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Connection of the intensive methods of manufacturing and the financial outcomes in agricultural enterprises

Scientific problem. Over the recent decade, Ukraine has successfully expanded grain trading to the global agricultural market, however, current state and trends of the meat production indicate the lack of competitiveness of domestic producers. It dictates the usefulness of the study of the factors that can improve the position of Ukraine in the market and raise financial profits in the domestic agricultural industry. A number of scientists and experts consider that

intensification of agricultural production is an effective tool for this purpose. The most integrated and systematic view on the identified problem can be obtained on the basis of the research which determines the nature and significance of the relationship between designated economic parameters of development of the agricultural enterprises. This is both the subject of the content and direction of this research paper.

Analysis of recent researches and publications. After joining the World Trade Organisation (WTO), Ukrainian markets became more open, and the pricing system on agricultural production, capital and technical resources has liberalized. This determines that economic estimation of the efficiency of these processes gains particular importance. This evaluation is built on the theory and methods of the micro-economic theory of an Enterprise Market Behavior, which was developed significantly by a number of Ukrainian and foreign scientists: Brue S. [7], Hryschenko O.. [6], McConnell R.[7], Nordhaus W. [10], Samuelson P. [10], Yastremsky O. [6] and others. The sector specifics of these problems are thoroughly covered in the works of Andriychuk V. [1], Bodnar O. [4], Voskobiynyk Y.[2,4], Dem'yanenko S. [3], Kaminsky I. [2], Koester U. [9], Mazorenko D. [5], Mazniev G. [5], Nivevsky O. [3], Sabluk P. [5], Shpykulyak O. [2], Shpychak O. [4,5] and others. However, there is a gap in the studies assessing the effectiveness of the processes of intensification of individual types of agricultural enterprises, which determines the relevance of the study.

The objective of the article. Aim of this study is to evaluate the impact of the level of intensity of production on the financial results of agricultural enterprises, and to define the role of the specified indicator to improve their position in the market.

Statement of the main results of the study. In the theory and practice of statistical analysis a variety of study methods of the relationships and dependencies between economic phenomena were developed. Among the most common methods of mathematical statistics, one can name a correlation-regression analysis, graphical method, the method of comparison of paral-

lel lines, the method of analytic groups, factor and functional-cost analysis. Each of these methods allows to solve certain tasks and to highlight the characteristics of the relationships between economic phenomena: their nature and density, complexity and difficulties, etc. For the purpose of this study, in order to introduce abovementioned relationships comprehensively and systematically, a combination of research methods is required.

To determine the influence of the intensity of segments of agricultural production on the performance indicators, a combination of the two methods was used–analytical groups and analysis (synthesis) of dynamic rows. A source of information was the database of the Annual Report № 50 of The Department of Statistics branch in the Rivne region. A sample study was conducted in order to give the economic assessment of the processes discussed.

As the cost of one hectare of crops in crop production and the expenditure per head for fattening livestock are known to be the one of the main indicators of the level of intensity of agricultural production, this indicator was used to group the selected enterprises. Using these methods, three groups of enterprises were singled out based on the criterion of production intensity in the context of specific types of activities for the period 2005-2012, and the influence of this factor on crops and animal productivity was determined. The final stage of the research was the estimation of average by groups of financial and economic indicators that also reflect the effectiveness and efficiency of the production intensity and dynamic analysis of these indicators. Research results are reflected in Fig. 1-6.

In particular, the results of grouping of wheat farmers of the Rivne region show that firms with low level of intensification in production have the lowest rates of wheat yield (10-15 quintals / ha), however, in the next two groups, the figure is under 20-30 and 32-45 quintals /ha of harvested area (Fig. 1). However, in terms of the profit per hectare of the harvested area, companies with a high level of intensification of production show the worst results during the study period, with the exception of the years 2008 and 2012.
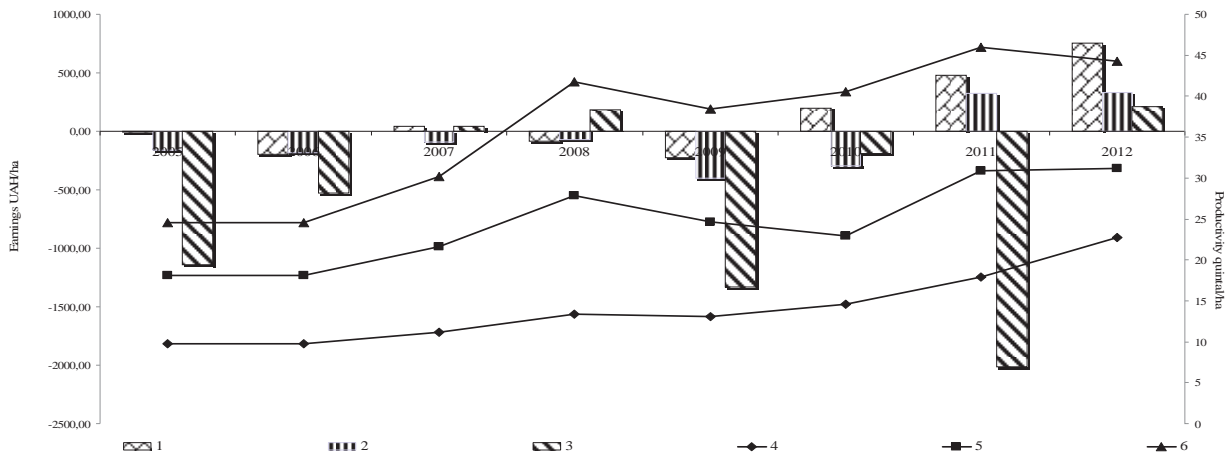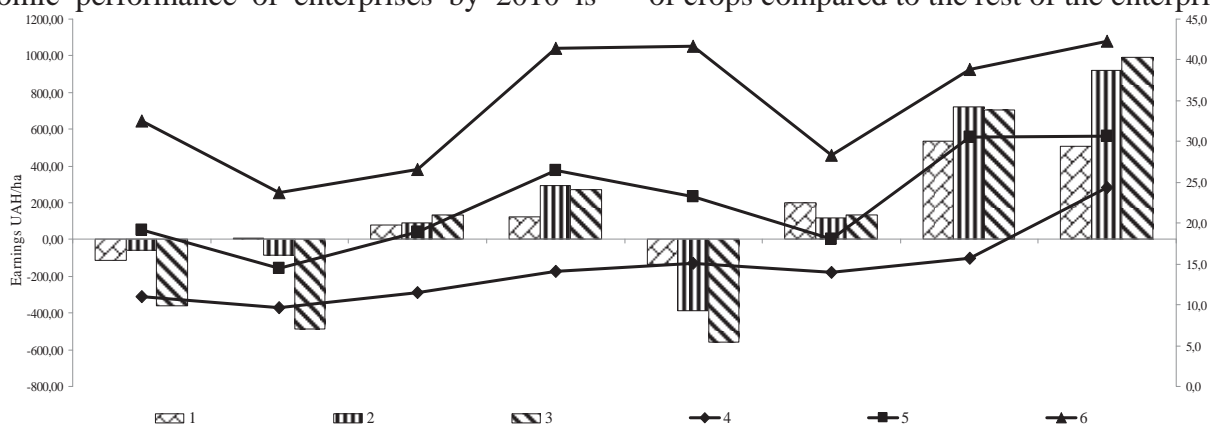
Figure 1. Dynamics of the impact of wheat farms in the Rivne region with different levels of intensity * for the years 2005-2012

*1,2,3 – Income (UAH / ha) in plants with low (1), medium (2) and high (3) level of intensity, 4,5,6 - yield (quintals / ha) in plants with low (4), medium (5) and high (6) the level of intensity of production

Increased costs per hectare of crop led to an increase in production and the total cost of one quintal of wheat and, consequently, to lower profitability of the enterprises which used a more intensive production technology. During the entire study period increase in the planting costs per hectare, as compared with the previous group of companies, was greater than the increase in the cost of production at market prices. Based on this, the presence of the negative effect of increasing the intensity of wheat production is determined in the test area. According to figure 2, the best financial and economic performance of enterprises by 2010 is observed mostly at companies with the low-and middle-intensification of barley. Although the increase in costs per hectare of crops led to increased production and total unit cost, the combined effect of the increase in yields and market prices of products in this group of companies was higher. For example, in 2007 it was 0.52 and 0.63 thousand UAH, and in 2008 - respectively 0.80 and 1.24 thousand UAH. Due to the sharp rise in prices for feed grain in 2011, the situation changed. The graph 2 shows that companies that used more intensive production technology, received the most profit per hectare of crops compared to the rest of the enterprises.

Figure 2. Dynamics of production efficiency in barley farms of the Rivne region with different levels of intensity * for the 2 years

*1,2,3 – Income (UAH / ha) in plants with low (1), medium (2) and high (3) level of intensity, 4,5,6 - yield (kg / ha) in plants with low (4), medium (5) and high (6) the level of intensity of production

In 2011-2012 it reached the highest value and was , respectively, 704.32 and 992.16 UAH. During this period, these companies have reached a record high yield of barley, which amounted to 38.8 and 42.4 quintals / ha, and the highest price levels, through their own efforts to bring the product to the best quality. Thus, in 2011 the average price of barley in that

group of companies amounted to 1667 UAH / ton, which is 237 UAH more than in the previous group, for instance, in 2012 it was 2008 UAH / ton, which is 582 UAH more. That is, the profit indicators are more dependent on the influence of market prices than the level of production costs.

Further, data in Figure 2 show the dynamics of yield of barley in the study groups of companies. As in the previous case, companies with the high levels of intensification of production demonstrate the best performance in yield of barley, which ranges around 26-42 quintals /ha; in the next group, the yields performance is 18-30 quintals /ha, and the economies with low costs per hectare - only 11-15 quintals /ha. However, despite this positive effect, the profitability level of barley usually was the highest in the group of companies with the middle level of intensification of production, while, in the farms with the highest level of intensification of production, this figure has never exceeded the average value of the sample within the study period.

Figure 3 shows the results of clustering of Rivne corn farmers in terms of applying intensive methods of production. It shows that in companies with a high level of intensification of maize yield hovers around 67-83 quintals / ha, while in the next group the figure is 30-60 quintals / ha, and the enterprises with the low costs per hectare received only 11-30 quintals / ha. In terms of yield of this culture, it is the most productive in the grain group, however, not the most profitable one.

Financial performance indicators of corn closely interact with the market index and prices of resources (in particular, the prices of imported seeds), and therefore are difficult to forecast. In 2005-2006 and 2010, companies with high levels of intensification of production, while, during the other years, the enterprises with the average cost per hectare received the most profit. The same is observed while analysing the profitability of corn production. Despite a significant increase in productivity, increased intensification led to an increase in production and the total cost of maize, which explains these trends in profitability of production.
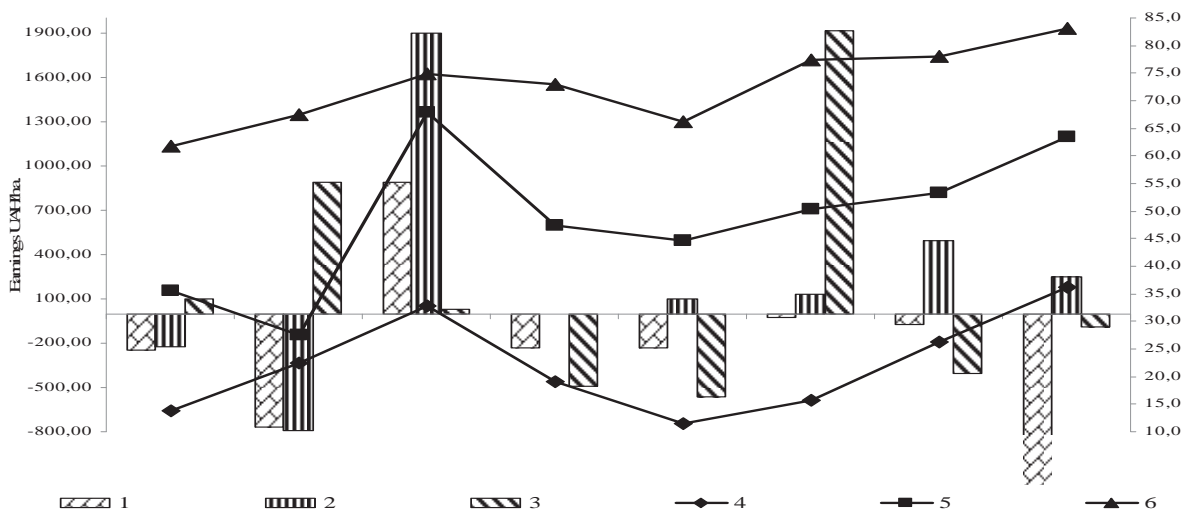
Figure 3. Dynamics of the effectiveness of maize farms in the Rivne region with different levels of intensity * for the years 2005-2012

*1,2,3 – Income (UAH / ha) in plants with low (1), medium (2) and high (3) level of intensity, 4,5,6 - yield (quintals / ha) in plants with low (4), medium (5) and high (6) the level of intensity of production
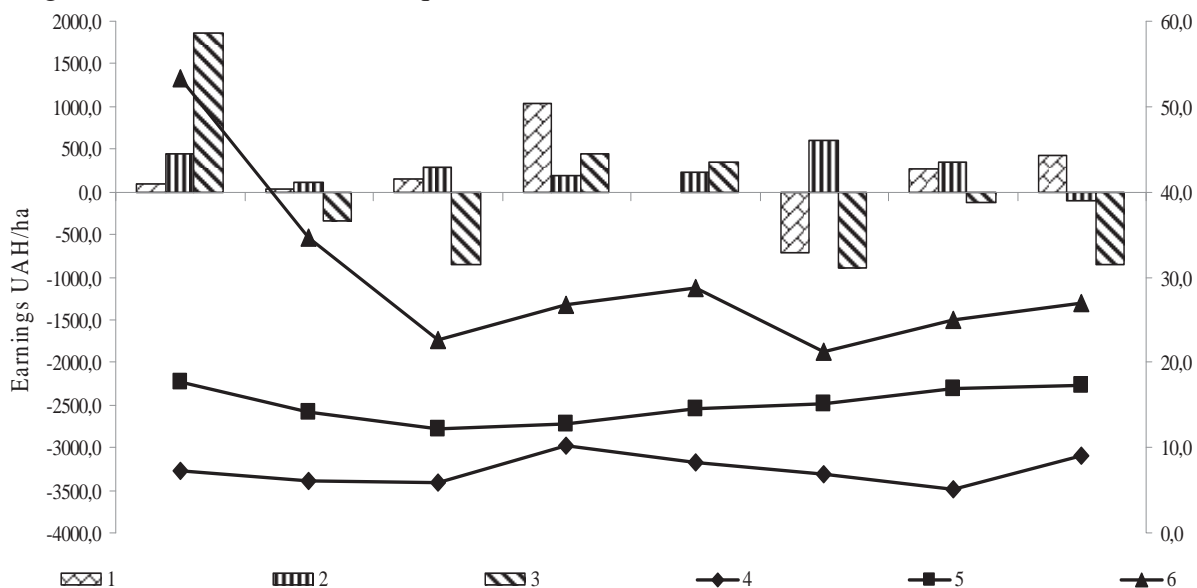
Growth in the cost of production in the companies that used more intensive technologies are the highest. For example, in 2005 the total cost of corn plants with the lowest level of intensification accounted for 56.86 UAH / kg, with the high level- 53.61 UAH / kg, in 2012 - 140.32 UAH/ kg and 155 19 UAH / kg accordingly, that is the growth constitutes 2.5 and 2.9 times, respectively. In particular, according to the figure 3, we can estimate the impact of

these factors on the yield and the amount of income received by producers per hectare of crops.

Grouping of canola farmers of the Rivne region in terms of intensity confirms the conclusions about the effectiveness of the intensification methods in agriculture (Fig. 4). As shown, traditional companies with a high level of intensification of production are the best performers in the yield of canola, which hovers around 22-53 quintals / ha in the next group, the figure is twice lower, 12-17 quintals / ha,

and in the enterprises with the low costs per hectare is lower - only 5-10 quintals / ha. However, in terms of the profit per hectare of crops, the best performers are predominantly the companies with the middle-intensification of canola production. The exception is only 2005 and 2009, where the positive effects of growth yield of canola plants, in the enterprises with high levels of intensification of production, was higher as compared to the previous group.

Figure 4. Dynamics of the impact of canola farming on farms in the Rivne region with different levels of intensity * for the years 2005-2012
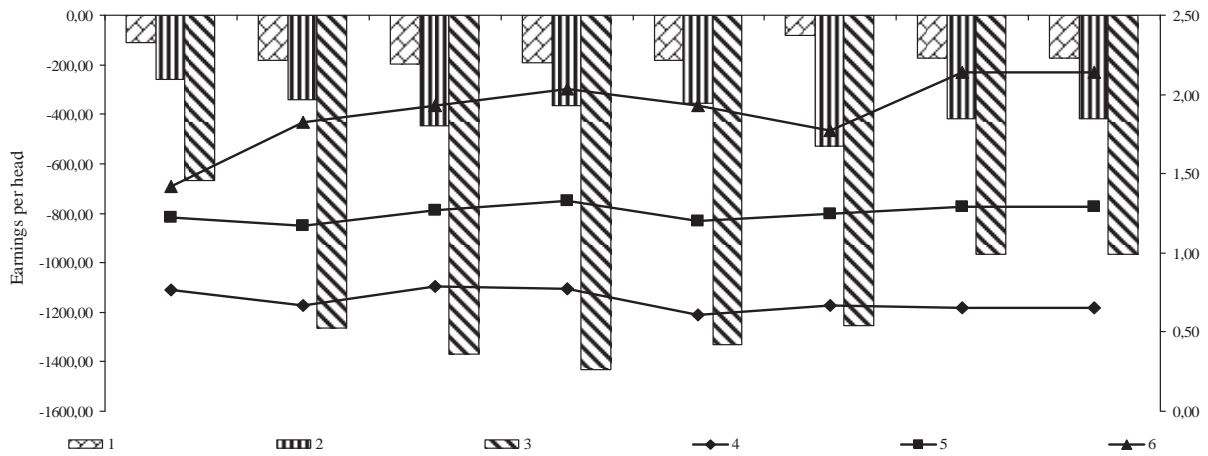
*1,2,3 – Income (UAH / ha) in plants with low (1), medium (2) and high (3) level of intensity, 4,5,6 - yield (quintals / ha) in plants with low (4), medium (5) and high (6) the level of intensity of production.

Similar trends are observed in the indicators of profitability of canola growth. As in the previous case, increasing intensification leads to an increase in production and the total cost of canola production. Growth in the cost of production at the companies that used more intensive technologies was the highest. During the period 2005-2012 the total cost of canola production in enterprises with the lowest level of intensification increased from 70.19 to 286.45 UAH / kg or 4.1 times, in enterprises with an average level of intensification - respectively from 67.29 to 395 48 UAH / kg, or 5.9 times, and in companies with a high level of intensification - from 63.20 to 415.39 UAH / kg, or 6.6 times. As the production costs increased faster than the market price, a general downward trend in the level of profitability of canola can be ob-

served, with the lowest level in enterprises with the high levels of intensification.

In the Rivne region, and in Ukraine in general, the largest decline in production was in beef cattle, as its production cycle is the longest, it requires the largest prepaid expenses, and the risk is the highest, given the volatility of prices for farm products and inputs for its production. As it is shown above, the production of meat is the most flawed type of the agricultural production; that is why it is particularly important to study how the management at various levels of intensity has shown the ability to adjust to market changes. Grouping of beef production enterprises in the Rivne region, in terms of intensity of production, has to evaluate the impact of these factors on the performance of their activities (Fig. 5).

Figure 5. Dynamics of performance of growing cattle farms with different levels of intensity *
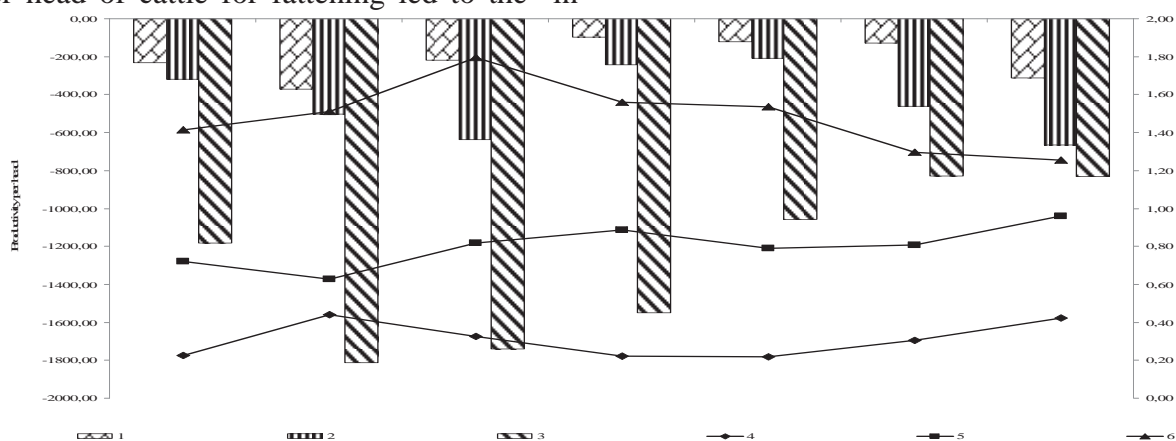**for the years 2005-2012 in the Rivne region**

* 1,2,3 - Income (uah / 1 head fattening) in plants with low (1), medium (2) and high (3) level of intensity, 4,5,6 - growing products 1 head on feeding on plants with low (4), medium (5) and high (6) the level of intensity of production.

According to the figure 5, firms with the low production intensification have the lowest rates of growth of production cultivation (0,63-1,03 kg / head), and in the next two groups, the figure is under 1,20-1,41 and 1,42-2,14 quintals per head of cattle for fattening. However, in terms of the resulting loss per head of cattle, companies with the high levels of intensification of production show the lowest results during the study period. It should be noted that losses of the companies with an average level of intensification of production are generally twice as high, and in the following group, the rate is 4-5 times higher compared to less intensive production.

The study found that the increased spending per head of cattle for fattening led to the in-

crease in production and the total cost per unit of output and, consequently, to higher losses of enterprises that used more intensive production technology. Throughout the period of study of this group of companies, as compared to the previous group, the increase in spending per head of cattle for fattening was greater than the increase in the cost of production at market prices. Based on this study, a negative effect of increasing intensification of beef production in the study area is determined.

A negative effect is determined based on the study of increasing intensification of pork production in the study region, on the basis of the farms' grouping in the Rivne region (Fig. 6).

Figure 6. Dynamics of performance indicators in pig farms with different levels of intensity *
for the years 2005-2012 in Rivne region

* 1,2,3 - Income (Euro / 1 head fattening) in plants with low (1), medium (2) and high (3) level of intensity, 4,5,6 - growing products 1 head on feeding on plants with low (4), medium (5) and high (6) the level of intensity of production.

The figure shows that firms with the low production intensification had the lowest rates of growth of production cultivation (0,22-0,48 quintals /head), in these two groups, the figure is under 0,72-1,11 and 1,26-1,79 quintals per head for growing pigs. These trends correspond to those detected in the study of beef producers. In terms of net losses per head of cattle companies with high levels of intensification of production bare losses 2-3 times higher compared to less intensive production.

A positive aspect for pork producers is that the cost of their products was growing moderately as compared to other types of products selected for this studies, including beef production. Thus, the average cost of one quintal of pork in 2005 was 1,942.55 UAH and in 2012 - 2183.17 UAH, with the growth rate 12.4%. The dynamics of this indicator is roughly the same for the three groups of the researched enterprises. Due to the rise in prices of pork, unprofitability of pork production over the period of study declined to 28.5 from previously 39.9 percent. However, the increase in spending per head in pork production led to an increase of the total cost per unit; this outweighed a positive price effect and, as a result, companies that used more intensive production technologies, have a higher loss ratio. Throughout the period of study in this group of companies, the increase of spending per head was larger than the increase in the prices in market conditions. Results of this research show a negative effect of increasing intensification of pork production in the tested area.

Conclusions. From the above analysis we can draw the following conclusions. The economic conditions of the local agricultural enterprises and the possibility of introduction of intensive technologies in the production are getting lower due to the increased growth of cost of such production. Grouping of farms in the Rivne region in terms of the intensity confirmed this general tendency. Thus, to maintain the competitive advantage of domestic farmers, it is necessary to increase the government support or improve the mechanism of price formation for agricultural products and resources for its production.

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