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Substantiation of the Risk Neutralization Mechanism in the Financial Security Management of Agricultural Enterprises

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Abstract: In the context of the Ukrainian economy reforming and ensuring that economic activity is conducted in accordance with current global economic trends, special attention should be paid to solving the problem of neutralizing risks in the financial security management of agricultural enterprises. The purpose of this article is to substantiate the risk neutralization mechanism in the management of financial security for enterprises in the agrarian sector. In writing this article, we used scientific methods such as modeling (to determine the impact of a certain set of factors on the level of enterprises' financial security), analysis and synthesis (to find out the reasons that cause changes in the studied indicators), tabular and graphical (to present the study results), and abstract and logical (to make theoretical and methodological generalizations). The study results presented in this paper are important for developing offers for neutralizing risks in the financial security management of agricultural enterprises.

Keywords: financial security; financial stability; risk; management; agricultural enterprises

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Citation: Davydenko, N.; Wasilewska, N.; Titenko, Z.; Wasilewski, M. Substantiation of the Risk Neutralization Mechanism in the Financial Security Management of Agricultural Enterprises. *Sustainability* **2024**, *16*, 1159. https://doi.org/10.3390/su16031159

Academic Editor: Wen-Hsien Tsai

Received: 1 December 2023
Revised: 17 January 2024
Accepted: 23 January 2024
Published: 30 January 2024

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1. Introduction

Agricultural enterprises develop and operate in a fiercely competitive and risky business environment, which significantly affects their performance and has a direct impact on the level of their financial security. In a changing external environment that significantly affects business and the ability to ensure an adequate level of financial results, it is important to reduce the impact of negative factors on the development of enterprises.

Despite the significant potential of the agricultural sector, there are a number of negative factors, including a shortage of investment resources, high depreciation of fixed assets, low competitiveness of products, and insufficient use of innovative technologies, which negatively affect the financial performance of enterprises. In order to improve the level of their performance, it is of primary importance to elaborate a development strategy that requires an effective system of financial support. In today's business environment, the financial condition of enterprises is important for their development, so the issue of studying the impact of various factors on the financial security of agricultural enterprises is of primary importance.

The concept of financial security for enterprises is quite complex and involves taking into account external and internal risks of activity, substantiating the enterprise's development strategy, taking into account the changing conditions of the external environment, and the available financial resources of the enterprise.

In her research, Tanklevska N. focuses attention on taking into account the influence of external and internal factors; in particular, she notes that "the financial security of an enterprise is such a financial and economic state of an enterprise that helps ensure the

protection of its financial and economic interests from negative factors of the external and internal environment and the creation of the necessary financial and economic conditions for continuous successful activity and sustainable development of the enterprise" [1], (p. 636).

In her research, Horiacheva offers the following statement regarding the category of financial security of the enterprise: "which is manifested in the existing financial state, which is characterized by the balance and quality of financial instruments, technologies and services, resistance to threats, the ability of the financial system of the enterprise to ensure the realization of its own financial interests, missions and tasks with sufficient amounts of financial resources, as well as to ensure the effective and sustainable development of this financial system" [2].

Lavrova believes that "the financial security of an enterprise is a system that ensures the stability of important financial proportions of the enterprise's development, which form the security of its financial interests in balance with the financial interests of its economic agents" [3], (p. 275).

According to Kudrytska, the financial security of an enterprise should be understood as "the balanced state of its elements and subsystems as a separate economic system, which can be expressed by quantitative or qualitative indicators and is characterized by resistance to the negative effects of the internal and external environment and the ability to ensure its effective functioning, stability of development and economic growth in the long term" [4]. In his research, the author defines financial security as a separate system, but financial security is a characteristic of the financial system as a whole.

According to N. Davydenko, the financial security of corporations should be ensured at three levels: first, attracting financial resources; second, their effective use in production processes; and third, effective dividend policy due to the distribution of income and profit [5], (p. 59).

Note that financial security is a component of economic security and is characterized by a system of quantitative and qualitative indicators that have marginal criterion values and must ensure the financial stability of the enterprise from a certain perspective.

Studies show that there is a significant variety of interpretations of this economic category, which confirms the fact that there is no consensus among scholars on the issue under consideration. However, we can note the existence of two main approaches to determining the financial security of an enterprise.

The first approach is based on achieving the main goal of the enterprise's economic activity as an object of management. The essence of the financial security concept and the task of the financial security-ensuring system in this case is the ability of the enterprise to function effectively and provide an increase in competitive positions on the market. Supporters of this approach [6–14] define the criterion of financial security as the achievement of the enterprise's goal.

Another group of scholars [15–19], when studying the concept of the financial security of an enterprise, focuses on its ability to counteract internal and external threats. Researchers recognize the criterion of financial security as the protection of all structural elements of the enterprise from threats.

Risks and threats that directly affect the activities of enterprises are constantly in the focus of scholars' attention, as they have a significant impact on financial stability and performance.

Scholars have determined that risks and threats can affect corporate investment decisions [20–22], as well as the ownership structure [23], relations with employees and suppliers, and even the enterprise's strategy [24–26].

Therefore, one of the important tasks in the process of determining the appropriate level of financial security for an enterprise is to identify the factors that have a direct impact on it. The research conducted shows that in the economic literature, there is a diverse classification of factors that have an impact on this economic category.

In our research, we agree with the views of scholars [27–29] on the division of influence factors into positive and negative ones.

In modern security theory, there are several levels of destructive factors:

1. The probability of a situation that can generate danger (emergence of a risk zone).
2. Provocative actions or means of pressure (challenge).
3. The real possibility of causing evil or harm (danger).
4. Intention to harm or unintentional dangerous set of circumstances (threat) [30], (p. 251).

In order to develop effective ways to ensure a sufficient level of financial security for an enterprise, it is of particular importance to identify and assess the existing threats and dangers of conducting business. Therefore, in the course of the study, the identification of negative factors and the assessment of their impact on the financial performance of an enterprise are of particular importance.

However, it should be understood that the impact of positive factors (favorable natural and climatic conditions, availability of markets for products, provision of financial and production resources, etc.) should be constantly assessed and analyzed. This is because, in certain economic conditions, these factors can be transformed into negative ones and have a destructive impact on the financial security of enterprises. Therefore, continuous monitoring of the impact of both positive and negative factors is important in the course of business.

Having analyzed different points of view on ensuring the financial security of agricultural enterprises, we have determined that most often, the set of influence factors is divided into internal and external factors. However, for a more thorough study of them, it is worth grouping them by their main features and the possibility of determining their impact.

Our in-depth analysis of external factors affecting the financial security of agricultural enterprises allowed us to group them as follows:

- Regulatory: constant changes in legislation, in particular related to taxation, are destructive, but ensuring the stability of regulatory acts will have a positive impact;
- Economic: destructive factors include high inflation, fluctuations in the national currency, and economic crises. These factors can also have a positive impact, in particular by ensuring a sufficient level of state support for the agricultural sector;
- Political: the instability of the political situation in the country and the war with Russia have a negative impact, while the simplification of business operations and the reduction in pressure from regulatory authorities in the industry have a positive impact on improving financial security;
- Technological: in agriculture, these factors have a significant impact; in particular, the negative one is due to the lack of use of modern machinery and equipment in the industry, while the introduction of the latest technologies in the production process improves product quality and, in turn, has a positive impact;
- Environmental: the environmental situation in the country is important and has a significant impact on the efficiency of agricultural enterprises; destructive factors include soil degradation and rising temperature regimes, which lead to the implementation of irrigation systems. As for the positive impact, it is worth noting the presence of certain areas with the possibility of organic production;
- Socio-demographic: the high level of labor migration, especially in certain regions, is a destructive factor, while increasing the level of social protection for the rural population will have a positive impact.

The impact of external factors on financial security does not directly depend on the activities of the enterprise itself, and, therefore, it is impossible to minimize their negative nature. Therefore, from the point of view of controllability and validity, internal factors are more important since they are conditioned by the peculiarities of the business activities of the enterprise under study.

In the course of the study, we identified a number of internal factors that have a direct impact on financial security. Thus, the main internal factors include the following: managerial (coherence of strategic and tactical goals of the enterprise, ensuring the effective work of financial managers), financial (structure of the enterprise's capital, amount of receivables and payables, and level of profitability), resource (ensuring a continuous production process due to the availability of production, financial, and labor resources), innovative (introduction of innovative production technologies to increase the competitiveness of products), human resources (level of staff qualification, increasing the level of labor motivation), and other factors. Taking into account the above factors will make it possible to improve the financial condition of the enterprise and ensure an increase in the level of financial security of agricultural enterprises.

The aim of the article is to conduct a thorough analysis of the impact of external and internal factors on the level of financial security of agricultural enterprises, which will make it possible to develop an effective mechanism for neutralizing the risks in the management of financial security of enterprises in the agrarian sector.

2. Materials and Methods

In a financial analysis, there are five main groups of financial ratios, the calculation of which makes it possible to assess the financial condition of an enterprise and the level of its financial security. Among them, a prominent place belongs to the analysis of profitability indicators, in which the basic component is the net profit of the enterprise. At the same time, there are a number of indicators that are widely used in international practice but are of limited use in Ukrainian practice. Thus, it is worth noting the EBITDA indicator, which is calculated by investors to assess the effectiveness of potential investments and indicates the level of financial security.

Academic publications do not pay much attention to the calculation and analysis of this indicator. For example, Yu. V. Netesanyi notes that the EBITDA indicator makes it possible to analyze the enterprise's profit without taking into account "all the nuances of financing expenses and accounting formats adopted by a particular company" [31], (p. 33). In fact, this indicator makes it possible to compare the profitability of companies in different industries and countries. The method for measuring this indicator in the context of calculating the return on assets and capital is discussed in the works of K.S. Malynka, T.P. Lobodzynska [32], T.Yu. Chaika, V.V. Martynova, D.V. Nevmyrych [33], A.V. Ozeran [34], and T.V. Savchuk [35], Hogg, R.V., and Craig, A.T. [36], and I.M. Stewart [37].

The object of this research is the activity of agricultural enterprises in Ukraine for 2013–2021. Due to the Russian–Ukrainian conflict, some Ukrainian enterprises were unable to submit activity reports in 2022. Therefore, the author's data for this period are not taken into account, as they do not objectively reflect the situation in the country. For a more detailed analysis, it is advisable to use correlation and regression analyses, in particular the volume of attracted investments (X1), gross value added in the industry (X2), output (production at actual prices) (X3), exchange rate fluctuations (X4), cost of capital (X5), and exports of agricultural products (X6) on the financial performance of agricultural enterprises' EBITDA (Y1) during 2013–2021.

EBITDA represents the company's total income before taxes and fees, excluding loans and production costs. EBITDA is an indicator of the entire activity of the company, which includes operational, investment, and financial activities [38].

EBITDA = Net profit—Financial income + Financial expenses + Income tax + Depreciation

For the analysis, a linear function is used, the general form of which is shown below:

$$Y = A + A_0X \cdot \quad (1)$$

A linear function describes a very wide range of economic processes.

Depending on the sign of the parameter, the linear function will describe different economic processes, such as accelerated growth, slow growth, and decline [39–41].

The Durbin–Watson test focuses on examining ordinary least squares (OLS) residuals. DW is a statistical test that compares the presence of autocorrelation in the regression residuals. The main characteristic of a data series with autocorrelated residuals is a defined trend in the data [42,43].

The coefficient of determination is a measure of the closeness of the relationship between all explanatory variables and the dependent variable, i.e., in this case, the relationship between the factors is very close [44].

To draw conclusions about the practical significance of the correlation, the Chaddock scale is used. According to the Chaddock table, we can see the density of the relationship between the performance index and the factors [45].

The elasticity coefficient is used to determine the dependence of the change in the performance indicator on the factor index [46,47]. It determines by how many percent the average change in the performance index (Y) will occur when the factor index (X) changes by 1% [48].

$$E = f'(x) \cdot \frac{\dot{x}}{\dot{y}} \tag{2}$$

The equation for the linear model is as follows:

$$E = a_1 \cdot \frac{\dot{x}}{\dot{y}} \tag{3}$$

3. Results

The current situation in Ukraine has led to a number of challenges faced by agricultural enterprises in particular and the economy as a whole. This has necessitated an increase in the level of financial security of the studied business entities, which will help ensure highly profitable production and stimulate the efficient and economical use of material and financial resources.

Enterprises in the agricultural sector of Ukraine's economy have significant potential and are the basis for ensuring sustainable development and strengthening the country's competitive position in the international market.

Minimizing the risks to the financial security of the enterprise requires, first of all, the identification of these risks, the assessment of their impact, and the development of effective directions for their management. The most important thing is the development of effective management methods, which will make it possible to ensure the appropriate level of financial security for the enterprises under study.

In his monograph, Vlasyuk O. defines the "threats to the financial security of Ukraine" as a set of existing and potentially possible phenomena and factors that destabilize the financial sphere, the manifestations of which are a sharp drop in GDP, disruption of the process of formation and distribution of centralized state funds, destabilization of the banking system, devaluation of the national currency and default by sovereign debts, and a growing level of shadowing of the economy [49], (p. 34).

The main characteristic of the unwanted impact of risks is a decrease in the financial stability of enterprises and a deterioration of the main indicators of their financial condition as a whole, which is due to the influence of external and internal factors on the activities of enterprises and can be effectively influenced by making management decisions.

Conducting economic activity requires the formation of a strategy for the development of the enterprise, especially the agricultural sector. However, the situation in the world, in particular the COVID-19 pandemic and in the country as a whole, regarding the Russian–Ukrainian conflict has a negative impact on the financial results of enterprises and hinders the development of effective ways of minimizing risks. In 2022, agricultural enterprises had significant problems with harvesting as well as the sale of agricultural products, in particular to foreign markets, which will be reflected in the financial condition of these enterprises [50–53].

Climate change has a significant impact on the financial security of agricultural enterprises, the speed and scale of which have increased significantly over the last century. As noted by practitioners, noticeable changes in weather conditions create difficulties for the application of conventional methods of agriculture. Temperature fluctuations, frequent and intense extreme weather events, as well as CO_2 emissions, complicate the cultivation of plants and reduce their yield. In particular, the impact of cold can severely damage crops, leading to the loss of the crop. On the other hand, a warm and humid climate promotes the spread of pests, and an increased level of CO_2 can reduce the protein content of rice, soybeans, and wheat [54]. Therefore, when determining the main destructive factors affecting the level of financial security of agricultural enterprises, special attention should be paid to climatic risks.

The main risks that threaten the financial security of a business entity include (Table 1) the following:

- Risk of loss of financial stability;
- Risk of unprofitability of certain types of activities or the enterprise as a whole;
- Risk of loss of liquidity;
- Risk of an inefficient capital structure;
- Investment risk;
- Tax risk;
- Climate risk;
- Other types of risk.

Table 1. Risks that threaten the financial security of business entities.

Types of Risks	Causes of Risk Occurrence					
	Imperfect Legislation	Economic Situation in the Country	Force Majeure Circumstances	Inefficient Enterprise's Financial Management	Competitors' Activities	Inflation
Risk of loss of financial stability		+		+	+	
Risk of unprofitability			+	+	+	
Risk of loss of liquidity			+			+
Risk of inefficient capital structure				+		+
Investment risk	+	+				
Tax risk	+					
Climate risk	+		+			

Source: authors' own research.

The financial security of agricultural enterprises is associated with their ability to effectively use available financial resources, provided that the impact of negative external and internal factors is reduced. Given that the risks associated with the financial activities of an enterprise are among the most dangerous in terms of their negative consequences, it is advisable to ensure their constant monitoring and timely diagnosis.

Most scholars consider that the "risk" and "threat" concepts are identical and do not actually differ in essence. However, some economists disagree with this, as they believe that these are still different concepts, although they remain connected to each other: if there is a threat of influence from external and internal environmental factors, then when making certain decisions, there is a risk of losing financial stability and not being able to achieve the planned results. We consider it appropriate to agree that the "risk" and

"threat" concepts are somewhat different in nature: threats to the financial security of an enterprise are characterized by certain undesirable events for the enterprise, and risks are characterized by the probability of their occurrence [55,56].

In the course of agricultural enterprises' activities, there are risks that have a negative impact on the financial security of enterprises (Figure 1).

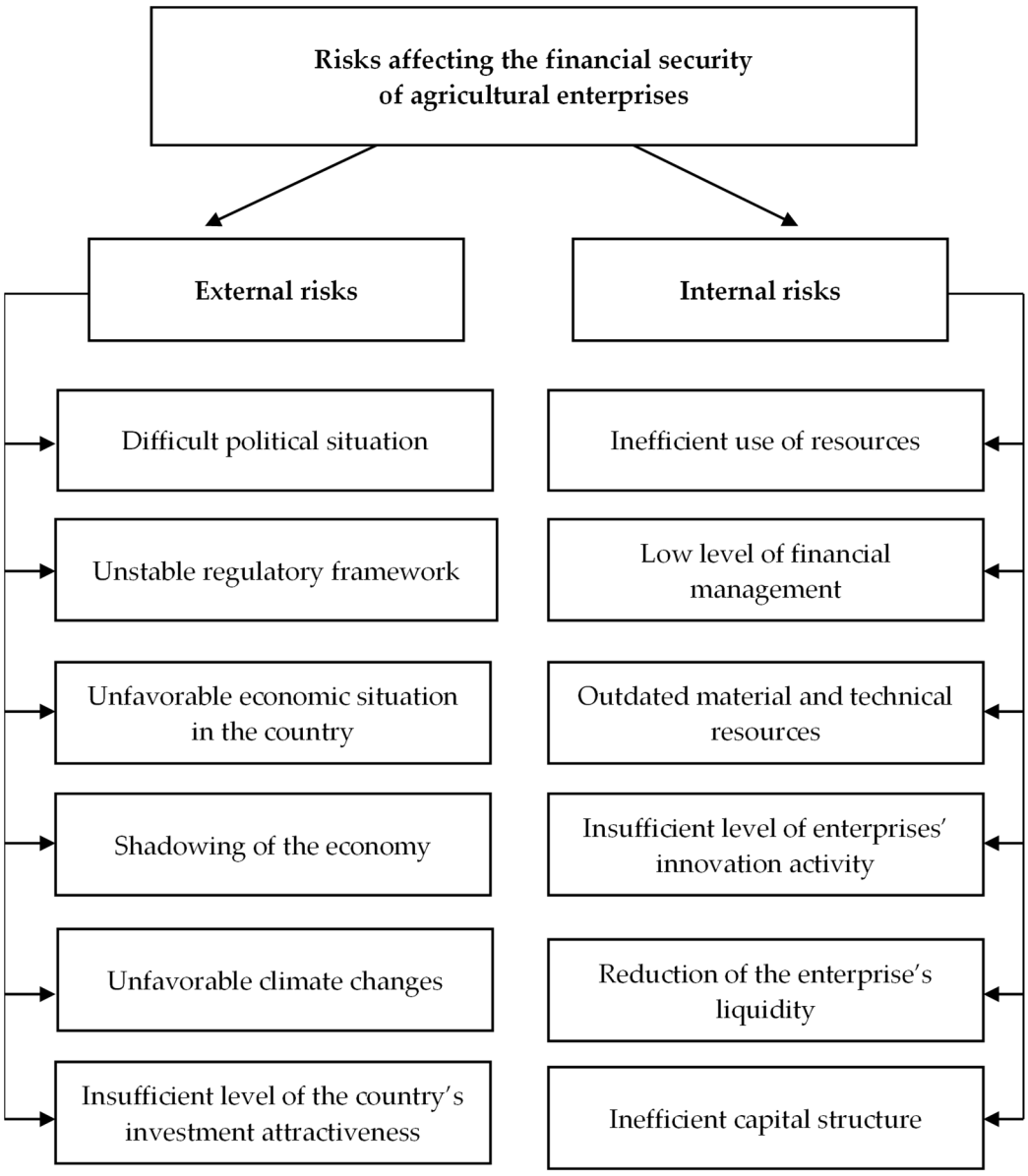


Figure 1. Threats to the financial security of agricultural enterprises. Source: authors' own research.

In the economic literature, these threats are most often grouped according to their impact, i.e., external and internal. As for internal threats, effective financial management can significantly minimize their consequences. As for external threats, it is quite difficult to neutralize their impact, but they should be taken into account when developing a strategy for agricultural enterprises. In particular, attracting additional investment resources to upgrade the material and technical resources and use innovative production technologies is significantly complicated by the instability of the regulatory framework and the economic and political situation in the country. One of the significant threats to financial security is the impact of climatic conditions, as severe droughts in 2019 greatly reduced the finan-

cial results obtained, and the share of enterprises that incurred losses during the period increased accordingly.

In modern economic conditions, climate change can lead to a decrease in harvest and increase risks for agricultural enterprises. However, the destructive impact of the climate can be reduced, in particular through the use of innovative technologies that allow obtaining information about climate changes and predicting their impact on future crops, thus reducing the risk of losing financial stability due to climate change. Climate change is an inevitable factor; therefore, in order to minimize the risk, agricultural enterprises should grow less vulnerable varieties of plants and use the appropriate technology of soil treatment, which will reduce moisture loss.

Ensuring an adequate level of financial security for agricultural enterprises involves identifying and substantiating the main factors that have a direct impact on the economic category under study. It is important to determine the impact of these factors on the dynamics, which will make it possible to assess the degree of their interconnection in order to develop measures to minimize their negative consequences.

Having analyzed the macroeconomic factors that affect the financial security of agricultural enterprises, we can group them as follows:

- General economic: gross output value, gross value added, production volume, etc.;
- Specific: inflation rate, exchange rate, exports, per capita consumption, etc.;
- Partial: the impact of these factors is manifested in a specific economic situation, in particular the impact of the COVID-19 pandemic, the Russian–Ukrainian conflict, and the impact of climatic fluctuations during the sowing or harvesting period (dry summer or rainy autumn).

The specifics of conducting business in the agricultural sector of the economy and the significant dependence of the results obtained not only on economic and natural but also on climatic factors necessitate a PESTEL analysis. The essence of this analysis is to study the following set of factors: political (P), economic (E), social (S), technological (T), environmental (E), and legal (L) [57]. The combination of these external factors has a direct impact on the activities of agricultural enterprises and determines the level of their financial security.

When conducting this analysis, it is reasonable to determine the impact of each individual factor and the possibility of minimizing their negative consequences in the process of conducting business (Table 2).

The results of the analysis conducted indicate that environmental factors have a direct impact on the activities of agricultural enterprises. Most of the studied factors are potential threats, but certain changes in the economic situation in the country may change the vector of influence of the studied factors.

To analyze the closeness of the relationship, we identified six main indicators that have a significant impact on the financial performance of enterprises in the agricultural sector of the Ukrainian economy (Table 3).

To analyze the closeness of the relationship, we identified six key indicators that have a significant impact on the financial performance of agricultural enterprises in Ukraine. The performance indicator EBITDA had significant fluctuations during the period under study, but in 2021, its value increased significantly and amounted to UAH 286 billion, due to favorable economic (high selling prices of the main types of agricultural products) and natural conditions (the level of yield for the main crops was 1.5 times higher compared to the previous year). These dynamics resulted in a financial safety margin in 2022 for agricultural enterprises despite the difficult economic situation caused by the war as well as by unfavorable natural and climatic conditions (significant rainfall in the autumn), which negatively affected the harvested crops.

The closeness of the relationship between the studied factors will be assessed using correlation and regression analyses (Table 4). If the value of the correlation coefficient is positive, this indicates a direct relationship between the studied indicators, and vice versa, a

negative value is evidence of an inverse relationship; that is, with the growth of the studied factor, the performance index tends to decrease.

Table 2. Generalized results of a PESTEL analysis.

Components of PESTEL Analysis	Factors	Influence Characteristics	Possibilities +/ Threats −
Political	- Political stability;	Ensuring political stability reduces the uncertainty factor in the activities of agricultural enterprises;	+/−
	- State support for agricultural producers;	Providing support to agricultural enterprises at the state level (through specific government programs);	+
	- Establishment of international cooperation	Relevant international programs for the development of innovative technologies will have a positive impact on the activities of enterprises.	+
Economic	- Inflation rate;	It has a negative impact on businesses, as it depreciates money and reduces the purchasing power of the population;	−
	- Exchange rate fluctuations;	In agricultural production, a significant amount of resources involved in the production process are of foreign origin (protective equipment, planting material), and the rise in the exchange rate negatively affects the final results of operations;	−
	- Attracting investments;	The favorable investment climate and the growth of foreign investment have a positive impact on the activities of agricultural enterprises.	+
Social	- Population migration;	Outflow of highly qualified specialists;	−
	- Level of rural population education;	Causes restrictions on the introduction of new technologies.	−
Technological	- Introduction of innovative technologies;	Improving the competitive position of enterprises through the use of the newest technologies;	+
	- Updating the material and technical resources;	Reducing physically and morally outdated equipment in agricultural production will help improve product quality and reduce its cost.	+
Environmental	- Depletion of natural resources;	Failure to comply with crop rotation and excessive use of plant protection products negatively affect soil quality;	−
	- Minimization of environmental pollution in the process of production of agricultural products;	The use of modern technologies in the production process should ensure compliance with environmental regulations and standards;	+
	- Climatic changes	Changes in the ripening periods of agricultural crops and increasing their ability to be affected by pests.	−
Legal	- Legislative stability;	Constant changes in regulations, in particular with regard to taxation;	−
	- Protection of investor interests;	Developing appropriate regulations to protect investors will help attract foreign investment.	+

Source: composed by authors.

Table 3. Initial data for correlation and regression analyses of the macroeconomic factors' impact, 2013–2021.

Years	EBITDA, UAH Billion	The Amount of Attracted Investments, UAH Billion	Gross Value Added, UAH Billion	Production, UAH Billion	Exchange Rate, UAH/USD	Capital, UAH Billion	Export, UAH Billion
	Y	**X_1**	**X_2**	**X_3**	**X_4**	**X_5**	**X_6**
2013	26	18	66	184	7.99	309	198.1
2014	33	18	121	272	11.89	386	136.1
2015	117	29	177	396	21.84	680	318.1
2016	108	50	179	449	25.55	792	390.5
2017	88	63	186	493	26.60	904	598.4
2018	99	65	191	580	27.20	974	572.3
2019	132	59	196	601	25.85	1020	472.3
2020	122	50	255	643	26.96	1121	506.3
2021	286	68	312	736	27.29	1332	762.6

Source: developed by the authors based on [58].

Table 4. Matrix of correlation between financial results and environmental factors for 2013–2021.

	Y	**X_1**	**X_2**	**X_3**	**X_4**	**X_5**	**X_6**
Y	1						
X_1	0.6657	1					
X_2	0.9045	0.7649	1				
X_3	0.8250	0.8887	0.9468	1			
X_4	0.6520	0.9043	0.8257	0.8964	1		
X_5	0.8464	0.9016	0.9530	0.9941	0.9025	1	
X_6	0.8021	0.9458	0.8571	0.9059	0.8464	0.9343	1

Source: developed by the authors.

The analysis of the correlation matrix shows that all the factors under study have a direct impact on the performance indicator, i.e., their growth will contribute to the improvement of financial performance. The Chaddock scale was used to assess the level of correlation density.

The analysis of the dependence showed that gross value added (X2) has a significantly high impact on the performance indicator EBITDA (Y), while output (production at actual prices) (X3), cost of capital (X5), and agricultural exports (X6) have a high impact on the performance indicator. There is also a significant relationship between the volume of attracted investments (X1), exchange rate fluctuations (X4), and the financial performance of agricultural enterprises (the EBITDA indicator) (Y1).

Factors that are closely related to each other cannot be included in a multivariate equation. The correlation between factors in a multiple regression equation is called collinearity. Collinearity makes it difficult to study the impact of individual factors on the outcome measure [59]. We will use a regression analysis to build linear equations

to quantify the impact of individual factors on the performance index and assess its significance according to the relevant criteria (Table 5).

Table 5. Assessment of the influence of the studied factors on the performance index, 2013–2021.

Performance/Factorial Indicator	Coefficients of the Regression Equation		Fisher's Criterion	Student's Criterion	Average Values	Elasticity Coefficient
	a_0	a_1				
Y					112.34	
X_1	−5.439	2.520	5.571	2.360	46.75	1.05
X_2	−68.360	0.965	31.489	5.612	187.21	1.61
X_3	−55.264	0.346	14.918	3.862	483.86	1.49
X_4	−37.697	6.713	5.176	2.275	22.35	1.34
X_5	−46.681	0.190	17.680	4.205	835.17	1.42
X_6	−19.916	0.301	12.625	3.553	439.41	1.18

Source: developed by the authors based on [58].

Based on the results of the analysis, we can conclude that there is a close relationship between the factors under study and the performance index, since

$$F_{calculated} \geq F_{tabular} \quad (4)$$

According to Fisher's criterion, the dependence equations are statistically significant: the calculated values of the F-criterion exceed the table value for all the studied indicators. The value of the Student's criterion for all factors (X1–X6) exceeds the table value (2.26), which indicates the significance of the sample correlation coefficient and confirms the reliability of the influence of the selected factors on the result (Table 5).

The correlation and regression model of the EBITDA dependence on the amount of attracted investments is as follows:

$$Y = -5.4393 + 2.5195X_1 \quad (5)$$

The value of the coefficients of the regression equation shows an increase in the variable Y when X1 changes by one compared to the average. Thus, with an increase in investment of UAH 1 billion, EBITDA increases by UAH 2.5 billion. The interpretation of the elasticity coefficient is important in the analysis, as it indicates how many percent the performance index (Y) will change on average if the factor index (X) changes by 1%. A 1% increase in investment leads to a 1.05% increase in the performance index (EBITDA) compared to the average values in the sample.

The correlation and regression model of EBITDA dependence on gross value added is as follows:

$$Y = -68.360 + 0.965X_2 \quad (6)$$

The analysis of the dependence of these factors shows that an increase in gross value added of UAH 1 billion will lead to an increase in EBITDA of UAH 0.965 billion. As for the elasticity coefficient, its value is 1.61, which is the highest value among all the values studied, indicating that a 1% increase in the studied factor X2 will contribute to a 1.61% increase in the performance indicator.

The correlation and regression model of EBITDA dependence on output (production at actual prices) is as follows:

$$Y = -55.264 + 0.346X_3 \quad (7)$$

Thus, it can be concluded that a 1% increase in output will lead to a 1.49% increase in financial results, as evidenced by the elasticity coefficient. The value of the coefficient of the regression equation indicates that an increase in output of UAH 1 billion will contribute to an increase in EBITDA of UAH 0.346 billion.

The estimation of the closeness of the relationship between the performance index (Y) and the cost of capital (X5) and agricultural exports (X6) shows that a1 is 0.190 and 0.301, respectively, which determines the coefficient of increase for the variable Y when increasing X5 and X6 by one compared to the average. Thus, it can be concluded that with an increase in the cost of capital and exports, the financial performance of agricultural enterprises tends to increase.

Based on the elasticity coefficients, we can conclude that a 1% increase in the cost of capital and exports of products increases financial performance (EBITDA) by 1.42% and 1.18%, respectively, compared to the sample mean.

An assessment of the closeness of the relationship between the influence of external factors proves their importance for the performance indicator. Equally important to the analysis is examining the impact of internal factors. Our research shows that external factors are important, but enterprises cannot influence them. Microenvironmental factors are more manageable from the perspective of the enterprise, and their fluctuations can be significantly influenced by effective measures at the enterprise.

For a more detailed analysis, it is reasonable to assess the degree of influence of microenvironmental factors on the financial performance of agricultural enterprises using correlation and regression analyses. In the course of our study, we identified indicators that, in our opinion, have the most significant impact, in particular the amount of attracted investments (X1), capital productivity (X2), asset turnover (X3), credit resources (X4), and financial leverage ratio (riskiness of the capital structure) (X5), on the financial performance of agricultural enterprises' EBITDA (Y1) during 2013–2021 (Table 6).

Table 6. Initial data for correlation and regression analyses of the impact of microenvironmental factors, 2013–2021.

Years	EBITDA, UAH Billion	The Amount of Investments Attracted by Enterprises, UAH Billion	Capital Productivity	Asset Turnover	Credits, UAH Billion	Financial Leverage Ratio
	Y	X_1	X_2	X_3	X_4	X_5
2013	26.0	18.2	0.299	0.399	34.3	0.995
2014	33.1	18.4	0.532	0.532	41.0	1.382
2015	116.9	29.3	0.514	0.514	48.4	1.496
2016	107.5	49.7	0.254	0.254	48.5	1.181
2017	88.4	63.4	0.484	0.484	54.1	1.088
2018	99.4	65.1	0.518	0.518	60.7	1.033
2019	131.5	58.6	0.527	0.527	67.4	0.966
2020	122.3	50.2	0.524	0.525	57.1	0.843
2021	285.9	68.0	0.669	0.869	59.8	0.684

Source: developed by the authors based on [58].

To analyze the closeness of the relationship, we identified five main indicators from the entire set that have a significant impact on the financial performance of enterprises in the agricultural sector of the Ukrainian economy.

In order to determine autocorrelation in regression residuals, we will use the Durbin–Watson test. The classic Durbin–Watson test examines the strength of the relationship between the investigated factors as follows:

$$d = \sum_{t=2}^{T} (e_t - e_{t-1}) / \sum_{t=1}^{T} e_{t^2}$$

where

t—the total number of investigated factors;

e_t—t residual of the regression model.

We will assess the correlation between the EBITDA ratio (Y) and the volume of attracted investments (X1) according to the proposed methodology. It is determined that the test statistic d = 1.05137 for the X1 factor. By comparing this value with the Durbin–Watson table, it is stated that for nine observation periods and k = 2 independent variables in the regression model of the Durbin–Watson table, the upper and lower critical values are as follows: the lower critical value is 0.82, and the upper critical value is 1.32. Since our test statistic 1.05137 is not out of this range, we do not have sufficient evidence to reject the null hypothesis of the Durbin–Watson test. In other words, we have shown that there is no correlation among the residuals.

Using this method, we checked other factors for the presence of autocorrelation and obtained similar conclusions about its absence.

The methodology for assessing the closeness of the relationship for microenvironmental factors is similar to that used for the macroenvironment. That is, the degree of closeness of the relationship between the studied factors will be assessed using correlation and regression analyses (Table 7). Since the studied factors affect not only the performance index but also have a direct relationship with each other, we cannot use multifactorial dependence. Out of the entire set of factors studied, X1–X4 have a positive value, which characterizes the existence of a direct relationship between the studied indicators and the performance index. Instead, X5 has a negative value, meaning that a decrease in this indicator will have a positive impact on financial results and vice versa. Since the financial leverage indicator shows riskiness, the inverse relationship with the EBITA indicator is natural.

Table 7. Matrix of correlation between financial results and internal environmental factors for 2013–2021.

	Y	**X_1**	**X_2**	**X_3**	**X_4**	**X_5**
Y	1					
X_1	0.6657	1				
X_2	0.6075	0.3941	1			
X_3	0.7471	0.3644	0.9067	1		
X_4	0.6311	0.8680	0.5743	0.4280	1	
X_5	–0.5807	–0.6094	–0.2730	–0.4787	–0.4815	1

Source: developed by the authors.

As in the analysis of the macroenvironment, the assessment of the closeness of the relationship between the microenvironmental factors was determined using the Chaddock scale. The dependence analysis showed a positive impact of asset turnover (X3) on the performance indicator EBIDTA (Y) and a significant positive impact on the performance indicator of the amount of attracted investments (X3), cost of capital (X1), capital productivity (X2), and the amount of credit resources (X4). There is also a significant negative impact

of the financial leverage ratio (X5) on the financial performance of agricultural enterprises (by the EBIDTA indicator) (Y1).

Using a regression analysis, we will build linear equations to quantify the impact of individual factors of the internal environment on financial performance and assess their significance according to the relevant criteria (Table 8).

Table 8. Assessment of the microenvironmental factor influence on the performance index, 2013–2021.

Performance/Factorial Indicator	Coefficients of the Regression Equation		Fisher's Criterion	Student's Criterion	Average Values	Elasticity Coefficient
	a_0	a_1				
Y					112.34	
X_1	–5.439	2.520	5.571	2.360	46.75	1.05
X_2	–59.972	358.908	4.094	2.023	0.48	1.53
X_3	–66.084	347.456	8.842	2.973	0.51	1.59
X_4	–126.982	4.571	4.634	2.153	52.36	2.13
X_5	297.823	–172.675	3.561	–1.887	1.07	–1.65

Source: developed by the authors.

The conducted studies show the existence of a close relationship between the microenvironmental factors and the performance index (EBIDTA) since $F_{calculated} \geq F_{tabular}$. According to the Fisher and Student's criteria, the equations of dependence between the selected factors and the performance index are statistically significant and confirm the reliability of the influence of the selected factors on the result (Table 8).

The correlation and regression model of EBIDTA dependence on capital productivity is as follows:

$$Y = -59.572 + 358.908X_4 \quad (8)$$

It can be concluded that a 1% increase in capital productivity will contribute to a 1.52% increase in the performance indicator.

Assessment of the closeness of the relationship between the performance index (Y), asset turnover (X3), and credit resources (X4) shows that a1 is 347.456 and 4.571, respectively, which determines the coefficient of increase for the variable Y when increasing X3 and X4 by one compared to the average. Thus, it can be concluded that with the increase in asset turnover and the growth of credit resources, the financial performance of agricultural enterprises tends to increase.

The analysis of the elasticity coefficient shows that a 1% increase in asset turnover and credit resources leads to an increase in financial performance (EBIDTA) by 1.59% and 2.13%, respectively, compared to the sample average.

The correlation and regression model of EBIDTA dependence on the financial leverage ratio is inverse and looks as follows:

$$Y = 297.823 - 172.675X_5 \quad (9)$$

Therefore, we can conclude that with a 1% decrease in the factor under study, the performance indicator will increase by 1.65%.

4. Discussion and Conclusions

In today's realities, the Ukrainian economy is quite vulnerable and suffers from various challenges; therefore, the issue of financial security is gaining more and more relevance, since this factor is an objective condition for ensuring sustainable socio-economic

development. In order to increase the level of financial security, it is necessary to implement a justified choice of the state's economic strategy, to create a comprehensive and perfect regulatory and legal field, and to constantly monitor global economic changes with the aim of early detection of the emergence of crisis phenomena and the implementation of preventive measures to minimize their negative impact on the financial system of the country as a whole.

In order to constantly support the financial security of the enterprise at the appropriate level, it is necessary, first of all, not to forget about such an important internal component as organizational security, which is primarily related to the competence of the personnel of the enterprise itself [60].

Different researchers propose their own set of factors that directly influence the financial security of enterprises. For instance, O. E. Ponomarenko finds it appropriate to define the following indicators characterizing the dynamics of the influence factors of the external (GDP, price index, consolidated budget indicators, balance of trade) and internal (activity profitability, gross value added, indicators of investment and innovation activities, indicators of financial stability) environments [61]. In his research, I. V. Tomashuk suggests considering the following among the external risks: the country's development level, inflation rate, exchange rate differences, interest rates in the financial market, and industry development. As for internal factors, the following should be considered: the availability of internal resources, the level of investment activity, asset structure, risk management, and the level of employee qualification [62].

On the basis of a comprehensive study, the article identifies the factors of the external and internal environment that directly affect the financial security of agricultural enterprises. It is established that they can have both positive and negative impacts. Thus, external factors include regulatory, economic, political, socio-demographic, and environmental factors. Their impact on financial security does not depend directly on the activities of the enterprise itself, and, therefore, it is impossible to minimize their negative nature. Therefore, from the point of view of manageability and validity, internal factors are more important since they are conditioned by the peculiarities of the economic activity of the enterprise under study. As for the internal ones, it is worth highlighting managerial, financial, innovative, and human resources. Taking into account the above factors will make it possible to improve the financial condition of the enterprise and ensure an increase in the level of financial security.

In order to analyze the dependence of economic growth and the level of financial security of agricultural enterprises on external and internal factors, a factor analysis was carried out. The conducted research clearly shows a significant degree of influence of both internal and external factors on the financial performance of agricultural enterprises and the level of their financial security. In order to increase the level of financial security of agricultural enterprises, it is advisable to attract additional investment resources since this indicator significantly affects the level of financial security. It is proven that the output (production at actual prices), the cost of capital, and the export of agricultural products have a high impact on the performance indicator.

The analysis of the impact of external factors indicates that with a 1% increase in gross value added and production output, the examined category of EBITDA will rise by 1.61% and 1.49%, respectively. Among the selected set of external factors, these indicators have the most significant impact. Regarding microenvironmental factors, the most significant influence from the selected set is the volume of credit resources; a 1% growth in this volume will contribute to a 2.13% increase in the examined indicator, while a decrease in the financial leverage indicator will contribute to a 1.65% increase in the EBIDTA ratio. The analysis of autocorrelation using the Durbin–Watson method indicates its absence.

We have determined that the factors of the internal and external environment and the possibilities of preventing their negative impact are of great importance in ensuring the financial security of agricultural enterprises. It is important to establish an effective mechanism for neutralizing the negative impact of internal factors, taking into account the

specifics of agricultural enterprises since the enterprise has the ability to directly influence them. At the same time, the influence of external factors can be leveled as a result of the stabilization of the economic and political situation in the country, which will ensure the stability of the functioning of enterprises in general.

The adaptation of enterprises to changing climatic conditions is important for agricultural enterprises, which involves the formation of an appropriate strategy and the development of a financial mechanism for managing climate risks.

Author Contributions: Conceptualization, N.D., N.W., Z.T. and M.W.; methodology, N.D. and Z.T.; software, Z.T.; validation, N.W., N.D. and M.W.; formal analysis, Z.T. and M.W.; investigation, N.D. and N.W.; resources, Z.T. and M.W.; data curation, N.D., Z.T., N.W. and M.W.; writing—original draft preparation, N.D., M.W. and N.W.; writing—review and editing, Z.T., N.W. and N.D.; visualization, N.D.; supervision, N.W. and N.D.; project administration, M.W. and Z.T.; funding acquisition, N.W. and M.W. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: Data are available upon request from the corresponding author. Restrictions with regard to the public dissemination of data apply.

Conflicts of Interest: The authors declare no conflicts of interest.

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