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Asian Consumer's Store Choice for Fresh Pork in San Francisco, California

By

THERESA LE 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirement for the degree of MASTER OF SCIENCE

IN

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The undersign certify that they have read, and recommended to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled ASIAN CONSUMER'S STORE CHOICE FOR FRESH PORK IN SAN FRANCISCO, CALIFORNIA submitted by THERESA LE in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in AGRICULTURAL ECONOMICS.

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Abstract

This study examines Asian consumers' store choices for fresh pork and assesses factors that may influence these choices. These factors include socioeconomic and demographic characteristics of the consumer and store characteristics. The store characteristics examined in this study are: the price and quality of pork sold at the store, the level of customer service in the meat department, location and accessibility of the store, and the variety of specialized pork products sold at the store. This study also examines the type of stores in which Asian consumers purchase various pork cuts.

Data for the analyses were obtained through a "mall intercept" survey, conducted in San Francisco, of Asian consumers who consume and purchase pork, buying this at four different types of stores. Store types include small Asian stores, large Asian stores, American style supermarkets, and meat specialty stores. Cross-tabulations and a multi-nominal logit model of consumer's store choice for fresh pork from the four types of stores were developed and the probabilities of selecting each store type were estimated.

The results indicate that Asian-origin consumers who are price conscious are more likely to purchase fresh pork from small Asian stores. Conversely, consumers who purchase most of their pork from large Asian stores are less price conscious and less concerned about store-level customer service. Consumers who consider convenience important in their store choice for fresh pork are most likely to purchase from American-style supermarkets. Korean, Japanese, Vietnamese, and Filipino consumers have a higher probability of purchasing most of their pork from American stores. In contrast to a common perception of a preference for speciality cuts by Asian consumers, offal, pork side bellies, and hocks are least purchased, while pork loins, shoulders and ground pork are the pork cuts most favored by Asian purchasers in San Francisco.

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Chapter 1 Introduction

1 Introduction

Retail sales are a key component of the distribution system for any product (Riethmuller 1994) and many factors contribute to the success of retail sales. Consumer characteristics such as ethnicity have an important effect on retail sales because ethnicity permeates all areas of life including consumer's shopping needs, choices and habits (Solomon et al 1996). Consequently, ones culture has an impact on the decision of where to shop and what products to purchase. Food marketers are recognizing the importance of understanding the correlation between ethnicity and purchasing practises and are becoming more strategic in their marketing strategies toward specific ethnic groups. For example one common perception of Asian consumers' shopping habits is that Asian consumers are most likely to shop in Asian speciality stores. A question which then arises is what kinds of products are Asian consumers likely to purchase from Asian speciality stores? Knowledge about consumer's store choice for specific products in these ethnic markets is needed to market products effectively within the Asian market segment. As individual ethnic groups grow in size and prominence, their unique cultures and traditions may represent a sizeable sub-group of consumers associated with particular market outlets. Evidence of this can be seen in the growth of ethnic market places such as in the "Chinatown" or the "Little Italy" often found in large metropolitan cities. This demonstrates the effects of ethnicity on retail sales is too important to be ignored.

In recognizing the importance of ethnicity, Alberta Pork Producers Development Corporation and Alberta Agriculture Research Institute funded a project to learn more about the Asian ethnic market for fresh pork, as a potential niche market for Alberta pork. Niche markets consist of an identifiable sub-group of consumers with specific needs or preferences. Often niche markets are associated with individual ethnic groups. The selection of Asian consumers versus other ethnic groups was largely due to two factors; pork is an important component in Asian diets and the number of Asian food stores and supermarkets in Canada is increasing (Solomon et al 1996). This project resulted in a study by Kuperis et al (1997) to evaluate the Asian ethnic market for fresh pork in the Pacific Northwest United States. That study examined how retailers from

Asian speciality stores retailed fresh pork and the marketing structure and channels of the Asian fresh pork market in Settle, Portland and Vancouver. In the study by Kuperis et al (1997) the ethnic Asian market in Northern California was also suggested to be a potential niche market for Canadian fresh pork.

San Francisco's Asian market for fresh pork was chosen as a target market of potential interest for Alberta pork in California and is the focus of this study. Knowledge of San Francisco's ethnic Asian consumer's store choice for fresh pork is needed to assess this market. This knowledge may enable Alberta pork exporters to better determine possible marketing and distribution channels. Such knowledge could potentially be used to influence the way consumers' shop within the market segment. To effectively meet the demands of this growing segment of ethnic consumers, marketers need to understand the specific demands, characteristics, purchasing preferences, and habits of this market segment. Such knowledge will assist in marketing Alberta pork in a manner which meets the needs of ethnic Asian consumers in San Francisco, California.

San Francisco was chosen as a focus of this study for a number of reasons. Firstly, approximately 33% of San Francisco population (259,087 people) are Asian and Pacific Islanders. This is the second largest ethnic group in San Francisco, after "Whites"[1] (California State Department of Finance 1998). This city is believed to have the largest "Chinatown" in North America. More information on San Francisco's growing population can be found in Appendix 1. Secondly, San Francisco is geographically closer to Alberta than is the case for other major Californian cities. Alberta has a slight distance advantage over the Midwest states to serve Northern California markets. At present, Alberta's retail presence in pork markets in California is rather insignificant. There is a need to explore the market potential in California for Alberta pork.

1.1 California as a Potential Market for Fresh Canadian Pork

Currently, most of the pork and live hogs shipped to California come from the Midwest United States. The production of pork in California is small in comparison to the other American states. The hog industry in California supplements its inventory of hogs by importing hogs for feeding and breeding from other states and some of these are from

[1] California State Department of Statistics uses the following names "whites", "blacks", "Hispanic", "Asian/Pacific Islander" and "American Indian" to categorize race/ethnic origin.

Canada (Quagrainine 1997). Using the United States per capita pork consumption as representative of per capita pork consumption in California and comparing total in-state pork production to total state population, Quagrainie (1997) found that California has a deficit in pork production. According to his analysis, it was found that in-state production accounts for only 4% of the total pork requirements in California between the years of 1991 to 1995 (see Table 1-1). By 1996 and 1997, in-state production accounted for only 3.8% and 3.6% respectively, of the pork requirement in California. Over the last few years, California's total pork production has been declining, while population has been increasing. The shortfall in meeting California's pork requirements suggests a potential for Alberta pork exporters to expand successfully into this market.

Table 1-1: Pork Production and Consumption in California (1990-1997)

	1990	1991	1992	1993	1994	1995	1996	1997
Total Population ('000)	29,944	30,565	31,188	31,517	31,790	32,063	32,384	32,957
California Total Pork Production ('000lb.)	71,671	85,367	93,966	101,833	95,245	88,614	77,815	74,055
Per Capita Pork Consumption (lb.)[a]	63.7	64.4	67.9	67.1	68	67.5	63.3	62.9
Total Pork Consumption ('000 lb.)[b]	1,907,433	1,968,386	2,117,665	2,114,791	2,161,720	2,164,253	2,050,181	2,071,903
California % of pork production to consumption	3.8	4.3	4.4	4.8	4.4	4.1	3.8	3.6

Source: Quagrainie (1997), California Agricultural Statistics Services (1998) and USDA (1997)

a. US per capita pork consumption estimates (carcass weight) were from USDA (1997)
b. Estimated total consumption is per capita consumption multiplied by the total population

1.2 Objectives of the Study

The overall objective of this study is to gain a better understanding of San Francisco's fresh pork marketing channels and ethnic Asian consumer's store choice for fresh pork. The specific objectives for this study are:

1. Obtain information on where ethnic Asian consumers purchase most of their fresh pork products;
2. Investigate how and whether factors such as the price and quality of fresh pork, location, convenience and the level of customer service influences the ethnic Asian consumer's store choice;

3. Determine whether the socioeconomic and demographic characteristics of consumers have an influence on their store choice and;
4. Derive marketing implications from the information gathered.

1.3 Method of Analysis

To meet these objectives formal interviews were conducted with retailers, wholesalers, and slaughter and packing companies in San Francisco. Then a mall intercept survey was used to elicit information on where respondents purchased most of their fresh pork, factors that may influence their store choice, and respondent's socioeconomic and demographic characteristics. The study is based on the results of a survey of 198 Asian respondents, who are consumers and purchasers of fresh pork in San Francisco, California. The survey was conducted in September of 1998. To examine whether and how these factors and characteristics influence ethnic Asian consumer's store choice, two types of analysis were employed: cross-tabulations and the development of a multi-nominal logit model that relates to consumer's store choice for fresh pork.

1.4 Organization of the Thesis

The thesis starts with a description of San Francisco's Asian fresh pork market. In Chapter 3, a brief literature review is discussed. A discussion of cross-tabulation methods and the theoretical framework of the multi-nomial logit model are also provided in Chapter 3. The survey design and description of the data set are outlined in Chapter 4. The analysis of the collected data using cross tabulations is provided in Chapter 5. In Chapter 6 the results of the multi-nominal logit model are reported and analyzed. In the final chapter, implications of the research are outline and future research possibilities in the area are outlined.

Chapter 2 San Francisco's Asian Fresh Pork Market

2 Introduction

Little is known about San Francisco's Asian fresh pork market. To gain insight into this market, interviews were conducted with retailers, wholesalers, and packers who service this market. The interviews were conducted in two phases. The first phase consisted of initial telephone interviews with wholesalers and retailers in San Francisco, California. Direct, unstructured, open-ended questions were used to elicit general information on San Francisco's Asian fresh pork market. The second phase of these interviews involved direct, open-ended structured discussions, in addition to quantitative rating questions for a series of attributes that were used to assess their perceptions regarding the quality of fresh pork and the effectiveness of promotional activities. The majority of interviews in the second phase were conducted in San Francisco and in the establishments of the respondents; a few interviews were conducted over the telephone. The purpose of conducting the interviews at the various establishments was to allow the interviewer to observe directly the ways in which fresh pork is retailed in the San Francisco Asian food market. To provide a more complete picture of the fresh pork market, interviews were also conducted with representatives of pork companies that did not service the Asian market. A total of 19 interviews were conducted: 5 wholesalers, 1 packer and 13 retailers. A copy of the questionnaire which was used is provided in Appendix 2.

The observations made during the interviews, together with information gathered during the interviews, provide the basis for the following description of the structure of the Asian fresh pork market in San Francisco. These descriptions are discussed in the following sections.

2.1 Grocery Retail Structure

The Asian fresh pork market in San Francisco is composed of four main types of stores: (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, 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 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 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 America 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.

The fresh pork retail market in San Francisco's Main Chinatown is very competitive. There appears to be much competition amongst the retailers. For example, on Stockton Street, the center street of Main Chinatown, there are 6 small Asian groceries and 2 large butcher shops, all located within one block of each other. In contrast, there is a lower concentration of retailers in New Chinatown, Japantown, and Vietnamese town. For example, there are only two grocery stores in Japantown that sell fresh pork.

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

[1] The number of stores mentioned in this thesis was assessed from the San Francisco Metropolitan Area 1998 phone book and from the representatives of the retail outlets that were

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 their meal as take-out. The fast food section of the store includes a dessert counter as well as a Bar-B-Q section where Bar-B-Q pork, duck, sausage and squid are sold.

2.2 Retailing of Fresh Pork

It was observed that 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. The 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 also 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 visited do not carry offal. Some American stores will sell pig feet at the customer's request.

It was observed that 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

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surveyed

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.

2.3 Observed Market Channels

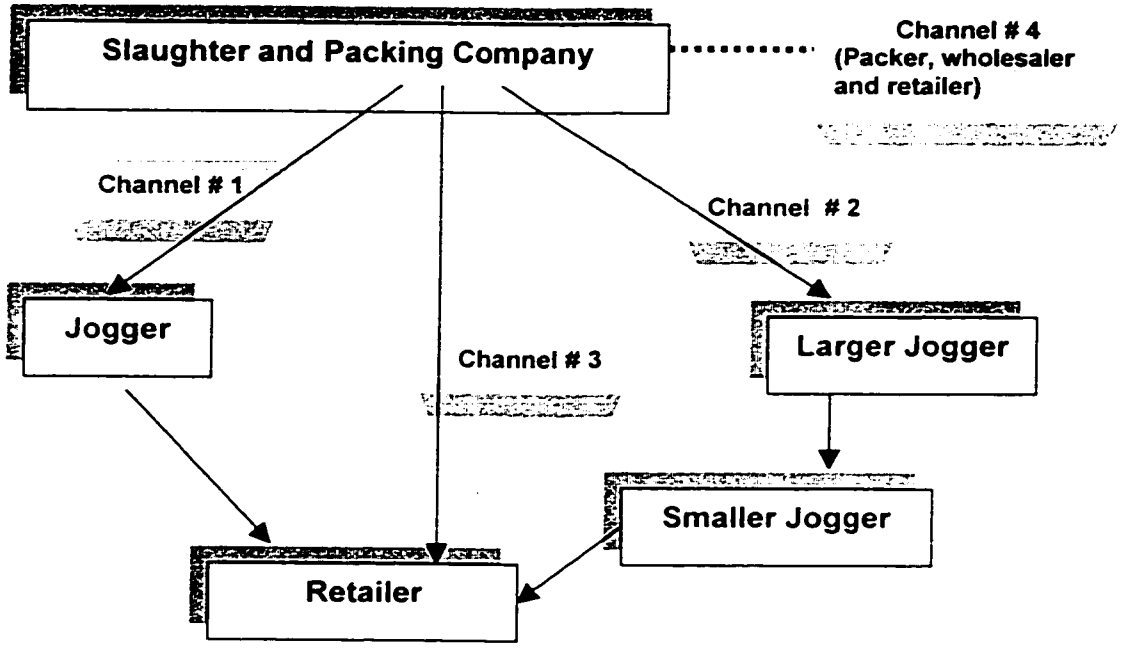
The Asian fresh pork marketing channels in San Francisco include three main levels: slaughter and packing companies; brokers or wholesalers (more commonly referred to as "joggers"), and retailers. In San Francisco, there are two types of joggers and are characterized according to size. Smaller joggers will tend to purchase pork from larger joggers, then resell the pork to retailers. This is largely due to their lack of storage facilities, as the majority of smaller joggers do not have the storage space to hold large amounts of pork.

In San Francisco, four different types of marketing channels exist in the Asian fresh pork market. The first of the four is the most basic marketing channel, where the packers sell to the joggers and the joggers then resell the product to the retailers. In the second type, packers sell to larger joggers, larger joggers sell to smaller joggers, and then smaller joggers sell to retailers. The third type is where the packers sell directly to the retailers. The fourth type is probably the least common of the four, where the packer functions as a wholesaler and a retailer. In San Francisco, most of the larger Asian retailers fall into the third group. Small Asian stores and meat specialty stores tend to be part of channels one or two. Small Asian stores and meat specialty shops purchase their pork products from wholesalers on a daily basis as their needs require since most of these stores have very limited storage capacity. The majority of American-style supermarkets tend to purchase directly from the slaughter and packing plants. Figure 2-1 provides an illustration of the four main types of channels that exist in the market.

The closest and largest slaughter plant to San Francisco is Yosemite Meat Co. The company is located in Modesto, California; which is approximately three hours away from San Francisco by car. This company is ranked 25th in the United States in terms of plant capacity, with an estimated daily capacity of approximately 1200 head (National Pork Producers Council 1998). Yosemite Meat Co. sources its hogs from various producers and has imported live hogs from Canada from time to time (Personal

communication from Yosemite Meat Co. representative). The wholesalers interviewed indicated that there are also two smaller custom slaughter facilities that are located at a similar distance from San Francisco.

Figure 2-1 San Francisco's Fresh Pork Marketing Channels



The Asian fresh pork market is supplied by wholesalers or brokers who purchase the majority of their pork from Yosemite Meats Co and IBP Inc. This market is also supplied by wholesalers who purchase from out-of-state packers located in areas such as Nebraska and Iowa (or from IBP Inc. which is not located in California). In Main Chinatown and New Chinatown, the majority of retailers prefer to purchase hogs that have been slaughtered within 72 hours after the kill. Most of the retailers that were interviewed preferred to purchase half carcasses (sides) but have purchased "cryovac" or boxed pork in the past. American style supermarkets purchase the majority of their pork from out-of-state packing plants such as IBP Inc.

The Asian pork market in San Francisco is composed of small Asian stores, large Asian stores, American style supermarkets, and butcher shops. These four types of stores have different preferences regarding how they purchase their pork products. For

example, it was observed that small Asian stores and butcher shops have a preference for obtaining their pork products through smaller joggers. This is compared to American style supermarkets that prefer purchasing their pork products directly from the packing companies. Knowledge about market structure and marketing channels are useful in examining the market potential for Alberta pork as it provides possible avenues in which Alberta pork can enter the Asian fresh pork market in San Francisco.

The retailing of pork varies according to store type. Knowledge about how stores retail their pork is important in examining consumers store choice. One of the many questions that arises from this chapter is whether Asian consumers store choice for fresh pork is dependent on how pork is retailed.

Chapter 3 Store Choice: Literature and Modeling

3 Introduction

This chapter provides a brief review of some of the studies that have been used to examine consumers' store choice. The purpose is to provide a framework for the survey design and the store choice models that will be used to analyze the factors that influence the consumers' store choice for fresh pork in the ethnic Asian market in San Francisco.

3.1 Literature Review

In the area of marketing, the study of store choice covers many different facets. Some studies have focused on products which are generally easily identifiable, such as branded products like instant coffee, breakfast cereal and household items while other studies have focused on examining the frequency of purchase of certain products and patterns of store choice (Keng and Ehrenberg 1988 and Frisbie 1980). The objectives of these types of studies are twofold. One is to examine the competition between brands within the same store group (i.e. for store chains such as Safeway). The second is to examine the competition between store groups (viz. Safeway versus Save On Foods) for the same brand. Studies of consumers' grocery shopping patterns have been used to examine the relationships between frequency of shopping and demographic characteristics as well as looking at the difference between "random" and "routine" shoppers. Random shoppers are those who visit a grocery store at irregular intervals and routine shoppers are those who visit the grocery store at relatively regular intervals (Kim and Park 1997). Modeling patterns of store choice by consumers typically involves the use of negative binomial distribution (NBD) and Dirichlet models. These models show consumer purchasing behavior and forecast patterns of store choice for frequently purchased grocery items (Keng and Ehrenberg 1988). The NBD model was originally developed for studying brand purchasing, but has since been used to predict consumer purchases of frequently bought non-durable goods at particular store groups, store types, or individual stores (Leszczyc and Timmermans 1996).

The Dirichlet model is a purchase incidence model, which examines the number of times a consumer visits a store within a certain time period. The Dirichet model has

"two components or sub-models, which deal with the purchase incidence of the product field and with the probability of selecting particular stores. The model is derived from five distribution assumptions, two concepts concerning store choice, two concerning purchase incidence and one their interrelationship (Wrigley and Dunn 1984:760)."

For a detailed discussion of both NBD and Dirichlet models refer to Wrigley and Dunn (1984) and Keng and Ehrenberg (1988).

In the last decade, other types of store choice models have been developed, such as the Unconditional Competing Risk Hazard Model. The hazard model incorporates a consumer's actual inter-shopping time and has several advantages over the Dirichlet model for modeling store choice. First, in the Dirichlet model, it is assumed that inter-shopping trip timing and store choice behavior are two independent processes. In other words, the timing of inter-shopping trips is independent of store choice. In contrast, the hazard model allows for dependence between these two processes, as one intuitively expects (Leszczyc and Timmermans 1996). For example, it seems reasonable to assume that less frequent shopping trips are associated with the choice of larger supermarkets or shopping centers, and the more frequent trips involve closer, smaller stores and neighborhood centers (Leszczyc and Timmermans 1996).

Another aspect of store choice research is the study of store attributes, commonly called store image variables in marketing literature. The objective of these types of studies is the identification of key attributes that influence a consumer's store choice. These key attributes have often been discussed as "determinant" attributes, since they determine preference and choice (Tigert 1983). Various approaches have been taken towards to the identification and the study of determinant attributes and their effect on store choice. One approach is to query consumers directly with open-ended questions in individual or group interviews. In food retail studies for example, respondents were commonly asked to identify the most important reason why they shop at a particular store. A second approach is to have "expert" retailers list characteristics that they believe consumers rely on in the store choice situation. A third approach is to conduct a literature review on previous studies. The fourth approach is to estimate the coefficients of the choice behaviour (Tigert 1983). In the fourth approach, respondents were commonly asked to rate the stores they shopped at most often (Tigert 1983) or rate

the specific attributes that characterized their store choice (Recker and Kostyniuk 1978). Respondents were also commonly asked to identify the characteristics (levels) of the attributes that best reflects their store choice (Timmermans 1996). For example, in the price attribute, the levels could be expensive, cheap, and average. Regardless of the various approaches, the fundamental questions that store choice studies tries to answer is, "Who shops where and what factors determine where they shop?".

In a mailed survey of 300 randomly selected households, Recker and Kostyniuk (1978) employed a multi-nominal logit model to examine the factors influencing store choice for the urban grocery trip. From their study, they determined that important store attributes can be divided into four major categories;

(1) quality (price of goods, variety of goods);

(2) accessibility (distance from residence and distance from work);

(3) convenience (parking facilities, proximity to other shops, convenient hours, degree of crowding in the store and the display of goods); and,

(4) service (acceptance of credit cards, cheque-cashing policy, and the ease of returning goods).

Recker and Kostyniuk (1978) also identified that the destination choice for the typical urban grocery shopping trip is influenced by three main factors: the individual's perception of the destination; the individual's accessibility to the destination; and the relative number of opportunities to exercise any particular choice (Recker and Kostyniuk 1983).

As cited in Fotheringham (1988b), other studies of shopping behavior, aimed at discovering important store attributes, have supported the findings of Recker and Kostynicuk (1978). They include: Timmermans et al (1982), in which distance, price of goods, choice range, service, quality of goods and parking facilities were identified; Schuler (1979), which identified price, quality, service, parking facilities, and distance; and Blommestein et al (1980), where price, range of good, service, accessibility, parking facilities, atmosphere, safety, complementary service were identified as important store choice attributes.

The study by Woodside and Trappey (1992) on consumers' food store choice, found that low prices, large selection, and a convenient location were the three reasons mentioned most often by respondents for shopping at their named primary store. Their

study supports an earlier one conducted by Louviere and Meyer (1979) in which 100 residents in Tallahassee, Florida and 100 residents in Laramie, Wyoming were surveyed. The consumers were asked to rank the store attributes they perceived as important in their selection of store (Fotheringham 1988b). The results clearly showed that the three attributes which overshadowed all others in frequency of response by consumers were variety of products, convenience to residence, and price levels.

These studies provide great insight on store attributes that are important to consumers. However, knowledge of how these important attributes compare for different consumers is equally necessary. According to Keng and Ehrenberg (1988):

> *"Individual consumers differ demographically, by lifestyle, by usership experience and habits, by exposure to advertising, by price sensitivity, by their proximity to different shops, and by their working habits and mobility."* (Keng and Ehrenberg 1988: 247)

These differences are likely to have an affect on a consumer's store choice. In Fotheringhem's and Trew's (1993), study of the effects of race and income on store choice, income and distance were found to be important determinants to store choice. They found that a store's distance from a consumer's residence is the prime variable in explaining store choice (Fotheringhem and Trew 1993). However, low income consumers were willing to travel further for grocery shopping, *ceteris paribus*, presumably to take advantage of lower prices. Higher income consumers may be unwilling to spend the extra time to shop at stores with the lowest price, being more likely to give up low prices for the sake of convenience (Fotheringhem and Trew 1993). Fotheringhem and Trew's study also suggested that the store choice process may vary across market segments. Indeed, it is highly implausible that all attributes have the same affect on the store choice process for all consumers. Popkowski and Timmermans (1996), using panel data from 1,367 consumers' grocery store purchases for three years, also identified income as being an important factor in store choice:

> *"...people with a high income level tend to patronize these stores [grocery stores 2 and 3] less frequently than people with lower income levels. Consumers who have a higher income level and who work more hours per week are expected to have a value for leisure time and hence higher search costs. It is expected that these consumers shop less often*

...and larger households tend to shop more often." (Leszczyc and Timmermans 1996:366)

The study also identified a household's size as being significant in store choice, due to the tendency of larger households to shop more often. In Tigert (1983), examination of determinant attributes for shoppers in different demographic segments found that large families were more sensitive to price and price tended to be the primary determinant in store choice. It was also found that respondents aged 31-40 were the most price-oriented shoppers, with male shoppers giving both convenience and lower prices a higher rating than that provided by female shoppers. Male shoppers appeared to economize more, while females tended to opt for more quality and service.

It should be emphasized that the literature presented, only addressed the influence of personal attributes and the main store attributes that have been used in the store image literature for grocery shopping trips. In recent store image studies there have been a number of store attributes that have been identified, although not all pertaining to grocery store choice. These attributes include attractiveness of the store, store ambient (prestige-image vs discount image), physical surrounding, store hours, and parking facilities (Baker and Grewal 1994, Reardon and Miller 1995, and Eckman and Kotsiopulos 1997). Store image studies dealing specially with Asian consumers' and grocery store choice cannot be readily found. This study endeavors to fill this gap in the literature. In this study, the store attributes examined are price, quality, convenience, variety of specialty pork products sold at the store, and customer service as they are most relevant to Asian consumers' store choice for fresh pork.

3.2 Store Choice Modeling

Two of the most common approaches to model store choice in the marketing literature are cross–tabulations and the multi-nominal logit model. In cross-tabulations, the sample is divided into subgroups to learn how the dependent variables vary from subgroup to subgroup. Cross-tabulation is one of the most popular data analysis technique in marketing research and is an important mechanism for studying relationships between and among variables (Churchill 1996). Cross-tabulations provide substantive insight into understanding a consumer's store choice, however, the information one can glean from cross tabulations is somewhat limited as it does not

provide an indication of how these variables interact with one another. Because of this limitation, the cross-tabulation approach is often used in conjunction with the multi-nominal logit model (Fotheringham and Trew 1993). The multi-nominal logit model can be used not only to identify the most important factors that affect a consumer's choice, but also to identify the trade-off between these factors.

The next two sections provide the theoretical framework of cross-tabulations and the multi-nominal logit model.

3.2.1 Using Cross Tabulations to Analyze Store Choice

A cross-tabulation involves the simultaneous counting of the number of observations that occur in each of the data categories of two or more variables. The contingency table or cross-tabulation table is similar to the joint-density table, except that the joint densities (probabilities) are replaced by the observed frequencies or cell frequencies. A contingency table with *r* rows and *c* columns is called an *r* x *c* contingency table. The entities being cross-classified are often called units of association. That is, the two variables may be associated with each other but not caused by each other. The total frequency in each row or each column is called the marginal frequency from which the marginal probabilities can be calculated. If the cell frequencies are divided by *n*, the result would be a table of sample joint-densities (Jobson 1992). An example of a contingency table is provided in Table 3-1 below.

Table 3-1: Example of Contingency Table

	C categories			
R Categories	c_1	c_2	c_3	***f*(c)**
r_1	n_{12}	n_{12}	n_{31}	$n_1 c$
r_2	n_{21}	n_{22}	n_{32}	n_2 c
r_3	n_{31}	n_{32}	n_{33}	n_3 c
r_4	n_{41}	n_{42}	n_{43}	n_4 c
f (r)	$n_1 r$	n_2 r	n_3 r	**N**

In addition to the substantive interpretation of cross-tabulations, a question that often arises is whether the observed association between variables is a reflection of sampling variation. Therefore, it is also important to determine whether the observed

associations between the variables in the cross-tabulation are statistically significant and how strong these associations are.

A test of independence is used to determine the significance of an observed association in cross-tabulations of two or more variables. A common test of independence is the Pearson chi-square test. A Pearson chi-square is used to test whether two random variables are independent. With *r* rows and *c* columns in the contingency table, the Pearson chi-square is obtained from the distribution of the sums of squares of standardized normal random variables. The Pearson chi-squared is defined as:

$$\chi^2 = \sum_i \sum_j \frac{(f_{ij} - e_{ij})^2}{e_{ij}}$$

Where f_{ij} is the observed frequency for contingency table category in row *i* and column *j* and e_{ij} is the expected frequency for contingency table category in row *i* and column *j* based on the assumption of independence. The test statistic has a chi-square distribution with (r-1)(c-1) degrees of freedom provided that the expected frequencies are five or more for all categories (Jobson 1992). If the hypothesis of independence for the Pearson chi square is not rejected, there is no relationship between the two variables.

In cross-tabulations it is also important to know the strength of the association and the statistical significance of that association. Indexes of agreement are used to measure the strength of association between two variables in cross-tabulations. Two popular indexes for summarizing the degree of association between two variables in a cross-tabulation of *r* rows and *c* columns are the contingency coefficient (C) and the Cramer's V. The contingency coefficient is related to the chi square and is defined as:

$$C = \sqrt{\frac{\chi^2}{n + \chi^2}}$$

Where n is the sample size and χ^2 is the chi-square statistic. When there is no association between the variables, the contingency coefficient will be zero, indicating statistical independence. The value of C can never be greater than 1, but the maximum

value of C in any given situation will be strongly influenced by the size of the contingency table. The maximum value of C can be calculated as:

$$C_{max} = \sqrt{\frac{k-1}{k}}$$

where k= smaller r (number of rows) or c (number of columns); and either one if r=c.

The maximum value of the contingency coefficient is a symmetric measure of association (Green et al 1988).

Cramer's V is another measure of association between variables based on the chi-square, but is free from dependence on the table size. The values range between zero and 1 regardless of the size of the table. A value of zero indicates no association between the row and column variables, while values close to 1 indicates a high degree of association between the variables (Green et al 1988). The Cramer's V is defined as:

$$\text{Cramers' V} = \sqrt{\frac{\chi^2}{n(k-1)}}$$

where k = smallest of *r* or *c* (or when *r* = *c*, k = *r* = *c*).

In this study, two-dimensional contingency tables or bivariate cross-tabulations, were used to analyze the relationships between the consumers' store choice for fresh pork and their demographic and social-economic characteristics, their shopping habits for fresh pork, and store and product characteristics.

3.2.2 Using MNL Model to Analyze Store Choice

Modeling consumer's store choices, whereby the store choice is based on relevant personal characteristics of the buyers could be approached through a Random Utility Model (RUM) approach. Examples of this approach are in Ben-Akiva and Lerman (1985) and Unterschultz et al (1996).

Consumer choice modeling assumes that individuals, whether they are selecting a brand or a store, evaluate each alternative in terms of the utility or benefit to be derived from selecting that alternative, and then selecting the alternative that yields maximum

utility (Fotheringham 1988). In a Random Utility Model, the choice process the consumer undergoes is to determine the utility that each choice yields, and to pick the choice that yields the highest utility. Each consumer's utility for each alternative cannot be known to the researcher with certainty and may involve random errors, Thus, these are treated by the researcher as random variables (Ben-Akiva and Lerman, 1985). Thus, for each alternative *i* for person *n* in the choice set, there is an associated utility level, which is represented by:

$$U_{in} = V(X_{in}) + \varepsilon (X_{in}) \qquad (1)$$

Where V is the indirect utility function and the systematic/objective component of the total utility U_{in} while ε is the random component, which is the unobservable component of the total utility. The unobservable component is due to observational deficiencies that could result from unobservable attributes, taste variations, measurement errors or use of proxy variables (Ben-Akiva and Lerman, 1985). X_{in} is a vector of characteristics for alternative *i*, as viewed by respondent *n*. In the economic literature, equation (1) is also known as a conditional indirect utility function as it is conditional on choice *i*. Selection of alternative store *i* implies that the utility of U_{in} is greater than the utility of another alternative store, say U_{jn} . it is noteworthy that U_{in} is a function and is assumed to be deterministic (Ben-Akiva and Lerman, 1985). As the overall utility is random, it is possible to analyze the probability of choosing one alternative *i* over another or:

$$Pr(i) = Pr(V(X_{in}) + \varepsilon (X_{in}) \geq V(X_{jn}) + \varepsilon (X_{jn})) : \text{for all } j \in C_n \qquad (2)$$

Where C_n is the choice set of individual *n*. For analytical convenience and ease of computation of choice probabilities, we assume that ε_{in} is independently, identically[1], and Gumbel-distributed (or Type I extreme value distributed) with a scale parameter μ = 1. As such, the probability of choosing an alternative *i* is expressed as:

[1] This assumption constrains all the disturbances to the same scale parameter μ. This implies that the variances of the random components are equal.

$$Pr(i) = \frac{\exp\,(V_{in})}{\sum_{J} \exp(V_{jn})} \qquad (3)$$

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

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

Where V_{in} is the respondent n's utility of choosing store i, x_{ink} is the k^{th} characteristics for alternative i as viewed by the respondent n, and β's are the estimated coefficients.

Using the expression in equation (3) for probability of choice, the parameters can be estimated using maximum likelihood. A multi-nominal logit model is estimated using a maximum likelihood technique. The likelihood function is globally concave so that a maximum will exist. The maximum likelihood estimator of β is consistent, asymptotically normal, and asymptotically efficient (Ben-Akiva and Lerman, 1985). Equation (3) estimates the multi-nominal logit model.

3.3 Application of Store Choice Modeling

To examine consumers' store choice for fresh pork, it is necessary to look at how socioeconomic and demographic characteristics and store attributes influence ethnic Asian's store choices for fresh pork. It is also important to examine how socioeconomic and demographic characteristics vary among consumers who purchase their fresh pork from small Asian stores, large Asian stores, American style supermarkets and butcher shops. Cross–tabulations and multi-nominal logit models, described earlier in this chapter, were employed to study these relationships. These two approaches were chosen for their simplicity, effectiveness, and lower survey costs. The analysis and discussion of the cross-tabulation results are given in Chapter 5, and the analysis and discussion of the multi-nominal logit model results are provided in Chapter 6. The following chapter describes the survey design, data collection and the data used for the cross-tabulation and multi-nominal logit analysis.

Chapter 4 Survey Design, Data Collection, and Data Description

4 Introduction

This chapter consists of two sections. The first section discusses the survey design. The second section describes the method of data collection and the sample used in the analysis of store choice.

4.1 Store Choice Survey Design

The store choice survey was designed to elicit information on each consumer's choice of store for fresh pork, and possible reasons as to why they chose to shop at one particular store over another store. The development of the survey was based on previous literature on store choice (Timmermans 1996, Fayyaz et al 1995, Oppewal et al 1996, and Recker and Kostyniuk 1978) and consumer meat studies (Hui et al 1995, Goodwin and Koudele 1990, and Kinsey et al 1993). These studies provided a framework to the design of the survey. However, the pre-testing and testing of survey dictated the number of questions that could be asked and the how detailed the questions could be.

The researcher surveyed 50 Asian customers from a large and small Asian store in Edmonton to determine the amount of time a respondent would want to be interviewed, so that an appropriate length of survey questionnaire could be developed. The survey was designed to only take about five minutes to complete, as this was the maximum amount of time respondents wanted to be interviewed. It was observed that for anytime longer than that, the respondent would just walk away. Each question in the survey was pre-tested and tested to ensure that the questions were easy to answer and well understood by the respondent. The survey was pre-tested at small and large Asian stores in Chinatown in Edmonton, Alberta. The survey was also pre-tested in Chinatown in Vancouver, British Columbia as well as at a large Asian store in Coquitlam, a suburb of Vancouver. Information obtained from consultation 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 incorporated into the questionnaire. Appendix 3 provides a copy of the store choice survey used in San Francisco.

The store choice survey has three parts. The first section of the survey asks the respondents to specify (i.e. choose) one of five store types where they purchase the

majority of their groceries and fresh pork. The five types of stores are small Asian grocery stores or supermarkets, large Asian supermarkets, American-style supermarkets, meat specialty stores such as butcher shops and Bar-B-Q houses and "other" stores. "Other" types of stores do not fit into any one of the four categories mentioned and include "price clubs" such as COSTCO. The first four types of stores were identified in Chapter Two and were observed to be the main types of stores in the Asian fresh pork market. This section of the survey also queried the various cuts of fresh pork purchased by respondents. The cuts of fresh pork considered include loins and pork chops, legs, hind foot and hocks, side pork bellies, ground pork, and pork shoulders. These cuts were identified by retailers and wholesalers in San Francisco to be the main types of pork cuts that are sold in the Asian fresh pork market. Pictures of the various pork cuts were shown to respondents to ensure that the respondent and the interviewer were discussing the same product. The pictures used during the interview are shown in Appendix 4.

The second part of this survey section involved a series of store-specific questions focused on the type of store where the respondents indicate where they purchase the majority of their fresh pork; see Appendix 3 questions number 5 and 7. The purpose of these questions was to examine how various store characteristics may influence the respondent's store choice and why pork is purchased at one particular store rather than at another.

It should be emphasized that the length of survey had a significant influence on the number of store choice attributes that would be examined in the study. As mentioned in Chapter 3 there are a number of store choice attributes that may influence consumers' store choice. However, not all these attributes could be included in the study. The characteristics selected in the study are those that have been identified by studies on grocery store choice (Timmermans 1996, Fayyaz et al 1995, Oppewal et al 1996, Recker and Kostyniuk 1978, Tigert 1983, and Eckman and Kotsiopulos 1997) and by discussions with retailers and wholesalers in San Francisco and Edmonton who sell fresh pork to Asian consumers, Asian homemakers, and scientists. The variables that were identified for this study 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 or section. As indicated

in Chapter Two, it was observed that the level of customer service in the meat department differs between the various types of stores. These differences may influence the consumer's store choice for fresh pork. Each attribute has discrete levels that provided measures of attributes affecting the consumer's store choice for fresh pork. In this analysis, all attributes have four levels. As an example, for the attribute 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 only one of the four alternatives. The attributes and corresponding levels used in this analysis are listed in Table 4-1.

Table 4-1: 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

Questions 8, 9, and 10 of the store choice survey in Appendix 3 were developed to attempt to elicit consumers' perceptions, opinions and purchasing habits for fresh pork. The final section of this survey provides information on respondents' socioeconomic and demographic details such as income, age, ethnic background, gender, and education (refer to questions 3, 4,11 to 16 in Appendix 3).

4.2 Data Collection

Different types of methods were considered for data collection. Mailing out the surveys or conducting a telephone survey were considered to be too expensive and it would be difficult to obtain an appropriate mailing list. Furthermore, there was a degree of uncertainty concerning the response rate, as respondents would have to mail their responses back to Canada. In addition, mail-out surveys offer little control on the size of the sample. The mall-intercept method was used to collect the data.

The mall intercept is a method of data collection where the interviewer intercepts shoppers in a shopping mall or in the vicinity of the store; the interviewer intercepts a sample of passers by requesting them to participate in the research study (Churchill 1996). 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. The criteria for a willing consumer to be included in the sample were based on two features. Specifically, the respondent must be a consumer and a purchaser of fresh pork and must be of Asian descent.

The sample was drawn from consumers who shopped at small and large Asian grocery stores or supermarkets, meat specialty stores and American style supermarkets. One reason for sampling from the four types of stores was to ensure that consumers from all store types were represented. However, it should be emphasized that the sample drawn is not random.

Collecting a random sample presented two problems at the time the interviews were being conducted. First, storeowners were not particularly too keen on having someone standing outside their store for an extended period of time. Thus, the researcher had to travel from one store to another store to avoid possible negative ramifications for storeowners. Second, the researcher wanted to ensure that there was a large enough sample of Asian participants who consumed and purchased pork. Consumers of "other" categories were not visited and are not addressed in this study.

One question concerning the non-random selection of respondents is the issue of whether the location where the respondent was surveyed biased their store choice. From the third question in Figure 4-1 (where the respondent purchased most of their

fresh pork store choice), responses were grouped according to where respondents were surveyed (survey site). From this grouping it appeared that where the respondent was surveyed did not necessarily indicate where they purchased their fresh pork. There were 32 respondents surveyed at butcher shops, but only 3 indicated that they purchased most of their fresh pork from butcher shops. However, there was a larger percentage of respondents surveyed at large Asian and American stores that purchased most of their fresh pork from these stores. There were 75 respondents surveyed at large Asian stores and 48 from American stores. Of those respondents, 48% and 63% of those who were surveyed at large Asian stores and American stores respectively also purchased most of their pork at large Asian stores and American stores. For small Asian stores the percentage is 50%. From the results presented there seems to be a reasonable match for most of the store types with the exception of butcher shops. However, the correlation coefficient calculated between survey site and store choice presented in Table 4-2 indicates little correlation between the two variables.

Figure 4-1: Comparison of Survey Site and Store Choice

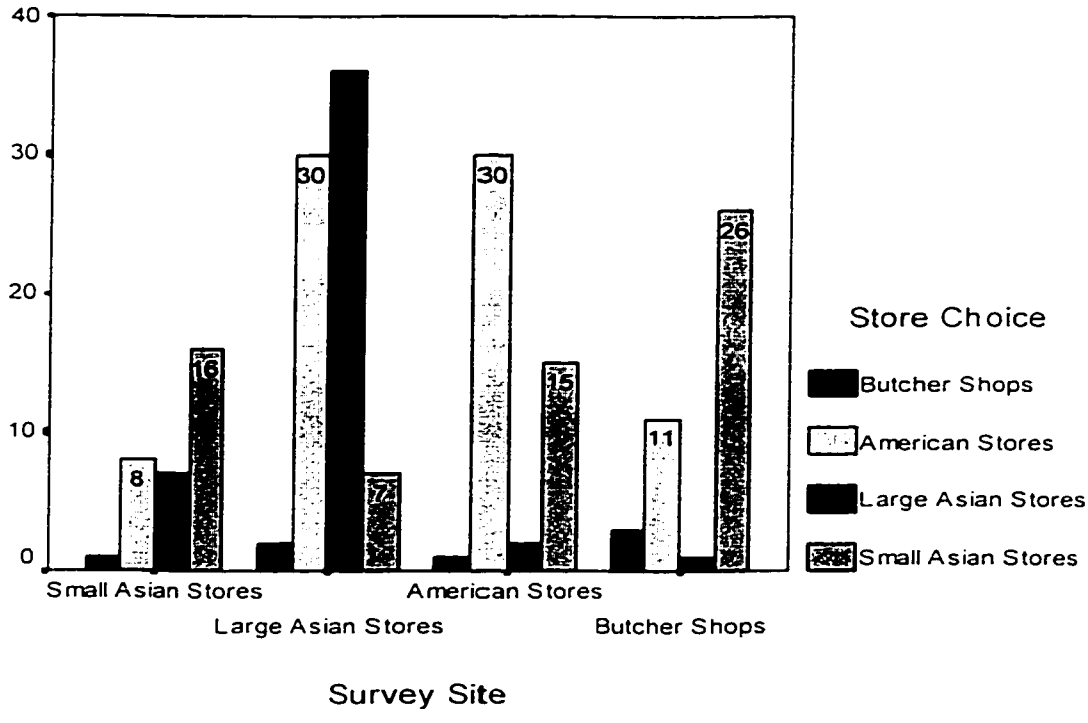


Table 4-2: Correlation between Store Choice for Fresh Pork and Survey Site

		Store Choice	Survey Site
Store Choice	Pearson Correlation	1.000	.053
	Sig. (2-tailed)	-	.463
Survey Site	Pearson Correlation	.053	1.000
	Sig. (2-tailed)	.463	-

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. Two of the survey forms were discarded because there were missing data. 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. A detailed description of the "sample collection statistics" are provided in Table 4-3.

Table 4-3: Sample Collection Statistics

Variables	Categories	Number of Responses	% of Total Sample
Language the survey was conducted in	English	147	75.0
	Chinese	49	25.0
Time of Day Survey was conducted in	11:00 to 1:59 p.m.	34	17.3
	2:00 to 4:59 p.m.	117	59.7
	After 5:00	44	22.4
	Before 11 a.m.	1	0.5
Day of week the survey was conducted in	Monday	27	13.8
	Tuesday	19	9.7
	Wednesday	28	14.3
	Thursday	15	7.7
	Friday	45	23.0
	Saturday	39	19.9
	Sunday	23	11.7
Survey site where the survey was conducted	Small Asian	32	16.3
	Large Asian	75	38.3
	American style	48	24.5
	Butcher shop	41	20.9
Whether respondent purchased pork at the site	No	156	79.6
	Yes	40	20.4

4.3 Store Choice Data Description

In the following tables, the responses from the store choice survey are summarized. The results are presented and discussed according to consumer characteristics, store characteristics and socioeconomic and demographic characteristics.

4.3.1 Pork Purchasing Characteristics

According to the information presented in Table 4-4, 19% percent of the respondents purchased pork more than once a week, 77% percent of the respondents were the primary grocery shopper in the their household and 69% of the respondents did most of the cooking in the household. In total, 56% percent of the respondents indicated that they always looked at the expiry date when they purchased pork, but interestingly, 61% of the respondents did not compare the advertised pork prices. The majority of respondents perceived the quality of pork in California to be very high, giving an average rating of 4 out of a scale of 5. The amount of fat contained in pork cuts was of concern

to the respondents surveyed, with 68% of the respondents stating that they always bought the leanest cuts of pork.

Table 4-4: Pork Purchasing Characteristics

Variables	Categories	Number of Responses	% of Total Sample
Buys fresh pork once a week	Yes	38	19.4
	No	157	80.1
	I don't know	1	0.5
Always looks at expiration date	Yes	110	56.1
	No	69	35.2
	I don't know	17	8.7
Only buys the lean cuts of pork	Yes	134	68.4
	No	62	31.6
		1	0.5
Use advertisements to compare pork prices	Yes	59	30.1
	No	119	60.7
	I don't know	17	8.7
Quality of fresh pork in California, poor (1) to excellent (5)	1	1	0.5
	2	2	1.0
	3	42	21.4
	4	120	61.2
	5	31	15.8
Does majority of grocery shopping	No	45	23.0
	Yes	151	77.0
Prepare most of the meal	No	61	31.1
	Yes	135	68.9

4.3.2 Where Asian Consumers Purchase Most of Their Groceries and Fresh Pork

As seen from Figure 4-2b, 40% of 196 respondents purchase most of their fresh pork from American stores, 23.5% from large Asian stores, 32.5% from small Asian stores and only 3.6% from butcher shops. Where Asian consumers purchase their groceries is not always where they purchase most of their fresh pork. 107 out of 196 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). The results from the survey suggests that the perception that Asians shop mainly in Asian 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. It should be noted that forty-six percent of respondents indicated that they purchase most of their groceries at Asian stores. While this was not the majority of respondents, the importance of Asian stores in the retail market should not be dismissed (see Figure 4-2a). The results

confirms the need and the importance of further investigation the market potential for pork in Asian markets.

Figure 4-2a: Where Asian Consumers Purchase Most of Their Groceries

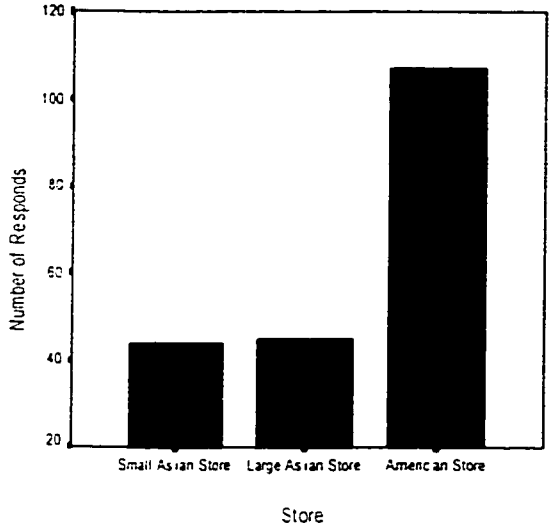
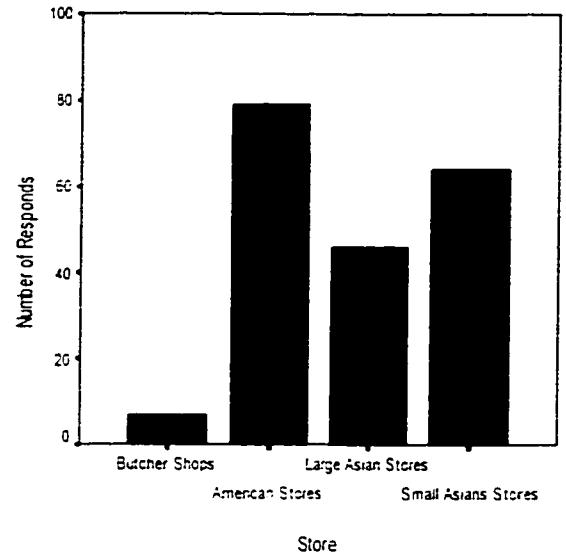


Figure 4-2b: Where Asian Consumer Purchase Most of Their Fresh Pork



Respondents were also asked to indicate the characteristics that best reflect the store where they purchase the majority of their fresh pork (See Appendix 3, Question 7). The results are summarized in Table 4-5. Thirty-six percent of the respondents indicated that the price of fresh pork sold at their store choice was cheaper compared to other stores. While, 27% indicated that price of pork was not an important factor in their store choice. Fifty-nine percent of respondents described the level of service at their store choice as being helpful and courteous compared to other stores. Seventy percent of the respondents indicated that the location and accessibility of the store where they purchase the majority of their fresh pork was more convenient than other stores. Forty-five percentage of the respondents indicated that their store choice had a better selection of specialized or non-traditional pork cuts (offal). Fifty-five of the respondents indicated that the quality of pork sold at their store choice was better than at other stores. Over sixty percent of the respondents drove to their store choice.

Table 4-5: Results for Store Choice Survey: Store Attributes

Variables	Categories	Number of Responses	% of Total Sample
Where the respondent purchases the majority of fresh pork	Small Asian	64	32.7
	Large Asian	46	23.5
	American style	79	40.3
	Butcher shops	7	3.6
Where they purchase most of groceries	Small Asian	44	22.4
	Large Asian	45	23.0
	American style	107	54.6
Price of fresh pork at respondent's choice store	Cheaper than other stores	70	35.7
	More expensive than other stores	16	8.2
	Comparable to other stores	58	29.6
	Not important	52	26.5
Overall quality of fresh pork at respondent's choice store	Better than other stores	107	54.6
	Worst than other stores	3	1.5
	Comparable to other stores	66	33.7
	Not important	20	10.2
Availability of specialized pork products at respondent's choice store	Greater than other stores	88	44.9
	Less than other stores	24	12.2
	Comparable to other stores	35	17.9
	Not applicable	49	25.0
Location and accessibility of respondent's choice store	Convenient compared to other stores	137	69.9
	Inconvenient compared to other stores	15	7.7
	Comparable to other stores	30	15.3
	Not important	14	7.1
Level of service in meat section at respondent's choice store	Helpful and courteous compared to other stores	117	59.7
	Impersonal compared to other stores	19	9.7
	Not important	27	13.8
	Not applicable	33	16.8
Mode of transportation to respondent's choice store	Walk	39	19.9
	Bus	33	16.8
	Car	124	63.3
Length of Travel Time	Under 10 minutes	77	39.3
	11-15 minutes	53	27.0
	16-20 minutes	26	13.3
	21-25 minutes	12	6.1
	26-30 minutes	3	1.5
	More than 30 minutes	25	12.8

4.3.3 Where Asian Consumers Purchase Different Cuts of Pork

The results from the responses as to where consumers purchase different cuts of pork are summarized in Figures 4-3a to 4-3f. The results indicated that the most popular pork cut was stated by the respondents to be loins (pork chops). Of the 133 respondents who purchased loins, 53% purchased them at American style supermarkets. Offal was the least purchased among the seven different pork cuts, followed by hind foot (hock), then

side pork bellies, and pork legs. Of the 196 respondents, only 50 indicated that they purchased offal. Of these respondents, 82% purchased offal at small and large Asian stores. Fifty percent of the respondents who purchased side bellies purchased the product at small Asian stores. Fifty-two percent of respondents who purchased hind foot (hocks and front foot) purchased this product at small Asian stores. Of the 96 respondents who purchased pork legs, 66% of them purchased these at large Asian stores and American style supermarkets. Forty-one percent of the respondents who purchased shoulders/butts or roast purchased them at American stores.

These results seem to suggest that specialized pork cuts such as offal, hind foot and side bellies are not commonly purchased by Asian consumers in San Francisco. Those respondents who did purchase specialized pork cuts were more likely to purchase these cuts at small Asian stores and, to a smaller extent, at large Asian stores. Perhaps this is due to a limited selection of specialized pork cuts in the American style supermarkets. Traditional pork cuts such as loins, shoulder/butts or roast were more commonly purchased at American style supermarkets, and to a smaller extent, at large Asian stores. The number of respondents who purchased pork products at butcher shops was very small relative to the other three types of stores. A more detailed summary of the results is provided in Appendix 5.

Figure 4-3a: Where Asian Consumers Purchase Pork Chops and Loins

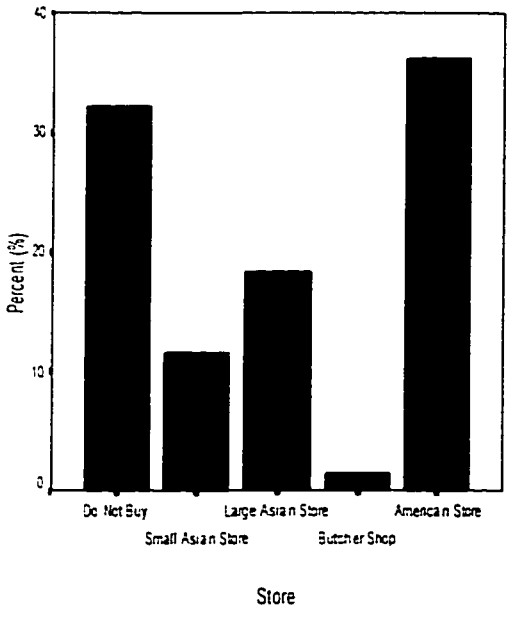


Figure 4-3b: Where Asian Consumers Purchase Offal

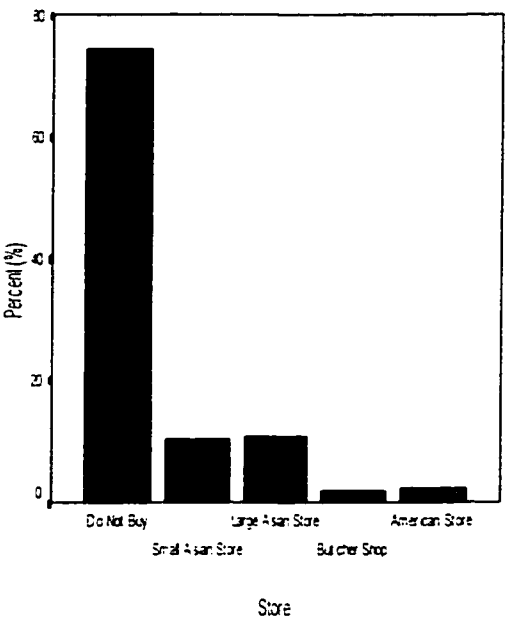


Figure 4-3c: Where Asian Consumers Purchase Pork Legs

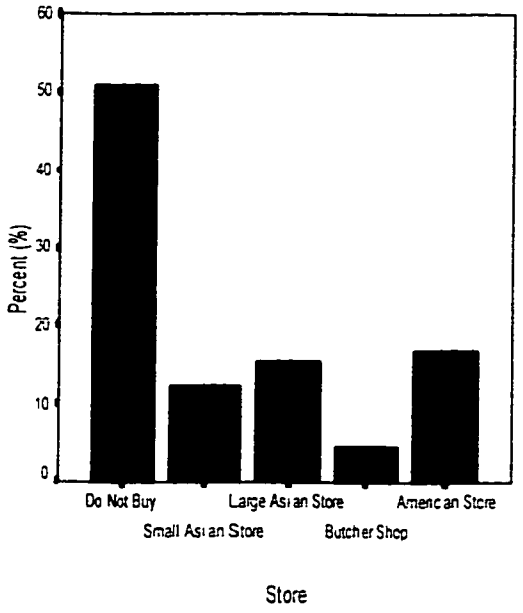


Figure 4-3d: Where Asian Consumers Purchase Hock (Pig Feet)

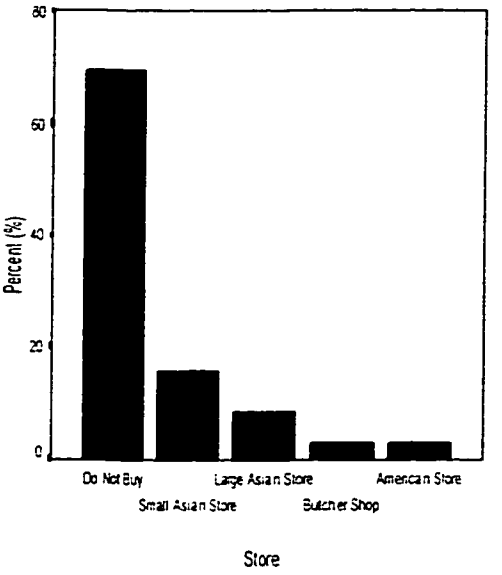


Figure 4-3e: Where Asian Consumers Purchase Pork Side Bellies

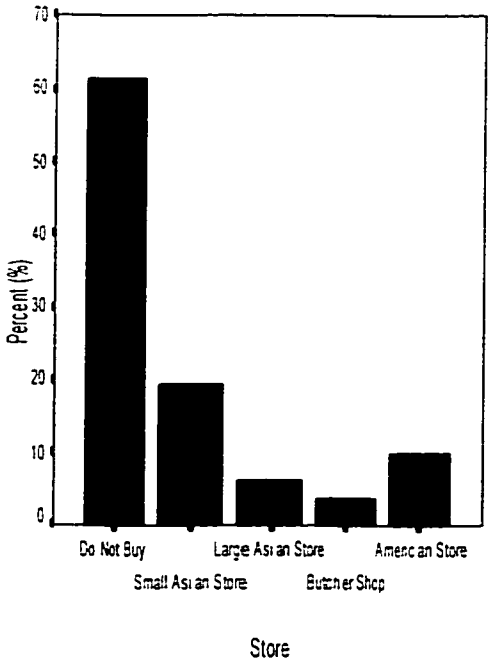
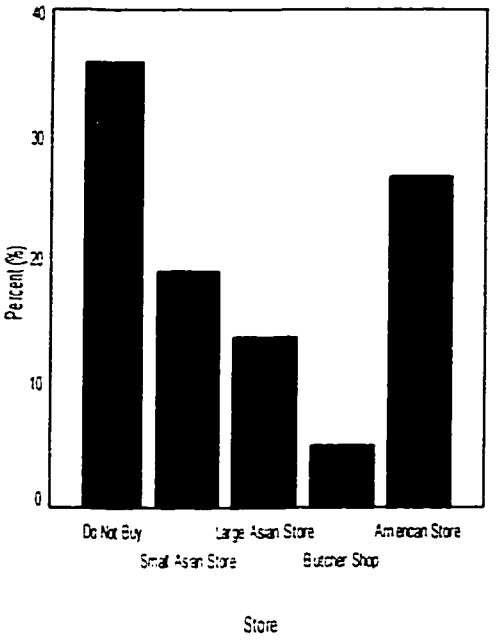


Figure 4-3f: Where Asian Consumers Purchase Pork Shoulders and Butts



4.3.4 Socioeconomic and Demographic Characteristics

The sample consisted of 104 women and 92 men. Sixty percent of the respondents were Chinese. The remaining 40% is scomprised of people with Vietnamese, Filipino, Korean or Japanese and "other" ethnic backgrounds (i.e. Asian respondents who were not Vietnamese, Filipino, Korean or Japanese). Forty-five percent of the respondents were employed full-time and 39% of respondents were college educated. Fifty-nine percent of the respondents were between the ages of 25 and 44. Seventy-seven percent of the respondents purchase most of the groceries and 68% prepare the majority of the meals in the household. A more detailed description of the sample is provided in Appendix 5.

4.4 Sample Representativeness

The survey sample was not collected in a random manner, therefore it is important to determine the overall representativeness of the sample. In Table 4-6, the survey sample is compared with the data on demographic characteristics of "Asian and Pacific Islanders" in 1990. As seen in Table 4-6 the survey sample is representative for San Francisco. The age and gender are reasonably representative of San Francisco's census data on Asian and Pacific Islanders, with the exception of respondents between the ages of 35 to 44 and 65 and over, who are over-represented (State of California Department of Finance 1998). While, respondents under 24 are under-represented. Although Filipinos are under-represented and Vietnamese, "others" and Chinese are over-represented, the overall ethnic group distribution of the sample is fairly representative of San Francisco's Asian and Pacific Islander population. If ethnic groups were collapsed into two groups, Chinese and non-Chinese, the difference between the sample and San Francisco's 1990 census of Asians is only 9%. Furthermore, in both cases ethnic Chinese make up the majority of San Francisco's Asian population.

Table 4-6: Comparison of the Survey Sample with San Francisco's Demographic Characteristics in 1990

Variables	Categories	Number of Responses	% of Total Sample	San Francisco's Demographic breakdown in % in 1990
Gender	Female	104	53.1	52
	Male	92	46.9	48
Ethnic background	Vietnamese	14	7.1	3.93
	Filipino	20	10.2	27.96
	Chinese	119	60.7	51.35
	Korean	4	2.0	3.29
	Japanese	13	6.6	7.48
	Other	26	13.3	5.99
Age Category	under 24	16	8.2	15.5
	25-34	40	20.4	18.4
	35-44	60	30.6	15.6
	45-54	21	10.7	9.9
	55-64	20	10.2	10.6
	65 and over	39	19.9	12.6

Source: Gale Research (1993) and State of California Department of Finance (1998)

Chapter 5 Store Choice: Cross-Tabulation Analysis

5 Introduction

Two-dimensional contingency tables or bivariate cross-tabulations were used to analyze the relationships between the consumer's store choice for fresh pork and their demographic and socioeconomic characteristics, in this chapter. The theory and the advantages of using cross –tabulations were discussed in Chapter 3.

In cross-tabulations the sample is divided into subgroups. In this study there are four subgroups representing the four store types. The results from the cross-tabulations are divided into the categories of small and large Asian stores, American stores and butcher shops. The cross-tabulations were calculated by SPSS for Windows Release 9 (SPSS Inc 1998). Table 5-1 illustrates how the results are presented. The column entitled "Variable" indicates the independent variable that is cross-classified with the respondent's store choice for fresh pork (the dependent variable). The number of categories of the independent variable is provided in the "Categories" column. The "Cross Tab" column represents the number of cases that fall into a category when the independent and dependent variables are considered simultaneously. For example, in Table 5-1, out of 196 respondents, 41 indicated that they purchased most of their fresh pork and groceries at small Asian stores. The "% Cal" column show the number of cases in percentages. The percentages are calculated in the direction of the independent variable. For example, 64% (41/64) of consumers who purchase most of their fresh pork from small Asian stores purchase most of their groceries at small Asian stores. The "Joint Prob" column represents the joint probability of selecting a respondent who falls under two categories. For example, the probability of a respondent purchasing fresh pork and doing most of their grocery shopping from small Asian stores is 0.209.

Table 5-1: Example of Cross-Tabulations Results:

		Store Choice for Fresh Pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal.	Joint Prob.	Cross Tab	%Cal.	Joint Prob.	Cross Tab	%Cal.	Joint Prob.	Cross Tab	%Cal.	Joint Prob.
Where they purchase most of groceries	Small Asian	***41***	***64.1***	***0.209***	0	0	0.000	1	1.3	0.005	2	28.6	0.010
	Large Asian	6	9.4	0.031	36	78.3	0.184	3	3.8	0.015	0	0	0.000
	American style	17	26.6	0.087	10	21.7	0.051	75	94.9	0.383	5	71 4	0 026

To determine whether the association between variables is statistically significant various test statistics are employed. They include, the Pearson Chi-square test, Cramer's V, Contingency Coefficient, and C max. To interpret the test results the following example is used. Table 5-1a provides an example of the test statistics from the cross-tabulations of consumers' store choice for fresh pork and where they purchase most of their groceries.

Table 5-1a: Example of Cross-Tabulations Test Statistics:

Dependent Variable: Store choice for fresh pork					
Independent Variables	Pearson Chi-Square (P-Value)		Cramer's V	Contingency Coefficient	C max
Where most groceries purchased	198.485	(0.000)	0.712	0.709	0.816497

The Pearson Chi-square tests whether the association between the two variables is statistically significant. According to the above example, the association between the consumers' store choice for fresh pork and where they purchase most of their groceries is statistically significant. The Cramer's V and Contingency Coefficient determine the strength of the association. The higher the value of the Cramer's V, the greater the association between two variables. The C max is the maximum value of the Contingency Coefficient and is used as a reference point. In this example, the Contingency Coefficient is 0.709 and C max is 0.866, which indicates a very strong association between consumer's store choice for fresh pork and where they purchases most of their groceries. The closer the Contingency coefficient is to the C max the stronger the association.

5.1 Pork Purchasing Characteristics and Store Choice for Fresh Pork

Table 5-2 and 5-2a provide the results from the cross-tabulations and the test statistics between consumers' store choice and pork purchasing characteristics. The results presented in Table 5-2 indicated that consumers who purchase most of their fresh pork from small Asian stores also had the highest probability of purchasing fresh pork more than once a week. The joint probability for purchasing fresh pork more than once a week and purchasing pork from small Asian stores was 0.097 compared to 0.036 from large Asian stores, and 0.046 from American style supermarkets. The Pearson Chi-square test statistic of 11.858 and P-value of 0.065 suggests that there is a relationship between store choice and whether the respondents purchase pork more than once a week at a 0.10 significance level. However, the degree of association is very small given a contingency coefficient of 0.239 and C max of 0.816.

Seventy-five percent of the respondents who buy pork from American stores always look at the expiration date marked on the pork that they purchase. This compares to 27% of consumers who mainly purchase fresh pork from small Asian stores. Perhaps this could be attributed to how pork is retailed at these two stores. Pork sold at small Asian stores are not pre-packaged, whereas pork sold in American stores are wrapped in plastic with the expiration date clearly labeled. The contingency coefficient is 0.405 and C max is 0.816 for the association between consumer's store choice for fresh pork and whether they look at the expiration date when they purchase pork. The results suggest that the degree of association between the two variables is moderate. The Pearson chi-square indicates that the association is statically significant at a 0.01 significance level.

Consumers who purchase most of their fresh pork from American style supermarkets had the highest probability of only buying lean cuts of pork with a joint probability of 0.306. Consumers who purchase most of their pork from small Asian stores had the highest probability of not purchasing only lean cuts of pork, the joint probability is 0.117. However, the relationship between the consumers' store choice for fresh pork and whether the consumer only purchases lean cuts of pork is not statistically significant.

The largest percentage of consumers who used advertisements to compare pork prices come from consumers who purchase most of their fresh pork from large Asian

stores and American style supermarkets. Only 21% of consumers who purchased most of their fresh pork from small Asian stores used advertisements compared to 35% from large Asian stores and 34% from American stores. The author observed that in San Francisco, American style supermarkets advertised far more than their small and large Asian store counterparts. The relationship between the two variables are not statistically significant.

Seventy percent of consumers who purchase most of their pork from small Asian stores rated the quality of pork served at the store a four out of a possible five, five being excellent. This is compared to 61% from large Asian stores, 57% from American style supermarkets, and 29% from butcher shops. Interestingly, the only consumer to give a poor quality rating (1 out of 5) came from a consumer from American style supermarkets.

Table 5-2: Cross-Tabulations Results: Pork Purchasing Characteristics and Store Choice:

		Store Choice for Fresh Pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal.	Joint Prob.	Cross Tab	%Cal.	Joint Prob.	Cross Tab	%Cal.	Joint Prob.	Cross Tab	%Cal.	Joint Prob.
Buys fresh pork once a week	Yes	19	29.7	0.097	7	15.2	0.036	9	0.11.4	0.046	3	42.9	0.015
	No	45	70.3	0.230	39	84.8	0.199	69	0.87.3	0 352	4	57.1	0.020
	I don't know	0	0	0.000	0	0	0.000	1	0.01 3	0.005	0	0	0.000
Always looks at expiration date	Yes	17	26.6	0.087	30	65.2	0.153	59	0.74.7	0.301	4	57.1	0.020
	No	36	56.3	0 184	15	32.6	0.077	15	0.19 0	0.077	3	42.9	0.015
	I don't know	11	17.2	0.056	1	2.2	0 005	5	0.06.3	0.026	0	0	0.000
Only buys the lean cuts of pork	Yes	41	64.1	0.209	27	58.7	0.138	60	0.75.9	0.306	6	85.7	0.031
	No	23	35.9	0.117	19	41.3	0.097	19	0.24 1	0.097	1	14.3	0.005
Use advertisements to compare pork prices	Yes	14	21.9	0.071	16	34.8	0.082	27	0.34.2	0.138	2	28.6	0.010
	No	39	60.9	0.199	29	63.0	0.148	47	0.59.5	0.240	4	57.1	0.020
	I don't know	11	17.2	0.056	1	2.2	0.005	4	0.05.1	0.020	1	14.3	0.005
Quality of fresh pork poor (1) to excellent (5)	1	0	0	0.000	0	0	0.000	1	0.01.3	0.005	0	0	0.000
	2	0	0	0.000	1	2.2	0.005	1	0.01.3	0.005	0	0	0.000
	3	16	25.0	0.082	11	23.9	0.056	13	0.16.5	0.066	2	28.6	0.010
	4	45	70.3	0.230	28	60.9	0.143	45	0.57.0	0.230	2	28.6	0.010
	5	3	4.7	0.015	6	13.0	0.031	19	0.24.1	0.097	3	42.9	0.015

Table 5-2a: Test Statistics: Pork Purchasing Characteristics and Store Choice:

Dependent Variable: Store choice for fresh pork					
Independent Variables	Pearson Chi-Square (P-Value)		Cramer's V	Contingency Coefficient	C max
Buys fresh pork once a week	11.858	(O.O65)	0.174	0.239	0.816497
Always looks at expiration date	38.348	(O.OOO)	0.313	0.405	0.816497
Only buys lean cuts of pork	5.612	(O.132)	0.169	0.167	0.707107
Use ads to compare pork prices	12.802	(O.172)	0.148	0.248	0.816497
Quality of fresh pork in California: poor (1) to excellent (5)	18.62	(O.O98)	0.178	0.295	0.866025

5.2 Different Cuts of Pork and Store Choice for Fresh Pork

The results from the cross-tabulations indicate that respondents who purchased most of their pork from small Asian stores buy mostly ground pork, shoulder butts and roasts, whereas consumers who purchased most of their fresh pork from large Asian stores buy mainly legs, shoulder butts and roast (See Appendix 6 Table A6-1 and Figures 5-1a to d). Respondents from American stores buy mainly loins (pork chops) and ground pork. In other words, respondents who purchased most of their fresh pork from American stores are more likely to purchase loins and ground pork from American stores than any other types of stores.

The tendency observed is that the store where the respondent purchase most of their fresh pork is likely to be the same place where they will purchase their desired cuts of pork. This is particularly true for pork shoulder, roast and butts, ground pork, loins (pork chops) and pork legs. In all cases, of those consumers who indicated that they purchase these cuts of pork, an overwhelming majority of them will purchase these cuts at the store where they purchase the majority of their fresh pork. To illustrate this, Figure 5-1a graphs the cross-tabulations of where the respondents purchase their pork loins and where they purchase most of their fresh pork. The respondents' store choices for pork loins are grouped according to their store choice for fresh pork. For example, 64 respondents purchase most of their pork from small Asian stores. Of the 64 respondents, 38 do not buy pork loins, 17 buy loins from small Asian stores, 1 buys loins from large Asian stores, 1 buys loins from American stores, and 7 buy loins from butcher shops. Demonstrated also in Figure 5-1a, 73% of those respondents who purchase most of their pork from American style supermarkets also purchase most of their pork loins from American style supermarkets. The joint probability of the two variables

occurring is 0.296 versus 0.036 when the consumers' store choice was small Asian stores, and 0.087 when it was large Asian stores. Figure 5-1b-d depicts a similar trend for pork shoulders/butts or roast, pork legs, and ground pork. The association between where the consumer purchases most of their fresh pork and where they purchase pork shoulder, roast and butts, ground pork, loins (pork chops) and pork legs are statistically significant at a 0.01 significance level. Consumers' store choice for fresh pork and where they purchase their ground pork, loins, and shoulder/butts or roast had the highest degree of association. The Contingency Coefficients for all three cuts of pork were all above 0.70 and the C max was 0.86, which indicates a high degree of association (See Table 5-3). A detailed summary of the results from the cross-tabulations between consumer's store choice for fresh pork and where they purchase different cuts of pork is provided in Appendix 6, Table A6-1.

Figure 5-1a: Respondents Store Choice for Fresh Pork and Pork Loins

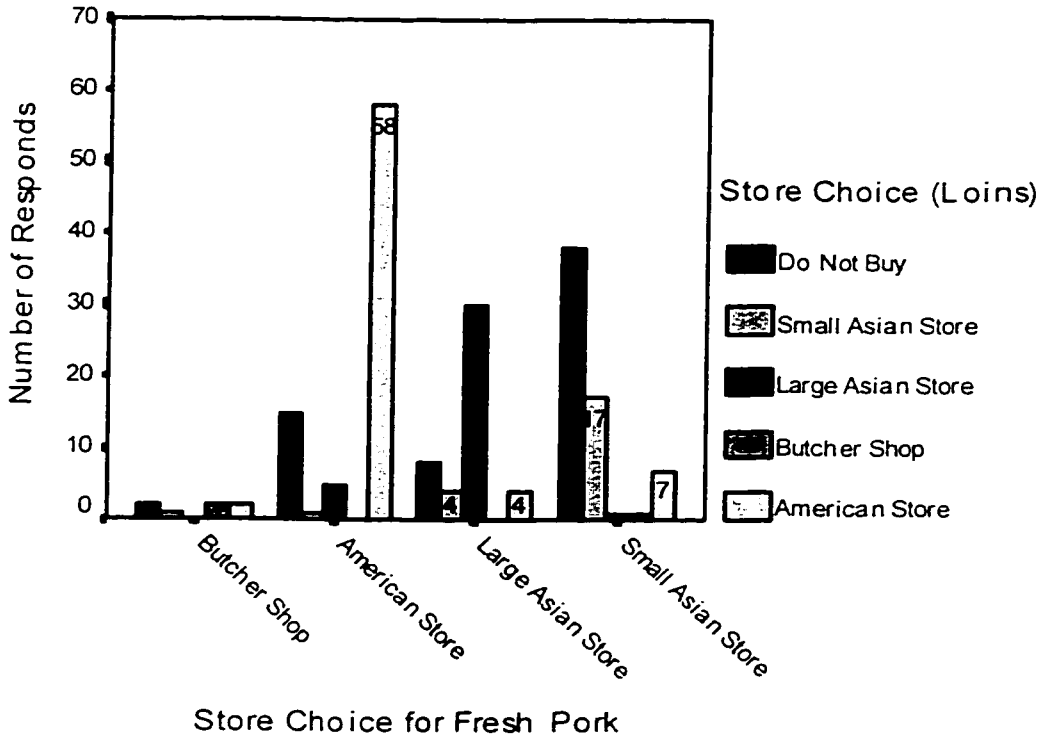


Figure 5-1b: Respondents Store Choice for Fresh Pork and Pork Shoulders (butts)

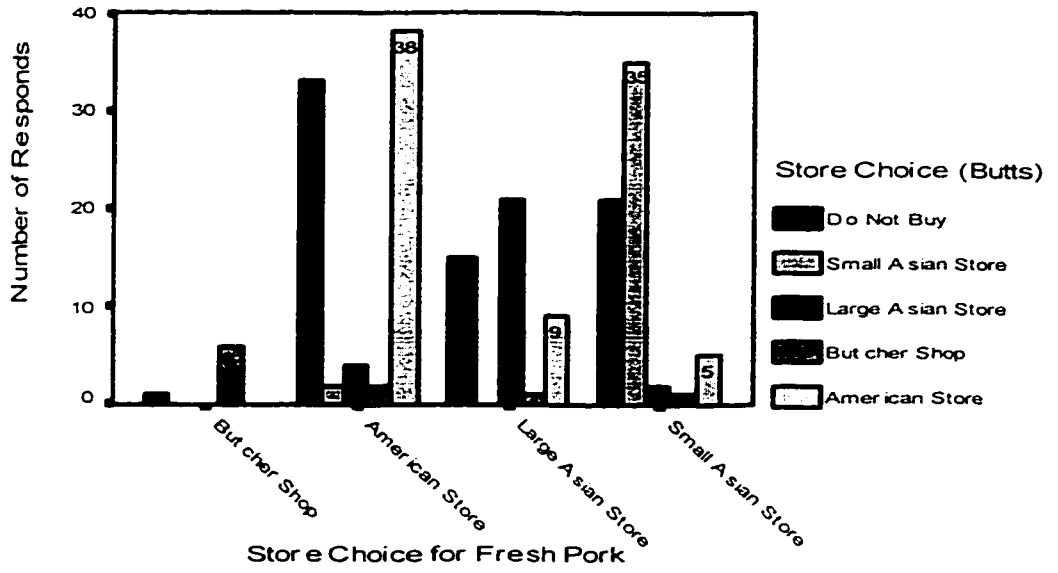


Figure 5-1c: Respondents Store Choice for Fresh Pork and Pork Legs

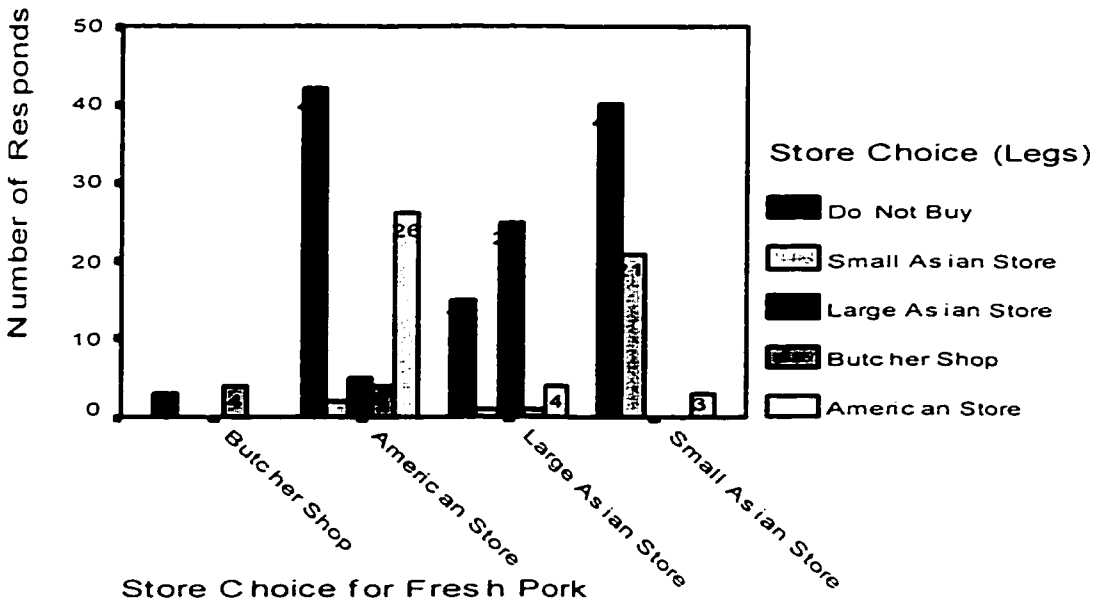


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Figure 5-1d: Respondents Store Choice for Fresh Pork and Ground Pork

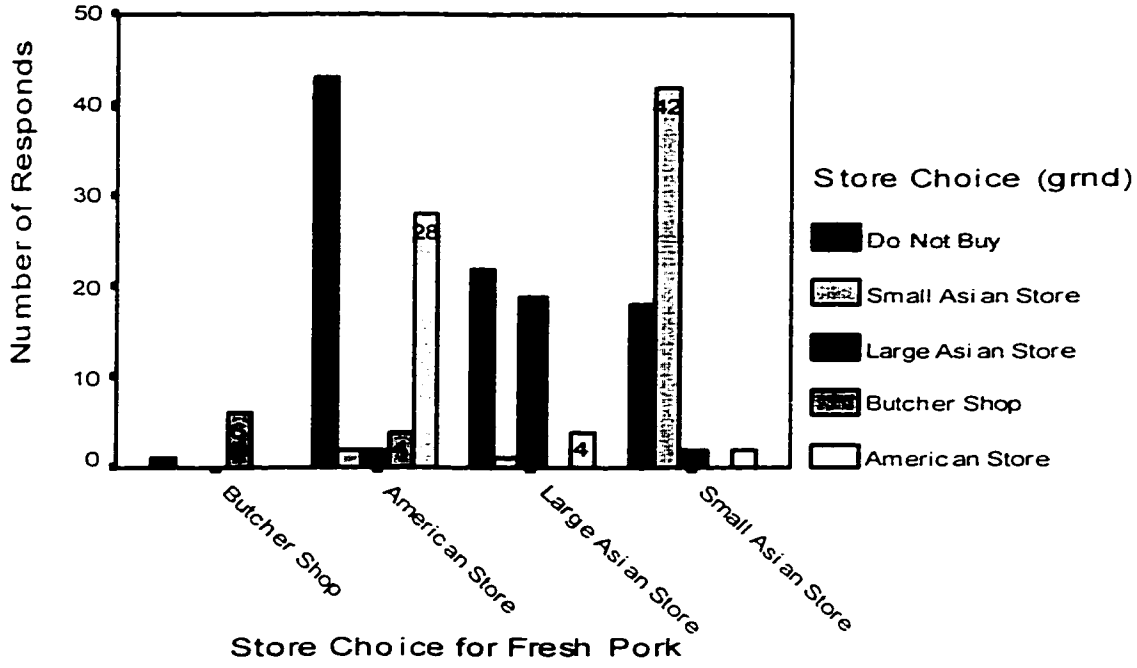


Table 5-3: Test Statistics: Purchases of Different Cuts of Pork and Store Choice

Dependent Variable: Store choice for fresh pork					
Independent Variables	**Pearson Chi-Square (P-Value)**		**Cramer's V**	**Contingency Coefficient**	**C max**
Offal (hearts, livers, stomach etc)	53.888	(0.000)	0.303	0.464	0.866025
Loins (chops)	200.818	(0.000)	0.584	0.711	0.866025
Pork legs	164.958	(0.000)	0.530	0.676	0.866025
Hind foot (hock, front foot)	99.951	(0.000)	0.412	0.581	0.866025
Side pork (bellies)	102.094	(0.000)	0.417	0.585	0.866025
Ground pork	247.859	(0.000)	0.649	0.747	0.866025
Shoulders butts/roast	228.697	(0.000)	0.624	0.734	0.866025

The tendencies exhibited in the purchase of pork loins, shoulder butts, legs and ground pork do not necessarily apply to offal, side pork bellies and hind foot, especially for respondents who purchase most of their fresh pork from American stores. Respondents who purchased most of their pork from American stores had the highest probability of not buying offal. The joint probability of consumers' purchasing most of

their fresh pork at American style supermarkets and not purchasing offal was 0.291, compared to 0.163 from large Asian stores and 0.265 from small Asian stores. Only 22 of the 79 respondents who purchase most of their pork from American style supermarkets purchased offal. Of these, 41% (9/22) purchased offal at large Asian stores. Consumers who bought most of their pork from small Asian stores had the second highest probability of not buying offal. This seems counter-intuitive because small Asian stores tend to carry the greatest selection of offal. The results seem to suggest that whether or not the store carries offal, does not necessarily influence the consumers' store choice. This inference is supported by the test statistics obtained from the Cramer's V, the closer the Cramer's V is to 1, the higher the degree of association. The Cramer's V test statistic suggests a small degree of association between consumers store choice and their purchases of offal, hind foot, and pork side bellies, the test statistics are 0.303, 0.412, and 0.417 respectively. Note that the Cramer's V for pork loins, shoulder/butts or roast, and ground pork are 0.584, 0.624, and 0.649, respectively.

Similar to the offal results, consumers who purchased most of their pork from American style supermarkets also had the highest probability of not buying hind foot and side pork bellies. Only 18 respondents purchased hind foot, of which 44% (8/18) of them purchased hind foot from small Asian stores. Sixty-five percent of respondents who purchased the majority of their fresh pork from American stores did not buy pork side bellies. However, if a consumer who purchase most of their pork from American stores were going to buy pork side bellies the probability of them buying pork side bellies from American stores is 0.082. The joint probability of consumers who purchase most of their pork from American stores and buy pork side bellies from small Asian stores is 0.036 compared to 0.005 from large Asian stores, and 0.020 from butcher shops.

Consumers who purchase most of their pork from large Asian stores buy relatively small quantities of hind foot. Of those respondents that did buy hind foot, 88% (14/16) indicated that they bought the product from large Asian stores. Consumers from small Asian stores were most likely to buy pork side bellies (31 out 64 respondents indicated that they purchased pork side bellies).

5.3 Store Attributes and Store Choice for Fresh Pork

The test statistics presented in Table 5-4 indicate price, quality, availability of specialized pork cuts, location and accessibility to the store, the level of customer service at the store meat section and mode of transportation are associated with where the respondents purchase most of their fresh pork at a 0.05 and 0.01 significance level. The degree of association between price and where the respondent purchases most of their fresh pork is small as suggested by values the Cramer's V and Contingency Coefficient of 0.247 and 0.393, respectively. As noted in Table 5-4, the degree of association between consumers' store choice for pork and the overall quality of pork, availability of specialized pork cuts, location and accessibility to the store, the level of customer service, and mode of transportation are very small given the low values of the Camer's V and the Contingency Coefficient.

Table 5-4: Test Statistics: Store Attributes and Store Choice

Dependent Variable: Store choice for fresh pork					
Independent Variables	Pearson Chi-Square (P-Value)		Cramer's V	Contingency Coefficient	C max
Where most groceries purchased	198.485	(O.OOO)	0.712	0.709	0.816497
Price of fresh pork	35.783	(O.OOO)	0.247	0.393	0.866025
Overall quality of fresh pork	21.274	(O.O11)	0.190	0.313	0.866025
Avail. Of specialized pork products	80.871	(0.000)	0.371	0.540	0.866025
Location and accessibility	21.591	(O.O10)	0.192	0.315	0.866025
Level of service in meat section	45.440	(O.OOO)	0.278	0.434	0.866025
Mode of transportation to/from	24.426	(O.OOO)	0.203	0.332	0.866025

The results presented in Figure 5-2a indicate that 63% of the respondents who purchased most of their fresh pork from small Asian stores stated that the price of pork sold at small Asian stores was cheaper in comparison to other stores. This is in contrast to respondents who purchase most of their fresh pork from large Asian stores and American style supermarkets, where only 26% and 20% respectively, of the respondents made this statement about prices. It appears, therefore, that the price of fresh pork in small Asian stores is perceived to be cheaper than in large Asian stores and American style supermarkets. In fact, only 1% of the respondents who purchased pork from small Asian stores indicated that the price of pork sold at the store was more expensive,

whereas this percentage rises to 14% for American style supermarkets and 6% for large Asian stores.

Survey results also indicate that, in addition to the price of pork, most respondents also view the quality of pork sold at small Asian stores to be higher than at other types of stores. Seventy percent of the respondents who purchased most of their fresh pork from small Asian stores indicated that the quality of fresh pork sold at the store was better than at other stores. However, only 39% of the respondents who purchase most of their pork from American style supermarkets indicated that the quality of pork sold at American stores was better. Fifty-four percent of the respondents from large Asian stores indicated that the quality of pork at large Asian stores was better than other stores and 35% of the respondents indicated that the quality was comparable to other stores (See Figure 5-2b).

Whether the availability of specialized pork cuts is greater, less or comparable to other stores is dependent on the type of store. American stores generally do not carry specialized or non-traditional cuts of pork, while small and large Asian stores tend to carry a variety of these products. The results of the survey support this conclusion. Seventy percent of the respondents who purchased fresh pork from small Asian stores indicated that the availability of specialized pork products was greater than that of other stores. The opposite was true for respondents who purchased most of their fresh pork from American style supermarkets. In fact, 29% (23/79) of these respondents indicated that there was less availability of specialized pork products than at other stores and another 39% indicated that the availability of specialized pork was not applicable in their store choice. Does this mean that respondents who buy pork from American stores do not purchase specialized pork products? No, what it does indicate is that there is a higher probability that respondents who purchase most of their pork from American style supermarkets do not purchase specialized pork products, such as offal, hind foot, and side pork bellies (See Figure 5-2c).

As mentioned in Chapter 4, the majority of respondents indicated that location and accessibility to where they purchase most of their fresh pork was convenient compared to other stores. This is particularly true in the case of consumers who purchase most of their fresh pork from American style supermarkets. The probability of a respondent purchasing fresh pork from American style supermarkets because the

location of the store was convenient compared to other stores is 0.332. This is the highest among any of the store choice characteristics (See Figure 5-2d).

Respondents also seem to view the level of service in the meat department at small Asian stores to be more courteous and helpful than other types of stores. A higher percentage of respondents indicated that the level of service in small Asian stores was more courteous and helpful than other stores. The results are consistent with how the different types of stores retail their pork. Small Asian stores have a full service approach to selling pork whereas American style supermarket have a self-service approach to selling their pork. (See Figure 5-2e). A detailed summary of the results from the cross-tabulations between consumer's store choice for fresh pork and the store attributes is provided in Appendix 6, Table A6-2.

Figure 5-2a: Store Choice and Price

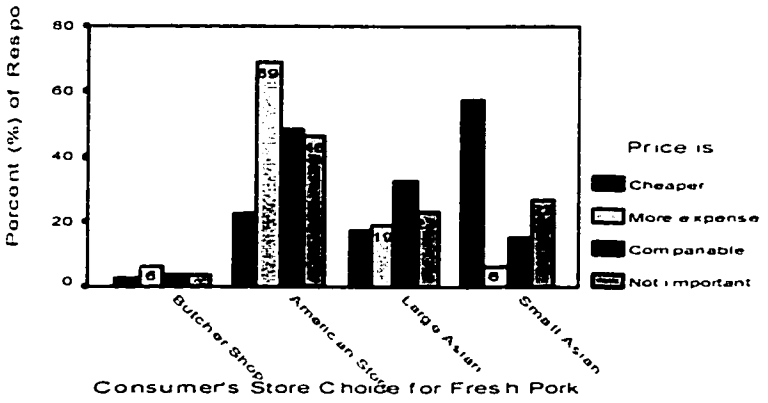


Figure 5-2b: Store Choice and Quality

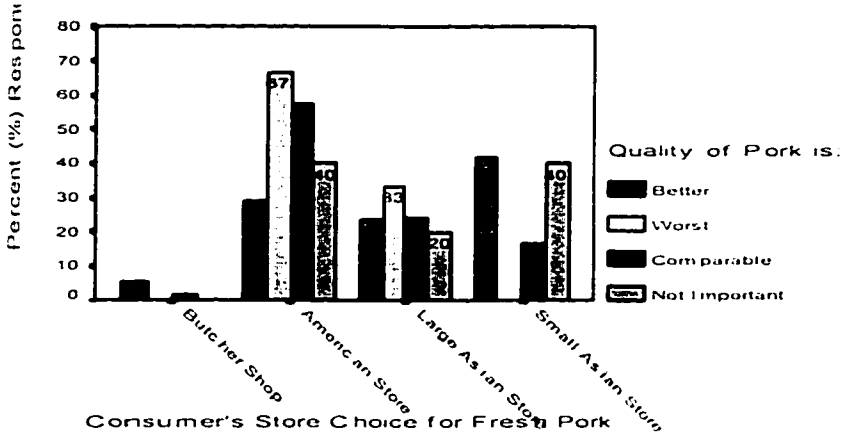


Figure 5-2c: Store Choice and Variety of Specialized Cuts

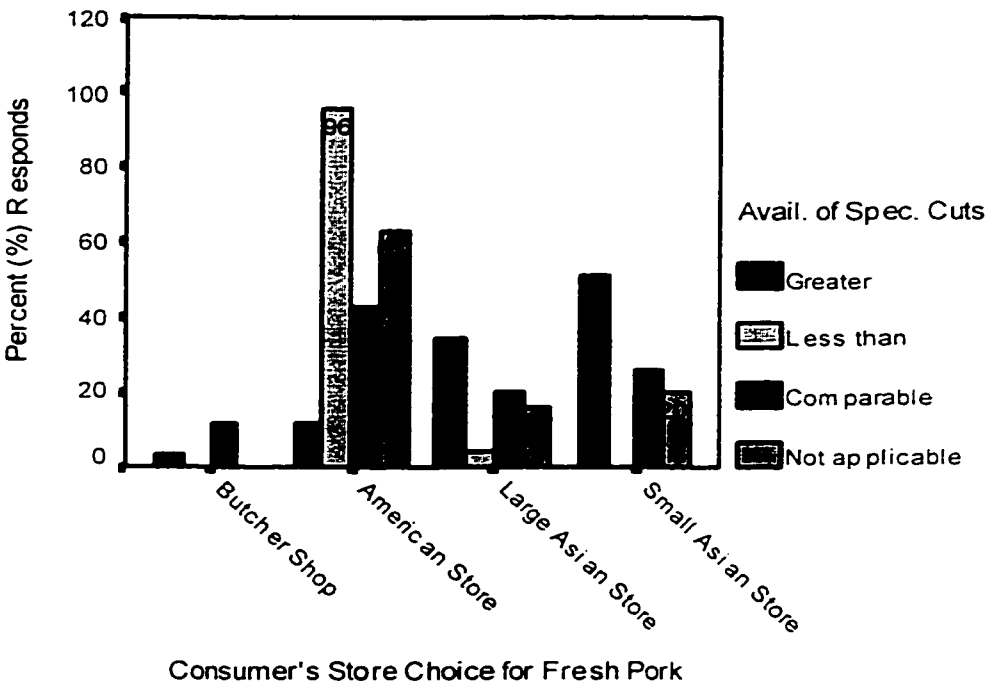


Figure 5-2d: Store Choice and Location and Accessibility

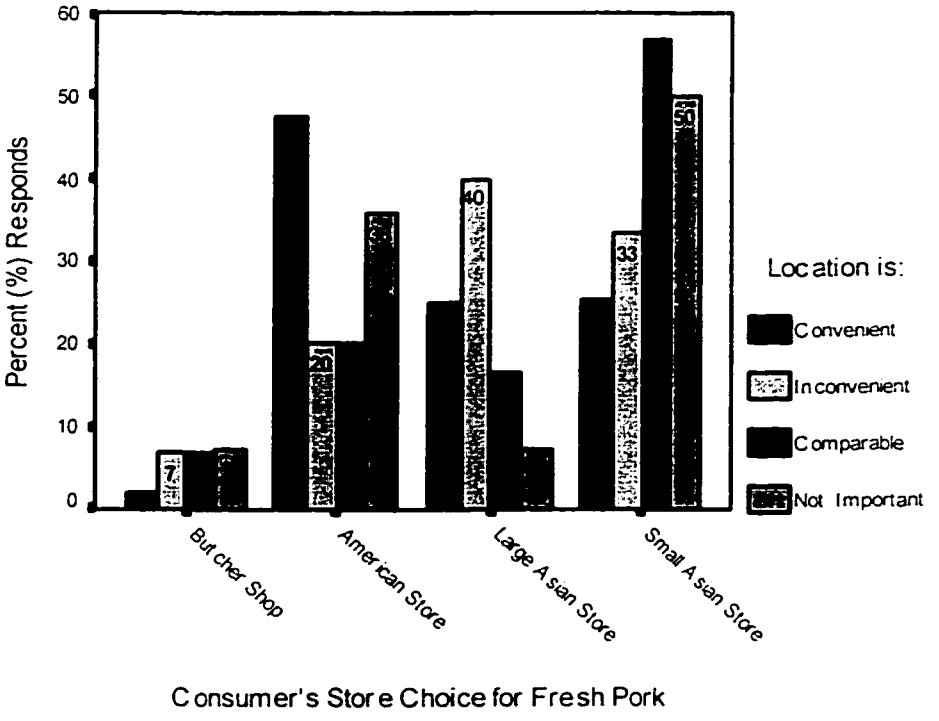


Figure 5-2e: Sore Choice and Level of Customer Service

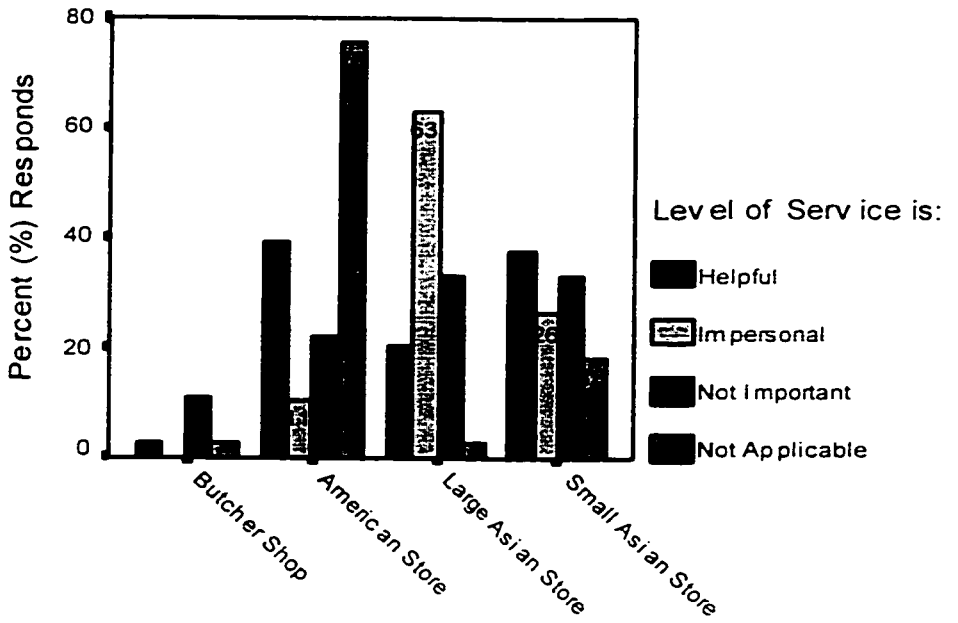
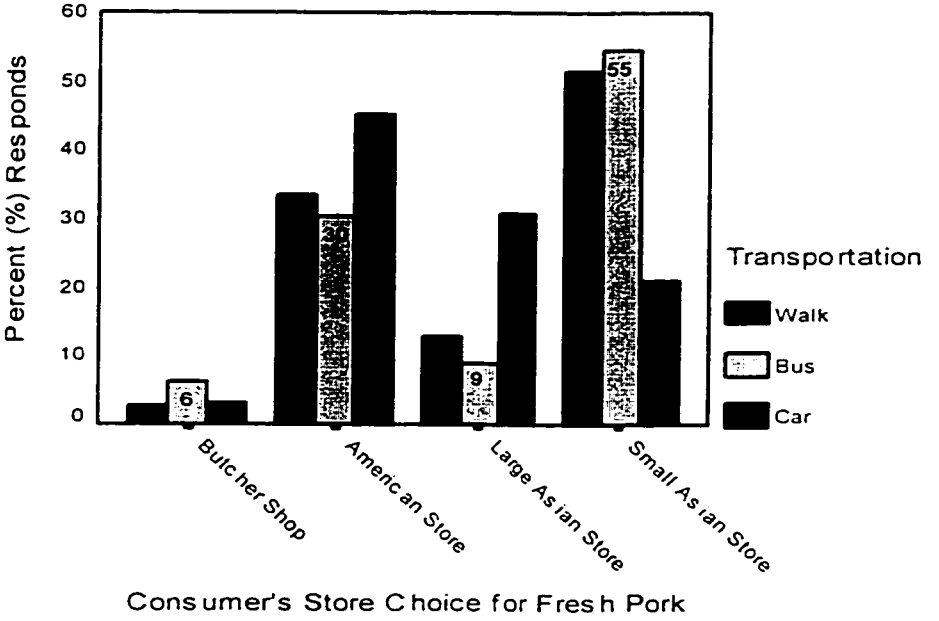


Figure 5-2f: Store Choice and Mode of Transportation



5.4 Socioeconomic and Demographic Characteristics and Store Choice for Fresh Pork

The following summarizes, according to store type, the characteristics of a typical consumer who purchases pork from one of the four store types. The findings are based on the cross-tabulations of socioeconomic and demographic characteristics of the respondent and where they purchase most of their fresh pork. A detailed summary of the results from cross-tabulations are provided in Appendix 6, Table A6-3.

Consumers who purchase most of their fresh pork from small Asian stores tend to be Chinese females between the ages of 35-44 and have at least three people living in their household. They are generally the main shoppers and cooks in the household, while working full time. Their annual household income averages between $15,000 to $29,999. The highest level of education they have completed is high school.

Consumers who purchase most of their pork from large Asian stores also tend to be Chinese females between the ages of 35-44. Again, they are the main grocery shopper and cook in the household and also work full time. However, they will tend to have a larger household and a slightly higher annual income. This likely corresponds to the fact hat the majority of them have obtained a college education.

Consumers who purchase most of their fresh pork from American stores, tend to be male and either Korean, Vietnamese, Japanese, Filipino or "others". They do most of the grocery shopping in the household but do not do most of the cooking. The average size of their household is between 2 and 4, and their gross income in 1997 was between $30,000 to $59,999. Similar to the consumers who purchase most of their pork from large Asian stores, they tend to be employed full time and have obtained a college or university education.

As mentioned earlier, there were only 7 people who indicated that butcher shops were the place where they purchased most of their fresh pork. Thus, the results for this category would not be representative, as the sample size is below 30. However, the characteristics of these 7 people follow a similar profile to the consumers who purchase most of their fresh pork from small Asian stores.

To determine whether or not the socioeconomic and demographic characteristics of respondents are related to their store choice, various test-statistics are used. Table 5-5 provides the results of these tests. Education, ethnic background, and whether the person was born in the United States were the only three cases where the null

hypothesis of independence was rejected at a 0.05 and 0.01 significance level. This indicated that there is a statistically significant association between the respondents' education, ethnic background, and if the person was born in the United States and their store choice for fresh pork. However, the degree of association for all the three variables was small. The Cramer's V was 0.235 for being born in the U.S., 0.246 for the respondent's level of education and 0.238 for the respondent's ethnic background. The contingency coefficient for education was 0.393 with the maximum value of the coefficient being 0.866, suggesting a small to moderate association between where the respondent purchases most of their fresh pork and their education level (See Table 5-5). Of the 64 respondents who purchased most of their fresh pork from small Asian stores, 41% had obtained a high school education. This is compared to large Asian stores where 50% (23/46) of the respondents received a college education. As well 45% of the respondents from American style supermarkets have attended college.

With respect to age, small Asian stores have the largest group of respondents who are over the age of 65 (see Appendix 6, Table A6-3). The probability of a respondent who is over the age of 65 and purchases most of their pork at small Asian stores was 0.082. The joint probability of a respondent who is over the age of 65 and purchase most of their pork at large Asian stores is 0.046, 0.066 at American style supermarkets, and 0.006 at butcher shops.

American style supermarkets had the largest group of respondents with incomes $100,000 and over, accounting for 14% of the 79 respondents. Small Asian stores had the largest group of respondents with income under $15,000 (25% of 64 respondents). For all of the four stores, 50% of the respondents were employed full-time. Shoppers at American style supermarkets had the largest number of respondents who were students.

Table 5-5: Test Statistics: Socioeconomic and Demographic Characteristics and Store Choice

Dependent Variable: Store choice for fresh pork					
Independent Variables	**Pearson Chi-Square (P-Value)**		**Cramer's V**	**Contingency Coefficient**	**C max**
Gender	1.481	(O.687)	0.087	0.087	0.707107
Does majority of grocery shopping	4.049	(O.256)	0.144	0.142	0.707107
Prepare most of the meal	1.234	(O.745)	0.079	0.079	0.707107
Born in the US	10.843	(O.O13)	0.235	0.229	0.707107
Ethnic background	33.322	(O.OO4)	0.238	0.381	0.866025
Size of household	19.023	(O.390)	0.180	0.297	0.866025
Approx. net family income from all sources before taxes in 1997	27.647	(O.O68)	0.217	0.352	0.866025
Age Category	20.027	(O.171)	0.185	0.304	0.866025
Current job status	14.929	(O.667)	0.159	0.266	0.866025
Highest level of education completed	35.708	(O.OO2)	0.246	0.393	0.866025

The results from this cross-tabulation analysis were used to provide insight into one of the fundamental research objectives of the study; what factors influence Asian consumers store choice for their fresh pork. In summary, cross-tabulations can provide valuable insights into the characteristics of consumers who purchase their fresh pork from small Asian stores, large Asian stores, American style supermarkets, and butcher shops.

One of the main draw-backs of cross-tabulations, especially in the case of discrete variables, is that cross-tabulations do not indicate the direction of these relationships. Does age or ethnic background have a positive or negative influence on the consumers' store choice? Does having a cheaper price for pork encourage consumers to purchase pork at one particular store over another? These types of questions are difficult to answer using cross-tabulations alone.

Chapter 6 Store Choice: Multi-nominal Logit Analysis

6 Introduction

This chapter consists of two parts. The first section describes the development of the multi-nominal logit (MNL) model of consumer's store choice for fresh pork. The second section describes the estimation procedure using the data presented in Chapter 5 and the results of the estimation. The coefficients estimated by the models will also be discussed.

6.1 Model Development

The primary objective of this study is to gain a better understanding of ethnic Asian consumer's store choice for fresh pork in San Francisco. The theoretical framework of the MNL model used to analyze consumer's store choice was discussed in Chapter 4. In this study, each respondent was faced with four[1] choices of where they purchase most of their fresh pork. The four choices include: small Asian stores, large Asian store, American style supermarkets, and meat specialty stores or butcher shops. The choice set for person "n" can be represented as:

Choice
- = 1 if consumer "n" purchased most of their fresh pork from small Asian stores
- = 2 if consumer "n" purchased most of their fresh pork from large Asian stores
- = 3 if consumer "n" purchased most of their fresh pork from American style supermarkets
- = 4 if consumer "n" purchased most of their fresh pork from butcher shops

The MNL store choice model can be specified as:

$$Pr(j) = \frac{\exp(\beta_j' X_i)}{1 + \sum_{K=1}^{3} \exp(\beta_k' X_i)} \quad \text{for } j = 1,2,3 \qquad (5)$$

[1] Each respondent was actually faced with five store choices, small and large Asian stores, American style supermarkets, meat specialty stores, and other types of stores. However, none of the respondents surveyed selected "other" types of stores as their store choice for fresh pork. As such "other" stores were not included in the analysis.

where the Pr (j) is the probability of a consumer purchasing most of his/her fresh pork at store j; X_i represents a set of socioeconomic, demographic characters and/or store characteristics, and β_j is a vector of unknown parameters (Huang and Fu 1995). As implied in equation (5), Pr (4), the choice of butcher shops were excluded from the choice set. The estimation of the MNL model requires the normalization of one of the parameter sets in order to identify the parameters of the model (Hung and Fu 1995 and Greene 1997). In this study, the regression coefficients for butcher shops (store 4) were normalized and chosen as the base. As such, the choice set was recoded to 1,2,3,0 representing American stores, large Asian stores, small Asian stores, and butcher shops, respectively.

Table 6-1 lists the independent variable definitions and their codes. The socioeconomic and demographic characteristics include: age (AAG-), gender (GEN), number of years living in the USA (NUM), ethnic background, whether the respondent was Chinese or not Chinese (ETH3), education (AEDGR-), employment status (EMPLOY), and whether or not the respondent prepares most of the meals (MMEAL) in their household, buys pork more than once a week (DNY1), always looks at the package expiration date (DNY2), buys the leanest cuts of pork (DNY3), and uses advertisements to compare pork prices (DNY4). All variables are measured as binary variables, 0 for nonoccurrence and 1 for occurrence, with the exception of the number of years living in the USA (NUM) and size of household (SIZEOH) which are continuous variables. There are three categories for age, income, and education. The age and income category was grouped into three categories to reduce the number of dummy variables used in the data. Education was also grouped into three categories. Note that in the estimation of equation (5), 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.

For the purposes of modeling, the four levels in each of the store attributes presented in Chapter 4 and 5 were reduced to one (See Table 4-1 for the list of attributes and associated levels). The first level for each of the store attributes was used to represent whether consumers view a particular characteristic as being important or not important in their pork purchases at a particular store. The selection of the first level in each of the store attributes was made on the assumption that consumers perceive

that: better quality of pork, greater selection of specialized pork products, convenience, and helpful customer service are important relative to those stores that did not offer the same level of service, quality, customer service, and selection of specialized pork products. The assumptions made for the purposes of modeling does not take into account the relative importance that a consumer may place on a specific store attribute. The reason why the first level was chosen and not the other three levels can best be illustrated through an example. Let us assume that a consumer does not consider price to be an important factor in where they purchase pork. If the consumer does not consider price important, they will purchase pork at a store even if the price was more expensive or comparable to other stores. However, if the consumer views price as being important, one would expect the price of pork sold at their store choice to be perceived as being cheaper than other stores. It is not logical for a person who views price as being important to purchase most of their fresh pork at a store where the price is perceived to be more expensive than other stores. The same logic is applied to the overall pork quality characteristic, availability of specialized pork product characteristic, location and accessibility characteristic, and the level of service at the meat department characteristic. Similar to the socioeconomic and demographic characteristics, these new store attributes are also measured as binary variables using, 1 for important and 0 for not important. In Table 6-1 the independent variables that is used in the estimation of the MNL model are provided.

Table 6-1: 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

6.2 Estimation and Results

The specification of the MNL model is based on the literature review in Chapter 3 (Recker and Kostyniuk 1978) and the cross-tabulation analysis conducted in Chapter 5. The test-statistics shown in Table 5-2a, 5-3, and 5-5 provided a basis for determining which variables may be relevant and significant in predicting consumers store choice. Several versions of the MNL model were estimated, because of problems of multicollinearity, the inclusion of certain variables resulted in singular matrixes. As a

result, the choice probabilities could not be estimated. This was noted by Timmermans (1981) and Fotheringham (1988b) as a common problem when using the MNL model in estimating store choice. Problems of multicollinearity occur as some categories of store attributes are highly correlated with one another and when more than four store attributes are included in the model. This is also another reason why the store choice attributes were reduced to only one level and certain socioeconomic and demographic characteristics were excluded from the MNL model. 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. This helps to explain some of the multicollinearity and the extremely large standard errors, and singularity problems exhibited in the same models estimated. Consequently, only two models were used to represent consumers' store choice.

The two multi-nominal logit models were estimated using LIMDEP, Version 7.0 (Greene 1995). Using equation (5), 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 variables 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.

A third model, Model 3 that combines Model 1 and 2, was also estimated. However, the problems that arise from multicollinearity and the number of estimated coefficients relative to the sample size are more apparent in Model 3. The inclusion and exclusion of certain variables produced relatively large changes in the parameter estimates, higher standard errors and the estimated parameters that were significant in Model 1 and Model 2 were no longer significant in Model 3.

The estimated coefficients for Model 1 are given in Table A7-1, and Table A7-2 contains results for Model 2 in Appendix 3. For reference, the estimated coefficients for Model 3 are provided in Appendix 7 and are not discussed in this study. Table A7-1 and Table A7-2 also report goodness of fit measures. The chi-square statistics and the significance levels show that the two models are highly significant. The results from the log-likelihood ratio[2] indicate that the two estimated models are statistically valid. The value of the pseudo R^2 of Model 1 is 0.29 and Model 2 is 0.19[3] which indicates an acceptable goodness of fit. The predictive ability of the 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.

As seen in Table A7-1 and A7-2, for each independent variable, there are three estimated coefficients. The interpretation of the sign and magnitude of the estimated coefficient are (Huang and Fu 1995) not straightforward to interpret. As such the discussion of the results focus on the marginal analysis.

With reference to equation (5), "it is tempting to associate β_j with the jth outcome, but this would be misleading" (Greene 1997:916). By the differentiation of equation (5), the marginal effect of the characteristics on the probabilities are:

$$\delta_j = \frac{\partial Pr_j}{\partial x_j} = Pr_j\left[\beta_j - \sum_{k=0}^{J} Pr_k \beta_k\right] = Pr_j\left[\beta_j - \bar{\beta}\right] \qquad (6)$$

where Pr (j) is the probability of a consumer purchasing most of his/her pork at store j

"Therefore, every subvector of β enters every marginal effect, both through probabilities and through the weighted averages that appears in δ_j (Greene 1997: 916)". What is suggested here is that the sign on the estimated coefficient does not necessarily indicate the increase or decrease in the probability of Pr (j). That is "for any particular x_k, $\partial Pr_j/\partial x_k$ need not have the same sign as β_{jk}. Furthermore, as indicated in the above section, the estimation of Model 1 and 2 requires the normalization of butcher shops. "Thus, each set of the estimated coefficients has an interpretation that is analogous to binary

[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)]

variables in ordinary least squares regression (Huang and Fu 1995:48)". This indicates that the coefficient estimated represents the relative movements between a pair of choice outcomes with butcher shops being the reference store. As such, the marginal effects on the probabilities that are presented in equation (6) "measure the shifts in the probability of an outcome with respect to a change in a given regressor. The marginal probabilities for a given independent variable is always summed to zero because an increase in the probability in a category must be offset by corresponding decrease in another category or categories" (Huang and Fu 1995:48).

It should be noted that because the variables in the models are measured in terms of dummy variables (0's and 1's) , "the marginal effect of a dummy variable on event probability calculated by taking derivatives is a rough approximation (Liao 1994:47)". The partial derivatives, equation (6), measures a change in probability given a change in x_k. "In a continuous variable a unit change approximates a small change, thereby the partial derivative approximates a marginal effect; while in a dummy variable the only change is from 0 to 1 and 1 to 0, a 100% change (Liao 1994:20)". Taking the partial derivative of a dummy variable tends to overestimate the marginal effect. Thus, the marginal effects on event of probability as calculated by LIMDEP only provide an overall impression of the effects of various characteristics on store choice. A more accurate examination of the effects of store, socioeconomic and demographic characteristics on consumer's store choice for fresh pork can be accomplished by looking at the changes in the predicted probability of a "representative consumer" when the characteristic (x_k) is equal to 1 and when it is equal to 0 (Liao 1994). This "representative consumer" represents the characteristics of an average consumer in the sample, regardless of their store choice. The predicted probability of the "representative consumer" is calculated using equation (5). The marginal effect of x_k (a characteristic) on the predicted probabilities of purchasing fresh pork from one of the four store choices is the change in the predicted probability of a "representative consumer" when the characteristic (x_k) is equal to 1 and when it is equal to 0, *ceteris paribus* (Liao 1994).

In this study the marginal probabilities and the changes in predicted probability of a "representative consumer" are both calculated and analyzed. The marginal probabilities calculated by LIMDEP are used to identify significant sources of change in the probability of purchasing fresh pork from small and large Asian stores, American

style supermarkets and butcher shops. The marginal effect on the probability of store choice for both models were calculated by LIMDEP, using equation (6). The LIMDEP results are provided in Table 6-2 and 6-3. The predicated probabilities of the "representative consumer" for Models 1 and 2 are provided in Tables 6-4 and 6-5 respectively.

6.2.1 Marginal Probabilities: Model 1

As shown in Table 6-2, this study finds 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 a 0.05 significance level. The importance of convenience, price, and quality on store choice corresponds to the results from Recker and Kostyniuk (1978) and Woodside and Trappey (1992) study on consumers food store choice.

The estimated marginal probability suggest that consumers who considers price to be of relative importance in their store choice, the probability of purchasing pork from large Asian stores decrease by 0.1872 and increase by 0.293 for small Asian stores.

The marginal probability of consumers who perceive the variety of specialized pork products important in their store choice, has a negative influence on the probability of purchasing pork from American style supermarkets and butcher shops and a positive influence on probability of purchasing pork from large and small Asian stores. The results are consistent with the findings in Chapter 6 and reflect the characteristics of consumers who purchase pork from American and large Asian stores. Recall the discussion from section 5.2 in Chapter 5. The highest percentage of consumers who did not purchase offal, pork side bellies and hock was from consumers who purchased most their pork from American stores. Furthermore, American stores in general do not carry specialized pork products such as offal, whereas large Asian stores do.

The marginal probability of convenience indicates a positive and statistically significant influence on the probability of a consumer purchasing pork from American stores and negative influence on the probability of a consumer purchasing pork from small Asian store. This is consistent with the findings in Chapter 5. The results in Figure 5-2 and Appendix 6, Table A6-2 indicate that 74% of consumers who purchase most

their fresh pork at large Asian and 82% from American stores stated that their store choice is more convenient than other stores. This is compared to 54% of consumers who purchase pork from small Asian stores.

The estimated marginal probability suggests that for consumers who consider customer service to be relatively important in their store choice, their probability of purchasing pork from large Asian stores decreases by 0.1459. It increases by 0.1209, 0.06325 for large Asian stores and small Asian stores, respectively. If a consumer drives to the store, the probability of the consumer purchasing pork at American store increases by 0.2583 and decreases by 0.3121 for small Asian stores. Conversely, if a consumer takes a bus to the store, the probability of the consumer purchasing pork at small Asian store increases by 0.0913. The results are in accordance with the cross-tabulations presented in Chapter 6 (see Figure 5-2f). The proportion of consumers who purchase their pork from American stores that drive (TRAN3) is larger than the proportion of consumers who drive and purchase pork from small Asian stores.

Table 6-2: Estimated Marginal Probabilities by Store: Model 1

	Marginal Probabilities[a]: Model 1			
Variable	Butcher shop	American Store	Large Asian Store	Small Asian Store
PRICE1	-0.01762 *(-0.569)*	-0.08816 *(-0.835)*	-0.1872 *(-1.766)***	0.293 *(2.657)****
VAR1	-0.01305 *(-0.464)*	-0.5889 *(-3.306)****	0.3105 *(2.708)***	0.2915 *(2.539)****
CONV1	-0.4626 *(-1.107)*	0.2546 *(2.366)****	0.03922 *(0.469)*	-0.2476 *(-2.145)****
SERV1	-0.03822 *(-1.007)*	0.1209 *(1.377)*	-0.1459 *(-1.637)***	0.06325 *(0.804)*
TRAN3	-0.03731 *(-1.016)*	0.2583 *(2.592)****	0.09104 *(1.079)*	-0.3121 *(-2.317)****
TRAN1	-0.04658 *(0.926)*	0.1043 *(0.877)*	-0.1491 *(-1.079)*	0.09134 *(0.966)*
STQU1	0.0520 *(1.118)*	-0.08352 *(-0.808)*	-0.07627 *(-0.812)*	0.1078 *(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

6.2.2 Marginal Probabilities Results: Model 2

The results from Table 6-3, indicate that ethnic background (Chinese or not Chinese), level of education, and whether or not the consumer looks at the package expiration date are the most important variables that characterize each store choice, in terms of the variables being statistically significant.

The estimated marginal probability suggest that consumers who are Chinese, their probability of purchasing pork from American style supermarkets will decrease by 0.2264. This probability will increase by 0.1123 for large Asian stores and increase by 0.1129 for small Asian stores. The results suggest that consumers who are Chinese have a higher probability of not purchasing most of their fresh pork at American stores. Interestingly, the marginal probability of being Chinese and purchasing fresh pork from American store was only one that was statistically significant.

From the results in Table 6-3, for those consumers who have obtained a college education, this has a positive effect on the probability of purchasing fresh pork from large Asian stores and a negative effect on the probability of purchasing fresh pork from small Asian stores. The results reflect the cross-tabulations presented in Chapter 6. There is a higher percentage of consumers with a college or university education who purchase pork from large Asian stores and American stores than from small Asian stores and butcher shops. Consumers who always look at the expiration date on pork are more likely to purchase pork from American and large Asian stores and less likely to purchase from small Asians store.

The marginal probability estimates suggest that for consumers that purchase pork more than once a week, their probability of purchasing pork from American style supermarkets and large Asian stores decreases while the probability of purchasing from small Asian stores and butcher shops increases Consumers who are employed full time have a positive effect on the probability of purchasing pork from large and small Asian stores and a negative effect on American style supermarkets and butcher shops. The marginal probability suggests that for consumers who are between 35 and 44, their probability of purchasing fresh pork from butcher shops will increase by 0.022. If the consumer's store choice was large Asian stores, this probability would decrease by 0.1402. The opposite effect is true for consumers over the age of 45. Their probability

of purchasing from large Asian stores increases by 0.011 and decreases by 0.108 for American style supermarkets.

Table 6-3 Estimated Marginal Probabilities by Store: Model 2

	Marginal Probabilities[a]: Model 2			
Variable	**Butcher shop**	**American Store**	**Large Asian Store**	**Small Asian Store**
GEN	-0.007858 *(-0.310)*	0.09592 *(1.047)*	-0.1248 *(-1.460)*	0.03672 *(0.411)*
MMEAL	-0.007411 *(-0.288)*	0.05831 *(0.620)*	-0.06574 *(-0.809)*	0.01484 *(0.162)*
NUM	-0.0001713 *(-0.247)*	0.003297 *(1.263)*	-0.004316 *(-1.559)*	0.00119 *(0.482)*
DYN1	0.03491 *(.935)*	-0.1232 *(-0.996)*	-0.02833 *(-0.280)*	0.01166 *(1.104)*
DYN2	-0.007272 *(-0.283)*	0.1862 *(1.893)***	0.1472 *(1.673)**	-0.3261 *(-2.805)****
DYN3	0.02284 *(0.687)*	0.1217 *(1.297)*	-0.1246 *(-1.547)*	-0.01988 *(-0.239)*
DYN4	0.006875 *(0.242)*	0.004776 *(0.052)*	0.03079 *(0.419)*	-0.04244 *(-0.453*
ETH3	0.001215 *(0.050)*	-0.2264 *(-2.310)****	0.1123 *(1.425)*	0.1129 *(1.246)*
SIZEOH	-0.005147 *(-0.594)*	-0.01169 *(-0.414)*	-0.009167 *(-0.415)*	0.0260 *(0.954)*
ING1	-0.04337 *(-1.022)*	-0.05174 *(-0.456)*	-0.05029 *(-0.563)*	0.1454 *(1.341)*
ING2	-0.07133 *(-1.023)*	-0.0219 *(-0.214)*	-0.01269 *(-0.159)*	0.1060 *(1.023)*
AEDGR2	0.001548 *(0.051)*	0.140 *(1.306)*	0.168 *(1.655)**	-0.3095 *(-2.489)****
AEDGR3	-0.004031 *(-0.122)*	0.1486 *(1.180)*	0.07654 *(0.740)*	-0.2211 *(-1.735)**
EMPLOY	-0.3311 *(-0.826)*	-0.078 *(-0.770)*	0.03313 *(0.442)*	0.0780 *(0.808)*
AAG3	-0.02039 *(-0.541)*	-0.1018 *(-0.838)*	0.01135 *(1.238)*	0.008642 *(0.076)*
AAG2	0.0221 *(0.558)*	0.07416 *(0.638)*	-0.1402 *(-1.338)*	0.04389 *(0.396)*
* Statistically Significant at 0.10 **Statistically Significant at 0.05 ***Statistically Significant at 0.01				

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

6.2.3 Predicted Probabilities and Marginal Probabilities of the Representative Consumer Results: Model 1

In Model 1 the "representative consumer" represents the characteristics of over 55% of the respondents in the sample survey. This consumer drives to the store and considers price and the variety of specialized pork products sold at a store not an important factor in where they purchase their fresh pork. However, they do consider the quality of fresh pork sold at the store, convenience, and the level of service in the meat department important in their store choice for fresh pork. The predicted probabilities were calculated in Excel Spreadsheet 8.0, using equation (5).

Table 6-4 provides the marginal effects of price, convenience, quality, variety of specialized pork cuts and different methods of transportation on the representative consumer's store choice for fresh pork and the associated predicated probabilities. The predicted probability of the representative consumer (base case scenario) purchasing most of their fresh pork at American stores is 0.791, 0.139 for large Asian stores, 0.048 for small Asian stores, and 0.0212 for butcher shops. Now assume that the consumer is price conscious and considers price important (recall the representative consumer does not consider price important in their store choice for fresh pork), but everything else about the consumer is the same (*ceteris paribus).* The predicted probability of the consumer purchasing pork now decreases to 0.736 for Americans stores, 0.0877 for large Asian stores, 0.0143 for butcher shops. This probabiiity increases to 0.1620 for small Asian stores. The difference between the probability of the consumer that considers price important and one who does not consider price important is the marginal effect of the importance of price on the consumer's store choice for fresh pork. The marginal effect on price relative to consumer's store choice is negative for all stores except for small Asian stores. This suggests that if the consumer is price conscious, all other variables being equal, the probability of the consumer purchasing pork at small Asian store increases. It appears that if consumers purchases pork from small Asian stores, they are more likely to be price conscious than consumers who purchases pork from American stores, large Asian stores, or butcher shops. The results presented are consistent with the results from the cross-tabulations in Chapter 5. The largest

percentage of consumers who stated that price was important comes from consumers who purchase pork from small Asian stores (see Figure 5-2a in Chapter 5).

If the "representative consumer" does not consider convenience important in their store choice for fresh pork, the probability of the consumer purchasing fresh pork from American style supermarkets decreases to 0.5547, and increases to 0.166, 0.155, 0.130 for large Asian stores, small Asian stores, and butcher shops, respectively. The marginal effect of the importance of convenience on the probability of purchasing fresh pork from American style supermarkets is 0.2358 and -0.1664 for large Asian stores, -0.1559 for small Asian stores, and -0.1230 for butcher shop. This finding is consistent with the marginal effects estimated by LIMDEP (see Table 6-2) and the cross-tabulations results in Chapter 5 (see Figure 5-2d). The largest percentage of consumers who stated convenience as being important comes from consumers who purchase most of their pork from American stores, not from large and small Asian stores.

If the representative consumer takes a bus, their probability of purchasing fresh pork from American stores, large Asian stores and butcher shops decreases. However, the probability of purchasing fresh pork from small Asian store increases. The findings are supported by results of the cross-tabulations presented in Chapter 5 (see Figure 5-2f). The largest percentage of consumers who take a bus comes from consumers who purchase most of their fresh pork from small Asian stores.

If the representative consumer does not consider the level of service in the meat department important, the probability of purchasing fresh pork from American and small Asian stores decreases to 0.632 and 0.0428, respectively, and the probability of purchasing fresh pork from large Asian stores and small butcher shops increases.

Interestingly, if the consumer considers the variety of specialized pork cuts sold at the store important, there is a higher probability of them purchasing fresh pork from a large Asian store. Comparatively, if he does not consider important the probability of him purchasing from an American store increases. The predicted probability of the representative consumer who purchases fresh pork from American stores drops from 0.790 to 0.240 when is considered an important factor their store choice, whereas the predicted probability of the consumer purchasing fresh pork from large Asian stores increase from 0.139 to 0.541. This result is consistent with marginal effects estimated by LIMDEP (see Table 6-2). The availability of specialized pork products is negative for

consumers who purchase pork at American stores and positive for consumers who purchase pork at large Asian stores. This is also supported by the cross-tabulations results in Chapter 5, section 5.2. Overwhelming majorities of consumers who purchase most of their fresh pork from American stores do not buy specialized pork cuts and do not consider the availability of specialized pork products important.

Table 6-4 Total and Marginal Probabilities on of Store Characteristics on the Probability of Store Choice [a, b]

	American Store	Large Asian Store	Small Asian Store	Butcher shop
Base Case Scenario (predicted probability)	**0.7905**	**0.1394**	**0.0489**	**0.0212**
Changes to the predicted probability when ONE of independent variables is changed in the base scenario, *ceteris paribus*, where:				
Convenience is not important (CONV1)	0.5547 *(-0.2358)*	0.1664 *(0.0270)*	0.1559 *(0.1070)*	0.1230 *(0.1017)*
Service is not important (SERV1)	0.6326 *(-0.1579)*	0.2476 *(0.1083)*	0.0428 *(-0.0061)*	0.0770 *(0.0558)*
Quality is not important (STQU1)	0.8189 *(0.0283)*	0.1498 *(0.0105)*	0.0278 *(-0.0210)*	0.0035 *(-0.0178)*
Price is important (PRICE1)	0.7360 *(-0.0545)*	0.0877 *(-0.0516)*	0.1620 *(0.1131)*	0.0143 *(-0.0069)*
Varity of specialize pork products is important (VAR1)	0.2401 *(-0.5505)*	0.5471 *(0.4078)*	0.1930 *(0.1441)*	0.0198 *(-0.0014)*
Takes bus rather than a car (TRAN2)	0.7055 *(-0.0850)*	0.0837 *(-0.0557)*	0.1897 *(0.1408)*	0.0211 *(-0.0001)*

(a) Marginal probabilities are in parentheses
(b) Total probability estimates are not in parenthesis

6.2.4 Predicted Probabilities and Marginal Probabilities of the Representative Consumer Results: Model 2

For Model 2, the representative consumer is a Chinese woman who has lived in the United States for 21 years. She is between the ages of 35 to 44 and has three people living in her house. Her gross annual income is between $30,000 to $59,000 and she has a college education. She does the majority of the grocery shopping and cooking in the household. She does not purchase pork more than one a week and does not bother to use advertisements to compare pork prices. She does, however, always look at the expiration date on the pork she does buy and will always try to buy the leanest cuts of pork. The predicated probability of this woman purchasing most of her fresh pork at

American stores is 0.400, 0.481 at large Asian stores, 0.117 at small Asian stores, and 0.0016 from butcher shops (See Table 6-5).

The marginal effects of socioeconomic and demographics characteristics on the probability of this woman purchasing fresh pork from small and large Asian stores, American stores and butcher shops are provided in Table 6-5. The marginal effects of income, age, size of household, education, ethnic background, gender, and the number of years living in the United States on store choice are the primary effects examined in this discussion. This is largely because these variables were identified in LIMDEP's estimation of the marginal effects (See Table 6-3) and the cross-tabulation analysis to be statistically significant and have an influence in consumer's store choice. They are consistent with, income, size of household and race being reported by Tigert (1983), Fortheringhem and Trew (1993) and Leszczyc and Timmermans (1996) to be important factors that influence store choice.

The results from Table 6-5 suggests that if the representative consumer had a lower income, the probability of her purchasing fresh pork from large Asian stores decreases while the probability of her buying pork from small Asian stores increases. However, the reverse is true when her income increases. If she had a higher income, she would have a higher probability of purchasing most of her fresh pork from a large Asian store. This is consistent with the sample surveyed. Consumers who purchase pork from small Asian stores and American stores tend to have lower incomes.

The less people the representative consumer has living in her house, the higher the probability of her purchasing most of her fresh pork from large Asian stores. If she had a university education, she would most likely purchase most of her fresh pork from American stores. If she were younger, she would have a higher probability of purchasing most of her pork at American stores, but if she were older, she would purchase most of her pork at large Asian store. If she had lived in the United States for 21 years or more, the higher probability of her purchasing most of her pork from American stores. However, if she had lived in the United States for less than 21 years, there is a higher probability of her purchasing most of her fresh pork from large Asian stores.

The predicted probability for her purchasing most of her fresh pork from small Asian stores is 0.1168. If she lived in the United States for more than 21 years, the

probability of her purchasing fresh from small Asians stores increases, but if she lived in the United for less than 21 years, it decreases. If she were no longer a Chinese woman, but a Korean, Vietnamese, Japanese, Filipino or "other" woman, she would purchase most of her pork at American stores. If the consumer being considered is a male, *ceteris paribus*, he would have a higher probability of purchasing most of his fresh pork from American stores.

Table 6-5 Total and Marginal Probabilities of Socioeconomic and Demographic Characteristics on the Probability of Store Choice [a, b]

	American Store	Large Asian Store	Small Asian Store	Butcher Shop
Base Case Scenario (predicted probability)	**0.4008**	**0.4809**	**0.1168**	**0.0016**
Changes to the predicted probability when ONE of independent variables is changed in the base scenario, *ceteris paribus*, where:				
Income is lower (ING1)	0.4358[0] *(0.0351)*	0.4033 *(-0.0776)*	0.1534 *(0.0366)*	0.0075 *(0.0059)*
Income is higher (ING3)	0.3716 *(-0.0292)*	0.5406 *(0.0597)*	0.0726 *(-0.0441)*	0.0152 *(0.0136)*
Size of household is equal to 1 (SIZEOH=1)	0.3750 *(-0.0258)*	0.5352 *(0.0544)*	0.0880 *(-0.0287)*	0.0018 *(0.0002)*
Size of household is equal to 5 (SIZEOH=5)	0.4213 *(0.0205)*	0.4249 *(-0.0560)*	0.1524 *(0.0356)*	0.0014 *(-0.0002)*
Younger (AAG1)	0.5783 *(0.1776)*	0.2514 *(-0.2295)*	0.1558 *(0.0391)*	0.0144 *0.0128)*
Older (AAG3)	0.2935 *(-0.1073)*	0.5994 *(0.1186)*	0.1055 *(-0.0113)*	0.0017 *(0.0001)*
Korean, Vietnamese , Filipino, Japanese and "Other" (ETH3=0)	0.6324 *(0 2316)*	0.2909 *(-0 1900)*	0.0751 *(-0 0417)*	0.0016 *0.0000)*
Male (GEN)	0.5800 *(0.1792)*	0.2668 *(-0.2141)*	0.1514 *(0 0346)*	0.0019 *0.0003)*
Living in the United States for 2 years (NUM=2)	0.2997 *(-0.1010)*	0.6059 *(0.1250)*	0.0928 *(-0.0240)*	0.0016 *0.0000)*
Living in the United States for 5 years (NUM=5)	0.3151 *(-0.0856)*	0.5866 *(0.1058)*	0 0966 *(-0 0201)*	0.0016 *(0.0000)*
Living in the United States for 10 years (NUM=10)	0.3414 *(-0.0594)*	0.5540 *(0.0731)*	0 1030 *(-0 0138)*	0.0016 *0.0000)*
Living in the United States for 40 years (NUM=40)	0.5027 *(0.1019)*	0.3580 *(-0.1229)*	0 1378 *(0.0211)*	0.0015 *(-0.0001)*
Living in the United States for 60 years (NUM=60)	0.5985 *(0.1978)*	0.2462 *(-0.2347)*	0 1540 *(0 0372)*	0.0013 *(-0.0003)*
Technical school education AEDGR1	0.3321 *(-0.0686)*	0.2893 *(-0.1915)*	0 3773 *(0 2605)*	0.0012 *-0.0003)*
University education AEDGR3	0.4706 *(0.0699)*	0.3505 *(-0.1303)*	0.1769 *(0.0601)*	0.0020 *(0.0004)*

(a) Marginal probabilities are in parentheses
(b) Total probability estimates are not in parenthesis

Chapter 7 Summary, Conclusions, and Marketing Implications

7 Summary and Conclusion

This study examines San Francisco's fresh pork marketing channels and ethnic Asian consumer's store choice for fresh pork. From observations and interviews with retailers, wholesalers, and representatives from slaughter and packing companies, the marketing channels and market structure of San Francisco's Asian fresh pork market were described and outlined in Chapter 2. As well, the main store choices were identified as large and small Asian stores, American stores and butcher shops. It was observed that small Asian stores dominate San Francisco's Asian fresh pork market, and that there are four main channels by which pork is delivered to the retailer. Of these four, the most common channel used by retailers that service the Asian fresh pork market is one where the retailer purchases pork from a wholesaler who purchases from the slaughter or packing company. It was also observed that retailers who cater to the Asian market prefer "hot" hogs, that is pork that has been slaughtered within a time period of less than 72 hours after the kill. The preference for "hot" hogs was also observed in Vancouver, Portland, and Seattle (Kuperis et al 1997).

A second characteristic explored in this study is variation in the selection of pork cuts. Findings showed that retailers of large and small Asian stores and butcher shops prefer to purchase half carcasses (whole pork sides). American stores retail a very limited selection of specialized pork cuts, compared to large and small Asian stores which sold the widest selection. Furthermore from the study it was found that the most common cuts sold by all store types were loins and pork chops, pork legs and shoulders, and ground pork. This is consistent with the results from Kuperis et al 1997, who found these to be the most common cuts sold in Asian stores in Vancouver, Seattle, and Portland. Pork side bellies, offal, and hock are sold more often in small and large Asian stores than the other two store types.

To study store choice San Francisco's Asian consumers, a survey was designed. This was used to elicit information about consumer's store choice and some of the factors that may influence their store choice for fresh pork. Two different approaches were used to examine consumer's store choice for fresh pork: cross-tabulations and a multi-nominal logit model. Cross-tabulations were first used to examine the degree of

association between consumer's store choice for fresh pork and the major factors that may influence their choice. The factors that were assessed were the price of pork sold at the store, quality of pork, variety of specialized pork cuts, location and access to the store, level of consumer service at the store, mode of transportation to the store, and the consumer's socioeconomic and demographic characteristics. Cross-tabulations were also used to assess the general characteristics of the consumers who purchased most of their pork from each store type and to examine consumer's store choice for different pork cuts. To examine the effects of these factors on store choice, a multi-nominal logit model of store choice was then developed. Two multi-nominal logit models were estimated. One model, (Model 1) was developed to examine the importance of the price of pork, quality of pork, variety of specialized pork cuts, convenient location and access to the store, level of consumer service at the store, and mode of transportation on consumer's store choice for fresh pork. The second model (Model 2) examined the effect of socioeconomic and demographic characteristics on consumers' store choice for fresh pork. Both models displayed similar predictive abilities. The findings from this study are now summarized.

Based on the sample surveyed, loins, shoulder and ground pork are the most favored cuts purchased among Asian consumers in San Francisco. The least favored products purchased by this group of consumers are offal, pork side bellies, and hock. These results are surprising considering the common perception is that Asian consumers have a preference for specialized pork cuts, although several factors beyond the scope of this study may explain this finding. Loins, shoulders and legs are most often purchased at American stores. Offal is commonly purchased at small and large Asian stores. This was expected as most American stores do not carry offal. The results from the test statistics measuring the degree of association between where consumers' purchase most of their pork and their store choice for various cuts suggests that there is a statistically significant relationship between the two variables. That is, consumers will purchase most of their fresh pork at the same place where they purchase most of their favorite cuts of pork.

Consumers who consider convenience 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 stores do not appear to be 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.

7.1 Study Limitations

As stated in Chapter 3, using two approaches to study store choice for fresh pork offers several advantages. However, there are a number of limitations of the study which offer implications for improvement. Firstly, the sample selected was not randomly collected but confined to customers of particular store types who purchased pork (though not necessarily at that store). A more holistic picture of consumer's store choice would have been provided had the sample included consumers who do not purchase but consume pork. Problems associated with non-random data may include questionable validity of some of the test statistics used to analyse the data and the fact that test statistics such as the Pearson Chi-square test calls for random variables (Jobson 1992). The analysis conducted in this study does not account for this problem.

Secondly, several of the survey questions could have been worded differently so as to offer greater specificity and clarity. For example, the selection of the levels within store attributes were not store specific. This means that regardless of which type of store the individual purchases from, they must select from a general set of store characteristics defined by the survey. Store specificity would have allowed for the researcher to measure the trade-offs between different levels of store attributes. Additionally, parking availability may be an important store characteristic for some consumers (Timmermans et al 1992, Schuler 1979 and Blommestien 1980). However, this feature was not included in the study due to the need to keep the survey short enough that respondents would be willing to participate.

This study would have been more insightful if more quantitative measure could have been used to analyze the price of pork sold at various stores and the price of different pork cuts. Another consideration is that there were a number of store image variables that may influence consumer's store choice but were not included in this study, such as store atmosphere and the language spoken by the staff in the store. The language characteristic may have been very important because most of the staff at small and large Asian stores spoke some type of Asian language. As well the degree of assimilation of Asian consumers into the western culture was not examined in this study. Lastly, multicollinearity is a problem in the multi-nominal logit models estimated.

7.2 Marketing Implications

With California supplying only 4% of total domestic requirements, there is potential for Alberta pork marketing in Northern California. This study has provided some insight into the pork market structure. From looking at the four main marketing channels that exist in San Francisco's Asian fresh pork market, Alberta pork exporters should consider entering the Asian pork market through the wholesalers. This is largely to overcome two obstacles: storage and brand name recognition. Most retailers do not have the storage space to carry large stocks of fresh pork. Also, it was observed in San Francisco that in most grocery stores, supermarkets, and meat stores, brand recognition for fresh cuts of pork is often associated with the store from which the pork is being sold (i.e. Safeway pork). This fact has important marketing implications for Alberta pork exporters, as branding Alberta pork at the retailer level may not be the most effective way to introduce and promote Alberta pork to the Asian fresh pork market. Selection of an appropriate wholesaler will also be an important factor in the market development of Alberta pork in California, as wholesalers supply to different types of retailers. From the results of the store choice analysis, it was found that 40% of consumers surveyed purchased most of their fresh pork from American stores and 33% purchased pork from small Asian stores. This suggests that Alberta pork exporters should consider working with wholesalers that supply American and small Asian stores. This strategy is similar to the one recommended by Kuperis et al 1997 as the best strategy to extend Canadian pork sales in Portland. Like retailers in Portland, most retailers of small and large Asian stores in San Francisco are not used to trading with packers, but are use to trading with local

wholesalers and distributors. Alberta pork exporters will need to price competitively as they must compete not only with local packers and slaughter companies to supply the wholesale market, but also with several larger out of state companies such as IBP Inc. As such, further research is needed in the area of logistics, pricing schedules, cost and feasibility of marketing Alberta pork in California.

Knowledge about Asian consumers and where they purchase their pork is important in the market development of Alberta pork in San Francisco. Such information can be very useful in the early stages of market development to help determine possible marketing strategies by targeting various groups of consumers according to store type. As mentioned earlier marketing efforts should focus on wholesalers who service small Asian store and American style supermarkets. However, it should be emphasized that the marketing strategies employed should take into the consideration the differences between the characteristics that characterize Asian consumers who purchase pork from these two stores. The results of the store choice survey and the analysis of the data suggests that there are significant differences between consumers who purchase pork from small Asian stores and those that purchase from American style supermarkets. These differences have important implications on the marketing strategies used to increase Alberta's presence in the Asian fresh pork market in San Francisco. Firstly, consumers who purchase pork from small Asian store are price and quality conscious compared to consumers who purchase pork from American style supermarkets. Given this knowledge, Alberta pork exporters must be prepared to provide high quality cuts of pork at very competitive prices to successfully tap into the small Asian store market. When surveyed, the majority of respondents stated that the quality of pork that was available at their store choice had a rating of 4 out 5, with 5 being excellent. However, consumers who purchased pork at American stores gave a lower rating to quality of pork purchased and these respondents tended to indicate that quality was not as important in their store choice. Knowing this, Alberta pork exporters could potentially tailor the quality of pork they are marketing to match the degree of quality consciousness. Thus it would be sensible to emphasize quality in marketing fresh pork to small Asian stores. Conversely, quality and price of pork are not as an important issue in the marketing of Alberta pork in American style supermarkets. Convenience is the driving factor in consumers store choice for fresh pork at American style supermarkets.

Secondly, the results indicated that 21% and 34% of consumers who purchase most of their fresh pork from small Asian and American style supermarkets, respectively, use advertisements to compare pork price. Given the information it may be more feasible to allocate more advertising dollars to promote Alberta pork at American stores and less to small Asian stores.

Thirdly, consumers who purchase pork these two stores have different preferences for different pork cuts. Pork loins and shoulder butts are the cuts most commonly purchased in American style supermarkets, while pork legs are commonly purchased in small Asian stores. The results from the survey indicated that consumers who purchased most of their pork from American stores had a higher probability of purchasing pork loins than other pork cuts. Furthermore offal are purchased at small Asian store more frequently than at American style supermarkets. A possible strategy is for Alberta pork exporters to market their pork according to consumer's store choice for different cuts of pork.

Although the fresh pork market San Francisco was identified as niche market, it is important to recognize that the Asian market is far from homogenous. The term Asian refers to about 20 ethnic groups with different attitudes and purchasing habits. The results of the study supports this argument as Asian consumer's store choice for fresh pork is heterogeneous. There are additional issues and questions which are beyond the scope of this study. Future assessment could be much more in-depth, as with a much longer questionnaire. Conducting such a survey would require much more time, a larger sample, and at a much greater cost. The results of a more elaborate study would be even more beneficial to Alberta pork exporters because such a study would provide more information, which would provide precise and strategic information on establishing an efficient and effective marketing program.

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Appendix 1 San Francisco's Population Projection and Pork Expenditures

California is the third largest state in the United States (155,973 miles^2) and was ranked number one in terms of the size o resident population (31,878,000) and households (111,201,000) in 1996 (U. S. Department of Commerce 1997). Recent trends in California's race/ethnic group distribution suggest a growing pork market in California arising from its Asian population. Over the years, there has been a shift in California's race/ethnic group distribution between "White", "Hispanics" and "Asian/Pacific Islanders". Since 1990, Hispanic and Asian/Pacific Islander[1] population changes have provided 91% of California's population increases (Brown 1998). The Hispanic population has grown from 26% of the total population to 29%, while the Asian/Pacific Islander population has increased from 9% to 11% from 1990 to 1997. In contrast, the "White" population, as a proportion of the State's population, has declined since 1990, from 57% to 52% by 1997. Since 1990, Hispanic and Asian/Pacific Islander population have provided 91% of California's population increase (Brown 1998).

The increase in the Asian/Pacific Islander population is mainly attributable to migration, while growth in the Hispanic population is primarily due to increased birth rate (Brown 1998). From 1993 to 1996, the Asian/Pacific Islander was the only race/ethnic group to experience positive net migration to California (Brown 1998). This is not surprising considering 36% (292,600) of all immigrants to the United States in 1994 were of Asian descent. Of the 292,600 Asian immigrants to the United States, 18% came from the Philippines, 14% from Vietnam, 5% from Korea, and 18% from China. Interesting 32% of the 53,985 Chinese immigrants that come to the United States migrate to California. Similarly, 45% of the 53,535 Filipino immigrants to the United States also migrate to California. This also applies to the 34% of the 41,345 immigrants from Vietnam (Statistical Abstract of the United States 1996).

Currently, San Francisco has the highest percentage of Asian/Pacific Islander population in California. Asian/Pacific Islanders account for 32% of the city's population. This percentage is projected to increase to 34% by the year 2002 (State of California Department of Finance 1998). This trend in the Asian market makes San Francisco a promising future market for Alberta pork. Table A-1 gives the San Francisco's

population projection by race/ethnic group from 1990 to 2010, as projected by the State of California Department of Finance (1998).

Table A-1: San Francisco's Population by Race/ethnic Group From 1990 to 2010

YEAR	TOTAL	WHITE		HISPANIC		ASIAN/PACIFIC ISLANDER		BLACK		AMERICAN INDIAN	
		No.	%	No.	%	No.	%	No.	%	No.	%
1990	727873	338958	46.57	101687	13.97	207969	28.57	76615	10.53	2644	0.36
1991	732287	335201	45.77	104012	14.20	213895	29.21	76527	10.45	2652	0.36
1992	740476	333136	44.99	106890	14.44	220986	29.84	76805	10.37	2659	0.36
1993	750736	331903	44.21	110112	14.67	228788	30.48	77278	10.29	2655	0.35
1994	753072	327104	43.44	112189	14.90	234198	31.10	76926	10.21	2655	0.35
1995	751532	320675	42.67	113672	15.13	238376	31.72	76144	10.13	2665	0.35
1996	768263	322025	41.92	117965	15.35	248421	32.34	77163	10.04	2689	0.35
1997	777492	320441	41.21	121537	15.63	254748	32.77	78063	10.04	2703	0.35
1998	784624	320548	40.85	123828	15.78	259087	33.02	78447	10.00	2714	0.35
1999	788975	318981	40.43	126060	15.98	262485	33.27	78730	9.98	2719	0.34
2000	792049	317214	40.05	128205	16.19	264820	33.43	79095	9.99	2715	0.34
2001	794342	315166	39.68	130703	16.45	266596	33.56	79168	9.97	2709	0.34
2002	795577	312819	39.32	132871	16.70	268067	33.69	79121	9.95	2699	0.34
2003	795759	310220	38.98	134506	16.90	269452	33.86	78888	9.91	2693	0.34
2004	795186	307482	38.67	135823	17.08	270744	34.05	78449	9.87	2688	0.34
2005	792104	304556	38.45	136457	17.23	269939	34.08	78460	9.91	2692	0.34
2006	788669	301353	38.21	137078	17.38	269080	34.12	78465	9.95	2693	0.34
2007	787266	298122	37.87	138346	17.57	270137	34.31	77973	9.90	2688	0.34
2008	785791	294832	37.52	139637	17.77	271128	34.50	77511	9.86	2683	0.34
2009	784191	291463	37.17	140971	17.98	272032	34.69	77046	9.82	2679	0.34
2010	782469	288035	36.81	142303	18.19	272855	34.87	76606	9.79	2670	0.34

Source: State of California Department of Finance (1998)

Expenditures on Pork

From Consumer Expenditure Surveys of selected western metropolitan statistical areas , San Francisco's household average expenditure on pork was around 17% to 18% of total meat, poultry, fish and egg expenditure from 1984 to 1991 (Economic Research Services 1995). In 1994 to 1995, households in the San Francisco area spent approximately 15% of their total expenditure on meats, poultry, fish and eggs (Economic Research Services 1995). Households' annual average expenditures in San Francisco

[1] Asian/Pacific Islander include Chinese, Filipino, Japanese, Asian Indian, Korean,

are provided in Table A-2. Unfortunately, a more in-depth analysis of pork expenditures could not be conducted as data on pork expenditures according to race and metropolitan areas are not readily available.

Table A-2: Annual Average Expenditures of Households in Selected Standard Metropolitan Statistical Areas (San Francisco)

	1984-85	1986-87	1988-89	1990-91	1992-93	1994-1995
Households in Statistical Area (thousands)	1,539	2,359	2536	2,520	2,636	2,828
Age of householder (years)	45.5	45.6	44.6	44.6	44.7	45.8
	In Dollars					
Income before tax	30,741	35,768	37,566	42,215	46,986	49,142
Average food expenditure	4,037	4,290	4,827	5,284	5,337	5,220
Food at home	1,690	2,395	2,617	3,032	3,234	3,160
Food away from home	2,147	1,894	2,210	252	2,103	2,060
Meats, poultry, fish, and eggs	543	643	595	729	783	789
Pork	90	114	84	124	N/A	N/A
Percentage of total meat expenditures in average	13%	15	12%	14%	15	15%
Percentage of pork expenditures in total meat expenditures	17%	18%	14%	17%	N/A	N/A

Source: Economic Research Services (1984-85, 1986-87,1988-89,1990-91,1992-93 and 1994-95)

Vietnamese, Cambodian, Laotian, Thai, and other Asian.

Appendix 2: Retailer Questionnaire

QUESTIONNAIRE (Brokers, wholesalers, retailers, butchers)

Name of organization: _____
Name: _____
Position: _____
Date: _____

Interview Preamble

The purpose of the study is to obtain a better understanding of expectations of buyers of fresh pork for the Asian market in San Francisco on product quality and marketing practices of pork. Your participation in the survey is voluntary and all individual replies are confidential. Please indicate your rating on the following scales, by circling a number.

Example:

Automobile Quality

Poor	1	2	3	4	5	6	7	Excellent

1) Product quality (major cuts: shoulder butt and loin)

1. Overall pork quality

Poor	1	2	3	4	5	6	7	Excellent

2. Meat color

Acceptable	1	2	3	4	5	6	7	Unacceptable

3. Fat color

Yellow 1	2	3	4	5	6	7	White

4. Fat trim

1 inch 1	2	3	4	5	6	7	1/4 inch

5. Food safety standards

Low	1	2	3	4	5	6	7	High

6. Water content

Acceptable	1	2	3	4	5	6	7	Unacceptable

7. Price

Inexpensive	1	2	3	4	5	6	7	Expensive

8. Consistency of each shipment

Inconsistent	1	2	3	4	5	6	7	Highly Consistent

2) Promotional activity

1. Reliability of Supply:
(Frequency and timing of deliveries from packers or distributors or wholesalers)

Excellent	1	2	3	4	5	6	7	Poor

2. Your awareness of promotion activities from:

a. National or State (California) Pork Producer Association

Unaware	1	2	3	4	5	6	7	Highly Aware

b. Foreign companies or another country's pork producers association

Unaware	1	2	3	4	5	6	7	Highly Aware

3. Level of service and assistance from packagers

Excellent	1	2	3	4	5	6	7	Poor

2) Qualitative questions (US Asian fresh pork market)

1. What are the main characteristics you consider before making a pork purchasing decision?

2. How is the freshness of pork measured? What is considered "fresh"?

a. How would you rank the freshness of the pork that you are current receiving? Please circle a number.

Poor	1	2	3	4	5	6	7	Excellent

3. What color of pork meat is considered acceptable?

4. If all the competitors offer items that are the same in price, quality, and promotion, does the origin of the pork matter? Is so, which state(s)'s or country's(s) pork product would you select, and why?

5. Have you ever purchased pork from Canada? If so, what cuts? (sides, primal cuts, etc).

6. If possible, please give two reasons why you would purchase domestic pork instead of pork from another state(s) or country(s)?

   a.

   b.

7. Please list and rank your five most preferred packers/processors or wholesaler/distributors involved in the fresh pork market in your region (in terms of service and product quality)?

8. What should packers do in order to increase market share in the Asian fresh pork market in terms of marketing practices and product quality?

Shipping specifications

9. Would you prefer purchasing a whole side or cuts from your pork supplier? Please give your reasons.

10. Which pork cuts would you prefer to buy? Please describe the specifications for each cut.

11. Would you prefer preparing your own case ready products or prefer buying case ready products directly from the packers ? Please give your reasons.

12. Do you think out of state suppliers should identify their brand of fresh pork products ?
    If yes: What method (s) should they use to brand its products ?
    If no : Please give your reasons.

Future

13. What changes do you foresee in the Asian fresh pork market in the future, in the retail sector?

Appendix 3 Store Choice Survey

Store Choice Survey

Store type: _____ Date:_____

Purchase pork: Y N Time:_____

Gender: M F Location:_____

1. Are you the person that normally does the grocery shopping? Please check. ____Yes __No
2. Are you the person who prepares the main meals? Please check. ____Yes ___No
3. Were you born in the United States? Please check. ____Yes ___No
4. Number of years living in the United States? _____
5. Where do you do MOST of your grocery shopping? Please check only one.

___ Small Asian Grocery store
___ American Style Supermarket
___Others
___ Large Asian Supermarket
___ Meat Specialty Store (butcher shop)

6. Where do you buy MOST of your fresh pork (in terms of quantity)? Please check only one.

___ Small Asian Grocery store
___ American Style Supermarket
___Others
___ Large Asian Supermarket
___ Meat Specialty Store (butcher shop)

7. Please evaluate each of the following store characteristics, in terms of how each characteristic best reflects the store at which you purchase MOST of you pork (the store chosen above). Please check only ONE per question.

a. The price of fresh pork is _____ cheaper than other stores.
_____ more expensive than other stores.
_____ comparable to other stores.
_____ not important.

b. The overall quality of fresh pork sold is _____ better than other stores.
_____ worse than other stores.
_____ comparable to other stores.
_____ not important.

c. The availability of specialized pork products is (i.e. hearts, stomach, intestine etc)
_____ greater than other stores.
_____ less than other stores.
_____ comparable to other stores.
_____ not applicable.

d. The location and accessibility of store is _____ convenient compared to other stores.
_____ inconvenient compared to other stores.
_____ comparable to other stores.
_____ not important.

e. The service in the meat section that customizes/personalizes your pork cuts is
_____ helpful and courteous compared to other stores.
_____ impersonal compared to other stores.
_____ not important.
_____ not applicable.

f. What is your method of transportation to the retail outlet?

_____Within walking distance _____ By bus _____ By car _____Other (taxi, bike)

g. How long does it take to get from your home, to the retail outlet where you purchase most of your pork? Please check only ONE.

Retail outlet:	**Under 10 minutes Away**	**11 to 15 minutes away**	**16 to 20 minutes away**	**21 to 25 minutes away**	**26 to 30 minutes away**	**More than 30 minutes away**
From home						

8. Please mark **YES** or **NO** or **I Don't Know** to the following questions.

I buy fresh pork more than once a week.	YES	NO	I Don't Know
I always look at the package expiration date when I buy pork.	YES	NO	I Don't Know
I only buy the leanest pork.	YES	NO	I Don't Know
I use advertisements to compare pork prices, before making a pork purchase.	YES	NO	I Don't Know

9. What is your overall opinion of the **QUALITY** of fresh pork in California? Please circle a number.

Poor 1 2 3 4 5 Excellent

10. In a given month, which store do you normally go to, to purchase the following cuts or parts of pork (in terms of quantity)? Please check: you can only check ONE store for each cuts or pork parts.

Stores:			**Where do you purchase MOST of the following pork parts or cuts**			
Do you purchase the following cuts or parts:	**YES**	**NO**	**Small Asian store**	**Large Asian Supermarket**	**Meat Specialty Store (butcher shop)**	**American Style Supermarket**
Offal (heart, livers, stomach etc.)						
Loins- chops						
Leg						
Hind Foot (hock, front foot						
Side Pork (bellies)						
Ground Pork						
Shoulder butts/ roast						

11. What is your ethnic background? Please check.

____Vietnamese ____Chinese ____Japanese
____Filipino ____Korean ____Other

12. Size of household including yourself? Please check one.
__1 __2 __3 __4 __5 __6 __7 __8 or more.

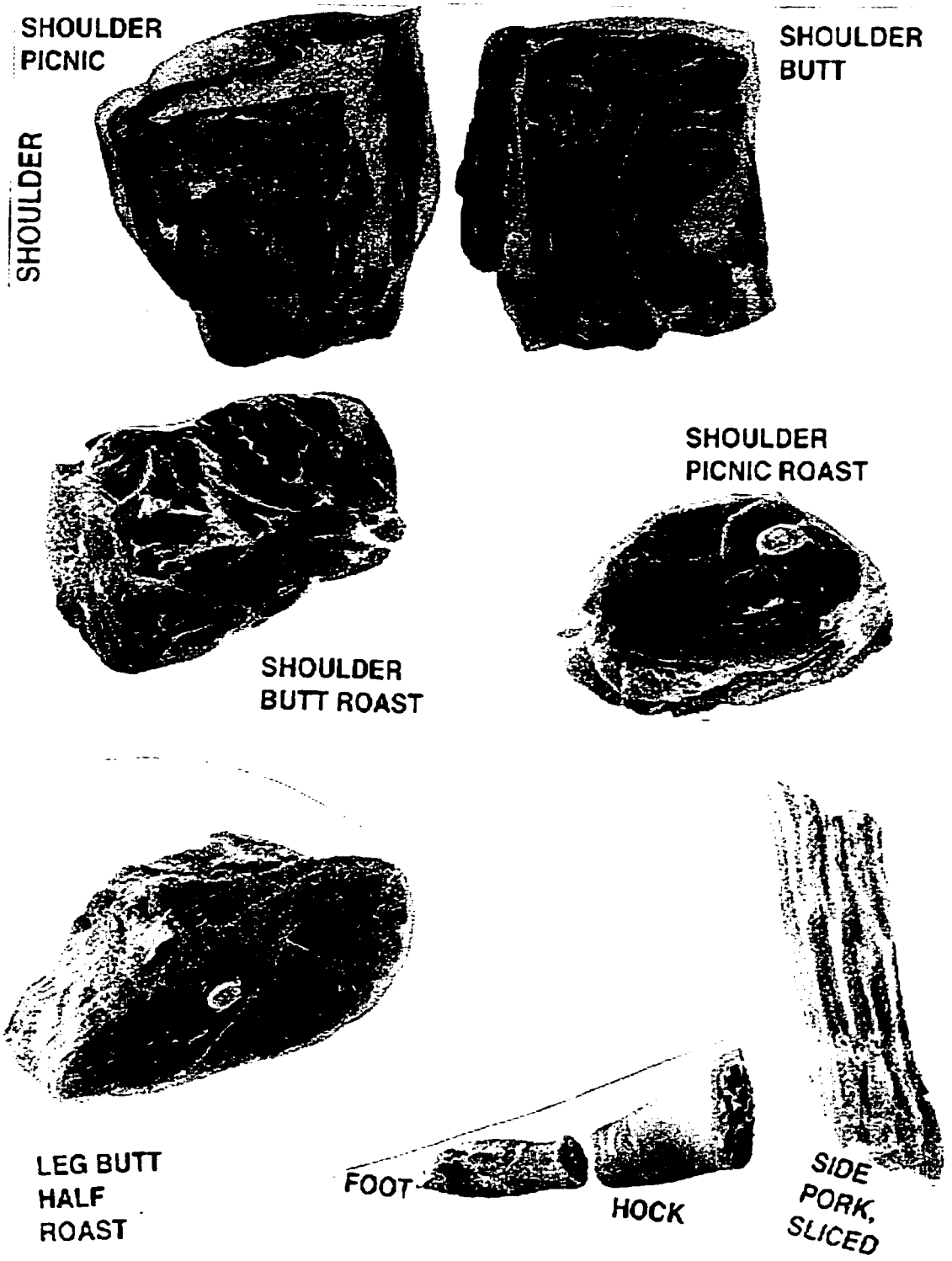
13. What is your approximate net family income from all sources before tax in 1997? Please check one.
____Less than $15,000
____$15,000 - $29,999
____$30,000 - $44,999
____$45,000 - $59,999
____$60,000 - $74,999
____$75,000 - $99,999
____$100,000 and over

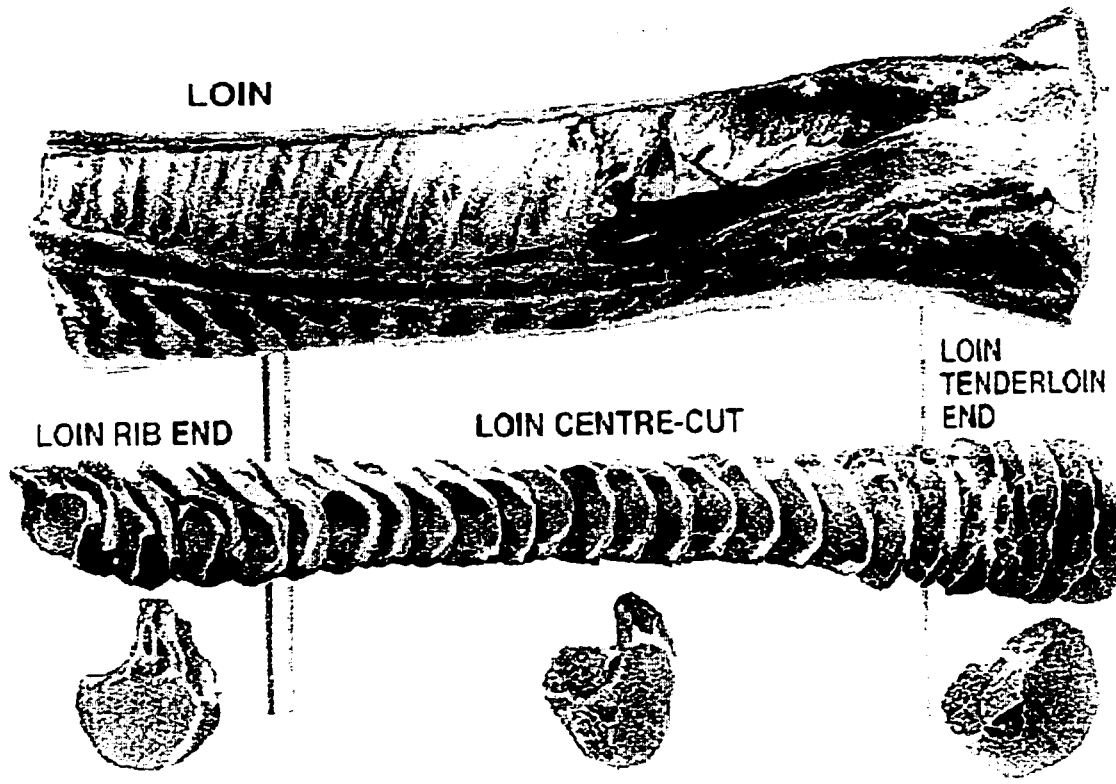
14. Your age category?
____Under 24 years
____25 - 34 years
____35 - 44 years
____45 - 54 years
____55 - 64 years
____65 and over

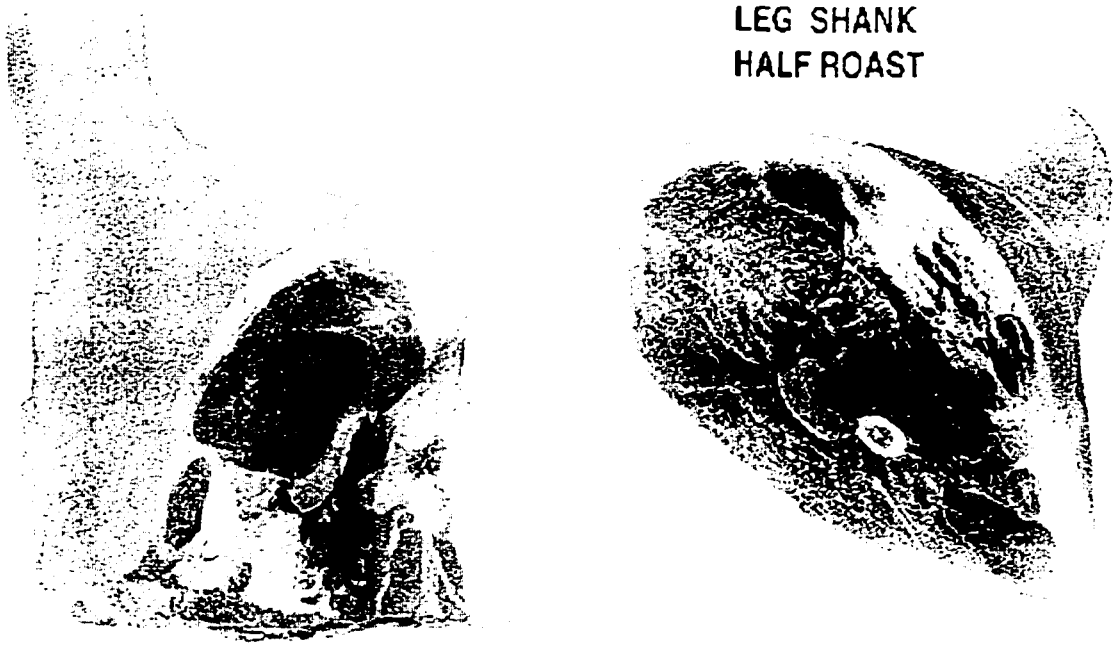
15. Which is your current job status? Please check one.
___ Student ___Employed full time ___Unemployed ___ Other
___Retired ___Employed part time ___ Full time home maker

16. What is the highest level of education that you have completed? Please check one.
___Elementary ___High school ___ College
___Junior High ___Technical school ___ University

Appendix 4 Pictures of Different Pork Cuts




LOIN
LOIN RIB END
LOIN CENTRE-CUT
LOIN TENDERLOIN END


LEG SHANK
HALF ROAST

Appendix 5 Survey Results:

Where Respondent Purchases Different Cuts of Pork:

Variables	Categories	Number of Responses	% of Total Sample
offal (hearts, livers, stomach etc)	do not buy	146	74.5
	Small Asian store	20	10.2
	Large Asian store	21	10.7
	meat specialty store	4	2.0
	American store	5	2.6
loins (chops)	do not buy	63	32.1
	small Asian store	23	11.7
	large Asian store	36	18.4
	meat specialty store	3	1.5
	American store	71	36.2
pork legs	do not buy	100	51.0
	small Asian store	24	12.2
	large Asian store	30	15.3
	meat specialty store	9	4.6
	American store	33	16.8
hind foot (hock, front foot)	do not buy	136	69.4
	small Asian store	31	15.8
	large Asian store	17	8.7
	meat specialty store	6	3.1
	American store	6	3.1
side pork (bellies)	do not buy	120	61.2
	small Asian store	38	19.4
	large Asian store	12	6.1
	meat specialty store	7	3.6
	American store	19	9.7
ground pork	do not buy	84	42.9
	small Asian store	45	23.0
	large Asian store	23	11.7
	meat specialty store	10	5.1
	American store	34	17.3
shoulders butts/roast	do not buy	70	35.7
	small Asian store	37	18.9
	large Asian store	27	13.8
	meat specialty store	10	5.1
	American store	52	26.5

Socioeconomic and Demographic Characteristics:

Variables	Categories	Number of Responses	% of Total Sample
Gender	Female	104	53.1
	Male	92	46.9
Born in the US	No	166	84.7
	Yes	30	15.3
Size of household	1	33	16.8
	2	49	25.0
	3	44	22.4
	4	41	20.9
	5	21	10.7
	6	5	2.6
	7	3	1.5
Approx before tax net family income from all sources in 1997	less than 15,000	37	18.9
	15,000-29,999	35	17.9
	30,000-44,999	40	20.4
	45,000-59,999	37	18.9
	60,000-74,999	13	6.6
	75,000-99,999	16	8.2
	100,000 and over	18	9.2
Current job status	Student	24	12.2
	Retired	44	22.4
	employed full	97	49.5
	employed part	10	5.1
	Unemployed	3	1.5
	full time homemaker	17	8.7
	Others	1	0.5
Highest level of education Completed	Elementary	4	2.0
	Junior	11	5.6
	High-school	50	25.5
	technical school	7	3.6
	college	77	39.3
	university	47	24.0

Appendix 6 Cross-Tabulations Results:

Table A6-1: Cross-Tabulation Results: Consumer Characteristics and Store Choice

		Store choice for fresh pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.
Offal	do not buy	52	0.813	0.265	32	0.696	0.163	57	0.722	0.291	5	0.714	0.026
	Small Asian store	11	0.172	0.056	2	0.043	0.010	7	0.089	0.036	0	0.000	0.000
	Large Asian store	0	0.000	0.000	12	0.261	0.061	9	0.114	0.046	0	0.000	0.000
	Meat specialty store	0	0.000	0.000	0	0.000	0.000	2	0.025	0.010	2	0.286	0.010
	American store	1	0.016	0.005	0	0.000	0.000	4	0.051	0.020	0	0.000	0.000
Loins (chops)	do not buy	38	0.594	0.194	8	0.174	0.041	15	0.190	0.077	2	0.286	0.010
	Small Asian store	17	0.266	0.087	4	0.087	0.020	1	0.013	0.005	1	0.143	0.005
	Large Asian store	1	0.016	0.005	30	0.652	0.153	5	0.063	0.026	0	0.000	0.000
	Meat specialty store	1	0.016	0.005	0	0.000	0.000	0	0.000	0.000	2	0.286	0.010
	American store	7	0.109	0.036	4	0.087	0.020	58	0.734	0.296	2	0.286	0.010
Pork legs	do not buy	40	0.625	0.204	15	0.326	0.077	42	0.532	0.214	3	0.429	0.015
	Small Asian store	21	0.328	0.107	1	0.022	0.005	2	0.025	0.010	0	0.000	0.000
	Large Asian store	0	0.000	0.000	25	0.543	0.128	5	0.063	0.026	0	0.000	0.000
	Meat specialty store	0	0.000	0.000	1	0.022	0.005	4	0.051	0.020	4	0.571	0.020
	American store	3	0.047	0.015	4	0.087	0.020	26	0.329	0.133	0	0.000	0.000
Hind foot (hock, front foot)	do not buy	41	0.641	0.209	30	0.652	0.153	61	0.772	0.311	4	0.571	0.020
	Small Asian store	22	0.344	0.112	1	0.022	0.005	8	0.101	0.041	0	0.000	0.000
	Large Asian store	0	0.000	0.000	14	0.304	0.071	3	0.038	0.015	0	0.000	0.000
	Meat specialty store	0	0.000	0.000	1	0.022	0.005	2	0.025	0.010	3	0.429	0.015
	American store	1	0.016	0.005	0	0.000	0.000	5	0.063	0.026	0	0.000	0.000
Side pork (bellies)	do not buy	33	0.516	0.168	31	0.674	0.158	51	0.646	0.260	5	0.714	0.026
	Small Asian store	30	0.469	0.153	1	0.022	0.005	7	0.089	0.036	0	0.000	0.000
	Large Asian store	0	0.000	0.000	11	0.239	0.056	1	0.013	0.005	0	0.000	0.000
	Meat specialty store	1	0.016	0.005	0	0.000	0.000	4	0.051	0.020	2	0.286	0.010
	American store	0	0.000	0.000	3	0.065	0.015	16	0.203	0.082	0	0.000	0.000

Cross-Tabulation Results: Consumer Characteristics and Store Choice (cont')

		Store choice for fresh pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.
Ground pork	do not buy	18	0.281	0.092	22	0.478	0.112	43	0.544	0.219	1	0.143	0.005
	Small Asian store	42	0.656	0.214	1	0.022	0.005	2	0.025	0.010	0	0.000	0.000
	Large Asian store	2	0.031	0.010	19	0.413	0.097	2	0.025	0.010	0	0.000	0.000
	Meat specialty store	0	0.000	0.000	0	0.000	0.000	4	0.051	0.020	6	0.857	0.031
	American store	2	0.031	0.010	4	0.087	0.020	28	0.354	0.143	0	0.000	0.000
Shoulders butts/roast	do not buy	21	0.328	0.107	15	0.326	0.077	33	0.418	0.168	1	0.143	0.005
	Small Asian store	35	0.547	0.179	0	0.000	0.000	2	0.025	0.010	0	0.000	0.000
	Large Asian store	2	0.031	0.010	21	0.457	0.107	4	0.051	0.020	0	0.000	0.000
	Meat specialty store	1	0.016	0.005	1	0.022	0.005	2	0.025	0.010	6	0.857	0.031
	American store	5	0.078	0.026	9	0.196	0.046	38	0.481	0.194	0	0.000	0.000

Table A6-2: Cross-Tabulations Results: Store Characteristics and Store Choice

		Store choice for fresh pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100	Joint Prob.	Cross Tab	%Cal. (x100	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.
Where they purchase most of groceries	Small Asian	41	0.641	0.209	0	0.000	0.000	1	0.013	0.005	2	0.286	0.010
	Large Asian	6	0.094	0.031	36	0.783	0.184	3	0.038	0.015	0	0.000	0.000
	American style	17	0.266	0.087	10	0.217	0.051	75	0.949	0.383	5	0.714	0.026
Price of fresh pork at respondent's choice store	cheaper	40	0.625	0.204	12	0.261	0.061	16	0.203	0.082	2	0.286	0.010
	more expensive	1	0.016	0.005	3	0.065	0.015	11	0.139	0.056	1	0.143	0.005
	comparable	9	0.141	0.046	19	0.413	0.097	28	0.354	0.143	2	0.286	0.010
	not important	14	0.219	0.071	12	0.261	0.061	24	0.304	0.122	2	0.286	0.010
Overall quality of fresh pork at respondent's choice store	better than other stores	45	0.703	0.230	25	0.543	0.128	31	0.392	0.158	6	0.857	0.031
	worst than other stores	0	0.000	0.000	1	0.022	0.005	2	0.025	0.010	0	0.000	0.000
	Comparable to other stores	11	0.172	0.056	16	0.348	0.082	38	0.481	0.194	1	0.143	0.005
	Not important	8	0.125	0.041	4	0.087	0.020	8	0.101	0.041	0	0.000	0.000
Availability of specialized pork products at respondent's choice store	Greater than other stores	45	0.703	0.230	30	0.652	0.153	10	0.127	0.051	3	0.429	0.015
	less than other stores	0	0.000	0.000	1	0.022	0.005	23	0.291	0.117	0	0.000	0.000
	comparable	9	0.141	0.046	7	0.152	0.036	15	0.190	0.077	4	0.571	0.020
	not applicable	10	0.156	0.051	8	0.174	0.041	31	0.392	0.158	0	0.000	0.000
Location and accessibility of respondent's choice store	convenient	35	0.547	0.179	34	0.739	0.173	65	0.823	0.332	3	0.429	0.015
	Inconvenient	5	0.078	0.026	6	0.130	0.031	3	0.038	0.015	1	0.143	0.005
	Comparable	17	0.266	0.087	5	0.109	0.026	6	0.076	0.031	2	0.286	0.010
	Not important	7	0.109	0.036	1	0.022	0.005	5	0.063	0.026	1	0.143	0.005

Table A6-2: Cross-Tabulations Results: Store Characteristics and Store Choice (con't)

		Store choice for fresh pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100	Joint Prob.	Cross Tab	%Cal. (x100	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.
Level of service in meat section at respondent's choice store	Helpful and courteous	44	0.688	0.224	24	0.522	0.122	46	0.582	0.235	3	0.429	0.015
	Impersonal	5	0.078	0.026	12	0.261	0.061	2	0.025	0.010	0	0.000	0.000
	not important	9	0.141	0.046	9	0.196	0.046	6	0.076	0.031	3	0.429	0.015
	not applicable	6	0.094	0.031	1	0.022	0.005	25	0.316	0.128	1	0.143	0.005
Mode of transportation to respondent's choice store	Walk	20	0.313	0.102	5	0.109	0.026	13	0.165	0.066	1	0.143	0.005
	Bus	18	0.281	0.092	3	0.065	0.015	10	0.127	0.051	2	0.286	0.010
	Car	26	0.406	0.133	38	0.826	0.194	56	0.709	0.286	4	0.571	0.020

Table A6-3: Cross-Tabulation Results: Socioeconomic and Demographic Characteristics and Store Choice:

		Store choice for fresh pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.
Gender	Female	35	0.547	0.179	27	0.587	0.138	38	0.481	0.194	4	0.571	0.020
	Male	29	0.453	0.148	19	0.413	0.097	41	0.519	0.209	3	0.429	0.015
Main Shopper	No	20	0.313	0.102	10	0.217	0.051	14	0.177	0.071	1	0.143	0.005
	Yes	44	0.688	0.224	36	0.783	0.184	65	0.823	0.332	6	0.857	0.031
Main Cook	No	20	0.313	0.102	16	0.348	0.082	24	0.304	0.122	1	0.143	0.005
	Yes	44	0.688	0.224	30	0.652	0.153	55	0.696	0.281	6	0.857	0.031
Born in the US	No	59	0.922	0.301	41	0.891	0.209	59	0.747	0.301	7	1.000	0.036
	Yes	5	0.078	0.026	5	0.109	0.026	20	0.253	0.102	0	0.000	0.000
Ethnic group	Vietnamese	9	0.141	0.046	1	0.022	0.005	4	0.051	0.020	0	0.000	0.000
	Filipino	2	0.031	0.010	5	0.109	0.026	11	0.139	0.056	2	0.286	0.010
	Chinese	48	0.750	0.245	30	0.652	0.153	36	0.456	0.184	5	0.714	0.026
	Korean	1	0.016	0.005	1	0.022	0.005	2	0.025	0.010	0	0.000	0.000
	Japanese	1	0.016	0.005	3	0.065	0.015	9	0.114	0.046	0	0.000	0.000
	Other	3	0.047	0.015	6	0.130	0.031	17	0.215	0.087	0	0.000	0.000
Household size	1	7	0.109	0.036	9	0.196	0.046	16	0.203	0.082	1	0.143	0.005
	2	15	0.234	0.077	12	0.261	0.061	20	0.253	0.102	2	0.286	0.010
	3	21	0.328	0.107	8	0.174	0.041	14	0.177	0.071	1	0.143	0.005
	4	12	0.188	0.061	10	0.217	0.051	17	0.215	0.087	2	0.286	0.010
	5	6	0.094	0.031	7	0.152	0.036	8	0.101	0.041	0	0.000	0.000
	6	2	0.031	0.010	0	0.000	0.000	3	0.038	0.015	0	0.000	0.000
	8	1	0.016	0.005	0	0.000	0.000	1	0.013	0.005	1	0.143	0.005

Table A6-3: Cross-Tabulation Results: Socioeconomic and Demographic Characteristics and Store Choice (cont')

		Store choice for fresh pork											
Variables	Categories	Small Asian Store			Large Asian Store			American Store			Butcher shop		
		Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.	Cross Tab	%Cal. (x100)	Joint Prob.
Income	Less than 15,000	16	0.250	0.082	10	0.217	0.051	10	0.127	0.051	1	0.143	0.005
	15,000-29,999	17	0.266	0.087	3	0.065	0.015	13	0.165	0.066	2	0.286	0.010
	30,000-44,999	14	0.219	0.071	9	0.196	0.046	17	0.215	0.087	0	0.000	0.000
	45,000-59,999	8	0.125	0.041	11	0.239	0.056	17	0.215	0.087	1	0.143	0.005
	60,000-74,999	2	0.031	0.010	6	0.130	0.031	5	0.063	0.026	0	0.000	0.000
	75,000-99,999	6	0.094	0.031	3	0.065	0.015	6	0.076	0.031	1	0.143	0.005
	100,000 and over	1	0.016	0.005	4	0.087	0.020	11	0.139	0.056	2	0.286	0.010
Age Category	Under 24	0	0.000	0.000	5	0.109	0.026	11	0.139	0.056	0	0.000	0.000
	25-34	15	0.234	0.077	11	0.239	0.056	13	0.165	0.066	1	0.143	0.005
	35-44	23	0.359	0.117	9	0.196	0.046	25	0.316	0.128	3	0.429	0.015
	45-54	6	0.094	0.031	8	0.174	0.041	6	0.076	0.031	1	0.143	0.005
	55-64	4	0.063	0.020	4	0.087	0.020	11	0.139	0.056	1	0.143	0.005
	65 and over	16	0.250	0.082	9	0.196	0.046	13	0.165	0.066	1	0.143	0.005
Job status	Student	3	0.047	0.015	7	0.152	0.036	14	0.177	0.071	0	0.000	0.000
	Retired	17	0.266	0.087	8	0.174	0.041	16	0.203	0.082	3	0.429	0.015
	Employed full	32	0.500	0.163	24	0.522	0.122	38	0.481	0.194	3	0.429	0.015
	employed part	3	0.047	0.015	4	0.087	0.020	3	0.038	0.015	0	0.000	0.000
	unemployed	2	0.031	0.010	0	0.000	0.000	1	0.013	0.005	0	0.000	0.000
	full time homemaker	7	0.109	0.036	3	0.065	0.015	6	0.076	0.031	1	0.143	0.005
	others	0	0.000	0.000	0	0.000	0.000	1	0.013	0.005	0	0.000	0.000
Education	elementary	3	0.047	0.015	1	0.022	0.005	0	0.000	0.000	0	0.000	0.000
	junior	8	0.125	0.041	0	0.000	0.000	2	0.025	0.010	1	0.143	0.005
	High-school	26	0.406	0.133	8	0.174	0.041	16	0.203	0.082	0	0.000	0.000
	technical school	2	0.031	0.010	2	0.043	0.010	2	0.025	0.010	1	0.143	0.005
	college	14	0.219	0.071	23	0.500	0.117	37	0.468	0.189	3	0.429	0.015
	university	11	0.172	0.056	12	0.261	0.061	22	0.278	0.112	2	0.286	0.010

Appendix 7: Model 1, 2, and 3 Results

Table 7A-1: Maximum Likelihood Estimates of the MNL Model 1

	American store		Large Asian		Small Asian	
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 7A-2: Maximum Likelihood Estimates of the MNL Model 2

	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%						

Model 3: Results

	American Store		Large Asian Store		Small Asian Store	
Variable	**Coefficients**	**T-Ratio**	**Coefficients**	**T-Ratio**	**Coefficients**	**T-Ratio**
PRICE1	0.5719	0.433	-0.1415	-0.105	2.7801	2.08**
VAR1	-1.7939	-1.333	1.5013	1.113	1.2358	0.929
CONV1	2.5509	2.183***	3.0106	2.456***	1.4691	1.234
SERV1	1.8733	1.411	1.4382	1.068	1.7589	1.34
TRAN3	0.289	0.171	1.2804	0.738	0.3519	0.211
TRAN1	1.1771	0.623	1.8323	0.924	2.7164	1.495
STQU1	-3.4581	-2.206**	-3.0978	-1.954**	-2.6261	-1.663*
GEN	-0.5998	-0.488	-2.1779	-1.679*	-1.272	-0.968
MMEAL	0.4658	0.354	-0.9504	-0.696	-0.9441	-0.674
NUM	0.0266	0.755	0.0038	0.103	0.0296	0.823
DYN1	-2.3313	-1.592	-2.3244	-1.526	-1.8081	-1.236
DYN2	0.4727	0.315	-0.0169	-0.011	-1.7147	-1.134
DYN3	-1.8862	-1.248	-2.2761	-1.503	-1.4888	-1.006
DYN4	-0.5198	-0.381	0.1659	0.199	-1.1727	-0.827
ETH3	-0.7436	-0.62	0.396	0.326	0.3438	0.28
SIZEOH	0.0402	0.104	-0.1067	-0.264	0.2097	0.51
ING1	1.1999	0.656	-0.175	-0.094	0.3062	0.17
ING2	3.4891	1.991	2.2604	1.261	2.6364	1.455
AEDGR2	-0.2878	-0.156	-0.2528	-0.137	-2.8554	-1.54
AEDGR3	-0.5011	-0.258	-0.77	-0.399	-2.3876	-1.215
EMPLOY	2.1542	1.37	1.9843	1.245	2.8635	1.774
AAG3	2.527	1.287	3.6499	1.824**	2.9996	1.526*
AAG1	3.9394	1.694*	4.6725	1.987**	3.9678	1.672*
* Statistically Significant at 0.10						
**Statistically Significant at 0.05						
***Statistically Significant at 0.01						
Log likelihood function: -128.9507						
Restricted log Likelihood: -233.4167						
Chi-squared: 208.9320						
Significance level: 0.0000						
% Correct Predications: 78%						