

MODELING THE SYSTEM OF SOCIAL STABILITY THROUGH THE FOOD SAFETY PARADIGM

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On a country-wide scale, the problem of food security is closely connected with the general doctrine of national security. The article analyzes the causes and factors of the features and patterns of food security issues as a component of international economic security; the essence and content of food security as an integral part of socio-economic development in the context of international economic security are presented. The purpose of the article is to determine the influence of economic and social factors on the level of food security of the population. The methodic of work is based on the construction of a correlation-regression model of the influence of a certain range of factors on food safety of households in the context of providing social stability. During the study it was used the information obtained from official statistical sources and respondents survey. The results of the study represent the dependence of the food security of the population of Italy and Ukraine on such factors as the level of income, the importance of value when choosing products, the availability of family members who are starving, etc.

Keywords: correlation-regression analysis, food security, household incomes, questionnaires, social policy, social stability.

JEL Codes: Q12, Q14.

1. Introduction

The intensification of the globalization processes, the escalation of security problems in many regions of the world become objective preconditions for the revision of the state of national security in general and economic security with all its components as its basis.

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The problem of providing humanity with food currently holds one of the leading places in the hierarchy of global problems. Food safety of the countries is an indispensable condition and a guarantee of preservation of its sovereignty and independence, which ensures sustainable social and economic development as well as formation of high standards and quality of life of the population and reproduction of human capital.

On a country-wide scale, the problem of food security is closely connected with the general doctrine of national security. From the perspective of the philosophy of social stability, the task of providing the population with food is not only the one element. However, this element can be called the main one, because in practice it represents a guarantee of internal social stability and stability of the ruling regime in case of an external or internal cataclysm.

The study of food security issues of various hierarchical ranks, as well as its principles, factors and threats, is represented in a large number of scientific works, in particular Ickowitz, Powell, Rowland, Jones, Sunderland (2019), Mwungu, Shikuku, Atibo, Mwongera (2019), Alexandria, Lucaa, Kevorchiana (2015), Babych and Kovalenko (2018) and others.

In their papers Blumberg, Bialostosky, Hamilton, Briefel (1999) suggest the usage of the respondent questionnaires to identify the current state of food security of the population and discover the factors that have the greatest impact on its provision. The questionnaire composed by scientists was developed with a nonlinear factor analysis technique that created a multidimensional scale in which all items load equally upon the single factor.

Some scientists such as Candel (2018), Abdullah, Shah, Ali, Ahmad, Din, Ilyas (2017) emphasize that food security has many dimensions, ranging from global, regional, local and household to the individual level. Scientists point out that food security is seemed to be a multidimensional phenomenon encompassing climate change, civil conflicts, natural disasters and social norms.

A large-scale study of the influence of social determinants on the formation of food security of households was carried out in papers of Agidev and Singh (2018), Feleke, Kilmer, Gladwin (2005) and others. Scientists have established the dependence of the food security status on the size of households, age of the head of the family, level of education, gender, access to the Internet and number of the financial instruments in disposal of individual households. In papers of Shebanina, Klyuchnik, Burkovska and Caruso is formulated the relationship between the economic affordability of food and the average monthly wage in the country, as well as arrears in its payment.

Anema, Fielden, Castleman, Grede, Heap and Bloem (2014) observed in their papers main dimensions and components of food security which enables more specific measurement and analysis of the nature of food security or insecurity among populations. These authors developed the typology which can be useful for assessing the extent to which the food people consume meets their needs and for identifying specific gaps in food security that need to be addressed. In papers of Leroy, Ruel,

Frongillo, Harris and Ballard (2015) the main indicators of food security are studied that brought clarity in the assessment of the food access dimension of food security at the household and individual level.

The purpose of the paper is to conduct investigation of the influence of economic and social factors on the level of food security of the population and to identify the most significant among them. The research object implies the level of food security in Italy and Ukraine. The research subject includes the factors that affect the food security (the size and sources of monthly income of the population, gender, age, level of education, household size, availability of the Internet access, etc.)

The methodic of this article is based on the construction of a correlation-regression model of the influence of a certain range of factors on food security of households in the context of providing social stability. Study period: from March to May 2019. The survey involved 402 respondents from Italy and 484 respondents from Ukraine aged 17-30. During the study it was used the information obtained from statistical sources and respondents survey.

The questionnaires for Italian and Ukrainian respondents consisted of 17 and 13 questions, of which 7 questions with several suggested answer choices; 5 yes-no questions; 4 questions to clarify the degree of agreement with the statement and 1 question with the proposed frequency matrix of answers (4 questions to clarify the degree of agreement with the statement were presented just in the questionnaire for Italian respondents. These questions were asked as additional due to some differences in the level of socio-economic development of Italy and Ukraine).

2. Results and discussion

The intensification of the processes of globalization, the escalation of security problems in many regions of the world become objective preconditions for revision of the state of national security in general and its basis – economic security with all its components.

Food security of the countries is an indispensable condition and a guarantee of preservation of its sovereignty and independence, ensuring of sustainable social and economic development, formation of high standards and quality of life of the population, reproduction of human capital.

Given the need to determine the impact of economic and social factors on the level of food security of the population, consider their definitions in Table 1, with reference to relevant literary sources.

Table 1. Basic definitions

Concept	Definition	References to the literature sources	Examples that were used during the study
Economic factors	Characterize the ability of consumers to mobilize resources to provide themselves and households with food, which guarantees their economic independence	(Chavas, 2017)	The size and sources of monthly income of the population
Social factors	Includes a range of factors of anthropogenic origin, which determine the quality of human life in society and exist inseparably with people, social structures and institutions	(Cheeseman, 2016)	Gender, age, level of education, household size, availability of the Internet access
The level of food security of the population	It is considered as a subjective assessment of the own diet and food behavior of the population, taking into account the threat of hunger and nutritional inadequacy	(Blumberg, Bialostosky, Hamilton and Briefel, 1999)	The presence or absence of precedents for restrictions on the consumption of food due to lack of funds for its purchase

Hidboro, Hoddinott, Kumar and Olivier (2018) examine food safety from the standpoint of the legal approach, according to which the nutrition of an individual, family, social group depends on what they can buy to meet their food needs. These scientists paid special attention to the social aspect of the food problem, concluded that food security depends not only on the production of products and agricultural activities, but also on the solution of several problems, including the ability of individuals to obtain food. In turn, the economic availability of food products is formed as a component of the social policy of the state, which is realized through the social protection of citizens.

Thus, social protection of the population is a state support for certain categories of population that can be negatively affected by market processes, providing an appropriate standard of living by providing legal, financial, material assistance to individual citizens (the most vulnerable groups of the population), as well as the creation of social guarantees for economically active part of the population, ensuring the living conditions and work of citizens, acceptable for the country, including through the establishment of social standards (Bruck, d`Errico, 2019).

Creation of an effective model of social protection of the population promotes not only the stabilization of relations in society, but also the improvement of the state of food security of the country. Consider the dynamics of the current state of social security of the population of the countries under study in Table 2.

Table 2. The state of social security of the population in the dynamics

Indexes	Years			
	2014	2015	2016	2017
<i>Italy</i>				
Relative poverty threshold (monthly expenditure in euros)	625.15	630.57	636.81	651.13
Growth of the relative poverty threshold relative to the previous period, %	-	0.9	1.0	2.2
The average monthly salary, according to collective labor contracts, in euros	2097.17	2123.08	2136.75	2151.17
Growth of the average salary relative to the previous period, %	-	1.2	0.6	0.7
Consumer price index relative to the previous period, %	0.241	0.039	-0.094	1.227
<i>Ukraine</i>				
Subsistence minimum, UAH	1176	1227.33	1388.08	1603.67
Growth of the subsistence minimum relative to the previous period, %	-	4.4	13.1	15.5
Average salary, UAH	3470.08	4207.33	5187.33	7105.42
Growth of the average salary relative to the previous period, %	-	21.2	23.3	37.0
Consumer price index relative to the previous period, %	24.9	43.3	12.4	13.7

Source: calculated using (Households..., 2017) and (State..., 2019).

Thus, the growth of income in Italy is faster than the inflationary processes that have an impact on ensuring a solvent demand for consumer goods. The increase in the average wage in Ukraine is substantially higher than the growth rate of food prices, while the growth of the subsistence minimum is only indexed by the level of inflation.

Depending on the level of economic development, countries have varying in scale and content of the problem in ensuring food security of the population. Thus, for countries with high GDP per capita, the priority tasks for achieving a high level of food security are to ensure the normative quality of products and the environmental safety of its production. At the same time, countries with low rates of economic development have significant problems in ensuring effective food supply and the economic availability of meals.

Taking into account the hypothesis that developing countries have the potential for faster growth than developed countries due to higher profitability of factors of production, as well as the tendency to copy the methods of production, technologies and institutions that are characteristic of developed economies, we will calculate the period which is necessary for Ukraine to achieve the level of economic development of Italy in Table 3, using the formula:

$$T = \ln(Y_u/Y_i) / \ln((1+g_i)/(1+g_u)) \quad (1)$$

where T – time period, years; Y_u - GDP per capita in Ukraine, USD; Y_i - GDP per capita in Italy, USD; g_u - growth of GDP per capita in Ukraine, %; g_i - growth of GDP per capita in Italy, %.

Table 3. Calculation of the possible period of convergence of the economies of Italy and Ukraine

Indexes	2014	2015	2016	2017
GDP per capita in Ukraine, USD	3105	2125	2186	2640
Growth of GDP per capita in Ukraine, %	-	-31.6	2.9	20,8
GDP per capita in Italy, USD	35397	30180	30669	31953
Growth of GDP per capita in Italy, %	-	-14.7	1.6	4.2
Possible convergence period, years	x	x	216	17

Source: calculated using (GDP..., 2018).

Thus, during the period under study, the rate of economic growth in Ukraine demonstrates positive dynamics, which allows us to assume that the economic indicators of Ukraine's development are approaching the indicators of Italy under the conditions of preserving the existing growth rates for 17 years. Under these conditions, the challenges accompanying the process of food security in Ukraine should be addressed considering the combination of factors that contribute to the creation of social stability at all levels, including food security.

To determine the impact of the factors discussed above on the level of food security of the population we conducted a survey of more than 400 respondents from Italy and Ukraine (the study was conducted among students of Milan Polytechnic (Italy) and the Mykolayiv National Agrarian University (Ukraine)), the minimal number of which was determined by the formula:

$$n = \frac{t^2 * p(1-p)}{m^2} \quad (2)$$

where n – is the sample size; t – is the confidence level; p – is estimated prevalence; m – is the confidence interval. Thus:

$$n = \frac{1,96^2 * 0,5(1-0,5)}{0,05^2} = 384.$$

The survey of respondents was conducted through the questioning in personal communication, as well as posting the developed questionnaire on the electronic resources of universities. The questionnaire for collecting information contains the following questions presented in Table 4.

Table 4. The content of the questionnaire

№	Question	Options for answers	Answers of respondents in Italy	Answers of respondents in Ukraine
1.	Please indicate your gender:	Male	270	250
		Female	132	234
2.	Please specify the number of people in your household:	1	28	51
		2	58	116
		3	88	149
		4	154	104
		5	52	41
		More than 5	22	23
3.	Indicate the level of your English proficiency:	Elementary	14	141
		Intermediate	190	228
		Advanced	198	115
4.	Do you have any permanent Internet access?	Yes	386	441
		No	16	43
5.	In the last 12 months have the members of your family ever faced a situation in which they could not afford to buy enough food to satisfy their basic needs?	Yes	6	163
		No	396	321
6.	During the last 12 months, have you ever faced a situation in which you could not afford to buy enough food to satisfy your basic needs?	Yes	12	144
		No	390	340
7.	What is your monthly income?	Less than 2000 UAH (Ukraine); Less than 651 euros (Italy);	290	84
		2001- 4200 UAH (Ukraine); 651,01-2195 euros (Italy);	94	180
		4201 – 10000 UAH (Ukraine); 2195,01 – 2410 euros (Italy);	8	168
		More than 10000 UAH (Ukraine); More than 2410 euros (Italy);	10	52
8.	Indicate the main source of funds for your monthly maintenance:	Salary	94	205
		Profit from business	12	39
		Scholarship	48	102
		Pension	-	20
		Unemployment benefits	-	8

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		Financial support provided by relatives	228	107
		Patronage assistance	14	3
		Passive income (dividends, interest, etc.).	6	8
9.	What does your normal diet include and how often?	<i>Daily / Weekly / Monthly / Quarterly / I do not use it</i>		
		Meat and meat products	170/202/10/4/16	151/225/58/5/45
		Milk and dairy products	260/104/14/8/16	180/184/47/7/66
		Eggs	36/296/48/8/14	224/141/29/4/86
		Cereals and legumes	164/184/22/10/22	216/160/36/10/62
		Potatoes	32/270/74/6/20	243/143/41/2/55
		Vegetables and melons	272/94/12/4/20	184/159/50/5/86
		Fruits and berries	278/86/16/2/20	126/185/55/21/97
		Sugar	238/80/38/10/36	239/130/26/8/81
		Oil	330/54/2/4/10	236/130/35/5/78
		Fish and Fish Products	24/266/62/20/30	116/190/64/21/93
		Bread and flour products	296/72/18/4/12	257/112/28/2/85
		Confectionery	150/172/48/10/22	141/169/47/11/116
10.	What is the main reason why you limit your food consumption?	I limit myself in food because of lack of funds	8	100
		I limit myself in food because of ethical-religious beliefs	14	18
		I limit myself in food because of the doctor's recommendations	28	41
		I limit myself in food because of my own desire to lose weight	122	34
		I do not restrict myself in eating	230	191
11.	In case of increasing your monthly income which of these product groups would you more often consume?	Meat and meat products	186	217
		Milk and dairy products	10	61
		Eggs	0	14
		Cereals and legumes	6	10

		Potatoes	0	8
		Vegetables and melons	14	18
		Fruits and berries	34	52
		Sugar	0	5
		Oil	0	1
		Fish and Fish Products	132	69
		Bread and flour products	4	3
		Confectionery	16	26
12.	Is it important for you when choosing products?			
	- Price;	Yes	310	340
		No	92	144
	- Quality.	Yes	386	370
		No	16	114
13.	Do you consume organic (environmentally friendly) products?	Yes	294	279
		No	108	205
14.	To what extent do you pay attention to the product certification when purchasing?	I never pay any attention to this	26	x
		I pay attention to this very rarely	66	x
		Sometimes I pay attention to this	168	x
		I pay attention to this very often	122	x
		I always pay attention to this	20	x
15.	To what extent do you pay attention to the product ingredients (nutrients, stabilizers and other additives) when purchasing?	I never pay any attention to this	20	x
		I pay attention to this very rarely	74	x
		Sometimes I pay attention to this	146	x
		I pay attention to this very often	112	x
		I always pay attention to this	50	x
16.	To what extent do you pay attention if product packaging keeps food longer and safer?	I never pay any attention to this	16	x
		I pay attention to this very rarely	72	x
		Sometimes I pay attention to this	140	x
		I pay attention to this very often	140	x
		I always pay attention to this	34	x

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17.	To what extent do you pay attention if product packaging is made of sustainable (innovative recycled and recyclable) materials?	I never pay any attention to this	40	x
		I pay attention to this very rarely	86	x
		Sometimes I pay attention to this	138	x
		I pay attention to this very often	100	x
		I always pay attention to this	38	x

After processing the results of the questionnaires and turning them into binary, numeric and categorical variables using the JASP statistical program, we obtained the following results presented in the table 5.

Table 5. Model summary (based on the survey in Italy and Ukraine)

Model	Variables	Italian dataset		Ukrainian dataset	
		Correlation Index	p-value	Correlation Index	p-value
0	Monthly income	-0.134	0.007	-0.378	< .001
	Value of Price	0.130	0.009	0.196	< .001
	Sources of money	0.094	0.061	-0.002	0.959
1	Gender	-0.034	0.503	0.043	0.351
	Number of household members	0.116	0.023	-0.024	0.601
	Level of your English proficiency	0.044	0.385	0.072	0.119
	Permanent Internet access	-0.052	0.304	-0.034	0.457
	Household members restricted in eating	0.473	< .001	0.395	< .001
	Monthly income	-0.097	0.050	-0.295	< .001
	Value of Price	0.156	0.002	0.101	0.027
	Value of Quality	-0.017	0.737	-0.015	0.740
	Consumption of organic products	0.133	0.009	-0.073	0.111
	Sources of money	0.100	0.050	-0.003	0.950
	Certification	-0.060	0.241	x	x
	Ingredients	-0.085	0.093	x	x
	Product packaging	0.081	0.111	x	x
Sustainable materials	0.096	0.058	x	x	

Source: built using JASP statistics

On the basis of the obtained results it can be concluded that the most significant factors influencing the food security of the population, expressed in the absence of precedent for hunger due to the inability to purchase food because of lack of funds, are:

- monthly income (negative correlation indicates that the higher the income, the less probability of respondent's hunger);
- value of prices when choosing food (direct correlation indicates that the more consumers consider the price of food, the greater the probability of the respondent's hunger);

- the number of family members (direct correlation indicates that the larger the size of the household, the greater the probability of the respondent's hunger);
- the number of famine-affected family members (direct correlation indicates that the more likely the hunger of a household member is, the greater the probability of a respondent's hunger), etc.

3. Conclusions

Fighting hunger is recognized as a priority task for international economic cooperation of nations, and therefore food security belongs to the global category, since it is not enough for individual countries to solve it, but a well-established cooperation between the world community is required, regardless of social and economic development. Therefore, in conditions of economic development in Ukraine and in the process of implementation of agrarian reform, considerable attention should be paid to the borrowing of international experience in legislative regulation of food security issues.

Depending on the level of economic development, countries have varying in scale and content of the problem in ensuring food security of the population. Thus, for countries with high GDP per capita, the priority tasks for achieving a high level of food security are to ensure the normative quality of products and the environmental safety of its production. At the same time, countries with low rates of economic development have significant problems in ensuring effective food supply and the economic availability of meals.

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