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Impacts on U.S. Prices of Reducing Orange Juice Tariffs in Major World Markets

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A demand model is developed to examine the impacts on orange juice prices resulting from elimination or reduction of the tariffs on orange juice imposed by the United States, European Union, and Japan. An empirical analysis suggests that elimination of the U.S. tariff by itself would decrease the U.S. orange juice price by about $0.22 per gallon, while simultaneous elimination of the U.S., European, and Japanese tariffs would decrease the U.S. price by about $0.13 per gallon. Alternatively, reducing these tariffs according to the Swiss 25 formula would decrease the U.S. price by an estimated $0.09 per gallon. The U.S. produces about 1.4 billion gallons of orange juice annually and each penny reduction in the price impact increases U.S. orange juice FOB revenue by $14 million.

Tariffs on orange juice (OJ) have been critical for the U.S. orange juice industry. In a recent study of the impact of the proposed Free Trade Area of the Americas (FTAA) on world OJ markets, Spreen, Brewster, and Brown (2003) estimated that unilateral elimination of the U.S. tariff on OJ imports from Brazil, the world's largest OJ producer, would result in decreases in U.S. OJ prices for frozen concentrated orange juice (FCOJ) and not-from-concentrate orange juice (NFC) of $0.22 per single-strength equivalent (SSE) gallon and $0.21 per SSE gallon, respectively. Elimination of the U.S. OJ tariffs would make the U.S. market relatively more profitable to foreign exporters, increasing U.S. imports of foreign product and driving down U.S. OJ prices. In some ways, however, this is a worst-case scenario, because, through World Trade Organization (WTO) negotiations, other major importing countries may end up sacrificing their OJ tariffs in order to obtain trade concessions from the United States. World markets where OJ tariffs are eliminated or reduced would also become more attractive to exporters. Marginal profits would increase in these markets and the flow of imports into the United States would be expected to be moderated compared to the case where only the United States eliminated its tariffs.

The purpose of this paper is to examine how OJ prices may be impacted if tariffs are eliminated or reduced across the three major markets in the world—the United States, European Union, and Japan.[1] The United States and Europe are the largest OJ markets in the world, accounting for over 40% and 35% of world consumption, respectively (Spreen, Brewster, and Brown 2003; USDA 2002). The Japanese market is much smaller but still significant, accounting for about 4% of world consumption. Production of OJ is dominated by Brazil and the United States. In 2001–02, Brazil and the United States accounted for 51.6% and 39.6%, respectively, of the OJ produced in the major producing countries in the world (USDA 2003a). The focus of this study is on the tariff impacts on U.S. and Brazil prices.

Two tariff-reduction scenarios are examined. First, total elimination of U.S., European Union and Japanese OJ tariffs is considered. Then, a partial tariff-reduction scenario based on the Swiss 25 formula proposed by the United States in WTO negotiations is discussed. The Swiss formula harmonizes tariffs by lowering all tariffs across all countries to similar levels.

U.S., European Union, and Japanese OJ Tariffs

Much of the orange juice imported into the United States is subject to a tariff. For 2003, the most-favored-nation (MFN) tariff rates for FCOJ and NFC

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[1] Canada is also a significant market for OJ, with consumption levels as high as or higher than in Japan (Statistics Canada). Canada does not, however, impose a tariff on OJ imports, nor do they produce OJ, and was included in the rest-of-world market group in subsequent analysis.

are \$0.297 and \$0.170 per SSE gallon, respectively. These tariff rates declined by 15% from 1994 to 2000 according to the General Agreement on Trade and Tariffs (GATT). The MFN tariffs apply to Brazil, which is the largest producer of OJ in the world and is the dominant supplier of imported OJ to the U.S. market. U.S. OJ imports from Caribbean countries (CBERA), Andean Trade Preference Act countries (ATPA), Israel, African Growth and Opportunity Act countries (AGOA) including South Africa, and Canada are duty-free. OJ imports from Mexico receive preferential treatment as established by the North American Free Trade Agreement (NAFTA)—the first 40 million SSE gallons of FCOJ and all NFC from Mexico are subject to reduced tariff rates; presently imports of FCOJ above the 40-million-gallon level are subject to a tariff rate that is the same as the MFN tariff; the NAFTA tariffs on FCOJ and NFC are scheduled to decline to zero by 2008 (Spreen and Mondragon 1996).

OJ tariffs in the European Union and Japan are applied on an ad-valorem basis. The European tariff is 15.2%, while the Japanese tariff is 25.5%. These rates apply to the cost-insurance-freight (CIF) value of the import. The Japanese tariff has decreased by 15% since 1994 according to the GATT agreement, while the European tariff has declined by 20%. Europe also offers some trade preferences to select countries in Africa, the Caribbean, and the Pacific (Spreen, Brewster, and Brown 2003). The main beneficiaries of these trade preferences are Belize and Costa Rica.

Swiss 25 Formula

The WTO has considered various approaches to determine tariffs across countries, including the use of specific formulas. During the Kennedy Round (1963–67) negotiations, a simple formula of cutting tariffs by 50% was used, although some products were exempted and smaller tariff reductions were negotiated based on their economic sensitivity. In the Tokyo Round (1974–79) negotiations, a formula known as the Swiss formula, which reduces higher tariff rates by larger amounts in both absolute and relative terms, was used. The next round of negotiations, the Uruguay Round (1986–94), was based on a less-specific approach—broad tariff reduction goals across product sectors leaving the distribution of cuts by product up to negotiations between trading partners. More recently, however, the United States has proposed using the Swiss formula again. This formula can be formally written as

$$(1)\quad T_1 = \alpha T_0/(T_0 + \alpha),$$

where T_1 is the new tariff and T_0 is the current tariff rate. The parameter is a ceiling tariff rate, the highest possible new rate. The U.S. proposal is known as the Swiss 25, as the ceiling rate α is set at 25% in the formula.

Empirical Analysis of Price Impacts of U.S., European Union and Japanese OJ Tariffs

Model

In our empirical analysis, the world is divided into four markets—the United States, European Union, Japan, and the rest of the world (RW). Following Brown, Lee and Spreen (1996), the case where the United States, Europe, and Japan absorb all OJ produced domestically plus part of the production of the RW is considered. Imports in the analysis are assumed to be net (import-exports)—some exports/re-exports from major importing countries, even those in Europe that do not produce OJ from round oranges, to niche markets across the world will occur.

Formally, let total supplies of OJ from the United States, European Union, Japan and the RW be denoted by q_1, q_2, q_3, and q_4, respectively.[2] Japanese OJ production is insignificant at less than 0.2% of its domestic consumption (USDA 2003a). Supplies across the world are assumed to be fixed and the short-run adjustment process of allocating them across markets is considered.

The demand for OJ in each market is specified as a function of the price of OJ and cost margins including the tariff in that market. The quantity demanded in the United States is specified as $f_1(p + c_1 + t_1)$ where p is the price in the RW measured by the Brazilian FOB price, c_1 is the transportation cost from the RW to the United States, and t_1 is the U.S. tariff. The FOB price in the United States is $p + c_1 + t_1$. As most U.S. imports are FCOJ, only the FCOJ tariff is considered—NFC import levels are minor

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[2] Duty-free OJ imports from nearby CBERA countries, as well as from Mexico in the future when the NAFTA tariff rates go to zero, can be treated as part of U.S. domestic production and included in q_1.

because the transportation cost of importing NFC is much greater than for FCOJ. The United States is assumed to have excess demand; that is, $f_1(p + c_1 + t_1) > q_1$.

The quantities of OJ demanded in the European Union and Japan are specified as $f_2((p + c_2)(1+ t_2))$ and $f_3((p + c_3)(1+ t_3))$, respectively, where p is again the FOB price in the RW; c_2 and c_3 are transportation costs from the RW to the European Union and Japan, respectively; and t_2 and t_3 are the European Union and Japanese ad-valorem tariff rates, respectively. The (after-tariff) FOB prices in Europe and Japan are $(p + c_2)(1+ t_2)$ and $(p + c_3)(1+ t_3)$, respectively. Europe and Japan are assumed to have excess demand; that is, $f_2((p + c_2)(1+ t_1)) > q_2$ and $f_3((p + c_3)(1+ t_1)) > q_3$.

The quantity demanded for OJ in the RW is specified as $f_4(p)$. The RW is assumed to have excess supply; that is, $f_4(p) < q_4$.

These excess supply and demand assumptions are descriptive of the world OJ situation over the last decade and are assumed to hold with or without the U.S., European, and Japanese tariffs. In the future, however, excess supply and demand conditions may change across markets.

The quantities of OJ produced in the United States, European Union, and Japan are assumed to be consumed domestically in each market. On the other hand, the RW is assumed to export OJ to each of these markets as well as to supply the RW, receiving the same net price p in each market. Prices are determined by equating excess supply and demand. U.S., European, and Japanese excess demands vary inversely with p, while the quantity of excess supply in the RW varies directly with p, given negatively sloped demands ($\partial f_i/\partial p < 0 \; i = 1, ..., 4$).

Setting RW excess supply equal to aggregate U.S., European Union, and Japanese excess demand results in a world supply-demand equilibrium equation

$$(2) \quad [q_4 - f_4(p)] = [f_1(p + c_1 + t_1) - q_1] + [f_2((p + c_2)(1+ t_2)) - q_2] + [f_3((p + c_3)(1+ t_3)) - q_3].$$

Collecting supply and demand terms separately, equation (1) can be alternatively written as total world supply equals total world demand. Assuming an interior solution, the impact of the U.S., European Union, and Japanese tariffs on price can be determined straightforwardly from this equation; changes in the tariffs result in a change in the equilibrium price level p that equates excess supply and demand.

Unilateral elimination or reduction of the U.S. tariff makes it more profitable for the RW to reallocate its OJ from the RW, Europe, and Japan to the United States. As OJ is taken out of these world markets for reallocation to the United States, p increases until a new equilibrium is reached. Similarly, elimination or reduction of the European and Japanese tariffs reallocates RW OJ from RW markets without tariff changes and from the United States for export to Europe and Japan. To determine the impacts of these tariff changes on prices, totally differentiate the equilibrium equation (2) with respect to prices and tariffs, holding supply constant, and find

$$(3) \quad 0 = \partial f_1/\partial p(dp+dt_1) + \partial f_2/\partial p\,(dp) + \partial f_2/\partial p\,(((p+c_2)/(1+ t_2))dt_2) + \partial f_3/\partial p\,(dp) + \partial f_3/\partial p\,(((p+c_3)/(1+t_3))dt_3) + \partial f_4/\partial p\,(dp).$$

Solving the above result for dp,

$$(4) \quad dp = -w_1(dt_1) - w_2(((p + c_2)/(1+ t_2))dt_2) - w_3(((p + c_3)/(1+ t_3))dt_3),$$

where $w_1 = (\partial f_1/\partial p)/(\partial f/\partial p)$, $w_2 = (\partial f_2/\partial p)/(\partial f/\partial p)$, and $w_3 = (\partial f_3/\partial p)/(\partial f/\partial p)$, with $\partial f/\partial p = \partial f_1/\partial p + \partial f_2/\partial p + \partial f_3/\partial p + \partial f_4/\partial p$. The derivative $\partial f/\partial p$ is the world price slope and the term w_i is the i^{th} market's contribution or share of the world price slope.

Hence, the change in the U.S. price is

$$(5) \quad dp + dt_1 = (1- w_1)\,dt_1 - w_2((p + c_2)/(1+ t_2))dt_2 - w_3((p + c_3)/(1+ t_3))dt_3.$$

Based on results (4) and (5), if all demand slopes ($\partial f_i/\partial p$, $i = 1, ..., 4$) are changed proportionally—say doubled—each market's share of the world price slope (w_i) is unchanged, and the impacts of the U.S., European, and Japanese tariffs on prices are also unchanged. That is, the relative, not absolute, magnitudes of the market-demand slopes are the determining factors.

When estimates of the market-price slopes are unavailable, a simple approach to determine the market shares of the world-price slope is to assume the price elasticities across markets are all the same in which case w_i becomes the volume shares.[3]

Based on result (5), as the U.S. share of the world price slope (w_1) declines, the impact of the U.S. tariff on the U.S. price increases. For the extreme case where the U.S. share approaches zero (the United States becomes a price taker), the impact on price is the full amount of the U.S. tariff, with the European Union and Japanese tariffs unchanged ($dt_i = 0$; $i = 2, 3$).

Demand Estimates

Estimates of the price slopes by market are required to apply equations (4) and (5). In this study, the U.S. price slope is based on an estimate of the U.S. price elasticity of demand for OJ reported by Brown, Lee and Spreen (2003). The price slopes for the other markets are based on price elasticity estimates obtained by applying the seemingly unrelated regression (SUR) method to Brazil export data. In this analysis, the natural logarithm of Brazil's FCOJ exports by destination was regressed on the natural logarithm of Brazil's CIF price,[4] and time. Data from 1990–91 through 2000–01 reported by ABECitrus (an association of Brazilian processors) were used. The Japanese price elasticity was based on exports to Asia, as Japanese exports were not reported separately. In the equations for the European Union and Japan, the Brazil price, expressed in dollars, was transformed to Francs[5] and Yen, respectively, based on the exchange rates for these two currencies. The general demand specification in the set of SUR equations can be written as

$$(6)\ \log(Q_j) = \beta_{j0} + \beta_{j1}\log(p_j * r_j) + \beta_{j2}\,t,\quad j=2, 3, 4,$$

where Q_j is the quantity of Brazilian exports to market j; j=2, 3, and 4 for the European Union, Asia and the RW (excluding NAFTA countries), respectively; p_j is the Brazil CIF price; r is the exchange rate (Francs for Europe, Yen for Asia, unity for the RW); t is time; and β_{j0}, β_{j1} and β_{j2} are intercepts, price elasticities, and growth rate coefficients, respectively. Time was excluded from the Japanese equation, as it was not significantly different from zero at any reasonable level of significance. The estimates are shown in Table 1. All coefficient estimates were significant at the $\alpha = 5\%$ level of significance, except the estimate of the price elasticity for the RW—OJ exports to the RW were subject to a strong trend, and in comparison, price appears to be a relatively minor factor.

Total Elimination of OJ Tariffs

Based on the elasticity estimates and on data from the USDA (2003b) and the Florida Department of Citrus (FDOC) (2003), equation (5) was used to estimate the impacts of the U.S., European Union, and Japanese tariffs on the U.S. price of OJ as shown in Table 2. The last two columns of this table show the estimated impacts of the tariffs on prices; the first six columns of the table show underlying market parameters. For each market, the price slope was estimated as that market's price-elasticity estimate times the market quantity divided by the market price (columns one through four of Table 2); price slopes are assumed to be the same at different levels of the marketing chain—e.g., FOB, import, retail. Column 5 of Table 2 shows each market's estimated share of the world price slope based on the previous column estimates. Column 6 shows each market's tariff-change term in equations (4) and (5)—dt_1 for the United States, $((p + c_2)/(1+ t_2))dt_2$ for Europe, and $((p + c_3)/(1+ t_3))dt_3$ for Japan. Column 7 shows the estimated market-specific components for equation (4), the impacts of the tariffs on world price p; column 8 shows the estimated market-specific components for equation (5), the impact of the tariffs on the U.S. price. The totals of these last two columns show the price impacts when all tariffs are eliminated.

If only the U.S. tariff were eliminated, the RW price is estimated to increase by $0.079 per SSE gallon, while the U.S. price is estimated to decrease by $0.218 per SSE gallon. These estimates are similar to those found by Spreen, Brewster, and Brown (2003). Additionally, elimination of the European Union tariff results in an estimated increase in the RW price of $0.071 per SSE gallon, while elimina-

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[3] The market price slope share is $w_i = (\partial f_i/\partial p)/(\sum_j \partial f_j/\partial p) = [(\partial f_i/\partial p)(p/f_i)f_i]/(\sum_j (\partial f_j/\partial p)(p/f_j)f_j) = f_i/\sum_j f_j$ when the price elasticity $(\partial f_j/\partial p)(p/f_j)$ is equal across j.

[4] The CIF price was measured by the Rotterdam FCOJ price for exports to Europe and the RW, and the Rotterdam price plus an additional $0.08 per SSE gallon transportation cost for exports to Japan. Transportation costs from the RW (Brazil) to the United States and Europe are about the same, estimated at $0.10 per SSE gallon, while the cost from the RW to Japan is estimated at about $0.18 per SSE gallon.

[5] Although arbitrary, use of the Franc exchange rate in the regression analysis is representative of exchange-rate movements in Europe to the extent that the Franc-dollar exchange rate and other European exchange rates were highly collinear.

Table 1. Seemingly Unrelated Regression Estimates of Export Demand for FCOJ in the European Union, Asia, and the RW (Excluding the U.S. and Other NAFTA Countries).[a]

Region	Parameter	Estimate	Approximate standard error
European Union	$\beta 20$	16.737	1.417
	$\beta 21$	-0.410	0.158
	$\beta 22$	0.053	0.008
Asia	$\beta 30$	17.204	2.525
	$\beta 31$	-0.471	0.210
RW	$\beta 40$	10.677	2.787
	$\beta 41$	-0.109	0.379
	$\beta 42$	0.061	0.021

[a] R-square values for European, Asia, and the RW were .84, .33, and .56, respectively.

Table 2. Estimates of Quantity-Price OJ Demand Slopes in U.S., European Union, Japanese, and RW Markets, and Tariff Impacts on Prices.

	Quantity[a]	Price[b]	Price elasticity[b]	- - - - Price slope[c] - - - -		Tariff[d]	Impact on world price	Impact on U.S. price
Market	Mil. SSE gallons	$/SSE gallon	$(\partial q/\partial p)$ (p/q)	$\partial q/\partial p$: Mil. SSE gal./$	Share of world	- - - - - - - $/SSE gallon - - - - - - -		
U.S.	1,515	4.25	-.70	-250	26.6%	0.297	0.079	-0.218
Europe	1,230	.90	-.41	-561	59.8%	0.119	0.071	0.071
Japan	145	.98	-.47	-70	7.4%	0.199	0.015	0.015
RW	483	.90	-.11	-58	6.2%			
TOTAL	3,373	.90	-.25	-938	100.0%		0.165	-0.132

[a] Market consumption based on data reported by the FDOC (2003), and by the USDA (2002).

[b] Retail price for United States, based on ACNielsen data; Rotterdam Bulk FCOJ price for Europe and RW (tariff not paid), based on data reported by *Foodnews*; Rotterdam price plus a transportation differential for Japan.

[c] Estimated as price elasticity times market gallons divided by market price; price slopes are assumed to be the same at different levels of the marketing chain; e.g., FOB, import, retail.

[d] For United States, absolute tariff; for Europe and Japan, ad-valorem-tariff term in equation (5): ((Brazil CIF price for bulk FCOJ)/(1+ad-valorem rate))(ad-valorem rate).

tion of the Japanese tariff results in an estimated increase in the RW price of $0.015 per SSE gallon, which in turn would increase the U.S. price by the same amounts. Hence, elimination of the U.S., European, and Japanese tariffs would decrease the U.S. FOB price for OJ by an estimated $0.132 per SSE gallon or $0.086 per SSE gallon less than the impact of the losing the U.S. tariff only.[6] This reduction in the negative impact of losing only the U.S. tariff is an estimate of the gain that might be obtained through negotiations that eliminate OJ tariffs across countries.

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[6] The simple approach to calculating the world price-slope shares provides a somewhat similar result—measuring w_i in equation (5) by the volume shares, the U.S. OJ price decreases by $0.11 per SSE gallons.

Swiss 25 Tariff Reductions

Alternatively, OJ price impacts resulting from partial tariff reductions according to the Swiss 25 formula are shown in Table 3. These results are based on a U.S. CIF import price for bulk FCOJ of $0.90 per SSE gallon. In this case, the ad-valorem equivalent of the U.S. tariff is 33% (FCOJ tariff of $0.297 per SSE gallons divided by $0.90 per SSE gallon). Application of the Swiss 25 formula reduces the U.S., European Union and Japanese OJ tariffs by 18.8%, 5.7%, and 12.9%, respectively (Columns 1–3 of Table 3). Column 5 shows each market's estimated tariff-change term for equations (4) and (5); while Column 6 shows again each market's estimated share of the world price slope used in these equations. Column 7 shows the estimated impacts on the world price based on equation (4), while Column 8 shows the estimated impacts on the U.S. price. The estimates in the last column show that the Swiss 25 tariff changes would lead to an estimated reduction in the U.S. price of $0.09 per SSE gallon. Hence, these results suggest that use of the Swiss 25 formula would cut the negative impact on the U.S. price by more than half, compared to the scenario where only the United States eliminated its tariffs on OJ.

Qualifications/Extensions

The results shown in Tables 2 and 3 are based on the assumption that the United States, European Union, and Japan have excess demand for OJ with or without tariffs. For Europe and especially Japan, extending this assumption into the future seems reasonable, as their production levels are relatively small compared to their consumption levels. U.S. OJ production, however, is relatively large, and various corner solutions are possible (Takayama and Judge 1971). In some world supply-demand situations, U.S. imports, other than for blending, may be zero with or without the U.S. tariff, in which case the U.S. OJ price might be determined by U.S. production only; or, for some large U.S. production levels, the United States may become a net exporter, with the U.S. price becoming the world price. Another possibility is that imports are zero with the tariff but some positive amount without the tariff.The analysis of this study has also examined the impact of tariffs under the short-run assumption that supply is not a function of price. Orange-tree populations across producing countries, along with weather, largely determine OJ production in the current year independent of prices. OJ prices are assumed to be high enough for growers to maintain groves and tree yields, as has generally been the case historically. Production for the next several years also tends to be independent of prices. Trees under three years old generally do not produce a significant amount of fruit to be commercially harvested, and production for the next several years is largely dependent on maturation of the current tree populations (yield per tree tends to increase with age) and tree losses. In upcoming years, higher-than-average tree losses

Table 3. Tariff Impacts on Prices, Based on Swiss 25 Formula.

Market	- - - - - Ad-valorem tariff - - - - - - Current[a]	New[b]	Change	FCOJ price[c]	Tariff change[d]	Share of world price slope[e]	Change in world price	Impact on U.S. price
				- - $/SSE gallon - -			- - - $/SSE gallon - - -	
U.S.	33.0%	14.2%	-18.8%	0.90	-0.169	26.6%	0.045	-0.124
Europe	15.2%	9.5%	-5.7%	0.90	-0.045	59.8%	0.027	0.027
Japan	25.5%	12.6%	-12.9%	0.98	-0.101	7.4%	0.007	0.007
TOTAL							0.079	-0.090

[a] U.S. ad-valorem rate was estimated as the U.S. FCOJ tariff of $0.297 per SSE gallon divided by an assumed tariff-not-paid FCOJ import price of $0.90 per SSE gallon.

[b] Based on Swiss 25 formula: 0.25*current tariff/(0.25+current tariff).

[c] Tariff-not-paid CIF price for bulk FCOJ.

[d] For United States, the ad-valorem tariff-change times the tariff-not-paid import price of $0.90 per SSE gallon; for Europe and Japan, the ad-valorem-tariff term in equation (5): ((Brazil CIF price for bulk FCOJ)/(1+ad-valorem rate))(ad-valorem rate change).

[e] See Table 2 for calculations.

are expected as a result of diseases in Brazil and the United States. Trees are being lost to the citrus tristeza virus (CTV) and canker in Florida and to citrus chlorosis variegated (CVC) and "sudden death of citrus" in Brazil. Tree losses to diseases combined with maturing tree populations may even keep orange production relatively flat or possibly result in production declines in upcoming years (FDOC 2001).

In the long run, prices may have a notable impact on production through planting rates, and following Spreen, Brewster, and Brown (2003), extension of our model to the long run is straightforward. The latter study found a strong, positive relationship between tree-planting levels in Florida and previous-season grower prices. A similar relationship was found for Brazil. Hence, following their approach, price levels determined in the short run along with past prices might be used to determine planting levels, which in turn might be used to determine future production in a forward recursive manner.

Concluding Comments

This study examined how the U.S. OJ price might change if tariffs in the United States, European Union, and Japan were eliminated or reduced according to the Swiss 25 formula. Spreen, Brewster, and Brown (2003) found in an earlier study that elimination of the U.S. tariff by itself would reduce the price of OJ by $0.21 per SSE gallon to $0.22 per SSE gallon, depending on product form. The present study confirms this result and further finds that simultaneous elimination of the U.S., European, and Japanese tariffs would decrease the U.S. OJ price by an estimated $0.13 per SSE gallon, or about $0.09 per SSE gallon less than if only the U.S. tariff were eliminated. Alternatively, if OJ tariffs are reduced according to the Swiss 25 formula, the U.S. price is estimated to decline by $0.09 per SSE gallon, or $0.13 per SSE gallon less than if only the U.S. tariff were lost.

These results provide an indication of the value that may be obtained through multilateral trade negotiation. If the United States finds that it may lose its OJ tariffs, a secondary strategy should include seeking OJ-tariff reductions in other world market. Given that the United States typically produces 1.4 billion SSE gallons per year, each penny reduction in the adverse price impact of losing the U.S. tariff is worth $14 million to U.S. OJ industry. Thus, the roughly $0.09-per-SSE-gallon savings obtained by eliminating the European and Japanese tariffs translates into a $126 million gain to the U.S. OJ industry. Similarly, the $0.13-per-SSE-gallon difference in the price reductions for eliminating only the U.S. tariff versus reducing tariffs in these major markets based on the Swiss 25 formula is worth $182 million.

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