

у середині країни, в тому числі при використанні їх на виробництво свинини, та можливому експорті вже продуктів їх переробки сукупна додана вартість збільшується в 1,4-1,7 рази порівняно з експортом сирови-

ни. Це уможливило збільшити економічну вигоду, може вирішити питання безробіття, продовольчої безпеки і зменшення імпортозалежності в енергетичній сфері.

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Operating leverage and production profitability: functional dependence

Scientific problem. The classic formula for calculating the operating leverage as an indica-

tor of economic security of crops cultivation involves dividing the marginal profit by the marginal revenue of both certain types of products and the full range of crops. Doing these calculations within enterprises causes certain

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difficulties usually associated with the lack of initial data.

The objective of the article is to suggest a simplified method of calculating of financial safety margin and operating leverage available for enterprises' specialists.

Statement of the main results of the study.

As it is known, there are two types of costs in the enterprise: variable and fixed. Their structure can significantly affect the trend of changes in revenues or costs. This is due to the fact that each additional unit of production brings some additional yield, which covers fixed costs, and depending on the ratio of fixed and variable costs in the total cost structure, the total increase in marginal revenue from an additional unit of goods can represent a sharp change in profit. Once the breakeven point is achieved, the marginal profit is observed to grow faster than the level of marginal revenue. At this point it is possible to apply operational analysis which allows identifying the impact of the cost structure and volumes of production revenue on the company's financial results. On this basis it is possible to further identify the relationship between costs and revenues at different levels of production, to determine the most advantageous combination of price and sales volume, the ratio of fixed and variable costs, to minimize business risks, and, thus, contribute to an increase of enterprises' economic security. Operational analysis includes such important indicators as financial safety margin and operating leverage.

Financial safety margin is one of the indicators of an enterprise's financial condition, i.e. the level of its financial sustainability. There are two major methods of determining financial safety margin which are usually being used.

According to the first method, the calculation represent the difference between the actual (planned) sales volumes and break-even point, i.e. financial safety margin shows how many lei (1 USD = 18 Moldovan Lei) or tons of production can be reduced, without incurring losses. The higher the financial safety margin is, the more opportunities are found to maintain the relative level of profitability in case of decrease in sales revenue, which positively affects the economic security of an enterprise.

The formulas for calculating the financial safety margin indicator in absolute terms looks like as follows:

$$D = N - N_{min}, \quad (1)$$

$$D = Q - Q_{min}, \quad (2)$$

where: N и N_{min} - stand for the actual and breakeven (minimal) volumes of production revenue respectively in value terms;

Q и Q_{min} - stand for the actual and breakeven (minimal) volumes of production revenue respectively in volume terms.

The second method implies the calculation of the percentage of the financial safety margin to the actual (planned) volume. This value shows the percentage of a possible decrease in revenue for an enterprise to be able to avoid losses. The higher is an enterprise's financial safety margin, the more stable the enterprise is and the lower are its risks of incurring a loss.

$$D = \frac{N - N_{min}}{N} \cdot 100, \quad (3)$$

$$D = \frac{Q - Q_{min}}{Q} \cdot 100, \quad (4)$$

The absolute indicator of the financial safety margin in volume terms (D), using the indicator of the crop yield is determined by the formula:

$$D = q - q_{min}, \quad (5)$$

The relative indicator of the financial safety margin is calculated as:

$$D = \frac{q - q_{min}}{q} \cdot 100, \quad (6)$$

where: q – stand for the actual level of the crop yield.

Another indicator which reflects the state of economic security of an enterprise is *operating leverage* (L). This indicator can be characterized quantitatively by the ratio between fixed and variable costs in their total amount and by the variability of the net profit indicator. It is higher in those companies, in which the ratio of fixed costs to variable costs is higher, and correspondingly lower in the opposite case. Understanding of the operating leverage mechanism allows to purposefully control the ratio of fixed and variable costs in order to improve the efficiency of an enterprise's current activity. This control is reduced to the change of operating leverage value under different conditions of the commodity market trends. The operating leverage indicator allows to determine fast enough (without profit and loss reporting) how changes

in sales revenues affect the net profit from the sales of production:

$$R = \frac{\Delta P}{\Delta N}, \quad (7)$$

where: ΔP - stands for growth of gross profit;
 ΔN - stands for growth of revenue.

Operating leverage demonstrates the percentage point change in the enterprise profit given a change in revenue by one percentage point.

Operating leverage characterizes the degree of an enterprise's business risk. The profits of the enterprise whose level of operating leverage is higher, are more sensitive to changes in sales revenues. The enterprise's activity with low operating leverage is associated with lower risk, but also with smaller remuneration (net profit).

It was established that there is an inverse relationship between the coefficient of financial

$$L = \frac{N - TC - FC}{P} = \frac{N - TC + FC}{P} = 1 + \frac{FC}{P} L = 1 + \frac{FC}{P} \quad (10)$$

Product profitability (R) shows the profit that the enterprise receives per each unit of cost and is calculated as follows:

$$R = \frac{P}{Z} \quad (11)$$

where: Z – stands for the cost price of production in Moldovan lei.

Bearing in mind that according to equation 11, $P = R \cdot TC$, and the cost of production is $Z = TC$, on the basis of formulas 10 and 12, the operating leverage can be calculated as:

$$L = 1 + \frac{FC}{P} = 1 + \frac{FC}{TC \cdot R} = 1 + \frac{\beta}{R} \\ L = 1 + \frac{\beta}{R} \quad (12)$$

where β stands for the share of fixed costs in the total cost structure ($\beta = FC/TC$).

The given formula demonstrates that operating leverage is directly proportional to the relative weight of fixed costs in the total cost structure and is inversely related to an increase in the level of production profitability. In other words, business efficiency is higher (and the value of operating leverage is lower) in those enterprises, in which ceteris paribus the share of fixed costs is lower and production profitability is higher.

Financial safety margin (according to formula 8) may be represented by the following formula:

safety margin and the effect of operating leverage. The higher the effect of operating leverage, the lower the security level is and vice versa [1, p.136].

$$L = \frac{1}{D} \quad (8)$$

It is known that the operating leverage is determined by the formula:

$$L = \frac{N - VC}{P}, \quad (9)$$

where: N – stands for product sales revenue;
 VC – stands for variable costs.

Taking into account the fact that the total cost (TC) are equal to the sum of fixed (FC) and variable costs (VC), while profit (P) is the difference between the revenue (N) and total cost (TC), then

$$D = \frac{R}{R + \beta} \quad (13)$$

Only knowing the required optimal level of operating leverage and financial safety margin, an enterprise can plan its production activities, manage the costs of the enterprise, increase its own competitiveness and improve the level of its economic security.

Knowing the value of the operating leverage or financial safety margin, we can find the coefficient of profitability of products:

$$R = \frac{\beta}{L - 1} \quad (14)$$

$$R = \frac{\beta}{\frac{1}{D} - 1} \quad (15)$$

Let us consider further the features of calculating the financial safety margin and the operating leverage of agricultural enterprises in the Autonomous Territorial Unit of Gagauzia (ATU Gagauzia), located in the southern zone of the Republic of Moldova – in the area of high-risk (unstable) agriculture. Studies have shown that, in such circumstances, an enterprise is able to realize simple reproduction at the level of production profitability of 25% and above, while extended reproduction is possible at the level of 37% and higher [3, p. 76].

It has been proved that under conditions of unstable agriculture in the ATU Gagauzia, the average share of fixed costs of the enterprises producing crops in 2010-2012 constituted: [2, p. 23]:

cereal and leguminous crops – 0,389;
 cereal and leguminous crops without corn – 0,413;
 corn – 0,549;

sunflower – 0,648.

Based on the formulas 12 and 13 let us determine the values of financial safety margin and operating leverage required for simple and extended reproduction on the planting area of the indicated types of crops. The results obtained will be called normative. Calculated data are presented in the table.

Table 1. Normative levels of financial safety margin and operating leverage for the production of basic crops in ATU Gagauzia

Crops	Share of fixed costs	Financial safety margin for reproduction(not less than)		Operating leverage for reproduction (not more than)	
		simple	extended	simple	extended
cereal crops	0,389	0,391	0,487	2,556	2,051
cereal crops without corn	0,413	0,377	0,473	2,652	2,116
corn	0,549	0,313	0,403	3,196	2,484
sunflower	0,648	0,278	0,363	3,592	2,751

Source: developed by the authors.

Let us present the indicators of financial safety margin and operating leverage in the

production and sale of basic crops in the ATU Gagauzia for 2007-2012 years in Figure 1.

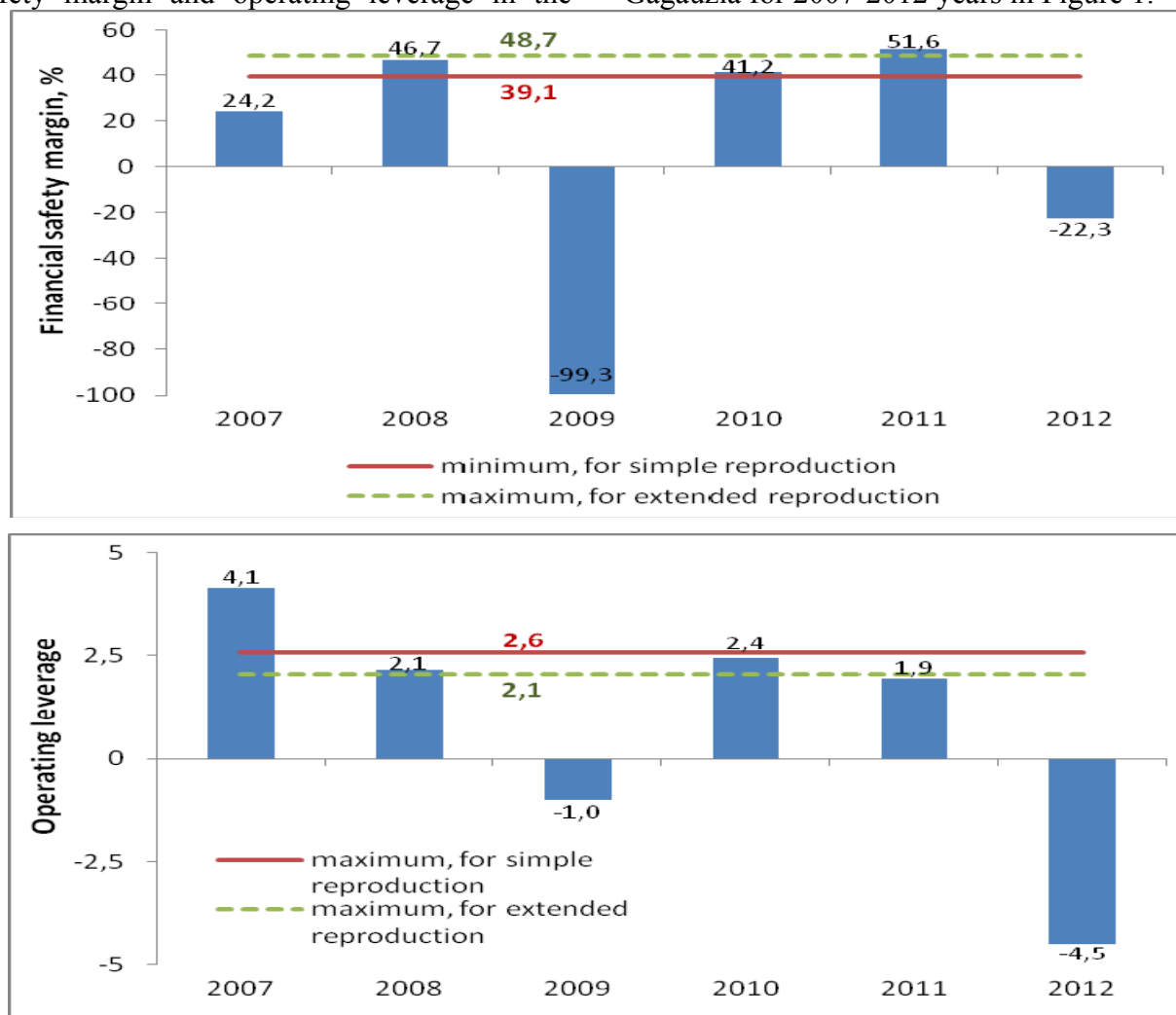


Figure 1. Levels of financial safety margin and operating leverage in the cultivation of cereal crops within enterprises of ATU Gagauzia for 2007-2012 years

Source: developed by the authors according to the Department of Agriculture of ATU Gagauzia

Operating leverage indicators are closely related to the level of financial safety margin. During the reported period, while production of cereal crops without corn and the corn itself the indicator of financial safety margin exceeded the minimum required level for simple reproduction during 3 years, and for the extended reproduction – during only two years (2010 and 2011). This demonstrates low sustainability and insufficient profitability of these types of crops, which negatively affects the level of economic security of enterprises and the industry as a whole.

Cultivation of sunflower proved to be more sustainable. Within the ten years' period, the enterprises of the Autonomy reached the required level of financial safety margin for maintaining simple reproduction during 7 years, and for extended reproduction -during 6 years respectively.

Let us present the calculated and actual average indicators of operating leverage in the production and sales of main types of crops in the Autonomy or the period of 2010-2012 years in Figure 2.

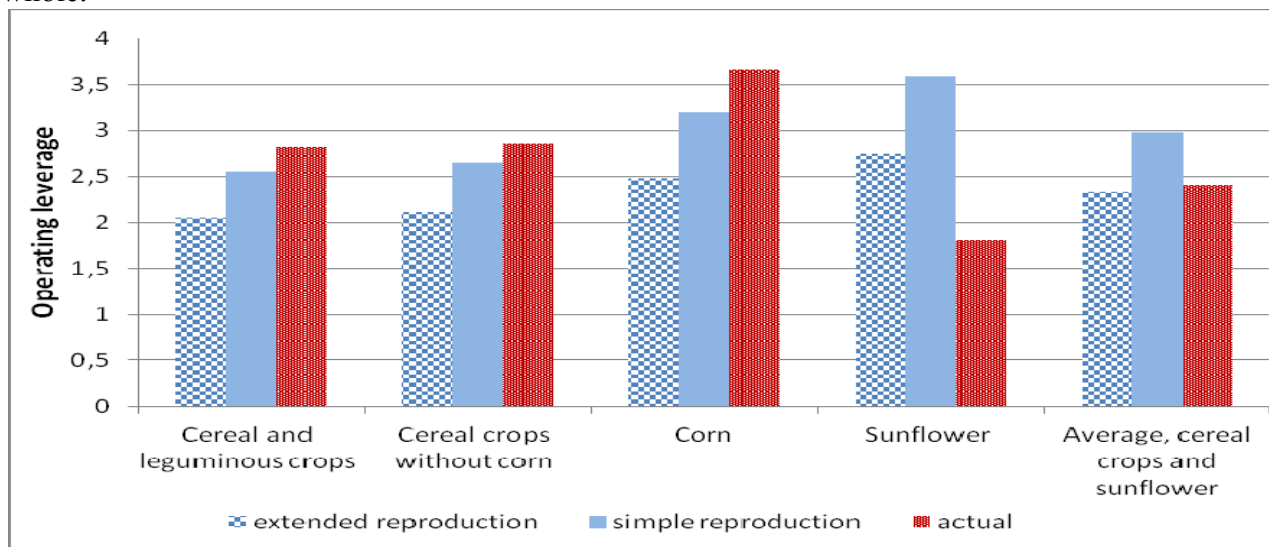


Figure 2. Indicators of average levels of operating leverage in the production of cereal crops and sunflower within the enterprises of ATU Gagauzia (2010-2012)

Source: developed by the authors according to the Department of Agriculture of ATU Gagauzia

The actual value of operating leverage as an indicator of economic security of cultivation of cereal crops is above the level required for extended reproduction by 37.7%, and is lower for sunflower by 34.6%. On average, during the cultivation of grain and sunflower the level of leverage for the years mentioned reached the value of 2,41 at the normative value is 2,334, that is, representing an excess of 3,3%. Thus, the majority of agricultural enterprises of the

autonomous region ensured safe production of basic crops on average for 2010 - 2012 years.

Conclusions the research showed a close relationship between the indicators of financial safety margin, operating leverage and profitability of production and confirmed the presence of significant potential for increasing the efficiency of production and sales of products, which will allow ensuring economic security of agricultural enterprises of the ATU Gagauzia.

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