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Derived Demand for Grated Cheese Products Imported into Japan

Andreas P. Christou, Richard L. Kilmer, James A. Sterns, Shiferaw T. Feleke and Jiaoju Ge[1]

Abstract

The objective of this article is to estimate the derived demand for imported grated cheese products into Japan when grated cheese import data are disaggregated by country of production. We provide empirical measures of the sensitivity of demand to changes in total imports, own-price, and cross-prices among exporting countries for grated cheese. Japan's derived demand for U.S. grated cheese products is perfectly inelastic. Thus, the import demand competition among importing countries should be based upon differences in product characteristics.

Introduction

Changes in domestic and international policies will have a major effect on the international cheese market. Specifically, U.S. dairy price supports may be phased out in the future which may reduce milk costs for U.S. dairy products. This will cause U.S. cheese products to become more competitive worldwide. The General Agreement on Tariffs and Trade (GATT) ended in 1997 and is still applied by the WTO since the new act is still in the process of negotiation. This means that world agricultural export

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subsidies will be reduced by 21% and the budget expenditures for export subsidies will be reduced by 36%. Since an export subsidy is a payment by a government to their exporters, this allows the exporters to sell their commodity to another country at a reduced price. If a government reduces it's subsidies to its exporters, the exporters will likely increase the price they charge importers for the exporter's commodity. Because the subsidizing country's exporters will likely charge a higher price in order to cover expenses, their exports are reduced. At the same time, exporters from other countries will experience an increase in their exports as they are more price competitive with the previously subsidized exporters.

The export subsidy reduction will have a major effect on the European Union (E.U.) but a small effect on the U.S. In 2001, the E.U. was both the largest producer (21.3%) and the largest consumer (21%) of cow's milk in the world, compared to 13.1% and 12% for the U.S. (CEC). The E.U. provides more than $1 billion in dairy export subsidies which is more than 100 times what the U.S. spends on export subsidies (NMPF). From 2000 through 2002, U.S. dairy exports that were unsubsidized represented 81, 86, and 84 percent of total U.S. dairy exports (NMPF). The reduction in export subsidies by other countries will help the U.S. be more competitive in the international cheese market and increase market share.

The United States Dairy Export Council (USDEC) has identified Japan as one of the countries that will increase its share of world imports of dairy products in the future based on increasing per capita income. Even though cheese consumption in Japan is low as compared to the E.U., the U.S., Canada, Brazil and Russia on a total

ton basis, the cheese market shows room for expansion and potential in the future.

The objective of this study is to estimate the derived demand for imported grated cheese into Japan when grated cheese import data are disaggregated by source country of production and to provide empirical estimates of the sensitivity of grated cheese demand to changes in total imports, own price, and cross prices among exporting countries.

Background of U.S. and Japan grated cheese market

The quantity of U.S. Grated cheese exports ranged from 4,844 metric tons in 1991 to 24,564 metric tons in 2002 before falling to 17,057 metric tons in 2003 (Table 1). Grated cheese exports increased an average of 13.8% per year which is slightly higher than the average annual rate of 12.5% for all cheeses exported by the U.S. The percentage change per year in grated cheese exports is variable ranging from -30.6% to 51.2% (Table 1). The grated cheese share of total U.S. cheese exports increased from 35% in 1991 to 44.2% in 2002 before dropping to 31.8% in 2003. The grated cheese market share was as low as 21.7% during the 1991-2003 period.

Over the same time period, Japan's grated cheese imports from the U.S. were also variable. The average annual rate increase was 13.1% (Table 2), but slightly lower than the change in U.S. exports of grated cheese (13.8%) (Table 1). Furthermore, U.S. grated cheese exports to Japan peaked in 2000 at 1,994 metric tons and continued to drop in 2001 and 2003 with a slight increase in 2002 (Table 2). The year to year change in the Japan grated cheese imports from U.S. averaged 13.1% which is lower than total grated cheese imports into Japan (21.2%) (Table 2). Furthermore, the U.S. share of Japan grated cheese imports averaged 50.3 percent

from 1991 through 2003 and generally trended downward over that period. Over all, for the Japan cheese import market, Australia ranked first, New Zealand ranked second and the U. S. ranked ninth in 2004. All the above information suggests the U.S. grated cheese exports to Japan have the potential to increase if the cheese industry

Table 1. U.S. Cheese Exports, 1991-2003.

Year	U.S. Cheese Exports (Metric Tons)				
	Grated Cheese	Percent Change	All Cheese	Percent Change	Percent Share
1991	4,844	~	13,856	~	35.0
1992	4,481	-7.5	17,467	26.1	25.7
1993	5,506	22.9	18,521	6.0	29.7
1994	7,775	41.2	24,761	33.7	31.4
1995	9,049	16.4	31,990	29.2	28.3
1996	10,720	18.5	35,845	12.1	29.9
1997	8,702	-18.8	40,156	12.0	21.7
1998	9,009	3.5	40,591	1.1	22.2
1999	13,625	51.2	43,120	6.2	31.6
2000	14,788	8.5	49,865	15.6	29.7
2001	21,888	48.0	53,958	8.2	40.6
2002	24,564	12.2	55,620	3.1	44.2
2003	17,057	-30.6	53,700	-3.5	31.8
Total	152,009	~	479,449	~	31.7
Average	11,693	13.8	36,881	12.5	~

Data Source: United Nations COMTRADE Databases, 2004

finds an effective marketing strategy to compete with other countries.

Methodology

The differential factor allocation model is an input derived demand model (i.e., not consumer demand). The derived demand model is determined from the minimization of the cost to obtain a predetermined level of output. The inputs are cheeses that come from different countries. This formulation allows the competitive advantage/disadvantage that each country experiences relative to other countries to be

analyzed. The sensitivity of the quantity demanded to a country's own price (price elasticity of demand) as well as to the price of a competing country (cross price elasticity of demand) is calculated from the derived demand equation. The price elasticity of demand is used to determine the impact of export subsidy reduction on an exporter's quantity of exports. The cross price elasticities of demand are used to

Table 2. Japan Grated Cheese Imports, 1991-2003.

Year	Grated Cheese Imports (Metric Tons)				
	U.S.	Percent Change	World	Percent Change	Percent Share
1991	473	~	552	~	85.7%
1992	562	18.8%	768	39.2%	73.1%
1993	616	9.6%	930	21.1%	66.2%
1994	633	2.8%	1075	15.6%	58.9%
1995	889	40.3%	2253	109.6%	39.5%
1996	1,348	51.7%	2493	10.6%	54.1%
1997	1,525	13.1%	2633	5.6%	57.9%
1998	1,849	21.3%	3138	19.2%	58.9%
1999	1,814	-1.9%	3906	24.5%	46.4%
2000	1,994	9.9%	4167	6.7%	47.9%
2001	1,908	-4.3%	4368	4.8%	43.7%
2002	1,931	1.2%	4034	-7.6%	47.9%
2003	1,830	-5.3%	4223	4.7%	43.3%
Total	17,373	~	34,541	~	50.3%
Average	1,336	13.1%	2,657	21.2%	~

Data Source: "Ministry of Finance Japan" website, 2004

determine the level of competition between countries. The Divisia import elasticity shows the percentage change in a country's exports that are imported into another country given a one percent change in the importing country's imports.

Empirical Projection

The Divisia index elasticities are 0.848, 0.431, and 5.926 for the U.S., the

European Union (E.U.), and rest of the world (ROW), respectively (Table 3). This indicates that if total grated cheese imports into Japan increase by 1.0%, holding all prices constant, cheese exports to Japan from these countries will increase by 0.848%, 0.431%, and 5.926%. The biggest beneficiary when total cheese imports into Japan increase is the ROW, with the U.S. receiving the second largest increase.

Table 3. Conditional[a] Divisia and Price Elasticities of Derived Demand for Imported Grated Cheese into Japan.

	Elasticities				
			Conditional[a] Cross-Price		
Exporting Country	Divisia Index	Conditional[a] Own-Price	United States	EU	ROW[b]
United States	0.848*** (0.114)[c]	-0.056 (0.078)		0.051 (0.073)	0.005 (0.019)
EU	0.431** (0.203)	-0.167 (0.258)	0.187 (0.267)		-0.020 (0.033)
ROW	5.926*** (1.550)	0.007 (0.262)	0.081 (0.308)	-0.088 (0.146)	

Source: Andreas P. Christou, Richard L. Kilmer, James A. Sterns and Shiferaw T. Feleke.
[a] Conditional: the elasticities are based on a predetermined level of output
[b] ROW = rest of the world;
[c] The ANALYZ routine in TSP was used to calculate the asymptotic standard errors in parentheses
*** Significance level = 0.01;
** Significance level = 0.05
* Significance level = 0.10

For the U.S., the E.U., and the ROW, the conditional own-price elasticities are not statistically different from zero (Table 3). This suggests that price is not a significant factor for the grated cheese exported into Japan. A change in the price of these source countries will not change the quantity of their imports into Japan.

The cross-price elasticities are also statistically insignificant among the U.S., the E.U., and the ROW. This indicates there is no substitution or complementary relationship among them. Therefore, the above two countries and the ROW do not compete on a price basis with each other in the Japan grated cheese import market.

Implications

Given the attempts of domestic and international policy makers to reduce trade barriers, U.S. manufacturers of cheese products have a growing interest in becoming successful in international markets. The results of the derived demand for imported grated cheese show that grated cheese importers most probably do not compete with one another on a price basis in the grated cheese market; therefore, the best strategy for the U.S. dairy industry to increase grated cheese exports to Japan is to compete through product characteristics.

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