

Does Price Knowledge Affect An Individual's Willingness to Pay in Traditional Wet Markets?

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Traditional wet market (TWM) consumers in Taiwan face potential challenges discerning whether the pork sold in these markets are free of growth hormones utilized during the raising period. Furthermore, U.S. pork, which is not growth hormone free (GHF), may be imported due to trade negotiations currently in progress. In the effort to examine the willingness to pay (WTP) for GHF information in TWMs, potential consumers were surveyed. Facing the potential differences of price knowledge in TWMs, the elicitation of WTP required extra care in the special design of the questionnaire. Questionnaires designed with a web-based method using Apple iPads in streets were deployed and collected. The key design of survey was to separate respondents into two groups: a Control Group and an Experimental Group. Therefore, through this survey design, the variation of price knowledge (i.e., internal reference price) leading to a different WTP elicitation is observed. Results show that TWM consumers are willing to pay

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a premium for the GHF information. Especially when consumers designate themselves as being from the highest perceived pricing market, the WTP premium elicited is higher than all other low-priced market premiums. The implication of this study reveals that consumers desire a certain level of food safety information in TWMs. Regarding the potential challenges of the U.S. pork importation, the central and local governments should pay particular attention in designing a system of food safety/reliability information sharing within TWMs. Even the local meat vendors in TWMs should consider options regarding how to enhance their food safety credibility to consumers. Furthermore, this study suggests that the central and local governments should start the distribution and promotion of GHF information in the high-priced TWMs where it would quickly receive consumer attention.

Keywords: Growth hormone, Wet market, Willingness to pay, Payment card

I. Introduction

Traditional wet markets (TWMs) in Asian countries are still the major source for purchasing daily fresh meat, fish, and vegetables. Many of the reasons for their popularity include their freshness, diversity, and convenience (being nearby consumers' homes) (Bougoure & Lee, 2009; Nocella, Hubbard, & Scarpa, 2010; Zeng, Lei, Geaun, & Huang, 2017). However, a number of recent food safety and food fraud scandals have heightened consumers' concerns and government's attention to the quality of food sold in TWM and other different retail formats (Naspetti & Zanolì, 2009; Koubová, Samková, & Hasoňová, 2018; Chin & Hung, 2018). Nevertheless, food safety and food fraud incidents expose the limitations of vendors in TWMs, particularly regarding their ability to provide reliable and credible sourcing information to their customers (News Desk, 2016; Lu, Li, & Liu, 2018). Consequently, it is a timely and pertinent question whether consumers are willing to pay more for food (with accompanying food safety certified information) in TWMs.

Berning, Chouinard, Manning, McCluskey and Sprott (2010) find that consumers may not be willing to pay for any additional information as consumers' purchasing decisions may result from their prior accumulated shopping experiences and product knowledge. Consumers may not necessarily want access to more information (Stranieri & Banterle, 2015) or may not change their purchasing behavior with the information provided (Carneiro et al., 2005; Yang, Qing, Hu, & Liu, 2014). Moreover, this study reveals that the unit price of pork across different vendors and TWMs in Taiwan is not the same. This means that consumers in TWMs may not receive the same price across different vendors and markets in the same area. Consumers with long term experience of shopping at TWMs with certain meat butchers would have a keen sense of how much he/she would usually pay or had recently paid. The variation of reference price may lead to a potential issue in eliciting the willingness-to-pay

(WTP) (Book, Tanford, & Chen, 2016; Nieto-García, Muñoz-Gallego, & González-Benito, 2017). This implies that the WTP elicitation required extra precautions, which will describe later.

Since consumers face different prices in TWMs, their price knowledge would not be the same. *Price knowledge* is linked to *price perception*. Price perception can be influenced from the assessment and comparison between individual's original perceived value (i.e., internal reference price or IRP) on product or service and new perceived value with objective price of the product (Winer, 1986). Price perception can be an important informational cue for marketing strategy (Hsieh, 2012; Theysohn, Klein, Volckner, & Spann, 2013). The IRP, which has been studied and discussed in recent years (Roy, Rabbane, & Sharma, 2016; Book et al., 2016; Nieto-García et al., 2017), can be defined by buyers using their own price memory as a fundamental judgement or comparison point for actual prices (Winer, 1986; Monroe, Grewal, & Compeau, 1991; Mazumdar, Raj, & Sinha, 2005). If the actual prices are not the same as their IRP, it could potentially influence consumer behavior (Campo & Yagüe, 2007). Therefore, regarding this IRP phenomenon, this study integrates the price knowledge as part of consumers' utility function.

TWMs in Taiwan still account for a significant market share of food purchases, despite the existence of modern retail stores since 1969 (Huang, Tsai, & Chen, 2015). The empirical findings of growth hormone production information related to consumer behavior in TWMs is limited. The concern of growth hormone (the growth hormone, ractopamine, used during the production) utilization in meat raised food safety concerns in Taiwan. Thus, the objective in this study is to determine the WTP for the growth hormone free (GHF) information on meat sold at TWMs in Taiwan.

Consumer WTP can often provide useful information for determining key factors that may help policy makers, marketers, and food producers to form a better policy or strategy (Lubben, 2005; Jan & Fu, 2007). Choice experiments (CEs), contingent valuation (CV), and experimental auctions (EAs) are popular methods that can be used

to elicit consumer preference as well as WTP on food attributes, such as traceability, GHF information, non-genetically modified food, local indication, and other numerous attributes (Hossain, Onyango, Schilling, Hallman, & Adelaja, 2003; Krystallis & Chryssohoidis, 2005). There are three types of CV approaches: open-ended, sequential bids, and close-ended (Shi, Gao, & Chen, 2014). The open-ended method is more practical and widely used (Cummings, Brookshire, Schulze, Bishop, & Arrow, 1986; Hanemann, 1994). The payment card approach has advantages of both being an open-ended question and a checklist approach (Champonnois, Chanel, & Makhloufi, 2018). Therefore, this study adopts the payment card approach that also copes with an indication of self-perceived market price, so it would be able to observe whether the WTP elicitation can be different when the price knowledge of customers is varied. The contribution of this paper is twofold: first, whether consumers in TWMs would be willing to pay a premium for products with GHF information; second, whether price knowledge of consumers in TWMs could affect the elicitation of WTP in TWMs.

II. Literature Review

2.1 The Circumstance of TWMs in Taiwan

According to the report from the Taiwanese Ministry of Economic affairs, there were 640 TWMs across the country and over 50,000 vendors. According to the distribution of population in Taiwan¹, the density of TWMs for each region should follow the distribution of population. Therefore, the study of consumers among these

¹ According to the records of the Department of Household Registration Affairs, the population distribution in 2015 for all city and county in Taiwan is: New Taipei City (17%), Taipei City (12%), Taoyuan City (9%), Taichung City (12%), Tainan City (8%), Kaohsiung City (12%), Hsinchu County (2%), Miaoli County (2%), Changhua County (5%), Nantou County (2%), Yunlin County (3%), Chiayi County (2%), Pingtung County (4%), Yilan County (2%), Hualien County (1%), and Taitung County (1%).

640 TWMs should be cautious about the price knowledge into their WTP. Taiwanese consumers mainly buy fresh fish, meat and vegetables in TWMs nearby their home (Liao & Yang, 2017). Goldman, Ramaswami and Krider (2002) find that TWMs in Asia have a comparative advantage in the delivery of fresh food, a critical factor in consumers' food choice. Moreover, the quality of food (particularly its freshness) as well as the relational benefits (namely in terms of personalized treatment and services) are the critical advantages to fresh retail format in Taiwan (Liao & Yang, 2017).

Modern retailers have advanced data management systems that not only enable them to serve their clients more effectively, but may also easily pass on information consumers may desire or demand (Reinartz, Dellaert, Krafft, Kumar, & Varadarajan, 2011). Although many studies were examined for food safety attributes (Angulo & Gil, 2007; Loureiro & Umberger, 2007; Tonsor, Schroeder, Pennings, & Mintert, 2009; Chiueh & Chen, 2014; Wongprawmas & Canavari, 2017), very limited information related to consumer preference and WTP is found in TWMs (Schipmann & Qaim, 2011). Although Chang (2014) found that the proportion of food purchased in TWMs has been slightly declining, it still represents 60% of fresh foods sales in 2013 and had an annual turnover of US\$3 billion. Therefore, recent developments on mobile information technologies may enable vendors in TWMs to access and provide such information to consumers (Lowe, Fraser, & Souza-Monteiro, 2015).

2.2 The Relative Issue Regarding WTP Elicitation

There is an increasing interest in determining how Asian consumers value information on food safety attributes. Cicia and Colantuoni (2010) conducted a meta-analysis from 23 studies to assess how the WTP estimates for certain meat product attributes are related. The baseline price indicated in Cicia and Colantuoni (2010) is a negative sign, meaning that the WTP estimates in these 23 studies tend to receive lower values when the baseline price increased. However, the study of Cicia and Colantuoni (2010) contains many potential issues, including methodology and country to be

studied, so it might be necessary to further understand what effect or potential bias the variation in baseline (or reference) price or price knowledge might have.

One well known bias affecting the valuation is the anchoring effect, which is subjected to the initial value, or starting point (Tversky & Kahneman, 1974; McCall & Lynn, 2008). Mitchell and Carson (1981) developed a payment card approach to avoid anchoring bias. Boyle and Bishop (1988) further point out range bias, resulting from the selected fixed intervals of potential questions. Additionally, other related issues, such as framing effects or ordering effects and payment scales, are discussed (Voltaire, Donfouet, Pirrone, & Larzillière, 2017). Payment scales seem able to elicit a “true” WTP if it provides a realistic payment range (Soeteman, van Exel, & Bobinac, 2017). Depending on the study, the ordering effects may or may not influence respondents' WTP; however, ordering effect may be more related to the uncertainty of preferences (Voltaire et al., 2017). Green, Jacowitz, Kahneman and McFadden (1998) found that the WTP elicitation could be susceptible when the payment card approach is adopted. Thus, Green et al. (1998) suggest these biases need to be considered and mitigated either through the experiment protocol or corrected in the data analysis.

In addition, consumers in different areas would have different attitudes and amounts for WTP on meat products (Wang, 2016). Normally, respondents would be able to indicate the highest WTP for product information for a given starting point (Hu, 2006). However, the final valuations of WTP would usually positively correlate with the given threshold value when there is a starting point effect (Tversky & Kahneman, 1974; Boyle, Bishop, & Welsh, 1985; Green et al., 1998). Although the price knowledge paradox could happen when consumers have a better recall of unfamiliar price but have a lower confidence in price memory (Gaston-Breton & Raghubir, 2014), a series of interval choices for WTP would enhance recall of general choices and provide some greater anonymity in responses regarding their personal preferences (Cameron & Trivedi, 2005). More importantly, respondents initially confronted with low prices tend to sense the following prices as more expensive than those who faced high prices (Monroe, 2003). Therefore, it is necessary to further discuss whether the

impression of price does generate the potential bias.

Recent studies have found that consumers with a higher price knowledge may be more sensitive and increase their WTP (Shi et al., 2014; Book et al., 2016; Nieto-García et al., 2017). With the unique market characteristics across different regions, consumers may not always receive a consistent price across different TWMs in Taiwan. Therefore, this study considers and adopts the variation of price knowledge across different types of TWM consumers. Furthermore, other factors, such as demographic variables, awareness of certification (Feng, Feng, Tian, & Mu, 2012; Takahashi, Todo, & Funaki, 2018), and purchasing behavior (Feng et al., 2012; Jen & Lin, 2013; Woods, Nogueira, & Yang, 2013), are considered in order to examine the potential preference for the GHF information in TWMs.

III. Model Development for GHF Information: Known/Unknown Reference Prices

Following Batte, Hooker, Haab and Beaverson (2007), this study further demonstrates the convergent and divergent effects that are influenced by the *unknown* and *known* reference prices. Equation (1) exhibits the consumer's utility function that consists of the number of product attributes under a price. A linear random utility function is assumed for a random individual, so utility (U) of consumers can be defined as:

$$U_{ij} = \alpha_i \cdot p_{ij} + \sum_{k=1}^T \beta_{ik} \cdot x_{ijk} + \varepsilon_{ij} \quad (1)$$

where U_{ij} defines the utility of product choice j for consumer i , p is the certain market price, x_{ijk} defines the k th attributes of product choice j for consumer i , α_i and β_{ik} defines marginal utilities of certain market price for consumer i and the k th attribute, respectively. T is defined as the number of attributes of product choice j , and ε is a stochastic disturbance.

The WTP of the k th attribute for consumer i is the same amount of money that consumer i would be willing to have stay the same at the previous utility level if the k th attribute alters. Now, when a new product attribute was introduced in the market, the k th attribute in product choice j would enhance from level A (without attribute k in the market yet) to level B (with attribute k in the market). If consumer i accepts this upgrade, the WTP of consumer i would have price premium that he/she would pay for this upgrade. Assuming this condition holds, then the equality can be illustrated:

$$\alpha_i \cdot p_{ij} + \sum_{\substack{c=1 \\ c \neq k}}^T \beta_{ic} \cdot x_{ijc} + \beta_{ik} \cdot x_{ijk}^A = \alpha_i \cdot (p_{ij} + WTP^k) + \sum_{\substack{c=1 \\ c \neq k}}^T \beta_{ic} \cdot x_{ijc} + \beta_{ik} \cdot x_{ijk}^B \quad (2)$$

where the superscript A of attribute x represents the initial product attribute and superscript B represents the upgraded product attribute. The left hand side of Equation (2) represents before the upgrade, and the right hand side represents after the upgrade.

Assuming that p_{ij} on both sides is not affected by individual's price knowledge, p_{ij} in Equation (2) stays the same before and after the product attribute was given to consumers. Solving Equation (2) for WTP, we can obtain the Equation (3):

$$WTP^k = -\frac{\beta_{ik}}{\alpha_i} (x_{ijk}^B - x_{ijk}^A) \quad (3)$$

In a linear utility function, assuming a binary variable x can be used to represent the attribute change, the WTP of an individual for the k th attribute is a negative ratio of the estimated parameter of the k th product attribute to the estimated parameter of price: $WTP^k = -\frac{\beta_{ik}}{\alpha_i}$. This ratio is also fulfilled when the assumption of price knowledge is consistent before and after the certain market price level. Consumers in TWMs often receive different pork pricing level per unit. Whether the original market price varies at a certain level, the estimation would be potentially inconsistent. Therefore, the original certain market price, p_{ij} , is further assumed to be high-priced market, p_{ijH} , and

low-priced market, p_{ijL} . Both high- and low-priced markets would represent two different levels of marginal utility, α_{iH} and α_{iL} . The Equation (1) can be re-written as:

$$U_{ijH} = \alpha_{iH} \cdot p_{ijH} + \sum_{k=1}^T \beta_{iHk} \cdot x_{ijHk} + \varepsilon_{ijH} \quad (4)$$

$$U_{ijL} = \alpha_{iL} \cdot p_{ijL} + \sum_{k=1}^T \beta_{iLk} \cdot x_{ijLk} + \varepsilon_{ijL} \quad (5)$$

Equation (4) presents the utility of product choice j for consumer i as facing a high-priced market; and Equation (5) represents the utility of product choice j for consumer i as facing a low-priced market. Following the similar step in Equation (2), the Equations (4) and (5) can be solved as Equations (6) and (7) when there is new product attribute introduced in the market:

$$WTP^{Hk} = -\frac{\beta_{iHk}}{\alpha_{iH}} (x_{ijHk}^B - x_{ijHk}^A) \quad (6)$$

$$WTP^{Lk} = -\frac{\beta_{iLk}}{\alpha_{iL}} (x_{ijLk}^B - x_{ijLk}^A) \quad (7)$$

The difference among Equations (3), (6), and (7) is the potential variation in market price level. When there is lower variation of market price level, these three equations may have a similar estimation. When there is enough variation in market price level, the estimation of Equations (3), (6), and (7) may be truly different. The difference between Equation (3) and Equations (6) as well as (7) is dependent on whether consumers have their own price knowledge. When there is no knowledge background about the market price level, it would fall into the condition of Equation (3). Whenever there exists a knowledge background for the market price level, it would be the conditions of Equations (6) and (7). Thus, this study attempts to examine these three conditions in Equations (3), (6), and (7) whether it is held when there exists a variation in market price level. Furthermore, if there is enough variation in market price level, the condition should be held as following:

$$WTP^k \neq WTP^{Hk} \neq WTP^{Lk} \quad (8)$$

IV. Survey Design, Data and Methodology

A pilot field study at TWMs revealed that pork belly is the most popular portion meat sold in markets (Liu & Sheu, 2002) and that its price per *jin* (approximately 600g or 1.32 lbs.) varies between 110 to 150² New Taiwan Dollars (NT\$). This means that the knowledge of market price level can range from NT\$110 to NT\$150. Based on the characteristics of pricing variation in TWMs, this study design has developed a suitable choice set to elicit the potential WTP for GHF information at TWMs.

4.1 Survey Design

The characteristics of TWM consumers are quite unique, as the majority are female consumers and are usually responsible for family food purchases. Hence, two screening questions were adopted, and each respondent needed to answer positively to both, to be considered a valid response. The first screening question was "Have you been to any TWM in the past 12 months?" If the respondent answered "No" or "Don't remember", then he/she would be screened out. The second screening question was "During the past 12 months, have you purchased any commercial fresh meat product at any TWM?" Again, if the respondent answered "Don't know" or "No, I have not", then he/she would be screened out. Since this study focused on the WTP elicitation of meat product attributes³, these two screening questions had to be satisfied so the sampling bias could be removed.

Another potential bias considered related to reference prices because different respondents may face different pricing levels across different TWMs and vendors in

² According to the exchange rate during the research period in July, 2015, one US Dollar can exchange about 31.09 New Taiwanese dollars (NTD). This means that one pound of pork can approximately be cost from US \$2.68 to \$3.65.

³ Since no labeling is used in fresh meat in TWMs, respondents may use their experience from supermarkets to answer the WTP question.

Taiwan. The elicitation of WTP for pork belly at TWMs was designed as a simple two-step procedure (Figure 1). The represented pork belly price levels were summarized as NT\$110, NT\$120, NT\$130, NT\$140, and NT\$150 per jin from the field study.

Step One randomly separated respondents into two different groups via the last digit of respondents' phone number: odd numbers in Group A (i.e., Control Group) and even numbers in Group B (i.e., Experiment Group). Respondents in the Control Group were given an average market price level (\$130) as the reference price of WTP elicitation. Only if respondents were part of the Experiment Group, would they continue to Step Two. If respondents fell into the Experiment Group, they were asked to indicate which market price level they would face at their usual TWMs. Therefore, respondents in the Experiment Group indicated the market price level for pork belly they usually had in the TWMs (i.e., NT\$110, NT\$120, NT\$130, NT\$140, NT\$150, or don't know/not sure). If respondents in the Experiment Group indicated "don't know/not sure", they were also provided an average market price level (\$130) as the reference price prior to WTP elicitation. This elicitation design helped the researchers observe and understand if the WTP elicitation would have different outcomes or not.

4.2 Data

In order to easily direct respondents to fill out the survey, a web-based survey questionnaire conducted on Apple iPads was utilized in the street survey⁴. With the web-based feature, the survey design was easily configured to the logic procedure without any redundant or unrelated pages. Other features of the web-based survey include avoiding a failed scenario by answering all unrelated questions, non-random choices, and unexpected illogical questions, which decreased the potential bias during filling out the survey.

⁴ The survey was evaluated by the Institutional Review Board on Humanities & Social Science Research at National Cheng Kung University, Taiwan.

A total of 2,369 completed and valid survey data were collected during mid-July 2015. The trained researchers collected the street surveys in North, Central, South, East Taiwan. Each researcher was equipped with one Apple iPad and was trained to approach potential respondents nearby TWMs, supermarkets, and train stations. Since potential respondents were those whose major purchase is food for family, our researcher would confirm respondents' purchasing experience for the family, before they were asked to participate in the survey. In order to enhance the quality of survey and the participation rate of those willing to fill out the survey, a gift valued NT\$150 was provided when respondents filled out their survey.

4.3 Empirical Method and Model

Meat product information is very limited at TWMs in Taiwan, and there is most often no information related to GHF examination. The variation of market price level can potentially reach up to about 40% difference between the highest (NT\$150) and the lowest (NT\$110) price levels. The Experiment group respondents were asked to indicate their market price level to fit in with their own reference price. Thus, an interval censored regression is an appropriate choice for the econometric analysis in this article.

Unlike the unknown boundaries of the choice variable in an ordered probit model, the interval censored regression model is one in which the cut-points (i.e., outcomes separated by different values) are known. Assuming respondents' true WTP can be observed through a latent variable y_i^* , the model is specified as:

$$y_i^* = x_i' \beta + u_i \text{ and } y^* | x \sim \text{Normal}(x' \beta, \sigma^2) \quad (9)$$

where the x_i is a set of independent variables, which consists of *Shopper*, *Safety*, and *Demographic characteristics*, as the potential effective factors for WTP, the β are the estimated parameters for the models, u_i is a constant variance error term with mean zero, and normality is assumed in the interval censored regression. The interval

boundaries γ_s in y_i^* are mutually exclusive intervals of $(-\infty, \gamma_1], (\gamma_1, \gamma_2], \dots, (\gamma_J, \infty)$. Thus, a probability function can also be expressed as Equation (10):

$$\Pr[\gamma_j \leq y^* \leq \gamma_{j+1}] = \Pr[y^* \leq \gamma_j] - \Pr[y^* \leq \gamma_{j-1}] = F^*(\gamma_j) - F^*(\gamma_{j-1}) \quad (10)$$

Therefore, the choice variable for specific product information in this article would be indicated within one of these interval choices: $y^* \leq \$0$, $\$1 \leq y^* \leq \3 , $\$4 \leq y^* \leq \$6, \dots, \$16 \leq y^*$.

The pork in TWMs is zero growth hormone applied during the growth period. The product attribute of GHF information in TWMs is elicited for the WTP. The elicitation of WTP question requests respondents to indicate their WTP for the GHF information if comparing with the pork without the GHF information. The empirical specification in this article for GHF information is:

$$GHF_WTP = y_{GHF}^* = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \dots + \alpha_{19} X_{19} + \varepsilon \quad (11)$$

where $GHF_WTP(y_{GHF}^*)$ is the dependent variables, X_s are independent variables, the α_s and β_s are estimated parameters, and ε is assumed to be a normalized error term. The WTP of TWM consumers associated with different product information can be explained from shopper, safety, and socio-demographic characteristic variables. Since most respondents are able to indicate their market price level, the empirical specification can be expanded as follows:

$$GHF_WTP = y_{GHF,j}^* = \alpha_{0,j} + \alpha_{1,j} X_{1,j} + \alpha_{2,j} X_{2,j} + \dots + \alpha_{19,j} X_{19,j} + \varepsilon \quad (12)$$

where j represents the indication of market price level that is ranged from \$110 to \$150.

V. Results and Discussion

5.1 Sample Distribution

The sample statistics and definitions for dependent and independent variables are presented in Table 1. Overall, respondents are, on average, willing to pay about NT\$6.16 for pork with GHF information. The independent variables consisted of Demographic, Shopper, and Safety characteristic variables. The demographics of the respondents were very similar to previous studies (Jen & Lin, 2013; Huang et al., 2015); first, most food buyers are female. About 65% of female respondents participated in the survey with an average age of 40 years⁵. Most respondents also hold an Associate's Degree from college⁶. The average family income is about NT\$65,500. Housewives in this study account for about 12%. The majority of respondents (52%) were surveyed from Northern Taiwan, and about 25% from Central Taiwan.

Shopper characteristics can highly influence their WTP. About 51% of respondents are primary shoppers in a household, 31% are casual shoppers. Respondents, on average, cook at home about seven times within a week; meaning that most respondents, on average, cook every day during a week. On average, respondents live within a 1.2 km radius from the TWMs. About 52% of respondents, on average, spend 30-60 minutes at TWMs to finish their grocery shopping, and only 13% of respondents spend more than one hour to shop at TWMs. This means that about 35% of respondents spend less than 30 minutes to shop at their TWMs. The market's opening hours in a day can be distinguished into morning (5-11am), afternoon

⁵ According to the records of the Department of Household Registration Affairs, the Ministry of the Interior, the Taiwanese average age is about 40.22 in 2015.

⁶ According to the records of the Department of Household Registration Affairs, the Ministry of the Interior, the Taiwanese average education is University & College in 2015.

Table 1. Definitions and Sample Statistics of Variables ($N=2,369$)

Variables	Description of Variables, CV=Continuous Variable, BV=Binary Variable	Mean	Std. Dev.
Dependent Variables			
<i>GHF_WTP</i>	CV; respondent's WTP for growth hormone free information ($N=2,369$)	6.16	4.78
Demographic			
Female	BV=1 if respondent is female, 0 o.w.	0.65	0.47
Age	CV; years of age	40.70	9.97
Education	CV; years of education	15.20	2.20
Family income	CV; total monthly household income before tax (NT\$1,000)	65.50	31.20
Housewife	BV=1 if respondent's occupation is housewife, 0 o.w.	0.12	0.32
Northern Taiwan	BV=1 if respondent is from Northern Taiwan, 0 o.w.	0.51	0.49
Central Taiwan	BV=1 if respondent is from Central Taiwan, 0 o.w.	0.26	0.43
Urban	BV=1 if respondent is from urban region, 0 o.w.	0.62	0.48
Shopper Attributes:			
Prim-shopper (<i>Always</i>)	BV=1 if respondent is always the only one who buys groceries in a family, 0 o.w.	0.51	0.49
Prim-shopper (<i>Sometimes</i>)	BV=1 if respondent is sometimes the only one who buys groceries in a family, 0 o.w.	0.31	0.46
Frequency cook at home	CV; frequency that respondent cooks at home per week	6.70	5.19
Distant to market	CV; distance between respondent's place and the closest TWM	1.26	1.09
Time spent (30-60 mins)	BV=1 if respondent spends time frame at TWM within 30-60 minutes, 0 o.w.	0.52	0.49
Time spent (> 1 hr)	BV=1 if respondent spends time frame at TWM over 1 hour, 0 o.w.	0.13	0.33
Schedule to shop (5-11am)	BV=1 if respondent used to go to TWM at 5-11 Am, 0 o.w.	0.40	0.49
Schedule to shop (11-5pm)	BV=1 if respondent used to go to TWM at 11 Am - 5 Pm, 0 o.w.	0.23	0.42
Often buy pork	BV=1 if respondent often buy pork for every grocery purchase, 0 o.w.	0.61	0.48
Safety Attributes:			
Trust given by butcher	BV=1 if respondent thinks that trust given by butcher is important to their meat vendor selection, 0 o.w.	0.82	0.37
Safety_certificate	BV=1 if respondent thinks that examination certificate is related to meat safety, 0 o.w.	0.69	0.46

Source: Sorted by this study.

(11am-5pm), and evening (after 5 pm) markets. Most respondents (40%) are likely to go to morning TWMs and only about 23% to the afternoon TWMs. This means that most respondents usually go to the morning and evening markets. About 61% of respondents, on average, often purchase pork whenever they have a chance in TWMs.

Safety characteristics can also highly alter consumers' WTP. Most respondents (about 82%) adopt the trust relationship strategy to decide which butcher vendors to purchase meat from. However, still a large percentage of respondents (69%) think that the examination certificate is highly correlated with the meat safety.

5.2 Empirical Outcomes

The comparison results of the empirical estimation for GHF information are shown in Table 2. **Group A** represents the control group in which respondents were only provided the NT\$130 as their market price level. **Group B** respondents were asked to indicate whether they know their market price or not. 821 respondents indicated their market price level, and 628 people indicated that they didn't know or were not sure of the current price level. Therefore, a large percentage of respondents (56%) still knew about their perceived market price level, which is also similar to the amount of respondents (69%) who can recall their prices (Gaston-Breton & Raghurir, 2014). Among those who already have their perceived market price, respondents who indicate market price level at NT\$120 from their purchase experience account for most respondents (about 312 people or 38%), and only a small number of respondents (58 people or 7%) indicated the NT\$150 market price level. The higher frequency of respondents who experience below market pricing (<NT\$130) may represent that consumers in TWMs usually face below average market, or the majority of consumers prefer to visit the butcher with below market price in TWMs. However, this is the first important result of this study: Most consumers in TWMs *perceive* the market price level below the average market price level.

Table 2. The WTP Estimates of GHF Information between Group A and Group B (N=2,369)

	Group A		Group B (Experiment Group)						
	Control Group		Selected	Selected	Selected	Selected	Selected	Selected	Unknown
	NT\$130		NT\$110	NT\$120	NT\$130	NT\$140	NT\$150	NT\$130	NT\$130
Demographic:									
Female	0.340		-0.125	0.589	-0.202	-3.240**	1.196		1.440**
Age	-0.044*		-0.064	0.007	-0.055	-0.029	-0.035		-0.054*
Education	0.054		0.197	-0.171	-0.082	0.310	-1.107**		0.148
Family income	0.007		0.015	0.015	-0.026**	-0.028	-0.019		0.018**
Housewife	-1.220*		2.326	0.337	-0.712	-2.793	-4.233		-0.531
Northern Taiwan	0.354		-1.350	0.071	-0.553	-4.028	-5.165**		0.353
Central Taiwan	0.336		0.919	0.235	1.392	-2.767	-5.060*		-0.014
Urban	-0.901**		0.101	-0.230	1.306	-3.026***	0.681		0.722
Shopper Attributes:									
Prim-shopper (<i>Always</i>)	0.623		0.930	0.564	-0.836	-1.158	7.912***		-0.450
Prim-shopper (<i>Sometimes</i>)	0.791		1.447	0.651	-0.252	-2.685	5.122**		0.489
Frequency cook at home	-0.010		-0.107	0.097	0.121	0.058	-0.092		-0.007
Distant to market	0.011		-0.073	0.512	-0.246	0.513	1.348**		0.171
Time spent (30-60 mins)	0.836**		-0.137	-0.218	1.199	0.455	0.860		-0.690
Time spent (> 1 hr)	0.516		2.403	-0.209**	0.381	-0.414	1.312		-1.170
Schedule to shop (5-11am)	-0.668		1.089	-1.490**	1.073	1.284	-3.467**		0.643
Schedule to shop (11-5pm)	-0.350		1.805	-1.746*	2.319**	0.163	-2.702		0.741
Often buy pork	0.197		1.276	0.143	1.032	-1.206	2.789**		0.043
Safety Attributes:									
Trust given by butcher	0.018		1.513	0.699	1.106	2.061	3.030**		1.613**
Safety_certificate	1.100***		1.246	1.197*	1.528*	-0.293	-0.003		1.414**
Constant	4.792		-0.120	4.995	5.460	11.755**	21.442**		0.439
Observations	920	155	312	223	73	58	628		
Log-Likelihood	-2,002.54	-332.08	-675.06	-474.87	-139.53	-107.32	-1,369.40		
Wald χ^2	38.30***	36.56***	27.18*	38.45***	51.08***	82.99***	42.69***		
AIC	4.40	4.55	4.46	4.45	4.40	4.43	4.43		
WTP Mean	6.00	6.00	6.49	6.00	5.97	7.82	6.20		
WTP Standard Deviation	4.76	4.90	4.66	4.69	3.94	4.60	4.97		
WTP Median	5.00	5.00	5.00	5.00	6.16	6.16	5.00		

Source: The estimation outcomes are calculated by this study.

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

In both the Control Group and Experiment Group, the average WTP for each model was about NT\$6, except for the Experiment Group knowing about their market price level at NT\$150. The average WTP for those who indicate the market price level at NT\$150 was NT\$7.82, which is about 30% higher than other WTP at NT\$6. This was the first evidence of a potential variation from Equation (8). When the reference price is higher, the elicitation of WTP may be varied. Furthermore, note that the averages of WTP in the Control Group, the *Selected Unknown* Group, and the *Selected NT\$130* Group are very close to each other. These three groups have the same reference price, which is very important design for this research. Therefore, this was the second piece of evidence observing a potential consistent elicitation of the average WTP if the reference price is the same.

In order to observe whether the Equation (8) was held or not, the two groups compared were the Control Group and the *Selected Unknown* Group. Both were given the same reference price at NT\$130. The estimated parameters of *Age* and *Safety_certificate* variables revealed very similar and consistent outcomes with a significant difference level. This exhibited that younger consumers are likely to pay more for GHF information. Especially when respondents treat the examination certificate as highly correlated with the meat safety, they would be willing to pay at least NT\$1.1 to NT\$1.4 for GHF information. Furthermore, the LR (Likelihood-Ratio) test was examined to contrast the goodness of fit of every two models for the outcomes of *WTP* estimates in Table 3. The outcomes of Table 3 reveal that the Control Group and the *Selected Unknown* Group are not fitting into a significant level of difference. This implies that the Control Group and the *Selected Unknown* Group have no significant difference. Therefore, this outcome is consistent with previous studies which also adopted a payment card approach (Boyle et al., 1985; Hu, 2006; Yang, Qing, Hu, & Liu, 2013). Hence, the elicitation of WTP^k running with a payment card approach is held and corresponds with the second evidence in this comparison.

Table 3. The LR Test on Parameter Equality among Models for the GHF Information

	<i>Control Group NT\$130</i>	<i>Selected NT\$110</i>	<i>Selected NT\$120</i>	<i>Selected NT\$130</i>	<i>Selected NT\$140</i>	<i>Selected NT\$150</i>	<i>Selected Unknown NT\$130</i>
<i>Control Group NT\$130</i>	(1.0000)						
<i>Selected NT\$110</i>	(0.4687)	(1.0000)					
<i>Selected NT\$120</i>	(0.6122)	(0.2874)	(1.0000)				
<i>Selected NT\$130</i>	(0.1051)	(0.6691)	(0.0932) [*]	(1.0000)			
<i>Selected NT\$140</i>	(0.0560) [*]	(0.0077) ^{***}	(0.0571) [*]	(0.0187) ^{**}	(1.0000)		
<i>Selected NT\$150</i>	(0.0009) ^{***}	(0.0008) ^{***}	(0.0247) ^{**}	(0.0003) ^{***}	(0.0008) ^{***}	(1.0000)	
<i>Selected Unknown NT\$130</i>	(0.2083)	(0.6755)	(0.0892) [*]	(0.0615) [*]	(0.0058) ^{***}	(0.0005) ^{***}	(1.0000)

Source: The estimation outcomes are calculated by this study.

Note: LR test chi-square probability in parentheses. Asterisks indicate levels of significance: * = 0.10, ** = 0.05, and *** = 0.01.

A further step in comparison is combining the Control Group and ***Selected Unknown*** Group to contrast with the ***Selected NT\$130*** Group. Basically, the average WTP for these three groups is very similar around NT\$6 to NT\$6.20, but the estimated values of these three groups only showed one explained variable to be consistent, the variable of *Safety_certificate*. The ***Selected NT\$130*** Group is potentially different from the other two groups, since respondents indicated their reference price at NT\$130 by themselves. Therefore, only one variable, *Safety_certificate*, reveals a significant level and the WTP estimates is about NT\$1.5 for GHF information. Although there is one variable having a consistent outcome, another variable, *Family_income*, reveals an inconsistent result in a significant level. This is also one of the reasons that the LR test presents a 10% significant difference between the ***Selected NT\$130*** Group and the ***Selected Unknown*** Group. Furthermore, this result shows that the elicitation of WTP^k running with a payment card approach is not held in this comparison when the price knowledge is not the same.

The explanation of the variable, *Family_income*, depends on whether respondents know about the current market price level or not. If respondents do not know about the current market price level, the family with higher income respondents would be willing to pay more for pork with GHF information. On the other hand, if respondents know about the current market price level at NT\$130, the family with higher income respondents would not be willing to pay more for pork with GHF information. Therefore, this result gives us the third evidence that the awareness of price knowledge would have a potential influence on the WTP elicitation.

Another example can be found in the comparison between the ***Selected NT\$140*** Group and the ***Selected Unknown*** Group. Female respondents are not likely to pay more for GHF information when they perceived the market price level is at NT\$140, but female respondents without knowledge about market price level are likely to pay more for GHF information. The interesting part is that the WTP difference for GHF information can reach up to NT\$4.68 (i.e., NT\$3.24+NT\$1.44) depending on whether female respondents had perceived the market price level or not. This may potentially

imply that female respondents with limited knowledge would be willing to pay a bit extra for safety reasons without objections.

Furthermore, both variables *Trust given by butcher* and *Safety_certificate* in the ***Selected Unknown*** Group reveal a significant level with a positive sign. When respondents don't have background knowledge about the market price level, respondents are more likely to pay more for GHF information. This exhibits that both trust given by butcher (approximately NT\$1.6 of WTP) and the safety certificate (approximately NT\$1.4 of WTP) are equally important. In contrary to consumers who perceived the market price at NT\$150, they seem to count on the trust given by butcher, and move all of WTP to the safety credit to butcher (about NT\$3 of WTP). However, it only happened when consumers perceived the market price level at NT\$150.

The variation of market price levels from the lowest to the highest point can reach up to about 40% in this research. With the appropriate interval range in the choice set, the decision of the highest WTP from the lowest reference price (NT\$110) may not reach to the highest reference price (NT\$150). It may have a potential underestimated or overestimated WTP for GHF information. Therefore, this article adopts a series of reference prices (i.e., NT\$110, NT\$120, NT\$130, NT\$140, and NT\$150) to catch whether the elicitation of WTP can be different when there are high and low reference prices.

The next step is to confirm the condition of Equation (8) in this article. This part is going to check whether the high- or low-priced markets would potentially alter the WTP estimation. Combining the variables with a significant level in the ***Selected NT\$110*** Group and ***Selected NT\$120*** Group, only three variables exhibit a significant level. Especially, there is no variable showing a significant level in the ***Selected NT\$110*** Group, but the overall estimation is held. On the other hand, about 11 variables reveal a significant level in the ***Selected NT\$140*** Group and the ***Selected NT\$150*** Group. Furthermore, the LR test in Table 3 shows that the ***Selected NT\$140***

Group and the ***Selected NT\$150*** Group have a significant level different from all other models. This means that both conditions of $WTP^{Hk} \neq WTP^k$ and $WTP^{Hk} \neq WTP^{Lk}$ are held. However, the ***Selected NT\$110*** Group and the ***Selected NT\$120*** Group still do not have a significant level different from the Control Group and the Unknown Group. This means that the condition of $WTP^k \neq WTP^{Lk}$ is not held. These outcomes confirm that the condition of Equation (8) would exist when respondents tend to have a high-priced knowledge background but not the low-priced knowledge background. This can be interpreted that the WTP elicitation should be cautious about the variation of price knowledge.

As a result, the WTP for the GHF information exhibits positive in TWMs. This reveals that consumers in TWMs care about the meat safety issues. Especially, consumers who usually go to high pricing markets are willing to pay a premium if comparing to other low-priced markets. Furthermore, those respondents who are from Southern Taiwan, have lower educational background, are the primary grocery shoppers for the family, live far away from TWMs, are likely to go to the morning markets, often purchase pork whenever they have the chance, and who require higher trust given by butcher, are likely to pay more for GHF information. Although there is a significant difference for the morning market between the ***Selected NT\$120*** Group and the ***Selected NT\$150*** Group, it reveals that respondents who usually go to the evening market would like to pay more for the GHF information.

Corresponding to previous studies (Wu, Wang, Zhu, Hu, & Wang, 2015), this article also confirms that certain groups of consumers reveal a positive WTP with a significant level for product information. In sum, TWM consumers have different potential WTP for GHF information. This outcome corresponds to Gao and Schroeder (2009) showing that the market with different price levels, especially the high-priced market, may also lead to different amounts of WTP for a specific product's information. This corresponds to research conducted by Monroe (2003) that people who go to high-priced markets may feel the extra payments as not so expensive, so it shows a higher WTP in high-priced markets. Since TWM consumers in Taiwan may

not face an identical market pricing level, the approach of the WTP elicitation in this study exhibits reasonability and corresponds to previous studies.

VI. Conclusion and Policy Implications

TWMs in Asian countries still account for the major platform for fresh meat, fish and vegetable purchases. Vendors of TWMs in Taiwan currently only provide limited information to consumers. This study attempts to determine the WTP for additional product attributes on meat sold at TWMs in Taiwan. Especially, when TWM consumers may not receive the same market price level across different markets and vendors in the same region, this issue may raise an inconsistent estimation in the elicitation of WTP for additional product information. Therefore, a series of payment card with different market price levels was necessary to adopt in order to observe the differences of WTP elicitations when there exists the knowledge of the reference price.

This study finds that the WTP for GHF information at TWMs is potentially attractive to certain types of consumers. For instance, those who are younger consumers, truly believe certificates that are highly related to safety. Also, those who do not know the current market price for pork may be willing to pay more for pork with GHF information. These outcomes imply that if consumers lack of price knowledge and also feel higher food safety uncertainty, then they are willing to pay more for GHF information (such as meat safety certificates) in TWMs. Moreover, consumers who are from Southern Taiwan, who have lower educational backgrounds, who respond as a primary grocery shopper for the family, who live far away from TWMs, who usually go to morning markets, who often purchase pork whenever possible, who receive higher trust given by butcher, and who have perceived a high-priced market are willing to pay more for pork with GHF information. Since there is currently nothing similar to GHF certified information provided in TWMs, some consumers who regularly frequent the high-priced (NT\$150) markets rely highly instead on the trust relationship with butchers.

Overall, this article significantly observes three things that could be helpful for future research studies utilizing the payment card approach: (1) the WTP elicitation with a payment card approach can be consistent if respondents do not have any knowledge about the market price level, (2) the WTP elicitation with a payment card approach can be inconsistent if respondents have his/her own market price knowledge, and (3) consumers with the knowledge of a high-priced market are more inclined to receive a potential effect on the WTP elicitation with a payment card approach in this study. Therefore, this study finds that the influence of price knowledge could potentially play an important role in the WTP elicitation under a payment card approach.

6.1 Policy Implication & Wet Market Management in Taiwan

This study has found that there exists a preference and importance of pork GHF information for TWM consumers in Taiwan. As to the policy implication, further understanding of the potential issues behind this information may be required. Several key potential relevant policy implication and wet market management are shown and discussed below:

6.1.1 Building more food safety information in wet markets is needed

There is no certainty to when U.S. pork imports (often using growth hormones in raising pigs) will increase substantially into Taiwan. However, the Taiwanese government should prepare for any uncertainty, because wet market consumers will not be able to easily distinguish the difference between GH and GHF pork. Further, if consumers only prefer GHF pork but receive a GH pork, then this situation is not only creating consumers distrust our market system but also undermining the trust of domestic pork producers. In order to protect our pig industry and consumer markets, this study suggests that government should plan to require and provide more food safety information especially in wet markets, such as the GHF certified information, linking from farm to table in our food system.

6.1.2 Integrating market sectors and educating vendors are needed

In order to provide the GHF certified information in TWMs, it would require a series of public and private sectors to be involved, such as market vendors, private slaughter houses, government related slaughter houses, and government certified examination centers. GHF certified information is impossible to be provided by any individual butcher vendor at TWMs, because of the concerns of cost, and limited credence provided by individual butcher. Further, others argue what an appropriate display method would be since there is no box packaging in TWMs. More specifically, does the responsibility of the GHF certified information belong to central government, local/city government, both, or neither? Therefore, the participation and education of market vendors and butchers is critical for the meaning of food safety certificate in markets. Moreover, when U.S. pork imports substantially increase into Taiwanese markets, market vendors and butchers will be the key people to promote Taiwanese domestic pork as well.

6.1.3 Wet market consumers need to be educated

In this study, the researcher has confirmed that TWM consumers would be willing to pay for the GHF certified information up to NT\$7 per jin. This reveals that if the promotion cost of GHF information can be controlled NT\$7 per jin or below, then it should be feasible. Meanwhile, this study also finds that not all consumers are willing to pay for the GHF information. Therefore, wet market consumers need to be educated about what GHF information contains, and what is the value and meaning of GHF information. At a minimum, this study recommends that government can start the promotion in the high-priced TWMs, so it may quickly receive consumer attentions.

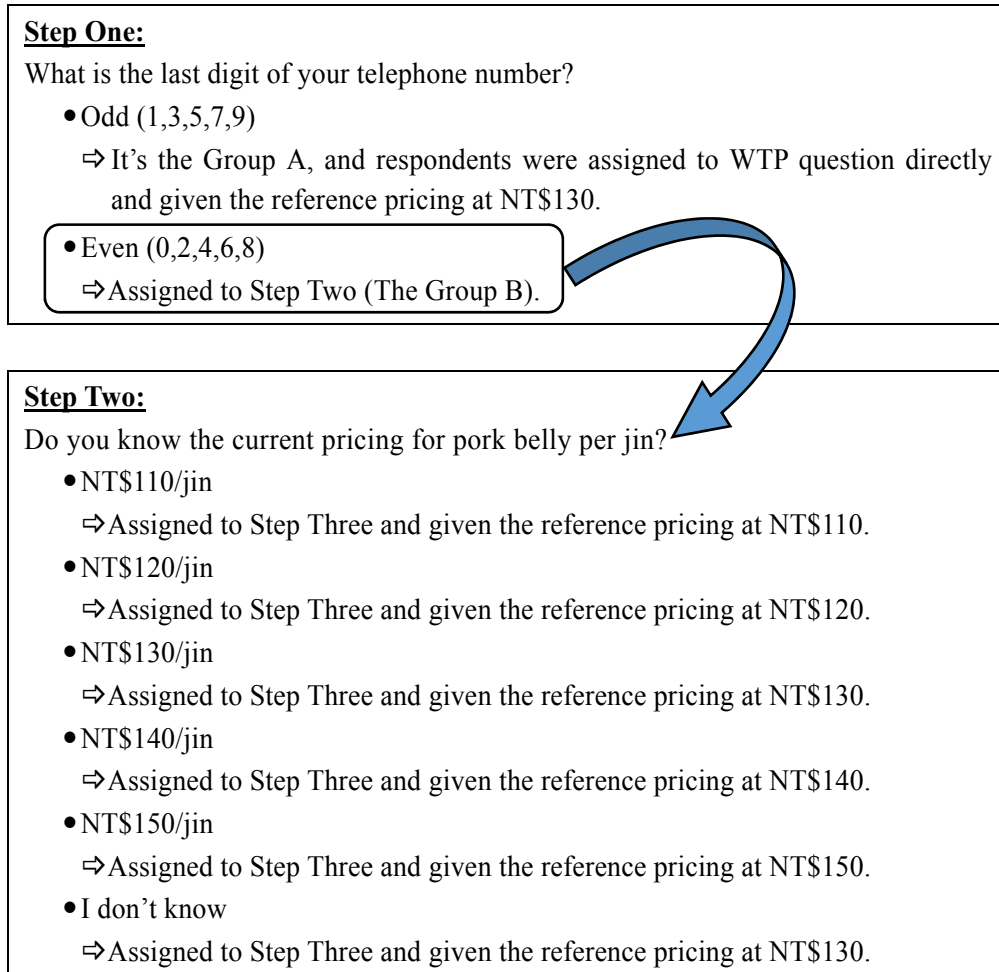


Figure 1. The sampling procedure design

Source: Designed by this study.

References

- Angulo, A. M., & Gil, J. M. (2007). Risk perception and consumer willingness to pay for certified beef in Spain. *Food Quality and Preference*, 18(8), 1106-1117.
- Batte, M. T., Hooker, N. H., Haab, T. C., & Beaverson, J. (2007). Putting their money where their mouths are: Consumer willingness to pay multi-ingredient, processed organic food products. *Food Policy*, 32(2), 145-159.
- Berning, J. P., Chouinard, H. H., Manning, K. C., McCluskey, J. J., & Sprott, D. E. (2010). Identifying consumer preferences for nutrition information on grocery store shelf labels. *Food Policy*, 35(5), 429-436.
- Book, L. A., Tanford, S., & Chen, Y. S. (2016). Understanding the impact of negative and positive traveler reviews: Social influence and price anchoring effects. *Journal of Travel Research*, 55(8), 993-1007.
- Bougoure, U., & Lee, B. (2009). Service quality in Hong Kong: Wet markets vs supermarkets. *British Food Journal*, 111(1), 70-79.
- Boyle, K. J., & Bishop, R. C. (1988). Welfare measurements using contingent valuation: A comparison of techniques. *American Journal of Agricultural Economics*, 70(1), 20-28.
- Boyle, K. J., Bishop, R. C., & Welsh, M. P. (1985). Starting point bias in contingent valuation bidding games. *Land Economics*, 61(2), 188-194.
- Cameron, A. C., & Trivedi, P. K. (2005). *Microeconomics: Methods and applications*. Cambridge, England: Cambridge University Press.
- Campo, S., & Yagüe, M. J. (2005). Effects of price promotions on the perceived price. *International Journal of Service Industry Management*, 18(3), 269-286.
- Carneiro, J. deD. S., Minim, V. P. R., Deliza, R., Silva, C. H. O., Carneiro, J. C. S., & Leão, F. P. (2005). Labelling effects on consumer intention to purchase for soybean oil. *Food Quality and Preference*, 16(3), 275-282.
- Champonnois, V., Chanel, O., & Makhoulfi, K. (2018). Reducing the anchoring bias in multiple question CV surveys. *Journal of Choice Modelling*, 28, 1-9.
- Chang, C. (2014). Taiwan Retail Foods. GAIN Report Number: TW14046. Retrieved from USDA Foreign Agriculture Service, https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Retail%20Foods_Taipei%20ATO_Taiwan_12-18-2014.pdf

- Chin, M. C., & Hung, W. T. (2018). The cause of and solution to the food safety problems- A case study of the farmed chicken market in Taiwan. *Taiwanese Agricultural Economic Review*, 24(1), 25-56. (In Chinese)
- Chiueh, Y. W., & Chen, L. T. (2014). Evaluation the value of traceability certification: The example of the fishery products. *Taiwanese Agricultural Economic Review*, 19(2), 43-64. (In Chinese)
- Cicia, G., & Colantuoni, F. (2010). Willingness to pay for traceable meat attributes. *International Journal of Food System Dynamics*, 3, 252-263.
- Cummings, R. G., Brookshire, D. S., Schulze, W. D., Bishop, R. C., & Arrow, K. J. (1986). *Valuing environmental goods: An assessment of the contingent valuation method*. New Jersey, NJ: Rowman & Allanheld Publishing.
- Feng, H., Feng, J., Tian, D., & Mu, W. (2012). Consumers' perceptions of quality and safety for grape products: A case study in Zhejiang Province, China. *British Food Journal*, 114(11), 1587-1598.
- News Desk (2016). Seafood Importer, Processor Warned after Failing Safety Checks. *Food Safety News*. Retrieved from: <https://www.foodsafetynews.com/>
- Gao, Z., & Schroeder, T. C. (2009). Effects of label information on consumer willingness-to-pay for food attributes. *American Journal of Agricultural Economics*, 91(3), 795-809.
- Gaston-Breton, C., & Raghubir, P. (2014). The price knowledge paradox: Why consumers have lower confidence in, but better recall of unfamiliar prices. *Customer Needs and Solutions*, 1(3), 214-224.
- Goldman, A., Ramaswami, S., & Krider, R. E. (2002). Barriers to the advancement of modern food retail formats: Theory and measurement. *Journal of Retailing*, 78(4), 281-295.
- Green, D., Jacowitz, K. E., Kahneman, D., & McFadden, D. (1998). Referendum contingent valuation, anchoring and willingness to pay for public goods. *Resource and Energy Economics*, 20(2), 85-116.
- Hanemann, W. M. (1994). Valuing the environment through contingent valuation. *Journal of Economic Perspectives*, 8(4), 19-43.
- Hossain, F., Onyango, B., Schilling, B., Hallman, W., & Adelaja, A. (2003). Product attributes, consumer benefits and public approval of genetically modified foods. *International Journal of Consumer Studies*, 27(5), 353-365.

- Hsieh, M. F. (2012). Estimating price effect on consumer shopping across quality-differentiated store formats. *Taiwanese Agricultural Economic Review*, 18(1), 1-30.
- Hu, W. (2006). Use of spike models in measuring consumers' willingness to pay for non-GM oil. *Journal of Agricultural and Applied Economics*, 38(3), 525-538.
- Huang, C. T., Tsai, K. H., & Chen, Y. C. (2015). How do wet markets still survive in Taiwan? *British Food Journal*, 117(1), 234-256.
- Jan, M. S., & Fu, T. T. (2007). HACCP on Seafood in Taiwan-A double-bounded dichotomous choice contingent valuation. *Taiwanese Agricultural Economic Review*, 12(2), 163-188. (In Chinese)
- Jen, L. C., & Lin, P. Y. (2013). Research on consumption patterns of traditional retail market in Taipei: An application of quantile regression. *Taiwan Journal of Marketing Science*, 9(1), 77-108. (In Chinese)
- Koubová, J., Samková, E., & Hasoňová, L. (2018). Food fraud detection by Czech agricultural and food inspection authority in retail market. *British Food Journal*, 120(4), 930-938.
- Krystallis, A., & Chrysosoidis, G. M. (2005). Consumer's willingness to pay for organic food: Factors that affect it and variation per organic product type. *British Food Journal*, 107(5), 320-343.
- Liao, Y. Y., & Yang, S. H. (2017). Using focus group approach to investigate the demand of fresh meat product information for the traditional market consumers. *Journal of Agriculture and Forestry*, 65(3), 173-188. (In Chinese)
- Liu, Y. C., & Sheu, Y. J. (2002). Study on pork consumption and CAS sign recognize for different urban degree. *Chinese Journal of Agribusiness Management*, 8, 223-245. (In Chinese)
- Loureiro, M. L., & Umberger, W. J. (2007). A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety. *Food Policy*, 32(4), 496-514.
- Lowe, B., Fraser, I., & Souza-Monteiro, D. M. (2015). A change for the better? Digital health technologies and changing food consumption behaviors. *Psychology & Marketing*, 32(5), 585-600.
- Lu, J. H., Li, X. Y., & Liu, K. E. (2018). Consumer perception of food incident risk categorization. *Taiwanese Agricultural Economic Review*, 24(2), 61-88. (In Chinese)
- Lubben, B. D. (2005). *A welfare analysis of country-of-origin labeling and alternative*

policy choices for beef (Unpublished PhD dissertation). Kansas State University, Manhattan, Kansas, KS.

Mazumdar, T., Raj, S. P., & Sinha, I. (2005). Reference price research review and propositions. *Journal of Marketing*, 69(4), 84-102.

McCall, M., & Lynn, A. (2008). The effects of restaurant menu item descriptions on perceptions of quality, price, and purchase intention. *Journal of Foodservice Business Research*, 11(4), 439-435.

Mitchell, R. C., & Carson, R. T. (1981). An experiment in determining willingness to pay for national water quality improvements. Draft report to the US Environmental Protection Agency, Washington DC.

Monroe, K. B. (2003). *Price: Making profitable decisions* (3rd ed.). New York, NY: McGraw-Hill.

Monroe, K. B., Grewal, D., & Compeau, L. D. (1991, October). The concept of reference prices: Theoretical justifications and research issues. Paper presented at the Association for Consumer Research Conference, Chicago, Illinois, IL.

Naspetti, S., & Zanolì, R. (2009). Organic food quality and safety perception throughout Europe. *Journal of Food Products Marketing*, 15(3), 249-266.

Nieto-García, M., Muñoz-Gallego, P. A., & González-Benito, Ó. (2017). Tourists' willingness to pay for an accommodation: The effect of eWOM and internal reference price. *International Journal of Hospitality Management*, 62, 67-77.

Nocella, G., Hubbard, L., & Scarpa, R. (2010). Farm animal welfare, consumer willingness to pay, and trust: Results of a cross-national survey. *Applied Economic Perspectives and Policy*, 32(2), 275-297.

Reinartz, W., Dellaert, B., Krafft, M., Kumar, V., & Varadarajan, R. (2011). Retailing innovations in a globalizing retail market environment. *Journal of Retailing*, 87(1), S53-S66.

Roy, R., Rabbane, F. K., & Sharma, P. (2016). Antecedents, outcomes, and mediating role of internal reference prices in pay-what-you-want (PWYW) pricing. *Marketing Intelligence & Planning*, 34(1), 117-136.

Schipmann, C., & Qaim, M. (2011). Modern food retailers and traditional markets in developing countries: Comparing quality, prices, and competition strategies in Thailand. *Applied Economic Perspectives and Policy*, 33(3), 345-362.

Shi, L., Gao, Z., & Chen, X. (2014). The cross-price effect on willingness-to-pay estimates

- in open-ended contingent valuation. *Food Policy*, 46, 13-21.
- Soeteman, L., van Exel, J., & Bobinac, A. (2017). The impact of the design of payment scales on the willingness to pay for health gains. *The European Journal of Health Economics*, 18(6), 743-760.
- Stranieri, S., & Banterle, A. (2015). Consumer interest in meat labelled attributes: Who cares? *International Food and Agribusiness Management Review*, 18(4), 21-38.
- Takahashi, R., Todo, Y., & Funaki, Y. (2018). How can we motivate consumers to purchase certified forest coffee? Evidence from a laboratory randomized experiment using eye-trackers. *Ecological Economics*, 150, 107-121.
- Theyssohn, S., Klein, K., Volckner, F., & Spann, M. (2013). Dual effect-based market segmentation and price optimization. *Journal of Business Research*, 66(4), 480-488.
- Tonsor, G. T., Schroeder, T. C., Pennings, J. M. E., & Mintert, J. (2009). Consumer valuations of beef steak food safety enhancement in Canada, Japan, Mexico, and the United States. *Canadian Journal of Agricultural Economics*, 57(3), 395-416.
- Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science*, 185(4157), 1124-1131.
- Voltaire, L., Donfouet, H. P. P., Pirrone, C., & Larzillière, A. (2017). Respondent uncertainty and ordering effect on willingness to pay for salt marsh conservation in the Brest roadstead (France). *Ecological Economics*, 137, 47-55.
- Wang, A. E. (2016). Consumers' willingness to pay for safe pork and its influencing factors: A field survey in Wuhan. *Chinese Agricultural Science Bulletin*, 32(26), 175-180. (In Chinese)
- Winer, R. S. (1986). A reference price model of brand choice for frequently purchased products. *Journal of Consumer Research*, 13(2), 250-256.
- Wongprawmas, R., & Canavari, M. (2017). Consumers' willingness-to-pay for food safety labels in an emerging market: The case of fresh produce in Thailand. *Food Policy*, 69, 25-34.
- Woods, T. A., Nogueira, L., & Yang, S. H. (2013). Linking wine consumers to the consumption of local wines and winery visits in the northern Appalachian states. *International Food and Agribusiness Management Review*, 16(4), 181-205.
- Wu, L., Wang, S., Zhu, D., Hu, W., & Wang, H. (2015). Chinese consumers' preferences and willingness to pay for traceable food quality and safety attributes: The case of pork. *China Economic Review*, 35, 121-136.

- Yang, S. H., Qing, P., Hu, W., & Liu, Y. (2013). Using a modified payment card survey to measure Chinese consumers' willingness to pay for fair trade coffee: Considering starting points. *Canadian Journal of Agricultural Economics*, 61(1), 119-139.
- Yang, S. H., Qing, P., Hu, W., & Liu, Y. (2014). Product information and Chinese consumers' willingness-to-pay for fair trade coffee. *China Agricultural Economic Review*, 6(2), 278-294.
- Zeng, J. H., Lei, L. F., Geaun, J., & Huang, S. J. (2017). The study on consumers' purchase intention of traditional market in Taipei. *Taiwanese Agricultural Economic Review*, 23(1), 45-74. (In Chinese)

Appendix I. The Survey Instrument (For Respondent's Copy)

Dear respondent:

This survey is related to the investigation for consumer behavior of meat purchase. The purpose of this survey is trying to understand consumer demand of meat product information at traditional wet market. The potential participants are those who have purchase meat product at traditional wet markets within one year and also are the meal planner at home. This survey has about 35 questions, and takes about 10 minutes to complete. We appreciate your valuable time to fill out survey for us. This survey adopts anonymous method and proceed through the Apple iPad. The data collected by this survey is protected by system manager. Researchers would need to obtain the permission to access and examine this data. And the data would not have any personal distinguished information in order to avoid any concern of the exposure of the personal privacy. Hence, this survey would not cause any risk to you, such as reputation, money, etc., so please feel relieved to fill out the survey. For those who are willing to participate this survey, a gift valued about U.S.\$5 dollars will be provided to compensate your help on this survey.

You are free to decide whether you should join this survey or not. You also can stop to complete this survey at any moment. Any information you provided will not be able to save when you decided to quit this survey. This survey is anonymous and no coded at all. Even this survey is not able to track any specific individual respondent. If you feel unsafe about your privacy after you completed the survey, and still want to exit from the data record, then this survey will be not able to accept the elimination procedure because the data system is not able to track any specific identity that belongs to any specific respondent.

If you have any further question after filling out survey, please feel free to contact us. This survey is reviewed by the Institutional Review Board on Humanities & Social Science Research at National Cheng Kung University. If you hope to know your rights and need any further consultant, please contact the review committees at +886-6-2757575 Ext. 51020 or via an email at: em51020@email.ncku.edu.tw.

More detail information will be provided after the blind review closed
March 10, 2015

~ If you agree to join this survey, please keep this page as your own record ~

Source: This information was approved by the Institutional Review Board of National Cheng Kung University.

價格知識是否影響消費者個人 在傳統市場上的願付價格？

楊上禾*

臺灣傳統市場消費者面對市場的豬肉是否在飼養過程中都是零瘦肉精，在分辨識別上遇到潛在挑戰，再者，由於美台貿易談判仍進行中，可能美國以瘦肉精生產豬肉將會出口至國內市場，因此本研究嘗試檢測傳統市場上零瘦肉精檢驗資訊之願付價格，而潛在消費者已被調研。由於在傳統市場上存在著不同的價格知識，對願付價格的推估在問卷設計上需要額外被注意，以網路問卷設計採用蘋果平板在街上展開與蒐集問卷，問卷的關鍵設計是將受訪者分成兩個群體：對照組與實驗組，因此透過此研究設計，價格知識（如：心中的參考價格）的變化引導不同願付價格已被觀察。研究結果顯示傳統市場消費者對零瘦肉精檢驗資訊是願意支付最高價額，特別是當消費者認定自己是去最高認知價格市場時，其願付價格的估計是高於其他相對較低認知價格之市場。本研究隱含結果顯示傳統市場消費者渴望某程度以上的食品安全資訊，關於美國豬肉進口的潛在挑戰，中央及地方政府應特別關心與設計食品安全或可靠資訊之分享系統於傳統市場上，甚至傳統市場肉販商應考量一些有效方法提升他們的肉品給消費者的信任感，最後本研究建議若中央及地方政府有意推廣相關資訊，應先從高認知價格的傳統市場開始發佈與推廣零瘦肉精資訊，因為在高認知價格的傳統市場將會快速引起消費者的注意。

關鍵詞：瘦肉精、傳統市場、願付價格、支付卡法

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