Consumer Willingness to Pay a Premium for Organic Fruit and Vegetable in Ghana

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Abstract

This paper analyzes the willingness of consumers to pay a premium for organic watermelon and lettuce using contingent valuation data from urban Kumasi in Ghana. The effects of the determinants of consumer willingness to pay a premium are estimated with a bivariate Tobit model. The empirical findings indicate that in addition to socioeconomic characteristics, product freshness and cleanness tend to have positive effects on consumer willingness to pay a premium for organic watermelon compared to conventional watermelon. Whereas product size has a negative influence on consumer willingness to pay premium for organic lettuce, less insect damage to vegetables tends to have a positive effect. The study estimates the willingness to pay a premium for organic watermelon/lettuce compared to conventional watermelon/lettuce. The estimated mean consumer willingness to pay premium for 1 kilogram of organic watermelon is GH¢0.5554 (US$ 0.4575) and that of organic lettuce is GH¢1.2579 (US$1.0361).

Keywords: Africa, consumer perceptions, Ghana, organic foods, willingness-to-pay

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Introduction

Organic fruits and vegetables are the fruits and vegetables like watermelon and lettuce which are produced without the use of chemical fertilizers and pesticides. Due to food safety and environmental quality concerns, policy makers worldwide are attaching more importance to the production and consumption of such food products. The consumption of fresh organic food products could enhance the prevention of some of the health hazards associated with the consumption of conventional foods. Indeed, the risk of consuming conventional foods in Africa including Ghana could be traced to inappropriate use of chemical pesticides and inorganic fertilizers by agricultural producers who may or may not be aware of the associated health hazards of the chemical residues (Nouhoheflin et al. 2004).

Fresh organic fruits and vegetables could contribute significantly to employment generation, wealth creation and poverty alleviation in Ghana since they constitute important raw materials for the local food industries as well as the fast growing restaurants and supermarkets in the country (Nouhoheflin et al. 2004; Norman 2007). Organic production requires fewer inputs (energy, pesticides and so on) and tends to improve soil quality (Hole et al. 2005; Dabbert 2006). Moreover the multiplying effect on farmers' income depending on the income inequality could reduce poverty. Traditionally, households in Ghana have consumed conventional fruits and vegetables. An important approach to achieve food safety and minimize the health hazards associated with fruit and vegetable consumption is the promotion of consumption of organic fruits and vegetables in the country. This in turn requires reliable information on consumer willingness to pay a premium for organic fruits and vegetables (specifically, watermelon and lettuce) and their determinants in Ghana.

In spite of the numerous advantages of consumption of organic food products, information on their market demand and prospects in Ghana appear to be limited (IFOAM 2003). A number of consumer studies have examined the consumption of organic food products in developed countries (Wier and Calverly 2002; Cranfield and Magnusson 2003). However, few consumer studies on organic food products exist in Ghana (Nouhoheflin et al. 2004) and other developing economies (Piyasiri and Ariyawardana 2002; Rodriguez et al. 2007; Aryal et al. 2009). In particular, issues concerning consumer willingness to pay (WTP) a premium for organic fruits and vegetables compared to conventional fruits and vegetables in Ghana have not been rigorously addressed.

The main goal of the present paper therefore is to analyze the willingness of consumers to pay a premium for organic watermelon and lettuce in the Kumasi Metropolis of Ghana. The paper contributes to the literature on consumer preference for organic food products in Africa. The main hypothesis tested is that apart from socioeconomic characteristics of consumers, consumer perceptions concerning product attributes tend to influence consumer willingness to pay (WTP) a premium for organic watermelon and lettuce compared to conventional watermelon and lettuce.

The next section briefly discusses the literature on consumer WTP a premium for organic food products. Section 3 presents the theoretical foundation and the empirical model. Section 4 describes the data employed. Section 5 discusses the empirical results. Section 6 discusses implications of the study for managers and scholars. Section 7 provides the concluding remarks.

Literature on Consumer Willingness to Pay a Premium for Organic Foods

Consumer demand for organic products has received some attention in the consumer choice literature. Various authors have employed different techniques such as contingent valuation (Misra et al. 1991; Boccaletti and Nardella 2000; Gil et al. 2000; Krystallis and Chryssohoidis 2005), choice experiments (Wang and Sun 2003; Stolz et al. 2011) and hedonic pricing approach (Nouhoheflin et al. 2004). In contingent valuation surveys, hypothetical markets are set up in which consumer willingness to pay for products are solicited by asking respondents to value the products contingent on the available market. Where market prices already exist for the product, contingent valuation surveys tend to focus on the premiums that consumers are willing to pay for the product. Some contingent valuation surveys have employed the single-bounded approach where individuals are offered only one bid to pay or reject (see for instance, Haghiri et al. 2009). The doubled-bounded approach employed in this study is often used extensively in valuing nonmarket goods because it incorporates more information on individuals WTP. Also it provides more efficient estimates and tighter confidence intervals (Hanemann et al. 1991). With regards to the choice experiments (CV), one drawback is that different food quality attributes are assumed to be independent of attributes that are not provided to respondents in the survey or experiment (Gao and Schroeder 2009). The hedonic pricing approach on the other hand, imputes prices of attributes based on the relationship between the observed prices of differentiated products and the number of attributes associated with these products. However, it provides very little guidance on the choice of the proper functional form and as such may lead to inconsistent estimates.

Misra et al. (1991) and Boccaletti and Nardella (2000) used contingent valuation and analyzed consumer willingness to pay for pesticide-free fruits and vegetables in Italy and the United States of America. Gil et al. (2000) employed contingent valuation and found that the willingness of consumers to pay premiums for organic fruits and vegetables was high in Spain. With choice experiment (CE), Wang and Sun (2003) examined consumer preferences and demand for organic apples and milk in a conjoint analysis framework. Stolz et al. (2011) employed latent class models and established that consumers who strongly prefer organic products are less price sensitive than those who prefer conventional products. Nouhoheflin et al. (2004) employed the hedonic pricing approach, which is an indirect method of valuation, to assess consumer perceptions and willingness to pay premiums for organic vegetables compared to conventional vegetables in Benin and Ghana. Their empirical findings revealed a consumer willingness to pay of more than 50 percent price premium for chemical-free vegetables.

Other studies have analyzed consumer preferences for organic products on the market with various statistical techniques. Employing a two-limit Tobit model, Gifford and Bernard (2006) found out that the likelihood that consumers will purchase organic foods is influenced by the potential benefits from organic methods and perceived risk from conventional agricultural methods. Briz and Ward (2009) applied a multinomial logit model in their study on consumer awareness of organic products, and found out that awareness of organically-produced foods alone does not necessarily translate into actual consumption. Rather, the demand for organically grown products is achieved through understanding the linkages between the awareness and purchasing decisions of the consumer. Verhoef (2005) investigated consumer purchases of organic meat with a probit model and found out that not only are rational economic motives

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necessary for consumers to pay premiums for organic products, but emotional motives such as fear, empathy and guilt are relevant. Michaelidou and Hassan (2010) examined the factors which affect rural consumer purchase of organic and free-range produce in Scotland and found direct relationships between consumer attitudes toward organic food and factors such as food safety concerns, ethical lifestyle and price perceptions. Cranfield and Magnusson (2003) analyzed Canadian consumer's willingness-to-pay for pesticide free food products with an ordered probit model. While the use of the ordered probit model is novel, such an analysis cannot lead to the estimation of a premium; it can only lead to what is associated with being in one of the WTP categories.

Empirical literature on consumer surveys reveal that consumers' socio-economic characteristics such as age, gender, level of education, income level, household size as well as the level of consumers' awareness and perceptions, product price, taste, size, freshness and cleanness tend to influence consumers' willingness to pay (WTP) for organic food products. Govindasamy and Italia (1999) showed that younger consumers, regardless of gender, paid higher premiums for organic products. Consistent with this finding, Liu et al. (2009) found an inverted-U-shape relationship between age and consumer WTP, indicating that WTP for additive free foods increases with age but decreases as age increases beyond a threshold age. However, Darby et al. (2008) found no significant impact of age on consumer WTP. Some consumer studies have shown females in particular to be more willing to pay higher premiums for safe foods (Williams and Hammitt 2000; Williams and Hammitt 2001; Liu et al. 2009). Darby et al. (2008) and Liu et al. (2009) found education to be positively correlated with WTP statistically.

Empirical results on the effect of income on consumer WTP for safety foods appear to be mixed. Since consumer WTP for food safety is negatively correlated with the marginal utility of money, consumer WTP is expected to increase as income of the consumer increases (Liu et al. 2009). Other empirical studies did not find income as a significant determinant of consumer WTP for organic food products (Darby et al. 2008; Voon et al. 2011). In a study on multi-ingredient organic foods, Batte et al. (2007) observed that shoppers who were aware of the National Organic Program on organic seal for food products were more willing to pay a premium price. Concurring with this proposition, Liu et al. (2009) pointed out that the level of consumers' cognition of food safety has a positive impact on WTP. Michaelidou and Hassan (2008) argue that consumers are more likely to develop positive attitudes toward the health enhancing attributes of organic food since organic food is generally regarded as more nutritious and safer than conventionally-produced food.

In addition to these factors, literature suggest that apart from consumer perceptions on private effects such as health , taste and quality, external effects such as impact on soil quality, energy use and biodiversity also matter in consumer preferences for organic foods (Stolze et al. 2000; Bengtsson et al. 2005; Hole et al. 2005). Dabbert (2006) for instance argued out that consumer perception on external effects such as ground and surface water, climate and air, farm input and output, animal health and welfare are relevant consideration in consumer choices for organic foods.

Rigorous consumer studies on organic products have not paid adequate attention to sub-Saharan Africa, and for that matter Ghana, making market information on organic products scanty. The

present paper therefore contributes to a better understanding of consumer choice of organic products in Africa. It provides empirical estimates of consumer willingness to pay premiums for organic watermelon and lettuce compared to conventional watermelon and lettuce in Kumasi, Ghana by emphasizing that apart from consumer socioeconomic characteristics, consumer perceptions of organic food attributes influence consumer preferences for organic fruits and vegetables.

Theoretical Foundation and the Empirical Model

Consumers generally face a two-fold choice decision. This comprises the specific good to choose and how much to consume of the chosen good. Consumer willingness to pay a premium for a particular good is considered as a choice problem within the framework of consumer-stated preference. This method assesses the value of non-market goods by using individuals' stated behavior in a hypothetical setting. Revealed preference, on the other hand, assesses the value of non-market goods by using the actual (revealed) behavior on a closely related market.

A rational consumer i is assumed to choose from a bundle of organic agricultural product (γ^1) and conventional product (γ^0) that gives the higher utility. Thus, the consumer is willing to pay a premium for a given organic food product if the expected utility of consuming the organic product $E[\Omega(\gamma^1)_i]$ is positive and exceeds the expected utility of consuming the conventional food product $E[\Omega(\gamma^0)_i]$. Consumer WTP a premium for a food product is specified as a function of a change in utility arising out of the consumer choice: $\text{WTP} = h[\Delta\Omega(\gamma)]$, where $\Delta\Omega(\gamma)$ is the change in utility and $h' > 0$. Notably, the consumer chooses the organic food γ^1 over the conventional food γ^0 if the change in utility is positive $\left[\Delta\Omega(\gamma) = \Omega(\gamma^1) - \Omega(\gamma^0) > 0\right]$ for all $\gamma^1 \neq \gamma^0$. The utility of the consumer is however not observable. What is observed is whether or not the consumer chooses to pay a premium for the organic product. To analyze this consumer choice behavior, the present paper employs the double-bounded dichotomous choice framework proposed by Hanemann et al. (1991).

With the double-bounded dichotomous choice approach, two consecutive bids are proposed to a consumer. The second bid is contingent upon the response to the first bid. The consumer who responds "*YES*" to the first bid P_i^1 is presented with a second higher bid P_i^{2H} (that is $P_i^{2H} > P_i^1$). A bid is the price of the organic food proposed to the respondent. If the response to the first bid is "*NO*", the respondent is presented with a second lower bid P_i^{2L} (that is $P_i^{2L} < P_i^1$). The possible outcomes are the responses "*YES − YES*", "*YES − NO*", "*NO − YES*" and "*NO − NO*".

The present paper employs a bivariate Tobit model to quantify the effects of the determinants of WTP premiums. This approach is justified because it takes account of the possible zero WTP responses; it also takes account of the joint cross-equation correlation among the WTP premiums for organic watermelon and lettuce (Blundell and Meghir 1987; Carlsson and Johansson-Sterman 2000; Greene 2008). Theoretically, consumers who eat lettuce as salad tend to eat fresh watermelon as dissert. In the tropics, people tend to prefer fresh watermelon as it compensates

for the loss of water from the body due to the high temperatures. Consumption of fruits and vegetables has also increased in Ghana of late due to the government's effort of encouraging consumers to be nutritionally conscious in their dietary intakes. The bivariate Tobit model for organic watermelon and lettuce is expressed in Equation (1):

(1) $$R_{ij} = \begin{cases} R_{ij}^* = Z_{ij}\beta + \varepsilon_{ij}, & \text{if } R_{ij}^* > 0; \ \varepsilon_{ij} \sim MVN(0,\Sigma); \ j=\text{organic water melon, organic lettuce} \\ 0, & \text{if } R_{ij}^* \leq 0 \end{cases}$$

where R_{ij} is a censored dependent variable indicating the proposed premium or monetary amount in Ghana Cedis per kilogram (GH¢/kg) that a consumer i who responds "$YES-YES$" or "$YES-NO$" or "$NO-YES$" to the two bids is willing to pay for the organic food product j, and zero observation for a consumer i who responds "$NO-NO$" to the two bids. β is a vector of parameters to be estimated, Z_i summarizes the consumer specific socioeconomic characteristics, consumer awareness of organic fruits and vegetables and consumer perceptions of organic food attributes, and ε_{ij} is an error term which is multivariate normally distributed.

The consumer specific socioeconomic characteristics investigated in the WTP models include age, gender, marital status, number of years of schooling, children (specifically, whether a household has children below 15 years of age), and income levels (specifically, low, middle and high income). Consumer awareness includes awareness of organic food products and awareness of chemical residues in conventional foods. Also investigated in the WTP models are the consumer perceptions (specifically, concerning price and taste of organic foods) and consumer attitudes toward organic food attributes (specifically, product freshness, size, cleanness and insect damage).

Higher educated consumers are expected to pay higher price premiums for organic foods since they tend to appreciate issues of preventive health care through the consumption of chemically-free food products better than consumers with no education (Piyasiri and Ariyawardana 2002, Haghiri et al. 2009). Children within different age cluster groups are expected to influence their parents' WTP premiums for food products due to the differences in the nutrition intake of children and the cost of raising them (Lino and Carlson 2009). For instance, parents with children less than 15 years of age are expected to pay higher premium prices for organic fruits and vegetables compared to conventional fruits and vegetables. The income variables (higher and middle income) are expected to be positively related to the WTP premiums for organic fruits and vegetables compared to conventional fruits and vegetables in order to agree with economic theory (Asafu-Adjaye 2000). It is therefore hypothesized that high affordability will positively impact willingness to pay for organic foods compared to conventional foods (Voon et al. 2011). The taste and price perception dummy variables are expected to have positive relationships with the WTP premiums for organic foods compared to conventional foods. Freshness, cleanness, size and less insect damage of organic fruits and vegetables are product attributes hypothesized to have positive effects on WTP premiums. The estimated WTP premium price for organic watermelon or organic lettuce is the predicted premium bid in Ghana Cedis per kilogram (GH¢/kg) of the dependent variable of each WTP regression model. The conventional GHK–algorithm is employed to estimate the model (Train 2003).

The Survey Design, Sampling Method and Data

The data employed in this paper comes from a contingent valuation survey conducted among consumers in the Kumasi Metropolis of Ghana in 2008. While the sample used in this study is not representative of Ghana, Kumasi is the second largest and one of the fastest growing urban centers in Ghana. With an estimated population of 1.2 million and an annual growth rate of 2.6 percent (Ghana Statistical Service 2010), the economically active population in the metropolis is about 71.4 percent and a majority of them is self-employed in the private informal sector. The Kumasi Metropolitan Assembly, which has the administrative oversight over the city, has stratified the metropolis into low (50.7%), middle (30%) and high (19.3%) income residential areas based on the population density, housing quality and the level of community facilities (GLSS 2000). The low-income area comprises 28 suburbs, the middle-income areas have 32 suburbs and the high-income areas comprise 17 suburbs.

A two-stage stratified sampling procedure was employed in this study, based on the income stratification of households in the city. The income stratification supports the widely-held view that incomes of households influence their consumption patterns (Boccaletti and Nardella 2000). The city's suburbs were first randomly selected, followed by a random selection of household heads and individuals in charge of food purchases in the household. To ensure one-third proportional representation of each income stratum in the sample, 10 suburbs were randomly selected from the low-income suburbs, 11 suburbs from the middle-income suburbs, and 6 suburbs from the high income suburbs in the metropolis. Finally, 218 consumers, 127 consumers and 84 consumers respectively were randomly selected from the sampled low, middle and high-income suburbs making a total sample of 429 consumers.

Direct face-to-face interviews with respondents were undertaken during the contingent valuation survey. Carson (2002) points out that a direct face-to-face interview is a more reliable approach in contingent valuation studies. The face-to-face interview offered one-on-one interactions with the consumers and provided an opportunity to explain some of the questions to respondents with low literacy levels. This did not introduce any significant bias into the study. The views of the respondents were solicited through open-ended and closed-ended questions made up of pre-coded responses. The questions focused on consumer specific socio-economic characteristics. Information was also sought on consumer awareness and perceptions of organic food products, and their preferences for product-specific attributes. The perceptions of the consumers on the benefits and qualities of organic food products were measured on a five-point Likert scale with perception indices from averages of coded responses comprising, strongly disagree (-1), disagree (-0.5), neutral (0), agree (+0.5) and strongly agree (+1). Apart from this, specific perception dummies indicating 1 if the consumer strongly agrees that organic foods are tastier or expensive and 0 otherwise, were also captured in the questionnaire. In the double-bounded dichotomous choice framework, the relevant data on how much premium consumers were willing to pay for organic lettuce and organic watermelon were collected. The respondents were presented with a first bid. Those who accepted the initial amount were given a second higher bid but those who declined the initial bid were offered a second lower bid. In both scenarios, some respondents accepted the proposed bids while others declined.

The prices of fresh conventional watermelon and lettuce were collected from food retail points at the Asafo and Central Markets in Kumasi. Additional information on prices of lettuce and watermelon was obtained from the Gyinyase Organic Vegetable Growers' Association (GOVGA) in Kumasi, and from the Ghana Organic Agriculture Network (GOAN). The average market price of 0.5kg of conventional lettuce was GH¢0.10 (US$0.08). The consumers were asked if they would be willing to purchase organic lettuce at a premium (i.e. relatively higher price). Specifically, they were asked if they would be willing to pay a premium of GH¢0.15 (US$0.12) which is 50% more than the price of the conventional lettuce. This proposed premium was used as a lower bid price for the organic lettuce. Different premium levels (see Table 1) were randomly assigned to different respondents. Those who responded "YES" to the first bid were randomly assigned higher premium bids, computed based on the lower bid price. Those who responded "NO" to the first bid were randomly assigned discount bid prices (i.e.1% to 30%, 31% to 40% premium, 41% to 50%). Similarly, the average market price of 3.50kg of conventional watermelon was GH¢1.50(US$1.24). A price premium of GH¢1.80 (US$1.48) which is 20% higher than the conventional watermelon was computed and used as the lower bid. For those who expressed "YES" to the first bid, we then randomly assigned higher premium bids

Table 1. Distribution of WTP price premiums for organic lettuce and watermelon

Responses	YES–YES	YES–NO	NO–YES	NO–NO	Total
Lettuce					
WTP 1% premium				17 (4)	17 (4)
WTP 2% to 30% premium			21 (4.9)	8 (1.9)	29 (7)
WTP 31% to 40% premium		7 (1.6)	17 (4)	14 (3.3)	38 (9)
WTP 41% to 50% premium		3 (0.7)	22 (5.1)	5 (1.2)	30 (7)
WTP 51% to 60% premium	11 (2.6)	15 (3.5)		12 (2.8)	38 (9)
WTP 61% to 70% premium	105 (24.5)	9 (2.1)			114 (27)
WTP 71% to 80% premium	49 (11.4)	8 (1.9)			57 (13)
WTP 81% to 90% premium	83 (19.3)				83 (19)
WTP 91% to 100% premium	19 (4.4)				19 (4)
WTP ≥100% premium	4 (0.9)				4 (1)
Total	271 (63.2)	42 (9.8)	60 (14)	56 (13)	429 (100)
Watermelon					
WTP 1% premium				14 (3.3)	14 (3.3)
WTP 2 % to 20% premium		10 (2.3)	7 (1.6)	18 (4.2)	35 (8.2)
WTP 21% to 40% premium	145 (33.8)	13 (3)	15 (3.5)	11 (2.6)	184 (42.9)
WTP 41% to 60% premium	103 (24)	19 (4.4)	40 (9.3)	15 (3.5)	177 (41.3)
WTP 61% to 80% premium	11 (2.6)				11 (2.6)
WTP 81% to 100% premium	6 (1.4)				6 (1.4)
WTP ≥100% premium	2 (0.5)				2 (0.5)
Total	267 (62.2)	42 (9.8)	62 (14.5)	58 (13.5)	429 (100)

Note: Figures in parentheses are percentages
WTP 1% price premium is the same as the price of the conventional product
Source: Authors' calculations

based on the lower bid price (see Table 1) to different respondents. Those who responded "NO" to the first bid were also randomly assigned discounts bids based on the lower bid price..[1]

Empirical Distributions of WTP and the Postulated Determinants

More consumers are willing to pay relatively higher premiums for organic lettuce and watermelon compared to conventional lettuce and watermelon. Consumers with zero WTP observations (NO-NO responses) are those who expressed unwillingness to pay (UWTP) price premiums. With the exception of the respondents who expressed WTP price premiums of 51% to over 100% for organic lettuce, respondents from all the WTP price premiums categories indicated NO-NO responses. Similarly, with the exception of the respondents who expressed WTP price premiums of 61% to over 100% for organic watermelons; all the WTP price premiums categories indicated NO-NO responses (see Table 1).

The definitions and sample statistics of the relevant variables and the analytical results of the differences in the means of the variables are presented in Tables 2 and 3. Regarding the socioeconomic characteristics, perceptions and preferences for organic food attributes, the significant levels suggest some differences between respondents who expressed willingness to pay (WTP) and those who indicated unwillingness to pay (UWTP) price premiums for organic lettuce and watermelon compared to conventional watermelon and lettuce. For instance, some significant difference exists between respondents with WTP and UWTP price premiums for organic lettuce compared to conventional lettuce with regards to children who are less than 15 years of age. Notably, the children of consumers with WTP premiums who are less than 15 years are significantly higher than those with UWTP price premiums.

The awareness on chemical residues in conventional foods by respondents with WTP price premiums is relatively higher than those with UWTP price premiums. Govindasamy et al. (2006) argue that consumer awareness on organic foods tend to influence their likelihood to pay higher premiums for organic foods compared to conventional foods. Some significant differences also exist between the preferences for freshness of organic food products by consumers. Also 50% of respondents with WTP price premiums indicated their preferences for freshness of organic fruits compared to 26% of the respondents with UWTP price premiums.

The impacts of the respondents' perception concerning private effects such as health, taste and quality of organic products and external effects such as soil quality and biodiversity on the WTP estimates are presented in Table 4. The respondents' perceptions on the benefits, quality and the environmental advantages of organic vegetables and fruits are generally positive.

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[1] Respondents who declined the second higher bid but expressed their WTP the first bid (YES-NO) were assigned premium bids based on the first bid. Those who declined the first bid but expressed their WTP the second lower bid (NO-YES) were assigned premium prices based on the lower bid. Apart from the NO-NO respondents who expressed WTP of exactly 1% premium for the organic vegetable or fruit, the other NO-NO respondents (with protest bids) were further asked in the contingent valuation survey how much they would be willing to pay for the organic vegetable or fruit. They also indicated WTP of exactly 1% price premium for the organic vegetable or fruit.

Table 2. Variables used in the regression model of consumer WTP for organic lettuce

Variable	Definition of variable	WTP Mean (S.d)	UWTP Mean (S.d)	Difference in means
Socio-economic characteristics				
AGE1	1 if consumer's age is less than 35 years, 0 otherwise	0.51 (0.50)	0.52 (0.50)	-0.01
AGE2	1 if consumer's age is from 35 - 49 years, 0 otherwise	0.32 (0.47)	0.38 (0.49)	-0.05
AGE3	1 if consumer's age is above 50 years , 0 otherwise	0.17 0.37)	0.11 (0.31)	0.06
FEMALE	1 if consumer is a female, 0 otherwise	0.93 (0.26)	0.95 (0.23)	-0.02
MARISTAT	1 if consumer is married, 0 otherwise	0.61 (0.49)	0.55 (0.50)	0.05
CHILD	Children less than 15 years of age	3.48 (2.53)	2.68 (2.27)	0.80**
EDU	Number of years of schooling	8.59 (4.42)	8.28 (4.21)	0.31
INCLOW	1 if consumer's average monthly income is up to Gh¢100, 0 otherwise	0.50 (0.50)	0.57 (0.50)	-0.07
INCMID	1 if consumer's average monthly income is between Gh¢100 and Gh¢200, 0 otherwise	0.08 (0.26)	0.07 (0.26)	-0.01
INCHIGH	1 if consumer's average monthly income is more than Gh¢200, 0 otherwise	0.43 (0.50)	0.36 (0.48)	0.07
Awareness and perceptions				
ORINF	1 if consumer is aware of organic products, 0 otherwise	0.47 (0.50)	0.43 (0.50)	0.04
KNOW	1 if consumer is aware of chemical residues in conventional vegetables, 0 otherwise	0.84 (0.37)	0.93 (0.26)	-0.09**
TASTEDUM	1 if consumer strongly agrees that organic foods have better taste, 0 otherwise	0.94 (0.24)	0.96 (0.19)	-0.02
PRICEDUM	1 if consumer has strong agrees that the price of organic food is expensive, 0 otherwise	0.72 (0.45)	0.23 (0.43)	0.49 ***
Product attributes				
FRESH	1 if consumer considers freshness of vegetables, 0 otherwise	0.60 (0.49)	0.66 (0.48)	-0.06
SIZE	1 if consumer considers vegetable size, 0 otherwise	0.09 (0.28)	0.16 (0.37)	-0.07
INSDAM	1 if consumer considers less insect damage to vegetables , 0 otherwise	0.39 (0.49)	0.45 (0.50)	-0.06
CLEAN	1 if consumer considers cleanness of vegetable, 0 otherwise	0.01 (0.13)	0.02 (0.12)	-0.01

Note. 1 US Dollar ($) =1.2141 Ghana Cedi (GH¢) in 2008.
WTP indicates consumer willingness to pay and UWTP indicates consumer unwillingness to pay

Table 3. Variables used in the regression model of consumer WTP for organic watermelon

Variable	Definition of variable	WTP Mean (S.d)	UWTP Mean (S.d)	Difference in means
Socio-economic characteristics				
AGE1	1 if consumer's age is less than 35 years, 0 otherwise	0.51 (0.50)	0.53 (0.50)	-0.30
AGE2	1 if consumer's age is from 35 - 49 years, 0 otherwise	0.33 (0.47)	0.36 (0.48)	-0.40
AGE3	1 if consumer's age is above 50 years , 0 otherwise	0.17 (0.37)	0.10 (0.31)	0.06
FEMALE	1 if consumer is a female, 0 otherwise	0.92 (0.26)	0.97 (0.18)	-0.04
MARISTAT	1 if consumer is married, 0 otherwise	0.61 (0.49)	0.52 (0.50)	0.09
CHILD	Children less than 15 years of age	3.52 (2.54)	2.47 (2.16)	1.05***
EDU	Number of years of schooling	8.74 (4.06)	8.52 (4.25)	0.22
INCLOW	1 if consumer's average monthly income is up to Gh¢100, 0 otherwise	0.50 (0.50)	0.55 (0.50)	-0.05
INCMID	1 if consumer's average monthly income is between Gh¢100 and Gh¢200, 0 otherwise	0.07 (0.28)	0.09 (0.26)	-0.01
INCHIGH	1 if consumer's average monthly income is more than Gh¢200, 0 otherwise	0.43 (0.50)	0.36 (0.48)	0.06
Awareness and perceptions				
ORINF	1 if consumer is aware of organic products, 0 otherwise	0.48 (0.50)	0.38 (0.48)	0.10
KNOW	1 if consumer is aware of chemical residues in conventional fruits, 0 otherwise	0.84 (0.37)	0.93 (0.26)	-0.09**
TASTEDUM	1 if consumer strongly agrees that organic foods have better taste, 0 otherwise	0.94 (0.24)	0.95 (0.22)	-0.01
PRICEDUM	1 if consumer strongly agrees that the price of organic food is expensive, 0 otherwise	0.72 (0.45)	0.98 (0.13)	-0.26***
Product attributes				
FRESH	1 if consumer considers fruit freshness, 0 otherwise	0.50 (0.50)	0.26 (0.44)	0.24***
SIZE	1 if consumer considers fruit size, 0 otherwise	0.33 (0.47)	0.40 (0.49)	-0.06
INSDAM	1 if consumer considers less insect damage to fruit , 0 otherwise	0.26 (0.44)	0.24 (0.43)	0.02
CLEAN	1 if consumer considers cleanness of fruit , 0 otherwise	0.12 (0.32)	0.09 (0.28)	0.03

Note. 1 US Dollar ($) =1.2141 Ghana Cedi (GH¢) in 2008.
WTP indicates consumer willingness to pay and UWTP indicates consumer unwillingness to pay

Table 4. Consumer attitude and perceptions on organic food products

Statements	Percentage of Consumers					Mean score		
	Strongly disagree Score = -1	Disagree Score =0.5	Neutral score = 0	Agree Score = 0.5	Strongly Agree Score= 1	Consumer aware	Consumer not aware	Overall
Private effects								
Organic products are healthier	2	5	3	20	70	0.67	0.81	0.75
Organic products are tastier	2	3	4	21	70	0.69	0.83	0.76
Benefit perception index (BPI)						0.68	0.82	0.76
Organic products have no harmful effects	1	6	3	36	54	0.58	0.77	0.68
Organic products have superior quality	7	9	4	33	47	0.5	0.52	0.51
Quality perception index (QPI)						0.54	0.65	0.6
External effects								
Production of organic products improve the soil fertility	5	6	9	34	46	0.51	0.58	0.55
Production of organic products improve the soil flora and fauna	8	10	8	26	48	0.46	0.49	0.48
Environment perception Index (EPI)						0.49	0.54	0.52

Source: Authors' calculations.

For instance, more than half of the respondents strongly agree that organic lettuce and watermelon are healthier, tastier and have no harmful effects. About 20% of the respondents agree that organic foods are healthier and tastier whereas 36% and 33% respectively agree that organic foods have no harmful effects and are of superior quality than the conventional foods. Also about 46% of the respondents strongly agree that the production of organic products improves the fertility of the soil whereas 48% strongly agree that the production of organic products improve the soil flora and fauna. Averaging the scores for health and taste perceptions led to a positive benefit perception index, BPI=076 and averaging the scores for quality perceptions gave a positive quality perception index, QPI=0.60. Hughner et al. (2007) point out

that WTP price premiums of consumers are influenced by their perceptions on the benefits from consuming the organic food products. Similarly, averaging the scores for the soil fertility and biodiversity perceptions of the respondents led to a positive environment perception index (EPI) of 0.52. The positive soil quality perception (Bengtsson et al. 2005, Hole et al. 2005), and the biodiversity perception (Stolze et al. 2000, Dabbert 2006) of organic farming could influence the consumers' WTP for organic produce and also under certain circumstances, justify policy intervention. The perceptions of the respondents on the private effects are relatively higher than the external effects. These findings concur with empirical evidence provided by Haghiri et al. (2009). The results however need to be interpreted with caution because Dabbert (2006) pointed out that the comparison between the environmental effects of organic and conventional farming could pose a number of methodological challenges.

Empirical Regression Results

The maximum likelihood estimates of the bivariate Tobit model are presented in Table 5. The results of the relevant likelihood ratio test show that the null hypothesis that the estimated coefficients are jointly equal to zero is rejected at the 1% significance level in each WTP model (Table 5). The estimated correlation coefficient is positive and significantly different from zero at the 1% level, indicating that unobserved variables involved in each organic food product option are significantly positively related, and confirms that it is more efficient to model the two organic food products jointly rather than separately. The variable representing the presence of children less than 15 years of age in the household (CHILD) exhibits positive significant relationship with consumer WTP premiums for the two organic food products compared to the conventional food products. These empirical results concur with Gao et al. (2011) who observed that consumers with children within the cluster group of 6 to 12 years tended to have more preference for quality of fresh citrus fruits than those without children. The education variable (EDU) representing the number of years of schooling of consumers is positive and significant at the 5% levels in the WTP premium models for organic watermelon and lettuce. The results thus indicate that as the number of years of schooling of consumers' increases, they are likely to pay higher premiums for organic watermelon and lettuce compared to conventional watermelon and lettuce. The empirical results also agree with the studies by Du Toit et al. (2003) for consumers in South Africa and by Akgüngör et al. (2007) for Turkish consumers but disagree with a study by Pascucci et al. (2011) who found no significant impact of education on consumers' probability to change their consumption habits toward high quality food products.

The variables representing high income (INCHIGH) and middle income (INCMID) earners exhibit the hypothesized positive signs and are significant at the 10% level in the WTP premium model for organic lettuce. Asafu-Adjaye (2000) pointed out that income is expected to have significant positive relationships with consumer WTP premium, in conformity with economic theory. The study's findings are also consistent with that of Haghiri et al. (2009) with Canadian data. However, in a study by Voon et al. (2011), the hypothesis that high affordability will positively impact willingness to pay for organic foods compared to conventional foods was statistically rejected. They argue that the behavioral intentions of consumers are antecedents of their actual behavior. Statistically, age and gender are insignificant even at the 10% level. The empirical results agree with a study by Gao et al. (2011) on consumer preferences for fresh citrus in the U.S.

Table 5. Bivariate Tobit estimates on consumer WTP premiums for organic food products

	Lettuce		Watermelon	
	Coefficient	z-value	Coefficient	z-value
CONSTANT	-0.8055 *	-1.80	0.3730 ***	4.43
Socio-economic characteristics				
AGE 1	0.2039	1.08	0.0217	0.60
AGE 2	0.2254	1.12	0.0025	0.06
FEMALE	-0.1197	-0.48	-0.0688	-1.44
MARISTAT	-0.0425	-0.32	0.0304	1.20
CHILD	0.0664 ***	2.55	0.0136 ***	2.72
EDU	0.1736 **	2.05	0.0325 **	1.94
INCMID	0.4639 **	1.95	0.0352	0.73
INCHIGH	0.2388 *	1.76	0.0287	1.11
Awareness and perception				
ORINF	-0.0033	-0.03	0.0613 **	2.41
KNOW	0.3011 *	1.67	0.0811 **	2.33
TASTEDUM	0.5992 **	2.03	0.0514	0.95
PRICEDUM	1.3615 ***	9.12	0.2158 ***	8.22
Product attributes				
FRESH	0.0062	0.07	0.0465 **	2.69
SIZE	-0.3415 **	-2.08	-0.0192	-1.03
CLEAN	0.0389	0.27	0.0562 **	2.12
INSDAM	0.1924 **	2.06	-0.0145	-0.75
Observations	429			
Log-likelihood	-532.999			
$\chi^2 - statistic$	179.53***			
Cross-equation correlation	0.7612 ***			
(ρ_{L_WM})				

Source: Authors' calculations
*** =significant at 1%
** =significant at 5%
* = significant at 10%

Awareness of consumers concerning organic food products (ORINFO) has a positive significant relationship with the WTP premium for organic watermelon compared to conventional watermelon at the 5% level. The empirical result agrees with a U.S. consumer survey by Govindasamy et al. (2006) which posits that when consumers are aware of organic products compared to conventional products, they are likely to pay higher premiums for them. Consumer awareness of chemical residues in conventional food products (KNOW) positively influences their willingness to pay premiums for organic lettuce and watermelon compared to conventional watermelon and lettuce. The empirical results support the awareness hypotheses posited by Nouhoheflin et al. (2004) and Haghiri et al. (2009). The empirical results indicate significant positive relationships between consumer perceptions of taste and price of organic products and the WTP premium for the organic food products compared to conventional food products. The findings concur with a preposition by Voon et al. (2011) that positive perception towards organic food compared to conventional food positively impacts willingness to purchase organic food.
Freshness and cleanness of watermelon have significant positive effects (Table 5), indicating that consumers place higher premium on organic watermelon that is fresh and clean. In reality

freshness and cleanness are relevant for both organic and conventional foods. However in a situation where conventional produce is not handled properly, one is likely to observe our empirical results. The results also concur with an empirical finding by Pascucci et al. (2011) that consumers who are motivated to pay premiums for high-quality foods look out for freshness of organic foods. The negative significant coefficient of vegetable size indicates that consumers are not influenced much by the size of organic lettuce. Consumers on the other hand, pay more attention to insect damage to organic lettuce. The empirical findings thus suggest that consumers tend to consider less insect damage to organic lettuce more than its size when purchasing organic lettuce. Also freshness and cleanness are relevant product attributes consumers tend to look out for when they are purchasing organic watermelon for consumption.

The estimated mean WTP price premiums for 1 kg of organic lettuce and watermelon compared to conventional watermelon and lettuce are GH¢1.2579 (US$1.0361) and GH¢0.5554 (US$ 0.4575) respectively. The median WTP premium for 1kg organic lettuce is GH¢1.5257 (US$1.2567) and that of organic watermelon is GH¢0.5829 (US$0.4801).

Table 6. Estimated consumer willingness to pay premiums for organic food products

Statistic	Watermelon		Lettuce	
	WTP (GH¢/kg)	WTP (US$/kg)	WTP (GH¢/kg)	WTP (US$/kg)
Mean	0.5554	0.4575	1.2579	1.0361
Standard deviation	0.1289	0.1062	0.6733	0.5546
Median	0.5829	0.4801	1.5257	1.2567
Maximum	0.9092	0.7489	2.6465	2.1798
Minimum	0.2284	0.1881	-0.6207	-0.5112

Source: Authors' calculations
1 US Dollar (US$) =1.2141 Ghana Cedi (GH¢) in 2008

Implications of the Empirical Results for Managers, Management Scholars and Other Stakeholders

Based on the results of this study, the following implications of relevance to agribusiness managers, management scholars and other stakeholders are made. Governments, non-governmental organizations and other stakeholders could formulate policies that would encourage and promote the consumption of organic fruits and vegetables in the Kumasi Metropolis in Ghana. These policy measures should include creating awareness concerning the relevance of consuming organic watermelon and lettuce through effective marketing strategies and educational campaigns. In particular, these strategies should focus on labeling to assist consumers to differentiate organic food products on the market from the conventional foods. Educational campaigns should put emphasis on the socio-economic benefits to smallholder producers and the environmental benefits accruing to all society emanating from consuming organic watermelon and lettuce.

Business managers and retailers of organic watermelon and lettuce in the Kumasi Metropolis should pay more attention to handling and storage of the organic food products, as freshness,

cleanness and insect damage are crucial to consumers' willingness to pay premiums for these products. Agribusiness managers, wholesalers and retailers of fresh fruits and vegetables could be assisted and provided with the technical expertise on how to maintain the freshness of organic watermelon and lettuce so as to attract the maximum price premium and increase the patronage of the consumption of organic foods in Ghana.

Apart from consumer perceptions on private effects of organic foods, one of the key motivations for the interest in organic farming is the perceived environmental advantages. Although this study could only analyze the external or environmental effects such as soil quality and biodiversity, management scholars should examine in future studies the external effects such as ground and surface water, climate and air, farm input and output, animal health and welfare on consumer WTP for organic food products.

Concluding Remarks

This study has analyzed the willingness of consumers to pay premium prices for organic watermelon and lettuce compared to conventional watermelon and lettuce, using a contingent valuation data collected in 2008 from 429 consumers in the Kumasi Metropolis of Ghana. Consumer knowledge and perceptions of organic food products have been measured with perception indices. The factors which influence consumer WTP price premiums for organic watermelon and lettuce compared to conventional watermelon and lettuce have been analyzed with a bivariate Tobit model. Consistent with existing studies on consumer preferences for organic food products, the empirical results show that consumer socioeconomic factors, awareness and perceptions tend to influence their WTP premiums for organic watermelon and lettuce compared to conventional watermelon and lettuce. Consumers tend to pay premiums for organic melons that are fresh and clean. Whereas consumers do not pay much attention to the size of the organic product, they are willing to pay higher premiums for vegetables that have less insect damage. The estimated median WTP premium for 1kg organic lettuce is GH¢1.5257 (US$1.2567) and that of 1kg of organic watermelon is GH¢0.5829 (US$0.4801). Finally, the study makes recommendation of the relevance to agribusiness managers and management scholars.

Acknowledgements

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