International Food and Agribusiness Management Review
Special Issue - Volume 19 Issue B, 2016

Potential Impacts of Trans-Pacific Partnership on Japanese Cheese Imports

Christopher G. Davis[1]

Economist, Economic Market and Trade Economics Division, Economic Research Service, US Department of Agriculture, 355 E Street, SW, Washington, DC 20024-3221, USA

Abstract

Japan is a major importer of cheese—second only to the United States in both volume and value. In 2015, the US accounted for 15% of Japan's total volume of imported cheese. If the Trans-Pacific Partnership (TPP), is ratified by Congress, US and other major cheese exporters stand to benefit from duty free or reduced tariff rates. An import demand model is used in estimating Japan's demand for imported cheese. Estimates from this analysis are then used to project Japanese cheese imports in volume and value as a result of TPP. Findings suggest that the own-price elasticities for cheese from the EU–28, US, and the ROW are more sensitive to changes in prices than cheese from Australia. Given a 29.8% reduction in the tariff rate on Japan's fresh cheese imports, Japan is projected to import from the US, New Zealand, and Australia a total of 29.2 million kilograms more cheese. Cheese exporting companies can benefit from the research results that indicate potential export market share changes for competing countries, increases in overall Japanese cheese imports, and price sensitivity of individual country exports of cheese.

Keywords: cheese, demand, imports, trade, TPP, tariff rate

ⓘCorresponding author: Tel: + 1.202. 694.5167
Email: C.G. Davis: chrisdavis@ers.usda.gov

[1] The views expressed here are those of the author, and may not be attributed to the Economic Research Service or the U.S. Department of Agriculture.

Introduction

Japan is one of the top importers of agricultural products in the world and the third largest dairy importer. Japan is the largest importer of cheese, surpassing Russia after that country's embargo against European cheese imports (Archwamety 2016). Over the last five years, Japan's cheese imports from the US have risen. In 2015, the US accounted for 15% of Japan's total volume of imported cheese, compared to only 7% in 2010. This trend could possibly continue as more regional trade agreements, particularly the Trans-Pacific Partnership (TPP), are put into place to reduce trade barriers. On October 5, 2015, the President of the United States and other country leaders concluded negotiations on TPP, which is yet to be ratified by the US Congress (Calmes 2015). TPP is a trade and investment agreement negotiated by twelve Pacific Rim countries, including the United States and eleven other countries: Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, and Vietnam (Burfisher et al. 2014).

Presently, the basic legislation that governs import trade in Japan is a Customs Tariff Law that sets the bound rates as agreed to in the Uruguay Round (UR) Agreement on Agriculture. Each year, a temporary amendment to that legislation, known as the Temporary Tariff Measures Law, is passed to fix certain tariffs at lower rates. There are several dairy product tariff rates established for which there are no quotas. For cheese and curd, the tariff rate[2] for most of the products imported into the Japanese market falls under the tariff rate of 29.8%. Under the proposed TPP agreement, Japan's tariff rates will be eliminated.

Of the twelve countries currently involved in the TPP trade agreement, three (US, Australia, and New Zealand) are major cheese exporters to Japan and will directly benefit from any reduction in tariffs.[3] The other major cheese exporters are the EU–28 and the rest of the world. In 2000, Japan imported over 205 million kilograms of cheese exceeding $547 million. By 2015, Japan's cheese imports had grown by 21.5% when compared to 2000, while the value almost doubled ($1.187 billion) over the same period. Figure 1 shows Japan's cheese imports by value and source country of origin. Australia is Japan's largest supplier, with EU–28 being a distant second. Growth in export values peaked for EU–28 and New Zealand in 2005, 2008, and 2012. Since 2010, cheese imports from the US climbed steadily until 2015, when export values fell 28% as the US dairy price dropped considerably due to an almost worldwide decline in import demand. The greatest increase in US export values occurred from 2013 to 2014 (see Figure 1).

Market shares of Japan's cheese imports have fluctuated over time (Table 1). From 2000 to 2015, cheese imports from the EU–28 increased by 1% in volume and declined 3% in value. The lack of growth or inability of EU–28 to export more cheese to Japan is primarily due to the

[2] Processed cheese (0406.30), which does not include shredded cheese for pizza, faces a higher tariff of 40%. There is, however, a tariff-rate quota for fresh cheese imported for cheese processing in Japan, with a 0 tariff within the quota.

[3] The Japan-Australia Economic Partnership Agreement entered into force on Jan. 15, 2015. Australia received country-specific tariff-rate quotas related to cheese that offer reduced in-quota tariffs (0 in the case of the TRQ for fresh cheese) for limited quantities (Australian Government, Department of Foreign Affairs and Trade 2016). Because the Japan-Australia Agreement is quite recent, not fully implemented, and limited in scope, we chose to use the TPP-negotiated concessions which apply to Australia as well.

notably tariffs, non-tariff barriers, and unsatisfactory access to the Japanese public procurement market. Similar to EU–28, Australia's market shares also dropped by 8% in volume and 5% in value, over 2000–2015. Australia was not able to meet growing demand of its cheese exports in 2015 due to the country's lower milk production in 2014. Of the five major exporting markets, New Zealand is the only country where market share remained relatively constant during the data period. Cheese exports from the US experienced the greatest growth in market shares. Over the last sixteen years, the US exports of cheese to Japan increased 13% in volume and 12% in value. The US growth in the Japanese market has occurred for many reasons. A few of the reasons are (1) an increase in Japanese consumers demand for quality Western foods; and (2) Japan's strong perception of the US as good food suppliers (Archwamety 2016).

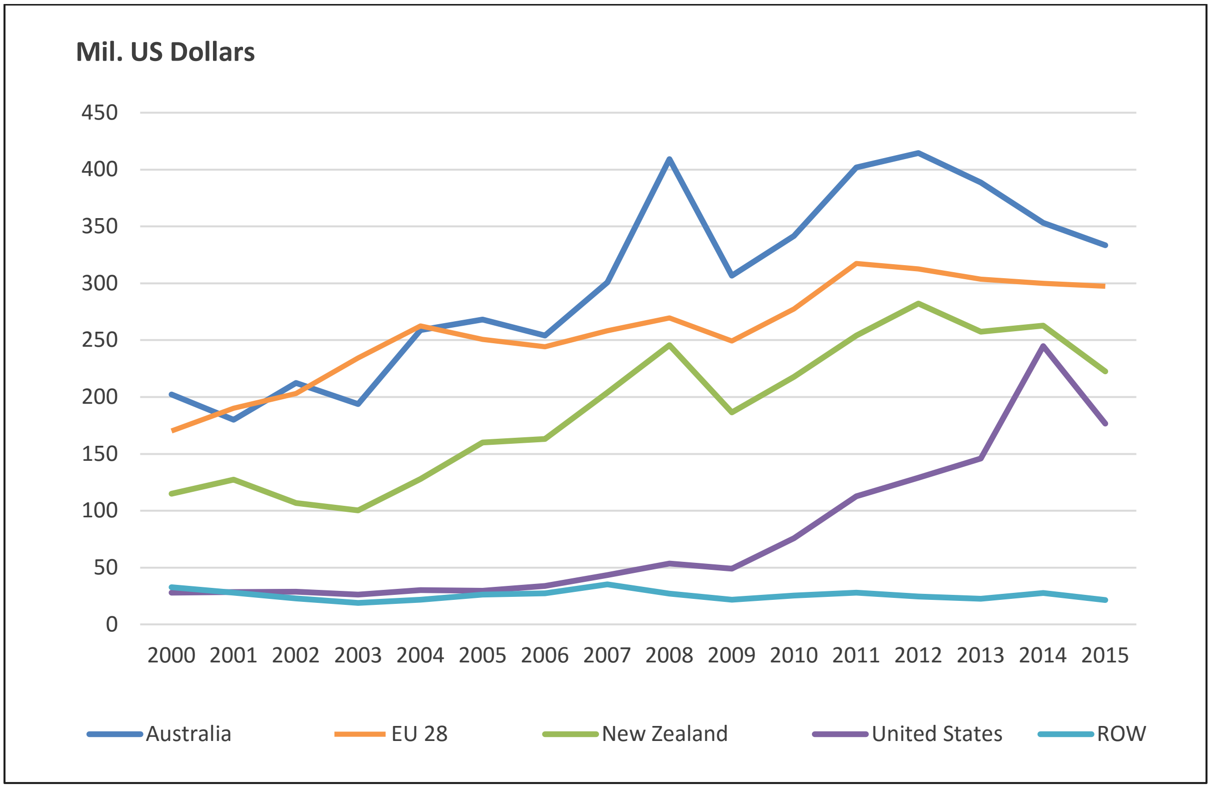

Figure 1. Japanese cheese imports by location and value
Source. World Trade Atlas®

In the study, the impact of tariff reductions in Japan's cheese market are considered. Reductions of 29.8% are assumed and applied to all TPP member countries, particularly the US, Australia, and New Zealand. The objective of this research is to estimate Japan's demand for imported cheese by obtaining estimates of the unconditional elasticities of demand. These elasticities are then used to project Japan's imports in volume and value.

Table 1. Market share of cheese by exporting country and selected years

Japan Imported Cheese		Years 2000	2005	2010	2015
Japan's total cheese imports[1]		205.12	211.62	199.08	249.29
Expenditure on imported cheese[2]		547.77	734.61	938.06	1,029.81
		Market Shares			
EU–28					
	Quantity	0.23	0.24	0.22	0.24
	Value	0.31	0.34	0.30	0.28
Australia					
	Quantity	0.44	0.44	0.43	0.36
	Value	0.37	0.37	0.36	0.32
New Zealand					
	Quantity	0.24	0.26	0.26	0.23
	Value	0.21	0.22	0.23	0.21
United States					
	Quantity	0.02	0.02	0.07	0.15
	Value	0.05	0.04	0.08	0.17
ROW					
	Quantity	0.07	0.04	0.03	0.02
	Value	0.06	0.04	0.03	0.02
Total					
	Quantity	1.00	1.00	1.00	1.00
	Value	1.00	1.00	1.00	1.00

Note. [1]Millions of kilograms. [2]Millions US dollars
Source. Authors' calculation using the World Trade Atlas®.

Rotterdam Import Demand Model

In this study, we estimated an import allocation model and a total impact model. The derived demand for imported cheese is based on the production version of the Rotterdam model. Importing firms in Japan buy cheese from other countries and sell it domestically. Once the cheese has been purchased, production inputs such as fuel and utilities are used to operate the manufactory or storage facilities that house the cheese. Cheese imported from Australia, for example, is considered a separate good within the cheese group, but it is also unique based on its country of origin (Armington 1969). There are some physical differences that exist for various types of imported cheese which could be linked to taste, age, quality, protein and fat content. Along with the physical differences, there are also some perceived differences such as a country's reputation for producing quality products, previous trade relationships, dependability, and political status (Zhou and Novakovic 1996).

The Rotterdam model is a demand system/model that is frequently used to test economic theory. The model works in differentials and all theoretical restrictions are applied directly to the parameters. The production version of the Rotterdam model is a two stage differential approach. The first stage of the differential approach involves firms seeking to obtain a profit-maximizing level of output where marginal cost equals marginal revenue (Washington and Kilmer 2002). Once the profit maximization has been obtained, the second stage of the differential approach is to estimate a system of derived demand equations (Washington and Kilmer 2002). Each derived demand equation is source or country specific.

The production version of the Rotterdam model is used to estimate Japan's import demand for cheese (Theil and Clements, 1978; and Clements and Theil, 1978). Similar to Armington (1969), an assumption made in this study is that cheese from all five major exporting markets are individual goods (e.g., US cheese) in that cheese is assumed differentiated by country of origin. The competitiveness across countries captures how changes in relative prices cause import demand to swing toward or away from different exports. Another assumption is that imported cheese from the five destinations is an intermediate good[4] and is weakly separable from domestic inputs such as fuel, utilities, and intermediate imports.

Following Washington and Kilmer (2002), we can express the demand for an import from a country as a function of the import prices by source and total import expenditures on cheese as:

$$(1)\quad \overline{s_{it}}\,\Delta q_{it} = \theta_i\,\Delta Q_t + \sum_{j=1}^{k_1} \pi_{ij}\,\Delta p_{jt} + \textstyle\sum_{h=1}^{12} \delta_{ih}\, d_h + \varepsilon_{it}.$$

Equation (1) signifies the import allocation model where q_i is the quantity of the *i*th import and p_j is the *j*th import price. Δ represents finite log changes where for any q or p, $\Delta q_{it} = \log\left({}^{q_{it}}/_{q_{it-1}}\right)$ and $\Delta p_{it} = \log\left({}^{p_{it}}/_{p_{it-1}}\right)$. $\overline{s_{it}} = 0.5(s_{it} + s_{it-1})$, where s_i is the share of the *i*th import in total import cost $\left({}^{p_i q_i}\Big/_{\sum_{i=1}^{k_1} p_i q_i} \right)$.

$\Delta Q_{it} = \sum_{i=1}^{k_1} \overline{s_{it}}\Delta q_{it}$ is the Divisia Index. It is a measure of all real expenditures on imported cheese (in total). $\theta_i = \partial(p_i q_i)/\partial(\Sigma_i p_i q_i)$ represents the marginal share of the *i*th import. The conditional import price effect is defined as π_{ij}, also known as the Slutsk Divisia price coefficient. The conditional import price effect measures the effect of the *j*th import price on Japan's cheese imports from country ***i***. Monthly dummy variables (d_h) added to equation (1) measure any seasonal fluctuation in cheese demand, such that δ_{ih} captures any seasonality effects. For estimation purposes, θ_i, π_{ij} and δ_{ih} are assumed to be constant. The error term is ε_{it}.

The adding up, homogeneity, and symmetry condition are respectively imposed as follows: $\sum_i \theta_i = 1$, $\sum_i \pi_{ij} = 0$, and $\sum_i \delta_{ih} = 0$ (adding up); $\sum_j \pi_{ij} = 0$ (homogeneity); $\pi_{ij} = \pi_{ji}$ (symmetry).

[4] More details about intermediate products please see Sanyal and Jones (1982).

The total import expenditures are defined as

$$(2) \quad \Delta Q_t = \gamma \Delta p* + \sum_{j=1}^{k} \pi_j \, \Delta p_j \; + \pi_f \, p_f \; + \pi_u \, p_u \; + \sum_{h=1}^{12} \delta_h \; d_h \; + \varepsilon_t \quad .$$

In equation (2), total expenditures on imported cheese in Japan are a function of resource prices such as fuel and utilities (p_f and p_u), Japan's domestic cheese price (p^*), and individual import prices (p_j). Parameters are γ, π_j, and π_k and are assumed constant for estimation. ε_{it} is the error term. Because of the weak separability of imports and domestic inputs, domestic resource demand will not be modeled within the import allocation system.

In order to derive the unconditional elasticities of demand with respect to fuel and utilities prices, Japan's domestic cheese price, and individual import prices, we substituted equation (2) for the Divisia index term in equation (1). After substitution, we can solve for the following:

$$(3) \;\; \eta_{q\mathrm{p}*} = \frac{\Delta q_i}{\Delta \mathrm{p}*} = \frac{\theta_i}{\overline{s_\iota}} \gamma \,,$$

$$(4) \;\; \eta_{qp_f} = \frac{\Delta q_i}{\Delta p_f} = \frac{\theta_i}{\overline{s_\iota}} \pi_f \;,$$

$$(5) \;\; \eta_{qp_u} = \frac{\Delta q_i}{\Delta p_u} = \frac{\theta_i}{\overline{s_\iota}} \pi_u \;\; \text{, and}$$

$$(6) \;\; \eta_{qp_j} = \frac{\Delta q_i}{\Delta p_j} = \frac{\theta_i \, \pi_j}{\overline{s_\iota}} + \frac{\pi_{ij}}{\overline{s_\iota}} \,.$$

Equation (3) is the percentage change in quantity from the *i* country divided by the percentage change in price. Equations (4 and 5) represent the percentage change in quantity from the *i* country divided by the percentage change in the price of fuel (or utilities). Equation (6) is the percentage change in quantity from country *i* divided by the percentage change in the price from country *j*.

Data and Estimation Results

Monthly observations from 2000 to 2015 are analyzed for Japan's cheese imported, which included import expenditures, quantities, and unit prices obtained from the World Trade Atlas® database. The Harmonized System Codes (HS Code) at the 6-digit level (0406.10 and 0406.20 cheese and curd) are used to collect trade volumes and values for cheese and curd by country of origin. Using the cheese data, price and expenditure elasticities are estimated for each market.

We estimated the five major cheese suppliers imposing homogeneity and symmetry conditions to all. One of the demand equations was dropped from the demand systems to avoid singularity. We dropped the ROW equation for estimation.

To determine if there was an AR(1) problem a likelihood ratio (LR) test was conducted using the maximum likelihood method from Berndt and Savin (1975). The results suggest that AR(1) should not be rejected at the 5% significant level (Table 2). All results that follow have AR(1) imposed.

Table 2. Likelihood ratio test results for AR(1)

Model	Log-Likelihood Value	LR Statistic	P-value
AR(1)	1850.069		
Without AR(1)	1759.408	181.3215	0.000***

Note. Level of statistical significance - ***- 1%.

Table 3 presents the conditional parameter estimates of Japan's import demand for cheese. As shown in Table 3, all own-price coefficients are negative and significant, as expected. The own-price coefficients for imported cheese from the EU–28 (–0.405), the US (–0.085), Australia (–0.168), and the rest of the world (ROW) (–0.433) are significant at the 0.01 significance level, while New Zealand (–0.111) is statistically insignificant. Cross-price parameter estimates indicate that six of the ten cross relationships are positive. These parameter estimates also suggest that EU–28 and Australia (0.228), EU–28 and New Zealand (0.137), EU–28 and US (0.023), Australia and the US (0.036), New Zealand and US (0.028), and Australia and ROW (0.035), cheese products could potentially serve as substitutes within the Japanese market. All six of the above cross-price parameter estimates are statistically significant.

Table 3. Conditional derived demand parameter estimates for Japan's imported cheese

	Exporting Countries				
Japan Imported Cheese	**EU–28**	**Australia**	**New Zealand**	**US.**	**ROW**
EU–28	–0.405***	0.228***	0.137***	0.023*	0.014
	(0.040)	(0.044)	(0.042)	(0.013)	(0.010)
Australia		–0.168***	–0.088	0.036***	–0.035***
		(0.092)	(0.077)	(0.017)	(0.013)
New Zealand			–0.111	0.028*	0.007
			(0.081)	(0.016)	(0.015)
U.S.				–0.085***	0.000
				(0.010)	(0.004)
ROW					–0.433***
					(0.005)

In Table 4, we estimated the impact of the resource prices, import prices, and output prices. Importers rely on fuel and utilities. It is expected that as the prices of fuel and utilities rise, countries will import less cheese given the increase in the cost of domestic transportation and storage facilities. As predicted, the parameter estimate for fuel price (z_i) is positive (1.628), but statistically insignificant, which means that the value of fuel is no different from zero. The parameter estimate for the utilities price was –0.015 and statistically insignificant. Import prices are negative and statistically significant for the EU–28 (–0.590), US (–0.144), and the ROW (–0.125). Australia and New Zealand are statistically insignificant. The output price (0.595) yielded the expected sign, but it was insignificant as well. While output price is statistically insignificant, the positive sign indicates that the imports of intermediary cheese products by Japanese firms give rise to opportunities to add more value to final goods, which are then resold domestically or re-exported to other countries.

Table 4. Parameter estimates of Japan's input price for imported cheese

Input Price Coefficients[1]							
EU–28	**Australia**	**New Zealand**	**U.S.**	**ROW**	**Output Price**	**Fuel**	**Utility**
–0.590***	–0.296	0.231	–0.144***	–0.125***	0.595	1.628	–0.908
(0.136)	(0.228)	(0.220)	(0.050)	(0.049)	(0.858)	(1.304)	(0.832)
R2 = 0.65							

Note. [1]p_f and p_u. Author calculations based on World Trade Atlas®. Asymptotic standard errors are in parentheses. *** implies that the coefficient is significant at the 0.01 level.

Unconditional Price Elasticities

Table 5 displays the estimates of the unconditional price elasticities[5] for imported cheese. Note that all unconditional price elasticities are calculated at the mean. The unconditional own- and cross-price elasticities provide an illustration of the impact of import price changes on cheese imports, holding total imports constant. From a practical and theoretical perspective, Japan will often change how total imports are allocated across the exporting countries as import prices (relative prices) change, but will also change imports due to the effect of prices on total expenditures. Unconditional own-price elasticities show an inverse relationship between source-specific prices and quantities demanded. The own-price elasticities are –1.267, –0.832, –0.006, –1.376, and –1.592 for EU–28, Australia, New Zealand, US, and the ROW cheese, respectively. All of the own-price elasticities estimates are statistically significant except for New Zealand. These own-price elasticities suggest that the demand for cheese imports from the EU–28, the United States, and the ROW tend to be relatively elastic and quite sensitive to changes in price. These findings suggest that a 1% change in price will cause a percentage change in quantity demanded that is greater than 1%. Washington and Kilmer (2002), also found statistical significance among own-price elasticities for the United States, Australia, EU and ROW.

The impact of source-specific price changes can also be captured in unconditional cross-price elasticities as well. A change in the US cheese price could affect total imports such that total volume of cheese imported by Japan can outweigh the impact of relative price changes. Unconditional cross-price elasticities of derived demand for Japanese imported cheese suggest that of the twenty cross-price relationships, six are statistically significant (see Table 5). Four of the six cross-price elasticities are substitutes. A percentage increase in the price of cheese imports from Australia and New Zealand will result in an increase in cheese imports from EU–28 by 0.427 and 0.317%, respectively. Similarly, a percentage increase in the price of cheese imports from New Zealand will increase the volumes of imported cheeses from the US and the ROW by 0.788 and 0.993%, respectively. Other studies that examined Japan's import demand for cheese also support our findings. Washington and Kilmer (2002) findings suggest that Australia and New Zealand cheeses are substitutes for EU cheese in the Japanese market, and that New Zealand cheese is a substitute for the US and ROW cheeses. Using the conditional

[5] The unconditional price elasticity measures the total effect of changes in the price of cheese imports from country j on imports from country i. In contrast to the conditional price elasticity, which measures the effect of relative prices only, the unconditional price elasticity measures the effect of relative price changes and the effect of price changes on total imports.

elasticities of derived demand, findings from Christou et al, (2005) suggest that the EU/the US, the EU/ New Zealand, and ROW/New Zealand cheeses are all substitutes in the Japanese market.

Our findings also show that two of the cross-price relationships are complements. Given a percentage decrease in the price of cheese imports from ROW, results suggest that imports from Australia and the US will increase by 0.156 and 0.159%, respectively. Findings displayed by Washington and Kilmer (2002) for cross-price elasticities among the EU/US and ROW/Australia parallel our study suggesting that these cheeses are complements in the Japanese market. These cheeses from different regions suggest complementary relationships due to product differentiation based on source of location.

Table 5. Unconditional price elasticities for Japan's imported cheese

	Exporting Countries				
Japan Imported Cheese	**EU–28**	**Australia**	**New Zealand**	**U.S.**	**ROW**
EU–28	–1.267***	0.427***	0.317*	0.010	–0.008
	(0.138)	(0.186)	(0.170)	(0.050)	(0.041)
Australia	–0.258	–0.832***	0.104	–0.099	–0.156***
	(0.215)	(0.384)	(0.350)	(0.083)	(0.076)
New Zealand	–0.327	–0.627	–0.006	0.053	–0.011
	(0.209)	(0.379)	(0.381)	(0.085)	(0.075)
U.S.	–0.365	0.085	0.788***	–1.376***	–0.159***
	0.235)	(0.340)	(0.309)	(0.136)	(0.078)
ROW	0.034	–0.171	0.993***	–0.193	–1.592***
	(0.320)	(0.487)	(0.438)	(0.139)	(0.149)

Note. Level of statistical significance - * - 10%, or -***- 1%. Standard errors are in parentheses.
Source. Authors' calculation using the World Trade Atlas® data.

Elimination of Tariff Rates on TPP Countries

The tariff rate imposed by Japan on imported fresh cheese shipped from Australia, New Zealand, and US is 29.8%. For the purpose of this study, no tariff rate reduction is applied to the EU–28 or the ROW, because they are not members of TPP or the percentage of their cheese export to Japan is extremely small in comparison to the selected countries. A complete elimination of tariffs by Japan on cheese imports from TPP partners is assumed, although the TPP concessions by Japan are limited to some major categories, and then qualified by some quantity restrictions and a multi-year implementation period (Office of the United States Trade Representative 2016). Table 6 presents the impact of a zero tariff rate on cheese imports into Japan. The baseline quantities, values, and shares show Australia as the leading country in all of the above categories. New Zealand is the second largest cheese exporter in terms of volume and EU–28 is the second largest exporter from a value perspective.

Given a 29.8% reduction in the tariff rate imposed on fresh cheese from TPP countries, Japanese total cheese imports are projected to increase from 249.2 million kilograms to 267.4 million kilograms, an increase of 7.3%. Most of this increase is driven by the increase in Australia's cheese exports to Japan as illustrated in Table 6. Japan's imports of EU–28 cheese are projected to decrease 17.0% in volume and an increase of 9% in value given a higher average unit price for the previous three years than the unit price recorded in 2015. While EU–28 presently stands as Japan's second largest cheese exporter (28% of market), because it is not a member of the TPP agreement, our projections suggest that once the tariff rates are reduced to zero, the EU–28 will become Japan's third largest cheese exporter in volume. In addition, once TPP is fully implemented, the US is projected to remain Japan's fourth largest cheese market, but will become a strong competitor to the EU–28 for third place.

The difference after the tariff rate reduction results in a total net increase of 18.2 million kilograms and a $198.3 million increase in cheese imports to Japan. The bulk of this expansion is due to the large cheese imports from Australia and New Zealand who are projected to increase their shipments to Japan by 17.1 and 7.7 million kilograms, respectively. Given these increases, Australia's and New Zealand's total values of cheese imported by Japan are projected to increase 31% and 22% from the baseline, respectively. Japanese cheese imports from the EU–28 and the ROW are projected to decline by 10.4 and 0.6 million kilograms, respectively. As a result of favorable dairy prices during 2014, the average cheese price over the past three years (2013–2015) is higher than the average 2015 cheese price, which causes the value of imported cheese from EU–28 to increase $26.7 million once all tariff rates are reduced to zero. Japanese cheese imports from the ROW are projected to fall by $2.2 million. Japan is projected to import 4.4 million kilograms more cheese from the US once the tariff rates are completely eliminated.

Our findings for US cheese differ from the percentage changes found by Burfisher et al. (2014) for a number of reasons. First, the focus of the present study is on fresh cheese, while Burfisher et al. examined both fresh and processed cheeses. Second, the present study estimated Japan's import demand of cheese from Australia, New Zealand, EU–28, US, and ROW using a partial equilibrium model and monthly cheese quantities and values from 2000–2015. All estimated price elasticities were then used to project what the US quantity and value would be once the tariff rates are eliminated. Burfisher et al. used the price elasticity of dairy products for all countries as a proxy for cheese price elasticity and used a general equilibrium model (GTAP) in addition to annual economic data for 2007–2012 and projections for 2012–2025 to determine US projected quantity once the tariff rates are eliminated. These differences are likely to produce distinct results by the two studies.

Table 6. The impact of reductions in Japan's tariff rate on imported cheese.

	Baseline			**Tariff Rate Reduced to Zero**			**Difference after Reduction**		
	Qty (mil. kg)	**Value** (mil. $)	**Share** (%)	**Qty** (mil. kg)	**Value** (mil. $)	**Share** (%)	**Qty** (mil. kg)	**Value** (mil. $)	**Share** (%)
EU–28	61.5	297.5	0.28	51.1	324.2	0.26	–10.4	26.7	0.02
Australia	89.4	333.3	0.32	106.5	435.6	0.35	17.1	102.3	0.03
New Zealand	57.1	222.5	0.21	64.8	272.1	0.22	7.7	49.6	0.01
U.S.	37.0	176.6	0.17	41.4	198.5	0.16	4.4	21.9	–0.01
ROW	4.2	21.5	0.02	3.6	19.4	0.01	–0.6	–2.2	–0.01
Total	249.2	1051.4	1	267.4	1249.8	1	18.2	198.3	0.04

Source. Author calculations based on World Trade Atlas®. Quantity is measured in million kilograms (mil. kg) and value is measured in million U.S. dollars (mil. $).

Summary and Conclusion

In this study, we examined the impact the TPP will have on Japan's cheese import market for five cheese suppliers, EU–28, Australia, New Zealand, the United States, and ROW. Monthly data from 2000 to 2015 were used in estimating an import allocation model and import decision model. In addition to the own-and cross price elasticities, we estimated parameters for the output price, input prices, and resource prices. Our findings indicated that the parameters for output price, input prices, and resource prices were statistically insignificant. All of the own-price elasticities were negative and there are some strong substitutions between New Zealand and other major competitors such as EU–28, the United States and ROW. Our findings also suggest that Australia's and EU–28's cheese products are strong substitutes within the Japanese market.

The US stands to gain from the Trans-Pacific Partnership (TPP) agreement. Cheese exporting companies can benefit from the research results that indicate potential export market share changes for competing countries, increases in overall Japanese cheese imports, and price sensitivity of individual country exports of cheese. However, other TPP countries are major exporters of cheese to Japan. It is unclear as to which TPP country will benefit the most from a reduction in tariff rates. While Australia and New Zealand may benefit more due to proximity, the US has had a long dairy trade history with Japan. Given the recent strength in cheese exports to Japan, the United States could gain considerable benefit from the TPP tariff concessions by Japan.

References

Armington, P. S. 1969. A theory of demand for products distinguished by place of production. *International Monetary Fund Staff Papers* 16:159–176.

Archwamety, Rena. 2016. Consumers in Japan seeking high quality, specialty cheeses. *Cheese Market News.* http://www.cheesemarketnews.com/articlearch/passport/japan.html

Berndt, E.R., and N.E. Savin. 1975. Estimation and hypothesis testing in singular equation systems with autoregressive disturbances. *Econometrica* 43(5-6): 937–958.

Burfisher, M.E., J. Dyck, B. Meade, L. Mitchell, J. Wainio, S. Zahniser, S. Arita, and J. Beckman. 2014. Agriculture in the Trans-Pacific Partnership, USDA/ERS (October):1–62.

Calmes, Jackie. 2015. Trans-Pacific Partnership Is Reached, but Faces Scrutiny in Congress. *The New York Times*. October 5. (accessed on August 2016). http://www.nytimes.com/2015 /10/06/business/trans-pacific-partnership-trade-deal-is-reached.html?_r=0.

Christou, A.P., R.L. Kilmer, J.A. Stearns, S.T. Feleke, and J. Ge. 2005. Derived demand for fresh cheese products import into Japan. International Agricultural Trade and Policy Center, University of Florida, Policy Brief Series, PBTC 05–04.

Clements, K.W. and H. Theil. 1978. A Simple Method of Estimating Price Elasticities in International Trade. *Economics Letters* 1:133-137.

GTIS, Inc. World Trade Atlas. Database (accessed May 2015).

Laitinen, K. 1980. The theory of the multiproduct firm. New York: North Holland.

Muhammad, A, K.G. Jones, and W.F. Hahn. 2007. The impact of Domestic and Import Prices on U.S. lamb imports: A Production System Approach. *Agricultural and Resource Economics Review* 36(2):293-303.

Office of the United States Trade Representative. 2016. TPP Full Text. https://ustr.gov/trade-agreements/free-trade-agreements/trans-pacific-partnership/TPP-Full-Text.

Office of the United States Trade Representative . 2015. Fact Sheet: How TPP Opens Markets for Made in America Exports, www.ustr.gov. October 5.

Sanyal, K.K. and R.W. Jones. 1982. The theory of trade in middle products. *The American Economic Review* 72:16-31.

Seo, J. Y. 2001. Demand diversification under uncertainty and market power. *Asian Economic Journal* 15:425–450.

Theil, H. 1980. *The System-Wide Approach to Microeconomics*. Chicago, IL: The University of Chicago Press.

Theil, H., and K. W. Clements. 1978. A Differential Approach to U.S. Import Demand. *Economics Letters* 1:249–252.

Washington, A. and R. Kilmer. 2002. The Derived Demand for Imported Cheese into Japan: A Two-Stage Differential Production Approach. Selected Research Paper presented at the annual meeting of the Agricultural & Applied Economics Association. Long Beach, CA. July 28–31.

