period, (Geneva, 1942), E. Hexner, International Cartels, pp.129-32.

⁵⁶ Regarding the 'performance standard', see A.H. Amsden, 'A Theory of Government Intervention in Late Industrialization', in L. Putterman and D. Rueschemeyer (ed.), State and Market in Development: Synergy or Rivalry? Brown University, 1992.

⁵⁷ The "medium cost" was defined as an average cost level of each industry, and "reasonable profit" was defined as an average profit of national economy, normally conceived the amount to enable 8% dividend. See H. Miyajima, "Hiryô Dokusen-seisaku no Tenkai to Juyô-hiryôgyô Tosei-hô no Seiritsu", pp.120-124

⁵⁸ There might be some cases in the non-core countries where the government prepared for import restriction under severe competition, especially in the 1930s, and this intervention often caused the creation of international cartels. In this case, the government attitude was in favor of, or at least neutral to, international cartels. However, in the case of Japan, the government invariably refused any international agreement restricting domestic capacity. This point was made clear in both the ammonium sulphate case and the soda ash case. Although bilateral agreements were concluded in the dyestuff and ammonium sulphate industries in the 1930s, it was only after realizing their self-sufficiency that the government conceded to the participation of domestic companies in international cartels under a laissez faire policy. As for non-core countries' government attitude, see C.A. Wurm, 'International Industrial Cartels, the State and Politics: Great Britain between the Wars', in A. Teichova et al. (ed.), Historical Studies in International Corporate Business. (Cambridge, GB, 1987); Devos, Greta, 1992, 'International Cartels in Belgium and the Netherlands during Interwar Period: The Nitrogen Case' in A. Kudo and T Hara ed. International Cartels in Business History, (Tokyo, 1992).

⁵⁹ Regarding the "high fixed cost strategy", see W. Lazonick, Business Organization and the Myth of the Market Economy (Cambridge, MA. 1991), ch.2.

Table 1 Self Sufficiency Ratio, Growth Rate and Relative Price

	1913	19	20-4	25-8	29-32	33-37
Dyestuff						
S. S. Ratio	29.6	62.8	33.5	50.0	58.5	77.0
G. Rate	-	98.0	-2.5	3.3	-1.7	53.3
R. Price	136.8	13.2	-37.2	-48.2	-7.7	13.0
Ammonium						
Sulfer						
S. S. Ratio	8.0	43.8	47.6	39.8	55.4	86.1
G. Rate	-	37.0	4.3	20.0	44.5	36.7
R. Price	63.5	152.2	33.7	20.0	-5.2	-11.2
Soda Ash						
S. S. Ratio	6.5	8.6	8.7	23.4	48.4	79.9
G. Rate	-	44.4	7.3	48.8	69.9	37.8
R. Price	20.0	163.0	-59.9	-30.4	-9.8	17.5

Source: K. Okawa, Chōki Keizai Tōkei: Bukka [Long-term Economic Statistics: Price] 1967, M. Shinohara, Chōki Keizai Tōkei Kō-kogyō [Long-term Economic Statistics: Mining and Manufacturing], 1972; H. Miyajima, '1920 Nendai no Jukagaku Kōgyō-ka to Sangyō Seisaku [Heavy Chemical Industrialization and Industrial Policy in the 1920s]', Annual Journal of Modern Japan Research, Vol. 11, 1991).

- Note: 1. **S. S. Ratio** = Self-sufficiency Ratio
G. Rate is based on quantity, without dyestuff, which is deflated value.
R. Price = relative price, calculated average chemical goods price level minus each product.
2. Price index is based on 1934-6 = 100.

Table 2 Subsidies to Dyestuffs and Soda Ash Development
(1,000 Yen)

		Dyestuff			Soda Ash	
		Nihon Senryo			Mitsui Mining	Asahi Glass
	Revenue	Profit (Loss)	Subsidy	R&D + deprecia	Profit & (Loss)	Profit & (Loss)
1918	n.a	n.a	n.a	n.a	n.a	(691)
19	6,190	(1,605)	1,226	1,104	n.a	(524)
20	5,338	(1,222)	1,862	1,285	(456)	(828)
21	4,732	(1,515)	2,165	1,340	(456)	(182)
22	4,904	(2,606)	3,246	2,117	(704)	(397)
23	7,181	(1,353)	1,971	1,079	7	(398)
24	7,995	(1,204)	1,844	883	(146)	(253)
25	6,891	(997)	1,438	689	(724)	(49)
26	9,728	(314)	513	419	486	(195)
27	11,355	58	435	500	846	(123)
28	13,147	(156)	817	700	1,366	(28)
29	15,518	137	560	1,021	1,211	(9)
30	10,991	131	326	572	1,370	(457)
31	11,294	316	178	598	872	(317)
32	17,841	1,161	227	2,109	1,722	92

Source: Nihon Senryō, Annual Business Report, "Itano Document" in Sumitomo Chemical Inc., Asahi Glass, Companies History of Asahi Glass, Mitsui Toatsu Inc., Manuscript of Company History.

- Note 1) Profit of NSK means profit before getting subsidy, which from 1919-25 is calculated by revenue - expenditure, and which after 1926 is calculated by profit - subsidy.
- 2) Profit & loss of both Mitsui Mining and Asahi Glass is dyestuff and soda ash division's figure respectively.

Table 3 Market Segmentation and Industrial Policy Set

Market Segment	Domestic Capacity	I.G.Farben Price Strategy	Industrial Policy
Low Grade ex. Surfer Black)	Self-sufficient	Low	Import restriction by license
Middle	competitive	Low	Moderate Tariffs using specific duties
High Grade =Naphthol & Indigo	scarce	High	Product Subsidies

Table 4 The Promotion Plan for Indigo Production (ton: 1,000yen)

Year	Production	Production Cost	Market Price	Loss	Subsidy
First	50	11.7	3.5	8.2	410
Secon	100	10.4	3.5	6.9	690
Third	300	8.6	3.5	5.1	1,530
Forth	700	5.7	3.5	2.2	1,540
Total	1,150	--	--	--	4,170
Fifth	1,000	3.87	3.87	--	--

Source: MCI, Jinzô Ai Seizô Shôrei ni kansu Sanko-shiryô (The Reference Material for Promoting Indigo Production) 1927.

**Table 5 The Supply and Demand of Ammonium Sulphate in Japan
(1,000 ton)**

	Consumption	Prod.	EX	IM	<u>Composition of Exporter</u>		
					Germany	England	USA
1927	385	176	1	250	54.6%	24.2%	16.3%
1928	456	232	2	284	52.4	34.5	10.0
1929	521	235	2	381	47.9	36.5	14.1
1930	488	266	15	303	57.2	27.7	13.7
1931	617	393	12	224	69.0	23.8	1.7
1932	619	460	18	119	63.3	30.3	2.0
1933	551	471	50	108	74.1	19.5	--
1934	650	471	2	161	84.4	13.7	0.0
1935	814	612	6	239	63.6	1.7	1.3
1936	1,050	880	18	314	43.4	0.0	19.7
1937	984	932	8	224	32.6	0.9	--

Source: Ministry of Agriculture and Forestry, Hiryo Yōran (Statistics of Fertilizers). Hashimoto, 1980.

Note : Consumption included inventories.

Table 6 Effect of Subsidy in Naphthol Dye

	(1,000yen: yen/3.75kg)					
	1923	24	25	26	27	28
Import	N.A	138	86	426	564	827
Production	0	0	7	116	548	1121
Consumption	N.A	138	93	542	1112	1948
Self-sufficient	0	0	7.6	21.4	49.3	57.5
Ratio-						
Market Price	12.5	6.5	6.5	3.96	3.35	3.05
Subsidy	--	--	--	N.A.	3.49	2.14
Cost	--	--	N.A	N.A	6.22	4.72

Source: MOF., Kanzei Chosa I-inkai Shirô (The Record of Investigation Committee of Tariff) in Showa Zaiseishi, Micro film, 4-18

Table 7 The Cost-benefit Analysis of Subsidy in Soda Ash
(1,000yen)

	1930	31	32	33	Total
[1] Subsidy	459	735	418	--	1,612
[2] Consumer Surplus	1,015	698	4,724	-5,296	1,140
[3] Surplus of producer Price effect	-721	-922	-3,351	13,522	8,529
Share effect.	-475	-441	-3,514	4,313	-116
	-246	-481	163	9,210	8,645
[4] = [2] + [3]	295	-224	1,373	8,226	9,669

Source: The same as Figure 1 and K. Okawa, Long Term Economic Statistics: Price, (1967).

Note 1. Deflator based on the average price of chemical goods.
1933=100

2. The estimation is followings:

$$dW = dCS + dR = D \cdot dP + \{X \cdot dP + (P-C) \cdot dX\}$$

dW = Change of Surplus =(4) in above Table

dCS= Change of Consumer Surplus = (2)

dR = Change of Producer Surplus = (3)

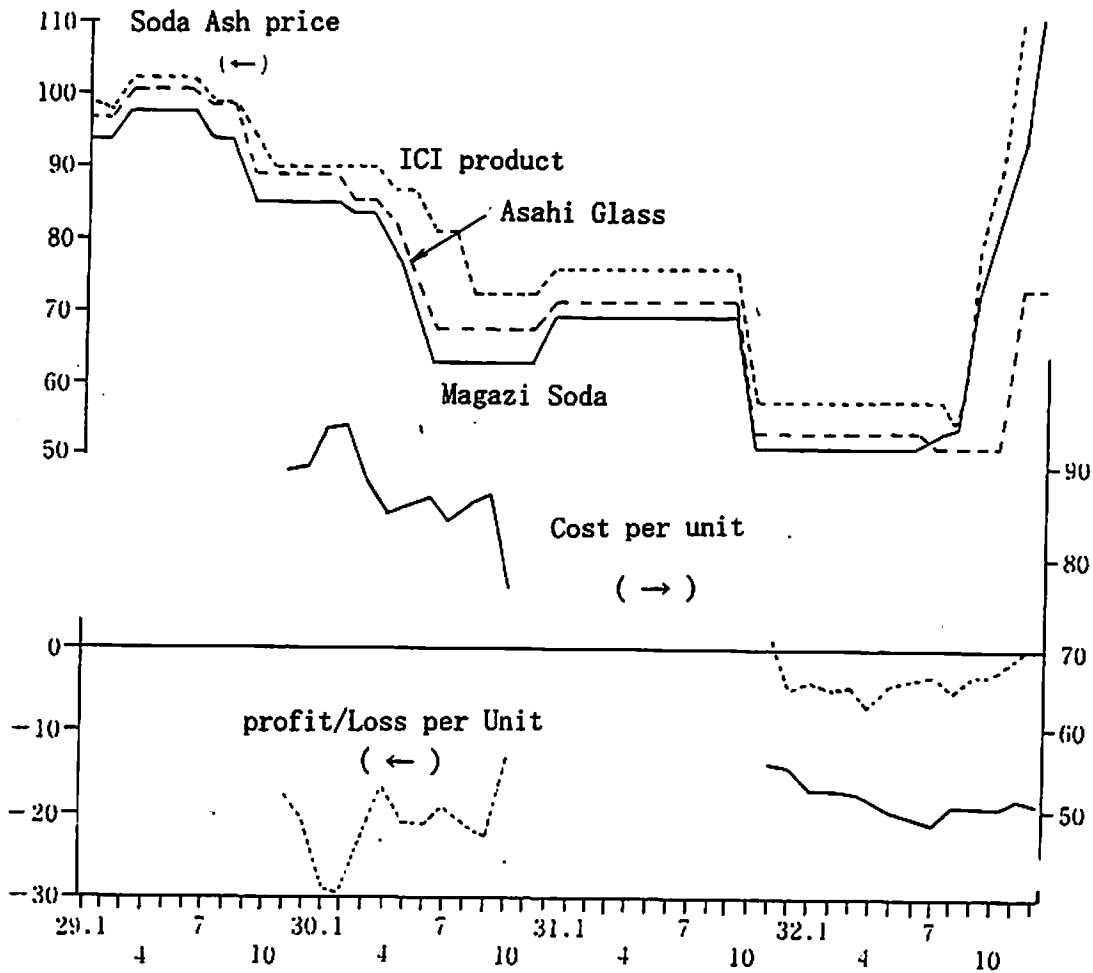
P= Domestic price,

D= Domestic demand,

X= Domestic production

C= Production cost (average cost= fixed cost+valuable cost,
based on Asahi Glass's data)

Figure 1 Price, Cost of soda Ash (Dumping Period)



Source: "Yunyu Sodabai Futorenbai Mondai ni Kansuru Sanko Shiryo"

[Materials concerning Dumping problem of Soda Ash] in Ministry of Finance Showazaisei shi shiryo, [Materials concerning Fiscal History in the Showa Period], 4-176, Asahi Gurasu, Sodabai seizo ni kansuru Shintatsusho [The Reports of Producing Soda Ash], No. 1 & 3, Toyokeizai-shinposha, Buttuka 20 nen (The report of price for 20 years)

Note: Both Profit/Loss per unit and cost are based on Asahi Glass product.