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Distortions to Agricultural Incentives in Japan, Korea and Taiwan

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Distortions to Agricultural Incentives in Japan, Korea and Taiwan

Masayoshi Honma and Yujiro Hayami[1]

The story of agricultural policy in Northeast Asia over the past 50 years illustrates the dramatic changes that can occur in distortions to agricultural incentives faced by producers and consumers at different stages of economic development. In this study of Japan, the Republic of Korea (the southern part of the peninsula, hereafter referred to as Korea) and the island of Taiwan, China (hereafter referred to as Taiwan), we estimate the degree of distortions for key agricultural products as well as for the agricultural sector as a whole over a period when these economies transitioned from low- or middle- to high-income status (1955 to 2004 plus, in the case of Japan, its experience pre- World War II) – the beginning of the so-called East Asian economic miracle of dramatic industrial development.

Theodore Schultz (1978) established that as economies advance from low- to high-income status, agricultural policies tend to change from taxing to subsidizing agriculture, and Japan, Korea and Taiwan are clear examples. We compare the policy evolution in these economies and provide information on the effect of policies and underlying economic conditions on changes in agricultural distortions. Our findings shed lights on how agricultural distortions may change over different stages of economic development in later-developing countries.

To begin, we give a succinct summary of core characteristics of the three economies in terms of the nature of their economies, including their resource endowments that determined the course of their modern economic growth and development. The evolution of agricultural policies in the three economies is then reviewed before discussing how to measure distortions to agricultural incentives using the methodology from Anderson et al. (2008), the focus of which is on nominal and relative rates of assistance (NRAs and RRAs). Implications of our empirical findings for policy reforms in the three economies are discussed in the final section, where we

[1] This chapter draws on the introductory and country chapters in Anderson and Martin (2008), with data updated using Anderson and Valenzuela (2008).

also identify lessons for later-developing economies experiencing similar structural transformations in the course of their economic growth.

We find that significant agricultural protection growth began when these economies entered the middle-income stage of economic development. We identify the mechanisms underlying the growth of agricultural protection. Statistical observations are found to be consistent with the hypothesis that the success of rapid industrialization that advanced these economies to the middle-income stage resulted in declines in agriculture's comparative advantage associated with the growing income disparity between farmers and employees in non-agricultural sectors. The demand from farmers for a reduction of farm-nonfarm income disparity materialized in the form of increased assistance to agriculture. This was manifest predominantly through rapid and sustained growth in border protection of agricultural products.

Economic development and structural change

The choice of agricultural policies, particularly price-distorting policies, is closely related to the process of economic development. As identified by Schultz (1978), there are two agricultural problems — "the food problem"— that underlie policies commonly adopted in low-income countries that exploit or tax agriculture. These policies contrast to the policies that protect or subsidize agriculture in many high-income countries seeking to solve "the farm problem". Schultz' hypothesis became an established paradigm among agricultural economists, finding support in several empirical studies (Anderson and Hayami 1986; Hayami 1988; Krueger, Schiff and Valdes 1991). More recently, Hayami (2005) and Hayami and Godo (2004) have added "the disparity problem" as specific to middle-income economies. They suggest it is important to see how distortions in agricultural incentives change in all three types of economies over their different stages of development.

The most distinguishing characteristic of Japan, Korea and Taiwan during the period we study is their unusually rapid rates of economic growth and industrial development. In describing the so-called East Asian Miracle, the World Bank (1993) depicted Japan as the front runner, and

Korea and Taiwan, together with Hong Kong and Singapore, as the second group.[2] The ASEAN nations and China are following behind with rapid rates of economic growth. Since the changing nature of distortions of agricultural incentives seems to be closely related to the rate of economic growth and structural change, we provide an overview of the development of the three economies and associated changes in economic and agricultural structures.

Initial conditions and development strategies

Northeast Asia is characterized by regular monsoon rain, together with mountainous, undulated topography in which irrigation water could be controlled relatively easily with efforts at the family and community levels. This makes the region well suited to rice production by small family farms, commonly called "peasants", who were organized into village communities. The agrarian structure — established before the modern era — involved smallholder farms on an average of about one hectare, predominantly dependent on rice cultivation. It is important to recognize that, unlike Southeast Asia, large agribusiness plantations based on hired labor were almost completely absent not only in Japan and Korea, located in the temperate zone, but also in Taiwan where tropical cash crops such as sugar and banana comprised a significant share of agriculture. The rural community was traditionally stratified across landlords, land-owning cultivators and landless tenants prior to the land reforms after the Second World War, but agricultural laborers subsisting on hired labor wages were not a significant component of the rural population.

There is a high degree of similarity in the agrarian structures of Japan, Korea and Taiwan, due in part to the fact that Japan brought its institutions to its colonies — Taiwan since 1895 and Korea since 1910. The most fundamental institution was fee simple titles granted to land owners through cadastral surveys, in return for their payment of land tax. Japanese efforts to develop the colonies concentrated on agriculture, and especially on rice after Japan experienced a shortage of supply relative to demand after the so-called Rice Riot in 1918. The promotion of rice production through agricultural research and extension systems, and irrigation and drainage infrastructure, plus protection from rice imports from the rest of the world (see Anderson and

[2] On the dramatic transformation of Korea and Taiwan from slow inward-looking economic growth to rapiur

Tyers 1992), was considered a major success from Japan's viewpoint in that its rice imports from the two colonies increased from 5 to 20 percent of consumption in Japan between 1915 and 1935.

The increased export of rice and other primary commodities and the corresponding inflow of manufactured commodities meant dependency of the Korean and Taiwanese economies on agriculture remained high. This tendency was especially pronounced in the southern part of Korea, because Japanese industrial development efforts on the Korean peninsula were concentrated in the north: hydroelectric power of the Yalu River fed a complex of chemical industries there that was larger than existed in Japan in those days. The heavy dependency on agriculture in the south was furthered by urban destruction during the Korean War (1950-53).

Relative to (South) Korea, commerce and industry were more active in Taiwan. This was because the larger cash-crop sector there required larger amounts of processing and marketing activities relative to subsistence crops such as rice and barley. The Taiwan situation under colonial rule was somewhat akin to Japan from the mid-19th to the early 20th century. The commercial treaties imposed by Western powers in the mid-19th century deprived Japan of tariff autonomy. Japan consequently specialized in labor-intensive manufactures based on farm-supplied materials such as silk reeling, tea processing, and cotton weaving. This accorded with comparative advantage under virtual free trade. This led to a wide dispersion of small and medium industries in rural areas in Japan. This small-scale industry in Japan and Taiwan contrasts with the concentration of Korean industry in large-scale establishments in urban areas.

This is not the place to discuss why Japan, Korea and Taiwan were able to achieve remarkable success in economic development as the forerunners in the East Asian Miracle.[3] Here it suffices to note that the success of these economies was due to successful borrowing of technology from advanced economies. Gerschenkron (1962) suggests that the later is the start of industrialization in an economy, the larger is the scope for economic growth through technology borrowing from earlier starters. The question still remains, however, as to why Japan, Korea and Taiwan in particular were successful in technology borrowing among the many late starters.

One reason is the endowments of cheap but relatively well educated labor in these resource-poor economies. This made initial borrowing of labor-intensive technologies more efficient, and the later switching to capital/knowledge-intensive technologies smoother. Another

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export-led economic growth, see for example Mason et al. (1980) and Tsiang (1980).

reason is the great crises faced by these economies: Japan's defeat in the Second World War, South Korea's military confrontation with the North, Taiwan's loss of the Mainland to the communists. Those crises compelled their leaders to adopt policies to achieve economic success for the sake of maintaining their legitimacy, instead of indulging in rent-seeking activities (Hayami and Godo 2005, pp. 275-6).

Despite much similarity, there were also significant differences in the industrialization strategy adopted by the three economies, especially as between Korea and Taiwan. In Japan, although policies were aimed at promoting the development of capital-intensive industries after the recovery of tariff autonomy in 1911, small/medium industries continued to survive as a major component of the industrial sector, and many of them located in rural areas. In Taiwan, although the Nationalist Party tightly controlled formal sectors, there was little government intervention in the activities of small/medium entrepreneurs, who were able to grow through various marketing and financial linkages among themselves and with foreign firms. They became very internationally competitive (Ho 1979, 1982). In contrast, government control in Korea was stronger and more complete, especially under the military administration of Pak Chong-hui (1961-79). All formal credits were channeled from nationalized banks to large industry, while foreign direct investment was tightly controlled (Cole and Park 1983, Amsdae 1989). This strategy underlay the high concentration of industrial production in a small number of large enterprises in Korea.

Economic growth and structural transformation

We now turn to a quantitative summary of economic development in Japan, Korea and Taiwan in the past five decades. Table 1 shows some indicators of economic development. The first three rows indicate real GDP per capita in 2000 constant prices at purchasing power parity (PPP) in Japan, Korea and Taiwan, taken from Heston, Summers and Aten (2006). In 1955, Japan's GDP per capita was more than $3,000, whereas Korea and Taiwan's was less than $1,500. Japan experienced economic growth thereafter, reaching $4,500 in 1960 and $5,000 in 1961. In 1960 Korea and Taiwan had per capita GDP averages of around $1,500, but they had achieved per capita GDPs of $5,000 by 1978 in Taiwan and 1983 in Korea. Japan reached a level of per capita

[3] For our perspective on such a question, see Hayami (2005, Section 8.4) and Aoki and Hayami (1998).

GDP beyond $10,000 by 1970, and Taiwan and Korea reached that level by 1988 and 1991, respectively. Roughly speaking, in terms of the growth of per-capita GDP, Japan was ahead of Taiwan by about two decades and Taiwan was ahead of Korea by about half a decade; although these margins decreased over time.

It is convenient to classify the development of the economies into four stages of economic development as follows:

- Low-income stage ($1,500 or less): 1950 for Japan and before 1960 for Korea and Taiwan;
- Lower middle-income stage ($1,500-$5,000): 1950-60 for Japan and 1960-80 for Korea and Taiwan;
- Upper middle-income stage ($5,000-$10,000): 1960-70 for Japan and 1980-90 for Korea and Taiwan; and
- High-income stage ($10,000 or more): after 1970 for Japan and after 1990 for Korea and Taiwan.

The criteria of classification are not universal but are convenient for the comparison of the economic development in these three economies.[4]

Changes in other indicators in Table 1 are closely related with changes in per capita real GDP over the four stages. The GDP share of agriculture in Japan in 1955— the lower middle-income stage — was 17 percent, which was much smaller than the shares in the low-income stage for Korea and Taiwan, of 47 and 29 percent, respectively. By 1970 in Taiwan and 1980 in Korea, the shares had declined to similar levels to that of Japan at the lower middle-income stage — 15 percent and 16 percent, respectively. Bt the time Japan entered the high-income stage in 1970, the agricultural share of GDP had declined to 4 percent, which was about the same as that of Korea and Taiwan in the 1990s when they entered the high-income stage.

Although Korea and Taiwan experienced similar changes in per capita real GDP over the four stages, significant differences can be observed in their economic structures. The GDP share of agriculture in 1955 in Korea was nearly 50 percent whereas that of Taiwan was below 30

[4] In terms of real GDP per capita in 2000 constant prices, for example, China exceeded $1,500 in 1990 and $5,000 in 2004 whereas Thailand passed $1,500 level in 1968 and $5,000 level in 1991. For high-income stage, the United

percent, and similar differences can be observed with respect to agriculture's share of labor force which was as high as 80 percent in Korea versus less than 55 percent in Taiwan. This reflects Korea's higher dependency on agriculture. In both countries, the share of agriculture in GDP declined significantly over time — to 3.8 percent in Korea and 1.7 percent in Taiwan by 2004 — although Korea's share remained at nearly double Taiwan's.

Historical differences can be observed in agriculture's shares of the labor force in Korea and Taiwan. Interestingly, however, the difference in the labor force share of agriculture disappeared by 2004 with about 7.7 percent of Korean employment in agriculture versus 7.5 percent in Taiwan. The relatively faster declines in the labor force share of agriculture in GDP in Korea reflect its high urban concentration of industries. In Taiwan, characterized by the wide dispersion of industries over rural areas, farmers increased their incomes from off-farm employment while continued to be classified as farmers. In contrast, far more rural people in Korea had to quit farming and migrate to urban areas to obtain non-farm employment. These differences are reflected in the much faster decreases in the share of farm household population in total population in Korea relative to Taiwan and Japan.

The last rows in Table 1 report the ratios of agricultural GDP per worker to the total GDP per worker. This can be considered an indicator of the relative labor productivity of agriculture to the total labor productivity of the whole economy. It may also be regarded as an indicator of the income gap between the agricultural sector and the whole economy. The relative labor productivity of agriculture in nominal terms was not very different among the three economies in 1955. But in Japan it declined sharply, from 52 percent in 1955 to nearly 25 percent in 1970 and thereafter. It was not until 1960 that this ratio began to decline in Korea and Taiwan. In Korea it reached 44 percent in 1980 (from 65 percent in 1960) and stayed nearly constant thereafter. In Taiwan, the ratio continued to decline to 23 percent in 2000. That is lower than that of Japan, reflecting the extraordinary abundance of non-farm employment opportunities for farmers in Taiwan.

These measures should be interpreted with great care, however. Faster declines in this ratio in Taiwan relative to Korea appear to indicate faster growth in agricultural labor productivity in Korea. In fact, however, the declining ratio is due to faster decreases in the

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Kingdom and France exceeded $10,000 in 1960 and 1964, respectively, whereas the United States had already

Korean farm labor force owing to faster out-migration of farm labor to urban occupations in Korea relative to Taiwan. Thus, growth in the labor productivity of farmers engaging in agricultural activities relative to that of other workers would not have been slower and could have been even faster in Taiwan if the ratio was calculated using output per hour of labor instead of output per worker according to the official sectoral labor force classification.

Changes in the structure of agriculture

How did the structure of agriculture in Japan, Korea and Taiwan change in the course of their economic development? In Japan as of 2004, 2.9 million farm households accounted for 2.6 million workers engaged mainly in agricultural activities. Because the number of workers engaged mainly in agriculture is less than the number of farm households, some farm households have no worker engaged mainly in agriculture. Japan's Agricultural Census defines a farm household as the one that operates 0.1 hectare or more of farmland, or annual sales of agricultural products of 150,000 yen (US$1,250 for the exchange rate of 120 yen/$) or more. Thus, very small units of farm operation, in which no full-time worker engages in farm production, are classified as farm households. Indeed, full-time farm households having no family member engaged in non-agricultural employment accounted for 15 percent of total farm households in 2004. On the other hand, non-commercial farm households, which operate less than 30 ares of farmland or have annual sales of less than 500,000 yen, accounted for 26 percent of total farm households. Moreover, part-time farm households whose income from non-agricultural sources exceeds agricultural income accounted for a half of total farm households.

The number of agricultural workers in Japan declined from 14 million in 1955 to 2.6 million in 2004, but the number of farm households declined only from 6.0 million in 1955 to 2.9 million in 2004. Slow decreases in the number of farm households, together with decreases in agricultural land (from 6.1 to 4.7 million hectares between 1955 and 2004), resulted in a very small increase in arable land per farm from 1.01 hectare in 1955 to 1.61 hectares in 2004 (Table 2). The average area of agricultural land per farm in Japan is very small by global standards. Europe's are 20 to 45 times larger, and those of the United States are 125 times larger. The slow

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reached more than $10,000 in 1950.

growth of small-sized operation has been a key constraint on the growth of agricultural productivity, resulting in continual declines in the comparative advantage of Japanese agriculture, particularly of land-intensive activities, in the course of rapid industrial development.

Table 2 shows that in 2004, 2.9 million farm households in Japan held 9.4 million people with the average family size being 3.2 persons. In the same year, 1.2 million farm households in Korea held 3.4 million people and 1.8 million hectares of arable land with the average family and farm sizes being 2.8 persons and 1.5 hectares, respectively. In Taiwan, 0.72 million farm households held 3.2 million people and 0.84 million hectares of arable land with the average family and farm sizes being 4.5 persons and 1.2 hectares, respectively. It is notable that the number of people in farm households in Korea declined at a much faster rate than in Japan and Taiwan, which was the result of faster decreases in both the number of farm households and the number of persons per household in the former than the latter. These observations reflect the scarcity of non-farm employment opportunities in Korea's rural areas, due to its urban-centered industrialization. Indeed, from 1970 to 2004 the share of agricultural income in the total income of farm households declined from 32 to 14 percent in Japan and 49 to 22 percent in Taiwan, whereas in Korea it was as high as 76 percent in 1970 and was still 39 percent in 2004.

Japan has lost 23 percent of its arable land area over the past 50 years, falling from 6.1 million hectares in 1955 to 4.7 million hectares in 2004. Thus decreases in arable land under cultivation were a significant contributor to changes in farm size in Japan in terms of arable land per farm household. Meanwhile, the arable land area in Korea deceased from 2 million hectares in 1955 to 1.8 million hectares in 2004, and arable land in Taiwan remained almost constant (0.87 million hectares in 1955 and 0.84 million hectares in 2004). Farm-size changes in Korea and Taiwan were almost exclusively the result of changes in the number of farm households. In Japan and Korea, average farm sizes increased slowly from 1.0 and 0.9 hectares in 1955 to 1.6 and 1.5 hectares in 2004, respectively, whereas the farm size in Taiwan remained almost constant during this period. The faster increase in farm size in Korea, relative to Taiwan, was the result again of faster out-migration of farm workers and their families to urban areas owing to more urban-centered industrialization in Korea.

The distinct characteristic of industrialization in Korea is clearly reflected in its high share of agricultural income in total farm household income. In all three economies, this ratio decreased as off-farm employment for the members of farm households increased. In Japan, the

ratio decreased from 70 percent in 1955 to 32 percent in 1970 and further to 14 percent in 2004, corresponding to the shift from the lower middle-income to upper middle-income stage of development and then to the high-income stage. In Taiwan this ratio was already below 50 percent in 1970 when its economy was in the lower middle-income stage, and it went down to 22 percent in 2004. In contrast, in Korea the ratio was 76 percent in 1970 and it was still nearly 40 percent in 2004, which is not only higher than in Taiwan but is also higher than in Japan at comparable development stages.

Major differences in the adjustments of agriculture to economic growth based on industrial development are also reflected in changes in the commodity mix of farm production. Rice was traditionally the most important crop in all three economies, but its importance declined as per capita income increased. However, changes in its relative importance were different. From 1960 to 2004, the share of rice in the total value of agricultural production in Japan declined from 47 to 23 percent and in Korea from 59 to 28 percent. In contrast, the share of rice in Taiwan was originally lower at 37 percent in 1960 and it decreased rapidly to as low as 7 percent by 2004. Such a contrast reflects the fact that Taiwan's agriculture traditionally depended less on rice because of its greater opportunity to grow cash crops and, also, its success in achieving greater agricultural diversification toward high-valued commodities such as vegetables, fruits, poultry and pigmeat more efficiently than Japan and Korea in response to the shift in domestic demand for more income-elastic commodities.

Evolution of agricultural policy

We now outline changes in agricultural policies in Japan, Korea and Taiwan after the Second World War.

Japan[5]

[5] This section draws heavily on Hayami (1988).

Before the mid-1950s Japan tried hard to recover from the devastation of the Second World War. The primary emphasis of agricultural policy was on increasing domestic food production and delivering food equitably at low costs to consumers. To this end, the government invested heavily in agricultural research, extension and land infrastructure and, at the same time, placed rigid controls on rice procurement from farmers and delivery to consumers under the Food Control Laws enacted during the War.

Right after the Second World War, land reform was carried out in accordance with the strong recommendations of the occupying authorities. The urgent need to increase agricultural production through increased production incentives to cultivators was sufficiently strong to overcome the opposition of landlords against strengthening of the rights of tenants through government control of rents and land prices. During the four years from 1947 to 1950, the government purchased 1.7 million hectares of farmland from landlords and transferred 1.9 million hectares, including state-owned land, to tenant farmers, which amounted to about 80 percent of the land under tenancy before the land reform.

Although land reform resulted in a considerable change in the distribution of land ownership, the size distribution of operational holdings experienced no basic changes. As a result the traditional agrarian structure of Japan, characterized by small-scale family farms with an average size of about l hectare, remained despite the rise and the fall of landlordism (Table 2). There is no doubt that the land reform promoted more equal asset and income distribution among farmers, and hence contributed to social stability in Japan's rural sector. However, land reform did not induce changes in the basic direction of technological developments, because small-scale family farms continued to be the basic unit of agricultural production. Land reform contributed to an increase in standards of living and consumption levels, but its contributions to capital formation and productivity growth in agriculture were not significant (Kawano 1969).

As Japan set off on its 'miraculous' economic growth in the mid-1950s, agriculture began to face serious adjustment problems. The rate of growth in agricultural productivity, which was rapid by international standards, was not rapid enough to keep up with growth in the industrial sector. The intersectoral terms of trade did not improve for agriculture during the 1950s after the end of the Korean War. This was partly because of the pressure of surplus agricultural commodities in the United States and other exporting countries, and partly because the domestic demand for major staple cereals (especially rice) approached saturation after the bumper crop of

1955. As a consequence, incomes and living standards of farm households lagged behind those of urban households during the 1950s..

In 1961 real GDP per capita in Japan exceeded $5,000, which meant Japan entered the upper middle-income stage of economic development. Correspondingly, the major goal of agricultural policy shifted from increased production of food staples to reducing the rural-urban income gap. The need to assist farmers increased in the 1960s, as the rural-urban income gap progressively widened and the out-migration of agricultural labor accelerated. The difficulty of structural adjustment in agriculture as a result of the rapidly growing economy led to the enactment in 1961 of the Agricultural Basic Law, a national charter for agriculture. This Law declared that it was the government's responsibility to raise agricultural productivity and thereby to close the gap in income and welfare between farm and non-farm people.

In order to raise agricultural productivity and to improve farming efficiency, it was considered essential to increase the scale of farm operation by eliminating inefficient farm units and by promoting cooperative operations among remaining farms. Despite such efforts at structural adjustment, the rate of agricultural productivity growth was not increased sufficiently to prevent the rural-urban income gap from widening further. In such a situation the Food Control System, which was originally designed to provide food security to consumers, became the major instrument to protect farmers. Under the Food Control System, based on the Food Control Law of 1942, most food items were placed under direct government control. However, as the Japanese economy recovered from the war, the number of items under control was reduced so that rice alone remained under direct control after 1952. Rice was directly controlled in its distribution. Initially, the whole marketing process of rice from producers to consumers was under direct control of the Food Agency and prices were regulated from the farm-gate to the retail level, although the regulations were gradually relaxed.

After Japan entered the upper middle-income stage in the 1960s, the Food Control System became a powerful instrument for rice farmers, and they organized political lobbying to raise rice prices for government purchases. Their pressure resulted in a rice price determination formula in 1960 called the 'Production Cost and Income Compensation Formula' under the Food Control System. This formula was designed to reduce the gap between farm and non-farm income and wages by raising rice prices. This goal appears to have been achieved: income per agricultural worker compared to income per worker in manufacturing improved after 1960 following a rapid

rise in agricultural relative to manufacturing prices. The increase in the price of rice, which constituted about 40 percent of the total value of agricultural output before 1970, was a major factor in improving the domestic terms of trade for agriculture. The rise in agricultural prices, together with increases in off-farm income, resulted in a marked reduction in the income per capita gap between agricultural and non-agricultural households.

Protecting rice farmers through a price policy was possible in Japan because rice trade was completely controlled by the state-trading system. During the 1960s the price of rice was raised not only far above the world price but also above the market equilibrium price under autarky. At the upper middle-income stage, Japan was able to let consumers and taxpayers shoulder the costs of agricultural protection.

However, there was a limit on increasing agricultural protection through price policy. The high protected prices of rice resulted in an expansion of rice production in excess of consumption. The accumulated surplus of rice in government storage forced the government to introduce controls on rice acreage in 1969, which are still in place today. Further, the dramatic increase in income and wages of industrial workers after 1960 meant their diet changed. Average consumption per industrial employee (deflated by the consumer price index) doubled in the 1955-70 period, and again in the following decade and half. Correspondingly, rice was no longer a major wage good for industrial workers. To cope with the increasing rice surplus, the Food Control System was revised. The direct control on rice distribution was relaxed by introducing non-government distribution channels. Finally in 1995 the Food Control Law was replaced by the Staple Food Law, whereby the role of government was limited to stock holding operations for food security, although state-trading of rice is maintained for international trade.

Real GDP per capita in Japan exceeded $10,000 after 1969. As the economy advanced to the high-income stage, demand for agricultural protection from the farm bloc increased. Japan's comparative advantage continued to shift away from agriculture to industry, while internal resistance to protectionism declined because the non-farm population became affluent and, hence, less resistant to shouldering the cost of agricultural protection in the form of high food prices or subsidies to farm producers. However, while internal resistance weakened, external pressures for liberalization of agricultural imports increased.

Under the Uruguay Round Agreement on Agriculture, Japan had to adjust agricultural policies to be more consistent with the globalization of the economy. Following the agreement, in

1995 Japan converted non-tariff border measures to tariffs for 28 commodities. At the beginning of implementation, rice was exempted from tariffication in compensation of larger minimum access imports of rice, namely 4 percent of domestic consumption in 1995, rising to 8 percent by 2000. However, Japan adopted tarriffication for rice in 1999, so the minimum access imports remained at 7.2 percent of domestic consumption.

Becoming a member of the World Trade Organization (WTO) in 1995 forced the government to reform domestic agricultural policy. In 1999 the Basic Law on Food, Agriculture and Rural Areas was enacted as a replacement for the 1961 Agricultural Basic Law. Four years earlier the Food Control Law was abolished in 1995 to liberalize the domestic rice market. The 1999 Basic Law obliged the government to draft a Basic Plan for Food, Agriculture and Rural Areas for the promotion of the comprehensive and systematic implementation of policies on food, agriculture and rural areas. The plan is supposed to be redrafted every five years. Under the current Basic Plan, made in 2005, a key point of the new agricultural policy is to target government assistance to farmers who satisfy certain conditions, especially on minimum farm size. That is, it compels farmers who want to continue farming under government assistance to expand the size of their farm operation.

Korea[6]

Before 1960 Korea was a low-income country, with per-capita income below $1500. Its economy was left severely damaged by the Korean War. The agricultural policy adopted in this stage aimed to maintain low domestic consumer prices for staple foods, notably rice and barley, as well as for fertilizer. The Grain Management Law, enacted in 1950, gave the government the authority to regulate the price of staple foods. However, government control was not very effective during the 1950s since the market share of government-controlled rice was less than 10 percent. The government was supposed to purchase grain directly from farmers, but they were unable to purchase sufficient amounts due to budgetary constraints and upward spiraling grain prices due to inflation in the mid-1950s. Schemes to collect rice as land tax in kind and to barter fertilizer for rice were initiated. The former was successful but the latter was not because the implicit price of

[6] This section draws heavily on Moon and Kang (1989).

rice in the barter was lower than the market price. Grain imports from the United States under Public Law 480, which amounted to 8 to 12 percent of total domestic grain during 1956-65, helped the Korean government to keep grain prices low.

In the 1960s, Korea began to launch in a massive way the policies of promoting industrialization under the development autocracy of Pak Chong-hui. Agricultural policies at this time were designed to keep the price of staple food crops low so as to maintain low costs of living and wage rates for industrial workers, rather than maintaining adequate incomes for farmers. The government purchase prices were below market prices, which were considered necessary for the purpose of increasing industrial profits and capital formation. Over time, the Korean government's price intervention became more intense. The market share of government-controlled rice was expanded to 20-25 percent during the 1960s, which was used mainly for maintaining low domestic prices. These agricultural-taxing policies continued in the beginning of the lower middle-income stage.

As Korea's economy quickly advanced toward the upper middle-income stage, the direction of agricultural policy gradually moved toward supporting farmers. In the early 1970s, the buffer-stock operation for non-cereal products was set in motion for counteracting their price declines. In addition to chemical fertilizers, pesticides and farm machineries were added to the list of subsidized inputs (alleviating the adverse impact on farmers of import protection to manufacturers of those inputs). The government's purchase prices for rice and barley were steadily raised with the aim of increasing food production as well as reducing the urban-rural income gap. Although the government raised the producer prices for staple food grains, it did so without a comparable rise in the market prices of rice and barley in order to prevent the cost of living and the wage rate of industrial workers from rising. Likewise, it assisted livestock producers in part by using import quotas rather than tariffs to protect them from import competition, with the rent from those quotas being captured by the producer-managed meat import agency.[7]

The implementation of the two-price system, however, conflicted with the need to maintain financial and monetary stability. As the difference between the purchase and sale prices

[7] This drove a small wedge between the nominal rate of assistance for producers and the consumer tax equivalent for beef (Anderson 1986). This was very similar to the scheme operating in Japan in the 1970s. On why the government

of rice and barley widened, the deficit of the grain management fund increased. Since a large portion of this deficit was financed by long-term overdrafts from the Bank of Korea, this policy became a major addition to inflationary pressure. Expansion of the government deficit due to the two-price policy became a serious constraint on the policy.

Upon entering the upper middle-income stage in the 1980s, the Korean government took a step toward reducing both tariff and non-tariff protection for manufacturing industries. In contrast, agricultural policies toward protecting farmers were strengthened. The producer prices of farm products were increased to levels far above border prices by means of quantitative import restrictions on most agricultural commodities.

After Korea entered the high-income stage in the early 1990s, significant policy changes in were mostly related to the Uruguay Round Agreement on Agriculture (URAA) stipulated in 1995. According to the provisions of the URAA, all of Korea's quantitative restrictions were converted to tariffs for all agricultural products except rice. In the Uruguay Round negotiations, Korea retained the status of a developing country, which gave it special treatment in implementing commitments to reduce border protection. The agricultural products under tariffication were subject to a protection reduction commitment of 24 percent on average within ten years, with the minimum cut of 10 percent. Tariff rates of Korean agricultural products were over 60 percent on average. Tariffs on products which were considered particularly important in Korea were cut by the minimum rate of 10 percent.

In addition, imports of many agricultural products began under the minimum market access commitment. This commitment required that for all agricultural products, at least 3 percent of consumption must be purchased from overseas in the first year and the import share must increase annually up to 5 percent of consumption within ten years. Low tariff rates were applied to the in-quota volume so as to guarantee easy market access from exporting countries. Many key agricultural products such as rice, barley, orange, red pepper, garlic, and onion began to be newly imported under this commitment.

Rice, the most important item for Korean agriculture, was temporarily exempted from tariffication as provided in Annex 5.B of the URAA. As an exception, rice was subject to an import quota, beginning with 1 percent of total consumption and gradually increasing up to 4

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chose that scheme rather than a more efficient equally-protective tariff plus a consumer subsidy funded by the tariff

percent in 2004, the final implementation year. If Korean rice had not been exempted from tariffication, Korea would have complied with the standard market access commitment of from 3 percent to 5 percent. The temporary exemption from tariffication expired in 2004, but Korea opted to continue invoking a rice exemption from tariffication for another 10 years, to 2014.

Taiwan[8]

After World War II Taiwan suffered from high inflation rates, serious shortages of food and other necessities, and a heavy defense burden. The government gave the highest priority to economic stabilization, food production increases, and the repair of war damages. To alleviate the intense population pressure on limited land, it decided to grant incentives to farmers. Together with the land reform program implemented between 1949 and 1953, war-damaged irrigation and drainage facilities were repaired, fertilizers and other farm inputs were made available, and farmers' organizations were strengthened.

In the recovery stage of the Taiwan economy the Sino-American Joint Commission on Rural Reconstruction (JCRR), established in Nanking in 1948, played an important role. JCRR served as a non-permanent agency for the postwar rural reconstruction of China. From 1951 to 1965 the United States provided a total of $1.5 billion in aid. Approximately one-third went to agriculture, which was used to build infrastructure and foster human resources for agriculture. Also, substantial imports of U.S. aid-financed commodities and increases in domestic production, especially of food, helped relieve demand pressures.

In the low-income stage of economic development (before 1960), agricultural policy in Taiwan was designed mainly to supply rice at low stable prices to non-farm population. In those days two important taxes were imposed on farmers: the farm land tax and the hidden rice tax. This was done by means of compulsory rice purchases and the rice-fertilizer barter system. The compulsory purchase of paddy from landowners at official prices was another source of government-control over rice. All the paddy lands were subject to the paddy land tax plus the compulsory procurement of rice. The compulsory procurement was assessed on the basis of tax units determined by land productivity. The difference between the government procurement

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revenue is discussed in Hayami (1979) and Anderson (1983b).

prices and farmers' market prices constituted a hidden tax on paddy landowners who were mostly farm operators after the implementation of land reform program. The hidden tax was gradually reduced as per-capita income rose, but it continued to exist until its abolition in 1973.

The government's rice collection by all of these methods during 1950-70 averaged 50 to 60 percent of the total amount of rice produced minus farmers' home consumption. By 1973, however, this share had declined to 20 percent. In subsequent years it increased again because of the implementation of the guaranteed rice price policy. The total of this hidden rice tax was larger than Taiwan's total income tax before1963 and was more than twice the farm land tax before 1961, except in 1954. After 1961, when Taiwan moved to the lower middle-income stage, the hidden rice tax decreased rapidly: the ratio of the hidden rice tax to the total income tax was only 8.5 percent in 1971 (Kuo 1975).

Agricultural policy geared to exploit agriculture for the sake of supporting industrial development (and military development) largely ended during the 1970s, when the shift to subsidizing agriculture began. This was the period when Taiwan rapidly expanded its labor-intensive light industries in response to increases in export demand. Because many light industries such as garments and footwear were located in rural areas, non-farm incomes became increasingly more important to farm households. Taiwan farmers were able to take advantage of employment in manufacturing without leaving home and, also, many of them engaged in non-farm self-employed activities in less-busy farm seasons. Therefore, the need for farmers to rely on agricultural protection policies was smaller than in Korea.

It was 1978 when Taiwan entered the upper middle-income stage with its real GDP per capita exceeding $5,000. Still, to help equalize the income level of farm workers with that of the rapidly expanding industrial sector, the government offered loans and subsidies for promoting farm mechanization, which were designed to raise farmers' labor productivity. At this time the growth of rice production began to slow down in response to an increased emphasis on livestock and fishery products and high-value export crops. Increases in industrial employment also were pushing up the costs of farm labor. Labor productivity in agriculture continued to lag behind that of the industrial sector, and the gap between farm and non-farm per capita incomes was increasing, especially for farmers who relied mainly on rice production. The problems faced by

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[8] This section draws heavily on Mao and Schive (1995).

Taiwan agriculture were similar to those that many other industrial countries experienced at a comparable development stage, especially Japan in the early 1960s and Korea in the late 1970s.

In Taiwan, per-capita consumption of rice fell from 140 kilograms per year in 1968 to 74 kilograms in 1988. Correspondingly, an accumulation of the rice stock became a serious problem. In order to reduce production, farm extension workers encouraged farmers to plant other crops in rice fields, but their efforts were not successful because no economic incentive was provided. A six-year rice-crop substitution plan was inaugurated in 1984 that gave direct subsidies of 1 metric ton of paddy rice per hectare to farmers who shifted their rice fields to corn or sorghum, or 1.5 metric tons of paddy rice per hectare to farmers who shifted to crops other than corn and sorghum. In addition, corn and sorghum were purchased by the government at guaranteed prices. Under the program, rice production declined to 1.84 million metric tons in 1988, which was smaller by 0.9 million metric tons than the peak of 1976. The paid-in-kind subsidy was changed to a cash payment in 1988 to improve efficiency in the management of the program.

Taiwan entered the high-income stage in the late 1980s with its real GDP per capita exceeding $10,000 from 1988. The most important changes in agricultural policy in Taiwan in the high-income stage were related to its accession to the WTO that became effective on 1 January 2002. In line with the level of economic development, Taiwan agreed to bring its tariff rates to a level between those of Japan and Korea. Taiwan agreed to reduce its tariffs from the average nominal tariff rate of 20 percent in 2001 to 14 percent in the first year of its accession and to gradually reduce it to 12.9 percent by 2004. The target date for tariff reductions was 2002, except for 137 items that are under tariff rate quotas (TRQs). Of the 41 products that were under import quota restrictions before accession, 18 were moved to tariffication after WTO accession. Rice received a special exemption and the remaining 22 items are governed by the tariff rate quota regime.

Similar to Korea, the special treatment of rice is based on the rules of Annex V of the URAA. The quota of rice imports was set in 2002 at 8 percent of the average domestic consumption between 1990 and 1992 (144,720 tons of brown rice). By negotiation, this amount was divided into governmental and private import quotas. The government rice quota (65 percent of rice imports) was subject to the same treatment as rice purchased from local growers. The imported rice cannot be exported for food aid nor can be used for animal feed. The remaining (35

percent) was imported by private firms and was allocated on first-come-first-serve basis. For both private and government quotas, there is a ceiling on the price mark-up of NT$23.26 per kilogram for rice and NT$25.59 for rice products when they are sold on the domestic market. If the sale of quota rice is slow, the price mark-up can be cut by NT$3 every two weeks. The mark-up reduction can be continued until all of the quantities are sold out.

Measurement of distortions to agricultural incentives

The main focus of the present that create a gap between domestic prices and what they would be under free markets. Since it is not possible to understand the characteristics of agricultural development with a sectoral view alone, the project's methodology not only estimates the effects of direct agricultural policy measures (including any distortions in the foreign exchange market), but also generates estimates of distortions in non-agricultural sectors for comparative evaluation. Specifically, this study computes a Nominal Rate of Assistance (NRA) for farmers including an adjustment for direct interventions on inputs such as border protection on fertilizers. It also generates an NRA for nonagricultural tradables, for comparison with that for agricultural tradables via the calculation of a Relative Rate of Assistance (RRA – see Anderson et al. 2008).

The commodities for which we calculate a NRA include rice, wheat, barley, soybean, beef, pigmeat, poultry, egg, and milk for Japan and Korea. For Taiwan, we calculate estimates for rice, wheat, beef, pigmeat, poultry, and egg. Domestic prices are converted to US dollars using market rates of foreign exchange rates except for 1955-64 in Korea and for 1955-61 in Taiwan, for which the shadow exchange rates estimated for Korea by Frank, Kim and Westphal (1975) and for Taiwan by Scott (1979) are used to take into account the distortions to the foreign exchange market in early years. Aggregate NRAs on output for each county are calculated using weights based on domestic production of commodities valued at undistorted prices.

In addition to the commodities above covered in this study, several other crops are included in the calculation of RRAs for Japan and Korea. These include apple, cabbage, cucumber, grape, mandarin, pear, spinach, strawberry, onion, and sugar for Japan, and cabbage, red pepper, and garlic for Korea. The estimates for these products come from the OECDs

estimates of producer and consumer support estimates, PSEs and CSEs (OECD 2007). The data for these crops are available only since 1986. We assume distortions of those crops prior to 1986 were at the level of 20 percent in Japan and 90 percent in Korea of the NRAs for the available covered products.

The percentage of agricultural output covered in this study is between 55 and 70 (valued at undistorted prices). It is difficult to judge the levels of NRAs for the residual products. We assume it is made up of the following share trends (at distorted prices) between 1955 and the present: import-competing 50 to 80 percent and non-tradables 50 to 20 percent in Japan and Korea. Distortions of the residual products are assumed to be zero for non-tradables, and the same as that of the 11 (Japan) and 4 (Korea) OECD products for import-competing products. For Taiwan, we assume that the distortions of all the non-covered residual products are zero, because most of them are non-tradable or exportable.

To compute the RRA, we estimate the NRA for non-agricultural industries. For the latter, weighted tariffs were available in only selected years for Japan, Korea and Taiwan. We linearly interpolated for the years between those for which the data are available. For the early years the tariff rates are estimated as total tariff revenue divided by value of imports. Assuming the exportable industries receive no assistance, the weighted average tariff is multiplied by the share of import-competing industries in the value of all non-agricultural tradables. This procedure is likely to underestimate assistance to non-agricultural industries, especially in Korea where subsidized credits to target industries were the major form of assistance.

The estimation results for nominal and relative rates of assistance (NRA and RRA) to selected commodities are summarized in five-year averages in Tables 3 and 4 for Japan, Tables 5 and 6 for Korea, and Tables 7 and 8 for Taiwan.[9] Annual movements of the RRA are shown in Figure 1 to compare protection patterns in the three economies of Japan, Korea and Taiwan.

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[9] The NRAs for commodities are different from those estimated by OECD. Major differences between our study for NRA and OECD study for PSE are two-fold: (1) our domestic prices are wholesale prices whereas OECD uses farm-gate prices for PSE and prices paid by consumers at the farm-gate level for CSE; and (2) border prices in our calculations are based on the study in Anderson and Hayami (1986) whereas OECD uses a different set of reference prices. . The fact that the producer price was often above the wholesale (consumer) price in the case of grains and soybean in Japan and Korea is captured by setting the NRA equal to the measured CTE times the ratio NRA/CTE in Anderson, Hayami with associates (1986) and Anderson (1989) for the period to 1985 and times the negative of the ratio PSE/CSE in OECD (2007) for the period from 1986. Most differences in NRA between OECD and our measures come from the differences in border prices. For example, our border price of rice is common for Japan and Korea as the world import unit value adjusted by a quality coefficient. But OECD's border price of rice in Japan is

Japan's RRA was 13 percent in 1955 when Japan was in the lower middle-income stage of economic development. But it soon rose to the 30-40 percent range in the 1960s when Japan entered in the upper middle-income stage. However, the RRA of Korea and Taiwan, both in the low-income stage in the 1950s and the lower middle-income stage in the 1960s, were at very low levels, involving negative rates for some years before the mid-1970s.

After Japan entered the high-income stage in the 1970s, it increased its RRA steadily except during the period of the "World Food Crises" in 1973-4. It reached a peak in 1994, although this year followed a bad rice harvest (one-quarter below average). Japan's RRA was within the 100-150 percent range after the mid-1980s, except in 1994.

In Korea the rapid rise of agricultural assistance began in the late 1970s when the country moved from the lower to the upper middle-income stage. Taiwan followed Korea with an increase in the RRA, but the difference in the level of the RRA between the two economies continued to be significant during their upper middle-income stage. It is interesting to see that Taiwan was behind Korea in terms of the RRA level until the mid-1990s. After this time, however, Korea's RRA fell. After Korea and Taiwan entered the high-income stage in the 1990s, a relatively high RRA was maintained although there were some fluctuations in both economies.

The wide fluctuations in the RRA in the late 1990s were caused by the currency crises in Asia that began in 1997. This resulted in a sharp decline in the RRA in Korea in 1997 and 1998. Sharp increases in Taiwan's RRA in 1999 and 2000 were caused by shortages of livestock products due to the September 1999 earthquake and reduced production of pigmeat resulting from the spread of foot-and-mouth disease among pigs in 1997. Although the paths of the RRAs were different during the middle-income stage, both Korea and Taiwan started at slightly negative protection levels in the low-income stage in the 1960s and reached very high RRAs (about 120 percent in Korea and 70 percent in Taiwan) by the beginning of the new millennium.

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based on the price of rice imports by Japan and that for Korea is China's export price of rice adjusted by transportation costs and, from 2001, average import prices of rice from China, the U.S. and Thailand. This makes our series of NRAs for rice more stable than that of OECD's in recent years. This also explains the stability of our NRA for Korean rice compared with that of OECD's. For meat products also the border prices are different. In the estimation of NRAs for beef, pork and chicken the OECD uses basically the meat data of the US or Canada for border prices while we use Japan's import price for beef and unit values for pork and chicken (or Hong Kong import prices for the 1950s). Our approach is preferred for estimating NRAs consistently for longer time periods, particularly for the period when Korean imports were absent or negligible. Also, our approach is preferred for comparing the NRAs between Korea and Taiwan on a similar basis for the border prices.

Movements of the NRA for covered farm products are similar to those of the RRA in all three economies until the late 1970s, when the growth of the NRA in non-agriculture was much faster, particularly in Taiwan. In contrast to the path of the RRA, Taiwan kept pace with Korea in terms of the growth of the NRA for agriculture, albeit about ten years behind. Taiwan then caught up with Japan and Korea at a 150-180 percent NRA in the late 1990s.

Japan, Korea and Taiwan maintained policies to protect covered agricultural products that were considered politically important and sensitive. However, the importance of these covered products declined over time with a smaller share of those commodities in the value of production. Thus the growth in the RRA was less than that in the NRA because the RRA takes into account the non-distorted uncovered products whose share in value of production increased.

Fluctuations in the RRA and NRA consist mainly of changes in the NRA of individual commodities and changes in the weight of each commodity. In Japan, Korea and Taiwan the most important agricultural product was rice. Its protection therefore had a large influence on the RRA. A clear upward trend in the NRA of rice was present in all three economies (Figure 2). In Japan, the NRA for rice was as high as nearly 100 percent in the 1960s when Japan had already entered the upper middle stage, whereas it was nearly zero in Korea and Taiwan in the lower middle-income stage. From the late 1970s when Korea and Taiwan approached the upper middle-income stage, the rice NRA began to rise sharply and continued to rise thereafter.

The fastest increases in the rice NRA, however, occurred in Japan from the late 1970s. It peaked in the late-1980s. The fast increase in the rice NRA in Japan was caused, to a large extent, by a rapid appreciation of the Japanese yen relative to the US dollar. The border price of rice declined sharply, but there was no transmission to domestic market prices because of the control of rice imports by the government. The peak of the rice NRA in Japan was temporarily interrupted by a bad rice harvest in 1993 which resulted in a shortage of Japonica rice on world markets. This raised border prices, while domestic prices were kept relatively stable under the Food Control System. Thereafter, further increases in rice NRA was counteracted by yen depreciation and also by the acceptance of minimum access obligations in the URAA from 1995 and the later shift to tariffication in 1999.

In Korea and Taiwan, the rising trend of rice continued after the 1970s. Such increases in the NRA of rice are a major factor underlying rapid increases in the RRA in Korea during the upper middle-income stage, because the weight of rice in agricultural production continued to be

high. Korea's exemption from tariffication in the URAA allowed the NRA for rice to grow even under the implementation of WTO commitments.

Similar to the NRA for covered products in Figure 1, Taiwan followed Korea in the growth of the NRA for rice with a five to eight year lag for the period from the late 1970s to the mid-1990s. The gap in NRAs for rice between Taiwan and Korea widened in recent years, but the protection level of rice in Taiwan appears to be maintaining a rising trend.

Consumer tax equivalents on food

The support provided to farmers in Japan, Korea and Taiwan has mostly come via food import restrictions, but in addition there have been schemes whereby crop producer prices have been supported above those charged to grain and soybean consumers (including feedmixers providing livestock producers with animal feedstuffs). Thus the CTE is below the NRA for some crop products. As a result of that, together with the different weights of various products in consumption as compared with production, the average NRA for covered products is around 50 percent above the CTE for both Japan and Korea in 2000-04 (compare Tables 3 and 5). Thus consumers have been spared some of the implicit tax that otherwise would have been imposed on them had border measures alone been used to raise producer prices above international levels.

Sources of agricultural protection growth

The experiences of Japan, Korea and Taiwan are good examples of policy switching from exploitation to protection of agriculture when economies grow through industrial development. This shift is most clearly illustrated by the cases of Korea and Taiwan, whose agricultural protection levels were negative in the 1950s and the 1960s and began the rise sharply from the 1970s with the success of industrial development.

In Anderson, Hayami and Honma (1986), the growth of agricultural protection in Japan, Korea and Taiwan is empirically documented. They draw attention to three characteristics of the

East Asian growth of agricultural protection, based on the nominal rates of protection for agricultural products, in comparison with other advanced economies: first, the rapid rise over time in protection rates in the three economies in East Asia; second, the increase in agricultural protection in East Asia was much faster than for other industrial countries for the period of 1955 to 1980; and third, the highest level of agricultural protection the three economies reached as of 1980 was rivaled only by Switzerland. They also note that the growth of agricultural protection in these economies during the three decades to 1980 was exceptionally rapid, compared with that of earlier starters of industrialization in the West. That is, East Asia was not exceptional in having increasing agricultural protection, but was exceptional in its speed in reaching the world's highest level. Figures 1 and 2 indicate that the protection growth in terms of RRA and NRA continued at the same speed for about 20 years after the previous study period.

The rapid growth of agricultural protection in industrializing economies was largely explained by the shift in comparative advantage away from agriculture to industry as the result of successful industrialization. The decline in agriculture's comparative advantage increased the intersectoral resource adjustment costs that had to be shouldered by farmers if left to the competitive market mechanism. That boosted their demand for agricultural protection. This problem typically applies where industrial growth has been so rapid that intersectoral adjustments are not fast enough under free markets to prevent a widening rural-urban income disparity.[10]

The association between the rise in agricultural protection and the decline in agriculture's comparative advantage was tested in Honma and Hayami (1986) using multiple regression analysis and a pooled data set for 15 countries at 6 points of time ending in 1980. A strong correlation was found between the level of aggregate NRP[11] and the index of agriculture's labor productivity relative to total economy's labor productivity. According to those results, Honma and Hayami conclude that the high level of agricultural protection in East Asia resulted not so much from factors unique to East Asia but mainly from factors common to all industrial countries.

However, it should be noted that there are differences in the process of the intersectoral resource adjustment between Japan and other two economies. In 1955, the first year for our

[10] For more on agricultural policies in the process of economic development, see Hayami (2005) Hayami and Godo (2004).

investigation, Japan was already in the middle-income stage of economic development and entering the so-called "High Growth Era" characterized by extremely rapid industrialization.[12] This was associated with a widening income gap between rural and urban households. Japan increased its agricultural protection soon after it entered the High Growth Era, an era in which Japan moved from a middle-income to a high-income economy in less than two decades. Japan's agricultural protection was raised to a level comparable with that of the European Community during the 1960s.

Meanwhile, Korea and Taiwan were still in the low-income stage of economic development in the 1950s. They entered the middle-income stage early in the 1960s. In the middle-income stage, productivity growth in agriculture tended to lag behind that of non-agriculture as a result of successful industrialization. With delays in labor out-migration from farming, farmers' income levels tended to decline relative to those of non-farmers. Nevertheless, it was impossible for the government in the middle-income stage to secure sufficient finance from non-agricultural sectors to raise support for farmers to the extent needed to close the income gap. This is because agriculture was too large a sector in terms of its shares of both national income and the labor force. Thus despite growing rural-urban income disparity, Korea and Taiwan retained low levels of agricultural protection until the late 1970s and the early 1980s, respectively.

The agricultural problem confronted by middle-income economies like Korea and Taiwan in the 1960s and 1970s has been called the "disparity problem" by Hayami (2005) and Hayami and Godo (2004), referring to the income disparity between farm and on-farm households. The problem is a lag in productivity growth in agriculture relative to non-agriculture, brought about by insufficient labor out-migration from farming in response to the successful industrialization that raised these economies to the middle-income stage. Farmers, who observe non-farm workers' rapid escape from poverty, begin to realize how relatively poor they are, even if their

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[11] Actual data used for the level of agricultural protection in the regression analysis are the nominal protection coefficients (NPC = 1+NRP/100).

[12] Indeed Japan's tariff protection for rice began in 1904 and, after 1918 included its colonies of Korea and Taiwan in what became an imperial rice self sufficiency policy. An earlier set of estimates of the nominal rate of rice protection suggests it grew from 9 percent in 1903-07 to 21 percent in 1908-12 and 27 percent in 1913-17. It then fell to an average of 13 percent in 1918-27 with the greater inflow of rice from the colonies, before rising again to 26 percent in 1928-32, 45 percent in 1933-37 and 84 percent in 1938, according to Anderson, Hayami and Honma (1986). See also Table 7 below for new estimates for an even longer period.

income level did not decrease from the previous stage. The resulting dissatisfaction among farmers often becomes a significant source of social instability. Once an economy reaches the middle-income stage, that dissatisfaction becomes a prime concern of policymakers who might adopt agricultural protection measures to appease farmers and prevent the dissatisfaction elevating into a serious anti-governmental movement.

That protection may not be strong enough to close the income gap between farmers and urban workers until the country graduates from the lower middle-income stage, however. Because the shares of agriculture in both national income and the labor force are still large, it is difficult to either (a) raise sufficient revenue from the non-farm sectors to close the growing farm-nonfarm income gap with direct support payments or (b) pass on the cost of agricultural protection to consumers by raising food import barriers, because increases in food prices erode real wages paid by the large number of small-scale enterprises that rely heavily on cheap labor. Faced with the disparity problem, policymakers in middle-income countries are forced to search for ways and means to protect farmers within the constraint of the food problem that is still binding because a large number of urban workers are still absolutely poor and so still have a high share of food in their household expenditure.

In the early 1990s when all three Northeast Asian economies entered the high-income stage, the decline in relative agricultural income (in terms of agricultural GDP per worker divided by total GDP per worker) stopped in Japan and Korea. In Taiwan, the relative agricultural income continued to decline until recently (Table 1), despite the high level of agricultural protection. The reason why Taiwan's relative agricultural income continued to decline was that Taiwan increased its total economy's labor productivity more rapidly than agriculture's labor productivity even after 1990.

Agricultural protection in Korea rose faster and to higher levels than in Taiwan and Japan during the upper-middle income stage. The RRAs in Korea are located significantly above those of Taiwan and Japan for the same levels of per-capita incomes throughout their upper middle-income stage (Figure 3). The difference could reflect the different costs of intersectoral adjustment (corresponding to changes in comparative advantage) that farmers had to shoulder. In Korea the shift of labor from agriculture to non-agriculture involved the migration for workers from rural to urban areas, whereas in Taiwan and Japan much of the shift was done by farmers' increased non-farm activities while continuing to live in their home villages and towns and

farming part-time. Correspondingly, both the pecuniary and psychological costs of intersectoral labor reallocation were much higher for farmers in Korea.

In Japan the decline in relative agricultural income ceased in the 1970s when Japan reached the high-income stage. This was due to a deceleration in the growth of labor productivity in the total economy after reaching the high-income stage. The Korean experience after 1990 is likely to be explained by fast increases in agricultural labor productivity resulting from the rapid out-migration of agricultural labor to urban activities (Table 1).

The relationship between relative agricultural income and the RRA in Japan, Korea and Taiwan for 1955-2004 is shown in Figure 4.[13] There is a negative correlation for all countries and all periods, except Korea in 1990 and 2000. The correlation is, however, weak when relative agricultural income is around 40 percent or more. This corresponds to the low-income and lower middle-income stages of economic development.

Korea and Taiwan strengthened their agricultural protection policies in the 1980s when both economies entered in the upper middle-income stage. This followed Japan's protection pattern in the 1960s when the income gap was widening and protection measures were deemed necessary to close it. Under such circumstances in the upper middle-income economies, politicians were not able to resist pressure from the farm lobby and thus instituted policies to prevent farmers' incomes from lagging behind those of non-farm workers.

In addition, Korea may have had a specific reason for strengthening agricultural protection, particularly at the farm-gate level. The constant threat of communist aggression from the north prompted commercial and industrial interests to support farmers and thereby maintain political stability.

If the income gap was adequately dealt with during the middle-income stage, problems caused by agricultural protection in the following upper middle-income stage might have been avoided. Yet, in academic and policy debate, the disparity problem in the middle-income stage has received relatively little attention, despite the fact that there are today many economies attempting to reach the upper middle and high-income stage through industrialization. The growing income disparity between farm and non-farm populations could become a major source

[13] RRA of 1955-59 average is paired with agricultural GDP per worker relative to total GDP per worker in 1955 and so on.

of social and political instability elsewhere in Asia, from ASEAN to China and eventually to South Asia, particularly India.

In the analysis by Honma and Hayami (1986), it was found that political power in the agricultural sector is maximized when the share of agriculture declines to 4 to 5 percent of GDP or 5 to 8 percent of the labor force. Japan has passed this range, Korea recently entered this peak zone in terms of both GDP and labor force, as did Taiwan in terms of the labor share (having passed over this zone in 1990 in terms of GDP share). Political economy factors may well underlie the rise of agricultural protectionism in Korea at the high-income stage after 1990, as observed in terms of the NRA at the farm-gate level despite no apparent further increase in its agricultural comparative disadvantage.[14]

Japan's pre-Second World War experience

The pattern of agricultural protection growth in Japan, Korea and Taiwan in the era of East Asian Economic Miracle, as outlined in the previous section, was very consistent with the hypothesis that rapid protection growth occurred when these economies were in the middle-income stage under the dictate of the "disparity problem" described above. Under the disparity problem, when farmers' income levels tend to decline relative to non-farmers', the economy is often characterized by a dual structure: a formal sector consisting of large modern enterprises and government agencies, and an informal sector consisting of agriculture and other small/medium-scale enterprises. That was the case for Japan in the half-century before the Second World War. In this period Japan advanced from the low-income to the middle-income stage of economic development.

Japan set upon modern economic growth with the Meiji restoration of 1868 that transformed its political structure. Japan went from a union of feudal fiefs under the hegemony of Tokugawa shogun (Tycoon) to a modern nation state in the form of the constitutional monarchy

[14] The shares of Korean agriculture in GDP and the labor force were 3.8 percent and 7.7 percent, respectively, in 2004, while those in Taiwan were 1.7 percent of GDP and 7.5 percent of the labor force in that year (Table 1, rows 2 and 3).

under an emperor who was a symbol of national unification without actual ruling power. The immediate impetus for this political reorganization was the threat of colonization by western powers that became obvious through the gunboat diplomacy of the United States and the use of Admiral Perry's fleet. The national slogan of the Meiji state was to establish *fukoku kyouhei* (a wealthy nation and strong army) for the sake of preserving national independence. To achieve this prime goal, economic policies in Meiji Japan were aimed at the promotion of modern industries to catch up to the economic power of western nations. Japan at that time was deprived of the freedom to set import and export duties above 5 percent *ad valorem* levels according to unequal commercial treaties signed by the Tokugawa tycoon with Western powers in the mid-19th century. Thus, industrial promotion policy relied mainly on subsidies in areas such as the import of machines and factories and the purchase of their designs, the employment of engineers and skilled workers, and the collection and dissemination of information on overseas technologies and markets. It was mainly through taxation of agriculture — through the newly established land tax system — that subsidies for industrial promotion as well as for other modernization measures were financed.

As the data in Table 6 show, in the early Meiji period (before 1900) the agricultural sector shouldered about 90 percent of the total direct tax burden, which amounted to about 15 percent of agricultural GDP. At this time agriculture's share of the national government's subsidy amounted to less than one-quarter, which was less than 5 percent of agricultural GDP. Evidently, at the beginning of its modern economic growth, Japan adhered to the strategy of promoting modern sectors through the exploitation of the traditional sectors, which is a strategy commonly practiced by developing economies when they became independent of colonial powers around the early 1960s. Imbalanced taxation and subsidization as between agriculture and non-agriculture was even greater than the data of Table 6 reveal, as a disproportionately high share of the population educated at publicly-financed schools were from non-farm households.

Under strong promotion by the government, industrialization progressed rapidly in Japan, especially in the area of labor-intensive manufacturing. Comparative advantage in this sector was unhampered owing to virtual free trade in the absence of tariff autonomy in Japan.

Changes in the position of agriculture in the total economy over the course of modern economic development under the Meiji restoration are summarized in Table 7. The series of real GDP per capita show that the Japanese economy moved from the low-income to the

middle-income stage by the beginning of the 20th century, with the share of agriculture in GDP at about 40 percent. This is roughly comparable to Korea and Taiwan's share of agriculture in GDP when they advanced to the middle-income stage. Thereafter, Japan remained at the status of a lower-middle-income economy until the Second World War. Meanwhile, the growth of labor productivity in agriculture lagged behind that of industry, resulting in a continual decline in the ratio of labor productivity in agriculture to labor productivity in industry (column 6). This reflects successful industrial development (as in Korea and Taiwan during the era of East Asia's Economic Miracle). Nevertheless, because the terms of trade did not improve for agriculture throughout the inter-war period (column7), income per-capita in farm households continued to decline relative to that of farm employees' households, parallel to the declines in agriculture/industry real productivity ratio (column 8 of Table 7).

Growing dissatisfaction among farmers in Japan gave rise to strong political lobbying — organized by the politically powerful landlords — for reduced tax burdens and increased support to agriculture. The result was a significant reduction in the tax burden and a greater allocation of government subsidies to agriculture in the first half of the 20th century. Before the beginning of the 20th century, landlords were largely satisfied by the government's support to agricultural research and extension services and land infrastructure improvements such as irrigation and drainage systems, which proved to be highly effective in raising rice yields per hectare and thereby raising land prices and land rents for the benefits of landlords (Hayami and Yamada 1991, pp. 68-77). However, as comparative advantage continued to be lost from agriculture — owing to rapid industrial development — landlords' demands began to shift toward border protection on agricultural commodities, especially rice. Their strong lobbying achieved the installation of a rice tariff at 15 percent *ad valorem* in the first year of the Russo-Japanese War (1904-05). This tariff was approved under the excuse of raising government revenue to finance the war. It was supposed to be terminated at the War's end, but the landed interests lobbied extensively to make it permanent in the form of a specific duty. Thereafter, the rice tariff became an issue of a major public controversy in Japan — similar to the controversy caused by the Corn Laws in the UK a century earlier and German grain tariffs a half century later. The imperial Agricultural Society, representing the landed interests, and the Tokyo Chamber of Commerce, representing the interests of manufacturers and traders of export commodities, lobbied strongly for opposite ends.

The battle ended with a victory to the landed interests and the successful imposition of a specific duty on rice at one yen per 60 kilograms.

This outcome contrasts with the victory of the bourgeoisie in the UK and the repeal of the Corn Laws in 1846; and resembles the situation in Germany in which tariff protection was installed on food grains (wheat and rye) in 1879 under Bismarck. Unlike the UK, which was able to establish itself as the workshop of the world, the comparative advantage of industry was less certain in Germany, so that industrialists found it advantageous to seek protection on their products while approving some protections on agriculture. In addition, the rapid growth of the Social Democratic Party — a labor party initially based on orthodox Marxist doctrine — was considered a common menace by the Junkers and the Industrialists. In fact, the installment of the grain tariffs and iron and steel tariffs in Germany at the same time was the result of a united campaign of landlords in Eastern Germany (Junkers) and Industrialists in West Germany (Gerschenkron 1943). This experience was repeated by other late starters of industrialization such as France and Italy who tried to match the UK in industrial strength (Kindleberger 1951). Japan's protectionist policies were similar: after tariff autonomy was recovered in 1911, Japanese industrialists actively lobbied for industrial protection, especially in heavy and chemical industries. They also campaigned for reductions in tariffs on imports of industrial raw materials such as raw cotton and iron ore (Little, Scitovsky and Scott 1970; Yamazawa 1984).

As a result, Japan saw the emergence of tariff escalation, with lower rates applied to materials for industrial processing and higher rates applied to its imports of processed final products. Although agricultural production was raised by means of increases in food tariff rates, this was largely paralleled by increases in industrial tariff rates, which can be inferred from the movements in the average tariff rate for all products compared with the movements in just the rice tariff rate (columns 4 and 5 of Table 7). However, tariffs were largely exempt on the imports of raw materials for industrial production, so effective rates of industrial protection were much higher than the nominal rates implied by the tariff rates. In particular, a zero tariff on raw cotton was instrumental in making the cotton spinning industry the top foreign exchange earner in Japan and, at the same time, completely eradicated domestic cotton farming.

Although the rice tariff was raised successively from 14 percent *ad valorem* in 1910 to 41 percent in 1935, which with quantitative import restrictions increased the nominal rate of protection on rice from 21 percent in 1900 to 134 percent in 1935, improvement in the terms of

trade for agriculture was slower than the decline in the agriculture/industry labor productivity ratio. This resulted in the continual decline of farmers' household income per capita relative to that of non-farmers' throughout the inter-war period (Table 7). Although agricultural protection began to increase significantly during this period, it was evidently insufficient to counteract the loss of agriculture's comparative advantage owing to rapid industrial development. To undertake agricultural protection at a scale sufficient to close the widening income disparity, Japan waited until after the Second World War when the Japanese economy advanced to the upper middle-income and the high-income stages so that non-agricultural sectors could bear the cost of agricultural protection. In the early 20th century, the share of food in household consumption expenditure (the Engel coefficient) was higher than 60 percent. This implies that the elevation of food prices had a large effect on the cost of living and, hence, on the wage rate of workers, which caused serious damage to labor-intensive industries, which were then at the center of the Japanese economy. Indeed, as mentioned earlier, the fear that high food prices would damage industrial development was a major motive in the Government's decision to launch rice development programs in Korea and Taiwan following the rice riot in 1918. This is despite opposition from landlords in Japan against policies fostering competitors to Japanese rice farming. The importation of Japonica rice free of tariffs from the two colonies became a major factor aggravating agricultural depression in Japan during the 1930s.

The situation changed dramatically after Japan advanced to the upper middle-income stage in the 1960s as a forerunner of the East Asian Miracle. Although supports on agricultural product prices were raised rapidly, industrial wage rates were raised even faster, so that the Engel coefficient fell from 52 percent in 1955 to 31 percent in 1980 and further to 17 percent in 1995 (Hayami and Godo 2002, p. 132). Meanwhile, the center of gravity in Japanese industry moved from labor-intensive manufacturing to capital- and knowledge-intensive activities. Under this environment, Japanese industrialists were able to tolerate increases in food prices so as to prevent farm-nonfarm income disparity from widening. Industrialists found it was to their advantage to support farmers, to keep them as allies against organized labor and left-wing activities under the cold war regime (similar to the attitude of German industrialists toward the grain tariff campaign a century earlier). The major surge of Japan's agricultural protectionism continued until it was counteracted by the serious trade frictions with food-exporting countries, particularly the United States.

Concluding remarks

This chapter examines changes in distortions to agricultural incentives in terms of price distortions in Japan, Korea and Taiwan in a manner consistent with the methodology in Anderson et al (2008). Rates of assistance to the agricultural sector are estimated for Japan and Korea for 1955-2004 and for Taiwan for 1955-2002. These are based on estimates of the nominal rates of assistance for selected individual commodities and the relative rates of assistance (RRA) as between agricultural and industry. The estimates show that the growth of agricultural protection in Northeast Asia, together with the decline of industrial protection rates, caused the RRA to rise there over the five post-War decades under investigation.

The experience in these three economies can be explained by factors common to rapidly industrializing economies, especially the high cost of industrial adjustment shouldered by farm producers in the process of rapid industrial development. However, the agricultural protection level continued to grow even after 1980 in all the three economies despite apparently decreased needs for agricultural support to prevent widening rural-urban income disparity.

All the three economies suffered problems commonly observed in the high-income stage of economic development, notably a widening income gap between agricultural and non-agricultural sectors as the economy entered the middle-income stage. If the income gap had been dealt with more appropriately at the middle-income stage, problems caused by agricultural protection in the following high-income stage could have been significantly reduced.

Greater attention needs to be paid to the agricultural problem in the middle-income stage, the so-called “disparity problem”. The challenge at that stage of development is to find a compromise between the conflicting needs to reduce the farm-nonfarm income gap on the one hand, and the supply of low-cost food to a large number of workers in urban areas on the other, when the government’s capacity to raise sufficient revenue from non-agricultural sectors is weak and food import restrictions effectively tax net buyers of food. The somewhat contrasting patterns of agricultural and industrial growth between Korea and Taiwan led to different solutions to that problem, which may provide insights for some later-developing economies.

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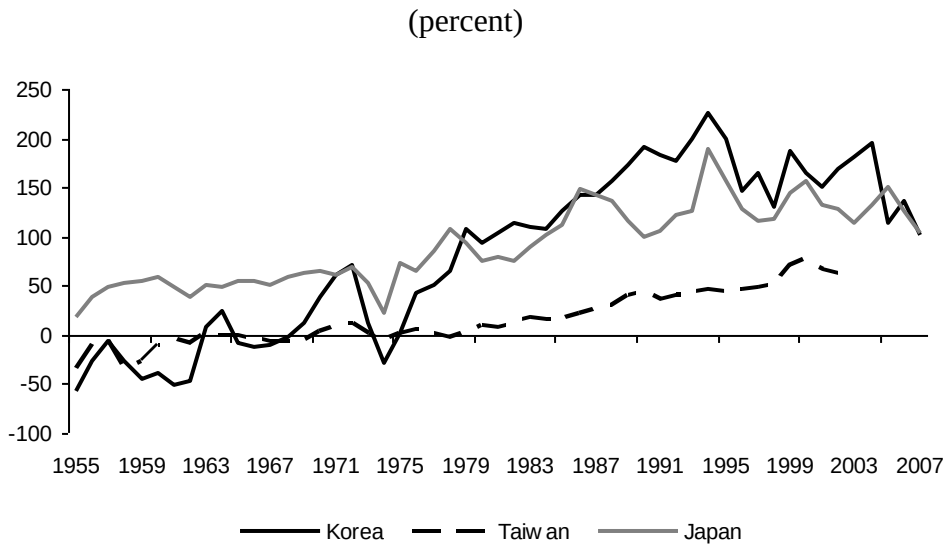
Figure 1: Relative rate of assistance to agricultural versus non-agricultural tradables,[a] Japan, Korea and Taiwan, 1955 to 2007

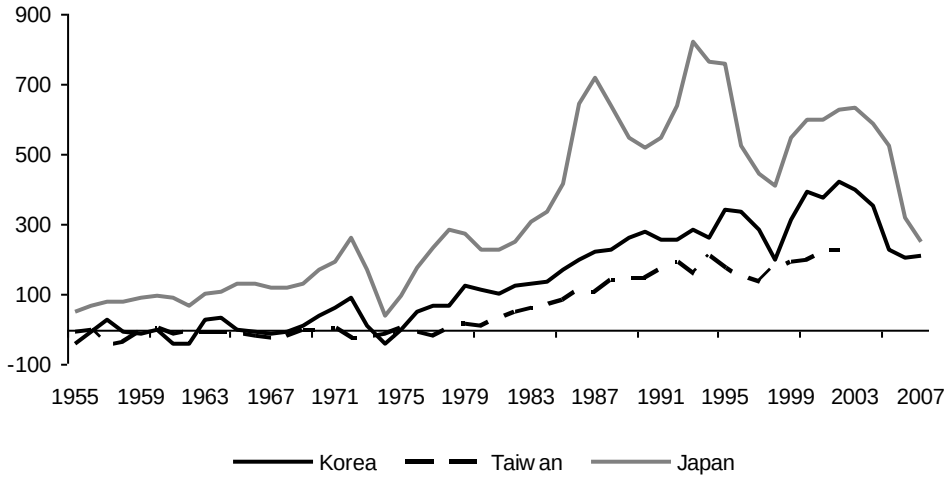


[a] The RRA is defined as 100*[(100+NRAag^t)/(100+NRAnonag^t)-1], where NRAag^t and NRAnonag^t are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Source: Authors' spreadsheet

Figure 2: Nominal rate of assistance to rice, Japan, Korea and Taiwan, 1955 to 2007

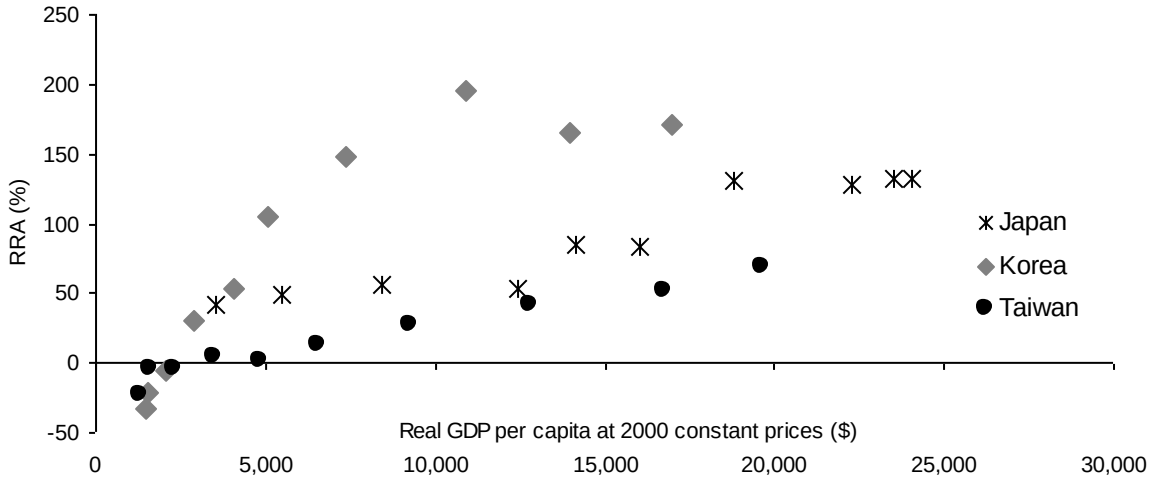
(percent)



Source: Authors' spreadsheet

Figure 3: Relative rate of assistance to agriculture and real GDP per capita, Japan, Korea and Taiwan, 1955 to 2004

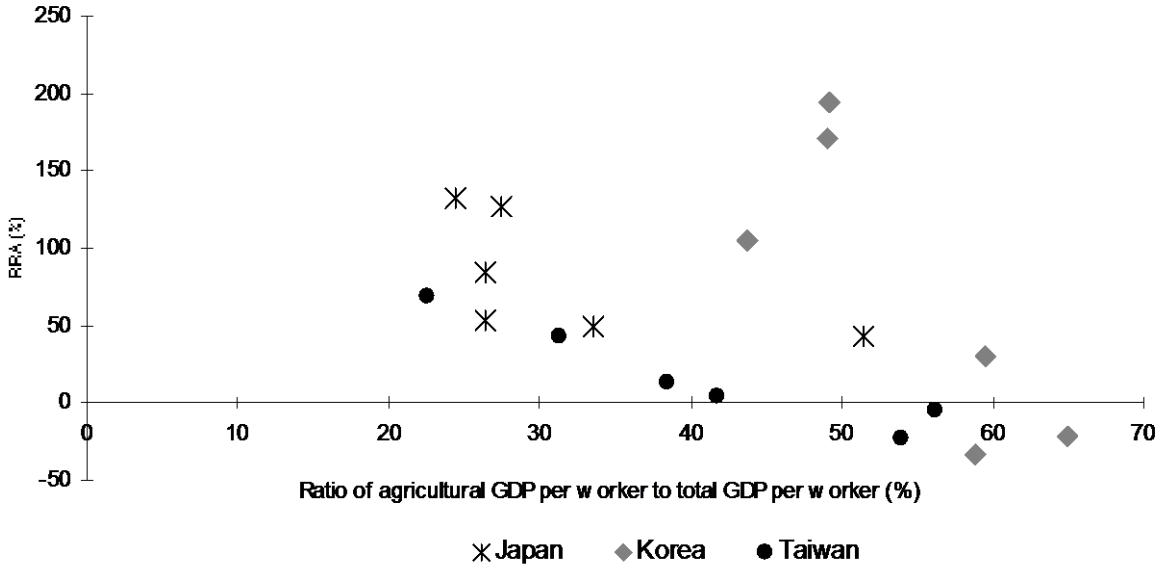
(percent and 2000 constant $ prices)



Source: Authors' computations

Figure 4: Relative rate of assistance to agriculture and relative GDP per agricultural worker, Japan, Korea and Taiwan, 1955 to 2004

(percent and 2000 constant $ prices)



Source: Authors' computations

Table 1: Economic growth and structural transformation in Japan, Korea and Taiwan, 1955 to 2004

		1955	1960	1970	1980	1990	2000
Real GDP per capita in 2000 constant $ prices[a]	Japan	3,128	4,509	11,391	15,520	21,703	23,971
	Korea	1,429	1,458	2,552	4,497	9,593	15,702
	Taiwan	1,241	1,444	2,846	5,963	11,248	19,184
Share of agriculture in GDP (percent)	Japan	17.4	9.0	4.2	2.4	1.7	1.1
	Korea	46.9	39.1	29.2	16.2	8.9	4.9
	Taiwan	28.9	28.2	15.3	7.5	4.0	2.0
Share of agriculture in economically active population (percent)[a]	Japan	33.8	26.8	15.9	9.1	6.2	4.5
	Korea	79.7	60.2	49.1	37.1	18.1	10.0
	Taiwan	53.6	50.2	36.7	19.5	12.8	8.9
Share of farm household popn in total population (percent)	Japan	40.7	36.5	25.1	18.3	14	8.2
	Korea	61.9	58.2	44.7	28.4	15.5	8.6
	Taiwan	50.7	49.8	40.9	30.3	21.1	16.5
Agricultural GDP per worker / total GDP per worker (percent)	Japan	51.5	33.6	26.4	26.4	27.4	24.4
	Korea	58.8	65.0	59.5	43.7	49.2	49.0
	Taiwan	53.9	56.2	41.7	38.5	31.3	22.5

[a] Shares of agriculture in GDP and labor force include forestry and fisheries.

Sources: Heston, Summers and Aten (2006); JMAFF, Nogyo Hakusho Fuzoku Tokei-hyo (Statistical Appendix of Agricultural White Paper), various issues; Korean Government, *Major Statistics of Agriculture, Forestry and Fisheries*, various issues. Taiwan Government, *Taiwan Agricultural Yearbook*, various issues.

Table 2: Changes in agricultural structure in Japan, Korea and Taiwan, 1955 to 2004

		1955	1960	1970	1980	1990	2000	2004
Number of farm households (‘000)	Japan	6,043	6,057	5,342	4,661	3,835	3,120	2,934
	Korea	2,218	2,350	2,483	2,155	1,768	1,383	1,240
	Taiwan	733	786	880	891	860	721	721
Population in farm households (‘000)	Japan	36,347	34,411	26,282	21,366	17,296	10,467	9,400
	Korea	13,300	14,559	14,422	10,827	6,661	4,031	3,415
	Taiwan	4,603	5,373	5,997	5,389	4,289	3,669	3,225
Persons per farm household	Japan	6.01	5.68	4.92	4.58	4.51	3.35	3.20
	Korea	6.00	6.20	5.81	5.02	3.77	2.91	2.75
	Taiwan	6.28	6.84	6.81	6.05	4.99	5.09	4.47
Arable land (‘000ha)	Japan	6,095	6,071	5,796	5,461	5,243	4,830	4,714
	Korea	1,995	2,025	2,298	2,196	2,109	1,918	1,836
	Taiwan	873	869	905	907	890	852	836
Arable land per farm household (ha)	Japan	1.01	1.00	1.08	1.17	1.37	1.55	1.61
	Korea	0.90	0.86	0.93	1.02	1.19	1.39	1.48
	Taiwan	1.19	1.11	1.03	1.02	1.03	1.18	1.16
Share of agric income in total farm household income (percent)	Japan	70.7	49.5	31.9	17.0	13.8	13.1	14.3
	Korea	na	na	75.8	65.2	56.8	47.2	39.3
	Taiwan	na	na	48.7	24.8	20.1	17.6	22.0
Share of rice in value of agric. production (percent)	Japan	na	47.4	37.9	30.0	27.8	25.4	22.8
	Korea	na	59.3	37.3	34.1	36.9	32.9	27.6
	Taiwan	37.4	36.5	25.7	19.8	12.1	9.6	7.1

Sources: JMAFF, *Nogyo Hakusho Fuzoku Tokei-hyo* (Statistical Appendix of Agricultural White Paper); Korean Government, *Major Statistics of Agriculture, Forestry and Fisheries*; Taiwan Government, *Taiwan Agricultural Yearbook*; various issues.

Table 3: Nominal rates of assistance to selected agricultural products, Japan, Korea and Taiwan, 1955 to 2007 (percent)

(a) Japan

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Import-competing products	**53.7**	**66.5**	**79.9**	**77.8**	**110.8**	**111.8**	**153.1**	**149.3**	**147.3**	**146.5**	**124.3**
Rice	72.5	91.0	122.9	164.9	210.8	267.2	591.6	656.2	535.4	607.0	362.8
Barley	35.7	38.7	16.5	10.1	63.1	88.6	203.6	141.7	129.0	121.5	197.6
Wheat	36.1	39.1	42.4	25.4	76.2	111.8	170.3	200.4	204.2	128.6	269.5
Beef	27.4	68.3	130.8	106.0	215.3	136.7	208.9	177.0	191.8	149.1	39.3
Pigmeat	17.9	59.8	12.4	-3.4	2.9	12.6	0.5	5.7	10.3	5.5	138.0
Poultry	33.1	42.8	33.5	36.7	31.1	16.8	17.6	25.1	41.4	74.0	11.7
Egg	3.0	-3.3	-5.3	-2.8	-3.3	1.4	19.9	23.2	33.8	27.6	17.1
Milk	44.2	96.2	162.1	165.4	385.7	211.5	365.2	280.3	238.0	273.2	101.0
Apple	na	na	na	na	na	na	32.0	24.1	27.7	31.4	17.3
Cabbage	na	na	na	na	na	na	10.3	31.1	127.5	177.5	204.6
Cucumber	na	na	na	na	na	na	57.1	17.4	29.8	43.2	31.1
Grape	na	na	na	na	na	na	87.2	82.2	117.7	177.4	178.6
Mandarin	na	na	na	na	na	na	21.1	44.8	47.3	32.4	46.4
Pear	na	na	na	na	na	na	35.0	24.0	64.2	157.3	128.7
Spinach	na	na	na	na	na	na	89.2	138.0	236.7	134.4	32.3
Strawberry	na	na	na	na	na	na	11.0	25.1	26.5	16.8	7.2
Onion	na	na	na	na	na	na	55.3	80.8	144.4	284.2	294.9
Soybean	na	na	na	na	na	410.7	259.4	21.3	42.2	67.2	68.5
Sugar	na	na	na	na	na	229.6	198.3	158.4	159.0	154.7	106.6
Exportables	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.
Total of covered products	53.7	66.5	79.9	77.8	110.8	111.8	153.1	149.3	147.3	146.5	107.4
-- from domestic measures	-0.4	3.1	10.0	9.2	10.9	9.6	8.0	6.0	4.5	4.5	4.0
-- from border (import) measures	54.1	63.4	69.9	68.6	99.9	102.1	145.2	143.3	142.8	142.0	102.9
Dispersion of covered products [b]	39.4	40.3	69.4	82.2	156.1	142.6	175.3	161.5	136.1	142.5	116.0
% coverage (at undistorted prices)	69	65	59	55	55	56	69	68	67	67	76

Table 3 (continued): Nominal rates of assistance to selected agricultural products, Japan, Korea and Taiwan, 1955 to 2007
(percent)

(b) Korea

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Import-competing products [a]	**-3.9**	**4.4**	**16.6**	**47.6**	**73.8**	**122.8**	**166.7**	**201.9**	**182.9**	**213.6**	**116.4**
Rice	-8.2	-7.0	-5.4	31.3	59.6	118.4	214.4	265.9	294.3	385.9	213.3
Barley	41.2	83.5	72.3	120.3	101.2	165.9	357.0	524.3	543.0	562.8	275.6
Wheat	-43.0	-26.7	-11.2	0.4	26.5	92.2	144.4	216.0	122.8	135.4	na
Beef	38.8	34.4	64.9	73.9	162.6	163.2	126.2	200.8	159.9	167.8	182.3
Pigmeat	-15.2	21.7	158.7	204.1	202.9	169.1	124.7	149.3	116.2	134.4	103.1
Poultry	-11.8	6.9	131.4	103.5	161.7	94.2	86.6	155.6	171.7	179.2	55.7
Egg	-27.1	-24.7	23.0	0.1	-7.5	14.9	19.4	28.0	26.6	54.3	31.6
Milk	na	na	173.3	108.8	189.0	179.8	185.2	203.7	140.7	149.8	137.0
Cabbage	na	na	na	na	na	na	30.0	30.0	29.1	27.6	27.0
Pepper	na	na	na	na	na	na	175.0	245.4	145.5	197.0	235.7
Soybean	-13.0	18.8	58.8	80.0	122.2	253.0	361.8	508.2	625.6	757.4	729.2
Garlic	na	na	na	na	na	na	250.3	288.8	213.3	122.6	128.1
Exportables [a]	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**
Total of covered products	**-3.9**	**4.4**	**16.6**	**47.6**	**73.8**	**122.8**	**166.7**	**201.9**	**182.9**	**213.6**	**147.3**
-- from domestic measures	-0.2	-0.4	0.9	4.2	7.1	5.3	5.5	5.9	6.1	5.2	4.4
-- from border (import) measures	-3.7	4.7	15.7	43.4	66.7	117.5	161.2	196.0	176.9	208.5	143.0
Dispersion of covered products [b]	34.1	40.5	85.0	82.5	89.0	80.1	114.8	164.2	200.1	225.4	206.0
% coverage (at undistorted prices)	48	57	67	65	65	61	60	57	51	46	55

Table 3 (continued): Nominal rates of assistance to selected agricultural products, Japan, Korea and Taiwan, 1955 to 2007
(percent)

(c) Taiwan

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-02	2003-07
Exportables [a]	**-23.5**	**7.5**	**5.7**	**20.7**	**13.4**	**35.9**	**89.5**	**161.4**	**167.6**	**203.1**	n.a.
Rice	-29.6	-6.6	-17.9	-9.4	-7.6	32.5	103.3	161.4	167.6	203.1	n.a.
Pigmeat [d]	-8.1	64.0	99.7	98.3	60.6	42.6	64.8	n.ap.	n.ap.	n.ap.	n.a.
Import-competing products [a]	**-33.0**	**5.3**	**21.7**	**26.7**	**32.5**	**49.1**	**55.4**	**93.6**	**126.3**	**160.0**	n.a.
Wheat	48.2	36.0	39.4	32.2	57.2	92.3	n.a.	n.a.	n.a.	n.a.	n.a.
Beef	13.7	41.2	28.8	22.0	79.6	77.0	101.3	98.5	82.6	72.8	n.a.
Pigmeat [d]	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	107.1	131.3	173.2	n.a.
Poultry	-47.5	-3.7	21.2	27.1	30.0	63.6	84.6	143.0	228.7	279.5	n.a.
Egg [e]	n.ap.	n.ap.	n.ap.	n.ap.	n.ap.	0.7	26.8	23.9	17.9	24.7	n.a.
Nontradable [a]	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**n.ap.**	**n.ap.**	**n.ap.**	**n.ap.**	n.a.
Egg [e]	0.0	0.0	0.0	0.0	0.0	0.0	n.ap.	n.ap.	n.ap.	n.ap.	n.a.
Total of covered products [a]	**-23.2**	**7.2**	**6.2**	**20.0**	**14.0**	**35.1**	**76.1**	**109.5**	**134.0**	**167.8**	n.a.
Dispersion of covered products [b]	33.4	35.3	47.5	40.5	40.5	34.5	56.9	66.1	86.9	106.4	n.a.
% coverage (at undistorted prices)	53	49	49	48	50	42	35	34	35	36	n.a.

[a] Weighted averages, with weights based on the unassisted value of production.
[b] Dispersion is a simple 5-year average of the annual standard deviation around the weighted mean of NRAs of covered products.
[c] n.a. = data not available; n.ap. = not applicable.
[d] Pigmeat changed trade status in 1989, from import-competing to exportable. The period average reported here corresponds to 1985-88 for the import-competing product, and 1989-94 for the exportable product.
[e] Eggs were assumed to be a non-tradable with zero distortions prior to 1983.
[f] n.a. = data not available; n.ap. = not applicable (because shown elsewhere in the table with the opposite trade status).
Source: Anderson and Valenzuela (2008), based on authors' spreadsheet.

Table 4: Nominal rates of assistance to agricultural relative to non-agricultural industries,[e] Japan, Korea and Taiwan, 1955 to 2007
(percent)

(a) Japan

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Covered products	53.7	66.5	79.9	77.8	110.8	111.8	153.1	149.3	147.3	146.5	107.4
Non-covered products	5.3	6.5	7.7	8.0	12.1	13.0	23.7	26.7	42.0	50.5	18.6
All agriculture (excl NPS)	38.8	45.8	50.4	46.9	65.9	68.3	112.4	110.5	112.8	115.2	70.9
All importables	46.1	55.0	62.1	58.1	81.2	82.1	127.5	124.4	127.6	129.1	124.3
All exportables	na	na	na	na	na	na	na	na	na	na	na
All nontradables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.8
TBI	-0.32	-0.35	-0.38	-0.37	-0.45	-0.45	-0.56	-0.55	-0.56	-0.56	-0.55
Non-product specific (NPS)	na	na	na	na	4.8	4.0	6.4	5.8	6.8	5.1	3.3
Inputs	na	na	na	na	4.8	4.0	6.4	5.8	6.8	5.1	3.3
Other	na	na	na	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All agriculture (incl NPS)	38.8	45.8	50.4	46.9	66.8	72.3	118.8	116.3	119.6	120.4	74.3
Decoupled payments	0.0	0.0	0.0	0.0	3.6	15.1	7.1	2.5	2.7	4.6	5.0
All agriculture (incl NPS & dec)	38.8	45.8	50.4	46.9	70.4	87.4	125.9	118.9	122.3	124.9	79.3
All agricultral tradables (incl NPS)	46.1	55.0	62.1	58.1	87.6	86.1	133.8	130.2	134.4	134.2	127.7
All nonag tradables	2.5	3.9	3.8	2.8	1.6	1.1	1.3	1.1	0.8	0.7	0.6
Relative rate of assistance, RRA [d]	**42.5**	**49.1**	**56.2**	**53.7**	**84.6**	**84.0**	**130.9**	**127.6**	**132.4**	**132.7**	**126.4**

Table 4 (continued): Nominal rates of assistance to agricultural relative to non-agricultural industries,[e] Japan, Korea and Taiwan, 1955 to 2007
(percent)

(b) Korea

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Covered products	-3.9	4.4	16.6	47.6	73.8	122.8	166.7	201.9	182.9	213.6	147.3
Non-covered products	-1.7	-0.2	7.0	15.3	25.3	37.4	64.3	88.0	74.6	71.7	49.3
All agriculture (excl NPS)	-3.2	4.0	13.4	35.7	56.3	89.4	126.1	152.8	129.8	137.3	80.6
All importables	-3.3	4.9	16.3	46.1	71.8	118.6	159.8	197.6	164.8	171.9	116.4
All exportables	na	na	na	na	na	na	na	na	na	na	na
All nontradables	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All nontradables	0.03	-0.05	-0.14	-0.32	-0.42	-0.54	-0.62	-0.66	-0.62	-0.63	-0.54
Non-product specific (NPS)	na	na	na	na	0.6	0.7	2.2	7.1	7.3	4.4	3.9
Inputs	na	na	na	na	0.6	0.7	2.2	7.1	7.3	4.4	3.9
Other	na	na	na	na	0.0	0.0	0.0	0.0	0.0	0.0	0.0
All agriculture (incl NPS)	-3.2	4.0	13.4	35.7	56.4	90.1	128.1	159.8	137.0	141.7	84.4
Decoupled payments	0.0	0.0	0.0	0.0	0.1	0.4	0.5	5.3	2.7	7.2	12.3
All agriculture (incl NPS & dec)	-3.2	4.0	13.4	35.7	56.4	90.5	128.6	165.2	139.7	148.8	96.8
All agricultral tradables (incl NPS)	-3.3	4.9	16.3	46.1	71.9	119.3	161.7	204.7	171.9	176.3	120.3
All nonag tradables	45.6	37.1	22.3	11.4	11.7	6.8	5.7	3.3	2.3	1.7	1.5
Relative rate of assistance, RRA [d]	**-32.6**	**-21.4**	**-4.8**	**30.5**	**54.0**	**105.4**	**147.8**	**195.0**	**165.8**	**171.6**	**117.0**

Table 4 (continued): Nominal rates of assistance to agricultural relative to non-agricultural industries,[e] Japan, Korea and Taiwan, 1955 to 2007 (percent)

(c) Taiwan)

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-02	2003-07
Covered products [a]	-23.2	7.2	6.2	20.0	14.0	35.1	76.1	109.5	134.0	167.8	n.a.
Non-covered products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	n.a.
All agricultural products [a]	-11.8	3.5	3.0	9.2	7.0	14.6	26.4	37.2	45.5	60.0	n.a.
Non-product specific (NPS) assistance	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Total agricultural NRA (incl. NPS) [b]	-11.8	3.5	3.0	9.2	7.0	14.6	26.4	37.2	45.5	60.0	n.a.
Trade bias index [c]	-0.15	0.05	0.02	0.12	0.05	0.15	0.27	0.11	0.02	0.00	n.a.
Assistance to just tradables:											
All agricultural tradables	-15.8	4.7	3.9	12.0	8.9	18.5	32.7	45.0	53.6	69.2	n.a.
All non-agricultural tradables	8.8	9.3	8.8	7.5	7.0	5.2	4.5	2.6	1.8	1.1	n.a.
Relative rate of assistance, RRA [d]	**-22.5**	**-4.2**	**-4.5**	**4.2**	**1.7**	**12.7**	**27.0**	**41.3**	**51.0**	**67.3**	n.a.

[a] NRAs including product-specific input subsidies.
[b] NRAs including product-specific input subsidies and non-product-specific (NPS) assistance. Total of assistance to primary factors and intermediate inputs divided to total value of primary agriculture production at undistorted prices (%).
[c] Trade bias index is TBI = $(1+NRAag_x/100)/(1+NRAag_m/100) – 1$, where $NRAag_m$ and $NRAag_x$ are the average percentage NRAs for the import-competing and exportable parts of the agricultural sector.
[d] The RRA is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.
[e] n.a. = data not available; n.ap. = not applicable.

Source: Anderson and Valenzuela (2008), based on authors' spreadsheet.

Table 5: Consumer tax equivalents for selected agricultural products, Japan, Korea and Taiwan, 1955 to 2007
(percent)

(a) Japan

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Apple	na	na	na	na	na	na	30.8	23.8	27.5	31.0	17.0
Barley	34.9	32.6	10.2	5.8	20.3	29.1	158.1	131.9	118.9	105.9	114.3
Beef	27.4	68.3	130.8	106.0	215.3	136.7	208.9	177.0	191.8	149.1	38.5
Cabbage	na	na	na	na	na	na	9.2	30.8	127.0	176.6	204.0
Cucumber	na	na	na	na	na	na	56.4	17.2	29.7	42.9	30.9
Egg	3.0	-3.3	-5.3	-2.8	-3.3	1.4	19.7	22.9	33.6	27.2	17.0
Grape	na	na	na	na	na	na	85.3	81.6	117.2	176.3	177.8
Mandarin	na	na	na	na	na	na	20.0	44.5	47.0	32.0	46.0
Milk	44.2	96.2	162.1	165.4	385.7	211.5	365.2	280.3	238.0	273.2	93.5
Onion	na	na	na	na	na	na	54.0	80.4	143.9	282.9	294.0
Pear	na	na	na	na	na	na	35.0	24.0	64.2	157.3	103.4
Pigmeat	17.9	59.8	12.4	-3.4	2.9	12.6	0.5	5.7	10.3	5.5	138.0
Poultry	33.1	42.8	33.5	36.7	31.1	16.8	17.6	25.1	41.4	74.0	11.7
Rice	73.1	85.7	103.9	137.3	179.6	232.6	548.5	613.2	506.4	574.6	348.6
Soybean	na	na	na	na	na	0.0	0.0	0.0	0.0	0.0	0.0
Spinach	na	na	na	na	na	na	89.2	138.0	236.7	134.4	32.3
Strawberry	na	na	na	na	na	na	10.0	24.8	26.2	16.4	7.0
Sugar	na	na	na	na	na	167.0	185.9	154.8	155.4	151.6	119.6
Wheat	35.9	33.0	27.4	14.1	26.7	37.2	136.1	108.4	73.4	68.7	73.6
All covered products	**53.0**	**62.2**	**66.8**	**67.6**	**93.2**	**98.8**	**134.9**	**119.3**	**116.1**	**106.6**	**81.0**
Import-competing	53.0	62.2	66.8	67.6	93.2	98.8	134.9	119.3	116.1	106.6	86.9
Exportables	na	na	na	na	na	na	na	na	na	na	na
Dispersion, cov. products[b]	39.1	39.6	66.5	75.0	144.0	97.2	154.5	149.3	130.0	141.8	108.3

Table 5 (continued): Consumer tax equivalents for selected agricultural products, Japan, Korea and Taiwan, 1955 to 2007 (percent)

(b) Korea

Korea	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-07
Wheat	-46.2	-22.5	-11.1	1.1	16.2	46.0	132.8	167.4	80.5	80.6	na
Barley	40.8	77.8	64.9	96.6	57.3	119.6	325.6	411.5	341.2	327.5	174.4
Rice	-7.7	-5.5	-5.0	29.1	54.5	113.4	211.5	261.7	290.8	385.3	213.3
Beef	38.8	34.4	64.9	73.9	162.6	163.2	122.1	200.7	153.9	167.7	182.3
Pigmeat	-15.2	21.7	158.7	204.1	202.9	169.1	124.7	149.3	116.2	134.4	103.1
Poultry	-11.8	6.9	131.4	103.5	161.7	94.2	86.6	155.6	171.7	179.2	55.7
Egg	-27.1	-24.7	23.0	0.1	-7.5	14.9	19.4	28.0	26.6	54.3	31.6
Milk	na	na	173.3	108.8	189.0	179.8	185.2	203.7	140.7	149.8	137.0
Cabbage	na	na	na	na	na	na	30.0	30.0	29.1	27.6	27.0
Pepper	na	na	na	na	na	na	175.0	245.4	145.5	197.0	235.7
Soybean	-19.8	8.2	51.6	63.2	95.2	245.4	112.2	75.5	63.6	66.8	91.9
Garlic	na	na	na	na	na	na	250.3	288.8	213.3	122.6	128.1
All covered products	**-5.0**	**5.4**	**14.5**	**39.7**	**63.9**	**114.3**	**148.5**	**176.4**	**144.9**	**154.1**	**135.1**
Import-competing	-5.0	5.4	14.5	39.7	63.9	114.3	148.5	176.4	144.9	154.1	115.7
Exportables	na	na	na	na	na	na	na	na	na	na	na
Dispersion, cov products[b]	34.7	37.6	85.3	81.1	92.3	82.3	95.1	118.1	107.3	116.2	81.7

Table 5 (continued): Consumer tax equivalents for selected agricultural products, Japan, Korea and Taiwan, 1955 to 2007 (percent)

(c) Taiwan

	1955-59	1960-64	1965-69	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-02	2003-07
Rice	-29.6	-6.6	-17.9	-9.4	-7.6	32.5	103.3	161.4	167.6	203.1	na
Wheat	38.3	16.4	29.6	14.6	-1.6	-0.3	na	na	na	na	na
Beef	13.7	41.2	28.8	22.0	79.6	77.0	101.3	98.5	82.6	72.8	na
Pigmeat	-8.1	64.0	99.7	98.3	60.6	42.6	76.5	103.9	131.3	173.2	na
Poultry	-47.5	-3.7	21.2	27.1	30.0	63.6	84.6	143.0	228.7	279.5	na
Egg	0.0	0.0	0.0	0.0	0.0	0.7	26.8	23.9	17.9	24.7	na
All covered products [a]	**-21.1**	**7.7**	**6.9**	**19.0**	**15.2**	**38.4**	**82.7**	**116.5**	**136.8**	**166.5**	**na**
Import-competing	-6.1	13.2	26.0	23.3	27.3	49.0	74.7	102.1	129.1	159.5	na
Exportables	-23.7	7.0	5.2	19.1	13.7	36.2	89.6	161.4	167.6	203.1	na
Dispersion, cov products[b]	33.3	35.9	47.2	40.6	40.2	32.2	34.1	56.2	87.1	106.0	na

[a] Weighted averages, with weights based on the unassisted value of consumption where consumption is derived using the value of production and self-sufficiency ratios (derived from the FAOSTAT Database) as production/consumption.
[b] Dispersion is a simple 5-year average of the annual standard deviation around the weighted mean of CTEs of covered products.
[c] n.a. = data not available; n.ap. = not applicable.
Source: Anderson and Valenzuela (2008), based on authors' spreadsheet.

Table 6: Changes in direct tax burdens and the allocations of national government subsidies to agricultural and non-agricultural sectors, Japan, 1978 to 1937

(a) Tax burdens

	Direct tax burden[a]				Direct tax rate[b]	
	Agriculture		Non-agriculture		Agriculture	Non-agriculture
	(million yen)	(% of total)	(million yen)	(% of total)	(%)	(%)
1878-82	63.6	91	6.3	9		
1888-92	58.5	86	9.8	14	14.9	2.0
1898-02	99.1	74	35.4	26	11.7	2.7
1908-12	153.4	54	132.2	46	11.2	5.5
1918-22	295.7	41	431.1	59	7.5	4.8
1928-32	205.5	33	421.3	67	8.1	3.8
1933-37	197.3	26	559.2	74	6.5	4.0

(b) Subsidy allocations

	Subsidy receipt[c]				Subsidy rate[d]	
	Agriculture		Non-agriculture		Agriculture	Non-agriculture
	(million yen)	(% of total)	(million yen)	(% of total)	(%)	(%)
1881	0	0	0.7	100		
1891	0	0	2.5	100	0	0.49
1901	0.4	2	18.7	98	0.05	1.41
1911	0.3	1	27.8	99	0.02	1.09
1921	0.6	1	51.8	99	0.02	0.55
1931	21.4	17	101.5	83	1.17	1.11
1934	28.3	28	71.0	72	1.14	0.58

a Includes both national tax and local rates.
b Direct tax burden divided by sectoral NDP
c National government subsidies.
d Subsidy receipt divided by sectoral NDP.
Source: Tobata and Ohkawa (1956) for tax and subsidy data; Ohkawa and Shinohara for sectoral NDP data.

Table 7: Farm-nonfarm income disparity in Japan's economic development, 1885 to 2000

	GDP per capita (ppp at 2000)	Share of agriculture in GDP	Nominal rate of protection for rice	Tariff rate of rice	Average tariff rate, all products	Agriculture/ industry labour productivity ratio	Agriculture/ manufacturing terms of trade	Farm / non-farm house-hold income ratio
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	US$	%	%	%	%	%	1885=100	%
1885	1,092	45	15	-	-	75	100	76
1890	1,285	48	34	-	-	67	115	87
1900	1,498	39	21	-	3.7	49	102	52
1910	1,656	32	35	14	16.2	37	98	47
1920	2,154	30	16	10	10.7	50	99	48
1930	2,350	18	57	14	22.6	31	104	32
1935	2,693	18	134	41	23.8	24	136	38
1955	3,519	21	49	-	3.5	55	163	77
1960	5,063	13	98	-	6.5	39	169	70
1970	12,337	6	150	-	6.9	25	303	94
1980	17,056	4	205	-	2.5	25	342	116
1990	23,580	2	481	-	2.7	26	379	115
2000	26,220	1	560	778	2.1	22	347	101

Notes:

(1) GDP per capita in PPP at 2000 from World Bank (2006), linked with the series from OECD (2003).

(2) The share of agriculture in nominal GDP for 1885-1935 and share in NNP for 1885-1935 are from Ohkawa and Shinohara (1979, pp.273-81) 1960-2000 data are from World Bank (2006).

(3) Nominal rates of protection for rice for 1885-1960 are calculated by the difference between the domestic wholesale price of rice and the unit value of imported rice as percentage of the latter. For 1970-2000, it is calculated by the difference between the domestic wholesale price of rice and unit value of world rice imports multiplied by 1.18, expressed as a percentage of the latter. Data are from Kayo (1977) and Bank of Japan, *Yearbook of Wholesale Price Indexes*, various years for domestic wholesale price of rice, and Nihon Boeki Seiran, Toyo Keizai Shinposha, 1935, *Yearbook of Japan Foreign Trade Statistics*, Japan Tariff Association, and FAOSTAT, FAO for border prices.

(4) Tariffs for 1910, 1920, 1930 and 1935 are tariffs in 1908, 1918, 1928 and 1933, respectively, from Ohkawa, Shinohara and Umenura (1967). Tariff rate for 2000 is ad valorem tariff equivalent of specific duty, 341 yen/kg, which was reported to the WTO by the Japanese government.

(5) Tariffs for 1900, 1910, 1920, 1930 and 1935 are tariffs in 1898, 1908, 1918, 1928 and 1933, respectively, from Ohkawa, Shinohara and Umenura (1967). Tariffs for 1955-2000 are average tariffs calculated by total tariff revenue as percentage of total import cif value in the Ministry of Finance, *Monthly Report of Financial Statistics*, various issues.

(6) The ratio of real GDP per worker in agriculture (including forestry and fishery) to real GDP per worker in industry (including mining). 1885-1970 from Hayami (1986, p.120). 1980-2000 values are extended from 1970 using real GDPs and the numbers of employed persons from *Annual Reports of National Accounts*.

(7) 1985-1960: the ratio between the price index of agricultural products and the price index of manufacturing products in Ohkawa, Shinohara and Umenura (1967, pp.165 and192-3). 1970-80 extended from 1960 using the Ministry of Agriculture, Forestry and Fishery's price index of agricultural products and the Bank of Japan's domestic corporate goods price index for manufacturing industry products.

(8) 1885-1935: the ratio in household income per household member between farm and non-farm households in Otsuki and Takamatsu (1982). 1955-2000 values are the ratio in per-capita income between farm households and employees' households based on the Ministry of Agriculture's *Farm Household Economy Survey* and the Ministry of Internal Affairs' *National Survey of Family Income and Expenditure*. Farm households in 1990-2000 exclude non-commercial farm households.

Sources: Authors' compilation drawing on data sources noted above

Appendix Table A1: Annual distortion estimates, **Japan**, 1955 to 2007
(a) Nominal rates of assistance to covered products
(percent)

	Apple	Barley	Beef	Cabbage	Cucumber	Egg	Grape	Mandarin	Milk	Onion	Pear
1955	na	26	-5	na	na	-63.5	na	na	49	na	na
1956	na	27	44	na	na	17.9	na	na	47	na	na
1957	na	31	43	na	na	42.6	na	na	41	na	na
1958	na	50	38	na	na	18.2	na	na	52	na	na
1959	na	44	18	na	na	0.0	na	na	31	na	na
1960	na	61	44	na	na	0.0	na	na	51	na	na
1961	na	55	65	na	na	-6	na	na	75	na	na
1962	na	24	79	na	na	4	na	na	92	na	na
1963	na	30	90	na	na	-9	na	na	125	na	na
1964	na	24	63	na	na	-6	na	na	137	na	na
1965	na	17	122	na	na	-11	na	na	112	na	na
1966	na	5	115	na	na	-2	na	na	103	na	na
1967	na	10	115	na	na	-2	na	na	112	na	na
1968	na	23	136	na	na	-1	na	na	199	na	na
1969	na	27	167	na	na	-9	na	na	284	na	na
1970	na	38	128	na	na	-1	na	na	266	na	na
1971	na	10	106	na	na	-9	na	na	157	na	na
1972	na	71	112	na	na	3	na	na	92	na	na
1973	na	-14	114	na	na	-9	na	na	167	na	na
1974	na	-54	69	na	na	3	na	na	145	na	na
1975	na	na	205	na	na	5	na	na	144	na	na
1976	na	4	203	na	na	-14	na	na	337	na	na
1977	na	43	242	na	na	-5	na	na	502	na	na
1978	na	134	266	na	na	1	na	na	545	na	na
1979	na	72	159	na	na	-4	na	na	400	na	na
1980	na	44	138	na	na	-3	na	na	259	na	na
1981	na	62	138	na	na	13	na	na	173	na	na
1982	na	41	123	na	na	-3	na	na	146	na	na
1983	na	155	139	na	na	-2	na	na	214	na	na
1984	na	142	146	na	na	2	na	na	265	na	na
1985	na	226	156	na	na	16	na	na	308	na	na
1986	64	227	252	5	24	52	53	20	453	83	42
1987	20	255	230	5	24	-4	55	20	494	83	23
1988	23	181	227	25	28	16	61	23	364	27	38
1989	20	130	179	5	154	20	180	20	206	27	38
1990	21	94	168	6	5	19	88	21	230	30	8
1991	20	115	164	5	17	37	64	20	268	49	28
1992	20	134	143	5	7	6	56	26	254	33	38
1993	39	146	183	5	44	16	81	20	290	128	8
1994	20	220	228	135	14	38	123	137	360	165	38
1995	27	151	183	136	24	55	121	60	295	94	83
1996	19	72	196	79	14	27	107	88	208	83	29
1997	19	90	200	113	32	25	86	19	205	106	16
1998	56	129	196	162	33	6	117	52	200	207	87
1999	18	203	184	148	45	56	158	18	281	232	106
2000	44	154	174	193	44	63	158	42	296	222	219
2001	57	119	206	153	50	28	155	17	185	261	199
2002	18	125	105	166	39	22	174	25	324	302	224
2003	17	102	98	153	42	2	196	20	305	294	61
2004	21	108	163	223	40	23	205	57	256	342	84
2005	17	284	40	240	47	17	203	37	119	344	76
2006	17	258	39	187	38	17	176	85	118	286	233
2007	17	51	39	187	8	17	157	17	65	255	77

	Pigmeat	Poultry	Rice	Soybean	Spinach	Strawberry	Sugar	Wheat	All covered
1955	3	-40	51	na	na	na	na	34	23
1956	-3	-41	67	na	na	na	na	31	50
1957	2	93	77	na	na	na	na	31	63
1958	0	59	79	na	na	na	na	42	65
1959	87	95	88	na	na	na	na	42	68
1960	94	99	94	na	na	na	na	44	75
1961	89	37	87	na	na	na	na	41	64
1962	55	13	66	na	na	na	na	36	53
1963	28	33	102	na	na	na	na	42	69
1964	33	31	107	na	na	na	na	33	71
1965	23	34	127	na	na	na	na	44	77
1966	17	27	128	na	na	na	na	40	79
1967	0	37	118	na	na	na	na	32	75
1968	11	45	115	na	na	na	na	43	82
1969	10	25	126	na	na	na	na	52	86
1970	-10	24	166	na	na	na	na	57	91
1971	3	53	193	na	na	na	na	56	87
1972	3	45	257	na	na	na	na	97	100
1973	-2	38	169	na	na	na	na	-8	79
1974	-12	24	39	na	na	na	na	-75	31
1975	4	26	94	na	na	na	na	-85	64
1976	-5	35	175	na	na	na	na	4	91
1977	-7	37	229	na	na	na	na	156	116
1978	20	40	285	na	na	na	na	212	156
1979	4	17	271	547	na	na	107	94	127
1980	6	22	227	391	na	na	100	66	100
1981	18	24	225	415	na	na	224	84	105
1982	7	12	248	533	na	na	243	93	97
1983	13	20	303	282	na	na	258	149	120
1984	19	6	332	433	na	na	323	167	136
1985	-1	7	413	631	na	na	310	182	148
1986	-5	29	645	264	103	10	215	172	168
1987	1	21	718	205	103	10	191	198	160
1988	7	23	637	119	147	13	159	163	157
1989	1	7	546	78	5	10	116	136	133
1990	-4	11	518	48	5	11	151	138	119
1991	11	14	544	34	33	10	156	226	127
1992	16	19	638	17	119	12	164	182	142
1993	1	44	818	0	103	32	168	212	149
1994	4	37	762	7	430	61	153	244	209
1995	8	31	758	13	140	46	148	290	177
1996	7	36	523	21	583	22	143	155	142
1997	8	32	441	43	234	19	135	174	130
1998	16	39	411	65	54	11	175	180	127
1999	12	69	544	68	173	33	194	222	160
2000	13	108	597	39	199	34	150	185	173
2001	16	73	597	41	108	20	152	153	146
2002	9	71	624	79	112	9	147	111	142
2003	-11	73	629	79	134	11	175	102	128
2004	1	45	588	98	119	9	150	92	143
2005	94	12	521	76	91	9	152	387	129
2006	162	12	318	109	3	6	109	358	109
2007	159	12	249	20	3	6	59	63	85

Appendix Table A1 (continued): Annual distortion estimates, **Japan**, 1955 to 2007
(b) Nominal and relative rates of assistance to all[a] agricultural products, to exportable[b] and import-competing [b] agricultural industries, and relative[c] to non-agricultural industries (percent)

	NRA, all agric products,[a] by component					NRA, agric tradables				
	NRA, covered products (1)	NRA, non-covered products (2)	NRA, non-product-specific support (3)	NRA, all ag products (incl NPS) (4)=1+2+3	NRA, all ag products (incl NPS and decoupled) (5)	NRA, ag export-ables (6)	NRA, ag import-competing (7)	NRA, all agric tradable goods [c] (8)=6+7	NRA, all non-ag tradable goods (9)	RRA[b] (10)
1955	23	2	na	17	17	na	20	20	2	17
1956	50	5	na	34	34	na	41	41	2	39
1957	63	6	na	43	43	na	53	53	2	50
1958	65	6	na	49	49	na	57	57	3	52
1959	68	7	na	52	52	na	60	60	3	55
1960	75	8	na	55	55	na	64	64	4	59
1961	64	6	na	47	47	na	55	55	4	50
1962	53	5	na	36	36	na	44	44	4	38
1963	69	7	na	47	47	na	57	57	4	51
1964	71	6	na	44	44	na	55	55	4	48
1965	77	7	na	49	49	na	60	60	4	54
1966	79	8	na	48	48	na	60	60	4	54
1967	75	7	na	45	45	na	57	57	4	51
1968	82	8	na	54	54	na	65	65	4	59
1969	86	9	na	56	56	na	68	68	4	62
1970	91	10	na	57	57	na	70	70	4	65
1971	87	9	na	54	54	na	66	66	3	61
1972	100	10	na	59	59	na	74	74	3	69
1973	79	8	na	45	45	na	57	57	2	53
1974	31	3	na	19	19	na	23	23	1	22
1975	64	7	na	39	39	na	48	75	1	73
1976	91	10	na	54	54	na	67	67	2	64
1977	116	13	na	72	72	na	88	88	2	84
1978	156	17	na	89	89	na	112	112	2	108
1979	127	14	4	79	97	na	92	96	1	93
1980	100	12	4	63	80	na	73	76	1	75
1981	105	12	4	68	83	na	77	81	1	79
1982	97	11	4	65	81	na	73	77	1	75
1983	120	14	4	77	92	na	87	92	1	90
1984	136	16	4	88	102	na	100	104	1	102
1985	148	17	5	96	110	na	109	114	1	111
1986	168	27	7	137	143	na	145	152	1	149
1987	160	23	8	131	136	na	137	145	1	142
1988	157	25	7	124	129	na	132	139	1	136
1989	133	26	6	106	111	na	113	119	1	117
1990	119	15	5	90	93	na	96	101	1	99
1991	127	19	5	95	98	na	102	107	1	105
1992	142	21	6	112	115	na	118	124	1	121
1993	149	29	7	112	114	na	121	128	1	125
1994	209	50	7	172	174	na	186	192	1	189
1995	177	43	8	140	142	na	151	159	1	156
1996	142	39	6	116	119	na	123	130	1	127
1997	130	34	6	106	109	na	111	118	1	116
1998	127	46	7	105	108	na	113	119	1	118
1999	160	49	7	131	133	na	140	147	1	145
2000	173	55	6	141	145	na	152	159	1	157
2001	146	50	5	119	124	na	129	134	1	132
2002	142	49	5	115	120	na	124	129	1	128
2003	128	46	5	103	108	na	111	115	1	114
2004	143	53	4	123	127	na	130	134	1	133
2005	129	0	3	88	93	na	148	151	1	150
2006	109	31	3	75	79	na	124	127	1	126
2007	85	24	4	60	65	na	101	104	1	103

a. NRAs including assistance to nontradables and non-product specific assistance.

b. NRAs including products specific input subsidies.
c. The Relative Rate of Assistance (RRA) is defined as 100*[(100+$NRAag^t$)/(100+$NRAnonag^t$)-1], where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Appendix Table A2.1 (continued): Annual distortion estimates, **Japan**, 1955 to 2007
(c) Value shares of primary production of covered[a] and non-covered products, (percent)

	Apple	Barley	Beef	Cabbage	Cucumber	Egg	Grape	Mandarin	Milk	Onion	Pear
1955	na	4	2	na	na	14	na	na	2	na	na
1956	na	5	2	na	na	6	na	na	3	na	na
1957	na	4	2	na	na	5	na	na	4	na	na
1958	na	4	2	na	na	6	na	na	5	na	na
1959	na	4	3	na	na	7	na	na	5	na	na
1960	na	3	2	na	na	8	na	na	5	na	na
1961	na	3	2	na	na	12	na	na	5	na	na
1962	na	2	2	na	na	10	na	na	4	na	na
1963	na	2	2	na	na	13	na	na	4	na	na
1964	na	1	3	na	na	12	na	na	4	na	na
1965	na	1	2	na	na	13	na	na	5	na	na
1966	na	1	2	na	na	11	na	na	4	na	na
1967	na	1	2	na	na	9	na	na	4	na	na
1968	na	1	2	na	na	10	na	na	3	na	na
1969	na	1	2	na	na	12	na	na	3	na	na
1970	na	0	3	na	na	11	na	na	3	na	na
1971	na	0	4	na	na	12	na	na	5	na	na
1972	na	0	4	na	na	11	na	na	7	na	na
1973	na	0	4	na	na	10	na	na	4	na	na
1974	na	0	4	na	na	7	na	na	4	na	na
1975	na	na	3	na	na	8	na	na	5	na	na
1976	na	0	3	na	na	10	na	na	3	na	na
1977	na	0	3	na	na	10	na	na	3	na	na
1978	na	0	3	na	na	9	na	na	3	na	na
1979	na	0	5	na	na	8	na	na	4	na	na
1980	na	0	5	na	na	10	na	na	5	na	na
1981	na	0	5	na	na	9	na	na	6	na	na
1982	na	0	6	na	na	8	na	na	7	na	na
1983	na	0	6	na	na	8	na	na	6	na	na
1984	na	0	6	na	na	8	na	na	5	na	na
1985	na	0	6	na	na	8	na	na	5	na	na
1986	2	0	6	2	3	8	1	3	5	1	1
1987	2	0	7	2	3	9	1	3	5	1	2
1988	2	0	7	2	3	7	1	3	6	2	1
1989	2	0	7	1	1	7	1	3	8	2	1
1990	2	0	6	2	3	7	1	3	7	2	2
1991	2	0	6	2	3	7	1	4	6	2	1
1992	3	0	7	1	3	7	1	3	7	2	2
1993	2	0	6	2	3	7	1	3	7	1	2
1994	3	0	6	1	4	7	1	2	7	2	2
1995	3	0	7	1	3	7	1	3	8	1	1
1996	3	0	6	1	3	8	1	3	9	1	2
1997	2	0	6	1	3	8	1	3	9	1	2
1998	2	0	5	1	3	8	1	3	9	1	1
1999	3	0	7	1	3	7	1	3	8	1	1
2000	2	0	8	1	3	7	1	3	9	1	1
2001	2	0	5	1	2	8	1	3	11	1	1
2002	2	0	7	1	3	8	1	3	7	1	1
2003	2	0	8	1	2	8	1	3	7	1	1
2004	3	0	8	1	2	9	1	2	9	1	1
2005	3	0	8	1	3	10	1	3	8	1	1
2006	3	0	8	1	3	9	1	2	8	1	1
2007	3	0	7	1	3	8	1	3	9	1	1

	Pigmeat	Poultry	Rice	Soybean	Spinach	Strawberry	Sugar	Wheat	Non-covered
1955	2	1	44	na	na	na	na	3	28
1956	3	2	40	na	na	na	na	3	37
1957	3	0	44	na	na	na	na	3	34
1958	3	1	50	na	na	na	na	3	28
1959	2	1	48	na	na	na	na	3	27
1960	2	1	45	na	na	na	na	3	30
1961	2	2	41	na	na	na	na	3	30
1962	3	3	39	na	na	na	na	2	35
1963	5	3	35	na	na	na	na	1	35
1964	5	2	29	na	na	na	na	2	43
1965	6	3	29	na	na	na	na	1	40
1966	6	3	28	na	na	na	na	1	44
1967	8	3	29	na	na	na	na	1	44
1968	8	3	33	na	na	na	na	1	38
1969	9	4	31	na	na	na	na	1	39
1970	11	4	24	na	na	na	na	0	42
1971	12	4	18	na	na	na	na	0	43
1972	12	5	16	na	na	na	na	0	45
1973	12	5	17	na	na	na	na	0	48
1974	11	4	25	na	na	na	na	1	44
1975	12	4	25	na	na	na	na	1	43
1976	14	5	19	na	na	na	na	0	46
1977	16	6	20	na	na	na	na	0	43
1978	14	6	18	na	na	na	na	0	48
1979	14	6	16	0	na	na	0	0	46
1980	14	6	14	0	na	na	0	0	46
1981	13	6	16	0	na	na	0	0	44
1982	14	7	15	0	na	na	0	0	42
1983	14	7	14	0	na	na	0	0	45
1984	13	8	15	0	na	na	0	0	44
1985	15	8	13	0	na	na	0	0	44
1986	19	7	11	0	1	2	1	0	27
1987	17	7	10	0	1	3	1	0	27
1988	15	6	10	0	1	3	1	0	30
1989	13	7	10	0	2	3	1	0	31
1990	13	6	9	0	2	2	1	0	32
1991	11	6	8	0	2	3	1	0	34
1992	12	6	9	0	1	3	1	0	30
1993	12	5	6	0	1	3	1	0	36
1994	14	6	12	0	1	3	1	0	27
1995	12	6	8	0	1	3	1	0	33
1996	12	6	10	0	0	3	1	0	31
1997	11	6	10	0	1	3	1	0	32
1998	10	6	9	0	2	3	1	0	35
1999	12	6	9	0	1	3	1	0	33
2000	12	5	8	1	1	4	1	0	33
2001	12	6	7	1	1	4	1	0	33
2002	13	6	7	0	1	4	1	0	34
2003	13	5	6	0	1	4	1	0	36
2004	14	7	8	0	1	4	1	0	27
2005	7	4	9	0	1	4	1	1	34
2006	5	5	11	0	3	4	1	0	34
2007	4	4	12	1	2	4	1	1	34

Source: Anderson and Valenzuela (2008), from authors' spreadsheet a. At farmgate undistorted prices

Appendix Table A2: Annual distortion estimates, Korea, 1955 to 2007
(a) Nominal rates of assistance to covered products
(percent)

	Barley	Beef	Cabbage	Egg	Garlic	Milk	Peppers	Pig meat	Poultry	Rice	Soybean	Wheat	All covered
1955	-11	7	na	na	na	na	na	-42	-43	-42	-33	-56	-38
1956	36	36	na	na	na	na	na	-39	-31	-6	-28	-41	-4
1957	90	54	na	na	na	na	na	-15	-6	26	-5	-32	27
1958	63	62	na	-16	na	na	na	29	9	-6	-11	-43	3
1959	27	35	na	-38	na	na	na	-8	13	-12	12	-43	-7
1960	65	53	na	-45	na	na	na	-2	6	-4	29	-41	1
1961	19	-3	na	-50	na	na	na	-41	-33	-44	-33	-56	-36
1962	19	21	na	-40	na	na	na	16	-13	-44	-23	-45	-32
1963	144	61	na	-13	na	na	na	68	12	25	61	-8	36
1964	171	40	na	25	na	na	na	67	62	32	60	16	52
1965	61	39	na	25	na	na	na	108	81	-2	44	-19	16
1966	43	26	na	24	na	na	na	114	81	-10	55	-15	7
1967	68	30	na	34	na	105	na	145	134	-14	104	-10	10
1968	85	87	na	30	na	210	na	235	203	-11	38	-6	19
1969	105	143	na	2	na	205	na	191	158	9	53	-6	32
1970	144	119	na	28	na	216	na	207	152	39	131	10	64
1971	149	120	na	9	na	133	na	286	153	63	76	17	82
1972	198	85	na	-8	na	41	na	222	80	88	102	25	95
1973	74	18	na	-7	na	60	na	193	52	11	48	-20	23
1974	36	28	na	-21	na	94	na	112	80	-44	43	-31	-27
1975	59	80	na	-17	na	133	na	154	107	-4	59	-20	13
1976	76	128	na	-14	na	187	na	189	144	48	108	-4	60
1977	112	218	na	-11	na	189	na	169	182	65	118	53	76
1978	131	224	na	-2	na	175	na	270	212	66	174	61	89
1979	129	162	na	6	na	261	na	232	164	123	152	42	131
1980	57	137	na	12	na	223	na	181	90	109	199	89	112
1981	125	186	na	4	na	194	na	285	122	98	252	86	119
1982	170	190	na	8	na	169	na	196	90	122	290	92	131
1983	241	159	na	36	na	153	na	106	87	130	292	110	129
1984	238	144	na	14	na	160	na	78	82	133	232	84	123
1985	293	68	na	23	na	128	na	164	75	169	275	69	144
1986	399	97	30	11	250	211	175	144	64	196	302	99	158
1987	417	93	30	3	250	238	175	100	57	222	415	171	161
1988	336	178	30	7	250	162	175	119	112	226	410	204	177
1989	341	195	30	54	250	187	175	97	126	259	407	178	195
1990	363	207	30	39	250	152	175	190	142	276	459	222	209
1991	494	223	30	9	250	289	175	172	136	254	461	265	200
1992	461	206	30	40	250	158	175	95	138	254	508	201	184
1993	534	171	30	12	310	197	281	116	165	283	554	195	198
1994	769	197	30	39	383	222	421	173	198	262	559	197	219
1995	632	223	30	59	210	154	204	130	171	340	734	200	214
1996	403	200	29	15	44	128	108	138	185	336	604	134	186
1997	635	144	29	17	232	147	153	88	161	284	453	99	177
1998	449	71	29	7	373	118	87	60	135	199	393	64	127
1999	596	162	29	35	207	157	176	166	206	313	945	116	210
2000	740	139	28	30	30	205	192	124	220	390	908	157	216
2001	412	175	28	42	8	105	221	93	201	374	702	137	194
2002	561	254	28	40	88	154	144	122	164	422	780	130	221
2003	572	142	27	55	205	139	267	134	131	395	750	129	211
2004	528	129	27	105	282	145	162	199	180	350	647	124	226

2005	320	164	27	33	245	149	154	82	58	226	791	na	147
2006	322	200	27	28	116	173	335	125	75	205	813	na	159
2007	185	183	27	35	23	89	218	102	34	210	584	na	137

Appendix Table A2 (continued): Annual distortion estimates, Korea, 1955 to 2007

(b) Nominal and relative rates of assistance to all[a] agricultural products, to exportable[b] and import-competing [b] agricultural industries, and relative[c] to non-agricultural industries (percent)

	NRA, all agric products,[a] by component					NRA, agric tradables				
	NRA, covered products (1)	NRA, non-covered products (2)	NRA, non-product-specific support (3)	NRA, all ag products (incl NPS) (4)=1+2+3	NRA, all ag products (incl NPS and decoupled) (5)	NRA, ag export-ables (6)	NRA, ag import-competing (7)	NRA, all agric tradable goods [c] (8)=6+7	NRA, all non-ag tradable goods (9)	RRA[b] (10)
1955	-38	-17	na	-28	-28	na	-36	-36	48	-57
1956	-4	0	na	-2	-2	na	-2	-2	35	-28
1957	27	10	na	17	17	na	26	26	35	-7
1958	3	1	na	2	2	na	3	3	41	-27
1959	-7	-3	na	-5	-5	na	-7	-7	69	-45
1960	1	0	na	1	1	na	1	1	66	-39
1961	-36	-17	na	-27	-27	na	-33	-33	37	-51
1962	-32	-14	na	-23	-23	na	-29	-29	34	-47
1963	36	13	na	27	27	na	35	35	26	7
1964	52	17	na	42	42	na	51	51	23	23
1965	16	6	na	13	13	na	15	15	27	-9
1966	7	3	na	6	6	na	7	7	23	-13
1967	10	4	na	8	8	na	9	9	23	-11
1968	19	9	na	15	15	na	19	19	21	-2
1969	32	13	na	25	25	na	31	31	18	11
1970	64	22	na	48	48	na	62	62	17	38
1971	82	26	na	61	61	na	79	79	12	60
1972	95	27	na	72	72	na	91	91	12	71
1973	23	9	na	18	18	na	22	22	9	12
1974	-27	-7	na	-21	-21	na	-24	-24	8	-29
1975	13	5	na	10	10	na	12	12	9	3
1976	60	23	na	48	48	na	58	58	11	43
1977	76	28	na	59	59	na	75	75	17	50
1978	89	33	na	66	66	na	86	86	12	66
1979	131	37	0	99	99	na	128	129	10	108
1980	112	34	1	80	81	na	107	108	8	93
1981	119	37	0	90	91	na	116	116	6	103
1982	131	39	1	97	97	na	127	128	7	114
1983	129	39	1	93	94	na	125	125	7	110
1984	123	38	1	90	90	na	119	120	6	107
1985	144	46	1	101	101	na	138	139	6	126
1986	158	69	1	127	127	na	156	156	6	141
1987	161	67	2	126	127	na	155	157	6	141
1988	177	69	3	141	141	na	169	172	6	157
1989	195	70	4	145	145	na	180	184	4	173
1990	209	76	6	160	166	na	196	201	4	190
1991	200	77	6	151	157	na	187	193	4	183
1992	184	81	6	149	155	na	179	186	3	176
1993	198	96	8	161	166	na	200	209	3	200
1994	219	109	9	178	182	na	226	235	3	226
1995	214	87	10	158	162	na	198	208	2	200
1996	186	50	7	124	127	na	145	153	3	146
1997	177	77	8	137	139	na	164	171	2	165
1998	127	75	6	111	113	na	129	134	2	129
1999	210	83	5	155	158	na	188	194	2	188
2000	216	60	5	138	142	na	166	171	2	166
2001	194	56	4	127	134	na	150	154	2	149
2002	221	66	5	139	146	na	168	173	2	168
2003	211	85	4	146	155	na	181	185	2	180
2004	226	91	3	159	166	na	196	199	1	195

2005	147	49	4	87	102	na	114	117	2	114
2006	159	53	4	89	102	na	136	139	2	136
2007	137	46	4	76	86	na	100	104	2	101

a. NRAs including assistance to nontradables and non-product specific assistance.

b. NRAs including products specific input subsidies.

c. The Relative Rate of Assistance (RRA) is defined as 100*[(100+$NRAag^t$)/(100+$NRAnonag^t$)-1], where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Appendix Table A2 (continued): Annual distortion estimates, Korea, 1955 to 2007
(c) Value shares of primary production of covered[a] and non-covered products,
(percent)

	Barley	Beef	Cabbage	Egg	Garlic	Milk	Peppers	Pigmeat	Poultry	Rice	Soybean	Wheat	Non-covered
1955	6	1	na	na	na	na	na	4	2	39	1	1	48
1956	7	1	na	na	na	na	na	4	1	31	1	1	54
1957	5	1	na	na	na	na	na	3	1	30	1	1	58
1958	4	1	na	1	na	na	na	3	1	35	1	1	53
1959	5	2	na	3	na	na	na	4	1	34	1	1	50
1960	4	2	na	4	na	na	na	4	1	32	1	1	51
1961	7	1	na	1	na	na	na	2	1	39	1	1	47
1962	7	1	na	2	na	na	na	1	1	38	1	1	49
1963	5	1	na	2	na	na	na	2	1	47	1	1	40
1964	9	2	na	2	na	na	na	2	1	52	2	1	28
1965	11	2	na	2	na	na	na	2	1	46	2	1	33
1966	12	2	na	2	na	na	na	2	1	48	1	1	32
1967	10	2	na	2	na	0	na	2	1	47	2	1	35
1968	10	2	na	2	na	0	na	1	1	47	2	1	33
1969	8	2	na	4	na	0	na	2	1	48	1	1	33
1970	8	2	na	4	na	0	na	2	1	41	2	1	38
1971	9	3	na	5	na	0	na	2	2	40	2	1	37
1972	8	3	na	6	na	0	na	2	2	41	2	1	35
1973	7	4	na	4	na	0	na	2	2	45	2	0	34
1974	5	2	na	3	na	0	na	1	1	53	1	0	33
1975	7	3	na	4	na	0	na	2	1	51	2	0	29
1976	7	3	na	5	na	0	na	2	1	46	2	0	33
1977	3	2	na	5	na	1	na	3	1	47	2	0	36
1978	3	3	na	4	na	1	na	3	1	43	1	0	41
1979	4	5	na	4	na	1	na	5	2	43	1	0	35
1980	3	6	na	5	na	1	na	7	2	33	1	0	42
1981	3	5	na	4	na	1	na	5	1	43	1	0	36
1982	2	5	na	5	na	1	na	7	2	39	1	0	38
1983	2	5	na	4	na	2	na	8	2	36	1	0	40
1984	2	5	na	5	na	2	na	8	2	35	1	0	40
1985	2	8	na	4	na	3	na	7	2	31	1	0	43
1986	1	7	3	4	2	2	4	6	3	31	1	0	36
1987	1	7	4	5	1	2	3	6	3	27	1	0	38
1988	1	5	5	4	2	3	4	6	3	30	1	0	36
1989	1	4	5	4	2	3	1	6	3	26	1	0	44
1990	1	4	4	4	3	4	2	7	3	26	1	0	41
1991	1	5	4	5	3	2	3	7	3	23	0	0	45
1992	1	6	3	4	3	3	4	9	3	22	0	0	41
1993	1	6	4	4	2	3	3	10	3	19	0	0	44
1994	0	6	4	4	2	3	2	8	3	21	0	0	46
1995	0	5	3	4	4	3	4	8	3	15	0	0	52
1996	0	4	3	4	4	3	5	7	3	16	0	0	51
1997	0	5	3	4	2	3	3	9	3	19	0	0	48
1998	0	6	3	5	2	3	4	10	3	21	0	0	42
1999	0	6	3	4	2	3	3	9	3	19	0	0	48
2000	0	5	3	3	3	3	3	7	2	16	0	0	53
2001	0	4	3	4	4	4	3	8	2	16	0	0	52
2002	0	3	3	4	2	4	3	8	3	13	0	0	56
2003	0	5	4	4	1	4	2	9	3	14	0	0	55
2004	0	4	3	4	1	4	3	9	3	17	0	0	53

2005	0	7	2	5	1	4	2	12	4	18	0	na	43
2006	0	7	3	5	1	4	1	10	4	19	0	na	46
2007	0	7	3	4	3	5	2	8	4	17	0	na	47

[a] At undistorted farmgate prices Source: Authors' spreadsheet

Appendix Table A2 (continued): Annual distortion estimates, **Korea**, 1955 to 2007
(d) Trade status[a] of covered products

	Barley	Beef	Cabbage	Egg	Garlic	Milk	Pepper	Pigmeat	Poultry	Rice	Soybean	Wheat
1955	M	M	na	na	na	na	na	M	M	M	M	M
1956	M	M	na	na	na	na	na	M	M	M	M	M
1957	M	M	na	na	na	na	na	M	M	M	M	M
1958	M	M	na	M	na	na	na	M	M	M	M	M
1959	M	M	na	M	na	na	na	M	M	M	M	M
1960	M	M	na	M	na	na	na	M	M	M	M	M
1961	M	M	na	M	na	na	na	M	M	M	M	M
1962	M	M	na	M	na	na	na	M	M	M	M	M
1963	M	M	na	M	na	na	na	M	M	M	M	M
1964	M	M	na	M	na	na	na	M	M	M	M	M
1965	M	M	na	M	na	na	na	M	M	M	M	M
1966	M	M	na	M	na	na	na	M	M	M	M	M
1967	M	M	na	M	na	M	na	M	M	M	M	M
1968	M	M	na	M	na	M	na	M	M	M	M	M
1969	M	M	na	M	na	M	na	M	M	M	M	M
1970	M	M	na	M	na	M	na	M	M	M	M	M
1971	M	M	na	M	na	M	na	M	M	M	M	M
1972	M	M	na	M	na	M	na	M	M	M	M	M
1973	M	M	na	M	na	M	na	M	M	M	M	M
1974	M	M	na	M	na	M	na	M	M	M	M	M
1975	M	M	na	M	na	M	na	M	M	M	M	M
1976	M	M	na	M	na	M	na	M	M	M	M	M
1977	M	M	na	M	na	M	na	M	M	M	M	M
1978	M	M	na	M	na	M	na	M	M	M	M	M
1979	M	M	na	M	na	M	na	M	M	M	M	M
1980	M	M	na	M	na	M	na	M	M	M	M	M
1981	M	M	na	M	na	M	na	M	M	M	M	M
1982	M	M	na	M	na	M	na	M	M	M	M	M
1983	M	M	na	M	na	M	na	M	M	M	M	M
1984	M	M	na	M	na	M	na	M	M	M	M	M
1985	M	M	na	M	na	M	na	M	M	M	M	M
1986	M	M	M	M	M	M	M	M	M	M	M	M
1987	M	M	M	M	M	M	M	M	M	M	M	M
1988	M	M	M	M	M	M	M	M	M	M	M	M
1989	M	M	M	M	M	M	M	M	M	M	M	M
1990	M	M	M	M	M	M	M	M	M	M	M	M
1991	M	M	M	M	M	M	M	M	M	M	M	M
1992	M	M	M	M	M	M	M	M	M	M	M	M
1993	M	M	M	M	M	M	M	M	M	M	M	M
1994	M	M	M	M	M	M	M	M	M	M	M	M
1995	M	M	M	M	M	M	M	M	M	M	M	M
1996	M	M	M	M	M	M	M	M	M	M	M	M
1997	M	M	M	M	M	M	M	M	M	M	M	M
1998	M	M	M	M	M	M	M	M	M	M	M	M
1999	M	M	M	M	M	M	M	M	M	M	M	M
2000	M	M	M	M	M	M	M	M	M	M	M	M
2001	M	M	M	M	M	M	M	M	M	M	M	M
2002	M	M	M	M	M	M	M	M	M	M	M	M
2003	M	M	M	M	M	M	M	M	M	M	M	M
2004	M	M	M	M	M	M	M	M	M	M	M	M
2005	M	M	H	M	M	M	H	M	M	H	M	M

2006	M	M	H	M	M	M	H	M	M	H	M	M
2007	M	M	H	M	M	M	H	M	M	H	M	M

[a] Exportable (X), import-competing (M) and nontradables (H).
Source: Anderson and Valenzuela (2008), based on authors' spreadsheet

Appendix Table A3: Annual distortion estimates, Taiwan, 1955 to 2002
(a) Nominal rates of assistance to covered products (percent)

	Beef	Egg	Pigmeat	Poultry	Rice	Wheat	All
1955	-23	0	-39	-68	-49	96	-47
1956	52	0	10	-37	-11	31	-6
1957	47	0	9	-30	-3	38	1
1958	-10	0	-20	-55	-48	53	-41
1959	3	0	-1	-46	-37	23	-25
1960	20	0	14	-34	-9	31	-3
1961	49	0	24	-14	3	34	8
1962	48	0	73	2	-13	32	2
1963	51	0	120	4	-7	41	16
1964	39	0	88	25	-7	42	13
1965	66	0	118	20	-8	43	16
1966	51	0	112	14	-14	30	11
1967	4	0	87	18	-21	36	2
1968	0	0	113	31	-24	43	2
1969	24	0	69	23	-21	45	1
1970	14	0	82	19	0	55	21
1971	29	0	109	29	0	39	31
1972	50	0	114	39	2	65	35
1973	-4	0	111	27	-24	8	16
1974	22	0	74	22	-25	-6	0
1975	105	0	125	22	-15	0	15
1976	73	0	57	20	3	29	20
1977	89	0	45	42	-10	84	13
1978	91	0	49	35	-19	90	9
1979	41	0	28	31	3	83	15
1980	54	0	46	39	17	81	29
1981	72	0	48	65	8	81	27
1982	75	0	44	63	29	115	37
1983	88	1	41	85	46	na	46
1984	96	2	33	66	63	na	47
1985	95	9	41	57	73	na	53
1986	104	19	56	70	84	na	64
1987	108	17	72	87	110	na	81
1988	102	27	90	98	108	na	93
1989	97	61	123	110	142	na	122
1990	97	9	112	107	146	na	112
1991	97	-1	76	112	144	na	93
1992	95	41	93	149	170	na	115
1993	99	30	100	168	191	na	126
1994	106	40	138	178	156	na	140
1995	66	33	108	167	208	na	131
1996	97	2	124	167	174	na	126
1997	101	-1	94	195	149	na	114
1998	85	11	108	242	134	na	128
1999	63	44	221	372	174	na	212
2000	44	33	201	347	189	na	202
2001	95	22	168	254	195	na	169
2002	79	19	150	237	226	na	164

Appendix Table A3 (continued): Annual distortion estimates, Taiwan, 1955 to 2002
(b) Nominal and relative rates of assistance to all[a] agricultural products, to exportable[b] and import-competing [b] agricultural industries, and relative[c] to non-agricultural industries
(percent)

	Total ag NRA				Ag tradables NRA				
	Covered products		Non-covered products	All products (incl NPS)				Non-agric tradables NRA	RRA
	Inputs	Outputs			Exportables	Import-competing	All		
1955	0	-47	0	-22	-35	-7	-30	7	-35
1956	0	-6	0	-3	-4	-3	-4	8	-11
1957	0	1	0	0	1	-2	0	8	-7
1958	0	-41	0	-20	-31	-3	-27	10	-33
1959	0	-25	0	-14	-21	-3	-18	10	-26
1960	0	-3	0	-1	-2	-1	-2	9	-10
1961	0	8	0	4	7	-1	5	9	-3
1962	0	2	0	1	1	1	1	10	-8
1963	0	16	0	8	13	1	11	9	1
1964	0	13	0	6	10	2	8	9	-1
1965	0	16	0	7	12	2	10	9	0
1966	0	11	0	5	8	2	7	10	-2
1967	0	2	0	1	1	2	1	8	-7
1968	0	2	0	1	1	3	1	9	-7
1969	0	1	0	1	0	3	1	8	-7
1970	0	21	0	10	16	2	13	8	5
1971	0	31	0	14	23	3	18	7	10
1972	0	35	0	16	26	5	20	8	11
1973	0	16	0	7	12	3	9	8	1
1974	0	0	0	0	-1	3	0	7	-6
1975	0	15	0	7	12	3	9	7	2
1976	0	20	0	10	16	4	13	7	6
1977	0	13	0	7	9	8	8	7	1
1978	0	9	0	4	5	6	5	7	-2
1979	0	15	0	7	10	5	9	7	2
1980	0	29	0	12	21	6	15	5	9
1981	0	27	0	11	17	9	14	5	8
1982	0	37	0	14	25	8	19	5	13
1983	0	46	0	19	31	12	23	5	17
1984	0	47	0	19	33	10	23	5	17
1985	0	53	0	20	37	9	25	5	19
1986	0	64	0	23	44	11	29	5	23
1987	0	81	0	26	53	13	33	5	27
1988	0	93	0	28	58	13	35	4	30
1989	0	122	0	38	53	45	47	4	41
1990	0	112	0	41	60	45	50	4	45
1991	0	93	0	34	57	34	41	3	37
1992	0	115	0	37	56	40	45	2	41
1993	0	126	0	38	61	41	46	2	43
1994	0	140	0	41	51	50	50	2	47
1995	0	131	0	39	60	43	47	2	45
1996	0	126	0	42	55	48	50	2	47
1997	0	114	0	43	58	48	50	2	48
1998	0	128	0	45	51	54	53	2	50
1999	0	212	0	63	61	79	74	2	72
2000	0	202	0	69	70	83	80	1	78
2001	0	169	0	60	66	70	69	1	67
2002	0	164	0	55	75	60	63	1	62

a. NRAs including assistance to nontradables and non-product specific assistance.
b. NRAs including products specific input subsidies.

c. The Relative Rate of Assistance (RRA) is defined as $100*[(100+NRAag^t)/(100+NRAnonag^t)-1]$, where $NRAag^t$ and $NRAnonag^t$ are the percentage NRAs for the tradables parts of the agricultural and non-agricultural sectors, respectively.

Appendix Table A3 (continued): Annual distortion estimates, Taiwan, 1955 to 2002
(c) Value shares of primary production of covered[a] and non-covered products, (percent)

	Beef	Egg	Pigmeat	Poultry	Rice	Wheat	Non-covered
1955	0	0	12	1	34	0	52
1956	0	0	15	1	40	0	43
1957	0	0	16	1	35	0	48
1958	0	0	12	1	36	0	50
1959	0	1	17	1	37	0	43
1960	0	1	13	1	33	0	53
1961	0	1	13	2	35	0	49
1962	0	1	8	1	40	0	49
1963	0	1	9	2	38	0	50
1964	0	1	9	1	35	0	54
1965	0	1	9	1	36	0	53
1966	0	1	9	1	37	0	52
1967	0	1	10	2	37	0	51
1968	0	1	9	1	39	0	50
1969	0	1	11	2	35	0	50
1970	0	1	12	2	32	0	53
1971	0	1	12	2	29	0	55
1972	0	2	12	3	28	0	55
1973	0	1	12	3	29	0	54
1974	0	1	12	2	38	0	46
1975	0	2	10	2	36	0	50
1976	0	2	15	3	31	0	49
1977	0	2	17	4	26	0	51
1978	0	3	16	4	26	0	52
1979	0	2	18	4	22	0	54
1980	0	2	14	4	21	0	58
1981	0	2	14	4	21	0	59
1982	0	2	15	4	18	0	61
1983	0	3	16	5	17	0	59
1984	0	3	16	5	15	0	60
1985	0	3	16	5	14	0	62
1986	0	3	17	5	11	0	64
1987	0	2	16	5	9	0	68
1988	0	2	14	5	10	0	69
1989	0	2	14	6	9	0	69
1990	0	3	17	6	10	0	63
1991	0	3	19	5	9	0	64
1992	0	3	17	5	7	0	68
1993	0	3	15	5	7	0	70
1994	0	3	14	5	7	0	70
1995	0	3	16	5	6	0	70
1996	0	4	17	6	7	0	67
1997	0	5	17	7	8	0	62
1998	0	5	14	7	8	0	65
1999	0	5	11	6	8	0	70
2000	0	5	14	7	8	0	66
2001	0	5	16	7	7	0	64
2002	0	5	14	7	7	0	67

[a] At undistorted farmgate prices
Source: Anderson and Valenzuela (2008), updated from authors' spreadsheet

Appendix Table A4: Consumer tax equivalents for covered agricultural products, Japan, 1955 to 2007

(percent)

	Apple	Barley	Beef	Cabbage	Cucumber	Egg	Grape	Mandarin	Milk	Onion
1955	na	27	-5	na	na	-64	na	na	49	na
1956	na	27	44	na	na	18	na	na	47	na
1957	na	30	43	na	na	43	na	na	41	na
1958	na	49	38	na	na	18	na	na	52	na
1959	na	42	18	na	na	0	na	na	31	na
1960	na	57	44	na	na	0	na	na	51	na
1961	na	47	65	na	na	-6	na	na	75	na
1962	na	19	79	na	na	4	na	na	92	na
1963	na	23	90	na	na	-9	na	na	125	na
1964	na	18	63	na	na	-6	na	na	137	na
1965	na	12	122	na	na	-11	na	na	112	na
1966	na	3	115	na	na	-2	na	na	103	na
1967	na	6	115	na	na	-2	na	na	112	na
1968	na	14	136	na	na	-1	na	na	199	na
1969	na	15	167	na	na	-9	na	na	284	na
1970	na	20	128	na	na	-1	na	na	266	na
1971	na	5	106	na	na	-9	na	na	157	na
1972	na	34	112	na	na	3	na	na	92	na
1973	na	-7	114	na	na	-9	na	na	167	na
1974	na	-23	69	na	na	3	na	na	145	na
1975	na	na	205	na	na	5	na	na	144	na
1976	na	1	203	na	na	-14	na	na	337	na
1977	na	14	242	na	na	-5	na	na	502	na
1978	na	42	266	na	na	1	na	na	545	na
1979	na	24	159	na	na	-4	na	na	400	na
1980	na	14	138	na	na	-3	na	na	259	na
1981	na	21	138	na	na	13	na	na	173	na
1982	na	14	123	na	na	-3	na	na	146	na
1983	na	51	139	na	na	-2	na	na	214	na
1984	na	46	146	na	na	2	na	na	265	na
1985	na	74	156	na	na	16	na	na	308	na
1986	63	186	252	5	23	51	52	20	453	83
1987	20	225	230	5	23	-4	54	20	494	83
1988	20	178	227	22	26	16	56	20	364	24
1989	20	128	179	5	153	20	179	20	206	27
1990	20	90	168	5	5	19	87	20	230	29
1991	20	107	164	5	17	37	64	20	268	48
1992	20	124	143	5	7	6	56	26	254	32
1993	39	134	183	5	44	15	80	20	290	128
1994	20	205	228	134	14	37	122	137	360	164
1995	27	153	183	135	24	54	120	59	295	93
1996	19	70	196	78	14	27	106	88	208	83
1997	19	83	200	112	32	25	86	19	205	106
1998	55	110	196	161	33	6	116	51	200	206
1999	18	178	184	148	45	56	158	18	281	232
2000	44	135	174	192	44	62	157	42	296	222
2001	56	103	206	153	50	27	154	17	185	260
2002	17	111	105	165	39	22	172	25	324	300
2003	17	88	98	152	42	2	195	20	305	292
2004	21	93	163	222	40	23	203	56	256	341
2005	17	244	39	239	47	17	202	37	112	342

2006	17	83	39	186	37	17	175	84	110	285
2007	17	16	39	187	8	17	157	17	59	255

Appendix Table A4 (continued)

	Pear	Pigmeat	Poultry	Rice	Soybean	Spinach	Strawb.	Sugar	Wheat	Total
1955	na	3	-40	49	na	na	na	na	35	24
1956	na	-3	-41	65	na	na	na	na	32	48
1957	na	2	93	76	na	na	na	na	30	59
1958	na	0	59	83	na	na	na	na	41	65
1959	na	87	95	93	na	na	na	na	41	69
1960	na	94	99	98	na	na	na	na	42	75
1961	na	89	37	85	na	na	na	na	35	62
1962	na	55	13	66	na	na	na	na	29	52
1963	na	28	33	93	na	na	na	na	33	63
1964	na	33	31	85	na	na	na	na	25	59
1965	na	23	34	109	na	na	na	na	32	67
1966	na	17	27	109	na	na	na	na	27	67
1967	na	0	37	91	na	na	na	na	21	58
1968	na	11	45	97	na	na	na	na	26	67
1969	na	10	25	115	na	na	na	na	31	74
1970	na	-10	24	150	na	na	na	na	32	81
1971	na	3	53	168	na	na	na	na	30	82
1972	na	3	45	211	na	na	na	na	48	90
1973	na	-2	38	128	na	na	na	na	-5	63
1974	na	-12	24	29	na	na	na	na	-35	22
1975	na	4	26	73	na	na	na	na	-27	50
1976	na	-5	35	142	na	na	na	na	2	74
1977	na	-7	37	197	na	na	na	na	54	98
1978	na	20	40	244	na	na	na	na	71	135
1979	na	4	17	242	0	na	na	59	34	109
1980	na	6	22	205	0	na	na	56	22	92
1981	na	18	24	191	0	na	na	118	28	92
1982	na	7	12	215	0	na	na	145	30	86
1983	na	13	20	264	0	na	na	204	50	108
1984	na	19	6	289	0	na	na	312	56	115
1985	na	-1	7	359	0	na	na	276	61	126
1986	42	-5	29	590	0	103	10	205	155	146
1987	23	1	21	683	0	103	10	183	209	146
1988	38	7	23	600	0	147	10	153	161	141
1989	38	1	7	510	0	5	10	113	95	116
1990	8	-4	11	481	0	5	10	148	101	103
1991	28	11	14	504	0	33	10	152	136	112
1992	38	16	19	597	0	119	12	161	98	111
1993	8	1	44	754	0	103	32	164	103	124
1994	38	4	37	729	0	430	60	149	103	147
1995	83	8	31	717	0	140	46	145	97	129
1996	29	7	36	501	0	583	22	139	43	105
1997	16	8	32	410	0	234	19	131	60	107
1998	87	16	39	389	0	54	11	172	68	112
1999	106	12	69	514	0	173	33	190	98	128
2000	219	13	108	560	0	199	34	149	103	124
2001	199	16	73	559	0	108	20	150	68	110
2002	224	9	71	587	0	112	9	144	60	100
2003	61	-11	73	601	0	134	10	170	60	91
2004	84	1	45	565	0	119	9	145	52	107
2005	0	94	12	501	0	91	9	142	207	100
2006	233	162	12	303	0	3	6	136	13	82
2007	77	159	12	242	0	3	6	81	0	62

Appendix Table A5: Consumer tax equivalents for covered agricultural products, Korea, 1955 to 2007 (percent)

	Barley	Beef	Cabbage	Egg	Garlic	Milk	Peppers	Pigmeat	Poultry	Rice	Soybean	Wheat	All covered
1955	-12	7	na	na	na	na	na	-42	-43	-39	-40	-62	-37
1956	37	36	na	na	na	na	na	-39	-31	-6	-36	-44	-6
1957	90	54	na	na	na	na	na	-15	-6	23	-11	-36	23
1958	63	62	na	-16	na	na	na	29	9	-6	-18	-47	2
1959	26	35	na	-38	na	na	na	-8	13	-11	6	-42	-7
1960	62	53	na	-45	na	na	na	-2	6	-4	25	-32	1
1961	18	-3	na	-50	na	na	na	-41	-33	-39	-41	-53	-31
1962	18	21	na	-40	na	na	na	16	-13	-39	-31	-36	-28
1963	133	61	na	-13	na	na	na	68	12	24	35	-5	33
1964	158	40	na	25	na	na	na	67	62	31	53	14	51
1965	56	39	na	25	na	na	na	108	81	-2	37	-18	15
1966	41	26	na	24	na	na	na	114	81	-9	50	-17	8
1967	63	30	na	34	na	105	na	145	134	-13	97	-9	8
1968	77	87	na	30	na	210	na	235	203	-10	24	-5	15
1969	88	143	na	2	na	205	na	191	158	8	50	-6	28
1970	122	119	na	28	na	216	na	207	152	32	120	9	51
1971	134	120	na	9	na	133	na	286	153	53	65	13	67
1972	153	85	na	-8	na	41	na	222	80	81	90	23	81
1973	51	18	na	-7	na	60	na	193	52	9	25	-13	16
1974	23	28	na	-21	na	94	na	112	80	-29	16	-25	-16
1975	37	80	na	-17	na	133	na	154	107	-3	38	-15	9
1976	50	128	na	-14	na	187	na	189	144	44	89	-2	48
1977	65	218	na	-11	na	189	na	169	182	59	87	32	67
1978	72	224	na	-2	na	175	na	270	212	58	146	38	80
1979	63	162	na	6	na	261	na	232	164	115	116	29	115
1980	24	137	na	12	na	223	na	181	90	97	173	43	96
1981	72	186	na	4	na	194	na	285	122	97	246	47	113
1982	109	190	na	8	na	169	na	196	90	119	301	44	126
1983	192	159	na	36	na	153	na	106	87	126	295	52	124
1984	201	144	na	14	na	160	na	78	82	127	212	45	113
1985	246	68	na	23	na	128	na	164	75	157	252	44	128
1986	322	92	30	11	250	211	175	144	64	195	56	80	133
1987	381	84	30	3	250	238	175	100	57	222	77	157	146
1988	336	174	30	7	250	162	175	119	112	226	83	204	163
1989	343	193	30	54	250	187	175	97	126	257	92	179	174
1990	342	207	30	39	250	152	175	190	142	274	96	209	190
1991	380	223	30	9	250	289	175	172	136	254	51	204	179
1992	397	206	30	40	250	158	175	95	138	252	68	173	166
1993	409	171	30	12	310	197	281	116	165	276	87	150	173
1994	529	197	30	39	383	222	421	173	198	253	75	102	174
1995	435	222	30	59	210	154	204	130	171	329	87	138	182
1996	305	199	29	15	44	128	108	138	185	333	67	101	154
1997	302	130	29	17	232	147	153	88	161	282	42	47	130
1998	254	55	29	7	373	118	87	60	135	198	40	36	96
1999	411	162	29	35	207	157	176	166	206	312	83	80	162
2000	364	139	28	30	30	205	192	124	220	389	79	77	162
2001	312	175	28	42	8	105	221	93	201	372	73	104	154
2002	362	254	28	40	88	154	144	122	164	420	67	84	168
2003	301	142	27	55	205	139	267	134	131	395	57	68	148
2004	299	129	27	105	282	145	162	199	180	350	57	70	139

2005	217	164	27	33	245	149	154	82	58	226	113	na	135
2006	167	200	27	28	116	173	335	125	75	205	110	na	147
2007	139	183	27	35	23	89	218	102	34	210	52	na	123

Source: Authors' spreadsheet

Appendix Table A6: Consumer tax equivalents for covered agricultural products, Taiwan, 1955 to 2002

(percent)

	Beef	Egg	Pigmeat	Poultry	Rice	Wheat	All covered
1955	-23	0	-39	-68	-49	na	-47
1956	52	0	10	-37	-11	37	-3
1957	47	0	9	-30	-3	na	0
1958	-10	0	-20	-55	-48	46	-35
1959	3	0	-1	-46	-37	32	-21
1960	20	0	14	-34	-9	36	0
1961	49	0	24	-14	3	25	9
1962	48	0	73	2	-13	20	3
1963	51	0	120	4	-7	21	16
1964	39	0	88	25	-7	-20	11
1965	66	0	118	20	-8	27	16
1966	51	0	112	14	-14	27	12
1967	4	0	87	18	-21	29	3
1968	0	0	113	31	-24	31	3
1969	24	0	69	23	-21	34	2
1970	14	0	82	19	0	34	21
1971	29	0	109	29	0	31	29
1972	50	0	114	39	2	35	33
1973	-4	0	111	27	-24	3	13
1974	22	0	74	22	-25	-30	-2
1975	105	0	125	22	-15	-4	14
1976	73	0	57	20	3	0	21
1977	89	0	45	42	-10	2	16
1978	91	0	49	35	-19	-6	10
1979	41	0	28	31	3	0	15
1980	54	0	46	39	17	6	29
1981	72	0	48	65	8	-3	28
1982	75	0	44	63	29	-4	37
1983	88	1	41	85	46	na	49
1984	96	2	33	66	63	na	49
1985	95	9	41	57	73	na	53
1986	104	19	56	70	84	na	66
1987	108	17	72	87	110	na	82
1988	102	27	90	98	108	na	93
1989	97	61	123	110	142	na	120
1990	97	9	112	107	146	na	110
1991	97	-1	76	112	144	na	94
1992	95	41	93	149	170	na	116
1993	99	30	100	168	191	na	125
1994	106	40	138	178	156	na	137
1995	66	33	108	167	208	na	127
1996	97	2	124	167	174	na	125
1997	101	-1	94	195	149	na	112
1998	85	11	108	242	134	na	124
1999	63	44	221	372	174	na	196
2000	44	33	201	347	189	na	184
2001	95	22	168	254	195	na	163
2002	79	19	150	237	226	na	153

Source: Anderson and Valenzuela (2008), based on authors' spreadsheet