

What is Happening to Japan's Industrial Structure?

SPECIAL REPORT

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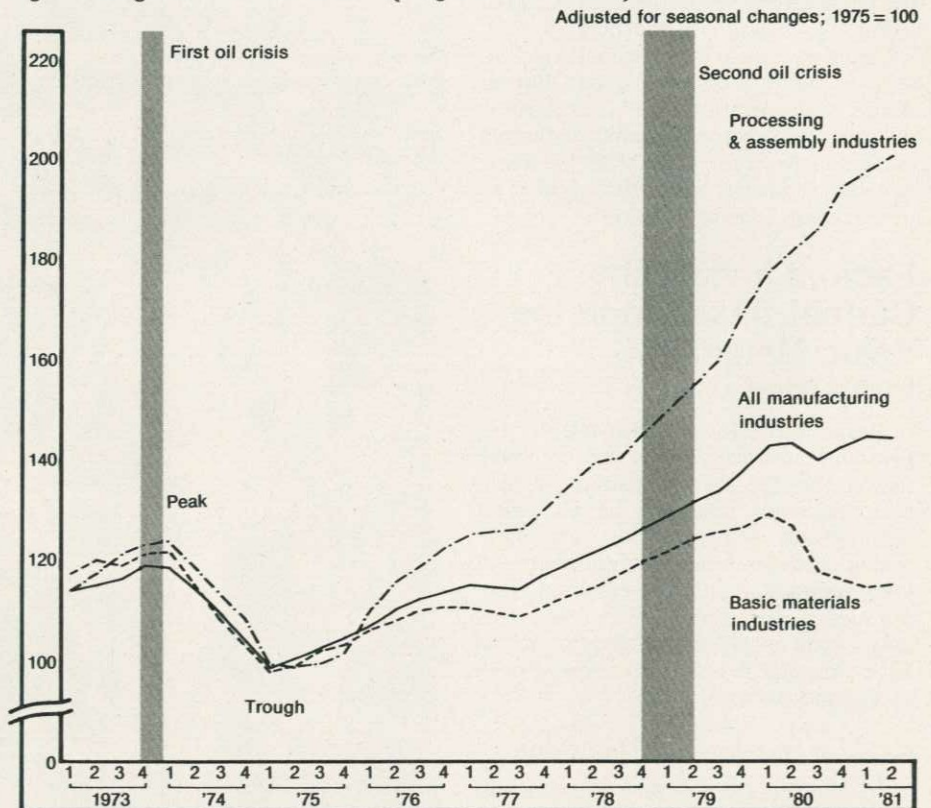
The Bipolarization of the Japanese Industrial Structure

The first and second oil crises aggravated the economic stagflation all countries, particularly the advanced industrialized nations, had been experiencing. In fact, adjustments are still being made to accommodate this turn of events. Against this background, Japan has managed to overcome both oil crises, and has shown a relatively better economic performance than Europe and the United States. Many consider Japan has successfully combated the effects of the two oil crises. Certainly, macroeconomic indicators, such as economic growth rate, unemployment rate and rise in the cost of living, suggest a remarkable economic performance on Japan's part in comparison to those of other countries.

However, when we probe more deeply into the situation, we find that there are various imbalances and lack of coordination between foreign and domestic demand, among industries, among different-sized enterprises and among geographical regions. The imbalance among industries, especially, is a major problem.

Just as Japan is being admired for the strength of its economic power, major changes are taking place within its industrial structure. The very foundation of that industrial activity which must support

Fig. 1. Changes in Production Indices (weight of value added)



(Source) Kokogyo Shisu Nenpo

Japan's future economic performance is in danger.

The imbalance among industries, in other words the changing Japanese industrial structure, is reflected in the imbalance between the basic materials industries and the processing and assembly industries and in the bipolarization between these two industrial sectors in international competitiveness.

If we look at industrial trends right after the second oil crisis, we find that Japan's automobile and other processing and assembly industries have become so competitive internationally as to cause trade friction with Europe and the United States. On the other hand, the basic materials industries, such as aluminum refining and petrochemicals, have experienced a decline in their international competitiveness, despite their generally satisfactory production levels, because of the rise in the price of crude oil. Exports dropped and imports

increased. The relative increase in costs for these industries compared to those in other industrial sectors created changes in the domestic demand structure. This has resulted in sluggish production and in a market environment of rising material costs and falling product prices. Business conditions are worsening.

Figure 1 shows this trend towards industrial imbalance in terms of production indices. After the first oil crisis, production significantly decreased in both the basic materials and the processing and assembly industries. But after hitting bottom in the first quarter of 1975, the processing and assembly industries began a continuous climb towards recovery until, by the second quarter of 1981, they had attained an index level exceeding 200. In contrast, the basic materials industries, which also hit bottom in the first quarter of 1975, declined again after the second oil crisis, after a brief recovery. By the second

quarter of 1981, their production index had fallen to 115. This graph clearly shows the imbalance between the two industrial sectors—and the gap is widening.

Employment and operating ratio indicators also point to the same trends. For instance, the operating ratio indices show that the processing and assembly industries are gradually recovering while the basic materials industries have dropped back to the same low level as in 1975.

Factors behind the Current Situation in the Basic Materials Industries

Stagnation of domestic demand and unfavorable economic conditions are some reasons for the current distress of such basic materials industries as aluminum refining and petrochemicals. The basic reason, however, is the structural change in both supply and demand resulting from the sudden rise in crude oil prices. Let us take a look at the current situation in the basic materials industries in terms of both supply and demand.

(1) Supply Problems and Their Causes

A. The Rising Costs of Raw Materials and Energy

The principal cause of supply problems is the rising cost of raw materials and energy resulting from high crude oil prices. Increased raw material and energy costs have led to increased overall costs for all industrial sectors. As Figure 2 shows, oil-related (petrochemicals, etc.) and electric power-related (aluminum refining, etc.) basic materials industries have been the most seriously affected because raw materials and energy account for much of their total costs. There is a definite difference between the situation for the basic materials industries and that for the processing and assembly industries. The effect of rising raw material and energy costs varies, even among the basic materials industries, because of differences in oil consumption levels. Basic materials industries dependent upon oil as a major heat source (such as the steel and cement industries) have been reducing their energy costs by switching to alternative heat sources and making more efficient use of heat. As a result, they have

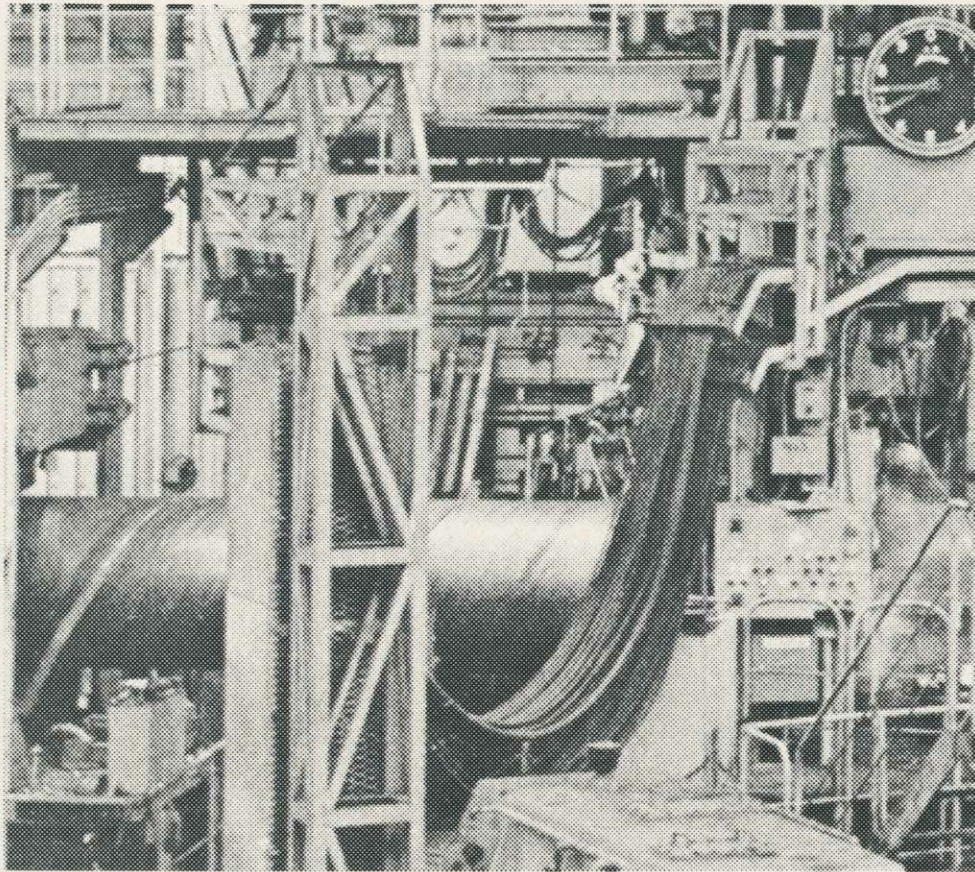
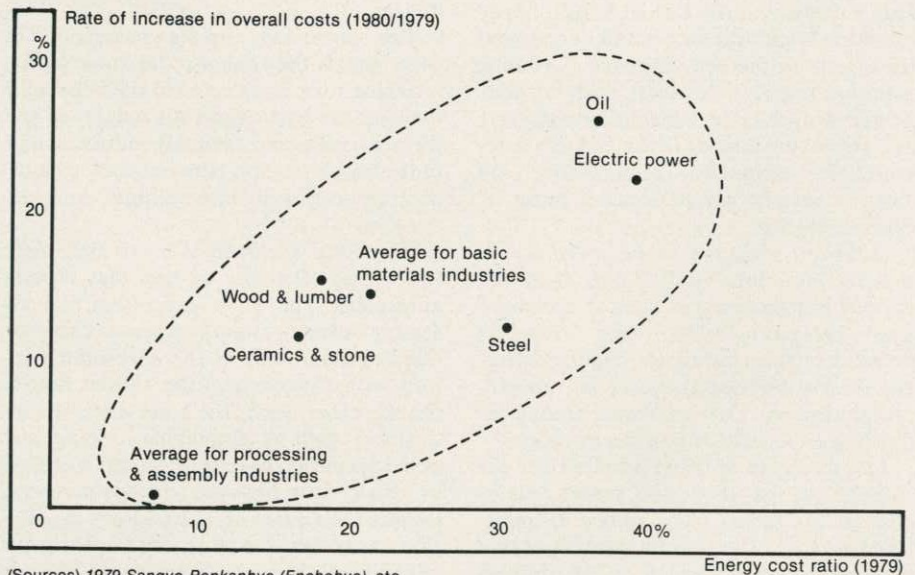
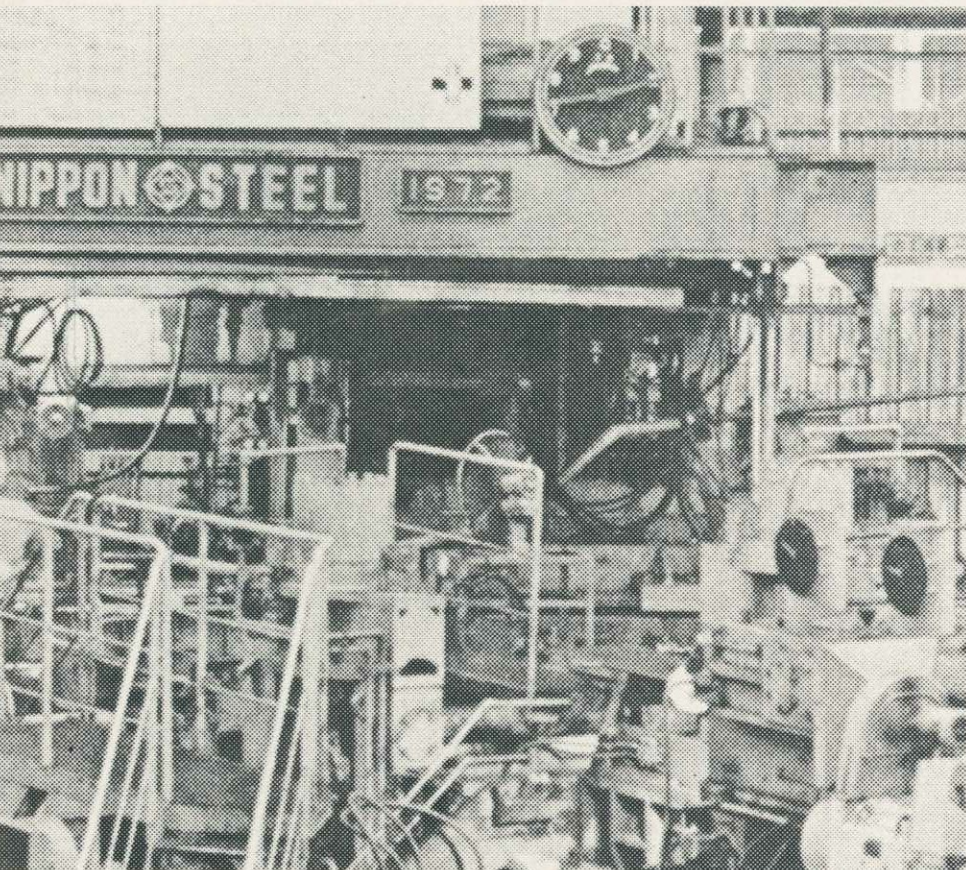


Fig. 2. Correlation of Rate of Increase in Overall Costs to Ratio of Raw Material and Energy Costs





been only slightly affected by the rise in oil costs. On the other hand, basic materials industries which use oil as a principal raw material, such as oil refining, petrochemical and vinyl chloride-related industries, and those which consume oil as a power source, such as the aluminum and zinc refining industries, have been more seriously affected. It has not been easy for these industries to find alternative raw materials and energy sources to counteract the sudden rise in crude oil prices. Their predicament is a dire one.

B. Decline in International Competitiveness

A secondary result of the situation described above has been a decline in international competitiveness. For example, Japan's petrochemical and chemical fertilizer industries use naphtha as the basic raw material. The price of domestically produced naphtha has soared due to the rising

cost of imported crude oil. In Canada and the United States, where natural gas is the basic raw material, price increases have been successfully kept down by the enforcement of price controls. This provides a significant difference in raw material costs. As a result, the price of ethylene, a primary petrochemical product, in the first half of 1981 was ¥170 per kilogram in Japan in contrast to ¥70 per kilogram in the United States.

Another example is the aluminum refining industry. Japan's aluminum refining is heavily dependent upon oil-burning power generation. Even when hydroelectric power is included, Japan's average power cost for the refining industry is ¥14 per kilowatt-hour, while in the United States and Canada, where water is the principal power source, the cost is only ¥1 to ¥5 per kilowatt-hour. This naturally makes Japan's aluminum refining industry less competitive on the international market.

The fall in Japan's competitive edge is causing its exports to decrease. In Southeast Asia, once Japan's major export market for petrochemical products, Japanese producers are losing to their American and Canadian rivals who can rely on cheaper natural gas. Japanese ammonia fertilizers are also made mainly from naphtha and here again the growing gap in production costs is causing a decline in Japanese exports of such products.

Another reflection of the disparity in raw material costs has been a steep increase in imports of such petrochemical products as ethylene derivatives. This has resulted in boosting the market share of imports, most of which come from the United States and Canada. These countries are highly competitive because they can rely on cheaper natural gas. There also has been a notable increase in imports of aluminum ingots. Aluminum imports which had accounted for 27% of the market in 1975 increased to 60% in the period from April 1981 to January 1982. Imports from the United States, formerly an importer of aluminum ingots, have rapidly increased. One factor behind this is the drop in U.S. demand for aluminum products for the housing and automobile industries and the growing pressure for spot exports.

C. Excessive Competition

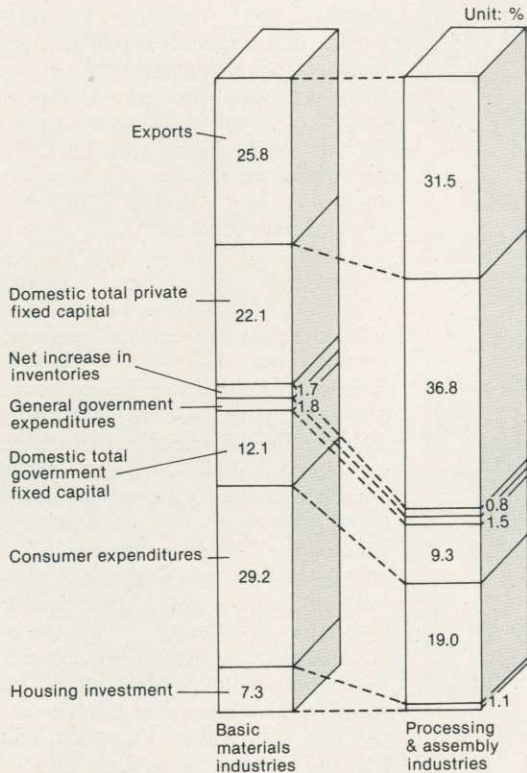
A third cause of supply problems is excessive competition. A unique structural feature of Japan's basic materials industries is their lack of either vertical or horizontal integration as compared to their U.S. and European counterparts. The resulting excessive domestic competition makes it difficult for the basic materials industries to pass on increased costs in the form of higher prices for their products to the downstream industries which depend upon them. Their problem is one of costly raw materials and low product prices.

(2) Demand Problems and Their Causes

A. Sluggish Domestic Demand

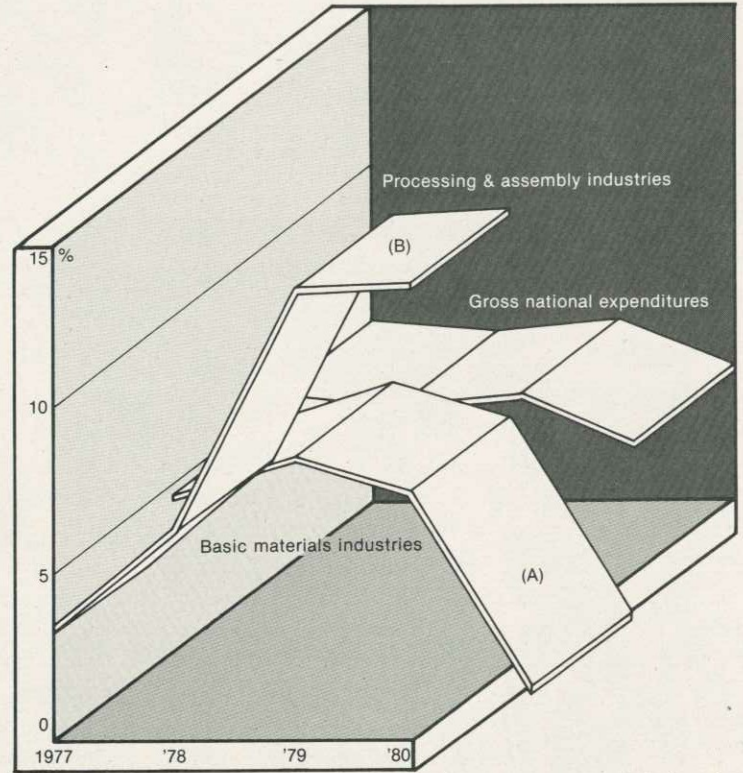
The primary factor behind the demand problems is sluggish domestic demand. Processing and assembly industries are heavily dependent upon exports and private investment in equipment and plants. In contrast, the basic materials industries rely to a greater extent on final demand such as housing investment, public works

Fig. 3-1. Dependence on Final Consumption by Item (1979)



(Sources) 1979 Sangyo Renkanhyo (Enchohyo), 1975 Kensetsu Bunsekiyo Sangyo Renkanhyo, and Kokumin Keizai Keisan Nenpo, Economic Planning Agency

Fig. 3-2. Annual Growth by Sector (in 1975 prices)



(Notes) (A) Total of demand items on which basic materials industries are relatively dependent (private housing investment, household final expenditures and public fixed capital) (B) Total of demand items on which processing and assembly industries are relatively dependent (exports, private corporate plant investment, etc.)

(Source) Kokumin Keizai Keisan Nenpo, Economic Planning Agency

spending and individual consumption. The recent stagnation in housing and public investments is a direct cause of the slump in domestic demand (See Figure 3). This sluggish domestic demand, particularly in the housing market, is for the most part a structural problem. In the area of demand, therefore, the basic materials industries will continue to experience difficulties.

B. Substitutions Resulting from Changes in Relative Prices and in the Demand Structure

The rise in relative cost of basic materials, as compared to that of other materials, has resulted in decreased new demand for these materials. There is even a trend toward reverting to the use of materials once thought obsolete. Consumers of such petrochemical end products as polyethylene film are also economizing. Whereas the demand for petrochemical products was 30 tons per ¥100 million GNP

before the first oil crisis, it dropped to 22 tons per ¥100 million GNP by 1980.

Figure 4 illustrates the factors behind the current situation in the basic materials industries.

The Position of the Basic Materials Industries and Their Functions

(1) The Position of the Basic Materials Industries

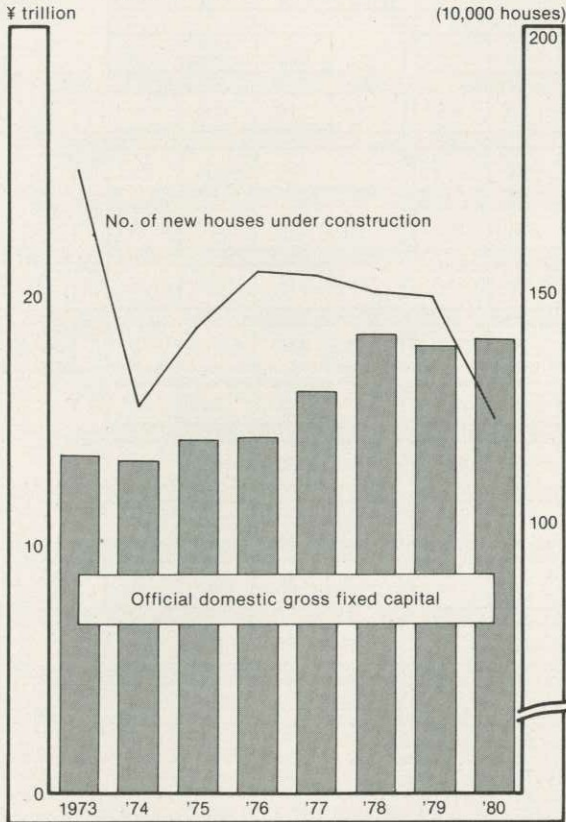
The basic materials industries refine and process primary raw materials to be supplied as intermediate raw materials to other industries. The processing and assembly industries process these various basic materials into different forms and assemble them into end products. The basic

materials industries are the central support of Japan's industrial structure.

Next, let us look at the basic materials industries' share in the Japanese economy. In 1979 the basic materials industries' share in all manufacturing industries was 31.8% in terms of product shipments; 24.9% in terms of value added; 18% in terms of number of employees and 46.4% in terms of tangible fixed assets. In the money market, the basic materials industries accounted for 21.2% of corporate capital for all industries, and borrowed 12.4% of all outstanding loans made to industries by financial institutions.

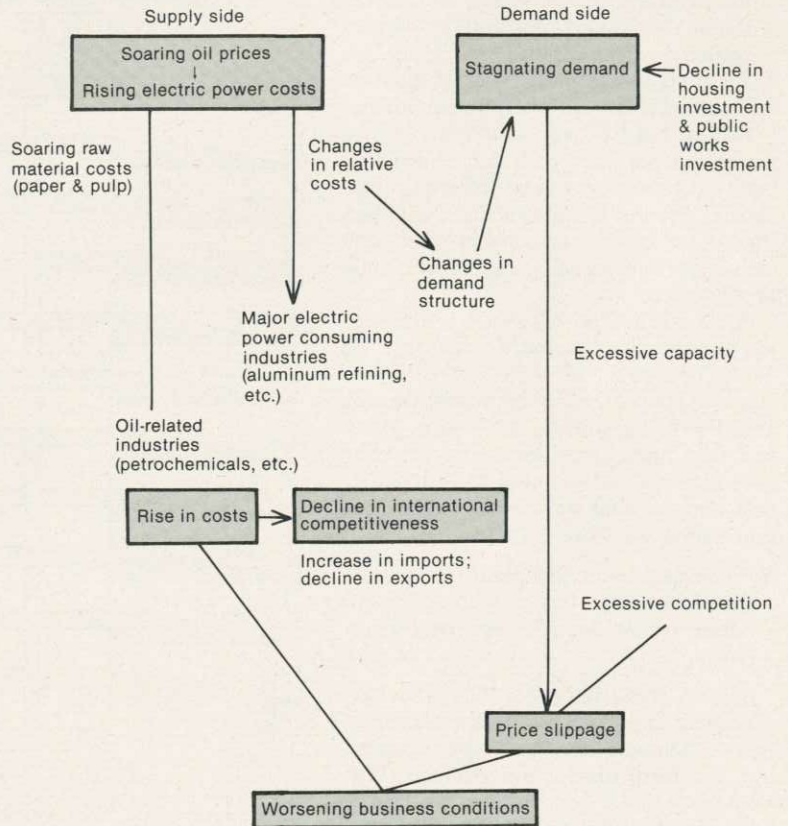
The basic materials industries have a significant influence on regional economies. There are basic materials factories in all parts of Japan, most of them located in small and medium-sized cities of up to several hundred thousand in population. The industries support the employment and regional economies of these cities.

Fig. 3-3. Official Domestic Gross Fixed Capital (in 1975 prices)



(Sources) *Jutaku Chakko Tokei*, Ministry of Construction, and *Kokumin Keizai Keisan Nenpo*, Economic Planning Agency

Fig. 4. Factors behind the Current Situation in the Basic Materials Industries



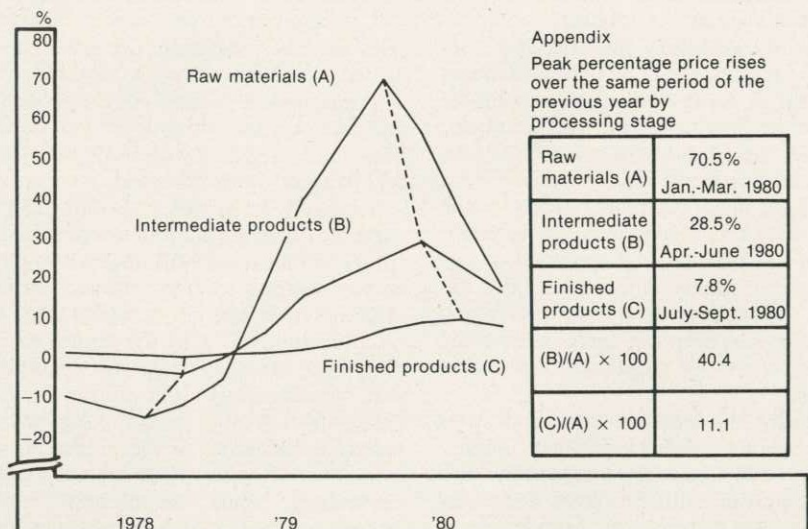
(2) The Ideal Functions of the Basic Materials Industries

A. The Basic Materials Industries and Economic Security

Let us take a look at the role the basic materials industries play in supporting Japan's economic security. First of all, these industries function as volume and price buffers. Their preservation of production facilities at home means that they maintain a considerable volume of buffer stockpiles. The domestic production facilities also serve to cancel out price increases for imported basic materials. Figure 5 illustrates this price mechanism in Japan from 1978 to 1980.

A second function of the basic materials industries is that they ensure a certain degree of bargaining power. The world's supply of primary products and basic materials is based on an oligopolistic structure. To ensure steady supplies, it is impor-

Fig. 5. Changes in Wholesale Prices by Processing Stage



(Source) *Bukka Shisu Nenpo*, Bank of Japan

tant to diversify sources of imports, but more important, it is necessary to preserve a strong bargaining position in various negotiations for volume and price. A stable domestic production scale must be maintained to ensure effective bargaining.

A third function is to maintain technical prowess. Even when undertaking development of overseas resources for import into Japan, domestic production facilities should be kept at reasonable levels and technology reproduction capacities should be expanded.

All countries are well aware of the need to support their economic security. As Table 1 shows, advanced industrialized regions such as the United States, Canada and the EC countries, maintain, within specified limits, some domestic production of basic materials essential to their industries and national welfare, in spite of any domestic lack of raw materials.

B. The Basic Materials Industries' Contributions to the Accumulation of Know-how within Japan's Industrial Structure

Japan's basic materials industries have played an important role in the accumulation of technical know-how and in increasing the added value of end products. They have made major contributions to the processing and assembly industries in Japan, as epitomized by the automobile industry. Exports of end products such as machines are composed of a mass of basic materials, the cost and quality of which have a significant impact upon the products' competitiveness. By absorbing the price increases of raw materials, the basic materials industries help to keep down increases in the price of the final products, which, in turn, promotes the salability of the products on the international market.

The basic materials industries have made other, non-price, contributions as well. First of all, they have contributed to improving the quality of products. For example, the Japanese steel industry's rolling technology has been one factor behind the competitiveness of Japanese-made automobiles.

Secondly, the basic materials industries have ensured steady product quality through stable business transactions and prompt dealing with problems and complaints. These features have been indispensable to the adoption of automation and

Table 1. Major Industrialized Regions' Percentages for Domestic Production of Main Materials (Production/Domestic consumption) (%)

	Japan	North America		EC				
		U.S.A.	Canada	United Kingdom	West Germany	France		
Steel	152	75	72	106	114	106	119	110
Aluminum ingots	42	120	105	329	72	91	70	74
Copper ingots	74	95	88	163	55	24	48	13
Tin ingots	83	101	91	207	97	111	103	104
Zinc ingots	101	96	53	371	99	n.a.	85	87
Paper	102	90	92	292	77	56	78	84
Synthetic fibers	114	109	107	178	115	89	187	81
Ethylene dioxide	92	109	108	132	103	n.a.	106	100
Polyvinyl chloride	105	103	106	61	107	88	106	109
Population (in millions)	117	252	228	24	270	56	62	54
GNP (in US\$100 billion)	1.040	2,848	2,626	222	2,637	519	824	574

(Note) Survey bases for the different products are:
 Steel: Crude steel base, 1980 (1978 for U.K. only) (EC total covers U.K., West Germany, France & Italy) Aluminum ingots: New ingot base, 1980 (FY 1980 for Japan) (EC total covers 7 countries excluding Ireland & Luxembourg)
 Copper: Electrolytic copper base, 1979 (Refined copper for France) (EC total covers U.K., West Germany, France & Belgium) Lead: Lead ingot base, 1979 (EC total covers U.K., West Germany, France, Italy & Belgium) Zinc: Zinc ingot base, 1979 (EC total covers West Germany, France, Italy & Belgium)

the maintenance of stable operations (resulting in increased productivity) by the processing and assembly industries.

A third contribution has been that deliveries of basic materials are made in required volumes and at a required time. This has made it possible for the processing and assembly industries dependent on such basic materials to save on storage costs and add to their competitiveness.

Moreover, basic materials industries are expected to make major contributions to future technical innovations. Existing technology relating to fine ceramics, organic high polymer chemistry, metallurgy and crystallization will play the central roles in such new areas as materials engineering and biotechnology. Innovations are anticipated also in other fields linking the basic materials industries to the processing and assembly industries: these include element technology, optic technology, nuclear power and space and aeronautics technology.

For a Balanced Industrial Structure

Let us now examine the future prospects of Japan's industrial structure. In doing so we must take into consideration the analysis made thus far and the direction which Japan's medium- and long-term economic management should take.

(1) The Direction of Medium- and Long-term Economic Management

As already noted, as far as macroeconomics are concerned, the Japanese economy has put up a good performance and successfully overcome two oil crises. It will be necessary, however, to maintain this good performance well into the eighties if the various problems confronting Japan are to be solved and if national welfare is to be secured and improved. It seems that this is possible.