

Korean Beef Import Preferences: Implications for Trade Patterns in the Twenty First Century

by
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Paper presented at the annual meetings of the International Agricultural Trade Research Consortium (IATRC), Auckland, New Zealand, January 18-19, 2001.

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Introduction

Importation of beef by South Korea is of importance to world markets for this commodity, accounting on average, for some three percent of world imports of beef and veal from 1994 to 1998 (Akerman and Dixit, 1999). Korea is highly dependent on imported food products; imports account for 75 to 80 percent of consumption (USDA, 1998). Although beef importation fell sharply during Korea's financial crisis, this category of imports remained as Korea's highest valued livestock product import, valued at US\$481 million in 1997 (KREI, 1999, p82). The rapid growth in demand for beef, combined with a small and inefficient domestic beef industry, has led to beef imports accounting for 70 percent of Korean meat imports in recent years (OECD, 1998, p25; Table 1). Beef is a preferred meat for many Koreans and its consumption is highly dependent on beef imports (Figure 1). Importation of beef is increasing as minimum market access levels, under the Agricultural Agreement (AA) of the General Agreement on Tariffs and Trade, rise from 167 thousand tons in 1997, to 225 thousand tons in 2000 (OECD 1998, p25). In future years, it is expected that Korea may be a nation of significant import potential for international beef producers and exporters.

Korean beef imports have been regulated by the Livestock Products Marketing Organization (LPMO), a state trading enterprise. This agency was the sole beef importer until 1988; it has used beef import quotas as a tool to manage the balance between domestic and import supply and to control domestic beef prices. Subsequently, beef has also been imported through a designated sector of the private trade. Imported beef is marketed through two distribution channels in South Korea: through sales to the LPMO or through the Simultaneous Buy and Sell (SBS) system. Beef imported through the LPMO has been purchased under an open tender system and then sold on the wholesale market; import prices under the SBS system have been negotiated between sellers and the 'supergroups' of private firms (OECD 1998, p26).

The eleven or so supergroups that participate in the SBS system are buyers representing middlemen in the beef-marketing channel that supply directly to beef end-users such as hotels and restaurants³. This system was introduced by the Korean government as a means to bridge the gap between the earlier LPMO import monopoly and the more liberalized trading system anticipated in 2001. Only supergroup members have been allowed to participate in the SBS system. The share of SBS import volumes has gradually increased, accounting for 70 percent of the total by 2000 (Table 2). Each SBS buyer has the exclusive right to supply a particular type of end-user and cross trading of imported beef among the different SBS market segments has not been allowed. Thus, each SBS buyer can be expected to hold an appreciable degree of market power in its own market segment. The individual quotas specifying the quantities of beef importation allocated to each SBS firm have been determined at the beginning of each year by the LPMO. Quota allocations among SBS buyers have largely been determined on past sales records. The SBS buyers, licensed by the LPMO, have imported beef from four exporting nations: the United States, Australia, Canada and New Zealand (Table 3) through a voluntary bidding

³ In 2000, two new firms were added to the list of those designated as SBS importers.

system. SBS buyers have supplied imported beef to their designated end-users at their purchase price, plus a mark-up, paid to the LPMO, that covers additional costs reflecting ocean freight, insurance, carrying costs and quota rent.

The four largest SBS buyer groups are: the National Livestock Cooperative Federation (NLCF), Korea Superchain Store Association (KOSCA), Korea Tourist Hotel Supply Center (KTHSC) and Korea Cold Storage Co., LTD. (KCSC). The four-firm concentration ratio of these largest firms was 71% in 1995 and this ratio has remained at a high level since then (Figure 2). The number of SBS designated firms, was, however, increased from six in 1994, to eleven firms in year 2000 (Table 7). The four-firm concentration ratio is expected to decrease in future, reflecting an increase in competition in the imported beef market.

As the beef importation system transforms from a centralised system to liberalised imports by private traders, competition can be expected to increase between SBS buyers and other potential importers and wholesalers. The market situation of SBS buyers in future years can be expected to reflect their competitive situation and this is likely to change in future. However, knowledge of the past performance of SBS buyers may provide some indications of their future prospects to exporters and other traders. Thus the role and nature of SBS buyers is of interest in assessing potential future changes in the Korean beef market.

International pressure to open South Korea's market for imported beef, coupled with rising demand for imported beef in the late 1980s, were amongst the factors that led the Korean government to commit to a bilateral beef trade agreement with the U.S. and to the trade liberalising provisions of the Agreement on Agriculture (AA) of the Uruguay Round negotiations of the GATT. These commitments involve gradual reductions in the restrictive tariff-rate quota for beef (Table 2). The associated tariff rate will decrease from 43.6 percent, ad valorem, in 1995 to 41.2 percent in 2001.

Prices of beef imported under the SBS system have been subject to a government determined 'mark-up' to ensure that imports did not undercut wholesale market prices (OECD 1998, p26). The Korean government also committed to make changes in this mark-up, which was specified to decrease from 70 percent in 1995 to zero percent in 2000 (Table 2). The AA commitments have, therefore, provided for a reduction in protection, with a reduced role for state-trading intervention, but with maintenance of a 40 percent tariff, by 2001. Changes in the marketing system for beef are expected to increase the ability of major beef exporting nations to compete in the Korean market.

The Korean beef market is multifaceted and faces a number of internal and external challenges. Economic instability and uncertainty reduced consumer confidence and resulted in decreased levels of consumption of beef in 1997 and for a period subsequently. Korea imported less than the scheduled level of import commitment (the tariff-rate quota) for the period from 1997 to 1999. The domestic cattle (Hanwoo) industry has experienced falling farm-gate prices and more costly inputs, caused by reductions in government support. These have accompanied an increased supply of

livestock into domestic marketing channels, with a contraction of domestic cattle numbers. Thus, weaker market demand and increased supplies from the domestic beef sector contributed to weaker Korean demand for imported beef for some period from 1997. In 1998, Korea's beef import quota was 187,000 metric tons while imports totaled just over 92,000 tons (USTR, 2000). However, imports amounted to 177,478 tons in 1999 and preliminary import estimates for 2000 were that these totaled 245,000 tons (USDA, 2001).

Complaints that regulatory interventions for beef that were inconsistent with the AA had been applied by Korea were made by the United States in its request, in April 1999, for establishment of a WTO Trade Dispute Settlement Panel. The Panel findings were appealed by Korea but the subsequent Appellate Body found that Korea's requirement that imported beef, sold at retail, could only be sold only in separate retail stores, to be inconsistent with Korea's obligations under GATT 1994 Article III:4, and not justified under Article XX(d). In effect the dual retail system resulted in less favorable treatment for imported beef than accorded to Korean domestic beef (WTOa,b, 2000). It was recommended that Korea remove the WTO-inconsistent policy measures by January 2001. Korea has accepted the findings of the Appellate Body but it is expected that a process of further discussions will accompany changes in policies and regulations.

The WTO panel ruling on the system of Korean beef imports, and the report of the Appellate Body on this case, can be expected to enhance market access for imported beef, as restrictions on the retail distribution of imported beef diminish in Korea. With economic recovery and with import and market liberalisation, Korean demand for imported beef is expected to increase further. Historically a major focus of demand growth for beef imports has been from sales through the hotel and restaurant sector (Kim et al,1997). Future changes in the Korean beef marketing system are likely to be influenced significantly by the nature of actual reforms in the beef import regime, the changes that are introduced in the retail sector and the course of domestic agricultural policy.

Objectives

A major objective of this paper is to undertake a preliminary evaluation of the likely market outcomes of liberalisation of the South Korean import market for beef, based on analysis of the behaviour of importers in recent years. Seventy percent of the importation of beef to Korea was allocated to the SBS system as of 2000, thus we focus on this market segment. We examine the behavior of the eleven major SBS buyers in purchasing imported beef from four exporting nations. The emphases of the paper are to provide information about: (1) the SBS buyers (supergroups)' purchasing behavior of imported beef; (2) the general degree of competitiveness of four major exporting nations in the SBS market segment; and (3) the nature of export prospects for four major beef exporting nations: the United States, Australia, New Zealand and Canada. Finally, it is proposed to assess ways in which the market may be developed for beef exporters in the light of information from (1), (2) and (3).

Background

Numbers of previous studies have applied traditional methods to analyse the demand for meat in North American, Japanese and other markets. These have included studies by Eales *et al.* (1997); Eales and Wessells (1999); Satyanarayana *et al.* (1999); and Kinnucan *et al.* (1997). Most have evaluated the demand for beef under the assumption that this is a homogenous commodity that is purchased in a competitive market. Most studies of the demand for meat have been applied at the consumer level, and use retail-level price data (Eales *et al.* 1997; Wessells and Wilen 1994). In some studies, such by Wahl *et al.* (1990), Japanese wholesale or import level demand for meat was estimated. Typically, demand functions were estimated under the assumption that demand is price-driven. However, the assumptions of conventional demand analysis are necessarily relevant to the demand for imported beef in South Korea under the quota-constrained trade regime. Thus, conventional demand models may not be the most appropriate in examining the Korean import beef market.

This study is not directed at the assessment of aggregate demand for imports but focuses instead on a model of import demand that is formulated as an adaptation of a market share model in a manner that allows us to assess how SBS firms have made decisions on purchases of imported beef from four major exporting nations. Thus we deviate from previous studies in several ways through the application of firm-specific data on purchases and import prices by source of supplies. Specifically, we employ price data at the import level and import volume data at the firm-specific micro level and focus explicitly on the SBS market segment. Focus on the SBS system alone is consistent with the process of quota allocations to the SBS marketing system and other regulations by the Korean government that effectively disaggregated distribution of imported beef and domestic beef. The focus on individual SBS firms also reflects the feature that these have exclusive rights to supply to particular end-user groups. The nature of the imported beef marketing system in Korea allows us to assume weak separability between domestic beef and imported beef at the wholesale level. (There is no logical difficulty in imposing separability for closely related goods, since separability does not imply that between-group responses are necessarily small, only that they conform to a specific pattern (Nayga and Capps, 1994)).

This study attempts to provide a better understanding of import demand by SBS buyers as the market has been transforming from a centralised marketing system (in which earlier the LPMO was the sole importer of beef), during the process of adjustment to a privatised system (in which there has been an increase in the share of SBS importation of beef). Assessment of future market prospects may be improved by knowledge of the operation and outcomes of the SBS system to this point. For instance, there is the question of how the quota allocations of particular SBS firms may have affected the market shares of different exporting nations. Similarly there are questions of how changes in the importation of beef through the SBS marketing system may have affected each exporting nation's sales to Korea. A better understanding of the potential changes in the demand for imported beef is expected from analysis of the behaviour of individual SBS firms.

Model Specification and Data

Conventional demand system analyses of meat consumption data have generally used aggregate annual, quarterly, or monthly time series data of purchases and prices at the retail level (Kinnucan et al. 1997; Mittelhammer et al. 1996; McGuirk et al 1995). However, these data are too general to reflect firm-specific decision making. Assessment of beef demand employing aggregate market data cannot provide insightful information on imported beef demand differentiated by SBS firms and by source.

Data on beef import purchase volumes and prices (CIF, custom clearance basis), differentiated by country of origin for each SBS firm are collected by the LPMO, on a monthly basis, from information generated from the LPMO tender operation. These were available for the study. The data consist of monthly time series observations from January 1995 to December 1999. Since the SBS system commenced at the beginning of 1995, no observations are available prior to 1995.

The market shares of each of the major beef exporting nation are expected to be influenced by the relative prices of beef exported from the different countries of origin. The relative prices of beef from different origins can be expected to depend, at least in part, on their substitutability for each other. Wilson (1990) used a constant market share (CMS) model to address issues of substitutability in the world wheat market, on grounds that use of a system of CMS equations could enable important relationships among the parameters across equations to be incorporated into demand analysis. We follow Wilson in attempting to address substitutability among beef exported from four different exporting nations by applying a system of demand equations, but differ from the CMS approach that he applies by incorporating an ad hoc specification: the dependent variable in our study is the quantity of beef imported from each exporting nation, rather than the market share of each exporter (as in Wilson's case). As well, our model incorporates firm-specific information on beef imports, which leads us to use a different set of explanatory variables and parameters, as outlined below.

The SBS firms are indexed by $j = 1, \dots, 11$ and the beef exporting countries are indexed by $i = 1, \dots, 4$, representing the United States, Canada, Australia, and New Zealand respectively. Each firm decides on its share of imports from each country. These shares are described as $\mathbf{a}_i^j(p, E, W_{SBS})$ and $\sum_i \mathbf{a}_i^j(p, E, W_{SBS}) = 1 \quad \forall j$, reflecting the hypothesis

that each firm's import shares for beef are affected by input prices (p); total expenditure (E) which is viewed to represent the influence of changes in the aggregate demand for beef; and each firm's total allocation of beef import quota (W_{SBS}).

The amount of beef imported by firm j from country i is, then, $\mathbf{a}_i^j(p, E, W_{SBS}) \cdot Q_j$ where Q_j is the total amount of beef imported by firm j . Hence, aggregate imports from each country are equivalent to the sum of each firm's total imports weighed by its allocation shares

$$Q_i = \sum_{j=1}^{11} \mathbf{a}_i^j(p, E, W_{SBS}) \cdot Q_j \quad \forall i = 1, \dots, 4 \quad (1)$$

Let the allocation shares (\mathbf{a}_i^j) be linear functions of prices, market size, and market openness which are hypothesised to be the determinants of SBS buyers' decision processes. Then:

$$\mathbf{a}_i^j(p, E, W_{SBS}) = a_i^j + \sum_{k=1}^4 b_k^i \cdot p_k + c_i W_{SBS} + d_i \cdot E \quad (2)$$

Finally, a system of equations becomes:

$$Q_i = \mathbf{I}_i + \sum_{j=1}^{11} a_i^j Q_j + \sum_{k=1}^4 b_k^i \cdot p_k \cdot Q_{SBS} + c_i \cdot W_{SBS} \cdot Q_{SBS} + d_i \cdot E \cdot Q_{SBS} \quad \forall i = 1, \dots, 4 \quad (3)$$

where $Q_{SBS} = \sum_{j=1}^{11} Q_j$ and for empirical purposes intercepts \mathbf{I}_i are added to each equation.

The following restrictions apply: $\sum_{i=1}^4 a_i^j = 1$ for all j (across 4 equations), $\sum_{i=1}^4 b_k^i = 0$ for all $k = 1, \dots, 4$ (across 4 equations), $\sum_{i=1}^4 c_i = \sum_{i=1}^4 d_i = 0$ for all $i = 1, \dots, 4$ (across 4 equations)

Quota elasticities can be determined as:

$$e_{ij} = \frac{\partial \ln Q_i}{\partial \ln Q_j} = \left[a_i^j + \sum_{k=1}^4 b_k^i \cdot p_k + c_i \cdot (2 \cdot W_{SBS} - W_{SBS}^2) + d_i \cdot E \right] \frac{Q_j}{Q_i} \quad (4)$$

Price elasticities are:

$$\mathbf{f}_{ik} = \frac{\partial \ln Q_i}{\partial \ln p_k} = b_k^i \cdot Q_{SBS} \frac{p_k}{Q_i} \quad (5)$$

If quotas are relaxed on all firms, the total expansion effect (equivalent to Q_{SBS} expansion) can be computed as:

$$dQ_i = \sum_{j=1}^{11} \frac{\partial Q_i}{\partial Q_j} dQ_j = \sum_{j=1}^{11} e_{ij} \cdot Q_i \quad (6)$$

$$\frac{dQ_i}{Q_i} = \sum_{j=1}^{11} e_{ij} \quad \forall i = 1, \dots, 4 \quad (7)$$

The last expression is the growth rate for each country's aggregate imports. The import growth rate for each nation exhibits how much each particular country's imports would increase if all SBS firms' import quantities (constituting Q_{SBS}) increase. This variable is postulated to reflect the effect of market openness on exporter's market share (representing the degree of government control, calculated as ' Q_{SBS} expansion').

The Empirical Results

Table 4 provides information on the market shares and the identity of each SBS firm in the Korean market. Table 5 reports estimated firm-specific quota elasticities at the mean. These measures indicate how the demand for beef from each of the four different nations responds to changes in the levels of firm-specific SBS quota allocations. A positive sign on these estimates suggests that the demand for beef exported from a particular country is likely to increase if there is an increase in the level of import quota allocated to a particular SBS firm, holding prices constant. Most of the quota elasticity estimates of SBS firms relative to US import share are statistically significant. Four firms that hold minor stakes, in terms of the SBS quota shares, were found to have statistically insignificant quota elasticities. Overall, these results suggest that an increase in the import shares of SBS firms would be likely to have a positive impact on the US import market share for Korean beef.

An increase in the quota allocated to the Korea Superchain Store Association (KOSCA) is likely to have the strongest positive impact on the US market share of South Korea's imported beef market. The US exports grain-fed beef, which is viewed as a superior product to grass-fed beef and is mostly marketed to consumers through supermarkets and department stores. Since KOSCA is a major distributor for supermarkets and department stores in Korea, its position in the market will likely influence considerably the market share of the US.

Australia mainly supplies grass-fed beef to Korea. [For example, 92 percent of Australian beef exports to South Korea was grass-fed in 1999 (LPMO 2000)]. The market share of the Korea Cold Storage Co. (KCSC) and the Korea Meat Industries Association (KMIA) have the largest positive influences on the success of Australian beef in the Korean market. For Canada, the competitiveness of both the Korea Cold Storage Co. Ltd. (KCSC) and the Korea Superchain Store Association (KOSCA) have the largest positive impacts on market share. The quota share of KTHSC and the Korea Restaurant Supply Center (KRSC) largely influence New Zealand's market share in the Korean imported beef market. For instance, a one percent increase in the quota share of KRSC would result in a 39 percent increase in New Zealand's market share.

Overall, it appears that there may be alliances of exporting nations with different SBS firms. This may reflect the feature that each SBS firm supplies different end-users while different end-users tend to have different product specification requirements for imported beef. For instance, grain-fed beef is preferred in the tourist hotel market segment, while grass-fed beef is preferred in the non-tourist hotel segment. Almost all US beef exported to South Korea is grain-fed, as is also the case for Canadian beef, while Australian and New Zealand beef exports are largely grass-fed. The preferences of the different SBS firms to source beef imports from particular national origins may be driven mainly by end-user preferences. Whether or not the source preferences of firms are retained in the future is likely to depend on the nature of future changes in the structure and behaviour of firms in the Korean beef marketing system,

Table 6 exhibits estimates of the price elasticities, expenditure elasticities and import growth rate with respect to total quota expansion (Q_{SBS}). Own-price elasticities for the

United States, Australia and New Zealand are statistically significant and negative. The own price elasticity estimate for Canada is not statistically significant. The own-price elasticities vary from -1.70 (New Zealand.) to -0.56 (the United States.), while for Australia, this estimate is -0.90 . The more inelastic own-price elasticity for US beef than for Australian and New Zealand beef [and the lack of a significant estimate for Canada] suggest that the United States may have been more successful in differentiating its beef products such that SBS buyers are less sensitive to changes in the price of US beef than to price changes in either Australian or New Zealand beef.

Estimates of the cross-price elasticities with respect to quota expansion suggest a competitive relationship between US beef and each of Australian and New Zealand beef. A complementary relationship appears to exist between US and Canadian beef and this is also the case for Australian and New Zealand beef imports in the Korean market. Total expenditure elasticities are also reported in Table 6 but these are not significant. The impact of total import growth rates on each exporting nation's market presence is estimated from Equation (7) and reported in Table 6. These can be interpreted as estimates of the "market penetration rate" of each exporting nation, as Korea has expanded beef imports through SBS channels. These estimates are highest, and very similar, for Australia and New Zealand. Canada is found to have been the least effective in terms of penetrating the Korean market.

Model Simulations of Import Growth

Initial simulations to assess the effect of market growth on different exporters were based on projections of the exogenous variables and changes in the total amount of SBS beef imported from 10,963 tons in the year of 1999 to six different levels. This established a basis for comparison with subsequent simulations of progressive increases in the total amount of SBS beef imports. For example, if the total quantity of imported beef purchased by SBS groups is increased from 10,000 to 15,000 tons, subject to the assumption that shares among the SBS buyers remain relatively stable from the previous year, the model can be used to determine which exporting nation is most likely to increase its market share in the Korean beef market. Since the total amount of SBS beef imports is likely to increase, the model was simulated under six different levels of SBS beef imports. This provided a broad range of possible increases in the total amount of the SBS imports. Three assumptions were made in these projections. First, the price of imported beef from the four different origins was assumed to remain relatively stable between the base period and the projected period. Thus, information on prices of imported beef from four different origins and market shares of 11 SBS buyers were taken from the last observation in the data set: December of 1999. Second, information on total expenditure on imported beef is also taken from the last observation: December of 1999. Third, it is assumed that market shares of 11 SBS buyers sum up to 1.

Table 7 provides the base level of import quantity and market share, differentiated by countries of origin. The base level for each exporting nation is compared to the projected level of import quantity and market share with respect to changes in the total SBS import quantity. In the first scenario of a marginal increase in the total quantity of SBS beef

imports, US market share increases by 10 percent, while other exporting nations lose market share (Table 7). However, as the levels of total imports by SBS firms increase, the incremental gain by the U.S. appears to diminish, while Australia appears likely to compete more effectively. However, Canada appears to be negatively affected by an increase in overall SBS beef imports and loses 25 percent of its market share, regardless of the extent of the liberalisation. New Zealand does not appear to be a winner in the process of reforming the Korean beef market.. Its market share is projected to decrease by four percent, regardless of the degree of market reform.

If the simulations are interpreted as representing the effects of deregulation of the Korean beef importing system on imported beef from different sources, they suggest that the United States will be the largest winner, compared to other countries, from liberalisation, while Canada will be most likely to lag behind other competing nations in penetrating the Korean market (Table 4).

Concluding Remarks

This paper addresses impacts on beef exporting nations of south Korean market privatization for imported beef. Changes in beef imports, differentiated by four countries of origin, are estimated, based on micro-level firm-specific monthly import and price data for the period of 1995 through 1999. This permits an analysis of changes in firm-specific quotas on the relative market position of different exporters of beef to South Korea during this time. The results suggest that Korean import demand for beef is highly inelastic for US beef. Beef from the United States has the strongest competitive position in the SBS market segment for the Korean beef imports. Simulation of the estimated model suggests that beef exports from the United States are likely to expand as the Korean imported beef market transforms to a more open system.

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Table 1. Changes in Beef Supply and Consumption

1, 2		1990	1991	1992	1993	1994	1995	1996	1997
Domestic	Production	94.9	98.5	99.6	129.6	147.3	154.7	173.7	233.0
Beef	Consumption	94.9	98.5	99.6	129.6	147.3	154.7	173.7	233.0
Imported	Import	81.6	129.0	133.0	99.0	120.1	148.1	147.2	167.0
Beef	Stock	4.2	8.4	9.8	9.8	7.3	8.9	3.8	42.0
	Consumption	82.1	124.7	103.4	103.4	122.5	146.5	149.2	128.8
Total Consumption		177.0	223.3	233.0	233.0	269.8	301.2	322.8	361.8
(Consumption per Capita: kg)		(4.1)	(5.2)	(5.3)	(5.3)	(6.1)	(6.7)	(7.1)	(7.9)

1. Unit: 1,000 ton

2. Source: NLCF (National Livestock Cooperative Federation), Livestock Price and Supply Data, 1998.

Table 2. Liberalization Schedule for Beef Importation in South Korea

Year	Quota ^{1, 2}	SBS ² (%)	Added Cost on CIF + Duty (%) (Ceiling Price) ²	Mark-Up ³
1993	99,000	9,900 (10%)	140.00 (20%)	100%
1994	106,000	21,200 (20%)	134.00 (20%)	95%
1995	123,000	36,900 (30%)	144.12 (43.6%)	70%
1996	147,000	58,800 (40%)	129.12 (43.2%)	60%
1997	167,000	83,500 (50%)	99.92 (42.8%)	40%
1998	187,000	112,200 (60%)	70.88 (42.4%)	20%
1999	206,000	144,200 (70%)	- (44.2%)	10%
2000	225,000	157,500 (70%)	- (41.6%)	0%
2001	Abolition of the Quota	0	- (41.2%)	
2002	Abolition of the Quota	0	- (40.8%)	
2003	Abolition of the Quota	0	- (40.4%)	
2004	Abolition of the Quota	0	- (40.0%)	

1. Unit: Tons

2. Source: MAF (Ministry of Agriculture and Forestry), 2000.

3. Source: MFA (Ministry of Foreign Affairs), 1999.

Table 3. Average Unit Prices and Market Shares of Four Exporting Nations: 1995-1999

Country of Origin 1,2	Average Unit Price (CIF Basis, US\$/tons)	Market share within the SBS segment (%)	SBS Market Share of Total Beef Exports (%)
The United States	4.78 (2.46) 2	0.12 (0.23)	13.54 (77.28)
Australia	2.22 (1.04)	0.06 (0.12)	73.07 (194.65)
Canada	3.42 (1.63)	0.58 (0.36)	0.37 (0.23)
New Zealand	1.02 (1.20)	0.24 (0.30)	0.53 (0.25)

1. Source: LPMO (Livestock Products Marketing Organization), 2000.

2. Values in parenthesis are standard deviation.

Table 4. Definition and Descriptive Statistics of 12 SBS firms in Korea

Abbreviation of SBS Firm	Definition	Market share Mean (S.D.) ¹ .	Introduction to the SBS System
NLCF	National Livestock Cooperatives Federation	0.13 (0.08)	1994
KCSC	Korea Cold Storage Co.	0.16 (0.07)	1994
KTHSC	Korea Tourist Hotel Supply Center	0.10 (0.06)	1994
KMIA	Korea Meat Industries Association	0.17 (0.09)	1994
KRSC	Korea Restaurant Supply Center	0.09 (0.05)	1994
KOSCA	Korea Superchain Store Association	0.15 (0.07)	1994
KFMP	Korea Federation of Meat Purveyors	0.07 (0.06)	1996
KLMC	Korea Livestock Marketing Corporation	0.07 (0.07)	1996
KLTC	Korea Livestock Trading Corporation	0.02 (0.06)	1998
IMPT	Imported Beef Marketing Corporation	0.002 (0.01)	1999
SP	Space Specialty Co. Ltd.	0.005 2. (0.003)	1999
PR	Livestock Processing Cooperatives	Note footnote 2.	1999

1. Note: Standard deviations are in parentheses (S.D.).

2. The market shares of SP and PR are combined to represent an 11th SBS firm since their 1999 SBS tender purchases were reported to be at a minimal quantity.

Table 5. Estimated SBS Quota Elasticities at the Sample Mean

Quantity of	Quota of										
	NLCF	KCSC	KTHSC	KMIA	KRSC	KOSCA	KFMP	KLMC	KLTC	IMPT	SP/PR
The US	0.16*	0.15*	0.14*	0.12*	0.04**	0.17*	0.05	0.07*	0.01	0.01	-0.001
	(0.03)	(0.03)	(0.04)	(0.05)	(0.04)	(0.05)	(0.03)	(0.02)	(0.02)	(0.01)	(0.004)
Australia	0.08	0.20*	-0.07	0.34*	0.12**	0.12	0.20*	0.13*	0.10*	0.01	-0.006
	(0.06)	(0.07)	(0.08)	(0.11)	(0.07)	(0.11)	(0.07)	(0.04)	(0.04)	(0.01)	(0.01)
Canada	-0.15	0.42*	0.10	-0.16	0.04	0.33**	-0.03	-0.10	0.21*	-0.09*	0.09*
	(0.12)	(0.14)	(0.17)	(0.21)	(0.14)	(0.21)	(0.14)	(0.10)	(0.08)	(0.03)	(0.02)
New Zealand	0.20*	-0.01	0.35**	0.21	0.39*	-0.04	0.04	0.02	-0.05	-0.01	0.01
	(0.10)	(0.11)	(0.14)	(0.18)	(0.12)	(0.18)	(0.12)	(0.08)	(0.07)	(0.02)	(0.01)

Note: Asymptotic standard errors are in parentheses; asterisk (*) indicates significance at the 0.05 level while (**) indicates significance at the 0.10 level.

Table 6. Estimated Price Elasticities for Korean Beef Imports at the Sample Means

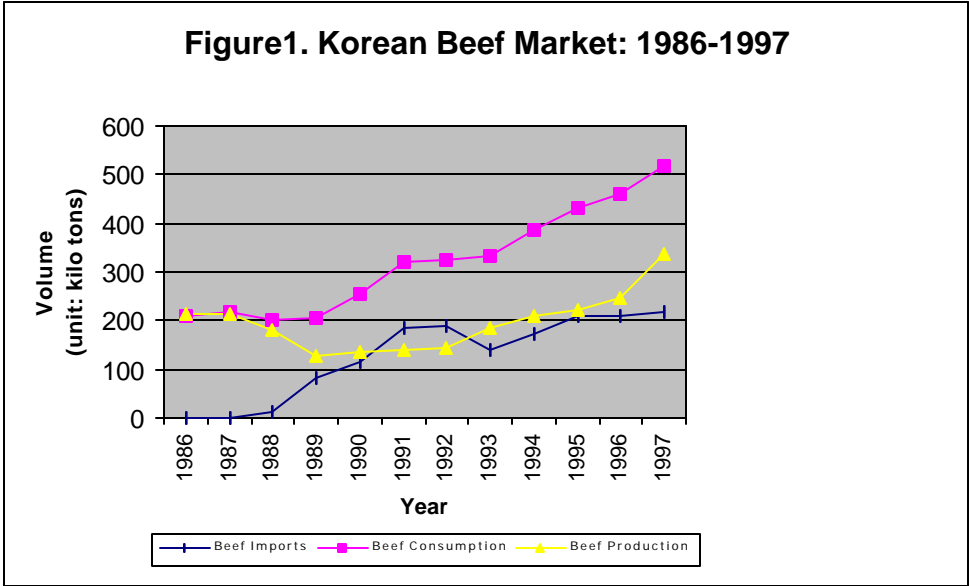
Quantity of	The Import Price (CIF) ₁ of					
	The US	Australia	Canada	New Zealand	Total Expenditure	Import Growth Rate
The US	-0.56* (0.18)	0.61* (0.18)	-0.11 (0.09)	0.11 (0.12)	0.09 (0.08)	0.91
Australia	1.14* (0.37)	-0.90* (0.36)	0.13 (0.18)	0.18 (0.25)	-0.0002 (0.16)	1.22
Canada	-2.73* (0.73)	0.86 (0.72)	0.08 (0.35)	1.26* (0.50)	0.0001 (0.33)	0.65
New Zealand	1.24* (0.61)	-1.84* (0.60)	0.34 (0.30)	-1.70* (0.42)	-0.0001 (0.27)	1.11

1. Import Prices are custom basis (CIF)

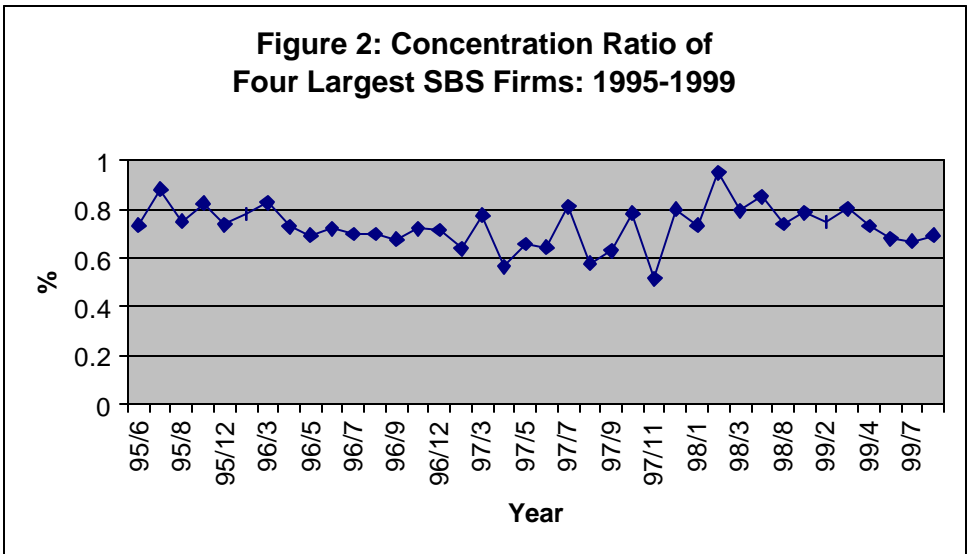
2. Note: Asymptotic standard errors are in parentheses; an asterisk (*) indicates significance at the 0.05 level while (**) indicates significance at the 0.10 level.

Table 7. Simulated Impacts of Increases in Beef Imports by SBS Buyers

	Base Quantity	Projected Quantity	Base Market share	Projected Market Share	Change
Scenario 1: An increase in the total amount of SBS Beef Imports from 10,963 to 15,000 tons					
The U.S.	6153	9253	0.56	0.62	0.10
Australia	3507	4185	0.31	0.28	-0.13
Canada	430	441	0.04	0.03	-0.25
New Zealand	873	1122	0.08	0.07	-0.06
Scenario 2: An increase in the total amount of SBS Beef Imports from 10,963 to 20,000 tons					
The U.S.	6153	12223	0.56	0.61	0.09
Australia	3507	5678	0.31	0.28	-0.11
Canada	430	587	0.04	0.03	-0.25
New Zealand	873	1515	0.08	0.08	-0.05
Scenario 3: An increase in the total amount of SBS Beef Imports from 10,963 to 25,000 tons					
The U.S.	6153	15192	0.56	0.61	0.09
Australia	3507	7171	0.31	0.29	-0.10
Canada	430	732	0.04	0.03	-0.25
New Zealand	873	1907	0.08	0.08	-0.04
Scenario 4: An increase in the total amount of SBS Beef Imports from 10,963 to 30,000 tons					
The U.S.	6153	18161	0.56	0.61	0.08
Australia	3507	8664	0.31	0.29	-0.10
Canada	430	878	0.04	0.03	-0.25
New Zealand	873	2299	0.08	0.08	-0.04
Scenario 5: An increase in the total amount of SBS Beef Imports from 10,963 to 35,000 tons					
The U.S.	6153	21130	0.56	0.60	0.08
Australia	3507	10156	0.31	0.29	-0.09
Canada	430	1024	0.04	0.03	-0.25
New Zealand	873	2691	0.08	0.08	-0.03
Scenario 6: An increase in the total amount of SBS Beef Import from 10,963 to 40,000 tons					
The U.S.	6153	24100	0.56	0.60	0.07
Australia	3507	11649	0.31	0.29	-0.09
Canada	430	1170	0.04	0.03	-0.25
New Zealand	873	3083	0.08	0.08	-0.03



Source: OECD, *AGR/CA (98)5/Final*. "The Economic and Policy Aspects of Livestock versus Feed Grain Imports in Selected Asian Countries", 1998.



Source: LPMO, 2000.