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A SOCIO–ECONOMIC THESIS ON FOOD SAFETY: MORE CONSUMPTION, EDUCATION OR RELIGIOUSNESS?

Rezear Kolaj
Agricultural University of Tirana, Albania

Petar Borisov
Agricultural University, Plovdiv, Bulgaria

Adelida Osmani Ergen
Siirt University, Turkey a

Ekaterina Arabska
University of agribusiness and rural development, Plovdiv, Bulgaria

Abstract: Demographic dynamics, growing pressures from new tech or challenges from the pandemic Covid–19 and the consequences represent just some of the concerns on food safety in the markets in 2021. Socio–economic developments of recent years and changes in the structure of consumption, can also affect the level of food safety in local markets in the city of Tirana, in Albania. Verification of the thesis of the impact of socio–economic factors on food safety, represents a trilemma of interest especially between the factors of consumption, education and the religiousness. The paper's objective is an evaluation impact of the factors such as: age, safety knowledge, gender, consumption quantity, domestic tomato consumption, imported tomato consumption, greenhouses tomato consumption, field tomato consumption, Muslim religiousness, Christian religiousness to the food safety of vegetables, by illustrating with a case study from the agri–food markets in Tirana. The results of the statistical model used shows that variables safety knowledge, domestic tomato consumption, greenhouse tomato consumption, imported tomato consumption, field tomato consumption, primary education, middle and university education affect very significantly up to significantly to food safety. The findings can serve especially to professionals and future studies and also to the food agencies and market actors.

Keywords: food safety, safety knowledge, consumption, education, religiousness, Albania.

1. Introduction

Demographic dynamics, growing pressures from new technologies or challenges from the Covid–19 disease, and the consequences represent just some of the concerns for food market security in 2021. The mobility of the young and highly qualified population abroad, as everywhere even in Albania, has brought implications for families, with consequences for income stability and growth. Interaction with major factors, such as climate change, technological and e-commerce transformations, e-services etc., food production through 3D technology and the industrial massification of their production, have further increased the complexity of concerns over the production, consumption and food security, exposing more to these potential and still unstudied consequences small and unintegrated markets. The issue of food security has always been a major public agenda for researchers and policymaking, but currently this issue has become particularly primary and challenging due to the unpredictability of the situation created everywhere by the Covid–19 pandemic and the consequences for the stability of the economic system, functioning of markets and the trade, production and sustainable consumption.

The consequences of the Covid–19 pandemic, socio–economic developments and new demographic trends have had their impact on the functioning of markets and the issue of food safety in Albania. In the agri–food markets of the city of Tirana, several times there have been concerns which have identified the problem of production standards, product quality and their food safety. Given that a significant part of the food supply is provided through domestic agricultural production, the problems identified among vegetable agricultural products have raised concerns about their food security as an issue that affects the consumer and the functioning of markets on the one hand, as well as domestic producers, their competitiveness, exports and imports on the other hand. From this point of view, a research on the possible impact of some key socio–economic factors on food safety in the food markets of the city of Tirana is reasonable and represents a thesis of interest to better understand the problem in terms of factors by further offering possible adjustments needed for improvement.

Recent socio–economic dynamics and changes in the structure of consumption in the city of Tirana, can also affect the level of food safety in local markets. Food safety is related to factors such as age, gender, including level of education or safety knowledge, but can also be influenced by consumption and the religiousness. A perspective between the main categories of vegetable consumption, such as domestic production, imported, produced in greenhouses and field production and the quantity of consumption along with demographics as well as factors of safety knowledge and religiousness towards food safety can provide a more specific overview on this issue. The analysis of the above factors can contribute especially to: (1) consumer protection agencies and institutions, (2) market institutions and participants, as well as (3) local agricultural producers, given the fact that food safety from recent decades has been seen as well as a market sub–policy; or expressive of the competitive advantage of producers. The study investigates the impact of factors such as age, safety knowledge, gender, consumption quantity, domestic tomato consumption, imported tomato consumption, greenhouses tomato consumption, field tomato consumption, Muslim religiousness, Christian religiousness to food safety in the food markets of the city of Tirana in Albania. Annual studies on the impact of the socio–economic factors to the food safety are lacking and the verification of the above thesis or possible trilemma for more consumption, education or religiousness towards food safety represents a topic of research interest and may serve to the field professionals for further studies.

Researchers have dealt with the impact of changing socio–economic factors to food safety. The age is a strong predictor of perceptions on food–related health risks and food safety[1]. Persons

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at least 40 years old reports safer food patterns[2]. The lack of food safety knowledge affect to food safety[3]. Consumers safety knowledge affect to food safety[4]. The most concerned on food safety tend to be woman[5]. Gender is an important predictor of perceived food safety[6]. Food consumption quantity affect in diferent ways to the food safety between EU countries[7]. Rising of food consumption quantity has rised concerns about over–aplications pesticides and chemical contaminants and their impact on food safety in China[8]. Increasing consumption and demand for domestic vegetables in Vietnam has caused state failure in food safety protection[9]. Over the last decade great attention has been paid to food safety due to the increases of demand for domestic food products which has caused increase of diseases by chemical residues[10]. The rise of more than triple of food imports value from China has raised public concerns to food safety in the US[11]. U.S. agricultural imports have increased significantly in recent years and several recent incidents have raised concerns about food safety[12]. The rapid growth of greenhouses vegetable production has raised attention to consumption and food safety[13]. Dietary exposure of heavy metals through vegetable consumption produced in greenhouses has been identified as a potential risk to human health and food safety[14]. Disease outbreaks originating from fresh field agricultural produce are a major concern for public health and food safety by causing foodborne illnesses (46%) and hospitalizations (38%) in the US[15]. The continuous rise in the number of outbreaks of foodborne illnesslinked to fresh field vegetables is related with the enteric pathogens on plants represents a complicated challenge to food safety[16]. Consumers representative of Muslim religiousness are inclined to consume brand food products rather than others due to percepton as suitable for food

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safety standards and intended to advance their well–being[17]. Based on their trustworthiness and food quality and safety specific logo foods are regarded by consumers of Muslim religiousness as one of the healthy food available in the markets[18]. Studies find positive links between Christian religiousness of persons and tendencies for a nutritious diet associated with quality "healthy nutrition" and food safety factors[19]. There is a positive connection of safe and nutritious food diets which contributes greatly to the good health and nutritional status among the representatives of the Christian religiousness in the area of Crete compared to others[20]. Preparation of skilled students during primary education for comprehending microorganisms and their pathogenic effects is of crucial importance on the consumer level and food safety[21]. Primary educational level is one of the demographic factors that influence on low knowledge of consumers concerning food safety[22]. Studies revealed that students were lacking in food safety knowledge by practiced some risky food–handling behaviors and the middle school students offer an ideal target group for food safety efforts[23]. There is a need of actions on adolescients groups at the middle education level by considering influence to food safety[24]. Observations on students attending college suggest that students continued to use risky practices and the risks of food safety remain[25]. A study among college students in China confirm a optimistic bias on food safety issues, based on recommendations were made to increase public awareness affecting to food safety[26]. University students knowledge and behaviours affect to food safety[27]. Studies have noted shortcomings in food safety behaviour among university students by resulting on wider implications to food safety issue and its problematic[28].

2. Objectives and hypotheses

The objective of the paper is to evaluate the impact of several factors of a socio–economic nature such as the age, safety knowledge, gender, consumption quantity, domestic tomato consumption, imported tomato consumption, greenhouse tomato consumption, field tomato consumption, Muslim religiousness, Christian religiousness to the food safety of vegetables (the case of tomatoes) in the agricultural food markets of the city of Tirana in Albania.

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The study hypotheses are:

- H1 — the age of consumers affects food safety;
- H2 — safety knowledge of consumers affects food safety;
- H3 — consumers gender affects food safety;
- H4 — consumption quantity affects food safety;
- H5 — domestic tomato consumption affects food safety;
- H6 — imported tomato consumption affects food safety;
- H7 — greenhouses tomato consumption affects food safety;
- H8 — field tomato consumption affects food safety;
- H9 — Muslim religiousness of consumers affects food safety;
- H10 — Christian religiousness of consumers affects food safety;

Considering the importance of the education factor under the influence of new demographic dynamics a question of research interest is also formulated. Does education according to degrees: (1) primary, (2) secondary, (3) college/institute, and (4) university affects food safety?

The above variables have been tested through interviewing, and they are: age; safety knowledge; gender; consumption quantity; domestic tomato consumption; imported tomato consumption; greenhouse tomato consumption; field tomato consumption; Muslim religiousness; Christian religiousness, primary education; middle education; college education; and university education.

3. Measurement procedure

A questionnaire was construct to perform a quantitative measurement and provide an extensive database which was further used in the study area (220 interviews) by random selection. The variables are measured by scales (1–5) and consumers have been responded to the questions. Based on data provided a statistical model is used. The significance of the variables is presented by table 1.

Table 1. The significance of variables by linear statistical model
Dependent variable: Food safety

	Coefficient	*Std. Error*	*t–ratio*	*p–value*	
const	1.77211	0.607042	2.919	0.0039	***
Age	0.0809955	0.0691338	1.172	0.2427	
Safety knowledge	0.306062	0.0633671	4.830	<0.0001	***
Gender (0 if female, 1 if male)	−0.104161	0.113492	−0.9178	0.3598	
Consumption quantity	0.149273	0.114538	1.303	0.1940	
Domestic tomato consumption	0.241512	0.0651342	3.708	0.0003	***
Imported tomato consumption	−0.158579	0.0462034	−3.432	0.0007	***
Greenhouse tomato consumption	0.143188	0.0535648	2.673	0.0081	***
Field Tomato Consumption	−0.193743	0.0471373	−4.110	<0.0001	***
Religion_1 (1 if Muslim, 0 otherwise)	−0.0428817	0.175479	−0.2444	0.8072	
Religion_2 (1 if Christian, 0 otherwise)	0.238585	0.184817	1.291	0.1982	
Education_2 (1 if 8 year, 0 otherwise)	−1.06789	0.292432	−3.652	0.0003	***

Education_3 (1 if Middle, 0 otherwise)	−0.459207	0.237785	−1.931	0.0549	*
Education_4 (1 if College, 0 otherwise)	−0.524020	0.371312	−1.411	0.1597	
Education_5 (1 if University, 0 otherwise)	−0.393446	0.223285	−1.762	0.0796	*

Statistics based on the weighted data:

Sum squared resid	805.8578	S.E. of regression	1.992421
R–squared	0.469287	Adjusted R–squared	0.432686
F(14, 203)	12.82173	P–value(F)	2.52e-21
Log–likelihood	−451.8365	Akaike criterion	933.6731
Schwarz criterion	984.4405	Hannan–Quinn	954.1788

Statistics based on the original data:

Mean dependent var	2.922018	S.D. dependent var	1.059681
Sum squared resid	174.3755	S.E. of regression	0.926819

Source: Data processed by authors.

4. Conclusions and discussions

The paper in accordance with the objective of the study investigates the impact of the above variables to food safety in the agri–food markets of Tirana, Albania. Age, gender, consumption quantity, Muslim religiousness, Christian religiousness and college education are factors which do not impact to food safety (table 1). The perception on food safety issues has no differences between demographic factors. Consumers representing the Muslim and Christian religiousness's despite differences do not affect food safety and this is an important finding for policymaking. The college level education affect in different way food safety compared to other levels of education. Given the average age and low presence of the respondents of college education, the fact that does not affect to the food safety compared to others (primary, middle and university educ.) may be related to self–identification (of age 50+), where respondents with Higher education can be identified more with the university than the colleges level degree. This can be explained as a simple routine reaction of self–identification of the interviewees or a matter of self–confidence and it may deserves further studies.

Safety knowledge, domestic tomato consumption, greenhouse tomato consumption, imported tomato consumption, field tomato consumption, primary education, middle and university education affect very significantly up to significantly to food safety (table 1). The safety knowledge affects very significantly to food safety and this implies the importance of training and actions to be taken in the long–proactive way to spread the knowledge and culture of food safety. Consumption of domestic vegetables (tomatoes) and consumption of vegetables from greenhouses affect very significantly food safety. In a sense these two categories may even overlap, given that the greenhouses tomato has a longer presence in the markets than field production, and the positive attitude of consumers also implies continuous improvements in production safety standards. Imported tomatoes and tomato field produced also affect very significantly food safety but are negatively related. This finding can justified by consumers unsafe perception f for these categories and it deserves attention. Studies support the low level of food safety of the field vegetables due

to the presence of pathogens as E.coli[29] or listeria, salmonella, etc. and we have submitted also during the literature review. Primary education affect very significantly to food safety, while the middle and university education affect significantly and also are related negatively. There seems to be a reactive and further more proactive perception among the consumers according the levels from the primary to middle and university education to the food safety and negatively related. Specific education on culture and food safety knowledge and actions increasing credibility of actors in the market regardless of demographic/religiousness factors are recommended measures for professionals dealing with local markets. Education actions are effective in changing attitudes practices and personal relationships on food safety and culture[30]. Actions on contemporary safety knowledge would bring closer the actors in the chain wholesalers–retailers–consumers, increasing the reliability as a key issue to food safety.

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