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Factors Affecting Consumer Preferences for Major Food Markets in Taiwan

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The Food Industry Research and Development Institute conducted a nationwide survey of food consumption in Taiwan in 1999. A sample of 1200 consumers responded to a questionnaire, which asked whether there was a use/visit experience in the past year for each of six types of food markets: traditional vegetable market, supermarket, hypermarket, consumer cooperative, chain convenience store, and grocery store. Questions also asked which types of food markets consumers used most frequently for the purchase of fresh foods, planned purchases or occasional purchases of processed foods, and what factors influenced consumers to choose their most frequently used market. Nearly 84 percent of surveyed consumers have used/visited traditional vegetable markets in the past year, while 47 percent choose traditional markets as their most frequented marketplace for buying fresh food in Taiwan. Some 81 percent of surveyed consumers have used or visited a supermarket in past year, while 17.7 percent and 29.0 percent choose supermarkets as the most frequented marketplace for planned and occasional purchases of processed foods, respectively.

We apply stepwise logistic regression to identify significant sociodemographic factors (such as gender, age, and others) which influence the choice of each of the six major types of food markets and to identify the promotional factors which positively or negatively influence consumers' preferences for the most often used market. Female consumers have almost four times higher odds of frequently using traditional vegetable markets in the past year. The unmarried, divorced/widowed, and/or those who had higher family monthly incomes demonstrate lower odds of frequently using traditional markets. For purchases of fresh foods, female respondents, older consumers, and/or those living in northern Taiwan have higher odds of choosing traditional vegetable markets as the most frequently used market, while occupation "chief," and those with higher levels of education have lower odds of choosing traditional markets. Price level influences consumers positively in choosing traditional vegetable markets, while products with mark registrations, such as GMP or CAS, negatively influence this choice.

For planned purchases of processed foods, older consumers are more likely than others to choose traditional vegetable markets, and price level is also a positive influence for choosing these markets. For occasional purchases of processed foods, manual laborers and/or those living in northern Taiwan have higher odds of choosing traditional vegetable markets, while unmarried respondents have lower odds. Price level and products with nutrition labeling are positive promotional factors influencing consumers to choose traditional vegetable markets. For the other five market types, sociodemographic factors influence consumers' choices of markets differently in each case, but marketing factors also influence choices of which type of marketplace to use most frequently.

Introduction

Market development commonly parallels the development of a region's or a nation's economy. The most frequently used food markets in Taiwan include traditional vegetable markets, supermarkets, hypermarkets, consumer cooperatives, chain convenience stores, and grocery stores.

Traditional vegetable markets are markets that provide fresh foods for most of the housewives in Taiwan. They have existed for more than 40 years and have made changes with the development of other parts of the economy. There are generally several dozen, or even more than 100, stalls in the market. Most of the stalls are fixed in place, but some movable stalls may scatter around the market or the nearby roadside. The market is opened in the morning and usually is closed at noon or around 1 p.m. Some grocery stores may be located near or in the traditional market and open their doors in the afternoon or even in the evening. The scale of these markets is dependent on the number of residents around the market.

In the traditional vegetable market, one can purchase vegetables, fish, meat, eggs, and dry vege-

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tables, from which housewives can prepare cooked foods at home. In the old type of traditional vegetable market, the floor may be wet and a little dirty. For newly built traditional markets, display is neater and cleaner and the floor is dry. In addition to the vegetable and fruit section, a meat section, and a fish section, there are stalls used for selling clothes, toys, and other daily necessities. Some stalls may provide food services. During business hours, it is very crowded in the traditional market. Many housewives go there to search what they can buy to cook cheaply. Many varieties of vegetables, and usually low price, are the characteristics of the products in traditional vegetable markets.

Supermarkets have developed since the 1960s and became popular as the mainstream market during the 1970s. The scale of newly developed supermarkets usually ranges from 264 square meters to 661 square meters. Most supermarkets locate along the streets, while some may be located in the basement of department stores. The variety of goods numbers around 6500 to 8000, with items shelved neatly. Employees number around eight to twelve per store. Air conditioning and cooling systems are required to keep room and foods at low temperatures. To meet the competition, there is a tendency that some stores make alliances to be chain stores to lower the costs of purchase, promotion, education and training, and to increase efficiency of management, service and merchandizing.

Hypermarkets have emerged and developed prosperously in recent years. There are large spaces for goods allocation and parking. Customers must apply for an identification card to enter the store and buy goods. Purchase information is recorded in a POS system for each client. The varieties of goods are enormous, usually more than 12,000 per store. Prices are lower than at other kind of markets. The facilities and space are very like those of Kroger and K-mark in the U.S.A. The number of clients and the amount of purchased foods for each client on average are the largest among all kinds of markets, and they are expected to be the mainstream markets to drive the development of food vending in the future.

Consumer cooperatives originally developed in the 1950s, with the need of government to supply goods with low prices to governmental employees, teachers, and families of military services. They also developed as the purchase needs of people who worked at institutions changed, and recently with the joining of new consumers to the

cooperatives. The spaces are as large as those of supermarkets, and the prices of goods are lower. Clients are mostly restricted to members only, with an ID card needed for entering the store. However, most stores do not record personal purchase information in POS systems.

Chain convenience stores, CVS, were first successfully operated at a profit by 7-Eleven after eight years of successive losses during the 1980s. While there were 2,634 CVS stores in December 1994, the number grew to 5,736 by May 2000. Almost all the chain convenience stores open doors 24 hours a day, and most of the clerks and clients are among the younger generation. They usually locate on the corner of the cross streets. The logo is unique for each CVS system. Lighting at the stores is very bright, and the displays are very neat and clean. Managers order goods based on the information in their POS systems. The goods displayed on the shelf are usually popular and are easily sold out. If goods are not easily sold out, the CVS managers will not let the goods being displayed on the shelf. The turnover of goods in the CVS system is the quickest among the markets. In addition to easy-sell-out processed foods, they also display cooked foods, such as hot dogs, tea-leaf-egg sandwich, su-si, and other ready-to-eat, prepared foods.

Grocery stores are the oldest types of retail markets in Taiwan. Spaces are small, usually around 66-76 square meters. Varieties of goods are limited and are mostly daily necessity. Usually, the managers are the owner. They keep the store as part of their family. The store may be succeeded from their parents and so has history. Displays of goods in grocery stores are usually not neat. Wine, eggs, dehydrated foods, and daily necessities are the common products of grocery stores. Usually, there is no receipt to customers at transaction in old type store.

To analyze the data collected related to the six types of food markets, using the greatest possible amount information to explore the relationship of a dependent variable and explanatory variables may best illuminate the possible implications for the studied events. However, in a regression model, using too many independent variables pooled together may cause one to encounter the problem of multicollinearity and generate many insignificant coefficients. With the development of social research, sociodemographic variables have been included in economic analysis to enrich analytical models with not only the variables of

price, quantity, and income, but also of gender, age and other sociodemographic variables.

Consumers chose foods from markets based on their preferences, endowment, income, and prices of goods. Different consumers might have different preferences in choice of markets from which to buy goods or foods. In this study, sociodemographic factors and market related factors were investigated to explore factors affecting consumers' choices of food market in general and as the most frequently used market to buy foods among the competitive markets.

Data and Methodology

Data

The Food Industry Research and Development Institute (FIRDI) conducted a nationwide survey of food consumption in Taiwan from January to February 1999. A sample of 1200 consumers was collected, based on the distributions of age and gender among 23 counties and cities in Taiwan. The interviewer searched the visiting interviewee through going along the street or road, past three houses, and visited the fourth house to find a consumer with age and gender within the quota of sampling as interviewees. Then the interviewer went past three houses again and selected the next fourth house to find out a second consumer as interviewee, who was fitted to the designed sample qualification. After the sampling, each interviewee was asked to fill out the questionnaire within a mutually agreeable period. Then the interviewer returned to check the questionnaire and collect it.

The questionnaire included questions of whether there was a use/buy experience in the past year for each of 188 kinds of processed foods, for each 130 kinds of fresh agricultural foods, and for each of 18 kinds of food channels. There were also 50 questions about the degree to which one paid attention to some kinds of life style characteristic, to some kinds of food attributes, to some kind of food tastes, and how one liked to eat some kinds of foods. There were 14 demographic variable questions. Responses to questions relating to the choice/use of six major types of food markets in past year were used as dependent variables in this research. The dependent variable choice of market was defined as whether one chose/use market in the past year. The variable preference for market was defined as whether one used the

market as the most frequently used one for buying fresh or processed food.

Possible explanatory variables included sociodemographic variables and market-related factors. Sociodemographic variables included gender, age, education, occupation, religion, residing area, family size, family monthly food expenditure, family monthly income, personal monthly food expenditure and personal monthly income (Table 1) Market related factors included factors related to marketplace and factors related to products. For factors related to marketplace, it included neat and clean in market, product fresh and good quality, abundant variety of products, low price, cooked food for ready to eat, location near home, and personnel manners in providing service. For the factors related to products, it included product with nutrition labeling, freshness or product expiration date, product with mark registration such as GMP or CAS, price level, and brand image.

Family size, education, income, and food expenditure were ordinal and categorical. Gender, marital status, religion, and occupation were nominal and categorical. This study used the age variable with continuous response. Each nominal and categorical variable was defined as one for true and zero otherwise. For example, the female gender variable was set equal to 1 for female and 0 for male. For education, it was 1 for those having education of primary school or under, 2 for those having high school education, 3 for those having college or university education, 4 for those having education beyond university, such as master and Ph.D. For religion, there were Christian, Buddhist, Yi-Guan-Daoism, Muslim, Daoism, and others, including those with no religion. Each one was defined as a variable with level equal to 1 when it was true and 0 otherwise. The survey did not interview a Muslim. For the family monthly food expenditure, there were 14 ranges -- the lowest level at NT\$ 2,500 or under, and the highest level at NT\$ 32,500 or more. For family monthly income, the lowest level was below NT\$20,000 and the highest level was more than NT\$140,000. For personal monthly food expenditure, there were seven ranges, with the lowest level being less than NT\$1,000 and the highest level being more than NT\$6,000. For personal monthly income, there were nine ranges: the lowest level was no income and the highest level was more than NT\$80,000. Family size ranged from one person to 10 or more.

Table 1. Variable Sample Statistics.

<i>Variables</i>	<i>Mean</i>	<i>Min</i>	<i>Max</i>	<i>S.d.</i>	<i>Missing</i>
Gender (female=1)	0.505	0	1	0.500	0
Age	36.938	14	71	14.511	0
Education	2.020	1	4	0.653	0
Marital status					
Unmarried	0.327	0	1	0.469	0
Married	0.651	0	1	0.477	0
Divorced/widowed	0.023	0	1	0.148	0
Personal income	2.865	1	9	2.084	0
Personal food exp	3.740	1	7	1.936	2
Family income	6.192	1	14	3.073	11
Family food exp	6.883	1	14	3.059	12
Family size	4.832	1	10	1.706	1
Residing area					
Northern	0.424	0	1	0.494	0
Middle	0.249	0	1	0.433	0
Southern	0.298	0	1	0.458	0
Eastern	0.028	0	1	0.166	0
Occupation					
Housewife	0.250	0	1	0.433	0
Chief	0.157	0	1	0.364	0
White collar	0.168	0	1	0.374	0
Manual labor	0.200	0	1	0.400	0
Unemployment	0.048	0	1	0.215	0
Student	0.147	0	1	0.354	0
Religion					
Christian	0.029	0	1	0.168	0
Buddhist	0.476	0	1	0.500	0
Yi-Guan-Daoism	0.023	0	1	0.148	0
Daoism	0.210	0	1	0.407	0
Other/none	0.262	0	1	0.440	0

Note: Sample=1200.

Methodology

Using the choice and preference for market as dependent variables defined above, the study examined all possible variables of demographic factors (Table 1) and market or product related factors, such as marketplace neat and clean, product fresh or quality good, abundant variety, low price, cooked foods for ready-to-eat, location near home, personal manner in providing service, product with nutrition labeling, product expiration date, mark registration, such as GMP or CAS, price level, and brand image. In addition to the

market or product-related factors, there were 12 types of demographic factors, or totally 26 defined variables, considered. Stepwise regression was employed to identify the significantly explanatory variables.

Since data were collected through randomly stratified sampling, it was assumed that the data were at least conceptually representative of a stratified population. The data had likelihood with the models posited:

$$(1) \quad \log\left(\frac{\pi_{hi}}{1 - \pi_{hi}}\right) = \alpha_i + X'_{hik} \beta_{ik},$$

where X denoted the matrix of explanatory variables; β denoted the vector of coefficients, α denoted the intercept parameter; $i = 1, 2, \dots, 6$ for the choice of traditional vegetable market, super market, hyper market, consumer cooperative, CVS, and grocery store, respectively; $k=1, 2, 3, \dots$ denoted the explanatory variables included; π denoted the probability that the event happened, while $1-\pi$ denoted the probability that the event did not happen.

To identify the models, a stepwise process was employed. Score Chi-square was used as the entry criterion to include a new explanatory variable in the model (Stockes et al., 1995). A 0.05 significance level was used to select the entry variable. The model fitting information and testing global null hypothesis of $\beta=0$, such as Chi-square for covariates in the criterion of likelihood $-2 \log L$, Chi-square for covariates of score, and residual Chi-square, were used. For a valid model fitting, the Chi-square for covariates in the criterion of likelihood $-2 \log L$ and in the criterion of score should be significant, while residual Chi-square should not be rejected at 5 percent significance level (Stockes et al. 1995). Hosmer and Lemeshow goodness-fit test should be insignificant.

Empirical Results

Sample Statistics

We found that 83.8 percent of surveyed consumers chose/used traditional vegetable market in past year, while 47.1 percent of those surveyed chose traditional vegetable market as the most

often chose market for buying fresh food in Taiwan (Table 2). Some 81 percent of surveyed consumers chose/used super market in past year, while 17.7 percent and 29.0 of those surveyed chose super market as the most frequently chose market for planned and occasional purchase of processed foods respectively. About 78.5 percent of surveyed consumers chose/used CVS in the past year, while 14.9 percent chose CVS as the most frequently chose marketed for occasional purchase of processed foods. 70.9 percent of consumers surveyed chose/used grocery store in the past year, while 68.3 percent chose hypermarket, and 48.0 percent chose/used consumer cooperatives (Table 2).

General Choice of Market Model

We use stepwise regression to identify significant demographic variables for each market outlet model. Model fitting information and testing of the global null hypothesis $\exists = 0$ with Chi-Square for covariates in criterion of score support the adequacy of the models (Table 3).

Female consumers have 3.99 times higher odds of using traditional vegetable market vendors in the previous year than their male counterparts. The unmarried, divorced/widowed, and/or those who had higher family monthly incomes exhibit lower odds of using traditional market than their counterparts. Female respondents also have higher odds (1.427 times) of using supermarkets in the past year than do males, while the older consumers and students show lower odds of visiting a supermarket in that period.

Table 2. Consumer Response to Choices of Food Markets.

Market channel	General choice		Most Frequently Used Market for Fresh Food		Most Frequently Used Market for Planned Purchase of Processed Foods		Most Frequently Used Market for Occasional Purchase of Processed Foods	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Traditional vegetable market	1005	83.8	565	47.1	88	7.3	98	8.2
Supermarket	973	81.1	283	23.6	212	17.7	348	29.0
Hypermarket	819	68.3	48	4.0	112	9.3	67	5.6
Consumer cooperatives	576	48.0	8	0.7	73	6.1	51	4.3
CVS	942	78.5	22	1.8	30	2.5	179	14.9
Grocery store	851	70.9	6	0.5	11	0.9	44	3.7

Sample: 1200.

Table 3. Parameter Estimates and Odds Ratios for Each General Choice of Food Market Model in Previous Year.

Variable	Traditional vegetable market	Supermarket	Hypermarket	Consumer cooperative	CVS	Grocery store
Intercept	0.7758	2.5765	0.9159	-1.6531	1.1080	0.9990
Female	1.3667 <3.992>	0.3554 <1.427>		0.4377 <1.549>		
Age		-0.0396 <0.961>	-0.0289 <0.972>		-0.0376 <0.963>	
Education			0.5369 <1.711>	0.5206 <1.683>	0.7143 <2.043>	
Unmarried	-1.3347 <0.263>		-0.5146 <0.598>			
Divorced/widowed	-1.3427 <0.261>					
Housewife				0.4209 <1.523>		
Student		-0.7164 <0.489>	-0.4676 <0.626>			-0.4403 <0.644>
Northern				-0.3014 <0.740>		
Southern			0.5743 <1.776>			
Eastern			-1.2229 <0.294>			
Christian						-0.7943 <0.452>
Daoism				-0.4173 <0.659>		
Non-religion						-0.4030 <0.668>
Personal food exp					0.0890 <1.093>	
Family food exp				0.0492 <1.050>		
Family income	-0.0662 <0.936>			-0.0597 <0.942>		-0.0822 <0.921>
Family size						0.1283 <1.137>
Concord.	74.4%	63.2%	66.2%	63.3%	73.9%	61.1%
P-value*	0.6994	0.0667	0.1128	0.1147	0.1847	0.8479

Note: P-value* denotes the probability value of Hosmer and Lemeshow goodness-of-fit statistic. Odds ratios are included in < >.

Those with a higher level of education and those living in southern Taiwan are more likely to have used a hypermarket in the past year, while unmarried consumers, the older, students, and/or those living in eastern Taiwan demonstrate lower odds of visiting a hypermarket. Female consumers, housewives, those having higher family monthly food expenditures, and/or those with higher levels of education exhibit higher odds of choosing consumer cooperatives in the past year, while consumers having higher family monthly incomes, those living in northern Taiwan, and/or those who believe in the religion of Daoism reveal relatively lower likelihood of visiting consumer cooperatives.

Consumers with higher personal food expenditures and those with higher levels of education are more likely to have chosen CVS outlets in the previous year, while older consumers are significantly less likely to use such convenience stores. Larger family sizes generally indicate higher likelihood of choosing grocery stores, while students, those with higher family monthly incomes, Christian respondents, and those who do not believe in any religion exhibit lower odds of visiting a grocery store.

Most Often Used Markets for Fresh Foods

Using stepwise regression, significant variables for each market model are identified, and the model fitting information and testing of the global null hypothesis $\beta = 0$ with Chi-Square for covariates in criterion of score support the adequacy of the models (Table 4). Female respondents, the older, and/or those living in northern Taiwan have higher odds of choosing traditional vegetable market vendors most frequently in buying fresh foods, while occupation chief and those with higher levels of education lower the odds of choosing traditional markets for these purchases. This is consistent with the fact that females are the major buyers and cooks of food for their families, while traditional vegetable markets provide the most abundant source of fresh foods for them to choose. The clients in traditional vegetable markets are most frequently the middle aged and the older females. Price levels positively influence choices of traditional markets in buying fresh foods, while "product with mark registration such as GMP or CAS" negatively affects the likelihood of these actions. Prices are negotiable and

most consumers achieve acceptably low levels, but, while products are not labeled, no brand, or even a mark registration, is needed for consumers to buy fresh foods in traditional vegetable markets.

Eastern region consumers and/or those with the occupation "chief" have higher odds of choosing supermarkets most often in buying fresh foods, while older consumers have lower odds of most frequently using these marketplaces. "Freshness or product expiration date" is also a negative factor influencing consumers' choice of supermarkets. These findings are consistent with the fact that fresh foods are placed in a cooling system, often for several days, at the supermarket, and thus induce consumer images of less freshness, even in the fresh products. On the other hand, those with higher levels of education, those living in southern Taiwan, and those with higher personal monthly incomes have higher odds of choosing hypermarkets most frequently in buying fresh foods. "Freshness or expiration date," low price, "abundant variety of goods," and "personnel manners in providing service" also positively influence consumers to choose hypermarkets as the most often used market in buying fresh foods.

"Product with mark registration such as GMP or CAS," and "brand image" positively affect the odds of consumers choosing consumer cooperatives most frequently for buying fresh foods, whereas for grocery stores, older consumers have higher odds of these sites as the most often used markets in buying fresh foods. This is consistent with the fact that many consumer cooperatives sell water-cultivated vegetables, packed vegetables with brand labels, fruit and meat, while for grocery stores, the finding may imply that the older have more intimate connections to grocery store owners/operators in daily life. The fresh foods may be eggs, ginger, garlic, seaweed, and other dry agricultural products.

For CVS outlets, those living in middle Taiwan, the occupation "chief," and/or those having higher family monthly food expenditures tend to have greater odds of choosing these markets most frequently in buying fresh food, while older consumers and those who believe in Daoism have lower odds. As to market factors, brand image, personnel manners in providing service, and products with nutrition labeling positively affect consumers to choose CVS most frequently in buying fresh foods.

**Table 4. Parameter Estimates and Odds Ratios for Most Frequently Used Food Markets—
Fresh Foods.**

<i>Variable</i>	<i>Traditional</i>	<i>Supermarket</i>	<i>Hypermarket</i>	<i>Cooperative</i>	<i>CVS</i>	<i>Grocery store</i>
Intercept	-08385	0.2807	-6.7392	-5.1346	-2.2583	-9.5587
Female	0.5581 <1.747>				-1.6672 <0.189>	
Age	0.0274 <1.028>	-0.0317 <0.969>			-0.0801 <0.923>	0.0964 <1.101>
Education	-0.3363 <0.714>		0.0268 <2.792>			
Northern	0.3315 <1.393>					
Middle					2.7890 <16.264>	
Southern			0.7528 <2.123>			
Eastern		0.9257 <2.524>				
Chief	-0.4950 <0.610>	0.4636 <1.590>			1.4572 <4.294>	
Daoism					-1.7450 <0.175>	
Personal monthly income			0.2300 <1.259>			
Family food expenditure					0.1734 <1.189>	
Freshness or product expiration date		-0.6375 <0.529>	1.0681 <2.910>			
Product with mark registration such as GMP or CAS	-0.6524 <0.521>			1.9776 <7.226>		
Low price			1.7980 <6.038>			
Price level	0.4768 <1.611>					
Brand image				2.4266 <11.320>	3.1045 <22.299>	
Abundant variety			1.3829 <3.987>			
Personnel manners in providing service			1.9464 <7.003>		2.3392 <10.373>	
Product with nutrition labeling					2.4625 <11.734>	
Concord.	68.6%	63.7%	78.3%	35.6%	91.3%	76.4%
P-value*	0.4661	0.1649	0.6492		0.8932	0.5108

Note: P-value* denotes the probability value of Hosmer and Lemeshow goodness-of-fit statistic. Odds ratios are included in < >.

Most Frequently Used Market for Planned Purchases of Processed Foods

Stepwise regression is used to identify significant variables for each model. Model fitting information and testing of the global null hypothesis $\exists = 0$ with Chi-Square for covariates in criterion of score support the adequacy of the models (Table 5). Older consumers have higher odds of choosing traditional market vendors most often for planned purchases of processed foods. Price levels also positively influence consumers in this choice for planned purchase of processed foods. Older consumers prefer shopping in the vegetable markets, where price level may be determined through bargaining. Sales of processed foods are often bulk pack or large quantities for family or institution use or for retailers to re-sell.

Students have higher odds of choosing supermarket most often for planned purchases of processed foods, while the perception of (lack of) low prices negatively influences consumers in their choice of supermarkets for planned purchases. That is, students are important clients for super markets, while prices of goods in supermarkets are not regarded as inexpensive. White collar workers appear to have higher odds of choosing hypermarkets for planned purchases, and "Neat and clean market," and "abundant variety of goods" are positive factors influencing consumers to choose hyper market as the most often use market for planned purchase of processed foods. The findings imply that the strengths of hypermarkets are variety, display of goods, and the targeting of white-collar consumers as clients in the beginning periods of their establishment.

Table 5. Parameter Estimates and Odds Ratios for Most Frequently Used Food Markets—Planned Purchases of Processed Foods.

Variable	Traditional	Supermarket	Hypermarket	Cooperative	CVS	Grocery store
Intercept	-3.3382	-0.3968	-1.9130	-2.4994	-3.5296	-6.8294
Age	0.0341 <1.035>					
White collar			0.7425 <2.101>			
Manual labor						3.2140 <24.879>
Student		0.7978 <2.221>			1.4981 <4.473>	
Low price		-1.0966 <0.334>		1.8822 <6.568>		
Price level	1.3127 <3.716>					1.9120 <6.767>
Brand image						1.9079 <6.739>
Market neat and clean			0.8238 <2.279>			
Abundant Variety of goods			1.1974 <3.311>			
Product expiration date				0.7055 <2.025>		
Product with nutrition labeling					1.2716 <3.567>	
Location near home					0.8357 <2.306>	1.3839 <3.991>
Concord	70.8%	24.6%	52.1%	46.5%	64.4%	83.3%
P-value*	0.2217	0.9240	0.9416	0.9465	0.0599	0.2040

Note: P-value* denotes the probability value of Hosmer and Lemeshow goodness-of-fit statistic. Odds ratios are included in < >.

Low prices and "product expiration date" increase the odds of consumers choosing cooperatives for planned purchases of processed foods, consistent with the fact that products in consumer cooperatives are usually sold at lower prices and have higher turnover rates, suggesting more recently manufactured dates. On the other hand, students have a higher likelihood of choosing CVS as the most often used markets for planned purchases, implying that students are major clients of CVS, and location provides convenience for clients. Perceptions of "product with nutrition labeling" and "location near home" also increase the likelihood that consumers will choose CVS most often for planned purchases. Manual laborers have higher odds of choosing grocery stores as their most often used markets, while price level, brand image, and location near home are also positive factors influencing consumers to choose grocery stores as their most frequented market for planned purchases of processed foods.

Most Frequently Used Market for Occasional Purchases of Processed Foods

Again, model fitting information and testing of the global null hypothesis $\beta = 0$ with Chi-Square for covariates in criterion of score support the adequacy of the models (Table 6). Manual laborers and/or those live in northern Taiwan have higher odds of choosing traditional market vendors most often for occasional purchases of processed foods, while unmarried respondents have lower odds of choosing traditional sites. Price level and "product with nutrition labeling" positively influence choice of traditional markets for these types of purchases. Female consumers are more likely to choose supermarket shopping most frequently for occasional purchases of processed foods, while those living in northern Taiwan show lower odds of choosing supermarkets. "Product fresh or with good quality," "product expiration date," and "product with mark registration such as GMP or CAS" influence consumers positively towards choosing supermarkets most frequently, while a poor perception of (lack of) low prices is considered a negative factor.

Those living in northern Taiwan are significantly more likely to shop in hypermarkets for occasionally purchased goods, but the unmarried are less likely than their cohorts to do so. Hyper-

markets are currently located mostly in northern Taiwan. Low prices and "abundant variety of goods" reflect positively on choosing hypermarkets, but "location near home" decreases the odds of consumers choosing hypermarkets for occasional purchases of processed foods. Hypermarkets are generally more distant from consumers' homes than are other types of outlets. Christian consumers are more likely to choose consumer cooperatives, while perceptions of low prices, "personnel manners in providing service," and "product with nutrition labeling" also increase the likelihood of consumers choosing cooperatives most frequently for occasional purchases.

Unmarried consumers have higher odds, but females, older consumers, manual laborers, and/or those living in southern Taiwan have lower odds, of choosing CVS outlets most frequently for occasional purchases of processed foods. Brand image increases the odds, while perceptions of "market neat and clean" decreases the odds of consumers choosing CVS outlets for these food products. Manual laborers have higher odds, while those with higher levels of education and those living in northern Taiwan have lower odds, of choosing grocery stores as their most frequented markets for occasional purchases of processed foods. "Location near home" is a marketing strength of grocery stores.

Conclusions

Survey data of consumer choices of the six major food market channels in Taiwan were analyzed utilizing stepwise logistic regression to determine demographic, market, and product-related factors that influence preferences for each type of retail outlet. The results demonstrate that different factors influence consumer preferences for each type of market outlet in purchases of fresh or processed foods. For example, female consumers have nearly four times greater odds of frequenting traditional vegetable markets in the past year than do male consumers. The unmarried, divorced/widowed, and/or those who have higher family monthly incomes exhibit lower odds of using traditional vegetable market than their counterparts. Older respondents and those living in northern Taiwan have higher odds of choosing traditional vegetable markets most frequently in buying fresh foods, while those with higher levels

Table 6. Parameter Estimates and Odds Ratios for the Most Frequently Used Food Markets—Occasional Purchases of Processed Foods.

Variable	Traditional	Supermarket	Hypermarket	Cooperative	CVS	Grocery Store
Intercept	-2.4484	-1.3541	-2.4693	-3.0697	0.7695	-1.4465
Female		0.5081 <1.662>			-0.6590 <0.517>	
Age					-0.0290 <0.971>	
Education						-1.0980 <0.334>
Unmarried	-0.9677 <0.380>		-1.6148 <0.199>		0.6376 <1.891>	
Manual labor	0.5580 <1.747>				-0.5337 <0.586>	0.8255 <2.283>
Northern	0.5644 <1.758>	-0.4582 <0.632>	0.7134 <2.041>			-1.2030 <0.300>
Southern					-0.5701 <0.565>	
Christian				1.5348 <4.640>		
Good quality and fresh		0.4055 <1.500>				
Low price		-1.7799 <0.169>	1.1556 <3.176>	1.4441 <4.238>		
Price level	1.2204 <3.388>					
Brand image					1.0248 <2.786>	
Market neat and clean					-0.7990 <0.450>	
Abundant variety of goods			1.1910 <3.290>			
Product expiration date		0.7592 <2.136>				
Product with mark registration such as GMP or CAS		0.9426 <2.567>				
Personnel manner in providing service				1.3521 <3.866>		
Product with nutrition labeling	0.7437 <2.104>			0.8721 <2.392>		
Location near home			-1.6340 <0.195>			1.4273 <4.167>
Concord.	63.2%	65.3%	74.0%	42.4%	74.0%	78.8%
P-value*	0.9367	0.9774	0.9687	0.6761	0.7544	0.5447

Note: P-value* denotes the probability value of Hosmer and Lemeshow goodness-of-fit statistic. Odds ratios are included in < >.

of education are less likely to choose traditional markets. Perception of favorable purchase price levels is important and positive, while products that lack trademark or registration/branding decrease the odds of choosing traditional market-places for purchasing fresh products.

Female respondents have 1.4 times higher odds than males of frequently using a supermarket in the past year, while older respondents and students show lower odds of visiting supermarkets. Older consumers exhibit significantly lower odds of choosing supermarkets most frequently in Taiwan. The perception of freshness or product expiration also negatively influences consumers from choosing supermarkets most frequently for fresh produce. For planned purchases of processed foods, students show a higher likelihood than other groups of choosing supermarkets most frequently. Low prices are not associated with the supermarket concept in Taiwan. Female consumers have higher odds of choosing supermarkets for occasional purchases of processed foods.

Those with higher levels of education and those living in southern Taiwan are more likely to frequent hypermarkets for fresh food products in past year, while unmarried consumers, older, students, and/or those living in eastern Taiwan exhibit lower odds of visiting a hypermarket. Freshness or expiration date, low prices, abundant variety, and manners in providing service are also positive factors for using hypermarkets most frequently in buying fresh foods. White-collar workers more likely choose hypermarkets most frequently for planned purchases of processed foods.

Female consumers, housewives, those having higher family monthly food expenditures, and/or those with higher levels of education are more likely to frequent consumer cooperatives, while those having a higher family monthly income, those living in northern Taiwan, and/or those believing in the religion of Daoism exhibit significantly lower odds of visiting consumer cooperatives. Products with mark registration and brand image positively influence decisions to choose consumer cooperatives most frequently in buying fresh foods, but for planned purchases of processed foods, low prices and product expiration date are positive factors. For occasional purchases of processed foods, Christian consumers are more likely to choose consumer cooperatives, and low prices, manners in providing service, and products

with nutrition labeling positively influence consumers to choose these outlets.

Consumers having higher personal food expenditures and/or those with higher levels of education have higher odds of choosing CVS outlets, while older consumers have lower odds. As to market factors, brand image, personnel's manners in providing service, and products with nutrition labeling are positive influences on consumers choosing CVS most frequently for buying fresh foods. Students more likely choose CVS outlets most frequently for planned purchases of processed foods. CVS outlets also score positively with respect to product labeling and location near home. Unmarried respondents have higher odds, but females, older consumers, manual laborers, and/or those living in southern Taiwan have lower odds, of choosing CVS most frequently for occasional purchases of processed foods. Brand image positively affects this choice, while perceptions of "market neat and clean" is a negative factor for CVS. Like CVS outlets, grocery stores in Taiwan are largely considered for convenience or neighborliness.

Those with larger family size have higher odds of choosing grocery stores, while students, those having higher family monthly incomes, Christian respondents, and/or those who do not believe any religion have significantly lower odds of visiting grocery stores. Older consumers are more likely to choose grocery stores most frequently for buying fresh food products. Manual laborers exhibit higher odds of choosing grocery stores most frequently for planned purchases of processed foods. Price level, brand image, and location near home positively affect the choice of shopping at grocery stores for planned purchases of processed foods. For occasional purchases of processed foods, manual laborers again have higher odds, while those with higher levels of education and those living in northern Taiwan have lower odds, of choosing grocery stores most frequently. Location near home is also an important and positive influence on consumers to choose grocery stores for occasional purchases of processed foods.

References

- Cody, R.P. and J.K. Smith. 1997. *Applied Statistics and the SAS Programming Language*, 4th Ed., pp. 235-47. NJ: Prentice Hall.
- Council of Agriculture.² 1999. "Taiwan Food Balance Sheet," in *Taiwan Food Statistics Book*, pp. 97-98. Edited by Department of Food, Taiwan Provincial Government, ROC.

- Council of Agriculture.^b 1999. "Taiwan Food Balance Sheet," in *Taiwan Food Statistics Book*, 1998 edition, pp. 270-73. Edited by Department of Agriculture and Forestry, Taiwan Provincial Government, ROC.
- Dickerson, M.D. and J.W. Gentry. 1983. "Characteristics of Adopters and Non-Adopters of Home Computers." *Journal of Consumer Research*. 10(September):225-35.
- Kastens, T.L. and B. K. Goodwin. 1994. "An Analysis of Farmers' Policy Attitudes and Preferences for Free Trade." *Journal of Agricultural and Applied Economics*. 26(2):497-505.
- Maddala, G.S. 1992. *Introduction to Econometrics*, 2nd ed. NY: Macmillan.
- Nayga, R.M. Jr. 1996. "Sociodemographic Influences on Consumer Concern for Food Safety: The Case of Irradiation, Antibiotics, and Pesticides." *Review of Agricultural Economics*. 18:467-75.
- Stockes, M.E., C.S. Davis, and G.G. Koch. 1995. *Categorical Data Analysis Using SAS System*. NC:SAS Institute.