

# Analysis of Consumers' Willingness to Pay for Traceable Fresh Fruits in Shanghai City and Countermeasures

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**Abstract** By the survey of consumers' behaviour of purchasing fresh fruits, this paper researches the group characteristics of people who consume traceable fresh fruits, and analyses the main factors influencing consumers' willingness to purchase. Based on this, corresponding proposals are put forward as follows: first, the government should not only focus on supervision and regulation over food security, but also strengthen the education of food security knowledge, publicity and promotion of traceable system; second, the government and related enterprise should particularly pay attention to the impact of consumers' individual characteristics on willingness to purchase and purchase behaviours, and work out feasible strategy of traceable food marketing, according to consumers' preferences, consumers' attention to health, consumers' attention to the healthy growth of children and other factors; finally, when implementing the system, the state and the government should take into full account the average income level of consumers, give full play to the effect of scale merit, and work out the reasonable price that can be accepted by most of consumers.

**Key words** Traceability, Fresh fruits, Consumers, Willingness to pay, China

"Traceability" is to return the whole process of production and historical trace of circulation in the end of the food chain, including the occurrence places and all sales channels. The traceable system of food is the information recording system which strengthens the information transmission of food security, controls foodborne disease hazards and protects the interests of consumers<sup>[1-4]</sup>. At present, the traceable fresh fruits are rare in market, and most of the traceable fresh fruits are sold in supermarkets and specialty stores. Though random survey of consumers, I research the consumers' cognition of quality safety of fresh fruits and consumers' willingness to participate in traceable system of quality safety of fresh fruits, in order to provide reference for the smooth implementation of building of traceable system of fresh fruits.

## 1 The survey object and theoretical hypothesis

The consumers pay close attention to safe and healthy food, and have strong demand for traceable fresh fruits, with widespread consumer groups. I select one foreign-owned store and one domestic-owned supermarket, respectively, to conduct random survey of consumers, comprehensively take into account behaviour, attitude, subjective norms, cognitive control and other factors influencing the purchase of consumers in cities, especially consumers' behaviour of purchasing fresh fruits and consumers' willingness to purchase fresh fruits passing safety certification, and reflect these factors in design of questionnaire one by one. The survey questionnaire mainly covers

the basic situation of consumers, consumption habits, degree of attention to the problem of quality safety of fresh fruits, cognition of overall quality of fresh fruits and traceable fresh fruits, degree of satisfaction with government regulation, consumers' personal experience, frequency of household purchase and so on.

From August 21, 2010 to August 25, 2010, in Bufeng Lotus Hypermarket and Lianhua Supermarket, I adopt the way of questionnaire to conduct random survey of consumers. Taking into account the difference in different consumers' purchase time in supermarket, I select two periods: 10:00–11:30 and 19:00–20:30 when there are mainly middle-aged consumers and office workers, respectively. I send out 1 000 copies of questionnaire, eliminate 177 copies of invalid questionnaire missing key information or having obvious error, and finally get 823 copies of effective questionnaire, with effective response rate of 82.3%.

Based on rational behaviour theory, consumers' buying behaviour depends on behavioral intention, and in turn, the intention of buying behaviour is jointly determined by consumers' behaviour and attitude, subjective norms, and cognitive control. In terms of traceable characteristic of fresh fruits, consumers' payment attitude is determined by two factors: perception of safety of traceable fresh fruits and evaluation of price of traceable fresh fruits; consumers' subjective norms are determined by consumers' personal characteristics and family characteristics (personal characteristics include consumers' gender, age, educational level, occupation; family characteristics include consumers' average monthly disposable income of household, whether families have children under the age of 6 and so on); consumers' cognitive control can be reflected from whether the consumers can correctly choose traceable identification. Based on the above analysis, the following theoretical assumption is made: the willingness to pay for traceable fresh

Received: October 25, 2011 Accepted: December 3, 2011

Supported by Shanghai College Student Innovation Activity Project in 2009.

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fruits is impacted by the above factors together.

## 2 Analysis of survey of consumers

The survey findings show that the majority of consumers believe that the problems of food quality safety in China are serious, and have low overall evaluation of policies and regulations implemented on food quality safety and supervision in China. 54.56% of them think they are common; 23.33% of them think they are good; 11.66% of them think they are not good enough; only 10.45% of them think they are very good.

The consumers have shown high-degree attention to problems of food quality safety. 470 people in total are extremely concerned and relatively concerned about the problems, accounting for 26.00% and 31.17% of respondents, respectively, while only 9.11% and 1.22% of respondents pay less attention to and are not concerned about the problems, respectively. I interview a large portion of consumers who are extremely concerned about the problems of food quality safety. The majority of consumers being concerned about food quality safety problem is in that they are at the end of food supply chain. The food security is a major important matter pertaining to health, life and quality of life, and once problems erupt, the risk can not be transferred.

When the residents need to make a choice in buying their daily food, quality and price fall within sphere of their consideration, certainly in conjunction with brand and other factors. With the continuous improvement of residents' living standards, the factor of food security has become one important indicator in the process of food consumption. Without considering price factors, up to 86.4% of surveyed consumers express their willingness to buy traceable fresh fruits; but once considering the rise in cost, the consumers who are willing to buy only account for 46.17%. And in 380 consumers surveyed who express the willingness to buy, 211 consumers are willing to pay more than 10% or 20% of the current price; 69 consumers are willing to pay higher than 20% to 30% of the price; only 18 consumers are willing to pay higher than 30% of the current price. In 380 consumers who are willing to pay higher than the current price but not more than 20%, 299 people are the consumers who have children under the age of 6 or prepare the baby's birth, and the educational level of them is more than college degree, indicating that they are willing to pay additional costs after considering completely the healthy development of children.

According to analysis results of questionnaire, gender has no significant effect on consumers' willingness to pay, but age and educational level have significant influence on consumers' willingness to pay. The cognition level of consumers who have children is significantly higher than those without children, and the average disposable income monthly of household of consumers who have children is higher, with greater proportion of willingness to pay.

As for consumers' cognitive control, in the light of analysis of survey results, consumers' cognition of food quality safety information is still at low level. There are only 53 consumers knowing well about pollution-free, green and organic food, accounting for 6.44% of those surveyed; there are only 107 consumers relatively and well knowing about traceable system of food quality safety, accounting for 13.00% of those surveyed. The cognition of pollution-free green food and traceable system

of food quality safety is in sharp contrast to the degree of attention of consumers to food quality safety. And the main channels for consumers to obtain cognition of food quality safety information are experience accumulation and mutual communication, television or radio, magazines and networks. The main reason for this result is that the traceable system of food quality safety is still in its infancy in China, and it mainly concentrates in big cities for demonstration.

## 3 Analysis of Consumers' Willingness to Pay for Traceable Fresh Fruits

According to analysis, it can be found that there is quantitative relationship to some extent between willingness to pay for traceable fresh fruits and the above factors. To further examine the quantitative relationship between payment behaviour of traceable fresh fruits and these factors, I select regression analysis method for further study. Given that the dependent variable is the classified variable, I select logistic regression model as analysis means. According to logistic model, let

$$P_n(Y=1|X) = \frac{e^{\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n}}{1 + e^{\beta_0 + \beta_1 X_1 + \dots + \beta_n X_n}}$$

where  $Y$  is willingness to pay for traceable fresh fruits;  $X_1, X_2, \dots, X_n$  signify the influencing factors;  $\beta_0, \beta_1, \dots, \beta_n$  are regression coefficient. In the binary logistic process of using SPSS software to conduct regression analysis on questionnaire data, we can find that apart from the constant term, the importance degree of safety factors of fresh fruits in all variables has the greatest significance, followed by the degree of trust on traceable information, the degree of attention to traceable information, health condition and other factors; the impact of price on consumers' willingness to purchase is negative, indicating that the rise in price of traceable fresh fruits will abate consumers' willingness to purchase; coefficients of other variables are all positive, indicating that consumers purchase fresh fruits, the more attention they pay to safety factors, the more the willingness for they to buy traceable food; the greater the degree of consumers' attention to and cognition of traceable fresh fruits, the higher the degree of trust on traceability information identification affixed on the package, the more the willingness for they to buy traceable fresh fruits. The regression results of gender, age, awareness of information search and so on, are not very significant, indicating that consumers' buying behaviour is not sensitive to the above several variables (Table 1).

After eliminating the above insensitive variables, we re-conduct regression, and find that the judgement coefficient of binary logistic regression model is 89.5%, the forecast accuracy rate is 94.8%, and the significance level of statistic of Hosmer - Lemeshow chi-square goodness of fit test  $P = 0.74 > 0.05$ , so the null hypothesis that there is no significant difference between the observational data and forecast data is accepted, which indicates that the model can well fit the overall sample data, and the independent variable can well explain the dependent variable. The regression coefficient of logistic model can be shown in Table 2.

## 4 Conclusions

I use theoretical analysis and model analysis to establish the large supermarket consumption model of traceable fresh fruits,

and research the main factors influencing consumption of traceable fresh fruits. Through the preceding descriptive statistical anal-

ysis and econometric model analysis, there are three main factors influencing consumers' purchase of traceable fresh fruits.

**Table 1 The independent variable and definition in the model**

Definition of variable	Explanation and evaluation
Gender	1 = Male; 2 = Female
Age	1 = 20 - 29; 2 = 30 - 39; 3 = 40 - 49; 4 = 50 - 59; 5 = 60 above
Educational level	1 = Below junior high school; 2 = Junior high school; 3 = Senior high school/secondary technical school; 4 = Junior college; 5 = College; 6 = Postgraduate or above
Income	1 = 1 000 yuan below; 2 = 1 001 - 3 000 yuan ; 3 = 3 001 - 5 000 yuan ; 4 = 5 001 - 10 000 yuan ; 5 = 10 001 yuan above
Health condition	1 = Very poor; 2 = Relatively poor; 3 = Common; 4 = Good; 5 = Very good
The degree of attention to traceable information	1 = No attention; 2 = Not much attention; 3 = General attention; 4 = Relative attention; 5 = Much attention
Consideration of the degree of importance of price factor	1 = Very unimportant; 2 = Relatively unimportant; 3 = Not to matter; 4 = Relatively important; 5 = Very important
Consideration of the degree of importance of safety factor	1 = Very unimportant; 2 = Relatively unimportant ; 3 = Not to matter; 4 = Relatively important ; 5 = Very important
The degree of cognition of traceable fruits	1 = Have never heard of ; 2 = Don't know well; 3 = Barely know; 4 = Very familiar with
Awareness of information search	1 = Impossible; 2 = May not do; 3 = Hard to say; 4 = Probable ; 5 = Certain
The degree of trust in traceable information	1 = No trust ; 2 = No too much trust ; 3 = General trust ; 4 = Trust; 5 = Great trust

**Table 2 Logistic regression coefficient**

Variable	Estimated value of regression coefficient	Asymptotic standard error	Z statistic	Concomitant probability
Regression value	19.954 2	4.555 9	4.379 9	0.000 0
Educational level	0.365 1	0.294 8	1.238 3	0.215 6
Income	0.360 5	0.247 1	1.458 9	0.144 6
Health condition	0.704 9	0.349 8	2.015 0	0.043 9
The degree of attention to traceable information	0.462 5	0.338 2	1.367 5	0.171 5
Consideration of the degree of importance of price factor	-0.329 6	0.394 3	0.836 0	0.403 1
Consideration of the degree of importance of safety factor	1.511 5	0.524 5	2.881 9	0.004 0
The degree of cognition of traceable fruits	0.755 6	0.343 8	2.198 0	0.027 9
The degree of trust in traceable information	1.205 7	0.498 0	2.421 2	0.155 5

The first is the impact of cognition. The traceable system is considered as the system that can effectively ensure safety of fresh fruits, but the consumers know little about it. On the one hand, the government and relevant organizations are devoid sufficient publicity of traceable system of food, and some consumers have not heard of or do not know the connotation of traceable system of fresh fruits, thus they cannot correctly understand and practise the traceable system of fresh fruits; on the other hand, as the development of traceable system of food in China is still in its infancy, for the time being, what confronts the consumers is hike in price arising from implementation of this system, and the consumers need to pay more costs. The positive effect that the traceable system of food can generate has not yet been fully reflected. Although the consumers are very concerned about quality safety, most consumers still entertain wait - and - see attitude<sup>[5-7]</sup>.

The second is the impact of subjective and objective factors. The consumers' willingness to purchase traceable fresh fruits is not only affected by the educational level, income level, health condition and other objective factors, but also affected by the degree of consumers' emphasis on safety factors of fresh fruits, the degree of consumers' attention to traceable fresh fruits, the degree of trust on traceability information identification affixed on the package, and other subjective factors.

The third is the impact of price. The price has the greatest impact on the consumers' behaviour of purchasing traceable fresh fruits. When the implementation of traceable system

leads to rise in price of fresh fruits, the consumers choose to wait or give up, while as for the consumers who express unwillingness to purchase, " the traceable information is not reliable" , " the price is too expensive" and so on, become the most direct causes for choices made by this part of consumers. As for the consumers who are willing to pay higher than the price but not more than 20% , most of them are the households with average annual income more than 0.1 million yuan or households with children under the age of 6. As for the consumers who can accept more than 30% of the current price, the average annual income of them reaches 0.2 million yuan, therefore, the price of traceable fresh fruits should be controlled within the scope of price that the ordinary people can accept, and not higher than 20% of the current price. And if the price of traceable fresh fruits is controlled at 15% of the current price, it will be more conducive to gradual promotion of traceable fresh fruits.

Through the survey, it is found that most respondents are concerned about problems of quality safety, which meshes well with the fact that the consumers hold that the food security problems are serious in China at present. The establishment of traceable system has had a good mass base<sup>[8-12]</sup>. According to the above conclusions, corresponding proposals are put forward as follows.

First, the government should not only focus on supervision and regulation over food security, but also strengthen the education of food security knowledge, publicity and promotion of

traceable system. In order to reduce the price of traceable food, the government should use public-spirited advertisements via television, radio, Internet and other media, to strengthen publicity and popularization, and especially reinforce publicity and promotion in preschool and primary school where the children are concentrated. Second, the government and related enterprise should particularly pay attention to the impact of consumers' individual characteristics on willingness to purchase and purchase behaviours, and work out feasible strategy of traceable food marketing, according to consumers' preferences, consumers' attention to health, consumers' attention to the healthy growth of children and other factors. Finally, when implementing the system, the state and the government should take into full account the average income level of consumers, give full play to the effect of scale merit, and work out the reasonable price that can be accepted by most of consumers, which can not only ensure food security, but also enable the consumers to obtain a reasonable price accepted in terms of mentality and ability, so as to achieve double effect of moderate price and food security.

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## 5 Strategic selection for development of agricultural product logistics in Shaanxi Province—Logistics cost control

From the above systematic analyses on strengths, weaknesses, opportunities and threats of agricultural product logistics in Shaanxi Province, it can be seen that there are both similarities and differences between the agricultural product logistics of Shaanxi Province and that of other provinces. Shaanxi Province is endowed with favorable natural and locational advantages in production of agricultural products. In addition to its powerful agricultural scientific research strength, Shaanxi Province has the first scientific and technologic exchange platform for agricultural science in China. These are advantages of rapidly developing agricultural product logistics in Shaanxi Province. At the same time, Shaanxi Province is located in northwest inland, and backward ideas and unsmooth transmission of information are weaknesses in development of agricultural product logistics in Shaanxi Province. With limitations of information and economic conditions, it is impossible for Shaanxi Province to catch up other developed provinces and become a domestic large province of production and sales of agricultural products.

In view of these situations, the development strategy for Shaanxi's agricultural product logistics should make best use of the advantages and bypass the disadvantages, and take full ad-

vantage of domestic and international resources. Besides, it should actively and reliably take the road of "satisfying domestic and international markets, capturing northwest market, breaking into national market, and exploiting international market". Furthermore, it is required to energetically develop regional excellent and special products, to realize high-efficient, rapid, and convenient development of agricultural product logistics.

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