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RURAL ECONOMY

**A Stated Preference Analysis of International Commodity
Marketing: South Korean Hotel Meat Buyers' Perceptions
of Canadian Beef, US Beef and Australian Beef**

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and Renee B. Kim

Staff Paper 96-11

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Summary: A Stated Preference Analysis of International Commodity Marketing: South Korean Hotel Meat Buyers' Perceptions of Canadian Beef, US Beef and Australian Beef

James Unterschultz, Kwamena K. Quagraine, Michele Veeman and Renee B. Kim

Background

Since the late 1980's, South Korea has become one of the most affluent and influential Asian countries. Korean consumers' food demands are changing with their increased income. Beef consumption has continuously grown since the reopening of the market to beef imports in 1988. Potential exists for the Canadian beef industry to penetrate the South Korean market for grain-fed beef. The United States and Australia dominate the Korean market for imported beef. Canada has not yet had major successes in penetrating the Korean market.

Objective

This study conducted in November 1995 evaluates Korean attitudes towards Canadian beef relative to competing beef from the United States and Australia. The objectives are to (1) evaluate the importance of country-of-origin (country brand) in buying decisions; (2) to gather information that may be used in developing marketing strategies to increase Canada's market share of grain-fed beef exports to Korea; (3) to provide a baseline measurement of Korean perceptions of beef sourced from Canada, the United States and Australia and; (4) to evaluate the suitability of stated preference survey methodology.

Target Market and Method of Analysis

Major 4-star and 5-star hotels in South Korea are the focus of this market study. These establishments use high quality grain-fed beef and are a primary target market for beef exporters. Executive chefs, and purchasing managers were interviewed in the fall of 1995 in person in Korea by a U. of A. graduate student fluent in both English and Korean. These individuals make the beef purchase decisions for their respective hotels.

The quantitative method reported here is based on *stated Preference*. This method indirectly examined preferences for Canadian beef versus competitor's beef using quantitative marketing techniques where respondents were given different written descriptions of products to choose from.

Findings

Conjoint analysis using multinomial logit analysis indicated Korean buyers (chefs and purchasing managers) strongly prefer beef from the US with quality similar to US prime. Analysis revealed that frozen cuts were still preferred to fresh product. Overall, beef of Canadian and Korean origin does not have any significant effect on buyer's utility since there is no increase in the probability that buyers will purchase beef products from these sources. In fact, product of Canadian origin may even have a slight negative impact on the decision to purchase beef. There is a much higher probability of a hotel purchasing beef from the U.S. than from either Canada or Australia given the same meat quality, price and customization. Beef from Australia has a significant negative effect on the probability of purchase.

The results were further analyzed segmenting the four and five star hotel respondents into non-Korean chefs, Korean chefs and Korean purchasing managers. All three decision groups view the U.S as a preferred foreign beef supplier. The non-Korean executive chefs are essentially neutral to Australia and Canada as meat suppliers and strongly negative on sourcing their high quality beef from Korea. Korean chefs have a stronger preference for beef from Canada than from the U.S. They are negatively biased towards the purchase of beef from Australia and Korea. Purchasing managers would prefer beef from Korea, or as a second best, from the U.S. They do not prefer beef sourced from either Canada or Australia.

In fact, for a comparable high quality beef product from Canada or the U.S. the estimated model predicts there is a 28% chance of the aggregate group choosing Canadian beef versus a 49% chance of this same group choosing U.S. beef. Further predictions

segmented by Korean chefs, non-Korean chef and purchasing managers are presented in the main paper. For example the models predict a 26% chance that non-Korean chefs will choose a Canadian product versus a 60% chance that they will choose U.S. beef of similar quality.

Further analysis reveals the strength of the U.S. beef brand image. The model predicts that a -15% price change on Canadian beef is required to equalize the probability of the aggregate group choosing between Canadian beef and U.S. beef. Non-Korean chefs and purchasing managers require a price change on Canadian beef of -20% and -25% respectively to equalize the probability of these two groups choosing between Canadian beef and U.S. beef. Overall, the U.S. has a sufficiently valuable brand image such that significant price drops or expensive marketing efforts may be required before Canadian beef can displace U.S. beef in this Korean market.

Conclusion

The stated preference results confirm that buyers for the hotel and restaurant market segment demand high quality meat but are, nonetheless, sensitive to price. Hotels on average still prefer frozen products from exporters of grain fed beef. Future changes in the marketing infrastructure may change this situation, but the preference at the time of the study was for a frozen product that was not customized for each individual hotel.

However, different groups within the target hotel market have significantly different views on beef from different countries. The U.S. holds a dominant position with non-Korean chefs and Korean purchasing managers. It will generally require significant price cuts in the range of 15% and/or other major marketing efforts to influence these two groups to purchase Canadian beef versus U.S. beef. Canadian beef has a slight edge over Australian beef with Korean beef purchasing decision makers. However, non-Korean chefs, those individuals with more international experience, have a slight preference for an Australian product over a Canadian product.

The market segment of international hotels and restaurants in South Korea is a target market for the Canadian beef industry. Results presented here highlight several challenges facing the Canadian beef industry. The U. S. has a dominant position in the market. This dominance applies not only in terms of market share, but also reflects buyers' perceptions regarding the product. A Canadian beef product is not generally viewed by respondents as superior to a U.S. product.

A Stated Preference Analysis of International Commodity Marketing: South Korean Perceptions of Canadian Beef, US Beef and Australian Beef

Introduction

Since the late 1980's, South Korea has become one of the most affluent and influential Asian countries. Economic growth has considerably increased per capita disposable income, favouring the consumption of more meats. Beef consumption has continuously grown since this market began to be opened to beef imports in 1988. Per capita beef consumption grew from 3.6 kg in 1986 to 6.1 kg in 1994 (Bryne et al. 1995). South Korean self sufficiency in beef supplies was 54.5% in 1994 (South Korean Ministry of Agriculture, Fishery and Forestry, 1995). Multilateral trade pressures favouring freer beef trade have given greater international access to the South Korean beef market and this will increase even more in the future. Beef import quotas are expected to increase from 106,000 tonnes in 1994 to 225,000 tonnes by the year 2000. Quotas will be abolished after that date.

Potential exists for the Canadian beef industry to penetrate the South Korean market for grain-fed beef, yet to date the Canadian beef industry has been a minor participant in this market. Canadian beef exports to Korea were almost non-existent in 1991 and by 1994 Canada accounted for only 1.3% of the total beef exports to Korea. South Korea has been targeted as a primary export market by the Canadian Beef Export Federation, an organization charged with developing international beef markets for Canadian products.

Canada produces a grain-fed beef product that, in terms of price and quality, is competitive in certain market segments in South Korea, such as in the hotel and restaurant trade. To evaluate the competitiveness of Canadian beef in the high-end segment of this market, specifically in the five-star and four-star hotel restaurant sector, a market research survey was undertaken in November 1995. It evaluated South Korean meat buyers' perceptions of Canadian beef relative to beef sourced from the major national export

competitors. Information on buyers' perceptions is important for evaluating marketing program effectiveness, assessing competitor strengths and weaknesses and planning future marketing strategies. Information on total sales and market shares are other valuable types of data that can be used to evaluate the success of marketing efforts and competitiveness, but directly obtained information on how a product is viewed by purchasers provides insight into the factors that underly these market outcomes. In addition to giving a basis to evaluate programs, export competitors and marketing strategies, the information and methodology presented here enable us to value the strength of country-of-origin effects.

Two types of quantitative survey questions, semantic differential scale questions and stated preference questions, were asked of more than 40 hotel purchasing managers and hotel executive chefs in South Korea in the fall of 1995 by means of direct interview. Hotel purchasing managers and executive chefs are the primary decision makers in hotel meat purchases. One individual who is fluent in both Korean and English conducted the interviews.

The survey analyzed in this study had four major purposes:

- I. To evaluate the importance of country-of-origin (country brand) in buying decisions.
- II. To gather information that may be used in developing marketing strategies to increase Canada's market share of grain-fed beef exports to Korea.
- III. To provide a baseline measurement of Korean perceptions of beef sourced from Canada, the United States and Australia in order to be able to measure the effectiveness of any future marketing campaign in the target market.
- IV. To evaluate the suitability of stated preference survey methodology for the purposes outlined above.

In the remainder of this paper, further background information on the South Korean beef market is presented. The stated preference survey methodology is described along with the survey instruments. The stated preference survey results are presented and evaluated.

Results from the semantic differential scale questions and a series of open-ended qualitative questions are reported and analyzed elsewhere (Kim et al. 1996a; Kim et al. 1996b). The concluding section of the paper gives suggestions for further market research, an evaluation of the stated preference method employed in this study and some suggestions for marketing strategies in the South Korean market.

Background

A complex bureaucratic structure regulates the imports of beef into South Korea. Interested readers are referred to CBEF (1994) or Kim et al. (1996a) for details on the practices and institutions that are applied to imported beef. One important recent change is that tourist hotels can now deal directly with foreign beef suppliers through a “Simultaneous Buy and Sell” system. Product quality and service are increasingly viewed as important product attributes in addition to price. The five-star and four-star hotel segment has been identified as a primary target market for Canadian beef. This market currently uses imported frozen cuts.

The five-star and four-star hotel segment demands high quality beef. This usually comes from grain-fed animals. The United States, a grain-fed beef producer, has been a primary supplier to this market and was the source of 70% of imports through the Simultaneous Buy and Sell system in 1994 (The Korean Tourist Hotel Supply Center). Australia accounted for 22% of this market segment while Canada supplied less than 1%. Historically Australia has been a supplier of low-cost grass-fed beef but grain-fed beef is now beginning to be supplied for higher priced markets, such as the Korean hotel and restaurant industry.

Hotel purchasing managers and executive chefs are the primary decision makers for hotel beef purchases. Purchasing managers are concerned with price and the reliability of supply (Kim 1996b). Executive chefs are primarily concerned with product preparation, quality and customer satisfaction. These individuals were designated as the target group

for the survey instruments which were designed to determine buyers' perceptions and relative preferences for Canadian beef, United States beef and Australian beef. The survey instruments were applied through direct interviews in Korea.

Research Methodology

The analysis and associated research models are built upon the premise that buyers' perceptions of a selected product and its characteristics strongly influence the decision to purchase an item. Each buyer's perceptions will determine whether or not a purchase is made from one supplier, whether a different product is purchased from a competing supplier or whether no purchase is made. While two different methodologies were employed to evaluate South Korean meat buyers' perceptions of imported beef, this paper focuses on the analysis and results of the stated preference model.

Stated Preference Methodology

The stated preference method (SPM) is based upon a buyer's hypothetical choice behaviour for beef purchases. The use of alternate related methodologies based on revealed preference as shown by actual choices are not applicable in this market research setting since the Canadian product has not been chosen for a number of reasons, including the lack of market development efforts. The SPM, also referred to as experimental or stated choice analysis, involves asking respondents to simulate discrete choice behaviour. Questions are put in a behavioural choice context: "if you were to have product alternatives characterized by these particular attributes available to you, which one would you choose?".

A possible disadvantage of this technique is that peoples' stated preferences may not fully reflect actual behaviour. Another issue is whether a respondent to whom a set of alternative options has been described can adequately evaluate the hypothetical choices although the inclusion of the default option of "no choice" should allow this to be

assessed. Despite these potential concerns, the stated preference model has been used extensively in empirical work, particularly in examining choices of travel, environmental amenities, and recreational facilities (Ben-Akiva and Lerman, 1987; Wilman and Pauls, 1987; Kroes and Sheldon, 1988; Hensher, Barnard and Truong, 1988; McLeod, Boxall and Adamowicz, 1993; Adamowicz et al., 1994a, 1994b; Louviere, 1994). The method is flexible, capable of dealing with a wide variety of attributes and is cheap to apply. Louviere (1994), suggests that the SPM has good predictive ability of future choices.

The Analytical Framework

The SPM is based on economic principles whereby choices of products which embody bundles of attributes are modelled in a random utility framework. By defining the relevant attributes and the levels of these, an individual's utility function can be specified.

Following Ben-Akiva and Lerman (1987), Kolstad and Braden (1991), Louviere (1994), and Adamowicz et al. (1994a), a general random utility function, defined in terms of product attributes, is expressed as:

$$U_{in} = V(X_{in}) + \epsilon_{in} \quad (1)$$

where U_{in} is person n 's utility of choosing alternative product i , V is the indirect utility function associated with the alternative i , X_{in} is a vector of attribute values for alternative i as viewed by respondent n , and ϵ_{in} is a random element associated with errors in perceptions or measurements of utility. Total utility U_{in} is thus a sum of observable and unobservable components which can also be expressed as V_{in} and ϵ_{in} respectively. From this perspective, the choice probability of alternative i is equal to the probability that the utility of alternative i , U_{in} , is greater than or equal to the utilities of all other alternatives in the choice set. This can be written as follows:

$$P_n(i) = \Pr(V_{in} + \epsilon_{in} \geq V_{jn} + \epsilon_{jn}; \text{ for all } j \in C_n) \quad (2)$$

where C_n is the choice set for respondent n . Assuming that all the disturbances, ϵ_{in} are independently, identically, and Gumbel-distributed with a scale parameter $\mu=1$, then the probability of choosing an alternative i is expressed as:

$$P_{in}(i) = \frac{\exp(V_{in})}{\sum_j \exp(V_{jn})} \quad (3)$$

Assuming that V_{in} is linear-in-parameters, the functional form can be expressed as:

$$V_{in} = \beta_1 + \beta_2 x_{in2} + \dots + \beta_k x_{ink} \quad (4)$$

where, V_{in} = Respondent n 's utility of choosing product alternative i ,

x_{ink} = k^{th} attribute values for alternative i as viewed by respondent n , and

β_1, β_2 to β_k are coefficients to be estimated.

Equation (3) is estimated as a non-nested multinomial logit model as described below.

The empirical application requires the identification of the specific attributes and the levels of each attribute. These are discussed next.

The Empirical Model

For this study of hypothetical purchase decisions by members of the Korean hotel and restaurant industry, a broad set of important product attributes which affect a buyer's product perceptions and purchase decision is identified. In the literature on experimental design, such decision attributes are viewed as "factors", and the values that each factor takes on in the experiment are treated as "levels."

Initial research based on industry reports (CBEF 1994; U.S. Meat Export Federation, 1994), meetings with industry representatives and government experts and published market research findings such as Menkhaus et al. (1993,1990,1988), identified important beef product factors and levels. The factors identified as major attributes in the decision to purchase beef include the country-of-origin of the beef, its price, the product quality or grade, and the product specification. Each examined factor is specified at four levels and these are presented in Table 1. For example, the four levels on country-of-origin for beef product are the United States, Korea, Australia and Canada. The product specification attribute evaluates the importance of fresh/chilled versus frozen product and whether the hotels strongly desire cuts customized to their particular specifications.

It is assumed that the product attributes, i.e. factor descriptions, affect a buyer's perceptions of beef and ultimately translate into a decision to purchase or not to purchase. The factors and the levels presented in Table 1 were used to design a fractional factorial experiment with orthogonal main effects. This required a total of thirty-two questions. The questions were blocked into four sets of questions and one block was incorporated into each questionnaire. Each question gives 3 choice alternatives involving different beef product profiles. Figure 1 is an example of one question in the survey. Choices A and B involve two different beef product descriptions; these vary for each question. The option of choice C, which is to choose neither A nor B, is included in all questions. The option of not making a purchase applies if neither descriptions of the beef product in alternatives A and B are preferred and this choice of the "base" alternative C sets the origin or base of the utility scale. Louviere (1988), explains that the base alternative acts as a constant subtracted from the utilities of the other alternatives.

The orthogonal main effects experimental design imposes independence between the factors and assumes that interaction effects are negligible. Dummy variables (-1, +1) are used to effects code the attribute levels so that the base alternative is exactly equal to the origin. The fourth level of each attribute, omitted during estimation to avoid singularity, is calculated afterwards using the effects coding constraint that all four attribute coefficients must sum to zero (Johnson, Johnson and Buse, pp.187-192, 1987). Since thirty-two questions were required to complete the experimental design and these were broken into four blocks, each respondent was asked eight questions. The model investigated here is a non-nested multinomial model which assumes that there is only one level of decision-making in the buyers' beef purchase decision process.

The Data and Estimation Procedure

As previously described the data were obtained by means of a survey, conducted by means of interview of 43 executive chefs and purchasing managers associated with most of the major tourist hotels and restaurants in South Korea. These establishments use high quality grain-fed beef similar to the product produced in Canada and they are regarded as leading

institutions in the procurement of high quality beef. The survey instrument was translated into Korean and cross-checked for translation accuracy with local Korean business people. Respondents had the option of answering the questions in Korean or English.

The interviewed respondents included: 22 Korean purchasing managers for Korean international hotels, 11 Korean executive chefs at Korean international hotels and 12 non-Korean executive chefs at Korean international hotels.

The data for the entire sample size of 43 respondents or 344 responses is initially analyzed. The model then is rerun on the segmented data sets for the purchasing managers, Korean executive chefs and non-Korean executive chefs to analyze the differences in perceptions of each group. The sample size drops to 41 or 328 responses when the sample is segmented and includes responses by 22 purchasing managers, 10 foreign executive chefs, and 9 Korean chefs. Detailed information of the perceptions and stated choices of each segment may be valuable in targeting marketing strategies directly at these specific groups within the hotel industry. Finally, the estimated models are used to assess a monetary valuation or price of the country-of-origin of beef under specific assumptions. This “price” represents the dollar value of the beef country exporter’s brand image relative to a competitor’s beef. The non-linear logit procedure of the statistical program Limdep 7.0 (Greene, 1995) was used for estimation of the multinomial logit model described above.

The Discussion of Results

The stated preference approach provided information on 4 different attributes specified with four levels. The first set of results presents the combined model with all variables effects coded. Next, results of the combined model are presented where the variable of price change is included as a continuous variable rather than as effects coding. Then the model is segmented to separate the responses of non-Korean chefs from Korean chefs and purchasing managers. This model is estimated with a continuous price change variable. Finally the models are used to estimate the value of a country’s brand image.

The stated preference results from the combined model with price effects coded are in Table 2. The coefficient estimates given in Table 2 express the relative effects of attributes on the probability of a buyer choosing either alternative A or B based on the specific attribute level. The log-likelihood ratio statistic in Table 3 indicates that the attributes examined in the model are jointly important in affecting consumers utility for the purchase of beef products. The log likelihood functions are also used to determine a goodness-of-fit measure, the pseudo- \hat{R}^2 . The pseudo- R^2 value is 0.104 (Table 2). This indicates a reasonable fit for this type of model.

The results reveal that overall, beef of Canadian and Korean origin does not have any significant effect on buyer's utility since there is no increase in the probability that buyers will purchase beef products from these sources. In fact product of Canadian origin may even have a slight negative impact on the decision to purchase beef. Beef products from the U.S. have a significantly positive effect on buyers' utility. There is a higher probability of a buyer purchasing beef from the U.S. than from either Canada or Australia given the same meat quality, price and customization. Beef from Australia has a significant negative effect on the probability of purchase.

The price effects from Table 2 indicate that lower prices increase buyers' utility. Product grade is an important factor affecting utility. The estimated coefficients on higher beef grades have a positive sign while for lower grades, these have a negative sign. Equivalent to prime, the highest quality, is most preferred while the select grade is least preferred. The product specification coefficients indicate that products with no custom cuts are preferred by these Korean institutional buyers. The estimated coefficient on frozen beef without custom cuts has a positive sign and is statistically significant while the estimated coefficient on beef with custom cuts has a negative sign and is also statistically significant. The preference of hotel buyers for frozen beef may be explained by the feature that the Korean marketing infrastructure cannot as yet easily handle fresh chilled product while still maintaining product quality.

Including price as a continuous variable may be more useful than effects coding for evaluating marketing alternatives. Due to the wording of the stated preference questions, the price variable is included as a price change variable rather than as an actual price. Results from this model version are reported in Tables 4 and 5. The price change coefficient is negative and significant. The other estimates are similar to the first model. We will return to the results from this model when the country-of-origin value simulation results are developed.

The two preceding model versions assume that the different respondents are homogeneous. The next model segments the sample into non-Korean executive chefs, Korean executive chefs and purchasing managers. Thus, all right hand side variables are interacted with dummy variables representing these three segments in order to evaluate differences in responses between groups. The results are reported in Table 6. All three segments, exhibit a similar response to price changes. These three coefficients are not significantly different from each other at the 5% level of significance (Table 6). However, differences occur between the three segments on the country-of-origin coefficients.

The views on the importance of the U.S. as a country-of-origin for beef are similar for each group and there is no statistical difference between these coefficients. All three segments view the U.S as a preferred foreign beef supplier. There are differences in the subgroups perceptions concerning Canada, Australia and Korea as suppliers. The non-Korean executive chefs are essentially neutral to Australia or Canada as meat suppliers and strongly negative on sourcing their high quality beef from Korea. Korean chefs have a stronger preference for beef from Canada than from the U.S. They are negatively biased towards the purchase of beef from Australia and Korea. Purchasing managers would prefer beef from Korea, or as a second best, from the U.S. They do not prefer beef sourced from either Canada or Australia.

There are several explanations for the different responses by each group on the country-of-origin of beef. Traditionally, Australia has been a supplier of grass-fed beef to Korea. The consequent impression of Australia as a supplier of lower quality beef may be the reason for the negative coefficients on Australian beef by Korean chefs and purchasing managers. Purchasing managers are concerned about service and reliability (Kim et al. 1996b). Canada has had problems with service and meeting order specifications in the past (Kim et al. 1996a) and this could account for the negative coefficient on Canada as a beef source by purchasing managers. If products could be sourced from Korea this would make the purchasing managers task easier and this would account for the positive sign on the Korean country-of-origin. Presumably non-Korean executive chefs have more international experience. While this segment strongly prefers beef sourced from the United States, they are neutral to beef from Australia. Their perceptions of Australian beef are not as negative as the views held by the other two segments.

The models with the continuous price change variables can be used to estimate probabilities of product choice and value of country-of-origin. For example, if Korean hotels were offered exactly the same quality beef product at the same price from two different countries, the models presented here can be used to determine which product is most likely to be chosen. Using a Canadian perspective, we can then ask by how much would prices of the Canadian product have to change to give an equally likely chance of Canadian beef being chosen over beef from a competing country. This price change represents an estimate of the dollar value of the relative brand image of beef from a particular country. The “brand” image of country-of-origin picks up all the service, product quality, and general country- image values that are not reflected in the other three attributes of the stated preference questions. Rather than being used as welfare measures, these price measures suggest the value of promotion, service and other origin-based aspects of the beef product. The measures may also be interpreted as the price change that is required to make the target group indifferent to beef of equivalent quality sourced from the different countries. A similar analysis could also be conducted from the

viewpoint of Australia, the U.S. or Korea. Implicit in this analysis is that only the two alternatives presented (or the choice of neither of these) are available to the respondent.

This simulation was conducted by comparing Canadian beef to U.S. beef and Australian beef. The possibilities of Korea producing significant quantities of grain-fed beef are limited (Kim et al. 1996a) and are not discussed further. Table 8 provides the base level of price, grade and product specification used in the simulation comparing Canadian beef to American beef. These levels, for a reasonably high quality frozen beef product, were chosen based on the background information and the model results presented above. The attribute levels of Table 8 are used to evaluate price changes. Exactly the same Table 8 levels, aside from country of origin, were used to compare Canadian beef to Australian beef.

Table 9 gives the probability of choosing a U.S. beef product versus a Canadian beef product of exactly the same quality and at the same price using the levels from Table 8. These results are reported for the non-segmented model (Table 4 coefficients) and the segmented model (Table 6 coefficients). For the non-segmented model there is a 28% chance of the aggregate group choosing Canadian beef versus a 49% chance of this same group choosing U.S. beef (Table 9). Furthermore a -1% Canadian price change gives a marginal change in the probability of choosing Canadian beef of 0.8%. For the segmented model there is a 26% chance that non-Korean chefs will choose a Canadian product versus a 60% chance of this same group choosing U.S. beef.

Table 10 reports the estimated price change from the base case presented in Tables 8 and 9 that is required to equalize the probability of choosing a Canadian beef product versus a U.S. beef product. The non-segmented model requires a price change of -15% on Canadian beef to equalize the probability of choice at 41%. Non-Korean chefs and purchasing managers require a price change on Canadian beef of -20% and -25% respectively. A price change of 5.3% on Canadian beef is required for Korean chefs to equalize the probability of choosing a Canadian product versus U.S. beef of equal quality.

Overall, the U.S. has such a sufficiently valuable brand image that significant price drops or expensive marketing efforts may be required before Canadian beef can displace U.S. beef in this Korean market.

Table 11 reports the price change required to equalize the probability of choosing Canadian beef versus Australian beef, using the attribute levels in Table 8. Overall, Canadian beef price could increase by 6% to equalize the probability of choosing Canadian beef versus Australian beef. The results in this table show that for two of the three segments, Canadian beef has a country brand image advantage over Australian beef.

Many different simulations can be evaluated. The scenarios above only evaluated a Canadian price change. Other situations can be explored. The next simulation leads the reader through a base case comparing the probabilities of choice between Canadian beef and U.S. beef. Then the quality component (grade) for Canadian beef is increased. Finally the grade component is changed and Canadian price is changed to equalize the probability of choice of Canadian beef and U.S. beef. This group of comparisons evaluates the probability of purchase of different Canadian products profiles relative to U.S. products. The information can be used to develop Canadian products that have an equal or even greater chance of purchase than U.S. products. The base case is described first.

Table 12 gives the levels for the base case 2 comparing U.S. beef and Canadian beef. The key change in this base case is that both products have the grade *equivalent to choice small marbling* versus *choice modest marbling* used in base case 1 (Table 8). The probability of choosing U.S. beef versus Canadian beef is evaluated. The probabilities in Table 13 are very similar to the probabilities for base case 1. In general there continues to be a much higher chance of U.S. beef being selected.

Next the U.S. product levels are held constant and the Canadian product grade is improved slightly to *equivalent to choice modest marbling*. Everything else stays unchanged. The probabilities of choice are reported in Table 14. There is a slight increase

in the probability of choosing Canadian product, however for the non-segmented model the probability of choosing Canadian product is only 30%. There are similar small changes in probability in the segmented model.

Next the Canadian grade is increased to *equivalent to prime* while holding U.S. beef levels at those in Table 12. The new probabilities of choice are reported in Table 15. Canadian beef is now the preferred product versus U.S. beef with both the non-segmented model, and also with non-Korean chefs and with Korean chefs. Korean chefs are very sensitive to the highest beef quality with the probability of choosing Canadian beef at 82%. However purchasing managers still strongly prefer U.S. beef. They have a 30% chance of choosing Canadian beef versus a 45% chance of choosing U.S. beef. Purchasing managers are relatively insensitive to beef quality. Unfortunately, the actual production of “prime” quality beef in Canada is limited at this present time.

Finally, we consider holding U.S. beef levels at the base case 2 (Table 12) but offer better quality Canadian beef with *grade equivalent to choice modest marbling* (i.e. Table 14 results). The price change that is required to equalize the probabilities between choosing the U.S. base case versus the Canadian product is evaluated. This combination of quality improvement and price change in the Canadian product is reported in Table 16. Major price reductions in the Canadian product ranging from -11% to -20% are still required for the aggregate responses in the non-segmented model, for non-Korean chefs and for purchasing managers. Offering a Canadian beef product that is slightly superior in quality is still not sufficient in total to equalize the probability of choosing Canadian beef versus U.S. beef.

Marketing Implications for Canadian Beef in Korea in the International Hotel Segment

The market segment of international hotels and restaurants in South Korea is a target market for the Canadian beef industry. Results presented here highlight several challenges facing the Canadian beef industry. The U. S. has a dominant position in the market. This

dominance applies not only in terms of market share, but also reflects buyers' perceptions regarding beef products. Canadian products are not generally viewed by respondents as superior to U.S. products.

The stated preference results confirm that buyers for the hotel and restaurant market segment demand high quality meat but are, nonetheless, sensitive to price. Hotels on average still prefer frozen products. Future changes in the marketing infrastructure may change this situation, but the current preference is for frozen products that are not customized for each individual hotel.

However, different groups within the target hotel market have significantly different views on beef from different countries. The coefficient estimates in Table 6 and the simulation estimates in Tables 10 and 11 highlight the differences in country-of-origin. The U.S. holds a dominant position with non-Korean chefs and purchasing managers. It will generally require significant price cuts in the range of 15% and/or other major marketing efforts to influence these two groups to purchase Canadian beef versus U.S. beef. Canadian beef has a slight edge over Australian beef at this time with Korean beef purchasing decision makers. However, non-Korean chefs have a slight preference for Australian products over Canadian products.

The estimated models and the simulation results highlight the need for marketing efforts to be tailored to the target audience. There are significant differences in perceptions of non-Korean chefs, Korean chefs and purchasing managers. An initial strategy to target hotels that already use U.S. beef would require a price reduction of 15% or some combination of quality improvement and price decrease. Alternatively, the price change of 15% gives a monetary value to all the unnamed attributes associated with U.S. beef relative to Canadian beef. These unnamed attributes need to be identified and incorporated into the marketing plan. The most appropriate marketing strategies vary depending upon the target group in the hotel.

Conclusions

There is a relatively higher probability of Korean buyers for the higher-end hotel and restaurant market purchasing beef from the U.S. rather than from Canada or Australia. The stated preference study confirms the importance of U.S. beef in the market segment of Korean international hotels. The Korean hotel industry preferred lower prices and high-grade beef products. For Canada to penetrate the Korean market and compete effectively in the beef market, the issues of price and grade, as well as Canada's image in Korea have to be seriously addressed. This may entail aggressive targeted pricing and promotional activities to make Canada known to Korean buyers as a producer of high quality beef.

Observations of the interviewer and the completed survey results confirm that nearly all respondents answered the stated preference questions; this was not the case for the semantic differential scale approach. Stated preference survey instruments may have an advantage in situations where buyers are not familiar with some of the described products. The stated preference approach frames hypothetical questions that are relevant to the buyer and that include descriptions of products that may not yet be available to the buyer. Thus the hypothetical nature of the stated preference approach can be of considerable advantage in some market assessment studies. One trade-off is that the stated preference necessarily focuses on a smaller number of attributes than may be considered in other structured survey formats, such as in the semantic differential scale approach which was also pursued in this study. In this sense, the stated preference approach may provide a data set that is less rich in terms of the number of attributes that can be evaluated. Thus with the aid of industry participants particular care must be taken to identify the relevant selected attributes for the stated preference approach. A check on the appropriateness of these is provided by the statistical tests embodied in the analysis. Further, very useful quantitative results such as the potential response of buyers to specified price changes can be derived from stated preference models. Thus the more rigorous analytical and statistical context which can be developed for the stated preference approach can be viewed as a considerable strength of this approach.

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Tables

Table 1: Factor Levels/Descriptions for Stated Preferences

FACTORS	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Product Origin	Canada	United States	Australia	Korea
Product Price	40% less than previous price paid	20% less than previous price paid	Same price as previous price paid	20% more than previous price paid
Product Grade	Equivalent to U.S. prime (slightly abundant marbling)	Equivalent to U.S. choice (modest marbling)	Equivalent to U.S. choice (small marbling)	Equivalent to U.S. select (slight marbling)
Product Specification	Frozen with no custom cuts	Fresh/chilled with no custom cuts	Frozen with custom cuts	Fresh/chilled with custom cuts

Table 2: Estimated Results of the Non-linear Logit Model: Non-Segmented Model With Price Effects Coded

Variable	Coefficient Estimat	Standard Error
<u>Origin Attribute</u>		
Canada	-0.120	0.149
USA	0.327*	0.150
Australia	-0.387*	0.153
Korea	0.180	0.149
<u>Price Attribute</u>		
40% less than previous	0.705*	0.150
20% less than previous	0.240	0.144
Same as previous	-0.198	0.155
20% more than previous	-0.747*	0.168
<u>Grade Attribute</u>		
Prime - marbling	0.587*	0.144
Choice - modest marbling	0.097	0.151
Choice - small marbling	-0.009	0.151
Select - slight marbling	-0.675*	0.161
<u>Specification Attribute</u>		
Frozen with no custom cuts	0.260**	0.140
Fresh/chilled with no custom cuts	0.152	0.153
Frozen with custom cuts	-0.309**	0.160
Fresh/chilled with custom cuts	-0.103	0.151
Log likelihood function	-338.66	
Pseudo-R ²	0.104	

* indicates statistical significance at the 95% confidence level.

** indicates statistical significance at the 90% confidence level.

Table 3: Results of Log Likelihood Ratio Test: Non-Segmented Model with Price Effects Coded

Hypothesis	Log likelihood function of restricted model (L_R)	Log likelihood function of unrestricted model (L_U)	Chi-Squared statistic*
Ho: All Slope coef. =0	-377.92	-338.66	78.52

* the critical value at the 95% confidence level and 13 degrees of freedom is 22.36.

Table 4: Estimated Results of the Non-linear Logit Model: Non-Segmented Model With Continuous Price Change Variable

Variable	Coefficient Estimate	Standard Error
<u>Origin Attribute</u>		
Canada	-0.14	0.15
USA	0.41*	0.16
Australia	-0.38*	0.15
Korea	0.11	0.15
<u>Price Attribute</u>		
price change	-3.78*	0.44
<u>Grade Attribute</u>		
Prime - marbling	0.62*	0.15
Choice - modest marbling	0.10	0.15
Choice - small marbling	-0.03	0.16
Select - slight marbling	-0.69*	0.16
<u>Specification Attribute</u>		
Frozen with no custom cuts	0.28*	0.14
Fresh/chilled with no custom cuts	0.11	0.16
Frozen with custom cuts	-0.35*	0.17
Fresh/chilled with custom cuts	-0.04	0.15
Log likelihood function	-310.41	
Pseudo-R ²	0.18	

* indicates statistical significance at 95% confidence level.

^a indicates statistical significance at 90% confidence level.

Table 5: Results of Log Likelihood Ratio Test: Non-Segmented Model with Continuous Price Change Variable

Hypothesis	Log likelihood function of restricted model (L_R)	Log likelihood function of unrestricted model (L_U)	Chi-Squared statistic*
Ho: All Slope coef. =0	-377.92	-310.41	67.51

* critical value at 95% confidence level and 10 degrees of freedom is 18.31.

Table 6: Estimated Results of the Non-linear Logit Model for Segmented Model With Continuous Price Change Variable

Variable	non-Korean chef	Korean chefs	Purchasing Managers
<u>Origin Attribute</u>			
Canada ¹	-0.01	0.67 ^a	-0.48*
USA ²	0.87*	0.41	0.39 ^a
Australia ³	0.12	-0.60	-0.74*
Korea ⁴	-0.98*	-0.48	0.83*
<u>Price Attribute</u>			
price change ⁵	-4.46*	-4.98*	-3.56*
<u>Grade Attribute</u>			
Prime - marbling	0.57 ^a	1.58*	0.53*
Choice - modest marbling	-0.14	-0.05	0.23
Choice - small marbling	-0.24	0.10	0.07
Select - slight marbling	-0.20	-1.63*	-0.84*
<u>Specification Attribute</u>			
Frozen with no custom cuts	0.59*	1.00*	0.13
Fresh/chilled with no custom cuts	-0.33	0.29	0.28
Frozen with custom cuts	-0.19	-1.06*	-0.35
Fresh/chilled with custom cuts	-0.06	-0.23	-0.07
Log likelihood function	-273.16		
Pseudo-R ²	0.25		

* indicates statistical significance at 95% confidence level.

^a indicates statistical significance at 90% confidence level.

1. Canadian origin coefficients significantly different between segments (5% prob.)
2. U.S. origin coefficients not significantly different between segment (5% prob.)
3. Australia origin coefficients not different between segments (5% prob.)
4. Korean origin coefficients significantly different between segments (5% prob.)
5. Price coefficients not significantly different between segments (5% prob.)

Table 7: Results of Log Likelihood Ratio Test: Segmented Model With Continuous Price Change Variable

Hypothesis	Log likelihood function of restricted model (L_R)	Log likelihood function of unrestricted model (L_U)	Chi-Squared statistic*
Ho: All Slope coef. =0	-360.34	-273.16	97.20

* critical value at 95% confidence level and 30 degrees of freedom is 43.8.

Table 8: Base Case 1 Simulation Assumptions on Beef Product Choices Between Canada and U.S.

Product features	Choice A	Choice B	Choice C
Country-of-origin	Canada	United States	Neither Choice A nor Choice B
Price	same price as last previous price paid	same price as last previous price paid	
Grade	Equivalent to choice (modest marbling)	Equivalent to choice (modest marbling)	
Product Specification	Frozen with no custom cuts	Frozen with no custom cuts	

Table 9: Probability of Product Choice Under Base Case 1 Levels Given in Table 8

	Canadian Origin	U.S. Origin
<u>Non-segmented Model</u>		
Probability of Choosing Alternative	0.28	0.49
Marginal Probability for -1% price change	0.008	0.009
<u>Non-Korean chef</u>		
Probability of Choosing Alternative	0.26	0.60
Marginal Probability for -1% price change	0.008	0.011
<u>Korean chef</u>		
Probability of Choosing Alternative	0.51	0.39
Marginal Probability for 1% price change	0.012	0.0119
<u>Purchasing Manager</u>		
Probability of Choosing Alternative	0.22	0.53
Marginal Probability for 1% price change	0.006	0.009

Table 10: Canadian Beef Price Change Required to Equalize Probability of Choice: Canada Vs. U.S. (Base Case 1)

	Canadian Price Change Required	Canadian Origin	U.S. Origin
<u>Full Non-segmented Model</u>	-15%		
Probability of Choosing Alternative		0.41	0.41
Marginal Probability for -1% price change		0.009	0.009
<u>Non-Korean chef</u>	-20%		
Probability of Choosing Alternative		0.44	0.44
Marginal Probability for -1% price change		0.011	0.011
<u>Korean chef</u>	5.3%		
Probability of Choosing Alternative		0.44	0.44
Marginal Probability for 1% price change		0.012	0.012
<u>Purchasing Manager</u>	-25%		
Probability of Choosing Alternative		0.40	0.40
Marginal Probability for 1% price change		0.008	0.008

Table 11: Canadian Beef Price Change Required to Equalize Probability of Choice: Canada Vs. Australia (Base Case 1)

	Canadian Price Change Required	Canadian Origin	Australian Origin
<u>Non-segmented Model</u>	6% %		
Probability of Choosing Alternative		0.33	0.33
Marginal Probability for -1% price change		0.011	0.011
<u>Non-Korean chef</u>	-3%		
Probability of Choosing Alternative		0.39	0.39
Marginal Probability for -1% price change		0.011	0.011
<u>Korean chef</u>	26%		
Probability of Choosing Alternative		0.37	0.37
Marginal Probability for 1% price change		0.012	0.012
<u>Purchasing Manager</u>	7%		
Probability of Choosing Alternative		0.29	0.29
Marginal Probability for 1% price change		0.007	0.007

Table 12: Base Case 2 Simulation Assumptions on Beef Product Choices Between Canada and U.S.

Product features	Choice A	Choice B	Choice C
Country-of-origin	Canada	United States	Neither Choice A nor Choice B
Price	same price as last previous price paid	same price as last previous price paid	
Grade	Equivalent to choice (small marbling)	Equivalent to choice (small marbling)	
Product Specification	Frozen with no custom cuts	Frozen with no custom cuts	

Table 13: Probability of Product Choice Under Base Case 2 Levels Given in Table 12

	Canadian Origin	U.S. Origin
<u>Non-segmented Model</u>		
Probability of Choosing Alternative	0.28	0.48
<u>Non-Korean chef</u>		
Probability of Choosing Alternative	0.24	0.59
<u>Korean chef</u>		
Probability of Choosing Alternative	0.52	0.40
<u>Purchasing Manager</u>		
Probability of Choosing Alternative	0.22	0.51

Table 14: Probability of Product Choice Under Base Case 2 Levels With Canadian Beef Grade Equivalent to Choice Modest Marbling

	Canadian Origin	U.S. Origin
<u>Non-segmented Model</u>		
Probability of Choosing Alternative	0.30	0.46
<u>Non-Korean chef</u>		
Probability of Choosing Alternative	0.26	0.57
<u>Korean chef</u>		
Probability of Choosing Alternative	0.48	0.43
<u>Purchasing Manager</u>		
Probability of Choosing Alternative	0.24	0.49

Table 15: Probability of Product Choice Under Base Case 2 Levels With Canadian Beef Grade Equivalent to Prime

	Canadian Origin	U.S. Origin
<u>Non-segmented Model</u>		
Probability of Choosing Alternative	0.42	0.38
<u>Non-Korean chef</u>		
Probability of Choosing Alternative	0.52	0.45
<u>Korean chef</u>		
Probability of Choosing Alternative	0.82	0.14
<u>Purchasing Manager</u>		
Probability of Choosing Alternative	0.30	0.45

Table 16: Canadian Beef Price Change Required to Equalize Probability of Choice: Canada Vs. U.S. with Canadian Grade Equivalent to Choice Modest Marbling (Base Case 2)

	Canadian Price Change Required	Canadian Origin	U.S. Origin
<u>Non-segmented Model</u>	-11%		
Probability of Choosing Alternative		0.40	0.40
<u>Non-Korean chef</u>	-18%		
Probability of Choosing Alternative		0.44	0.44
<u>Korean chef</u>	2%		
Probability of Choosing Alternative		0.45	0.45
<u>Purchasing Manager</u>	-20%		
Probability of Choosing Alternative		0.39	0.39

Figures

Figure 1: Example of Stated Preference Question

Assume that the following choices are the only ones on your next order for grain-fed beef short ribs. Would you choose A, B or would you choose neither?			
Product features	Choice A	Choice B	Choice C
Country-of-origin	Canada	United States	Neither Choice A nor Choice B
Price	20% less than last price paid	40% less than last price paid	
Grade	Equivalent to <i>Prime</i> (marbling: modest)	Equivalent to <i>Select</i> (marbling: slight)	
Product Specification	Frozen with custom cuts	Frozen with custom cuts	
Check only one choice: A: _____ B: _____ C: _____			