



WILLINGNESS TO CONSUME MORE IF SAFER: THE CASE OF TOMATO CONSUMERS IN TIRANA, ALBANIA

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Abstract

The aim of this study is to identify potential factors of consumer willingness to buy more fresh tomatoes. Focus. Unordered and ordered multinomial logistic models have been estimated to answer questions related to the study purpose. Data used have been collected through direct interviews of 834 urban consumers in the commune of Tirana, Albania. The results reveal that urban consumers are willing to consume more tomatoes if they were safer. Factors such as household's income and size are crucial for the consumers to buy more, but consumers' perceptions about food safety risks and attitude to them is also a key factor influencing consumer consumption behavior. Thus, consumers' tolerance against risks is critical as a factor affecting consumer willingness to buy more. Education also appears to be an important factor, with more educated people tending to consume more if the product were safer. Religious affiliation of the consumers also plays a role in their willingness to consume more. Production, distribution or sharing information between all actors of the tomato value chain about food safety risks is crucial not only to encourage the production of safer products but also making consumers more willing to buy.

Keywords: Multinomial logistic model; Risk; Safety; Tomato consumer; Willingness to consume

INTRODUCTION

As of year 2018, the tomato accounted for about 25% of the area and 37% of Albanian vegetable production. Greenhouses contribute to 48% of the country's tomato production (INSTAT, 2019). Most of it is consumed fresh by local consumers, mainly urban, while the rest is processed or exported. Tomato production technology in greenhouses is using considerable chemicals, like fertilizers, pesticides and/or herbicides, additives and various stimulants, thus potentially presenting some risks to the consumer. This, in turn, may affect consumer consumption behavior. Except for the potential safety risk, other factors may influence the amount of tomato the consumers are willing to buy.

Research problem

So far no studies exist in Albania about what are the determinants of the amount of tomato consumers would be willing to consume if the product would be safer. This constitutes at the same time the knowledge gap or the research problem in this study.

Purpose

Based on the above, the objective of this study is to identify factors that influence the amount of tomato urban consumers who would be willing to purchase if the safety of the product is guaranteed.

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

The Albanian Law of Food (2008) defines the risk as the possibility of an adverse effect on health as well as the severity of this effect, as a consequence of the presence of one or more damaging elements in food. Risk attitude is the willingness of a person to accept risk. People can be risk-averse, risk-neutral and risk-seeking (Schroeder et al., 2007).

Acceptable risk is how much is acceptable in a given context. Risk tolerability is the willingness to live with the risk and having at the same time some benefits. For a risk to be acceptable means that people are prepared to take it as it is (Rausand, 2011).

The amount of a product that people are willing to buy and factors that determine it is explained by consumer behavior. The consumer behavior is the consumers' decisions in relation to the purchase, consumption, and disposition of goods (Hoyer et al., 2013).

Based on the theory of consumer behavior, decisions about whether to buy and how much is explained by numerous factors. Cultural and psychological core are two major domains of factors affecting consumer buying behavior, including the amount of consumption, the cultural and the psychological factors (Hoyer et al., 2013). The cultural factors include consumers'

behaviors, norms, and ideas that are characteristic of a group of people. Age, gender, education background consumer ethnic and religious differences could also be included in this set of factors.

The psychological group includes motivation and ability. Motivation has to do with the need that the consumer intends to fulfill by purchasing the product and the risk that he perceives from the consumption of the product. Ability relates to financial opportunities (family or individual income), cultural knowledge, experience, education and age of the consumer.

Some other authors categorize the determinants of consumer purchasing behavior into four groups: economic, psychological, socio-cultural, and demographic determinants (Holysz, 2013). Economic factors are individual or family income level; demographic factors are age, sex, number and the composition of the consumer's household; the number of persons affecting the consumer behavior indirectly through the level of family income and the demand for food. Socio-cultural factors are the family life cycle stage, education, occupation, lifestyle, membership in social groups and sub-culture. Psychological factors include consumer's needs, motives, perceptions, preferences, attitudes, and learning.

Factors related to the type of characteristics of risk, the so-called risk dimensions, are crucial in explaining consumer's behavior. Marketing p-s, (price, promotion, place, and product) can also affect consumer's buying behavior, including the amount of the product purchased and consumed at home.

Product availability and assortment are also essential variables determining the consumption, thus crucial for the consumer's decision to buy.

Empirical research also has been investigating the factors that explain consumption behavior. Just to mention a few of them, Sánchez et al. (2012) in their study found that product information and socioeconomic factors with the most effects on consumers' buying behavior were gender, age, and educational level. Sekhampu (2012) found that socio-economic determinants like household income and size, age, and the educational level of the household have a positive impact on the amount of food expenditure, thus consumption, while gender didn't prove to be significant. Verbeke and Vackier (2004) found that personal characteristics, among others, such as gender, age, children, income, education level, and region have an impact on consumption behavior. Umar et al. (2018) also found that age, income and household size and education level of the household level had a positive significant effect on consumption expenditure, but they didn't find any significant effect of the variable gender. Kostakis (2014) using the classical and binary logistic models in a study about determinants of household's food expenditure in Greece found the same, that household's income affects positively the level of consumption, age influence is also positive with older people consuming more; gender is found

to be in an inverse relationship with the consumption. As research shows, the presence of children may also have an impact on consumption behavior.

Consumer's attitude toward risk could be a crucial determinant in shaping their buying behavior. In addition, wealth, expectations about the level and riskiness of future income or wealth may result decisive or pretty influential in consumer's buying behavior.

Research hypotheses

Hypothesis I-Household's income, intolerance against safety risks, education level and age are expected to affect positively the amount of tomato consumed by the household if it would be safer.

Hypothesis II-Gender is expected to influence negatively the level of tomato consumption, with women being more sensitive to safety risk, thus tending to consume more if the tomato is safer.

Hypothesis IIII-No clear hypothesis could be made about the influence of religious affiliation on the amount of tomato consumed.

MATERIAL AND METHOD

A sample of 834 urban consumers has been used to collect data about the needed variables. Respondents were accidentally selected in the city of Tirana commune (Albania), mainly in the city but also in its surroundings. Table 1 below shows the variables, and their measurement scale and categories/values.

Table 1. Variables and their measurement scale

No.	Variables	Code	Measurement scale	Values
1	Age	Age	Ratio	-
2	Gender	Gen	Nominal	0=Female, 1=Male
3	Education background	Edu	Nominal	1=Elementary,2=Secondary, 3=Superior
4	Religious affiliation	Relig	Nominal	1=Muslim, 2=Christian, 3=Other
5	Household's Income	Inc	Ratio	-
6	Risk intolerance	Riskintol	Nominal	1=Highly tolerant, 2=Somewhat tolerant, 3=Not at all tolerant
7	Willing to consume if safer product	WillConsSafe	Ordinal	Up to 10%, 10-20%, Above 20%.

The method used to analyze data is econometric modeling, mainly ordered and unordered multinomial logistic models. Willing to consume if the product would be safer (WillConsSafe) is the dependent variable with three categories, which has been used as a nominal variable. The other six are taken as potential factors or determinants of the consumption amount.

If WillConsSafe is the dependent variable Y with $C=3$ categories as shown in Table 1, the ordered multinomial logistic model is:

$$P_j = P(Y \leq j) = \frac{\exp(a_j - BX)}{1 + \exp(a_j - BX)} \quad j=1, 2, \dots, C-1$$

Where P_j is the cumulative probabilities; it is the probability of consumption in the j th or previous categories of the dependent variable for given values of factors X , a_j and B are the model parameters. Coefficients $\text{Exp}(B)$ are partial odds ratios for being in the higher rather than in the lower half of the dependent variable dichotomies. In our case, two dichotomies could be formed:

Dichotomy 1: Up to 10% vs. (10-20% or Above 20%)

Dichotomy 2: (10% or 10-20%) vs. Above 20%

If the first category is taken as the base, the unordered multinomial logistic model would be:

$$P_j = \frac{\exp(a_j + b_{1j}X_1 + \dots + b_{kj}X_k)}{1 + \sum_{i=2}^M (a_i + b_iX_1 + \dots + b_iX_k)}, \quad j = 2, 3, \dots, M$$

This model gives the probability or the chance of being in the j category for given values of the k factors.

For both models, since some of the independent variables are nominal with more than two categories we use dummy variables (with two categories 0 and 1) to make possible their inclusion in the model. For each variable are needed as many dummies as their number of categories minus one. For the variable education, for example, taking the first category (Primary education as a basis) we could use two dummies, DEdu_2 and DEdu_3 (not necessarily both): DEdu_2=1 (if education level is Secondary) and 0 otherwise (Primary or Superior). DEdu_3=1 (if education level is Superior) and 0 otherwise (Primary or Secondary).

Further details about logistic multinomial models the reader could find in (Osmani, 2017; Benoit, 2012; Wooldridge, 2013; Gujarati, 2003; Osmani and Kambo, 2019). The econometric software GRETl has been used to estimate the models.

RESULTS

Table 1 below shows the estimation results of the ordered logit model. Model is statistically significant and all variables included in the model make a significant contribution to the model with the intercept only (Likelihood ratio test: Chi-Square (9) = 141.3 [0.0000<0.01]).

Two major comments could be made based on these results. First, about which of the variables affects significantly the amount willing to consume. Household's income and size, education and religious affiliation and consumer's intolerance against safety risks are the only significant factors. All of them affect positively the amount of consumption, except for religion which is in a negative relationship with it.

Table 2. Ordered Logit Model, Dependent variable: WillConsSafe

	Coefficient	Std. Error	z	p-value	Exp(B)
Age	-0.005	0.005	-1.086	0.278	0.995
Gen	-0.131	0.136	-0.964	0.335	0.877
Inc	0.002	0.001	3.753	0.000	*** 1.002
Size	0.094	0.049	1.929	0.054	* 1.099
DEdu_3	0.285	0.154	1.856	0.063	* 1.330
DRelig_2	-0.467	0.151	-3.099	0.002	*** 0.627
DRelig_3	-0.581	0.271	-2.146	0.032	** 0.559
DRiskintol_2	0.570	0.161	3.531	0.000	*** 1.768
DRiskintol_3	0.406	0.173	2.338	0.019	** 1.501
cut1	-0.555	0.338	-1.641	0.100	* 1.000
cut2	1.423	0.342	4.165	<0.0001	*** 1.000

Mean dependent variable	16.39	S.D. dependent variable	7.44
Log-likelihood	-821.02	Akaike criterion	1664.03
Schwarz criterion	1715.54	Hannan-Quinn	1683.82

Likelihood ratio test: Chi-Square (9) = 141.269 [0.0000]

The second comment regards the exponentiated coefficients EXP(B). If we take Size for illustration, it means that if household's size is increased by one member, other variables remaining unchanged, the odds of consumption to be above 20% are 1.099 times (almost 10%) higher than being less than 20% (to be under 10% or 10-20%). The coefficient 1.501 for the variable DRiskintol_3 means that the odds of someone being highly intolerant against risks are

1.5 times greater (or 50%) than those that are not highly intolerant to consume more than 20% if the product is safer. The same comment could be made for more educated people, whose odds are 1.5 higher than the odds of less-educated people to consume more than 20% if the product is safer. The dummy DRelig_2 represents the Christian affiliation against the other affiliations. Thus, the coefficient 0.627 means that odds of a Christian to consume more than 20%, if the product is safer, are 0.373, $(1-0.627=0.373)$, or 37.3% lower than the odds of the other affiliations.

Table 3 shows the estimation results for the unordered multinomial logistic model. In the table are presented coefficients for two models, one for the category of the dependent variable 10-20% and another one for the category above 20%. Based on the Likelihood Ratio test the model is significant. This model allows for more detailed results, though it disregards the fact the dependent variable is ordered. First, the same variables result significant, but some of them are not significant (education and religious affiliation) for the first model, and the direction of the effect is the same. The coefficients EXP(B) are odds. If we take the coefficient 1.28 for the variable size in the first model, then if the size of the household is increased by one, other variables remaining unchanged, the odds of the consumption to be in the second group (10-20%) rather than first group (under 10%) are 28% higher. If we take the coefficient 1.21 for the variable size in the second model, then if the size of the household is increased by one, other variables remaining unchanged, the odds of the consumption to be in the third group (above 20%) rather than first group (under 10%) are 21% higher.

Table 3. Multinomial Unordered Logit Model, Dependent variable: WillConsSafe

	Coefficient	Std. Error	z	p-value	Exp(B)
WillConsSafe=10-20%					
Const	-0.798	0.496	-1.611	0.107	0.450
Age	-0.011	0.007	-1.643	0.100	0.989
Gen	-0.169	0.195	-0.868	0.386	0.845
Inc	0.003	0.001	3.072	0.002	*** 1.003
Size	0.247	0.072	3.426	0.001	*** 1.280
DEdu_3	0.342	0.235	1.455	0.146	1.408
DRelig_2	-0.331	0.214	-1.545	0.122	0.718
DRelig_3	-0.425	0.360	-1.179	0.238	0.654
DRiskintol_2	0.625	0.226	2.770	0.006	*** 1.868
DRiskintol_3	0.801	0.253	3.162	0.002	*** 2.228

WillConsSafe=Above						
20%						
const	-0.964	0.516	-1.866	0.062	*	0.381
Age	-0.008	0.007	-1.135	0.256		0.992
Gen	-0.228	0.203	-1.121	0.262		0.796
Inc	0.004	0.001	3.995	<0.0001	***	1.004
Size	0.192	0.075	2.569	0.010	**	1.212
DEdu_3	0.488	0.243	2.010	0.045	**	1.629
DRelig_2	-0.688	0.228	-3.021	0.003	***	0.503
DRelig_3	-0.767	0.390	-1.965	0.050	**	0.464
DRiskintol_2	0.826	0.234	3.523	0.000	***	2.284
DRiskintol_3	0.713	0.268	2.664	0.008	***	2.040

Table 3...

Mean dependent variable	16.39	S.D. dependent variable	7.44
Log-likelihood	-808.42	Akaike criterion	1656.84
Schwarz criterion	1750.49	Hannan-Quinn	1692.82

Likelihood ratio test: Chi-Square (18) = 78.80 [0.0000]

If we divide the two coefficients ($1.21/1.28=0.95$) the result means that if the size of the household is increased by one, other variables remaining unchanged, the odds of the consumption to be in the third group (above 20%) rather than second group (10-20%) are 5% lower.

DISCUSSION

One of the major determinants of the willingness to consume more fresh tomato is income. This is as expected and in full line with findings from the empirical literature. However though highly significant, in terms of magnitude, the effect of income is small, which means that only a small portion of income increased goes for more tomato consumption. The household size is also a second crucial factor for the consumption to increase. This also is completely as expected and fully in line with the literature. Consumer risk tolerance is also highly significant with a positive effect on willing to consume more if the product would be safer. This is quite logical because people tend to reduce consumption because of risks, and if guarantees exist or reliable safety information is available (for example, product information leaflets, government information about safety issues and about the technology used by the farmers to produce tomato, etc.) it is

expected higher demand for a safety-guaranteed product. Thus the result is fully in line with our expectations and literature.

Education and willingness to consume more resulted in a positive relationship, where people with superior education tending to spend more on the safer product. This result is in line with our expectations and it is quite logical because people with higher education tend to be more concerned about food safety and as soon as they realize that the product has become safer, they might be more willing to consume more, other factors being unchanged.

Age and gender resulted insignificant, this result is not in line with our expectations, where women were expected to be more concerned about food safety, thus more willing to buy if the product becomes safer. This result means that in Albanian conditions men and women tend to behave in a similar way against risks, or other strong factors may interfere in the relationship between gender and willingness to spend more for a safer product. High product prices might be one factor.

As for the age as a factor, the result is not as expected and not in line with literature findings. Here other factors may have interfered as well.

CONCLUSIONS

The purpose of this study is to investigate potential factors that influence the urban consumer's willingness to consume more fresh tomatoes. Data for 834 customers selected according to the principle of accidental sampling in the municipality of Tirana, mainly in its urban part, have been collected. Multinomial logistic econometric models were constructed to analyze the data.

The most important determinants, or factors of the consumer's willingness to consume more tomatoes if the product would be healthier, are socio-economic factors such as household income, family size as a number of members, and the level of education of the head of the household. The increase in these factors is generally associated with an increased willingness to consume more safe products. Two demographic factors such as gender and age do not have significant effects, which means that their role is currently modest in general and does not significantly affect consumer attitudes toward food safety.

There appear to be substantial differences in willingness to consume even when it comes to religious affiliations, where consumers of Muslim affiliation appear to be less willing to increase consumption even if the products were safer.

Along with socio-economic factors, the consumer's perception of risk is significant, despite its socioeconomic and demographic characteristics. On one hand, if consumers perceive high food safety risks and by nature, they are little or no tolerant towards them, this significantly affects the rejection of unsafe products and, while on the other hand, if the

guarantees for safe products are greater they are generally more willing to consume healthier tomatoes.

POLICY IMPLICATIONS

The consumer is willing to consume more, but he needs guarantees regarding the food safety of fresh tomatoes. Public information on tomato production technologies used on the farm must be more periodic, reliable and accessible to consumers, media or interest groups. On the other hand, the information that the consumer should obtain directly at the time of purchase (such as from product information labels) should be not only available but also as comprehensive as possible. Legal standards regarding production and marketing should be more effectively monitored and enforced, even with severe penalties.

Risk assessment using consumer interviews, and risk estimation by experts should be used by relevant authorities to periodically collect information about food safety and risks, and share this information with farmers in an easily accessible way, with consumers and farmers, as well as all actors along the tomato value chain. This not only will bring about safer products in the future but will also encourage consumers to purchase safer products.

WAY FORWARD

Willingness to consume is, in fact, closely related with a number of key issues concerning both farm production and consumer behavior, all needing cautious and special investigation. First of all, since the food safety is a critical issue considered by the consumers during the purchase, a study of how consumer's perceptions about tomato food safety are shaped would help to discover factors that determine the safety level as perceived by them. Then, a risks-benefit analysis related with tomato consumption would be another interesting thread of study, because during the purchase the consumers take into account not only risks but also possible benefits. Moreover, experience shows that consumers, because of certain reasons, may pay not enough attention to food safety risks, making thus the consumer concern about risks another possible investigation which would help to understand why some consumers underestimate risks when consuming tomato. Willingness to pay for fresh tomato would be another aspect to investigate, focusing on factors making the consumers more or less willing to pay higher prices for safer tomato. All this could help to better understand why some consumers are willing to consume more tomato if it is safer. With all this information available the policy makers would become more able to draft effective policies and measures related with both production and consumption of tomato.

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