

**European Economic Integration**

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**A DISCOURSE ON HOUSEHOLD EXPENDITURE
IN RURAL AREAS IN THE CONTEXT
OF EUROPEAN ECONOMIC STUDIES****Abstract**

The article examines the dynamics and structure of household expenditure in rural areas of Ukraine from 2014 to 2021, utilizing a research toolkit developed by the authors. The study identifies peculiarities in expenditure formation, both in total and by category, taking into consideration inflation response, and determines preconditions for expenditure growth. By estimating the impact of individual expenditures on total household expenditure, the authors conclude that food expenditure is the most important factor in the overall spending of the rural population. A comparative analysis was conducted to examine household expenditure in rural areas of Ukraine and selected EU countries, focusing on the expenditures on food and non-alcoholic beverages; housing, water, electricity, gas and other fuels; healthcare; education; as well as purchasing power standards for different years between 2005 and 2020. The findings reveal noticeable disparities in expenditure levels between Ukraine and EU countries, with significantly lower lev-

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els observed in Ukraine. Given Ukraine's orientation towards European vector of development and drawing from foreign experience and potential national capacities, the study proposes recommendations for a substantial increase in the level of household spending in Ukraine.

Key Words:

social expenditure; structure of expenditure; theoretical constructs; well-being of population.

JEL: E21, I14, R20.

2 figures, 8 tables, 15 formulae, 36 references

Problem Statement and Literature Review

The purposeful accession of Ukraine into the European community should involve its harmonious integration into fundamentally different political, economic, social, and mental structures that encompass various mechanisms, schemes and models of social functioning.

When assessing the standards of living in individual countries of the EU, it is important to note significant disparities in both the levels of living and the approaches used to achieve them.

When analyzing the criteria of well-being within EU countries, specifically in terms of household expenditure in rural areas, it should be noted that official statistical datasets provide broader coverage of categories such as total earnings, wages and social benefits, while population expenditures in individual countries, in particular in rural areas, are presented in more narrow manner.

Nevertheless, the data on population or household expenditure collected by official international statistics, such as Eurostat and the State Statistical Service of Ukraine, offer the most comprehensive characterization of the country's

standard of living, as it is the consumption of food, communal, medical, cultural, educational, and other services that serves as the most objective measure of the population's well-being.

This issue holds great relevance for Ukraine, as the substantial social benefits received by the majority of Ukrainian population, including those residing in rural areas, are predominantly used to meet their essential needs, such as food, utilities, healthcare, and household necessities. When evaluating these payments, especially with respect to people for whom they constitute the main source of income, it is important to note that for certain recipients, these payments barely cover the legally defined minimum physiological level. However, given the complicated conditions of 2022 and the outlook for 2023, and considering the annual inflation rate of about 30%, this minimal physiological level remains insufficient.

In this study, the authors identified the specific characteristics of household expenditure in rural areas across the EU as a whole and in its individual member countries, comparing them with corresponding households in Ukraine. Through the analysis of the peculiarities of household spending in Ukraine, the study revealed the existing problems and their underlying causes, and proposed vectors for increasing the levels of expenditure in the future.

Household expenditure in rural areas constitutes an integral part of the socio-economic complex of any country. In view of this, scientists meticulously investigate the processes underlying its formation, dynamics, peculiarities, and distinguishing features from both theoretical and pragmatic perspectives.

When synthesizing the scientific contributions of Ukrainian and foreign scientists concerning specific elements of this expenditure, we can distinguish between research conducted at the all-European and national levels.

We first examine the contents of the relevant research conducted at the all-European level.

According to Cylus et al. (2018), the analysis of threshold expenditure on healthcare using the normative spending on food, housing and utilities method revealed that these expenditures were concentrated in the poorest quintile in all countries. Conversely, when the budget share method was employed, the aforementioned spending was found to be largely associated with wealthier households.

When analysing changes in household spending on public catering services in Europe, with a special focus on Polish households, Piekut & Valentukevičienė (2019) revealed an increase in the share of food expenditure in the total expenditure between 2012 and 2016.

In studying housing expenditure among households in the euro area, Roma (2021) found that housing costs accounted for more than 40% of their dis-

posable income in 2019. This aggregate figure masks considerable variations among households. While nearly 10% of households were estimated to be overburdened, the percentage of overburdened tenants who rent their housing at market prices was 24%, compared with less than 5% for outright owners (mortgage-free owners). Based on this same metric, more than 12% of urban households exceeded this threshold in 2019, whereas it was less than 7% for households in rural areas.

The European Union places significant importance on addressing poverty within the population, including in rural areas, and extensively publicises this issue. A study conducted by Miežienė & Krutulienė (2019) on this matter demonstrated that the impact of public spending on poverty reduction can vary depending on the sector of spending, the effectiveness of its targeting and the mode of financing. Some countries manage to achieve a substantial reduction in poverty rates even with relatively low, in the context of other EU member states, social expenditure as a percentage of GDP. This indicates that, in order to reduce poverty rates, it is important to take into account not only the amount allocated to social spending, but also the specific areas targeted for social transfers.

The EU pays due attention to societal development, particularly in the social sphere. Thus, the recently established Recovery and Resilience Facility (RRF) is the largest component of the Next Generation EU (NGEU) initiative and a major instrument used by the European Union for promoting post-pandemic recovery. The RRF is expected to issue grants of up to 312.5 billion euros in constant 2018 prices or 338 billion euros in current prices. Comparing national recovery plans can be challenging due to variations in the presentation of data structures. Among the areas of financing, healthcare, education and non-digital skills hold particular importance (Darvas et al., 2023; Acemoglu & Robinson, 2012).

Regarding the substantiation of the aforementioned expenditures at the national level, it is worth noting that there is a significant body of literature on this topic, given that these problems are prevalent in all European countries, including Ukraine. We now provide a concise overview of the nature of these challenges and the approaches taken to tackle them in a selection of countries.

The analysis of food expenditure in Slovakia carried out by Kubicová et al. (2011) revealed that it constitutes over 6% in total household expenditure. Moreover, variations in household incomes significantly influence consumer behaviour in the food market. It was observed that households with the lowest level of incomes are more sensitive to changes in demand. Additionally, households in rural areas of Slovakia tend to allocate higher levels of expenditure towards food products, compared to other EU countries.

Using Slovakia as an example, Lazíková (2018) emphasized that developments in household spending patterns were shaped by many events that have taken place in recent decades, such as the fulfilment of the Maastricht criteria,

the accession of the Slovak Republic to the EU, the adoption of the euro, and the economic crisis. Thus, the researcher proposed to adopt the categories of gross cash expenditure, net cash expenditure or consumption expenditure to estimate household expenditures across 12 basic consumption categories based on the Classification of Individual Consumption by Purpose (COICOP).

In their study comparing the specifics of rural household expenditure between the metropolitan area of France and its overseas departments, Audoux & Mallemanche (2020) discovered that families residing in overseas departments exhibit lower consumption levels, and these disparities in spending are more pronounced when analysed by income level and household profile. For example, the consumption level of single-parent families and couples without children in overseas departments deviates more from average consumption than in metropolitan France. The hierarchy of expenditure also differs, with transport expenditure often ranking higher than housing and food expenditures. Furthermore, with the exception of Mayotte, households in these regions allocate over a quarter of their budgets to food expenditure on average.

The analysis of the U. K. Office for National Statistics (2021) for the period from April 2020 to March 2021 revealed important insights into the specifics of household expenditure in the rural areas of Great Britain. The findings indicate that lower-income households have shown an increase in spending on housing, fuels and electricity, food and non-alcoholic beverages, as these expenditures hold significant importance for this population category.

When examining housing expenditure in Germany, Dustmann et al. (2022) discovered that a tendency towards growing inequality, which has been observed since the 1990s, has considerably intensified. The income share allocated to housing expenditure has disproportionately risen for the lowest income quintile, while decreasing for the highest income quintile. Younger cohorts save less and spend more on housing than older cohorts.

A comprehensive study of well-being and living conditions at the local level was conducted by Secondi (2021) for 7,893 Italian municipalities. The estimation of household consumption expenditure, as one of the most important indicators of economic material well-being of an area, was carried out by employing the cokriging spatial interpolation technique. This study is of high significance for the policy-makers who wish to study inequalities and formulate targeted and effective economic and social intervention policies.

Another fundamental study focused on the multifaceted nature of poverty, in particular food poverty, was performed by Marchetti & Secondi (2022). Their study unveiled that nearly 9% of Europe's population suffers from extreme food insecurity. Based on using the microdata from the Household Budget Survey (including data from rural areas), which was carried out by the Italian National Statistics Institute, the researchers proposed an analytical approach to identification and measurement of different degrees of food poverty and insecurity. The find-

ings of this study revealed that 22.3% of Italy's total population faces the threat of food poverty or food shortages. Additionally, the levels of food poverty risk were found to vary at the regional level, ranging from 14.6% in Umbria and 29.6% in Abruzzo. Notably, higher levels of food consumption inequality primarily affected vegetables, meat and fish products.

In analysing these scientific contributions, it is noteworthy that household expenditure in rural areas tends to be lower than in urban areas, while the share of expenditure on food products in the total expenditure is generally lower for poorer population groups compared to wealthier segments of the population.

The goal of this article is to develop substantiation for the theoretical approaches to optimization of household expenditure in rural areas, taking into account the Euro-integration vector of development. In this context, the following tasks were defined:

- to refine the essence of the concept of «economic studies»;
- to determine the main research toolkit;
- to conduct a comparative analysis of household expenditure in rural areas of Ukraine and in individual European countries, as well as to reveal disparities in the formation of these expenditures;
- to develop recommendations for increasing the level of household expenditure in rural areas of Ukraine.

Methodology

In order to achieve the goal of this study and address the set tasks, we utilized the following approaches and methods: *systems approach* was used to develop propositions that provide theoretical substantiation for the peculiarities of household expenditure; *economic-mathematical* method was utilized to conduct analysis of household expenditure in Ukraine and in foreign countries; *historical method* was utilized to examine the mechanisms involved in the formation of the aforementioned expenditures; *logical method* was employed to develop recommendations for expenditure optimization.

Research Results

In order to accomplish the set tasks, we conduct our analysis in the following order.

Refining the essence of the concept of «economic studies»

When exploring the etymological origin of the term «studies», it is important to note that its roots can be traced back to the Italian word «studium» (derived from «studere» – to study). According to «A large explanatory dictionary of the modern Ukrainian language» (Busel, 2005), the noun «study» is defined as a process of «thoroughly learning something or receiving education somewhere.»

An extended interpretation of this concept was proposed by Volkova & Zadorozhnyuk (2019). They suggested that the term «economic studies» should be used when researching and monitoring processes that take place in the modern economy under the influence of fundamental factors that affect its formation (the system of techno-economic, socio-economic and organizational-economic relations).

Currently, this concept is used at both national and international levels to convey various meanings. It is used to describe the process of studying and examining specific economic problems, as well as to designate the names of study disciplines, academic departments (see, for example, College of Europe, 2023), or economic journals.

Determining the main instruments of research

The theoretical and methodological framework of this study was developed based on the respective approaches, theories, methods, and sources of information, taking into account the following factors:

- the characteristics of the current post-modern era;
- development vectors in the social processes of the European community;

- mental features of the countries that were selected for analysis of household expenditures in rural areas;
- pan-European values of social nature that are closely related to the mentioned expenditures.

The systems approach was selected as the main approach for this study due to its suitability for investigating processes that occur within complex disequilibrium social systems, within which the mentioned expenditures are being formed.

Among theories and concepts, it is necessary to highlight those that have been modernized to explain the formation of household expenditure in rural areas, taking into account economic-social approaches.

The human-centric paradigm within the framework of new streams in economic theory offers a multidimensional perspective on individuals, encompassing their psycho-physiological peculiarities along with the study of emotions, assessment of risk appetite, formation of emotions from possession and loss of money, determination of the level of happiness and sorrow. The essence of the individual aligns with the concept of a humanistic subject, where the emphasis is placed on the «point of departure» rather than the pursuit of rational utility. Theoretical concepts, such as behavioural economics and neuroeconomics, support the holistic approach and/or the inclination towards hedonism inherent in the inductive neoclassical economic theory. In this context, game theory, experimental economics and managerial economics serve as rational frameworks that provide support for the human-centred paradigm of economic development (Thaler, 1985; Sanfey et al., 2003; Hofstede, 2001).

According to the value theory proposed by Schwartz (2012), there exist ten basic values, known as motivational value types, which are shared among various countries and cultures. These values form a circle continuum organized along two bipolar dimensions. The refined PVQ-51 methodology employs an expanded set of indicators compared to the original version. This approach divides the motivational continuum into more narrowly defined and conceptually distinct values, making it possible to measure a total of 19 values.

Baudrillard (2000) made a substantial contribution to the consumption theory. In his opinion, our modernity exists in a state of simulation, where we can only «play» out various scenarios, as they have already happened before, either in reality or virtually. Concurrently, society is both a practical reality and a form of myth, as it contains a mythological dimension within its own objective definition.

By generalising the works of Sugden (2008), Jorgenson & Slesnick (1989), Koliadych (2016) suggested that modern research in welfare theory can gain in effectiveness through further development and synergistic combination of the following concepts: the extended resource-based (money-based) concept of national well-being/poverty, which evolves within the methodological framework of

human and social capital; the concept of national well-being and human capability development; socio-eco-economic concept of sustainable welfare development and poverty reduction; the concept of national well-being.

The concept of post-materialist values proposed by Inglehart (1997), Inglehart & Baker (2000) assumes that the culture of people changes gradually in response to challenges within their internal and external environment with a possible social lag. By affecting the life experiences of individuals, these changes in socio-economic environment contribute to the reshaping of beliefs, attitudes and values at the individual level. This approach emphasizes the idea that culture, primarily values, and societal processes are inseparably connected and interdependent.

The presented theoretical constructs are closely linked to spending behaviours of households, in rural areas in particular. They shape their spending patterns, determine the nature of their interactions with society, and delineate their distinctive characteristics, contributing to better understanding of the dynamicity of development.

Analytical toolkit used in the study

The dynamics of household expenditures in EU countries and in Ukraine is analysed using the mathematical toolkit, in particular the correlation and regression analysis. The calculations are performed according to Formulas (1)-(6):

Coefficient of multiple correlation (concordance):

$$R = \frac{12S}{m^2 (n^2 - n)} \quad (1)$$

$$S = \sum_{i=1}^n \left(\sum_{j=1}^m R_{ij} \right)^2 - \frac{\left(\sum_{i=1}^n \sum_{j=1}^m R_{ij} \right)^2}{n} \quad (2)$$

where: m = number of groups being ranked

n = number of variables

R_{ij} – rank of i^{th} factor in j^{th} unit.

The significance of partial correlation coefficients can be checked using the same criteria of agreement as for pairwise correlation coefficients. In order to determine the degree of linear correlation between the specific characteristic and the remaining factors, the total coefficient of multiple correlation is calculated.

The significance of the total coefficient of multiple correlation can be evaluated using the χ -criterion, similar to the correlation ratio:

$$\chi^2 = m(n - 1) * W \tag{3}$$

$$\chi_{kp}^2 = (\alpha; (n - 1)(m - 1)) \tag{4}$$

If $\chi^2 > \chi_{kp}^2$, the null hypothesis is rejected.

In the case of dependent ranks:

$$R = \frac{12S}{m^2 (n^2 - n) - m \sum_{j=1}^m (t_j^2 - t_j)} \tag{5}$$

$$\chi^2 = \frac{12S}{mn(n+1) - \frac{\sum_{j=1}^m (t_j^2 - t_j)}{n-1}} \tag{6}$$

1. *R-square – coefficient of determination:*

$$R^2 = \frac{\sum_{i=1}^n (y_i - \bar{y})^2 - \sum_{i=1}^n (y_i - (\hat{a}x_i + \hat{b}))^2}{\sum_{i=1}^n (y_i - \bar{y})^2} \tag{7}$$

3. *Standard error – standard error of the regression:*

$$S = \sqrt{\frac{SS_{res}}{n(n-2)}} \tag{8}$$

$$SS_{res} = \sum_{i=1}^n (y_i - (\hat{a}x_i + \hat{b}))^2 \tag{9}$$

4. *Observation – number of observations: n.*

Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression					
Residuals					
Total					

Statistics on regression and regression residuals is shown in the two rows of the above table:

df = number of the degrees of freedom:

$$df = n - 2 \quad (10)$$

SS = regression sum of squares:

$$SS = \sum_{i=1}^n (y_i - \bar{y})^2 - \sum_{i=1}^n (y_i - (\hat{a}x_i + \hat{b}))^2 \quad (11)$$

MS = mean regression sum of squares, or sum of squares divided by the number of variables m ; in this case $m=1$.

5. F – value of the Fisher criterion:

$$F = (n - 2) \frac{\sum_{i=1}^n (\bar{y} - (\hat{a}x_i + \hat{b}))^2}{\sum_{i=1}^n (y_i - (\hat{a}x_i + \hat{b}))^2} \quad (12)$$

Significance F is the calculated value of the probability of the Fisher's distribution with $(1, n-2)$ degrees of freedom.

6. Table, which describes the regression line.

	Coefficients	Standard error	t-statistic	P-value	Lower 95%	Upper 95%	Lower p%	Upper p%
V-intercept								
Variable Y 1								

The two rows of the table contain statistics for the constant b (V-intercept) and the coefficient a (Variable Y1) from the linear regression equation $y = ax + b$:

Coefficients designate values of coefficients b and a respectively in the linear regression equation $y = ax + b$;

7. *Standard error*-standard error of the regression

$$S = \sqrt{\frac{SS_{\text{res}}}{n(n-2)}}; \quad (13)$$

$$SS_{\text{res}} = \sum_{i=1}^n (y_i - (ax_i + b))^2 \quad (14)$$

8. *t-statistic* represents the calculated sample value from the Student's t-distribution that is used to test the significance of coefficients. The null hypothesis states that the coefficient is equal to zero. The t-statistic is computed as a point estimate of the coefficient divided by its standard error:

$$t_a = \frac{\hat{a}}{s_a}, t_b = \frac{\hat{b}}{s_b}; \quad (15)$$

9. *P-value* is the probability associated with the observed test statistic under the assumption of the Student's t-distribution with (n-2) degrees of freedom. Low p-values indicate that the coefficients are statistically significant.

10. *Lower 95%, Upper 95%, Lower 90.0%, Upper 90.0%* represent the upper and lower limits of the confidence intervals for coefficients *b* and *a*. By default, these limits are calculated with a 95% confidence probability. In addition, they can be calculated with any specific probability as requested by the user.

Predicted V represents the estimated theoretical value of the response variable.

Residuals denote residuals calculated in the regression model.

11. *Percentile* is a statistical measure of position, which divides an ordered distribution of data into one hundred equal parts. This non-central indicator of position helps to determine the percentage of observations in the distribution that have values lower than the observed value of the variable.

This applied mathematical toolkit serves as a basis for conducting a correlation-regression analysis of the impact of the defined expenditures on total household expenditure in rural areas of Ukraine.

**Conducting a comparative analysis
of household expenditures in Ukraine
and selected European countries and revealing
disparities in the formation of these expenditures**

We analyse the dynamics of corresponding expenditures and determine the impact of individual expenditures on total expenditures, using Ukraine as the example. For this purpose, we considered the 14 groups of consumption and non-consumption expenditures officially published by the State Statistical Service of Ukraine, which comprise the total household expenditure. Among these groups, we selected four essential expenditures: food and non-alcoholic beverages; housing, water and electricity; healthcare; and education. The choice of these indicators was motivated by the well-known A. Maslow's «human needs pyramid». This model includes food, water and housing needs, whereas the importance of healthcare and education in the present-day reality of the first quarter of the 21st century can hardly be contested. The importance of these expenditures within the overall structure of total household expenditure during the specified time period is illustrated in Table 1.

Table 1

**The dynamics and structure of average household expenditure
in rural areas from 2014 to 2021, per household per month**

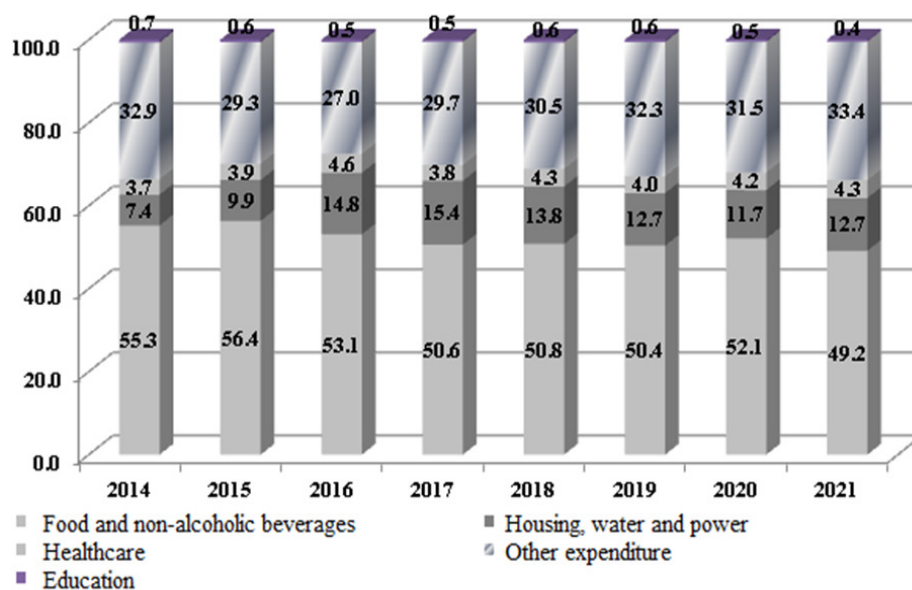
	2014		2015		2016		2017		2018		2019		2020		2021	
	uah	%	uah	%	uah	%	uah	%	uah	%	uah	%	uah	%	uah	%
Food and non-alcohol beverages	2077.0	55.3	2647.0	56.4	2935.0	53.1	3401.0	50.6	3869.0	50.8	4462.0	50.4	4637.0	52.1	5195.0	49.2
Housing, water, electricity	279.0	7.4	463.0	9.9	820.0	14.8	1034.0	15.4	1055.0	13.8	1123.0	12.7	1041.0	11.7	1343.0	12.7
Healthcare	140.0	3.7	185.0	3.9	252.0	4.6	256.0	3.8	326.0	4.3	358.0	4.0	378.0	4.2	457.0	4.3
Education	25.0	0.7	26.0	0.6	29.0	0.5	31.0	0.5	48.0	0.6	50.0	0.6	43.0	0.5	44.0	0.4
Other expenditure	1238.0	32.9	1376.0	29.3	1492.0	27.0	1995.0	29.7	2321.0	30.5	2864.0	32.3	2804.0	31.5	3530.0	33.4
Total expenditure	3759.0	100.0	4697.0	100.0	5528.0	100.0	6717.0	100.0	7619.0	100.0	8857.0	100.0	8903.0	100.0	10569.0	100.0

Source: calculated by the authors based on State Statistics Service of Ukraine (2015, 2016, 2018, 2020, 2022).

When analysing this dynamics, we observe consistent annual increases in both the total expenditure and individual expenditures, indicating a response to inflation and corresponding shifts in income growth. These changes are more obvious when shown graphically in Figure 1.

Figure 1

Structure of average household expenditure in rural households from 2014 to 2021, per month per household, in %



Source: constructed by the authors based on State Statistics Service of Ukraine (2015, 2016, 2018, 2020, 2022).

We can now analyse the dynamics of change in the selected indicators (Table 2).

Table 2

The dynamics of change in average individual expenditures of rural households from 2014 to 2021, per month per household

	2014		2021		Rate of change		
	uah	%	uah	%	for individual indicator		as % of total expenditure
					uah	%	%
Food and non-alcoholic beverages	2077.0	55.3	5195.0	49.2	+3118	2.50 times	- 6.1
Housing, water, electricity	279.0	7.4	1343.0	12.7	+1064	4.81 times	+5.3
Healthcare	140.0	3.7	457.0	4.3	+317	3.26 times	+0.6
Education	25.0	0.7	44.0	0.4	+19	1.76 times	- 0.3

Source: calculated by the authors based on State Statistics Service of Ukraine (2018, 2020, 2022).

Having analysed this dynamics, we can draw the following conclusions:

Regarding changes in individual indicators, the highest rates of growth, when measured in absolute terms, were observed for food and non-alcoholic beverages expenditure and housing, water and electricity expenditure, whereas healthcare and education expenditures demonstrated the lowest rates of growth. At the same time, when considering percentage change, the highest growth was observed for housing, water and electricity expenditure and healthcare expenditure, whereas education expenditure exhibited the lowest growth rate.

In terms of changes relative to total expenditure, the highest rate of increase was observed in expenditure on housing, water and electricity, while expenditure on food and non-alcoholic beverages showed a decrease. Education expenditure remained practically unchanged.

The revealed expenditure dynamics reflects complex processes that are ongoing in the political, economic and social dimensions of the real-life functioning of households.

We can now assess the significance of the impact of individual expenditures on the total expenditure, using the embedded EXCEL correlation and regression analysis tool pack. The results of our analysis are presented in Table 3,

whereas the output for regression statistics, analysis of variance, regression coefficients, residuals, and probability calculations are shown in Tables A1-A5, B1-B5, C1-C5, D1-D5, and E1-E4.

Table 3

Estimated impact of individual expenditures on the total expenditure of rural households from 2014 to 2021

	Impact of variable Y1 on V	Impact of variable Y2 on V	Impact of variable Y3 on V	Impact of variable Y4 on V	Factual V
2014	3673	3305	3699	4729	3759
2015	4906	4433	4688	4925	4697
2016	5529	6623	6159	5513	5528
2017	6536	7935	6247	5905	6717
2018	7549	8064	7784	9237	7619
2019	8831	8481	8487	9629	8857
2020	9209	7978	8926	8257	8903
2021	10416	9830	10661	8453	10569

In evaluating these expenditures, it must be noted that it has been proven that the most considerable impact on total household expenditure is attributable to food expenditure. The thesis suggesting that Ukrainians have the mental capacity for significant food consumption appears somewhat debatable, however, given the considerable disparity in the size of household incomes between Ukraine and the majority of EU countries.

The overall impact of individual expenditures on total household expenditure is shown in Figure 2.

We now analyse this household expenditure in Ukraine and EU countries by consumption purpose on a monthly basis in Tables 4-7.

Figure 2

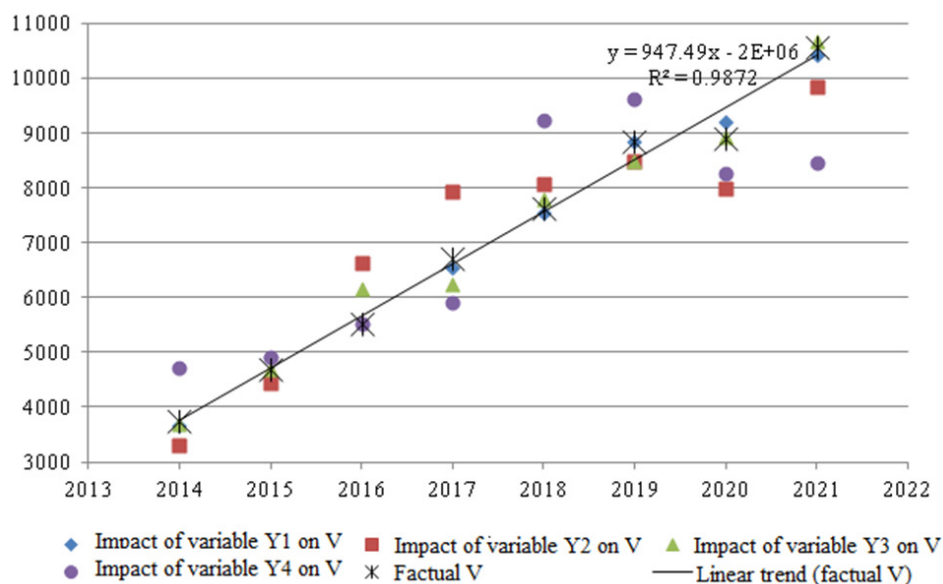
The impact of individual household expenditures on the total expenditure of rural households from 2014 to 2021

Table 4

Household expenditure on food and non-alcoholic beverages

	2005	2010	2015	2020
European Union – 27 countries (from 2020)	:	:	177	186
European Union – 27 countries (2007-2013)	172	168	:	:
Bulgaria	394	380	348	312
Czechia	215	209	223	222
Spain	207	164	166	190
Poland	295	257	237	279
Italy	205	207	196	220
Greece	166	179	212	234
Germany	115	119	117	111
Ukraine	115	147	109	150

Source: Eurostat (2023a).

Table 5

Household expenditure on housing, water, electricity, gas and other fuels

	2005	2010	2015	2020
European Union – 27 countries (from 2020)	:	:	305	311
European Union – 27 countries (2007-2013)	265	266	:	:
Bulgaria	271	272	283	289
Czechia	180	206	184	215
Germany	301	306	330	317
Greece	230	263	265	306
Spain	267	279	305	337
Italy	251	285	334	348
Poland	301	325	322	301
Ukraine	13	20	19	34

Source: Eurostat (2023a).

Table 6

Household expenditure on health

	2005	2010	2015	2020
European Union – 27 countries (from 2020)	:	:	34	35
European Union – 27 countries (2007-2013)	34	30	:	:
Bulgaria	47	58	63	85
Czechia	18	28	27	27
Germany	32	30	32	34
Greece	62	54	75	68
Spain	24	30	34	36
Italy	41	44	42	46
Poland	44	41	45	43
Ukraine	5	8	8	12

Source: Eurostat (2023a).

Table 7

Household expenditure on education

	2005	2010	2015	2020
EU-27 (after 2020)	:	:	7	6
EU-27 (from 2007 to 2013)	8	10	:	:
Bulgaria	4	2	1	1
Czechia	5	5	6	11
Germany	8	8	7	7
Greece	22	24	23	22
Spain	6	6	9	10
Italy	6	7	5	4
Poland	10	8	7	5
Ukraine	1.3	2.2	1.1	1.4

Source: Eurostat (2023a).

Based on the results of comparative expenditure analysis, we can draw the following conclusions:

- The level of monthly expenditure on housing, water, electricity, gas and other fuels, as well as health and education expenditures are significantly lower in Ukraine than in other countries, reflecting a much lower level of standard of living in Ukraine.
- The level of monthly household expenditure on food and non-alcoholic beverages in Ukraine is comparable to that in Germany, but significantly lower than in the other analysed EU countries.
- The countries exhibit considerable variations in the levels of monthly household expenditure, which reflect differences in the levels of economic development, wealth, mental features, prices, inflation, and other factors of influence upon these indicators.

We now analyse the purchasing power standard of households on an annual basis (Table 8).

Table 8

Purchasing power standard (PPS) per household

	2005	2010	2015	2020
EU-27 (after 2020)	:	:	26 380	26 280
EU-27 (2007-2013)	23 467	25 774	:	:
Bulgaria	5 743	6 928	8 906	9 995
Czechia	11 791	12 822	14 992	17 099
Germany	28 320	30 421	33 109	35 128
Greece	30 190	27 345	22 062	19 449
Spain	22 467	27 788	27 886	25 071
Italy	27 713	24 874	26 857	24 902
Poland	9 666	13 946	17 576	16 686
Ukraine	2 256	3 156	2 328	3 468

Source: Eurostat. (2023b)

The assessment of these annual indicators leads us to ascertain that household expenditures in rural areas of Ukraine are considerably lower compared to other countries. Thus, in 2014, household spending in Ukraine was 2.54 times lower than in Bulgaria, and in 2020, it was 2.89 times lower. Similarly, comparing to Germany, Ukraine's household spending was 12.55 times lower in 2005 and 10.13 times lower in 2020. In comparison to the average EU data, Ukraine lagged behind by 10.4 times in 2005 and 7.58 times in 2020. When analysing this dynamics, it is worth noting that there has been gradual convergence of Ukrainian household expenditures with those of European countries, albeit too slow.

Recommendations for increasing incomes and expenditures in Ukraine

Taking into account Ukraine's focus on the European vector of development, as well as having performed the analysis of household expenditures in Ukraine and in comparison with other countries, the following recommendations are proposed:

1. Recognizing that increasing level of incomes is fundamental to raising the level of spending, it is essential to design programmes for the development of administrative units and create the enabling environment for development of dif-

ferent business structures. This will stimulate production and subsequently increase workers' incomes.

2. For various categories of unemployed individuals within households, mechanisms should be developed to facilitate their partial employment, taking into account their physical abilities, while gradually increasing state support.

3. Implementation of the mechanisms of competition among producers and trading entities will curb excessive revenue generation that leads to inflation and decreases the purchasing power of households.

4. Considering that approximately half of the meat, fruit, berry, and vegetable products are produced in private households, it is necessary to increase state support for these products. Increased state assistance will bolster production, contributing significantly to higher earnings. Consequently, this will result in greater expenditure on food products, which traditionally constitute the largest share of total household expenditure.

Conclusions

The regression analysis of the impact of individual expenditure items on the total expenditure of rural population was conducted using the EXCEL spreadsheets and embedded formulas. The results enabled us to draw the following conclusions.

First, the expenditures of Ukrainian households are considerably lower compared to households in separate EU countries.

Second, among the expenditure items, food expenditure has the largest impact on the total expenditure of rural population. The coefficient of determination, $R^2 = 0.994594$, indicates a high goodness of fit for the regression model, suggesting that the model accurately fits the data.

Third, since the significance F is less than $\alpha=0.01$, the null hypothesis can be rejected with 99% confidence. This indicates that the regression model is adequate and suggests a direct dependence of the total expenditure (V) on food expenditure ($Y1$).

Fourth, the p -value for the food expenditure variable is calculated as $4.95E-8$, which is less than $\alpha=0.01$. Thus, the confidence interval for the parameter β is at the 99% level, which leads us to conclude that there exists a statistically significant linear relationship between the variable $Y1$ and the outcome indicator V .

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Appendix A

The impact of food expenditure (y1) on total expenditure (v)

Table A1.

Regression statistics

Regression statistics	
Multiple R	0.997293
R Square	0.994594
Adjusted R Square	0.993693
Standard error	185.5095
Observations	8

Table A2.

Analysis of variance

	df	SS	MS	F	Significance F
Regression	1	37986410	37986410	1103.814	4.95E-08
Residual	6	206482.6	34413.77		
Total	7	38192893			

Table A3.

Regression coefficients

	Coefficients	Standard error	t-statistic	P-value	Lower 95%	Upper 95%
Y-intercept	-818.701	246.6567	-3.31919	0.01602	-1422.25	-215.154
Variable Y 1	2.162632	0.065093	33.2237	4.95E-08	2.003355	2.321909

Table A4.

Calculation of residuals

Observations	Predicted V	Residuals
1	3673.087	85.91344
2	4905.787	-208.787
3	5528.625	-0.62522
4	6536.412	180.5881
5	7548.524	70.47606
6	8830.965	26.03501
7	9209.426	-306.426
8	10416.17	152.8254

Table A5.

Calculation of probability

Percentile	V
6.25	3759
18.75	4697
31.25	5528
43.75	6717
56.25	7619
68.75	8857
81.25	8903
93.75	10569

Appendix B

The impact of housing, water and power expenditure (y2) on total household expenditure (v)

Table B1.

Regression statistics

Regression statistics	
Multiple R	0.936468
R Square	0.876973
Adjusted R Square	0.856468
Standard error	884.945
Observations	8

Table B2.

Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance <i>F</i>
Regression	1	33494127	33494127	42.76969	0.000611
Residual	6	4698766	783127.6		
Total	7	38192893			

Table B3.

Regression coefficients

	Coefficients	Standard error	<i>t</i> -statistic	<i>P</i> -value	Lower 95%	Upper 95%
Y-intercept	1594.093	895.4531	1.780208	0.125341	-597.002	3785.188
Variable Y 2	6.132475	0.937708	6.539854	0.000611	3.837986	8.426965

*Table B4.***Calculation of residuals**

Observation	Predicted V	Residuals
1	3305.053	453.9466
2	4433.429	263.5711
3	6622.722	-1094.72
4	7935.072	-1218.07
5	8063.854	-444.854
6	8480.862	376.1376
7	7977.999	925.0005
8	9830.007	738.993

*Table B5.***Calculation of probability**

Percentile	V
6.25	3759
18.75	4697
31.25	5528
43.75	6717
56.25	7619
68.75	8857
81.25	8903
93.75	1343

Appendix C**The impact of healthcare expenditures (y3)
on total expenditures (v)**

Table C1.

Regression statistics

Regression statistics	
Multiple R	0.989523
R Square	0.979156
Adjusted R Square	0.975681
Standard error	364.2597
Observations	8

Table C2.

Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance <i>F</i>
Regression	1	37396782	37396782	281.846	2.85E-06
Residual	6	796110.9	132685.1		
Total	7	38192893			

Table C3.

Regression coefficients

	Coefficients	Standard error	<i>t</i> -statistic	<i>P</i> -value	Lower 95%	Upper 95%
Y-intercept	624.976	405.5544	1.541041	0.17424	-367.38	1617.332
Variable Y 3	21.95969	1.308038	16.78827	2.85E-06	18.75904	25.16034

Table C4.

Calculatio of residuals

Observation	Predicted V	Residuals
1	3699.333	59.66734
2	4687.519	9.481267
3	6158.818	-630.818
4	6246.657	470.3432
5	7783.835	-164.835
6	8486.545	370.4548
7	8925.739	-22.739
8	10660.55	-91.5546

Table C5.

Calculation of probability

Percentile	V
6.25	3759
18.75	4697
31.25	5528
43.75	6717
56.25	7619
68.75	8857
81.25	8903
93.75	10569

Appendix D**The impact of education expenditures (y4)
on total expenditures (v)**

Table D1.

Regression statistics

Regression statistics	
Multiple R	0.862801
R Square	0.744425
Adjusted R Square	0.70183
Standard error	1275.482
Observations	8

Table D2.

Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance <i>F</i>
Regression	1	28431760	28431760	17.47651	0.00581
Residual	6	9761133	1626855		
Total	7	38192893			

Table D3.

Regression coefficients

	Coefficients	Standard error	<i>t</i> -statistic	<i>P</i> -value	Lower 95%	Upper 95%
Y-intercept	-171.375	1792.495	-0.09561	0.926946	-4557.45	4214.703
Variable Y 4	196.0135	46.88767	4.180492	0.00581	81.28353	310.7435

Table D4.

Calculation of residuals

Observation	Predicted V	Residuals
1	4728.963	-969.963
2	4924.976	-227.976
3	5513.017	14.98311
4	5905.044	811.9561
5	9237.274	-1618.27
6	9629.301	-772.301
7	8257.206	645.7939
8	8453.22	2115.78

Table D5.

Calculation of probability

Percentile	V
6.25	3759
18.75	4697
31.25	5528
43.75	6717
56.25	7619
68.75	8857
81.25	8903
93.75	10569

Appendix E**A model of regression analysis
for all independent variables**

Table E1.

Regression statistics

Regression statistics	
Multiple R	0.999314435
R Square	0.99862934
Adjusted R Square	0.996801794
Standard error	132.0977577
Observations	8

Table E2.

Analysis of variance

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	Significance <i>F</i>
Regression	4	38140543	9535136	546.4318	0.000127
Residual	3	52349.45	17449.82		
Total	7	38192893			

Table E3.

Regression coefficients

	Coefficients	Standard error	<i>t</i> -statistic	<i>P</i> -value	Lower 95%	Upper 95%
Y-intercept	-482.9387693	222.9861	-2.16578	0.118927	-1192.58	226.7027
Variable Y 1	1.68467401	0.179049	9.409005	0.002544	1.11486	2.254488
Variable Y 2	0.78876519	0.360517	2.187874	0.116486	-0.35856	1.93609
Variable Y 3	0.461526797	0.223702	2.063136	0.131101	-0.25039	1.173445
Variable Y 4	13.98944786	11.27694	1.240536	0.302953	-21.8988	49.8777

Table E4.

Calculation of probability

Percentile	Y
6.25	3759
18.75	4697
31.25	5528
43.75	6717
56.25	7619
68.75	8857
81.25	8903
93.75	10569

Appendix F**Exchange-rate-adjusted expenditures
of households in rural areas of Ukraine**

	2005	2010	2015	2020
Average annual exchange rate, hryvnias per euro	6.38	10.52	24.23	30.79
Total monthly expenditure, uah	1198	2766	4697	8903
Total monthly expenditure, euro	188	263	194	289
Total annual expenditure, euro	2256	3156	2328	3468
Monthly expenditure on food and beverages, uah	735	1551	2647	4637
Monthly expenditure on food and beverages, euro	115	147	109	150
Annual expenditure on food and beverages, euro	1380	1764	1308	1800
Monthly expenditure on housing, water, power, uah	81	205	463	1041
Monthly expenditure on housing, water, power, euro	13	20	19	34
Annual expenditure on housing, water, power, euro	156	240	228	408
Monthly expenditure on health, uah	31	84	185	378
Monthly expenditure on health, euro	5	8	8	12
Annual expenditure on health, euro	60	96	96	144
Monthly expenditure on education, uah	8.4	24	26	43
Monthly expenditure on education, euro	1.3	2.2	1.1	1.4
Annual expenditure on education, euro	16	26	13	17

Source: calculated by the authors based on (National Bank of Ukraine, 2023).

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