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PLOTTING ENGEL CURVES FOR COMMODITIES "FOOD" AND "EDUCATION" IN THE CONTEXT OF UKRAINIAN HOUSEHOLDS' WELL-BEING EVALUATION

ABSTRACT

The article is devoted to the adaptation of Engel's curve tools for evaluating the well-being of Ukrainian households. In particular, the assessment of the welfare inequality, observed between households with the lowest equivalent per capita income and the most affluent households, as well as the main trends in the change of the consumption structure for the period 2014-2020. The research is based on the concept that overcoming the concentration of consumer spending around the purchase of food is a necessary condition for the launch of microeconomic mechanisms of socio-economic development because it allows households to actively invest in the accumulation of human capital and thus overcomes the monopoly of budget financing of social sphere industries. To assess the level of satisfaction with food needs, the Engel line "income - food consumption" was constructed and the coefficient of elasticity of food consumption from income was determined. Similar calculations were made concerning the consumption of goods created by the educational sector.

According to the results of the Engel function development, the income elasticity of the absolute amount of food consumption is equal to 0.47: an additional percentage of income encourages households to increase the amount of food consumption by 0.47%. According to our calculations, the income elasticity of educational goods consumption is equal to 0.928 (an additional percentage of real income encourages Ukrainian households to increase the amount of educational goods consumption by 0.93%). Therefore, Ukrainian households value education enough and tend to use economic opportunities (income released from priority needs satisfaction) for expanding education consumption.

Both assessments of elasticity coefficients indicate that the achieved level of meeting food needs for the vast majority of Ukrainian households does not allow them to count on the release of their funds from meeting basic current needs and the expansion of those expenses that have the character of investing in human capital and have a pronounced positive impact on the qualification level of labor resources and the productivity of their use in the national economy.

Keywords: consumer spending, consumption structure, food, education spending, Engel's law

JEL Classification: D12, H52, I31

INTRODUCTION

The population's well-being evaluation is a necessary component of the analytical support for the development of any state policy: it provides feedback and information about how the implementation of a certain policy affected the living conditions characteristics of the policy's target group, creating prerequisites for the adjustment the tools of policy implementation or principles of the policy itself. At the same time, the interpretation of the category "welfare", and even more so, approaches to the quantitative assessment of the well-being aggregate function, or individual components of well-being, remain a promising field of scientific research. How are the dynamics of consumption volumes and the level of well-being for different (by income, lifestyle, demographic features)

groups of consumers related? What structural shifts in consumption (consumer spending) of households are evidence of growth in well-being, and what are signs of stagnation or even deterioration of their economic capabilities? Within the framework of the development of analytical support for the state socio-economic policy of Ukraine, not only the "conceptual" questions of the relationship between the size and structure of households' consumer expenditures and their well-being are extremely relevant, but also more specific applied questions. Such as "how do the economic opportunities of different population groups change? Is it appropriate and possible to rank these groups according to the order (priority) of providing aid from the state budget or humanitarian organizations? How the households' consumer behavior is changing and how do these changes correlate with the tasks of social development in Ukraine? What challenges and tasks for the state policy do these changes create?

LITERATURE REVIEW

In the system of tools for modern microeconomic analysis of consumer behavior, Engel's curves are qualitatively distinguished by their focus on direct operation with statistical data [1]. Both characteristics, the connection between which is formalized by Engel's curves (physical volumes of consumption of a certain good (commodity) and consumer's incomes), are subject to a fairly meaningful and realistic assessment, despite the numerous problems associated with the heterogeneity of goods within the researched commodity groups and shortcomings of procedures for determining real income based on nominal income and the consumer price index [2]. In contrast to Engel's curves, the tools for modeling consumer behavior created later (utility functions, indifference curves, formal conditions for optimizing consumer choice through the ratio of marginal utilities, or marginal rates of substitution between goods) operate with categories that do not have a direct, measurable expression by means of statistics. For example, the toolkit of "marginal rates of substitution between goods" is used in empirical studies, but with the use of artificially calculated substitutes for those quantities that are actually used in theoretical models: neither "fixed level of general utility", nor "marginal rate of substitution of one good for another in consumption" – are not directly observed and not measured by means of statistics. Accordingly, it is the apparatus of Engel's curves that is still the leading tool for combining the conceptual provisions of consumption theory with statistical data and real measurable goals of state policy and meaningful characteristics of well-being [3].

At the same time, it is difficult to overestimate the importance of the consumer behavior patterns formulated by Engel. "Engel's law in a weak formulation" predicts that an increase in the real purchasing power of consumers is accompanied by a decrease in the specific weight of expenditures on food products. This thesis became the basis of further modeling of the food demand elasticity by income (the elasticity of demand on food is less than one and tends to "zero" with increasing incomes – [4 – 5]) and, in fact, became the theoretical embodiment of the leading microeconomic mechanism of development in the second half of the 19th century - the first third of the 20th century. Societies that manage to turn industrialization into a source of general well-being, achieve a rapid reduction in the number and share of the population suffering from a lack of food [6]. Accordingly, Engel's law becomes a microeconomic model of development: as the need for normal nutrition is met, further income growth is increasingly freed from additional food consumption and can be directed to the consumption of goods that radically improve the quality of the national economy's labor resources. The level of education and territorial mobility is increasing, the health and working capacity of both the current generation of the economically active population is improving, and to an even greater extent, thanks to the improvement of living conditions, children who are born and raised in families free from hunger and poverty.

The formal reflection of mentioned development model was the decreasing income elasticity of demand for food (increasing economic capabilities of households is accompanied by a decrease in the share of additional income allocated to food purchasing) and "Engel's Law in a strong formulation": a two-fold increase in real income leads to a decrease in the specific weight of food expenditures by ten percentage points [7–8].

Further, Engel's curves became the basis for the classification of goods according to empirical data: if the growth of consumption volumes precedes the growth of incomes (the relative growth rates of the consumption volumes are higher than the relative rates of growth of real income and the specific weight of expenditures on the good in aggregate consumer expenditures increases), then the good is classified as "luxuries".

If the consumption volume grows, but the relative rate of growth is lower than the relative rate of real income growth, then we are dealing with goods of standard quality (the specific weight of expenditures on such goods slowly decreases with the growth of income). Goods whose consumption volumes remain approximately constant with income growth (respectively, the share of expenditure on such goods decreases with income growth) are classified as essential goods. A classic example of an essential good can be food in families where the desired (normal) level of nutritional needs meeting has already been achieved. Finally, goods whose consumption volumes decrease with the growth of real consumer incomes

(both consumption volumes and the share of expenditure on such goods in the total consumer spending will decrease with income increasing) are goods of "low quality" or "undesirable goods".

Studies with a similar focus to our research [7 – 9] mainly operate with data on the specific weight of commodity groups in aggregate consumer spending, accordingly, the dynamics of the dependent variable reflect the influence of not only consumption volumes but also real income and relative prices. However, in the context of assessing well-being, indicators that depend only on the consumption volumes (real amount of consumption) of a certain commodity group provide a more meaningful description of well-being. Apart from the cases of "undesirable goods", and "goods of lower consumer quality", which consumers tend to refuse in the process of economic opportunities growth, the increase in the consumption of goods, in itself, may be interpreted as a sign of positive dynamics of household well-being. Unlike the studies of American authors, who also used statistical data from Ukraine, we use Working's function [10] as a basis for calculating elasticity coefficients, and not the "Florida RI model". This is due to the focus on the relationship "income - consumer behavior", and, accordingly, the elements of the function, reflecting own price and cross-price elasticity are excluded from the research.

In addition, we form a database for estimating the parameters of this function using aggregated value (absolute size) of consumer expenditures for certain commodity groups (consumer expenditures in base year prices), instead the data on their specific weight in total consumer expenditures. This makes it possible to abandon the logarithmization of income as a factor variable.

We describe changes in well-being through the dynamics of consumption behavior, observed for certain commodities relying not only on the specific weight of expenditures on such commodity in total spending (as in the study [9]), but we take into account the dynamics of the absolute amount of consumption, relative prices, and the real purchasing power of households, which expressed in the purchase volume of the relevant commodity, available to the consumer. This makes it possible to more accurately identify the driving forces of changes in consumer behavior and create analytical prerequisites for evaluating the impact of certain industries (participants in the production of certain group of goods) on the general level of consumers' well-being.

AIMS AND OBJECTIVES

Accordingly, our article solves two main tasks:

- to specify the relation between fluctuations in the real purchasing power of Ukrainian households, the structure of their consumer expenditures and the consumption volumes of various goods, and thus obtain a meaningful assessment of changes in the welfare of the population for the period 2014-2020, useful for determining priority tasks and challenges to income policy and policy of social protection implemented by the Ukrainian government.
- to define the impact of certain commodities (industries and types of activity) on the general dynamics of economic possibilities and purchasing power of the population, which will improve the conditions for evaluating the results of industry development programs and policies.

METHODS

The main methodological advantage of the Engel curve apparatus used in our study is that the Engel curve, in its initial form, links the size of consumer income (as a factor variable) with the absolute amounts of goods consumption, which connection with the consumer's well-being is more transparent and unambiguous than analogous connect for the specific weight of the spending on commodity, used in other widely used models for the analysis of consumer behavior (Florida PI and Florida Slutsky) [8;9;11 – 14]. Accordingly, the elasticity indicators calculated on our model provide information that directly reflects the characteristics of well-being, and not only changes in consumer preferences expressed through the income and price elasticity of indicators of the share of expenditures on certain goods in aggregate consumer expenditures. It was the desire to obtain characteristics directly related to the households' well-being that determined the choice of methods and indicators for quantitative assessment.

In particular, consumer spending on aggregated commodity groups, calculated in base (2014 year) prices, was used as the dependent variable [15]. Cumulative price indices of the corresponding commodity group relative to the base year (2014) were used to convert nominal indicators into real ones [16] as analogous to [17–19]. Thus, the differentiation of these indicators between groups of consumers with a certain size of income reflects only the changes in absolute amounts of consumption, which corresponds to the objectives of the research. We obtain an indicator that reflects the change in

the absolute amount of certain goods consumption as a function of the change in the real purchasing power of the household. Thus, the database of the dependent variable is formed from indicators of consumer spending on key product groups for households with different sizes of equivalent per capita income (the source of data was the statistical collections "Expenditures and Resources of Ukrainian Households" for 2014-2020). The choice of the retrospective period years was determined, firstly, by the availability of data (2020 is the last year for which data of the selected format is available), and secondly, by the desire to collect a sufficient number of observations to obtain statistically significant estimates of the function parameters.

The availability of data on the structure of consumer spending by groups of households with different equivalent per capita incomes made it possible to obtain 11 values of the dependent variable for each year, accordingly, a database of 77 observations was formed over a 7-year retrospective period. At the same time, such a database is characterized by a minimal probability of distortions inherent both to time series (the probability of autocorrelation of residuals is minimal because every 11 consecutively selected values of the dependent variable refer to one time period) and inherent to panel databases (qualitative differences in the system of factors, that determine the size of the dependent indicator for different units of the researched population are also reduced to a minimum, because we are considering households of one country, one culture and traditions of consumption, accordingly, we have a high probability that the leading factor, explaining the scale of consumption for each commodity group is the size of income).

This is also confirmed by the formal estimates of the model's parameters, obtained for all commodity groups – the absence of dependence of the models' residuals on the values of the explanatory variable indicates the absence of heteroskedasticity (the instability of the system of factors that determine the variation of the dependent indicator), and the values of the Durbin Watson coefficients close to "2" indicate the absence of autocorrelation function residuals.

The database of the factor indicator is formed on the basis of data on the average equivalent per capita incomes of certain groups of households in Ukraine. In particular, according to the statistical collection " Expenditures and Resources of Ukrainian Households" in 2020, 1,208,000 households (8.2% of the total number) had an average per capita equivalent total income of up to UAH 3,000. month; 2625.3 thousand (17.8%) - more than 3000 thousand and up to 4000 thousand UAH. month; 3117.8 thousand households (21.1%) - more than 4000 thousand UAH. and up to UAH 5,000. per month and so on. Per capita equivalent total income above UAH 12,000. per month had 589.5 thousand households (4.0% of their total number). The average of the upper and lower limits was taken as the quantitative value of income for each range. Cumulative consumer price indices were used to convert nominal incomes into real ones (real incomes are expressed in base prices - 2014).

The mathematical form of displaying the dependence of the physical volumes of consumption of goods on the real income of the household:

$$Q = a + b \times I + \varepsilon, \tag{1}$$

where: *a* – the free term of the function, reflects the autonomous, income-independent amount of consumption (to be estimated); *b* – coefficient near the variable "real household income"; reflects the marginal increase in the absolute amount of consumption as a result of changes in the real households' income (to be estimated); *I* - the real income of the household; ε – stochastic component of the model (deviation of the calculated value of the dependent variable from the actual value).

The function was adapted by authors from the Working function [9] by refusing algorithmically reflection of factor variable since the dependent and factor variable in our database have the same dimension.

For such a function, the first derivative (equal to the coefficient "b") characterizes the marginal change in consumption as a result of a minimal change in real income. The elasticity, calculated for a linear function by formula (2), characterizes the percentage (relative) growth in the consumption of goods of a certain commodity group in response to a one-percent increase in real income. Accordingly, it is the elasticity coefficient that should be used to classify the goods of the relevant commodity group as "necessary goods" (for them, the elasticity coefficient of such a function should be close to zero – in case where the relevant need is mainly satisfied); "goods of standard quality" (less than one); the good of "luxury" (close to one or greater than it).

The formula for calculating the coefficients of elasticity of consumption volumes from income [20]:

$$E_i = \frac{a_i \times \bar{x}}{\bar{y}} \tag{2}$$

where: E_i – coefficient of dependent variable elasticity on the explanatory one; x – is the average value of the factor variable; Y – is the average value of the dependent variable.

Since both the dependent and explanatory variables have the same dimension (monetary units), and the increase of the explanatory variable is, in fact, distributed among the increases of a group of dependents, the hypothesis that the variation of the dependent variable is proportional to the relative rather than the absolute changes of the explanatory is rejected, accordingly, we refuse the using logarithm of real income, as in the original Working function.

To determine the parameters of the function, we used the 1MLS method [20] and implemented calculations using operations with matrices [20]:

$$A = (X^*X)^{-1} (X^*Y) \quad (3)$$

where: A – is a vector of function parameters; X – matrix of values of explanatory variables; X^* – transposed matrix of values of explanatory variables; Y – matrix of values of dependent variables.

RESULTS

Expenditures on food products still dominate the structure of Ukrainian households' consumer expenditures. In 2020, on average, this product category accounted for 44.3% of household monetary expenditures. According to the three groups of households with the lowest equivalent per capita income (up to UAH 5,000 per month), the share of expenditure on food products is higher or close to 50% and ranges from 48.1% to 54.6%. These three groups of households account for 47.0% of the total number of Ukrainian households. Only three groups of households with the highest incomes (equivalent monthly incomes of more than UAH 10,000 per person) overcome the "limit" of 40% of the specific weight of expenditure on food, and such three groups account for only 8.4% of the total number of households.

The nominal weighted average incomes of the three groups of households with the highest per capita equivalent incomes (above UAH 10,000 per place) are 2.8 times higher than the similar indicator of the three groups of households with the lowest per capita incomes (less than UAH 5,000 per month). So, according to Engel's law "in the strong formulation", it is expected that the share of expenditure on food for the three most affluent groups of households will be approximately 14 percentage points lower than the three poorest. In fact, in 2020, the weighted average share of expenditure on food for the poorest households was 50.5%, and for the three wealthiest groups – 33.7% of total monetary expenditure. Accordingly, the manifestation of Engel's law in the consumer behavior of Ukrainian households even slightly exceeds the expected: a two-fold increase in income reduces the share of food expenses by more than 10 percentage points. Given that Engel's laws were formulated in his 1857 article [1], the strengthening of the tendency to consumer spending diversification with the growth of economic opportunities of households looks quite reliable.

However, such differentiation is observed only concerning households with different incomes: in dynamics by year, the period 2014-2020 is characterized by variable fluctuations in the size of real incomes, and on average for all households, real incomes in 2020 were only 9.6% higher than incomes 2014 – an average annual growth rate of only 1.4%. Accordingly, within each group of households, separated by average per capita income, no noticeable reduction in the share of expenditure on food products was recorded. In particular, the average share of expenditure on food in the total monetary expenditure of households in 2014 for all households. was 47.8% (by 2020 it decreased by only 3.5 percentage points, to 44.3%). That indicator for three of the poorest group of households – in 2014 was equal to 57.4%, and in 2020 – 50.5%, a reduction of 7.2 percentage points, which is quite a good indicator, if we do not take into account that in the same period the share of expenses for the payment of communal services (housing, water, electricity, gas and other types of fuel), on average for all households, increased from 9.9% in 2014 to 15.2% in 2020. Concerning the three least affluent groups of households, this increase was from 10.7% to 16.7%, that is, all the resources released due to the decrease in the share of food expenditure were absorbed by the growth of costs for the payment of communal services – another category of spending that has nothing in common with the development of human capital.

The results of estimating the model parameters for the commodity "food" according to the data of all groups of households are shown in Table 1.

The coefficient of elasticity for the given linear function is equal to 0.473 (for a 1% change in real income, there is a 0.47% change in the amount of food consumption).

We would like to emphasize that the presented indicator reflects the elasticity of physical volumes of food consumption and shows the propensity of Ukrainian consumers to buy significantly more food in response to the growth of their economic capabilities. This means that even this basic need is not met by the majority of the population.

Table 1. The analytical form of the Engel curve for food, based on the data for all households in Ukraine.

Indicators	Commodity "food"
The share in monetary spending of households, 2014 / 2020, %	47.8 / 44.3
The coefficient "a"	898.64
Standard error	30.75
t statistics for coefficient «a»	0.034
Coefficient «b»	0.18
Standard error	0.01
t statistics for coefficient «b»	0.034
Determination coefficient	0.93
Fisher's criteria	843.94 (bigger than the table value)

A graphic displaying of the Engel curve for food is shown in Figure 1.

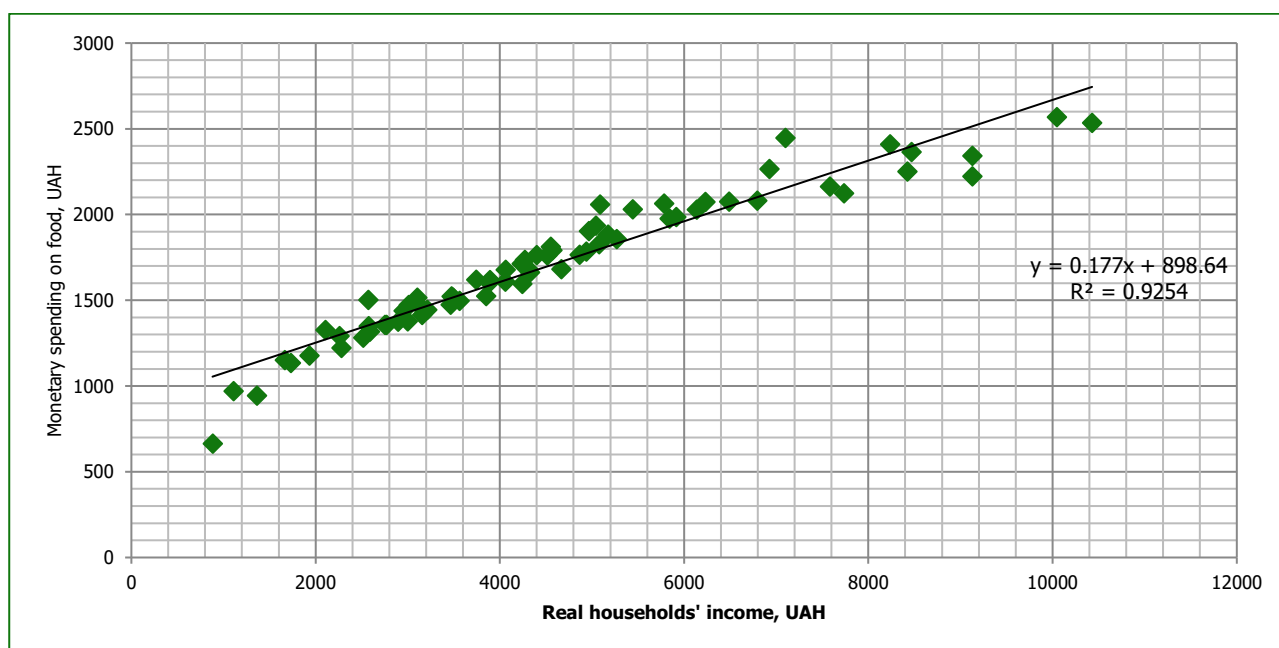


Figure 1. A linear function of the absolute size of food costs dependence on real household income (both indicators in 2014 prices).

Education spending as of 2020 on average, for all households in Ukraine, did not even reach one percent of monetary expenses (equal to 0.94%). For three groups of households with the lowest equivalent per capita incomes (up to UAH 5,000 per month), the share of education expenses does not reach the level of 1% of total monetary expenses and ranges from 0.51% (in the poorest households) to 0.95% by a group of households with average per capita equivalent income above UAH 4,000 per month and below UAH 5,000 per month. Even the three groups of the wealthiest Ukrainian households spend a tiny share of their consumer spending on education: 1.0%, 1.96%, and 1.41%, in order of increasing per capita equivalent income.

The differentiation of educational goods consumption between households with different levels of income is quite clear: in basic (2014) prices, the poorest households spent in 2020 for education UAH 12.6 per month, and the wealthiest – UAH 132.1. The obtained difference is more than 10 times, and it is much more than the differentiation of incomes between these groups, which allows us to expect a high-income elasticity of consumption of the goods, produced by the educational sector. However, the dynamics of education consumption observed for 2014-2020 do not look positive. If in 2014, the

average expenditure for the purchase of educational goods for all households was equal to UAH 45.86 per month, then in 2020 (in 2014 prices) they were only UAH 41.86 per month. The poorest households saw an increase in consumption amounts (expenditures expressed in base-year prices) from UAH 8.81 per month up to UAH 12.64, and for the wealthiest - from UAH 72.17 to UAH 132.13 per month.

The higher rate of growth in the consumption of educational goods by wealthier households compared to poorer households indicates the growing inequality of access to education and a whole list of risks generated by such inequality. These are the risks of hereditary poverty and marginalization, and the risks of turning budgetary funding (free access) education into a "service industry for the poor" due to the concentration of higher quality education in the commercial segment. The problems created by this growing inequality of access to education deserve more detailed research in future publications.

The results of estimating the parameters of the model for the commodity "education" based on the data of all groups of households are shown in Table 2.

Indicators	Education
The share in monetary spending of households, 2014 / 2020, %	1.24% / 0.94%
The coefficient "a"	3.39
Standard error	3.48
t statistics for coefficient «a»	1.02
Coefficient «b»	0.01
Standard error	0.0007
t statistics for coefficient «b»	0.07
Determination coefficient	0.73
Fisher's criteria	198.07 (bigger than the table value)

A graphic displaying of the Engel curve for commodity "education" is shown in Figure 2.

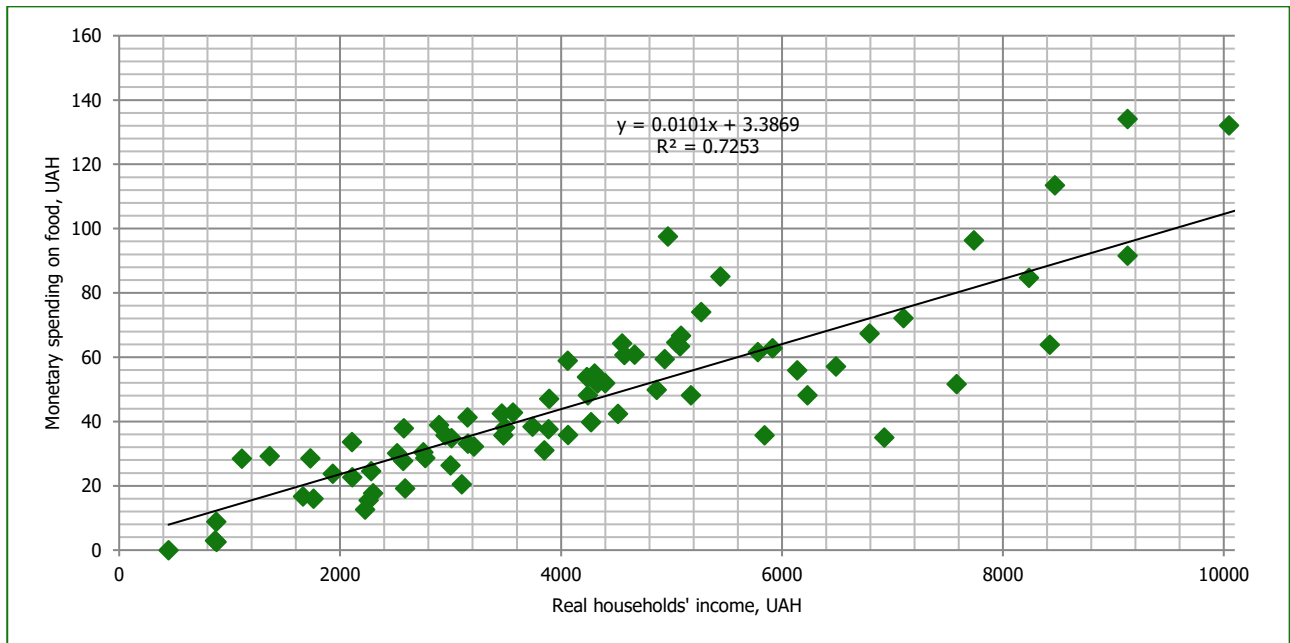


Figure 2. A linear function of the absolute size of education costs dependence on real household income (both indicators in 2014 prices).

The coefficient of elasticity for the given linear function is equal to 0.928 (1% change in real income causes for 0.93% of the change in the amount of consumption of goods, produced by the educational sector).

DISCUSSION

The recorded reduction in the share of food expenditures did not allow to remove the poorest households from a situation whose main characteristics are high vulnerability (such a structure of spending makes savings impossible and makes it extremely problematic to finance any unforeseen expenses) and critically limited opportunities to make expenditures that are of the nature of investments and contribute to the improvement of human capital. After all, when more than half of the monthly income is spent on food, the opportunities to invest in education, health services, recreation and culture are extremely limited.

Thus, the qualitative, meaningful basis of the formal analysis using Engel curves is that we expect a fairly high elasticity of food consumption amount on income: a high share of relevant spending in total household spending indicates that this group of needs is far from being satisfied and significant part of the population will be forced to spend the increment of income on improving the quality of food, limiting the satisfaction of other needs.

In fact, the solution to this problem, the stabilization of amounts of food consumption, which should be expressed in a significant decrease in the income elasticity of food consumption [21–23], is not observed for the majority of Ukrainian households. But such achievement is a necessary condition for the formation of economic prerequisites for development, the driving force of which is the households' investment in human capital. In our opinion, all the previous experience of Ukraine shows that attempts to replace the role of households in investing in human capital, relying on the expansion of state funding, have not been successful. The problems of low efficiency of such investments and the limitation of their resource base do not allow relying on such investment in human capital as the key to increasing economic efficiency.

A long-term retrospective of the state of solving the problem of releasing funds from the purchase of food can be obtained if we compare the estimates of the income elasticity of demand for food calculated in our research with the estimates obtained in the article [9]. Its authors, based on a cross countries panel data, covered by the 1996 ICP report, determined the income elasticity coefficients for the main groups of goods, in particular for Ukraine. The difference between the coefficients calculated in the mentioned article and ours is that they reveal the income elasticity of the share of expenditure on food. However, it is not difficult to recalculate the indicators calculated in our research to the type compared with those given in the article [9]: the change in absolute amount differs from the change in the share of costs due to two indices. First, the index of the relative price of the corresponding commodity (the larger it is, the more the index of the cost share exceeds the index of absolute amounts, *ceteris paribus*). Secondly, the index of the total size of consumer expenditures (the larger it is, the smaller the change in the share of expenditures will be compared with the change in the absolute amount of consumption).

Accordingly, the difference between the change in the amount of consumption and the change in the share of costs on a certain good is determined, in fact, by the index of real purchasing power (change in the number of goods of a certain group available to the recipient of a certain income). With regard to food for the retrospective period, such an index can be defined as the cumulative index of real income (1.187 for the period 2014-2020) divided by the cumulative index of the relative price of the commodity group "food products" (0.941 for the period 2014-2020). Accordingly, the food availability index for the average Ukrainian household is 1.261, that is, the amount of food available to the average household increased in 2020 by 26.1%, compared to 2014. Thus, multiplying the elasticity coefficient obtained in our research by the food availability index (0.473×1.261), we get the elasticity coefficient for the share of food spending: 0.597.

This size is somewhat lower than the one obtained in the article [9] according to the data of 1996 – 0.66. Therefore, the propensity of Ukrainian households to use additional income to increase food consumption has decreased somewhat, compared to the 90-s of the last century, but not significantly. For an almost 30-year period, the change is insignificant and shows that even the basic problem – the problem of freeing household funds from meeting current needs to direct them to spend that have the nature of investments and activate the mechanisms of development and growth of economic efficiency – has not been solved.

The calculated value of the income elasticity coefficient for commodity "education" allows to classify education as a "luxury good" for Ukrainian households, despite the fact that, formally, with such an elasticity coefficient, the relative growth rates of absolute amounts of consumption lag behind the relative growth rates of incomes. Following the procedure described for the commodity group "food", we can recalculate the elasticity coefficient of education into a form, that reflects the change in the share of education expenditure as a result of changes in real income. The index of the availability of education goods for the period 2014-2020 is 1.18 (due to the growth of real income and the cheapening of education in the system of relative prices, the average household in 2020 has access to 18% more education benefits than in 2014). Accordingly, the elasticity coefficient for the share of expenditure on education according to our model will be equal to 1.097, that is, almost 1.1. It is significant that exactly such a result (1.1) was obtained in the article [9], and this is evidence of the

similarity of the methodological approaches used in our article and in the work of American authors. However, in combination with the revealed stagnation of the consumption of education benefits and the threatening trend of growing inequality of access to education, this also indicates extremely unfavorable conditions for expanding the participation of households in financing investments in human capital. The insufficiency of the current share of spending on education and the stagnation of the total income of households (we cited the average annual growth rate of real purchasing power of only about 1.4%) do not allow the majority of households to significantly improve their human capital reserves, respectively, to form the prerequisites for the growth of the profitability of their labor.

During the period 2014-2020, the scale of consumption of goods created by the education industry decreased on average across all Ukrainian households. If in 2014 the average amount of education spending for all households was UAH 45.9 per month, then in 2020 (in 2014 prices) – 41.9 UAH per month (8.7% reduction). Such stagnation of the educational services consumption is observed against the background of the cheapening of education in the system of relative prices: in 2020 on average, educational products were 4.8% cheaper compared to 2014 (note, we are talking about relative prices, so the above means that education services rose in price by 4.8% slower than the average consumer price index). The expected (theoretically justified) consumers' reaction to a relative decrease in the price of a good, which, according to the experience of all developed countries, is classified as a "luxury good" – a significant expansion of consumption. After all, the income elasticity of the share of education spending for Korea, France, Japan, and the USA fluctuates around 1.1 – that is, the growth rates of education spending exceed the growth rates of real consumer income [9].

In Ukraine, the reaction of consumers is fundamentally different; there is a stagnation of education consumption volumes. This is a sign of either the critical ineffectiveness of mechanisms for paying back investments in education in Ukraine, or the critical lack of resources of households that are "locked" in the trap of insufficient current income to meet current basic needs.

CONCLUSIONS

During 2014 - 2020, the parameters of food consumption contributed to the growth of the average level of Ukrainian households' well-being. Food became cheaper in this period in the system of relative prices by 5.9%, which, together with the growth of the real purchasing power of the average income (by 18.7%), led to an increase in the amount of food available to households by 26.1%. However, the achieved increase in the availability of food did not ensure a qualitative change in the consumer priorities of the majority of Ukrainian households: the propensity to spend additional income on expanding food consumption remains relatively high. The main reason for such a situation was the fact that the volume of food consumption increased in 2020 compared to 2014 by only 3.4%, and the majority of the released potential created by the growth of incomes and the decrease in the price of food was "absorbed" by the rise in prices for utility services – the share of spending for this commodity increased during 2014 – 2020 from 9.8% to 15.2% of total households' consumer spending.

According to the results of the Engel function development, the income elasticity of the absolute amount of food consumption was estimated: an additional percentage of income encourages households to increase the amount of food consumption by 0.47%. The recalculation of the given indicators to the size of the share of food costs in the total consumer expenditures of households allows us to obtain an estimate suitable for comparison with the work of American authors who estimated the income elasticity of demand for food products for Ukraine. According to our model, a 1% increase in income prompts the Ukrainian household to increase spending on food products by almost 0.6%, according to the results of the mentioned article, by 0.66%. Both assessments indicate that the achieved level of meeting food needs for the vast majority of Ukrainian households does not allow them to count on the release of their funds from meeting basic current needs and the expansion of those expenses that have the character of investing in human capital and have a pronounced positive impact on the qualification level of labor resources and the productivity of their use in the national economy.

For comparison, even according to the data of 1996 the income elasticity of food expenditure for France was equal to 0.32 (almost two times lower than modern Ukraine), for Japan – 0.28 (more than two times lower), for the USA – 0.08. The above estimates show how the forced concentration of household expenditures on meeting current basic needs, caused by a catastrophic lack of solvency, blocks the source of the most effective investments in the accumulation of human capital – households' investment.

The results of the estimation of the income elasticity of education consumption show that the main reason for the underfunding of education on the part of households is precisely the lack of solvency. According to our calculations, the income elasticity of educational goods consumption is equal to 0.928 (an additional percentage of real income encourages Ukrainian households to increase the amount of educational goods consumption by 0.93%). Therefore, Ukrainian households

value education enough and tend to use the opportunities it provides. After recalculating the elasticity coefficient to the size of the share of education expenses, we obtained a value of 0.97, i.e., the propensity of Ukrainian households to expand education expenses as incomes grow is not much lower than similar indicators of developing countries. However, the low incomes of the vast majority of households limit the ability to allocate a significant portion of their consumer spending to education. Such a situation is extremely threatening, both because of the deprivation of a major part of the population of the opportunity to improve their own position in the labor market by investing in education and because of the deprivation of public education from normal competitive interaction with paid education provided on a commercial basis.

Another threatening trend we discovered in the process of analyzing the relationship "income - education spending" for Ukrainian households is a large inequality of access to education. In particular, in 2020 expenditure on education of four percent of households that had an average per capita equivalent income of more than UAH 12,000 per month, exceeded the similar expenses of 8.1% of households with equivalent income of less than UAH 3,000 more than 10 times. At the same time, the propensity of poorer households to expand consumption of education as incomes grow is not less but even higher than that of wealthier households. The above once again confirms that it is the lack of solvency of the vast majority of Ukrainian households that acts as the main limitation to intensifying investment in the development of the human capital of the Ukrainian population.

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ПОБУДОВА КРИВИХ ЕНГЕЛЯ ДЛЯ ТОВАРНИХ ГРУП «ПРОДУКТИ ХАРЧУВАННЯ» ТА «ОСВІТА» В КОНТЕКСТІ ОЦІНКИ ДОБРОБУТУ УКРАЇНСЬКИХ ДОМОГОСПОДАРСТВ

Стаття присвячена адаптації інструментарію кривих Енгеля для оцінювання добробуту українських домогосподарств. Зокрема оцінці нерівності добробуту домогосподарств із найнижчими еквівалентними душевими доходами та найбільш заможних домогосподарств, а також основним тенденціям у зміні структури споживання за період 2014–2020 рр. Дослідження ґрунтується на концепції, що подолання концентрації споживчих видатків навколо придбання продуктів харчування виступає необхідною умовою запуску мікроекономічних механізмів соціально-економічного розвитку, бо дозволяє домогосподарствам активно інвестувати в накопичення людського капіталу й таким чином долає монополію бюджетного фінансування галузей соціальної сфери. Для оцінки міри задоволення потреб у харчових продуктах була побудована лінія Енгеля «дохід – споживання харчових продуктів» та визначено коефіцієнт еластичності споживання продуктів харчування від доходу. Аналогічні розрахунки виконані стосовно споживання благ, створюваних освітньою галуззю. За результатами розрахунків еластичність за доходом споживання продуктів харчування дорівнює 0,47: додатковий відсоток доходу спонукає домогосподарства збільшити обсяг споживання їжі на 0,47 %. Результати оцінки еластичності споживання благ товарної групи «освіта» за доходом показують, що основною причиною недофінансування освіти з боку домогосподарств є саме недостатня платоспроможність. За нашими розрахунками, еластичність споживання благ групи «освіта» за доходом дорівнює 0,928 (додатковий відсоток реального доходу спонукає українські домогосподарства збільшити обсяг споживання освітніх товарів на 0,93 %). Таким чином, українські домогосподарства цінують можливості, зумовлені споживанням освітніх послуг, та схильні використовувати економічні можливості (доходи, вивільнені від задоволення першочергових потреб) на розширення споживання благ товарної групи «освіта».

Обидві оцінки коефіцієнтів еластичності свідчать про те, що досягнутий рівень забезпечення продовольчих потреб переважної більшості домогосподарств України не дозволяє розраховувати на вивільнення достатніх обсягів коштів для розширення тих витрат, які мають характер інвестування в людський капітал і виразно позитивно впливають на кваліфікаційний рівень трудових ресурсів і продуктивність їх використання в національній економіці.

Ключові слова: споживчі видатки, структура споживання, продукти харчування, видатки на освіту, закон Енгеля

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