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HOUSEHOLD INCOME AS A FACTOR FORMING POTENTIAL DEMAND ON THE MARKET OF ORGANIC PRODUCTS

Purpose. *The purpose of the article is to analyze the situation of households in terms of income, expenditure, food quality, consumption of individual products and to assess the potential development opportunities for organic products market.*

Methodology / approach. *The dialectical method of cognition, the systematic approach to the study of economic phenomena and processes, the monographic method (the analysis of scientific achievements of domestic and foreign scientists on the assessment of income, cost structure, quality of life) were used in the research. The abstract-logical method (for theoretical generalizations and formulation of conclusions), the economic-statistical method (when assessing the reliability of differences between groups of households), the graphic method (when constructing graphical images), correlation analysis (to make a correlation between the level of consumption of meat and meat products based on the amount of income in the households) were used among the special methods of research. To assess the actual state of affairs, the authors used data from the statistical observation regarding the level of income and expenditures of the population of Ukraine according to 2018, which was called "Anonymous microdata on the main indicators of income, expenditures and living conditions of households". The total number of households that responded to questions about their income level was 7698 from 8051, or 95.6 %.*

Results. *The article emphasizes that one of the important criteria for social protection is the quality of food supply in accordance with scientific norms and established standards. The income level and food consumption by households were compared. It was noted that in general the distribution of respondents in cash income levels was not considered to be normal. A clear correlation was established between the level of household income and the level of food consumption in both monetary and physical units. These differences were tested using the statistical method of t-test for comparing averages, which provided evidence of the difference between groups of households.*

Originality / scientific novelty. *For the first time, the level of discrepancies in income and food consumption between households was assessed using the t-test method of comparison of averages, which allowed establishing statistically a significant difference between groups in these indicators. The assessment of the impact of household income on the level of expenditures and consumption of certain types of food products has been further developed with the identification of promising focus groups for consumers of organic products.*

Practical value / implications. *The practical value of the results is that the identification of patterns allows to predict further trends in the level of consumption of certain types of food, particularly organic.*

Introduction and review of literature. In any country, high quality and living standards of the population should be a strategic goal of the economic policy of the responsible government. In this case, it is possible to talk about ensuring social protection. One of the important criteria of this protection is to provide the population with food in accordance with scientific norms and established standards. The last one has a particular importance nowadays. The use of various chemical additives and substances, both directly in the production of products in agriculture and in the food industry, creates additional risks for the population. It is compliance with the appropriate standards that can provide consumers with the assurance that products are safe for their health. Organic products in this case provide the greatest guarantee of safety for the total absence of chemicals in the production process. Organic farming has significant benefits for human health. Firstly, it reduces the risk of health loss for agricultural workers, because they are the most vulnerable to the effects of pesticides and other chemicals that are used by conventional production. Secondly, organic products are healthier for consumers by minimizing the impact on health of toxic and persistent chemicals [1].

The fact is that organic products are much more expensive for products grown by conventional methods, the main consumers of organic products are wealthy segments of the population. The average price of organic products is 2–2.5 times higher than conventional food products. To remedy the situation, developed countries subsidize producers of organic food, makes it possible to meet the quality healthy food society [2]. It is already 10 % of the world's population consumes organic products today, and in Ukraine such a population is about 1–2 % according to various sources [3]. In countries where is used the organic farming, the price of finished products is 40–50 % higher than that grown in the traditional way (using pesticides, chemicals, growth promoters, fertilizers and other means of intensifying production), and individual products, depending on market conditions can exceed 100 % [4].

The term "quality" itself is Latin for "guamtec", which means property or quality. O. Osadchuk believes that product quality is the conformity and perfection degree of the product characteristics and properties with respect to the requirements and needs of consumers [5]. It is the clear observance of quality requirements that can guarantee the conformity of products to established standards. O. Varchenko et al. notes that the basic provisions of the EU White Paper on food safety became an important basis for the development of a number of regulatory documents by the higher governing bodies of the Community in the first half of the 2000s, later called the main EU legislation, which are still in force today [6]. There is a clear tendency to the expansion of the market of quality food products in the world today. According to G. Simakhina and N. Naumenko, the annual range expansion of traditional food products is at a level of 2–3 %, and health foods – 40–50 % [7]. This is especially relevant in Ukraine, where the state of population health is unsatisfactory. In recent

years, the state of population health of Ukraine has deteriorated so much that the problem has grown to become a threat to national security.

One of the ways to improve the nutrition quality of the population is the transition to the consumption of organic products. It should be noted that the problem of organic market development under different aspects are studied in the works of S. Padel, C. Foster [8], A. Tarkiainen, S. Sundqvist [9], M. Bahorka [10], G. Stanhill [11], D. Connor [12], M. Yazdanpanah et al. [13], O. Bazaluk et al. [14], D. Fedchyshyn [15], A. Kucher et al. [16; 17], R. Ostapenko et al. [18], G. Pruntseva et al. [19]. Researchers note that although organic products have advantages over conventional products in terms of food safety most of the population, even in the developed world is very conservative about changing their priorities in this segment. Even when the price difference between organic and conventional products is minimal, the vast majority of consumers know the preference for conventional products. A change in priorities in this case is possible only if the population reassesses its attitude to lifestyle in terms of the quality of nutrition.

In developing countries, there has also been considerable attention paid to nutritional quality. The group of researchers from Thailand led by M. A. Kelly investigated the impact of the spread of population consumption of "problem foods", namely deep-fried foods, soft drinks, snacks, convenience foods, processed meats, and Western-style baked goods (cakes, pies, sweets) [20]. The survey involved 87134 students. The authors concluded that supermarkets are becoming widespread and targeted in the middle and lower income sectors of society. This study provides evidence that the modernization of food retailing systems can play an important role in the transition to lower-quality diets. In contrast to many developed countries, Thailand retains a strong and resilient traditional sector dominated by fresh food markets. Currently, these markets remain widespread and provide an affordable source of health promotion.

It is noted that extremely poor families may spend two-thirds or more of their income on food, but even this spending provides them with insufficient calories. At the individual level, extreme poverty leads to malnutrition, underdevelopment and stunting [21]. It should be noted that very often it is the close relationship between a population's nutritional status and average growth that researchers draw attention to [22]. The most well-known situation in the world is when the population of South Korea significantly exceeds the average height of the population of North Korea. The main reason for this is well known: the chronic malnutrition and even the starvation among North Korea population.

The purpose of the article. The purpose of the article is to analyze the situation of households in terms of income, expenditure, food quality, consumption of individual products and to assess the potential development opportunities for organic products market.

Results and discussions. In order to evaluate the actual situation in relation to the impact of household income on the level of food consumption, the results of statistical research were used, which was carried out by the State Statistics Service of

Ukraine [23]. The results of this research included 8051 households. The respondents evaluated the following data: incomes and resources, some socio-demographic characteristics, expenditures, food consumption by households. In this case, it is especially interesting to compare the level of income and food consumption by households. Respondents were asked to self-assess their level of income over the past year and to assign themselves to one of four groups.

The results of statistically processing on the Ukraine population questionnaire are shown in Table 1.

Table 1

Impact of the cash income level of households on the consumption of certain food products in Ukraine in 2018

Indicators	Group 1. The income level was enough and there were savings	Group 2. The income level was enough and there were not savings	Group 3. The most basic necessities were constantly denied, except food	Group 4. It was not even possible to provide sufficient nutrition
Number of households	580	3164	3545	409
Structure of households by groups, %	7.5	41.1	46.1	5.3
Average number of people in a household	2.36	2.31	1.92	1.79
Cash income, UAH	135210	105258	65744	51895
The amount of expenditure for the consumption of certain food products				
Bread and bakery products, UAH	6883	6598	5698	5518
Meat, UAH	9905	9455	6484	5277
Milk, cheese and eggs, UAH	5388	5311	4066	3397
Oil and fats, UAH	3415	3565	3074	2642
Fruit, UAH	2774	2667	1714	1301
The consumption of certain food products per household				
Vegetables, kg	247	223	206	192
Fruits, berries, nuts and grapes, kg	123	114	86	73
Oil, margarine and other fats, kg	41	45	42	38
Meat and meat products, including co-products and fat, kg	162	149	116	98
Milk and dairy products, kg	608	596	490	401

Source: anonymous microdata on key indicators of household income, expenditures, and living conditions.

As for household expenditures on foodstuffs, they were assessed both in cash terms and in kind on a single weight basis. At the same time, the following groups of food products were singled out for consumption in kind: bread products, potatoes, vegetables, fruits, berries, nuts and grapes, melons, sugar and confectionery products, butter, margarine, meat and meat products, milk and dairy products, eggs, fish and fish products, meat and meat products, butter and cheese, butter, lard and animal fats, butter, fruits, berries and vegetables. In terms of cash expenditures, consumer expenditures were classified as follows: bread and bread products, meat, fish, milk,

cheese and eggs, butter and fats, fruits, vegetables, sugar and confectionery, coffee, tea and cocoa, mineral water, soft drinks and juices, wine, beer and tobacco products. Based on the goal of predicting the possible level of consumption of organic products among the population, we decided to compare the population groups with different income levels and consumption of food products in the groups where the most developing market for organic products. The following types of food products were selected: meat, fish, milk, cheese and eggs, oil and fats, fruits, vegetables.

First of all, it should be noted that the total number of households that answered the questions regarding their income level was equal to 7698 from 8051, or 95.6 %. It should also be noted that the vast majority of households were concentrated in group 2 with the level of income, which was assessed as "The income level was enough and there were not savings" (3164 households or 41.1 % of the total number) and in group 3 "The most basic necessities were constantly denied, except food" (3545 households or 46.1 % of the total number) (Fig. 1).
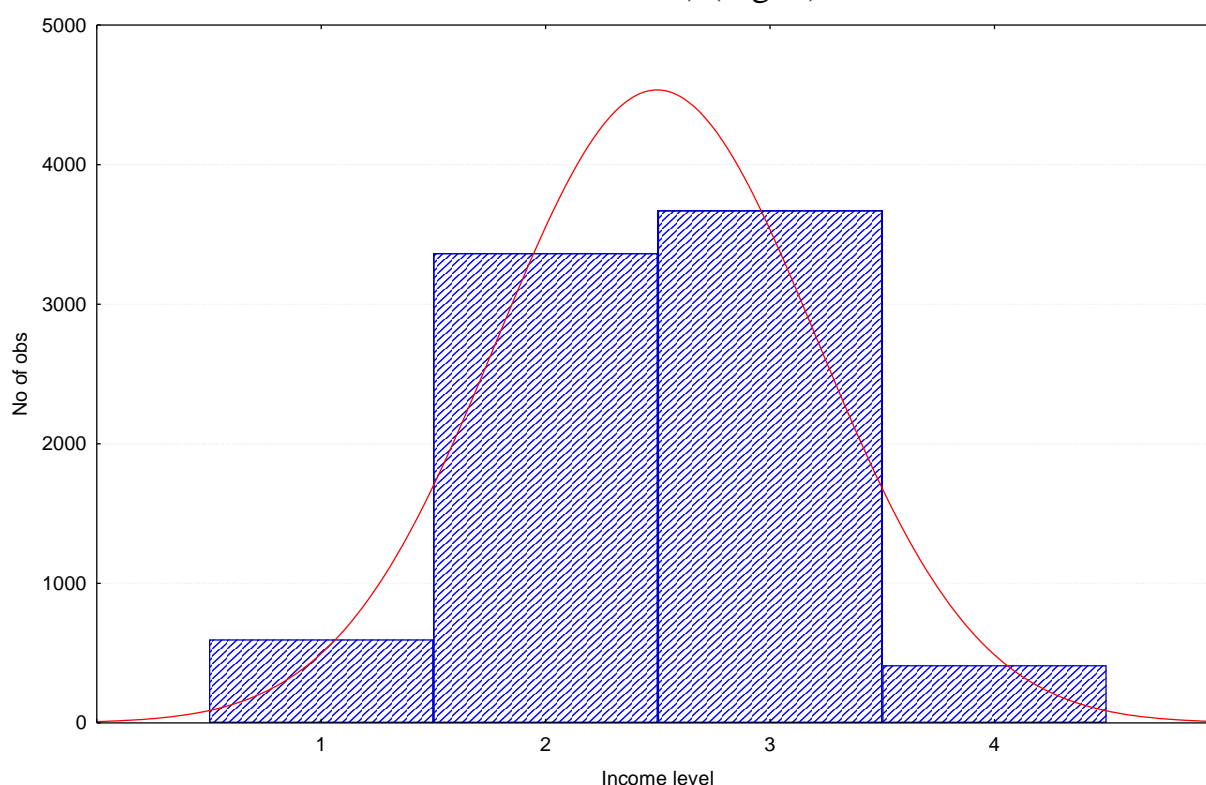
Fig. 1. The household distribution histogram by self-assessment of income level according to the results of the survey in 2018
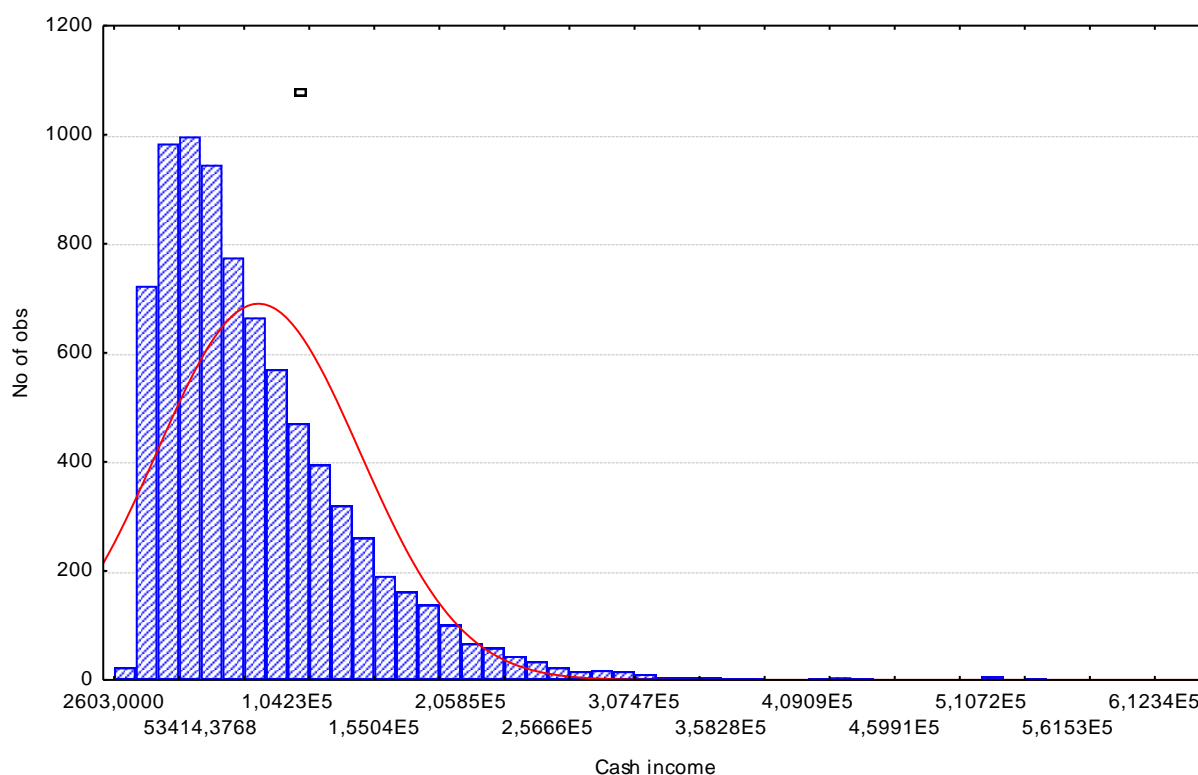
Source: own calculations.

This distribution is close to normal, although the criterion of Kolmogorova-Smirnova does not confirm it. The reason for this is that there were only 4 groups. It should also be noted that the distribution of respondents as a whole by level of money income was not such that is considered normal (Fig. 2). The distribution has a clearly defined left-sided asymmetry. The value of the Kolmogorova-Smirnova criterion is less than 0.01, which, in turn, is significantly lower than the normative value of 0.2. Thus, it can be assumed that individual households classified themselves as

belonging to the 3rd group rather as a result of psychological factors. They did not want to fix such a status at which they were able to provide even sufficient nutrition.

It should also be separately emphasized that the number of persons per household was calculated. It turned out that there is a clear dependence of income levels and the number of household members. In group 1 "The income level was enough and there were savings" the average number of persons is equal to 2.36, in group 2 it was equal to 2.31 persons, in group 3 – 1.92 persons, in group 4 – 1.79 persons. Here, there is a direct impact of the income on the number of people in the household. It should also be noted that this problem requires a separate study and it is directly related to the demographic situation.


Fig. 2. The household distribution histogram by level of cash income according to the results of the survey in 2018 (number of respondents is 8051)

Source: own calculations.

As for the level of household income, there is a clear dependence between the status of the corresponding group and the average level of the household cash income. In the group with the level of income assessment "The income level was enough and there were savings" their average value is equal to 135210 UAH, in the group "The income level was enough and there were not savings" – 105258 UAH, in the group "The most basic necessities were constantly denied, except food" – 65744 UAH, in the group "It was not even possible to provide sufficient nutrition" – 51895 UAH. The differences in the level of income between the first and second groups are statistically significant, as evidenced by the results of the t-test for the comparison of averages (Fig. 3). Levene's test gives a value of $p = 0.0000$, which is less than the standard value of 0.05. This is evidence of the fact that differences in the

averages between these populations are not random. The situation is similar for the reliability of differences between the other groups.
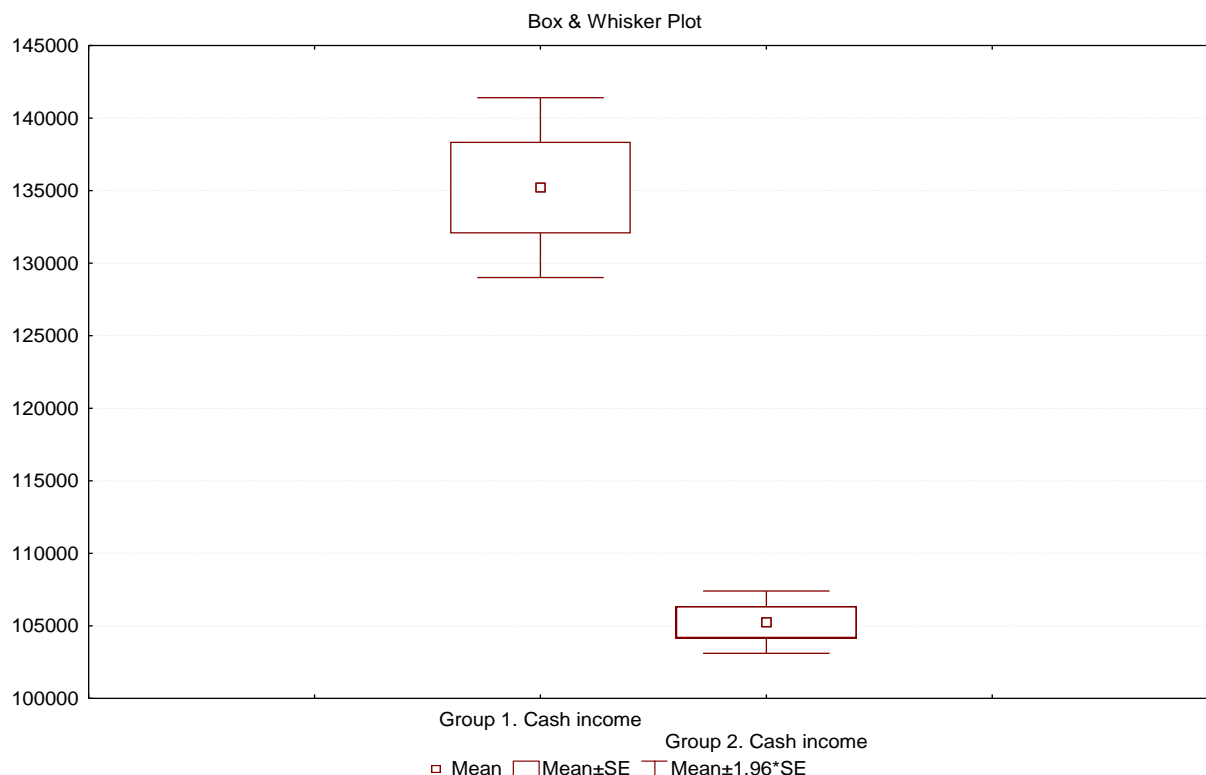
Fig. 3. The spread diagram of the amount of cash income of households in group 1 and group 2 according to the sociological survey in 2018

Source: own calculations.

Thus, the question arises as to how the differences in the level of income between groups of households influenced the level of their expenditures on foodstuffs. In this case, there is a data expressed in the form of monetary units, as well as in natural (weight) indicators. Let's begin our analysis with cash indicators. The first conclusion concerns the fact that the first two groups with the highest income levels hardly differed among themselves in their expenditures on food. Thus, the expenditures of households in group 1 and group 2 for meat are 9905 UAH and 9455 UAH, respectively, for milk, cheese and eggs – 5388 UAH and 5311 UAH, for oil and fats – 3415 UAH and 3565 UAH, for fruit – 2774 UAH and 2667 UAH. Consequently, it can be argued that, despite the difference in the average enormous income in these groups, the level of expenditure on food was relatively stable. Another situation was with the level of expenditure on food in groups 3 and 4. In this case, the value of spending on meat is equal to 6484 UAH and 5277 UAH per household, respectively. This, in turn, equals only 65.5 % and 53.3 % to the enormous expenses for meat in the first group. The randomness of the differences between the first and the fourth group is evidenced by the data of the t-test for the comparison of averages (Fig. 4). Thus, there is an almost 100 % guarantee that this disagreement between the groups is not random.
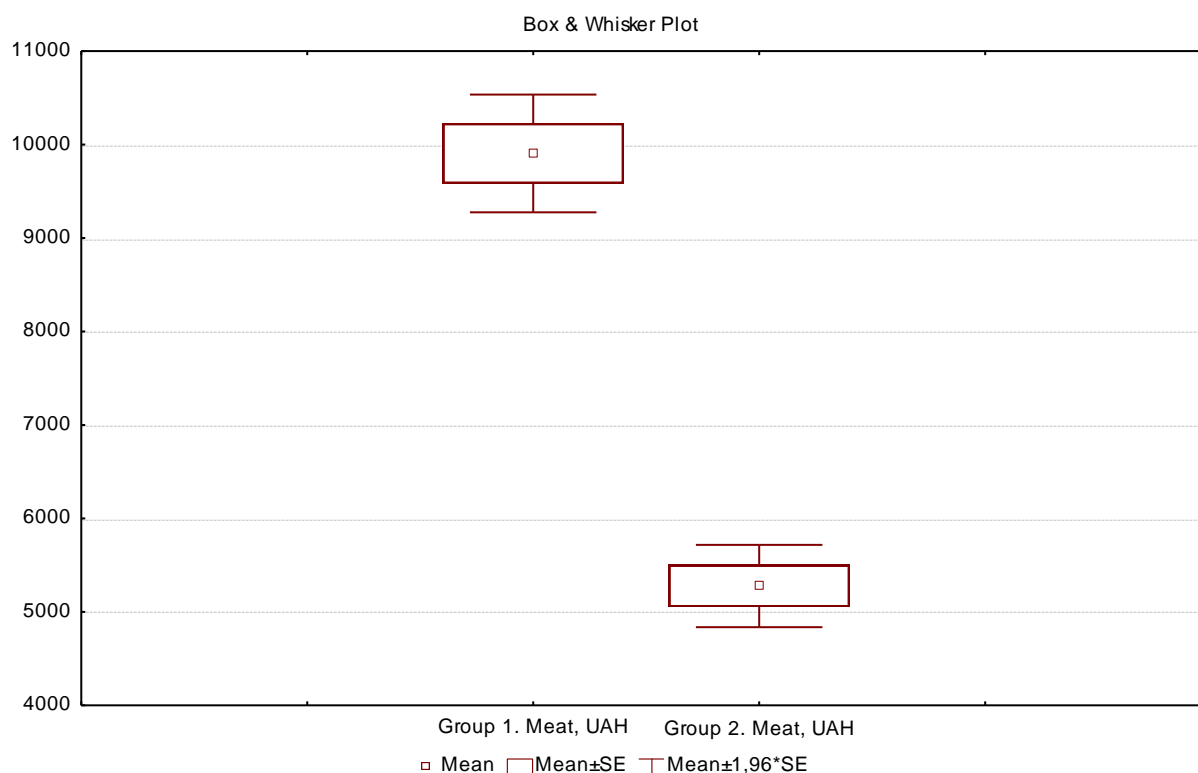
Fig. 4. The spread diagram of household expenditures for meat of group 1 and group 4 according to the sociological survey in 2018
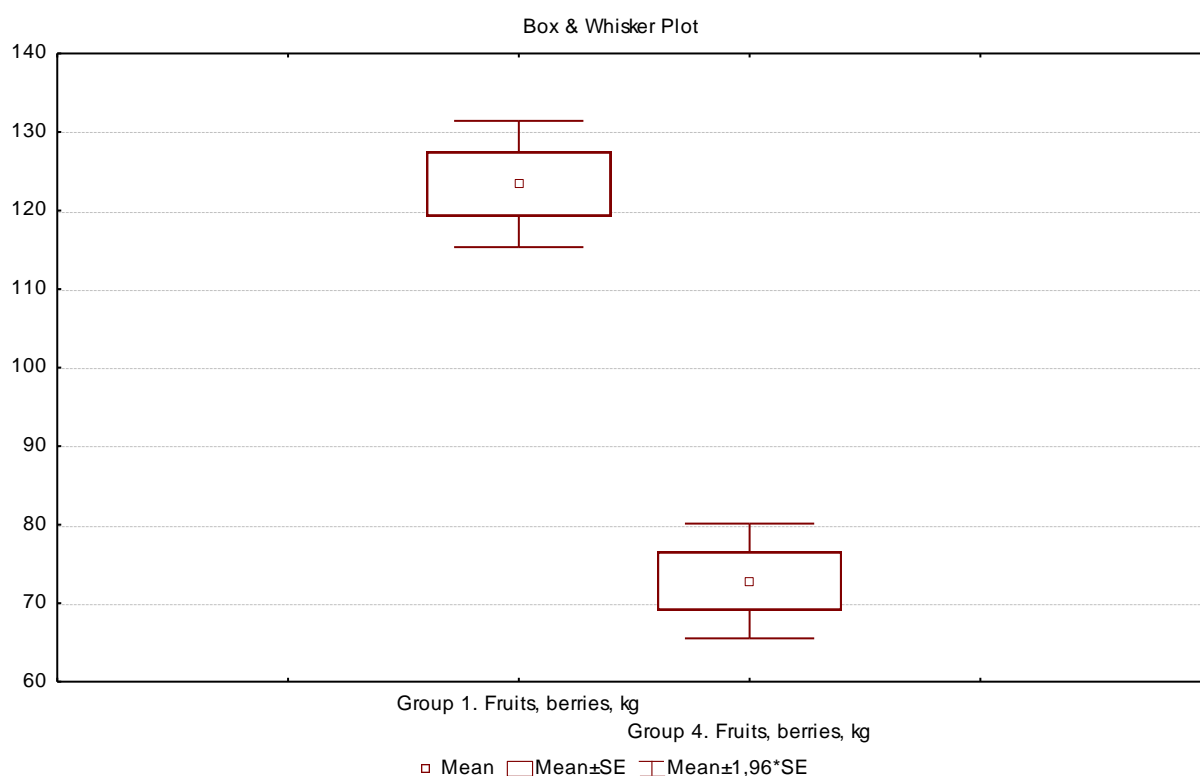
Source: own calculations.

A similar situation was also for milk, cheese and eggs. The level of expenses for this group of foodstuffs is equal to 6484 UAH and 5277 UAH in groups 3 and 4 respectively. If to compare this value of expenses on the first group of households, their value was 75.5 % and 63.0 % to the level of consumption of the first group accordingly. This is less difference than for meat, although it is also significant. At the same time, studies that were conducted by other scientists, in particular I. Boiko, testified that the most direct relationship between the consumption of food and income is noted in the consumption of meat and meat products, eggs, vegetables and melons, fruits and berries and oil (correlation coefficient of more than 0.75). The author draws the logical conclusion that the population will consume more of these products if their income grows. Low correlation dependence on income was noted in the consumption of milk and dairy products, potatoes and sugar [24]. It is the last conclusion that is not supported by our results.

For the other two food groups like oil, fats, and fruit, the situation was similar. However, for oil and fats between the first two groups of households with the highest income and the two groups with the lowest income, the difference was significantly smaller than for fruit. Especially for fruit the cost ratio between the first and fourth groups was the most significant. This indicates that the population tends to save on fruit, which nutritionists very often recommend as an element of a healthy and balanced diet.

If to analyze the level of food consumption in natural units, they largely

confirmed the dependencies that we established when analyzing expenditures in cash terms. So, the level of consumption of fruits, berries, nuts and grapes in group 1 of households with income level "The income level was enough and there were savings" was equal to 123 kg, and in group 4 with income level "It was not even possible to provide sufficient nutrition" is only 73 kg. In groups 2 and 3 the level of consumption in accordance is 114 and 86 kg. The significance of these differences is clearly stated in Fig. 5. The swing diagrams visually clearly state the essence of the disagreement between groups 1 and 4. The method of comparing averages using the t-test gives almost 100 % assurance that these differences are not random (Levene's criterion is $p = 0.0000$). There was also a significant difference between the groups for all animal products. In particular, the level of consumption of meat and meat products in group 1 was 162 kg per household, in group 2 – 149 kg, and in group 4 – 98 kg. For milk and dairy products, the level of consumption according to these groups was 608 kg, 596 and 401 kg. It is noteworthy that the difference between group 1 and group 2 households was not significant.


Fig. 5. The consumption level diagram of fruits, berries in households of group 1 and group 4 according to the sociological survey in 2018

Source: own calculations.

To sum up, the level of provision of these groups of households with food actually relates to the problem of quality filling. This in turn raises the question of what exactly these households can act as focus groups for consumers of organic products. In addition, even within each group the level of food consumption varies depending on the income received. A visual representation of the households group 1 dependence data and the amount of consumption of meat products is shown in Fig. 6

It shows that an increase in the level of household income on average by 1000 UAH leads to an increase in the level of consumption of meat and meat products by 0.5 kg.
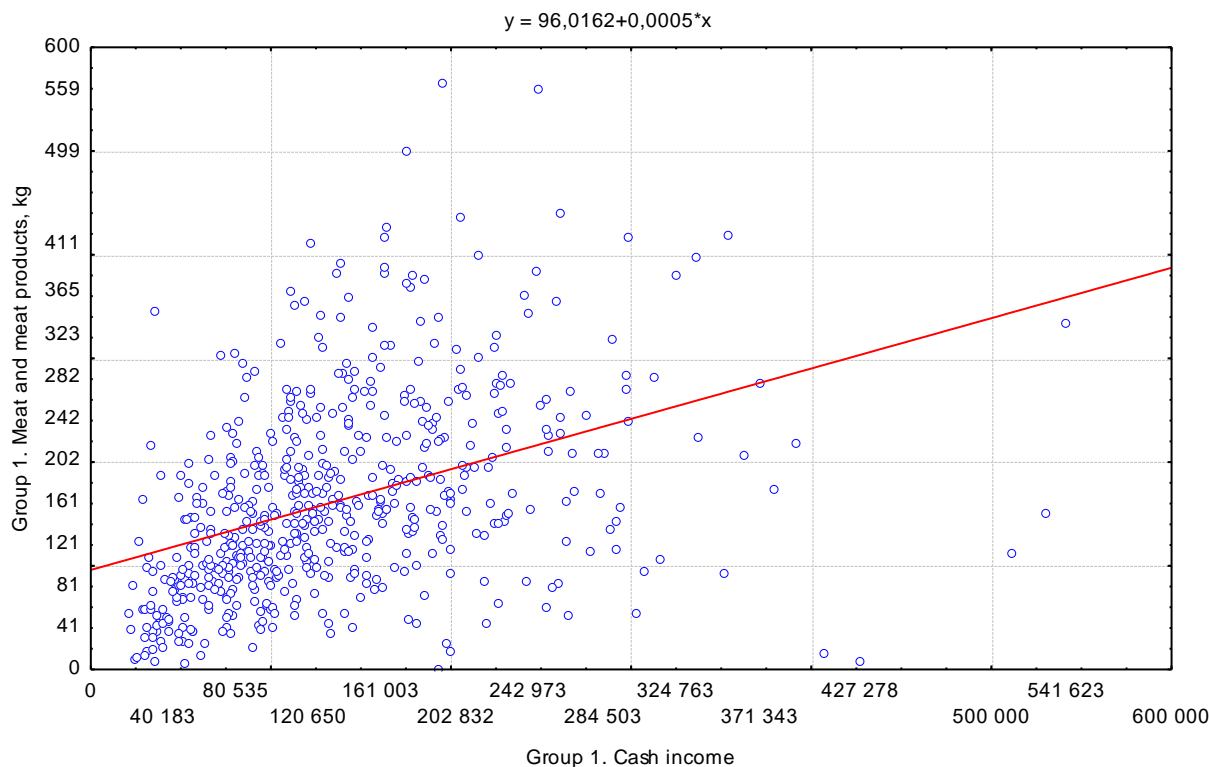
Fig. 6. Dependence of the level of meat and meat products consumption on the amount of money income in the households of group 1 according to the sociological survey in 2018

Source: own calculations.

Here, there is a direct impact of the income on the number of people in the household.

The dependence model is expressed by the following equation:

$$Y = 0.0005x + 96.01, \qquad (1)$$

where Y – meat and meat products consumption by the household, kg;

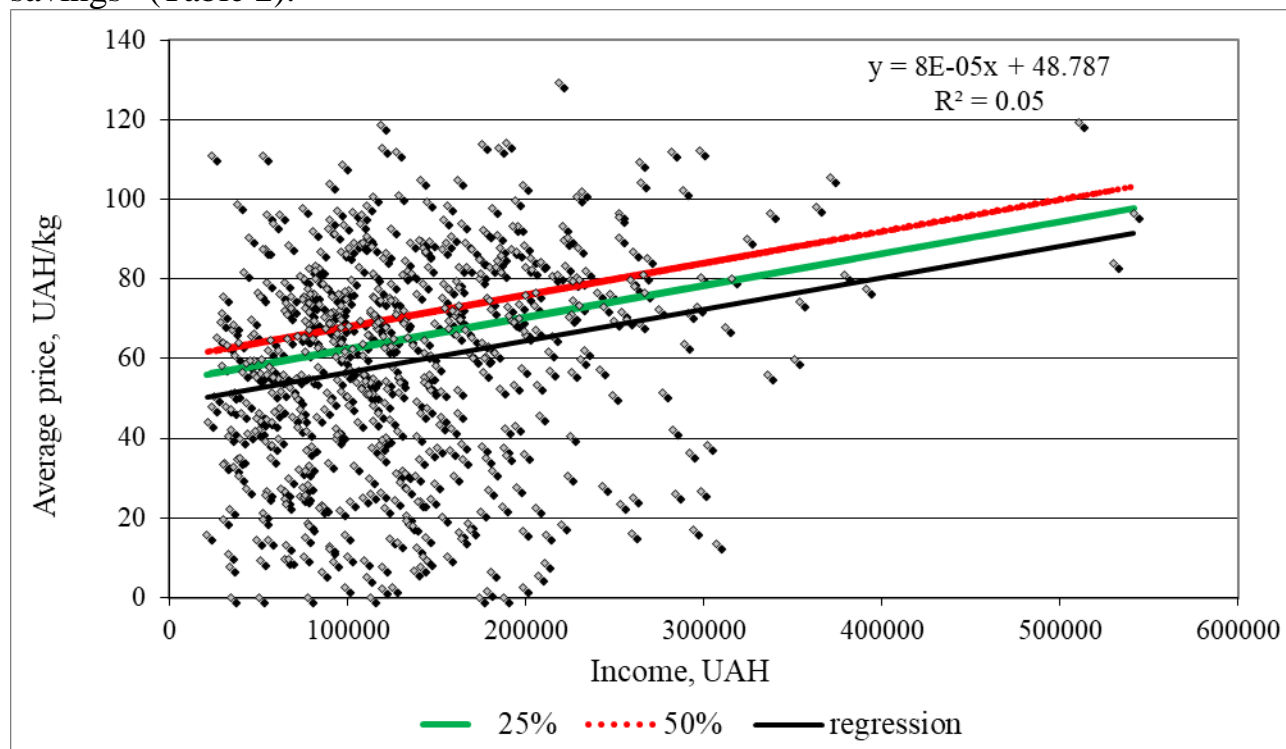x – the amount of monetary income of the household, UAH.

The results of the regression analysis show that the dependence level of meat and meat products consumption on the amount of monetary income in households of group 1 means the following: regression coefficient x = 0.0005 shows that if the household's monetary income increases by 1000 UAH, the amount of meat and meat products consumed by the household will increase by 0.5 kg. The correlation coefficient of the regression model is 0.454, indicating a moderate relationship between the studied features. The actual value of Fisher's test (F) was 153.8, which is much higher than its tabular value (1.59). This gives grounds to claim that the obtained dependence has a high level of reliability.

The question arises as to what extent the income level of the surveyed population can potentially shape the demand for organic meat and meat products. To answer this question, let's compare prices for ordinary and organic products in this

group at the first stage. It turned out that the average price for organic cooked sausage was about 50 % higher than for the ordinary sausage, semi-smoked sausage – by 34.6 %. On average, the prices of organic meat products exceeded the prices of ordinary ones by 45.6 %. The next step was to build a function of the relationship between income levels and average prices for ordinary meat and meat products. This dependence was built on the equation of the line function. The obtained equation was transformed, taking into account the established fact of exceeding the price of organic products compared to ordinary products by proportionally transferring the function in accordance with the new price level, namely shifting it on the graph above the Y axis by $1.456a_1x$. This transformation is as follows:

$$y = a_0 + a_1x \longrightarrow y' = a_0 + 1.456a_1x \qquad (2)$$

In fact, this will mean that the number of households that can be potential consumers of organic products and are above the obtained function will be much smaller. Today, however, it is possible to admit that neither the market, nor consumers are ready to switch completely to organic products. Moreover, the producers are not able to meet the growing demand. With this in mind, we simulated a situation where households switch to consuming organic products in different ways. In addition, the market does not yet have enough organic products. Thus, the authors decided to simulate three situations where the share of organic products in the consumption structure will be 25 % and 50 %, respectively. Fig. 7 shows the results of this modeling for group 1 with the level of income "It was enough and we made savings" (Table 2).

$$y = 8E\text{-}05x + 48.787$$
$$R^2 = 0.05$$

Fig. 7. Dependence of the average price of meat products on the level of monetary income of households in the first group in 2018
Source: own calculations.

Table 2

Dependence functions between average price of meat products and the level of monetary income of households in Ukraine in 2018

Products	Group 1. "It was enough and we made savings"
Ordinary products	y = 0.00008x + 48.79
Organic products – 25 %	y = 0.00008x + 54.40
Organic products – 50 %	y = 0.00008x + 60.00

Source: own calculations.

It was decided to estimate potential consumers from the total number of households at certain proportions of organic products consumption. Table 3 shows the obtained results.

Table 3

The number and share of households of potential consumers of organic meat products with different values of the share in the consumption structure in Ukraine in 2018

Indicators	Share of organic produce, %	
	25	50
Group 1. "It was enough and we made savings"		
Number	281	226
Share, %	47.1	37.9

Source: own calculations.

The main conclusion is that the number of potential consumers has decreased due to higher prices for organic products, but it was not significant. Thus, in the group with a possible share of organic products of 25 %, the number of households that could theoretically agree with the price of products was 47.1 %. With a share of 50 % organic products, this value will be 37.9 %, which is quite a significant figure. So, in this case, the question is how to promote organic meat products among the population.

Conclusions. A clear correlation was established between the level of household income and the level of food consumption in both monetary and physical units. These differences were tested using the statistical method of t-test for comparing averages, which provided evidence of the difference between groups of households.

The study was carried out to establish the necessary results in terms of shaping the perspective development of the domestic market of organic products. Firstly, the population with the income level, which is characterized as "The income level was enough and there were savings" and "The income level was enough and there were not savings" have a level of expenditure on food that meets their needs at a level that is quite sufficient to form a quality and balanced diet. In these groups, the level of expenditures, compared to the group of households with an income level that was defined as "Not even able to provide enough food" was 1.83 times higher for meat and meat products, 1.57 times higher for milk, cheese and eggs, and 2.09 times higher for fruit. In physical terms, this difference was also significant. In particular, the level of consumption of meat and meat products in group 1 was 162 kg per household, in group 2 – 149 kg, and in group 4 – 98 kg. Further growth of expenditure on food

products among these households is possible precisely by increasing the share of organic products in the structure of their expenditures. Secondly, increasing the population interest in organic products is possible, as shown by foreign experience, not only in conditions of increasing income levels of the population, but also in changing in their worldview in the direction of concern for health and the state of the natural environment. This requires the state to conduct an appropriate information policy among different segments of the population. Thirdly, it is necessary to introduce a number of measures in terms of state support for producers of organic products and create a favorable market environment for them. Prospects for further research are related to possible ways of reviving the demand for organic products in the domestic market.

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