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Japan's peanut import demand: implications for United States exports

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Abstract

Japan's import demand for both raw peanuts and processed peanut products was estimated using the Rotterdam model in order to determine the impact of an increase in the Japanese raw peanut quota on peanut imports from the USA and its competitors. The results indicate that if a larger import budget were allocated to raw peanut imports by Japan, most of the increase would be allocated to imports of Chinese raw peanuts. Furthermore, U.S. exports of peanut products could be affected if Japanese expenditures on peanut product imports change as a result of an increase in the quota for raw peanut imports. Thus, this study concludes that an increase in the Japanese import quota for raw peanuts provides only limited market opportunity for U.S. peanut exports, and China appears to benefit more than the USA from an increase in the Japanese raw peanut import quota. In contrast, the value added trade of peanut products could provide a better market opportunity for the U.S. peanut industry.

1. Introduction

Japan is the largest single-country market in the world for agricultural exports from the United States of America and the third largest importer of U.S. peanuts next to the EC and Canada. U.S. peanut exports to Japan were worth approximately $23 million annually over the period 1978 to 1991. Japan's large trade surplus with the United States in recent years has generated intense pressure on the Japanese to further open their market to more U.S. agricultural exports including peanut exports. During the recent U.S.-Japan trade negotiations, the USA, in its quest for increased exports, had requested that Japan increase its quota level for raw edible peanut imports (JETRO, 1991). [1]

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[1] Japan uses different import policies to protect its domestic peanut market. While an import quota is used for raw peanuts, import tariffs are utilized for processed products. The import quota is set annually based on the estimated consumption and domestic production. The tariff rates vary across peanut products. The basic tariff rates are 35% for peanut butter with sugar added and 25% without sugar, but can be as low as 10% based on bilateral trade agreements. The tariff rates for other peanut products, including roasted and fried peanuts, are 25%. The composition of peanut imports is affected by these import policies.

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Japanese raw edible peanut imports have been trending down during the 1980's while peanut product imports (i.e., peanut butter, roasted peanuts, and fried peanuts) have been increasing. Expenditures on raw peanut imports as a share of the total value of peanut imports decreased from 69.7% in 1982 to 39.4% in 1991. This corresponds to an increase from 30.3% to 60.6% in share of total expenditures attributed to the importation of processed peanut products. The share of total expenditure attributed to peanut products increased from 3.8% to 4.6% for peanut butter, from 18% to 23% for roasted peanuts, and from 8.5% to 33.2% for fried peanuts. Further changes in the composition of total imports between raw peanuts and processed peanut products can be expected if the quota on raw peanut imports is increased.

China and the United States are the two major exporters to the Japanese peanut market. U.S. share of the total import value for raw edible peanuts ranged from 20% to 50% during the period of 1978 to 1991 (except for the year 1981 and 1991 when U.S. exports to Japan were relatively small due to a drought in the major U.S. peanut production region). China's share of total import value ranged from 26% to 60% in the same period. The United States accounted for 30–50% of expenditures on peanut butter imports while China's share ranged between 24% and 63% over the same period. The U.S. share of total expenditure on roasted peanut imports ranged from 3% to 24% between 1978 and 1991 while the Chinese share ranged from 58% to 91% over the same period. Fried peanut exports from China accounted for 80–96% of the total import value of fried peanuts during the period of 1982 to 1991 while those from the United States were negligible. Other exporters in aggregate, on average, accounted for about 18% of the total import value of raw peanut imports, 17% of the total import value of peanut butter imports, and 10% of the total import value of roasted peanut imports, during the period 1978 to 1991. China was the dominant source of fried peanut imports while other exporters, on average, accounted for 11% of the total expenditures on fried peanut imports during the period 1982 to 1991.

The U.S. negotiations with Japan over peanut exports were designed to increase its import quotas for raw peanuts with expectations that total U.S. peanut exports would increase. The objective of this study was to investigate the Japanese import demand for raw peanuts and major peanut products from different export suppliers and to determine whether an increase in the raw peanut import quota would be beneficial to the United States, or to U.S. competitors both absolutely and relatively.

2. Import allocation model

A differential approach has been widely applied to estimate consumer demand and more recently has been used to estimate import demand in international trade (e.g., Clements and Theil, 1978; Theil, 1986; Theil and Clements, 1987; Lee et al., 1990; Sparks, 1991; Seale, Sparks and Buxton, 1992). An importing country in this approach is treated as an individual consumer. A general utility function is differentiated with respect to income and prices, but the functional form remains unspecified until the differential demand equation is derived. The advantage of this approach is that the import demand equation is derived from utility maximization, and a system of import demand equations are estimated such that the theoretical requirements of adding-up, homogeneity, and symmetry can be imposed.

The Rotterdam model derived from this differential approach was used in this study. The model assumes that an importing country allocates its expenditures first between domestic and imported goods, then among imported goods, and finally among geographic producers of each imported good. The block independence assumption between domestic and imported goods (i.e., an importing country's utility is additive) implies that domestic and imported goods are separable or that the marginal utility of imported goods depends only on the consumption of other imports. It follows then that the demand for imported goods can be estimated conditionally from total import expenditures and independently of the demand for domestic goods. If we assume

that the preference structure between the allocation of total import expenditures among the different goods for imports and the allocation of expenditures on an imported good among geographic producers (exporters) can be represented by blockwise dependence (Theil, 1976), then the demand for an imported good from a particular source can be estimated conditionally on the basis of expenditures on the imported good. Estimation of the conditional import demand for an imported good from individual geographic sources is particularly useful when it is of interest to determine the effects on conditional market shares of changes in the volume of imported goods resulting from changes in total income, government import policies or other trade barriers.

The conditional absolute price version of the Rotterdam model, following Seale et al. (1992) can be specified as:

$$W_{it}^{*}\ \Delta q_{it} = \theta_i^{*}\ \Delta Q_{gt} + \Sigma_{j \in g}\ \pi_{ij}^{*}\ \Delta p_{jt} + \varepsilon_{it} \qquad (1)$$

where $W_{it}^{*} = (W_{it} + W_{it-1})/2$, and W_{it} represents the share of expenditure on imports from source i; $\Delta q_{it} = \log(q_{it}/q_{it-1})$ and $\Delta p_{it} = \log(p_{it}/p_{it-1})$, where q_i and p_i represent the quantity and price of an import good, g, from export country i; $\Delta Q_{gt} = \Sigma_{i \in g}\ W_{it}^{*}\ \Delta q_{it}$, and $W_{gt}^{*} = \Sigma_{i \in g}\ W_{it}^{*}$; θ_i^{*} is the conditional marginal expenditure share on the imported good, g, from source i; π_{ij}^{*} is the conditional Slutsky price coefficient between the ith and jth importing sources; and ε_{it} is the disturbance term. The adding-up condition requires that $\Sigma_i\ \theta_i^{*} = 1$ and $\Sigma_i\ \pi_{ij}^{*} = 0$ while homogeneity requires that $\Sigma_j\ \pi_{ij}^{*} = 0$. The symmetry condition is satisfied through $\pi_{ij}^{*} = \pi_{ji}^{*}$, i.e., the estimated price parameters between the ith and jth supply regions are symmetrical.

The disturbance terms (ε) are assumed to be normally distributed with mean zero, a constant contemporaneous covariance matrix, and independent over time. Given that the variance-covariance matrix of the disturbance terms for the import demand system is singular, one equation must be omitted from the system. Parameter estimates are invariant to the equation omitted (Barten, 1969). The parameters of the omitted equation can be recovered from the following relationship:

$$\theta_n^{*} = 1 - \Sigma_{i \neq n \in g}\ \theta_i^{*} \text{ and } \pi_n^{*} = -\Sigma_{i \neq n \in g}\ \pi_i^{*} \qquad (2)$$

The price variables of the estimated equations are normalized by dividing each price by the import price of the imported good from the omitted exporter.

3. Data and estimation procedure

Peanut exporters to Japan were classified into subregions based on market shares for the purpose of the model. There were more suppliers for raw peanuts than for peanut products in the Japanese market. Thus, exports of raw peanuts to Japan were grouped into five regions: China, U.S., South America, Africa and rest-of-the-world (ROW), while exports of peanut products were divided into three regions: China, U.S. and ROW. Quantities and values of imports of raw peanuts and peanut products from each exporting supplier were obtained from the Japan Tariff Association for the period of 1978 to 1991. [2] The unit import value from each supplier, calculated as the import expenditure divided by the import quantity, was used as the import price from that supplier. Eq. (1) (described above) was used to estimate Japan's import demand for raw edible peanuts, peanut butter, and roasted peanuts. [3] The $n-1$ (n is the number of supply regions in each demand system) import demand equations for imports of raw peanuts, peanut butter and roasted peanuts were estimated with the previously discussed model restrictions imposed using the iterative seemingly unrelated regression procedure.

[2] Data requirements of the model and data availability limited the use of data to only after 1977.

[3] The import demand for fried peanuts was not estimated in this study due to the extremely small U.S. share of total import expenditure. U.S. exports were zero in 6 years out of the 14-year estimation period.

Conditional expenditure elasticities were calculated at the sample means by dividing conditional marginal import shares by the mean of the average import shares (i.e., θ_i^*/W_i^*, where $W_i^* = (1/T)\ \Sigma_t W_{it}^*$). The conditional Slutsky (compensated) price elasticities were calculated at the sample mean by dividing the Slutsky parameters by the mean of the average import shares (i.e., π_{ij}^*/W_i^*). These latter elasticities indicate the percentage changes in quantity demanded resulting from a 1% change in price, holding real expenditures on the imported good (e.g., peanut butter) constant. Conditional Cournot (uncompensated) price elasticities were calculated from $C_{ij} = \pi_{ij}^*/W_i^* - \theta_i^*\ W_j^*/W_i^*$, holding nominal expenditure constant, and thus reflecting both the substitution and income effects of the price changes.

The goodness-of-fit of the import demand system was measured by the R^2 suggested by McElory (1977) since single-equation measures of R^2s were not appropriate. Essentially, this R^2 is related to a Wald test with corrections for degrees of freedom and restriction that all parameters are zero:

$$R^2 = 1 - \frac{1}{1 + W/[(T-K)(n-1)]} \qquad (3)$$

where W is the Wald test statistic, T is the number of observations, K is the number of regressors in each equation, and n is the number of equations in the full system. The R^2 is not invariant with respect to the equation omitted in the import demand system. This value was calculated for each demand system with the ROW equation being omitted since we are least interested in the results for ROW.

4. Empirical results

The R^2s of the estimated demand systems were 0.98 for raw peanuts, 0.94 for peanut butter, and 0.96 for roasted peanuts. These results indicate that the model yielded a good fit to explain the market shares of total Japanese imports of raw peanuts, peanut butter, and roasted peanuts from different suppliers. The estimated parameters for the conditional marginal market import shares and the Slutsky price coefficients along with their asymptotic standard errors are reported in Tables 1, 2 and 3. The bottom half of the estimated price parameters (not included) is the mirror image of the top half due to the symmetry condition. Conditional marginal market shares indicate the relative share received by an import supplier when an additional dollar is added to total expenditures on the imported good. The estimated marginal shares for Japan's raw peanut imports were all statistically significant at the

Table 1
Parameter estimates of Japanese import allocation model for raw peanuts, 1978–91

Exporting country	Conditional Slutsky coefficient, π_{ij}^*					Conditional market share, θ_i^*
	China	U.S.	South America	Africa	ROW	
China	0.199 **	0.181 **	−0.007	−0.001	0.026	0.592 **
	(0.041) [a]	(0.064)	(0.035)	(0.052)	(0.019)	(0.061)
U.S.		−0.025	−0.049	0.010	−0.118 **	0.229 *
		(0.153)	(0.053)	(0.105)	(0.033)	(0.147)
South America			0.043	0.027	−0.018	0.198 **
			(0.033)	(0.051)	(0.016)	(0.055)
Africa				−0.232 *	0.196 **	−0.263 **
				(0.121)	(0.027)	(0.131)
ROW					−0.086 **	0.244 **
					(0.016)	(0.034)

[a] Asymptotic standard errors are in parentheses.
* Estimated coefficients are statistically different from zero at $\alpha = 0.1$ level.
** Estimated coefficients are statistically different from zero at $\alpha = 0.05$ level.

Table 2
Parameter estimates of Japanese import allocation model for roasted peanuts, 1978–91

Exporting country	Conditional Slutsky coefficient, π_{ij}^*			Conditional market share, θ_i^*
	China	U.S.	ROW	
China	−0.040	0.074	−0.033	0.583 **
	(0.234) [a]	(0.075)	(0.202)	(0.068)
U.S.		−0.115 **	0.042	0.079 **
		(0.038)	(0.055)	(0.032)
ROW			−0.008	0.338 **
			(0.196)	(0.049)

[a] Asymptotic standard errors are in parentheses.
* Estimated coefficients are statistically different from zero at $\alpha = 0.1$ level.
** Estimated coefficients are statistically different from zero at $\alpha = 0.05$ level.

10% significance level (Table 1). The estimated coefficients of the marginal market shares indicate that with a one-dollar increase in raw peanut import expenditures by Japan, China would receive about 59 cents, U.S. about 23 cents, South America about 20 cents, and the rest-of-the-world about 24 cents. In contrast, expenditure on raw peanuts imported from Africa would decrease by 26 cents with a one-dollar increase in Japanese expenditure on raw peanut imports. Peanuts from Africa normally have a higher level of aflatoxin and are considered as low-quality peanuts for edible use in the world market (Fletcher et al., 1993).

The estimated marginal market shares for roasted peanut imports were all positive and statistically different from zero at the 10% significance level (Table 2). The results indicate that with a one-dollar increase in import expenditures for roasted peanuts, 58 cents would be allocated to China, 34 cents to the rest-of-the-world, and 8 cents to the U.S. As with raw peanut imports, China is the dominate source for imported roasted peanuts in Japan. Expenditures on roasted peanuts from the U.S. would increase by only one-seventh of expenditures on roasted peanuts from China for each dollar of additional expenditures by Japan on roasted peanut imports.

The estimated coefficients of the marginal market shares for peanut butter imports were all positive, as expected, and were statistically significant at the 10% significance level except for peanut butter from ROW (Table 3). The United States, the major supplier of Japanese peanut butter imports, has the largest estimated marginal import share for peanut butter. For each additional dollar spent on peanut butter imports by Japan, 76 cents would be spent on the purchase

Table 3
Parameter estimates of Japanese import allocation model for peanut butter, 1978–91

Exporting country	Conditional Slutsky coefficient, π_{ij}^*			Conditional market share, θ_i^*
	China	U.S.	ROW	
China	−0.024	−0.153 *	0.177	0.230 *
	(0.169) [a]	(0.081)	(0.147)	(0.132)
U.S.		−0.072	0.225 **	0.763 **
		(0.067)	(0.072)	(0.077)
ROW			−0.402 **	0.007
			(0.157)	(0.131)

[a] Asymptotic standard errors are in parentheses.
* Estimated coefficients are statistically different from zero at $\alpha = 0.1$ level.
** Estimated coefficients are statistically different from zero at $\alpha = 0.05$ level.

of U.S. peanut butter, 23 cents would be spent on the purchase of Chinese peanut butter, and no change in expenditures for peanut butter imported from the rest-of-the-world.

The estimated own-price Slutsky coefficients for raw peanut imports from China, Africa and ROW was negative as expected and significantly different from zero at the 10% significance level (Table 1). The estimated own-price coefficient for raw peanut imports from the U.S. and South America was not, however, statistically different from zero. The nonsignificant own-price coefficients for peanuts from the U.S. and South America were unexpected and implies that prices are not a primary factor considered by Japanese importers for peanuts from these two regions. The signs of the cross price coefficients indicate substitution ($\pi_{ij} > 0$) or complementarily ($\pi_{ij} < 0$) between peanuts imported from different sources. The positive cross-price coefficients between China and U.S. and between Africa and ROW indicate their raw peanuts are substitutes while the negative coefficient between U.S. and ROW implies their peanuts are complementary. China and U.S. are the two major exporters and they compete for the Japanese raw peanut market. The complementary relationship between peanuts from U.S. and ROW may reflect that manufacturers of peanut products in Japan mixed peanuts imported from different sources in production to get the desired flavors of the peanut product and minimize production costs. U.S. peanuts have a higher quality and are more expensive while peanuts from ROW are lower in quality and prices (Fletcher et al., 1993). Furthermore, the positive correlation between import prices, especially between the major exporting country and the rest-of-the-world, could also contribute to the negative cross-price coefficients (Honma, 1993).

The estimated own-price coefficients for roasted peanut imports were all negative but only the price coefficient for roasted peanuts from the U.S. was statistically different from zero at the 10% significance level (Table 2). The unexpected nonsignificant own price coefficient for roasted peanuts from China and ROW implies that prices are not a primary concern for the Japanese importers. All of the cross-price Slutsky coefficients were insignificant at the 10% significance level, implying that substitution and/or complementarily does not exist in the Japanese market for roasted peanut imports.

The estimated own-price coefficients for peanut butter imports were all negative as expected, but only the coefficient for peanut butter from the ROW was significantly different from zero at the 10% significance level (Table 3). The cross-price coefficient between the U.S. and ROW was statistically significant at the 10% level indicating that peanut butter imports from these

Table 4
Elasticity estimates for Japan's import of raw peanuts, 1978–91

Exporting country	Cournot price elasticity					Expenditure elasticity
	China	U.S.	South America	Africa	ROW	
China	−1.002 **	−0.039	−0.069	−0.125	0.016	1.219 **
	(0.113) [a]	(0.130)	(0.073)	(0.105)	(0.040)	(0.125)
U.S.	0.207	−0.302	−0.175	−0.040	−0.371 **	0.675 *
	(0.309)	(0.449)	(0.162)	(0.314)	(0.102)	(0.438)
South	−2.280 **	−2.556 **	0.740	−0.150	−0.532 *	4.400 **
America	(1.069)	(1.157)	(0.737)	(1.111)	(0.366)	(1.208)
Africa	1.256	0.979	0.384	−2.030 *	2.024 **	−2.618 **
	(0.871)	(1.088)	(0.519)	(1.190)	(0.277)	(1.295)
ROW	−3.061 **	−6.628 **	−0.960 *	−6.613 **	−3.075 **	8.049 **
	(0.863)	(1.090)	(0.539)	(1.093)	(0.536)	(1.23)

[a] Asymptotic standard errors are in parentheses.
* Estimated elasticities are statistically different from zero at $\alpha = 0.1$ level.
** Estimated elasticities are statistically different from zero at $\alpha = 0.05$ level.

Table 5
Elasticity estimates for Japan's import of roasted peanut, 1978–91

Exporting country	Cournot price elasticity			Expenditure elasticity
	China	U.S.	ROW	
China	−0.632 **	0.030	−0.114	0.716 **
	(0.298) [a]	(0.092)	(0.249)	(0.083)
U.S	0.113	−1.455 **	0.403	0.939 **
	(0.966)	(0.453)	(0.657)	(0.381)
ROW	3.036 *	0.133	−0.418	3.322 **
	(2.040)	(0.540)	(1.923)	(0.483)

[a] Asymptotic standard errors are in parentheses.
* Estimated elasticities are statistically different from zero at $\alpha = 0.1$ level.
** Estimated elasticities are statistically different from zero at $\alpha = 0.05$ level.

two regions are substitutes. However, the estimated cross-price coefficient for peanut butter between China and the U.S. indicates Hicksian complementarity. Peanut butter from U.S. and China has different flavors due to differences in peanut varieties used to produce peanut butter. Furthermore, most of the peanut butter imported from the U.S. has sugar content while peanut butter from China is sugar-free.

Estimated expenditure and Cournot price elasticities and their associated asymptotic standard errors for imports of raw peanuts, roasted peanuts, and peanut butter are presented in Tables 4, 5 and 6, respectively. [4] The estimated expenditure elasticity by geographic source is conditional on the expenditure for an imported good (e.g., peanut butter). The coefficient indicates the percentage response in quantities demanded from each supplier as a result of a 1% increase in total import expenditures for that good. The estimated conditional expenditure elasticities were 1.22, 4.4, and 8.05 for raw peanuts imported from China, South America, and ROW, respectively. [5] These results indicate that if a larger budget was allocated to the import of raw peanut, both quantities and market shares for peanuts imported from China, South America, and ROW would increase. The expenditure elasticity for peanuts from the U.S. was 0.68, implying that the quantity imported from the U.S. would increase, but the market share of U.S. peanuts would decrease if Japan increased its import expenditure on raw peanut imports. The negative expenditure elasticity (−2.62) for peanuts from Africa means that both quantity and market share for African peanuts would decrease if Japan's import expenditure on raw peanuts increased.

Table 6
Elasticity estimates for Japan's import of peanut butter, 1978–91

Exporting country	Cournot price elasticity			Expenditure elasticity
	China	U.S.	ROW	
China	−0.283	−0.529 **	0.303	0.509 *
	(0.429) [a]	(0.174)	(0.324)	(0.293)
U.S.	1.329 **	−0.956 **	0.246	2.040 **
	(0.260)	(0.160)	(0.199)	(0.206)
ROW	0.998	1.278 **	−2.316 **	0.039
	(0.955)	(0.435)	(0.910)	(0.754)

[a] Asymptotic standard errors are in parentheses.
* Estimated elasticities are statistically different from zero at $\alpha = 0.1$ level.
** Estimated elasticities are statistically different from zero at $\alpha = 0.05$ level.

[4] The Slutsky own and cross price elasticities were also calculated and are available from the authors on request.

[5] As one reviewer noted, different expenditure elasticities from different peanut sources imply a non-homothetic expansion of peanut imports among the import suppliers. Reasons for this non-homothetic expansion are not identified by the empirical data and the model used in this study. Most likely, it is a combination of effects from nonprice export promotion efforts by exporters and intrinsic characteristics of peanuts from different sources. China and Argentina have emerged as major exporters in the world market since the early 1980s. As China and Argentina increased their product standards for exports, their peanuts have become more and more recognized by Japanese importers. Meanwhile, peanuts from Africa are considered having a high level of aflatoxin and being unsafe for use as edible nuts. The bad product image for African peanuts hurt African exports to Japan. Honma (1993) used an almost ideal demand system to estimate Japanese demand for horticultural products and attributed the different expenditure elasticities across the import suppliers to the export efforts taken by different exporters such as providing product information to Japanese customers and adopting pre-shipping inspection.

The estimated Cournot own-price elasticities for raw peanuts were −1.00 for China, −2.03 for Africa, and −3.08 for ROW, respectively. This result implies that a 1% increase in export prices to Japan would lead to a decrease in raw peanut exports by 1.00% for Chinese peanuts, 2.03% for African peanuts, and 3.08% for ROW peanuts. Examining the cross-price elasticities indicates that the cross-price elasticity estimate between Africa and ROW was positive when all other cross-price elasticities were negative. [6]

The conditional expenditure elasticity estimates for imported roasted peanuts from the three regions were all statistically different from zero at the 5% level. The magnitude of the expenditure elasticities implies that for a given increase in the import budget for roasted peanuts, the market share for the ROW would increase while market shares for the U.S. and China would decrease. The estimated Cournot own-price elasticity was −1.46 and −0.63 for roasted peanuts imported from the U.S. and China, respectively, while the price elasticity for the ROW was not statistically significant from zero.

The estimated conditional expenditure elasticities were 0.51 and 2.04 for peanut butter imported from China and the U.S., respectively. The magnitudes of these elasticities indicate that with a 1% increase in the import budget for peanut butter, U.S. peanut butter exports would increase by over 2% and the U.S. market share would increase. In contrast, peanut butter imports from China would increase by only one-half percent for each 1% increase in peanut butter import expenditures and its market share would decline. The demand for peanut butter from the ROW was price elastic (−2.31) while the price elasticity for the U.S. was approximately unitary. The demand for ROW peanut butter with respect to the U.S. peanut butter price was elastic (1.28). The negative cross-price elasticities for peanut butter from China and the U.S. implies that peanut butter imports from these two countries are complementary. Peanut butter imported from U.S. and China are different in terms of taste and sugar content.

[6] A negative Cournot cross-price elasticity does not necessarily imply a complementary relationship between peanuts from the two regions since the Cournot cross elasticity accounts for both price and income effects when price changes. A negative Cournot cross-price elasticity associated with a positive estimated cross-price coefficient means that the income effect is greater than the substitution effect.

5. Summary and conclusions

Japan is the third largest U.S. peanut export market. During the recent U.S.-Japan trade negotiations, the U.S. requested that Japan increase its import quota for raw peanuts. Japan's import demand for both raw peanuts and processed peanut products was estimated in order to determine the impact of an increase in the Japanese raw peanut quota on peanut imports from the U.S. and its competitors. The results indicate that if a larger import budget were allocated to raw peanut imports by Japan, raw peanut exports to Japan from all regions except Africa would increase while exports from Africa would decrease. The fact that Japan would allocate its expenditure over twice for peanuts from China than peanuts from U.S. if Japan spent more on peanut imports suggests that the U.S. will benefit much less than China from a quota increase. The positive Slutsky cross-price coefficient indicates that peanuts from China and U.S. are substitutes.

Furthermore, the results indicate that U.S. exports of peanut products could be affected if Japanese expenditures on peanut product imports changes, either as a result of an increase in the quota for raw peanut imports or for some other reasons. If Japan reduced its expenditures on roasted peanut imports, U.S. exports of roasted peanuts to Japan would decrease, but would not decrease as much as imports from China and the ROW. The finding that the own-price elasticity for U.S. roasted peanuts is greater than one implies that U.S. prices can be used to develop an effective marketing strategy to increase U.S. roasted peanut exports. The magnitudes of the coefficients and elasticities for expenditures on peanut butter imported from the U.S. indicates that U.S. peanut butter exports would be affected

significantly if there were a change in Japanese peanut butter import expenditures. The own-price elasticity for U.S. peanut butter is less than one implying that lowering prices is not an effective way to increase U.S. exports. Strengthening the import demand for peanut butter through such means as the USDA's Market Promotion Program could be a better marketing strategy for maintaining or increasing the current level of U.S. peanut butter exports.

This study concludes that an increase in the Japanese import quota for raw peanuts provides only limited market opportunity for U.S. peanut exports. Increasing peanut exports to Japan will require further efforts by the U.S. to improve its competitive position in the Japanese peanut market. Producing those types of peanuts preferred by Japanese consumers along with an assurance of a consistent export supply could be essential for expanding U.S. raw peanut exports to Japan. In contrast, the significant effect on U.S. exports from changes in the Japanese peanut product imports implies that the value added trade could provide a better market opportunity for the U.S. peanut industry.

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