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Preferences for Meat Labeling in Taiwanese Traditional Markets: What do Consumers Want?

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Abstract

Traditional markets provide a daily market platform for the majority of Taiwanese consumers. Food safety issues occurring in recent years have challenged traditional markets and eroded consumers' trust. This study investigates three types of meat product information: growth hormone, traceability, and nutrition labels, in a study designed to elicit how likely consumers at traditional markets are willing to pay for additional product information. Results show that younger females with higher education have a positive willingness to pay (WTP) for food safety related information, i.e., traceability and growth hormone. Implications from this study suggest that providing related information to ease the concerns of food-safety issues is a necessary strategy for traditional markets.

Keywords: growth hormone, traceability, nutrition label, traditional markets, willingness to pay

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Introduction

Traditional markets, also known as wet markets in Asia, have a long history of providing an important market platform in Asian countries. They are also called wet markets because they occur on wet ground, primarily for sanitary purposes. Most products sold at traditional markets come from local areas. Since vendors set their prices, getting the best price and the freshest food is the task of the purchaser. Based on the freshness characteristic, markets routinely provided customers live animals and seafood options—allowing them to choose the animal before it was butchered. With growing concerns about epidemic prevention and animal welfare, Taiwanese traditional markets are now prohibited from killing animals in front of customers.

Recently, a series of food safety issues have heightened consumer awareness. An incident concerning a meat adulteration scandal (Food Safety News 2014) occurred in Taiwan escalating consumers' concern for food safety and traceability while some market platforms, such as traditional markets still lack product information.

However, the cost of adding such information to labels impact the final price of the products, and it is debatable whether consumers of these traditional local markets really need additional information since they may rely on their accumulated product knowledge from their shopping experience (Berning et al. 2010). Indeed, consumers may not always need product information (Stranieri et al. 2010), and consumers may change their purchasing behavior depending on what type of information is provided (Derby and Levy 2001; Carneiro et al. 2005).

Although traditional markets in Taiwan have flexible pricing, diversity, and freshness, some types of product information is missing—such as growth hormone, traceability, nutritional information. Because meat safety is a concern, consumers are changing their purchasing behavior and sourcing food from more secure markets. This pioneer study investigates whether consumers need additional product information by surveying consumers' positive willingness to pay (WTP). Also examined is the type of consumer who is motivated to seek additional product information.

Empirical Models and Data

Consumers at traditional markets may or may not want additional product information due to their original purchasing behaviors. Since this type of information, can only be provided at an extra cost, consumers were asked if they are willing to pay more for it. A discrete choice format was used to assess each type of product variable. Every individual participating in the study is assumed to be a rational decision-maker. A random utility theory was adopted. Participants were provided a list of payment-card choices from zero and positive WTP. In order to find out whether consumers are willing to pay more for product information, the strategy in this paper treats the payment-card choices as a dichotomous choice set, i.e., zero and positive WTP choice.

Whether consumers at traditional markets would like to have this additional product information is highly related to purchasing behaviors which can be derived from their shopping experiences, i.e.: distance to markets, frequency of cooking (weekly), different types of meat in purchasing frequency, primary shopper for the family, frequency to the market, time spent at the market, and shopping time-of-day. Therefore, this study examines whether consumers are likely to give a

positive WTP for additional information with respect to their shopping experiences and demographic variables. A logit model was applied. Therefore, the probability of propensity to give a positive WTP can be presented as:

$$(1) \qquad p = pr(y_i = 1|\boldsymbol{x}_i) = F(x'\beta) = \frac{\exp(x_i'\beta)}{1+\exp(x_i'\beta)}$$

where y_i =1 indicates positive propensity to give a positive WTP; $\boldsymbol{x}_i$ denotes independent variables, including shopping experiences and demographic variables. The probability of the logit model is the cumulative density function of the logistic distribution. The marginal effects can be calculated as $\partial p/\partial x_j = F'(x'\beta)\beta_j$ for the logit model. The empirical specifications in this study for growth hormone, traceability, and nutrition label are:

$$(2) \qquad Growth\ Hormone = y_1^* = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_{22} X_{22} + \varepsilon$$

$$(3) \qquad Traceability = y_2^* = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \cdots + \gamma_{22} X_{22} + \varepsilon$$

$$(4) \qquad Nutrition\ Label = y_3^* = \tau_0 + \tau_1 X_1 + \tau_2 X_2 + \cdots + \tau_{22} X_{22} + \varepsilon$$

where the dependent variables (*Growth Hormone, Traceability, and Nutrition Label*) are explained by twenty-two independent variables (X_s), while the β_s, γ_s, and τ_s are parameters to be estimated. The explanatory variables consist of demographic and shopping experience characteristic variables.

A total of 2,381 complete observations were collected in mid-July, 2015. The data used in this paper were collected from two sources: a web-based consumer survey (*N*=1,791) distributed and managed by an existing consumer panel maintained by emailcash.com.tw, an affiliate of EmailCash Marketing Pty Ltd.; and random street sampling survey (*N*=590). Each participant was double pre-screened, to ensure they were, at least, twenty-one-years-old, and they had visited a traditional market during the past twelve months. Although these two data sources are not the same, a pre-screening question helped us sort out the similarities.[1]

The definitions and sample descriptive statistics of these variables are presented in the Appendix. Most surveyed respondents are willing to give a positive WTP for *Growth Hormone* (86%), *Traceability* (83%), and *Nutrition Label* (63%). The independent demographic variables included: *Female*, *Age*, *Education*, *Family Income*, *Housewife*, *Northern Taiwan*, and *Central Taiwan*. Over 60% of the respondents have positive WTP for additional product information. The majority of the respondents are female (65%), which is similar to the traditional market purchasing structure; and the average age is about forty-one-years-old. The average education of the respondents is fifteen years. The average monthly family income is about NT $65,500 (about US $2,101 under US $1=NT $31.17). About 12% of the respondents identified themselves as full-time housewives. Over 52% of the respondents are from Northern Taiwan and 25% from Central Taiwan.

[1] Upon the request, the sample distribution for these two data sources are ready to provide.

Shopping experience characteristics assessed in this study include: *Distance to markets*, *Primary shopper*, *Frequency to markets*, *Time spent at markets*, *Shopping time-of-day*, *Cook at home*, and different types of meat bought in purchasing frequency. Over 70% of the respondents are close to their home—within one kilometer. About 48% of the respondents are sometimes or not at all the primary shopper in a family. Respondents on average are used to shopping in traditional markets more than once a week. The majority of the respondents on average spent around 30–60 minutes at traditional markets. Around 40% of the respondents visited traditional markets from 5:00 a.m. to 11:00 a.m. and only 23% from 11:00 a.m. to 5:00 p.m. About 52% of respondents cook at home between four to twelve times per week, while around 30% of respondents cook at home only 0–3 times in a week. Among the highly purchased frequency of different meat types, respondents most often purchase pork (61%), chicken (47%), fish meat (45%), and beef (13%).

Empirical Regression Results

The results of estimated coefficients and marginal-effects likelihood for selecting a positive WTP from the logit regressions are summarized in Table 1. A failed rejection regarding the goodness-of-fit examination shows that each regression model fits reasonably well. Many estimated coefficients of the demographic characteristics are significant for each type of product information. Overall, compared with males, female consumers are likely to select positive WTP for additional product information. Female consumers especially show a higher interest than males in nutrition labels. However, housewives are less likely to select a positive WTP for nutrition labels compared to other non-housewives. Possibly there is a linkage that housewives have more time to learn about the nutrition for the food they buy, and often try to save money for the family since they are not in charge of family income. Younger consumers with higher education and family income are likely to give a positive WTP for growth hormone and traceability. Central Taiwanese consumers are more likely to select a positive WTP for product information than Southern consumers.

The shopping experience variables identified many interesting outcomes. Consumers traveling a longer distance to traditional markets are likely to give a posit WTP if compared to those who are within 1 kilometer, or 1–3 kilometers of the markets. There may be a linkage between consumers who live far away from markets and consumers who are often willing to give a positive WTP for product information. Consumers who are infrequent shoppers for the family tend to give a positive WTP, compared to those who are most often the primary shopper. This implies that the demand for product information is highly related to occasional buyers who often look for product information to make purchasing decisions.

Consumers types who frequently shop at traditional markets, spending around 30–60 minutes at markets, and shop in the evening (after 5:00 p.m.) are likely to give a positive WTP for nutritional information; however, these types of shoppers do not show a significant level of food-safety concern about product information. This may imply that these types of shoppers are highly concerned with health-related factors if they have more free time at markets. Consumers who highly frequent the markets to purchase pork are less likely to select a positive WTP for nutritional labels. This may be linked to their long-term practice of using pork as the major protein source and pork is very common meat in Taiwan compared with other types of meat.

While consumers who most frequently purchase chicken and fish are more likely to give a positive WTP for traceability and nutritional labels.

Table 1. The Empirical Results of the Logit Model for Preferences of Product Information.

Dependent Variable / Independent Variables	Growth Hormone		Traceability		Nutrition Label	
	Coef/t	M.E.	Coef/t	M.E.	Coef/t	M.E.
Female	0.358***	0.043**	0.275**	0.038**	0.324***	0.074***
Age	-0.005	-0.001	-0.012*	-0.002*	0.002	0.000
Education	0.047	0.005	0.061**	0.008**	-0.017	-0.004
Family income	0.004**	0.000**	0.001	0.000	-0.001	-0.000
Housewife	-0.046	-0.005	0.057	0.008	-0.331**	-0.077**
Northern Taiwan	0.167	0.020	0.172	0.023	0.154	0.035
Central Taiwan	0.217	0.024	0.437***	0.055***	0.237*	0.053*
Distant to markets (Within 1 km)	-0.446	-0.048*	-0.530*	-0.066**	-0.345*	-0.076*
Distant to markets (1–3 km)	-0.333	-0.042	-0.547*	-0.082*	-0.537***	-0.125***
Primary shopper (Sometimes)	0.403***	0.044***	0.140	0.019	0.246**	0.055**
Primary shopper (Not at all)	0.033	0.004	0.052	0.007	0.017	0.004
Frequency to markets	0.000	0.000	0.001	0.000	0.006***	0.001***
Time spend at markets (30–60 mins)	0.022	0.003	0.110	0.015	0.184*	0.042*
Time spend at markets (1 hr above)	-0.318*	-0.040	0.088	0.012	0.139	0.031
Shopping time (5 a.m.–11 a.m.)	-0.040	-0.005	0.053	0.007	-0.187*	-0.042*
Shopping time (11a..m.–5 p.m.)	-0.051	-0.006	0.068	0.009	-0.170	-0.039
Cook at home (0–3 times weekly)	0.063	0.007	0.126	0.017	0.210	0.047
Cook at home (4–12 times weekly)	0.106	0.012	0.154	0.021	0.155	0.035
Pork	0.089	0.010	-0.129	-0.017	-0.450***	-0.100***
Chicken	0.085	0.010	0.240*	0.032*	0.204*	0.046*
Fish	0.186	0.022	0.043	0.006	0.185*	0.042*
Beef	0.098	0.011	0.104	0.014	0.156	0.035
Constant	0.767		0.887		0.494	
Number of observations	2,381	2,381	2,381	2,381	2,381	2,381
McFadden R^2	0.020	0.020	0.017	0.017	0.021	0.021
Correctly classified	86.27%		83.62%		64.26%	
Goodness-of-fit	2368.21		2364.16		2379.32	
Log-Likelihood	-933.51		1,043.39		1,534.44	

Note. Asterisks indicate levels of significance: * = 0.10, ** = 0.05, and *** = 0.01.

In sum, shoppers at traditional markets have a strong desire for and a positive WTP for product information concerning growth hormones, traceability, and nutritional labels. Particularly, demographic factors are highly related to gender, age, education, family income, and region. Shopping experiences are significantly linked to consumer proximity to the markets and how often they purchase food for the family. Finally, shopping experiences concerning shopping

frequency, the time spent at markets, and the shopping time-of-day in the evening are highly correlated with a demand for nutritional labels. With the exception of pork, consumers who more frequently buy chicken and fish requested food traceability and nutritional label information.

Conclusion

Taiwanese consumers have faced troubles in sourcing their food products from traditional markets. As food safety issues continue to raise consumers' tension in changing purchasing behavior, there is still a lack of product information available. Although these consumers are used to operating with limited product information, the escalating incidents of food safety scares, leads to new questions concerning whether consumers need or desire additional production information.

This study found that Taiwanese shoppers at traditional markets have a strong desire to receive product information for growth hormone, traceability, and nutritional labels in some instances. Especially, younger female consumers from central Taiwan with higher education and incomes are more likely to select a positive WTP. Consumers traveling longer distances to markets and only occasionally the primary shopper for the family are also concerned with additional product information. Implications from this study suggest that providing related information will help to ease the concern of food safety and is a necessary strategy at traditional markets.

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Appendix

Definitions and Sample Statistics of Variables (N = 2,381)

Variables	Description of Variables, BV=Binary Variable	Mean	Std. Dev.	Min.	Max.
Growth hormone	BV=1 if respondent was willing to give a positive WTP for growth hormone information, 0 o.w.	0.86	0.34	0	1
Traceability	BV=1 if respondent was willing to give a positive WTP for traceability information, 0 o.w.	0.83	0.36	0	1
Nutrition label	BV =1 if respondent was willing to give a positive WTP for nutrition information, 0 o.w.	0.63	0.48	0	1
Female	BV =1 if respondent is female, 0 o.w.	0.65	0.47	0	1
Age	Continuous variable; years of age	40.7	9.92	18	79
Education	Continuous variable: years of education	15.2	2.19	2	18
Family income	Continuous variable; total monthly household income before tax ($1,000)	65.5	31.0	10	105
Housewife	BV =1 if respondent's occupation is housewife, 0 o.w.	0.12	0.32	0	1
Northern Taiwan	BV =1 if respondent is from Northern Taiwan, 0 o.w.	0.52	0.49	0	1
Central Taiwan	BV =1 if respondent is from Central Taiwan, 0 o.w.	0.25	0.43	0	1
Distant to markets *(Within 1 km)*	BV =1 if respondent can reach traditional market within 1 kilometer, 0 o.w.	0.74	0.43	0	1
Distant to markets *(1-3 km)*	BV =1 if respondent can reach traditional market within 1-3 kilometers, 0 o.w.	0.18	0.39	0	1
Primary shopper *(Sometimes)*	BV =1 if respondent is sometimes the only one who buys groceries in a family, 0 o.w.	0.31	0.46	0	1
Primary shopper *(Not at all)*	BV =1 if respondent is not the only one who buys groceries in a family, 0 o.w.	0.17	0.37	0	1
Frequency to markets	Continuous variable: frequency to traditional market within half year	34.9	27.5	0	96
Time at markets *(30-60 mins)*	BV =1 if respondent spends time at traditional market within 30-60 minutes, 0 o.w.	0.51	0.49	0	1
Time at markets *(1 hr above)*	BV =1 if respondent spends time at traditional market over 1 hour, 0 o.w.	0.12	0.33	0	1
Shopping time *(5-11am)*	BV =1 if respondent used to go to traditional market at morning (5-11 Am), 0 o.w.	0.40	0.49	0	1
Shopping time *(11-5pm)*	BV =1 if respondent used to go to traditional market around 11 AM-5 Pm, 0 o.w.	0.23	0.42	0	1
Cook at home *(0-3 times weekly)*	BV =1 if respondent cooks at home about 0-3 times weekly, 0 o.w.	0.32	0.46	0	1
Cook at home *(4-12 times weekly)*	BV =1 if respondent cooks at home about 4-12 times weekly, 0 o.w.	0.52	0.49	0	1
Pork	BV =1 if respondent often or every chance possible purchases pork, 0 o.w.	0.61	0.48	0	1
Chicken	BV =1 if respondent often or every chance possible purchases chicken, 0 o.w.	0.47	0.49	0	1
Fish	BV =1 if respondent often or every chance possible purchases fish, 0 o.w.	0.45	0.49	0	1
Beef	BV =1 if respondent often or every chance possible purchases beef, 0 o.w.	0.13	0.33	0	1