

## **Per capita food consumption trends in Ukraine**

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## **Per capita food consumption trends in Ukraine**

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**Abstract:** The overall objective of this study was to analyze per capita food consumption trends in Ukraine from 1991 to 2016 and estimate the main factors responsible for its changes. According to the study per capita food consumption has shown a "gap" during the period of 1991-2001 years. The next decade was characterized by rising with a "peak" in 2013-2014. The main factors influencing on food consumption were the average annual nominal wage adjusted by consumer price index and absolute share of income spend on food. The report has emphasized the importance of providing deep global reforms of Ukrainian economic.

**Key words:** per capita food consumption, agrarian food market, average annual income, correlation analysis

### **Introduction**

The problem of national food supply will always be one of the most important among other economic problems. The desire to achieve a high level of food security is one of the main priorities of the state economic and social policy of any country. It is evident that level of basic food products consumption affects the health of the nation and reflects the level of both the agrarian food market and the economic development of each country as a whole. That's why the purpose of social policy is the availability of healthy eating for all members of society.

The major drivers affecting the food supply system are in the field of interest of many scientists (Kearney, 2010, Godfray et al., 2010, Pashaver, 2014). Among these drivers are the level of the population income of the country, the prices of agrarian products and foodstuffs, the level of market infrastructure development, the degree of relation development between market players, the level of state support and state regulation of the agrarian sector of the economy, etc. The increase of food consumption also contributes to the multiplier effect: the further development of the manufacturing sector, the processing industry, marketing and distribution of food. In contrast, populations in those countries undergoing rapid transition are experiencing nutritional transition (Kearney, 2010).

Over the past 25 years, Ukrainian agrarian policy and economics have undergone many changes and transformations. It also led to significant changes in the food consumption of the Ukrainian population during 1991-2016. That is why the purpose of the study was to analyse the per capita consumption of basic food products in Ukraine during the period of independence and assess the main factors that cause changes in food consumption.

### **Methods and materials.**

This research conducts an analysis of changes in Ukrainian food supply trends based on statistics data across a period of 25 years. Thus, per capita food consumption of meat, milk, fish, bread-stuff products, eggs, fruits, vegetables was evaluated in Ukrainian population during the period of 1991-2016. Also comparable analysis of per capita food consumption and data of National Dietary Guidelines was conducted in order to evaluate the overall nutritional status of the country's population. The correlation analysis was done to estimate associative interactions between per capita food consumption of main products and average annual nominal wage

adjusted by consumer price index, absolute share of income spend on food. The relationship between two variables was estimated by Pearson's correlation analysis used in linear regression (Hinkle et al., 2003):

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\left[ \sum_{i=1}^n (x_i - \bar{x})^2 \right] \left[ \sum_{i=1}^n (y_i - \bar{y})^2 \right]}} \quad (1)$$

where r – Pearson's correlation coefficient

y – per capita food consumption of main products

$x_1, x_2$  – average annual nominal wage adjusted by consumer price index or absolute share of income spend on food

n – total number of values

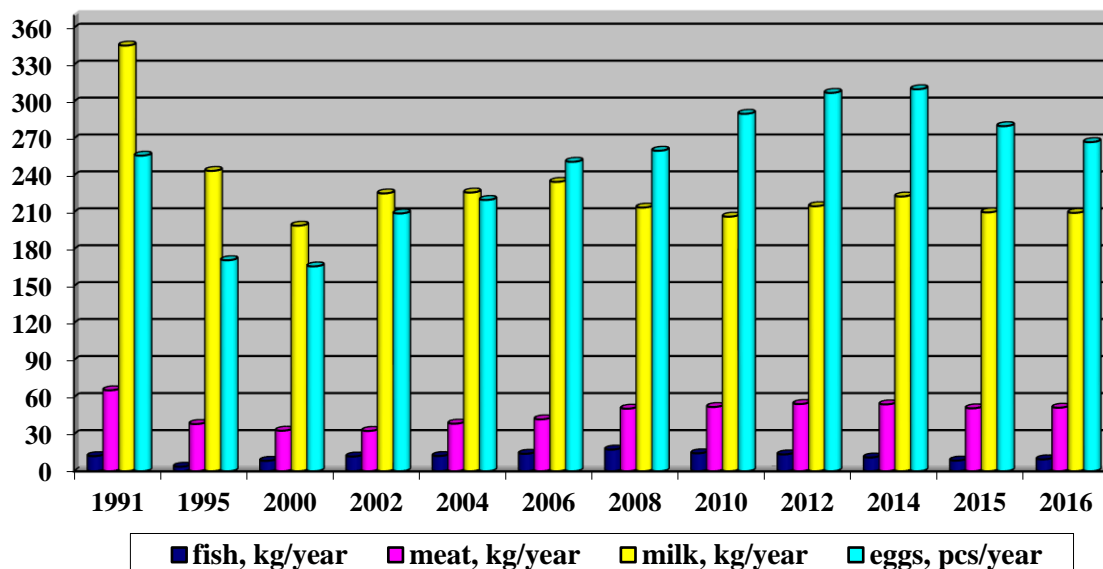
The Chaddock scale was used to determine the magnitude of the correlation coefficient and the strength of the relationship. Source data is State Statistic Committee of Ukraine (available [www.ukrstat.gov.ua](http://www.ukrstat.gov.ua)) and National Dietary Guidelines (available [www.me.gov.ua](http://www.me.gov.ua))

## Results and Discussion

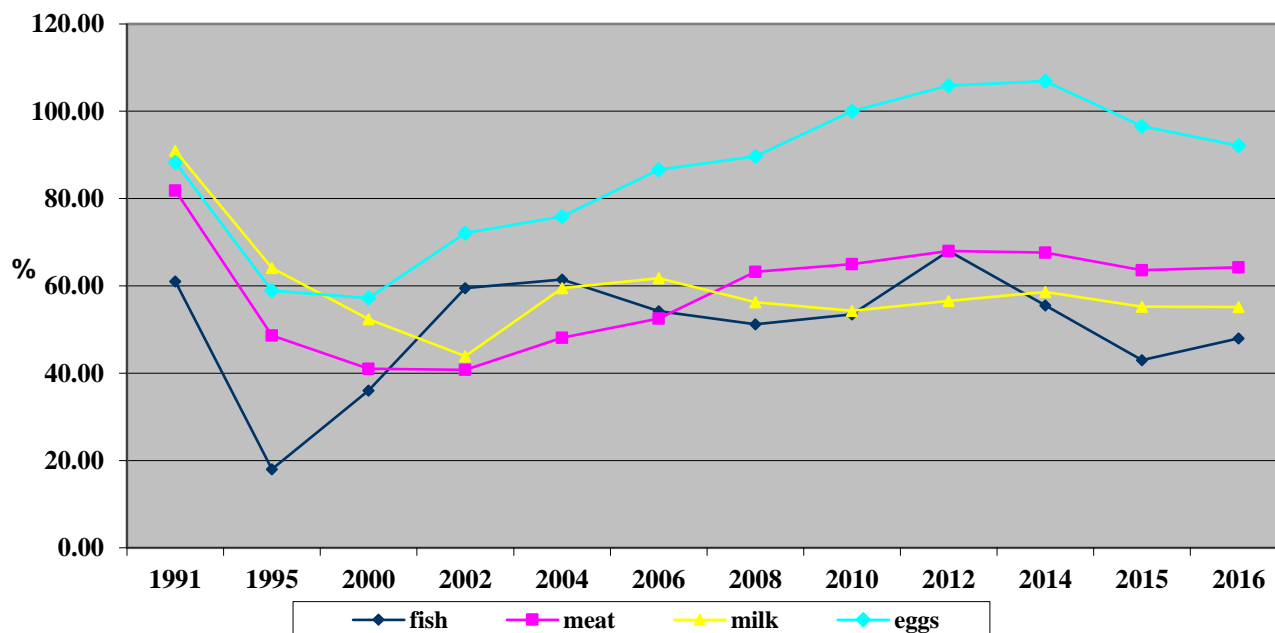
During 25 years of Ukraine's independence, consumption of basic food products has undergone significant changes and has been characterized by wave-like tendency. This was due to the economic situation of the country and its transition to market relations. Transformation and the dynamics of economic processes are reflected in the agrarian-food supply of the country's population. Over the years of independence, consumption of basic agrarian-food products by the Ukrainian population was marked by periods of "gaps" and "recovery", as well as a mismatch of consumption with the recommended medical standards that could affect the health of the nation. In general, the dynamics of consumption of basic agrarian-food products is characterized by the presence of two periods of "recession" and "recovery". The first period of recession began from the moment Ukraine gained independence in 1991 and lasted until 2001. From 2001 to 2014 there was a so-called period of "recovery", which is connected with improvement of the economic situation in the state. The next "gap" has begun since 2014. A comparative analysis indicates the presence of certain features in the consumption of different types of products during the study period. Thus, in particular, a significant decrease in consumption concerns to "high price" products such as fish, meat and meat products, milk and milk products (Figure 1). Studies have shown that there was a "gap" in the consumption of these food products in the period of 1991-2001. During this period, comparing with 1991, the maximum reduction in egg consumption was 35,2% (2000), milk products – 42,4% (2000), meat products – 52,5% (2001), fish – 70,5% (1995). The gradual improvement of the economic situation in the country contributed to the fact that the population's consumption of food products tended to increase. A positive trend was observed from 2001 to 2014. Beginning since 2014, Ukraine has continued to decrease the consumption of animal products important for human life (meat, milk, fish, eggs), which is ongoing.

An analysis of the consistency of consumption of animal origin food products showed that even during the period of economic growth of 2001-2014, consumption of meat, milk and fish did not reach the recommended standards, except consumption of eggs (Figure 2). The maximum

compliance levels of fish consumption with recommended standards amounted to 87,5% in 2008, meat – 70,1% in 2013 and milk – 61,6% in 2006. In contrast, per capita consumption of eggs has gradually increased from 180 pcs in 2001 to 310 pcs in 2014, which was 106,9% of the recommended standard. This tendency can be explained by the fact that the population of the country compensated the animal proteins shortage (meat, milk, fish) of the diet by the higher consumption of "cheaper" eggs.

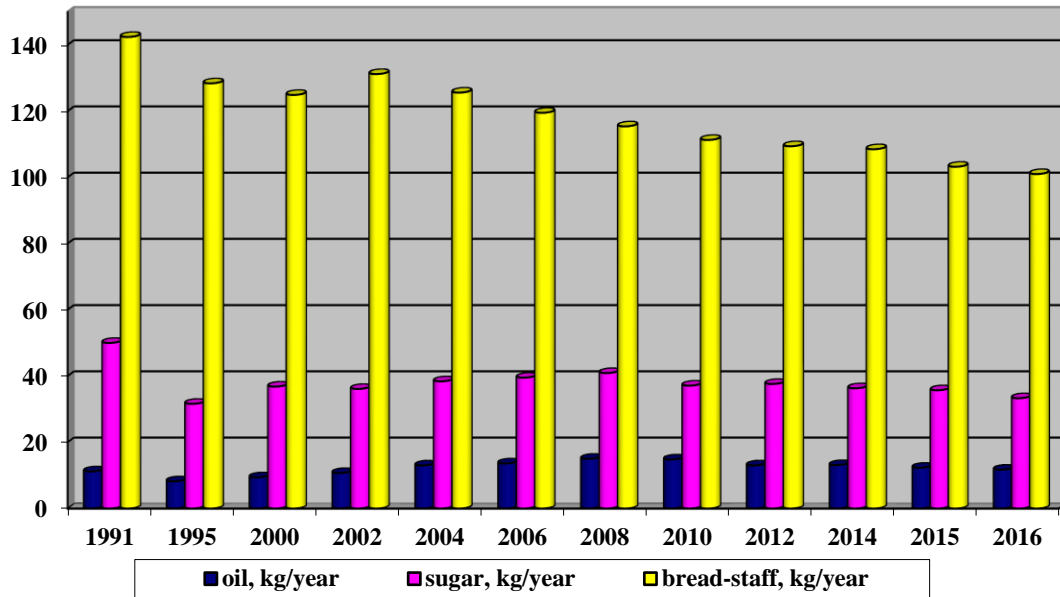


**Figure 1** Trends in per capita consumption of meat, fish, milk and eggs during 1991-2016 period  
Source: State Statistic Committee of Ukraine

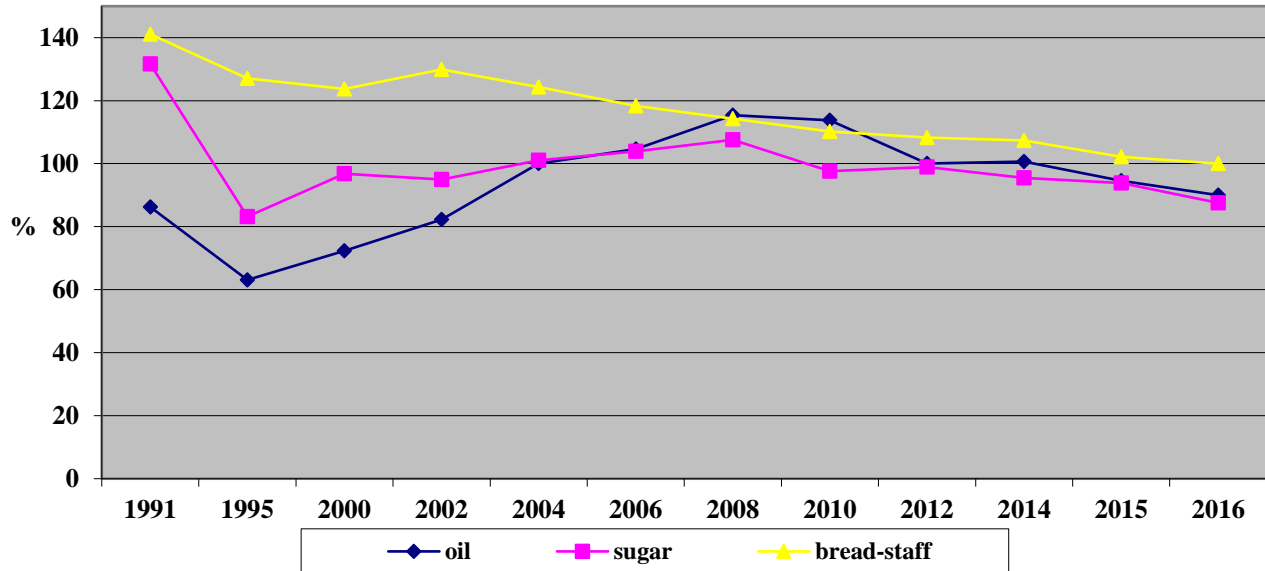


**Figure 2** The compliance of meat, fish, milk and eggs consumption with recommended standards during 1991-2016 period (%) Source: Calculated by author based on National Dietary Guidelines and State Statistic Committee of Ukraine

Insufficient consumption of animal origin food products is evidence of a significant increase in prices and low incomes. This led to an increase in the consumption of so-called inelastic "cheaper" food products (Figure 3).



**Figure 3** Trends in per capita consumption of oil, sugar and bred-staff during 1991-2016 period  
Source: State Statistic Committee of Ukraine

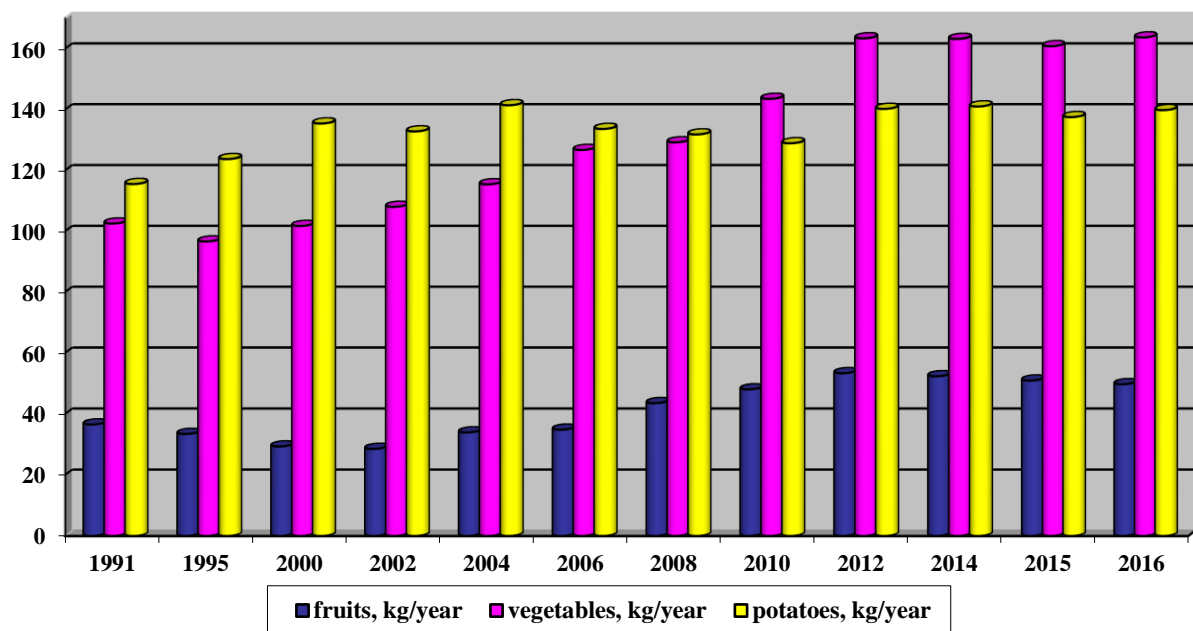


**Figure 4** The compliance of oil, sugar and bred-staff consumption with recommended standards during 1991-2016 period, (%) Source: Calculated by author based on National Dietary Guidelines and State Statistic Committee of Ukraine

According to the data during 1991-2016 the consumption of bread decreased for 29,1%, sugar – 33,4%, and consumption of oil increased for 4,5%. The economic availability of these food products contributed to the fact that their consumption complied with the recommended standards

for many years (Figure 4). So, consumption of bread and bakery products exceeded the recommended norm for 25 years of independence of the country, consumption of sugar – from 2004 to 2011, consumption of oil – from 2004 to 2014.

An important place in the nutrition of the population belongs to potatoes, vegetables and fruits. Consumption of potatoes in 2016 increased 21,0%, fruits – for 36,2%, vegetables – for 59,7% in comparison to 1991 (Figure 5).



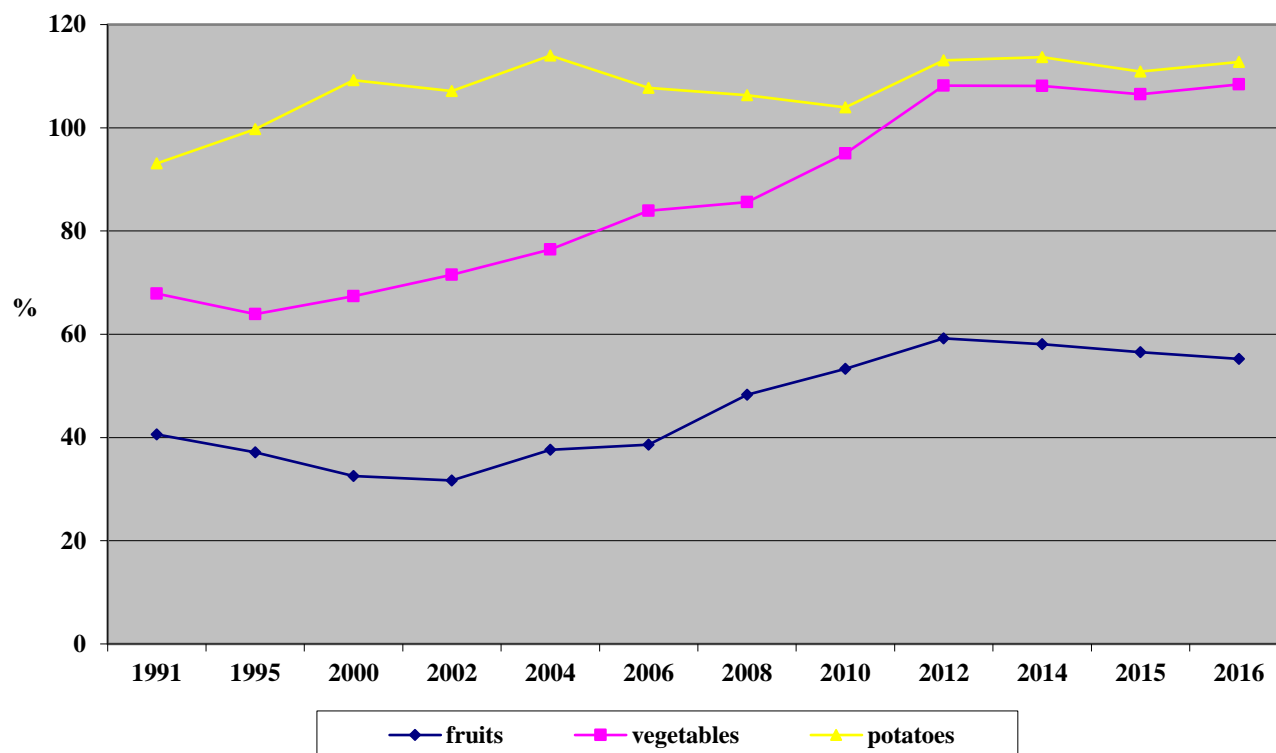
**Figure 5** Trends in per capita consumption of fruits, vegetables and potatoes during 1991-2016 period Source: State Statistic Committee of Ukraine

Studies have shown that during the study period, consumption of vegetables has a steady upward trend. If in 2010 the compliance of vegetables consumption was less than 100% to the recommended standards, then in 2011 exceeded the recommended standards for 7-8% (Figure 6). The explanation for this is the economic availability of vegetables on the market, especially at the seasonal peaks, as well as a significant share of the Ukrainian population self-sufficiency of this product.

Also, consumption of potatoes and, especially, fruits, is characterized by a wave-like tendency. Studies have shown (Figure 6) that over the years of economic recovery in Ukraine (2001-2014) potato consumption was characterized by a slight downward trend. This may indicate the desire of the population to reduce the consumption of "cheap" potatoes and increase consumption of "more expensive" products (meat, milk, fish, fruits). However, since 2014, there has been a negative trend towards increasing consumption of potatoes in the nation's diet.

Fragile consumption of the Ukrainian population is marked by fruit. Their consumption for the period of 1991-2001 decreased for 10,1 kg (27,7%) per person. However, since 2002, fruit consumption in Ukraine has been marked by a significant increase from 28,5 kg in 2002 to 56,3 kg in 2013. That is, consumption almost doubled. But despite the positive tendency increasing the compliance of fruit consumption with the recommended norms in Ukraine reached its maximum value of 62,6% only in 2013 (Figure 6). The inadequate level of fruits consumption by

the population of the country is due to low incomes and, consequently, low economic inaccessibility of this product, especially in the winter and spring periods.



**Figure 6** The compliance of fruits, vegetables and potatoes consumption with the recommended standards during 1991-2016 period (%) Source: Calculated by author based on National Dietary Guidelines and State Statistic Committee of Ukraine data

The next task of our study was to determine the main factors which influence the level of basic food product consumption in Ukraine and calculate the strength of relationship. Among these main factors we selected the average annual income adjusted by consumer price index and the absolute share of income spend on food. The calculated correlation coefficient showed that there were different relationships between the level of certain food products consumption and the average annual nominal wage adjusted by consumer price index (Table 1). So very high positive and high negative correlation was present in vegetables ( $r=0,9473$ ) and bread ( $r=-0,9345$ ) respectively; high positive correlation in meat ( $r=0,8876$ ), fruit ( $r=0,8774$ ) and eggs ( $r=0,8403$ ); moderate positive relationship – in oil ( $r=0,5194$ ); low positive correlation – in potatoes ( $r=0,4545$ ) and fish ( $r=0,3319$ ). In addition, the inverse correlation between the observed factor and the consumption of bread and milk was detected. That is, the growth of incomes of the Ukrainian population prompts to reduce consumption of these products.

The study has shown that another strong factor was the absolute share of income spend on food. It was in the reverse correlation with the level of consumption of all food products, except of bread-staff products. This means that with a reduction in the share of household incomes, food consumption will increase, and vice versa. Correlation analysis showed that a very high negative correlation was present in meat ( $r = -0,9052$ ); high negative in eggs ( $r = -0,8888$ ), fruits ( $r = -0,8353$ ), oils ( $r = -0,8234$ ), vegetables ( $r = -0,7583$ ) and bread ( $r = 0,7351$ ) moderate negative - in fish ( $r = -0,6736$ ); low negative – in milk ( $r = -0,3157$ ).

Table 1. The correlation analyses of main factors which influence the per capita food consumption in Ukraine

Products	Linear correlation coefficient of Pearson ( $r$ )	
	The average annual nominal wage adjusted by consumer price index ( $x_1$ )	The absolute share of income spend on food ( $x_2$ )
Meat	0,8876	-0,9052
Fish	0,3319	-0,6736
Milk	-0,16	-0,3157
Eggs	0,8403	-0,8888
Oil	0,5194	-0,8234
Sugar	0,1333	-0,2686
Fruits	0,8774	-0,8353
Vegetables	0,9473	-0,7583
Potatoes	0,4545	-0,1392
Bread-staff	-0,9345	0,7351

Source: Own estimation using Pearson's correlation analysis

**Conclusion.** During the years of independence Ukraine has failed to create an effective economic system that would gradually reduce the lagging behind of developed countries. The main reason is the low solvency of most of the population due to the general economic situation in the country. The share of income spending on food in the country still exceeds 50%. The recommended amount of calories in the diet of the country's population is still compensated by the "cheap" products. All this suggests that the country needs to undergo profound reforms in the economy, to improve the life of the nation.

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