RURAL ECONOMY

Pork Market Development Research Project: Market Potential for Alberta's Pork in Selected U.S. Markets

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Project Report # 00-02
AARI Project #97M092

Project Report

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Abstract

The ethnic Asian market in Washington and Oregon constitutes a sizable niche market for fresh Canadian pork. Since California possesses a large population segment that originates from Asia, the characteristics of the ethnic Asian-origin market in the northern part of that State are also of interest since this may also be a potential niche market for Canadian pork. The objectives of the first part of this study are to evaluate the Asian ethnic markets for fresh pork in the United States Pacific Northwest and Vancouver. In the second part of the project the assessment of the market for fresh pork by Asian-origin consumers was extended to San Francisco. In this extension, a detailed assessment was also made of the product preferences for fresh pork by Asian-origin consumers in San Francisco and the behaviour patterns associated with store choices of these fresh pork consumers.

Asian retailers and distributors in Vancouver, Seattle and Portland were surveyed by direct interview during November and December 1996. The survey applied semantic differential scaling questions, open-ended questions and a stated preference task, a conjoint methodology, to examine pork retailer's and distributor's perceptions of fresh pork produced in Western Canada and in the Midwest United States. Personal interviews with wholesalers and retailers were also applied in the San Francisco market survey which was conducted in 1998. Two consumer surveys were also conducted in San Francisco in 1998, directed at Asian-origin consumers of fresh pork.

The structure of the market for fresh pork represented by retailers catering to Asian consumers in Vancouver differs from that in Seattle and Portland. The "Asian market" in Vancouver is dominated by many small shops that deal directly with packers. The small shops in Seattle and Portland deal with distributors and wholesalers. Distributors play a small role in Vancouver's retail market. Asian retailers in Seattle deal with a variety of suppliers, including both packers and distributors. In Portland, retailers catering to Asian consumers trade mainly with distributors and a local packer-wholesaler. In San Francisco, Asian stores and butcher shops prefer to obtain pork

through smaller joggers, while American style supermarket retailers catering to the Asian consumers purchase pork directly from meat packing companies; fresh pork is sold in different ways in the different types of stores catering to Asian consumers that are found in these markets.

The first survey found that Western Canadian pork enjoys an image of superior quality amongst retailers and distributors in Seattle's ethnic Asian market. Asian retailers in Portland are less familiar with Western Canadian pork and did not regard it as highly as did retailers in Seattle. However, distributors in Portland are more familiar with Western Canadian pork and consider it to be superior to Midwest United States pork in terms of overall quality, meat colour and fat trim. In both these markets, Western Canadian pork is generally considered to be expensive. These results are not statistically significant, however they are of economic relevance since most of the major players in the segment were interviewed. Little knowledge of Western Canadian pork was evidenced by retailers or consumers in this market segment in San Francisco.

Western Canadian pork presently enjoys a reputation for superior quality amongst the retailers that specialize in sales to Asian consumers in Seattle and Portland. However it is also clear that many members of the trade lack information or experience with Canadian pork. Consequently, there is an opportunity for Canadian processors to maintain or increase market share through more education and promotion to this market segment.

The 1998 survey of Asian-origin consumers of fresh pork in San Francisco focused on two aspects: preferences for fresh pork attributes and choice of store for fresh pork purchases. An intercept survey method was chosen to select and interview consumer respondents. Some 40% of the 196 respondents to the store choice survey purchase most of their fresh pork from American style supermarkets, 33% purchase mostly from small Asian stores, 24% from large Asian stores, and the rest from butcher shops. The most popular cut of pork purchased by Asian consumers is loins, followed by pork shoulders and butts, then pork leg, bellies, hock, and offal. The analysis indicated

that socio-economic and demographic factors, as well as store attributes, significantly affect Asian consumers' store and product choices.

The analysis of the ranking of selected attributes of fresh pork by Asian-origin consumers in San Francisco, California showed that freshness is ranked as the most important attribute, followed by the attributes of the color of meat, lowness in fat, and the whiteness of fat. The attributes of price, freedom from chemicals, and being USDA labelled were also ranked to be of importance. The attributes of little or least importance were knowing that pork came from the US, customized pork cuts, the variety of pork cuts, packaged pork, vacuum packed pork and seasoned and prepared pork. Empirical results from an ordered probit model postulated to explain respondents' rankings of attributes indicate that particular demographic and socio-economic characteristics of Asian-origin consumers influenced the importance rankings for the pork attributes that were identified to be important. For example, Chinese origin consumers were appreciably more sensitive to pork price than were other Asian-origin groups. One facet of the findings is that marketing strategies should not treat Asian-origin consumers as a single homogenous niche group in marketing since there are identifiable sub-groups of these consumers with specific attitudes and preferences. The importance placed on different attributes by particular ethnic subgroups, and their different preferences for stores at which fresh pork is purchased, provides useful information on which to develop strategies to target market development activities at the Asian-origin ethnic subgroups.

Part I: Assessment of Market Potential for Alberta's Pork in the Ethnic Asian Market Segment within US Pacific Northwest Markets for Fresh Pork in Washington and Oregon

Part I: Background

Increasingly, food marketers are placing an emphasis on niche markets that consist of an identifiable sub-group of consumers with specific needs or preferences. Ethnicity is widely used by marketers as a market segmentation variable (Solomon, Zaichkowsky, and Polegato 1999). One such niche market is the "ethnic Asian market" in the United States Pacific Northwest (PNW). The Asian population of Washington and Oregon, two states in the PNW, is projected to increase from 429,000 persons in 1995 to 873,000 persons by the year 2010 (U.S. Department of Commerce, 1996). Pork is an important component of the Asian diet, and is primarily consumed as fresh meat. Thus, the ethnic Asian market in Washington and Oregon constitutes a sizable niche market for fresh Canadian pork. A significant Asian market segment also exists in the greater Vancouver region, a Canadian city located adjacent to the Pacific Northwest of the United States. To capture the market potential of a niche segment, it is necessary to identify particular product or service needs within that market segment, to understand the perceptions held by buyers servicing that market and to evaluate the differences in niche markets in separate locations.

Part I: Objectives

The objectives of the first part of this study were to evaluate the Asian ethnic markets for fresh pork in the Pacific Northwest of the United States. The specific objectives are to: (1) evaluate the market for fresh pork in the ethnic Asian market; (2) identify whether there are any perceived quality differences at the retailer and wholesaler level between fresh pork sourced from Canada, versus pork sourced from the US Midwest and (3) compare the ethnic Asian market and its structure in Vancouver, Seattle and Portland. Thus, within this part of the project, we evaluated and compared both cross-cultural demand differences and cross-national differences in a specific ethnic market.

A two-stage process was employed in each of the two components of this study. Initially existing literature was reviewed as were data on market disappearance and export trends. Initially interviews with Canadian industry experts identified markets for Canadian pork in the Pacific Northwest as a significant potential market segment. Retailers and meat distributors that cater specifically to the ethnic Asian market were identified as the most suitable target group to survey by direct interview due to their familiarity with fresh pork and potential knowledge about the Asian ethnic market.

Asian retailers and distributors in Vancouver, Seattle and Portland were surveyed by direct interview during November and December 1996. The survey applied semantic differential scaling questions, open-ended questions and a stated preference task, a conjoint methodology, to examine pork retailers' and distributors' perceptions of fresh pork produced in Western Canada and in the Midwest United States. This approach allowed a comparison of the "product image" of pork from these two sources in the ethnic Asian market and also enabled an assessment of the survey methodologies that were applied in the study. The distribution systems in each of the three areas were also assessed and compared. The information on perceptions about pork quality and other product and source characteristics can be used to develop marketing strategies for fresh pork in the market segments. Such information may also aid the evaluation of branding strategies. Other studies such as by Kim et al. (1997), Speece and Maclachlan (1991), Huang and Fu (1995) and Kyriakopoulos and Oude Phuis (1997) have used similar survey techniques to evaluate consumer preferences in international markets.

Part I: Market Background

The Pacific Northwest (Washington and Oregon) is the major export market in the United States for Western Canadian meat packers and this is a particularly important market for fresh pork. In 1995, this region accounted for 56.9 percent of fresh pork and 38.4 percent of processed pork

exported to the United States from Western Canada. These were supplied mainly from the Canadian provinces of Alberta and British Columbia (Agriculture and Agri-Food Canada, 1995). The Pacific Northwest (PNW) is an attractive market for Western Canada since the region is highly deficit in pork and Canada has the advantage of close location, giving a significant transportation cost advantage over the Midwest United States in serving Washington and Oregon. There are no explicit trade barriers for pork between Canada and the United States; tariffs on cross-border trade in pork were eliminated in 1991. Nonetheless, border inspections apply and regulations regarding packaging and labeling are not harmonized (Personal communication with Canadian pork packers; MacMillan et al., 1994).

The PNW is an area of rapidly growing population. Seattle and Vancouver are two of the fastest growing metropolitan areas in the United States and Canada (Gale Research, 1993; Statistics Canada, 1996). There is a sizable segment of population in the PNW that has ethnic Asian origins. This is also true for Vancouver which has experienced rapid growth in Asian population, mainly due to immigration from Hong Kong (Agriculture and Agri-Food Canada, 1994). This trend is now tending to moderate. Persons of Chinese origin form the largest Asian ethnic group in Vancouver, while the Asian populations of Seattle and Portland are more diverse. Seattle and Portland have not experienced sizable immigration from Asia in the past few years.

Production and consumption levels of pork in Washington and Oregon in recent years are shown in Tables 1 and 2. In both states the estimated consumption deficit is necessarily filled by interstate shipments and international imports. The large pork deficit of Washington reflects a decrease in pork production in this state of 35 percent from 1988 to 1994, while the estimated consumption of pork increased by 19 percent from 1988 to 1994. Thus, the "self-sufficiency ratio" for pork decreased from 6.9 percent in 1988 to 3.8 percent in 1994. Similar trends underlie the pork deficit of Oregon. Local pork production decreased by 42 percent between 1988 and 1994 and the self-sufficiency ratio declined from 24 percent to 12 percent.

Table 1. Total Supply and Disposition of Pork, Washington (Thousand Tonnes)[1]

Year	Production	Washington Consumption[2]	Canadian Imports (AB and BC)	Market Share-Western Canada (%)	International/ Interstate Imports[3]	Total Supply
1988	9.8	141.5	19.7	13.9	112.0	141.5
1989	10.1	143.3	14.8	10.8	117.7	143.3
1990	10.4	141.1	15.9	11.3	114.8	141.1
1991	7.9	147.5	14.8	8.8	126.6	147.5
1992	7.9	159.9	14.6	9.1	137.4	159.9
1993	6.7	167.6	15.5	9.2	145.4	167.6
1994	6.4	168.4	16.6	9.9	145.4	168.4

[1]Carcass weight. [2]Estimate based on United States pork consumption data. [3]Estimate based on columns 1 and 2.
Sources: U.S. Department of Agriculture *Agricultural Statistics* 1988-1995; Alberta Agriculture, Food and Rural Development (1988-1995)

Table 2. Supply and Disposition of Pork, Oregon (Thousand tonnes)[1]

Year	Production	Oregon Consumption[2]	Canadian Imports (AB and BC)	Market share-Western Canada (%)	International/ Interstate Imports[3]	Total supply
1988	20.3	83.6	1.6	1.9	61.7	83.6
1989	18.2	84.3	3.4	4.0	62.7	84.3
1990	14.8	82.4	2.4	2.9	65.2	82.4
1991	12.2	85.8	2.6	3.0	71.0	85.8
1992	12.0	92.1	6.2	6.7	73.9	92.1
1993	11.9	92.8	5.7	6.1	75.2	92.8
1994	11.8	95.7	8.3	8.7	75.6	95.7

[1]Carcass weight. [2]Estimate based on United States pork consumption data. [3]Estimate based on columns 1 and 2.
Sources: Oregon Agriculture and Fisheries Statistics, 1994-1995; U.S. Department of Agriculture, World Livestock Situation, 1992 and Livestock and Poultry: World Markets and Trade, 1996; U.S. Department of Commerce, 1996; Alberta Agriculture, Food and Rural Development (1988-1995)

Exports of fresh and processed pork from Alberta and British Columbia to the United States increased between 1988 and 1995 by 40 percent, from 36,204 tonnes to 50,847 tonnes (Table 3). Exports of fresh pork increased by 22 percent, from 28,253 tonnes to 34,434 tonnes, while exports of processed pork increased by 106 percent, from 7,951 tonnes to 16,413 tonnes. Washington and Oregon are the main United States market for Western Canadian pork, particularly for fresh pork. In 1995, this region accounted for 56.7 percent of fresh pork and 38.3 percent of processed pork exported from Alberta and British Columbia to the United States (Table 3). California is the other

major United States market for pork; Canada has less of a locational advantage for this market

(Alberta Agriculture, Food and Rural Development, 1995).

Table 3. Exports of Pork from Western Canada to the Pacific Northwest of the United States (Tonnes)[1]

	Washington		Oregon		PNW		Total US	
Year	Fresh	Processed	Fresh	Processed	Percent Fresh	Percent Processed	Fresh	Processed
1988	14,920	4,754	1,007	559	56.4	66.8	28,253	7,951
1989	9,844	4,947	2,763	604	58.9	65.0	21,390	8,546
1990	10,390	5,553	1,810	555	36.3	56.5	33,597	10,848
1991	9,182	5,642	2,102	451	33.3	48.2	33,893	12,646
1992	8,534	6,060	5,951	244	49.6	41.8	29,212	15,070
1993	8,313	7,155	5,444	212	51.8	38.1	26,570	19,344
1994	8,790	7,838	7,859	490	59.3	43.9	28,060	18,978
1995	7,323	4,806	12,212	1,476	56.7	38.3	34,434	16,413

[1]Carcass weight.
Source: Alberta Agriculture, Food and Rural Development (1988-1995)

Some features of the PNW market have been changing. Washington used to be a large buyer of fresh Canadian pork but this region is increasingly supplied from the Midwest United States. Canadian shipments of fresh pork to Washington decreased by 50 percent between 1988 and 1995 (Table 3), although shipments of processed pork remained steady. However, Canadian shipments of fresh pork to Oregon rose by 1,113 percent over this time period and shipments of processed pork more than doubled (Table 3).

Part I: Survey Methodology

The survey applied three types of questions: quantitative scaling questions, qualitative questions and stated preference questions to evaluate the attitudes of the target group of retailers and distributors towards fresh pork. Using the semantic differential scales approach, respondents were asked to rate a particular attribute on a seven-level semantic differential scale relative to two broad bipolar adjectives. The semantic differential scale has been used by Nagashima (1970), Papadopoulos et al. (1994) and Kim et al. (1996). The approach allows researchers to examine both the direction

and intensity of respondents' attitudes towards such concepts as corporate image, advertising image, brand or service image, and country image (Green, Tull and Albaum, 1988). For example, a respondent can be asked to rate the price of a product on a scale of -3 to +3, with -3 representing "expensive" and +3 representing "inexpensive". In designing a semantic differential scale task, the selection of an appropriate sample of adjective pairs is central to the ability to generate a score for the attribute and product being examined (Churchill, 1991). The product can then be compared to other products using this score. Nagashima (1970) views semantic differential scales to be an effective tool in cross-cultural and cross-linguistic settings.

Two groups of semantic differential questions were used. One set of nine questions focused on product quality evaluation for such features as price, fat color, meat color, food safety and water content. The second set of questions focused on promotion and service-assistance. The choice of product quality factors was based on results from the initial interviews with industry experts and Asian retailers in Western Canada. To prevent sequence bias and response routinization, the semantic differential scale was randomly rotated (Papadopoulos et al, 1994).

The qualitative portion of the survey included a set of structured, open-ended questions. The grocers and distributors who buy pork for sale to Asian consumers were asked for their opinions regarding the main fresh pork attributes that influence Asian pork buyers, the marketing and distribution of fresh pork, the origin and branding of fresh pork, the future of the ethnic "Asian fresh pork market" and the specific pork cuts demanded in these markets. Color pictures of the various cuts provided by the Canadian pork industry (Agriculture and Agri-Food Canada, Canada Pork International) were used to describe potential cuts.

Stated preference questions are an extension of conjoint analysis (Adamowicz et al. 1994, Unterschultz et al. 1997). These questions involved a formal statistical design to evaluate respondents' stated responses to attributes of price, freshness, country of origin and type of cut. The stated preference approach uses statistical models to measure the probability of choice based on different

product attribute levels. Each respondent answered eight related choice questions. Each question gave the respondent a written description of two different pork products. Price, product freshness, fat color, type of meat cut, meat colour and country of origin were varied between the questions. Multinomial logit models were used to analyze the data. The multinomial model estimates the probability of a respondent choosing a particular product. Positive coefficients on an attribute such as freshness reflect the increased probability of the respondent choosing fresh product. Negative coefficients indicate the decreased probability of a respondent choosing a product.

The field work was carried out during November and December of 1996 in Seattle and Portland and a similar study of the comparable market segment in Vancouver was also conducted. Respondents were selected according to geographic location, by referral through local packers and with the assistance of Asian business and cultural organizations in Vancouver and in Seattle. Vancouver respondents include eight Asian retailers and two meat distributors; these constitute the major traders in this ethnic Asian market, in which consumers are mainly of Chinese origin. In addition, open-ended interviews were conducted with two meat packers. In Seattle, respondents included seven Asian retailers, three meat distributors, and one packer-wholesaler. Additional open-ended interviews were conducted with one Canadian consular official and one meat packer sales representative. Portland respondents included eight Asian retailers, three meat distributors or wholesalers, one broker, one packer-wholesaler, and one retailer-wholesaler. In Portland and Seattle, customers in the ethnic Asian market are not primarily of Chinese origin. In each city the respondents represented the major portion of the target population of distributors and retailers in each of the three niche markets. The structure of the target market in each location was documented and compared.

Part I: Survey Results

Market Structure Description

The structure of the market for fresh pork represented by retailers catering to Asian

consumers in Vancouver differs from that in Seattle and Portland. The "Asian market" in Vancouver is dominated by many small shops although a new type of retailer, the "Chinese supermarket" also appears to be gaining prominence in this market. Most of the retailers that specialize in sales to Asian consumers deal directly with the packers and there are very few distributors or wholesalers of pork that are active in this market. Retailers in this market segment purchase fresh pork sides directly from packers located in the Vancouver area. The pork is processed by custom cutting into large cuts in the store.

Seattle's ethnic Asian market is also dominated by many small shops. Retailers in Seattle deal with a variety of suppliers of fresh pork, including packers, wholesalers, brokers and distributors. The Seattle retailers purchase fresh pork as primal cuts and process these in the store. These retailers purchase the standard primal cuts and did not express a preference for any "specialty" cuts.

Retailers specializing in Asian customers in Portland purchase fresh pork from distributors, brokers, wholesalers and a packer-wholesaler. Asian retailers in Portland purchase fresh pork as primal cuts and process these in the store. As in Seattle, these retailers purchase the standard primal cuts and did not express a preference for any "specialty" cuts.

Part I: Formal Survey Results for the Qualitative and Semantic Scale Approaches by City

Results for Vancouver

The United States exports minimal quantities of pork to the Vancouver region. Thus all results for the Vancouver market relate only to Canadian pork. The responses to the open-ended questions identified meat colour, fat trim and price as the most important attributes of fresh pork. Table 4 shows that colour of Western Canadian pork was rated as acceptable at 1.40 under the semantic scaling (the best score possible is 3.0). Retailers catering to Asian consumers prefer pork with a bright red colour which serves as an indicator of freshness in this market. The fat trim of current supplies was rated as acceptable by retailers in Vancouver (Table 4), although some of these

retailers indicated that they desire pork with even less outside fat than is currently available from the packers. Price received a negative rating in the semantic differential scale, indicating that the retailers perceived Western Canadian pork to be expensive. This segment of Vancouver retailers indicated that they were satisfied with the service and assistance they received from packers. No distributors were surveyed in Vancouver.

Table 4. Quantitative Semantic Differential Scale Results on Product Quality and Promotional Activity for Pork, Vancouver (Retailers and Distributors)

Attributes	Western Canadian Pork[1]	N[2]
Overall pork quality	1.60	10
Meat color	1.40	10
Fat color	1.90	10
Fat trim	1.50	10
Food safety standards	1.33	9
Water content	1.20	10
Price	-1.60	10
Variety of cuts	1.30	10
Consistency of each shipment	1.40	10
Service and Assistance	1.80	10
Awareness of promotion	0.30	10

[1] Mean rating scores on a scale from –3 to +3 with higher scores deemed better.
[2] The number of respondents to each question.

Results for Seattle

Seattle retailers identified fat trim, price and meat colour as the most important attributes of fresh pork, similar to Vancouver respondents. Western Canadian pork was rated higher than Midwest United States pork for overall quality (Table 5). Asian retailers in Seattle regard Western Canadian pork as considerably leaner than pork from the Midwest United States. Western Canadian pork and Midwest United States pork were considered to be equally acceptable in terms of meat colour and this is also represented in similar scaling results (Table 5). Western Canadian pork was perceived to be more expensive than pork produced in the Midwestern United States. Western Canadian pork received high ratings for both service and consistency of each shipment. Those retailers that dealt with Western Canadian packers were pleased with the service the packers provided and the

consistency of the pork they received. Western Canadian pork was also seen as being superior to

Midwest United States pork in terms of its overall quality. Retailers catering to Asian consumers were

unaware of promotional activities carried out by either the United States or Western Canadian pork

industries and this was confirmed by the scaling results (Table 5).

Table 5. Quantitative Semantic Differential Scale Results on Product Quality and Promotional Activity for Pork, Seattle

Attributes	Retailers				Distributors			
	Western Canada[1]	N[2]	Midwest US[1]	N[2]	Western Canada[1]	N[2]	Midwest US[1]	N[2]
Overall pork quality	2.75	4	1.30	5	1.67	3	1.20	5
Meat color	2.50	4	1.82	6	1.67	3	1.40	5
Fat color	2.00	4	1.09	6	1.33	3	0.20	5
Fat trim	2.00	4	0.73	6	1.33	3	1.60	5
Food safety standards	1.50	2	1.78	4	0.67	3	1.40	5
Water content	2.00	4	2.18	6	1.67	3	2.00	5
Price	-1.00	4	-0.09	6	-1.33	3	0.40	5
Variety of cuts	1.25	4	1.45	6	1.00	3	2.00	5
Consistency of each shipment	3.00	4	1.27	6	1.33	3	0.60	5
Service and Assistance	3.00	4	1.10	5	0.67	3	0.00	5
Awareness of promotion	-0.25	4	-0.45	6	-1.00	3	-0.20	5

[1] Mean rating scores on a scale from –3 to +3 with higher scores deemed better.
[2] The number of respondents to each question.

Distributors in Seattle also considered fat trim, price and meat colour to be important.

Midwest United States pork had a higher rating for fat trim (1.60 versus 1.33) while Western

Canadian pork received a higher rating for meat colour (1.67 versus 1.40) (Table 5). However fat

trim and meat colour of pork from both sources were rated as acceptable. Western Canadian pork was

perceived to be more expensive than Midwest United States pork. Western Canadian pork was

considered superior to Midwest United States pork in terms of overall pork quality. This perception

was less pronounced among distributors than it was amongst retailers. Western Canada was seen as

not providing as wide a variety of cuts as was available from Midwest United States packers.

Distributors were generally unaware of promotional activity carried out by the Western Canadian

pork industry and had limited awareness of promotional activity for United States pork.

Results for Portland

Retailers in Portland also identified price, meat colour and fat trim as the most important attributes of fresh pork. Western Canadian and Midwest United States pork were not perceived to be expensive, and Western Canadian pork was seen as the least expensive of these. While both types of pork were rated as having acceptable meat colour (Table 6), Midwestern United States pork was perceived to have superior meat colour to Western Canadian pork. Western Canadian pork was perceived as leaner (i.e. having a closer fat trim) than Midwest United States pork. Retailers in Portland were unaware of promotional activity for either United States or Western Canadian pork. It should be noted that the majority of Asian retailers interviewed in Portland were unfamiliar with Western Canadian pork.

Distributors in Portland identified price, meat colour and fat trim as important attributes. Distributors perceived both Midwest United States and Western Canadian pork as expensive, with Western Canadian pork being viewed as the more expensive (Table 6). Western Canadian pork was considered to be superior to Midwest United States pork in terms of meat colour and fat trim. Distributors rated Western Canadian pork to be superior to Midwest pork for overall quality. This perception is opposite to that stated by Portland's Asian retailers. The discrepancy may reflect the greater familiarity of distributors than retailers with Western Canadian pork. Only three retailers in Portland were able to rate Western Canadian pork while all six of the distributors interviewed were able to rate pork from Western Canada. Western Canada's pork suppliers were rated similar to Midwest suppliers for service and lower than the Midwest on awareness of promotional activity. Distributors in Portland were unaware of Western Canadian promotional activity but were aware of promotional activity by the United States pork industry.

Table 6. Quantitative Semantic Differential Scale Results on Product Quality and Promotional Activity for Pork, Portland

Attributes	Retailers				Distributors			
	Western Canada[1]	N[2]	Midwest US[1]	N[2]	Western Canada[1]	N[2]	Midwest US[1]	N[2]
Overall pork quality	1.33	3	2.00	6	2.67	6	0.83	6
Meat color	1.33	3	2.12	8	2.00	6	1.33	6
Fat color	0.67	3	2.00	8	1.67	6	1.50	6
Fat trim	2.67	3	1.12	8	2.00	6	0.33	6
Food safety standards	2.00	3	1.50	8	0.60	5	1.00	6
Water content	3.00	2	2.14	7	1.67	6	1.50	6
Price	1.67	3	0.62	8	-1.00	5	-0.33	6
Variety of cuts	0.00	3	0.37	8	1.00	5	1.83	6
Consistency of each shipment	0.67	3	1.14	7	1.50	6	0.83	6
Service and Assistance	-0.67	3	1.25	8	1.00	5	1.33	6
Awareness of promotion	-1.33	3	-1.12	8	-0.83	6	1.00	6

[1] Mean rating scores on a scale from –3 to +3 with higher scores deemed better.
[2] The number of respondents to each question.

Part I: Results of the Stated Preference Approach

Only fourteen respondents, twelve of them brokers-distributors, answered this part of the survey, which provided us with 112 data points. The aggregated data from Seattle, Portland and Vancouver is presented here due to the small sample size (Table 7). The positive coefficient estimates shown in the table indicate an increasing probability of choice, while negative coefficients indicate a decreased probability of choice, by respondents, of any product with that attribute level. For example, a positive coefficient on a product described as originating from Western Canada increases the probability of that pork product being chosen over a similar pork product that originates in the Midwest US. The difference in product origin is significant in this small sample and indicates that Canadian pork is preferred by the brokers-distributors surveyed in the study. Price is apparently not an important factor to pork buyers at the broker-distributor level, since none of the estimated coefficients on price are significant. A possible explanation for this finding is that brokers are particularly concerned with margins, so that the difference between purchase and selling prices is more important to them than the absolute price levels.

Table 7. Estimated Coefficients on Variables Predicting Choice, Stated Preference Methodology[1]

Variables	Estimated Coefficient	Standard Error

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Price:

Same as last price paid	-0.035	0.291
10% less than last price paid	-0.059	0.293
20% less than last price paid	-0.088	0.266
10% more than last price paid	0.182	0.278

Days From Slaughter:

8 days	-0.738*	0.309
6 days	0.446	0.291
4 days	0.202	0.280
2 days	0.090	0.272

Fat Color:

Yellow	-0.455*	0.174
White	0.455*	0.174

Type of Cut:

Sides	-0.408*	0.165
Primal cut	0.408*	0.165

Meat Color:

Dark	0.142	0.294
Normal	1.004*	0.279
Extremely dark	-0.896*	0.308
Pale	-0.250	0.278

Pork Origin:

Midwest US	-0.345*	0.169
Western Canada	0.345*	0.169
Pseudo R^2	0.180	

[1]The total number of respondents is 14. Each respondent answered 8 questions, giving a total of 112 observations.

* Indicates significance at the 95% confidence level.

Buyers do not prefer hogs that have been slaughtered eight days earlier, suggesting the importance of freshness of pork products. Product over six days old is less likely to be purchased. Coefficient estimates for hogs slaughtered earlier than six days ago all have positive signs and are not statistically significant. However, brokers-distributors are concerned if the product is eight days from slaughter. Regarding fat color, buyers-distributors show a positive preference for white-colored fat and a negative reaction to yellow-colored fat. Canadian pork tends to have whiter colored fat due to the use of feed barley in pig rations and this may give Canadian pork an advantage over competing product from the US, which does not have quite the same color of fat. Similarly the significant positive significant coefficient on the type of cuts shows that buyers-distributors prefer primal cuts over side cuts. This result is driven by the responses in the PNW market which purchases primal cuts

rather than sides. It is encouraging that even with such a small sample size, the results confirm many of the major conclusions that were derived using the semantic differential scaling questions and the qualitative questions.

Part I: Summary of Results

This project applied the three types of survey questions of semantic differential scales, stated preference and open-ended questions. All three types of questions were used to assess the importance of various attributes of fresh pork to Asian pork buyers. Two of the methods, semantic differential scales and open-ended questions, proved most useful in this task. The semantic differential questions worked very well in interviews with Asian retailers. These interviews were usually conducted in the store. The semantic differential questions were suited to this busy environment and were easily applied in this cross-cultural and cross-linguistic setting. The open-ended questions also worked well in this environment. The respondents were knowledgeable about the attributes of fresh pork and about their market. Thus, they were able to provide ratings of and opinions about fresh pork attributes. However, the semantic differential scale question dealing with service and assistance from packers was not sufficiently specific to provide useful guidance. Any future study should frame such a question to deal specifically with the frequency and timing of deliveries and the reliability of supply.

While the stated preference approach worked well with distributors, these questions proved to be unsuitable in the interviews with Asian retailers. Stated preference questions require a quiet atmosphere and more concentration than was available in the retail store environment.
As with all personal interview methods, there is the possibility of an "interviewer effect" during the questioning. That is, some of the ratings and responses may have been given in an effort to please the interviewer. There is no valid way of reliably evaluating this potential bias from this particular sample, however, the interviewers were of the opinion that the bias was small.

Part I: Conclusions and Implications

Western Canadian pork enjoys an image of superior quality amongst retailers and distributors in Seattle's ethnic Asian market. However, this advantage may be insufficient to assure sales in some regions, either because the quality of Midwest United States pork has improved or due to buyers' lack of knowledge. Asian retailers in Portland are less familiar with Western Canadian pork and did not regard this product as highly as did retailers in Seattle. Distributors in Portland are more familiar with Western Canadian pork and consider this to be superior to pork from the Midwest United States in terms of overall quality, meat colour and fat trim. In both markets, Western Canadian pork is generally considered to be expensive. Asian retailers and distributors in the Pacific Northwest are unaware of promotional activity carried out by the Western Canadian pork industry. These results are not statistically significant, however they are of economic relevance since most of the major players in the segment were interviewed.

Western Canadian pork presently enjoys a reputation for superior quality amongst the retailers that specialize in sales to Asian-origin consumers in Seattle. This opinion is also held by distributors in this market segment in Portland. However it is also clear that many members of the trade lack information or experience with Canadian pork. If the potential for increased sales to this market segment is to be achieved, more information and education regarding Western Canadian pork to Asian pork buyers and consumers in the Pacific Northwest will be required.

Price is very important to Asian retailers and distributors. The quantitative results show that respondents consider Western Canadian pork to be more expensive than Midwest pork. Consequently one competitive strategy for Western Canadian pork producers and packers is to maintain quality while improving the productivity of hog operations and the efficiency of pork packing plants.

Asian retailers in Vancouver prefer to purchase sides of pork. This reflects a difference in the structure of this market relative to the Asian markets for pork in the Pacific Northwest of the United States. In Vancouver, many small specialty meat shops cater to the ethnic Asian market. Seattle and Portland do not have these specialized meat shops. Asian retailers and distributors in Seattle and

Portland prefer to purchase primal cuts. In contrast, Asian retailers in Vancouver deal directly with meat packers. Distributors play a small role in Vancouver's retail market. Asian retailers in Seattle deal with a variety of suppliers, including both packers and distributors. In Portland, retailers catering to Asian consumers trade mainly with distributors and a local packer-wholesaler.

The results of this part of the study clearly demonstrate that ethnic Asian markets in geographically similar locations are not the same. The retail market structure and the type of cut demanded in Vancouver is distinctly different than in the ethnic Asian market segments in Seattle and Portland. Suppliers targeting these market segments must be aware of these differences and should follow different market strategies for Seattle and Portland than for Vancouver.

Part II: Extension of the Market Development Assessment to the San Francisco Asian Market for Fresh Pork

The second part of this study extended the analysis outlined above to assess features of the potential market for fresh pork in the Asian-origin market of San Francisco. This is the most northerly market in California, and is, therefore, the most easily accessed Californian market for Western Canadian pork. Even so, Canada has less of a locational advantage for this major United States pork market than it has for the Pacific Northwest markets that were assessed in Part I of the study.

Background on San Francisco's Asian Fresh Pork Market

The large size of the Californian market for pork and the fact that most pork consumed there must be shipped into this region, make this a market of interest to pork exporters. Pork is the primary meat consumed in the diets of many Asian-origin consumers. Since a large proportion of America's Asian-origin population resides in this state, and this population is increasing, the ethnic Asian-origin market in California is of interest as a potential niche market for Western Canadian pork.

Paralleling the assessments made in Part I of this study, an assessment was made of market channels and institutions involved in the marketing of fresh pork to Asian-origin consumers in San Francisco. Observation and a survey of processors and distributors indicated four main types of retail stores that sell fresh pork to Asian consumers: (1) small Asian independent grocery stores or supermarkets, (2) large Asian supermarkets (Asian chain stores), (3) meat specialty stores such as butcher shops or Bar-B-Q houses, and (4) American style supermarkets or stores, such as Safeway stores or Consumer Cooperatives. At the time of the survey, in 1998, there were 14 Safeways, 7 Cala Foods, 2 Lucky Stores and 8 "99" Ranch Markets outlets[1] as well as a large number of independent

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[1] This was assessed from the San Francisco Metropolitan Area 1998 phone book and from information provided by the representatives of the retail outlets that were surveyed.

small Asian stores, butcher shops and Bar-B-Q houses in San Francisco. The majority of butcher shops and Bar-B-Q houses are located in downtown San Francisco. Safeway, Cala Foods, and Lucky stores are classified here as American style supermarkets.

Small Asian stores dominate the Asian fresh pork market in San Francisco in terms of the number of stores. These stores are concentrated in four main areas of the city: Main Chinatown, which is located in downtown San Francisco and is approximately 10 blocks long (north to south) and 7 blocks wide (east to west). New Chinatown is located at the west end of San Francisco and is approximately 3 blocks long (north to south) and 4 blocks wide (east to west). Japantown is also located at the west end and is approximately 2 blocks long (north to south) and 4 blocks wide (east to west). Vietnamese town is located in downtown San Francisco is approximately 2 blocks long (north to south) and 3 blocks wide (east and west). Large Asian and American style supermarkets such as "99" Ranch Market, Safeway, Cala Foods, and Lucky 97 are located mainly in residential and suburban areas. The "99" Ranch Markets are located in the suburban areas of San Francisco in Asian "mini-malls" in which only Asian stores are represented.

Small Asian stores carry an arrangement of Asian foods, from dry goods to fresh vegetables and fruits, and fresh meats (beef, poultry, pork and others). Some stores also carry fresh and frozen seafood. The majority of the small Asian stores focus mainly on Chinese foods. However, some small Asian stores may specialize and carry foods that focus on a particular ethnic group (i.e. Japanese or Vietnamese food stores). Meat specialty stores are butcher shops and Bar-B-Q houses. Bar-B-Q houses carry both fresh and cooked meats. Large Asian stores are Chinese retail chain supermarkets. The largest chain of large Asian supermarkets are the "99" Ranch Markets. These stores have a similar format to the American style supermarkets such as Safeway. The "99" Ranch Markets offer a wider arrangement of Chinese foods than are typically carried in small Asian stores together with various Japanese, Vietnamese, Filipino and Korean dry and fresh foods. The "99" Ranch Markets also have a Chinese fast food section inside the store where a customer can sit and

eat a meal or buy a take-out meal. The fast food section of these stores include a dessert counter as well as a Bar-B-Q section where Bar-B-Q pork, duck, sausage and squid are sold.

The different types of stores are very different in their approach to selling their pork products and they carry different varieties of pork cuts or parts. Small Asian stores and meat specialty stores have a full service approach to selling their pork products. They are interactive in dealing with their customers. Pork is displayed on trays behind a clear display case. The customer selects a particular cut, the butcher weighs it, places the pork in a thin plastic bag or wraps it in paper, takes the money and hands the pork cut over to the customer. In these stores, customers can ask the butcher to trim, grind and slice a particular cut of meat. The large Asian stores also offer this service. It was observed that the pork cuts carried in large and small Asian stores and butcher shops include pork chops, tender loins, shoulder butts, hams, side pork bellies, hind foot (hock, pig feet), and offal (intestines, noses, pig tails, livers, and pig jowls). The small Asian and meat specialty stores tend to carry a larger offal selection than the large Asian stores. The majority of American-style stores that were visited do not carry offal. Some American stores will sell pig feet at the customer's request.

American style supermarkets (i.e. Safeway, Lucky, and Cala Foods) provide a self-service approach in their meat department, thereby promoting a western-style method of retailing pork. In these stores, fresh pork is cut, then packaged in a styrofoam tray and plastic wrap, and displayed in long, open, refrigerated display cases where a customer can physically select the cut of pork they choose to buy. The meat departments in some American-style supermarkets will trim or grind a customer's pork cut upon request, however this service is not always readily available. The majority of small Asian stores and meat specialty stores do not use a western style of retailing pork. However, some meat departments in large Asian stores offer both western and Asian styles of retailing pork.

Part II: Survey Methodology

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Three surveys were developed and applied in this part of the study. The first of these involved an initial assessment of the market channels for fresh pork sold to Asian-origin consumers. This adopted some of the survey techniques noted in Part I and was directed at processors and distributors. In contrast to the situation in Seattle and Portland, less fresh Canadian pork tends to be sold in San Francisco, since this is a further distant market. Major focus was placed, in this part of the study, on assessment of Asian-origin consumer behaviour in the purchase of fresh pork. This focused on two features, the first being consumers' store choices for fresh pork purchases. The other survey focus was on Asian-origin consumers' preferences for various attributes of fresh pork.

A mall-intercept method was chosen to collect consumer-level data. In this process the interviewer intercepted a sample of shoppers in a shopping mall or in the vicinity of the store; and requested them to participate in the research study. Such mall intercepts provide the "most sample control with respect to obtaining cooperation from the designated respondents "(Churchill 1996:193). In this study, the researcher intercepted consumers after they finished their grocery shopping at small and large Asian stores, American stores and butcher shops and asked if they would agree to participate in the study. Pre-testing in Edmonton and Vancouver indicated the importance of a short survey using this method. Consequently, the survey was designed to only take about five minutes to complete. This reflected the average amount of time that respondents were willing to be interviewed. Each question in the survey was pre-tested to ensure that it was easy to answer and well understood by the respondent. Information obtained from the initial consultations with retailers of small Asian stores and wholesalers in San Francisco's Main Chinatown was used to ensure that the characteristics of the San Francisco market were appropriately incorporated into the questionnaire.

The store choice survey has three parts. The first section of the survey asked respondents to indicate which of the type of five stores at which they purchased the majority of their groceries and fresh pork. The second section of this survey provides information on respondents' socioeconomic and demographic details such as income, age, ethnic background, gender, and education. The

third part of the store choice survey involved a series of store-specific questions focused on the type of store where the respondents purchase the majority of their fresh pork.

The store characteristics selected for assessment in the study are those that have been identified by previous studies on grocery store choice, guided also by discussions with retailers and wholesalers in San Francisco and Edmonton who sell fresh pork to Asian consumers. The variables identified were the price and quality of fresh pork sold at a store, selection of specialized pork products (i.e. offal), location and accessibility of the store, and the level of service offered in the store's meat department. All attributes were specified to have four levels. As an example, for the attribute of "price" a relevant question is: did consumer A choose to purchase most of their pork at American stores because the price was cheaper, more expensive, comparable or not important in their decision to purchase pork at that store? Consumer A was asked to select one of these four alternatives. The attributes and corresponding levels used in this analysis are listed in Table 8. The data on respondents sampled as customers of small Asian stores were collected in the Main Chinatown and New Chinatown regions in San Francisco. The data on customers of large Asian stores came from the "99" Ranch Markets located throughout the suburban areas of San Francisco. The data on customers of American style stores came from surveying shoppers at Safeway, Andornico's, and Cala Foods. The data on customers of meat specialty stores came from Main Chinatown. The survey was conducted during the months of September and October 1998. Survey interviews were conducted in both English and Chinese. Seventy-five percent of the 196 surveys collected were carried out in English. A Chinese student was hired to verbally translate the English survey into Chinese. There were 196 usable surveys out of 198 collected. Thirty-eight percent of the 196 surveys were from interviews conducted at large Asian stores, 16% at small Asian stores, 25% at American stores and 21% at meat specialty stores. Surveys were undertaken every day of the week between the hours of 11:00 a.m and 5:00 p.m., but the majority of surveys were conducted during the hours of 2:00 p.m. to 5:00 p.m. Monday to Sunday. Tuesdays and Thursdays had the lowest

number of respondents in the survey sample, accounting for only 10% and 8% of the total, respectively.

Table 8. Store Attributes and Levels

Attribute	Levels	Description of the Discrete Level
Price of pork relative to other stores	1	Cheaper than other stores
	2	More expensive
	3	Comparable
	4	Not important
Overall quality of fresh pork	1	Better than other stores
	2	Worse than other stores
	3	Comparable to other stores
	4	Not important
Availability of specialized pork products	1	Greater than other stores
	2	Less than other stores
	3	Comparable to other stores
	4	Not applicable
Location and accessibility of store	1	Convenient compared to others
	2	Inconvenient compared to others
	3	Comparable to other stores
	4	Not important
Service in meat section that customizes pork cuts	1	Helpful and courteous
	2	Personal compared to others
	3	Not important
	4	Not applicable

While 40% of 196 respondents purchased most of their fresh pork from American stores, 23.5% purchased from large Asian stores, 32.5% from small Asian stores and only 3.6% from butcher shops. In targeting sales efforts it is of interest to note that where Asian consumers purchase their groceries is not always where they purchase most of their fresh pork. Overall 107 out of 196 respondents indicated that they do most of their grocery shopping at American stores, while 110 indicated that they purchase most of their pork at Asian stores (large and small). However, results from this survey suggest that the perception that Asian-origin consumers shop mainly in Asian-style markets is not entirely false, especially in the case for fresh pork. Fifty-six percent of the respondents indicated that they purchase most of their fresh pork at Asian stores although forty-six percent of respondents indicated that they purchase most of their groceries at Asian stores.

Analysis of Store Choice by Asian-Origin Consumers

Modeling consumer's store choices, which are hypothesized to be based on relevant personal characteristics of the buyers and attributes of the store, was approached through multinomial logit models, following the random utility modelling approaches of Ben-Akiva and Lerman (1985). A full outline of the model of store choice is provided in the MSc thesis study of Theresa Le (1999). Table 9 lists the independent variable definitions and their codes.

A correlation matrix of all the possible independent variables revealed that there is a high degree of correlation between the different levels within each of the store attributes and the various socioeconomic and demographic characteristics. Consequently, two multi-nominal logit models were selected and estimated using LIMDEP, Version 7.0 (Greene 1995). Model 1 predicts consumer's store choice for fresh pork based on the importance of various store characteristics. Model 1 variables include: price, variety of specialized pork products, convenience, customer service, and quality of fresh pork sold that the store. Model 2 provides a means to predict consumer's store choice for fresh pork based on their socioeconomic and demographic characteristics. Model 2 includes the variables of customer age, gender, number of years living in the USA, ethnic Chinese, education, employed full-time, whether or not the respondent prepares most of the household meals, buys pork more than once a week, always looks at the package expiration date, buys the leanest cuts of pork, uses advertisements to compare pork prices, size of household, and income level.

The estimated coefficients and goodness of fit for Model 1 and 2 are given in Table 10a and 10b. The chi-square statistics show that the two models are highly significant. The results from the

Table 9. Store Choice Variable Definitions and Codes

Independent Variable	Codes	Definitions
Gender	GEN	If male GEN = 1 If female GEN = 0
Born in the USA	USA	USA = 1 Otherwise = 0
Number if years living in the USA	NUM	Continuous variable indicating the years

Prepares most of the meals	MMEAL	MMEAL = 1 Otherwise = 0
Buys pork more than once a week	DNY1	DNY1 = 1 Otherwise = 0
Always look at the packaged expiration date	DNY2	DNY2 = 1 Otherwise = 0
Always buys the leanest cuts of pork	DNY3	DNY3 = 1 Otherwise = 0
Uses advertisement to compare pork prices	DNY4	DNY4 = 1 Otherwise = 0
Ethnic background	ETH3	If Chinese , ETH3 = 1 If Korean, Vietnamese, Japanese, Filipino and "others" = 0
Size of household	SIZEOH	Continuous variable SIZEOH
Income range is:	ING1	$29,999 and under, ING1=1 Otherwise = 0
	ING2	$30,000-$59,999, ING2=1 Otherwise = 0
	ING3	$60,000 and over, ING3=1 Otherwise = 0
Highest level of education is:	AEDGR1	Up to technical school, AEDGR1 = 1 Otherwise = 0
	AEDGR2	College, AEDGR2 = 1 Otherwise = 0
	AEDGR3	University, AEDGR3 = 1 Otherwise =0
Employed full-time	EMPLOY	EMPLOY=1 Otherwise = 0
Age group is:	AAG1	34 and under, AAG1 = 1 Otherwise = 0
	AAG2	35 – 44, AAG2 = 1 Otherwise = 0
	AAG3	45 and over, AAG3 = 1 Otherwise = 0
Price of fresh pork sold at store is important	PRICE1	PRICE1 = 1 Otherwise =0
Availability of specialized pork products sold at the store is important	VAR1	VAR1 = 1 Otherwise = 0
Convenience is important	CONV1	CONV1 = 1 Otherwise = 0
Service in meat section is important	SERV1	SERV1 = 1 Otherwise = 0
Overall quality of fresh pork is important	STQU1	STQU1 = 1 Otherwise = 0
Method of transportation to store choice is:	TRAN1	Walking	TRAN1 = 1 Otherwise = 0
	TRAN2	Bus	TRAN2 = 1 Otherwise = 0
	TRAN3	Car	TRAN3 = 1 Otherwise = 0

log-likelihood ratio[2] indicate that the two estimated models are statistically valid. The value of the

pseudo R^2 which indicate an acceptable goodness of fit.[3] The predictive ability of Model 1 and

Model 2 are quite similar. The percentage of correct predications for Model 1 is 63% and for Model 2

this is 60% of the actual outcomes. The marginal effects of store attributes are shown in Table 11.

Table 10a. Estimates of the Multi-Nominal Logit Model for Store Attributes

	American store	Large Asian	Small Asian	

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[2] Log Likelihood Ratio = -2[Log-L unrestricted model-Log –L of restricted model]

[3] pseudo R^2 = 1-[Ln L(β) / Ln L (no coefficients)]

Variable	Coefficients	T-Ratio	Coefficients	T-Ratio	Coefficients	T-Ratio
PRICE1	0.3228	0.340	-0.0687	-0.072	1.5925	1.729*
VAR1	-1.1211	-1.230	1.4384	1.609	1.4442	1.631
CONV1	2.1105	2.500***	1.5791	1.879*	0.5696	0.674
SERV1	1.5113	1.816**	0.7136	0.851	1.4220	1.709*
TRAN3	1.8397	2.234**	1.4705	1.779*	0.0601	0.072
TRAN1	1.7303	1.448	0.9649	0.772	1.7837	1.512
STQU1	-1.8460	-2.098**	-1.8819	-2.113**	-1.2462	-1.411
* Statistically Significant at 0.10						
**Statistically Significant at 0.05						
***Statistically Significant at 0.01						
Log likelihood function: -172.7916						
Restricted log Likelihood: -233.4167						
Chi-square: 121.2502						
Significance level: 0.0000						
% Correct Predications: 63%						

Table 10b. Estimates of the Multi-Nominal Logit Model for Consumer Characteristics

	American store		Large Asian		Small Asian	
Variable	Coefficients	T-Ratio	Coefficients	T-Ratio	Coefficients	T-Ratio
GEN	0.4872	0.545	-0.2811	-0.300	0.3928	0.425
MMEAL	0.3870	0.422	-0.0353	-0.037	0.3047	0.324
NUM	0.0334	0.541	-0.0131	-0.494	0.0098	0.391
DYN1	-1.4818	-1.530	-1.3291	-1.302	-0.8169	-0.860
DYN2	0.6705	0.729	0.9022	0.943	-0.8510	-0.887
DYN3	-0.5131	-0.519	-1.3389	-1.327	-0.8533	0.861
DYN4	-0.2263	-0.228	-0.1008	-0.099	-0.3778	0.368
ETH3	-0.5534	-0.624	0.4550	0.495	0.3325	0.364
SIZEOH	0.1511	0.549	0.1369	0.482	0.2637	0.936
ING1	1.3789	1.396	1.2731	1.240	1.9779	1.962**
ING2	2.4102	1.871*	2.4035	1.823*	2.8111	2.141**
AEDGR2	0.2622	0.239	0.6897	0.607	-1.0798	-0.971
AEDGR3	0.4739	0.393	0.4776	0.367	-0.5943	-0.484
EMPLOY	0.9660	0.915	1.2885	1.192	1.4007	1.312
AAG3	0.4736	0.381	1.2050	0.948	0.7317	0.580
AAG2	-0.5949	-0.471	-1.3822	-1.056	-0.6165	-0.482
* Statistically Significant at 0.10						
**Statistically Significant at 0.05						
Log likelihood function: -190.7107						
Restricted log Likelihood: -233.4167						
Chi-square: 85.41						
Significance level: 0.000261						
% Correct Predications: 60%						

Table 11. Estimated Marginal Effects of Store Attributes

	Marginal Probabilities[a]			
Variable	Butcher shop	American Store	Large Asian Store	Small Asian Store

PRICE1	-0.01762	-0.08816	-0.1872	0.293
	(-0.569)	(-0.835)	(-1.766)**	(2.657)***
VAR1	-0.01305	-0.5889	0.3105	0.2915
	(-0.464)	(-3.306)***	(2.708)**	(2.539)***
CONV1	-0.4626	0.2546	0.03922	-0.2476
	(-1.107)	(2.366)***	(0.469)	(-2.145)***
SERV1	-0.03822	0.1209	-0.1459	0.06325
	(-1.007)	(1.377)	(-1.637)**	(0.804)
TRAN3	-0.03731	0.2583	0.09104	-0.3121
	(-1.016)	(2.592)***	(1.079)	(-2.317)***
TRAN1	-0.04658	0.1043	-0.1491	0.09134
	(0.926)	(0.877)	(-1.079)	(0.966)
STQU1	0.0520	-0.08352	-0.07627	0.1078
	(1.118)	(-0.808)	(-0.812)	(1.111)

* Statistically Significant at 0.10
**Statistically Significant at 0.05
***Statistically Significant at 0.01

(a) The marginal probabilities are calculated using on equation (6), calculated by LIMDEP
(b) T-ratio in parentheses

As shown in Table 10a, it is found that price, variety of specialized pork cuts, convenience, level of customer service, method of transportation, and quality of pork sold at the store appear to be the most important variables that characterize each store type. The coefficients of these variables on Asian consumers' store choice were found to be statistically significant at the 0.05 significance level. The importance of convenience, price, and quality on store choice corresponds to the results from studies on consumers' food store choice by Recker and Kostyniuk (1978) and Woodside and Trappey (1992).

The results in Table 11 suggest that for consumers who considered price to be of importance in their store choice, the probability of purchasing pork from large Asian stores decreases by 0.1872 while the probability of purchasing from small Asian stores increases by 0.293. For consumers who perceive the variety of specialized pork products to be important in store choice, this has a negative influence on the probability of purchasing pork from American style supermarkets and butcher shops and positive influence on probability of purchasing pork from large and small Asian stores. The highest percentage of consumers who did not purchase offal, pork side bellies and hock purchased

most their pork from American stores. (American stores in general do not carry specialized pork products such as offal, whereas large Asian stores do.)

Overall, Asian consumers who consider convenience to be important have a higher probability of purchasing fresh pork from American stores, regardless of the variety of specialized cuts available at the store. Consumers who are price conscious are more likely to purchase their pork from small Asian stores and are more likely to use forms of transportation other than a car. Conversely, consumers who purchase most of their pork from large Asian store are not as price conscious, nor are they as concerned about the level of customer service at the store. There is a higher probability that Korean, Japanese, Vietnamese, and Filipino consumers will purchase most of their fresh pork at American stores rather than at small and large Asian stores and butcher shops. Likewise, male consumers have a higher probability of purchasing most of their fresh pork at American stores than from small and large Asian store and butcher shops. Lastly, college and university educated consumers are more likely to purchase most of their pork from large Asian and American stores than from small Asian stores.

Analysis of Preferences of Asian-Origin Consumers in California for Pork Attributes

The objective of this section of the study was to examine how Asian consumers rank a variety of selected attributes of fresh pork and to evaluate the simultaneous effects of demographic and socioeconomic factors of Asian consumers on their preferences for these attributes of pork. The data applied in this study are from the survey of Asian-origin consumers that was conducted in San Francisco, California in 1998, in which a total of 173 Asian consumers were intercepted at small Asian stores, large Asian stores, American-style Asian supermarkets, and Asian butcher shops, respectively. As the sample that resulted from this sampling method are choice (store)-based, an ordered probit model, which is amenable to the choice-based sampling procedure, is applied in order to investigate the effects of demographic and socioeconomic factors of the sampled Asian-origin consumers on their preferences for fresh pork attributes.

To elicit information on consumers' perception of attributes of fresh pork in San Francisco, the self-explication approach outlined below [4] was adopted in the survey. The advantage of this approach is that it is simple to use, particularly when large numbers of attribute are of interest, as is the case in this study. Moreover, empirical results have suggested that this approach is likely to yield predictions that are roughly comparable to those of traditional conjoint analysis (Green and Srinivasan 1990, p 10). The nature of the self-explication procedure is that respondents were first asked to evaluate the importance level (rating) of each attribute, using a scale from 1 to 5, with 1 representing "not important at all" and 5 representing " extremely important" as an attribute. Respondents were then asked to allocate a specific number of points (specified as from 1 to 6 in this survey, with 1 representing the least important attribute and 6 representing the most important attribute) across the attributes, to reflect their relative importance or ranking. The respondents' importance ranking is termed its "part-worth" in the language of the marketing literature on attribute valuation (Green and Srinivasan 1990, p 9). The part-worth for each attribute is obtained by multiplying the rating for each attribute and the comparative ranking of each attribute.

A total of 173 Asian-origin consumers were successfully intercepted and surveyed at small Asian stores, large Asian stores, American style Asian supermarkets, and Asian butcher shops, respectively, in the Chinatown regions of San Francisco during the period from September to October, 1998. As for the store choice sample, discussed previously, the criteria for each individual

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[4] The self-explication approach has several possible problems. For example, substantial inter-correlation may apply between attributes and this can make it difficult for the respondent to provide ratings for levels of an attribute, holding all else constant. Another potential problem is that the question "how important is an attribute" can be viewed to be ambiguous, in that the respondent may answer in terms of his/her own range of experience, rather than relative to the experimentally defined range of attribute levels [Green and Srinivasan 1990].

respondent to be included in the sample were that each individual must be a consumer of pork and be of Asian descent. In the collection of these data, an effort was made to obtain an approximately equal number of respondents from each of the four types of stores. The data collected from small Asian stores came from "Main Chinatown" and the "New Chinatown" districts of San Francisco. The data for large Asian stores were collected from customers of the "99" Ranch Markets located in suburban areas of San Francisco. Customers of American style supermarkets were sought from Asian-origin customers of the Safeway, Andornico's, and Cala Foods outlets in the Chinatown regions. The data on customers of meat specialty stores was sought in the Main Chinatown area where these stores are located.

To assess the representativeness of the sample in terms of the demographic structure of the Asian-origin population of San Francisco, survey statistics on gender, ethnic background, and age structure are given in Table 12. It should be noted that demographic data reported for the Asian-origin population of San Francisco also includes the Pacific Island-origin population with the Asian-origin population. The survey sample has a slightly higher proportion of females, as might be expected since females may be more likely to undertake grocery shopping. Filipino and Koreans are under represented in our survey while Chinese-origin respondents are over represented. The group of lowest age, less than or equal to 24 years, is under represented as might be expected since the census data for San Francisco also includes non-shopping population, that is infants and young children, as under the age of 10. Age categories of 25-34 and 35-44 years are over represented. In general these age differences might be expected in terms of the sampled population of food shoppers.

The importance rankings for thirteen pork attributes are summarized in Figure 1. Large part-worth figures indicate high valuations by the surveyed consumers. On average, Asian-origin consumers value freshness most highly, the color of meat is ranked second, a low amount of fat is third, whiteness of fat is fourth, price is fifth, freedom from chemicals is sixth, and having a USDA

Table 12. Comparison of Sample Survey and San Francisco Demographic Data

Socioeconomic and Demographic Characteristics	Categories	Representation in the Survey Sample	Representation in San Francisco Statistics
Gender	Male	43.35%	48.15%
	Female	56.65%	51.85%
Ethnic Background	Vietnamese	4.05%	3.93%
	Filipino	9.83%	27.96%
	Chinese	71.10%	51.35%
	Korean	0.57%	3.29%
	Japanese	6.94%	7.48%
	other	7.51%	5.99%
Age Category	≤24	8.67%	30.90%
	25-34	27.75%	16.96%
	35-44	30.10%	15.58%
	45-54	10.98%	11.86%
	55-64	2.98%	9.35%
	>65	19.65%	15.35%

Source: Brown (1998) and this Survey

Figure 1. Asian-Origin Consumer Importance Rankings for 13 Selected Fresh Pork Attributes

Parts Worths of Attributes
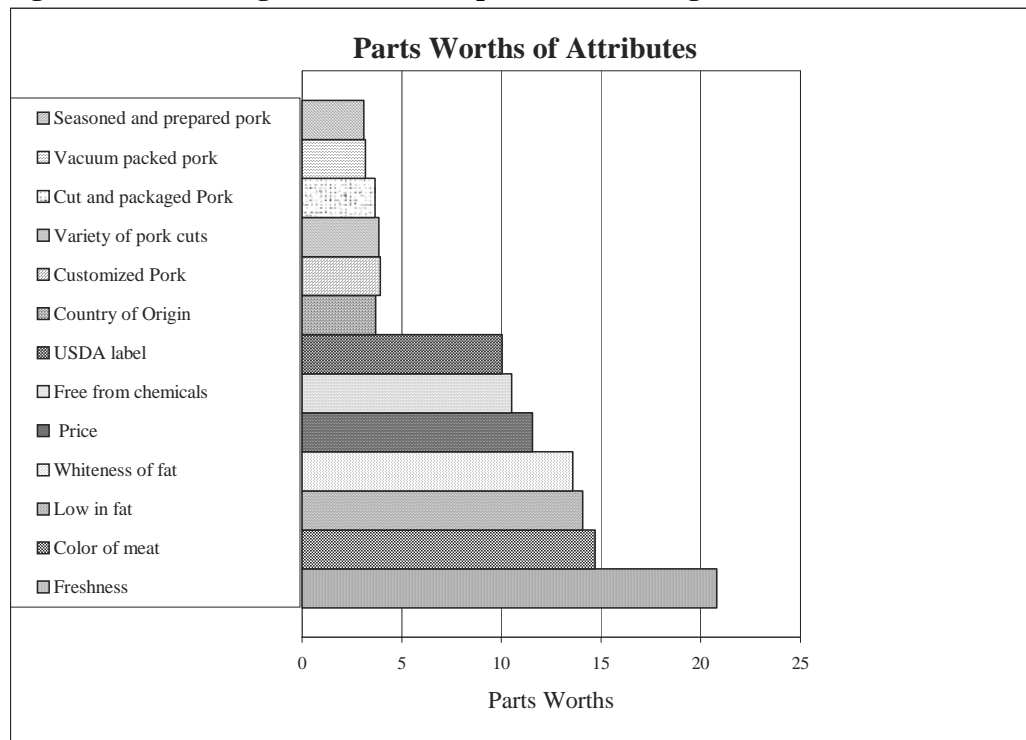
label is seventh. Seasoned and prepared pork was considered the least important attribute. To

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determine whether or not Asian-origin consumers differentiate between these various pork attributes, non-parametric tests, including the Kruskal-Wallis test and Dunn's procedure (Berenson and Levine 1996) were applied. The test results are presented in Table 13. The Kruskal-Wallis test rejects the null hypothesis that the importance rankings of the 13 pork attributes are identical. This test indicates that Asian-origin consumers differentiate between the importance of the pork attributes.

Table 13. The Kruskal-Wallis Test and Dunn's Procedure for Multiple Comparisons of Importance Rankings for Selected Fresh Pork Attributes

H_0: the importance rankings of 13 selected fresh pork attributes are identical.
H_1: the importance rankings of 13 selected fresh pork attributes are not different.

Observed Chi-square=1074.385 and critical Chi-square=26.217 at 0.01 level of significance with 12 degree of freedom. The null is rejected.

Fresh Pork Attributes	Mean Ranks for Fresh Pork Attributes	Dunn's Procedure for Multiple Comparison of c Sample Mean Ranks	
freshness	1942.269	A*	(1)**
color of meat	1594.381	B	(2)
low in fat	1544.642	B	(2)
whiteness of fat	1514.101	B	(2)
price of pork	1383.751	C	(3)
pork free from chemicals	1323.280	C	(3)
USDA label	1278.671	C	(3)
knowing that pork comes from USA	788.552	D	(4)
customized pork cuts	724.535	D	(4)
variety of pork cuts	706.983	D	(4)
cut and packaged pork	678.197	D	(4)
vacuum packed pork	580.422	D	(4)
seasoned and prepared pork	565.217	D	(4)

*Asian-origin consumer importance ranking on the attributes in the same category (A, B, C, or D) are not statistically different, while Asian-origin consumer importance ranking on the attributes in the different categories (A, B, C, or D) are statistically different.
**The numbers in the parenthesis are the order of importance ranks for the fresh pork attributes.

An importance order for the pork attributes is derived following Dunn's procedure and this is given in Table 13. The multiple comparisons reveal four categories of order of importance for the

specified pork attributes.   Individual attributes in the same category are equally important to the

surveyed Asian consumers. Freshness is the most important attribute these consumers consider when

purchasing pork. Attributes such as color of meat, lack of fat, and the whiteness of fat are equally

important to Asian consumers and comprise the second important group of pork attributes. The group

that is third in importance includes the price of pork, freedom from chemicals, and USDA labelled.

Knowing that pork comes from USA, customized pork cuts, the variety of pork cuts, packaged pork,

vacuum packed pork and seasoned and prepared pork are the least important group of attributes.

Explaining Preference Ratings

To model consumer preferences, a theoretical framework based on Lancaster's view of the

demand for attributes is used. Goods are not viewed as the direct objects of utility, rather, it is the

attributes of the goods from which utility is derived (Lancaster 1991).   In this study, consumers'

utility function associated with the purchase of pork is postulated in terms of importance ratings for

selected pork attributes and it is hypothesised that these are determined by a vector (X) of the

consumer's socio-economic and demographic factors. Several ordered-probit models (Maddala 1983,

p. 46-49) were specified and tested.

These included somewhat different specifications of the independent variables, because of

problems of collinearity among these. Based on a priori considerations and trial and error, a set of

variables was chosen as defined in Table 14. The specified socioeconomic and demographic

characteristics include: age, gender, number of years living in the USA, ethnic background,

education, employment status, and whether or not the respondent prepares most of the meals in the

household. All explanatory variables are expressed as binary variables, 0 for nonoccurrence and 1

Table 14. Variable Codes and Statistics for the Survey Data

Dependent variables	Definition & Codes
Selected Fresh Pork Attributes	(1) Free from chemical residues, (2) USDA Label, (3) Low in Fat, (4) Freshness, (5) Color of Meat, (6) Whiteness of Fat, (7) Variety of Pork cuts, (8) Seasoned and prepared Pork, (9) Cut and Packaged pork, (10) Vacuum Packaged Pork,(11) Customized Pork Cuts, (12) Price of Pork, and (13) Knowing That the Pork Comes from the United States.

Importance Rankings	Least important 0, 1, 2, 3, 4, 5 Extremely important		
Independent Variables	**Definition & Codes**	**Mean**	**Standard Deviations**
SASIANSTORE	small Asian store=1, otherwise=0;	0.231	0.423
LASIANSTORE	large Asian supermarket=1, otherwise=0;	0.168	0.375
ASUPERMKT	American style supermarkets=1, otherwise=0;	0.468	0.500
SSTORE	meat specialty store=1, otherwise=0.	0.133	0.341
GENDER	Male respondent =1; female =0	0.434	0.497
MEALMAKER	If the respondent is the main meal maker, yes=1; no=0	0.618	0.487
CHINESE	Chinese=1, otherwise=0.	0.711	0.455
USBIRTH	Born in U.S. =1; other=0	0.243	0.443
USYEARS	Numbers of Year Lived in the States	21.625	16.498
HDSIZE	Number of family members in the household	2.983	1.395
LINCOME	under $29,999=1, otherwise=0;	0.295	0.457
MINCOME	$30,000-44,999=1, otherwise=0;	0.277	0.449
HINCOME	$45,000 and over=1, otherwise=0.	0.428	0.496
YOUNGAGE	Under 34=1, otherwise=0;	0.364	0.483
MIDAGE	Between 35-44=1, otherwise=0;	0.301	0.460
OLDAGE	45 and over=1, otherwise=0.	0.335	0.473
FULLEMPL	full time employment=1, otherwise=0.	0.572	0.496
HIGHSCHOOL	up to high school/technical school=1, otherwise=0;	0.364	0.483
COLLEGE	up to college=1, otherwise=0;	0.335	0.473
UNIVERSITY	University=1, otherwise=0.	0.301	0.460

for occurrence, with the exception of the number of years that the respondent has been living in the USA and the size of the household, both of which are continuous variables. The variables age, income, and education were grouped into three categories as indicated in Table 14.

Separate models were estimated for each of the fresh pork attributes using the ordered probit model. One category of the age, income and education characteristic is dropped, as these characteristics are dummy variables and the inclusion of all three categories would result in singularity problems. As the sample is store-based, each stratum (specific type of store) is allowed to have its own set of cutoff values. Consequently, 16 threshold coefficients were estimated. A log-likelihood test was applied to assess the overall significance of the various independent variables in explaining the variations in the importance rankings (Table 15). A log-likelihood test using $\chi^2_{157,5\%}$ with a critical value of 26.296 indicated rejection of the null hypothesis of the test, $\beta = 0$ (a vector of the coefficients of the consumers' socio-economic and demographic factors), at the 95%

confidence level in the equations for freedom from chemicals, USDA label, low in fat, freshness,

color of meat, whiteness of fat, and price of pork. That is, the socio-economic and demographic

variables are relevant in explaining variations in Asian consumer importance rankings for these

important attributes. This would suggest that Asian-origin consumers cannot be treated as a

homogenous group in pork marketing. However, this test did not reject the null hypothesis, $\beta = 0$, at

the 95% confidence level in the equations for variety of pork cuts, seasoned and prepared pork,

packaged cuts, vacuum packaged pork, customized pork cuts, and knowing that the pork is from the

Table 15. The Estimates of The Ordered Probit Model on the Importance Rankings for the Selected Fresh Pork Attributes

Explanatory	Importance Rankings for Pork Attributes /a						
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(12)
Constant	1.531**/b	1.963**	1.963**	1.742**	1.684*	1.455*	1.228*
GENDER	-0.070	-0.286	0.510*	-0.543*	0.387	0.498	0.261
MEALMAKER	0.264	0.060	0.272	-0.246	0.273	0.299	-0.088
SASIANSTORE	-0.100	-0.224	-0.480	0.190	-0.437	-0.482	-0.119
LASIANSTORE	-0.093	-0.507	-0.131	1.074*	-0.116	0.212	0.801*
ASUPERMKT	-0.176	-0.402	-0.101	0.406	-0.070	0.149	0.520
CHINESE	-0.740**	-0.857**	0.113	-0.279	-0.061	0.065	0.415*
USBIRTH	0.665*	0.803**	-0.577	-0.305	-0.426	-0.620	-0.146
USYEARS	-0.003	0.006	0.001	0.012	0.002	0.007	-0.021*
HDSIZE	0.065	0.036	-0.113	0.122	-0.058	-0.110	-0.009
LINCOME	-0.048	-0.068	0.059	0.385	0.220	-0.036	0.260
MINCOME	-0.254	-0.322	0.325	0.179	0.474	0.350	0.192
YOUNGAGE	0.840**	0.789*	-0.305	-0.112	-0.034	-0.051	-0.704*
MIDAGE	0.836**	0.881**	-0.003	-0.260	0.019	0.008	-0.451
FULLEMPL	-0.241	-0.210	-0.075	0.092	-0.050	-0.086	0.123
HIGHSCHOOL	-0.258	-0.478	-0.034	0.373	-0.021	0.116	0.484
COLLEGE	-0.171	-0.289	-0.605**	0.303	-0.618**	-0.628**	0.161
Model chi-squares	0.42**	78.60**	53.62**	37.71**	45.24**	49.13**	46.82**

a. (1) Free from chemical residues, (2) USDA Label, (3) Low in Fat, (4) Freshness, (5) Color of Meat, (6) Whiteness of Fat, and (12) Price of Pork.
b. * at the 0.05 level of significance, and ** at the 0.01 level.

variations in Asian-origin consumers' importance rankings for these attributes which, as noted

previously, were found to be of least importance to Asian-origin consumers. Statistically significant

results of the ordered probit models of selected pork attributes, are reported in Table 15.

Table 16 presents the specification test results, using estimates of the threshold variables.

The threshold variables are interpreted as the numerical linkages between the utility function of respondents and the preference ratings for pork attributes. According to Maddala (1983), the threshold coefficients (μ_{ij}) should exhibit the relationship $\mu_{1j} \leq \mu_{2j} \leq ... \leq \mu_{j-1,j}$, and must be positive. Failure to exhibit these conditions would imply specification error of the model. All the estimated threshold coefficients were positive and properly ordered. All threshold coefficients were statistically significant at the 99% confidence level except for μ_{11} in the estimation of the equations for the attributes of freshness and whiteness of fat. The results imply that that there is no misspecification error in the ordered probit model. Highly significant, positive μ estimates indicate that the categories in the response variable are indeed ordered.

Estimated coefficients are tested using t-test statistics. A positive sign on a the statistically significant parameter estimates indicates the likelihood of the response increasing with the level or presence of x_k, holding other variables constant, and vice versa. For example, the coefficient of GENDER is significant at the 95% in the equations for "low in fat" and for "freshness", but GENDER is not significant in the rest of the attribute equations. The significantly positive coefficient of GENDER in the equations for "low in fat" indicates that the likelihood "low in fat" is important is higher for a respondent that is female rather than male. The significantly negative coefficient of GENDER in the equation for freshness indicates that the likelihood of importance of this attribute decreases for a respondent that is male rather than female. The importance rankings for other attributes are not changed with a difference in gender of the respondent.

Table 16. Major Statistical Properties of the Ordered Probit Models

Coefficients of the Thresholds Variables	Importance Rankings for Pork Attributes/a						
	1	2	3	4	5	6	12
μ_{11}	0.998**	1.028**	0.779**	0.857*	0.351	0.278	0.334**

μ_{21}	2.055**	2.091**	1.135**	1.193**	0.602**	1.344**	1.327**
μ_{31}	2.291**	2.304**	1.937**	1.626**	1.619**	1.806**	2.562**
μ_{41}	2.567**	2.558**	3.164**	2.903**	2.681**	2.887**	2.980**
μ_{12}	1.076**	1.010**	0.589**	0.482	0.131	0.459*	0.669**
μ_{22}	1.920**	1.733**	1.526**	0.726*	1.218**	1.359**	1.368**
μ_{32}	2.636**	2.480**	2.246**	1.838**	2.103**	2.095**	2.174**
μ_{42}	2.929**	2.869**	3.393**	2.719**	3.018**	3.366**	2.971**
μ_{13}	0.720**	0.874**	0.296**	0.310	0.364**	0.249**	0.600**
μ_{23}	1.820**	1.732**	0.972**	0.877**	0.815**	0.838**	1.517**
μ_{33}	2.547**	2.443**	1.792**	1.684**	1.809**	1.737**	2.456**
μ_{43}	3.224**	3.457**	2.437**	2.726**	2.535**	2.361**	2.870**
μ_{14}	1.056**	1.092**	0.631**	0.382**	0.684**	0.480**	0.783**
μ_{24}	1.696**	2.134**	1.219**	0.912**	1.097**	1.307**	1.414**
μ_{34}	2.381**	2.524**	2.279**	1.471**	2.135**	2.177**	2.530**
μ_{44}	2.705**	2.807**	3.243**	2.252**	3.231**	2.851**	3.706**

a. (1) Free from chemical residues, (2) USDA Label, (3) Low in Fat, (4) Freshness, (5) Color of Meat, (6) Whiteness of Fat, and (12) Price of Pork.

b. *at the 0.05 level of significance and ** at the 0.01 level.

Estimated coefficients of the variable LASIANSTORE were positive and significant at the 95% level of confidence in the equations for freshness and price, but not significant in the rest of the attribute equations. This suggests that Asian consumers who purchase most of their fresh pork at large Asian stores value freshness more and were more price sensitive than other Asian-origin consumers. Coefficients of CHINESE were negative and significant at the 99% level of confidence in the equations for "free from chemical residues" and "USDA label", while the estimated coefficient on CHINESE was positive and significant at the 95% level of confidence in the price attribute equation. This suggests that the Chinese-origin consumers value food safety attributes less than do the other groups of Asian-origin consumer and are more price sensitive than these other groups. Coefficients on the variable BIRTHUS were positive and significant at the 99% level of confidence in the equations for "free from chemical residues" and "USDA label", suggesting that a typical Asian-origin consumer who was born in the United States values food safety attributes more than the

other identified groups of Asian-origin consumers. The number of years that Asian-origin consumers have lived in the US significantly affects their importance rankings for the price attribute. The negative coefficient on YEARINUS indicates that the longer Asian-origin consumers have lived in the US, the more likely it is that the consumer   is less price sensitive.

Coefficients of YOUNGAGE and MIDAGE were positive and significant at the 99% level of confidence in the equations for "free from chemical residues" and "USDA label". Asian-origin consumers that are 45 years or less of age value food safety attributes more highly than do older Asian consumers. The estimated coefficient on YOUNGAGE was negative and significant at the 99% level of confidence in the price attribute equation. This indicates that Asian-origin consumers of 35 or less years of age tend to be less price sensitive than is the case for older Asian-origin consumers. Coefficients on COLLEGE were negative and significant at the 99% level of confidence in the equations for "low in fat", "color of meat", and "whiteness of fat". College-educated Asian-origin consumers value fresh pork attributes such as low in fat, color of meat, and whiteness of fat less than is the case for the sampled university-educated Asian-origin consumers. One interesting result that seems inconsistent with the findings concerning education is the sampled high school graduates appears to have the same preferences for these attributes as the university graduates.

Coefficients on HDSIZE, HINCOME, MINCOME, and LINCOME were insignificant in all the attribute equations. This suggests that household size and income were not important determinants of the importance rankings for the fresh pork attributes.

The marginal effects are computed for all equations and independent variables using LIMDEP 7.0. The marginal effects for the variables that are found to be statistically significant are reported in Table 17. A positive marginal effect of x_k indicates that the probability of an event increases with x_k while a negative effect indicates the opposite. The marginal effects should sum to zero by canceling one another out across the response categories. Scrutiny of demonstrates that this

holds true for the marginal effects in Table 17.

Table 17. The Marginal Effects of Selected Factors on the Probabilities of Importance Rankings for Pork Attributes

Attributes	Marginal Effect on the Probabilities of The Importance Rankings for Fresh Pork Attributes*					
	Prob(j=0)	*Prob(j=1)*	*Prob(j=2)*	*Prob(j=3)*	*Prob(j=4)*	*Prob(j=5)*
(1) Free from Chemical Residues						
CHINESE	0.0938	0.1506	0.0203	-0.093	-0.0689	-0.1029
USBORN	-0.0899	-0.1443	-0.0195	0.0891	0.066	0.0986
YOUNGAGE	-0.1118	-0.1795	-0.0242	0.1109	0.0821	0.1226
(2) USDA Label						
CHINESE	0.1257	0.1929	-0.0005	-0.1136	-0.1008	-0.1036
USBORN	-0.113	-0.1734	0.0005	0.1022	0.0906	0.0931
YOUNGAGE	-0.1173	-0.1799	0.0005	0.106	0.094	0.0967
MIDAGE	-0.1302	-0.1999	0.0006	0.1178	0.1044	0.1074
(3) Low in Fat						
GENDER	-0.0572	-0.055	-0.0577	0.0057	0.0925	0.0717
COLLEGE	0.0758	0.073	0.0765	-0.0075	-0.1227	-0.095
(4) Freshness						
GENDER	0.0054	0.0093	0.0345	0.1034	0.0599	-0.2125
LASIANSTORE	-0.01	-0.0171	-0.0631	-0.1895	-0.1097	0.3894
(5) Color of Meat						
COLLEGE	0.0771	0.055	0.0873	0.0167	-0.1197	-0.1164
(6) Whiteness of Fat						
COLLEGE	0.0915	0.0533	0.0863	-0.0108	-0.1141	-0.1061
(12) Price						
LASIANSTORE	-0.1359	-0.1409	-0.0897	0.1306	0.1367	0.0992
CHINESE	-0.0571	-0.0592	-0.0377	0.0548	0.0574	0.0417
USYEARS	0.0029	0.003	0.0019	-0.0028	-0.0029	-0.0021
YOUNGAGE	0.1009	0.1045	0.0666	-0.0969	-0.1015	-0.0736

* 5 represents highest preference rating and 0 lowest rating

The interpretation of the marginal effects is reasonably self-evident. Rank 5 represents the

highest preference rating and 0 is the lowest rating. For example, the marginal effect for CHINESE

on the probability of choice of particular importance rankings for "low in fat" shows that, if the

respondent is of Chinese-origin, there is an increase of 9.38% in the probability of choosing rank 0,

an increase 15.06% in the probability of choosing rank 1, an increase of 2.03% in the probability of

choosing rank 2, a decrease of 9.30% in the probability of choosing rank 3, a decrease of 6.89% in the probability of choosing rank 4, and a decrease of 10.29% in the probability of choosing rank 5. Taking another example, the marginal effect with respect to YEARINUS on the probability of importance rankings for the price attribute shows that, if the respondent has lived in the U.S. for one year longer, there is an increase of 0.29% in the probability of choosing rank 0, an increase of 0.3% in the probability of choosing rank 1, an increase of 0.19% in the probability of choosing rank 2, a decrease of 0.28% in the probability of choosing rank 3, a decrease of 0.29% in the probability of choosing rank 4, and a decrease of 0.21% in the probability of choosing rank 5.

Part II: Some Implications of Consumers' Importance Rankings for Pork and Consumers' Store Choices of Asian Origin Consumers

The preceding section of the study reports on an investigation of how Asian-origin consumers in San Francisco, California ranked thirteen selected attributes when purchasing fresh pork. The non-parametric tests reveal four distinct categories of order of importance for those pork attributes. Freshness is the most important attribute that the sampled consumers consider when purchasing pork. The second most important category of pork attributes includes color of meat, lack of fat, and the whiteness of fat. The third category consists of the price of pork, freedom from chemicals, and USDA labelled. Knowing that pork comes from the U.S., customized pork cuts, the variety of pork cuts, packaged pork, vacuum packed pork and seasoned and prepared pork are the least important attributes for Asian-origin consumers.

The empirical results from the ordered probit model suggest that Asian-origin consumers' demographic and socio-economic characteristics influenced their ranking of importance for the pork attributes that were identified to be important. Overall, these suggest that Asian-origin consumers should not be treated as a single homogenous group for niche marketing purposes since there are identifiable sub-group of these consumers with specific preferences. For example, the nutritional attribute of "pork that is low in fat" was valued more by highly educated females, and food safety

attributes such as "free from chemical residues" were valued more by U.S. born younger Asian-origin Americans. The results given here may be useful in helping determine effective marketing strategies targeted to Asian-origin consumers.   For example, Chinese-origin respondents were found to be much more price sensitive than were other Asian-origin groups, suggesting that efforts to reduce production and marketing costs of pork could be of particular importance in marketing pork to the Chinese-origin segment of Asian pork market. The other component of the second part of the study focused on the choice of retail stores by Asian-origin consumers for their fresh pork purchases. Price, variety of specialized pork cuts, level of customer service, method of customer transportation and quality of pork were all found to be important variables in explaining store choices by this group of customers. As in the analysis of preference rankings for pork attributes, there are nonetheless, distinct differences between preferences and behaviour of different ethnic subgroups within the broad category of Asian-origin consumers. Market development strategies that are oriented to particular subgroups may, therefore be desired.

Overall Summary

The ethnic Asian market in Washington and Oregon constitutes a sizable niche market for fresh Canadian pork. Since California possesses a large population segment that originates from Asia, the characteristics of the ethnic Asian-origin market in the northern part of that State are also of interest since this may also be a potential niche market for Canadian pork. The objectives of the first part of this study are to evaluate the Asian ethnic markets for fresh pork in the United States Pacific Northwest and Vancouver. In the second part of the project the assessment of the market for fresh pork by Asian-origin consumers was extended to San Francisco. In this extension, a detailed assessment was also made of the product preferences for fresh pork by Asian-origin consumers in San Francisco and the behaviour patterns associated with store choices of these fresh pork consumers.

Asian retailers and distributors in Vancouver, Seattle and Portland were surveyed by direct

interview during November and December 1996. The survey applied semantic differential scaling questions, open-ended questions and a stated preference task, a conjoint methodology, to examine pork retailer's and distributor's perceptions of fresh pork produced in Western Canada and in the Midwest United States. Personal interviews with wholesalers and retailers were also applied in the San Francisco market survey which was conducted in 1998. Two consumer surveys were also conducted in San Francisco in 1998, directed at Asian-origin consumers of fresh pork.

The structure of the market for fresh pork represented by retailers catering to Asian consumers in Vancouver differs from that in Seattle and Portland. The "Asian market" in Vancouver is dominated by many small shops that deal directly with packers. The small shops in Seattle and Portland deal with distributors and wholesalers. Distributors play a small role in Vancouver's retail market. Asian retailers in Seattle deal with a variety of suppliers, including both packers and distributors. In Portland, retailers catering to Asian consumers trade mainly with distributors and a local packer-wholesaler. In San Francisco, Asian stores and butcher shops prefer to obtain pork through smaller joggers, while American style supermarket retailers catering to the Asian consumers purchase pork directly from meat packing companies; fresh pork is sold in different ways in the different types of stores catering to Asian consumers that are found in these markets.

The first survey found that Western Canadian pork enjoys an image of superior quality amongst retailers and distributors in Seattle's ethnic Asian market. Asian retailers in Portland are less familiar with Western Canadian pork and did not regard it as highly as did retailers in Seattle. However, distributors in Portland are more familiar with Western Canadian pork and consider it to be superior to Midwest United States pork in terms of overall quality, meat colour and fat trim. In both these markets, Western Canadian pork is generally considered to be expensive. These results are not statistically significant, however they are of economic relevance since most of the major players in the segment were interviewed. Little knowledge of Western Canadian pork was evidenced by retailers or consumers in this market segment in San Francisco.

Western Canadian pork presently enjoys a reputation for superior quality amongst the retailers that specialize in sales to Asian consumers in Seattle and Portland. However it is also clear that many members of the trade lack information or experience with Canadian pork. Consequently, there is an opportunity for Canadian processors to maintain or increase market share through more education and promotion to this market segment.

The 1998 survey of Asian-origin consumers of fresh pork in San Francisco focused on two aspects: preferences for fresh pork attributes and choice of store for fresh pork purchases. An intercept survey method was chosen to select and interview consumer respondents. Some 40% of the 196 respondents to the store choice survey purchase most of their fresh pork from American style supermarkets, 33% purchase mostly from small Asian stores, 24% from large Asian stores, and the rest from butcher shops. The most popular cut of pork purchased by Asian consumers is loins, followed by pork shoulders and butts, then pork leg, bellies, hock, and offal. The analysis indicated that socio-economic and demographic factors, as well as store attributes, significantly affect Asian consumers' store and product choices.

The analysis of the ranking of selected attributes of fresh pork by Asian-origin consumers in San Francisco, California showed that freshness is ranked as the most important attribute, followed by the attributes of the color of meat, lowness in fat, and the whiteness of fat. The attributes of price, freedom from chemicals, and being USDA labelled were also ranked to be of importance. The attributes of little or least importance were knowing that pork came from the US, customized pork cuts, the variety of pork cuts, packaged pork, vacuum packed pork and seasoned and prepared pork. Empirical results from an ordered probit model postulated to explain respondents' rankings of attributes indicate that particular demographic and socio-economic characteristics of Asian-origin consumers influenced the importance rankings for the pork attributes that were identified to be important. For example, Chinese origin consumers were appreciably more sensitive to pork price than were other Asian-origin groups. One facet of the findings is that marketing strategies should not

treat Asian-origin consumers as a single homogenous niche group in marketing since there are identifiable sub-groups of these consumers with specific attitudes and preferences.

Implications of the Study for Alberta's Agri-Food Industry and the Advancement of Knowledge

Export market development is of major importance to Canada's industry. The hog sector of Western Canada is heavily dependent on external markets. The Asian-origin market for fresh pork was identified by Canada Pork International as a niche sector of interest to the industry. The selection of the Pacific Northwest market regions of Portland and Seattle was due to the current importance of these target markets for Western Canadian hog producers. Comparison assessments were made in the Canadian market-region of Vancouver. The subsequent extension of the analysis to San Francisco allowed assessment of major features of major northern California markets. There is opportunity of Canadian processors to expand market share through more education and promotion that is directly targetted to the preferences and shopping patterns of the identified groups of ethnic origin consumers to this market segment. However, prior to this study information was lacking on the ethnic market for fresh pork. Many members of the trade and most Asian-origin consumers in the specified target markets lack information and experience with Canadian pork. The study provided information about market channels, traders' assessments of Canadian pork and the services associated with Canadian pork in the specified regions. The analysis in San Francisco also provided information about Asian-origin consumers' preferences for pork attributes and store choices for fresh pork purchases. This information is expected to be helpful as a guide to market development strategies that might be applied in each market.

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List of Publications Emanating from the Study

At the time of writing, one MSc thesis has been completed and another MSc thesis is near completion. One Rural Economy staff paper has been published, as has one reviewed journal paper. One further journal paper is under review and a third is in preparation. Several abstracts have been displayed (as at the *Alberta Pork Symposium* and *Research Revelations*). Published works to this point are listed below.

Kuperis, Peter, Michel Vincent, James Unterschultz and Michele Veeman. 1997. "Niche Markets for Fresh Canadian Pork in the Pacific Northwest: A Case Study." Staff Paper 97-03. Department of Rural Economy, University of Alberta. Mimeo. 66 pp.

Kuperis, Peter, Michel Vincent, James Unterschultz and Michele Veeman. 1999. "Ethnic Niche Markets for Fresh Canadian Pork in the United States Pacific Midwest." Co-published simultaneously in *Journal of International Food and Agribusiness Marketing* International Business Press, and imprint of The Haworth Press Inc., 1999. pp. 31-45. and *Cross-National and Cross-Cultural Issues in Food Marketing*. (Ed: Erdener Kaynak) International Business Press an imprint of The Haworth Press, Inc., 1999, pp. 41-45.

Le, Theresa.. 1999. Asian Consumer's Store Choice for Fresh Pork in San Francisco California. M.Sc. Thesis. Department of Rural Economy, University of Alberta.

Chen, Kevin, Murad Ali, Michele Veeman, James Unterschultz and Theresa Le. "Importance Rankings for Pork Attributes by Asia-Origin Consumers in California: Applying an Ordered Probit Model to a Choice-Based Sample." 23 pp. Under Review.