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AN ASSESSMENT OF THE FINANCIAL AND ECONOMIC SECURITY OF THE AGRICULTURAL SECTOR IN UKRAINE

Abstract. The article states that the financial and economic security of the agricultural sector is aimed at ensuring a sufficient level of efficiency of financial and economic activities; protection from external and internal dangers, improvement of financial firmness, and stability. It is established that one of the ways to solve these problems is the application of modern approaches to determining the level of financial and economic security of agricultural sector entities in order to identify the most significant threats to the market, as well as the application of modern approaches to improving the level of financial and economic security of the Ukrainian agricultural sector.

It was found that the financial security of the country directly and proportionally affects the financial and economic security of the agricultural sector, and the presence of problems can prevent the agricultural sector from reaching the desired economic level. The basic elements of financial and economic security in agricultural entities are identified as financial resources, financial stability (solvency), and profitability of operating activities, effectiveness of financial and economic activities, the possibility and cost of attracting external financial resources. The indicators for financial and economic security of agricultural enterprises in Mykolayiv region are assessed and a model of factors influencing the indicator, which is the profitability of operating activity, is developed.

General and specialist research methods were used to study theoretical, and methodological issues of financial and economic security in the agricultural sector; monographic, causal relationships, and logical modeling are also used in determining the indicators of assessing the level of financial and economic security in the agricultural sector; method of dynamic analysis and — in order to assess the rate of economic growth of the main macroeconomic indicators of the country, taking into account the dynamics of their change in the market environment; calculation-constructive, graphic — when assessing the level of financial and economic security.

It is proved that the financial and economic security of the agricultural sector is aimed at ensuring a sufficient level of efficiency of financial and economic activities in the market environment, protection from external and internal dangers, as well as creating conditions for long-term development, given globalization challenges.

Keywords: agricultural sector, financial security, financial and economic security, indicators, approaches.

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ОЦІНКА ФІНАНСОВО-ЕКОНОМІЧНОЇ БЕЗПЕКИ СУБ'ЄКТІВ АГРАРНОГО СЕКТОРУ ЕКОНОМІКИ УКРАЇНИ

Анотація. Зазначено, що фінансово-економічна безпека суб'єктів аграрного сектору направлена на забезпечення достатнього рівня ефективності фінансово-економічної діяльності; захищеність від зовнішніх і внутрішніх небезпек, поліпшення фінансової стійкості та стабільності. Установлено, що одним із напрямів розв'язання цих проблем є застосування сучасних підходів до визначення рівня фінансово-економічної безпеки суб'єктів аграрного сектору з метою виявлення найбільш суттєвих загроз, а також застосування сучасних підходів до підвищення рівня фінансово-економічної безпеки суб'єктів аграрного сектору економіки України.

Виявлено, що фінансова безпека країни прямо пропорційно впливає на фінансово-економічну безпеку аграрного сектору національної економіки, наявність проблем якої перешкоджає суб'єктам аграрного сектору отримувати бажаний економічний ефект. Визначено базові елементи фінансово-економічної безпеки суб'єктів аграрного сектору: забезпеченість фінансовими ресурсами, фінансова стійкість (платоспроможність), рентабельність операційної діяльності, результативність фінансово-господарської діяльності, можливість і вартість залучення зовнішніх фінансових ресурсів. Здійснено оцінку показників рівня фінансово-економічної безпеки сільськогосподарських підприємств Миколаївської області та розроблено модель факторів впливу на результативний показник — рентабельність операційної діяльності.

Застосовано загальнонаукові та специфічні методи наукового пізнання — при дослідженні теоретичних, методологічних і методичних питань фінансово-економічної безпеки суб'єктів аграрного сектору; монографічний, причинно-наслідкових зв'язків, логічного моделювання — при визначенні показників оцінки рівня фінансово-економічної безпеки суб'єктів аграрного сектору; метод динамічного аналізу — з метою здійснення оцінки темпів економічного зростання основних показників діяльності суб'єктів аграрного сектору, урахування динаміку їхніх змін; розрахунково-конструктивний, графічний — при оцінці рівня фінансово-економічної безпеки.

Доведено, що фінансово-економічна безпека аграрного сектору направлена на забезпечення достатнього рівня ефективності фінансово-економічної діяльності, захищеність від зовнішніх і внутрішніх небезпек, а також створення передумов для розвитку в довгостроковому періоді, зважаючи на виклики сьогодення.

Ключові слова: аграрний сектор, фінансова безпека, фінансово-економічна безпека, показники, підходи.

Формул: 0; рис.: 1; табл.: 6; бібл.: 13.

Introduction. In the current economic climate, the activity of enterprises, regardless of ownership and organizational and legal form of management, is a subject that tends to constant risks and threats associated with increasing the impact of quarantine restrictions and external market factors. The constant increase in the risk of economic activity can cause a significant deterioration in the financial condition of the enterprise, and in the future lead to bankruptcy, and requires each business entity to develop and implement approaches to strengthen the level of financial and economic security.

At the same time, ensuring the profitability of the domestic agricultural sector requires modern approaches to developing recommendations for strengthening its competitive advantages and increasing the level of financial and economic security, which is affected by insufficient institutional support, lack of a unified accounting policy and increasing dependence of agricultural sectors on external investors and creditors.

Analysis of recent research and publications. The analysis of the statements of scientists and researchers shows that the financial and economic security of the agricultural sector has a complex structure. R. V. Markov [1], V. O. Kozlovskiy [9], S. V. Kozlovskiy [9], L. O. Vdovenko [4], O. S. Chernenko [4], S. M. Frolov, O. V. Kozmenko, A. O. Boyko and others studied the issues of ensuring the financial and economic security of the agricultural sector of the economy.

According to Markov R.V. financial and economic security of the agricultural sector is a system of relations between the participants of the four spheres of agricultural relations, which should provide active reproductive processes in agricultural production and acceptable profitability of agricultural activities, reduce the risks of the agricultural business and ensure food security of regions and the country as a component in ensuring the national security of the state [1].

It is worth noting the approach of scientists L. O. Vdovenko and O. S. Chernenko, that financial and economic security is a financial condition in which there are no dangers (internal, external), i.e. enterprises are dynamically developing in conditions of hydrothermal and price uncertainty, making a profit is the determining factor of financial and economic security and the main motive for entrepreneurial activity, which meets the priority interests of farmers and contributes to food, national and environmental security [4].

We suggest marking the financial and economic security of the agricultural sector as a condition that protects the financial and economic interests of agricultural businesses units from the negative factors of internal and external environment and creates the necessary financial and economic conditions for a successful operation, sustainable development through timely identification and prevents external and internal dangers and threats. The basic elements of financial and economic security of the agricultural sector are financial resources, financial stability (solvency), and profitability of operating activities, the effectiveness of financial and economic activities, the possibility and cost of attracting external financial resources.

In order to determine the condition of financial and economic security of agricultural sector entities, approaches were used to assess the level of financial security as a component of economic security of the national economy (inflation; domestic and foreign debt; state budget deficit; level of monetization; international reserves (excluding gold)); assessment of the level of financial and economic security based on the calculation of indicators (growth rate of income (revenue) from sales of products (goods, works, services); financial result before tax; profit (loss) from operating activities; profitability of operating activities)); assessment of the level of financial and economic security on the basis of indicators (coverage ratio; coefficient of autonomy; coefficient of maneuverability of own funds; coefficient of financial leverage; ratio of non-current and own funds; ratio of working capital and own working capital, return on assets) [4; 8; 12].

The purpose of the article is to determine the level of financial and economic security of the agricultural sector with the use of modern approaches in order to identify the most significant dangers, as well as possible ways of improvement.

Research results. In order to identify the impact of financial security of the national economy on the financial and economic security of the agricultural sector, the financial security of the Ukrainian national economy was calculated according to the methodology of the National Security and Defense Council of Ukraine during 2015—2019 (*Table 1*).

Table 1

Dynamics of financial security indicators according to the methodology of the National Security and Defense Council of Ukraine, 2015—2019

Indicator	Threshold value of indicator	Years					Abs. deviation (+, -)
		2015	2016	2017	2018	2019	2019/2015
The level of inflation, %	5%	43,3	12,4	13,7	9,8	4,1	-39,2 p. p.
The amount of domestic debt,% of GDP	less than 30% of GDP	26,7	28,9 4	25,7	21,7	21,1	-5,6 p. p.
The amount of external debt,% of GDP	less than 20% of GDP	47,9	48,9	43,7	38,6	31,8	-16,1 p. p.
State budget deficit,% of GDP	1% of GDP	2,3	2,9	1,6	1,7	2,0	-0,3 p. p.
Level of monetization,% to GDP	30 % of GDP	50,2	46,2	40,5	34,5	35,0	-15,3 p. p.
International reserves (excluding gold), billion dollars USA	up to \$ 5 billion USA	13,3	15,5	18,8	20,8	25,3	12,0

Source: built using data [7].

All indicators during 2015—2018 significantly exceed the threshold values. The inflation rate was at its highest in 2015 (almost ten times higher than the set threshold data), but the analysis of inflation in 2019 shows an improvement in the consumer price index. The rating of countries by the inflation rate of the Central Intelligence Agency shows that in 2015 Ukraine took the penultimate 224th place out of 225 places. The indicator of domestic debt of GDP during the studied period corresponds to the established values and in 2019 is 21.1% of GDP, which is less than in 2015 by 5.6 percent. The indicator of the volume of external debt to GDP needs special attention, because in 2016 the effective value of this indicator was 48.9% of GDP, while its threshold value should not exceed 20% of GDP. The state budget deficit with an optimal and close to the threshold value was in 2017. The highest level of monetization during the studied period was set in 2015 at 50.2%, and the lowest was in 2019 (35.0%), which indicates a decrease in speed of money rotation in the country. The largest volume of international reserves of Ukraine is observed in 2019 in the amount of 25.3 billion US dollars, which is a negative phenomenon, because the maximum level of their size should not exceed 5 billion US dollars.

The calculated indicators show that the level of financial security of Ukraine in the reporting year is improving. The biggest threats in the future are an increase in both domestic and foreign debt, rising dollarization, the devaluation of hryvnia caused by the results of past periods, as well as measures to suspend the agricultural sector in the context of national quarantine and others.

Correspondence of profit to operating costs and the amount of useful capital is determined with using profitability indicators, which allows us to assess the effectiveness of business activities and, to some extent, its financial stability and stability as equally important criteria for assessing the level of financial and economic security of agricultural sector of Mykolayiv region (*Table 2*).

Table 2

Determining indicators of financial and economic safety of the agricultural enterprises of Mykolayiv region

Indicators	Years					Abs. deviation (+,-)
	2015	2016	2017	2018	2019	2019/2015
income from sales of products (goods, works, services), thousand UAH	12 756,3	14 603,4	16 856,8	18 134,1	19 423,2	6666,9
growth rates of sales revenue, in % to the previous year	179,3	114,5	115,4	107,6	107,1	x
agricultural products (at constant prices in 2016) in enterprises per 100 hectares of agricultural lands, thousand UAH	1358,7	1525,2	1366,4	1492,1	1634,3	275,6

Table 2 (continue)

Indicators	Years					Abs. deviation (+,-)
	2015	2016	2017	2018	2019	2019/2015
financial result before tax, UAH million	3625,5	3621,6	2996,3	3292,7	2716,7	-908,8
profit (loss) from operating activities, UAH million	4044,6	4220,7	3352,2	3637,7	2903,2	-1141,4
operating expenses, million UAH	10 087,4	11 066,2	14 035,8	15 568,3	17 374,6	7287,2
profitability (unprofitability) of operating activities,%	40,1	38,1	23,9	23,4	16,7	-23.4 %
Capital investments, UAH million	1229,7	2492,6	2585,1	2384,9	2061,6	831.9
Agricultural indices of products at constant prices in 2016, in % to the previous year	102,0	108,5	91,0	106,1	107,0	5.0 %

Source: calculated according to [6].

Despite the growth of revenues from sales of products (goods, works, services) by 6666.9 thousand UAH in 2019 compared to 2015, the costs are growing, which directly affects the deterioration of the level of profitability (loss) from operating activities. The figure for 2019 is 23.4 percent, which is less than the value in 2015, which is evidence of reduced firmness and stability, and hence a danger to the financial security of enterprises in Mykolayiv region. The volumes of net profit from operating activities in the reporting year tend to decrease, which indicates the instability of their development trend and requires an increase in the level of financial management in agricultural enterprises.

The dynamics of capital investments has shown a negative trend since 2017 and indicates the importance of public authorities to consider the issue of increasing indirect state support for the agricultural sector.

The analysis of indicators of financial and economic security of agricultural enterprises of Mykolayiv region demonstrates sufficient indicators that considerable threats of technical and technological safety connected with low-tech character of production and realization of production.

Indicators of financial and economic security of the agricultural enterprises in Mykolayiv region are calculated for the purpose of establishment of conformity to threshold values (Table 3).

Table 3

Conformity of indicators of financial and economic safety of the agricultural enterprises of Mykolayiv region to threshold value

Indicators	Threshold value	Years				
		2015	2016	2017	2018	2019
coefficient of coverage	$\geq 1,0$	1,85	1,87	1,85	1,82	2,03
coefficient of autonomy	$\geq 0,5$	0,53	0,55	0,58	0,58	0,64
coefficient of maneuverability of own funds	$\geq 0,1$	1,38	1,35	1,24	1,23	1,05
coefficient of financial leverage	≤ 3	0,15	0,10	0,06	0,05	0,04
coefficient of the ratio of non-current and own funds	0,5-0,8	0,37	0,35	0,39	0,41	0,49
coefficient of security of turnover assets with own turnover funds	$\geq 0,1$	0,46	0,47	0,46	0,45	0,51
profitability of assets	inflation index	27,66	20,51	12,93	12,05	9,41

Source: calculated according to [6].

Most indicators conform to the threshold values, except for the coefficient of non-current and own funds (the entire study period).

The increase in the value of the coverage ratio in the reporting year of the study shows that companies have a significant amount of current assets, which were formed from their own sources. At the same time, we observe an increase in the share of invested capital in current assets and deterioration in the borrower's creditworthiness, which is a negative trend. Starting from 2017, the

level of security of non-current assets with own funds almost corresponds to the standard - 0.49 (according to the method of V.O. Metz 0.5—0.8). The high value of the ratio of working capital by own working capital (≥ 0.1) indicates the financial stability of enterprises and the ability to be active even in the absence of access to borrowed funds and external sources of financing.

In order to identify the factors that have the greatest impact on the financial and economic security of the agricultural sector, methods of economic and mathematical modeling with the construction of econometric models were used. Using multiple regressions, a model has been developed which shows factors influencing the profitability of operating activities, as an effective indicator of financial and economic security, which shows the results of work of enterprises in the agricultural sector.

Symbols were introduced and variables were identified: y – profitability of operating activities (dependent variable); x_1 — the coefficient of coverage (independent variable); x_2 — the coefficient of autonomy (independent variable); x_3 — the coefficient of maneuverability of own funds (independent variable); x_4 — the coefficient of financial leverage (independent variable); x_5 — the coefficient of non-current and own funds (independent variable); x_6 — the coefficient of working capital by own working capital (independent variable). Using MS Excel software, it has been built a correlation matrix of the dependence of the level of profitability of operating activities (y) on the influence of factors (x_i) (Table 4).

Table 4

Correlation matrix of dependence of the level of profitability of operating activity on the factors of influence

	y	x_1	x_2	x_3	x_4	x_5	x_6
y	1	-0,521	-0,933	0,943	0,935	-0,862	-0,462
x_1		1	0,783	-0,770	-0,390	0,806	0,995
x_2			1	-0,996	-0,863	0,939	0,743
x_3				1	0,846	-0,962	-0,723
x_4					1	-0,695	-0,353
x_5						1	0,750
x_6							1

Source: calculated according to data [6].

The closeness of the correlation between the level of operating activity and the coefficient of coverage (x_1) and the coefficient of working capital to own working capital (x_6) is inverse and weak, because the values of correlation coefficients are (-0.521) and (-0.462); the coefficient of autonomy (x_2) and the coefficient of non-current and own funds (x_5) is inverse and strong (-0.933) and (-0.862), respectively. There is a tight relationship between the level of operating activity and the coefficient of maneuverability of own capital (x_3) -0.943, and the coefficient of financial leverage (x_4) -0.935.

A regression analysis was performed and a model of multiple linear regression was evaluated in the form: $y = a_0 + a_1x_1 + a_2x_2 + \dots + a_nx_n$ using indicators that have a strong correlation tightness and are the most significant for the study (autonomy coefficient (x_1), maneuverability coefficient of own capital (x_2), financial leverage coefficient (x_3)). The coefficient of determination for each independent variable is determined: $R_{x_1}^2 = 0,993$; $R_{x_2}^2 = 0,992$; $R_{x_3}^2 = 0,762$.

The profitability of operating activities is most influenced by the coefficient of autonomy (financial independence of the enterprise from external sources of financing its activities) — $R_2 = 0,993$ and the coefficient of maneuverability of own capital (in the dynamics of the indicator had downward tendency, but within the normative value) — $R_2 = 0,992$, so correlation-regression analysis was applied with the construction of a model of the relationship between the coefficient of autonomy and profitability of operating activities in order to determine the adequacy and accuracy of the obtained values of the presented characteristic. Among the adequate models, the parabolic one, the most accurate in terms of the sum of the squares of the deviations y_ϕ and y_T , and the average approximation error $\bar{\epsilon}$, was chosen (Table 5).

Table 5

Influence of coefficient of autonomy on profitability of operational activity of the enterprises of agrarian sector in Mykolayiv region

Model	$(y_{\phi i} - y_{T i})^2$	σ_{ϵ}	$\bar{\epsilon}$
$y = 1,658 + 45,242x$	581,039	10,780	37,804
$y = -1,480 - 126,639 \lg x$	180,469	6,008	23,141
$y = 1,075 \cdot 104,953^x$	1479,084	17,199	45,127
$y = 0,030 + 316,538x - 462,203x^2$	68,963	3,714	14,436

Source: authors' own calculations.

The obtained correlation index of 0.983 confirms the close relationship between the coefficient of autonomy and profitability of operating activities, and the calculated value of the average approximation error $\bar{\epsilon} = 0.58\%$, which indicates sufficient accuracy of the model and is confirmed by Fig., which shows a slight deviation of the graphs y_{ϕ} and y_T .

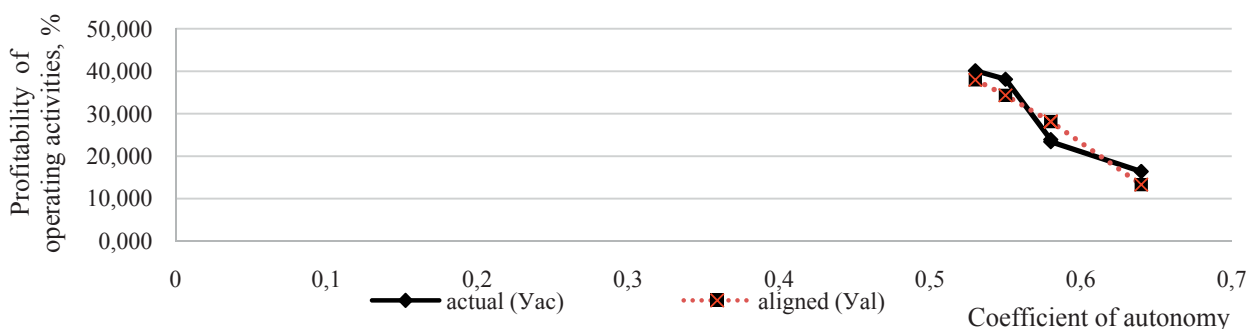


Fig. Actual and parabolic values of profitability of operating activities

Source: authors' own calculations.

The calculated coefficient of elasticity $E = 316.538 \cdot \frac{0,58}{28,38} = 6.42\%$, indicates that increasing the coefficient of autonomy by 1 will improve the level of profitability of operating activities by 6.42% and strengthen the level of financial and economic security of enterprises in Mykolayiv region as a part of improving financial firmness and stability. An assessment has been done to discover the level of financial and economic security of the agricultural sector using PEST-analysis based on expert assessments (the subjects were economic entities of the agricultural sector; number of respondents — 200 people) and the approach of scientists [9], the results of which are shown in Table 6.

According to the analysis of expert assessments to assess the level of financial and economic security of agricultural sector entities, the highest score (5 points) experts noted a group of economic factors, as it is important to strengthen financial and economic security is to increase operating profitability and economic competitiveness. growth. At the same time, the highest score (5 points) was given to the group of economic threats, including: deteriorating profitability of operating activities, unstable exchange rate and increasing external debt.

Among the possibilities, technological factors have the lowest score (3 points): modernization of means of production, as there is often a dependence on external sources of financing, in particular, soft loans. Among the threats, the lowest number of points is the decrease in entrepreneurial activity, which is explained by the relatively stable functioning of agricultural enterprises, especially in a pandemic.

In the block of threats the largest number of points (4.7) is «economic threats»: unstable exchange rate, increasing external debt; strengthening the dependence of agricultural enterprises on external investors and creditors; deterioration of the level of profitability of operating activities of the agricultural sector.

Table 6
Results of PEST-analysis to assess the level of financial and economic security of agricultural sector entities

Factors	Opportunities	Weighting factor	Score	Result	Threats	Weighting factor	Score	Result
Political	- improving the financial system through reforms	0,4	4	1,6	- increase in domestic debt	0,4	5	2,0
	- protection of competition	0,4	4	1,6	- increase in the level of political risks, imperfection of legal norms, corruption	0,3	4	1,2
	- restriction of monopoly	0,3	4	1,2	- reduction of volumes or abolition of preferential taxation and crediting of agricultural manufacturers	0,3	4	1,2
Economic	Σ	1		4,4	Σ	1		4,4
	- implementation of measures aimed at improving the efficiency of economic resources	0,2	5	1,0	- unstable exchange rate, increasing external debt	0,2	5	1,0
	- financing of measures for forecasting the development of market conditions, institutional regulation of financial and economic activities and resource provision	0,3	5	1,5	- strengthening the dependence of agricultural enterprises on external investors and creditors in quarantine measures (COVID-19)	0,3	4	1,2
	- increasing the profitability of operating activities and the competitiveness of economic growth	0,5	5	2,5	- deterioration of the level of profitability of operating activities of the agricultural sector	0,5	5	2,5
	Σ	1		5,0	Σ	1		4,7
Social	- increasing the level of staff motivation in the security system of the economic entity	0,4	5	2,0	- reduction of income and savings of the population, their purchasing power	0,4	5	2,0
	- development of social infrastructure	0,5	5	2,5	- reduction of entrepreneurial activity	0,1	3	0,3
	- application of modern approaches to increasing the level of financial and economic security by economic entities	0,1	4	0,4	- degradation of human potential, lack of qualified specialists in the agricultural sector	0,5	4	2,0
Technological	Σ	1		4,9	Σ	1		4,3
	- novelty of designs and production technologies	0,3	5	1,5	- a large number of morally and physically worn out fixed assets	0,3	4	1,2
	- improving the efficiency of security management	0,5	4	2,0	- appearance on the market of goods and competing companies with a higher level of competitive advantage	0,4	4	1,6
	- modernization of means of production	0,2	3	0,6	- reducing the time of use of means of labor	0,3	5	1,5
	Σ	1		4,1	Σ	1		4,3

Source: systematized and supplemented by the authors on the basis of materials [9] taking into account the expert assessments of economic entities of the agricultural sector.

The depreciation of the national currency leads to an increase in the amount of debt borrowed in foreign currency, as a result, this increase in government debt accelerates inflation and requires significant funds to repay debt, which increases the demand for foreign currency. In such circumstances, it is impossible to avoid further devaluation of the national currency, which, in turn, will only increase the burden of external debt payments on the national economy.

Among the opportunities to improve the financial and economic security of the agricultural sector, it is appropriate to highlight the socio-economic factors: the development of social infrastructure, the use of modern approaches to determining and improving the level of financial and economic security.

Conclusions. To conclude, the financial and economic security of the agricultural sector is aimed at ensuring a sufficient level of efficiency of financial and economic activities; protection from external and internal dangers, improvement of financial firmness and stability.

It is proved that the financial security of the country directly affects the financial and economic security of the national economy sectors, the presence of problems which prevents the agricultural sector from obtaining the desired economic effect.

By analysing the financial and economic safety conditions of the agricultural enterprises in Mykolayiv region testifies to importance of the account of modern tendencies of revealing and support of financial firmness and stability.

Based on the econometric model of profitability of operating activities from the autonomy of the enterprise, taking into account the coefficient of determination, it was found that 96.7% of total fluctuations in the level of profitability are due to the coefficient of autonomy, and the other 3.3% of fluctuation due to the influence of factors not studied in this model. It has been established that improving the level of profitability of operating activities by increasing the coefficient of autonomy (financial independence of the enterprise from external sources of financing its activities) will increase the level of financial and economic security.

The results of the PEST-analysis to assess the level of financial and economic security of agricultural sector entities show that the greatest threats are economic factors, namely: unstable exchange rate, increasing external debt; strengthening the dependence of agricultural enterprises on external investors and creditors in quarantine measures (COVID-19); deterioration of the level of profitability of operating activities in the agricultural sector. Among the opportunities to improve the financial and economic security of the agricultural sector, it is advisable to highlight socio-economic factors: the development of social infrastructure, the use of modern approaches to determining and improving the level of financial and economic security of economic entities.

Reducing threats to the financial and economic security of the agricultural sector will improve their development and provide an opportunity to achieve the appropriate level of implementation of measures to improve the efficiency of economic resources, ensure the production of new technologies and develop social infrastructure.

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