TRADE LIBERALIZATION AND CHANGING COMPOSITION AND QUALITY OF IMPORTS IN JAPANESE BEEF IMPORT MARKETS*

By

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Abstract
We show that the reduction of an ad-valorem tariff lead to an increase in Japanese imports of higher quality US beef relative to the lower quality Australian beef. Increasingly more efficient US beef production and strong income effect further explain the recent domination of the US beef in Japanese market.

Key Words: Ad-valorem tariff reduction, Japanese beef imports

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Introduction

The U.S. is one of the world's largest producers and exporters of beef. For example, in 1996 U.S. beef exports accounted for approximately 17 percent of world beef exports. Major U.S. customers for beef have been Japan, Mexico, Canada, and South Korea (USDA/AMS). Although the U.S. is the world's largest importer of beef and live cattle combined, Japan is the world's largest importer of beef. Japan purchases about 95 percent of its fed beef imports from the U.S. (the remainder from Canada). Most nonfed beef imports are supplied by Australia (more than 95 percent) and the rest by New Zealand (ALIC).

Overall Japanese beef imports almost tripled since the introduction of their trade liberalization policies in late 1980s. However, imports of US beef grew at a higher rate than imports of Australian beef during the same period. For instance, US beef market share was 33.4 percent while Australian beef market share was 60.3 percent of the total Japanese beef imports in 1986. In 2000, US beef market share grew to be 48.6 percent, while Australian market share fell to 45.8 percent of the total Japanese beef imports (ALIC) (Table 1).

(TABLE 1 APPROXIMATELY HERE)

Therefore, the main question we are asking is what contributed to this major shift in Japanese beef import markets? Within that issue we are also looking into possible implications of the reduction in import tariffs (due to GATT) on the composition or quality of Japanese beef imports. Finally, we are considering, at the theoretical level, different implications that the use of different policy instruments in trade liberalization (*i.e.*, reduction of per unit tariffs versus ad valorem tariffs) by an importing country will have on the composition (quality) of imports.

Differential Quality Imports and Ad-Valorem Import Tariffs

A model of quality choice by foreign monopolistic competitors

The model described here is one developed by Das and Donnenfeld (1987). On the supply side, consider a foreign monopolistic competitor. On the demand side, two somewhat different approaches have been used in the industrial organization literature to model quality choice by a consuming unit. In one (Spence, 1975), a consuming unit can buy any amount of a product of given quality. Utility maximization then gives rise to the quantity purchased by the consuming unit as a function of price and quality. Individual demand functions are assumed to be aggregatable and the market demand is a function of price and quality. The other approach (Shaked and Sutton, 1982) assumes that a consuming unit has a binary choice: it can buy zero or one unit of the product. It buys the product if the utility from consuming the product (at one unit) measured in money exceeds its price. Consuming units in the market are assumed to have varying intensity of preferences for the product, and a distribution function of preferences over the population is postulated. Thus, the aggregate quantity sold equals the number of consuming units that buy the product.

In this paper we use the latter approach mostly because the first approach may be too general to yield deterministic results unless specific functional forms are assumed. For instance, consider Spence's specification of the inverse demand function, $p = p(q, l)$, where p, q, and l are price, quantity, and quality, respectively. Some of the ambiguous results in his paper depend on the sign of cross partial derivative p_{ql}, which cannot be a priori determined unless specific utility functions are used.

Hence we assume that each buying unit can buy at most one unit of the product. Let the utility of having one unit of the product of quality l be indicated by

$$\boldsymbol{I}\, u(l), \quad u' > 0,\ u'' < 0, \qquad (1)$$

where $\boldsymbol{I}$ is the index of a particular buyer. $\boldsymbol{I}$ is assumed to be distributed continuously over an interval $(\underline{\boldsymbol{I}}, \bar{\boldsymbol{I}})$ with a density function $f(\boldsymbol{I})$. It is also assumed that individual preferences are uniformly distributed, *i.e.*, $f'(\boldsymbol{I}) = 0$. After denoting the price of the product by p and normalizing the marginal utility of income at unity, the following purchase rule for an individual $\boldsymbol{I}$ can be set as following:

$$\text{buy if and only if} \qquad \boldsymbol{I}\, u(l) \geq p. \qquad (2)$$

Condition (2) can be easily interpreted: buy the product if and only if it yields non-negative surplus.[1, 2]

On the production side, we assume that the foreign monopolistic competitor can produce a single quality at any given point in time,[3] and the marginal cost of output, c, is an increasing function of the level of quality but is independent of the scale of output:

$$c = c(l), \qquad c'(\cdot) > 0, \qquad c'' \geq 0. \qquad (3)$$

The assumption that the country (the US or Australia in this case) produces a single quality (variety) stems from the following considerations. At any given time, a country can accommodate the production of only a single quality (variety). Thus, the production of additional qualities (varieties) requires additional investments and time. Whether the country finds it profitable to sell more than a single quality depends on the magnitude of the fixed costs associated with each variety relative to the market size, the unit cost of production and the shape of the density function - distribution of consumers' tastes. We presume that such fixed costs are sufficiently high, so that provision of a single quality is most profitable for the foreign country.[4]

Therefore, in the subsequent analysis we shall focus on the case where the foreign monopolistic competitor provides a single quality.

The foreign monopolistic competitor chooses price, quantity, and the quality level that maximizes his profits:

$$\pi = [p - c(l)]x - K, \tag{4}$$

where x denotes the quantity produced and K is the fixed cost. The maximization problem can be further simplified by noting that once p and l are selected, then via (21) they also determine the marginal consumer, $\boldsymbol{I}_0$: that is the consumer with the lowest willingness to pay who participates in the market, *i.e.*, $\boldsymbol{I}_0 u(l) = p$. Since the quantity produced is equal to the number of customers served, we have

$$x = \int_{\boldsymbol{I}_0}^{\bar{\boldsymbol{I}}} f(\boldsymbol{I})\, \mathrm{d}\boldsymbol{I}. \tag{5}$$

Expression (5) defines $\boldsymbol{I}_0 = g(x)$, with $g'(x) < 0$. The negative relationship between the quantity sold and the marginal consumer is a reflection of the fact that the higher is $\boldsymbol{I}_0$ the fewer are the number of active buyers, and hence fewer units are sold. Substituting (5) in (2) we obtain:

$$p = g(x)\, u(l). \tag{6}$$

Replacing p with the above expression changes our profit maximization equation (6) into:

$$\max_{x,\, l} \pi(x, l) = [g(x)\, u(l) - c(l)]x - K. \tag{7}$$

The first-order conditions are:

$$\pi_x = 0 \Rightarrow [g(x) + xg'(x)]\, u(l) - c(l) = 0, \qquad (8)$$

$$\pi_l = 0 \Rightarrow g(x)\, u'(l) - c'(l) = 0. \qquad (9)$$

Equation (8) is the standard condition where marginal revenue equals marginal cost. Equation (9) states that the quality is set at the level that equalizes the marginal cost of quality with the marginal utility of quality of the customer with lowest willingness to pay. Put differently, the additional revenue induced by marginal improvement in quality matches the rise in cost. The solution to (8) and (9) is (x_0, l_0).

In order for these to be optimal, the second-order conditions are:

$$\pi_{xx} = [2g'(x) + xg''(x)]\, u(l) < 0, \qquad (10a)$$

$$\pi_{ll} = [g(x)\, u''(l) - c''(l)]\, x < 0, \qquad (10b)$$

$$\boldsymbol{J} \equiv \pi_{xx}\, \pi_{ll} - \pi^2_{xl}$$

$$= x\{u(l)[2g'(x) + xg''(x)][g(x)\, u''(l) - c''(l)] - x[g'(x)u'(l)]^2\} > 0. \qquad (10c)$$

If the cumulative distribution of preferences is not too concave, *i.e.*, $g''(x) > 0$ but small, it is easy ti verify that π_{xx} and π_{ll} are both negative. Needless to say, if the cumulative distribution is convex or linear the negativity of π_{xx} and π_{ll} is insured. However, for $\boldsymbol{J} > 0$, slightly stronger conditions are required.

Analysis of an ad-valorem tariff

It is well known that when foreign firms are perfectly competitive and produce goods with an exogenously fixed quality, there is no difference between the impact of specific and ad-valorem tariffs. Brander and Spencer (1984) have shown that these tariffs differ significantly in their effects when the foreign producer provides a homogeneous product but possesses monopoly power. Thus, it comes as a no surprise that when the foreign monopolist controls quality in addition to quantity (price) the effects of these tariffs will also differ. We are interested here in the effects of ad-valorem tariffs given that they were employed by Japan in beef imports.

Let τ denote the ad-valorem tariff rate and define $T = 1 + \tau$. Profits of the foreign monopolist can now be written as $\hat{\pi} = [g(x)\, u(l)/T - c(l)]x - K$. The first order conditions are:

$$g(x)u(l) - Tc(l) + xg'(x)u(l) = 0, \tag{11a}$$

$$g(x)u'(l) - Tc'(l) = 0. \tag{11b}$$

Differentiation of (11a) and (11b) with respect to τ and evaluating at $\tau = 0$ yields:

$$\mathrm{d}x/\mathrm{d}\tau = x/\boldsymbol{J}\ \{c(l)g(x)[u''(l) - c''(l)] - xg'(x)u'(l)c'(l)\}, \tag{12}$$

$$\mathrm{d}l/\mathrm{d}\tau = xu(l)u'(l)/\boldsymbol{J}\ \{g(x)\ [g'(x) + xg''(x)] - x(g'(x))^2\}. \tag{13}$$

Inspection of (12) and (13) reveals that the foreign country (exporter) response to an ad-valorem tariff is ambiguous. However, pointing out the reasons for these ambiguous results is instructive, since it highlights the interplay between direct and cross effects. Suppose that quality is held constant. The ad-valorem tariff lowers the marginal revenue, thus inducing the firm to reduce sales. Suppose now that quantity (rather than quality) is held constant. The tariff lowers the marginal benefit of quality and the firm responds by lowering quality. These are the direct effects. We turn now to the cross effects. The reduction in sales (direct effect) tends to raise price which in turn tends to increase the marginal revenue from quality. Hence the overall effect on quality is ambiguous. The decline in quality (direct effect) lowers the marginal cost of production; this induces an increase in output. Thus, the overall effect on quantity is also ambiguous.

However, a closer examination of equation (13) reveals that if the distribution of preferences is uniform or convex, *i.e.*, $g''(x) \leq 0$, an ad-valorem tariff lowers the quality of imports. Unfortunately, the impact on quantity of imports continues to be ambiguous. Thus we can state the following proposition:

Proposition 1: Given that the distribution of preferences is uniform, the imposition of an ad-valorem tariff leads to lower quality of imports, while the impact on quantity is ambiguous.

An immediate corollary can be stated:

Corrolary 1: Given that the distribution of preferences is uniform, the reduction of an ad-valorem tariff leads to higher quality of imports.

Japanese Beef Market Overview

GALLUP has conducted several surveys about factors affecting consumer consumption of beef in Japan during the last several years. These surveys have been conducted on behalf of the US Meat Export Federation (USMEF), and data on changes in consumer preferences used in our analysis are obtained from the USMEF. Some of the most recent 2002 Japan Beef Survey findings may be summarized as follows. Japanese consumers rate taste and tenderness as the most important quality attributes. Taste and tenderness of the US beef are perceived by Japanese consumers as superior relative to the Australian beef. Another of the top considerations among Japanese consumers when purchasing beef is freshness. US beef has been rated slightly lower (statistically insignificant) than Australian beef in this category. Obviously, it is desirable to educate consumers on the production process and steps the US takes to ensure product arrives fresh to the consumer in order to help this rating while increasing purchases of US beef. Finally, due to the Bovine Spongiform Encephalopathy (BSE) situation in Japan this past year, consumers have become leery of beef products in general and beef consumption has declined overall as a result. Beef mislabeling issues may have also contributed to the decline in consumption. Japanese consumers report significant declines in their perception of domestic beef as safe and healthy. However, there has been a significant increase in the perception that: first US beef, and second Australian beef, are safe and healthy.[5]

After establishing that, based on consumers' perception, Australian and U.S. beef are two different qualities of a same good, we will discuss possible factors affecting the composition of Japanese beef imports. First, it is a change in import tariffs. Until 1988, the Japanese domestic market was highly protected by import quotas and *ad valorem* tariffs. However, beef import quotas were relaxed in 1989 and 1990. In 1991, import quotas were replaced by a 70 percent *ad valorem* tariff which was subsequently reduced to 60 percent in 1992 and 50 percent in 1993. Under the 1994 GATT/Uruguay Round agreement, the tariff-rate quota were gradually reduced to 38.5 percent by 2001. However, Japan retains the right to reinstate the higher rate under safeguard provisions if imports of frozen or chilled beef over a specified period are greater than 17 percent of import levels for the corresponding period in the previous year. The safeguards have been frequently employed in the past few years (Miljkovic, Marsh, and Brester).

Some other variables that may have affected the composition of Japanese beef imports are exchange rate, per capita GDP, relative price of US to Australian beef, prices of substitutes such as pork or domestic wagyu beef, and seasonal variations in imports due to various reasons. A couple of these variables deserve an extra clarification. First, as for the exchange rate, Australian economy was affected more adversely by the Asian economic and financial crisis than the United States. That led to a rather significant depreciation of the Australian dollar relative to the US dollar during the second part of 1990s (IMF). The result of these changing currency values is that US beef became relatively more expensive than Australian beef in the Japanese market (Miljkovic, Brester, and Marsh). Second, relative price of US to Australian beef may be thought as of relative cost of production.

Empirical Specification, Data and Tests

We already pointed out that Japanese consumers perceive American grain fed beef and Australian grass fed beef as two different qualities of the same product (GALLUP Survey). Thus we estimate our equation (9) which represents the demand for quality. We measure the quality of the imported beef by Japan as the ratio of the US beef to Australian beef imports.[6] The explanatory variables include the ratio of the Japanese retail prices of the US to Australian beef as the measure of the relative (marginal) cost of production, retail prices of domestic wagyu beef and pork meat, tariff rate on Japanese imports of beef, real US dollar per Australian dollar exchange rate, quarterly dummies for seasonal effects with first quarter omitted, and time (trend) variable. All variables are presented and described in Table 2.

(TABLE 2 APPROXIMATELY HERE)

Quarterly data from 1991:1 through 2001:4 were used to estimate the changes in quality (composition) of the Japanese beef imports.[7] Japanese import quantities of U.S. and Australian beef and corresponding retail prices were obtained from Agriculture & Livestock Industries Corporation (ALIC) Monthly Statistic. Retail Japanese prices for pork and wagyu beef were also obtained from ALIC Monthly Statistic. Exchange rates were obtained from the FRED data base of the Federal Reserve Bank of Saint Louis. Tariff rate variable was obtained from the

Organization for Economic Cooperation and Development (OECD). Seasonality was accounted for by quarterly binary variables (intercept shifts).

The quality of imports equation was subjected to various specification tests. Using ordinary least squares (OLS), they included contemporaneous correlation of residuals, autocorrelation (Durbin-Watson test), heteroskedasticity (White and Glejser tests), and the presence of unit roots (augmented Dickey-Fuller unit root test, or ADF). Test results, although they may be sensitive to small sample size, did not indicate the presence of either autocorrelation or heteroskedasticity in the residuals. The null hypothesis of unit root residuals was rejected at the $\alpha = 0.05$ significance level.

Based on the above statistical tests, the quality of imports equation was estimated by OLS. The equation was estimated in double logs because it was assumed variables enter the equations multiplicatively. A Koyck (or first order) lag on the dependent variables was also tested, but the asymptotic t-ratio rejected partial adjustment (Pindyck and Rubinfeld, p. 234). Finally, because of short-run (quarterly) observations, composition of imports responses could be dynamic, *i.e.*, distributed lag adjustments may exist due to uncertainty and institutional constraints. We initially estimate the equation with lag specifications for the exogenous variables. The highest order lag was t-1 based on both the Akaike information criterion (AIC) and Schwartz information criterion (SIC).

Empirical Results

Table 3 gives the regression results.

(TABLE 3 APPROXIMATELY HERE)

The statistical results show an R^2, adjusted R^2, and standard error of equation of 0.75, 0.65, and 0.12, respectively. The significant variables at $\alpha = 0.01$ or higher are Japanese relative retail price of imported (US to Aus) beef, Japanese real GDP per capita, real exchange rate (US dollar per Aus dollar), tariff rate on Japanese imports of beef, and dummy-seasonal variables for the second and third quarter. Substitute prices, *i.e.*, retail Japanese prices for pork and wagyu beef, GATT dummy, and fourth quarter seasonal dummy are not significant. In terms of size of the coefficients, Japanese relative retail price of imported (US to Aus) beef, Japanese real GDP per capita, and tariff rate on Japanese imports of beef seem to be major driving force in determining the composition (quality) of Japanese beef imports.

The signs of the parameter estimates for the statistically significant variables are theoretically consistent. These include the negative effect of relative retail price (relative marginal cost) of imported beef on quality (composition) of Japanese beef imports. Specifically, as the price of US beef decreases by 10 percent relative to the price of Australian beef, the imports of US beef increase by 16.2 percent relative to the imports of Australian beef. Also, as Japanese real GDP per capita increases, consumers are willing to increase their consumption of the high-quality US beef relative to their consumption of the low-quality Australian beef. This effect is very strong as represented with the estimated coefficient of 2.21. Our estimate of effect of reduction in ad-valorem tariff (estimated tariff coefficient of -0.59) is consistent with the theoretical model previously described: the reduction of an ad-valorem tariff led to higher quality of imports. Specifically, reduction in ad-valorem tariff rate on Japanese imports of beef led to an increase in imports of US beef relative to the imports of Australian beef. Real exchange rate coefficient, although statistically significant, is very small (-0.003) and does not seem to have an impact on the quality (composition) of Japanese beef imports. Its sign, however, is consistent with theoretical expectations: relatively more expensive US dollar would lead to more Australian beef imports relative to US beef imports. Finally, estimates of the seasonal dummies for the second and third quarter are significant relative to the omitted seasonal dummy (first quarter). This is expected because Japanese fiscal year begins on April 01, and all tariff reductions and many other legislative measures are implemented at the beginning of fiscal rather than calendar year.

Implications and Conclusions

While most literature concerning trade liberalization focuses on its benefits of an obvious increase in international trade volume, we postulate that it may have some additional effects that have not been sufficiently emphasized in trade theory or previously empirically addressed. It has been previously showed in the international trade theory how a reduction in per unit import tariff has different effects on consumption of different ("standard" *versus* "choice") qualities of a same good (Miljkovic, 2002). The theory determined that a reduction in per unit import tariff will lead to an increase in consumption of "standard" quality imports relative to "choice" quality imports due to relative price effects, *ceteris paribus*.

We showed that the reduction of an *ad-valorem* tariff leads to higher quality of imports, *ceteris paribus*. We tested this hypothesis on the case of Japanese beef imports from the United States and Australia. US beef, according to the results of a GALLOP's survey, is considered the high-quality product while Australian-beef is considered the low quality product. Empirical results support our hypothesis. Moreover, the recent domination of the US beef in Japanese market is further explained by increasingly more efficient US beef production relative to Australians and strong income effect where higher per capita income leads to more demand for higher quality products.

These findings are interesting for several reasons. First, it is important to understand that different forms of trade liberalization will result in different patterns of composition of imports. Thus liberalizing trade does not imply automatically an increase of the exports to the liberalized market to all exporters. Moreover market shares in the import markets may shift significantly, as they did in the Japanese beef import markets, depending on choice of the trade liberalization instrument. Secondly, the choice of trade liberalization instrument affects the quality of imported goods that consumers demand. Thus consumers may end up consuming more of low-quality imported goods due to reduction in *per unit* the tariffs, or high-quality imported goods due to reduction in *ad-valorem* tariffs. Finally, as exporters fight for an increasing share in foreign markets, it is useful to enhance the understanding of what are the factors that determine their market share, especially when markets are saturated and may not be further developed.

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Table 1 Japanese Beef Imports by Origin, 1985-2000

Year	Australia tons	Australia % Share	United States tons	United States % Share	Total Imports tons
1985	97,415	61.8	49,671	31.5	157,728
1986	113,271	60.3	62,799	33.4	187,871
1987	124,498	55.7	84,611	37.8	223,606
1988	148,360	52.0	118,687	41.6	285,416
1989	189,884	52.2	151,665	41.7	363,997
1990	198,456	51.7	164,393	42.8	384,199
1991	175,976	53.8	141,529	43.3	326,923
1992	227,598	53.8	182,873	43.2	423,429
1993	301,702	53.2	243,085	42.9	566,911
1994	306,878	52.6	248,367	42.5	583,964
1995	314,544	47.8	307,936	46.8	658,365
1996	277,400	45.4	296,149	48.5	611,241
1997	307,254	46.6	315,455	47.9	658,966
1998	319,029	46.8	327,849	48.1	681,791
1999	314,140	46.0	331,564	48.6	682,596
2000	338,046	45.8	358,566	48.6	738,415

Source: Agriculture & Livestock Corporation (ALIC), *Monthly Statistics* (various issues)

Table 2 Definitions of Model Variables for Changes in Quality of the Japanese Beef Imports

Variable Name	Variable Definition
Q_{US}/Q_{Aus} (dep. variable)	Japanese imports of U.S. beef / Aus beef
$(P_{US}/P_{Aus})_{(t)}$	Japanese relative retail price of imported (US to Aus) beef
$P_{pork(t)}$.	Retail Japanese price for pork (yen/kg)
$P_{wagyu(t)}$	Retail Japanese price for wagyu beef (yen/kg).
$R_{(t)}$	Real exchange rate (US dollar per Aus dollar).
$GDP_{(t)}$	Japanese real GDP per capita
$Tariff_{(t)}$	Tariff rate on Japanese imports of beef.
GATT	GATT dummy (1 after 1995:1, 0 before)
D2, D3 and D4	Quarterly dummies for seasonal effects, representing 2nd, 3rd, and 4th quarters, respectively (quarter 1 omitted).

Table 3 Regression Results

Variable/Statistics	Estimated Coefficients
Constant	-33.23*** (-3.63)
$(P_{US}/P_{Aus})_{(t-1)}$	-1.62** (-2.11)
$P_{pork(t-1)}$	0.11 (0.37)
$P_{wagyu(t-1)}$	0.14 (0.14)
$R_{(t-1)}$	-0.003** (-2.33)
$GDP_{(t-1)}$	2.21*** (3.65)
$Tariff_{(t-1)}$	-0.59** (-2.27)
GATT	0.09 (1.08)
D_2	0.16*** (3.09)
D_3	0.10* (1.89)
D_4	0.07 (1.26)
R^2	0.75
Adj R^2	0.65

Table 3(continued) Regression Results

Variable/Statistics	Estimated Coefficients
Standard Error	0.121
Durbin-Watson	2.10

Note: Numbers in parentheses are the t-values. Critical t-values at the $\alpha = 0.10$, $\alpha = 0.05$, and $\alpha = 0.01$ levels are 1.69, 2.03, and 2.72, respectively (33 degrees of freedom). R^2 is the unadjusted R-squared, while Adj R^2 is the adjusted R-squared. Standard Error is the standard error of the equation.

Footnotes

1. This rule follows from the following utility maximization problem. Assume that the utility function is of the form:

$$\boldsymbol{I}\,\hat{u}(l, z) + v(x_1, x_2, ..., x_n),$$

where z is the quantity of the product and x's other goods. Z can take values 0 to 1, whereas the x's can be purchased continuously at the price vector, say p_x. Let $v(x)$ be homothetic, and let m denote income. Now if $z = 0$, the total indirect utility is of the form:

$$\boldsymbol{I}\,\hat{u}(l, 0) + m\hat{v}(p_x).$$

If $z = 1$, the total indirect utility is

$$\boldsymbol{I}\,\hat{u}(l, 1) + (m - p)\hat{v}(p_x).$$

Thus the individual will buy the product if and only if

$$\boldsymbol{I}\,\hat{u}(l, 1) + (m - p)\hat{v}(p_x) \geq \boldsymbol{I}\,\hat{u}(l, 0) + m\hat{v}(p_x).$$

Normalize $\hat{u}(l, 0) = 0$, $\hat{v}(p_x) = 1$, and define $\hat{u}(l, 1) = u(l)$. Then the above inequality reduces to condition (2).

2. Notice also that income does not appear in this purchase rule, which enables us to ignore the income effects in this partial equilibrium approach.

3. Based on results of the before mentioned GALLUP's surveys, it is clear that Japanese consumers perceive American beef and Australian beef as two different qualities of a product. Thus the assumption of a single quality at any given point in time seems to be justifiable.

4. If economies of scale were less severe and the possibility of producing several qualities were viable, the monopolist could engage in product differentiation and consumer discrimination. Also recall that the primary beef market for the US producers is within the US: more than 92 percent of total beef production in 1998 was consumed domestically (Miljkovic, Marsh, and

Brester, 2002). Thus the primary goal of US producers still is to satisfy tastes of domestic producers.

5. Reed and Iswariyardi (2001) analyzed the Japanese import demand while differentiating for quality measured by the degree of marbling irrespective of the country of origin of the imported beef. That certainly is an important issue to address, but does not help us in answering questions that we posed.

6. Notice that changes in this ratio, *i.e.*, US beef to Australian beef imports by Japan, may be viewed also as the changes in composition of imports.

7. This particular time span is used because, as we mentioned earlier, it coincides with the introduction of the *ad valorem* tariff as the only protection instrument employed by Japanese in their beef import markets.