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4 Japan's Agricultural Policy and Protection Growth

Masayoshi Honma

In recent years, agriculture has attracted worldwide attention in the political arena, such as the summit meetings and the OECD's council meetings at the ministerial level. Also, agriculture is one of the most important areas of the current Uruguay Round of GATT negotiations. The main focus of agricultural issues is the high level of agricultural protection in such industrial countries as EC member states and Japan. Even the United States, which insists on drastic reductions in agricultural support, does not do its duty and liberalize trade in several agricultural commodities, in violation of the ideal of the GATT.

It is commonly observed that the agricultural sector is strongly protected in those developed economies in the advanced stage of economic development, where the urban population shows less resistance to high food prices and farmers are more powerful in lobbying for protection. As several studies show, it is true that Japan's level of agricultural protection has been one of the highest in the world in recent years (e.g., OECD 1987; Webb, Lopez, and Penn 1990). While among the developed countries Japan is not unique in protecting agriculture, it is, however, unique in the relations existing there between agricultural protection and agricultural trade and production. Even though its domestic agriculture is highly protected, Japan has increased agricultural imports sharply and become increasingly less food self-sufficient (as shown in table 4.1)—in contrast with the EC countries, which maintain high levels of food self-sufficiency under the protection of the Common Agricultural Policy. Japan is now one of the largest food importers and the country most open to agricultural trade if measured in terms of food self-sufficiency.

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Table 4.1 **Food Self-Sufficiency Rates in Japan, 1960–89 (%)**

	1960	1970	1980	1989
Grains	82	46	33	30
Food grains	89	74	69	68
Rice	102	106	100	100
Wheat	39	9	10	16
Legumes	44	13	7	9
Vegetables	100	99	97	92
Fruits	100	84	81	67
Eggs	101	97	98	98
Dairy products	89	89	82	80
Meat	91	89	81	72
Beef	96	90	72	54
Pork	96	98	87	77
Sugar	18	22	27	35
Total final food consumption	91	81	75	68

Source: Japanese Ministry of Agriculture, Forestry, and Fisheries, *Shokuryo Jukyu Hyo* (Food balance sheets).

Another feature of Japan's agricultural protection that is different from other developed countries is its rapid growth in the protection level. In other words, the strong protection accorded agriculture in Japan is a relatively recent phenomenon. As we will see in section 4.2, Japan's level of agricultural protection in 1955 was much lower than that of European countries. However, that level rose rapidly and became the highest among industrial countries by 1970.

These characteristics of Japan's agricultural policy are strongly related to the fast decline in comparative advantage in agriculture in the course of the high industrial productivity growth that followed the recovery from World War II. The decline in comparative advantage in agriculture was coupled with rapid increases in the demand for highly valued foodstuffs such as meat and milk as per capita income rose. To increase domestic production of those products, imports of feed grains and soybeans were liberalized in the 1950s and the early 1960s, respectively, and thereafter Japan's agricultural imports sharply increased.

At the same time, the decline in comparative advantage in agriculture created a demand for agricultural protection. The rapid change in comparative advantage created a serious intersectoral adjustment problem requiring reallocation of agricultural resources to industry. In order to decrease the cost of intersectoral adjustment that rural people had to shoulder in such forms as rural depopulation and rural-urban income disparity, farmers lobbied for protection in order to shift a part of the intersectoral adjustment cost to the general public.

Agricultural protectionism in a rapidly growing economy appears to have a strong logic if we examine the domestic political market in which the level of

protection is determined. Japan's protection policy for agriculture has been persistent and is not likely to cease because it has been domestically at an equilibrium in the political market. However, there is another player emerging on the political scene—the foreign pressure demanding agricultural trade liberalization in Japan in exchange for the flood of exports of manufactured goods from Japan. Japan is now facing a sharp conflict between the internal resistance to and the external pressure for agricultural trade liberalization.

This paper examines the development of Japan's agricultural policy and the process of growth of agricultural protection, focusing on the political market. In the following sections, I first review briefly the background of current food and agricultural policies in Japan. Then I examine the level of Japan's agricultural protection in an international comparison. The growth in agricultural protection is next related to political and economic factors to determine the level of protection, and the relation is tested by a regression analysis. Finally, some implications of Japan's growth of agricultural protection are drawn.

4.1 Review of Agricultural Policies in Japan

4.1.1 Two Institutional Bases

Current Japanese agricultural policies are implemented mainly through two institutions: the Food Control Law of 1942 and the Agricultural Basic Law of 1961. The Food Control Law was originally designed to control food distribution during the war, when food was in very short supply. After the war, agricultural and nonagricultural economies were reconstructed, and the food supply recovered. The Food Control Law has been adjusted to account for the increasing food supply, and few food items remain under direct government control—with the notable exception of rice.

Only agents designated by the Food Agency within the Ministry of Agriculture, Forestry, and Fisheries may participate in the marketing of rice, and prices are regulated from the farm gate to the wholesale level. In administrative practice, however, those regulations have gradually been relaxed. For example, producers now sell high-quality rice, which is an important factor in rice consumption, directly to wholesalers through cooperatives at a negotiated price, although the quantities of rice that producers can sell through this channel and through the government agency at a fixed price are limited by quotas. Officially, producers cannot sell rice through any other channels, but it is said that about two million tons, or nearly one-fifth of total output, are marketed illegally, through private channels. In addition, two auction markets were established by the government in 1990, and about 1 million tons of rice are sold at regular auctions at more flexible prices, reflecting demand and supply by variety of rice.

The Food Control Law, originally instituted to protect consumers during the war, works currently to support agricultural producers. The high support

price stimulated an expansion of domestic production in excess of consumption, resulting in an accumulation of surplus rice in government storage, which made the adoption of an acreage-control program in 1969 inevitable. The acreage-control program was strengthened under the continuous pressure of the ever-accumulating surplus stock and escalating government deficit. The acreage diverted from production is currently 830,000 hectares, almost one-third of the paddy fields in Japan.

In the course of economic development that followed Japan's postwar recovery, farmers' incomes tended to lag behind those of urban workers. In an attempt to prevent the rural-urban income gap from widening, the Agricultural Basic Law, a national charter for agriculture, was enacted in 1961. The law declared that it was the government's responsibility to raise agricultural productivity and thereby close the gap in income and welfare between farm and nonfarm people. Among the measures identified as necessary for this purpose were incentives to expand the production of the high-income-elasticity agricultural commodities and to enlarge the scale of the production unit. In order to improve farming efficiency, it was considered essential to increase the scale of farm operations by reducing the number of inefficient farm units and promoting cooperative operations among the remaining farms.

Despite such attempts at structural adjustment, the rate of agricultural productivity growth was not raised sufficiently, and the rural-urban income gap continued to widen. The reaction of farmers was to organize political lobbying for protection by means of government intervention in agricultural product and input markets. When the increasing demand of farmers for protection was coupled with the decreasing resistance of the nonfarm population as a result of the increasing per capita income and the decreasing Engel coefficient, the result was a level of agricultural protection that remains among the highest in the world.

4.1.2 Means of Agricultural Protection

Japanese agriculture is protected by such policy instruments as border protection, direct supports on farm product prices, and subsidies on agricultural production inputs. A major source of criticism of Japanese trade practices has been quantitative restrictions on imports of agricultural commodities. Until 1988, twenty-two agricultural and marine products were subject to an import quota (IQ). However, the quotas on ten types of agricultural products were removed after a GATT multinational panel declared them illegal in 1988. Further, the quotas on beef and oranges, which used to be held up as symbols of the closed nature of Japan's market, were removed in April 1991 as a result of bilateral negotiations with the United States.

Besides the IQ restrictions, the imports of six agricultural commodities are controlled by trade monopolies of governmental or semigovernmental agencies: rice, wheat, and barley by the Food Agency; butter and powdered milk

by the Livestock Industry Promotion Corporation; and silk by the Silk and Sugar Price Stabilization Corporation.

While quantitative restrictions are strong in Japan, border protection by means of tariffs and levies seems to be relatively modest (Johnson, Hemmi, and Lardinois 1985). In Japan, the variable levy of the EC type is not commonly used, but a somewhat similar system is used for pork, in the form of a differential tariff, and for sugar and silk, in the form of an adjustable surcharge.

In addition to such indirect supports as border protection, various agricultural products are subject to direct government price support. The largest price support program is applied to rice under the Food Control Law. The price of rice that the government purchases from farmers is determined at a fixed level each year on the bases of production costs, nonfarm wages, general price level, and other economic conditions. This government rice price influences the price of rice distributed through other channels. Currently, the price of rice in Japan is not only far above the world price but also above the market equilibrium price under autarky (Otsuka and Hayami 1985). Wheat and barley produced domestically are purchased by the Food Agency, if their market prices decline below floor prices.

The so-called price stabilization programs for meat, dairy products, and silk involve buffer stock operations to support domestic wholesale prices between certain ceiling and floor prices. The deficits from the programs are financed partly by levies on imports and partly by transfer from the general budget. The same applies to the government purchase at floor prices of sugar cane, sugar beets, and potatoes for starch making.

Deficiency payments from the government apply to a limited number of products such as soybeans, canola, and milk for processing. A variation of the deficiency payment scheme used in Japan is the Price Stabilization Fund, to which the government and producers pay contributions and from which producers receive deficiency payments if market prices decline below target prices. This scheme is applied to calves, fruit for processing, and some vegetables.

Production subsidy is also a major policy instrument for agricultural protection. Japanese agricultural policy depends heavily on subsidies, which are spread across a large number of items, each receiving a relatively small disbursement. In Japan, subsidies have substantially contributed to agricultural capital formation, especially to investment in land infrastructure. It may appear that subsidies allocated to land infrastructure for such public-good projects as irrigation and drainage facilities are not protectionist in nature. However, only about 20 percent of land infrastructure investment is allocated to major canals and water-control facilities, the rest going to farm ditches and farm consolidation and reshaping, for which individual beneficiaries can be easily specified.

4.2 Growth in Agricultural Protection

4.2.1 Japan's Level of Agricultural Protection

Japan's agricultural policy is now aimed mainly at protecting domestic agriculture. However, such a high level of agricultural protection is a relatively recent phenomenon. This can be clearly demonstrated by an international comparison over time. The measure used for comparison is the average nominal rate of protection (NRP), calculated by subtracting the value of agricultural output in border prices from the value of agricultural output in domestic prices and dividing the remainder by the value of agricultural output in border prices; this is equivalent to the weighted average of the NRPs of individual commodities using their shares in the total output value at border prices as weights.

Table 4.2 summarizes the average NRPs estimated for fourteen industrial and newly industrializing countries by comparing producer and border (im-

Table 4.2 **Comparison of the Nominal Rates of Agricultural Protection between East Asian Countries and Eleven Other Developed Countries, 1955–87 (%)[a]**

	1955	1960	1965	1970	1975	1980	1985	1987
East Asia:								
Japan	18	41	69	74	76	85	108	151
Korea	−46	−15	−4	29	30	117	147	160
Taiwan	−17	−3	−1	2	20	52	28	74
European Community:								
Denmark	5	3	5	17	19	25	34	69
France	33	26	30	47	29	30	37	81
German, F.R.	35	48	55	50	39	44	40	79
Italy	47	50	66	69	38	57	72	127
Netherlands	14	21	35	41	32	27	38	57
United Kingdom	40	37	20	27	6	35	39	79
Average[b]	35	37	45	52	29	38	43	84
Nonaligned Europe:								
Sweden	34	44	50	65	43	59	65	131
Switzerland	60	64	73	96	96	126	181	218
Food exporters:								
Australia	5	7	5	7	−5	−2	−7	5
Canada	0	4	2	−5	−4	2	0	19
United States	2	1	9	11	4	0	11	23

Sources: Data for 1955–80 are from Anderson and Hayami (1986, 26). Data for 1985 and 1987 are estimates by the author.

[a]Defined as the percentage by which the producer price exceeds the border price. The estimates shown are the weighted averages for twelve commodities, using production valued at border prices as weights. The twelve commodities are rice, wheat, barley, corn, oats, rye, beef, pork, chicken, eggs, milk, and sugar.

[b]Weighted average for all six countries shown for 1975, 1980, 1985, and 1987 but excluding Denmark and the United Kingdom for earlier years.

port c.i.f. or export f.o.b.) prices for selected years between 1955 and 1987. Producer prices are used because they include the effects not only of border protection but also of more direct agricultural support policies such as deficiency payments. However, the use of producer prices leads to an underestimation of protection to the extent that there are costs of marketing from the farm gate to a point in the marketing chain equivalent to the internationally traded product. This bias is obvious in the case of the food-exporting countries such as Australia and the United States, for which the estimates of nominal protection rates are negative in some years when in fact no policy was exercised to exploit agriculture or, rather, modest protective policies were adopted. However, insofar as this bias is similar across countries and over time, it does not present a serious problem for the purpose of making broad comparisons.

As seen in table 4.2, average NRPs in recent years show a high level of agricultural protection in Japan. In 1987, the average NRP of Japan (151 percent) is much higher than the EC average (84 percent) and is lower than that in only Switzerland (218 percent) and Korea (160 percent). The U.S. dollar was sharply depreciated in 1987, especially in comparison to 1985, when the dollar was still high relative to other currencies owing to the money supply control of the Reagan administration, with the effect of lowering domestic agricultural prices in other countries relative to the import prices in dollar terms. Therefore, not only in Japan but also in most countries that apply insulation policies to prevent domestic agricultural markets from being tied to fluctuations in world prices, average NRPs rose sharply between 1985 and 1987. It is also noted that even the United States itself and other food exporters raised their agricultural protection levels from 1985 to 1987, reflecting the increases in export subsidies and other government expenses for agricultural support programs in recent years.

In any case, there is no doubt that the level of agricultural protection in Japan, as measured by average NRP, is among the highest in the world. However, the average NRP of Japan in 1955 was 18 percent, only half the EC average of 35 percent. It rose rapidly thereafter, reaching the EC level in 1960 and the Swiss level in 1965. This was the period when Japan's economic growth was especially rapid. More dramatic were the cases of Korea and Taiwan. Before the mid-1960s, when their spurt of industrial development began, their average NRPs were negative, reflecting the practice of agricultural exploitation policies common to low-income countries. During the 1970s, the protection level rose sharply, and Korea caught up with Japan by 1980.

4.2.2 Hypotheses on the Determinants of Agricultural Protection

Underlying the growth in agricultural protection is the change in equilibrium of the political market. The political market for agricultural protection is stylized in the framework of the neoclassical economic theory of politics (Hayami 1988, app. A). In this framework, the demand and supply schedules

of a policy that changes the level of agricultural protection are essentially the marginal evaluations of changes in political support for politicians by those who demand and those who oppose, respectively, agricultural protection. Therefore, the level of protection is determined at a subjective equilibrium by politicians to maximize their net revenue in the form of political support.

In a consideration of the factors that affect the demand and supply schedules of agricultural protection policies, there are two important variables that act to shift each schedule. One is the comparative advantage of agriculture, and the other is the share of agriculture in the total economy.

The comparative advantage of agriculture is inversely related to the stage of a country's industrial development and the need of reallocating resources from agriculture to industry. In the process of economic development based on industrial growth, agriculture loses its comparative advantage, and the income position of farmers deteriorates, unless resources are reallocated smoothly from agriculture to industry. Most of the resources in agriculture, however, are specialized and not easily transformed for other uses. Thus, farmers demand protection so that they can stay in farming despite the fact that their productivity growth lags behind that of industry. With economic development, a declining farming population finds it easier to organize and create political pressure. Correspondingly, the farmers' marginal political support for politicians or the demand schedule of agricultural protection is shifted upward.

The share of agriculture in the total economy indicates the degree of resistance to agricultural protectionism. As the importance of agriculture in an economy declines in the course of economic development, resistance to agricultural protectionism tends to decline. A relative contraction of the agricultural sector in the total economy reduces the burden of agricultural protection per capita of the nonagricultural population. Consumers' resistance to agricultural protection is reduced as their incomes rise and the Engel coefficient decreases; hence, the effect of rising food prices on the cost of living diminishes. People become more tolerant of the high cost of agricultural protection as their nostalgia for the pastoral life increases, and their interest in environmental conservation grows as the agricultural sector shrinks. Correspondingly, the marginal cost to politicians or the supply schedule of agricultural protection declines.

Therefore, I hypothesize that the level of agricultural protection is inversely associated with the comparative advantage of agriculture and the share of agriculture in the total economy. Not only the historical experiences of Japan, Korea, and Taiwan on NRPs but also the cross-sectional observations of NRPs in table 4.2 suggest the association of agricultural protection with comparative advantage. These countries with large endowments of agricultural land per capita, like Australia, Canada, and the United States, show low levels of NRPs, whereas Switzerland, Japan, and Korea, which are characterized by very meager endowments of natural resources for agricultural production relative to both physical and human capital for nonagricultural production, show

the highest levels of NRPs in recent years. Even within the EC, the NRP is low for Denmark and the Netherlands, which have traditionally been efficient agricultural producers, but high for Italy, which is known for its low agricultural productivity. At the same time, the general tendency of increases in NRPs over time observed in table 4.2 may support the hypothesis that the level of agricultural protection is associated with the share of agriculture, which has been contracting in most of the countries under study here.

Another factor that obvious influences changes over time in the level of agricultural protection is the international terms of trade between agricultural and industrial commodities. It is common for national governments in developed countries to intervene in agricultural markets so as to stabilize domestic prices at the expense of instability in international prices (Johnson 1975), whereas industrial commodities are traded relatively freely with international price fluctuations pervading domestic markets. Therefore, the inverse correlation between the level of agricultural protection and the international terms of trade, defined as agricultural export prices divided by industrial export prices in the world market, is expected. Indeed, the increase in NRP in most countries during the period between 1955 and 1970 corresponded to changes in the international terms of trade, which turned against agriculture under the pressure of accumulated surpluses of agricultural commodities in the United States and other major exporters. On the other hand, precipitous drops in NRPs were experienced from 1970 to 1975, corresponding to the sharp increases in world agricultural prices relative to industrial prices during the so-called world food crisis period.

Other than the three major factors outlined above, I also consider some country- or region-specific factors that explain the variations in the level of agricultural protection in table 4.2. The first factor is that EC member countries may have a different basis from other countries for agricultural protection because the EC acts as a regional bloc under the Common Agricultural Policy. The second is that Sweden and Switzerland have sought to be self-reliant and neutral militarily and have therefore preferred to maintain food self-sufficiency as a part of national security with a high level of agricultural protection. The third is that Korea and Taiwan have taken a similar course in that their level of agricultural protection has grown as their economies have developed. Finally, it is worthwhile to raise the question as to whether Japan's agricultural protection level, which is now among the highest in the world, is unique or can be explained by factors common to industrial countries.

4.3 Regression Analysis of Agricultural Protection Level

4.3.1 Specification

In order to test the hypotheses in the previous section, a multiple-regression analysis is conducted. The dependent variable representing the level of agricultural protection in the regression is the average nominal protection coeffi-

cient (NPC) for agriculture, which is obtained by adding one (100 percent) to NRP. NPC, the ratio of the value of agricultural output in domestic prices to its value in border prices, is used instead of NRP because NPC is consistent with the explanatory variables that are defined as an index setting the base point at 100, as explained below. Also, the logarithmic transformation of NPC represents a rate of difference between the output valued in domestic and in border prices, and it is therefore easy to interpret the estimated coefficients in equations with variables transformed into logarithms.

The explanatory variables are three fundamental variables representing (i) the comparative advantage of agriculture, (ii) the share of agriculture in the total economy, and (iii) the international terms of trade between agriculture and industrial commodities and four dummy variables representing the country- or region-specific factors of (i) the EC (six EC countries), (ii) nonaligned Europe (Sweden and Switzerland), (iii) Asian newly industrializing economies (NIEs) (Korea and Taiwan), and (iv) Japan.

As a variable to represent the comparative advantage of agriculture, I use an index of the productivity ratio, which is the ratio of labor productivity in agriculture to labor productivity in industry. Intercountry cross-sectional data on labor productivity in agriculture in real terms, as measured by total agricultural output per male worker, are available from Hayami and Ruttan ([1971] 1985) for 1980 and previous years. They are updated using agricultural production indexes (FAO, *Production Yearbook*) and data on male agricultural labor (ILO, *Yearbook of Labor Statistics*). As labor productivity in industry, average GDP per male worker for the whole economy at 1975 constant prices converted into U.S. dollars by purchasing-power-parity exchange rates in 1975 (OECD, *National Accounts of OECD Countries*) is used because of the lack of comparable labor productivity data for the industrial sector. It seems reasonable to assume that labor productivity in the industrial sector and labor productivity in the total economy are closely correlated in industrial countries. The productivity ratio thus calculated is expressed as an index, with the U.S. value in 1975 set at 100.

Two alternative variables are used to represent the relative share of agriculture in the total economy: agriculture's share in the labor force and agriculture's share in total GDP at 1975 constant prices. These data are obtained from ILO and OECD statistics.

The international terms of trade are specified as the ratio of the index of world export unit value of agricultural products (FAO, *Trade Yearbook*) to the export unit value index of manufactured goods from market economies (United Nations, *Statistical Yearbook*), with the 1975 value set equal 100.

Detailed explanations of and data for the variables listed above are given in Honma and Hayami (1986, 1991). The variables other than dummies are transformed into logarithms, and the regression equation is specified as follows:

$$(1) \qquad \ln P = b_0 + b_1 \ln C + b_2 \ln S + b_3 (\ln S)^2 + b_4 \ln T + b_5 E + b_6 N + b_7 A + b_8 J + e,$$

where P is the nominal protection coefficient, C is the index of comparative advantage in agriculture, S is the share of agriculture in the total economy, T is the international terms of trade, and E, N, A, and J are dummies representing the EC, nonmilitarily aligned countries, Asian NIEs, and Japan, respectively, taking a value of 1 if the observation is for the region or country and 0 otherwise. Specifically, the EC dummy is designed to be 1 from 1965 for the original EC member countries, 1 from 1975 for Denmark and the United Kingdom, and 0 otherwise to capture the effect of the Common Market correctly. The notation ln refers to natural logarithms, and e is the error term. The square of ln S is included to test for the possibility that the level of agricultural protection does not increase monotonically as the agricultural sector shrinks; the political influence of the farm sector may begin to decline beyond a certain threshold.

The model specified in the form of equation (1) is estimated by the ordinary least squares (OLS) method. Data for the dependent variable are available for fourteen countries at eight points in time for the period 1955–87, as observed in table 4.2. Thus, the regression analysis is conducted with 112 observations pooling fourteen countries at eight points in time between 1955 and 1987. It must be cautioned that some of the explanatory variables used in this analysis are not independent of the level of protection. For example, increased protection may exacerbate inefficiency in agricultural production and possibly block improvements in agriculture's comparative advantage. Likewise, protection increases inhibit the decline in the share of agriculture in the total economy. Considering the possibility of bias due to such simultaneity, the estimated regression parameters must be interpreted with caution.

4.3.2 Results of Estimation

The results of estimating regression equations are summarized in table 4.3. Regressions (1) and (2) represent the model, which includes only fundamental variables as explanatory variables; dummies are included in regressions (3) and (4). All the coefficients of fundamental variables satisfy the sign conditions postulated and are highly significant statistically. It is noteworthy that about 70 percent of the variations in NPC among countries and over time are explained in regressions (1) and (2) by only three fundamental variables—comparative advantage, share of agriculture, and international terms of trade—as the coefficients of determination adjusted for the degrees of freedom indicated. The results support my hypothesis that the level of agricultural protection rises as the comparative advantage shifts away from agriculture and as the international terms of trade turn against agricultural commodities.

The coefficients of the linear and square terms of agriculture's share are

Table 4.3 **Estimates of Regressions to Explain Nominal Agricultural Protection Coefficients in Fourteen Industrial Countries for 1955–87**

	Regression			
	(1)	(2)	(3)	(4)
Explanatory variables				
Comparative advantage:				
Productivity ratio	−.381**	−.337**	−.350**	−.291**
(ln C)	(−11.99)	(−11.51)	(−7.62)	(−7.42)
Share of agriculture:				
In labor force (A)	.345**		.306*	
(ln S_1)	(3.24)		(2.59)	
In GDP (B) (ln S_2)		.290**		.309**
		(2.80)		(3.17)
Square of A (ln S_1)^2	−.117**		−.098**	
	(−5.65)		(−3.82)	
Square of B (ln S_2)^2		−.125**		−.111**
		(−5.10)		(−4.54)
Terms of trade (ln T)	−.946**	−1.078**	−.951**	−1.033**
	(−7.26)	(−8.39)	(−6.80)	(−8.01)
Dummy variables				
EC (E)			.096*	.126**
			(2.58)	(3.42)
Nonalliance (N)			.160**	.234**
			(2.83)	(4.42)
Asian NIEs (A)			−.029	−.039
			(−.34)	(−.48)
Japan (J)			−.017	.064
			(−.23)	(.86)
Intercept	10.481	10.937	10.321	10.417
Adjusted coefficient of determination ($\bar{R}^2$)	.702	.673	.734	.744
Standard error of estimate	.155	.162	.146	.144
Threshold value of S[a]	4.4	3.2	4.8	4.0

Note: Student t-values are in parentheses, with levels of statistical significance shown as ** (1 percent) and * (5 percent). Equations with variables transformed into logarithms are estimated by the ordinary least squares method.

[a]The threshold value in the share of agriculture was obtained by solving $b_2 + 2b_3 \ln S = 0$.

positive and negative, respectively, in any case. This means that NPC is a concave function of agriculture's share and, therefore, that there is a specific point in agriculture's share that maximizes the level of agricultural protection with other things held constant. Thus, NPC continues to increase at a diminishing rate until the share of agriculture declines to a certain point, beyond which NPC decreases at a rate corresponding to further decreases in agriculture's share. This threshold point in agriculture's share is calculated by solving the following equation for S:

$$\partial \ln P/\partial \ln S = b_2 + 2b_3 \ln S = 0.$$

The calculated threshold value for each equation is shown in the last row of table 4.3. The threshold is reached when agriculture's share in the male labor force is 4–5 percent or when its share in GDP is 3–4 percent. These levels have already been reached in most European countries and those countries that are major food exporters, while Korea and Taiwan are still approaching the threshold. Japan, whose agricultural share is 5.7 percent in the male labor force or 2.3 percent in real GDP in 1987, is just passing the threshold. In other words, the farm bloc in Japan is at the height of its political strength today, having reached the optimal size for effective lobbying. This may partly explain why neither the ruling Liberal Democratic Party (LDP) nor any opposition party could say anything in favor of agricultural trade liberalization during the recent general elections for fear of losing farm votes. At the same time, the results outlined above suggest that the political strength of farmers in Japan may weaken gradually if Japan's agricultural share declines further. However, the share of agriculture, especially in the labor force, is unlikely to decline significantly in the short run because of the generally slow movement of labor out of agriculture. Moreover, the high level of agricultural protection itself plays a role in keeping agriculture's share from declining. Such resistance of agriculture's share to a further decline, combined with a high level of protection, results in a stalemate of domestic agricultural policies not only in Japan but also in other developed countries. Agricultural issues were brought onto the stage of international politics at, for example, summit meetings and the GATT multilateral negotiations as a way out of this stalemate was sought.

Another implication of the threshold values in table 4.3 is that agricultural protection may well increase further in newly industrializing countries such as Korea and Taiwan as their agricultural sectors continue to decline toward the present levels of Western Europe and Japan. This experience of Asian NIEs may be repeated in other newly industrializing areas such as ASEAN countries. Therefore, international collaborative efforts to prevent the spread of agricultural protection need to be intensified.

The coefficients of dummy variables in regressions (3) and (4) show the effects of country- or region-specific factors. The coefficients of the EC dummy are positive and statistically significant in both regression (3) and regression (4) at a conventional level. This supports the hypothesis that the EC acts as a regional bloc to provide more protection for agricultural producers in member countries than they would have without the Common Market. The coefficients of the nonalliance dummy are also positive and statistically significant, with a greater value than the EC dummy. Therefore, the hypothesis that the Swedes and the Swiss, who wish to remain nonaligned, are willing to shoulder the high cost of agricultural protection in order to increase their level of food self-sufficiency for reasons of national security is strongly supported.

An important finding from regressions (3) and (4) is that the coefficients of

the Japan dummy and the Asian NIEs dummy are not significantly different from zero, even at a very low level of statistical significance. Such results imply that the agricultural protection level of Japan and Asian NIEs may be neither exceptional nor unique in view of determinants of agricultural protection postulated in this study. The high rates of agricultural protection growth in Japan and two other East Asian countries may be the results, not of factors specific to the region, such as extreme agricultural fundamentalism, but of factors common to all industrial countries, such as the high social costs of intersectoral adjustment arising from the decline in agriculture's comparative advantage and the decrease in the nonagricultural population's resistance to agricultural protection in the process of industrial development.

4.4 Accounting for Agricultural Protection Growth

In order to identify the contributions of the three fundamental variables to Japan's growth in agricultural protection for the period 1955–87, the growth rate of NPC is decomposed by using the following growth-accounting equation derived from equation (1):

$$(2) \qquad (\dot{P}/P) = b_1(\dot{C}/C) + (b_2 + 2b_3 \overline{\ln S})(\dot{S}/S) + b_4(\dot{T}/T) + U,$$

where $(\dot{P}/P)$, $(\dot{C}/C)$, $(\dot{S}/S)$, and $(\dot{T}/T)$ are the annual compound rate of growth in NPC, the index of agricultural comparative advantage, the share of agriculture, and the international terms of trade, respectively; the b's are the regression coefficients estimated; $\overline{\ln S}$ is the mean of $\ln S$; and U is the unexplained residual. Each item on the right-hand side of equation (2) represents the contribution of each factor to the growth of NPC.

The results of the growth-accounting analysis for Japan based on the estimated coefficients of regressions (1) and (2) in table 4.3 are summarized in table 4.4. Japan's NPC rose at the rate of 2.4 percent per year on average for the period 1955–87. Roughly speaking, about half this growth of Japan's agricultural protection is explained by changes in the international terms of trade, about one-third by decreases in agriculture's share, and about one-sixth by declines in the agricultural comparative advantage, while the negative contribution of an unexplained residual of about 10 percent is recorded.

However, if the period under consideration is divided into two subperiods, 1955–75 and 1975–87, the following differences between the two periods can be seen. In the period 1955–75, which includes the era of rapid economic growth in Japan, the contributions of comparative advantage and agricultural share were much larger than in the second period, 1975–87. About 80 percent of the growth in agricultural protection for the first period is explained by the factors of comparative advantage and agricultural share, which are related to the costs of intersectoral adjustment and the changes in the political strength of the agricultural sector in the course of industrial growth.

Table 4.4 **Accounting for Agricultural Protection Growth in Japan**

	Year and Regression Used					
	1955–87		1955–75		1975–87	
	(1)	(2)	(1)	(2)	(1)	(2)
Growth in NPC (% per year)[a]	2.39	2.39	2.02	2.02	3.00	3.00
	(100)	(100)	(100)	(100)	(100)	(100)
Contribution due to:[b]						
Comparative advantage	.40	.35	.46	.40	.30	.26
	(17)	(15)	(23)	(20)	(10)	(9)
Agriculture's share	.97	.73	1.36	1.20	.31	−.04
	(40)	(31)	(67)	(59)	(10)	(−1)
Terms of trade	1.29	1.47	.41	.46	2.75	3.13
	(54)	(62)	(20)	(23)	(92)	(104)
Unexplained residual	−.27	−.17	−.20	−.05	−.35	.35
	(−11)	(−8)	(−10)	(−2)	(−12)	(−12)

[a]Numbers in parentheses represent the sum of contributions in percentages.

[b]Contribution is calculated on the basis of eq. (2) using the estimated coefficients in table 4.3 and the per annum growth rate of the related variable for each period. The percentage of the total growth of NPC due to each factor is shown in parentheses.

On the other hand, the growth in agricultural protection in the second period is explained mostly by the international terms of trade. This seems to imply that there was no longer strong pressure for further agricultural protection attributed to rapid industrial growth, which ended in the mid-1970s. However, the farmers were still politically strong enough to maintain the protective measures established in the previous period. With border protection measures that block the penetration of price fluctuations in the world market into the domestic market, the protection level rises automatically owing to this insulation of the domestic market from outside competition, when the international terms of trade turn against agricultural products, especially in the 1980s. Such irreversibility of agricultural policy has been a growing source of trade friction between Japan and the food-exporting countries. The large contribution of the terms of trade to the growth in agricultural protection for 1975–87 resulted from the gap between domestic and international prices that widened as the world food market became increasingly depressed in the 1980s. As a result, external pressure on Japan to liberalize agricultural trade has increased in recent years. Concomitantly, such external pressure has become a more dominant player in the political market for agricultural protection in Japan, while domestic consumers have been tolerant of protection growth.

4.5 Conclusion

A source of agricultural protectionism in an industrializing economy is the difficulty of reallocating resources, especially labor, from the agriculture to the nonagricultural sector in the face of relative declines in demand for food as per capita income increases. As an economy reaches an advanced stage of development, the political environment favors the agricultural sector for protection because the relative contraction of agriculture in the total economy reduces consumers' resistance to agricultural protection, on the one hand, and makes political lobbying by farmers more efficient, on the other. Thus, agricultural protectionism tends to be accepted in the process of economic development, and protectionist policies for agriculture are commonly observed in most industrial countries.

I examined the growth of agricultural protection in Japan in this political market framework. Japan's level of agricultural protection was much lower than the European level in 1955, when Japan's economy was still relatively undeveloped. But protection increased rapidly thereafter in the course of Japan's rapid industrial growth in order to ease the problem of a widening urban-rural income disparity, which was caused by the difficulty of reallocating resources. A multiple regression analysis using observations from fourteen countries at eight points in time from 1955 to 1987 found that the growth in agricultural protection in Japan was not based on a unique bias toward strengthening agricultural protectionism but could be explained by the decline

in agriculture's comparative advantage, the contraction of agriculture's share in the total economy, and the worsening international terms of trade, all of which are factors common to all industrial countries as determinants of the agricultural protection level.

However, the way in which the level of agricultural protection is raised has been changed. Japan's growth in agricultural protection by 1975 was attributed mostly to changes in the comparative advantage and the share of agriculture that were related to the rapid industrial growth. But its growth in the 1980s was explained mainly by changes in the international terms of trade. This implies that, even when the intersectoral adjustment problem became less serious after the Japanese economy entered a slower growth era, the farm bloc remained strong enough politically to maintain the established protection measures, with the result that the protection level continued to rise in response to declines in the world market prices of agricultural products.

It is time for Japan's policymakers to consider efficient ways of real intersectoral adjustments along with substantial decreases in the agricultural protection level, in order to avoid progressive decay under increasing foreign pressure and to harmonize agricultural policies internationally while seeking economic prosperity based on freer trade with international cooperation.

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Comment

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Masayoshi Honma's paper is a commendable effort at testing, for the case of agriculture, two implications of Downs's (1957) model of the political market for protection: (i) as comparative advantage declines for agriculture, the demand for protection rises; (ii) as the agricultural sector shrinks in size, the supply of protection rises.

At least two important results emerge, one methodological and one substantive. As for methodology, the paper's results lend support to Downs's model of the political market for protection. This is comforting since this model is a popular point of departure in studies of agricultural protection. The substantive contribution of the paper is to relate the size of the agricultural sector to average protection in agriculture. It is suggested that agricultural protection reaches a maximum when agriculture reaches about 3–4 percent of GDP. The latter result suggests some interesting applications for predicting future levels of agricultural protection.

Some of the paper's technical details require some comments. The average rates of nominal protection calculated for grains and livestock in table 4.2 have to be interpreted with some care. They are weighted averages, with the weights representing the adjustment of markets to the change in relative prices caused by protection. Since both the intensity of the adjustment response and the length of the adjustment period may be quite different among various commodities, weighted averages may lead to some peculiar results, for example, to relatively low average nominal rates of protection for livestock in Japan. Unweighted averages may avoid some of these problems, although they can also introduce others.

The regression model is subject to some caveats.

1. The choice of the dependent variable in the model, the nominal rate of protection (NRP), raises some interesting questions. First, does the NRP adequately capture the protective effort of the government? The answer to this question can only be a qualified yes. Border measures are surely captured, regardless of whether they come in the form of tariff or nontariff barriers to trade. This does not apply, however, to other government interventions, such as government support measures (e.g., explicit or implicit input subsidies) that work on the input side. The measure known as producer subsidy equivalent (PSE) combines these subsidies with the NRP and, therefore, is a more complete measure of government support. But even PSEs do not capture the protection afforded to value added. Hence, effective rates of protection that model the true production incentive effect more closely can still be underestimated for certain products. The relatively low NRP for beef in Japan, for example, hides a very high effective rate of protection that is induced by the low tariff on feed grain imports.

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Second, the NRP may not be tied very closely to the variables that are targeted by agricultural policymakers and the farming lobby. For example, the NRP for a particular commodity can change dramatically from year to year without a change in government policy because of changes in world price. A similar problem arises from the need to convert all prices into a common currency, mostly the U.S. dollars. The recent changes in the value of the dollar cause fluctuations in the NRP that cannot be attributed to changes in government policy. In sum, the use of the NRP may induce a significant amount of noise in the regression equation, that is, variation that cannot be attributed to government policy. If the latter is what is the focus of the research, the NRP may not be an ideal candidate for the dependent variable.

2. In an apparent effort to reduce the noise introduced into the NRP measure by world price fluctuations, Honma introduces into the regression equation the international terms of trade between agriculture and industry. One wonders to what extent this variable is exogenous. There may be a good case for believing that it is endogenous, especially in a regression that explains the NRP of the majority of industrialized countries. Agricultural protection by industrialized countries is well known to depress world prices quite significantly and, hence, to deteriorate the terms of trade for agricultural exporters. If this is the case, however, the agricultural terms of trade make little sense as an explanatory factor. Being the consequence of high NRPs, they cannot serve, at the same time, as an explanation of high NRPs.

3. The evidence on the dummy variables is used to conclude that Japanese protection is not fundamentally different from that of other industrialized countries. This conclusion holds for the set of dummy variables presented. However, those dummy variables assume a standard fixed-effects model: they modify the intercept term for various classes of observations. This is not the only model one can think of. Dummy variables may be used with equal justification to modify any of the slope parameters. In a general interaction term model, Japan may turn out to be fundamentally different after all, for example, with regard to its response to a decline in comparative advantage.

4. A number of measures, such as productivity, are defined with respect to the male labor force. This may introduce some unwanted noise into the regression for countries that have experienced a strong increase in female labor force participation over the sample period, such as the United States. A more general definition of the labor force would probably be preferable.

5. The unexplained part in table 4.4 suggests an overestimate of NRPs for the period 1955–70 and an underestimate for 1970–87. In a straight time-series analysis, this would be indicative of positive autocorrelation. How can that be explained in this context? Has there been a structural change over time in the behavior of governments, or is it an indication of a problem with statistical model adequacy? The reader may be more convinced of the merits of the model if some statistical adequacy tests were performed. For example, a RESET test may be useful not only as a check on general error orthogonality

but also to see whether the nonlinearity in the size of agriculture is the only one in the model.

Overall, the model provided by Honma provides a good starting point for investigating some additional questions regarding the political economy of agricultural protection. One interesting next step could be to disaggregate the model further. One may ask, for example, why ruminant meat and dairy is so much more protected than nonruminant meat in most countries. Does this pattern develop over the course of a country's development, or does it hold at any stage of development? Similar questions can be posed about the differences in the pattern and degree of protection provided to staple food products versus nontraditional agricultural products, such as fruit and vegetables.

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