



# IMPACT OF SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS ON WILLINGNESS TO PAY FOR FOOD SAFETY ATTRIBUTES

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### Abstract

The aim of this paper is to determine whether the dairy customers in Kosovo are willing to pay a higher price for certified products on food safety and which is the impact of socio-demographic factors in WTP. For this purpose, a survey of 303 customers of Viva Fresh Store supermarket network was conducted - the customers were interviewed at the time of purchase, inside the supermarket at the dairy products sector, namely white cheese, milk and yogurt. The survey took place from April 1 to May 5, 2015, in three cities representing three groups of cities by number of inhabitants: Pristine, Gjilani and Vitia. Logit Binary model was applied to analyze the results and test the hypothesis, which showed that the level of education, the level of incomes and the families with preschool children have a significant impact (p<0.05) in WTP. Other tested factors such as: the age, gender, residence (city-village), the number of family members, pensioners and the number of children in schools (6-17 years) in the families didn't show a significant impact (p>0.05). The results are important for the managers of milk processing industry as well as for state institutions.

# **Key Words**

Willingness to pay; food safety; socio-demographic factors; logistic regression; Kosovo.

# INTRODUCTION

Food safety is each day posing a concern for customers, because of the problems and incidents coming out, such as the cases of avian influenza, "crazy" cows, or melamine in baby milk in China, etc. Consequently, consumers also express their willingness to pay extra prices in exchange for additional security of the products they consume. Numerous researchers have paid and continue to pay a special attention on the willingness to pay a premium price for the additional food safety attributes (Grunert, 2005; Fox et al., 1995; Loureiro & Umberger, 2003; Piggott & Marsh, 2004; Baker & Crosbie, 1993; Xu & Wu, 2010; Lončarić et al., 2011).

Though there are few studies of this kind in Kosovo, there is a considerable degree of concern in terms of food safety (Canavari et al., 2014). According to this study, 2/3 of the interviewed customers claim to be quite concerned about food safety.

On the other hand, imported products continue to dominate Kosovo agrofood market, a situation which is still present 15 years after the liberation. Within the overall structure of imports, food products have the central place with over 24.2% (ASK, Jun 2015) while Kosovo has an extremely high deficit in the trade balance. According to the Statistics Agency of Kosovo, the deficit in 2015 was over €21.2 billion in total with degree coverage of 12.8%.

In this unfavorable trade balance, in terms of agro-food market, the dairy processing industry is considered as a sector that witnessed the fastest growth (Haas et al., 2015). However, even in this sector the level of food safety remains at a low level, at least in terms of food safety standards certification. A very small number of companies in this sector have their products certified with food safety standards such as ISO 22000 or food safety system HACCP.

Although a strong patriotism among Kosovo consumers is evident, which show confidence that local dairy milk is safer than the one imported (Haas et al., 2015), in relation to products coming from European Union (in regard to food safety), consumers show more trust compared to local products (Canavari et al. 2014). Products from EU countries represent the largest part of the total imports value with a trend that ranges between 40-45% in the last six years (ASK, June 2015).

As stated above, it can be said that food safety represents an important factor for the market in Kosovo that should be studied through specific dimensions. This is important also for political decision-makers in order to focus domestic policies towards the development of agro-food sector in Kosovo, namely the dairy industry but also the entire value chain, because, in order to increase consumer confidence to local products and therefore improvement trade balance, the investment in food safety should represent a priority alternative.

Therefore, the results of this study will be of particular interest to state institutions that deal with the development of specific policies in rising awareness of consumers about the problems related to insecure foods, and for the standards which should be applied in this sector. Also, the results of

the study are also of interest to dairy processors to recognize best customer behavior for their product services, specifically for food safety aspect.

# PROBLEM STATEMENT

As stressed above, it is necessary to understand consumers' willingness to focus on domestic products as a reflection toward the increase of food safety, since this dimension of the market in Kosovo so far is little studied. In many papers (Verbeke, 2005; Shi & Price, 1998; Baker G. A., 1999; Boccaletti & Nardella, 2000; Loureiro & Hine, 2002; Huang et al., 2000) there is a conclusion that costumers express WTP when it comes to improving attributes related to food safety. Incomes, level of education, gender, age, residence, etc., are also important factors that determine costumers' behavior and their WTP.

In this regard, the research problem can be formulated as: a need to better understand WTP additional price for food safety attributes for dairy products and the impact of socio-economic and demographic factors (SEDF) to this willingness.

### **OBJECTIVE AND HYPOTHESES**

So, the objective of this paper is to measure the impact of above mentioned factors on WTP of dairy consumer in Kosovo, which serves as the basis for the research hypotheses such as:

- 1. The income level of consumers has a positive report with the willingness to pay more for food safety.
- 2. The level of education has a positive report with the willingness to pay more for food safety.
- 3. Demographic factors (age, gender, number and the structure of the family (the presence of children and pensioners), type of residence (urban-rural)) affect the willingness to pay more for product safety.

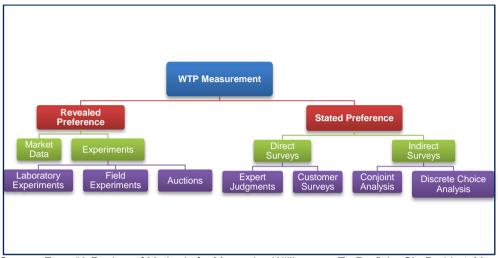
# PROCEDURES AND METHODS

### Methods

For studying or assessing consumers' behavior, WTP respectively, there are generally two methodological approaches: Revealed Preference and Stated Preference. The first approach focuses the observation on the consumer's behavior in the market to measure its ex-post WTP, while the second approach is based on hypothetical data to measure ex-ante WTP for attributes that are not present in the market yet (Berges & Casellas, 2009). Out of two basic methods derive other sub-divisions depending on the

source of data and the way of collection. Sub-divisions are shown schematically in Figure 1.

Figure 1. Classification framework of the methods to measure WTP



Source: From "A Review of Methods for Measuring Willingness-To-Pay", by Ch. Breidert, M. Hahsler, Th. Reutterer, 2006, Innovative Marketing, 2(4), 8-32.

In case of our research, SEDF involvement in current conditions in Kosovo is possible by carrying out a direct observation through customer surveys. So, quantitative methods in this research will be used since it belongs to stated preferences, which is the one of "face-to-face" questioning of the costumers during the shopping. In this way the data is taken directly from the decision-maker and thus the real preferences of the customers will be better understood (Loureiro & Umberger, 2003).

# The model

Econometric model for testing hypotheses is the one of regression where the "willingness to pay for additional safety - WTP" will be a dependent variable, while the others involved in hypotheses 1, 2 and 3 will be independent variables (explanatory). Since the dependent variable is dichotomous in this case, then dependent dummy model variable will be binary logit model (Osmani, 2010).

$$P_i = \frac{1}{1 + e^{-a - b_i X_i}} \tag{1}$$

As shown above, this model is not linear in parameters therefore the Ordinary Last Squares (OLS) cannot be directly used. It can be transformed into linear and behave as such in the following form:

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

To simplify the understanding of the model and interpretation, in our case, if the customer reacts positively in paying extra price we define it as a success and will mark 1, while the opposite is non-success and marked with 0. The quotient between the probability for success and non-success of an independent variable model (when the independent variable is categorical) is the expression in equation (2):  $\frac{P_i}{1-P_i}$  which is odds. From here on we have the equation of the logistic regression:

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

As shown above the coefficient a has no significance in interpretation, it represents log value (odds) when X=0. While  $b_i$  is the coefficient which shows the existing relationship between independent variable and log (odds) for the occurrence of the event that we have interests of, namely on the changes that occurs with odds for the event that interests us to happen when variable X changes for one unit.

When:

**b**<sub>i</sub>>**0** – the relationship is positive;

**b**<sub>i</sub><0 – the relationship is negative;

**b**<sub>i</sub>**=0** – there is no relationship between dependent and independent variables.

In fact bi represents the change between two categories of variable X (in cases when it is categorical variable) which can also be presented as:  $b_i = \log \, (\text{odds ratio}).$  When we do an anti-logarithm and odds radio is written as OR we win the expression:  $OR = e^{b_i}.$ 

### Data

Data are obtained from the survey. A questionnaire that provides answers to the research hypotheses and the model used for their testing is prepared and tested in advance. The survey was conducted within the premises of Viva Fresh Store supermarket network, at the dairy products sector, namely white cheese, milk and yogurt. This is because: (i) the customer was interviewed immediately after the shopping; (ii) during the survey the customer had also present other products which helps in providing more accurate answer about his decision by taking into account the alternatives; (iii) consumers were in a position to express more realistic in terms of the questionings about their decisions, since they have the product in front of them and there is an opportunity to analyze whether they check the content in the label or not.

In the observation conducted between 1 April and 15 May 2015, were involved a total number of 303 consumers, above 18 years old. Customers' selection was random. After conducting an interview, the next one was

conducted with the first customer who bought dairy products and agreed to be interviewed.

Based on the data from quantity sold dairy, in Viva Fresh Store markets, and based on socio-economic and demographic data of the Republic of Kosovo census (ASK, 2013a; ASK, 2013b; ASK, 2013c), and with the aim the sample to be as representative as possible, the studding centers were selected in three different localities with different size and a diverse population.

In capital Pristine, as a representative of the group of cities with over 100 thousand inhabitants, 153 surveys were conducted, in one of the biggest markets located in the vicinity of the city (called Veternik) and at another point inside the city, in the road B, which according to Viva Fresh Store officials has the biggest sale after the one in Veternik. The other selected locality was Gjilani, from the group of towns with 50-100 thousand inhabitants. 110 surveys were carried out in two different markets there. 40 interviews were conducted in a Viva Fresh Store market, in the small town of Vitia (which has less than 50 thousand inhabitants).

**Table 1:** Aspects of operationalization the data from the surveys with dairy customers

"	Concept	Variable	Measuring options-implementation	Symbols		
esis	Dependent variable					
Hypothesis	Willingness to pay	GPP	Dummy variable 1= willingness to pay 0=lack of willingness	GPP		
Inde	ependent variable	es				
1`	Level of family incomes	Incomes	Ordinal/interval variable, width 100€ Class 1: - up to 100; C2 -100-200;; 9 - 900+	Incomes		
2	Level of education of	Education	Dummy variable: high: middle: elementary.  A1) 1-high; 0 –other	HighEdu		
	the interviewed	Luucalion	A2) 1 – middle; 0 other	MidleEdu		
3	Demographic factors	The age of the interviewed	Report variable Number of years	Age		
		Gender of the interviewed	Dummy variable 1=Male, 0=Female	Gender		
		Under 5 years old children presence in the family	Dummy variable 1=there are under 6 years old kids; 0=there is not	NoSchKids		
		Presence of kids between 6-18 years	Dummy variable 1=there are kids over 5 years old; 0=there is not	SchKids		
		Presence of pensioners	Dummy variable 1=there are pensioners; 0=there are no pensioners	PensionNr		
	Respondent's residence	Residence	Dummy variable 1 – city; 2 - village	Residence		

Source: Own work

### **RESULTS**

# Summary of socio-demographic characteristics of the sample

Table 2. shows a discrepancy with census data, but there is a logical explanation if taken into account the fact that in the sample are included only customers of a network of supermarkets, although hypermarkets and groceries are most preferred shopping centers for dairy products' customers (Haas et al., 2015). Thus compared to 2011 census data, it shows that 65% of the customers in the sample are from the city while 62% of the total population lives in rural areas (ASK, 2013b). We also keep in mind the fact that the interviewing places were in urban areas.

The gender balance in the sample is 65% to 35% in favor of male, while the report in the population is 50:50. As much as we can take for granted the fact that the gender of buyers is dominated by male, also referring to the interviewed is proved that in most cases, female buyers generally rejected being interviewed, while in cases when a couple bought products, it was the men willing to be interviewed.

**Table 2:** Socio-demographic characteristics of the sample – Descriptive statistics

Socio-demographic		Fi	Percentage	Average	Stand.	Mode	Median
characteristics					Dev.		
Residence:		n=302	100				
	City	197	65.2 <b>(38)</b>				
	Village	105	34.8 <b>(62)</b>				
Gender		n=303	100				
	Male	197	65 <b>(50.34)</b>				
	Female	106	35 <b>(49.66)</b>				
Nr. of members in a famil	у	n=303	100	4.89 <b>(5.9)</b>	1.834	4	5
Age		n=303	100	38.27	11.995	30	37 <b>(26.3)</b>
Structure of the family:		n=303	100				
Nr. of pensioners:	0	215	71				
•	1	55	18.2				
	2	33	10.9				
Nr. of children:	0	90	29.7				
	1	64	21.1				
	2	95	31.4				
	3	35	11.6				
	4	14	4.6				
	5-8	5	1.6				
			-				
Incomes		n=300				900+	400-500
Education level:		n=302	100			High	High
Without ed	ducation	3	1.0 <b>(6.22)</b>				
Elementar	У	37	12.3 <b>(50.27)</b>				
Secondary		110	36.4 <b>(34.17)</b>				
High		152	50.3 <b>(9.34)</b>				
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<sup>\*-</sup> data in brackets were taken from 2011 census

Source: Own work

Even in regard to the level of education, there are differences with 2011 census education which shows that buyers generally have high level of education, with over 50%, a data equal with the research from Haas et al. (2015). Whereas the average age in the case of this study was 38.27 which is also corresponding to Haas et al (2015) in which is 38.4 with a standard deviation of 12.3. As regard to data from 2011 census, the median age is 26.3, while in our research was 37. The family structure is dominated by families without pensioners 71%, and most families have at least one child1 while 29.7% are families have no child.

On the family incomes the question was submitted through ordinal alternatives divided into 9 classes starting with the first one limited to  $\le 200$ , followed by  $\le 100$  intervals for the next groups until the last alternative which was  $\le 900$  and over. Distribution in this case is asymmetrical which is also influenced by the income differences between cities where the interviews were conducted. Consequently, the most representative average in this case is in the median interval alternatives of 400-500  $\le$ .

# **Consumption of dairy product**

Dairy products settle an important place in the daily meal of Kosovo families. Milk is a traditional product in Kosovo and elsewhere in the Balkans in terms of consumption and production (USAID, 2008). It is estimated that the consumption of milk per capita amounts to about 160 litters²/annually (Nushi & Selimi, 2009). But based on various studies there are available different data on consumption, depending on the surveys' specifics. On table 3 are presented the field results of a survey compared with two other researches (Haas et al., 2015; Miftari et al., 2011).

**Table 3:** Monthly average consumption of dairy products and comparisons with other researches

Product	N	Mean	Std. Deviation	(Miftari et Mean	t al., 2011) Std. Dev	(Haas et al., 20 Mean	15) Std. Dev.
Milk (I/month)	294	31,81	21,792	26.30	14.53	7.07(I/week)	4.923
Cheese (kg/month)	300	3,13	1,966	4.67	2.53	3.31(kg/week)	3.122
Yogurt (I/month)	287	25,14	18,668	10.51	7.53	3.73(kg/week)	3.058

Source: Field survey and Miftari et al., 2011 & Haas et al., 2015

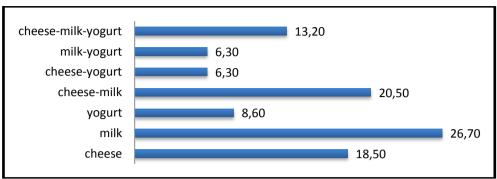
From the dairy products bought by our respondents we got the insight presented in Graphic 1 which shows that out of 303 buyers most of them bough only milk (26.7%), followed by those who have bought milk and cheese also (20.5%) followed by those who bought only cheese (18.5%).

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<sup>&</sup>lt;sup>1</sup> Children are considered those between 0-17 years old

This amount reflects the equivalence on the amount of milk for all milk products consumed in a year. For instance, a litter of pasteurized milk is equivalent to one litter of raw milk, while a kilo of yellow cheese requires an average of seven litters of raw milk.

**Graph 1:** Purchases by type of dairy products executed by respondents



Source: Field survey

# Logit binary model (logistic regression) and the impact of SEDF in WTP

Logit model helps in explaining the impact of SEDF in the WTP expression. Dependent variables in the model (WTP) separate respondents in two categories: those who are willing to pay and those who are not (Latvala, 2010). Table 4 shows that most of interviewed buyers (74.8%) are willing to pay extra price for the products certified with food safety standards. Let stress that before asking this question which was the last in the questionnaire (on the willingness to pay a higher price compared to the current price of the product), a sufficient explanation was provided to them on food safety concept, in cases when it's apparent that for the customer it was not clear the food safety concept and it was a confusion with the quality concept.

**Table 4:** Willingness to pay – descriptive statistics

		Frequency	Percentage	Valid percentage
Are you WTP for	No	76	25,1	25,2
certified products?	Yes	226	74,6	74,8
<b>P</b> • • • • • • • • • • • • • • • • • • •	Total	302	99,7	100,0

Source: Field survey

After inserting in the model statistically important factors only, SPSS in assessing an accurate forecast of observed and predicted values (Table 5) shows that the model has managed to have a successful forecast at 75.2% degree, which indicates a good model.

**Table 5:** Observed and predicted values produced by logit binary model

Observed values	Predicted values				
Observed values	No GPP	Yes GPP	Correct percentage		
No GPP	0	74	0,0		
Yes GPP	0	224	100,0		

Total percentage 75,2	Total percentage	75,2
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Source: Field survey

Results of logistic model, presented in Table 6 indicate which of SEDF have a significant statistical impact in explaining variations in the willingness of buyers to pay extra cost for certification of dairy products with safety standards. Variables that have been tested but have not been statistically significant are not included in the table.

**Table 6:** Logit binary model (n=303)

Variables	b	Standard error	Sig.	Odds ratio (e <sup>b</sup> )
HighEdu (X₁)	,621	,312	,046	1,860
NoSchKids (X <sub>2</sub> )	,424	,199	,033	1,529
Incomes (X <sub>3</sub> )	,128	,059	,030	1,137
Constant	-,110	,349	,752	,896

Source: Field survey -SPSS processing

From this model the probability can be calculated with the following equation:

$$P = \frac{e^Z}{1 + e^Z} \tag{4}$$

when 
$$Z = -0.11 + 0.621X_1 + 0.424X_2 + 0.128X_3$$
 (5)

Consequently we have also testing hypotheses:

Hypothesis 1: The level of consumer's income has positive correlation with the willingness to pay more for food safety. In our research the family income is a variable interval divided into 9 classes with a range of € 100, starting from the first grade of 0 - 100 € to continue to the last 900 Euros or more. As shown in Table 6, the incomes have positive impact on WTP (p = 0.03 < 0.05) since coefficient b has a positive value (0.128). By moving from a category to another category with higher incomes, odds ratio increases to 1,137. It also shows that the higher the incomes are the probability that consumers express willingness to pay extra price for dairy products safety certainly increases. Consequently we find that hypothesis 1 is correct.

**Hypothesis 2**: The level of education shows positive relationship with the willingness to pay more for food safety. In our research, we divided education in three categories, elementary (up to grade 8-9 years), secondary (12 years) and high (postgraduate). Elementary level was the basis for comparing two other levels. The results showed a significant positive relationship between the category of high education compared to the group of elementary education (p = 0.046 < 0.05 level). But when comparing the secondary education category with the elementary one it shows to be no statistically significant (p < 0.05). Even here, we can say that the level of

education is significant in terms of WTP, so we find hypothesis 2 also correct.

**Hypothesis 3:** Demographic factors (age, gender, number and members and the family structure (the presence of children and pensioners), type of residence (rural-urban) affect the willingness to pay more for product's safety. Most of the variables tested and which represented counted demographic factors in this hypothesis did not result statistically significant (p <0.05). The only variable statistically significant (p = 0.033 <0.05 level) showed to be the group of buyers who have pre-school children (b = 0.424). Therefore we can conclude that demographic factors such as age, gender, number of members in the family, the presence of pensioners, residence, and presence of children of school age have no statistically significant impact in respondents WTP.

Based on hypothesis test results we understand that they confirm the existing knowledge in this area. In regard to the income, Berges & Casellas, (2009) have suggested a positive relationship which comes into play especially in cases of customers informed with issues of food safety and with higher incomes. Positive impact of the customers with higher incomes expressing WTP on food safety has evidenced also Huang, Kan, & Fu (2000). As regards the other factors demographic such as age, gender, number of family members and the structure of the families, the result also confirms the findings of Latvala (2010) and are in line with other studies (Huang, Kan, & Fu, 2000).

### CONCLUSIONS

The study shows that most of respondents involved in the survey expressed willingness to pay premium price if dairy products (milk, cheese and yogurt) are certified with food safety standards such is ISO 22000 or certified for applying HACCP system. Most of these respondents are young, mainly coming from cities, and with higher education and incomes.

The study found that precisely the last two factors (income and higher education), as expected, resulted to have a positive impact on consumers' WTP. This willingness is evident also among the consumers with pre-school children, which can be concluded that it comes as a result of concern about the vulnerability of young children from food. Therefore, based on the findings from logistic regression model we can conclude clearly that this category of customers who buy in supermarkets (notably in Viva Fresh Store) is ready to respond positively in favor of products that are certified for food safety.

However, the study also found that demographic factors have no significant impact in increasing the probability that could be positively express in regard to GPP. Age, gender, number of family members, the presence or not of pensioners in the family or the differences between respondents from towns

or villages, tested with logistic regression model, showed no significance in explaining WTP variations.

The findings shed light on the research problem and create implications for the processing industry and state institutions.

As regards the producers of dairy products, they should start applying food safety standards certification in line with HACCP or ISO 22000. Within the marketing activities it's required to prioritize the food safety issue and launch awareness campaigns for consumers, which will show that they do respect the food safety standards. The results will also help them create targeted groups for specific campaigns.

The implications for state institutions, suggest that respective ministries must find ways to support producers for certification of food safety standards, through grants or by stimulating them through other fiscal facilities. Also, in coordination with producers the institutions should organize media campaigns but also other forms of information through focus groups, such as students, or employees from various organizations and institutions, either public or private. These activities should focus on food safety aspects as well as the knowledge of standards of food safety and quality. These recommendations should be addressed by the Ministry of Agriculture, Forestry and Rural Development, through the relevant departments and Food and Veterinary Agency as well as the Ministry of Trade and Industry.

The research results produce implications for further research. So, we consider that other factors that could have an impact on WTP should be tested, including consumer knowledge on food safety aspects, the level of information about food safety problems, their confidence to the manufacturers and institutions responsible for food safety control, namely confidence in the agencies that deal with food safety certification.

Like any other research of this kind, this has its own limitations. We consider that an extension of the research in terms of involvement of customer from smaller markets or open markets (known as green markets in which farmers sell they products) would be with interest in order to fulfill the limitations of this study.

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