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I. Introduction

The Japanese economy grew very rapidly after the Meiji Restoration (1868). Just one of several underdeveloped countries in the Far East a century ago, Japan has become the second most industrialized nation in the Free World. Many people call this growth a miracle, search for the main driving forces, and try to apply the lessons to the developing countries. As an attempt to diffuse Japan's unique experience, it is a worthwhile and fascinating exercise. But if the inquiry focuses only on Japan's growth and ignores the broader context of relations with other Western and Asian nations, it will result in an unrealistic model. The methodology of comparative economics is only meaningful when based on a structural analysis of world markets.

This essay attempts to describe the international factors in Japan's economic development. A mutual interaction will be described: how the century-long, tumultuous development of Japanese capitalism was influenced by world market conditions and the impact of that growth on world market composition. Two well-known theories on Japanese trade are available. Both were proposed in the 1930s on the basis of Japan's experience with economic development during the 70 years after the Meiji Restoration: the "three-linkage" model and the "flying-geese" model. These conceptual frameworks shaped the main schools of thought on Japan's foreign trade.

Nawa's three-linkage model divides Japan's trade in the 1930s into three segments by combining trading partners and commodities. Nawa argued that the more Imperial Japan intruded onto the Chinese continent (link 3), the greater its dependence on the British Empire (link 2) and the United States (link 1). He described in detail this inherent dilemma in building the Japanese empire.¹

By contrast, according to the flying-geese model of Akamatsu, which is similar to the product life cycle model, Japan's modernized sector grew through three continuous cycles of imports, production and exports. Demand was first stimulated by imported commodities; then production began in Japan and import substitution progressed; finally, exports were expanded. Akamatsu sought the key to Japan's economic development in the import substitution process.²

Both hypotheses illustrate different aspects of the growth of Japanese capitalism and are outstanding contributions to a theory of Japan's foreign trade. But, when we note the merits and demerits of Japanese capitalism, they have certain limitations. Should economists, with the Western model in mind, stress how Japan deviates

from it? Or, on the contrary, should Japan be seen only as an example of growth in an underdeveloped country, neglecting history of a Greater East Asia Co-prosperity Sphere? The synthesis of these antithetical viewpoints is an important task for economists today. Our approach is to describe the international background of Japanese economic growth as a “backward-country type” development.

Although both hypotheses are patterned on the same trade theory—the law of comparative costs—they do not use it to full advantage. Neither hypothesis sheds much light on international factors in Japan’s economic development from the perspective of structural changes in the world market.³ By applying the law of comparative costs originated by David Ricardo, I shall show the relationship between structural changes in the world market and Japan’s economic growth. I shall attempt to treat the Nawa-Akamatsu debate in the larger context of shifts in the comparative cost structure in the world economy and sketch a tentative picture of the significance of foreign trade to Japanese capitalism over the last century.

II. The Law of Comparative Costs and Japan’s Economic Growth

To show the international factors in Japan’s economic development, let us first review the law of comparative costs.

In the two-country, two-commodity model the value of a commodity unit is measured by the amount of labor needed to produce it. (In Table 1, A and B are countries, and X and Y are commodities, and the amount of labor per unit of each commodity is in parentheses. The arrows shows the direction of trade between A and B.) A monetary value—gold—(G) is introduced and each commodity is assigned a price expressed in an amount of gold. (In Table 1, the number of grams of gold per unit of commodities, X and Y are written outside the parentheses.) This was done to show more concretely the two-country, two-commodity competitive relationship.

One problem is how to set the value of gold. Following the formulation of Kinoshita, I adopted the average of the value (labor content) of the two commodities of each country as the value of gold in each country.⁴ Ricardo did not explicitly show a monetary value, but according to Ricardo’s quantity theory of money, it can be assumed that through the movement of gold between the two countries, the ratio of the values of gold between two countries always tends to converge to the ratio of the national average labor productivity between two countries.

For example, Case 1 is Ricardo’s model case. In Case 2, we assume that country B’s labor productivity for commodity Y increases and the quantity of labor required to produce one unit of Y declines from 120 to 100. The gold value does not change yet; only the market value of commodity B dropped from $1\frac{1}{11}$ grams to $\frac{10}{11}$ gram. The result is that not only country B’s commodity X but also commodity Y are cheaper than in country A and can be exported. This time, the expected international division of labor under Ricardo’s law of comparative costs does not occur.

However, through the adjustment mechanism of specie flows, international specialization again appears. To correct the imbalance in trade accounts, gold moves from country A to country B. As a result, as shown in Case 3, the value of gold of country A and country B change from $\frac{85}{110}$ to $\frac{88}{103.5}$ and move closer to the two countries’ new national average labor productivity level. This fluctuation changes the market value of all commodities in each country; again, Ricardo’s law

Table 1

(1) Structure of comparative costs in Ricardo's model

	A		B	
Y	(80)	$\frac{16}{17}$ g	→	$1\frac{1}{11}$ g (120)
X	(90)	$1\frac{1}{17}$ g	←	$\frac{10}{11}$ g (100)
G	(85)	1 g		1 g (110)

(2) Disequilibrium caused by the increase in labor productivity of commodity Y in country B

	A		B	
Y	(80)	$\frac{16}{17}$ g	←	$\frac{10}{11}$ g (100)
X	(90)	$1\frac{1}{17}$ g	←	$\frac{10}{11}$ g (100)
G	(85)	1 g	→	1 g (110)

(4) Introduction of new commodity Z in 2-country, 3-commodity model

	A		B	
Z	(70)	$\frac{7}{8}$ g	→	$1\frac{3}{7}$ g (200)
Y	(80)	1 g	←	$\frac{6}{7}$ g (120)
X	(90)	$1\frac{1}{8}$ g	←	$\frac{5}{7}$ g (100)
G	(80)	1 g		1 g (140)

(3) After adjustment by the change of the value of gold (G)

	A		B	
Y	(80)	$\frac{10}{11}$ g	→	$\frac{85}{88}$ g (100)
X	(90)	$1\frac{1}{11}$ g	←	$\frac{85}{88}$ g (100)
G	(88)	1 g		1 g (103.5)

(5) Increase in productivity for new commodity Z

	A		B	
Z	(40)	$\frac{4}{7}$ g	→	$1\frac{3}{7}$ g (200)
Y	(80)	$1\frac{1}{7}$ g	←	$\frac{6}{7}$ g (120)
X	(90)	$1\frac{2}{7}$ g	←	$\frac{5}{7}$ g (100)
G	(70)	1 g		1 g (140)

of comparative costs is applicable.

Under these conditions, in country A commodity Y and in country B commodity X will always have a comparative advantage and be exported. Because of this effect, Ricardo advocated an international division of labor through free trade. However, when examining Ricardo's call for free trade is seen in the context of England's capital accumulation in the early 19th century, his law of comparative costs reflects an international division of labor between agriculture and industry centered on the English textile industry.

At that time, compared to labor-intensive agricultural products, the difference in labor productivities for capital-intensive manufactured products would vary widely between two countries. If that is the case, country A corresponds to England, its export products Y and cotton thread and cotton cloth, and imports X are wheat and raw cotton. Country B, with disadvantageous national industrial productivity is becoming a food and resource base for English capitalism.

The significance of Ricardo's law of comparative costs for England's economy lay in importing cheap grains, reducing wages and strengthening capital accumulation.⁵ As accumulation proceeds, more marginal land is brought into cultivation and grain prices rise. But the additional surplus only reverts to landownership as differential rent. Thus, importing grain frees a country from the pressure of land ownership—the increase of differential rent. On the contrary, in the countries exporting primary products, entrepreneurship is weakened and landownership strengthened.⁶ The capital-versus-landowning nexus impacts not only grains but also minerals. The effect is felt not through wage costs but through raw material costs.

The conclusion to be drawn from Ricardo's law of comparative costs was that countries with disadvantageous national industrial productivity would become suppliers of food and resources in the process of capital accumulation by the advanced industrial countries. If Ricardo's theory explains the economic factors in underdeveloped countries specializing in the export of primary products, the industrialization of Japan must be regarded as an exception.

One theme of this essay is whether Japan's post-Meiji Restoration economic development accords with international trade theory. The question can only be answered by applying Ricardo's law. Ricardo created the simplest theoretical model—two countries and two commodities—but to make the model reflect dynamic reality, it must be expanded. I have increased the number of commodities by one to a total of three to give us one more handle on reality.

Bearing in mind the development of heavy and chemical industry from the late 19th to the early 20th century, let us hypothesize that a new commodity resulting from technological innovation—Z—has appeared in the world market as a basic trade commodity. The ratio of the productivity levels for this high-technology product (for example, steel) between a developed and underdeveloped country is 1:2.8, far greater than those for the previous basic trade commodities of X and Y. Case 1 and 4, and also Case 5, in table 1 show the enormous change in the structure of comparative advantage due to the introduction of new commodity and technological innovation. In country A, as soon as the new commodity Z gains comparative advantage and becomes the main export, commodity Y (for example, cotton goods) which had comparative advantage loses that edge and becomes an import product. If the productivity in high-technology sector Z in the advanced country rises more and the differential with underdeveloped country widens, this reversal is still greater (Case 5).

To less-developed country B, the advent of Z strengthens its comparative advantage in X (for example, wheat), the product for which the productivity differential with the developed country was the smallest. Now Y (cotton goods), which had been at a comparative disadvantage became fully competitive with those made in the developed countries. At this point two possibilities await underdeveloped country B: to be dragged further and further into the quagmire of exporting primary prod-

ucts, or the take-off toward industrialization. The latter enables an underdeveloped country to escape the fate of monoculture and industrialize.

The faster the pace of technological innovation, the more remarkable the structural shifts in comparative advantage in the world market and the greater the possibility of industrialization for underdeveloped countries. Although this factor applies similarly to all underdeveloped countries, very few have been able to take advantage of it and start to industrialize. The few exceptions are Japan in the 19th century, and the newly industrializing countries (NICs) today.

How did Japan use the opportunity afforded by a change in the structure of comparative advantage in the world market as a springboard for development? I have divided the process into four stages. My approach is to reexamine the relationship between Japan's economic development and foreign trade in the context of the dynamic changes in the structure of comparative costs throughout the world, i.e., the advanced industrial countries of the West, Japan, and the underdeveloped countries of Asia.

Furthermore, to be more concrete I assume that two additional factors were operative. First, I have situated Japan's trade in the shifting international division of labor, particularly in the evolution of the multilateral clearing system centered in London, after the Great Depression of the late 19th century.⁶ I shall describe the position of the Asian market and the significance of Japan's economic development from the formation of the multilateral clearing system to its collapse.

Second, to describe fluctuations in comparative production costs requires examination of changes in the productivities and wages in each sector in each country. The driving impetus for the reorganization of the clearing system was provided by the uneven development of various sectors in each country. It was greatly influenced by changes in the productivity and wage structure in the world market with emphasis on three factors—capital, labor, and landownership—in capital accumulation.

III. Primitive Accumulation: Primary Products Become an Export Industry

Evolution of the Multilateral Clearing System and Monoculture

The expansive surge of the world market reached Japan during the Great Depression at the end of the 19th century. This period when a global capitalist "world" was established, was a time of structural reorganization. A new international division of labor emerged due to the growth of heavy and chemical industry in Europe and the United States and a multilateral clearing structure, with London as the hub, gradually took shape.

The shift from the stage where the cotton textile industry was dominant to the new stage where the heavy and chemical industries had become the basic industries caused changes in the world market's system of productivities and wages, and in comparative production costs. In the underdeveloped countries with disadvantageous national industrial productivity, the agriculture and mining sectors increasingly had a comparative advantage. The late 19th century agricultural crisis was one aspect of these structural changes.

The new system of international specialization gradually was put into place. The pressure of landowning, which appeared as the increase of differential rent and the

rise of wages in the advanced countries was passed on to the underdeveloped countries. The underdeveloped countries were integrated into the world-wide accumulation created by capital in the developed countries, which were beset by high wages, and the underdeveloped countries began the transformation to monoculture.

Under the international gold standard with the pound as the key currency, there was a stratified international division of labor and latecomer-Asia was still in a "silver area." The world now had a dual structure.

Primary Products as an Export Industry

The trade channels of Japanese capitalism in its formative stage reflected the contemporary structure of comparative advantage: Japan imported cotton goods and exported primary products. The early Meiji period (1868–1912), exports were becoming specialized in agricultural and mineral products: raw silk, more than 30% of the total; tea, 10-20%, and rice, copper, coal, etc. What factors were responsible for primary-products export in Japan? They can be classified into three types.

1. Indigenous innovation. The main driving force that enabled the indigenous silk-reeling industry, the locomotive pulling primary product exports, to compete against the advanced silk-reeling firms of France, Italy, etc., and to specialize as an export industry was innovativeness in adapting machine-reeling, which far outdistanced the productivity of hand reeling.

Making maximum use of the new technical principles, Japanese made a wooden version of the imported heavy steel equipment, which at that time could not be produced or repaired in Japan.⁸ By this innovation, Japan's silk-reeling industry established a localized, indigenous production network that used the domestic sericulture industry and a labor force of rural female workers. In 1881, 60 to 80 percent of industry output was exported, an epochal breakthrough. The Japanese silk-reeling industry became part of the worldwide accumulation structure as an export industry selling a primary product to advanced nations like the United States and France.

2. Indigenous traditional. Exports of tea, the next largest item after raw silk thread, greatly expanded in the early Meiji period, with most sales to the U.S. market. In 1874, Japan's tea exports surpassed China's, but they levelled off thereafter. Although the silk industry was specialized into silk-reeling and sericulture, the tea industry was not adequately differentiated. Until the 20th century no machines invented in Japan were used; entrepreneurs could only mass produce a poor quality product.⁹

3. Western transfer. The development of the mining industry, coal and copper for example, into an export industry dates from the 1880s when the Meiji government, which had earlier nationalized major mines and adapted advanced Western technology, sold them off cheaply to favored businessmen. Modern large-scale exploitation began with *zaibatsu* capital. Thirty percent of coal output and 90 percent of copper production were exported; the former went to China and India and the latter to China, England and elsewhere. This was a type of primary-product exports typical of an underdeveloped country by a transferred industry using Western technology.

Primary-Product Exports and Capital Accumulation

During the period of primitive capital accumulation, the agricultural and mining sectors—producing raw silk thread, tea, rice, copper, coal, etc. were reorganized as export industries. Japan however, did not continue down the path to monoculture. The decisive factor is whether the trade profits from primary exports are channelled into capital accumulation or dissipated. The first crucial problem in development is if a country can retain trade profits. When the production or distribution is controlled by foreign capital, most of the profits escape overseas, and the underdeveloped country slides toward monoculture. Japan was able to control both processes.

As illustrated by the nationalization of the Takashima Coal Mine, which had been purchased by Thomas B. Glover, neither the agricultural nor mining sectors were controlled by foreign capital. After Japan was opened to the West in the 1850s, foreign merchants initially dominated the distribution process for some products. But the movement of recover commercial rights—notably in raw silk thread—by domestic businesses,¹⁰ and the establishment in early Meiji of large trading firms and shipping companies like Mitsui and Mitsubishi enabled Japan to retain profits.

A second problem is whether or not trade profits go to capital accumulation. If they revert to landownership as rent and are channelled into unproductive investments or consumption, capital accumulation is thwarted.¹¹ With indigenous traditional types like tea and rice, where there was little specialization of production, most of the trade profits finally ended up with landowners. By contrast, in the indigenous innovative industry of raw silk thread, the profits went to silk-reeling capital, and only a small share circulated to landownership. The portion that escaped to landowners was consumed in land expansion. In the late Meiji period, with the increase in parasitic landlords, this surplus was concentrated in capital accumulation through the financial market.

In the transferred industries like coal and copper mining, ownership of mineral rights was separated from landownership by the 1883 mining law. The 1899 Mining Industry Law made, for practical purposes, mining rights equal to the rights of landownership. These changes gave mining firms both the profit on the operation and the enormous differential rent that would otherwise have gone to landownership. Because the law of proprietary rights favored mining firms, profits from mineral exports were not siphoned off by landownership. Profits were concentrated in the *zaibatsu* firms where they could be invested for industrial diversification.

Exports of primary agricultural and mining products contributed to the primitive accumulation of Japanese capitalism. This is probably one of the rare instances where such profits were not invested in unproductive consumption like landownership, etc., and went into capital accumulation. Exports of primary products, led by raw silk, were not offset by the imported luxury goods and became industries that earned foreign exchange. Thus they accelerated the growth of a cotton-spinning industry that relied on imported raw cotton and spinning machinery. While Japan's economy was integrated into the worldwide accumulation system that favored capitalism in the advanced countries, this primary exports' accumulation mechanism partially explains how Japan avoided monoculture and achieved rapid growth.

IV. The Industrial Revolution: Import Substitution by the Cotton Spinning Industry

The Multilateral Clearing System and the Asian Cotton-Spinning Industry

The growth of heavy and chemical industry in Europe and the United States during the Great Depression of the late 19th century changed the structure of comparative costs in the world market. Primary products of underdeveloped countries with disadvantageous national industrial productivity had an even better comparative advantage; the transformation to monoculture was more difficult to avoid. At the same time, the cotton-spinning industry, which had a comparative disadvantage, gradually shifted to a comparative advantageous position, and a limited degree of import substitution became possible for national spinning industry.

The world-leading British cotton-spinning industry was beset by wage rises that accompanied the growth of the heavy and chemical industry. It was also badly hurt by the growth of Asian cotton-spinning industries that combined imported advanced technology and low wages. The spread of Indian low-count thick cotton yarn throughout the Asian market in the 1890s and the sudden emergence of Japan's cotton-spinning industry disrupted the international division of labor in agriculture and industry between England and Asia, Africa and Latin America.

The spreading of the gold standard in Europe caused severe fluctuations in the Asian silver zone, which aided the rapid growth of Asian cotton-spinning industries. It caused deep cracks in the multilateral clearing system that functioned on the structure of international specialization between agriculture and industry organized around the capital of the Western powers.

Import Substitution in the Cotton-Spinning Industry

While many underdeveloped countries shifted to monoculture during the dynamic shake-up in comparative advantage that accompanied the growth of heavy and chemical industry in the West, a few met the challenge of import substitution in the cotton-spinning industry. Japan is one successful example.

Japan's trade structure changed greatly in the 20 years after the Meiji Restoration. The main imports, cotton thread and cotton cloth were replaced by raw cotton. This alteration showed the progress of import substitution in cotton goods. Production of cotton thread and cotton cloth surpassed imports of each in 1891 and 1894, respectively. Exports of cotton thread and cotton cloth exceeded imports of each in 1897 and 1901, respectively. Import substitution was achieved with astonishing speed.

The cotton cloth from England and India that poured into Japan until 1885 shattered the indigenous cotton industry, especially the hand spinning. Faced with disaster, the cotton fabric industry replaced indigenous hand-spun thread with cheap imported cotton thread, and managed to survive. When hand spinning collapsed, the government introduced Western technology, established many 2,000-spindle textile factories and trained people to operate them. The mills were small and medium-sized, were run by water power, used indigenous raw cotton and produced for domestic regional markets. The effort failed because of unfamiliarity with the new technology, labor shortages and the failure to link the three crucial elements—motive power, raw materials and markets.

Learning from that experience, urban merchants and nobles (*kazoku*) established large-scale spinning factories, with 10,000 spindles in each, that could produce for the national market. The mills initially used mule spindles and later ring spindles, the finest equipment then available. This 10,000-spindle mills gradually became competitive with imported cotton thread in quality and price. Success was achieved by determined efforts to master the new technology, the use of steam power, replacement of domestic raw cotton with first Chinese and later Indian and U.S. cotton, employment of the urban poor, and 24-hour operation of the mills.¹² Unlike the indigenous innovation in the silk-reeling industry, cotton-spinning's import substitution required adoption of technical production factors far superior to local standards.

Asian Cotton-Spinning Industries and the Depreciation of Silver

Import substitution by the 10,000-spindle mills was achieved by driving out Indian cotton thread, which had supplanted English cotton thread in the 1880s. Japanese cotton mills with European advanced technology, combined with low wages, rapidly excluded the English cotton industry from the Asian market, and the British switched to high-count fine cotton yarn. The Asian market for low and medium-count cotton yarn became the battleground for Asian cotton industries.

The struggle occurred amidst the transfer of Western advanced technology and an enormous enlargement of the scale of firms. Import substitution and capturing the domestic market were only the preliminary skirmishes. The contest now was for the whole Asian market.¹³ Only the victor would retain independent national cotton-industry. The losers were destined for colonial monoculture.

The outcome hinged on fierce competition over price and quality based on technology and wage levels. Another important factor was the gold standard's repercussions in the Asian silver zone.

As the gold standard spread during the Great Depression, the price of silver continued to fall due to excess supply. One result was that the cotton industries in the silver-zone underdeveloped countries had a considerable competitive advantage over those in the advanced Western nations that had adapted the gold standard. Indian cotton thread, which had been supplanted in the Indian market by English cotton thread, now rapidly penetrated the Asian coarse thread market, then still controlled by the British. The Indian cotton industry took full advantage of the fall in silver prices. Badly hurt by the new competition, British cotton industry counterattacked. In 1893, the rupee was pegged to the pound at a comparatively high rate, and India became a subordinate element in the gold standard system.¹⁴

As India went under the colonial gold exchange standard, Japan, which like China was still under the silver standard, took advantage of the depreciated silver prices to drive Indian cotton thread out of the Japanese and Chinese markets. Japanese cotton industry, which had pushed import substitution and achieved price and quality superiority over Indian cotton thread, soon found that the low price of silver, once so advantageous, now fettered development. As long as Japan was under the silver standard, problems arose in settling accounts for imported Indian cotton and cotton thread exported to China. Another reason was the need for capital imports from Europe. Using the indemnity from the Sino-Japanese War (1894-95), Japan shifted to the gold standard in 1897.

With India and Japan integrated into the gold standard system, the profits from depreciated silver prices all fell to China, the last country using silver currency. External conditions were now conducive to the rapid expansion of Chinese national cotton industry during World War I.

From this brutal struggle among the cotton industries of England, India, Japan and China in Asia, the Japanese cotton industry achieved international superiority. Victory was due to the technically advanced ring spindles, 24-hour work shifts and the switch to high-count yarn by the use of Indian cotton, later combined with U.S. cotton. Japan now moved from import substitution to market penetration of Korea, Taiwan and China. Japan's two-tier trade pattern—with advanced and underdeveloped countries—stemmed from comparative advantage. Japan sold raw silk and tea to the West and purchased raw cotton and machinery for the new industries. Japan's imports from China and the colonies in Asia included raw cotton and sugar, raw materials for the new industries, and Japan's exports to them included cotton thread, cotton cloth and coal.

V. The Interwar Period: Import Substitution by Heavy and Chemical Industry and the Collapse of the Multilateral Clearing System

Once established, the international division of labor between agriculture and industry and the multilateral clearing system, both controlled by the imperialist powers, withstood internal destabilization. It took worldwide external forces like World War I to break up these arrangements. The imperialist nations' control of monocultural economies began to crack as a result of World War I, a struggle among the Western powers for imperial hegemony.

The redirection of Western economies to armaments and war-related production caused worldwide shortages of consumer goods, and stimulated unprecedented import substitution in many non-European countries and a huge surge in their exports. During this boom period, new industries like automobiles took root in the United States. Japan began import substitution in heavy and chemical industry and emerged as a new imperial power. Underdeveloped nations in Asia and Latin America like India, China and Mexico almost simultaneously accomplished import substitution in the cotton-spinning industry, which had steadily become more feasible from the end of the 19th century. The rapid rise of indigenous enterprises had begun.

Because of the severely uneven development of various industrial sectors in each country due to World War I, the world market became a dynamic, complex arena; stable international specialization could not be reconstituted. The restoration of the gold standard by the two imperialist powers, Great Britain and the United States, proved illusory, and in the 1930s the world market was divided into trading blocs.

It was a period of enormous vitality and economic growth in Asia. Japan created heavy and chemical industries, while China and India's cotton-spinning industry grew remarkably. Japan suspended the gold standard, and China and India showed signs of adopting it, developments subversive of a stable international division of labor. Ominous tremors spread from the East, and Asia shook the world.

Import Substitution by Heavy and Chemical Industry

Throughout the interwar period Japanese economy steadily built the capital goods industry. The establishment of capital-intensive heavy and chemical industries, given the enormous technological gap between Japan and the West, was extremely difficult, but it was gradually accomplished with the stimuli of World War I and growth of economic blocs in the 1930s.

To Japanese capitalism, which relied on imported capital goods, the rupture of trade with the West at the outset of World War I was a mortal crisis. Goaded by necessity, heavy and chemical industry established a foothold in Japan. Two streams of development coalesced. One, in venturesome heavy industry that became increasingly complex—from trade to shipping and then into shipbuilding and steelmaking—was led by the new wartime *zaibatsu* like Suzuki, Matsukata, etc. The other was the rapid growth of the electrical machinery and chemical industries due to the swift expansion of the power industry as factories were electrified.

The countless quick fortunes—the top were the nouveau riche *zaibatsu*—made on speculation and sustained by inflation, were checked by postwar deflation. A reorganization occurred that favored technical efficiency through Western capital and technology during the long depression. From the technical foundation laid in the 1920s, the heavy and chemical industry expanded enormously in the 1930s, aided by the undervaluation of the yen and the protective barriers around Japan's trade bloc, and a wartime economy. The technically efficient new *zaibatsu* included Nichitsu, Mori, Riken and Nissan. The old *zaibatsu*, including Mitsui, Mitsubishi and Sumitomo, also gradually moved into heavy and chemical industry.

The vast technological gap with the West made the expansion of Japan's heavy and chemical industry difficult, gradual and uneven. Sustained by military orders, the labor-intensive shipbuilding industry had already achieved world-level technology soon after the Russo-Japanese War (1904-05); during World War I ship sales surpassed copper exports and became one of Japan's five major export products.

Self-sufficiency in steel was the next task. Domestic production passed 70 percent of demand in the 1920s by the use of open-hearth furnaces, which required relatively less capital investment. But progress toward self-sufficiency in pig iron was very slow, because it was made in technologically advanced, capital-intensive blast furnaces. This imbalance between pig iron and steel production was never resolved until after World War II. The growth of heavy and chemical industry allowed gradual import substitution in sectors where the technological gap was narrow and degree of capital investment low; capital-intensive commodities were still imported from the West.

Although Japan's heavy and chemical industry and the cotton-spinning industry have their roots in import substitution, the processes were quite dissimilar. The cotton-spinning industry was established to replace British and Indian cotton yarn and cloth, which dominated Asia. Exports to Asia rose simultaneously with import substitution, and the huge trade profits went into expanding the scale of the firms or new investments in the integrated spinning and weaving mills. Import substitution was completed in an amazingly short time.

In Asia, no other countries had blazed a path for Japan's heavy and chemical industry. There were no mature or budding markets to be plucked by virtue of comparative advantage. Except for import substitution in the domestic market, these

businesses found no demand for their products. They had to both invest in heavy and chemical industry in Manchuria and create demand for the output. Thus, import substitution in capital-intensive commodities that could compete with West was very slow.¹⁵

Japanese Cotton Textile Capital Exports to China and the Agricultural Crisis

Japanese capitalism's basic strategy during the interwar period was autarky by formation of an international division of labor in Asia around Japanese cotton textiles, and heavy and chemical industry. Investment in agriculture and mining, mainly in the colonies of Chōsen (formerly Korea) and Taiwan, and China, would provide stable sources of natural resources and food and create export markets for Japan's cotton, heavy and chemical industries.

Such a realignment of international specialization in Asia, spurred on by the transformation of Japan's labor market and wage structure due to the growth of the new industrial sectors after World War I, gradually evolved. The salient events of the 1920s—the establishment of a Japanese textile industry in China and the agricultural crisis—were related to the new condition of production.

Skilled male workers in the expanded heavy and chemical industries formed the core of the labor market in place of females who worked only to supplement family income. Capital subsumed agriculture into its accumulation structure as a source of labor to back up the urban workforce. Landlords became more parasitic, exacerbating the uneven development of agriculture compared to industry, and Japan faced a food shortage. After the 1918 rice riots, capital was invested in Chōsen and Taiwan to make them granaries for the empire, and the production of cheap rice in the colonies increased. Rice grown in Japan proper was relatively expensive, partially because of higher real wages as inflation was curbed in the 1920s. Massive quantities of colonial rice flowed into Japan and triggered an agricultural crisis. An imperial food zone to support was created out of this drastic cycle of shortage and excess supply.

The wage rises that accompanied the growth of heavy and chemical industry spread not only to agriculture but also to the cotton-spinning industry and forced changes in international specialization. On the one hand, Japan's cotton textile industry, which had comparatively higher wages than China's, even allowing for differences in productivity, was now priced out of the Chinese market. On the other hand, as prices fell in the 1920s, profits were eroded by relatively high wage costs. In addition, the Chinese raised tariff rates and attempted to boycott Japanese goods.

To meet the crisis, Japan shifted from exports of cotton thread to cotton cloth and tried to capture the cotton thread market by direct investment in low-wage China. Chinese national cotton industry firms, which had developed as an indirect effect of the growth of heavy and chemical industry in Japan, were now overwhelmed by the direct investments by Japanese cotton firms, or the Japanese cotton industry in China. Therefore, China's economy was in danger of lapsing into the export of primary products from the agricultural and mining sectors.

Four-Linkage Trade and the Yen Bloc

Comparative advantage in Asia was changing with the growth of Japan's heavy and chemical industry. The Japanese Empire integrated Chōsen and Taiwan into an

imperial food zone; after crushing China's cotton industry, Japanese imperialism tried to turn the Middle Kingdom into a resource base and market for its cotton, heavy and chemical industries. From this process of reorganization emerged Japanese capitalism's international division of labor in the world market where the multilateral clearing system no longer functioned. Trade under bloc economies combined three elements: trading partners, commodities and settlement currencies.

The pre-World War I two-tier—with Europe/United States and with Asia—trade pattern centered on the cotton-spinning industry separated into four segments. Segment I trade with the dollar zone, involved the export of raw silk and the import of raw cotton and machinery. Segment II was trade with the pound zone (India, Southeast Asia, Australia): exports of cotton goods and imports of raw cotton, wool and raw materials for heavy and chemical industry. Segment III was transactions with the semi-colonial silver zone (China): the sales of metals, machinery and cotton fabric and the purchase of minerals, agricultural commodities. Segment IV was the colonial yen zone (Chōsen, Taiwan, South Manchuria): exports of metals, machinery, cotton goods and silk goods and imports of rice, sugar and fertilizer. The first tier of Japan's trade was separated into segments I and II, and the second tier into III and IV.

After the late 19th century Great Depression, the center of gravity of Japan's foreign trade changed from I to II, and then from II to III, and finally to IV. The export of raw silk to the dollar zone fell sharply because the 1929 crisis decreased the demand of silk and rayon became a substitute for the silk in the United States. Foreign exchange earned by the silk industry had been used to purchase raw cotton and raw materials for heavy and chemical industry which were indispensable for Japanese economy. Exports of cotton goods to the pound zone, in a bid to make up for sales lost in the dollar zone, were curtailed because of opposition by the English and Indian cotton industries.

The attempt to construct a new international division of labor in Asia centered on Japan's heavy and chemical industries was soon frustrated. On the one hand, because Japanese cotton textile companies in China crushed the Chinese national textile industry and forestalled the formation of a market for heavy and chemical industry products in China, Japanese heavy and chemical industry entrepreneurs had to export their own capital and create a demand. On the other hand, although direct investments by Japanese heavy and chemical industry were attempted, the collapse of the revived gold standard made it increasingly difficult to borrow in the European and U.S. capital markets. Entrepreneurs soon reached a dead end: poor, underdeveloped China could buy little.

Japan's organization of the international division of labor was only possible by taking advantage of changes in comparative advantage in the world market. In the 1930s, when the international specialization of labor was undergoing a new, rapid transformation, the gears of Japanese capitalism began to slip and everything went wrong. Beset by economic crisis, Japan used military force to bring Manchuria, China (III) and Southeast Asia (II) into the yen zone, which was free from settlement problems. Bewitched by the lure of a Greater East Asia Co-prosperity Sphere that would use state power to create an international division of labor around Japan's heavy and chemical industry, Imperial Japan plunged into World War II.

VI. Conclusion: Postwar Heavy and Chemical Industry

Post-World War II international specialization of labor, which hinged on Japan's heavy and chemical industry, the sectors so frustrated during the interwar period, was achieved by switching from less-developed China to partnership with the developed West. In the earlier pattern, Japan, as a developed country, hoped to export heavy and chemical industry products, which enjoyed comparative advantage in Asia, and import raw materials. But there was no demand yet in China or other underdeveloped countries for such products; Japan had to create the markets by capital exports. No longer a follower nation playing catch-up in markets developed by others, Japan became a pioneer on uncertain ground.

the same process was repeated in the postwar recovery until 1960. While moving ahead with import substitution in the heavy and chemical industries, Japan's exports of such products to Southeast Asia were financed by the reparations payment and yen loans. The large technological lead the United States acquired over Japan during World War II could not be reduced by this singlehanded, gradual expansion.

To fill the technological gap rapidly Japan switched to the "backward-country type" development strategy. It is a strategy of industrialization whereby a less-developed country catches up with the most industrialized countries through taking advantage of changes of in comparative costs caused by the increase of productive forces in the advanced nations. As the base productive forces in the postwar U.S. economy shifted toward new industries led by nuclear power and electronics, the heavy and chemical industry—steel, machinery, petrochemicals—lost their comparative advantage. Japan seized the opportunity, purchased the West's advanced technology, combined it with imported raw materials and cheap labor from the countryside, and exported heavy and chemical industry products to the United States, a developed country. The huge U.S. market already existed; the problem was competition in price and quality. Trade profits were invested in import substitution of capital-intensive commodities that require advanced technology, and import substitution was rapidly achieved. This was the main driving force for postwar rapid economic growth.

This development pattern of adopting technology from the advanced countries and moving into their markets while encouraging import substitution was exactly what the cotton-spinning industry did in the 19th century. It was replicated after World War II by the heavy and chemical industries, for example steel, automobiles, etc. When the wellsprings of this development strategy dry up, Japanese capitalism will have to devise, on its own, an international division of labor.

The advent of chemical fibers from the petrochemical industry derailed the cotton-spinning industry from its role as locomotive for industrialization. The condition for industrialization have become much more onerous. Now unless a country can create a capital-intensive, technologically advanced petrochemical industry, escape from monoculture is extremely difficult.

Several Asian countries like the Republic of Korea, Taiwan and Singapore, have followed the "backward-country type" development pattern, supported by multinational corporations, and gained a share of Japan's labor-intensive sectors like textiles. Japan's heavy and chemical industries have done the same to the United States. The growth of multinational corporations, which should be able to withstand

fall of a profit due to relatively high wages, in sectors where the United States still has comparative advantage—mainly capital intensive industries—or is slipping in comparative advantage, is a dynamic development. It is sustained by inflation, due to excess supply of the U.S. dollar, and the multinational corporation's control over vast natural resources, especially oil.

The future of Japanese capitalism depends on the atomic power and electronics industries, in which the United States still has a large technological lead, and whether Japan can join the multinational network in the natural resources sector, still its Achilles heel. These are the barriers Japanese capitalism, which successfully used the "backward-country type" development strategy, must overcome by its own efforts. That attempt is always the disruptive factor that undermines the structure of international comparative advantage in the world market. If it is accomplished, we shall witness extraordinary economic development throughout in the Far East.

Notes

1. Tōichi Nawa, *Nihon bōsekigyō to genmen mondai (Japan's cotton-spinning industry and raw cotton)*, 1937. Nawa conceived this model, inspired partly by Freda Utey, *Japan's Feet of Clay*, 1937.
2. Kaname Akamatsu, "Wagakuni keizai hatten no sōgō benshōhō" (A comprehensive dialectic on Japan's economic development), *Shōgyō keizai ronsō*, Vol. 15, Part 1, 1937; and "Wagakuni sangyō hatten no gankō keitai, kikaikigu ni tsuite" (The flying-geese pattern of Japanese industrial development: machinery and appliances) *Hitotsubashi ronsō*, 1956. Akamatsu named his theory from the similarity of the successive development of imports, production and exports to wild geese flying in follow-the-leader formation.
3. This criticism may also be made of Itsuhei Yamazawa, who has done extensive empirical research with Akamatsu's model. See Yamazawa, *Nihon no keizai hatten to kokusaibungyō (Japan's economic development and the international division of labor)*, 1984.
4. Etsuji Kinoshita, *Shihonshugi to gaikoku bōeki (Capitalism and foreign trade)*, 1965, chapter 4.
5. For the significance of David Ricardo's theory of capital accumulation in his work on foreign trade, see Yoshito Maeda, "Rikādo bōekiron no ichishikaku" (A perspective on Ricardo's theory of trade), *Keizaigaku zasshi*, Vol. 65, No. 5, 1971.
6. For the concept of the multilateral clearing system, see S.B. Saul, *Studies in British Overseas Trade, 1870-1914*, 1960.
7. For an analysis of Japan's overseas financial arrangements, as seen in the relationship between gold and silver, see Kazuichirō Ono, "Nihon ni okeru Mekishiko doru no ryūnyū to sono kōzai" (The impact on Japan of the influx of Mexican dollars), *Keizai ronsō*, Vol. 81, Nos. 3-6, 1958. Ono has written extensively on 19th century currency and financial issues.
8. Akira Ono, "Gijutsu shimpō to borrowed technology no ruikai—seishigyō ni kansuru jirei kenkyū" (Technological progress and types of borrowed technology: case studies in the silk-spinning industry) in Tsukui and Murakami eds., *Keizai seichō riron no tenbō (Theories of economic growth)*, 1968.
9. Kiyoshi Matsui ed., *Kindai Nihon bōeki-shi (A history of modern Japan's foreign trade)*, Vol. 1, 1959.
10. Fukuju Unno, *Meiji no bōeki (Japan's Foreign Trade in Meiji Era)*, 1967.
11. The United States also surmounted the vicious circle of an underdeveloped country. This was partly because of the special condition that landownership was absent for a long time.

12. For detailed empirical studies of Japan's cotton textile industry, see Naosuke Takamura, *Nihon bōsekigyō-shi josetsu (An introduction to the history of Japan's cotton-spinning industry)*, 2 vols., 1971.
13. Both Akamatsu and Yamazawa emphasize that imports, production and exports develop in sequence, but this formation seems too narrow. When the entire Asian market is considered, import substitution and export expansion occurred simultaneously.
14. Tadao Yanaihara, *Teikokushugika no Indo (India under imperialism)*, 1936, chapter 2.
15. There have been no convincing explanations for why, since the cotton textile industry accomplished import substitution and export expansion with extraordinary speed, heavy and chemical industry were so slow. Because Marxists also have little understanding of this issue, a rather misguided debate continues over whether the productive base of Japanese imperialism was in the textile industry or in heavy and chemical industry.