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FINANCIAL PERFORMANCE DETERMINANTS OF UKRAINIAN AGRICULTURAL COMPANIES IN THE PRE-WAR PERIOD

Purpose. *The purpose of the article is to identify the determinants of the financial performance of agricultural companies in Ukraine in the pre-war period.*

Methodology / approach. *Panel data regression analysis, carried out using the GRETL software, was used as a research method. The financial statements of thirty Ukrainian agricultural companies over the defined period 2015–2021 were selected to be data for analysis. Three models were constructed in the article based on the use of three different dependent variables (Return on Assets, Return on Equity, Return on Sales) and seven independent variables (Current Ratio, Capital Intensity, Export Intensity, Leverage, Size, Dummy variable for agricultural sub-sectors, Dummy variable for location). The selection of the mentioned independent variables was logically substantiated by the structure of the financial reports of the Ukrainian agricultural companies and analytical system "You Control".*

Results. *The study of the determinants of financial performance of the agricultural companies is a widespread area of research among academicians, however, is characterized by quite controversial results. Some of these conclusions were refuted, but certain results were confirmed on the example of Ukrainian enterprises. The results of the panel regression analysis with respect to Models 1-3, partially are in contradiction with the conclusions of other studies regarding the impact of the determinants on the financial performance of agricultural companies. None of the chosen independent variables has a significant effect on all the dependent variables as investigated in the article, namely ROA, ROE, and ROS. This confirms the formulated in the study hypothesis regarding the availability of a unique set of financial performance determinants for agricultural enterprises for each individual country. The independent variables used in the study have the most significant impact on ROA. Primarily, ROA is significantly affected by CAPI (5 % level), EXPI (10 % level), and DVL (5 % level). The results obtained confirm a need for improving regional support and ensuring an access to capital for agricultural enterprises in Ukraine.*

Originality / scientific novelty. *The originality of the conducted research lies in the study of a set of factors that influenced the financial condition of Ukrainian agrarian companies in the pre-war period, considering the peculiarities of the Ukrainian agrarian sector of the economy.*

Practical value / implications. *Investors and financial institutions can benefit from the research results. By recognizing which factors have the most significant impact on financial performance, they can make more informed decisions when considering investments in Ukrainian agricultural companies. Understanding which factors influence financial performance can help in risk management for both agricultural companies and financial institutions.*

Key words: *financial performance determinants, agricultural companies, panel data regression analysis, Ukraine.*

Introduction and review of literature. Ukraine is one of the world leaders in terms of the agricultural potential. This is due to availability of the favorable climatic conditions and high-quality agricultural resources, which open significant prospects for the development of the agricultural sector of the economy. The analysis of the statistical indicators characterizing the level of economic development enables us to state that the agricultural sector is one of the priority and strategic branches of the national economy vision of Ukraine. According to the Food and Agriculture Organization of the United Nations (2022), in 2019, the agricultural land occupied 68.4 % of the Ukraine's territory, with the share of agriculture, forestry and fisheries in the GDP of Ukraine of 11.7 % in 2019 (State Statistics Service…, 2022).

Moreover, the Ukrainian export of agricultural products over decades has played an important role in ensuring the global food security system, which has become recently even more relevant due to manifestation of the consequences of COVID-19 pandemic, which led to increasing in the scale of hunger in the world. The Ukrainian exports of grain crops in the 2019–2020 marketing year was second highest in the world after the United States.

At the same time, the progressive development of the Ukrainian agriculture sector is hindered by several issues that are a combination of its Soviet past and recent process of its integration into the world agro-industrial market, i.e., hypertrophied focus on the export of plant products; insufficient state support of the agricultural sector; lack of cheap credit funds; low level of resource and infrastructural support of enterprises. All the above-mentioned obstacles have a significant impact on the activities of the agricultural enterprises, which are forced to make excessive efforts and incur additional financial costs to improve the efficiency of their activities and competitiveness in the global market environment. This determines the urgency of conducting research on determining the impact of the financial performance determinants for the agricultural companies in Ukraine, as well as developing management recommendations for its further improvement.

However, the essential problem for the further development of the agricultural sector of Ukraine today is the russian military invasion of the country, because of which a significant number of enterprises from the Eastern and Southern regions were under occupation, they either partially suspended or completely stopped their business activities. In addition, the terrorist actions of russia regarding the export of the Ukrainian grain, the blockade of ports and the destruction of production infrastructure, the contamination of the agricultural land with the ammunition is causing enormous damage to the Ukrainian agricultural enterprises. Thus, the losses of the agricultural producers due to the russian aggression amounted to USD 11.9 billion as of June 2022 (Neuter et al., 2022), and as per the analysts' forecasts, by the end of the active phase of the war, the drop in income in the agriculture and related sectors may reach from USD 4.4 billion to approximately USD 15 billion, or 10 to 30 % loss in the GDP (Kravchenko, 2022).

Estimation of the total negative impact of the russian military aggression on the activities of the Ukrainian agricultural enterprises and the agricultural sector of the

economy is possible only after the end of the war operations. As for today, the consequences of hybrid warfare during the period 2014–2022 on the activities of the Ukrainian enterprises have been analyzed by a few Ukrainian researchers (Zhyhlei & Zakharov, 2019; Zhyhlei et al., 2020; Mohylnyi et al., 2022). The main focus of the present research is to study the determinants of the financial performance of the agricultural companies in Ukraine in the pre-war period. This study will serve as a starting point for the further analysis and will allow characterizing the dependence of their financial performance on various groups of factors later, in the post-war period.

The influence of various types of determinants (individual, industry, and national) on certain performance indicators, e.g., financial performance, profitability of the activities of all types of agricultural enterprises, i.e., public companies, limited liability companies, cooperatives, and farms was previously studied by some researchers. Factors affecting financial performance of agricultural companies of different legal forms were investigated by many researchers (Katchova & Enlow, 2013; Shamsuddin et al., 2017; Burja & Burja, 2017; Mijić & Jakšić, 2017; Kimetto & Kiman, 2018; Kucher, 2020; Ababiya, 2018; Singh et al., 2019; Liu et al., 2020; Vuković et al., 2022). Some researchers carried out a detailed analysis of the influence of the factors on the financial performance of agricultural companies, e.g., form (Kravčáková Vozárová et al., 2019), production (Novotná & Volek, 2015), company's size (Odalo et al., 2016), board gender diversity (Knežević et al., 2017), R&D investment (Wang, 2019), size and specialization (Pokharel et al., 2020), size (Hampl, 2020), intellectual capital (Xu & Zhang, 2021), and capital structure (Xu et al., 2021).

The 2030 Agenda for Sustainable Development, adopted by the UN member states in 2015, is gradually forming the general trend of conducting economic research on achievement of the goals defined in the document, some researchers also considered the issue of ensuring sustainability financial performance of agriculture companies and analyzed its determinants (Wei et al., 2017; Sukhonos et al., 2018; Sokil et al., 2020; Makarenko et al., 2021; Alrowwad et al., 2022).

The influence of multiple factors on financial performance of the agricultural companies is studied on the example of a number of countries, e.g., China (Wei et al., 2017; Liu et al., 2020; Xu et al., 2021), the Czech Republic (Hampl, 2020), Ethiopia (Ababiya, 2018), Kenya (Odalo et al., 2016; Kimetto & Kiman, 2018), Romania (Burja & Burja, 2017), Serbia (Knežević et al., 2017), Slovakia (Kravčáková Vozárová et al., 2019), USA (Singh et al., 2019; Pokharel et al., 2020), as well as applying a comparative approach across some European countries (Mijić & Jakšić, 2017; Vuković et al., 2022). This confirms the relevance and necessity of considering the national characteristics of the development of the agricultural sector of the economy and the possibility of conducting a comparative analysis of the possible impact of such determinants fin case of the agricultural enterprises worldwide.

The influence factors on the company's profitability and self-financing capacity are studied by Simtion (2016), Martínez-Victoria et al. (2018). The results show that the interaction effect between the closest similar companies becomes a key factor in determining productivity growth in agri-food companies. This factor is more important

for cooperatives compared to investor-owned firms.

The purpose of particular studies is also to assess the quantitative impact on the financial condition and performance of agricultural enterprises (Psomas et al., 2016; Marchuk & Fabiianska, 2017).

The analysis of the prior research devoted to the determinants of financial performance of agricultural companies revealed a lack of both a general typical set of determinants that have a significant influence, as well as the absence of unified tendency of such influence on financial performance across different countries and regions. Based on this, the research hypothesis was defined as follows: there is a unique set of the financial performance determinants for the agricultural enterprises relevant to each individual country; the types and characteristics of such determinants (strength and behavior of influence) depend on the level of development of the agricultural sector in a particular country and its external environment, which in its turn, modifies the influence of such determinants. Based on the proposed hypothesis, to improve the financial performance of the Ukrainian agricultural companies, management requires a unique set of practical recommendations based on specialized research in which the peculiarities of the development of the national agricultural market and its external environment are well considered.

The purpose of the article is to identify the determinants of the financial performance of agricultural companies in Ukraine in the pre-war period.

Methodology. To determine the influence of factors on the financial performance of the agricultural companies in Ukraine, the performance of the thirty Ukrainian agrarian companies were analyzed for the period 2015–2021. To put it succinctly, both publicly available information disclosed in the financial statements and information obtained from the analytical system "You Control", which provides information on the activities of the Ukrainian enterprises and their external environment (economic, legal, social, etc.), was used to generate panel data. The studied sample was limited only to the agricultural companies with necessary information available for the defined 7-year period.

Considering a time lag due the publication of financial information on the official websites of the agricultural companies, access to it in the statistical databases (up to 1.5–2 years), as well as the warfare in Ukraine while conducting the research, we analyzed only available complete information on the activities of the agricultural enterprises available for the period 2015–2021.

The use of the Gretl software package is an important tool for panel data analysis in the study. The Gretl software package allowed careful preparation of the data panels in the study, including reshaping and management of datasets.

Panel data analysis was used as a statistical research method to examine data collected over several time periods (2015–2021) for 30 organizations. The use of panel data analysis made it possible to study dynamic changes over time according to the selected indicators and allowed comparing differences between research entities.

According to the Basic Nomenclature of Goods (State Statistics Service of Ukraine, 2020), the analyzed enterprises are the producers of agricultural products, hunting, and related services (A, 01). To consider the influence of sub-industry

affiliation on the financial activity of the agrarian companies, two groups have been identified in their structure. The first group includes enterprises activities of which are related to animal breeding, and the second one includes the enterprises engaged in the cultivation of grain crops. All the studied enterprises belong to non-state-owned enterprises. The companies studied are of different forms of business organization, namely 17 companies with limited liability, 8 public joint-stock companies, and 5 private joint-stock companies.

To characterize the financial performance of the agricultural companies, three dependent variables were used, i.e., Return on Assets, Return on Equity and Return on Sales. The mentioned variables are most often used by the researchers as characteristics of the financial performance in the empirical studies on the example of agricultural companies (Knežević et al., 2017; Singh et al., 2019; Ievdokymov et al., 2020; Liu et al., 2020; Xu et al., 2021; Serpeninova et al., 2022; Vuković et al., 2022).

The following independent variables Current Ratio, Capital Intensity, and Export Intensity were studied in the article as the determinants affecting the financial performance of the Ukrainian agricultural companies. The selection of the mentioned independent variables was logically substantiated by the structure of the financial reports of the Ukrainian agricultural companies and analytical system "You Control" (2022).

In addition, four control variables were also used in the study, i.e., Leverage, Size, Dummy variable for agricultural sub-sectors and Dummy variable for location. Use of these variables enabled to control for a significant effect of company size, level of borrowing capital, unseen role of the agricultural sub-sectors affiliation and the location importance. Interestingly, the choice of the last two variables was related to the need to determine the influence of sub-sectors affiliation of the companies, as well as their affiliation to the capital region of Ukraine, where most of the financial transactions are carried out and there is a more open access to loan resources. The key variables of the study are presented in the Table 1.

To determine the influence of factors on the financial performance of agricultural companies in Ukraine in our study, three following models were investigated:

$$Model\ 1: ROA_{it} = \alpha + \beta_1 \cdot CR_{it} + \beta_2 \cdot CAPI_{it} + \beta_3 \cdot EXPI_{it} + \beta_4 \cdot LEV_{it} + \\ + \beta_5 \cdot l\_SIZE_{it} + \beta_6 \cdot DVAGSS_{it} + \beta_7 \cdot DVL_{it} + \varepsilon_{it} \tag{1}$$

$$Model\ 2: ROE_{it} = \alpha + \beta_1 \cdot CR_{it} + \beta_2 \cdot CAPI_{it} + \beta_3 \cdot EXPI_{it} + \beta_4 \cdot LEV_{it} + \\ + \beta_5 \cdot l\_SIZE_{it} + \beta_6 \cdot DVAGSS_{it} + \beta_7 \cdot DVL_{it} + \varepsilon_{it} \tag{2}$$

$$Model\ 3: ROS_{it} = \alpha + \beta_1 \cdot CR_{it} + \beta_2 \cdot CAPI_{it} + \beta_3 \cdot EXPI_{it} + \beta_4 \cdot LEV_{it} + \\ + \beta_5 \cdot l\_SIZE_{it} + \beta_6 \cdot DVAGSS_{it} + \beta_7 \cdot DVL_{it} + \varepsilon_{it} \tag{3}$$

where ROA, ROE, ROS – dependent variables, $_i$ = entity and $_t$ = time; α – identifier; β – regression coefficient; CR, CAPI, EXPI – independent financial variables, LEV, l_SIZE, VAGSS, DVL – independent control variables, where $_i$ = entity and $_t$ = time; ε_{it} – error term.

Table 1

Variables definition

Variable	Calculation (Source)	Abbreviation
Dependent Variables		
Return on Assets	Net turnover / Total Assets	ROA
Return on Equity	Net profit / Total Equity	ROE
Return on Sales	Earnings before interest and taxes / Net sales	ROS
Independent Variables		
Current Ratio	Current assets / Current liabilities	CR
Capital Intensity	Total assets / Total sales	CAPI
Export Intensity	Export sales / Total sales	EXPI
Control Variables		
Leverage	Total liabilities / Total Assets	LEV
Size	Logarithm of Total Assets	l_SIZE
Dummy variable for agricultural sub-sectors	1 for livestock producers, 0 for plant producers	DVAGSS
Dummy variable for location	1 for Kyiv region, 0 for non-Kyiv regions	DVL

Source: compelled by authors.

To conduct a regression analysis of panel data for each of the developed models 1–3, it is necessary to choose a panel data estimate parameter that would adequately correlate with the data used in the corresponding model.

The verification of the adequacy was carried out based on the application of F-statistics test, according to the results of which for Model 1 the value $F(7.142) = 6.999591$ with p-value 3.63e-07 was obtained, which is less than 0.05 and testifies to the adequacy of Fixed effects method (FEM) use. However, in a result of Breusch-Pagan test, chi-square $(1) > 0.409232$ p-value $= 0.52236$, which is larger than 0.05 and confirms zero hypotheses, i.e., the need for using the pooled OLS model as a quality estimate parameter for Model 1.

The use of F-statistics test and Breusch-Pagan test for testing the adequacy of the Model 2 confirmed the need for using pooled OLS model as an estimate parameter. As to Model 3, use of F-statistics test allowed to receive $F(7.142) = 7.022201$ with p-value $(F) = 3.44e-07$ that is less than 0.05 and indicates the adequacy of application of Fixed effects method (FEM). However, this conclusion is refuted by Breusch-Pagan test, according to which chi-square $(1) > 0.217347$ with p-value $= 0.641069$, which is larger than 0.05 and confirms zero hypothesis about adequacy of pooled OLS model. Use of Hausman test results (p-value $=$ prob (chi-square $(5) > 3.34492) = 0.646971$) confirms zero hypothesis about adequacy of Random effects method (REM). The results of testing of adequacy of REM application based on the Joint test on named regressors and Breusch-Pagan test refuted the expediency of its use, and, consequently, it was decided to use the pooled OLS model as a quality estimate parameter for Model 3.

Normality test, Autocorrelation test and Heteroscedasticity test were used to investigate the adequacy of panel data on the activity of Ukrainian agricultural companies for each of three proposed models. Testing for the normality of the

distribution of the residuals for all three models did not confirm the null hypothesis about the normality of the distribution of the residuals, since the obtained p-value for all three models (1.61116e-021; 1.14462e-043; 3.1184e-153) is less than 0.05. The autocorrelation test was carried out using the Wooldridge test for each model. As a result, the null hypothesis of Model 1 and Model 2 regarding the existence of first-order autocorrelation was confirmed as the values of p-value according to the results of using the Wooldridge test were less than 0.05 (9.58657e-006; 0.00389742). For Model 3 the absence of first-order autocorrelation was found since the p-value according to the Wooldridge test is 0.0812525. To check the presence of heteroscedasticity in Model 1 and model 2, the White test was used. Since the obtained p-value for Model 1 (0.422566) is more than the critical value (0.05), the null hypothesis about the absence of heteroscedasticity is confirmed. For Models 2 and 3, based on the obtained p-values (7.88789e-010; 7.66768e-016), the existence of heteroscedasticity was confirmed.

The obtained results of Normality test, Autocorrelation test, and Heteroscedasticity test made it possible to reveal the partial inadequacy of panel data in the proposed models. To reduce the problem, it is proposed to apply a robust standard errors technique, which allows for minimizing or eliminating the influence of outliers in models, improving the results of regression analysis of panel data (Serpeninova et al., 2022; Lehenchuk et al., 2022; 2023).

Results and discussion. The dynamics of three indicators, i.e., ROA, ROE, and ROS, characterizing the financial performance of the Ukrainian agricultural companies for the period 2015–2021 is shown in Figure 1.
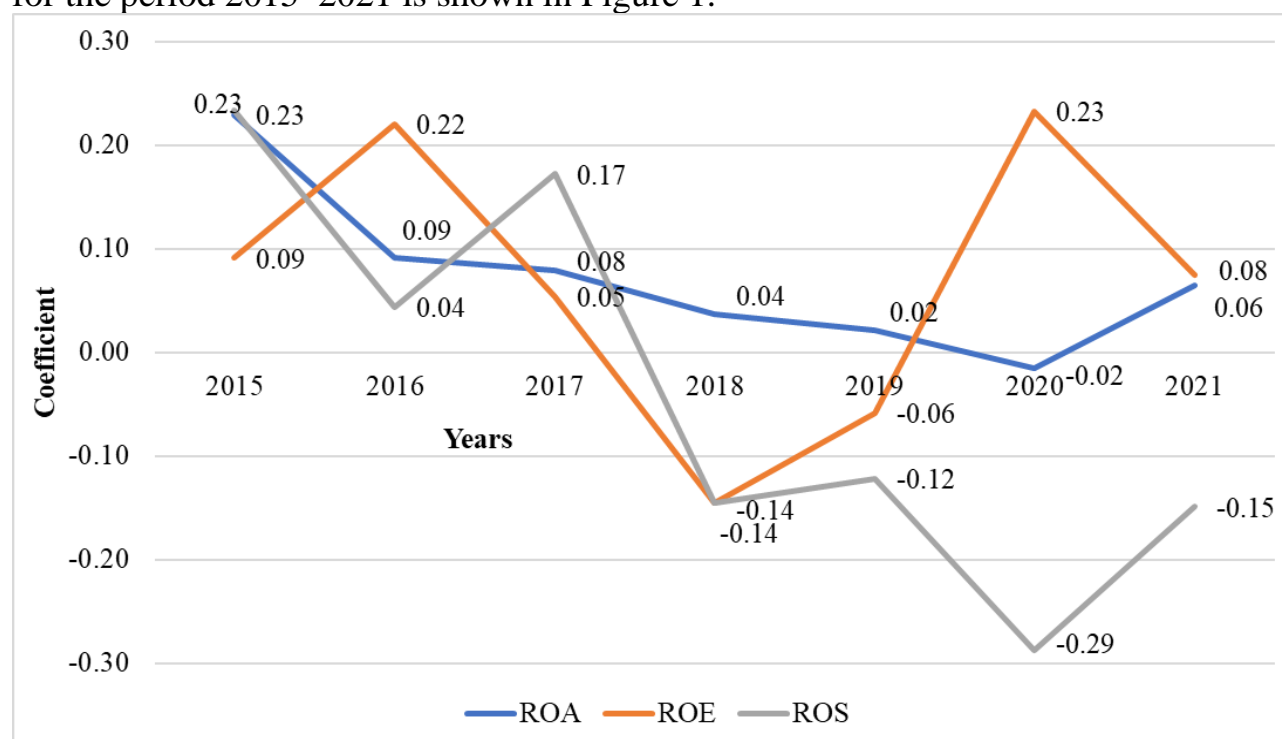

Figure 1. The trend of financial performance indicators of the Ukrainian agricultural companies during 2015–2021
Source: calculated by authors.

The presented dynamics of the financial performance indicators for the years 2015–2021 make it possible to identify the general absence of a common trend of changes in all three indicators. This, in turn, defines a partial drop in the economic efficiency of the activity of the Ukrainian agricultural companies (ROA, ROS) even before the start of the COVID-19 pandemic. At the same time, the dynamics of each individual indicator is unique and quite distinguished form others. Regarding ROA, a gradual decrease in values can be observed over first six years, however, from 2020, there is an increase in the value of ROA together with ROS.

Table 2 shows the descriptive statistics (observation, mean, median, standard deviation, minimum, maximum) of all variables.

Table 2

Descriptive statistics of variables (based on observations 30 Ukrainian agricultural companies for the period 2015–2021)

Variables	Observation	Mean	Median	St. Dev.	Minimum	Maximum
ROA	30	0.0727	0.0126	0.305	-2.75	1.56
ROE	30	0.1180	0.0405	0.776	-5.94	4.43
ROS	30	-0.0364	0.0830	0.996	-7.85	0.8700
CR	30	122.0	1.99	948.0	0.178	1.12e+004
CAPI	30	111.0	1.80	1.49e+003	0.00	2.15e+004
EXPI	30	0.111	0.00	0.358	0.00	3.12
LEV	30	0.581	0.4770	0.613	0.00	3.70
1_SIZE	30	11.6	11.5	2.60	6.19	17.1

Source: calculated via Gretl software package.

As shown in the Table 2 full sample consists of 30 entities. The mean value of ROS, ROA, and ROE is 0.0727, 0.118, and -0.0364 accordingly, which are less than the corresponding benchmark maximum values. Consequently, it means that several Ukrainian agricultural companies have negative financial performance measures. The greatest deviations in variables are related to CR (948), CAPI (1.49e+003), and 1_SIZE (2.6). The absence of the significant difference between the minimum and maximum values ROA, ROE, and ROS show that the financial efficiency indicators of the investigated agricultural companies are sufficiently close in value. For 1_SIZE the mean value is greater than the standard deviation value, which, in turn, means that data in these variables have a small distribution. It is worth mentioning that ROA, ROE, ROS, CR, CAPI, EXPI and LEV have a higher standard deviation value if compared with their mean value, which means that there is a relatively large set of ratios to characterize the curve of normal distribution.

The results of the conducted correlation analysis presented in Figure 2 confirm the absence of multicollinearity problem between independent variables, since the correlation coefficient is less than 0.5 (-0.5). Similar results were also obtained regarding the dependent variables ROA, ROE, and ROS.
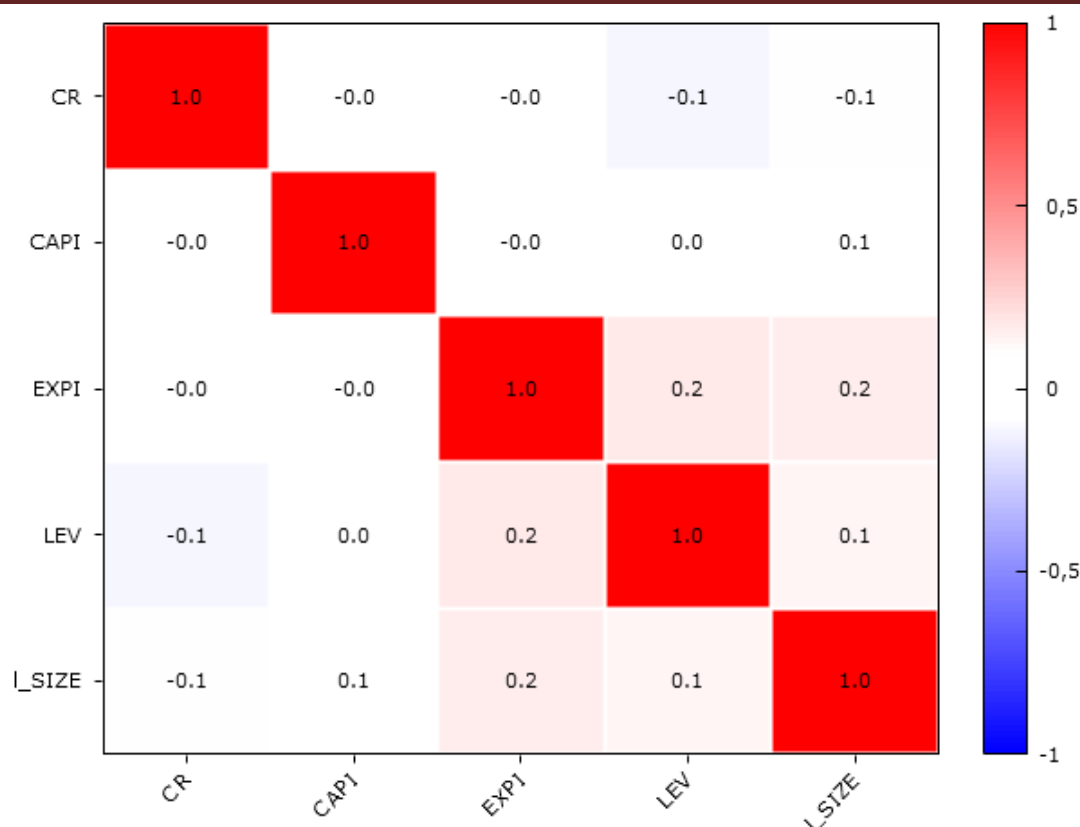
Figure 2. Correlation matrix of independent variables used in Models 1–3 (based on observations 30 Ukrainian agricultural companies for the period 2015–2021)

Source: calculated via Gretl software package.

Table 3 presents the results of the regression analysis (coefficient, p-value, level of significance) carried out using Pooled OLS method. It shows how the independent variable affect the dependent variable, which of the regressions have significant influence, extent, and direction of such influence.

Table 3

Models 1–3 (ROA, ROE, ROS). Pooled OLS (Robust standard errors) (based on observations 30 Ukrainian agricultural companies for the period 2015–2021)

Variable / Indicator	Model 1 (ROA)		Model 2 (ROE)		Model 3 (ROS)	
	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Const	-0.128985	0.4624	0.941557	0.1243	0.391262	0.6606
CR	-9.56499e-05	0.1664	-9.17431e-05	0.8288	8.66094e-05	0.7840
CAPI	-0.000228475	0.0470**	-0.00264671	0.0424**	-0.00863711	0.1209
EXPI	0.0414167	0.0925*	0.0641333	0.7221	0.102915	0.1542
LEV	-0.215574	<0.0001***	-0.143884	0.3112	-0.407784	0.0132**
l_SIZE	0.00837465	0.3932	-0.282925	0.2827	0.0101680	0.7745
DVAGSS	0.0215101	0.7134	-0.0221763	0.9207	-0.412680	0.3982
DVL	0.117079	0.0124**	-0.0153390	0.6123	0.310224	0.4351
R-squared	0.256533		0.039996		0.257149	
Adjusted R-squared	0.219884		-0.007328		0.220530	

Notes. * Significant at the 10 % level; **Significant at the 5 % level; *** Significant at the 1 % level.
Source: calculated via Gretl software package.

Model 1 can be interpreted through the following equation:

$$ROA_{it} = -0.128985 - 9.56499e\text{-}05\ CR_{it} - 0.000228475\ CAPI_{it} +$$
$$+\ 0.0414167\ EXPI_{it} - 0.215574\ LEV_{it} + 0.00837465\ l\_SIZE_{it} + \tag{4}$$
$$+\ 0.0215101\ DVAGSS_{it} + 0.117079\ DVL_{it} + \varepsilon_{it}$$

Based on the results of the regression analysis (Table 3) LEV (p-value = 0.0470) is most statistically significant, having the highest impact on ROA with significance at the 1 % level. With significance at the 5 % level and 10 % level, ROA is also significantly affected by CAPI, EXPI, and DVL. At the same time, LEV and CAPI have an inverse effect on ROA, which indicates that the growth of the level of borrowing capital and capital intensity leads to a decrease in the value of this financial performance measure. The existence of a positive influence of DVL on ROA confirms the important role of the physical location of the company in the capital region as a means of more accessibility to the loan resources, as found out by Ababiya (2018).

The overview of the regression coefficients in Model 1 testifies that if the value of the independent variable increases, it will cause a corresponding change in the value of ROA (based on the value of the coefficient). For example, if EXPI increases by 1 pt, ROA increases by 0.0414167. It was also found that there was no significant positive effect of affiliation with the agricultural sub-sector on ROA. Thus, whenever an agricultural company expands its activities by changing its business profile, ROA is unlikely to increase. The coefficient of determination (R-squared) of Model 1 is 0.256533. It means that 25.7% of the variation of ROA can be explained by the variation of the independent variables (const, CAPI, EXPI, LEV, l_SIZE, DVAGSS, DVL).

Model 2 can be demonstrated through the following equation:

$$ROE_{it} = 0.941557 - 9.17431e\text{-}05\ CR_{it} - 0.00264671\ CAPI_{it} +$$
$$+\ 0.0641333\ EXPI_{it} - 0.143884\ LEV_{it} - 0.282925\ l\_SIZE_{it} - \tag{5}$$
$$-\ 0.0221763\ DVAGSS_{it} - 0.0153390\ DVL_{it} + \varepsilon_{i}$$

Based on Table 3, unlike ROA, only CAPI was found to have an impact on ROE with significance at the 5 % level. Moreover, in case of ROA, this influence is characterized by the existence of an inverse relationship. The R-squared of model 2 is 0.039996, which is too low value to make a statement about the significant role of used independent variables in the ROE explanation. Since only about 4 % of the variation of the ROE can be explained by the variation of regressors, additional independent variables should be used to analyze the influence of factors on ROE.

Model 3 can be interpreted through the following equation:

$$ROS_{it} = 0.391262 + 8.66094e\text{-}05\ CR_{it} - 0.00863711\ CAPI_{it} +$$
$$+\ 0.102915\ EXPI_{it} - 0.407784\ LEV_{it} + 0.0101680\ l\_SIZE_{it} - \tag{6}$$
$$-\ 0.412680\ DVAGSS_{it} + 0.310224\ DVL_{it} + \varepsilon_{it}$$

The only statistically significant regressor of Model 3 is LEV (Table 3) with a level of significance of 5 %. The existing influence is inverted, which means that with an increase in the number of resources involved in the total capital of agricultural enterprises, the value of ROS will decrease. If the value of LEV increases by 1, then the value of ROS will decrease by 0.407784.

The analysis of the level of influence of l_SIZE on financial performance measures in all three developed models revealed its lack of significance. This means that the increase in the volume of assets by Ukrainian agricultural enterprises will not significantly affect their financial indicators (ROA, ROE, ROS). The same findings for all three models were obtained because of the analysis of the impact of DVAGSS on financial performance measures.

The results obtained because of the analysis of Models 1–3 are quite controversial, as they both partially confirm and partially refute the results of previous research. The significant reverse effect of CAPI on ROA and ROE confirmed the findings of Burja & Burja (2017), Singh et al. (2019), which shows the low efficiency of the use of non-current assets in Ukrainian agricultural enterprises due to their wear and tear and obsolescence, as well as due to the seasonality of agro-industrial production. Another cause of negative impact on financial performance may be the small firm effect, described in the study of agricultural cooperatives by Lerman & Parliament (1991).

In case of Ukrainian agricultural enterprises, EXPI has a significant impact only on ROA, which contradicts the research findings of Liu et al. (2020). Accordingly, Ukrainian agricultural enterprises can ensure improvements in financial efficiency indicators, provided that foreign trade increases. According to the results, LEV has a significant inverse effect on ROA and ROS, confirming the results of Singh et al. (2019), Xu & Zhang (2021), and at the same time contradicting the conclusions of Mijić & Jakšić (2017), Liu et al. (2020), Xu et al. (2021) and Vuković et al. (2022), which found that LEV positively influences on financial performance measures.

Our study showed l_SIZE has no impact on any of the investigated dependent variables which contradicts research findings by Odalo et al. (2016), Shamsuddin et al. (2017), Pokharel et al. (2020), Liu et al. (2020), Hampl (2020), Xu & Zhang (2021), Vuković et al. (2022), where a significant positive l_SIZE effect on ROA or ROE was found, and moreover contradicts the findings by Singh et al. (2019), Mijić & Jakšić (2017), who justified a significant negative effect. Such opposite results can be explained by the statements of Novotná & Volek (2015), that above-average agricultural enterprises (high growth of labor productivity and fixed assets), regardless of their size, have higher profitability indicators. Thus, increasing the output of Ukrainian agricultural enterprises, in particular because of their vertical integration, will not lead to improving their ability to generate returns. A similar result has also been found regarding the impact of CR on all financial performance measures, contradicting to the results of studies by Burja & Burja (2017), Vuković et al. (2022), where a significant positive impact of this independent variable was found.

There are certain limitations to be considered in the study when analyzing the results and comparing them with the results of other scientists. First, the content of the financial disclosures by Ukrainian agricultural enterprises lacks information to form a broader set of determinants and their impact that could be investigated in the study. Second, the number of financial performance measures having studied in the article can be expanded and supplemented based on those other aspects of financial performance that need to be focused on. Thirdly, it is worth mentioning that the results

obtained characterize the influence of various determinants on the financial performance of agricultural companies in Ukraine in the pre-war period (2015–2021), however, since 2022 the russian military invasion of Ukraine have caused enormous damage to its territory, human, financial and land resources, in general, and to the agricultural sector.

The study's findings provide valuable insights for policymakers and government authorities in Ukraine. Understanding the specific determinants that influence the financial performance of agricultural companies can help develop targeted policies and strategies to support the agricultural sector. For example, the need for improving regional support and ensuring access to capital for agricultural enterprises underscores the importance of tailored financial support programs.

For investors and financial institutions for instance, understanding that Capital Intensity (CAPI), Export Intensity (EXPI), and the presence of agricultural sub-sectors (DVL) significantly affect Return on Assets (ROA) suggests that investors should pay close attention to these factors when evaluating investment opportunities.

The result of the research has practical value for the agricultural market. Ukrainian agricultural companies can use the study's results to fine-tune their business strategies. The knowledge that certain variables have a significant impact on financial performance can guide them in making decisions related to resource allocation, capital structure, and market positioning. For instance, understanding that Capital Intensity (CAPI) and Export Intensity (EXPI) are crucial for ROA can prompt companies to focus on improving these aspects of their operations.

The research highlights the need for a country-specific approach when studying the determinants of financial performance in the agricultural sector. This suggests that researchers should consider the unique characteristics of each country's agricultural industry when conducting similar studies.

Conclusions. This study aimed at identifying determinants of financial performance of agricultural companies in Ukraine. For this purpose, the business activity of 30 agrarian companies over the period 2015–2021 was analyzed. The results of the panel regression analysis with respect to Models 1–3, partially are in contradiction with the conclusions of other studies regarding the impact of the determinants on the financial performance of agricultural companies. None of the chosen independent variables has a significant effect on all the dependent variables as investigated in the article, namely ROA, ROE, and ROS. This confirms the formulated in the study hypothesis regarding the availability of a unique set of financial performance determinants for agricultural enterprises for each individual country in Ukraine. Moreover, the extent and direction of such influence depend on the level of development of the agricultural market in the country as well as its external environment.

The independent variables used in the study have the most significant impact on ROA. Primarily, ROA is significantly affected by CAPI (5 % level), EXPI (10 % level), and DVL (5 % level). It means that financial performance of agricultural companies in Ukraine mostly depends on their capital intensity, the volume of their

export activity and the role of the location of the company in the capital area. Taking into consideration the inverse effect CAPI has on ROA, the reduction of capital intensity of Ukrainian agricultural companies will contribute into the growth of their financial performance, mostly due to the write-off of obsolete, inefficient equipment. To improve financial performance, it is necessary to expand the export activity of agricultural companies and increase export sales.

Research results also show that among all control variables, only LEV and DVL have a significant impact on financial performance measures. To put it more succinctly, LEV significantly impacts on ROA (1 % level) and on ROS (5 % level), and DVL impacts on ROA (5 % level), respectively. LEV has an inverse effect on ROA and ROS, which defines a necessary to refuse from using the borrowed capital for financing its business activities and transition towards the financing at the expense of equity capital. The reasons of DVL having a positive effect on financial performance may be easier accessibility of agricultural companies to sources of cheap capital, the possibility of lobbying the interests at the state level, and other opportunities that allow for minimizing the transaction costs of companies.

Our findings confirm a need for improving regional support and ensuring an access to capital for agricultural enterprises in Ukraine. Interestingly, but neither company size nor affiliation with different agricultural sub-sectors have a significant impact on the financial performance of agricultural companies in Ukraine.

The research results obtained will benefit both owners and managers when developing the operational and strategic activities of agricultural enterprises to improve the financial indicators, and for capital providers when making investing decisions, as well as for the state and the regulators when developing a strategy for the development of the agricultural complex in the post-war period.

In our further research, we will focus on the comparison of the influence of different types of determinants on the financial performance of agricultural companies in Ukraine in the pre-war and post-war periods, analysis of changes, if any, and determining the reasons causing such changes.

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