DIFFERENTIATION OF INCOME AND EXPENDITURES OF HOUSEHOLDS IN THE SYSTEM OF FORMATION OF THE DEMOGRAPHIC SITUATION IN UKRAINE

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Abstract: This article analyzes the role of household income and expenditure differentiation in shaping the demographic situation in Ukraine. The impact of socio-economic changes and their theoretical concepts on demographic dynamics was evaluated. The relationship between household incomes and expenses and indicators of the demographic situation, such as birth rate, death rate, migration, and aging of the population, is considered. The key factors influencing the differentiation of income and expenditure, such as education, employment, and regional disparities, have been identified. The fundamental understanding of the mechanisms contributing to the formation of the demographic situation in Ukraine has been improved. The results of the study can be used to develop the principles of state social and economic policy aimed at improving the demographic situation.

Keywords: household income; household expenditure; demographic indicators; demographic situation; population aging.

1 Introduction

The specificity of the current stage of socioeconomic development of Ukraine lies in the presence of a long-term problem of differentiation of household incomes and expenses, which significantly affects the state of the country`s economic development. At the same time, the problem of inequality in the distribution of income and expenses also plays a significant role in the formation of the demographic situation in the country [14]. In particular, this differentiation has a direct impact on the standard of living of the population, its demographic indicators, and social development in general. Solving this problem requires a detailed analysis of the role of household income and expenditure differentiation in shaping the demographic situation. In particular, on the basis of such an analysis, it is possible to identify the main factors that lead to the differentiation of incomes and expenses, as well as the possibility of assessing their impact on the demographic situation in the country [18]. At the same time, such research requires the processing of a significant array of socioeconomic data and the use of relevant theoretical concepts.

As it is known, the distribution of income and expenses is a complex process that includes many factors and relationships. However, currently, insufficient attention is paid to the study of this phenomenon, especially in the context of its impact on the demographic situation in Ukraine [6; 10]. At the same time, there is an objective need to expand the understanding of the relationship between the differentiation of household incomes and expenses and the demographic situation in Ukraine.

In addition, the study of the specifics of the differentiation of household incomes and expenditures is important for reasons of social justice and economic growth. High inequality in the distribution of income can lead to social tension in society, a decrease in the quality of life, and limited access to basic social services for the population. In addition, it can have a fairly serious impact on the demographic indicators of the country, such as birth rate, death rate, and migration.

In general, it can be argued that increasing the level of income and ensuring decent living conditions for all segments of the population is an important task for any country. But in order to achieve this goal, it is necessary to find out exactly how the differentiation of income and expenses affects the demographic situation. At the same time, Ukraine has recently faced numerous challenges related to reforming the economy and stabilizing socio-economic development. Understanding the impact of the differentiation of income and expenses on the demographic situation is a key aspect of the development of effective policies aimed at improving the quality of life of the population and ensuring sustainable development.

In this context, there is a growing need to identify the main factors that contribute to the differentiation of household incomes and expenses in Ukraine. Meanwhile, it is necessary to determine the influence of such factors as education, employment, regional differences, etc. on this process. In addition, determining the possible consequences of income and expenditure differentiation on demographic indicators, such as birth rate, mortality rate, migration, and population aging, is an urgent task. Only by taking into account all the mentioned factors will it be possible to determine the principles of functioning of the mechanisms that currently shape the demographic situation in Ukraine.

All this determines the relevance of the study of the problems of income and expenditure differentiation, the result of which should be methods of forming an effective socio-economic policy aimed at reducing income inequality, enhancing the quality of life of the population, and improving the demographic situation in the country in general.

2 Literature Review

The differentiation of household incomes and expenditures is a complex and multifaceted problem that attracts considerable attention in the scientific community. In recent years, in connection with the growth of social inequality and its impact on economic development and the demographic situation, research in the field of income and expenditure differentiation has become particularly relevant.

Among the key studies of the differentiation of household incomes and expenses, there are works that highlight the role of education in this process. In this aspect, it is worth noting the research of S. G. Beverly, who revealed that education has a significant impact on the distribution of income and expenses. A high educational qualification can provide access to high-paying jobs, which contributes to the growth of incomes. In addition, educated people are more likely to make smarter financial decisions and are more aware of the efficient use of their resources [5].

Regional differences are another important aspect in the study of income and expenditure differentiation. According to Yu. H. Horiashchenko`s research, there is a significant difference in income and expenses between different regions in Ukraine. The author emphasizes that regional differences can affect the country`s demographic situation, in particular, population migration flows. At the same time, it is claimed that Ukraine, as a country with diverse regions in terms of the level of economic development, faces the problem of population outflow from less developed regions to more developed ones. This can have a negative impact on the demographic situation in certain regions, in particular manifesting in the birth rate and aging of the population [9].

In addition, a number of researchers pay special attention to the impact of the differentiation of income and expenses on the birth rate and mortality rate. In particular, according to research by Asumadu-Sarkodie and Owusu, a high level of social inequality can lead to a decrease in the birth rate and an increase in the death rate. It has been argued that inequalities in access to resources and social services can limit the ability of low-income families to raise children and receive the health care they need, which can have long-term demographic consequences [4].

It is also worth noting the study of the impact of income and expenditure differentiation on population migration. In particular, the works of S. Kolodii [9] and V. Nahornyi [15] argue that high incomes and access to a wider range of opportunities can attract young and qualified workers to large cities or abroad, which can lead to an outflow of resources and the growth of regional disparities. Such processes can have a significant impact on the demographic situation, as well as on the change in the age structure, composition, and location of the population.

In general, the study of approaches to solving the problem of differentiation of household incomes and expenses, in particular within efficiency and macroeconomic context, as well as in the industry scale, is sufficiently widely presented in the works of such scientists and practitioners. as O. Agres [1-2], I. Britchenko [7], T. Kulinich [11-13], T. Shmatkovska [21-22], R. Sodoma [23-24], K. Sukhova [25], A Tiurina [26-27], I. Tofan [28], I. Tsymbaliuk [29], and many others.

However, it is worth noting that current scientific research in the field of differentiation of household incomes and expenses in Ukraine is limited, since most of the current studies focus on general indicators of economic development, without sufficient attention to their impact on the demographic situation. Therefore, there is an objective need to deepen the study of this issue to determine the relationships between the differentiation of household incomes and expenses and the demographic situation in Ukraine, which will allow the development and implementation of effective socio-economic policies aimed at reducing social inequality and creating a stable demographic situation.

3 Materials and Methods

When analyzing the property stratification of the population, it is necessary to study the dynamics of indicators of income differentiation, which are used in global practice, namely:

–The Gini coefficient - the concentration coefficient G, which takes on a value from 0 (even distribution of income among the entire population) to 1 (all income belongs to one person), calculated according to the formula

$$G = 1 - 2\sum_{i=1}^{n} P_i cumY_i + \sum_{i=1}^{n} P_i Y_i$$

where: P_i – the share of the population of i-th group in the total number of the population;
Y_i – the share of income (expenditure) of the i-th population group;
$cumY_i$ – the cumulative share of income (expenditure);
n – the number of population groups;

– Income deciles ratio – the ratio of the minimum level of income among the 10% of the most well-off population to the maximum level of income among the 10% of the least well-off population;
– Income quintile ratio – the ratio of the minimum level of income among the 20% of the most well-off population to the maximum level of income among the 20% of the least well-off population;
– The quintile factor of funds – the ratio of the total incomes of the 20% of the most and 20% of the least well-off population [17].

Based on the methods of economic and mathematical statistics, the differentiation of the population by the level of average per capita equivalent income was analyzed, and the indicator of the level of differentiation - the Gini coefficient - was calculated. The Lorentz concentration curve was constructed using the graphical variation method. Based on the method of analysis and synthesis, conclusions about the economic behaviour of households in Ukraine were made.

4 Results and Discussion

According to the realities of today, there is an opinion that the growth of the specific weight of social payments in the aggregate resources of households has negative consequences since such payments or the persons who receive them do not make any contribution to the creation of the gross domestic product. However, in our opinion, the growth of social benefits is inevitable as long as there is a population whose well-being is below the poverty line. Another issue is how to ensure the receipt of appropriate funds for payments to these segments of the population, the number of which is constantly growing.

This problem is becoming increasingly acute against the background of the constant aging of the population. From Figure 1, the disappointing forecasts regarding the age structure of the population of Ukraine are obvious.
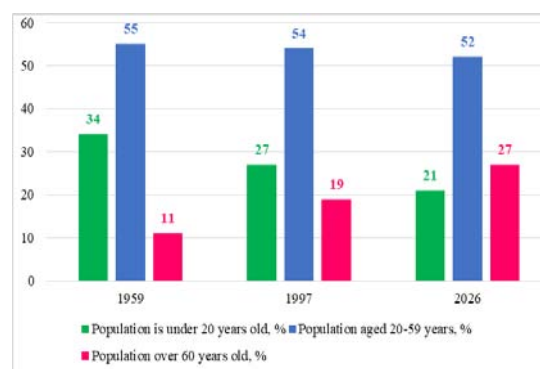

Figure 1. Population aging rates in Ukraine for 1959-2026 (including forecast)
Source: [16].

It is important that Ukraine in today`s realities belongs to the group of countries with a high level of economic shadowing. Significant scales of latent economic activity in Ukraine, exceeding the critical level (30%), form a kind of "parallel" state. Undoubtedly, the shadow sector of the economy has a significant impact on all socioeconomic processes in society, including the formation, distribution, and redistribution of income. Without taking into account this fact, the monitoring of population differentiation by official incomes is incomplete, and the corresponding results are inadequate.

The study of indicators of differentiation by total income shows that there is inequality in their distribution in Ukraine (Table 1). Thus, in 2021, the first five deciles groups of the population accounted for about 34.3% of total income, and for the other five - about 65.7%. It is significant that the tenth deciles group of the population has the largest share of total income, more than 20%. The deciles coefficient of differentiation of the total incomes of the population shows that during 2017–2021, the minimum incomes of the 10% of the most well-off population exceeded the maximum incomes of the 10% of the least well-off population by 2.6–3.1 times. At the same time, the coefficient of funds demonstrates a higher level of inequality in the income distribution (the ratio between the total incomes of 10% of the most and least well-off population during 2017–2021 varied between 4.4–5.6).

Table 1: Distribution of total incomes by deciles groups of the population in Ukraine for 2017–2021

Deciles groups	2017	2018	2019	2020	2021
First	4.5	3.8	4.6	4.7	4.5
Second	6.0	5.7	6.1	6.2	6.1
Third	6.9	6.8	6.9	7.1	7.1
Fourth	7.6	7.6	7.7	7.8	7.8
Fifth	8.4	8.5	8.5	8.6	8.8
Sixth	9.2	9.5	9.3	9.3	9.5
Seven	10.2	10.5	10.3	10.4	10.5
Eight	11.6	11.9	11.6	11.7	11.6

Ninth	13.5	14.2	13.7	13.7	13.6
Tenth	22.1	21.5	21.3	20.5	20.5
Deciles coefficient of differentiation of total income, times	2.7	3.1	2.7	2.6	2.6
Deciles ratio of funds, times	4.9	5.6	4.6	4.4	4.5
Income concentration ratio	0.243	0.253	0.237	0.226	0.227

Source: built on data [16].

Graphical analysis of the distribution of total incomes based on the Lorenz curve (Fig. 2) indicates less inequality in the distribution of incomes in Ukraine compared to EU states. It is significant that the Lorenz curve for both Ukraine and the EU has not reached the so-called critical point of differentiation. An additional argument in favour of moderate inequality in the distribution of total incomes in Ukraine is the income concentration coefficient (Gini), the variation of which in the range of 20–26% according to the classification of economies for OECD countries corresponds to a low degree of inequality.
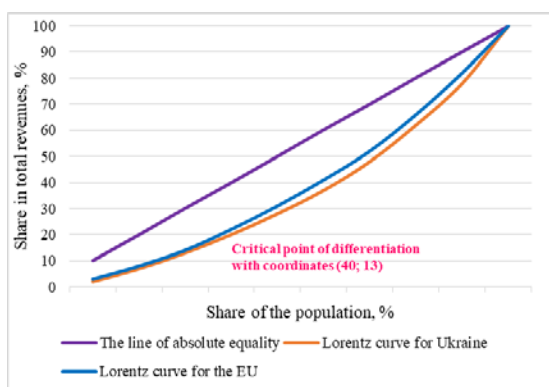

Figure 2. Lorenz curve for Ukraine and the European Union (by total income in 2021)
Source: built on data [19]

A comparative analysis of the Gini coefficient in Ukraine and the European Union, surprisingly, shows a significantly lower level of inequality in the distribution of income in the Ukrainian national economy compared to the vast majority of European states.

Ukraine, together with such countries of the European Union as Norway, Slovenia, the Czech Republic, Sweden, Finland, and Belgium, belongs to the group of countries with a low degree of inequality in the income distribution. Most of the states of the European Union are characterized by an average (France, Croatia, Germany, Ireland, Poland, Italy, etc.) or high (Greece, Portugal, Spain, Cyprus, Bulgaria, Serbia, etc.) degree of inequality in income distribution (Figure 3).
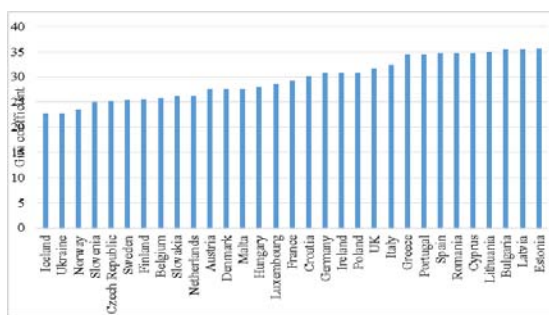

Figure 3. The Gini coefficient in Ukraine and the countries of the European Union in 2021
Source: built on data [19].

The study of the results of the assessment of the shadow economy in Ukraine using various methods (Fig. 4) shows that

the level of shadowing of the national economy is extremely high. In particular, in 2021, the specific weight of the "shadow" in the gross domestic product varied from 35% (according to the monetary method) to 56% (according to the "population expenditure - retail turnover" method). It is significant that since 2019 there has been a clear trend toward the growth of the shadow sector of the economy in Ukraine.

Of course, the darkening of the economy is characteristic not only of Ukraine, but also of the EU states. The analysis of the level of shadowing of the economies of the EU states, according to Professor F. Schneider, shows that the vast majority of European states are characterized by the so-called safe level of shadowing (only Bulgaria was an exception in 2021). It is significant that Ukraine is the leader in terms of the share of the latent economy in comparison with the EU states (Table 2).

Table 2: The level of the shadow economy in the countries of the European Union in 2021

Country	The level of the shadow economy, % of GDP	Country	The level of the shadow economy, % of GDP
Austria	8.2	Portugal	17.6
Netherlands	8.3	Spain	18.2
Luxembourg	9.0	Italy	20.6
Great Britain	9.4	Hungary	21.9
Ireland	11.3	Greece	22.4
Denmark	12.0	Slovenia	23.3
Germany	12.2	Poland	23.3
France	12.3	Latvia	23.6
Finland	12.4	Malta	24.3
Sweden	13.2	Lithuania	25.8
Slovakia	14.1	Estonia	26.2
Czech Republic	15.1	Romania	28.0
Belgium	16.2	Bulgaria	30.6

Source: [19].

The significant scale of shadowing of the national economy, exceeding the so-called safe level of 30%, indicates the latency of the processes of income formation in a significant number of the state's population. Under such conditions, it is obvious that the real problem of inequality in the distribution of income in Ukraine is much more acute than the data of official statistics show.

The data of a sample survey of expenses and resources of households of Ukraine for 2017–2021 became the statistical basis for the study of the differentiation of the incomes of the population of Ukraine, taking into account their shadow component.

The algorithm for estimating the differentiation of population incomes, taking into account their shadow component, in accordance with the author`s approach, is as follows:

1) Assessment of shadow incomes and justification of criteria for their distribution by deciles population groups;
2) Calculation of the so-called adjusted incomes (their shadow component is taken into account) by deciles population groups;
3) Calculation of the Gini coefficient based on the total and adjusted total incomes of the population;
4) Comparison of indicators of differentiation of population incomes by total and adjusted total population incomes.

The main problem in assessing the level of income differentiation of the population in Ukraine is the justification of the scale and criteria for the distribution of shadow component. The results of assessing the level of the shadow economy using different methodological approaches allowed us to determine the variation of shadow incomes. According to one of the scientific concepts, shadow incomes are distributed only between the last two deciles groups of the population [3]. Without denying the right to the existence of such an approach, we consider it

insufficiently substantiated within the framework of this study.

Of course, there are no statistical data that would make it possible to reliably assess the distribution of shadow incomes by deciles population groups. This can only be done on the basis of certain assumptions. In particular, we believe that the regularity of the distribution of shadow incomes can be reflected in the structure of household expenses. The analysis proved that in Ukraine, there is a significant variation in expenses by deciles population groups.

At the same time, the share of expenditure on food products and non-alcoholic beverages, tobacco products, payment for housing and communal services, as well as communication services, is higher in the first deciles groups of the population, and the specific weight of expenditure on other items (clothing, shoes, household items, household appliances, health care, transport, recreation and culture, education, restaurants, and hotels, helping relatives, buying shares, real estate, construction, major repairs, bank deposits) is significantly higher in the last deciles groups. With this in mind, all household expenses in the context of their impact on the distribution of shadow incomes were accordingly divided into two groups: disincentives and stimulators.

Another criterion for evaluating the distribution of shadow incomes can be the distribution of respondents based on self-assessment of their own standard of living (methodology of the State Statistics Service of Ukraine [19]). The corresponding results show that the share of respondents by deciles groups of the population who indicated the sufficiency of their own income with the possibility to make / not make savings is significantly higher in the last deciles groups. The specific weight of respondents who indicated a lack of income (cannot afford the most necessary, except for food; it was not possible to provide even sufficient food) prevails in the first deciles groups. Similarly to the above, all indicators based on the results of self-assessment of the standard of living in the context of their influence on the distribution of shadow incomes were divided into stimulators and dissimulators. The outlined criterion base made it possible to estimate the percentage share of each deciles group in shadow incomes (Figure 4).
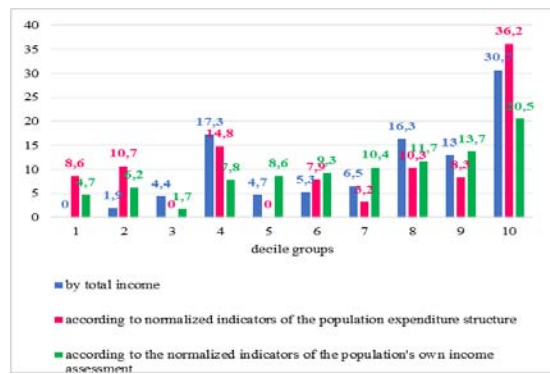
Figure 4. Specific weight of deciles groups of the population of Ukraine in shadow incomes according to various methods compared to total incomes, %
Source: built on data [19].

It is significant that the participation weights in the distribution of shadow incomes reflect a higher level of inequality than total incomes. In addition, the specific weight of the tenth deciles group of the population in the distribution of shadow incomes significantly exceeds the corresponding specific weight of total incomes.

The results of the calculations showed that taking into account the shadow component of incomes slightly changes the patterns of their distribution by deciles population groups compared to total incomes. So, if in 2021 the last deciles group of the population accounted for 20.5% of total incomes, then taking into account shadow incomes according to the author`s approach, the corresponding average share varies between 23.7–25.3%.

The results of the Gini coefficient calculations show significant differences in the estimation of differentiation by total and total adjusted incomes (Figure 5). While the Gini coefficient indicates a low level of inequality in income distribution for total incomes, for adjusted incomes it indicates an average or high level. Of course, the obtained results of estimating the differentiation of the population`s incomes, taking into account their shadow component, reflect income inequality within a certain confidence interval. In particular, the confidence interval of the Gini coefficient, calculated on adjusted total incomes based on normalized indicators of the population`s own income assessment, is ±7%, and on the basis of normalized indicators of the cost structure - ±2%.
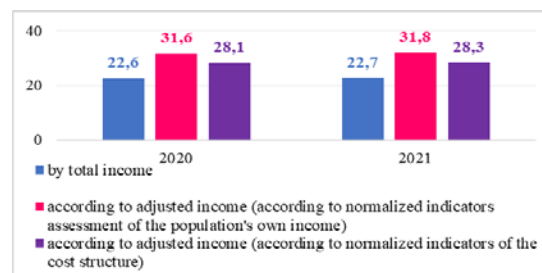
Figure 5. The ratio between the Gini coefficient for total and adjusted total income in Ukraine in 2020-2021, %
Source: own calculations.

Undoubtedly, the author`s approach to assessing the differentiation of the incomes of the population of Ukraine, taking into account their shadow component, can be subjected to a certain critical evaluation. After all, the corresponding calculations were made on the basis of indicators of sample surveys of household budgets, which are not absolutely reliable, and a number of assumptions. Despite this, the presented study should draw the attention of scientists to the need not only for an expert assessment of the distribution of shadow incomes but also for the search for methodological approaches for its quantitative justification for further assessment of the differentiation of the population' incomes. It is obvious that assessing income inequality without taking into account its shadow component does not reflect the real state of affairs in Ukraine. Ignoring this problem in the process of forming the state socio-economic policy only increases social and political instability in society.

5 Conclusion

According to the information of the State Statistics Service, there is a fairly moderate differentiation in the general income of the population in Ukraine. Moreover, inequality in the distribution of income in the national economy is significantly lower than in the states of the European Union. At the same time, according to experts, Ukraine is characterized by a high level of shadowing of the national economy, which exceeds the safe level. In such conditions, evaluating the differentiation of the population' income without taking into account shadow component does not reflect the real picture. There is no reliable information base for assessing the distribution of shadow incomes, which necessitated its substantiation. Possible criteria for characterizing the distribution of shadow incomes by deciles groups of the population of Ukraine according to the author`s approach are as follows: 1) the structure of household expenses; 2) the distribution of respondents according to self-assessment of their own standard of living. Taking into account the shadow component of incomes made it possible to calculate the so-called adjusted total incomes, the distribution of which by deciles groups of the population differs slightly from the distribution of total incomes. Finally, the author`s calculations revealed that the real inequality in the distribution of income in Ukraine is significantly higher than the statistical data show. The obtained research results, in our opinion, indicate that during the formation of the priorities of the socio-economic policy of the state, it is necessary to focus on indicators of inequality in the distribution of income, taking into account their shadow

component. Ignoring this problem will only deepen social and political instability in society.

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Primary Paper Section: A

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