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# Consumers' willingness to pay for organic products in Thailand

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**Faculty of Commerce Working Paper no.4**

**August 2013**

**ISSN: 2324-5220**

**ISBN: 978-0-86476-326-6**

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**Series URL** http://hdl.handle.net/10182/4745

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# Consumers' willingness to pay for organic products in Thailand


## Abstract

Organically grown products have received increasing attention worldwide. This appears to be due to growing awareness of environmental problems and increased concerns about the health and safety of modern agricultural food production practices. Despite the apparent rise of both supply and demand for organic products in Thailand, the industry is still in its infancy and consumers' purchasing behaviour towards organic products is not well researched. This paper investigates the factors affecting consumers' willingness to pay a premium price for organic products. A self-administered questionnaire was used to collect the data at five retail stores in the metropolitan area of Bangkok. Data were analysed using exploratory factor analysis and the double-bound contingent valuation method. Results show that respondents are willing to pay a premium price of 88%, 51% and 51% for organic Chinese kale, organic jasmine rice and organic pork, respectively. Analysis indicates that respondents are willing to pay a premium price for organic products if they have experience in purchasing organic products, have good health, strong ethical and environmental concerns, perceive that organic products provide greater quality and health benefits, and if reside in the city. Respondents with children in the household, however, are less likely to pay a premium price for organic products. Analysis also indicates that the price premium organic products require hinders consumers' purchase of organic products. Therefore, efforts should be made by policymakers, together with marketers and producers, to lower the price of organic products to attract more consumers.



**Keywords**: Choice modelling, contingent valuation, organic products, stated preference technique, Thailand, willingness to pay.



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## 1 Introduction

A study by Eischen, Prasertsri, and Sirikeratikul (2006) revealed the total volume of organic products distributed to Thai markets had increased by a factor of nearly 2.5 -- from 375 million baht in 2003 to 920 million baht in 2005, while the value of the domestic market was 494.5 million baht. However, a large group of consumers still were not purchasing organic products, and only a few purchased organic products on a regular basis (Roitner-Schobesberger, 2006).

A major reason for the lower demand for organic products is their higher price (Panyakul, 2003; Roitner-Schobesberger, 2006). Organically grown products in Thailand have been described as a niche market with a price premium. Reporting on an organic products survey, Panyakul ( 2001) noted that the retail prices of such products varied greatly, along with locations of retailers and the number of outlets available. Panyakul ( 2001) reported that the retail price of organic products was generally 100 per cent higher than for conventional products, and 30 per cent higher for hygienic products. Clearly, price can be a major constraint for consumers when making their decision to purchase organic products. The gap between conventional and organic products is high and significant differences exist between consumers' willingness to pay (WTP) premium prices for organic products versus market prices for conventional products (Thompson, 1998).

To succeed in enlarging the domestic organic market, it is important to understand consumers' preferences of organic products and how much they are prepared to pay for organic products. This information is not well researched or documented. Several studies have investigated consumers' behaviour towards environmentally friendly products in Thailand, but there has been little academic research on willingness to pay for organic products. The lack of such information is a major impediment to the growth of organic products consumption and the future development of organic product markets in Thailand. The objective of this paper is to estimate a price premium that consumers are willing to pay for organic products and to determine the critical factors affecting consumers' willingness to pay the price difference between organics and other goods.

## 2 Method

### 2.1 Measurement of Willingness to Pay (WTP) – stated preference techniques

The stated preference (SP) approach has been commonly used in the economic valuation of both non-market goods and services (i.e. environmental resources and transport) marketing and in food economics. It is also widely used to estimate consumers' preference or WTP for new products and new products' attributes (i.e. quality of food products). The SP technique uses direct methods such as surveys presenting hypothetical choices to gather data from consumers. Thus, SP data can be collected for either available products or those that are cannot be purchased. One advantage of the SP technique is that it allows policymakers or researchers to understand how consumers respond to novel goods and services and to predict demand for them when data from actual markets is not available. This is achieved by considering the value that consumers place on goods or services (Lee and Hatcher, 2001). The SP method is adopted in this study because organic products in Thailand comprise a very small market; there are no data currently available for evaluating the monetary premium that a consumer would be willing to pay for organic products.

Among the SP techniques, choice modelling (CM) and the contingent valuation method (CVM) are generally accepted by researchers as the most appropriate methods to elicit consumers' WTP. These are commonly applied in marketing research because they are easy to administer and inexpensive to carry out. Both methods use the random utility model (RUM). These are based on Lancaster consumer theory, which states that consumers make choices derived from their preferences for the particular attributes they perceive the goods to offer. These methods can thus use discrete choice

models to derive the average WTP, and the product attributes and factors influencing it WTP (Lusk and Hudson, 2004).

CVM has been extensively used to determine the monetary valuation of non-market goods and services, and is now widely used to evaluate the WTP for credence products. The primary objective of CVM is to obtain an accurate estimate of the benefits (or cost) of a change in the quality or quantity of non-market goods, such as environmental improvements. Because of the absence of market prices for non-market or credence goods, the CVM proposes a hypothetical market created for questionnaire respondents to operate in the market by directly asking them how much they would be willing to pay, contingent on a specific hypothetical scenario. The values generated by the hypothetical questions are treated as estimates of the value of the non-market good or service. The characteristic of CVM is that it reveals consumers' preference for unavailable goods and services as if a bundle of characteristics or the whole good (Carson and Hanemann, 2005). In general, CVM is a more appropriate method for evaluating the product of interest as a whole because it is improper to assume that the value of the whole product is equal to the sum of the product's attributes, as is the case with CM techniques. In contrast, CM is preferable when individual values for characteristics/attributes are required.

CVM has been a popular technique to evaluate consumers' willingness to pay for different types of food attributes, considered as credence attributes. This is because the quality of credence goods cannot be observed either before or after the purchase of the good, and may not be widely available in the market. A number of studies have applied CVM to evaluate consumers' preferences for food safety in terms of avoidance of pesticides, residue free products (Batte, Hooker, Haab and Beaverson, 2007; Jean, et al., 1995) and genetically modified products (Grimsrud, McCluskey, Loureiro, & Wahl, 2004). Other CVM studies focusing on environmentally friendly products and organic products include Sanjuán et al. (2003), Gil, Gracia and Sánchez (2000), Lusk (2003), Vanit-Anunchai (2006) and Rodríguez, Lacaze and Lupín (2007).

This study uses CVM to elicit the consumers' WTP for organic products in Thailand for a variety of reasons. Firstly, CVM allows us to establish a hypothetical market, since the organic products market in Thailand is relatively small and the products are not widely available. Secondly, since organic products present various attributes (e.g., greater perceived food safety, lesser environmental impact and the utilisation of ethical production practices), the CVM is a practical method for collecting primary data that are otherwise unavailable. Thirdly, CVM asks consumers specifically about their WTP, so the net value of WTP for the products can be directly estimated.

The CVM includes a variety of formats to elicit consumers' willingness to pay for goods and services, such as open-ended questions, iterative bidding questions (bidding game), the payment card approach, single-bounded dichotomous choice questions, and double-bounded dichotomous choice questions[1]. Among these, the double-bounded dichotomous choice has gained increasing popularity in estimating WTPs. Many researchers have found that the format (via a follow-up valuation question) was more information-intensive and gained more statistical efficiency compared with the single-bounded method (Cameron and Huppert, 1991; Hanemann et al., 1991; Lusk and Hudson, 2004). For example, Hanemann et al. (1991) showed that the double-bounded format yielded greater precision for coefficient estimates (i.e. mean and medium WTP) and lower mean-squared error, leading to much tighter confidence intervals around the WTP estimates. Cooper and Hanemann (1995) found that adding one or more additional follow-up questions produced greater estimation efficiency with relatively small costs. In addition, Hanemann et al. (1991) claimed that the double-bounded model can solve the problems associated with the use of CVM such as starting point bias, anchoring effect and yea-saying. The double-bounded model can avoid starting point bias

[1] For detailed description of each contingent valuation format, see Mitchell and Carson (1989), Bateman et al. (2002), Haab and McConnell (2002), Hanemann et al. (1991), and Lusk and Hudson (2004).

because it has only one follow-up question. This technique is thought to be less tiresome than a bidding approach. The anchoring problem may not occur, because there are differences between first and second bids. The response in the second bid is bounded by the value equal to or higher than the first bid so that a yea-saying problem in the second bid is less likely to occur (Cuccia, 2003).

However, there is a limited information problem with the double-bounded approach, compared with other methods (such as the bidding game). This is because the interval containing the true WTP value from the double-bounded approach is bounded by the second bid, which limits the WTP distribution. In order to gain more information about the true WTP distribution, the proposed initial bids should vary across respondents when implementing the survey (Bateman, et al., 2002). The present study used the double-bounded dichotomous format to elicit consumers' WTP in a survey.

### 2.2 Double-bounded contingent valuation method (CVM)

#### 2.2.1 Econometric model

Currently, organic products in Thailand are not widely available in the marketplace, with some types of organic products unavailable to the public. Consumers' WTP a premium in such a situation cannot be easily observed. To determine consumers' preferences and their WTP for the attributes offered by organic product, the double-bounded dichotomous choice method was applied to estimate the values.

The monetary value of the change, represented by the Hicksian's measures, is shown in equation (1), where we assume only ordinary quality products $q_0$ (i.e., non-organic) are available in the market and the products with the desired quality $q_1$ (e.g. organic) are introduced. If the individual considers that the change in product quality is a benefit or improvement, the RUM indirect utility function can be expressed as (Hanemann, et al. 1991; Bateman, et al. 2002):

$$v(p,q_1,y,z) \geq v(p,q_0,y,z) \tag{1}$$

In the single-bounded dichotomous choice case, the respondent is presented with an amount of money ( $B$ ) for organic products that change $q$ from $q_0$ to $q_1$, and is asked whether he/she would pay some given amount (to secure a given improvement in environmental quality). If the individual responds "yes", the indirect utility function can be written as $v(p,q_1,y-B,z) \geq v(p,q_0,y,z)$ , and "no" otherwise. Thus, the probability of "yes" is:

$$\Pr(response\ is\ "yes") = \Pr(v(p,q_1,y-B,z) \geq v(p,q_0,y,z)) \tag{2}$$

By equation (1), the compensating variation, which is an individual's WTP for an improvement can be presented as:

$$v(p,q_1,y-WTP,z) = v(p,q_0,y,z) \tag{3}$$

Solving for WTP in equation (3) yields:

$$WTP = F(p,q_0,q_1,z,y) \tag{4}$$

where $WTP$ is the individual's maximum WTP for changes in quality from $q_0$ to $q_1$, and $z$ is the individual's characteristics. Thus, equation 2 can be expressed as:

$$P(response\ is\ "yes") = P\left[F(p,q_0,q_1,y-WTP,z) \geq B\right] \tag{5}$$

In the case of the classical double-bounded dichotomous choice CVM, the $i^{th}$ respondent is presented with two bids. First, the respondent is asked to indicate whether he/she is willing to pay an initial offer price $(B_i)$ for an organic product. The follow-up price of the second bid is contingent upon the respondent's response to the first. If the individual responds "yes" to the first bid, meaning that he/she is willing to pay the amount of the initial offer price, he/she is presented with the second bid (with a follow-up price) that is somewhat greater than the first bid $(B_i^u)$. In contrast, if the respondent responds "no" to the first bid, meaning that he/she is not willing to pay the amount of the initial price, he/she is offered the second bid that is some amount smaller than the initial price $(B_i^d)$. The four possible responses to the first and second bids are: (1) 'Yes' to both bids (Yes/Yes), (2) 'Yes' followed by 'No' (Yes/No), (3) 'No' followed by 'Yes' (No/Yes), and (4) 'No' to both bids (No/No). The double-bounded dichotomous format is unobservable of the true WTP, but does reveal four possible ranges of the maximum WTP with values for lower and upper bounds. With regard to the bid designs estimating the WTP for organic products given in Table 1, the respondents' true WTP lies only in the range of positive values $(0, +\infty)$.

Thus, the four potential outcomes can be represented as binary-valued indicator variables: $d_i^{yy}$, $d_i^{yn}$, $d_i^{ny}$ and $d_i^{nn}$, where the these equal one denoting the occurrence of that particular outcome and zero otherwise (Hanemann, et al. 1991; Bateman, et al. 2002):

$d_i^{yy}$ = the $i^{th}$ respondent responds 'Yes' to the first bid ( $B_i$ ) and 'Yes' to the second bids with higher amount ( $B_i^u$ ), denoted as 'YY', and their WTP lies in $B_i^u < WTP < \infty$ ,

$d_i^{yn}$ = the $i^{th}$ respondent responds 'Yes' to the first bid ( $B_i$ ) and 'No' to the second bids with higher amount ( $B_i^u$ ), denoted as 'YN', and their WTP lies in $B_i < WTP < B_i^u$ ,

$d_i^{ny}$ = the $i^{th}$ respondent responds 'No' to the first bid ( $B_i$ ) and 'Yes' to the second bids with lower amount ( $B_i^d$ ), denoted as 'YN', and their WTP lies in $B_i^d < WTP < B_i$ ,

$d_i^{nn}$ = the $i^{th}$ respondent responds 'No' to the first bid ( $B_i$ ) and 'No' to the second bids with lower amount ( $B_i^d$ ), denoted as 'NN', and their WTP lies in $0 < WTP < B_i^d$ .

Under the assumption of a utility maximizing respondent, the cumulative density functions (CDF) of the probability distribution of the four possible outcomes, denoted by $Y^{yy}$, $Y^{yn}$, $Y^{ny}$, $Y^{nn}$, are obtained as follows:

$$\begin{aligned} Y^{yy}(B_i, B_i^u) &= \Pr(B_i \le WTP_i \ and \ B_i^u \le WTP) \\ &= \Pr(B_i \le WTP_i \,\big|\, B_i^u \le WTP)\ \Pr(B_i^u \le WTP) \\ &= \Pr(B_i^u \le WTP) \end{aligned} \quad (6)$$

Since, with $B_i^u > B_i$ , $\Pr(B_i \le WTP_i \,\big|\, B_i^u \le WTP) \equiv 1$ , then

$$Y^{yy}(B_i, B_i^u) = 1 - G(B_i^u; \theta) , \quad (7)$$

$$Y^{yn}(B_i, B_i^u) = \Pr(B_i \le WTP_i \le B_i^u) = G(B_i^u; \theta) - G(B_i; \theta) \quad (8)$$

$$Y^{ny}(B_i, B_i^d) = \Pr(B_i \ge WTP_i \ge B_i^d) = G(B_i; \theta) - G(B_i^d; \theta) \quad (9)$$

$$Y^{nn}(B_i, B_i^d) = \Pr(B_i > WTP_i \text{ and } B_i^d > WTP)$$

$$= \Pr(WTP_i < B_i^d) = G(B_i^d; \theta) \quad (10)$$

Where: $WTP$ is the maximum WTP,

$G(B_i^\bullet; \theta)$ is a random cumulative probability distribution function (CDF), where $B_i^\bullet$ denotes the value of first bid or second bid, and $\theta$ is the unknown parameters to be estimated.

To form the four possible outcomes above, the log-likelihood function for the double-bounded model takes the form below, where $N$ is the total sample of respondents:

$$\ln L^D(\theta) = \sum_{i=1}^{N} \begin{Bmatrix} d_i^{yy} \ln Y^{yy}(B_i, B_i^u) + d_i^{yn} \ln Y^{yn}(B_i, B_i^u) \\ + d_i^{ny} \ln Y^{ny}(B_i, B_i^d) + d_i^{nn} \ln Y^{nn}(B_i, B_i^d) \end{Bmatrix} \quad (11)$$

Then, the set of parameters, $\theta$, can be estimated by maximising log-likelihood function subject to a specified probability distribution which can be written as (Bateman, et al. 2002):

$$\frac{\partial \ln L^E(\theta)}{\partial \theta} = 0 \quad (12)$$

**Table 1: WTP ranges of the double-bounded dichotomous choice model**

| *Possible outcomes (First bid/second bid)* | *Model 1 (lower, upper)* | | *Model 2 (min, max)* | | *Model 3 (min, max2)* | |
|---|---|---|---|---|---|---|
| | *Lower bound* | *Upper bound* | *Lower bound* | *Upper bound* | *Lower bound* | *Upper bound* |
| Yes/Yes | $B_i^u$ | $\infty$ | $B_i^u$ | $Max$ | $B_i^u$ | $Max_i$ |
| Yes/No | $B_i$ | $B_i^u$ | $B_i$ | $B_i^u$ | $B_i$ | $Max_i$ |
| No/Yes | $B_i^d$ | $B_i$ | $B_i^d$ | $B_i$ | $B_i^d$ | $Max_i$ |
| No/No | $0$ | $B_i$ | $Min$ | $B_i$ | $Min$ | $Max_i$ |

### 2.2.2 Mean and median WTP

The mean and median WTP[2] can be calculated by using the estimated parameters from the constant-only bid function, which restricts all the exploratory variables except the bid variable. Thus, the parameter estimates are contained in the constant (intercept: $a$) and bid variable (scale: $\sigma$) in

[2] Mean and Median WTP can be calculated by the following formulas (Bateman, et al., 2002):

| **Distributions** | **Mean WTP** | **Median WTP** |
|---|---|---|
| Log-normal | $e^{(a+0.5\sigma^2)}$ | $e^a$ |
| Log-logistic | $e^{(-\alpha/\beta)} \frac{\pi/\beta}{\sin(-\pi/\beta)}$ | $e^{(-\alpha/\beta)}$ |
| Weibull | $e^a \Gamma(1+\sigma)$ | $e^a (\ln 2)\sigma$ |

the model. However, to calculate the mean and median WTP, it is necessary to assume the cumulative probability distribution of WTP responses, CDF. The families of distribution that various studies have used to estimate the double-bounded CVM include the normal, logistic, log-normal, and log-logistic distributions. Since, the possible values of WTP for organic products are positive (0, $+\infty$ ), the probability distributions that fit the log-likelihood function are limited to the non-negative distributions, including log-normal, log-logistic and Weibull (Bateman, et al. 2002). In order to select the appropriate probability distribution with the WTP data, that is, one with the best goodness of fit to the sample data, the value of the log-likelihood function in the restricted model, leaving only the constant and bid terms, was employed (Hanemann, et al. 1991).

### 2.2.3 Double-bounded followed-up with open-ended model

This study also aimed to explore the use of the classical double-bound dichotomous choice strategy combined with additional open-ended questions to elicit WTP, in order to improve the statistical efficiency of WTP estimates. With respect to the economic theory of the classical double-bounded model, the respondents were asked their WTP with the first and second bids of the dichotomous choice question, which can indicate their WTP by interval-censoring data, as discussed above. Therefore, the upper bound in the highest range (Yes/Yes response) of the interval-censoring model is infinity ($+\infty$ ). The lower bound in the lower range (No/No response) is equal to zero (Model 1: lower, upper) (see Table 1).

After the respondents responded to the classical double-bounded question they were asked an open-ended question to indicate their maximum WTP for particular organic products. Regarding the extra information obtained from the open-ended question, truncation of the upper bound values in the highest interval range (Yes/Yes response) can be applied to the WTP estimates. It was assumed that the respondents' true WTP would consider the income constraint, which is consistent with economic theory. This method should lead to more reliable and reasonable WTP estimates (Haab and McConnell, 2002). This study applied two different types of truncated values in order to test the efficiency of the truncation approach. First, in case of respondents providing the Yes/Yes response to the first and second bids, the highest respondents' WTP obtained from the open-ended question was chosen to represent the upper bound in the highest interval range ( $Max$ ) (Model 2). For Model 3, the upper bound of the four interval ranges was used for each individual's highest WTP amount obtained from the open-ended question ( $Max_i$ ) (Model 3). The truncation approach was also applied to the lower bound in the lowest interval range (No/No response). It was assumed that the true respondents' WTP for organic products would not be lower than the conventional alternative. Thus, to avoid the problem of unrealistic bid values, the lower bound value in the lowest interval range is truncated as equal to the conventional price (Bateman, et al. 2002; Haab and McConnell 2002). Hence, the respondents' true WTP is bounded between the conventional price and the highest WTP amount (min, max) in Model 2, while in Model 3 respondents' true WTP is bounded by the conventional price and each individual's highest WTP (min, max2) (see Table 1).

## 2.3 Empirical model

The explanatory variables of the model include "health consciousness", "food safety", "food ethics", "environmental concerns", "availability, information and price barriers", "quality and health benefits" and "environmental benefits". All are summated scale variables, obtained from factor analysis. The dummy variables consist of "consumers' knowledge about organic products", "the frequency of purchasing food at natural/health stores", "the presence of vegetarians in households". Socio-demographic variables include gender, education level, occupation, marital status, children in the households, household income and household location (see Table 2).

The reduced form for the consumers' WTP for organic products model is given as:

WTP = *f(*PURCHASE , HEALTH, FSAFETY, ETHICS, ENVIRON, QBENEFIT, AIPRICE, EBENEFIT, NSTORE, VEGETARI, DINEOUT, K_OR, FEMALE, HIGHEDU, WCOLLAR, MARRIED, CHILDREN, MIDAGE, ELDERLY, LOWINC, HIGHINC, CITY, e) (13)

**Table 2: Description of variables for consumers' WTP for organic products model**

| ***Variable names*** | ***Description of variables*** | ***Hypothesised signs*** |
|---|---|---|
| PURCHASE | 1 = if the respondent purchases organic products for home consumption; 0 = otherwise. | + |
| HEALTH | Health consciousness (summated scale). | + |
| FSAFETY | Food safety concern (summated scale). | + |
| ETHICS | Food ethical concern (summated scale). | + |
| ENVIRON | Environmental concern (summated scale). | + |
| QBENEFIT | Quality and health benefits (summated scale). | + |
| AIPRICE | Availability, information and price barriers (summated scale). | - |
| EBENEFIT | Environmental benefits (summated scale). | + |
| NSTORE | 1=if the respondent often purchases grocery products at natural/health food stores; 0=otherwise. | + |
| VEGETARI | 1=if the household has a family member who is on a vegetarian or vegan diet; 0=otherwise. | + |
| DINEOUT | 1=if the respondent's family dines out or consumes take-away food always to often; 0= otherwise. | - |
| K_OR | 1=if the respondent has knowledgeable and very knowledgeable about organic products; 0=otherwise. | + |
| FEMALE | 1= if respondent is female; 0=Male | - |
| LOWEDU* | 1=if respondent has completed below a bachelor degree; 0=otherwise. | +,- |
| HIGHEDU | 1=if respondent has completed a bachelor degree or higher; 0=otherwise. | +,- |
| WCOLLAR | 1=if respondent is white-collar worker (civil servant, private officers and self-employed); 0=otherwise (housewife, retired, blue-collar, other). | + |
| MARRIED | 1= if respondent is single; 0=otherwise (married, divorced, other). | + |
| CHILDREN | 1=if households having children aged less than 18; 0=otherwise. | + |
| YOUNG* | 1= if respondent has aged between 18 and 34; 0=otherwise. | +,- |
| MIDAGE | 1= if respondent has aged between 35 and 54; 0=otherwise. | +,- |
| ELDERLY | 1= if respondent has aged 55 and older; 0=otherwise. | +,- |
| LOWINC | 1=if monthly household income is less than 30,000 baht; 0 = otherwise. | - |
| MIDINC* | 1=if monthly household income is between 30,000-60,000 baht; 0 = otherwise. | + |
| HIGHINC | 1=if monthly household income is greater than 60,000 baht; 0 = otherwise. | + |
| CITY | 1=if respondent resides in the city; 0=otherwise. | + |
| e | Error term | |

Note: * indicates the reference category, dropped from the models to avoid perfect collinearity.

## 3 Data collection

### 3.1 Design and structure of questionnaire

This study was designed to identify the factors influencing consumers' WTP a premium for organic products. A structured questionnaire was used to collect data from consumers. Three types of organic food products provided the product focus for the device: vegetables, rice and meat. Unprocessed organic food products were selected because they are widely available and are frequently consumed in Thailand (Roitner-Schobesberger, et al. 2008). To estimate the value for organic food products, three specific products were selected as unprocessed organic food products; jasmine rice, Chinese kale and pork.

A structured questionnaire was developed from a review of the relevant food consumer literature. As noted above in the empirical model section, information collected related to: (1) attitudes related to health, food safety, ethics and environment; (2) perceptions of organic product attributes including quality (nutritious, taste, appearance), health, environment and availability of product and information and price of the products; (3) Knowledge about organic products; (4) Personal lifestyle including vegetarian diet, purchasing groceries at natural/health food stores and dining out; (5) socio-demographic characteristics including gender, education, age, occupation, marital status, children in household, household income, and household location; and (6) the consumers' willingness to pay (WTP). In the WTP section, the questions asked whether the respondents are willing to pay a premium for the organic products in general, and the three specified organic products (Chinese organic kale, organic jasmine rice and organic pork). If the respondents replied they were willing to pay more for the organic products, a follow up question measured the additional amounts of money respondents were willing to pay, using the double-bound techniques.

Utilising a 5-point Likert scale (with 1 equalling strongly disagree and 5 equalling strongly agree), consumers were asked to score items that measured their attitudes toward health, food safety, ethics and the environment, and their perceptions of organic products. Data on their knowledge of and about organic products were also collected. These questions were extracted into small sets of factors by using Principal Component Analysis in an exploratory manner (EFA). Tables 3 and 4 present the underlying factors on the 13 items of consumers' general attitudes and the 10 consumers' perception items towards organic products. The scores of the items representing each construct were averaged for each construct. These mean values were used in the model of consumers' willingness to pay (equation 13) a premium for organic products.

**Table 3: Rotated component matrix for the respondents' attitudes towards health, food safety, ethics and environment factors**

| | *VARIMAX Rotated Loading* | | | | *Communalities* |
|---|---|---|---|---|---|
| | *F1* | *F2* | *F3* | *F4* | |
| **Factor 1: Environmental concerns** | | | | | |
| I separate the rubbish that can be re-used and put in recycle bin. | 0.794 | | | | 0.689 |
| I use reusable bag when I shop. | 0.786 | | | | 0.685 |
| I like to buy product prepared in an environmentally friendly way. | 0.702 | | | | 0.585 |
| I believe that pesticide and herbicide residues on farms would cause negative effect on the environment. | 0.664 | | | | 0.617 |
| **Factor 2: Health consciousness** | | | | | |
| I often eat healthy food. | | 0.781 | | | 0.634 |
| I well balance work and family/life. | | 0.636 | | | 0.423 |
| I often read/check quality label before buying a new food products. | | 0.616 | | | 0.431 |
| I exercise regularly | | 0.610 | | | 0.418 |
| I avoid buying food with artificial additives and preservatives. | | 0.540 | | | 0.503 |
| **Factor 3: Food safety** | | | | | |
| I believe that the use of growth/red meat stimulants in livestock production is harmful to humans. | | | 0.853 | | 0.766 |
| I believe that pesticide residues in food cause cancer and other diseases. | | | 0.839 | | 0.776 |
| **Factor 4: Food ethics** | | | | | |
| I certainly believe that genetically modified foods are probably not safe for human consumption. | | | | 0.875 | 0.770 |
| I certainly buy 'animal welfare friendly' food products if they are available. | | | | 0.631 | 0.528 |
| Eigenvalues | 4.057 | 1.362 | 1.313 | 1.093 | |
| Variance explained (%) | 31.204 | 10.474 | 10.103 | 8.407 | |
| Cumulative variance (%) | 31.204 | 41.679 | 51.782 | 60.189 | |
| Number of items (N=13) | 4 | 5 | 2 | 2 | |
| Cronbach's Alpha | 0.775 | 0.694 | 0.775 | 0.356 | |
| Inter-item correlation | 0.468 | 0.320 | 0.633 | 0.222 | |

Note: Extraction method: principal component analysis with an orthogonal rotation (VARIMAX)

**Table 4: Rotated component matrix for the respondents' perceptions of organic products**

| | *VARIMAX Rotated Loading* | | | *Communalities* |
|---|---|---|---|---|
| | *F1* | *F2* | *F3* | |
| **Factor 1: Availability, Information and Price barriers** | | | | |
| Organic products do not have a wide range of choices compared with conventional products. | 0.842 | | | 0.743 |
| It is lack of availability of organic product information compared with conventional products. | 0.762 | | | 0.605 |
| Organic products are not easily found in grocery stores compared with conventional products. | 0.736 | | | 0.617 |
| Organic products are much more expensive than conventional products. | 0.564 | | | 0.367 |
| **Factor 2: Quality and health benefits** | | | | |
| Organic products have more nutrients than conventional products. | | 0.800 | | 0.644 |
| Organic products are tastier than conventional products. | | 0.750 | | 0.566 |
| Eating organic products are more beneficial to my health than conventional products. | | 0.683 | | 0.573 |
| Organic products are less chemical residue than conventional products. | | 0.623 | | 0.455 |
| **Factor 3: Environmental benefits** | | | | |
| Products grown organically are more ecologically sound than grown conventionally. | | | 0.848 | 0.769 |
| Products grown organically are obtained from sustainable resources and less polluted discharges into air, water and soil than grown conventionally. | | | 0.840 | 0.749 |
| Eigenvalues | 3.062 | 1.802 | 1.224 | |
| Variance explained (%) | 30.622 | 18.016 | 12.236 | |
| Cumulative variance (%) | 30.622 | 48.638 | 60.786 | |
| Number of items (N=13) | 4 | 4 | 2 | |
| Cronbach's Alpha | 0.726 | 0.696 | 0.754 | |
| Inter-item correlation | 0.395 | 0.364 | 0.605 | |

Note: Extraction method: principal component analysis with an orthogonal rotation (VARIMAX)

### 3.2 Bid design of the WTP section of the questionnaire

The bid design used in the WTP section of the questionnaire was based on the distribution of the WTP estimated from the open-ended questions assessing the WTP for organic products in the pre-test questionnaire. In that instance, the respondents were first asked whether they would be willing to pay a premium for organic products compared to the price of conventional products. If the respondents answered "Yes', then a follow-up question was asked to indicate the amount of money that they were willing to pay for the three specified organic products against the average conventional retail prices of these products at 30 baht/kg (Chinese kale), 140 baht/5 kg (jasmine

rice) and 90 baht/kg (pork)[3]. The information obtained from an open-ended question on the WTP for organic products was used to determine the possible distribution of the respondent's WTP for organic products. The three highest frequencies of the offered prices for the three specified organic products were used as three different starting bids (first bids) for the double-bounded dichotomous question in the final questionnaire. This study used three ranges of starting bids in order to guard against starting point bias.

We used three different versions of the final questionnaire (see Table 5), with a different starting bid for each version. To avoid question order bias, the three questionnaires were randomly assigned to the respondents.

**Table 5: Dichotomous choice questionnaire for eliciting a consumer's WTP**

| *Types of products* | *Questionnaire versions* | *Conventional prices* | *First bid (Baht/kg)* | *Second bid (Baht/kg)* | |
|---|---|---|---|---|---|
| | | | | *Lower amount* | *Higher amount* |
| Chinese kale | A | 30 | 45 | 37.5 | 52.5 |
| | B | 30 | 60 | 50.0 | 70.0 |
| | C | 30 | 75 | 62.5 | 87.5 |
| Jasmine rice | A | 140 | 210 | 175.0 | 245.0 |
| | B | 140 | 240 | 200.0 | 280.0 |
| | C | 140 | 270 | 225.0 | 315.0 |
| Pork | A | 90 | 135 | 112.5 | 157.5 |
| | B | 90 | 150 | 125.0 | 175.0 |
| | C | 90 | 165 | 137.5 | 192.5 |

Source: pre-test survey

### 3.3 Sampling method

Convenience sampling via the store-intercept technique was employed to select respondents for the study. This method was chosen due to the practical difficulties in detecting the target population. A self-administered survey instrument was utilised to collect data from consumers. The store-intercept and self-administered methods' numerous advantages determined this choice. The minimising of interview bias, the requirement of fewer staff to distribute and collect completed questionnaires, lower costs, speed of administration, and the ability to economically measure larger numbers of respondents (Cooper and Schindler, 2008) outweighed the advantages of random or systematic techniques. However, respondents who were not able to finish the questionnaire in-store were offered the option of a postal return of the completed instrument.

The survey targeted respondents at retail food stores where organic and conventional products were sold. The five types of retail food stores included grocery stores, hypermarkets, supermarkets, specialty stores (natural and health food stores) and traditional retail markets (i.e., fresh markets). These were selected to ensure reasonable variability on the relevant characteristics of participant households (e.g., income, consumer education and occupation), and store characteristics (e.g., hypermarket/supermarket/fresh market[4], presence/absence of a dedicated organic section). The surveys were administered in 2010 in retail stores in Bangkok metropolitan area. The questionnaires were distributed to Thai consumers who were primary purchasers of food products for their

[3] The average conventional retail prices of three organic products were collected from the Department of Internal Trade, Ministry of Commerce.

[4] A traditional market, also called a fresh market or wet market sells fresh food such as fruits, vegetables and meat, and dry grocery products such as rice, while a supermarket (such as TOPS, Home fresh Mart) is a self-service store offering a wide variety of food and household merchandise. Larger supermarkets provide consumers with all the basic needs in one area are known as a hypermarkets (such as BigC, Carrefour, Tesco/Lotus) (Schaffner and Schweiger, 2005).

household and aged 18 years or older. A total of 502 questionnaires were complete and useable, yielding a response rate of 71 per cent.

## 4 Empirical Results

### 4.1 Socio-demographic profiles of the respondents

The response rates for the three versions of the survey questionnaire were 34.1 per cent for Version A, 34.3 per cent for Version B and 31.7 per cent for Version C. Approximately 41.2 per cent of the respondents completed the questionnaire at supermarkets (located in The Mall and Future Park Rangsit), 38 per cent at fresh markets (Ying Charoen and Wongwian Yai markets) and 20.2 per cent at a natural/health food store (Aden shop).

Table 6 presents the profile of the respondents. Nearly half of the respondents, 242 (48.2 per cent) claimed they purchased organic products (purchasers of organic products). Females comprised the bulk of food purchase decision makers, representing 78.9 per cent of the sample. The modal category in the age distribution of the respondents was 25 to 34 years, though this proportion was not markedly different from that for the 25 to 44 year group (29.5 per cent) or the 45 to 54 (26.5 percent). Most respondents were highly educated, with 59 per cent of the respondents having completed an undergraduate degree (bachelor's). In terms of occupation, 35.8 per cent of the respondents worked as private officers, followed by government officers (32.6 per cent), with a small proportion self-employed (10.8 per cent). More than half of the respondents (53.8 per cent) were married or in de facto relationships. The proportion of households without children was 55.0 per cent. Modal household monthly income was between 30,001 and 40,000 baht (18.3 per cent), but was followed by the 40,001 to 50,000 baht (17.3 per cent) category. With respect to household location, 55.4 per cent of the respondents lived in the city, 45.6 per cent lived in suburbs.

**Table 6: Socio-demographic profile of respondents**

| | *Total (%) (n=502)* |
|---|---|
| *Gender* | |
| Female | 78.9 |
| Male | 21.1 |
| *Age* | |
| 18 – 24 | 4.2 |
| 25 – 34 | 29.9 |
| 35 – 44 | 29.5 |
| 45 – 54 | 26.5 |
| 55 – 64 | 8.4 |
| 65 and older | 1.6 |
| *Education level* | |
| Primary school | 1.6 |
| Secondary school | 10.0 |
| Technical/Vocational school (2 years) | 8.4 |
| Bachelor degree | 59.0 |
| Masters degree or higher | 21.0 |
| *Occupation* | |
| Government officer | 32.6 |
| Private company officer | 35.8 |
| Self-employed | 10.8 |
| Farmer | 0.2 |
| Housewife/husband | 9.2 |
| Labourer | 4.6 |
| Retired | 2.6 |
| Unemployed | 1.2 |
| Other(s) | 3.0 |
| *Marital status* | |
| Single | 41.1 |
| Married/de facto relationship | 53.8 |
| Divorced/separated/widowed | 4.6 |
| Other(s) | 0.2 |
| *Households with children* | |
| Children aged 0 to <7 | 20.5 |
| Children aged 7 to <18 | 32.8 |
| Children aged 0 to <18 | 45.0 |
| *Household income* | |
| Less than 10,000 baht | 1.2 |
| 10,001 – 20,000 baht | 10.8 |
| 20,001 – 30,000 baht | 12.4 |
| 30,001 – 40,000 baht | 18.3 |
| 40,001 – 50,000 baht | 17.3 |
| 50,001 – 60,000 baht | 11.6 |
| 60,001 – 80,000 baht | 10.4 |
| 80,001 – 100,000 baht | 9.4 |
| 100,001 – 150,000 baht | 4.6 |
| More than 150,000 baht | 4.2 |
| *Area of household location* | |
| City | 55.4 |
| Suburb | 44.6 |

### 4.2 Estimates of consumers' WTP for organic products

#### 4.2.1 Responses to the double-bounded dichotomous choice

A very large proportion of the 486 respondents (96.8 per cent) reported that they were willing to pay a price premium for organic products. They were then asked to respond to the double-bounded dichotomous choice questions with two bid prices: a starting bid and a follow-up bid.

Table 7 presents the distribution of the double-bounded WTP responses for the three specified organic products. In terms of the different structure of bid prices, the proportions of respondents were distributed nearly equally, with 34 per cent, 34.5 per cent and 31.5 per cent of the total respondents correspondending to the bid structure of versions A, B and C, respectively. The bid designs captured the WTP ranges quite well. The proportion of the respondents who were willing to pay the bid generally decreased with increases in price. This is confirmed by the fact that the higher starting bid price was less likely to generate a "Yes/Yes" response and more likely to produce a "No/No" response. In other words, the highest WTP outcome ("Yes/Yes" response) of the highest starting bid price (version C) of Chinese organic kale, organic jasmine rice and organic pork had the lowest responses, 19, 8, and 12 per cent of the total responses with bid structure version C, compared to the highest WTP outcome for the other two versions (19, 13, and 13 per cent of the total responses of the bid structure version B and 32, 26; and 23 per cent of the total responses of the bid structure version A). This indicates that very few respondents were willing to pay more than the prices offered in the bid designs. As documented in Table 7, the respondents' maximum WTP lies between the lower and upper bounds of the second bid price because there is a high proportion in the "Yes/No" and "No/Yes" responses.

**Table 7: Distribution of willingness to pay responses for the double-bounded dichotomous choice**

| *Types of products* | *Bid version* | *Bid amounts (baht/kg)*[2] | | | *Distribution of WTP response*[1] | | | | *No. of responses* |
|---|---|---|---|---|---|---|---|---|---|
| | | *First bid* | *Second bid* | | | | | | |
| | | | *Lower amount* | *Upper amount* | *Yes/Yes* | *Yes/No* | *No/Yes* | *No/No* | |
| Chinese kale | A | 45 | 37.5 | 52.5 | 32 (19.4) | 43 (25.6) | 56 (33.3) | 34 (20.6) | 165 (34.0) |
| | B | 60 | 50.0 | 70.0 | 19 (11.3) | 30 (17.9) | 78 (46.4) | 41 (24.4) | 168 (34.5) |
| | C | 75 | 62.5 | 87.5 | 19 (12.4) | 42 (27.5) | 36 (23.5) | 56 (36.6) | 153 (31.5) |
| Jasmine rice | A | 210 | 175.0 | 245.0 | 26 (15.8) | 14 (8.3) | 65 (38.7) | 60 (36.4) | 165 (34.0) |
| | B | 240 | 200.0 | 280.0 | 13 (7.7) | 23 (13.7) | 57 (33.9) | 75 (44.6) | 168 (34.5) |
| | C | 270 | 225.0 | 315.0 | 8 (5.2) | 21 (13.7) | 48 (31.4) | 76 (49.7) | 153 (31.5) |
| Pork | A | 135 | 112.5 | 157.5 | 23 (13.9) | 21 (12.7) | 71 (43.0) | 50 (30.3) | 165 (34.0) |
| | B | 150 | 125.0 | 175.0 | 13 (7.7) | 28 (16.7) | 72 (42.9) | 55 (32.7) | 168 (34.5) |
| | C | 165 | 137.5 | 192.5 | 12 (7.8) | 24 (15.7) | 47 (30.7) | 70 (45.8) | 153 (31.5) |

Note: [1] "Yes/Yes" indicates Yes and Yes response in the first and second bid, respectively.
"Yes/No" indicates Yes and No response in the first and second bid, respectively.
"No/No" indicates No and No response in the first and second bid, respectively.
"No/Yes" indicates No and Yes response in the first and second bid, respectively.
Figures in brackets provide the percentage of the possible outcomes.
[2] Unit price of the organic jasmine rice is baht/5 kg pack.

### 4.2.2 Specification of the probability distribution functions in the double-bounded CVM

The specification of the probability distribution of the double-bounded WTP estimates was performed in order to determine how well the distribution fit the data. To achieve the characteristic of a non-negative WTP value for organic products, the distribution function emphasises the non-negative probability distributions. Log-normal, log-logistic and Weibull distributions were considered (Bateman,et al. 2002). In order to select the appropriate probability distribution that best fits the WTP data, the maximum log-likelihood value of the three probability distributions models restricted for independent parameters was used for comparison (Hanemann,et al. 1991). Table 8 shows that the values of the maximum log-likelihood function for log-normal and log-logistic distributions did not differ much from one another; the fit to the WTP data was similar for the two distributions. After considering this outcome, we decided to estimate the consumers' WTP by specifying the log-normal probability distribution because the value of the maximum log-likelihood function was greater for the log-normal probability distribution than for the log-logistic or Weibull probability distributions.

A comparison of the three WTP models was made between the conventional double-bounded dichotomous choice (Model 1: lower, upper) and the double-bounded dichotomous choice, followed by the open-ended question which included Model 2 (min, max) and Model 3 (min, max2) to provide accurate WTP estimates. In the case of Models 2 and 3, the values of the lower and upper bounds were applied using an open-ended question approach. The prices of conventional Chinese organic kale, organic jasmine rice and organic pork products[5], 30 baht/kg, 140 baht/5 kg pack and 90 baht/kg, respectively, were used as the lower bound (min) of the lowest interval range (No/No response) in Models 2 and 3. With regard to the respondents' true WTP obtained from the open-ended question, the highest amounts of money that the respondents would be willing to pay for organic Chinese kale, organic jasmine rice and organic pork were 90 baht/kg, 400 baht/5 kg and 210 baht/kg, respectively. These values were used as the upper bound (max) for the highest range of WTP ("Yes/Yes" response) in Model 2. Similarly, in Model 3 the highest amount of money obtained from the open-ended question that each respondent was willing to pay was used as the upper bound of the four interval ranges (max2).

Table 9 shows the WTP estimates from models 1, 2 and 3. Model 3 was not an appropriate WTP estimate because when compared with models 1 and 2, it produced the lowest value of the log-likelihood (goodness-of-fit measures) for the three specified organic products. In addition, the point estimates of the WTP mean and median obtained from Model 3 were inaccurate values since there is an anchoring effect[6], resulting in biased estimates of the WTP mean. The anchoring effect emerges when the respondents recorded the maximum amount of money they were willing to pay in the open-ended question, which is essentially exactly the same as the value of lower bound in the dichotomous choice question. As documented in Table 10, anchoring in the second bid for Chinese organic kale, organic jasmine rice and organic pork occurred in 55.1 per cent, 21.2 per cent, and 31.5 per cent, respectively, of the total responses in the second bid.

The point estimates of the WTP mean and median and the 95% confidence intervals were calculated using the estimated parameters of the restricted equation (without explanatory variables). These were used to consider the accuracy of the WTP estimates between Model 1 and 2. Table 9 shows Model 2 has a higher precision of the WTP estimates than Model 1. This is because the point estimates of the WTP mean and median for the three specified organic products in Model 2 were lower than the WTP mean and median generated by Model 1. In addition, Model 2 produces a 95%

[5] The price of each conventional product used as the base price in this study was obtained by averaging the prices obtained from various stores during the pre-test store survey.

[6] Anchoring occurs when the answers (the decisions) in the follow-up questions are influenced by the proposed value (or information given), resulting from the respondents who are careless or have no pre-established values in answering the questions (Cameron and Quiggin, 1994; Mitchell and Carson, 1989).

confidence interval of the WTP mean that is tighter than Model 1 for the three specified organic products. The narrower interval determined our decision to use Model 2 to estimate the respondents' mean and median WTP values and the factors influencing their WTP for the products described in the questionnaire. These tighter confidence intervals thereby provide better estimates of the WTP.

### 4.2.3 Willingness to pay premium for the three specified organic products

The point estimates of the WTP obtained from the double-bounded dichotomous choice items followed by open-ended questions (Model 2) for the three specified organic products are presented in Table 11. The WTP median was significantly smaller than the WTP mean for the three specified products. This reflects the asymmetric shape of the log-normal probability distribution. The WTP mean for organic Chinese kale was 56.53 baht/kg. Compared with the conventional Chinese kale's price, the premium[7] price was 26.53 baht/kg, approximately 88 per cent higher than the conventional price for Chinese kale. For organic jasmine rice, the estimated WTP mean was 211.71 baht/5 kg pack. The premium price was 71.71 baht/5 kg pack, which is about 51 per cent more than the conventional jasmine rice price. In the case of organic pork, the respondents were willing to pay 135.95 baht/kg. This price was 45.95 baht/kg (51 per cent) higher than the conventional price for ordinary pork. This result confirms that the respondents were willing to pay a higher premium price for organic Chinese kale than for organic jasmine rice and organic pork. This suggests that the organic attributes of perishable products such as vegetables are seen as more valuable by consumers, hence their willingness to pay a premium to purchase them. Consumers may perceive that conventional fresh vegetables pose a greater risk of exposure to unacceptable levels of chemical residues than would be the case with the alternative products (i.e., rice or meat). Thus, they were willing to pay more for organic vegetables. This result differs from consumers' WTP for organic products in Europe (Gil, Gracia et al. 2000). The premium prices European consumers were willing to pay for organic products were not significantly different across products.

[7] The price premium for the three organic products was calculated by comparing the amount of money that the respondents were willing to pay for the three specified organic products with the corresponding conventional alternative.

**Table 8: Values of log-likelihood function by log-normal, log-logistic and Weibull probability distributions**

| *Distributions* | *Values of the maximum log-likelihood function ( $LL_{null}$ )* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Model 1 (lower, upper)* | | | *Model 2 (min, max)* | | | *Model 3 (min, max2)* | | |
| | *Chinese kale* | *Jasmine rice* | *Pork* | *Chinese kale* | *Jasmine rice* | *Pork* | *Chinese kale* | *Jasmine rice* | *Pork* |
| Log-normal | -745.208 | -606.155 | -622.581 | -769.212 | -631.249 | -637.577 | -707.050 | -722.141 | -742.040 |
| Log-logistic | -747.179 | -607.115 | -621.526 | -783.006 | -639.028 | -644.154 | -795.207 | -809.144 | -850.092 |
| Weibull | -755.974 | -610.431 | -632.637 | -796.765 | -678.819 | -682.868 | -876.835 | -887.716 | -930.116 |

**Table 9: Coefficients of the double-bounded dichotomous choice model for organic Chinese kale, organic jasmine rice and organic pork**

| | *Model 1 (lower, upper)* | | | *Model 2 (min, max)* | | | *Model 3 (min, max2)* | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Chinese kale* | *Jasmine rice* | *Pork* | *Chinese kale* | *Jasmine rice* | *Pork* | *Chinese kale* | *Jasmine rice* | *Pork* |
| Intercept ( $a$ ) | 3.9896 | 5.3089 | 4.8817 | 3.9959 | 5.3337 | 4.894 | 3.9132 | 5.2558 | 4.8209 |
| Scale ( $\sigma$ ) | 0.3151 | 0.2484 | 0.2158 | 0.2791 | 0.2075 | 0.1914 | 0.2853 | 0.2166 | 0.1986 |
| Median WTP[1](baht/kg)[1] | 54.03 | 202.13 | 131.85 | 54.37 | 207.20 | 133.49 | 50.06 | 191.67 | 124.08 |
| Mean WTP[2] (baht/kg)[2] | 56.78 | 208.46 | 134.96 | 56.53 | 211.71 | 135.95 | 52.14 | 196.22 | 126.55 |
| 95% CI of mean WTP[3] ($\pm$ baht/kg)[4] | 55.03-58.54 ($\pm$ 1.75) | 203.32-213.61 ($\pm$ 5.15) | 132.12-137.80 ($\pm$ 2.84) | 55.03 -58.04 ($\pm$ 1.51) | 207.48-215.94 ($\pm$ 4.23) | 133.47-138.44 ($\pm$ 2.48) | 50.76-53.52 ($\pm$ 1.38) | 192.31-200.12 ($\pm$ 3.91) | 124.25-128.85 ($\pm$ 2.29) |

Note: [1]Median WTP= $e^{a}$

[2]Mean WTP= $e^{(a+0.5\sigma^2)}$

[3]95% Confidence interval of the WTP mean is calculated by using estimated parameters

[4]Unit price of the organic jasmine rice is baht/5 kg pack.

**Table 10: Percentages of the anchoring between the maximum WTP and the lower bound in the second bid in Model 3 (min, max2)**

| | *Chinese kale (%)* | *Jasmine rice (%)* | *Pork (%)* |
|---|---|---|---|
| Anchoring (Max2=lower bound) | 55.14 | 21.19 | 31.48 |
| No anchoring (Max2>lower bound) | 44.67 | 78.81 | 68.52 |
| Total (N=486) | 100.00 | 100.00 | 100.00 |

**Table 11: Estimates for consumers' willingness to pay for organic Chinese kale, jasmine rice and pork**

| | *Model 2 (min, max)* | | |
|---|---|---|---|
| | *Chinese kale* | *Jasmine rice* | *Pork* |
| Median WTP (baht/kg) [1] | 54.37 | 207.20 | 133.49 |
| Mean WTP(baht/kg) [1] | 56.53 | 211.71 | 135.95 |
| Conventional price [2] (baht/kg)[1] | 30.00 | 140.00 | 90.00 |
| Estimated premium[3] (baht/kg)[1] | 26.53 | 71.71 | 45.95 |
| Percentage of premium[4] | 88.43 | 51.22 | 51.06 |
| Percentage distribution of premium[5] (N=486) | | | |
| 25 per cent and less | 10.91 | 23.25 | 21.40 |
| 26 – 50 per cent | 23.46 | 42.18 | 44.86 |
| 51 – 75 per cent | 18.72 | 15.23 | 17.49 |
| 76 – 100 per cent | 18.11 | 9.47 | 9.05 |
| Higher than 100 per cent | 28.81 | 9.88 | 7.20 |

Note: [1]Unit price of the organic jasmine rice is baht/5 kg pack.
[2]Average price of conventional products at the period of surveyed data.
[3]Estimated price premium = Mean WTP – Conventional price.
[4]Percentage of price premium = (Estimated premium*100)/Conventional price.

### 4.2.4 Factors influencing consumers' WTP for organic products

Table 12 summarises the regression results for equation 13. The analysis shows that the *PURCHASE, HEALTH, ETHICS, ENVIRON, QBENEFIT, K_OR, CHILDREN, ELDERLY, HIGHINC* and *CITY* coefficients were significant at the 10 per cent level or better. As hypothesised, the *PURCHASE* coefficient was positively and significantly correlated with the WTP for organic Chinese kale, organic jasmine rice and organic pork. This implies that the respondents who had experience in purchasing organic products were willing to pay more for organic products than other respondents. One possible explanation for this result is that purchasers of organic products appreciate the quality of organic products because of their previous purchase experience. They are thus less concerned about price than other respondents. The result is consistent with the studies by Govindasamy and Italia (1999) and Vanit-Anunchai (2006), who reported that consumers who regularly purchased organic fresh produce were willing to continue to pay a premium price for organic fresh produce.

The *HEALTH* coefficient was positive and significant at the 5 per cent level, which indicates that respondents who were more health conscious and more interested in the quality of food consumed, were more willing to pay a premium price for organic Chinese kale. Batte et al. (2007) also found that health-concern was an important determinant of the willingness to pay for products which

contained high proportions (e.g., 95 per cent) of organic content. Thus, we can conclude that respondents who engaged in health-conscious behaviours (e.g., considering quality of life when making purchases), were more willing to pay a premium price for organic vegetables.

The respondents' willingness to pay for organic jasmine rice was positively related to ethical concerns *(ETHICS)*. This result suggests that the higher the respondents' concern for ethics, the more likely they were willing to pay a premium price for organic jasmine rice. An example of such a concern is consumer attitudes towards GMO foods. In Thailand, consumers obtained information about GMOs through Greenpeace Southeast Asia and the government. These organisations provide information on the risks of GMOs and have reported that several products contained ingredients from soy proteins that were derived from GMOs (Valyasevi, Tanticharoen and Bhumiratana, 2003). The Thai government has decided to ban GMO rice (Gruère and Sengupta 2009), but an experiment with GMO papaya raised consumers' safety concerns for such products. This heightened sensitivity may influence their willingness to pay a premium price for organic rice, thus ensuring that they will be buying GMOs-free rice.

The results show a negative, significant relationship between attitudes to environmental concerns *(ENVIRON)* and consumers' WTP for organic Chinese kale and organic pork. Respondents who were more concerned with the environment were less willing to pay a premium price for organic products. This is a curious result that contrasts with prior studies regarding consumers' WTP for organic products in developed countries such as US and some European countries (see for example, Loureiro, McCluskey and Mittelhammer, 2002; Jill, Kim, and Morteza, 2006). However, Beckmann, Christensen and Christensen (2001) have argued that environmentally friendly behaviour cannot be led by environmental awareness. Rice, Wongtada and Leelakulthanit (1996) provided a good explanation of differences between countries in consumers' purchasing behaviour for environmentally friendly products. The authors found that in Western countries, consumers, who were concerned for the environment, changed their consumption behaviour. They tended to purchase environmental friendly products, in order to preserve the environment. In contrast, consumers in Thailand reported that purchasing green products did not solve environmental problems. The authors argued this may result from the limited availability of environmentally friendly products in the Thailand marketplace and the proportion of consumers expressing a heightened concern for the environment is not large when compared with Western countries.

Perception of the quality benefits of organic products *(QBENEFIT)* was positive and significant at the 1 per cent level. This result implies that the more respondents perceived quality and health benefits from organic products than conventional products (e.g., such products are tastier, have better appearance, offer more nutrients, less chemical residues and have more health benefits), the more likely they were willing to pay a premium price for organic products. This corroborates Loureiro and Hine's (2002) claim that consumers who pay attention to the nutrition and freshness of the products are willing to pay a higher price for organic potatoes.

The results also show that the *K_OR* coefficient was not significant in respondents' WTP for organic Chinese kale and organic jasmine rice. However, the coefficient was significant at the 5 per cent level in respondents' WTP for organic pork. This means respondents who were more knowledgeable about organic products were willing to pay more for organic pork than those who were not. This is because organic meat is either not available or promoted in Thailand markets. Therefore, we can conclude that only respondents who had a good understanding of organic products were willing to pay a higher price for organic pork.

The *CHILDREN, ELDERLY, HIGHINC* and *CITY* coefficients were the only socio-demographic variables that were statistically significant in affecting the consumers' WTP for organic products. However, the *CHILDREN* coefficient was negative, indicating that households with children under 18 years of age

were less likely to pay more for organic Chinese kale than households without children. This is consistent with Huang, Kan, Fu's (1999) findings that consumers with young children were less likely to pay a premium price for safer food (hydroponically grown vegetables). A possible explanation is that families with children tend to have lower levels of disposable income with which to pay a premium price for organic products. With respect to the respondents' age groups, both the *MIDAGE* (35 to 54 years old) and *ELDERLY* (55 years old and over) coefficients were positive, but only *ELDERLY* was significant at the 10 per cent level. This implies that the older the respondents, the more likely they would be willing to pay a premium price for organic jasmine rice. These results are similar to the finding of Misra, Huang and Ott (1991) and Batte et al.'s (2007) studies.

**Table 12: Estimated model for consumers' willingness to pay for organic products**

| *Variables* | organic Chinese kale | | organic jasmine rice | | organic pork | |
|---|---|---|---|---|---|---|
| | *Coefficient* | *Standard error* | *Coefficient* | *Standard error* | *Coefficient* | *Standard error* |
| PURCHASE | 0.0920*** | 0.0291 | 0.0425* | 0.0221 | 0.0360* | 0.0205 |
| HEALTH | 0.0642** | 0.0249 | 0.0119 | 0.0190 | 0.0146 | 0.0177 |
| FSAFETY | -0.0091 | 0.0246 | 0.0063 | 0.0186 | 0.0113 | 0.0173 |
| ETHICS | 0.0225 | 0.0178 | 0.0310** | 0.0135 | 0.0229* | 0.0126 |
| ENVIRON | -0.0507** | 0.0197 | -0.0235 | 0.0150 | -0.0255* | 0.0139 |
| QBENEFIT | 0.0545*** | 0.0203 | 0.0374** | 0.0155 | 0.0398*** | 0.0145 |
| AIPRICE | 0.0033 | 0.0181 | -0.0128 | 0.0137 | -0.0017 | 0.0128 |
| EBENEFIT | -0.0276 | 0.0192 | -0.0119 | 0.0146 | -0.0201 | 0.0136 |
| NSTORE | 0.0160 | 0.0335 | 0.0273 | 0.0252 | 0.0126 | 0.0235 |
| VEGETARI | -0.0337 | 0.0292 | 0.0108 | 0.0220 | -0.0012 | 0.0206 |
| DINEOUT | -0.0114 | 0.0263 | -0.0218 | 0.0199 | -0.0224 | 0.0185 |
| K_OR | 0.0360 | 0.0306 | 0.0211 | 0.0232 | 0.0437** | 0.0216 |
| FEMALE | -0.0168 | 0.0315 | -0.0176 | 0.0240 | 0.0109 | 0.0223 |
| HIGHEDU | -0.0227 | 0.0352 | -0.0263 | 0.0267 | -0.0109 | 0.0248 |
| WCOLLAR | -0.0348 | 0.0374 | -0.0484 | 0.0281 | 0.0047 | 0.0264 |
| MARRIED | 0.0057 | 0.0305 | 0.0057 | 0.0231 | 0.0147 | 0.0216 |
| CHILDREN | -0.0477* | 0.0289 | -0.0445** | 0.0219 | -0.0136 | 0.0204 |
| MIDAGE | 0.0133 | 0.0321 | 0.0320 | 0.0243 | 0.0091 | 0.0226 |
| ELDERLY | 0.0390 | 0.0524 | 0.0679* | 0.0394 | 0.0343 | 0.0368 |
| LOWINC | -0.0511 | 0.0346 | -0.0266 | 0.0260 | -0.0207 | 0.0242 |
| HIGHINC | 0.0574* | 0.0313 | 0.0347 | 0.0237 | 0.0130 | 0.0221 |
| CITY | 0.0390 | 0.0265 | 0.0371* | 0.0201 | 0.0577*** | 0.0187 |
| Scale (bid price) | 0.2508 | 0.0092 | 0.1867 | 0.0075 | 0.1756 | 0.0070 |
| Intercept | 3.7888 | 0.1472 | 5.2190 | 0.1112 | 4.6776 | 0.1034 |
| $LL_{\mathrm{model}}$ | -697.3745 | | -566.958 | | -579.741 | |
| No. of observations | 468 | | 468 | | 468 | |

Note: *, ** and *** indicate the estimated coefficients are significant at the 10, 5 and 1 per cent level, respectively.

With regard to income categories, the low income level variable (*LOWINC*) showed a negative relationship with the consumers' WTP for organic Chinese kale. High income level *(HIGHINC)* showed a positve relationship. This suggests that households with a low monthly income (less than 30,000 baht) are unlikely to purchase organic Chinese kale. Conversely, households with a high monthly income (greater than 60,000 baht) are likely to pay more for organic Chinese kale. This confirms that households with greater financial resources were willing to pay a premium price for organic vegetables. The results are similar to other studies in Thailand. For example, Posria, Shankarb and Chadbunchachaic (2006) stated that the probability of the WTP for safe vegetables increased if the households' income increased. Additionally, Boccaletti and Nardella (2000),

Govindasamy and Italia (1999), and Misra, Huang and Ott (1991) reported that higher income households were more likely to pay a premium price for certified organic produce.

As hypothesised, the *CITY* coefficient is positive and significant at the 10 per cent level. This indicates that respondents who lived in the city (urban areas) were more willing to pay a premium price for organic rice and organic pork than those who lived outside the city (suburban and rural areas). It is noteworthy that most stores selling natural or organic products are located in the city. Thus, urban consumers are much more likely to visit and purchase organic rice than rural consumers.

## 5 Practical implications

The results of this study provide some insight for which marketers might improve their strategies to enhance sales of organic products and to assist farmers or producers to develop effective production strategies for organic products. In addition, policy makers can use some of the findings to frame their policies in developing the domestic organic product market.

The socio-demographic characteristics that influence consumers' willingness to pay a premium price for organic products are a diverse rather than homogenous group. The marketing strategies for introducing organic products to the domestic market are more likely to be succesful if marketers target elderly consumers and families without young children, but with high household incomes. In addition, organic products will be more sellable in urban areas than in suburbs. This has clear implications for distribution strategies and mechanisms.

Policy makers, marketers and producers will be able to persuade more consumers to pay more for organic pork by providing more information and developing educational promotional campaigns. Our empirical results showed that greater knowledge about organic products will not only induce new purchasers to try organic products but will raise the level of money that consumers would be willing to pay for them. Policy makers and marketers should attempt to increase consumers' understanding of the term "organic" by providing information about how organic products are produced and processed. Standardising the term so that it has a consistent meaning and communicating that to the public will be beneficial as well.

Health and food safety consciousness is significantly associated with the willingness to pay for organic vegetables. Therefore, promotional activities focussed on organic products by government agencies and marketers should emphasise the health and food safety attributes of these products. For example, the promotional campaign should emphasise that organic products are safe and produced without synthetic chemical inputs, artificial additives or growth stimulants. Avoiding these substances is important to most consumers who are concerned about health and food scandals.

In addition, improving the perception of the quality and health benefits of organic products (i.e. better taste, more nutrition, less chemical residue) significantly increased consumers' WTP for organic products. The empirical results confirmed that food quality attributes (e.g. freshness, appearance, and nutrition) and the pesticides-free attribute were the most important factors influencing their purchase of food products. Marketing strategies should thus try to increase consumer familiarity with organic products and reinforce the perception that these products are likely to rate higher on the sensory (i.e. taste), nutrition and food safety attributes when compared with conventional products. Such strategies would include providing product samples, promoting trials of the products and communicating consumers' evaluations of the quality of the products. In addition, producers have to improve the quality and safety of organic products to meet consumers' expectations of quality standards.

The promotional campaign to attract new purchasers of organic products should emphasise the environmental benefits of organic products by informing consumers that organic agricultural production conserves national resources and prevents hazardous chemicals entering the environment, compared with conventional agriculture production. Meanwhile, policy makers should

highlight the negative impact of modern agriculture on the environment to raise the environmental awareness among the public.

This study's empirical results also show that ethical concerns with regard to animal welfare and GMOs in food production increased consumers' WTP for organic products, especially rice and meat. At present, government and marketing agencies have aggressively promoted the negative impact of traditional agriculture related to health and safety issues but have neglected to comment on animal welfare and GMOs (Valyasevi, et al., 2003; Gruère and Sengupta, 2009). For example, the government campaign on "food safety" focuses only on public health. Therefore, policy makers should raise consumers' awareness and understanding of animal welfare and potentially hazardous GMOs transfers. This understanding can enhance the perception of organic products' attributes as desirable as well as compatible with a modern lifestyle.

Our analysis also shows that the premium price for organic products hindered consumers' purchases of organic products. The WTP estimates for the three specified organic products (Chinese organic kale, organic jasmine rice, and organic pork) documents that consumers' mean WTP for those products was higher than the corresponding conventional products. Consumers perceive that the gap between the price of organic and conventional products is substantial. Policy makers, marketers and producers should focus on how to reduce the price of organic products to encourage more people to purchase organic products. Thailand's National Agenda on Organic Agriculture was launched in 2005 with several projects focusing on organic farming, the development of quality organic products and promoting organic products (Schröeder and McEachern 2004). There should be continuous support from government agencies and coordination between them. This effort should include the Ministry of Commerce (MOC), MOPH and MOAC. In addition, cooperation and coordination between government agencies and non-government organisation (NGOs) should be considered, aiming to increase the numbers of producers/farmers and sellers of organic products. At the same time, MOAC should provide more monetary (i.e. subsidising costs of organic inspection and certification and organic inputs) and technological support to organic producers. They should also emphasise efforts to convert non-organic producers to organic farming practices. Marketers and producers should improve the efficiency of processing and distribution of organic products. For example, they might focus on reducing the cost of distribution of organic products by establishing direct distribution of organic products, from producers to consumers. Enhancing the availability of organic products with wider distribution should also be considered. Such effort has the potential for lowering the marketing costs, with the result that consumers will be able to purchase organic products at lower prices.

The WTP mean for the three organic products specified in this project were lower than the actual prices of organic products in the market for both purchasers and non-purchasers of organic products. In light of these results, organic products might gain appreciable market share if marketers used a pricing strategy coupled with other elements of a coordinated marketing strategy to encourage consumers to purchase organic products. Such strategies might include an emphasis on price, demonstrating that organic products are not necessarily much more expensive than non-organic alternatives. For example, marketers might offer a sale price on a particular organic product (e.g. vegetables, rice or meat) through supermarkets to induce non-purchasers of organic products (in both upper and lower-income groups) to try organic products. Such experience might lead to a change in preference, and a more comprehensive switch to organic products as a result.

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