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Trade Agreements and U.S. Citrus Exports to Japan

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Citrus. fruits.

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Japan is one of the largest single-country markets in the world for U.S. agricultural exports. With Japan's large trade surplus with the U.S., there has been intense pressure for the Japanese to open their market to more agricultural exports. A study by the congressional research service of the Library of Congress concluded that the elimination of all Japanese agricultural import restraints could increase U.S. sales by approximately one billion dollars (Higashi and Lauter).

Even within Japan, there is some support to liberalize the trade in its agricultural sector. The Japanese industrialized sector argues that Japan's future depends on their sector. Therefore, the protection of agriculture is too heavy a price to pay, because protectionism creates resentment against industrial products abroad (Nippon). Accordingly, protection of agriculture should be replaced with a competitive market system regardless of the politics of socioeconomic concerns.

Citrus imports have come to the forefront of this debate. Recently, Japan agreed to increase imports of orange-juice concentrate from 8,500 metric tons in 1987 to 40,000 metric tons in 1991. By April 1, 1992, all quota restrictions of orange-juice imports into Japan will be removed, leaving the current tariff of 25 to 35 percent (depending on sugar content) in place.

The major purpose of this article is to investigate Japan's citrus subsector and its citrus import demand structures.

Citrus Production in Japan

Japan's citrus subsector is characterized by many relatively small production units. More than 50 percent of the citrus farmers have groves of less than 0.5 hectares. The major citrus crops produced in Japan are oranges and lemons. The production of lemons results in less than 1,000 metric tons per year. A major part of the oranges produced in Japan is tangerines, which includes mikan, hassaku, and iyokan oranges. Other oranges produced in Japan include the summer orange natsu-mikan or natsu-daidai and the navel orange (a sweet orange variety). Japan's production of Valencia and other varieties of sweet orange is minimal. During the past decade, tangerine production decreased from 3,539 thousand metric tons in the 1978/79 season to 2,941 thousand

March through September (Coyle). In addition, there is an off-season quota, which is only valid for the period from June through August. The tariff rates for fresh oranges are 20 percent and 40 percent of the c.i.f. value, respectively, for the time periods from June 1 through November 30 and from December 1 through May 31. Orange juice concentrate imports are subject to import quotas, blending requirements, and an import tariff. Before 1988, all orange juice concentrate imports were required to be marketed in blended form with Japan's domestic mikan orange juice. The import quotas for fresh grapefruit were lifted by the Japanese government in June 1971.

A new trade agreement was reached between the Japanese and U.S. governments in 1988. In this agreement, the Japanese government has agreed to increase both the quotas for fresh oranges and orange juice concentrate gradually through 1990. Also, the import allocation system for fresh orange and orange juice concentrate will be abolished on April 1, 1991 and April 1, 1992, respectively. The blending requirements for orange juice concentrate imports will be reduced gradually from 40 percent free of the blending requirement in the 1988/89 Japanese fiscal year (JFY) to 60 percent free of the blending requirement in the 1989/90 JFY. The blending requirement will be phased out completely in the 1990/91 JFY. In addition, the Japanese government has agreed to reduce the tariff rate on fresh grapefruit imports from the current rate of 25 percent during December 1 through May 31 to 15 percent on April 1, 1989, and then to 10 percent on April 1, 1990; and from the current rate of 12 percent during June 1 through November 30 to 10 percent on April 1, 1989. Summaries of historical and future quotas and current tariff rates for citrus are presented in Tables 1 and 2.

The U.S. is the major supplier of fresh oranges and fresh grapefruit for Japanese importers. According to the U.S. Department of Commerce, during the decade from 1978 through 1987 22 percent of the fresh oranges exported from the U.S. went to Japan; however, these exports accounted for more than 99 percent of all Japanese fresh orange imports. A similar pattern was found in the U.S. exports of fresh grapefruit. During the same decade, 53 percent of U.S. fresh grapefruit exports went to Japan, which accounted for 94 percent of all Japanese fresh grapefruit imports. The U.S. exported 63 percent of other fresh citrus to Japan. However, information is not available about the import share of U.S. other fresh citrus in Japan, although the relative share of other fresh citrus

competitive position of U.S. citrus exports in the Japanese import market.

The allocation by a country of its domestic expenditures on certain groups of commodities or a certain good from various countries is similar to the allocation problem faced by a single individual or firm. Therefore, an allocation model based on demand theory can be applied as an import allocation model in international trade (Theil 1980; Clements and Theil). With the assumption of two-stage budgeting (Deaton and Muellbauer), a country firstly allocates the total expenditure for imports among all imported goods, and secondly allocates the given budget from the first stage on demand for a particular group of goods over the same product supplied by different countries (Armington) or a particular commodity within a certain group of commodities, e.g., a group of fresh fruits.

Economic Models and Estimation Procedures

The system-wide approach used in this study is based on a system of equations instead of an individual equation. With this approach, one totally differentiates a general utility function with respect to income and prices, but does not specify a functional form until the differential demand equations are derived. In this particular study, the absolute version of the Rotterdam model (Theil 1976) was used. The major advantage of this version of the Rotterdam model is its linearity in the parameters.

The data used in this study came from two major sources. Japanese import quantities and values of citrus and other fresh fruit were provided by the Japanese Ministry of Finance Import Statistics. These data are annual observations from 1973 through 1987. Population and the consumer price index (CPI) information was provided by the International Monetary Fund. In this study, orange juice, grapefruit juice, and all other citrus juices were combined into one category and called citrus juice. The major citrus juice exporters considered in this study are the U.S., Brazil, Israel, and Argentina. All other countries are combined into one group, i.e., the rest of the world (ROW).

The Rotterdam model expressed in Appendix A was estimated with the maximum likelihood method with the adding-up and symmetry restrictions imposed. Tables 3 and 4 report the conditional income elasticity and price elasticity estimates, which were calculated at the sample means.

example, a one percent increase in the import prices of lemons and limes, bananas, and pineapples would decrease the respective imports by 0.83, 0.56, and 1.14 percent. Cross-price elasticity estimates indicate that a one percent increase in the import prices of bananas and pineapples would increase the imports of fresh grapefruit by 0.50 and 0.35 percent, respectively. On the other hand, a one percent increase in the import price of fresh grapefruit would increase the imports of bananas and pineapples by 0.19 and 0.94 percent, respectively.

Import Demand for Citrus Juices

The conditional income elasticity estimates shown in Table 4 indicate that each estimate is positive and statistically different from zero, except the ones for Argentina and the rest of the world (ROW). The result indicates that if a higher import budget were allocated for citrus juice imports, most of the increased budget would be allocated to the imports of citrus juices from Brazil and the rest would be allocated to the imports from the U.S. and Israel. The conditional income elasticity estimates show that for a one percent increase in expenditure for citrus juice imports, there would be 3.30, 0.34, and 0.60 percent increase in the citrus juice imports from Brazil, the U.S., and Israel, respectively.

Each of the own-price elasticity estimates is negative; however, the estimates for imports from the U.S. and the ROW were statistically the same as zero. In addition, these estimates show that given a one percent increase in the import price of citrus juice for the exporting country, the imports from Israel, Argentina, and Brazil would decrease by 2.21, 0.54, and 1.82 percent, respectively. The cross-price elasticity estimates shown in Table 9 indicate that Israel citrus juice is a substitute for the juice imported from Argentina and Brazil. On the other hand, citrus juice imported from Brazil or Argentina is a substitute for the juice imported from Israel. Results show that given a one percent increase in the import price of Brazilian (or Argentinean) citrus juice, the imports from Israel would increase by about one percent. Given a one percent increase in the import price of Israel juice, the imports from Brazil and Argentina would increase by 0.37 and 2.31 percent, respectively. The cross-price elasticity presented in Table 4 shows that the citrus juices imported from Brazil and Argentina have a complementary relationship. This relationship was not expected.

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Table 2. Japan's citrus quotas, Japanese fiscal year 1979-91.

Japanese Fiscal Year (April-March)	Fresh Oranges	5:1 Concentrated Juice	
		Oranges	Grapefruit
	metric tons		
1979	45,000	3,000	1,000
1980	68,000	5,000	3,000
1981	72,500	5,500	4,000
1982	77,000	6,000	5,000
1983	82,000	6,500	6,000
1984	93,000	7,000	[c]
1985	104,000	12,500	--
1986	115,000	8,000	--
1987	126,000	8,500	--
1988	148,000	15,000	--
1989	170,000	19,000	--
1990	192,000	23,000	--
1991	[a]	40,000[b]	--

[a] On April 1, 1991, the import allocation system on fresh oranges will be terminated.

[b] On April 1, 1992, the import allocation system on concentrated orange juice will be terminated.

[c] Japan eliminated import quotas on grapefruit juice on April 1, 1986. In fiscal years 1984 and 1985, import licenses were issued to meet any amount of domestic demand.

Table 4. Elasticity estimates for Japan's imports of citrus juice[a]

	U.S.	Israel	Argentina	Brazil	ROW	Expenditure
		--- Price ---				-- Income --
U.S.	-0.0621 (0.1639)	-0.0303 (0.0708)	-0.0214 (0.0354)	-0.0317 (0.1731)	-0.0241 (0.0535)	0.3393** (0.1150)
Israel	-0.2263 (0.5293)	-2.2121** (0.9330)	0.9696** (0.2780)	0.9963* (0.5859)	0.1727 (0.1622)	0.5994** (0.2917)
Argentina	-0.3816 (0.6310)	2.3091** (0.6321)	-0.5359* (0.3038)	-1.0304* (0.5678)	-0.2430 (0.2747)	-0.2365 (0.3609)
Brazil	-0.0880 (0.4796)	0.3695* (0.2172)	-0.1605* (0.0884)	-1.8219** (0.7605)	0.0498 (0.1567)	3.3021** (0.4359)
ROW	-0.2674 (0.5930)	0.2563 (0.2407)	-0.1514 (0.1712)	0.1993 (0.6270)	-0.2767 (0.3057)	0.2363 (0.2208)

[a]Estimated at sample means.

*Statistically different from zero at $\alpha = 0.10$ level.

**Statistically different from zero at $\alpha = 0.05$ level.

The conditional income elasticity of the i^{th} commodity can be derived by dividing (μ_i/m_g) by (w_i/w_g), i.e., the sample average of the conditional expenditure share of fresh fruit i, and price elasticities can be derived by dividing the following quantity by (w_i/w_g):

$$v_{ij} = \pi_{ij} + (\phi m_g/w_g)(\mu_i/m_g)(\mu_j/m_g), \quad i,j \in Sg.$$

The right-hand-side contains $\phi m_g/w_g$, which is the own-price elasticity for fresh fruit (or citrus juice) as a whole.[8] Since an own-price elasticity for the group is not available, a rough estimate of -0.50 was used in this study.