

Willingness to pay for organic vegetables in Vietnam:

A rural-urban comparison

Abstract

The organic market has been growing rapidly over the past decade. This paper provides an overview of organic vegetable consumption and compares the determinants of willingness to pay for organic vegetables between rural and urban regions in Vietnam. Data were collected on a quota sample of 498 households from rural and urban regions in Hanoi. We found that price stands out as the most important barrier of organic consumption. In addition, organic purchasers are different from non-organic purchaser in terms of residential location, socio-demographic characteristics, and psychological factors. Using contingent valuation method, our research reveals that there exist the differences as well as the consistencies in the determinants of willingness to pay (WTP) for organic vegetables between the rural and urban region. Household income and perceived use value of organic food increase the WTP in the two regions. In the rural region, the WTP is determined by age, perception of food safety risk of conventional vegetables, and trust in organic label. In the urban region, the WTP is shaped by gender, whether the consumer is an organic purchaser, and environmental value. Hence, policy intervention in organic agriculture and marketing activities should be designed in a way which is tailored to each local context.

Key Words: *Organic food, Environmental concern, Willingness to pay, Contingent valuation, Hanoi*

1 Introduction

Like many transitioned economy, Vietnam has anticipated shifts in food consumption pattern and spending, as a result of structural and institutional changes in the food chain. The share of high-value products in household's food basket is increasing in both rural and urban area (WorldBank, 2016). The demand for safe and high-quality food, such as organic products has been increasing. However, such growing demand is driven by not only the rising living standard but also the concern about environmental problems, and food safety issues have become a public debate in Vietnam.

To protect crop yield in Vietnam, farmers have to rely on pesticides. In addition, the substantial loss of cultural land due to the rapid urbanization and industrialization¹ lead to the intensive use of land, other natural resources, and agrochemicals. Moreover, the lack of knowledge about pesticides of farmers together with the failure of state governance in pesticide use and trade has made the problems even more serious (Van Hoi et al., 2009). As a result, the quantity of pesticide use increased from 15,000 tons in 1991 to 76,000 tons in 2007. The expenditures for pesticide imports increased 9.8 times between 1991 and 2006 (Van Hoi et al., 2009)). Particularly, pesticides use per hectare is highest in the vegetables (Anh, 2002). Subsequently, consumers' concern about food safety, particularly vegetable safety is growing.

¹ The data of Ministry of Natural Resources and Environment indicates that 366000 ha of agriculture land (about 4% of all cultivated land) has been lost from 2001 to 2005. Annually, more than 73000 ha of agricultural land are converted to non-farming land.

Facing emerging environmental and food safety problems, many Vietnamese consumers wish to access healthier and more environmentally friendly food products. This encourages the development of organic agriculture which is characterised by its' free chemical food products that are safe for consumer's health while still protecting producer's health, biodiversity and ecosystem. Particular, with a population of over 90 million and the rise of middle class in not only urban but also rural, Vietnam becomes the potential market of organic food. Having responded to growing demand, organic agricultural land in Vietnam has expanded remarkably, from 11, 365 ha in 2009 to 93,545 ha in 2017 (Willer et al., 2009, 2017). However, there are many barriers preventing consumers from buying organic products. The organic market, therefore, is still a niche one (Truong et al., 2012) and most of organic purchasers are infrequent buyers. To develop organic agriculture, it is important to gain the insight into consumer's preference of organic food in Vietnam.

Vegetable is one of dominant foods in Vietnamese's cuisine. Currently, organic fresh fruits and vegetables dominate household's food basket. This paper aims to provide an overview of organic vegetable consumption and compare the determinants of willingness to pay (WTP) for organic vegetables between rural and urban regions in Vietnam. To make a clear overview, the barriers of organic consumption is identified. Furthermore two consumers' segments: organic purchaser and non-organic purchasers are clarified. The determinant of willingness to pay for each region will be estimated by Contingent Valuation Method (CVM). The paper is organised as follows. The next section presents a previous literature. Section 3 represents methods and data. Section 4 illustrates results and discussions. Concluding remarks and implementations follow in the last section.

2. Related works

From the 90's, food safety incidents have occurred and there has been increasing studies to attempt investigating consumer's behavior and their attitude toward organic food. For examples, Henson (1996) shows that consumption of unsafe food potentially causes significant costs for individuals and their families. Being aware of these costs, consumers will logically take action to protect themselves by being willing to pay (WTP) more of their income for safer food. Henson (1996) argues that WTP for safe food theoretically reflects the value individuals place on food safety improvement. Moreover, the change of welfare is directly measured by the maximum that the average person would be willing to pay to reduce risk, or the minimum compensation he would be willing to accept for an increase in risk (Shogren and Velthuis. 2002).

Existing studies indicate that perception of food safety risk or the concern about food safety has been a main driving force of organic purchase (Yiridoe et al., 2005, Padel and Foster, 2005, Tsakiridou et al., 2008). Tsakiridou et al. (2008) show that health concerns were a strong motivation of organic food consumption. Most respondents were concerned about food safety, and the majority of them consider organic products to be healthier. While organic buyers were more concern about food safety than non-organic buyers, Wandel (1994) and Angulo et al. (2005) found that if risk perception or concern about food safety was not high enough, it would not influence consumers' food choice.

Consumers buy organic products because of their unique perceived values, as compared with conventionally - grown products (Shaharudin et al., 2010, Yiridoe et al., 2005). Organic produces are perceived by consumers to be safer, healthier, tastier, more nutritious, and more environmentally friendly than conventional products. These perceived values are positively associated with purchase intention of organic vegetables (Shaharudin et al., 2010). More specifically, Midmore et al. (2005) categorized various perceived values of organic food into two types: use value and non-use value.

Use value refers to the utilities consumers actually gain from consuming a food such as taste, health and freshness. Non-use values are public good values that are associated with the improved environment and/or animal welfare (Midmore et al, 2005). The authors found that the perceived values of organic food are not equally important. The non-use values were evaluated by consumers to be more important than use values. Being aware of environmental problems caused by conventional agriculture, consumers become more interested in organic products that are environmentally friendly. Krystallis and Chryssohoidis (2005) observe that the number of consumers who are willing to pay for environmentally friendly products is rising. However, there was a high variation in terms of the level of consumer's environmental concern and willingness to pay the premium for environmentally oriented products. Though environmental concern has been found to shape consumer attitudes toward organic produces, many studies have found that it was not an underlying driver of organic food purchase (for example, see Hughner et al, 2007 and references therein). According to Midmore et al. (2005) non-use values solely did not influence consumer's decision making in organic purchase.

There might exist regional differences with regard to behaviour and attitude toward organic food. Sociologist argued that there were disparities between rural and urban people in terms of social interaction, culture, and economic activities in Western countries (Durkheim, 1994, Tönnies, 1878). In developing countries, in particular, the gap in income and education between rural and urban region is widening (Nguyen et al., 2007, Dollar, 2007). Such disparities might explain why urban consumer's attitude toward food safety differs from their urban counterparts in some research. For example, Yazdanpanah et al. (2015) found that urban people had a higher level of perceived benefit of organic food and their willingness to use organic food was higher than rural residents. Similarly, Midmore et al. (2005) and Denver et al. (2007) show that urban household has higher organic shares than rural ones. Although willingness to pay for organic food is likely to be higher in urban area, it is unclear whether the determinants of willingness to pay for organic food of rural consumers differ from those of urban consumers due to a number of barriers to organic purchase. Padel and Foster (2005) point out price is the main reason for not buying organic food, whereas the lack of information and availability were demonstrated by Padel and Foster (2005). In addition, consumer's distrust in the organic label has dampened willingness to pay (WTP) for organic vegetables (Angulo et al., 2005, Yiridoe et al., 2005). The existence of these barriers explains why the organic market is still very small, although a promising growth has been observed worldwide (Padel and Foster, 2005).

Demographic characteristics have been found to affect WTP for organic food. Income is an important determinant of willingness to pay for safe food (Xu and Wu, 2010, Wee et al., 2014, Wu et al., 2012). Laroche et al. (2001) conclude that in most studies, consumers of organic food are females having children. In some studies, younger respondents are likely to willing to pay a higher price for organic products (Yu et al., 2014). Education is found to have an impact on WTP for organic food in some studies (Xu and Wu, 2010) but does not influence WTP in others (Angulo et al., 2005, Krystallis and Chryssohoidis, 2005).

Specifically, related research in Vietnam shows that WTP for organic food is very high. Consumer were willing to pay about 70-80% higher price for organic vegetable than those of regular vegetable (Mergenthaler et al., 2009, Hai et al., 2013). In addition, using Contingent Valuation Method (CVM), most of these studies found a consistent result: food safety concern is a strong predictor of consumer's preference for organic products (Truong et al., 2012, Hai et al., 2013, Khai, 2015). Only one research compares WTP between rural and urban region by treating the region as a dummy variable (Mergenthaler et al., 2009). Like research worldwide, studies that comprehensively compare the determinants of willingness to pay between rural and urban region is lacking in Vietnam.

3 Method and data

3.1 Method

To examine factors affecting willingness to pay (WTP) for organic vegetables, contingent valuation method (CVM) is used. CVM has some advantages: it is time and cost effective. CVM does not require geographical restrictions (Valeeva, 2004), and ensures sufficient variation in data (Kjær, 2005). CVM has been used to elicit WTP for certified traceable vegetables (Xu and Wu, 2010), free pesticide product or organic products (Bazoche et al., 2013, Mergenthaler et al., 2009, Owusua and Anifori, 2013, Sriwaranun et al., 2015).

The product to be selected to reveal WTP is organic choy sum. Selecting a produce which Vietnamese consumers are familiar like choy sum would reduce the bias caused by CVM, as suggested by Hutchinson et al. (1995). Choy sum is presentative for leafy vegetables that present a high potential of being contaminated by pesticides and bacteria. We argue that, when conventionally grown choy sum is perceived to be unsafe by consumers, consumers would be motivated to shift to an organic one. Hence, this would improve the quality of WTP estimation.

To elicit the WTP for organic choy sum, we utilize a double-bounded dichotomous choice technique CVM, proposed by Hanemann et al. (1991). This technique reduces surveying time, is simple for respondents to answer, more statistical efficiency and can capture more information than a single-bounded approach (Hai et al., 2013, Liou, 2015, Hanemann et al., 1991). With double-bounded dichotomous, respondents will be confronted with two consecutive bids. If the respondent says “yes” for the first bid (P^*), the second higher bid (P^h) will be given. If she/he says “no” for the first bid, the second lower bid (P^l) will be asked. Thus, there are four possible responses: Yes-Yes, Yes-No, No-Yes, and No-No.

The WTP of a consumer is estimated as flows:

$$WTP^* = x\beta + \varepsilon,$$

where x is a vector of the explanatory variable shown in Table 2, β is a vector of the coefficient and ε is an error term.

Since WTP^* is unobserved, it can be estimated based on the range of observed data identified.

If the two responses are Yes-Yes, $WTP > (P^h)$.

For the Yes-No responses, $P^* < WTP < P^h$.

Regarding the No-Yes responses, $P^l < WTP < P^*$, and for the No-No responses, $WTP < P^l$.

Hence, a log-likelihood function below can be used to estimate WTP:

$$\begin{aligned} \text{LnL} = \sum_1^n & \left[d_j^{yy} \ln \left(1 - \Phi \left(\frac{P^h - \beta x}{\sigma} \right) \right) + d_j^{yn} \ln \left(\Phi \left(\frac{P^h - \beta x}{\sigma} \right) - \Phi \left(\frac{P^* - \beta x}{\sigma} \right) \right) + d_j^{ny} \ln \left(\Phi \left(\frac{P^* - \beta x}{\sigma} \right) - \right. \right. \\ & \left. \left. \Phi \left(\frac{P^l - \beta x}{\sigma} \right) \right) + d_j^{nn} \ln \left(\Phi \left(\frac{P^l - \beta x}{\sigma} \right) \right) \right] \end{aligned}$$

where Φ is the standard normal distribution function, n is the number of observations, d_j^{yy} , d_j^{yn} , d_j^{ny} , d_j^{nn} are dummy variables presenting “Yes-Yes”, “Yes-No”, “No-Yes” and “No-No” answers of respondent j^{th} , respectively. If a respondent selects “Yes-Yes”, $d_j^{yy}=1$ and others equal zero.

Mean WTP is calculated as $E(WTP) = \hat{\beta} \cdot \bar{x}$

As data on organic food at market level are not available, we collected data through a questionnaire survey. During survey development, we randomly selected representatives to conduct interviews. Five sets of bid A, B, C, D, and E were determined, based on the information from a pilot survey on 30 respondents. In this pilot survey, the maximum WTP is 50,000 VND and 70% of the respondents expressed their maximum WTP in the range from 15,000 VND to 30,000 VND. Hence, among 5 sets of bid designed, 4 of them had initial bid (P^*) ranged between 15,000 VND to 30,000 VND and the largest higher bid (P^h) is 43,000 VND, smaller than 50,000 VND. Then 5 sets of bid were randomly distributed in the whole sample. In addition, to underline inconsistent response, an open-ended question conveying the maximum WTP amount was given after the second bid was asked. Table 1 presents a bid design.

Table 1: Bid design

Bid name	Initial bid(VND)	Lower bid(VND)	Higher bid (VND)	Number of respondents answer the bid	% of respondents within the group (A,B,C, D, or E) say “Yes” with initial bid
A	15,000	11,000	19,000	103	85.44
B	20,000	15,000	25,000	98	65.31
C	25,000	19,000	31,000	90	54.44
D	30,000	23,000	37,000	122	42.62
E	35,000	27,000	43,000	103	32.94

Ones can easily see from Table 1 that the proportion of positive answer for initial bid decreases when the value of initial bid increases.

3.2 Description of study area and characteristics of sample consumers

Hanoi - the capital of Vietnam, has a population of about 7.5 million with 30 districts, was chosen as a case study. The consumer survey was conducted from February to April 2017. The sample was selected from 7 districts including 4 urban (Ha Dong, Long Bien, Thanh Xuan, Hai Ba Trung), 01 semi-urban (Gia Lam), and 2 rural districts (Chuong My, Dong Anh). These districts are representative of Hanoi in terms of social, economic development and geographical characteristics.

We used quota sampling (Kothari, 2004) to select 498 respondents including 230 rural and 268 urban people. To reduce sampling bias, the diversity of the sample had been taken by selecting respondents from different income levels, education, age, and employment in the same district. Only consumers who were at least 18 years old and were main food shoppers of the family were invited to participate in the survey. Face - to - face interview was conducted in respondent’s house to create a comfortable environment for the respondents. Table 2 represents the background information of the sample survey. It also reflects the regional inequality which is a current problem in Vietnam.

As shown in Table 2, there is a gap in income and education between the rural and urban region. Urban respondent’s monthly income and their household monthly expense nearly doubled rural participants.

In average, most of the rural consumer had a high school qualification while majority consumers in the urban region held a university degree. The family structure was also different between the two regions. Urban families were characterized by younger main food shoppers, having more children, and smaller household size, as compared with rural households. We expect that such regional differences and/or inequality might lead to the difference in willingness to pay for organic food.

Table 2: Background information on the respondents and their household by region

Features	Rural (Mean & Std.)	Urban (Mean & Std.)
Repondent's monthly income (million VND)	4.958* [2.98]	9.74*[6.6]
Age	46.00* [13.93]	38.32* [10.06]
Education level	2.87* [1.17]	3.90*[1.90]
Gender (1= male)	.12 [.33]	.12[.33]
Number of children in the household	1.13* [.97]	1.38*[.85]
Household size	4.63* [1.60]	4.22*[1.12]
Household monthly expense (million VND)	6.09* [3.89]	11.46* [5.79]

Note: 22 000 VND = 1 USD,

*: statistically significantly different at 5% using independent sample t-test.

Numbers in brackets are standard deviation

Education levels are coded from 1(no schooling) to 6 (postgraduate qualification)

3.3 Description of variables used

Table 3 represent independent variables that are used to estimate WTP for organic vegetables. Most of the sociodemographic variables (except age, income) are dummy variables. The rests reflect perception and attitudes that are measured by a 10 point Likert scale. The 10 point- scale is easy for the respondents to answer since it will remind them of the academic grading system of 10 point- scale in Vietnam which they are familiar.

Table 3: Variables and variable definition

Variable	Variable definition	Scale
Gender	Respondent's gender (=1 if male, =0 if otherwise)	[0-1]
Age	Respondent's age (years)	
University	Respondent's education(=1 if graduate university and/or postgraduate	[1-6]
Income	Monthly family income (million VND)	
Children	The presence of children in the household (=1 if have at least 1 child)	[0-1]
Organic purchaser	=1 if the respondent is an organic purchaser	[0-1]
Risk Perception	Perception of food safety risk from conventional vegetables	[1-10]
Use Value	Perceived health value of organic vegetables	[1-10]
	Perceived safety value of organic vegetables	[1-10]
	Perceived taste value of organic vegetables	[1-10]
Environmental Value	Perceived environmental value of organic vegetables	[1-10]
Trust label	Trust in organic label	[1-10]

Being in line with previous literature such as Rosati and Saba (2004), risk perception was measured by the mean of perceived risk. Consumers were asked, "To what extent do you think that eating

conventional vegetables might cause the health risk to you”. The responses are coded from 1 (not risky at all) to 10 (extremely risky).

Particularly, we used 3 question items to capture different aspects of use values of organic produces including health, safety, and taste. Then, use value is calculated by the average score of these three items. To capture environmental value, the respondents were asked: To what extent do you think that organic vegetables are good for the environment. The answers were ranged from 1 (not good at all) to 10 (extremely good). Similarly, trust is measured by a 10 point- scale with 1 meaning “no trust at all” and 10 meaning “completely trust”.

4. Results and discussions

This section presents the statistical results and primary discussions, based on the data survey.

4.1 An overview of organic vegetable consumption

The market share of organic food is small in Vietnam. Only one-third of consumers surveyed were organic purchasers and most of them (60%) just bought organic vegetables once or twice per month. It is estimated that the share of household’s traceable vegetable consumption (including “safe”, “VietGap” and “Organic” labels) was very marginal, just about 10.7 %. Being consistent with Mergenthaler et al. (2009), and Nguyen (2011), we found that organic market in Vietnam is still a niche one.

To promote the organic agriculture in Vietnam, it is important to identify barriers to organic consumption. Hence, if the respondent was not an organic buyer, we asked them about the barriers of their organic consumption. In total, there were 323 of non-organic purchasers surveyed including 192 rural and 131 urban consumers (Table 4). Many barriers are found, as shown in Table 4. In the whole sample, the most common barrier was the high price of organic vegetables that were reported by two-thirds of survey participants. The lack of information and the unavailability of organic food was the second and third important barrier, respectively. Like consumers worldwide, the main barriers that hinder Vietnamese consumer from buying organic food are high price, insufficient information acquisition, unavailability, and inconvenience.

Table 4: Percentage of non-organic purchasers reported reasons for not buying organic vegetables

Why don't you buy organic vegetables?	Whole sample (n= 323)	Rural (n= 192)	Urban (n=131)
Organic vegetables are unavailable	39.3	48.4*	26.0*
Organic vegetables are very expensive	70.2	76.04*	61.83*
I do not believe in quality of organic vegetables	4.6	5.2	3.8
I don't know about organic vegetables	46.74	52.6*	38.2*
The organic shop is too far	41.48	42.7	38.9
Organic vegetables are not various	7.1	6.2	8.4

Note: *: statistically significantly different at 5%

Comparing between rural and urban region, unsurprisingly, the percentage of non-organic consumers were statistically significantly different between the two regions. A higher proportion of non-organic purchasers in the rural region expressed obstacles regarding availability, price, information, as compared with the urban region. It suggests that the access to organic food in the rural region is more difficult than urban region. This is because supermarkets and other modern retail channels have not

developed in the rural region. In addition, although the infrastructure system in the rural region has been regularly upgraded in Hanoi, the lack of public transportations and the financial constraints in this area might make the access to organic food become tough. Moreover, it can be seen that consumers, particularly rural consumers are not well informed about organic food. Hence, to boost the demand for organic food, it is crucial for the Vietnamese government and actors involving in organic initiatives to enhance information provision about organic food.

Table 5 presents the characteristics of two consumer segments: organic buyers and non-organic buyers. One can easily see from Table 5 that organic purchasers were very identical from non-organic purchasers, since the mean of all the variables is statistically significantly different between the two segments.

Table 5: The characteristic of organic consumers and non-organic purchasers

Indicators	Non-organic purchaser (n=324)		Organic purchaser (n=173)	
	Mean	Std. Dev	Mean	Std. Dev
Region (=1 if living in urban)	.39*	.48	.8035*	.398
Age	44.30*	13.55	37.38*	9.002
Education	3.09*	1.17	4.05*	.820
Number of children in the family	1.19*	.96	1.39*	.818
Number of elderly in the family	.63*	.82	.40*	.697
Individual monthly income (VND million)	6.41*	4.76	9.63*	6.94
Household expense(VND million/month)	7.74*	4.80	11.30*	6.42
Information	3.59*	.80	3.76*	.74
Vegetable risk perceived	6.95*	1.98	7.46*	2.03
Organic value perceived	6.52*	1.84	7.11*	1.70
Trust organic label	4.75*	2.46	5.95*	1.91

*: statistically significantly different at 5%

4.2 The determinants of WTP for organic vegetables

Table 6 shows that factors affecting WTP for organic vegetables are different between the two regions. In the urban region, gender has a significant and strongest effect on the WTP. Being female would increase 4,850 VND WTP for organic vegetables. The same with the result from previous studies, our urban data demonstrates that women are willing to pay a higher price for organic food. Woman's role in the family and their perceived control over the risk might explain such behavior. Lin (1995) highlighted that women tend to be more responsible to ensure food safety of their family than men as they are meal planners who play the role as household's gatekeepers to select and determine the content, preparation and consumption of food in households. In addition, women view the world as more dangerous than men because in many ways they are more vulnerable, they benefit less from many of its

technology and institution, as they have less power and control (Flynn et al., 1994). However, in the rural area, the coefficient of gender is not statistically significant.

Age is positively associated with WTP for organic vegetables in the rural area while it is not related to the WTP in the urban region. However, in the rural area, the effect of age on WTP is very small. The increase of 1 year of age will lead to the increase of only 92.5 VND in WTP. Perhaps, older rural people believe that they are more vulnerable to risk associated with food than younger ones. Therefore, they are more motivated to buy organic food.

Being consistent with many studies (Khai, 2015, Yiridoe et al., 2005, Owusua and Anifori, 2013), this study found that income exhibits a positive significant relationship with the WTP for organic food in both regions. Particularly, in the rural area, income has a stronger effect on the WTP than urban region. An additional 1 million VND of family expenditure would increase WTP by 580 VND in the rural region while the corresponding figure for the urban region is only 153 VND. This implies that with the same level of income increase, the growth in income in the rural region might cause a stronger push in the organic market.

Interestingly, while the number of children in the household and education level is higher in organic purchaser group, as compared with non-organic purchaser one (Table 5), the presence of children and education level are not related with WTP for organic vegetables. Regarding the former variable, perhaps, for the consumers who have already purchased organic food, the concern about children's health might be an initial motivation of organic purchase. Therefore, the change of organic price might not affect much their decision making toward organic purchase, since ensuring their children health is their priority. Hence, the presence of children is not a determinant of WTP. In terms of education, our research somehow provides a different result, as compared with related research in Vietnam such as Khai (2015), Hai et al. (2013), and Khai (2015) who consistently reported that education positively influenced WTP for organic.

Being an organic purchaser causes an effect on the WTP in the urban but not rural region. Our research reveals that urban region has more organic consumers. In addition, the share of traceable food including organic food in household's food basket is higher than that of the rural region (29% in urban households, and 16.7% in rural households that have already consumed organic food). Therefore, urban organic buyers might know more about organic food and have a higher level of trust in organic food than people who are not organic purchasers in the region. This might constitute the significant relationship between whether being organic purchaser with the WTP in the urban region.

Risk perception determines the WTP in the rural region rather than the urban area. Regarding rural region, we argue that risk perception in the rural region might be higher than consumer's acceptable level, therefore, it influences the WTP. Relating urban region, perhaps, other factors, rather than risk perception might have an impact on food choices such as price, product performance, and food preference, as suggested by Angulo et al. (2005). That is why although food safety risk perception of the urban consumer is very high and higher than rural residents (the mean of food safety risk perceived of rural and urban consumers are 6.7 and 7.4, respectively), the majority of them were not willing to pay for organic food.

As expected, perceived use values of organic food is an important determinant of the WTP in both the regions. The impact of this variable on the WTP is higher in the rural region. In addition, it is worth noting that within the region, perceived use values have a larger effect on the WTP than environmental value. This suggests a practical implication. To attract more customers, it is important for organic food producers and retailers to enhance the communication about the values of organic products that are appreciated by consumers.

Perceived environmental value is an important predictor of urban consumers' WTP but does not relate to rural consumers' WTP. Interestingly, our data reveals that the mean of perceived environmental values of rural consumers and urban consumers both are quite high (7.4 versus 7.5) but not statistically significantly different. Wandel (1994) and Vindigni et al., (2002) offer an insight into these results. The author noted that the fact that people often worry about an environment issue does not necessarily mean that this issue would significantly determine their food choices. This is because there is a trade-off between perceived environmental values from a product with other perceived value, such as its convenience, price and quality attributes. In our study, although rural and urban consumers are concern about environmental problems and appreciate the environmental value of organic food, only urban consumers consider environmental value when purchasing organic food. In contrast, rural consumers might sacrifice the environmental value for the exchange of other values of organic food.

Although trust in organic label is similar and at a neutral level in the both regions (mean of trust is 5.1), it increases the WTP in the rural region only. Hence, the improvement of organic labelling will lead to the increase in demand for organic food in the rural region.

Table 6: The determinants of WTP for organic vegetables by region

Variable	Rural model (n=230)	Urban model (n=268)
Gender	46.99 [2075.93]	-4850.01** [2107.432]
Age	92.15* [57.38]	-59.03 [77.61]
University	30.70 [1933.73]	2795.93 [1906.86]
Income	582.62** [200.38]	153.12** [127.5]
Children	1857.86 [1611.93]	359.07 [1848.03]
Organic purchaser	1130.55 [2051.91]	3390.718** [1566.23]
Risk Perception	2335.95*** [727.38]	799.19 [813.34]
Use Value	2156.03*** [606.76]	1964.33** [772.73]
Environmental Value	668.73 [528.95]	1133.42* [629.02]
Trust label	1002.666** [340.86]	454.542 [352.47]
Constant	8982.649*** [5209.88]	10123.45 ** [5555.78]
Log likelihood	-264.74351	-331.1199
Chi ²	45.2	38.56

*Note: *, **, ***: Statistical significant at the 10%, 5%, and 1% level, respectively
Coefficients are evaluated at sample means, therefore, can be interpreted as marginal effect on WTP
Numbers in brackets are standard errors*

5 Concluding remarks and implementations

Based on the questionnaire survey data of 498 respondents in Hanoi, this paper examines the WTP for organic vegetables and provides references for the government to assist with the formulation of relevant policies. This study applies a double-bounded dichotomous choice method to estimate WTP for one of organic vegetable systems, the organic choy sum, in Vietnam.

To be in line with previous research, our study reveals that there are many barriers that hinder Vietnamese consumers from purchasing organic vegetables. Among these barriers, price stands out as the most important one. Thus, to support organic agriculture which is a pathway to sustainable development, reducing organic price is a key solution. This can be done by reducing certification cost. Currently, Vietnam has no national certification body, therefore organic producers have to rely on international certification organizations that are costly.

In order to develop the organic market in Hanoi and Vietnam, it is important to identify characteristics of target consumers. Organic purchasers were characterized by their urban residential location. They were younger, had more children, and better education and income than non-organic purchasers. Their obtained information about food poisoning more frequently, therefore, they perceived a higher level of vegetable risk. Their trust on the organic label and their perceived value of organic vegetables were also higher than non-organic buyers.

To inform an effective organic agriculture policy which is tailored to local text, rural-urban differences and/or similarities in WTP for organic food should be investigated. Our study found that there exist the differences as well as the consistencies with regard to factors influencing the WTP between the rural and urban region. Unsurprisingly, household income and perceived use value of organic food increase the WTP in the two regions. In the rural region, the WTP is determined by age, perception of food safety risk of conventional vegetables, and trust in organic label. In the urban region, the WTP is shaped by gender, whether the consumer is an organic purchaser, and environmental value. Hence, better communication about the use values of organic food will improve consumer's knowledge, then translate into the growth in the demand for organic food in the two regions. In the rural region, restoring consumer's trust in food label by providing accurate information on organic label is important as trust is low and strongly affect the WTP for organic food. Furthermore, marketing strategies should be suitable for each local context: attracting old consumers in rural areas and attracting female customers in the urban region.

In addition, we found that while purchasing organic food, consumers consider a balance among competitive attributes or values of the organic produce. Although they acknowledge the environmental value of organic farming, this attitude does not always transform into the actual behaviour: the willingness to pay for organic food, as there is a trade-off between environmental values with other values in the same organic product. More research is required to intensively explore such trade-off in Vietnam.

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