INDUSTRIAL POLICY IN JAPAN: OVERVIEW AND EVALUATION

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SUMMARY

After presenting our basic conceptual framework for industrial policy analysis, this paper presents a concise historical overview of Japanese industrial policy in the post-war period. It is argued that there is a clear trend from direct intervention to catalytic intermediation and informational activities - which at least partially reflects the changing leverage of ministry in charge of industrial policy vis-a-vis private firms. We also evaluate three important aspects of Japanese industrial policy, viz. welfare criteria for industry selection, regulatory activities in the name of keeping "excessive competition" under control and informational activities by the government.
Introduction

Throughout the post-war period, the Japanese government has invoked a fairly sophisticated system of interventionist economic policies to promote steady growth, technological innovations and international competitiveness. Such policy initiatives have benefited from cooperative response by the private sector. Given the remarkable post war accomplishment of the Japanese economy, rapid economic growth in the 1960s and, thereafter, a smooth adjustment to international competition in the face of frequent and often unforeseeable external shocks, it is natural that the so-called Japanese industrial policy has become the focus of international concern. The purpose of this paper is to present an overview and a concise evaluation of Japanese industrial policy. Since there already exist sizable contributions on what the Japanese industrial policy is about, how it evolved and transformed itself through time, and how it is affecting the international competitiveness of the other countries, we will focus here on a theoretical evaluation of the Japanese policy, citing concrete historical instances only for illustrative purposes.

The paper is divided into four sections. In Section I, several basic concepts, which are important for an economic analysis of industrial policy, are introduced. Section II presents a concise historical account of Japanese industrial policy. Section III turns from description to evaluation. In

1/ Representative works include Adams and Ichimura [1], Hosomi and Okumura [12], Johnson [13], Komiya [14], Ohita [22], Fugai [30], Rapp [31], Saxonomhouse [32], Tresize [35], Uekusa and Ide [37] and Ueno [38]. Needless to say, these works differ substantially from each other in their view on the meaning and efficacy of industrial policy. Concerning our detailed historical as well as theoretical analysis of Japanese industrial policy, which forms the background of the present paper, the reader is referred to Komiya, Okuno and Suzumura [16], an English translation of which is forthcoming in 1987 from Academic Press. In addition to the above literature which deals specifically with Japanese industrial policy, Hindley [11] and Krugman [17] are also of interest.
particular, we study three important aspects of Japanese industrial policy, viz., welfare criteria for industry selection, regulatory activities to keep "excessive competition" under control, and informational activities by the government. Section IV concludes.

I. Industrial Policy: Some Basics

A Definition

For all the concern about industrial policy, it is rather perplexing that a standard definition of the concept has never been well-established. As a result, arguments for or against the country's industrial policy may be addressing entirely different issues.

In the 1970s, for example, Kaizuka observed that "At least as far as I could verify, it is surprisingly the case that the term industrial policy has never been unambiguously defined. ... [I]f I am obliged to define industrial policy, I cannot but answer (with a spice of sarcasm added) that industrial policy is nothing other than the MITI's policy (Kaizuka [14, P.167])."

The elusive nature of industrial policy was echoed by Hindley in the 1980s: "[T]he term 'industrial policy' has an entirely spurious sound of precision. Over the past ten or fifteen years, the term has become a portmanteau catchword for that broad range of governmental actions which directly affect the structure of production in an economy. From a political point of view, this very lack of precision in definition is a major attraction of support for industrial policy (Hindley [11, pp.277-81])."

In view of these well-taken critical remarks, we should begin with a workable definition of industrial policy. Throughout this paper, we mean by industrial policy "the totality of governmental policies undertaken to change the allocation of resources among industries from what it would be otherwise, or to intervene in the industrial organization within a certain individual
industry, with an intention to enhance the country's economic welfare if and when unrestricted functioning of the competitive market mechanism is found to fail in achieving that end (Okuno-Fujiiwara and Suzumura [27, p.3]).

Policy Objectives

Two features of our definition of industrial policy, which is admittedly abstract, deserve emphasis. First, it is explicitly maintained that industrial policy is concerned with complementing, rather than substituting for the competitive market mechanism if and when the autonomous functioning of the latter somehow fails. Second, the raison d'être of industrial policy is geared toward enhancing the country's economic welfare.

To lend concreteness to these abstract concept, we must identify causes and types of market failures, on the one hand, and criteria on which to evaluate the country's economic welfare, on the other. The latter problem is complicated by the fact that, more often than not, there are conflicting interests within the country, each of which should be considered in talking about the country's economic welfare. Depending on the choice made by the government as to whose welfare is at the top of its priority list, there are several alternative routes one may take in pursuing the country's industrial policy, although no democratic government seems to be so crude as to make its priority rule explicit. Instead, more down-to-earth policy objectives such as industrial modernization (sometimes under the name of "industrial rationalization"), self-sufficiency, sustained growth, international

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2/ This definition was also used in our research project on Japanese industrial policy reported in Komiya, Okuno and Suzumura [16]. It is admittedly rather narrow. For one thing, it excludes policies that are meant to pursue "non-economic" objectives, e.g., self-sufficiency and the like. It also excludes, e.g., an optimal tariff policy that would enhance a country's economic welfare in the absence of market failure at the sacrifice of other countries. Nevertheless, the policies covered by our definition are widely acceptable, whereas other policies are much harder to rationalize from the theoretical viewpoint.
competitiveness, amenity of life and the like are referred to. Nevertheless, the implications of these policy objectives for welfare distribution are often easily identifiable.

**Policy Implementability**

In order for the country's industrial policy to be at all implementable, two basic conditions must be satisfied.

First of all, the government must be endowed with effective policy instruments. Generally speaking, the instruments or policy measures of industrial policy may be classified according to the following criteria: 3/

1. Whether or not the policy measure is discriminatory. What we call **discriminatory measures** are those that provide favorable treatment to a particular firm (or a group of firms) within a specified industry, whereas **non-discriminatory measures** are those which apply to all firms within the industry.

2. Whether the measure is incentive compatible or regulatory. **Incentive compatible measures** work by providing pecuniary or non-pecuniary rewards to private firms, whereas **regulatory measures** involve explicit legal stipulations and/or administrative persuasion and guidance.

Note that the sustainability and efficacy of each type of industrial policy is determined, at least in part, by its domestic and/or international implications. This leads us to the second basic condition for implementability, viz., domestic and international compliance.

In implementing an industrial policy (which may well favor some firms or industries at the sacrifice of others) in a democratic society, at least implicit public agreement on the policy objectives (with their de facto distributational implications) is a pre-requisite for it to be sustainable. Also, more or less willing compliance by private firms is indispensable for

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3/ See Okuno-Fujiwara and Suzumura (27, pp.3-4).
the efficacy of intangible policy initiatives such as organizing cooperative research-and-development projects, collecting, exchanging and disseminating crucial industrial information that is typically not acquired on the basis of purely private incentives, and providing administrative guidance. With regard to international compliance, it should be noted that a country’s degree of economic development may well limit her implementable industrial policies. In less developed economies, a country’s pursuit of a protectionist industrial promotion policy in order to protect its infant industries may be more or less internationally accepted. However, such a policy will almost certainly become a target of harsh international criticism when implemented in mature economies. 4/

With these rudimentary concepts for studying industrial policy in hand, we turn now to a historical account of Japanese industrial policy.

II. Historical Overview

Post-War Economic Reforms: Shaping the Competitive Frame 5/

During the occupation period (1945-1952), a series of economic reforms aimed at the "democratization" of Japan were performed under the order and strict control of the Occupation authorities. Although they can hardly be classified among the Japanese industrial policies proper, these reforms undeniably shaped the competitive framework of the post-war Japanese economy. The major reforms consisted of the zaibatsu (family-dominated combines) dissolution, land reform, and labor democratization.

4/ This is emphatically not to say that any criticism by a foreign country is by itself proof of the illegitimacy of a country’s industrial policy. What we are saying is that the country should be ready to argue rationally and persuasively for the legitimacy of her industrial policy, and should include reasonable boundaries on the limits of that policy.

5/ Factual details of these reforms are concisely explained in, e.g., Nakamura [21, Chapter 2].
The first step in the zaibatsu dissolution was the breaking-up of its core, viz., the holding companies. In fact, this reform far exceeded the mere dissolution of zaibatsu itself. Indeed, the clear focus of the reform was to eliminate concentration in production as well as in property ownership in general, which culminated in the Anti-Monopoly Law (April 1947) and the Elimination of Excessive Concentration of Economic Power Law (December 1947).

Although the extent to which these laws succeeded in eliminating monopoly power is debatable, it seems to be unambiguously true that the zaibatsu dissolution, coupled with a policy of purging pre-war business leaders, facilitated the separation of property ownership from managerial control and set the stage for the keen interfirm competition that characterized the post-war Japanese economy.

No less important was the drastic land-reform initiatives stipulating that the property rights of all absentee landlords and a large proportion of landlords residing in the rural villages should be transferred to tenant farmers. This reform naturally motivated farmers to carry out land improvement on a large scale. The resulting increases of agricultural productivity and income raised domestic demand, thus supporting from the demand side the rapid economic growth to follow. As an important and somewhat ironic side effect, this radical land reform generated an overwhelmingly conservative political stance among the farmers, who became the very backbone of conservative party governments.

The labor reform symbolized by the Trade Union Law (December 1945), the Labor Relations Adjustment Law (September 1946) and the Labor Standards Law (April 1947), all of which were enacted in accordance with orders of the Occupation authorities, established institutional framework for democratic labor-management relation in Japan. The proportion of unionized workers rose
dramatically, and the pecuniary as well as non-pecuniary working conditions were greatly improved, which also served as a factor in supporting the ensuing rapid economic growth from the demand side.

Reconstruction Period: From Rationalization to Economic Independence

Immediately after the war, the legacy of war-time economic controls strongly influenced the stance of industrial policy, resulting in the so-called priority production system (1946-1948). This system was aimed at industrial rehabilitation by according special priority in allocating government funds, imported raw materials and foreign exchanges to industries of strategic importance. Coal being the primary energy source at that time, that industry which was critical for the development of coal mining, viz., the steel industry, received first priority. All imported oil was injected into the steel industry with the increased steel production being invested into the coal industry. The increased coal production was in turn reinvested into the steel industry, and so on. To support this system, the Reconstruction Finance Bank, which was established in January 1947 and served as a channel for providing government and the Bank of Japan funds to the industrial sector, invested funds in the coal industry on a top priority basis. Meanwhile, food and subsistence commodities were rationed as much as possible.\(^5\)

It is true that the priority production system enabled Japan to provide coal to other industries, thereby initiating the process of economic

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\(^5\) For more details on this phase of Japanese industrial policy, see, e.g., Komiya, Okuno and Suzumura [16, Chapter 1], and Tsuruta [36, Chapters 1 and 21.

\(^3\) One might wonder how such a policy, which puts extraordinary weight on the expansion of producer goods in the midst of starvation and destitution, could ever be implemented without invoking oppressive measures. Apart from the widespread eagerness for quick economic rehabilitation among people, one factor which might have been responsible seems to be the fact that the sacrifice, which was inevitable anyway, was not imposed by direct order, but by the indirect and impersonal mechanism of forced saving through inflation.
rehabilitation fairly quickly. Nevertheless, the resulting allocation of resources lacked any guarantee of economic efficiency. Indeed, the expansion of coal and steel production (as well as the production of other so-called stabilization belt goods including fertilizer, soda and gas) were made possible only at very high costs, so that government had to provide large-scale subsidies to fill in the gap between high production costs and low official prices. Furthermore, the Reconstruction Finance Bank obtained funds by issuing bonds that were accepted by the Bank of Japan. Obviously, this mechanism of financing the priority production system exerted a serious inflationary pressure.

A strong decree to curb inflation was issued by the Occupation authorities in December 1946. In particular, new loans from the Reconstruction Finance Bank were suspended in 1949, in order to cut inflation. In April 1949, the Occupation authorities also set the official exchange rate at the single rate of 360 yen to the dollar, which lasted until 1971.\(^9\) Given this exchange rate, (which was felt to appreciate the yen too highly), and high domestic production costs of basic commodities, extensive measures were needed to promote more efficient resource utilization and to enhance the development of new industries. In response to this need, major steps were taken in December 1949. The Industrial Rationalization Council (which in 1964 became the Industrial Structure Council) was established as an advisory organ under the Ministry of International Trade and Industry (MITI) with the purpose of arriving at a consensus among the government, private firms and labor regarding measures to be adopted in pursuing rationalization. The Council permitted informal participation of private agents in governmental policy formation through the exchange of ideas between government officials and private agents before authorizing any major industrial policy.

\(^9\) Private foreign trade was reopened in the summer of 1947, which was state-managed. Until April 1949, however, there was no fixed exchange rate. Instead, there were complex exchange rates for each commodity traded.
Similarly, the Foreign Exchange and Trade Control Law and the Foreign Investment Law were enacted, which enabled government to collect foreign currencies, to impose quantitative import restrictions, and to bring the inflow and outflow of capital under control. Within the framework thus established, several attempts were made to rationalize industries. Unlike the priority production system, which promoted several industries of strategic importance without discriminating among firms within the nominated industry, the focus of industrial policy was now to favor technically superior firms within the nominated industry. Productivity increased by virtue of this rationalization policy, but at the cost of incurring deflation, with massive bankruptcy of inefficient firms and increased unemployment.

The Korean War, which broke out in June 1950, changed this gloomy scene quite drastically. Exports, production, profits and employment all rose rapidly in textiles, chemicals, iron and steel, machinery, metals and lumber; Foreign currency income from special procurements (the expenditure of the U.S. Army and military personnel) raised the ceiling on the domestic expansion set by the balance of payment constraint. More important (from a long-run perspective) was the expansionary effect of the Korean War on plant and equipment investment and technological innovation. Expanding heavy and chemical industries and technology transfer from the U.S. Army to meet the special procurements demands motivated many industries to import technology from abroad and to expand and renew their productive capacity. It was against this background that the prototype of industrial policy in post-war Japan took clear shape.

Unlike the priority production system which retained vestiges of directly interventionist pre-war controls, the major tools of industrial policy now became largely incentive-oriented and advisory in nature. The Japan Development Bank, which assumed the assets and liabilities of the
Reconstruction Finance Bank, supplied key industries with low-interest national funds for plant and equipment investment, while the Japan Export-Import Bank was in charge of promoting exports by providing funds to exporting firms. Special tax measures for the promotion of plant and equipment investment and exports were introduced. The Law for the Promotion of Industry Rationalization was enacted, which established a special accelerated depreciation system for important machinery in order to facilitate plant and equipment investment. We should also mention the 1953 revision of the Anti-Monopoly Law authorizing cartels in times of depression and for the purpose of industrial rationalization. Finally, the Temporary Law on the Adjustment of Supply and Demand of Goods, which was a powerful law giving government the leverage to allocate important goods, lost effect in April 1952. From this time on, rigorous domestic control on the manufactured goods essentially disappeared in Japan. In this sense, the termination of this law symbolized the end of transition period from the directly controlled economy to the government-assisted competitive market economy.

Over the latter half of the 1950s, some of the promoted industries such as automobiles had already established themselves as high-yield industries and no longer received preferential tax treatment or low-interest public loans. Other decreasing cost industries including iron and steel and electricity had successfully rationalized themselves, whereas rationalization of increasing cost industries such as coal mining turned out to be a failure. The emphasis of industry promotion policy shifted towards such new and promising industries as synthetic fibre, plastics, petroleum refining, petrochemicals, electronics and general machinery. Other salient features of industrial policy during this period were, first, increased efforts to import oil and a shift away from coal production (with adjustment assistance given to the coal industry) and, second, expansion of the industrial infrastructure.
It should also be mentioned that protection of domestic producers through import restrictions was used extensively in promoting certain industries including automobiles and heavy electric equipments, whereas the imports of advanced foreign technology were greatly facilitated.

By the end of the 1950s, the era of rapid economic growth was about to begin. Newly promoted industries as well as established industries maintained high rates of expansion. One may be tempted to surmise that this "success" is sure-fire proof of the efficacy of industrial policy. Certainly such policies did not hurt, but it is still an open question whether industrial policy should be singled out as the most important factor. The more important factors would seem to be individual entrepreneurship, smooth expansion of domestic as well as international markets and adaptability to newly introduced technology from abroad.

Rapid Economic Growth: Herdoy of Industrial Policy

Plant and equipment investment by private firms continued to grow rapidly with the added fuel of technological innovation. Even the seemingly over-optimistic Income-Doubling Plan (published in December 1950) proved to underestimate the growth potential of the Japanese economy. Through this investment spurt, which the government authorities made every effort to sustain, the share of heavy and chemical industries in total production

9/ See, e.g., Komiya, Okuno and Suzumura (16, Chapter 2), and Tsuruta (36, Chapters 4, 5, and 6) for more details.

10/ Along with pursuing policies for the protection and promotion of industries, they also played an important role in providing temporary shelter to private firms when they were confronted with a severe business downturn:

"When it seemed that a business downturn was becoming rather severe, a helping hand would be extended by the government in the form of cartel assistance, tax reductions or exemptions, and industry-wide plant and equipment capacity expansion agreements. While a floor was being held under recession in these ways, business prosperity would begin to revive again. As firms became active once more, they were able to launch into their next set of plans. In this sense, the government's industrial policies functioned as a safety valve so that firms could boldly pursue aggressive programs within a secure environment (Nakamura (21, p.66))."
and subsequently in export compositions increased steadily, introducing several irreversible changes into the Japanese economy. Shortages occurred in the Japanese labor market for the first time in its history, increasing incentives to pursue plant and equipment investments embodying labor-saving innovation. A wider gap developed between the manufacturing sector, characterized by large and technologically advanced firms, and the stagnant sectors consisting of agriculture and small firms. In order to make up for this lop-sided development, policies designed to modernize agriculture and small firms were undertaken.

Increasing exports of the Japanese industrial products, coupled with an extensive lifting of import restrictions in the European nations, raised foreign countries' demand for trade liberalization in Japan. In the 1960s, the Japanese government responded to this trend by deciding in principle to proceed with trade liberalization. As far as the proportion of liberalized commodities is concerned, liberalization seemed to be nearly complete in 1964. However, several important items were kept off the liberalized commodity list as long as possible. For example, passenger cars were kept off this list until 1965, and in fact several agricultural products are still off the list.

On the other hand, in 1964 when Japan became an IMF Article VIII nation and also a member of the OECD, which meant that the liberalization of inward direct foreign investment could not be far off.\textsuperscript{11/}

It was with these prospects of internationalization in view that the authorities in charge of industrial policy undertook several measures to

\textsuperscript{11/} The first step towards liberalization of inward direct foreign investment was taken in June 1967, which was completed by April 1973.
enhance the international competitiveness of the Japanese industries. It should be recognized that MITI was going to lose most of its powerful control over private firms with the liberalization of trade and capital flows. Indeed, the assignment of import quotas, the authorization of individual patent and know-how import contracts, and the screening and authorization of joint ventures between foreign and Japanese companies, which served the MITI as a powerful measure for regulatory intervention, were all going to evaporate into thin air.

One of the major industrial policies in the 1960s was MITI's direct intervention into plant and equipment investment in such industries as iron and steel, synthetic fibres, petroleum refining, petrochemicals, paper and pulp in order to avoid "excessive competition". If left unregulated, it was feared that excess capacity would be generated, to the detriment of international competitiveness.

Another interventionist goal was the specialization of production in pursuit of scale economies and the organization of industrial complexes under MITI's auspices. In order to secure controls enabling MITI to accomplish these objectives, MITI submitted a bill to the Diet for a Law on Temporary Measures for Designated Industries (March 1962), with the declared purpose of promoting and improving international competitiveness in the heavy and chemical industries by such measures as standardization, specialization of production, establishment of joint capital enterprises, the organization of industrial complexes, rationalization of plant and equipment investment, mergers, the conversion of businesses to other fields of activity in line with the reorganization of industrial structure, and so forth. This appallingly interventionist bill which, if passed, would have enabled MITI to exert almost complete control over industries, was in fact defeated by the opposition of financial institutions.
Although the 1960s is occasionally dubbed the heyday of industrial policy in Japan, it may alternatively be viewed as an era of struggle between two compelling approaches to industrial policy, viz., direct regulation vs. the provision of advice and incentives, with the latter prevailing in the end. MITI expedited mergers among private firms in such manufacturing industries as chemicals, petroleum, metals and machinery so as to exploit potential scale economies and to help strengthen international competitiveness. In March 1964, Mitsubishi Heavy Industries was established, Prince Motor merged with Nissan Motor in August 1966, and Nippon Steel Corporation was born in March 1970 with the amalgamation of Yawata Iron & Steel and Fuji Iron & Steel. These mergers, however, materialized not by the regulatory decree of MITI. On the contrary, MITI's help was invoked only when such mergers were consistent with the the pursuit of private incentives. Indeed, MITI's plan to intensify automobile production (June 1961), which was designed to limit new entry and to specialize production in pursuit of scale economies, failed to elicit compliance by private firms. These and similar cases seem to suggest that the so-called "voluntary" compliance by private firms to the

12/ See, e.g., Komiyama, Okuno and Suzumura (16, p.55).

12/ This failure may be attributed to the lack of MITI's regulatory power in the form of screening, authorization and permission. However, even during the 1950s, when MITI's power over private firms was considered to be extremely potent, the government could not necessarily impose its will on private firms if it was going squarely against the dictates of private incentives. The case of Kawasaki Steel Corporation will suffice to exemplify this point:

"[A] plan by Kawasaki Steel Corporation to enlarge a steel mill in Chiba prefecture was assessed by the government to be on an excessively large scale in relation to the government's estimate of future steel demand. But Kawasaki Steel did not accept the official forecast and carried out the investment as they originally intended. Fortunately the judgement of Kawasaki Steel proved to be right, thanks to a rapid expansion of steel consumption (Hosomi and Okumura (12, pp.133-134))."

Likewise, in the 1950s, it was already maintained that petrochemical industry, being a typical heavy equipment industry with a large degree of scale economies, was in need of intervention by industrial policy with a view to controlling new entry and fostering orderly investment by excluding "excessive competition." For all of MITI's power, those firms which meant to enter eventually did so and intervention proved to be futile.
regulatory objectives could be obtained only when such objectives were largely consistent with private objectives. Even MITI could not force an unwilling horse to drink.

This tendency towards predominance of private incentives over administrative discretion was enhanced by the disappearance of MITI's controls in the process of trade and capital flow liberalization described above. The new era of industrial policy was about to come, in which the MITI's role was to be indicative, advisory and catalytic.

In the wake of rapid economic growth, environmental disruption and pollution became increasingly prevalent. This was viewed as an inevitable result of the reckless pursuit of rapid growth via heavy and chemical industrialization. Criticism against pollution grew vehement in the latter half of the 1960s, and in 1967 the Basic Environmental Pollution Prevention Law went into effect. By 1970, such anti-pollution acts as the Prevention of Noise Pollution Law, the Prevention of Air Pollution Law, and the Prevention of Water Pollution Law were promulgated. The salient feature of these acts is that they imposed strict responsibility on the polluter, revising the conventional idea of no indemnity due without proven malfeasance in the civil law. The social regulations thus introduced were quite severe and directly interventionist in nature, in sharp contrast with the trend of economic regulations described above. Private firms were now required to install effective equipment to keep pollutants under control.

Oil Crisis and After: From Direct Intervention to Catalytic Intermediation

The year 1973 will long be remembered as a watershed in the post-war Japanese economy. In February of that year, the flexible exchange rate system

14/ For more details on this phase of industrial policy, see, e.g., Komiya, Okuno and Sazanuma (16, Chapter 31), Tsuruta (36, Chapters 8 and 9), and Sekuna and Ide (37).
was adopted, and in the following October, the first oil crisis broke out when the Arab oil-producing countries set in their strategy of partial oil embargo and announced a five-fold increase in the price of crude oil. Rampant inflation, sharp declines in growth rates and a balance of payment deficit ensued. The impact of oil crisis was quite severe, particularly because the Japanese economy had developed primarily on the basis of high-energy-consuming heavy and chemical industries and because the main source of that energy was imported crude oil. Extraordinary efforts in economizing energy use enabled the Japanese economy to absorb almost entirely the impact of the oil crisis within three years. However, the high-energy-consuming basic material industries including iron and steel, non-ferrous metals, chemicals (excluding drugs and medicines), paper and pulp, and lumber became structurally depressed industries. Instead, industries such as automobiles and electronics, which were less dependent on imported raw materials and still left much room for further technological improvements, recorded rapid expansion, as did tertiary industries. In April 1979, when some of the structurally depressed industries were still struggling with excess capacity in the face of stagnant demands, further large-scale increases in crude oil prices by OPEC (the second oil crisis) took place. Moreover, there were striking price increases for other imported raw materials as well. Having learned important lessons from the bitter experience of the first oil crisis, adjustment to the second was faster and more efficient, backed up by the voluntary cooperation of laborers to put up with a temporary decrease in real wages. In the meanwhile, except for relatively brief periods after the first and second oil crisis, the balance of payments surplus had been accumulating massively, greatly escalating trade friction.

In response to these events, industrial policy after the first oil crisis had three focuses: adjustment assistance to the structurally depressed industries, promoting R & D investment in high-technology industries, and
dealing with trade friction. In coping with these focal tasks, the stance of authorities in charge of industrial policy was in sharp contrast to that during the era of rapid economic growth, for two reasons. First, MITI’s power had diminished still further. In 1980, an important judgement was made by the Court to the effect that cartels are illegal even if formed under MITI’s administrative guidance. In other words, industrial policy in general and administrative guidance in particular were explicitly made subordinate to the Anti-Monopoly Law. Secondly, interventionist and protectionist policies were losing international acceptance as well as domestic “voluntary” compliance. Criticism against the allegedly protectionist nature of Japanese industrial policy was becoming sharper than ever, in view of the increasing importance of Japan as an international competitor. And private firms did not have much reason to comply with administrative guidance unless such compliance was mandatory and/or doing so was consistent with the firm’s private motives. Thus, the character of industrial policy became mostly passive, indicative and intermediary rather than active, interventionist and regulatory.

Adjustment assistance to the stagnant industries suffering from massive excess capacity and from competition by newly industrializing countries was formally sanctioned by the Law on Temporary Measures for Stabilization of Designated Depressed Industries, enacted in May 1978. This Law designated several struggling industries as structurally depressed when they were found to be suffering from severe excess capacity with more than half of the firms making losses. Assistance was provided in essentially two ways. First, the Law authorized the establishment of joint credit funds to purchase scrapped facilities and to guarantee bank loans for the disposition of excess facilities. Second, the Law authorized collective capacity reduction among all firms within the industry. The designated industries included aluminium refining, synthetic fiber, shipbuilding, linerboard, cotton and other spinning, and chemical fertilizers.
It is still an open question whether the admission of such assistance did not work to hinder, rather than foster, the inevitable adjustment by keeping less efficient firms alive and by prolonging the process of intraindustry rationalization. Nevertheless, collective capacity disposal had been nearly completed in most of the designated industries by 1982. In order to assist those designated industries whose adjustment was made more difficult by the outbreak of the second oil crisis, as well as additional industries that had more recently fallen into distress, the Law on Temporary Measures for Structural Improvement of Designated Industries was enacted in May 1983, which authorized business tie-ups and promoted specialization in production as well as development of process innovation.

One feature of the Japanese adjustment assistance policy described above deserves emphasis. No recourse was ever taken to such protective measures as import restriction, tariff imposition or outright subsidies in assisting structurally depressed industries.

Regarding the promotion of R & D investment, it should first be noted that, quantitatively speaking, the private sector has been playing a much more important role in R & D activities in Japan than the public sector. Indeed, the rapid increase of R & D expenditure in Japan is not mainly due to government expenditure, but rather to private sector spending. According to the 1984 White Paper on Science and Technology, for example, the proportion of government-funded R & D expenditure among major industrialized countries is lowest in Japan. Furthermore, almost all of the government and/or non-profit research institutions, are engaging not in applied research for industrial use but in basic research. Therefore, the impact of government's R & D promotion policy in high-technology industries, is indirect and relatively small.

Nevertheless, involvement in private R & D activities did help to promote cooperation. Cooperative research and development in frontier technologies was promoted by giving favorable tax treatments and subsidies to private firms.
that organized an association for cooperative R & D activities.15/ The most visible and successful association was the Research Association on Very Large-Scale Integrated Circuits for Next Generation Computers (VLSI), consisting of five semi-conductor companies (Fujitsu, Hitachi, Mitsubishi Electric, NEC and Toshiba) that carried out their cooperative research activities from 1976 to 1979.

Judging from the research output of this Association as measured, for example, by the number of patents obtained, the promotion of the VLSI Research Association was a great success. These efforts helped to fill a wide technology gap existing between Japan and US and to establish the basis for the development of the Japanese computer and semi-conductor industry.

However, the government-promoted cooperative R & D projects were far from being perfect. There were, in fact, many occasions where the Association failed to be productive in research activities and also many cases where members of the Association failed to maintain, let alone enhance, their competitive position. An example is provided by the Research Association on Laser-Using Complex Manufacturing Systems (1977-1983). This was one of the projects under the title of Large-Scale National Research and Development Project, to which MITI gave special priority in the late 1970s. Throughout this project, the machine-tool industry had experienced rapid expansion, causing some leading producers of machining centers at the beginning of the project to increase their capacity at high cost. Whereas some (which were so small as to participate in the project in the first place) had established themselves so much as to assume technological leadership.

15/ The origin of the cooperative research associations in Japan can be traced back to the early 1960s. The Law on Research Association of Mining and Manufacturing Technology was passed in 1961, which was meant to avoid unnecessary duplication of funds and researchers that would occur unless research activities were coordinated by government intermediation, and promoted cooperative research in frontier technologies by giving tax benefits.
While the VLSI Research Association was on balance successful in its aim, this success was made possible only by a rare combination of favorable factors, including: (a) the Association was driven by the target of catching up to IBM within the designated time-span; (b) the Association had its own Research Institute where the exchange of information was efficiently performed; and (c) the Association was endowed with adequate funds as well as a mature and experienced research staff. We should also note that the cooperative research association may have some undesirable implications from the viewpoint of competition. Thus, the research association may serve as a basis for cooperative cartel behavior in the product market.

More recently, government subsidies to R&D activities have shifted towards the development of high technologies, e.g., electronics, new industrial materials, biotechnology and energy, where private incentives alone are unlikely to generate enough research efforts.

The third focus of the industrial policy, viz., dealing with trade friction, consisted of such measures as the elimination of residual import restrictions, the abolition or relaxation of tariff and non-tariff barriers, the simplification of customs procedures and import standards, and the use of "voluntary export restrictions." Although the response by the Japanese government to trade friction has often been quite slow and incremental in nature, it should be emphasized that the Japanese government has not taken recourse to measures such as protective tariffs or emergency import quotas in coping with the domestic problem of adjustment assistance to structurally depressed industries. On the other hand, accusations often made about non-tariff barriers or unfair trade practices in Japan should be carefully examined and redressed if found to be legitimate. Not all of those accusations about alleged non-tariff barriers are legitimate, however. For example, it would surely be invalid if one claims that the Japanese environmental standard is a non-tariff barrier on the grounds that it is too severe and is serving to prevent the
penetration of foreign cars, for example, into Japanese markets. Certainly, any nation is within her rights to determine whatever level of environmental standard to enforce within her boundary for the sake of the safety and health of her people. On the other hand, there seem to be wide areas including finance, retailing and air services, where the principle of reciprocity does apply.

III. Evaluation

Welfare Criteria for Industry Selection

One of the most important tangible measures of Japanese industrial policy was the government subsidy in the form of preferential tax treatments and special reserves, which were aimed at reducing the financial burden of large scale plant and equipment investment and risky R & D activities. In trying to rationalize the provision of these subsidies among several favored industries to the exclusion of others, NITI allegedly applied some criteria in picking industries of strategic importance. Although the exact nature of these criteria varied from time to time, they are typified by the criteria that were often invoked during the period of rapid economic growth. These criteria are explained by NITI in the following quotation: 16/ 17/

"The industrial vision [announced by the Industrial Structure Research Council in 1964] placed increased emphasis on the sophistication of the industrial structure through more strengthening of the heavy and chemical industries than ever, in order to enhance the country's international competitiveness. In defining the optimal industrial structure of the future, two criteria were adopted: one was the rate of productivity growth, and the other, income elasticity. The income elasticity criterion led to greater appreciation of the importance of developing export industries with high demand elasticity relative to world growth in real income. On the other hand, the productivity increase rate purported to examine the prospects for relative superiority on the basis of improved productivity. These criteria were in effect an application of a theory of comparative production with long term consideration on dynamic development of international trade."

16/ This quotation is taken from the Industrial Structure Division, the Ministry of International Trade and Industry, "Industrial Policy --Japan--," which was presented at the PAP Special Group in the OECD Economic Policy Committee in October 1980.

17/ The origin of these criteria may be traced back to Shinohara [33], who called them the Principle of Dynamic Comparative Costs.
For all their practical appeal (at least to the Japanese in the 1960s who were eager to catch up with the developed countries), it is rather doubtful if indeed the so-called "strategic" industries were actually chosen in accordance with these criteria, viz., the productivity improvement criterion and the income elasticity criterion. To substantiate our doubts, we have only to note that, although heavy and chemical industries (like iron and steel, general machinery, heavy electrical equipment, chemicals and petrochemicals), which were actually chosen and promoted, satisfied these criteria, there were many other industries (camera, bicycle, watch, tape recorder, magnetic tape, tourism, supermarkets and restaurants) which were not promoted, despite their clear "success" in passing these criteria.13/

Furthermore, almost no theoretically satisfactory explanations were provided justifying these criteria in the first place. To be sure, the well-known infant industry argument and other arguments based on market failures were sometimes invoked to defend them. The productivity improvement and income elasticity criteria, however, seem to have little to do with dynamic external economies which are the key element of infant industry argument. Against many criticisms on these criteria (and Japanese industrial policy in general) made by economists, MITI officials often tried to defend their stance by declaring that they were concerned with dynamic non-competitive (or "excessively competitive" in their terminology) situations, which their critics had failed to take into account. Nevertheless, no theoretical foundations of these criteria based upon dynamic non-competitive situations were provided either. Moreover, in spite of its importance, the welfare implications of these criteria were never made explicit. Thus, it is still left unanswered whether these two criteria (and, for that matter, other criteria mentioned in other phases of industrial policy) are really relevant.

13/ This point was made by Professor Komiya in Komiya, Okuno and Suzumura [16, p.8].
criteria for industry selection, especially from the welfare viewpoint. 19/

It is probably much closer to the truth that these criteria (and those corresponding criteria which were referred to in other phases) were nothing more than after-thought rationalization of a "strategic" industry selection that was in fact made for other reasons. Whatever these "other reasons" might have been, one fact is very clear. Unless these reasons for industry selection were (at least implicitly) agreed on in the process of bargaining among conflicting interests (each interest group being represented by the government agency participating in the industrial policy design), the de facto compliance by private firms and taxpayers to Japanese industrial policy would not have been maintained throughout the post-war period. To analyze the nature of this bargaining process is an important further step in the economic analysis of Japanese industrial policy.

Regulatory Activities: "Excessive Competition"

In post-war Japan, interfirm competition has been consistently keen. This competition has served as a major force in securing the embodiment of new technology through extensive plant and equipment investment by incumbent as well as new entrant firms. In such a lively environment, the competitive

19/ As a first step in filling this theoretical gap, Okuno-Fujiwara and Suzumura [26] examined the welfare-theoretic criteria for justifiable industrial subsidies in an oligopolistic setting. The model they considered is a static closed general equilibrium model consisting of two sectors, competitive and oligopolistic. Production technology in the oligopolistic sector is characterized by scale economies, and by constant returns to scale in the competitive sector. In such a setting, the welfare effects of the introduction of various tax-subsidy schemes for the promotion of an oligopolistic, increasing returns to scale industry were systematically examined. The welfare criteria they derived depend subtly on the possibility of firm entry into the oligopolistic industry, but they are not related in any recognizable way to the two criteria mentioned above. As far as we can infer on the basis of their analysis, therefore, the welfare-theoretic foundation of the two criteria for industry selection is quite shaky, to say the least. For the sake of fairness, however, we should add that their model economy is static and closed, which may well be totally inappropriate for the purpose of examining the two "dynamic" criteria that are meant to apply to an open economy. Further researches are in need here.
forces working in the markets should not be interrupted by regulatory authorities unless some identifiable dysfunctions of the market mechanism are observed. Nevertheless, government intervention within a specified industry had been resorted to in Japan, frequently in the name of keeping "excessive competition" among firms under control. However, "most of the articles arguing the damage caused by 'excessive competition' and the necessity for interventionist policy are unconvincing when examined from the viewpoint of economic theory. Furthermore, hardly anyone has ever cared to define clearly the meaning of 'excessive competition' (Komiya, Okuno and Suzumura [16, p.12])." Indeed, to those who are accustomed to the standard theory of welfare economics and industrial organization, the very term "excessive competition" sounds quite dubious and almost self-contradictory.

To examine if indeed "excessive competition" may make theoretical sense in the first place, let us note that industries where such phenomena allegedly prevailed in Japan were characterized by the necessity of heavy plant and equipment for production, homogeneity of output, and oligopolistic competition. Keeping this observation in mind, Okuno-Fujiiwa and Suzumura [28] examined a model incorporating these three features and tried to determine whether or not such a model exhibits an intrinsic tendency towards "excessive competition" in a clearly defined sense. As an auxiliary step, we defined the concept of "socially first-best (resp. second-best) investment" as that level of firm's investment that maximizes total market surplus when government can regulate both the firm's output and investment optimally (resp. government can regulate firm's investment only, leaving output decision to the firm). To gauge the market performance in terms of these measuring rods, Okuno-Fujiiwa and Suzumura examined a model with a fixed number of firms where each firm can commit itself to the cost-reducing fixed plant and

20/ Iron and steel, petroleum refining, petrochemicals, certain other chemicals, cement, paper and pulp may be cited as concrete examples of such industries. See Komiya [15].
equipment investment with a view to threatening the other firms. It was shown that, in this model (a) plant and equipment investment at the oligopolistic equilibrium is socially excessive in comparison with the first-best level if there exist at least two firms within the industry, and (b) plant and equipment investment at the oligopolistic equilibrium is socially excessive in comparison with the second-best level as well if the number of firms within the industry exceeds a critical number which is determined by demand conditions. An intuition behind these results is fairly clear. Since each firm can reduce its cost by committing itself to a larger fixed plant and equipment, each and every firm will try to do so ahead of the others, with the result that each firm ends up with making a socially excessive commitment.

The assumption of the model that the number of firms is constant may seem questionable. Indeed, one of the features of the neoclassical competitive paradigm is that the number of firms within an industry is determined endogenously by the entry and/or exit decision of firms in accordance with the profit incentive. Noting this fact, Suzumura and Kiyono (34) examined a homogeneous output Cournot oligopoly model with free entry. If left to themselves, potential competitors (resp. incumbent firms) will enter into (resp. exit from) this industry until the marginal firm earns zero profit. Let the number of firms existing in this long-run equilibrium be called the "equilibrium number of firms." Depending on the extent to which government can regulate the behavior of firms, two concepts of "socially optimal number of firms" may be relevant. These are the optimal number of firms corresponding respectively to the "first-best" and the "second-best" solution respectively. In the first-best case, government is assumed to exert strong control on firms, forcing them to price at marginal cost, whereas in the second-best case, government takes firms' profit-maximizing behavior as given.
Let us say that a number of firms is first-best optimal (resp. second-best optimal) if it maximizes the first-best market surplus (resp. the second-best market surplus). It was shown that (a) the equilibrium number of firms is socially excessive in that it exceeds the first-best number of firms as long as the latter exceeds unity, and (b) the equilibrium number of firms is also socially excessive in that it exceeds the second-best number of firms as long as the latter exceeds unity. The thesis of "excessive competition" is thus again vindicated in this free entry model.

With these theoretical conclusions at hand, we must concede that "regulation by enlightened, but not omniscient, regulators could in principle achieve greater efficiency than deregulation (Panzar [29, p.313])." Does it follow, however, that the actual regulatory activities by the Japanese government with the expressed purpose of keeping "excessive competition" under control are legitimate and theoretically defensible? Our answer is emphatically negative.

Note that, for government regulation to be first-best, it is necessary that government impose marginal-cost pricing principles on the firms, which presupposes that government can get hold of exact and detailed information concerning demand and cost conditions. The informational requirements of second-best regulation are lighter than that of first-best regulation, but are still substantial. For lack of access to this information, which is basically internal to the firms, actual interventions by the Japanese government had to be based on much cruder information. Indeed, actual regulation (in the form of allocating, for example, import quotas or mandatory authorization of new productive facilities) was conducted mainly in accordance with the "share principle", which assigned priority to a firm according to its rank-order in
terms of a simple index of productive capacity or market share.\textsuperscript{21/} For example, import quotas for crude oil were allocated in accordance with the rank-order of refining capacity at a certain time. The effect of the use of such a rule of thumb on regulation was rather paradoxical. Instead of keeping "excessive competition" under control as intended, it aggravated the situation by motivating firms to expand their productive capacity beyond the level justified by the prevailing market conditions in the hope of securing favorable treatment by the government ahead of competing firms. Thus:

"That productive capacity has actually been used or referred to for administrative or allocative purposes in direct controls, administrative guidance, or cartelization, and that companies rightly or wrongly expect this to be repeated in the future, seem to be the real cause of the 'excessive competition in investment' (Komiya [15, p.214]).\textsuperscript{22/}

\textbf{Informational Activities}

Several economists have expressed the opinion that, among the many policy measures the Japanese government undertook as part of its industrial policy, those which explicitly and/or implicitly manipulated industrial information flows within the economy were the most, if not the only, successful measures. For example, according to Komiya [15, p.221]:

\textsuperscript{21/} Quite apart from easy enforceability due to informational simplicity, the rule of thumb to the effect that "recompense each in accordance with his/her past accomplishment" does have an intuitive appeal with equitable flavor, so that it is rather difficult to argue against its application. It would seem that this was the reason why government officials took recourse to the share principle in their regulatory practice.

\textsuperscript{22/} See also, Komiya, Okune and Suzumura [16, pp.13-14 and pp.225-226].
"Whatever the demerits of the system of industrial policies in postwar Japan, it has been a very effective means of collecting, exchanging, and propagating industrial information. Government officials, industry people, and men from governmental and private banks gather together and spend much time discussing problems of industries and exchanging information on new technologies and domestic and overseas market conditions. People at the top levels of the government, industries, and banking circles meet at councils, and junior men meet at their subcommittees or less formal meetings. Probably information related to the various industries is more abundant and easily obtainable in Japan than in most other countries. Viewed as a system of information collection and dissemination, Japan's system of industrial policies may have been among the most important factors in Japan's high rate of industrial growth, apart from the direct or indirect economic effects of individual policy measures."

Although this statement seems persuasive and thought-provoking at first glance, it becomes much less convincing if one looks at it more carefully. In particular, the following arguments may be made against such statement.

(1) If markets are perfectly competitive and there are no missing markets the resulting resource allocation should already be Pareto efficient, and no improvement would be possible with information sharing or with facilitation of information transmission.

(2) Even if some markets are missing and/or some markets are not perfectly competitive, how can more information make resource allocation more efficient?

(3) Even if a mechanism of information sharing is created, it is not clear whether there is an incentive to share truthful information. And if there is no incentive to report truthful information, how would reported information (which may possibly be manipulated and incorrect) help improve resource allocation and economic efficiency?

In what follows, we would like to make some (theoretical) remarks related to the above questions. It is not our intention to claim, however, that the following arguments are always practically viable and that there are no other possible reasons to support information-related policies. Instead, our intention is to stimulate interests in this still undercultivated area of
economics with a view to understanding the function of industrial policy from this viewpoint.

There seem to be at least three major channels through which the government can potentially affect resource allocation within the private sector by explicitly or implicitly applying policy measures concerning information:

(a) Government may be able to affect communication channels among private firms, thereby changing their strategic behavior. In particular, government may be able to coordinate actions taken by private firms.

(b) Government can acquire information itself and/or give extra incentives to collect information that would not be acquired otherwise by private firms.

(c) Government may be able to design and implement information sharing mechanism, which enhances incentives to increase information flows.

Let us examine each one of these channels in detail.

Government as Coordinator:

When markets exhibit some degree of monopoly power and/or incomplete information prevails, strategic behavior becomes essential. Compared to markets where all agents take prices as given, such an economy must be described by a game in which strategic actions are explicitly taken into consideration.

Recently many examples have been found where an economy described by a game possesses multiple Nash equilibria, some of which Pareto dominate the
In such examples, the economy may be stuck with a Pareto inferior equilibrium. We may call such a situation coordination failure, as inferior equilibrium is obtained due to lack of coordination among players. Since the coordination failure occurs because of multiple Nash equilibria, some mechanisms which improve pre-game communication among players and/or create coordination in choosing proper strategic actions may help attain Pareto superior equilibrium.

Many arguments for the informational role of the Japanese industrial policy seem to rely implicitly upon the idea of coordination failures. For example, several economists have argued that an important role played by the Japan Development Bank (JDB) was the "cowbell effect", as it were, of its loan decision. When the JDB decided to provide loans to a private firm, it

23/ A simple two-person game with such a property may be described as follows. The strategy set $S$, which is the set of all non-negative real numbers, is common for both players. The payoff function for player 1, $x_i(s_{i, j})$ where $i \neq j$, is twice continuously differentiable with $\lambda_i > 0$, $m_i^j < 0$, and $n_i^j > 0$ for all $(s_{i, j}) \in S \times S$, where $m_i^1 = 3a_i /3s_i$, $n_i^1 = a_i^2 /3s_i$ and $n_i^j = a_i^2 /3s_i - s_j$. The last property of payoff function (that its cross partials are positive) is termed as the strategic complementarity by Bialow, Geanakoplos and Klemperer (3), which brings about upward sloping reaction functions. Assume that the payoff functions are symmetric and hence both players have the same reaction function. If the reaction function computed from $m_i$ is as in Figure 1, there are three symmetric Nash equilibria, viz., $E_{i, i}$, $E_{i, j}$, and $E_{i, j}$, among which $E_{i, i}$ and $E_{i, j}$ are "stable" and $E_{i, j}$ "unstable". Moreover, as is clear from indifference curves for player 1, the equilibrium $E_{i, i}$ is Pareto superior to the equilibrium $E_{i, j}$, which in turn is Pareto superior to the equilibrium $E_{i, j}$.

24/ The games with these properties may be found in various places, e.g., Diamond (6), Heller (10), Okuno-Pajiwara (24) and Weitzman (42) all of which are neatly summarised in Cooper and John (5). According to their presentation, a necessary condition for this phenomenon to occur is strategic complementarities. The fact that Nash equilibria may be Pareto ranked was first emphasized by Heller (10). Models of macroeconomic coordination failure, e.g., Diamond (6), and Marshallian or pecuniary externalities, e.g., Okuno-Pajiwara (24), may be subsumed in these models.

25/ See, e.g., Imai, Okuno and Suzumura (16, p.260) and Tsuruta (36, p.74).
worked as a signal to many private banks of the favorable prospect for that firm. As a result, the small amount of the JDB loan the firm received actually enabled it to satisfy much larger financial needs. The alleged reasons why private banks willingly followed the JDB's suit are two-fold. First, the JDB was thought superior to private banks in acquiring information about the growth-potential of private firms. Second, the internal decision-making process within private banks was such that, more often than not, it was much easier to argue for providing loans to a firm once the JDB had decided to do so. In other words, the JDB loan decision may have acted as a coordination mechanism in that the act of giving the JDB loan may have coordinated private banks' own loan decisions.

Serious problems still remain even with this potential role of government. There is no convincing criterion by which we may arrive at an equilibrium when the game possesses multiple equilibria, nor do we have a method to identify policy measures that are required to bring the economy out of coordination failure.

Government's Information Acquisition:

Consider an economy where some markets are not perfectly competitive, so that prices do not convey all the relevant information. In such an economy, where strategic behavior plays a crucial role, every agent needs information other than price information in order to select an optimal strategy. Since information acquisition is often costly, whether or not to engage in such an activity should be determined by weighing potential benefit against necessary cost \textit{ex ante}. Note, however, that potential \textit{private} benefit may be different from potential \textit{social} benefit accruing from such an activity. For example, information in question may be about the potential for new technology which, if successful, may reduce the price of output and may increase consumers'
surplus as well as producers’ surplus. Whenever social benefit outweighs private benefit, and information acquisition cost is not more when it is undertaken publicly than privately, public intervention in information acquisition activity may be socially beneficial. Indeed, as may easily be shown by a simple extension of Okuno-Fujiwara (24), there are cases where government should intervene into the private activities of information acquisition even if the information acquisition cost is the same for the government as for private agents.

Two qualifying remarks are in order. First, an important question remains as to whether government should directly engage in information acquisition activities or whether it should instead devote itself to providing incentives for private firms to do so. Second, in order for government’s intervention into information acquisition activities to be socially justifiable, two conditions should be satisfied: (1) the expected total benefit from intervention must exceed its cost; and (2) left to itself, the private agent must lack incentives to engage in information acquisition.26/

Information Sharing:

Many, if not all, economic agents seem to possess information which is exclusively their own. If such private information can be successfully diffused to all concerned agents, economic welfare may well increase in the aggregate. The question we now pose is two-fold: (1) under what condition will information sharing be welfare-increasing, and (2) by what mechanism, if any, can we generate incentives for information sharing?

26/ One is reminded in this context of the famous criteria of infant industry protection.
A partial answer to the first question is provided by recent literature on information sharing. Although the result seems to depend subtly on whether information in question concerns cost or demand parameters, on the one hand, and on whether interfirm competition is of Cournot quantity type or of Bertrand price type, on the other, there are identifiable cases where information sharing does indeed improve economic welfare.

The second question seems to be much more difficult to answer. The problem lies in the fact that, information being private, agents usually have incentives to convey false signals so as to harvest private gain. For example, a firm may tell competitors that its costs are low (when in fact they are high) so as to induce them to be less aggressive and to increase its own profit.

There seem to be, however, at least three eligible mechanisms which may limit the firm's incentive to provide misinformation.

(1) Reputation Mechanism

If the information exchange process is repeatedly applied and if an act of false signalling is made publicly known ex post, the lying agent's reputation will be severely damaged. Therefore, any agent with a reasonably long time-horizon will be motivated to comply "voluntarily" with the information sharing scheme by providing accurate information.

(2) Binding Contract Mechanism

Suppose that private information is verifiable ex post and that firms can sign binding contracts ex ante to share information. In such a case, true information must always be disclosed as long as the expected profit of sharing information is not less than that of not-sharing.

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27/ See, among others, Clarke [41], Gal-or [7 and 81], Novshek and Sonnenschein [22] and Vives [40].
(3) Self-Unravelling Mechanism

Even if binding contracts are not possible, verifiability alone may induce information unravelling for a fairly large class of games. As an example, suppose that the relevant information concerns the firm's own cost and that the possibility of information sharing exists. A firm whose cost is the lowest possible has every incentive to reveal this private information, thereby discouraging other firms and securing higher profit. It follows that a firm which does not reveal its cost is the lowest possible is in fact revealing that its cost is not the lowest possible. Knowing that the other firms may infer this much anyway, a firm whose cost is the second lowest possible has every incentive to reveal this private information truthfully, given verifiability and the possibility of information sharing. With these possible mechanisms to provide incentives for information sharing at hand, let us now pose a question: should government intervene to promote information sharing? Generally speaking, the answer is in the negative. First, information sharing may be welfare-decreasing rather than welfare-improving. Second, even when information sharing is welfare-improving, such sharing may be better organized by the private sector. Only when welfare-promoting information sharing cannot be realized without public assistance can government intervention be justified.

By what truth-revealing mechanism should government intervene when such an act is justifiable? The answer seems to depend subtly on the nature of the

28/ See, among others, Grossman [9], Matthews and Postlewaite [16], Milgrom [19], Milgrom and Roberts [20], and Okuno-Fujiiwara, Postlewaite and Suzumura [27].
information in question. Note, however, that government assistance does play an important role in supporting the viability of each mechanism mentioned above. In the case of the reputation mechanism, the ex post identifiability of true information is the key for its viability, which may be conducted only by government. In the case of binding contract mechanism, enforcement of such contracts may be performed only by government that can impose large penalties on those who break the rules. Finally, in the case of the self-unravelling mechanism, government cost advantages in verifying information may serve to guarantee its efficient operation, although the role government plays in this mechanism is mainly catalytic.

A question that largely remains open is whether Japanese industrial policy, seen as “a system of information collection and dissemination (Kōmiya),” may be at all justified on the basis of the above considerations. Our provisional judgement is that it may possibly be viewed as an information sharing mechanism of reputation or self-unravelling type.

IV. Concluding Remarks

In this paper, we have tried to trace out the mainstream of post-war industrial policy in Japan and to make several welfare-theoretic remarks on some of its salient features.

The central message of this paper is that competitive market forces should not be interfered with unless there exist clearly identified causes of market failure and that, even when intervention is warranted, it should be implemented so as to complement underlying private incentives. Both historically and theoretically, we have seen that policy interventions that are inconsistent with private incentives are often ineffective and unsustainable.
This paper left many problems unresolved. In this sense, what we have presented here may be regarded simply as the beginning stage of a large future research agenda. Nevertheless, it is our hope that we have helped reader form a balanced overview of the nature and role of Japanese industrial policy.29/

29/ Several other aspects of industrial policy including trade issues, which the present paper did not treat, are discussed extensively in our companion paper, viz., Okuno-Fujiwara and Suzumura (27).
Figure 1: Pareto-Ranked Nash Equilibria
References


