

## Research Paper

# Consumer purchasing behavior for Korla Bergamot Pear in China: based on a consumer perception perspective

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This research analyses consumer's purchasing behavior for Korla bergamot pear by using 585 questionnaires of consumers in Beijing, Shanghai and Zhengzhou of China to examine the factors determining the purchasing behavior through Heckman two-stage decision-making model. The results show that factors determining the possibility of purchase include consumer's education level, age, income level, vocational status, requirements for quality, safety, freshness and appearance, emphasis on the place of origin, product brand, price level and the degree of recognition for

recommendation from relatives or friends; and factors determining the quantity of purchase include consumer's gender, age, income level, requirement for quality and safety, emphasis on the place of origin and price level. Significant differences are also found among the purchasing behavior in different cities.

**Key words:** Featured agricultural product, Heckman two-stage decision-making model, consumer behavior, China.

## INTRODUCTION

China has faced environmental concerns due to its increased economic growth (Zhou, 2005; Zhong and Chen, 2008). Corporations are under various pressures to address their environmental footprints (Ma and Yan, 2013). They can also take the opportunity to build competitive advantage from their greening efforts to build green markets and address needs of green consumers (Liu, 2014). This is particular true in the recent years that food quality/safety incidents have discouraged the consumer's trust in food safety, and as a result, Chinese consumers are more and more concerned of the quality of food stuff (Zhong and Chen, 2008).

Therefore, various policy measures of supervision and regulation have to be introduced to strengthen quality control and promote safety of food industry (Zhou *et al.*, 2008; Herrmann and Teuber, 2011). However, quality is, in fact, only one of the consumers' concerns on

agricultural products. What consumers are concerned more essentially are environment protection, nutritional and health value, production technique, processing technology, and culture-related traditions of agricultural products, etc. (Ma and Gu, 2011; Quan and Zeng, 2013). Specifically, consumers' concerns on the quality of agricultural products are often embodied on the "place of origin" symbol, those produced in specific natural, social and cultural environments with remarkable geographical indications (Josling, 2006; Quan and Zeng, 2013). More importantly, consumer's recognition can remarkably improve the reputation and competitiveness of featured agricultural products so as to promote the development of the industry (Josling, 2006; Liu, 2014).

Given the consumer's concerns on quality of agricultural products, featured agricultural product retail commerce enjoys huge market potential and the consumers'

purchase behavior has attracted attention (Winfree and McCluskey, 2005; Ma and Yan, 2013). Since China's reform and opening policy (or more specifically, the accession to the World Trade Organization), China has achieved rapid economic growth and consumer's purchasing power has significantly increased, making China, the large economic body, the largest market in the world (Li *et al.*, 2009). Rapid economic growth and rising consumers' income in China have long raised attention both at home and abroad. As a result, China has become a global commercial focus, which makes it necessary for both domestic and international enterprises to understand the characteristics of consumer behavior in China (Li *et al.*, 2009). Moreover, continuing improvement of market economy in China is bringing about more and more severe competition. Thus the survival and development of featured agricultural product industry requires the study of consumer behavior theory so as to explore market demand potentials (Ma and Yan, 2013).

Food consumption has long been studied with emphasis on the consumer's perception of food safety and their willingness-to-pay for and purchasing behavior of safe foods. Most researchers have primarily focused on agricultural products, discussing the influence of factors such as consumer characteristics, market information and price on the consumer's willingness-to-pay and purchasing behavior (Gao *et al.*, 1993; Umberger *et al.*, 2002).

In recent years, researchers have begun to focus on the influence of factors such as awareness of environmental protection, morality, governmental credibility, information and food quality certification system on the consumer's purchase behavior (Dickinson and Von Bailey, 2005; Rousseau and Vranken, 2013).

China's food consumption study started late largely from rationing system of planned economy in the 1990s (Fan *et al.*, 1994; Wu *et al.*, 1995; Wu, 1996; Huang and David, 1993; Huang and Rozelle, 1998; Han and Wahl, 1998). However, after the new Millennium, many Chinese scholars have turned to focus on the consumer's perception, the willingness-to-pay, and the purchase behavior for pollution-free foods, green foods, organic foods, products with geographic indication (which are, as a whole, colloquially referred to as the "three food types plus one label" and genetically modified foods (Huang and Howarth, 2001; Yang *et al.*, 2004; Zeng *et al.*, 2007; Zhong and Chen, 2008). Having become a major research focus, consumer behaviors of pollution-free foods, green foods, organic foods, products with geographic indication and genetically modified foods are currently attracting intensive attention in China and overseas (Zhao *et al.*, 2011).

The extensive researches had already been conducted and therefore laid the foundation of both theoretical and empirical studies for food consumption behavior in China. However, it was not without limitations. Firstly, the samples chosen and the surveys on typical consumer

groups failed to reflect general situation; Then, some researchers merely focused on the willingness-to-pay (the first stage of consumption decision-making), some others focused on the quantity purchased (the second stage of consumption decision making), but few investigated the whole consumption decision-making process. Finally, most studies were focused on pollution-free agricultural products, green foods and organic foods, and therefore, more studies need to be done for featured agricultural products (Ma and Yan, 2013).

Consumer's purchase behavior includes two different stages, participation behavior and purchase behavior (Liu, 2014). It is clear for featured agricultural products that the consumer's participation behavior needs to be motivated so that it is finally transformed into actual purchase behavior. For this regard, not only the enterprises need to make proper marketing modes but the policy makers need to find theoretical foundation for the industrial policy layout as well. Meanwhile, effective identification and target market exploitation need systematical investigation into the consumption characteristics, the purchasing power, and the decision-making behavior for featured agricultural products. However, they are still to be done.

Therefore, this study chooses Korla bergamot pear, a featured fruit in Xinjiang of China, and adopts Heckman two-stage decision-making model to empirically analyze the consumer's purchasing behavior and its influencing factors. More importantly, with development of economy and improvement of living standards, fruits have taken an irreplaceable part in Chinese people's food consumption. With high nutritional and health value, special regional, historical and cultural characteristics, Korla bergamot pear enjoys high popularity in China and the research is thus free from the negative influence of low involvement degree.

## MATERIALS AND METHODS

### Data and description

The data used in this study came from 585 urban consumer survey in Beijing, Shanghai and Zhengzhou, which were located in northern, southeastern and central parts of China, with distinct social, economic, cultural and regional characteristics, and could thus as a whole reflect the overall Xinjiang Korla bergamot pear retail situation in Chinese fruit market.

The field survey of Xinjiang Korla bergamot pear in this study was a combination of face-to-face interview and questionnaire. Modifications of questionnaires were made based on the feedback from two pilot surveys conducted in March, April and June, August in 2011, and the formal field survey was conducted during January and March in 2012. The stratified sampling approach was applied for this survey. The first stage of this survey was to select districts from three cities: there were Dongcheng District,

Xicheng District, Haidian District, Chaoyang District, Fengtai District and Shijingshan District in Beijing; there were Huangpu District, Pudong New District, Xuhui District, Changning District, Jing'an District, Putuo District, Zhabei District, Hongkou District and Yangpu District in Shanghai; there were Zhongyuan District, Erqi District, Jinshui District, Huiji District, Guancheng District and Shangjie District in Zhengzhou. Three districts were randomly selected from each city. The second stage of this survey was to select final retail markets of Xinjiang Korla bergamot pear: two medium or large supermarkets and fruit stores were randomly selected from each sample districts. The questionnaires covered the basic information of consumers and their perceptions and purchase behaviors for Xinjiang Korla bergamot pear. The 650 questionnaires were distributed and finally 585 valid questionnaires were collected, of which 153 came from Shanghai, 192 came from Beijing and 240 came from Zhengzhou.

### Model selection

Consumption behavior is the joint effect of various factors such as consumers' perception and attitude (Liu, 2014). As the basis of consumer attitude, consumer perception was cognitively formed comprehensive understanding and evaluation of the product's functions and availabilities linked with the product's internal and external properties (Zhou *et al.*, 2008). Based on existing studies, this study will control the personal characteristics of consumers, and analyze the purchasing behavior of featured agricultural products from a consumer perception /evaluation perspective.

The first type of factors considered is the consumer's characteristic variables. According to consumer behavior theory, the resources consumed in purchasing mainly include economy and perception (Zhou *et al.*, 2008); consumers' economic resources, or purchasing power, is the key demographic indicator that explains the reason, object and time of purchase (Wang *et al.*, 2009). Empirically, most of frequently used demographic indicators include age, marital status, education level, income level and occupation, which are expected to exert significant influence on the consumers' opinions on the products and thus on their willingness and degree of payment (Luo, 2010). These individual characteristic variables are also chosen in this study.

The second type of factors is the consumer perception variables, which mainly are product properties and market environment. The variables of product properties include the requirements for quality, safety, freshness and appearance, and emphasis on the place of origin, while market environment variables are the premise of the consumers' perception and knowledge of the products, the factors such as market information channel and price influencing purchase behavior (Zhong and

Chen, 2008). Therefore, the price level, product brand and degree of recognition for recommendation are chosen as variables that represent for the consumers' market environment perception (Zhou *et al.*, 2008).

Moreover, social, economic and environmental differences across regions will also influence consumption behaviors. Hence this study takes Zhengzhou as a control regional dummy and incorporates Shanghai and Beijing as two regional dummy variables into the model to analyze regional differences of consumption behaviors.

Heckman two-stage decision-making model describe the whole process of consumption behavior (Heckman, 1979). In fact, Heckman model divides the whole consumption decision-making process into two interrelated stages: the first stage is a qualitative analysis of the probability of purchase, and the second is a quantitative analysis of the quantity purchased. Ordinary least squares estimation (OLS) of a part of the overall distribution will cause sample selection bias, which defined as Inverse Mill's Ratio (IMR) or defined it as Omitted Variable: the ratio of standard normal density function to cumulative normal distribution function. The sample selection is biased if the IMR estimated from Probit model in the first stage reaches significant level, and therefore Heckman model should be chosen.

Generally, Probit model is used to estimate the probability of purchase in the first stage of Heckman decision-making model. In this stage, cumulative distribution function for non-zero observations is defined as:

$$P(Y = 1) = \Phi(\beta' X) = \int_{-\infty}^{I_t} \frac{1}{\sqrt{2\pi}} e^{-\frac{(\beta' x)^2}{2}} dt \quad (1)$$

And cumulative distribution function for zero observations is defined as:

$$P(Y = 0) = 1 - \Phi(\beta' X) = 1 - \int_{-\infty}^{I_t} \frac{1}{\sqrt{2\pi}} e^{-\frac{(\beta' x)^2}{2}} dt \quad (2)$$

In equation (2),  $I_t = X' \beta$ , where, X is an explanatory variable vector in Probit model. After Probit estimation, IMR for zero observations is defined as:

$$IMR_{i0} = \frac{-\Psi(\beta' X / \sigma)}{1 - \Phi(\beta' X / \sigma)} \quad (3)$$

IMR for non-zero observations is defined as:

$$IMR_{i1} = \frac{\Psi(\beta' X / \sigma)}{\Phi(\beta' X / \sigma)} \quad (4)$$

In equation(4),  $IMR_i$  is the IMR value of the  $i^{\text{th}}$  consumer

**Table 1.** Variable definitions and statistic characteristics.

Variables	Mean	Min	Max	Standard deviation
<b>Dependent variables</b>				
Purchasing behavior	0.6	0	1	0.5
Quantity purchased	2.6	0	10	3.2
<b>Personal characteristics</b>				
Gender	0.5	0	1	0.5
Marital status	0.5	0	1	0.5
Education level	3.8	1	6	1.3
Age	34.0	20	82	11.0
Monthly income	3384.9	0	30000	2636.1
Commerce and service sector	0.5	0	1	0.5
Education, Science, Culture and Health sectors	0.2	0	1	0.4
<b>Perception of product characteristic</b>				
Requirements for quality and safety	4.4	1	5	0.8
Requirements for freshness	4.5	1	5	0.7
Requirements for place of origin	3.0	1	5	1.0
Requirements for appearance	3.8	1	5	0.9
<b>Perception of market environment</b>				
Emphasis on price	3.7	1	5	1.0
Emphasis on brand	3.3	1	5	1.0
Recognition for recommendation from relatives or friends	2.4	1	5	0.9
<b>Regional dummy variables</b>				
Shanghai	0.3	0	1	0.4
Beijing	0.3	0	1	0.5

Notes: The definitions of dependent variables are: (a) Purchasing behavior: 1= Yes, 0=No; (b) Quantity of purchase: Unit: Kg/month. The definitions of independent variables are: (a) Personal characteristic variables: Gender: 1=Male, 0=Female; Marital status: 1=Married, 0=Unmarried; Education level: 1=Elementary school or below, 2=Primary middle school, 3=Senior middle school, 4=Undergraduate, 5=Postgraduate (Master), 6=Postgraduate (Doctor); Age: years old; Monthly income: RMB¥; Occupation (With other occupations as the control group): Commerce and service, 1=Yes, 0=Other occupations; Education, Science, Culture and Health: 1=Yes, 0=Other occupations. (b) Consumer perception variables: (1) Perception of product characteristic: Requirements for quality and safety: Very low=1, Low=2, Fair=3, High=4, Very high=5; Requirements for freshness: Very low=1, Low=2, Fair=3, High=4, Very high=5; Requirements for place of origin: Not important=1, Not very important=2, Fair=3, important=4, very important=5; (2) Perception of market environment: Emphasis on price: Not important=1, Not very important=2, Fair=3, important=4, very important=5; Emphasis on brand: Not important=1, Not very important=2, Fair=3, important=4, very important=5; Recognition for recommendation from relatives or friends: Very low=1, Low=2, Fair=3, High=4, Very high=5. (c) Regional dummy variable (With Zhengzhou as the control group): Shanghai: 1=Shanghai, 0=Other city; Beijing: 1=Beijing, 0=Other city.

observed,  $\Psi(\cdot)$  is the density function,  $\Phi(\cdot)$  is the cumulative distribution function, and  $\sigma$  is the standard deviation. In the analysis, a dummy variable ( $Y$ ) is defined to be 1 for non-zero observations and 0 for zero observations (Table 1). In order to investigate the influence of independent variables on the probability of purchase, the marginal effects of independent variables, the partial derivatives of the dependent variable probability with respect to independent variables can be calculated as follows:

$$dF/dx_i = \Phi(X' \beta / \sigma) \beta \quad (5)$$

The quantities purchased can be estimated in the second stage through OLS method. With the incorporation of IMR estimated from the first stage, the conditional expectation

function of quantity of pear purchased, a dependent variable in the second stage is defined as:

$$Q_i | (p > 0) = \beta_0 + \beta_i X_i + \gamma IMR_i \quad (6)$$

Below is the generalized OLS estimation for the second stage:

$$Q_i = \beta_0 + \beta_i X_i + \gamma IMR_i \quad (7)$$

In Equation (7),  $Q_i$  is the quantity purchased,  $\beta_0$ ,  $\beta_i$  and  $\gamma$  are the coefficients to be estimated. As IMR is determined by the result of decision-making, all variables that influences consumer participation need to be incorporated into the estimation of the quantities purchased in the second stage. In addition, the impacts

**Table 2.** Sample distribution and consumption statistics.

Category	Sample distribution		Consumption characteristics	
	Observation	Share (%)	Participation %	Quantity purchased kg/month
<b>Region</b>				
Shanghai	153	26.2	56.2	3.8
Beijing	192	32.8	64.1	2.8
Zhengzhou	240	41.0	50.0	1.7
<b>Gender</b>				
Male	298	50.9	57.4	2.7
Female	287	49.1	55.1	2.6
<b>Marriage status</b>				
Married	314	53.7	61.5	2.9
Unmarried	271	46.3	50.2	2.2
<b>Education level</b>				
Junior middle school and below	88	15.0	35.2	1.3
Senior middle school	103	17.6	50.1	1.8
Undergraduate	234	40.0	57.7	3.0
Postgraduate	160	27.4	69.4	3.3
<b>Age</b>				
Below 20	6	1.0	33.3	0.5
20-30	320	54.7	48.8	2.1
31-40	113	19.3	73.5	3.9
41-50	89	15.2	68.5	3.7
Above 50	57	9.8	47.4	1.7
<b>Monthly income</b>				
Below 2000	191	32.7	38.2	1.2
2000-4000	243	41.5	56.4	2.3
4000-6000	89	15.2	76.4	4.8
Above 6000	62	10.6	82.3	5.1
Occupation:				
Commerce/Service industry	279	47.7	49.1	2.5
Education, science, culture and health	136	23.2	69.9	3.3
Others	170	29.1	57.1	2.2

Note: monthly income is measured in RMB.

of these variables on IMR must be considered in calculating their marginal effects, which will otherwise be biased. Generally, the IMR variable is used to link the first stage with the second and test the bias of sample selection and parameter estimation as well. Variable definitions and statistics are presented in (Table 1). An explanatory variable in the second stage of Heckman model should also be an explanatory variable in the first stage. Therefore, in this study, all explanatory variables will be also involved in both two stages' regression analysis.

## RESULTS AND DISCUSSION

### Sample statistics

Table 2 shows that 26.2% of consumers interviewed came from Shanghai, 32.8% from Beijing and 41.0% from Zhengzhou. Of total consumers interviewed, approximately half are male and half are female; 53.7% are married while 46.3% are unmarried; 27.4% are postgraduate, 40.4% are undergraduate, 17.6% are senior middle school and 15.0% are junior middle school

or below; only 1.0% are 20 years old or below, 54.7% are 20-30 years old, 19.3% are 31-40 years old, 15.6% are 41-50 years old, and 9.8% are over 50 years old; about 32.7% consumers' monthly income are below RMB 2000, 41.5% monthly income between RMB 2000-4000, 15.2% monthly income between RMB 4000-6000, and 10.6% monthly income are over RMB 6000; 47.7% are engaged in commerce/service sectors, 23.2% in education, science, culture and health, and 29.1% in other sectors.

Table 2 shows that the ratio of participation for purchasing of Xinjiang Korla bergamot pear. In detail, 56.2% are in Shanghai, 64.1% in Beijing and 50.0% in Zhengzhou. Similarly, 57.4% for male and 55.1% for female; 61.5 % for the married and 50.2% for the unmarried; 69.4% for postgraduates, 57.7% for undergraduates, 50.1% for senior middle school graduates and 35.2% for junior middle school graduates or below; 38.2% for those whose monthly income is below RMB 2000, 56.4% for RMB 2000-4000, 76.4% for RMB 4000-6000 and 82.3% for over RMB 6000; 49.1% for those who engage in commerce/service sectors, 69.9% for education, science, culture and health sector and 57.1% for other sectors.

Table 2 shows the quantity that consumers purchased

**Table 3.** Heckman two-stage model estimation results for the consumption behavior of Xinjiang featured agricultural product.

Explanatory variables	Probability of participation (Probit)			Quantity purchased (OLS)	
	Regression coefficient	Z-statistics	Marginal effect	Regression coefficient	Z-statistics
<b>Individual characteristics</b>					
Gender	-0.11	-0.90	-0.04	-0.11 <sup>*</sup>	-1.68
Marriage status	-0.06	-0.31	-0.02	-0.05	-0.51
Education	-0.06	-0.30	-0.02	0.00	0.00
Log(Education)	1.01 <sup>†</sup>	1.70	0.40	0.27	0.77
Age	0.19 <sup>***</sup>	3.96	0.07	0.11 <sup>***</sup>	2.82
Age square	-0.00 <sup>***</sup>	-3.58	-0.00	-0.00 <sup>***</sup>	-2.76
Income	0.00	1.17	0.00	9.63e-06	0.62
Log(Income)	0.03	0.61	0.01	0.06 <sup>**</sup>	2.13
Commerce/Service sectors	-0.39 <sup>**</sup>	-2.33	-0.15	-0.09	-0.85
Education, science, culture and health sectors	-0.40 <sup>**</sup>	-1.99	-0.16	-0.09	-0.81
<b>Perception of product characteristics</b>					
Requirements for quality and safety	0.25 <sup>***</sup>	3.21	0.10	0.10 <sup>†</sup>	1.67
Requirements for freshness	0.20 <sup>**</sup>	2.25	0.08	0.09 <sup>†</sup>	1.69
Requirements for places of origin	0.11 <sup>†</sup>	1.71	0.04	0.10 <sup>**</sup>	2.43
Requirements for appearance	-0.23 <sup>***</sup>	-3.23	-0.09	-0.05	-1.01
<b>Perception of market environment</b>					
Emphasis on price	-0.18 <sup>**</sup>	-2.35	-0.07	-0.17 <sup>***</sup>	-3.50
Emphasis on brand	0.23 <sup>***</sup>	3.33	0.09	0.08	1.49
Recognition of RF	0.18 <sup>**</sup>	2.49	0.07	0.05	1.05
<b>Regional dummy variables</b>					
Shanghai	-0.18	-1.06	-0.07	0.38 <sup>***</sup>	4.26
Beijing	0.41 <sup>***</sup>	2.64	0.16	0.16 <sup>†</sup>	1.69
IMR	-	-	-	0.60 <sup>**</sup>	2.10
Constant	-6.95 <sup>***</sup>	-6.21	-	-2.76 <sup>**</sup>	-1.90
Observations		585			329
Chi-square test statistic			79.81		
Probability of chi-square test statistics			0.000		

Notes: \*\*\*, \*\* and \* respectively represent 1%, 5% and 10% significant levels. RFRF stands for 'recommendation from relatives or friends'.

monthly for Xinjiang Korla bergamot pear. It can be seen that 3.8 kg per month in Shanghai, 2.8 kg per month in Beijing and 1.7 kg per month in Zhengzhou; 2.7 kg per month for male and 2.6 kg per month for female; 2.9 kg per month for the married and 2.2 kg per month for the unmarried; 3.3 kg per month for postgraduate, 3.0 kg per month for undergraduate, 1.8 kg per month for senior middle school graduates and 1.3 kg per month for junior middle school graduate and below; 0.5 kg per month for below 20 years old, 2.1 kg per month for 20-30, 3.9 kg per month for 31-40, 3.7 kg per month for 41-50 and 1.7 kg per month for above 50; 1.2 kg per month for those whose monthly income is below RMB 2000, 2.3 kg per month for RMB 2000-4000, 4.8 kg per month for RMB 4000-6000 and 5.1 kg per month for above RMB 6000; 2.5 kg per month for commerce/service sectors, 3.3 kg per month for education, science, culture and health sectors and 2.2 kg per month for other sectors.

From the analysis above, it can be seen that the ratios of participation and the quantities purchased are obviously different across three cities and personal characteristics. For example, of three cities surveyed, the highest ratio of participation is for those consumers who are in Beijing, male, married, postgraduate, age 31-40, high income and engage in education, science, culture and health sectors.

Meanwhile, ratios of participation and quantities purchased are found to have a quadratic curve relation with age and a linear or logarithmic relation with income level and education level.

### Model estimation and result analysis

Heckman model was estimated for the decision-making process in the purchasing behavior of Xinjiang featured

agricultural products. The estimated results are displayed in Table 3. The chi-square test statistics reaches 1% significance level, indicating good fitting degree of the model, while the 5% significance level of IMR variable verifies the existence of sample selection bias, suggesting the availability of Heckman two-stage decision-making model. According to the estimated results, the factors with significant influence on the probability of participation and the quantity purchased are analyzed next.

### Factors influencing the probability of participation

Observed from Table 3, education level is found to have significant influence on the probability of participation, while its marginal effect shows that a 10% increase in the length of education received will cause a 4% increase in the probability of participation, and the estimated result is consistent with many researchers, such as Zhou (2005), Ma and Yan, (2013) and Meas *et al.* (2015). The age of consumers is also found to have significant influence on the probability of participation, and meanwhile, the middle-aged group of consumers are found to be the most likely to participate with the quadratic curve reaching a maximum. The significant differences in probability of participation are also found across occupations. On the contrary, other individual characteristics are not found to have significant influence on the probability of participation.

All of consumer's perceptions are found to exert significant influence on the probability of participation, but in different ways, which is consistent with other researchers, such as Umberger *et al.* (2002) and Luo (2010). The influence is primarily found among the consumers' perceptions of featured agricultural product characteristics. For example, the higher the consumers' requirements are for quality/safety, freshness and place of origin, the more likely they are to purchase because marginal effects of these three variables are 1%, 0.8% and 0.4%, respectively. On the contrary, the higher the consumers' requirements are for product appearance, the more unlikely they are to purchase because the marginal effect is -0.9%. Perception of market environment also has significant influence on the probability of participation. For example, the higher the consumers' recognition is for product brand and recommendation from relatives or friends, the more likely they are to purchase because marginal effects of these two variables are 0.9% and 0.7%, respectively. On the contrary, the more emphasis the consumers put on price, the more unlikely they are to purchase because the marginal effect is -0.7%.

### Factors influencing the quantity purchased

Age of consumers has significant influence on both the

probability of participation and the quantity purchased, and the estimated results are consistent with Zhou *et al.* (2008) and Liu (2014). It suggests that the quantities the middle-aged consumer's purchased were significantly more than those of other age groups of consumers. Though without influence on the probability of participation, gender and income level do have significant influence on the quantity purchased, meaning that female consumers significantly purchased more than men, and the higher consumers significantly purchased more than lower income consumers. On the contrary, variables such as marriage status and occupation are not found to have significant influence on the quantity purchased.

Consumers' perceptions of product characteristics are primarily found to have significant influence on the quantity purchased. In addition, there are also many other studies on it, such as Dickinson and Von Bailey, (2005), Wang *et al.* (2009) and Rousseau and Vranke, (2013), and they reached the similar estimated results. Firstly, the higher the consumers' requirements are for quality/safety, freshness, and place of origin, the more they will purchase. On the contrary, consumers' requirement of product appearance does not significantly influence the quantity purchased. Secondly, consumers' emphasis on product price significantly influences the quantity purchased positively, while the emphases on product brand and recognition for recommendation from relatives and friends do not significantly influence the quantity purchased.

The analyses above show that the higher the consumers' requirements are for product characteristics, the more they are likely to purchase. On the contrary, the more emphasis the consumers put on product appearance and price, the more unlikely they are to purchase. However, once the purchasing behavior occurs, the quantity purchased will finally depend on the consumers' age and income level. Meanwhile, consumers from Beijing are found to be the most likely to purchase, while those from Zhengzhou are found to have the minimum quantity purchased.

### Conclusions

Using the questionnaire survey on the consumption of Korla bergamot pear among consumers in Shanghai, Beijing and Zhengzhou, this study investigated the factors influencing the probability of participation and the quantity purchased for the featured agricultural product by estimating Heckman two-stage decision-making model. The major conclusions are as follows: Firstly, individual characteristics of consumers (e.g., education, age and income level) have significant influences on the probability of participation, while gender, age and income of consumers eventually determine the quantity purchased. Secondly, consumers' perceptions of product characteristics have significant influences on both

probability of participation and the quantity purchased. Thirdly, consumers' purchase behavior vary also significantly across various occupations, and especially, across various perceptions of product characteristics and market characteristics. Finally, significant variations are also found in the probability of participation and the quantity purchased across cities.

Conclusions above come to the following marketing suggestions: Firstly, marketing promotion should focus on female and middle-aged consumers, especially those between 31-40 years old, who are not only more likely to purchase but likely to purchase more as well. Secondly, the consumers' perception of the characteristics of featured agricultural products (especially quality/safety, freshness and place of origin) needs to be strengthened as it can significantly increase both the probability of participation and the quantity purchased. Thirdly, reasonable pricing is necessary, as high price can significantly discourage the consumers' purchase motivation and thus reduce the quantity purchased. Fourthly, excess packaging which could increase cost and therefore the price should also be avoided, especially within an environmentally friendly society that rejects the dissipation and extravagance. Fifthly, brand promotion should be improved as the consumers are very sensitive to product brand and meanwhile with the reducing credibility of public media, the recommendation from relatives and friends will also help increase the probability of participation. Finally, marketing of featured agricultural products should adopt a regional differential strategy, focusing on both wealthier cities with higher probability of participation, which are, as far as this study found, Beijing and Shanghai, and female and middle aged consumers.

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