

Financial and economic conditions of rural development in Ukraine

Dmytro DEMA*, Iryna ABRAMOVA**, Larysa NEDILSKA***

Abstract

The article contains a substantiation of the financial and economic conditions of rural development in Ukraine. An analysis of the research of domestic and foreign scientists on the issues of rural development is carried out. It is established that rural development is an integrated combination of agricultural production with other types of activities in rural areas, which together form the economic basis of a qualitative living environment, social and cultural growth, and ecological safety for rural residents. The experience of rural development in the member countries of the EU is studied based on the official data from the European Commission. An investigation of the current state of budget financing of agriculture in Ukraine, showing significant gaps in this direction, determined by the lack of a consistent and complex budget support of farmers, partial financing, approved programs, not full or inappropriate use of budget funds was carried out. The analysis of the main financial and economic indicators of rural development in Ukraine showed that rural areas and rural population have significant problems, which are primarily connected to the lack of workplaces, decent wages, proper social and domestic infrastructure and normal living conditions in rural areas, etc. The evaluation of financial and economic conditions of rural development is carried out using the methods of correlation-regression analysis based on the data of the Office for National Statistics of Ukraine (2018) and Ministry of Finance of Ukraine. The state of budgetary financing of rural development is analysed. Priorities for rural development in Ukraine are identified. Tools for ensuring the financial provision or rural development are suggested; these tools are able to influence the growth of local economy and financial self-sufficiency of rural communities, the increase of the level and quality of life in rural areas, maintenance of ecological balance, preservation and improvement of local territories.

Keywords: rural development, rural areas, financial and economic conditions, financial provision, budgetary financing

*Dmytro DEMA is professor at Zhytomyr National Agroecological University, Zhytomyr, Ukraine; e-mail: dmitrodema@gmail.com

**Iryna ABRAMOVA is associate professor at Zhytomyr National Agroecological University, Zhytomyr, Ukraine; e-mail: irina79abramova@gmail.com.

***Larysa NEDILSKA is associate professor at Zhytomyr National Agroecological University, Zhytomyr, Ukraine; e-mail: lorka_nedelskaya@ukr.net.

Introduction

Despite the significant share of rural residents (approximately 31% of the total population), the level of rural development in Ukraine remains rather low. While agricultural production is increasing, rural areas and communities are in a particularly neglected state. The income level per capita in Ukraine is the lowest in Europe. Infrastructure development of rural settlements is almost non-existent. The Lack of workplaces, of a respectable salary, proper medical, cultural, and social services influences the migration of rural residents to cities or towards finding a job in richer countries.

The solution of the identified problems depends on many factors: well-considered state policy of rural development, implementation of government programmes by local authorities, the desire and perseverance of rural population on the way towards improving their own living conditions, etc. However, regardless of any measures that will be taken into account, apparently, it is impossible to implement them without sufficient financial provision. The necessity to improve financial and economic conditions of rural development indicates the relevance of the chosen topic for the research.

The purpose of the research is to analyse financial and economic conditions and to develop practical guidance on advanced rural development in Ukraine. The study is aimed at improving the financial and economic conditions of rural development through stimulating the local economy and the financial self-sufficiency of rural communities, thus increasing the level and quality of life in rural areas, the preservation and improvement of local territories.

The analysis of the issues raised in the research was carried out according to the general-methodological scheme of a *system approach*. *The analogy method* was the basis for studying the foreign experience of the financial provision of rural development and its adjustment to Ukrainian realia. *Statistical-economic and calculation-constructive methods* were used to analyse the financial and economic conditions of rural development in Ukraine. The *monographic method and the method of economic experiment* allowed us to verify the efficiency of the suggested financial and economic tools of rural development with specific references. *The method of economic-mathematic modelling* (based on the application software package EViews) provided an opportunity to evaluate the financial and economic conditions of rural development. *The abstract-logical method* helped to draft proposals regarding the improvement of the financial and economic conditions of rural development.

1. Literature review

The problems of rural development are the subject of research for a number of foreign (Mickiewicz and Mickiewicz, 2016; Van de Poele, 2015; Pelucha *et al.*, 2017; Maharjan, 2017; Andersson *et al.*, 2015) and Ukrainian (Borodina, 2015; Lupenko, 2015; Storonianska, 2014; Tanklevska, 2013) scientists. Ukrainian researchers substantiated the prospects of the policy of rural development based on communities (Borodina *et al.*, 2015; Lupenko, 2015); the sources for financing local social and economic development were defined (Concept of participatory management of financial resources in communities, Petrushenko, 2014); extra-budgetary sources for financing rural development were identified (Storonianska, 2014); key elements of the financial policy of rural development were established (Tanklevska, 2013).

World practice has accumulated considerable experience in implementing financial tools for ensuring sustainable rural development. The research (Mickiewicz and Mickiewicz, 2016) highlighted the peculiarities of the financial policy of the EU member states, which is aimed at diminishing differences in their levels of development, as well as at increasing the competitive ability of the regions and employment of the local population. L. Van de Poele (2015) substantiates the importance of projects for stimulating rural economic growth (“Leader’s Initiative”), while M. Pelucha, V. Kveton and K. Safr analyze the most important tools for financing rural development in the EU member states. A number of scientific publications of foreign scientists are devoted to the study of the problems caused by decentralization in rural areas in Indonesia (Maharjan, 2017), Brazil, Chile, Mexico and Peru (Andersson *et al.*, 2015), etc.

Borodina *et al.* (2015) made a significant contribution to the formation of the national paradigm of agricultural and rural development. Scientists believe that agricultural growth, agricultural development and rural development are related, but that they are essentially different concepts.

“Agricultural growth is an increase in production volumes and income from agricultural activity, regardless of the further forms of its distribution and ways of application; at the same time, agricultural development is a kind of an increase in agricultural production when benefits from it are more or less evenly distributed among all participants of the process, while increase of productivity is carried out in a way that is safe for the environment” (Borodina *et al.*, 2015, p. 9).

Domestic experts point out that rural development is based on agricultural development, which is accompanied by the creation of new workplaces in the non-agricultural sector and provides employment of workers released from agricultural production owing to the technical and technological progress of the agrarian sector. In addition, rural development involves engaging rural communities in the growth

of a diversified local economy, improving the level and quality of life in rural areas, maintaining ecological balance, preserving and improving local landscapes. According to the experts, “rural development is a process in which harmonious social and economic progress of rural areas is ensured on the basis of the self-organization of rural communities with the maximum possible use of factors of endogenous development (local assets) when combined with external opportunities” (Borodina *et al.*, 2015, p. 9).

Yu. Hubeni defines rural development as “a specific way of realizing social and economic relations, in which the goods produced by the agrarian sector and rural economy are distributed among the subjects of these relations taking into account the interests of the rural population in order to ensure their prosperity” (Hubeni, 2013, p. 18). Hence, the financial provision of rural development should be carried out at the expense of the income generated by the rural economy within rural areas, and the process of rural development will be conditioned by their volumes. The attraction of external sources for financing rural development is important, however, the internal potential of the rural economy should be a priority.

In his research on the financial provision of rural development (Bydyk, 2013), A. Bydyk emphasizes the necessity of using centralized and decentralized funds.

“The financial provision of rural development is an activity on the formation, distribution and use of centralized and decentralized funds in the context of the nationwide and regional strategic priorities in order to finance the continuity of reproduction processes, solve the problems and satisfy the interests of a well-balanced development of rural areas, business entities that are engaged in both agricultural and non-agricultural activity and function within these territories, increase the welfare and quality of life of the population living in these territories” (Bydyk, 2013, p. 160).

I. Chukhno (2015) indicates that the situation with the formation of budget replenishment emerged in Ukraine was bound to affect the volumes of financing the issues of social and economic development of rural areas and became the reason why considerable imbalance along with the lack of reasonableness and consistency occurred in financing the complex of measures aimed at the stabilization of the situation and development of rural areas. The scientist argues that when one improves the financial and economic component in the mechanism of state management of the development of rural areas, it is necessary to take into account the need to revise the organization of the movement of budget funds that will be allocated for the development of rural areas on the principles of transparency, consistency, integrity, subsidiarity and responsibility (Chukhno, 2015, p. 43). That is, the scientist is inclined to an opinion that the internal economic potential of rural territories is without doubt key to the formation of the system of financial provision of rural development, however, external sources, including financial resources from centralized monetary funds, are the locomotive capable of accelerating this process.

T.A. Kravchenko (2015) believes that rural development should be carried out with the help of rural communities, and the tools of such development can be grouped into political and legal, social and economic, and social and cultural blocks. The scientist observes that the political and legal block provides a legitimate basis for the subjectivity of a rural community; the social and economic one creates the material basis of the life activity of a rural community; meanwhile the social and cultural block forms the ideological and value basis of the functioning of a rural community as a social community (Kravchenko, 2015). Each of the components is determined by various factors, the analysis of which makes it possible to distinguish the necessary approaches for the creation and implementation of public policies for the development of rural areas with the help of rural communities under specific political, social, economic and cultural conditions. At the same time, the presence of a significant number of problems related to rural development in Ukraine indicates the need for a more in-depth study of this issue, taking into account global experience.

Examining the experience of rural development in the EU member states, V.I. Koliesnikov (2014) established that there are several parallel concepts (approaches) for the development of rural areas at the national and regional levels of the European Union:

- The first concept identifies rural development with the general modernization of agriculture and agri-food complex (Koliesnikov, 2014). This concept is based on the sectoral model of agricultural development. Rural territories are used as a mere supplier of raw materials for agricultural production. Social and cultural needs of rural population are ignored;
- The second concept associates rural development solely with diminishing differences between the most backward rural regions and the other sectors of economy (concept of approaching, redistributing model) (Koliesnikov, 2014). Such a model is focused on levelling both economic and social and cultural differences between regions through the state's encouragement of their development. Both direct and indirect levers of state influence are used with this purpose, namely recovery of expenses related to producing agricultural products, equipment, encouraging the development of processing sectors, diversifying production, developing green tourism in these regions, etc.;
- The third concept determines rural development as the development of rural regions in general by means of using all resources available on their territories (human, physical, natural, landscape and others) and of integrating all components and sectors at the local level (Koliesnikov, 2014).

The analysis of the research of foreign and domestic scientists suggests that rural development is basically an organic combination of agricultural production with other types of activities in rural areas, which together form the economic basis of a quality living environment, social and cultural growth and ecological safety of rural inhabitants. The aforementioned research laid a strong theoretical and

methodological basis for understanding the essence of rural development. At the same time, the financial and economic conditions of rural development in Ukraine remain insufficiently investigated, which indicates the need for a separate study in this direction.

2. Research

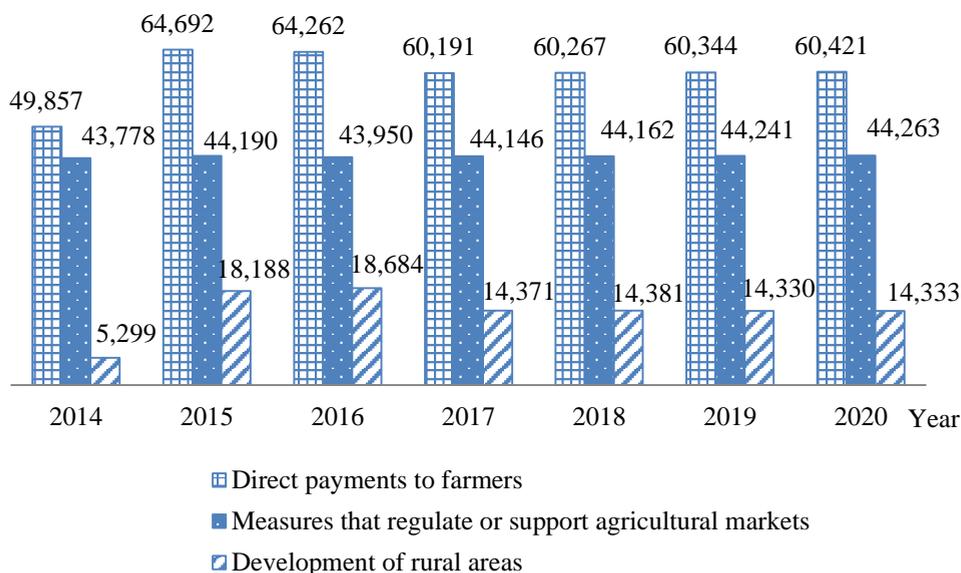
2.1. Foreign experience of the state support of rural development in the EU member states

Practice of rural development in the EU member states indicates that its financial provision is accomplished mainly by budget funds based on the program approach. There are currently 118 programs in the EU aimed at increasing the competitive ability of the agricultural sector, improving living conditions in rural areas, as well as strengthening the economic and social infrastructure of rural communities. In the course of implementation of the programs, it is expected that new workplaces will be created in rural areas, employees will be taught innovative approaches of running agri-business, foreign experience of farming will be investigated, farms will be modernized, young farmers will get support, management of land resources will be well-balanced, rural infrastructure will be improved, etc.

Agricultural expenditures are financed by two funds that are a part of the Common Budget of the EU: the European Agricultural Guarantee Fund (EAGF) and the European Agricultural Fund for Rural Development (EAFRD). The EAGF mainly finances direct payments to farmers and measures that regulate or support agricultural markets, while the EAFRD covers the share of the EU in rural development programs. For the implementation of the agricultural support programs for the period 2014-2020, the European Agricultural Guarantee Fund (EAGF) is expected to provide funding of EUR 27 billion along with EUR 99.6 billion provided by the European Agricultural Fund for Rural Development (EAFRD).

In general, expenditures on the implementation of the Common Agricultural Policy are set out in the Financial Program 2014-2020 under the item “Sustainable growth: natural resources”. It includes expenditure on direct payments to farmers, measures that regulate or support agricultural markets and the development of rural areas. The financing of these groups of costs is charged to the European Agricultural Guarantee Fund (Figure 1).

Figure 1. Expenditures of the European Agricultural Guarantee Fund in 2014-2016 (EUR mln.)



Source: European Commission (2017).

Direct payments to farmers are provided in the form of basic support for their income, regardless of the type and volume of products produced. The main purpose of these payments is to stabilize the incomes of farmers who are constantly exposed to the volatility of food markets. According to the Financial Program, the EU will provide annual direct payments to farmers in the amount of EUR 60 billion during 2015-2020.

Measures that regulate or support agricultural markets (in the range of EUR 44 billion annually) are targeted at leveling the volatility of food markets through the purchase of agricultural products, the partial storage of raw materials, or through other means. According to the policy of rural development for 2014-2020, the European Union will invest more than EUR 95 billion in member states in order to improve the agricultural competitive ability, to ensure efficient management of natural resources, to combat climate change, and to provide balanced rural development, which includes supporting employment in rural areas.

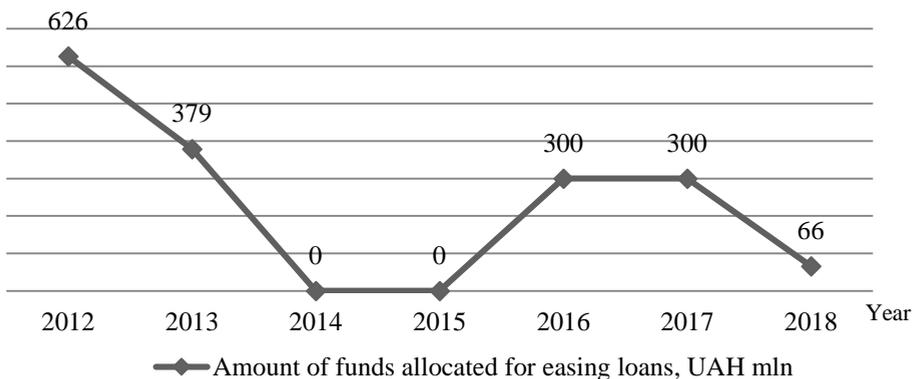
Consequently, the EU budget policy is a powerful tool for influencing the social and economic spheres of life of member states; this policy includes two components: the European budget policy and the total of national budgetary policies of the European Union. Given the structure of budget expenditures, it is obvious that the European community pays special attention to financing innovation and research,

the development of economic and social projects, as well as sustainable development of agriculture and rural areas.

2.2. Budget financing of rural development in Ukraine

The investigation of the current state of budget financing of agriculture shows significant gaps in this direction, determined by the lack of a consistent and complex budget support of farmers, partial financing, approved programs, incomplete or inappropriate use of budget funds, etc. Thus, during 2014-2015, the allocation of funds from the State Budget for easing loans to farmers was not implemented at all (Fig. 2). At the same time, in 2017, the Ministry of Agrarian Policy directed only UAH 294.9 million of budget funds to regions through the State Treasury Service (out of UAH 300 million planned payment orders). The balance of unused financial resources amounted to UAH 5.1 million. In 2018, the allocation of UAH 66 million for these measures, which is 2.2 times less than in the previous period, is planned.

Figure 2. State financial support of agricultural production through the mechanism of easing of loans (UAH mln)



Source: Ministry of Agrarian Policy and Food of Ukraine (2018).

In recent years, state support for the agrarian sector has undergone some changes. Up to 2017, it was characterized by small amounts of direct budget financing of agricultural activities and a preferential VAT regime for agricultural producers (which was quite significant in terms of preferential terms). However, from January 1, 2017, a decision was made to abolish this provision (special payment of VAT) and to increase the volume of financial support for agricultural production, in particular those industries that will be able to provide a lasting economic effect. The structure of budget expenditures for financing activities in agriculture in 2018 is presented in Table 1.

Table 1. Distribution of expenditures from the state budget of Ukraine in 2018, UAH ths

Name of expenditures according to departmental and program classification	General fund	Special fund	Total
Financial support of measures by easing of loans	66 000.0	0.0	66 000.0
Research, applied scientific and technical developments in the field of development of agri-business	77 561.5	55 083.9	132 644.9
Financial support of measures in agri-business	0.0	5 000.0	5 000.0
State support for the development of hop cultivation, planting young gardens, vineyards and berry fields as well as looking after them	300 000.0	0.0	300 000.0
State support for the livestock sector	4 000 000.0	0.0	4 000 000.0
Financial support for agricultural commodity producers	945 000.0	0.0	945 000.0
Financial support for farm enterprises	1 000 000.0	0.0	1 000 000.0

Source: Office for National Statistics of Ukraine (2018).

The distribution of budget expenditures shows that the funds are meant to be allocated for the following measures:

- 25% compensation of the cost of purchasing new agricultural machinery and equipment produced in Ukraine;
- 80% reduction of price for planting material in horticulture and berry growing;
- 100% compensation of the value of purchased Ukrainian seeds for small and medium-sized farm enterprises, as well as 90% of the cost of advisory services. This category of agricultural commodity producers also gets access to a cheap credit resource; they also get additional preference when buying agricultural machinery, i.e. 40% of its cost is compensated;
- in the framework of supporting and developing agricultural servicing cooperatives, the state will co-finance projects implemented by the agricultural servicing cooperatives in the livestock sector, horticulture, building storehouses for fruit and vegetable, covering 70% of expenses on purchasing new equipment for these purposes.

As a result of the implementation of state support programs, the Government aims to strengthen the role of farm enterprises and agricultural service cooperatives in the agrarian sector of the economy of the country and to increase the share of farm enterprises in agricultural GDP from the current 6% to at least 10%. At the same time, the lack of transparency in the process of obtaining and using funds, the low level of interconnection of state bodies with farmers, end users of financial resources,

insufficient control over the use of budget funds, etc. can be obstacles to government initiatives. However, it should be taken into consideration that budgetary opportunities, even with a certain increase in the volume of financial provision of agriculture, remain limited. Therefore, the question of finding additional or alternative sources for financing the needs of farmers remains relevant.

At the moment, scientists emphasize the need for partnership between the state and business in solving not only economic but also social and environmental problems in rural areas. The priority areas of public-private partnership are the creation, maintenance and use of objects of engineering and transport infrastructure objects.

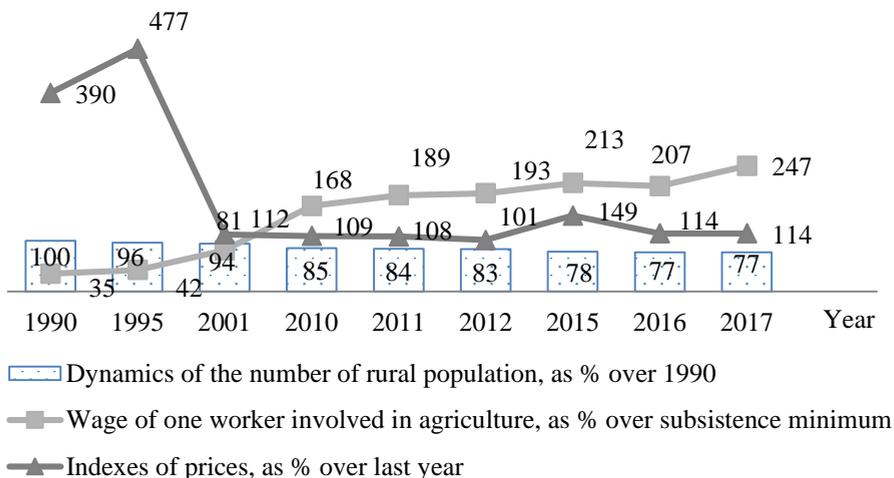
“Unlike traditional methods, public-private partnerships involve allocation of responsibility, reward and risks between the public (state) and private sectors. In many countries, the growing role of public-private partnership is determined by the fact that local authorities, as a rule, have limited budgets for service extension, infrastructure upgrade or providing subsidies to state enterprises. The income basis of local budgets is often insufficient for financing capital and operating infrastructure expenditures. The most common forms of cooperation between the authorities and the local sector are making contracts of services and management, co-financing of projects and registration of co-ownership, implementation of mechanisms “construction-exploitation-handover”, informal and voluntary cooperation, as well as passive state financing of private services” (Borodina *et al.*, 2015, p.38).

The partnership of the state and business, which is based on mutual responsibility of parties taking into account needs and interests of rural population, is an additional opportunity to solve economic, social and environmental problems in rural areas.

2.3. Analysis of financial and economic conditions of rural development in Ukraine

In Ukraine, an economic system that has been formed in rural areas cannot fully provide reproductive processes in the production sector and satisfy the vital needs of rural population. An indication of this is the limited scope of employment, labour migration and low income of rural residents (Figure 3).

Figure 3. Dynamics of social and economic characteristics of rural development (%)

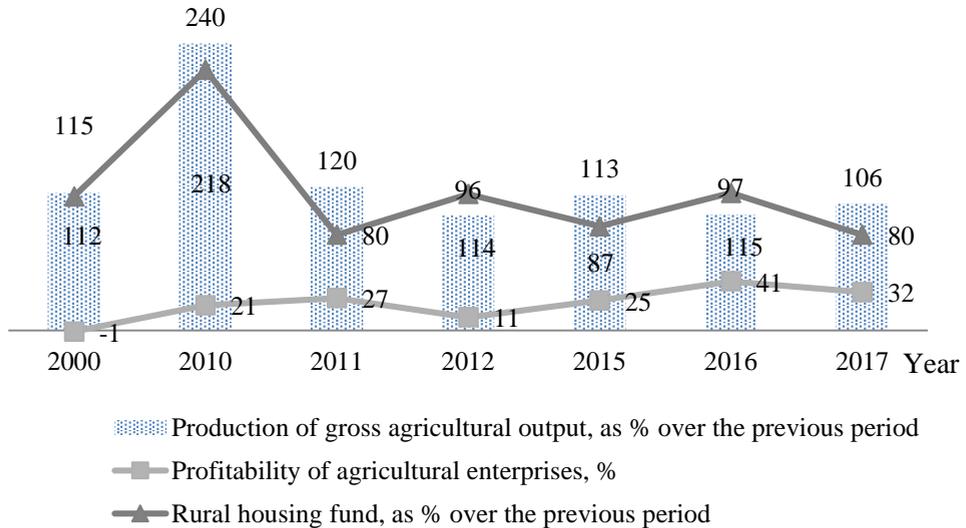


Source: Office for National Statistics of Ukraine (2018).

The data from Figure 3 indicate that, from 1990 until 2017, the number of rural population in Ukraine decreased by 33%. This situation is explained both by the natural aging of the population, the high mortality level in rural areas, and the labor migration of rural residents to cities and abroad in search of better working conditions and higher incomes. The level of wages of workers involved in the agrarian sector during the period 1990-2007 was lower than the subsistence minimum defined by the annual laws “On the State Budget”. Only since 2007, the tendency to increase the level of wages of agrarians has become noticeable; however, their size still remains the lowest among European countries (on average, 130 Euro per month). At the same time, since 1990, the indexes of prices for goods and services have showed abrupt directions, thus negatively affecting the unstable financial situation of the rural population.

There are still some concerns related to the situation, which is connected to the fact that increasing the production volumes of gross agricultural output and improving the profitability of the economic activity of agricultural enterprises does not virtually influence the improvement of living conditions of rural population, in particular, the increase of capacity of rural housing fund (fig. 4). However, it is usually the availability of housing that often influences a person’s choice on whether to stay and work in rural areas or to search for more attractive living conditions in the cities or abroad.

Figure 4. Dynamics of social and economic characteristics of rural development (%)



Source: Office for National Statistics of Ukraine.

Thus, the analysis of the main financial and economic indicators of rural development in Ukraine showed that rural areas and rural population have significant problems, primarily connected to the lack of workplaces, decent wages, proper social and domestic infrastructure and normal living conditions in rural areas, etc. As a result, rural residents lose motivation for self-development, the development of rural areas is restrained, and traditional agricultural production is curtailed. Such a situation is a threat to the food security of the country, which determines the necessity to search for new approaches of improving the conditions of rural development.

2.4. Characteristics of a model of financial and economic conditions of rural development

The theoretical foundations and methodological approaches to assessing factors influencing the development of the state economy were laid down by classical and neoclassical theories. According to these theories, the main sources of economic growth are the increase in labour and capital, rise in productivity and also scientific and technological progress. The corresponding models of economic growth were developed in the works of A. Smith, T. Malthus, D. Ricardo, R. Solou, R. Harrod, J. Hicks, and others. The development of these theories was reflected in the works of many scientists. In particular, the American economist E. Denison substantiated that economic growth under today's conditions is determined not so

much by the number of spent production factors, but by the growth of their quality and, first of all, by the improvement of the quality of labour force. The Ukrainian scientist M. Skrypnychenko (2007) developed the original model construction of economic development according to endogenous factors as indices of integral indicators. The aforementioned approaches and previous empirical research of the authors (Abramova, 2018; Nedilska, 2010) suggest that it is expedient to carry out the estimation of potential volumes of production of gross agricultural products as a possible indicator of rural development by taking into account a number of factors. They include budget expenditures for support of agriculture, volumes of investments, profitability of agricultural enterprises, size of rural housing fund and average monthly wages of rural workers.

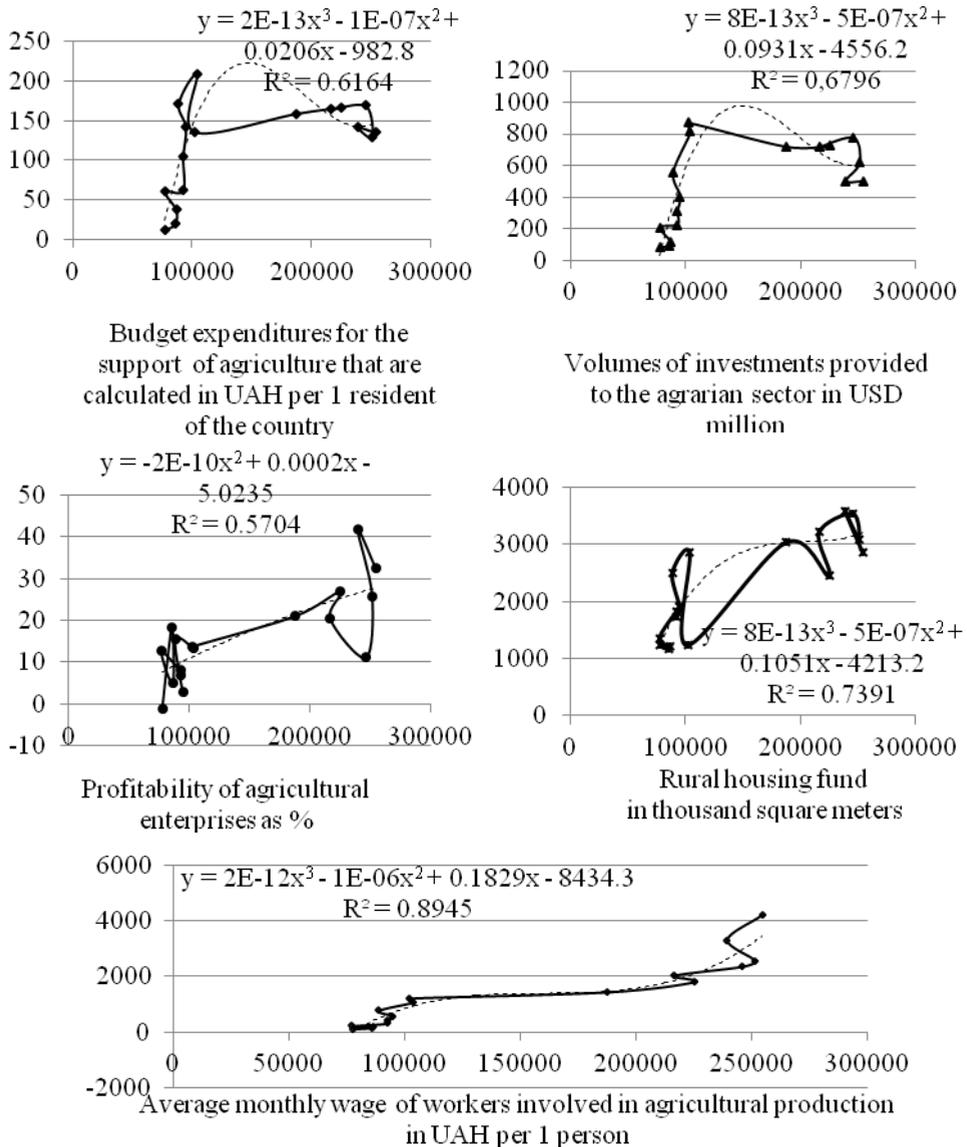
In order to provide a detailed assessment of the financial and economic conditions of rural development in Ukraine, the methods of correlation-regression analysis based on the basic indicator of the gross agricultural output in UAH million (Y – dependent variable) are used. Based on the above research, for constructing the model, we will assume that it is influenced by the following factors:

- budget expenditures for the support of agriculture calculated in UAH per 1 resident of the country (x_1). According to the conclusions drawn
- on the basis of studying foreign experience, we assumed that budget expenditures aimed at supporting farmers are able to improve the results of their economic activity and hence the value of the resulting indicator;
- volumes of investments provided to the agrarian sector in USD million (x_2). The choice of this factor is determined by the assumption that the increase of investments in agriculture favours the improvement of the material and technical facilities of farmers, the increase in the quantity of current assets and, accordingly, may have a positive impact on the growth of gross agricultural output;
- profitability of agricultural enterprises as % (x_3) is a motivating factor capable to improve the results of economic activity of farmers and, consequently, to have an impact on the volumes of agricultural output;
- rural housing fund in thousand square meters (x_4). The choice of this indicator is determined by the fact that living conditions of agricultural workers may have an impact on their working efficiency, and hence on the volumes of gross output produced by the agricultural sector;
- average monthly wage of workers involved in agricultural production in UAH per 1 person (x_5). The choice of this indicator is explained by the fact that the efficiency of workers involved in agricultural production depends on the wage and may thus influence the amount of gross agricultural output.

The construction of the model was carried out by using the values of these indicators for the period 2000-2017. Calculations were made using the econometric software package EViews. In the initial stage of work, the existence of regression dependence between the variables was proved by using graphical visualization, the

pair interdependence of GDP and selected indicators (Figure 5) (the statistical data is indicated by a full bold line, while calculated data by a broken line according to the established models). In this way, it was established that the relationship between the nominal GDP and the factors x_1, x_2, x_4, x_5 with a high confidence level of the approximation is characterized by polynomial of degree 3.

Figure 5. Pair interdependence of GDP and indicators selected for the model



Source: own representation

Visual assumptions regarding the existence of dependence between the variables are proved by the calculation of correlation coefficients (Table 2).

Table 2. Correlation matrix that shows the degree of dependence between the variables

Variables	Y	X ₁	X ₂	X ₃	X ₄	X ₅
Y	1.000000	0.606772	0.564594	0.845306	0.902882	0.916001
X ₁	0.606772	1.000000	0.890313	0.503319	0.786396	0.576049
X ₂	0.564594	0.890313	1.000000	0.385567	0.639486	0.432733
X ₃	0.845306	0.503319	0.385567	1.000000	0.719306	0.878389
X ₄	0.902882	0.786396	0.639486	0.719306	1.000000	0.789291
X ₅	0.916001	0.576049	0.432733	0.878389	0.789291	1.000000

Source: own representation.

The obtained correlation matrix (Table 2) shows that all the indicators included in the model have a moderate, noticeable and strong correlation (values range from 0.38 to 0.91). The greatest linkage exists between the resulting indicator (Y) and variables such as rural housing fund ($R_{X_4}=0.9$) and wages of workers involved in agricultural production ($R_{X_5}=0.91$).

The estimation of the dependence of the volumes of agricultural output on the determined factors during 2000-2017 by using the LS (Least Squares) method allowed the construction of a regression equation of the type:

$$Y = a_0 + a_1 * X_1 + a_2 * X_2 + a_3 * X_3 + a_4 * X_4 + a_5 * X_5.$$

As a result, modelling results were obtained with calculated coefficients and certain indicators of the adequacy of the model, which are shown in Table 3.

Table 3. Estimation of the parameters and main model characteristics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	19116.87	22403.72	0.853290	0.4102
Budget expenditures for the support of agriculture that are calculated in UAH per 1 resident of the country (X ₁)	-944.6195	313.0905	-3.017081	0.0107
Volumes of investments provided to the agrarian sector in USD million (X ₂)	154.5314	57.29499	2.697119	0.0194
Profitability of agricultural enterprises as % (X ₃)	435.2968	1054.650	0.412740	0.6871
Rural housing fund in thousand square meters (X ₄)	57.17787	15.69467	3.643141	0.0034

Average monthly wage of workers involved in agricultural production in UAH per 1 person (X_5)	21.01749	8.994687	2.336656	0.0376
R-squared	0.915271	Mean dependent var		156874.1
Adjusted R-squared	0.879967	S.D. dependent var		79726.99
S.E. of regression	27622.07	Prob(F-statistic)		0.000005
Sum squared resid	9.16E+09	Log likelihood		-205.9664
F-statistic	25.92547	Durbin-Watson stat		1.771893

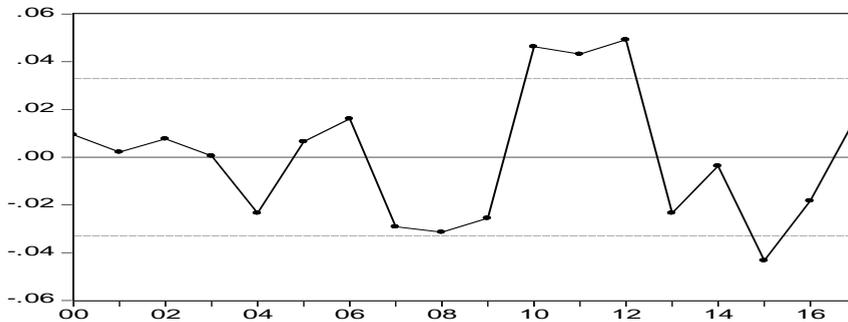
Source: own representation.

According to the results of modelling, the regression equation looked like this: $Y = 19116.88 - 944.62 * X_1 + 154.53 * X_2 + 435.30 * X_3 + 57.18 * X_4 + 21.02 * X_5$. The main characteristics of the regression equation are the value of the probability coefficient $\text{Prob}(F\text{-statistic}) = 0.000005$ (which is less than critical value 0.05), determination coefficient $R^2 = 0.9153$ and weighted determination coefficient $R = 0.88$, which show the close relationship of the variable (volume of gross agricultural output) on the explanatory variables (factors).

Based on the matrix of the coefficients of the pair correlation (Table 2), indicators with a value ≥ 0.8 (between y and x_4 ; y and x_5 , x_1 and x_2) are revealed, which is evidence of the presence of multi-collinearity. In this case, it may be the result of global trends for the simultaneous change in economic indices. In addition, the model uses indicators with the same lag values for each variable, which can also lead to the emergence of multi-collinearity. However, considering the acceptability of the values of the t -criterion of Student and F -statistic (Table 3), it can be assumed that the detected multi-collinearity is also acceptable because none of the existing methods for establishing its level makes a clear distinction between the permissible and the non-permissible values of multi-collinearity.

Regression balance (9.16E+09) has a normal distribution (since they are greater than the significance level of 0.05). Parameters and statistical characteristics of the model are typical (reliable), as evidenced by the t -criterion of Student at the level of 25.92, which is considerably higher than the tabular one (at the accepted level of significance 0.05 and the number of degrees of freedom 18 the tabular value is equal to 2.1). Consequently, we recognize the model as adequate and statistically significant.

The explanatory capability of the model was verified through graphical visualization of the deviations of the balances or model errors for the investigated period (Fig. 6), which were found to be insignificant (from -0.04 to +0.05).

Figure 6. Balances of the developed regression equation

Source: own representation.

The obtained balances of the model are used to detect autocorrelation (the interconnection of successive elements of the time series of data) based on several criteria. The first of them, which serves to verify the first-order autocorrelation, is the Durbin-Watson criterion. In our case, it is 1.771893, that is, the first-order autocorrelation is absent. To test autocorrelation of higher orders, the LM-test was used, the results of which indicate that only the coefficient with RESID-8 is statistically significant (p-value=0.0078). Thus, there is an autocorrelation of 8th order in the built model, that is, there is a cyclical nature of the studied parameters with a periodicity of 8 years. For economic phenomena and processes, this is logical in view of the presence of fluctuations in the level of gross agricultural output, investments, social development, etc. Consequently, the evaluation of the model by the most important criteria proves its adequacy.

The regression equation: $Y=19116.88-944.62x_1+154.53x_2+435.30x_3+57.18x_4+21.02x_5$ gives grounds to make important conclusions for assessing the financial and economic conditions of rural development. All parameters of the model are statistically significant; the model has substantial approximation properties, as evidenced by the graph (figure 5) and the determination coefficient (91.53%). The economic interpretation of the coefficients of multiple linear regression suggests that an increase in investment in the agricultural sector by USD 1 million can lead to an increase in gross agricultural output by UAH 154.53 million. Raising the profitability of financial and economic activity of agricultural enterprises by 1% can have an impact on the increase of gross agricultural output by UAH 435.29 million. An increase in the rural housing fund by 1 thousand m² can raise the gross agricultural output by UAH 57.17 million. The growth of wages per 1 person by 1% can increase the volume of gross agricultural output by UAH 21.07 million. At the same time, the budget expenditures per 1 hectare of agricultural land have an inverse relationship with a resulting feature, namely: an increase of budget expenditures by 1 UAH/person leads to the reduction in gross agricultural output by UAH 944.62 million.

The reverse relationship between budget expenditures and gross agricultural output revealed in the course of the analysis is explained by the fact that state financial support for agriculture in Ukraine during 2000-2017 was unstable and relatively insignificant (less than 2% of GDP). Structurally, it was characterized by small volumes of direct state support and significant tax privileges, which included a special tax treatment of value added tax (VAT) in agriculture and the application of a simplified system of taxation for agricultural producers. However, the aforementioned support also provided for certain state interference in the activities of farmers. In particular, the objects of state regulation were the prices for certain types of agricultural products, the functioning of the domestic agrarian market, export-import operations with agricultural products, etc. As a result, agricultural producers are virtually deprived of the opportunity to freely set prices for their products, and thus receive the expected profits. In addition, the lack of a systematic and complex nature of state support to farmers (Fig. 2 and Table 1), widespread corruption and the lack of transparency in the distribution of budget allocations significantly undermined producers' confidence in budget aid programs and, in general, prevented their positive impact on agricultural development and, consequently, on increasing the volumes of gross output produced by the agricultural sector of Ukraine's economy.

Conclusions

The conducted research showed that the key goal of financial provision of rural development is the formation of an effective economic system, ecological safety and decent social and domestic conditions in rural areas. Prospects for the financial provision of rural development are connected to solving the following tasks: capability of territorial communities to assess and efficiently use their own financial opportunities for economic, social and ecological development; searching for alternative financial sources; transparent processes of obtaining and using budget funds; establishment of a relationship between the state authorities and farmers, end users of financial resources; intensification of control over the use of budget funds; ability to engage business structures in order to solve urgent economic, social and ecological problems in rural areas; formation of investment image for rural settlements and investment development of small and medium-sized agricultural commodity producers. The recent history of rural development requires coordination and concerted efforts of all interested parties (rural residents, state and local authorities, business, scientific community) as well as understanding the mechanisms, tools, ways and means to achieve the expected results, and also identifying the sources and volumes of resources necessary to solve these tasks, etc.

It has been established that rural development will depend on the ability of territorial communities to create favourable conditions for the participation of small and medium-sized producers in this process, since it has been proved that the

organizational structure of agriculture in Ukraine is characterized by a significant share of individual farms of rural residents and farm households. Small agricultural producers account for more than 50% of the gross agricultural product and provide work for over 80% of the rural population. Their functioning has a significant impact on the quality of life in rural areas. In order to increase the contribution of small agricultural producers to rural development, it is necessary to intensify work on attracting investments, increasing incomes, intensifying their participation in agricultural markets and the effectiveness of state support. An important aspect is the creation of conditions for the association of small producers into agricultural service cooperatives or other forms of partnership interaction, which will improve their access to markets and market infrastructure, financial and logistic resources, etc. The diversification of the rural economy and the strengthening of the role of rural entrepreneurship, including production not related to agriculture, will have an impact on the increase of employment in rural areas and on the implementation of the principle of self-sufficiency in economic development.

It is substantiated that rural development is not only an increase in agricultural production, but also an improvement in the social and environmental conditions of living in rural areas. Meeting the interests of the rural population regarding social protection and social security, the development of social and domestic infrastructure, improving the quality of education and medical care will directly depend on the strengthening of the role of rural communities in these processes. Understanding the needs of communities and attracting flexible mechanisms that can solve local problems by developing their own decisions with support from the government will provide the basis for future measures. Improving the environmental situation in rural areas will depend on a profound rethinking of the interaction between human and nature, radical changes in the attitude towards the environment, rational use and conservation of natural resources, and also the formation of ecological consciousness of rural residents.

The implementation of the proposed measures will promote the social and economic self-development of rural communities by using their own potential and by stimulating the diversification of the rural economy. The following results are expected: growth of the local economy and the financial self-sufficiency of the rural communities, improving the level and quality of life in rural areas, maintaining the ecological balance, and conservation and improvement of local areas. Therefore, rural development can be an impetus for the overall economic as well as social and cultural development of the whole country, and its ecological component can be an important contribution to the needs of the universal community.

Further research of the authors will be aimed at developing a comprehensive mechanism for financial support of rural development.

Acknowledgement: This work was carried out on the basis of the Zhytomyr National Agroecological University, commissioned by the Ministry of Education

and Science of Ukraine, within the framework of scientific research topics: „Finance in the conditions of decentralization”, state registration number 0116U004551 and „Study of mechanisms for raising capitalization of the agrarian sector of the economy”, state registration number 0116U004554. Cover Letter No. 395 dated February 29, 2016. The results of the study will be presented for use by (1) the Ministry of Agrarian Policy and Food of Ukraine (which is interested in improving the social and economic situation in rural areas); (2) local authorities (concerned about the development of rural areas); (3) residents of rural areas (willing to improve their living conditions).

References

- Abramova, I. (2018), State and perspectives of rural development financing, *Scientific horizons*, 5(68). pp. 44-52.
- Andersson, K. Gordillo de Anda, G. and Laerhoven, F. (2015), *Decentralization and Rural Development: Comparing Lessons from Brazil, Chile, Mexico and Peru*, Arizona: University of Arizona Press.
- Borodina, O. Prokopa, I. and Popova, O. (2015), *Rural Development Policy Based on Communities in Ukraine*, Kyiv: Nan Ukrainy.
- Bydyk, A. (2013), Theoretical structure of financial mechanism of rural development, *Innovative economy*, 3(41), pp. 156-162.
- Cabinet of Ministers of Ukraine (2018), *State Support to Agriculture: Government Programs 2018*, (retrieved from <https://www.kmu.gov.ua/ua/news/derzhavna-pidtrimka-silskogo-gospodarstva-uryadovi-programi-2018>).
- Chukhno, I. (2015), Determination of sources of financial and economic support of governance to the development of rural territories in modern conditions, *Efektivna ekonomika*, 3 (retrieved from <http://www.economy.nayka.com.ua/?op=1&z=3897>).
- European Commission (2018), *Cross-compliance, Agriculture and rural development*, (retrieved from https://ec.europa.eu/agriculture/direct-support/cross-compliance_en).
- Hubeni, Yu. (2013), Development of rural territories: selected theses for designing a policy, *Socio-economic problems of the modern period of Ukraine*, 6(104), pp. 14-19.
- Kolesnykov, V. (2014), World experience of rural development, *Efektivna ekonomika*, 4, (retrieved from <http://www.economy.nayka.com.ua/?op=1&z=2956>).
- Kravchenko, T. (2015), Rural development based on communities: innovation of public policy in Ukraine, *Pressing problems of public administration*, 1(47) (retrieved from <http://www.kbuapa.kharkov.ua/e-book/apdu/2015-1/doc/2/02.pdf>).
- Lupenko, Yu. (2015), The Development of the Agrarian Sector of the Ukrainian Economy: Projections and Prospects, *Scientific Bulletin of the Mukachevo State University*, 2(4), pp. 30-34.

- Maharjan, K. (2017), Decentralization: Potential and Challenges for Rural Development, in: Sutiyo, and Maharjan, K. L. (eds.), *Decentralization and Rural Development in Indonesia*, Singapore: Springer, pp. 13-26.
- Mickiewicz, A. and Mickiewicz, B. (2016), Directions of development of regional policy within the framework of the local development strategy for rural areas, *International Scientific Conference on Economic Science for Rural Development*, 41, pp. 104-113.
- Ministry of Agrarian Policy of Ukraine (2018), *Programs of state support of agroindustrial complex* (retrieved from <http://minagro.gov.ua/apk>).
- National Statistics of Ukraine (2018), *Statistical Information, Demographic and Social Statistics, Economical statistics* (retrieved from http://www.ukrstat.gov.ua/operativ/operativ2007/ds/nas_rik/nas_u/nas_rik_u.html).
- Nedilska, L. (2010), *The organizational and economic mechanism of managing financial resources of agricultural enterprises*, Zhytomyr.
- Onishchenko, O. and Yurchyshyn, V. (2006), Rural Development: Fundamentals of Methodology and Organization, *Economy of Ukraine*, 10, pp. 4-13.
- Pelucha, M. Kveton, V. and Safr, K. (2017), Theory and reality of the EU's rural development policy application in the context of territorial cohesion perspective-The case of the Czech Republic in the long-term period of 2004-2013, *Land use policy*, 62, pp. 13-28.
- Petrushenko, Yu. (2014), *Financial support of socio-economic development of territorial communities: conceptual foundations and practical tools*, Sumy: University book.
- Skrypnychenko, M. Heiets, V. and Shumska, S. (2007), *Models Of Endogenous Growth Ukraine*, Kyiv.
- Storonyanska, I. (2014), *Financial support of rural communities development*, Lviv.
- Tanklevska, N. (2013), Formation of modern paradigm financial policy for agriculture country, *The actual problems of regional economy development*, 9(2), pp. 197-204.
- Van de Poele, L. (2015), Laurent Rural development from the grassroots: twenty years of the EU „leader approach”, *Constructing a new framework for rural development*, 22, pp. 195-207.
- Yurchyshyn, V. (2014), Institutional Principles of Rural Development in Ukraine: Theoretical and Applied Analysis, *Economy of Ukraine*, 6, pp. 95-96.

Appendix

Table 1. Output data for constructing a model of financial and economic conditions of rural development

Year	Gross agricultural output in UAH million	Budget expenditures for the support of agriculture that are calculated in UAH per 1 resident of the country	Volumes of investments provided to the agrarian sector in USD million	Profitability of agricultural enterprises as %	Rural housing fund in 1000 square meters	Average monthly wage of workers involved in agricultural production in UAH per 1 person
2000	77889	13	78.8	-1	1229	114
2001	85796	20	86.8	18.3	1166	154
2002	86784	38	113.2	4.9	1215	183
2003	77271	61	206	12.6	1359	219
2004	92531	62	224	8.1	1827	311
2005	92586	104	309.6	6.8	1728	437
2006	94895	142	404.3	2.8	1919	581
2007	88769	172	557.3	15.6	2507	771
2008	103978	208	813.3	13.4	2856	1076
2009	102093	136	871.4	13.8	1237	1206
2010	187526	159	719.5	21.1	3035	1430
2011	225382	167	725.3	27	2445	1800
2012	216590	164	717.8	20.5	3211	2023
2013	246109	169	776.9	11.2	3545	2344
2014	251427	129	617.0	25.8	3096	2556
2015	239467	142	502.2	41.7	3579	3309
2016	254641	135	500.1	32.4	2864	4195

Source: Office for National Statistics of Ukraine (2018).