

# Consumer Information and Willingness to Pay an Additional Price for Food Safety of Dairy Products

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## Abstract

Due to food safety incidents around the world, a number of research projects have found growing willingness to pay (WTP) premium price for additional safety of food products. However, this depends on the amount of information consumers have regarding food safety. The objective of this paper is to assess the level of information consumers have on the safety of dairy products in Kosovo and the impact of information on the consumers' willingness to pay premium price for dairy products if they are certified with food safety standards.

The results come from a survey conducted with 303 customers of Viva Fresh supermarket chain store, who were interviewed at the time of purchase in the supermarket. Descriptive statistics shows lack of knowledge of food safety; only 15% of respondents are aware of ISO9001 standard, 7% are aware of HACCP and only 10.2% of respondents can make a difference between the concepts of food quality and safety. With regard to information 66.3% of respondents have heard of food safety problems while 47.33% have heard through the media.

Using a logistic regression model, the research found that consumers who have heard about the problems of food safety ( $p = 0.049$ ) and those who are aware of the ISO 9001 ( $p = 0.002$ ) are more likely to have a positive attitude towards WTP.

**Key Words:** food safety, information, willingness to pay, dairy products, logistic regression

## 1. Introduction

Risks on food safety as it was the case with the avian influenza or bird flu, crazy cow flu, and melamine dispositions on baby milk in China have increased consumers' concern about food safety and their demand for safer food products. A number of studies (Caswell & Mojduszka, 1996; Latvala & Kola, 2003; Verbeke, 2008) inform however that information consumers have on food safety and on health problems from unsafe food may affect their consumption behaviours.

Information about health and nutritional composition can be used by consumers in their evaluation of product alternatives and formation of quality expectations (Verbeke, 2008). While in developed countries, such as Finland, about 41% of consumers are not interested in additional information about food quality and safety because consumers feel that the present labels guarantee the safety and quality already well enough (Latvala & Kola, 2003), in the developing countries, in contrast to the developed ones, consumers are less exposed to information and therefore less aware of hazards and risk in their food choices (Zhlilima, Imami, & Canavari, 2015).

Lack of sufficient information in developing countries also illustrates many consumer misunderstandings in terms of concepts dealing with food safety and quality. The concept of safety is still vague due to misinterpretation and interference with the broader concept of quality (Jabbar, Baker, & Fadiga, 2010). This leads to consumers giving high importance to safety, although they use the same attributes in defining food quality and safety (Kealesitse & Kabama, 2012).

Kosovo as a new state that is still in transition is one of the places where the problems of information on food safety leave much to be desired. Although studies of this kind in Kosovo are scarce, yet there is a considerable degree of concern in terms of food safety. Canavari, Imami, Gjonbalaj, & Alishani (2014) found that two thirds of consumers interviewed claim to be very concerned regarding food safety in Kosovo.

The dairy industry is considered as the sector that recorded the fastest growth (Haas, Canavari, Imami, Gjonbalaj, & Gjokaj, 2015). However, even in this sector, the level of food safety remains low, at least in terms of

certification of food safety standards. A very small number of companies in this sector have certified their products with food safety standards such as ISO 22000 or the food safety system HACCP. While Latvala & Kola (2003) point out that lack of information is a typical example of market failure.

From the above, it follows that the information is important for customer attitude and behaviour of its purchasing. In this context, the *objective of the paper is to study how the information affects the consumer willingness to pay an additional price for the safety of food*. The findings of this study are expected to be important for policymaking in terms of defining policies aiming at ensuring food safety information for consumers. Since the information is regarded as a public good, in that case the role of government is to create the legal framework that enables consumers to obtain and use information (Latvala & Kola, 2003).

The remainder of this report is structured as follows. The objectives and hypothesis are presented in the following paragraph. Then the findings and recommendations are presented after the research methods and procedures are introduced and discussed.

## **2. Objectives and Hypothesis**

The objective of the paper is to assess consumer awareness on food safety related standard and problems to test the impact of information on consumer willingness to pay an additional price for dairy products in Kosovo. Three hypotheses are therefore formulated as follows:

1. Consumer awareness of food safety problems has a positive impact on consumers' willingness to purchase products certified for food safety;
2. Consumer knowledge of safety and quality standards of ISO 9001 or HACCP has a positive impact on consumers' willingness to purchase products certified for food safety;
3. Clear distinction between food quality and safety leads to higher consumer willingness to pay for products certified for food safety.

## **3. Methods and Procedures**

For this study, we have used contingent valuation method (CVM) as a method used for measuring the value of nonmarket goods when data on non-market goods attributes are missing. Contingent valuation method has proven particularly useful when implemented alone or jointly with other valuation technique for non-market goods, such as the travel cost method or hedonic approaches (Alberini & Cooper, 2000). It is most often used method in studies dealing with food quality and safety characteristics (Latvala & Kola, Impact of information on the demand for credence characteristics, 2003). This method also meets the intent of the paper to draw descriptive statistics on the level of knowledge and information of consumers about food quality and safety and the impact on their willingness to pay for an additional price.

As stated by Alberini & Cooper (2000), CVM requires that the data collection is done through a survey asking consumers information on research questions through face-to-face interviews. Given that this method is stated as a preferred method which extracts information by asking hypothetical questions, obtaining reliable information is of a critical importance. To deal with methodological challenge, the field research has been conducted at a time of purchase, i.e. within focal points of sale, where consumers make decisions about buying. This way, the data is taken directly from the decision-makers and as such it will draw real customer preferences (Loureiro & Umberger, 2003).

### 3.1. Model

Logistic regression model has been used to test the hypothesis. "Willingness to pay a price premium for additional food safety" – WTP – which is our dependent variable; refer to Table 1 for operationalization of dependent and independent variables. Since the dependent variable is dichotomous in this case, then the model with dummy dependent variable will be the binary logit model (Osmani, 2010), as shown by Formula 1.

$$P_i = \frac{1}{1 + e^{-a - b_i x_i}} \quad (1)$$

Where  $P_i$  is the probability that a consumer belongs in a group of consumers who are willing to pay a premium,  $x_i$  are explanatory variables and  $b_i$  are parameters to be estimated.

As seen from the above, this model is not linear in terms of parameters, and thus, ordinary least squares (OLS) cannot be used directly for this assessment. It can be transformed into linear and behave as such in the following form:

$$L_i = \ln \frac{P_i}{1 - P_i} = a + b_i X_i + e_i \quad (2)$$

To simplify understanding of the model and interpretation, in our case, if the customer responds positively to paying additional price, we define as success and mark 1, and on the contrary, if the customer rejects to pay the additional price we mark 0. The ratio between probability of success and failure of the independent variable (the independent variable is categorical) is expressed in formula (2):  $\frac{P_i}{1 - P_i}$  which is called odds. From here the logistic regression equation is as the following:

$$\log(odds) = a + b_i X_i + e_i \quad (3)$$

Odds for consumer  $i$  is given by the Formula 4:

$$\frac{P_i}{1 - P_i} = e^{a + b_i X_i + e_i} \quad (4)$$

The coefficient  $b$  - is the coefficient which shows the relationship between the independent variable and  $\log(odds)$  for the occurrence of the event that interests us, namely how much  $\log(odds)$  changes when variable  $X$  changes by one unit. When:

$b_i > 0$  - relationship is positive;

$b_i < 0$  - relationship is negative;

$b_i = 0$  - no relationship between the independent and dependent variable.

### 3.2. The data

The data was obtained through a survey. The questionnaire was prepared and tested well in advance. The survey was conducted within the

premises of the supermarket chain store Viva Fresh. The targeted dairy products for the assessment include white cheese, milk and yogurt. The survey was conducted within the supermarket because: (i) the customer was interviewed immediately after the commission of the acquisition; (ii) during the interview, the customer had the chance to also have other products exhibited which helps in providing more accurately an opinion regarding his decision taking into account alternatives; (iii) consumers have been in a condition to express more realistically regarding questions about how they make decisions after they have purchased the product and have been able to look at the label content.

In the survey, which was conducted between April 1<sup>st</sup> and May 5<sup>th</sup> 2015, 303 consumers aged over 18 years have been interviewed. Customer choice is made at random. After finishing an interview, the next interview was conducted with the first customer who bought dairy products and who agreed to be interviewed.

Based on dairy quantity sold at Viva Fresh Store selling points, and based on the socio-economic and demographic census in the Republic of Kosovo (ASK, 2013a; ASK, 2013b; ASK, 2013c), selling points have been selected in three cities in such a way that the sample is as representative as possible.

In the capital city Pristina, as the representative of the group of cities with over 100 thousand inhabitants, were conducted 153 surveys at its widest point located in the suburbs (Veternik). In Gjilan, as the representative of the group of 50 to 100 thousand inhabitants, 110 surveys were conducted in two points of sale in the city. 40 interviews were conducted in a sales point of Viva Fresh Store, in this year (less than 50 thousand inhabitants).

**Table 1:** Operational Aspects – Data from Surveys with Consumers

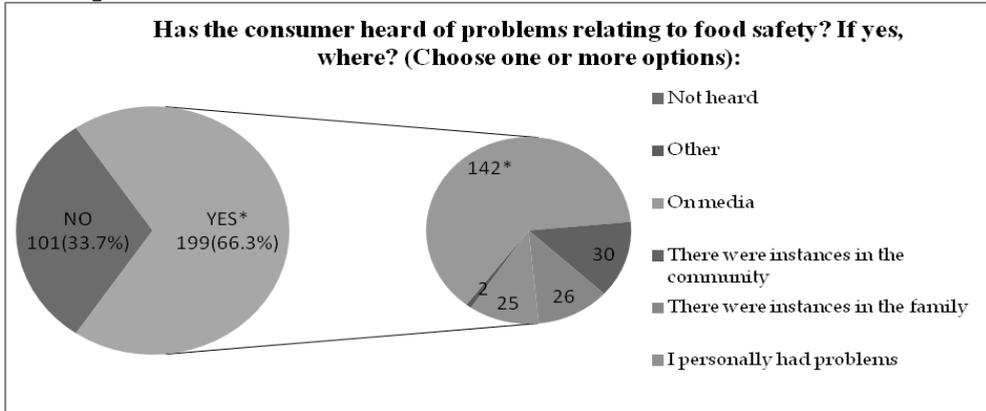
| Hypothesis | Concept                    | Variable | Method of Measure |
|------------|----------------------------|----------|-------------------|
|            | <i>Dependent Variables</i> |          |                   |

|                              |                                                                |                     |                                                 |
|------------------------------|----------------------------------------------------------------|---------------------|-------------------------------------------------|
|                              | Willingness to pay                                             | WTP                 | Dummy variable<br>1= Willingness to pay<br>0=No |
| <i>Independent Variables</i> |                                                                |                     |                                                 |
| 1                            | Has the consumer heard of problems relating to food safety?    | <i>ProblHear</i>    | Dummy variable<br>1=Yes<br>0=No                 |
| 2                            | Is the consumer aware of food safety and quality standards?    | <i>WhatHACCP</i>    | Dummy variable<br>1=Yes; 0=No                   |
|                              |                                                                | <i>WhatISO9001</i>  | Dummy variable<br>1=Yes; 0=No                   |
| 3                            | Do you know of the difference between food quality and safety? | <i>ClearConcept</i> | Dummy variable<br>1=Yes;<br>0=No                |

**Source:** Authors' own work

#### 4. Results and interpretation

The descriptive results show that consumers have problems with food safety and awareness of safety standards. As shown in Graph 1, answers on the question of whether they have heard about problems with food safety inform us that 66.3% of respondents who answered this question (n = 300) have heard of food safety problems and 33.7% have answered negatively. Only 8.33% of the total have been affected themselves by food related problems and most have heard through the media (47.33% compared with the total of respondents, or 71.36% compared with other alternatives from the group of respondents who have heard of problems with food).

**Graph 1: Awareness of the Effects of Food on Health Issues**

\* The discrepancy of the total number of "YES" (199), more than the frequencies presented in the second graph (225) which relates with the fact that respondents had opportunity to choose more alternatives

**Source:** Field survey, Authors' own work

Descriptive statistics are provided in the Table 2 on the measures of awareness that consumers have about food safety standards such as HACCP and ISO 9001. It shows that 89.8% of respondents have no clear idea on the concept of food safety. So a very small extent (10%) distinguishes attributes pertaining to food safety and quality. This is in line with the awareness of HACCP where only 7% of respondents know about the application of certification for food safety requirements by the manufacturer in the entire value chain. The situation is better with the standard ISO 9001 in which case 15.3% of respondents know that this seal on the packaging indicates that the standard for quality is complemented by ISO.

**Table 2:** Descriptive Statistics for Consumer Awareness on Food Safety

|                                                    |            | Frequency | Percent | Valid Percent |
|----------------------------------------------------|------------|-----------|---------|---------------|
| Is the concept on food safety clear for consumers? | NO         | 272       | 89,8    | 89,8          |
|                                                    | YES        | 31        | 10,2    | 10,2          |
|                                                    | Total      | 303       | 100,0   | 100,0         |
| Do you know what HACCP stamp stands for?           | Don't know | 279       | 92,1    | 93,0          |
|                                                    | I know     | 21        | 6,9     | 7,0           |
|                                                    | Total      | 300       | 99,0    | 100,0         |
| Do you know what ISO 9001 stamp stands for?        | Don't know | 254       | 83,8    | 84,7          |
|                                                    | I know     | 46        | 15,2    | 15,3          |
|                                                    | Total      | 300       | 99,0    | 100,0         |

**Source:** Field survey – processing by SPSS by Authors

#### 4.1. Results of the Tested Hypothesis

The testing of the hypothesis is conducted by using the econometric model of logistic regression. Results were processed through the statistical package for the social sciences (SPSS). As presented in Table 1 the independent variable is the dummy variable which shows whether the respondents says yes or no to WTP if the product is certified with safety standards. 226 (74.8%) of customers from the sample of 302 gave positive responses. With these data, through Backward Conditional method in step 3-win model presented in Table 3.

**Table 3:** The Model of Logistic Regression (Step 3 – Backward Conditional)

|             | B    | Standard Error |       | Sig. | Odds ratio ( <i>e<sup>b</sup></i> ) |
|-------------|------|----------------|-------|------|-------------------------------------|
|             |      |                | Wald  |      |                                     |
| ProblHear   | ,544 | ,276           | 3,869 | ,049 | 1,723                               |
| WhatISO9001 | ,652 | ,216           | 9,160 | ,002 | 1,920                               |

**Source:** Field survey – processing by SPSS by Authors

This model meets the criteria of Hosmer and Lemeshow test after the third step  $p\text{-value} = 0.809$  or  $P > 0.05$ , which makes the model highly important: the basic hypothesis that shows the difference between the data and the model prediction is statistically insignificant; it shows that the model provides better data (Tab. 4)

**Table 4:** Hosmer Test Lemeshow

| Step | Chi-square | df | Sig. |
|------|------------|----|------|
| 1    | 3,325      | 3  | ,344 |
| 2    | ,107       | 2  | ,948 |
| 3    | ,058       | 1  | ,809 |

**Source:** Field survey – processing by SPSS by Authors

From the above results, we see that the variable "ProblHear" has a significant effect ( $p = 0.042 < 0.05$  level) in the probability that consumers are willing to pay a premium. More specifically, the model shows a positive relationship between hearing about food related problem and WTP for higher food safety - the coefficient  $b > 0$  and the odds ratio (1.723) shows that the odds in favour of WTP increase by 72.3% ( $1.723 * 100 - 100 = 72.3\%$ ) in case of consumers who have heard about the problems of food security compared to consumers who have not heard, *ceteris paribus*. Significant effect ( $p = 0.002 < 0.01$ ) in the probability of customer WTP is also found in case of variable "WhatISO9001" - similar interpretation as above (variable "ProblHear") is valid for the variable "WhatISO9001" as well.

Consequently, we have the result of testing the hypothesis which is as follows:

**Hypothesis 1:** *The knowledge of consumers for food safety problems has positive relationship with the willingness to pay more for products certified for food safety.* The results of logistic regression model show that this hypothesis is accepted at 95% confidence level ( $p = 0.042$ ).

**Hypothesis 2:** *Knowledge of safety and quality standards ISO 9001 or HACCP has a positive effect on the willingness to pay more for products certified for food safety.* At 99% confidence level ( $p = 0.002$ ) hypotheses regarding the impact of the recognition of ISO 9001 is accepted, but hypothesis concerning the HACCP awareness is rejected.

**Hypothesis 3:** *The clarity in distinguishing the concepts of food quality and safety impacts positively on the willingness to pay more for products certified for food safety.* Results of logistic regression showed that there is not a statistical significant effect between clarity and WTP; therefore the hypothesis is rejected.

## 5. Conclusions

In general, this research indicates that the consumers in Kosovo have little knowledge about food safety and food standards. Only about 15% of respondents recognize the standard ISO9001 while 7% recognize HACCP. More than 90% of respondents mix the concept of food safety with food quality. This has been observed when consumers were asked to give feedback on food safety in which case they referred to food quality (Kealesitse & Kabama, 2012).

With regards to information on food, 66.3% of respondents have heard on food safety problems. It is important to note that most of consumer information is obtained from media sources, (47.33% of respondents in total). These findings are in line with the findings in the study of Latvala (2010).

The results of logistic regression model indicated that knowledge on ISO 9001 has a significant statistic effect on WTP. Since the relationship is positive, then it is necessary that consumers be informed and acquainted with this standard as the system of food safety, HACCP.

Research findings have important implications on consumer awareness and information about food safety issues and standards. They prove that consumers need more information about food quality and safety. Organizing media campaigns aiming at informing the public about food safety and quality is recommended. In these campaigns customers should be informed how to realize the difference between quality and food safety attributes. Improved information may lead to reducing consumers' uncertainty and improving their objective and subjective knowledge basis, or to assisting consumers in making choices that better align with their actual preferences (Verbeke, 2008). These activities should be in the focus of the responsible state institutions, dairy product producers and associations concerned with protecting the health of consumers.

In terms of further research, results suggest deeper research in order to identify other knowledge and informing factors related to food safety and

their impact on WTP. New research that takes into account food producers to analyse whether there is information asymmetry at the detriment of the consumer, may also be an extension to this research.

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