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# RURAL ECONOMY

## **Evaluating Québec's Preference for Alberta Beef**

James Unterschultz, Kwamena K. Quagraine and Michel Vincent

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# Staff Paper



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## **Summary: Evaluating Québec's Preference for Alberta Beef**

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The province of Québec is one of the major domestic markets for Alberta beef products. In 1994, Alberta accounted for 54.5% of beef imports into Québec. Other competitors who also supply beef to Québec include Ontario, the US, and Australia/New Zealand. Australia/New Zealand provide mostly manufacturing/ground beef, while Alberta and the US supply higher quality grain fed beef cuts. This study evaluates the preferences for beef quality and beef origin in the Québec wholesaler/retailer trade and in those restaurants serving or specializing in higher quality beef cuts. Stated preference questions, questions that simulate the purchase decision, were asked of managers and owners of seven beef wholesalers/retailers and 22 restaurateurs in the Montréal and Québec city areas. The objectives were to (1) evaluate the importance of product origin on buying decisions in Québec, (2) gather information to develop Alberta beef marketing strategies in Québec, (3) provide a baseline measurement of Québec's preferences for beef from Alberta, US and Ontario for future reference and (4) evaluate stated preference (SPM) research marketing techniques.

Data for the study were obtained from a survey conducted by means of direct interview of 22 restaurateurs and purveyors that serve higher quality beef cuts in the Montréal and Québec city area and 7 beef wholesalers/retailers. These seven wholesalers/retailers are the major buyers of non-manufacturing beef from outside Québec and typically purchase Alberta grade 'A' beef.

### Restaurateur Results

There is a much lower probability of restaurateurs purchasing US beef than Alberta beef given the same meat quality, price, and aging. Several simulations with the estimated models confirm the strength of this potential Alberta brand image over US beef. Beef grade equivalent to 'AAA' is the most preferred by restaurateurs followed by grade equivalent to prime, the highest quality. Beef grade equivalent to 'A' is the least preferred. Beef aged 21 days is preferred to 28 days aging however these differences are not significantly different from zero.

The sample was segmented into the Montréal area and the Québec city area. Both ~~cities~~ areas exhibited similar responses to price changes and product origin. Alberta is preferred over the US as a beef supplier. Regarding beef grade preferences, both segments prefer beef quality equivalent to 'AAA' or prime, while grade 'A' is the least preferred. Restaurateurs in the Montréal area possibly prefer 28 days aging while Québec city area restaurateurs prefer 21 days aging; however these differences are not

significant. There is a very strong preference for non-US beef products and this strongly suggests that Alberta/Canada can price above competing US products. However, caution is advised in interpreting these results since the strong preference for Alberta beef may also be picking up additional service or promotion attributes not directly modeled.

### Wholesalers/Retailers Results

Wholesalers/retailers have a preference for beef from Alberta and the US, and a relatively strong negative preference for beef sourced from Québec or Ontario. Overall Alberta beef is preferred over US beef if respondents are given a choice between similar quality beef but with different origins. This again suggests that branding of Alberta beef is possible. The preferred beef grades are 'A' and 'AA' with a small (but insignificant) preference for 'AA' over 'A'. Higher beef grades are not preferred in aggregate. Regarding shipping specifications, wholesalers/retailers are indifferent to boxed beef versus case ready. Similarly, beef prices over a range of -20% lower to 10% higher does not seem to be an important factor to these buyers. Two explanations seem jointly plausible for a lack of price response. First, wholesalers are in a margin business. The absolute price is much less important than the difference in price between the purchase and selling price. The SPM prices were in terms of absolute price changes. Secondly, the price range in the questions may not have been sufficient to present the respondents with a situation where absolute price levels overcame the importance of margin.

### Marketing Conclusions

Several marketing conclusions can be drawn from this SPM study of beef marketing in Québec. The marketing suggestions will be discussed separately for restaurateurs and then for wholesalers/retailers.

*Restaurateurs* Aside from the importance of price, the SPM results indicate several positive aspects for the Alberta beef industry. Given a choice of Alberta beef or US beef, restaurateurs will choose Alberta beef. Thus, there is a strong possibility that Alberta could brand its beef. The branding could occur strictly at the restaurateur level or at the consumer level.

Quality is important in this market. The respondents in aggregate are choosing the top quality beef. There may be a market for the new grade of beef, Canada Prime. Montréal in aggregate would already be choosing Canada Prime over 'AAA' if this product were offered at the same price as 'AAA'. It may even be possible to extract a slight price premium for Canada Prime. Québec city, may still in aggregate prefer 'AAA' to Canada Prime. This preference for 'AAA' could be due to different tastes or due to a lack of knowledge about Canada Prime. Alberta beef marketers should note that the wholesaler/retailer market did not express a preference for this higher quality beef. This strongly suggests

that the Alberta beef industry needs to target this specific segment directly and cannot depend on the wholesaler/retailer to develop or maintain this market. Aging does not appear to be an overriding issue at this time as long as the beef is aged for at least 21 days but Montréal may prefer slightly longer aging periods.

*Wholesalers/retailers:* Wholesalers/retailers are much less sensitive to price than are the restaurateurs discussed above. So competing on price is not as important a factor in this particular market but further market research is warranted to evaluate this conclusion. The market prefers grade 'A' and in particular grade 'AA' beef overall. This confirms that this is still a strong market for Alberta grade 'A' beef but that further emphasis should be placed on providing grade 'AA' beef for this market rather than just grade 'A'. This particular market definitely prefers beef from Alberta over either beef from Québec or Ontario. This may in part be related to greater reliability of supply from Alberta over these other two provinces. Beef from the United States is not preferred to Alberta beef but US beef is preferred to local Québec beef supplies.

Beef processors in Alberta are debating the move to case ready beef products versus boxed beef. The Québec market appears to be indifferent to the issue at this time. If there are significant advantages to case ready, the Québec wholesalers/retailers remain to be convinced. Therefore, marketing/education efforts are required if case ready is going to be accepted in this market.

#### Stated Preference Methodology Conclusions

The stated preference methodology provides useful information even in these relatively smaller sample sizes. The restaurateurs serving higher quality beef cuts had little or no difficulty in answering stated preference questions. The SPM provided a measure of the importance of beef-origin, aging and quality desired. Furthermore, the method was able to segregate the results by two locations; Montréal and Québec City. Differences in beef preferences exist in these two markets. The wholesalers/retailers response to the SPM was more neutral although they all answered the questions. The sample size was smaller since there are relatively fewer players in this market segment. Despite the small sample, SPM was able to confirm their preference for grades 'A' and 'AA' and their relative indifference to price changes over small intervals. In particular the SPM also provided a measure of the importance of beef-origin and strongly suggests that Alberta has a strong positive image in these market segments.

# Evaluating Québec's Preference for Alberta Beef

## *Introduction*

The province of Québec is one of the major domestic markets for Alberta beef products. In 1994, Alberta accounted for 54.5% of beef imports into Québec (Québec Agriculture - MAPAQ 1996; Alberta Agriculture , 1996). Other competitors who also supply beef to Québec include Ontario, the US, and Australia/New Zealand. In 1994, these sources accounted for 15.9%, 12.4% and 17.2%, respectively of imports into Québec (Québec Agriculture - MAPAQ 1995). Australia/New Zealand provide mostly manufacturing/ground beef, while Alberta and the US supply higher quality grain fed beef cuts. Québec emphasizes dairy production and places much less emphasis on beef production. In Québec, domestic beef production supplies about 20% of the total provincial market.

Imports of beef from Alberta and the US have substantially increased during the past 10 years at the expense of other Canadian provinces. For example, in 1986, 43.2% of beef imports came from Alberta, 1% came from the US, 5.1% came from Australia/New Zealand and 50.7% came from other provinces such as Saskatchewan, Manitoba and Ontario (Québec Agriculture - MAPAQ 1995; Alberta Agriculture, 1996). The decrease in beef trade with other provinces has mainly affected Saskatchewan and Manitoba. This leaves the US and Ontario as the major competitors to Alberta beef.

Québec's average imports of Alberta beef for the past five years were about 134,379 tonnes annually. This is comprised of about 80% boxed beef destined for the large retail chains and about 20% carcass beef destined mainly for meat shops and smaller grocery stores. Alberta mainly ships fresh steer grade 'A' to the retail market and grade 'AA' and 'AAA' to the hotel and restaurant market. The main buyers of Alberta beef are seven Québec wholesalers or combined wholesalers/retailers and two purveyors for the restaurant sector.

The Alberta beef industry, the largest producer of beef in Canada, plans to maintain or increase its share of the overall Québec beef market and if possible, increase its share in selected market segments. The Alberta beef industry is currently undergoing a major expansion in processing capacity. However, the Québec market is geographically more distant from Alberta than beef suppliers in the US or Ontario. The predominantly French Canadian population in Québec also presents unique marketing challenges with respect to potentially different consumer tastes, consumer preferences for product origin and other factors. These factors need to be evaluated by an Alberta industry that is exploring different methods of marketing



beef; including branding beef by origin and supplying case ready beef products. As well Alberta produces large volumes of grade<sup>1</sup> 'A' beef and Québec is Alberta's major market that prefers this leaner grade.

This study evaluates the preferences for beef quality and beef origin in the Québec wholesaler/retailer trade and in those restaurants serving or specializing in higher quality beef cuts. In the case of the wholesaler/retailers, they represent almost 100% of the relevant market for Alberta's grade 'A' type beef. Stated preference questions were asked of managers and owners of seven beef wholesalers/retailers and 22 restaurateurs and purveyors in the Montréal and Québec city areas. Owners and managers of these companies are the main decision makers with respect to beef purchases. A graduate student fluent in both French and English conducted personal structured interviews in June of 1996. Specifically, the objectives of the study were:

1. to evaluate the importance of product origin on buying decisions in Québec in two different market segments; the wholesaler/retailer sector and the restaurant sector serving higher quality beef cuts.
2. to gather information that may be used in developing marketing strategies to maintain or increase Alberta's market share in Québec.
3. to provide a baseline measurement of Québec's preferences for beef from Alberta, US and Ontario in order to be able to measure the effectiveness of any future marketing campaign in Québec.
4. to evaluate stated preference research techniques for gathering and analyzing market research data.

The methodology used in the study is outlined next. This includes an outline of the stated preference method, analytical framework, data, estimation procedure and estimated models. Stated preference survey results are then presented and evaluated. The concluding sections of the paper give suggestions for market research, an evaluation of the stated preference method employed in this study and some suggestions for marketing strategies in the Québec market.

### ***Stated Preference Model***

The stated preference method (SPM) is a relatively new method for evaluating consumer choice. This section first provides background on SPM and its value in exploring hypothetical market questions. The SPM, also referred to as experimental or stated choice analysis, involves asking respondents to

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<sup>1</sup> Canada's beef grades relevant to this study are AAA which is equivalent to the United States Department of Agriculture (USDA) grade Choice (marbling: small to modest plus); AA which is equivalent to Select (marbling: slight); and A which is equivalent to standard (marbling: trace). Canada in 1996 is introducing a grade, Canada Prime (also referred to in this study as AAAA), which will be equivalent to USDA Prime (marbling: slightly abundant). While these grades are equivalent they are not necessarily equal since there are differences in other quality factors used in grading by the two countries.

simulate discrete choice behavior. Questions are put in a behavioral choice context: "if you were to have product alternatives characterized by these particular attributes available to you, which one would you choose?". 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; 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 it is cheap to apply. Louviere (1994), suggests that the SPM has good predictive ability of future choices.

A possible disadvantage of this technique is that peoples' stated preferences may not fully reflect actual behavior. 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.

The SPM is based on economic principles whereby choices of products which embody bundles of attributes are modeled 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  $U_{in}$  = person  $n$ 's utility of choosing alternative product  $i$ ,

$V$  = the indirect utility function associated with the alternative,

$X_{in}$  = a vector of attribute values for alternative  $i$  as viewed by respondent  $n$ , and

$\epsilon_{in}$  = a random element associated with errors in preferences 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  $\epsilon_{in}$  respectively. From this perspective, the choice probability of alternative  $i$  ( $P_n(i)$ ) 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,  $\epsilon_{in}$  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  $i$ ,

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

$\beta_1, \beta_2$  to  $\beta_k$  are coefficients to be estimated.

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

### ***Empirical Model And Data Description***

For this study of hypothetical purchase decisions by Québec wholesalers/retailers and restaurateurs, 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 on beef purchasing decision attributes was done through meetings with Alberta beef processors, industry representatives and government experts on the beef trade. Also, published market research findings such as Menkhaus et al. (1988, 1991 and 1993), Capps et al. (1988), Pelzer et al. (1991) and Schmitz and Nayga (1991) identified important beef product factors and levels. The factors identified as major attributes in the decision to purchase beef include the origin of the beef product, its price, the product quality or grade, shipping specification, and aging. Separate factors and levels are specified for wholesalers / retailers and also separate factor levels for restaurants (see Table 1 for the respective factor levels).

The factors and the levels presented in Table 1 were used to design a fractional factorial experiment with orthogonal main effects. This resulted in a total of thirty-two questions each for wholesalers/retailers and restaurateurs. The questions were blocked into two sets of 16 questions and one block was incorporated into each questionnaire resulting in two versions of each questionnaire. Hence there were two versions of questionnaires for wholesalers/retailers and two versions of questionnaires for restaurateurs. Each question gives 3 choice alternatives involving different beef product profiles. Appendices I and II provide examples of questions for wholesalers/retailers and restaurateurs respectively. 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. This design is typical for this type of survey. Dummy variables (-1, +1) are used to effects code the attribute levels so that the base alternative is exactly equal to the origin (see Louviere 1988 for a detailed discussion on effects coding). The last level of each attribute is omitted during estimation to avoid singularity and for every occurrence of the omitted variable, the included variables take on a value of -1.

Using equation (4), a non-nested<sup>2</sup> multinomial logit model for wholesalers/retailers and a nested multinomial logit model for restaurants are specified and analyzed. In a non-nested logit structure, it is assumed that there is only one level of decision-making in the buyers’ beef purchase decision process based on the product attributes, i.e. factor descriptions. The assumption is that the descriptions of the factors affect a buyer’s perceptions of beef and ultimately translate into a decision to purchase or not to purchase. In a nested structure however, it is assumed that there are two levels of the decision making process. A buyer first decides to purchase or not to purchase; a decision not based on the factor descriptions. However, after the decision to purchase has been taken, then based on the factor descriptions i.e. product attributes, the buyer chooses from the available product alternatives. The data set is analyzed based on these choices.

Data for the study were obtained from a survey conducted by means of direct interview of 22 restaurateurs and 7 beef wholesalers/retailers in the Montréal area and Québec city area. These seven wholesalers/retailers are the major buyers of non-manufacturing beef from outside Québec. They have typically been major purchasers of Alberta grade ‘A’ beef. The restaurateurs represent establishments that serve beef cuts that would be of higher quality than grade ‘A’. The survey instrument was translated into French. Respondents had the option of answering the questions in French or English although the majority responded in French.

For restaurateurs, the data for the entire sample size of 352 responses is initially analyzed as Model 1. The model is then rerun segmenting for location for restaurateurs in the Montréal area and also for restaurateurs in Québec city area (Model 2). The purpose is to analyze the differences in preferences of each group. The sample size drops to 176 responses each for restaurateurs in Montréal and Québec city

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<sup>2</sup> The models were formally tested for nesting structures and nesting was not rejected for the restaurateurs.

areas. Both Models 1 and 2 are run using a continuous price variable. Detailed information on the preferences and stated choices of each segment may be valuable in targeting marketing strategies directly at these specific groups in Québec. Finally, for restaurants, the estimated models are used to assess a monetary valuation or price of the product origin of beef under specific assumptions. This “price” represents the dollar value of the beef exporter’s brand image relative to a competitor’s beef. For wholesalers/retailers the model is not segmented due to the sample size (112 responses). The wholesalers/retailers model is first run with effects coded price variables (Model 3) and then with a continuous price variable (Model 4). The non-linear logit procedure of the statistical program Limdep 7.0 (Greene, 1995 ) was used for estimation of the multinomial logit models. A summary of the estimated models are as follows:

**Model 1: Restaurateurs: Combined Model with Continuous Price Variable**

$$V(A) = V(B) = \beta_1 Price + \sum_{k=1}^4 \beta_{2k} Grade_k + \sum_{k=1}^2 \beta_{3k} Aging_k + \sum_{k=1}^4 \beta_{4k} Origin_k + \varepsilon \quad (5)$$

where  $V(A)$  and  $V(B)$  = utility of choosing alternatives  $A$  and  $B$ ,

Price = a continuous price variable,

Grade<sub>k</sub> = beef grade level  $k$  indicator variables,

Aging<sub>k</sub> = aging of beef product level  $k$  indicator variables.

Origin<sub>k</sub> = product origin level  $k$  indicator variables, and

$\varepsilon$  = error term.

$\beta_1$  to  $\beta_{4k}$  are coefficients to be estimated.

**Model 2 Restaurateurs: Segmented Model with Continuous Price Variables**

$$V_l(A) = V_l(B) = \beta_{1l} Price_l + \sum_{k=1}^4 \beta_{2kl} Grade_{kl} + \sum_{k=1}^2 \beta_{3kl} Aging_{kl} + \sum_{k=1}^4 \beta_{4kl} Origin_{kl} + \varepsilon_l \quad (6)$$

where  $l$  = Montréal or Québec City

All other variables are as previously defined. The two locations are jointly estimated to test for differences between the two cities.

**Model 3: Wholesalers/Retailers: Effects Coded Price Variables**

$$V(A) = V(B) = \sum_{k=1}^4 \beta_{1k} Price_k + \sum_{k=1}^4 \beta_{2k} Grade_k + \sum_{k=1}^2 \beta_{3k} Spec_k + \sum_{k=1}^4 \beta_{4k} Origin_k + \varepsilon \quad (7)$$

where Price<sub>k</sub> = effects coded price variable level  $k$  and

$Spec_k =$  shipping specification level  $k$

**Model 4: Wholesalers/Retailers:Continuous Price Variables**

$$V(A)=V(B) = \beta_1 Price + \sum_{k=1}^4 \beta_{2k} Grade_k + \sum_{k=1}^2 \beta_{3k} Spec_k + \sum_{k=1}^4 \beta_{4k} Origin_k + \epsilon \quad (8)$$

All variables are as previously described. Levels for each factor are presented in Table 1.

The model results are discussed next.

***Results and Discussion of Results***

Two separate data sets were collected. The smaller data set includes the responses by the wholesalers/retailers. The larger data set are the responses by the restaurateurs. Each data set is analyzed separately using the models previously described. Observations by the interviewer indicate that the restaurateurs had no difficulty answering the questions and found the questions relevant. The wholesalers/retailers found the task more difficult and several respondents suggested that they deal in many different beef qualities, thus making it harder to make hypothetical choices. The discussion begins with the analysis of the restaurateur’s responses.

**Restaurateurs:**

The stated preference results from the combined model (model 1) with continuous price variable are presented in Tables 2 and 3. This model assumes that the respondents are homogenous. The coefficient estimates express the relative effects of the attributes on the probability of a buyer choosing either alternative A or B based on the specific attribute level. For example, a negative coefficient on price implies that a positive price change decreases the probability of that product being chosen. The inclusive value is significantly different from one indicating a nesting structure in the decision process. The log likelihood ratio statistic (Table 3) indicates that the attributes examined in the model are jointly important. The pseudo-R<sup>2</sup> value is 0.16 (Table 2), a reasonable fit for this type of model.

Results from the combined model (model 1) reveal that beef of Alberta origin has a significant positive effect on buyer’s utility. The product attribute of product of Alberta significantly increases the probability that buyers will purchase the beef products. Beef products from the US have a significant negative effect on buyers’ utility. There is a lower probability of a buyer purchasing beef from the US than from Alberta given the same meat quality, price, and aging. These probability results are presented later.

The price effect from Table 2 indicates that lower prices increase buyers' utility. Product grade is also an important factor affecting utility. The estimated coefficients on higher beef grades have a positive sign while the lowest grade has a negative sign. Beef grade equivalent to 'AAA' is the most preferred followed by grade equivalent to prime, the highest quality. Beef grade equivalent to 'A' is the least preferred. These results confirm that these establishments utilize higher quality beef and indicates to Alberta beef marketers the type of beef quality required for this market segment. Estimated coefficients on aging of the product indicate that 21 days is preferred to 28 days however these coefficients are not significantly different from zero.

Model 2 segments the sample into restaurateurs in the Montréal area and restaurateurs in Québec city area. Montréal is generally viewed as more cosmopolitan in its ethnic background. Thus all right hand variables are interacted with dummy variables representing these two segments in order to evaluate differences in responses between groups. The results are reported in Tables 4 and 5.

Both segments exhibit similar responses to price changes and product origin. For the two segments, estimated coefficients on price and origin are not significantly different from each other at the 10% level of significance. Restaurateurs in both areas have similar attitudes to price and product origin. Alberta is preferred as a beef supplier over beef from the US.

Regarding beef grade preferences, both segments prefer beef quality equivalent to 'AAA' or prime, while grade 'A' is the least preferred. Estimated coefficients on these grades are statistically significant for Québec city. For the prime grade there is no statistically significant difference between estimated coefficients for the two segments but for grade 'A', there is some statistical significant difference. Restaurateurs in the Québec city area strongly reject grade 'A' beef more than restaurateurs in the Montréal area. The two segments also differ in their response to aging. While restaurateurs in the Montréal area possibly preferred 28 days aging, restaurateurs in Québec city area preferred 21 days aging. The Québec aging coefficients are significantly different from 0 and differences between the estimated coefficients by location are statistically significant at the 10% significance level (Table 4). Montréal may be a market that in aggregate, prefers more aging on their beef products.

These restaurateur models are next used to estimate probabilities of product choice and used to value product-origin. For example, if Québec restaurateurs were offered exactly the same quality beef product from Alberta and the US, the models presented here can be used to determine which product is most likely to be chosen. Using an Alberta perspective, we can then ask by how much would prices of the US product have to change to give an equally likely chance of Alberta beef being chosen versus beef from the US. This price change represents an estimate of the dollar value of the relative brand image of beef by

origin and assesses the possibilities for branding Alberta beef. A similar analysis could also be conducted from the viewpoint of the US.

Simulations were conducted by comparing Alberta beef to US beef. Tables 6 to 9 examine 4 cases or scenarios. The attribute levels chosen represent a reasonable high quality beef product and were picked based on the background information and prior model results. Case 1 compares two beef products of the same quality but one of Alberta origin and the other of US origin. Both products are of grade 'AAA' with the other attribute levels reported in Table 6. For case 1 the probability of choosing a beef product from Alberta is about 6 times more than the probability of choosing a beef product from the US. Consequently, for buyers to have the same probability of choosing an Alberta product versus a US product of equivalent quality, the US has to reduce the price of its product by about -40%. This is the case for the entire sample as well as the segmented samples. There is a very strong preference for non-US beef products which strongly suggests that Alberta/Canada can price above competing US products. However, caution is advised in interpreting these results as the actual price difference that could prevail in the market since the strong preference for Alberta beef may also be picking up additional service or promotion attributes not directly modeled.

In case 2 a comparison is also made for similar beef products to case 1 but with 28 days aging. The probability of choosing a product from Alberta is again higher than the probability of choosing a product from the US (see Table 7). For the aggregate restaurateurs, a price change of about -41% is required for US beef products before they are indifferent between the two products. Case 3 and case 4 compare a lower quality beef from Alberta to a higher quality beef product from the US (Tables 8 and 9). Results indicate that, despite the relatively lower quality beef from Alberta, there is a higher probability of buyers choosing a product from Alberta over a US product. Again this is suggestive of the potential brand strength for Alberta beef. Alberta beef suppliers should be very cautious about interpreting these results as suggesting that they could supply a much lower quality beef product than US suppliers and remain competitive over time. Overall, in both the combined and segmented models, buyers prefer Alberta beef to US beef. Many different alternatives could be evaluated using these models.

### Wholesalers/Retailers:

Results from the wholesalers/retailers model are presented in Tables 10, 11, 12 and 13. The results indicate that wholesalers and retailers also have a preference for beef from Alberta and the US. Estimated coefficients on these product sources are positive and for Alberta, the coefficient is statistically significant. The Alberta coefficient is significantly different from the US coefficient (Table 12). Estimated



coefficients on beef sourced from Québec and Ontario have a negative sign implying less preference for beef from these sources. The estimated coefficient on Québec is statistically significant and negative.

Grade is also an important factor to beef wholesalers/retailers in Québec. Results indicate that they prefer lower beef grades to higher grades. Estimated coefficients on grades 'A' and 'AA' have a positive sign while estimated coefficients on the higher grades 'AAA' and 'prime' have a negative sign. Grade 'AA' is the most preferred while 'prime' is the least preferred. The model reflects the current reality that much of the beef shipped to Québec via the major wholesalers/retailers is very lean beef.

Regarding shipping specifications, wholesalers/retailers are indifferent to boxed beef versus case ready. Although the estimated coefficient on case ready is positive, none of these coefficients are statistically significant. Similarly, price of the product does not seem to be an important factor to these buyers. For the continuous price variable, the estimated coefficient is positive but not significant (Table 12) however when the price is effects coded (Table 10) the signs are as expected but none are significant.

Superficially, the positively insignificant price coefficient (Table 12) seems contrary to economic logic. Two explanations seem jointly plausible for such a result. First, wholesalers are in a margin business. The absolute price is much less important than the difference in price between the purchase and selling price. The SPM prices were in terms of absolute price changes. Secondly, the price range in the questions may not have been sufficient to present the respondents with situations where absolute price levels overcame the importance of margin.

These results suggest a positive image for Alberta beef in Québec among wholesalers/retailers. Thus opportunities may exist for the Alberta beef industry to brand its products to distinguish it from beef from the other sources. This strategy is likely to enhance Alberta's edge over the US or even other provinces as a supplier of quality beef products of all grades.

## ***Marketing Suggestions***

Several marketing conclusions can be drawn from this SPM study of beef marketing in Québec. The marketing suggestions will be discussed separately for restaurateurs and then for wholesalers/retailers.

### **Restaurateurs**

Aside from the importance of price, the SPM results indicate several positive aspects for the Alberta beef industry. Given a choice of Alberta beef or US beef, restaurateurs will choose Alberta beef. Thus, there is a strong possibility that Alberta could brand its beef. The branding could occur strictly at the restaurateur level and/or at the consumer level. Further research would be required to determine which level should be targeted for branding beef. The simulations indicate that very strong price reductions would

be required by the US to have US beef chosen over Alberta beef. Therefore information is required on why US market share has increased in recent years. Other work associated with this survey suggests that Alberta is unable to always supply the desired quantity and quality year round, whereas the US is able to supply beef quality and quantities as required. This same observations also applies to the wholesalers/retailers market.

Quality is important in this market. The respondents in aggregate are choosing the top quality beef. There may even be a market for the new grade of beef, Canada Prime. Montréal in aggregate would already be choosing Canada Prime over 'AAA' if this product were offered at the same price as 'AAA'. It may even be possible to extract a slight price premium for Canada Prime. Québec city, may still in aggregate prefer 'AAA' to Canada Prime. This preference for 'AAA' could be due to different tastes or due to a lack of knowledge about Canada Prime. Alberta beef marketers should note that the wholesaler/retailer market did not express a preference for this higher quality beef. This strongly suggests that the Alberta beef industry needs to target this specific segment directly and cannot depend on the wholesaler/retailer to develop or maintain this market. Aging does not appear to be an overriding issue at this time as long as the beef is aged for approximately 21 days however Montréal may prefer slightly longer aging periods.

## Wholesalers/retailers

Wholesalers/retailers are much less sensitive to price than are the restaurateurs discussed above. Thus competing on price is not as important a factor in this particular market but further market research is warranted to evaluate this conclusion. As well, nesting was not detected in this model. Adding other beef choice alternatives would not significantly change the results.

The market prefers grade 'A' and in particular grade 'AA' beef overall. This confirms that wholesalers and retailers are still a strong market for Alberta grade 'A' beef but that further emphasis should be placed on producing grade 'AA' beef for this market rather than just grade 'A'. This particular market definitely prefers beef from Alberta over either beef from Québec or Ontario. This may in part be related to greater reliability of supply from Alberta over these other two provinces. Beef from the United States is not preferred to Alberta beef but US beef is preferred to local Québec beef supplies.

Beef processors in Alberta are debating the move to case ready beef products versus boxed beef. The Québec market appears to be indifferent to the issue at this time. If there are significant advantages to case ready, the Québec wholesalers/retailers remain to be convinced. Therefore, marketing and education efforts are required if case ready is going to be accepted in this market.

## **Conclusions**

The study used a stated preference methodology to examine the beef preferences of Québec beef wholesalers and Québec restaurateurs serving higher quality beef cuts. The objective is to evaluate the importance of product origin on buying decisions and to gather information that may be used in developing marketing strategies to increase Alberta's market share of beef exports to Québec. The study finds that beef from Alberta is the most preferred by restaurateurs, wholesalers and retailers. For wholesalers and retailers, beef from the US is preferred to beef from either Ontario or Québec. They also prefer beef grades 'A' and 'AA'. The scenarios comparing beef from Alberta versus beef from the US, indicates the potential for developing an Alberta brand image.

The stated preference methodology provides useful information even in these relatively smaller sample sizes. The restaurateurs serving higher quality beef cuts had little or no difficulty in answering stated preference questions. The SPM provided a measure of the importance of beef-origin, aging and quality desired. Furthermore, the method was able to segregate the results by two locations; Montréal and Québec City. Differences in beef preferences exist in these two markets.

The wholesalers/retailers response to the SPM was more neutral although they all answered the questions. The sample size was smaller since there are relatively fewer players in this market segment. Despite the small sample, SPM was able to confirm their preference for grades 'A' and 'AA' and their relative indifference to price changes over small intervals. Furthermore, the market still appears to be indifferent to case ready versus boxed beef. In particular the SPM also provided a measure of the importance of beef-origin and strongly suggests that Alberta has a strong image in this market segment. Therefore, the SPM does provide valuable information that can be used to improve knowledge about target markets and help in designing marketing campaigns.

**Table 1: Factor Levels/Descriptions**

<b>ATTRIBUTE</b>	<b>LEVEL 1</b>	<b>LEVEL 2</b>	<b>LEVEL 3</b>	<b>LEVEL 4</b>
<b><u>WHOLESALEERS &amp; RETAILERS</u></b>				
<b>PRICE</b>	10% more than last price paid	same price as last price paid	10% less than last price paid	20% less than last price paid
<b>GRADE</b>	Equivalent to A	Equivalent to AA	Equivalent to AAA	Equivalent to US Prime (proposed AAAA)
<b>SHIPPING SPECIFICATION</b>	Case ready	Boxed beef	-	-
<b>ORIGIN</b>	Alberta	Québec	Ontario	USA
<b>RESTAURANTS</b>				
<b>PRICE</b>	10% more than last price paid	same price as last price paid	10% less than last price paid	20% less than last price paid
<b>GRADE</b>	Equivalent to A	Equivalent to AA	Equivalent to AAA	Equivalent to US Prime (proposed AAAA)
<b>AGING</b>	21 days	28 days	-	-
<b>ORIGIN</b>	Alberta	USA	-	-

**Table 2: Estimated Results of the Nested Logit Model for Restaurateurs:  
Non-Segmented Model with Continuous Price Change Variable**

Variable	Coefficient Estimate	Standard Error
<b>Price Attribute</b>		
Price change	-4.139**	1.198
<b>Grade Attribute</b>		
Equivalent to A	-1.084**	0.195
Equivalent to AA	0.022	0.202
Equivalent to AAA	0.575**	0.174
Equivalent to US prime	0.488**	0.214
<b>Aging Attribute</b>		
21 days	0.078	0.114
28 days	-0.078	0.114
<b>Origin Attribute</b>		
Alberta	0.861**	0.135
US	-0.861**	0.135
<b>Inclusive Values</b>		
Purchase	0.477**	0.095
Non-Purchase	1.000	(fixed parameter)
<b>Log likelihood Function</b>	-331.18	
<b>Pseudo-R<sup>2</sup></b>	0.16	

\*\* indicates statistical significance at 95% confidence level

**Table 3: Results of Log Likelihood Ratio Test for Restaurateurs:  
Non-Segmented Model with Continuous Price Change Variable**

Hypothesis	Log Likelihood Function of Restricted Model (L <sub>R</sub> )	Log Likelihood Function of Unrestricted Model (L <sub>U</sub> )	$\chi^2$ Statistic*
H <sub>0</sub> = All Slope coefficients=0	-394.40	-331.18	126.43

\* the critical value at the 95% confidence level and 7 degrees of freedom is 14.07.

**Table 4: Estimated Results of the Nested Logit Model for Restaurateurs:  
Segmented Model with Continuous Price Change Variable**

Variable	Montréal	Québec City
<b>Price Attribute</b>		
Price change <sup>3</sup>	-3.718**	-5.638**
<b>Grade Attribute</b>		
Equivalent to A <sup>1</sup>	-0.786**	-1.735**
Equivalent to AA <sup>3</sup>	-0.125	0.239
Equivalent to AAA <sup>2</sup>	0.354	0.991**
Equivalent to US prime <sup>3</sup>	0.556*	0.505
<b>Aging Attribute</b>		
21 days <sup>2</sup>	-0.141	0.342*
28 days <sup>2</sup>	0.141	-0.342*
<b>Origin Attribute</b>		
Alberta <sup>3</sup>	0.761**	1.119**
US <sup>3</sup>	-0.761**	-1.119**
<b>Inclusive Value</b>		
Purchase	0.426**	
Non-purchase	1.000 (fixed parameter)	
<b>Log likelihood Function</b>	-326.58	
<b>Pseudo-R<sup>2</sup></b>	0.17	

\*\* indicates statistical significance at 95% confidence level

\* indicates statistical significance at 90% confidence level

<sup>1</sup> estimated coefficients significantly different between Montréal and Québec city (5% probability)

<sup>2</sup> estimated coefficients significantly different between Montréal and Québec city (10% probability)

<sup>3</sup> estimated coefficients not significantly different between Montréal and Québec city (10% probability)

**Table 5: Results of Log Likelihood Ratio Test for Restaurateurs:  
Segmented Model with Continuous Price Change Variable**

Hypothesis	Log Likelihood Function of Restricted Model (L <sub>R</sub> )	Log Likelihood Function of Unrestricted Model (L <sub>U</sub> )	$\chi^2$ Statistic*
H <sub>0</sub> = All Slope coefficients=0	-394.40	-326.58	135.65

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

**Table 6: Comparison of Alberta versus US - Case 1**

<b>Product Profile</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Price	same as previous price paid	same as previous price paid
Grade	AAA	AAA
Aging	21 days	21 days
Product Origin	Alberta	USA
<b>Probability of Choice</b>		
All sample	0.586	0.105
Montréal	0.522	0.114
Québec city	0.697	0.074
<b>US price change required</b>		
All sample		-41.6%
Montréal		-40.9%
Québec city		-39.7%
<b>Probability of choice after price change</b>		
All sample	0.371	0.371
Montréal	0.345	0.345
Québec city	0.409	0.409

**Table 7: Comparison of Alberta versus US - Case 2**

<b>Product Profile</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Price	same as previous price paid	same as previous price paid
Grade	AAA	AAA
Aging	28 days	28 days
Product Origin	Alberta	USA
<b>Probability of Choice</b>		
All sample	0.572	0.102
Montréal	0.547	0.119
Québec city	0.641	0.068
<b>US price change required</b>		
All sample		-41.6%
Montréal		-40.9%
Québec city		-39.7%
<b>Probability of choice after price change</b>		
All sample	0.363	0.363
Montréal	0.359	0.359
Québec city	0.382	0.382



**Table 8: Comparison of Alberta versus US - Case 3**

<b>Product Profile</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Price	same as previous price paid	same as previous price paid
Grade	equivalent to AAA	equivalent to US prime (proposed AAAA)
Aging	21 days	21 days
Product Origin	Alberta	USA
<b>Probability of Choice</b>		
All sample	0.592	0.097
Montréal	0.506	0.135
Québec city	0.721	0.047
<b>US price change required</b>		
All sample		-43.7%
Montréal		-35.5%
Québec city		-48.3%
<b>Probability of choice after price change</b>		
All sample	0.371	0.371
Montréal	0.345	0.345
Québec city	0.409	0.409

**Table 9: Comparison of Alberta versus US - Case 4**

<b>Product Profile</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Price	same as previous price paid	same as previous price paid
Grade	equivalent to AA	equivalent to US prime (proposed AAAA)
Aging	21 days	21 days
Product Origin	Alberta	USA
<b>Probability of Choice</b>		
All sample	0.499	0.142
Montréal	0.420	0.181
Québec city	0.619	0.086
<b>US price change required</b>		
All sample		-30.3%
Montréal		-22.6%
Québec city		-35.0%
<b>Probability of choice after price change</b>		
All sample	0.344	0.344
Montréal	0.319	0.319
Québec city	0.379	0.379

**Table 10: Estimated Results of the Non-Nested Logit Model for Wholesalers/Retailers with Price Effects Coded**

Variable	Coefficient Estimate	Standard Error
<b>Price Attribute</b>		
20% less than previous	0.165	0.282
10% less than previous	0.433	0.281
Same as previous	-0.347	0.289
10% more than previous	-0.251	0.297
<b>Grade Attribute</b>		
Equivalent to A	0.354	0.287
Equivalent to AA	0.711**	0.269
Equivalent to AAA	-0.332	0.296
Equivalent to US prime	-0.733**	0.308
<b>Shipping Specification Attribute</b>		
Case Ready	0.040	0.163
Boxed Beef	-0.040	0.163
<b>Origin Attribute</b>		
Alberta <sup>a</sup>	1.396**	0.293
Québec	-1.151**	0.324
Ontario	-0.378	0.293
US	0.132	0.280
<b>Log likelihood Function</b>	-101.13	
<b>Pseudo-R<sup>2</sup></b>	0.18	

\*\* indicates statistical significance at 95% confidence level

<sup>a</sup> Alberta is significantly different from the US at 95% confidence level.

**Table 11: Results of Log Likelihood Ratio Test for Wholesalers/Retailers with Price Effects Coded**

Hypothesis	Log Likelihood Function of Restricted Model (L <sub>R</sub> )	Log Likelihood Function of Unrestricted Model (L <sub>U</sub> )	$\chi^2$ Statistic*
H <sub>0</sub> = All Slope coefficients=0	-123.04	-101.13	43.82

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

**Table 12: Estimated Results of the Non-Nested Logit Model for Wholesalers/Retailers with Continuous Price Change Variable**

Variable	Coefficient Estimate	Standard Error
<b>Price Attribute</b>		
Price change	1.061	1.438
<b>Grade Attribute</b>		
Equivalent to A	0.364	0.281
Equivalent to AA	0.723**	0.265
Equivalent to AAA	-0.333	0.298
Equivalent to US prime	-0.755**	0.313
<b>Shipping Specification Attribute</b>		
Case Ready	0.008	0.163
Boxed Beef	-0.008	0.163
<b>Origin Attribute</b>		
Alberta <sup>a</sup>	1.399**	0.293
Québec	-1.144**	0.326
Ontario	-0.394	0.293
US	0.139	0.274
<b>Log likelihood Function</b>	-102.72	
<b>Pseudo-R<sup>2</sup></b>	0.17	

\*\* indicates statistical significance at 95% confidence level

<sup>a</sup> Alberta is significantly different from the US at 95% confidence level.

**Table 13: Results of Log Likelihood Ratio Test for Restaurateurs: Non-Segmented Model with Continuous Price Change Variable**

Hypothesis	Log Likelihood Function of Restricted Model (L <sub>R</sub> )	Log Likelihood Function of Unrestricted Model (L <sub>U</sub> )	$\chi^2$ Statistic*
H <sub>0</sub> = All Slope coefficients=0	-123.04	-102.72	40.59

\* the critical value at the 95% confidence level and 8 degrees of freedom is 15.51.

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**Appendix I:**

**Sample Question for Restaurateurs**

**QUESTIONS**

Assume that on your next order of beef the following alternative beef products are available to choose from. Considering the various attributes of beef such as price, grade, aging and origin, which one of the alternatives, A to C, presented in the scenarios following are you most likely to choose?

**SCENARIO 1**

PRODUCT ATTRIBUTE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Price</b>	same as last price paid	10% less than last price paid	Neither A or B is chosen
<b>Grade</b>	Equivalent to US prime (proposed AAAA)	Equivalent to AAA	
<b>Aging</b>	21 days	21 days	
<b>Product origin</b>	Alberta	Alberta	
<b>I would choose</b>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>

**SCENARIO 2**

PRODUCT ATTRIBUTE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Price</b>	same as last price paid	20% less than last price paid	Neither A or B is chosen
<b>Grade</b>	Equivalent to A	Equivalent to AA	
<b>Aging</b>	21 days	21 days	
<b>Product origin</b>	Alberta	USA	
<b>I would choose</b>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>

**SCENARIO 3**

PRODUCT ATTRIBUTE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Price</b>	20% less than last price paid	20% less than last price paid	Neither A or B is chosen
<b>Grade</b>	Equivalent to AAA	Equivalent to A	
<b>Aging</b>	21 days	21 days	
<b>Product origin</b>	USA	USA	
<b>I would choose</b>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>

**Appendix II:**

**Sample Question for Wholesalers/Retailers**

**QUESTIONS**

Assume that on your next order of beef the following alternative beef products are available to choose from. Considering the various attributes of beef such as price, grade, shipping specification and origin, which one of the alternatives, A to C, presented in the scenarios following are you most likely choose?

**SCENARIO 1**

PRODUCT ATTRIBUTE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Price</b>	same as last price paid	same as last price paid	Neither A or B is chosen
<b>Grade</b>	Equivalent to US prime (proposed AAAA)	Equivalent to US prime (proposed AAAA)	
<b>Shipping Specification</b>	Boxed beef	Case ready	
<b>Product origin</b>	USA	Ontario	
<b>I would choose</b>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>

**SCENARIO 2**

PRODUCT ATTRIBUTE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Price</b>	10% less than last price paid	20% less than last price paid	Neither A or B is chosen
<b>Grade</b>	Equivalent to AA	Equivalent to A	
<b>Shipping Specification</b>	Boxed beef	Case ready	
<b>Product origin</b>	Québec	Québec	
<b>I would choose</b>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>

**SCENARIO 3**

PRODUCT ATTRIBUTE	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
<b>Price</b>	same as last price paid	10% less than last price paid	Neither A or B is chosen
<b>Grade</b>	Equivalent to AA	Equivalent to A	
<b>Shipping Specification</b>	Case ready	Boxed beef	
<b>Product origin</b>	USA	USA	
<b>I would choose</b>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>	↓ <input type="checkbox"/>