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SHADOW ECONOMY VS ECONOMIC SECURITY: TRENDS, CHALLENGES, PROSPECTS[7]

The purpose of the article is to highlight the results of the study of counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population. The relationship between the shadowing of the economy and the growth of the poverty level in Ukraine is substantiated, which is confirmed by the results of cluster and regression analysis. A study of the dynamics of the integral indicator of the level of the shadow economy and changes in the volume of real GDP in Ukraine is conducted and the volume of official GDP created by shadow wages is estimated. Predictive assessments of the level of the shadow economy and poverty in the coming years have been made, and growth trends have been established. It has been found that the growth of the level of the shadow economy has a significant impact on the population poverty indicator. The regional features of the spread of the shadow economy and population poverty are analyzed, as a result of which it has been proved that a higher standard of living of the population and a lower level of poverty are observed in the border and industrially developed regions.

Keywords: shadow economy; economic security; legal relations; agricultural sector; economic security of agriculture; Ukraine
JEL: O17; Q10; Q14

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1. Introduction

Threatening trends in ensuring the economic security of the state and the deepening of macroeconomic and political instability in Ukraine present the state with a number of problematic issues of effective counteraction to destabilizing factors, phenomena and processes associated with the economic activities outside the official sector of the economy and the implementation of illegal acts in all spheres of the economy. The increase in the amount of shadowing of the economy calls into question the effectiveness of reforming the national economy, the correctness of choosing the vector of socioeconomic development and reduces the level of its economic security, and the incompleteness of the process of transformation of the economy strengthens negative trends, which are especially noticeable in the agricultural sector of the economy. Taking into account the insufficient level of efficiency of the agricultural sector and the effectiveness of the country's agrarian policy, which the protection of national interests in the agricultural sphere and sustainable socioeconomic growth of the country depends on, today there is a significant destructive effect of the spread of shadow economic activity and the discovery of new methods, ways and tools of shadowing the economy, which actualizes the need to deepen research in the direction of institutionalizing countermeasures against the shadow economy in the system of ensuring the economic security of the agricultural sector.

Analysis of recent research and publications. Theoretical and applied aspects of the study of the shadow economy in the system of ensuring the economic security of the agricultural sector were conducted by many scientists, including S. Cherniavskyi, O. Dzhuzha, V. Babanina and Y. Harust (2021), T. Drape, N. Magerkorth, A. Sen, J. Simpson, M. Seibel, R. Murch, S. Duncan (2021), S. Esaku and F. Tajani (2021), D. Nchor (2020), K. Pawlak and M. Kołodziejczak (2020), H. Mohammad (2019), M. Petrushenko, B. Burkynskyi, H. Shevchenko, Ye. Baranchenko (2021), H. Pohrishchuk, V. Semtsov, N. Dobizha, A. Kucher, I. Sysoieva (2021), A. Prosekov and A. Ivanova (2018), L. Shemaeva, Ya. Zhalilo (2021), N. Yurkiv (2021) and others. However, without denying significant achievements in this area, it has not yet been possible to solve the set tasks, and the scale of the spread of the shadow economy continues to grow.

It is obvious that the problem of counteraction to shadowing of the economy is extremely important both for science and for practice and requires detailed research in order to find effective methods of counteracting it and minimizing the impact on the socioeconomic development of the country and protecting national interests in the agricultural sphere.

Many Ukrainian scientists (Blikhar et al. (2019), Mukoviz et al. (2022)), including foreign ones (Baklouti et al., 2019; Grundler et al., 2019; Nguyen and Duong, 2021; Zouhaier et al., 2021) focus their attention on the presence of an emphasized negative causal effect of the shadow economy on the economic growth of the state in general, and economic security in particular. Therefore, scientists are convinced that, nevertheless, the size of the so-called informal sector positively depends on the indicators of tax legislation, government policy and regulatory acts. In addition, the urgent need to control and prevent corruption is emphasized, which significantly activates the economic component of state security. Ultimately, reducing corruption will necessarily reduce the size of the shadow economy and also reduce the negative impact of corruption on economic growth through the shadow economy.

For example, T. Luong and T. Nguyen (2020) substantiated in their study that indicators of the state's economic development have a negative and statistically significant impact on the shadow economy. Moreover, according to these scientists, in countries with a transition economy, the size of the shadow economy is negatively related precisely to the quality of the rule of law. However, there is also a positive relationship between inflation, state expenses and the size of the shadow economy. Therefore, the size of the shadow economy can be controlled by improving the effectiveness of the rule of law and economic growth, especially in countries with transitional economy.

Instead, a number of other scientists (Polese et al., 2022), nevertheless, emphasize the traditional measurement of the shadow economy, which will allow quantitative assessment of some socioeconomic phenomena that correlate with the low efficiency of the state. However, in their opinion, in this case, the causal relationship is not always clear and, most importantly, it should be found out whether the non-compliance with the law is connected with the ineffectiveness of the state, or, on the contrary, the ineffectiveness of the state arises from its citizens' non-compliance with the law. A situation with a high level of dissatisfaction with economic governance, a high level of solidarity with fellow citizens seems to be the ideal context for relying on alternative social support structures as a kind of necessity.

In this context, the research of H. Mohammad (2019), in which the author defends the thesis that global danger is more widespread today than ever, because many states have internal conflicts, and acts of violence, such as terrorism, are becoming more brazen than anyone could predict, becomes important today. The author's position is also interesting regarding the fact that the security threats of the 21st century are not limited to military threats, but also include non-military ones such as terrorism, gun violence and natural disasters. The relationship between security challenges around the world is complex, and it has been proved that as intergroup and interpersonal conflict decreases, there is a corresponding increase in less understood and less well-known threats, including threats to natural, economic and social systems. That is why there is an urgent need for a comprehensive understanding of these multidimensional problems in order to develop idea-based solutions to them that will be implemented by the government and other politicians. These solutions should take a multifaceted approach so that key players in society could integrate different strategies into different sectors to ensure multiple returns on public investments and initiatives, thus meeting the requirements of sustainable development.

Continuing in this direction, I. Rumyk (2021) substantiates the methods of economic modelling to ensure the safety and stability of the food supply system, which will ensure the complementarity of the activities of various business entities and create an appropriate basis for the development of the industry as a whole. Therefore, theoretical and methodological approaches to the study of food safety should be based on two general scientific approaches – systemic and integrated. Moreover, to assess the level of agricultural production, it is advisable to use the tools of economic and mathematical descriptive modelling.

For example, S. Zhanabekov (2022) states that reducing bureaucratic complexity by eliminating burdensome regulations could help reduce both wasteful government spending on enforcing these regulations and the size of the shadow economy. Since shadow activities are created to avoid being detected by the government, it is difficult to reliably estimate the

extent of the shadow economy. Moreover, according to this author, the ever-changing nature of the shadow economy may undermine current anti-shadow economy policies and create new challenges for the economy and society in general. After all, it is believed that the shadow economy is a reflection of economic difficulties in the state.

In this context, M. Vinichuk and A. Ryzhkova (2021) prove the urgent need to detinize the economy of Ukraine, considering the shadow economy as a threat to the socioeconomic development of the country and justify the expediency of revising and improving the state policy of detinization of economic relations, mechanisms of distribution and redistribution of financial resources and capital.

The strengthening of processes of globalization and instability in the world financial market necessitate the protection of national economic systems and ensuring the proper level of functioning of all sectors of the economy. Under such conditions, the protection of the agricultural sector from the influence of destabilizing factors of the external and internal environment becomes of primary importance, because the chronic underfinancing of the needs of agriculture, the imperfect mechanism of access to credit resources, the imperfection of the tax system and the limitations of the normative and legal regulation of agricultural relations create significant threats and risks of ensuring a proper standard of living of the population.

Ensuring the stable development of the agricultural sector and strengthening its economic security for a long time is the subject of scientific and practical discussions both at the national and international levels. The existence of a number of problems related to ensuring the economic security of the agricultural sector is felt not only in Ukraine, but also in most of the countries of the European Union. Confirmation of this can be the formation and implementation of a common agricultural policy at the level of the member states of the European Union and giving due attention to this issue through the prism of the need to support the agrarian policy of less developed countries by highly developed ones.

The most tangible problems in ensuring the economic security of the agricultural sector are the lack of motivation to carry out activities in agriculture, the increase in the level of unemployment in the agricultural sector, the strengthening of the processes of labour migration both within the country and within the European Union, the impoverishment of the population of rural areas and the decrease in growth rates and competitiveness of the agricultural sector, as well as inefficiency in the use of available resources and conducting economic activities outside the official segment. It is obvious that the outlined problems are extremely relevant for Ukraine; however, possessing significant agricultural potential thanks to a good geographical location and favourable climatic conditions for agriculture, the effectiveness of the functioning of the agricultural sector of Ukraine is not able to ensure a high level of its economic security and is not able to resist illegal processes and phenomena Therefore, under such conditions, at the level of combating the shadow economy, there is also the problem of deepening research in the field of ensuring economic security of the agricultural sector of the economy.

We should note that the analysis of available scientific developments in the field of security of the agricultural sector of the economy does not allow us to formulate a clear position regarding the conceptual and categorical apparatus, which complicates the process of

forming a methodological toolkit for assessing the level of security. In particular, some scientists consider the category "economic security of the agricultural sector" and others – "agricultural security". The current normative legal act of Ukraine, according to which assessments of the level of economic security in certain areas are carried out – Methodical recommendations for calculating the level of economic security of Ukraine [12] does not provide for the assessment of agricultural security, but is limited only to the assessment of food security, which, in fact, is not objective and does not reflect the completeness of the necessary calculations. In addition, there is still no legislative regulation of either term, and food security is only part of the studied phenomenon. At the international level, the majority of scientific views are focused on the concept of "economic security of the agricultural sector", however, some scientists in recent years have begun to substantiate the expediency of the term "agricultural security". In particular, K. Utenkova (2018) emphasizes that scientific approaches to agricultural security are characterized by absolute uncertainty and ambiguity is observed regarding the interpretation of the economic security of the agricultural sector, as very often this definition is equated with the economic security of the agricultural sphere. In turn, such authors as A. Balian et al. (2021) proposed the author's interpretation of the term "food security" as a complex of socioeconomic relations that develop thanks to the provision of people with food, appropriate standards of quality and quantity based on the innovative development of reproductive processes in agriculture and the economic security of the agro-food complex. At the same time, according to these authors, the issue of ensuring food security by the state is combined with the tasks of innovative development of reproductive processes in the regions in general, and agricultural producers, in particular. Based on this definition, a system of principles of state regulation of food safety issues was proposed: stability of the legal framework regulating economic processes; production stability; competitiveness of food products, enterprises, organizations; availability of food products for all population groups; effective use of land, production, labour resources; diversification of food supplies; protection from external and internal threats of the agro-food sector of the economy; socioeconomic direction of state development, etc. In this context, it is expedient to talk about guaranteeing the food independence of the state and to single out food security in the general structure of the economic security of the agricultural sector.

The same opinion is held by V. Zamlinsky and S. Kushnir (2019), who associate the provision of economic security in the agricultural sector with the provision of food security, justifying this by the fact that the agricultural sector is the material basis of economic security. We consider it appropriate to note that in relation to food security, an institutional and methodological basis has been formed and indicators for assessing its level have been determined, however, it is insufficient to assert the state of security of the agricultural sector only on the basis of the indicator of food security, since in the structure of the economic security of the agricultural sector there are also financial, personnel-intellectual, production-technological, political-legal, informational, environmental, investment-innovative, social, marketing, resource-technical, energy, transport and foreign economic components (Slyusarenko and Klyuchnik, 2020). Moreover, for example, O. Pronina et al. (2021) claim that the sustainable development of the agricultural sector is not limited to ensuring an adequate level of food, but includes indicators of agricultural development, economic security of enterprises of the agricultural sector, and counteraction to shadowing processes.

Instead, Yu. Maevsky (2020) proves that the need to reform the agrarian policy of the countries of the European Union arose in the process of the need to ensure food security, which proves the importance of this component of the economic security of the agricultural sector, and connects it with the need for self-sufficiency in food and strengthening food security. In this context, K. Utenkova (2021) considers the economic security of the agricultural sector as a state of the system, regardless of the permanent influence of external and internal environmental factors, ensuring the stability of functioning, detinization and progressive development of the agricultural sector in such a way that the preservation and further reproduction of the resource potential becomes possible.

In addition, the processes of globalization significantly affect the regional features of the functioning of the agricultural sector, and European integration strengthened the development of cross-border cooperation, as a result of which there was a need for the formation of a regional policy for the management of the agricultural sector, which led to the need for the implementation of a common agricultural policy.

For example, such authors as R. Lile et al. (2015) consider the increase in the competitiveness of the entire agricultural market of the European Union and stimulation of the effective development of rural areas to be the main goal of the common agrarian policy of the European Union. Positively assessing the idea of introducing a common agrarian policy of the European Union, S. Stanciu (2013) singles out additional opportunities received by rural youth who are employed in the agricultural sector. In particular, we are talking about significant financial support for young farmers and preferential employment conditions. Therefore, in this context, the aspirations of Ukraine to integrate into the European Union and to obtain the opportunity to ensure the sustainable development of the agricultural sector on the basis of environmental friendliness and social responsibility are substantiated.

Many modern researchers of the improvement of analytical management of the economic security of agricultural enterprises, in particular S. Vasylishyn et al. (2021), focus their attention on the fact that in the conditions of the strengthening of the destructive effects of the world economic crisis and the growing number of risks of the agrarian business, there is the problem of finding ways to improve accounting and analytical support as the only reliable source of reliable, relevant and accurate information necessary for managing the economic security. In this case, the authors proposed to implement a model of analytical support for the management of economic security in conditions of uncertainty and growing risks and threats to the business environment of agricultural enterprises, which should be based on the use of general economic, statistical, integral and econometric approaches. Moreover, in their opinion, in the process of counteracting the risks and threats to the external and internal environment of agrarian business, the use of integral methods of assessing the economic security of agrarian enterprises becomes crucial.

In general, D. Puyiriyani et al. (2020) claim that agricultural security as a separate scientific category began to form in the context of the study of deagrarianization of the economy and is associated with limited access to agricultural activities, use of land resources, and a slowdown in the sustainable development of the agricultural sector, as a result of which shadowing processes are intensifying. Although, according to A. Zolkover and V. Terziev (2020), the financial market and financial intermediaries are becoming an essential part of the problems and the topic of urban poverty, low incomes, drug abuse and problems of female

employment, gender inequality in incomes are very popular in works that analyze the problems of the shadow economy. In the end, summarizing the analysis of the latest research and publications, it is necessary to state a sufficiently significant scientific development in the field of shadow economy research and significant achievements, the results of which prove the severity of the outlined problem and the need to counteract the shadow economy.

2. Methodology

The purpose of the article is to highlight the results of the study of the counteracting of the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population.

The research uses general scientific and special methods of economic analysis, namely: analysis and synthesis to determine the essence of the shadow economy and economic security of the agricultural sector, comparison and analogy in order to assess the state and trends of the shadow sector of the economy and the level of ensuring the economic security of the agricultural sector, as well as their interrelationship and mutual influence, generalization and systematization for the formulation of hypotheses and the formation of conclusions, graphical for the purpose of visual display of the obtained research results, grouping and cluster analysis for the grouping of the regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy.

It is worth noting that due to the rapid development of innovative information and technical technologies and the development of a complex of measures to combat illegal economic activity, it is extremely difficult today to obtain accurate, true, unbiased and complete information on the volume of shadowing of economic sectors. It is obvious that the mechanism for assessing the level of the shadow economy in Ukraine is imperfect, despite the existing legally regulated methodological tools for assessing the level of the shadow economy and the approved Methodical recommendations for calculating the level of the shadow economy (Methodical recommendations…, 2021), according to which the assessment of the level of the shadow economy is carried out on the basis of four methods ("costs of the population – retail turnover and services", unprofitability of enterprises, electrical and monetary) and calculation of the integral indicator of the level of the shadow economy as a percentage of the official GDP, approved by Order of the Ministry of Economic Development, Trade and Agriculture dated January 20, 2021 No. 104.

The peculiarity of the method of calculating the integral indicator of the level of the shadow economy is that it is carried out by summing the results of estimates of the levels of the shadow economy of four methods for a certain specific period of time, weighted by the weighting factors inherent in each of the methods. Thus, the integral indicator of the level of the shadow economy is calculated as the sum of the weighted average estimates of the level of the shadow economy of the set of methods using the formula (1):

$$T_{int\,t} = \sum_{k=1}^{4} T_{k\,t} \text{ x } a_{k\,t} \quad (1)$$

where:

$T_{int\ t}$ – estimate of the level of the shadow economy by one of the methods in the specific analyzed period;

k – one of the methods of assessing the level of the shadow economy;

$a_{k\ t}$ – a coefficient that reflects the calculation of the average value of estimates of the level of the shadow economy for previous years, the root mean square deviation of estimates by one of the methods from their average value, and the calculation of the coefficient of variation.

However, the Methodical recommendations for calculating the level of the shadow economy regulated by law in Ukraine are universally binding, and on their basis, the government organization – the Ministry of Economy of Ukraine forms annual analytical studies, in particular: Shadow economy: general trends in 2020: an analytical note of the Ministry of Economy of Ukraine (2021), Shadow economy: general trends of January-September 2021: an analytical note of the Ministry of Economy of Ukraine (2022), which are official documents formed only in the Ukrainian language, which fully reflect the parameters of the shadow sector of Ukraine's economy, are acceptable for use in scientific research and do not require the formation of additional author's methods for calculating the integral indicator of the level of the shadow economy. Therefore, we consider it appropriate to use them in the study of trends in the shadowing of the economy of Ukraine and to confirm the proposed hypothesis about the deepening of the processes of shadowing of the economy and the growth of its volumes, which is proved by the calculations shown in Figure 1.

3. Results and Discussion

The increase in the volume of shadowing of the national economy and the emergence of destabilizing factors in the socioeconomic development of Ukraine led to the aggravation of problems related to the uneven distribution of resources, the strengthening of structural deformations and disproportions in the sustainable development of the economy and society, and the growth of the influence of informal institutions. The outlined trends, which are a consequence of the incompleteness, imperfection and inefficiency of the reform of all spheres of the economy, are in close interaction with the indicators of the socioeconomic development of the country and significantly influence the formation of their values and, at the same time, contribute to the development and expansion of the shadow sector of the economy, as well as to a decrease in the economic security level of the agricultural sector of the economy.

Counteraction to the shadow economy in the system of ensuring the economic security of the agricultural sector of Ukraine under the conditions of persistent financial-economic and socio-political instability and the incompleteness of the process of transformation of the economy requires due attention to the evaluation of the level of the shadow economy in the country, the identification of the main factors that contribute to the development and spread of this destructive phenomenon and determining the trends of the consequences caused by the tinization of the economy.

As evidenced by the results of studies, conducted on the level of the shadow economy in Ukraine, the dynamics of the integral indicator during 2010-2021 do not have a stable trend, and the periods of aggravation of the financial and economic as well as political crisis testify to the growth of the volume of the shadow sector of the economy (Figure 1). In particular, in 2013-2014 (a period of political crisis associated with the Revolution of Dignity and the annexation of the Autonomous Republic of Crimea) and 2019-2021 (coronavirus crisis and the spread of the COVID-19 pandemic), an increase in the integral indicator by 9 and 4 points respectively, and a simultaneous drop in real GDP to -9.8 % in 2014 and -4 % in 2020 were recorded. Forecast estimates of the analyzed indicator in the conditions of 2022-2023 indicate that the level of the shadow economy in Ukraine will continue to be at the level of 29-30 % of the country's official GDP. The value of the level of the shadow economy in Ukraine in 2022 and 2023 was calculated as a result of forecasting (using the linear trend).

Figure 1. Dynamics of the integral indicator of the level of the shadow economy in Ukraine and changes in the volume of real GDP in 2010-2023*, %

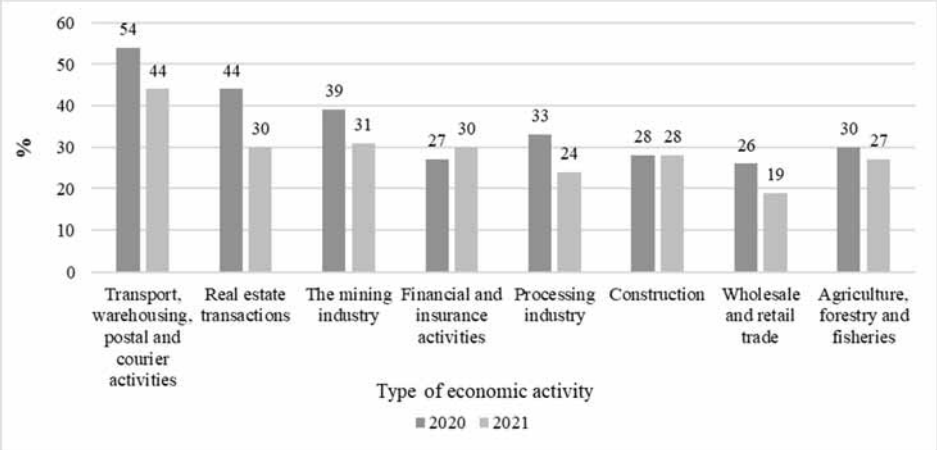
(2022-2023 – forecast estimates)

** data for 2021 are given for the period January – September.*
Source: (Shadow economy…, 2020; 2021), authors' forecast.

Detailed studies of the shadowing of the economy by types of economic activity (Figure 2) allow us to state that the level of shadowing of the agricultural sector in 2020 is 30%, and in 2021 – 27%. We should note that estimates of the level of the shadow economy by types of economic activity in Ukraine are also carried out on the basis of legally regulated Methodical recommendations for calculating the level of the shadow economy, which were approved by the Order of the Ministry of Economic Development, Trade and Agriculture dated January 20, 2021 No. 104. Accordingly, the calculations of analyzed in the article indicators of the level of the shadow economy, including by types of economic activity, are carried out on the basis of the current national methodology.

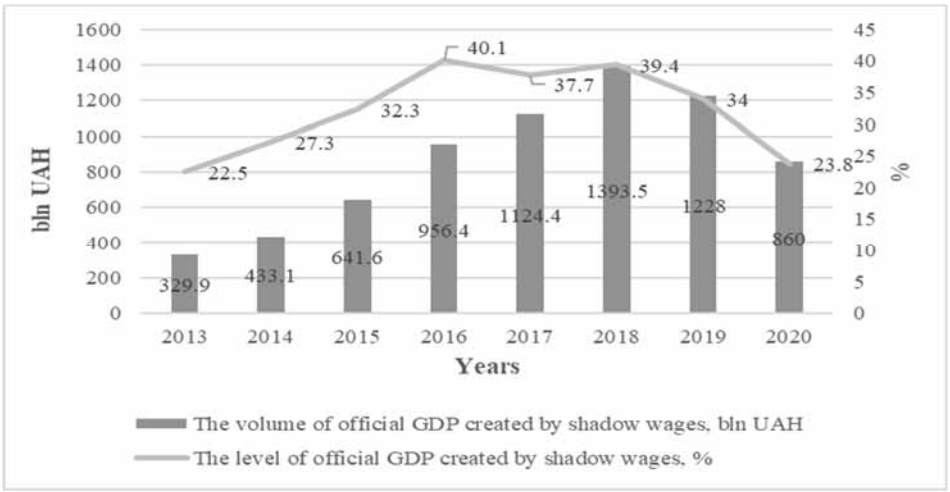
Along with the growth of the volume of shadow economic activity, the importance of such a problem as shadow wages is growing, which is in close interdependence with other destabilizing factors of the development of the shadow economy and forms quite significant volumes of GDP, in particular in the agricultural sector.

Figure 2. Dynamics of the level of the shadow economy of Ukraine according to types of economic activity in 2020-2021



Source: (Shadow economy…, 2021).

Figure 3. Dynamics of the volume of official GDP created by shadow wages and the level of official GDP created by shadow wages, UAH billion, %

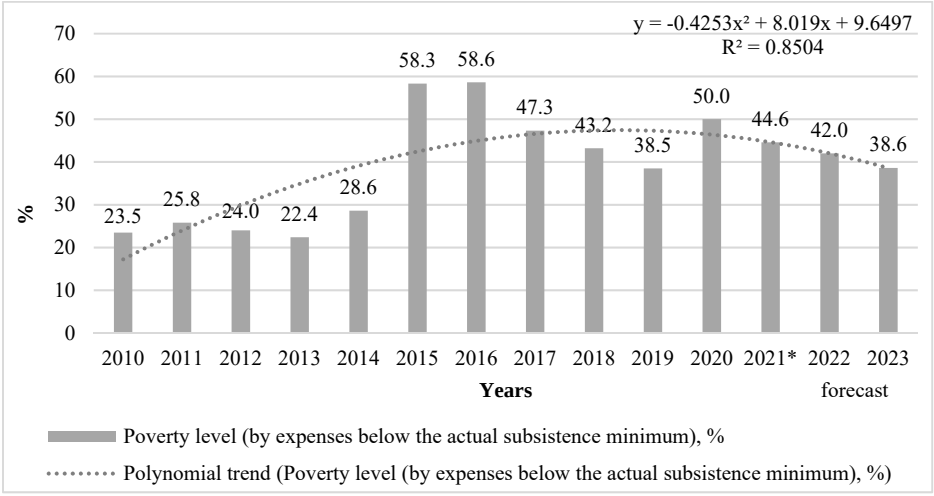


Source: (Shadow economy…, 2021).

The assessment of the dynamics of the volume of official GDP created by shadow wages and the level of official GDP created by shadow wages during 2013-2020 (Figure 3) shows a steadily growing trend relative to these indicators in the period 2013-2018 from UAH 329.9 billion up to UAH 1,393.5 billion (by 322.4%). Positive trends were observed during 2019-2020, and the reduction of official GDP created by shadow wages reached UAH 860 billion, which is 38.3% less than in 2018.

It should be recognized that the increase in the volume of official GDP created by shadow wages has a positive social effect in the short term, as illegal shadow incomes reduce the level of social tension in society due to the opportunity to improve the material situation of the population and increase the level of its purchasing power. However, in a strategic perspective, incomes received as a result of employment in the shadow sector of the economy and received in the form of shadow wages generate significant deformations and disproportions of the security system of socioeconomic transformations and have a particularly negative impact on the population of rural areas, which threaten the growth of differentiation of population incomes, decrease in the share of the very rich and an increase in the share of the very poor population. The formation of social inequality, in addition to all the above, intensifies the processes of population poverty, the level of which by the estimates of the Institute of Demography and Social Research, named after M. V. Ptukha of the National Academy of Sciences (Information and analytical note on living standards in January-March 2021) has acquired critical importance and has an upward trend (Figure 4). According to forecast estimates, by 2022, the level of poverty in Ukraine will be in the range of 41-43 %, which is an extremely negative phenomenon and requires deepening of research in the direction of identifying features, causes and finding methods of counteracting both the shadowing of the economy and poverty in Ukraine.

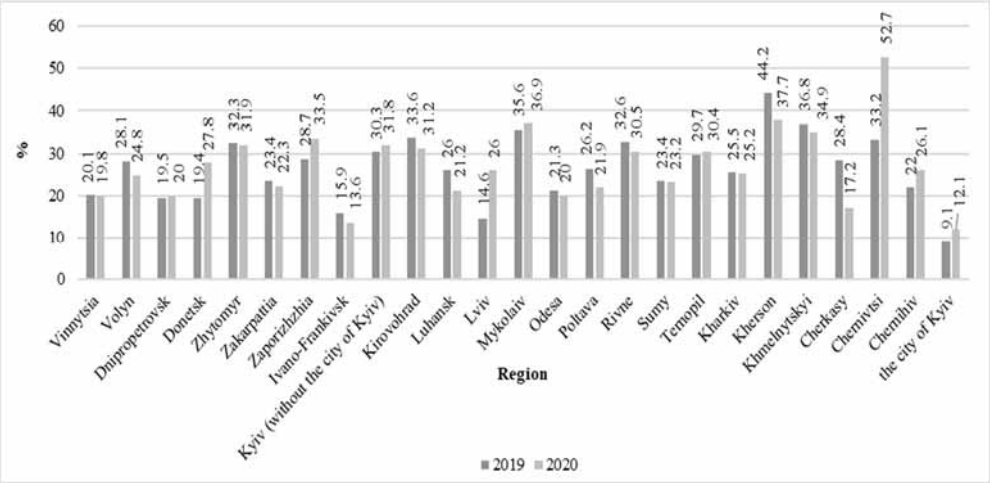
Figure 4. Dynamics of the level of poverty in Ukraine in 2010-2022 (by expenses below the actual subsistence minimum), % (2022-2023 – forecast estimates)



** Preliminary evaluation.*
Source: (Information and analytical note…, 2021), authors' forecast.

No less important is the study of regional features of the spread of poverty in Ukraine. As evidenced by the results of assessments of the level of poverty in the regions of Ukraine (Figure 5), the state of differentiation of the population's incomes in them is diverse: some regions show sufficiently low values of the analyzed indicator, and in some regions, they are extremely high, which indicates a decrease in the incomes of the population, or, more likely, their informal redistribution in favour of a small part of society.

Figure 5. Dynamics of the poverty level in Ukraine in 2019-2020, %



Source: (Information and analytical note…, 2021).

The grouping of the regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy in 2019-2020 with the help of multidimensional (cluster) analysis based on the k-means method using the Statistica 7.0 software package made it possible to distinguish three groups of regions (Table 1), which are characterized by common signs of the spread of poverty and the use of measures to raise the standard of living of the population and reduce the level of the shadow economy.

The first group, both in 2019 and in 2020, included such regions as Vinnytsia, Dnipropetrovsk, Ivano-Frankivsk, Odesa regions and the city of Kyiv, which are characterized as highly developed regions where industrial production is concentrated, and agricultural production has a negligible share, there is a high level of employment in the formal sector of the economy and a low level of poverty.

Volyn, Ternopil, Kharkiv, Zaporizhzhya, and Kyiv regions (without the city of Kyiv) are stable in the second group, but in 2020, Zakarpattia, Luhansk, Poltava, Sumy, and Cherkasy regions, which were in the second cluster, moved to the first. On the other hand, Donetsk and Lviv regions dropped from the first cluster to the second. The regions included in the second cluster are considered as border regions, which have a number of advantages related to cross-border cooperation with neighbouring countries and socioeconomic integration.

The third group includes Mykolaiv, Kherson, Khmelnytskyi and Chernivtsi regions, which are recognized at the state level as depressed regions of the country that require additional funding and constant financial support from the state.

So, it becomes obvious that the problem of shadowing the economy of Ukraine causes significant destructive changes in the socioeconomic development of the country, the most serious of which is the total impoverishment of the population, in particular, those living in rural areas, who do not have the possibility of official employment, and their desire to take participation in illegal production and expand the volume of the shadow sector of the economy.

Table 1. Grouping of the regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy in 2019-2020

2019			2020		
No.	Region	Cluster number	No.	Region	Cluster number
1.	Vinnytsia	1	1.	Vinnytsia	1
2.	Dnipropetrovsk		2.	Dnipropetrovsk	
3.	Donetsk		3.	Zakarpattia	
4.	Ivano-Frankivsk		4.	Ivano-Frankivsk	
5.	Lviv		5.	Luhansk	
6.	Odesa		6.	Odesa	
7.	Chernihiv		7.	Poltava	
8.	the city of Kyiv		8.	Sumy	
9.	Volyn	2	9.	Cherkasy	
10.	Zakarpattia		10.	the city of Kyiv	
11.	Zaporizhzhia		11.	Volyn	2
12.	Kyiv (without the city of Kyiv)		12.	Donetsk	
13.	Luhansk		13.	Zhytomyr	
14.	Poltava		14.	Zaporizhzhia	
15.	Sumy		15.	Kyiv (without the city of Kyiv)	
16.	Ternopil		16.	Kirovohrad	
17.	Kharkiv		17.	Lviv	
18.	Cherkasy		18.	Rivne	
19.	Zhytomyr	3	19.	Ternopil	
20.	Kirovohrad		20.	Kharkiv	
21.	Mykolaiv		21.	Khmelnytskyi	
22.	Rivne		22.	Chernihiv	
23.	Kherson		23.	Mykolaiv	3
24.	Khmelnytskyi		24.	Kherson	
25.	Chernivtsi		25.	Chernivtsi	

Source: authors' research on the basis (Information and analytical note…, 2021).

In this context, we consider it expedient to carry out a regression analysis of the influence of the level of the shadow economy on the poverty level of the population in Ukraine, which will allow us to determine the stochastic dependence between the parameters of the economic model, in which several values of the effective indicator will correspond to the value of the indicator, which is the influencing factor. At the same time, regression analysis will help to find out the forms and density of the relationship between the parameters of the poverty level of the population, which is defined as an effective indicator (Y), and we will consider the

level of the shadow economy (x_1) as a factor indicator. We will perform the necessary calculations using the Statistica 7.0 software package.

According to the results of research using the regression analysis technology (equation 2), the relationship between the analyzed indicators is characterized as strong, as evidenced by the correlation coefficient R = 0.817, and the statistical significance of the model is confirmed by the Fisher's test – F(3.29) = 36.017.

$$Y = 17.07 + 0.72x_1 \quad (2)$$

where:

Y – the poverty level of the population, %;

x_1 – level of the shadow economy, %.

Detailing the impact of the specified factors of the shadowing of the economy on the level of poverty of the population allows us to state that the growth of the level of the shadow economy deepens the processes of impoverishment of the population, which characterizes the positive directly proportional influence of this factor on the performance indicator, which confirms the regression indicator +0.72.

The importance of such scientific research is the personal scientific contribution of the authors to the deepening of methodological aspects of identifying the dynamics of the influence of the shadow economy on the level of poverty in Ukraine based on the study of relative indicators, which was initiated by one of the co-authors of this article and is presented in a monographic study (Vinichuk, 2016), where the author's own methodology is proposed on the basis of supplementing the existing indicators with indicators of the level of poverty and the level of the shadow economy, which makes some contribution to science. Such studies, unlike the existing ones, are based on conducted research of not quantitative, but qualitative indicators that characterize the parameters of the shadow sector of the economy and the level of life quality of the population.

Since the main goal is to highlight the results of the study of the institutionalization of countering the shadow economy in the system of ensuring the economic security of the agricultural sector and its impact on the poverty level of the population, and taking into account the limited scope of the article, we do not detail the calculations of indicators, but rely on their analysis, a reflection of changes in dynamics and establishing relationships between them.

Considering the proven threatening impact of the shadow economy on the socioeconomic development of the state as a whole, and the agricultural sector in particular, the problem of counteracting the shadow economy and ensuring the economic security of the agricultural sector needs immediate resolution. Therefore, the need to develop a complex of measures for the detinization of the economy of Ukraine, which we propose to direct in the following directions, becomes extremely urgent:

1) improvement of methods of assessing the level of the shadow economy by taking into account shadow economic relations arising in the temporarily occupied territories of the

country and in the direction of improving the assessment of the shadow sector by its structural components;

2) formation of an optimal taxation system taking into account the rationality of the tax burden, reducing the tax pressure on small and medium-sized businesses, especially in the agricultural sector;
3) improvement of the accounting system of income and expenses of business entities, which consists in ensuring conditions for voluntary payment of taxes, simplification of declarativeness and reporting;
4) ensuring the transparency of the use of state resources through transparent redistribution and use of available financial resources, obtaining free access to information about these resources and strict accountability of responsible persons;
5) increasing the effectiveness of monetary policy and establishing the management position of the National Bank of Ukraine regarding the regulation of the monetary and credit sphere and weakening the dependence of internal money circulation on "shocks" of the external environment;
6) improvement of current legislation in the field of prevention and counteraction to shadow economic activity, strengthening of criminal responsibility for committing crimes in the financial and economic sphere and the agricultural sector of the economy.

Thus, the results of the conducted research on counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector allow us to assert the significant shadowing of the economy of Ukraine, in particular, the agricultural sector, which leads to the emergence of significant negative processes in the financial and economic, as well as socio-political spheres, the main of which are population poverty, especially those living in rural areas, and informal employment. At the same time, in the regional dimension, three groups of regions have been formed, which are characterized by the degree of socioeconomic development, the level of development of the agricultural sector, the favourable geographical location and the differentiation of the population's incomes. The outlined factors indicate the level of well-being in the country and the poverty of the population.

4. Conclusion

The article defines the essence of the shadow economy in the process of socioeconomic transformations and economic security of the agricultural sector, outlines the main factors of the formation of the shadow sector and the consequences caused by the shadow economic activity in the agricultural sector. The results of the research into the problematic aspects of the institutionalization of counteracting the shadow economy in the system of ensuring the economic security of the agricultural sector give grounds for asserting that in Ukraine, the need to effectively counteract the shadow economic activity has become of critical importance, the level of which has reached a mark of more than 30% of the official GDP and continues to grow, which has a significantly destructive effect on the economic and socio-

political sphere, poses a significant threat to the formation and functioning of the agricultural sector. The growth of the volume of the shadow sector of the economy led to the emergence of dangers in the structure of the economic security of the agricultural sector, as a result of which there is a mass impoverishment of the population in the country, the poverty level of which is in the range of 22.4-58.6 %, which, in turn, intensifies the processes of development of the shadow economy.

The existing methodological tools for assessing the influence of the level of the shadow economy on certain indicators of the socioeconomic development of the country have been improved by proposing the grouping of regions of Ukraine according to indicators of the level of poverty and the level of the shadow economy in order to identify highly developed and depressed ones. The use of regression analysis is proposed to identify the relationship and mutual influence of the level of the shadow economy with the poverty level of the population. The results of research using the technology of cluster analysis based on the k-means method allow us to state that the grouping of regions of Ukraine based on the indicators of population poverty and shadowing of the economy in them indicates the separation of highly developed and depressed regions. It was established that the first group includes industrially developed, border and port regions, characterized by a high level of employment in the formal sector of the economy and lower poverty rates, and depressed regions include those areas that require additional state funding and constant support. At the same time, the results of the regression analysis of the impact on the poverty level of the population of the shadow economy confirm a strong relationship between the studied indicators, which is confirmed by the correlation coefficient $R = 0.817$.

The obtained results can be used by local self-government bodies in the formation of state regional policy, in determining the directions of its implementation, as well as by state authorities in the development of the Strategy for the development of the economic security of the agricultural sector. The prospects for further research should be determining the improvement of the system of state social protection of the population, since it has been established that it is insufficiently effective and there are a number of problematic issues regarding the protection of the population in conducting their own agricultural activities, which leads to the activation of integration into the system of shadow financial flows and, at the current stage, requires effective regulatory and legislative opposition.

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