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## OPERATIONAL LEVERIDGE IS AN IMPORTANT ECONOMIC INDICATOR

The article establishes the necessity of developing a methodology for assessing the economic stability of production and sales in both theoretical and practical aspects. It is specified that when maximizing the profit of an enterprise, account should be taken of the growing production risks.

Estimates of stability and / or riskiness of manufactured and sold products, using the indicator of the price operational leverage and the coefficient of profitability of sales.

The article summarizes the methodical approaches to determining the indicator of an operating leverage in foreign economic literature. Practical calculations of the natural and price operational levers are presented, criteria for the acceptable level of entrepreneurial risk are developed taking into account the financial stability of the agricultural enterprise.

Statistical information on the size and structure of the cost of production of certain types of plant products (wheat, corn, sunflower, grapes) in agricultural enterprises is systematized. The structure of fixed and variable costs in the production of these crops is determined, as well as the situation of the relevant product markets.

It is proved that the calculation of the level of operating leverage in the production of a particular type of crop production allows us to assess the state of economic sustainability and, accordingly, to formulate rational management decisions to achieve the permissible level of risk and increase the efficiency of production activities. The mechanism of management of the production program is based on the consideration of the change in the value of the strength of the operating lever at different trends in the development of the market situation of the corresponding products.

It is substantiated that the size of the operating lever is influenced by the sectoral features of agricultural production, the level of technical support, the volume of production, the price conjuncture of the domestic and foreign markets of the corresponding products, etc. indicators. The authors highlight that the main advantage of operational analysis for the enterprise management system is the ability to develop scenarios of influence on the amount of profit that the enterprise will receive, subject to a change in several factors: volume of production, composition and value of costs, product prices, structural changes in the product composition of the production program.

Keywords: sustainability, riskiness, operational leverage, profitability of sales, income, profit.

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**Introduction.** Increasing uncertainty as a result of changing global climate change, as well as the manifestation of other destructive phenomena on the macro- and micro levels of the functioning of agricultural enterprises, leads to an increase in uncertainty and risk. Under these conditions, issues of the risk management system for operational, financial and investment activities of agricultural enterprises are being updated. One of the tools of such a system is the operating leverage, which allows to form effective management decisions by the management of agricultural enterprises in ensuring sustainable development in the strategic perspective.

As it is known, in crop production an important condition for ensuring high production efficiency is to obtain high yields of products, i.e. fuller use of the potential of land productivity and biological potential of plants. However, the indicators of output per unit area do not directly characterize the state of the level of economic activity on earth. The development of a methodology for assessing the economic sustainability of production and sales of products, which should be available for practical use by experts of agricultural enterprises and at the same time reflect modern approaches to assessing the level of economic activity on the ground, is quite popular both in theoretical and practical aspects.

We believe that the use at the level of the agricultural enterprise in identifying and managing the internal risks in the field of plant production of the operating leverage tool will help to select the optimal strategy, policy and tactics of managerial influences of the management system, the formation of a rational structure of production potential, technical support, level of specialization, achievement of the relevant indicators the efficiency of growing crop production.

In our study, operational leverage is considered as a tactical and strategic tool that will contribute to achieve the desired performance in maximizing profits, sustainability of the enterprise. Assessing

111

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the level of operational leverage will allow us to identify opportunities for increasing profitability, risk level, profit sensitivity to external and internal changes.

Analysis of recent research. As scientists point out, it is important to determine the optimal value of the operating leverage of the enterprise in order to achieve flexibility in investing in production. The choice of the value of the operating leverage ratio is critical, since it affects the level of enterprise risk, the formation of production and financial indicators. However, there is virtually no research on determining the operating leverage ratio of an enterprise. Foreign researchers have identified important factors that influence the operating leverage ratio, such as costs (fixed and variable costs), demand characteristics (growth rates, volatility, price sensitivity), capital productivity and interest rates [1, 2].

Issues of the stability of land use results are considered in the economic literature from different perspectives. In particular, A. Altukhov suggests in his publications ways of improving the organizational and economic mechanism for the sustainable development of agro-industrial production [3, p. 2-11], and A.Rasskazova and R.Zhdanova introduce the concept of economic efficiency of sustainable land use [4, p. 23-25]. S.Siptits examines the problems of combining the efficiency and sustainability of functioning agri-food systems [5, p. 56-59], and I.Romanenko and N.Evdokimova – sustainability and efficiency of plant production in the territory, which ensures a high degree of use of the bioclimatic potential of the territory [6, pp.60-63]. Professor A.Stratan proposed a methodology for assessing the effectiveness and stability of crop production [7, p. 622-626], and M. Vronskikh investigated the impact of climate change on the risks of agricultural production [8, p. 211-215].

**Purpose of the article –** generalize the methodical tools for using the operational leverage indicator to assess the degree of risk of production and sales in the context of certain types of crop products, including using non-traditional approaches, and to adapt it for practical use by the management of agricultural enterprises.

Material and research methods. The research is based on the generalization of theoretical and methodological principles of the asset management toolkit, which is oriented towards increasing profits, and is known in financial management as leverage. In the course of the research, we systematized statistical information on the magnitude and structure of the cost of production of certain types of plant products (wheat, corn, sunflower, grapes) in agricultural enterprises. According to the established database, we have defined the structure of constant and variable costs in the production of these crops, as well as the situation of the relevant markets of products. Note that the production (operating) lever is an indicator that allows you to determine the directions of impact on gross profit by changing the cost of production and the volumes of their production. It is known that the effect of an operating lever is that any changes in revenue from the sale of products always lead to significant changes in profit. This effect is due to the influence of dynamics and the structure of fixed and variable costs on the formation of financial results when changes in production volumes. So, the higher the level of constant costs compared with the variables, the greater is the force of influence of the operating lever. From the mathematical point of view, the index of the operating lever in the context of a specific product type represents the coefficient of elasticity of profit in terms of sales. Operational leverage shows how much interest changes in profits when the volume of production changes (in real terms or in value terms) by one percent.

Summary of the main results of the study. The synthesis of foreign scientific literature has made it possible to establish that the management system of any enterprise is able to influence the operational and financial leverage, carrying out various administrative actions, between which there is a compromise. Enterprises have the opportunity to adjust the levels of operational and financial leverage in order to purposefully influence the desired levels and thus optimize the level of risk. In practice, high levels of both operational and financial leverage may be allowed. However, it is not appropriate to allow such a situation because they both contribute to risk [9].

As for the operating leverage of the enterprise, then the transition from a high level of constant costs to a high level of variable costs can be achieved in many ways. The scientific literature systematized the factors of production, influencing which management of an enterprise can optimize the level of risk based on the use of the indicator of the operating lever – changes in technology, the introduction of variability in the use of mechanisms, equipment, optimization of the staff of managers and employees, etc. Operating leverage is determined by the structure of fixed and variable costs,

respectively, the higher the value of the leverage of the operating leverage, the greater the amount of proceeds from sales of products must be ensured. For enterprises that are able to provide significant changes in sales volumes, it is possible to have a greater impact on the return on capital invested, and vice versa [10, 11]. Consequently, there is a positive relationship between the operating leverage and the risk that has been empirically proven by foreign researchers [12-14].

It should be noted that the calculation of the operating leverage is difficult, since it is not possible to determine the value of fixed and variable costs from the financial statements. It is obvious that such information can be obtained from the data of primary accounting at the level of the agricultural enterprise, which allows the management system to conduct an analysis of the structure of costs by the type of products possible, which will allow to assess the level of risk in their production.

However, research by foreign scholars shows that they have found alternative ways to assess the operating leverage. Thus, the level of the operating leverage can be used to assess how much the change in sales will affect the profit without using in the calculation of the cost structure of the enterprise. Found that the value of the operating lever above 1 indicates the existence of an operating lever. If the operating leverage is high, for example, 3, then the increase or decrease in sales by 1% will affect the profit by 3% in the same direction [15]. Such an approach to calculating the operating leverage can not be used in enterprises that suffered losses in the years to be calculated [16]. By definition, an operating leverage increases with an increase in fixed costs and / or a decrease in variable costs. However, scientists point out that the level of operational leverage increases with both increasing costs and variable costs. This means that the level of the operating leverage is not risk-related because of the increase in fixed costs, but rather the manifestation of the risk is due to changes in production and sales [17].

It is known that each enterprise in the industry cultivates, as a rule, several crops. Production and sale of some provide a high return on investment, others – low profitability. However, to abandon the production of the latter is not always possible due to agrotechnical requirements for compliance with the rotation of crops in crop rotation or other reasons, both internal and external. In other words, the structure of sales is always different in terms of profitability. In the conditions of the Republic of Moldova, first of all, depending on the prevailing weather and climatic conditions of cultivation and harvesting, the effectiveness of a single type of product may differ significantly – from loss-making to a level of profitability exceeding 30%. For example, the level of profitability of sold grain in the country varied from – 3.5% in 2009 to + 39.9% in 2011, sunflower – from 16.6 in 2009 to 89.8% in 2010, grapes – from 6.0 in 2009 to 37.0% in 2012 [18, p.325]. In this connection, a scientifically-based and accessible method of calculating indicators reflecting the degree of risk or the level of sustainability of the products sold seems to be quite popular. It is important for an enterprise to know and, therefore, objectively plan the amount of expenses that will ensure the volume of production per unit of area necessary to ensure simple and / or expanded reproduction.

Enterprise viability provides for sustainable development, thanks to the effective use of all types of resources and entrepreneurial opportunities. An enterprise develops in the case when the results of activity allow it to conduct continuous reproduction at its own expense. In pursuit of maximum profit, enterprises must take into account increasing production risks. The level of operational leverage is an indicator of enterprise riskiness. This explains the importance of assessing this indicator in determining the viability of the enterprise.

As you know, the company has two types of costs: variable and fixed. Their structure can significantly influence the trend of changes in profits or costs. This is due to the fact that each additional unit of production brings some additional profitability, which goes to cover fixed costs, and depending on the ratio of fixed and variable costs in the cost structure, the total increase in revenues from an additional unit of goods can result in a sharp change in profit. As soon as the break-even level is reached, a profit appears that starts to grow faster than the sales volume. Here we come to the aid of operational analysis, which allows us to analyze the impact of the cost structure and production (sales) on the financial results of the company. On this basis, it is possible to identify the relationship between costs and revenues for different production volumes, determine the most advantageous combination of price and sales volume, the ratio of fixed and variable costs, minimize business risks, and accordingly contribute to improving the economic security of the enterprise.

Operational analysis includes a number of important indicators: the break-even point, the stock of financial strength and operating leverage.

It is important to identify at the level of each enterprise the so-called break-even point, that is, the level of product sales at which the sales volume is equal to the total costs.

The degree of sustainability of the enterprise in relation to possible changes in the conditions of implementation can be characterized by indicators of the break-even boundaries and the limiting values of such parameters of the organization as the volume of production, prices of products, etc.

The calculation of the critical volume of production and sales of products in natural terms is found using the equation:

$$Q_{\rm cr} = \frac{FC}{p - AVC},\tag{1}$$

where Qcr – critical quantity of products (t);

FC – fixed costs (leu);

p – the sales price of products (leu / t);

AVC – specific variable costs (leu / t).

Similarly, we find the size of the critical yield (qmin) of products (subject to its full implementation):

$$\mathbf{q}_{min} = \frac{\mathbf{FC}}{\mathbf{p} - \mathbf{AVC}}, \, \mathbf{c/h}$$
 (2)

where FC - conditional fixed costs per hectare of planting (leu):

The calculation of the critical volume of sales (cr), in which the income from sales of products is equal to the sum of the costs of its production, can be calculated by the expression:

$$N_{cr} = \frac{FC}{1 - \frac{AVC}{B}}.$$
 (3)

A more objective assessment of the sustainability and economic security of the cultivation of crops gives an analysis of the stock of financial strength. Financial strength is one of the indicators of the financial condition of the company, that is, how financially stable the company is. The higher the stock of financial strength, the more opportunities to maintain the relative level of profitability while reducing sales revenue, which positively affects the economic security of the enterprise.

Usually, the percentage ratio of the stock of financial strength in physical or monetary terms to the actual (planned) volume is calculated. This value indicates how much interest sales can decrease so that the company can avoid losses. The higher the indicator of the stock of financial strength, the more stable the enterprise, and the less the risk of loss for it.

$$D = \frac{N - Ncr}{N} \cdot 100, \% \tag{4}$$

$$D = \frac{Q - Q_{cr}}{O} \cdot 100, \% \tag{5}$$

where N and Q – respectively, the actual figures of sales in monetary and physical terms.

The key indicator by which we can talk about the state of economic security of an enterprise is the effect of operating leverage or operating leverage (L). It is quantitatively characterized by the ratio between fixed and variable costs in their total amount and the variability of the rate of profit. It is higher in those companies in which the ratio of fixed costs to variables is higher, and, accordingly, lower in the opposite case. Understanding the mechanism of action of operating leverage allows you to purposefully manage the ratio of fixed and variable costs in order to improve the efficiency of the current activities of the enterprise. This management boils down to a change in the value of the strength of the operating leverage with different trends in the commodity market conditions. The indicator of operational leverage allows you to quickly (without having a report on profits and losses) determine how the changes in sales will affect the profit from sales of products:

$$L = \frac{\Delta P}{\Delta N}, \text{ i.p/i.r}, \tag{6}$$

where  $\Delta P$  is the increase in gross profit;

 $\Delta N$  is the increase in sales revenue.

Operating leverage shows how many percentage points the company's profit will change when income changes by one percentage point.

There are two types of operating leverage: price and natural.

Price operating leverage is determined by the formula:

$$L_{\text{Price}} = \frac{N}{P},\tag{7}$$

where N – income from sales of products;

P – profit of sales.

It is also important to pay attention to the formula 7 (Ltsen = N / P), which shows that price leverage is the ratio of the volume of sales in value terms to the amount of profit. We also know that the ratio of profit to sales volume is sales profitability. Thus, price leverage is the opposite indicator of profitability of sales: high profitability confirms the low value of price leverage, which underlines the stability of the business.

$$L_{\text{Price}} = \frac{1}{Rsale}.$$
 (8)

Thus, the assessment of the degree of risk can be carried out using both the value of the operational price leverage and the indicators of sales profitability. The lower the operating leverage indicator and, accordingly, the higher the profitability of the products sold, the higher the economic sustainability of the cultivation of grain, sunflower, grapes and other crops. This dependence is graphically presented (Fig. 1).

Natural operating leverage taken measured by the ratio of marginal income (M) to gross profit (P):

$$L_{\text{nat}} = \frac{M}{P}.$$
 (9)

Since the marginal income, in addition to gross profit, also contains the sum of fixed costs, the operating leverage is always greater than one. The effect of operating leverage characterizes the degree of riskiness of a business. The profit of an enterprise with a higher level of operating leverage is more sensitive to changes in revenue and is considered to be riskier. With a sharp drop in sales, such an enterprise can very quickly "fall" below the break-even point. The activity of an enterprise with a low operational lever is associated with less risk, but also with less remuneration (profit).

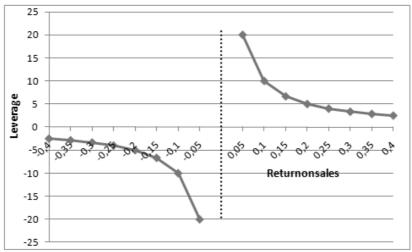


Fig. 1. Dependence of price operating leverage on return on sales.

Source: performed by the formula 8.

There are many different criteria by which you can determine the economic condition of the enterprise. Thus, the price operating leverage is an indicator that demonstrates the dependence of the dynamics of change in the rate of profit on the volume of sales in monetary terms.

Price operating leverage reflects price risk, that is, the effect of price changes on the amount of profit from sales. The natural operating leverage shows the production risk, that is, the variability of sales profits depending on the volume of output. With the increase in sales revenue and the excess of its actual value compared to the critical level, the impact force of the operating lever decreases. Each percentage increase in revenue gives a lower percentage of profit growth. In this case, the share of fixed costs in their total amount decreases. With the help of price operating leverage, you can get an answer to the question about the possible limit of price cuts, with the help of natural leverage – to identify the boundaries of a decrease in sales volumes in real terms.

Next, we identify the relationship between price and natural leverage.

According to the formula 9 
$$L_{price} = \frac{N}{p}$$
, then  $L_{price} = \frac{FC + VC + P}{p} = 1 + \frac{FC}{p} + \frac{VC}{p}$   
Since in accordance with the formula 10  $L_{nat} = 1 + \frac{FC}{p}$ , then
$$L_{price} = L_{nat} + \frac{VC}{p}$$
(10)

Consequently, price leverage is always more than natural by an amount directly proportional to variable costs and inversely proportional to the amount of profit. In other words, the higher the profit and the lower the variable costs, the closer the indicators of price and natural leverage are. The relationship between the sales profitability ratio and the price and natural operating leverage is shown in Figure 2.

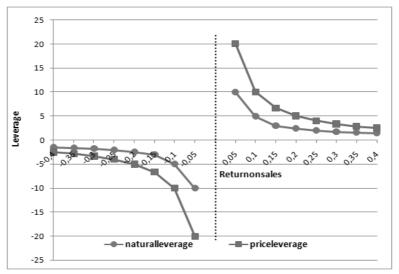


Fig. 2. Dependence of price and natural operating leverage on profitability ratio of sales.

Source: performed by the formulas 8 and 10.

As you know, the stock of financial strength is the inverse of the natural operating leverage. Then Figure 2 can be complemented by this dependency (Figure 3).

Studies have shown that in the conditions of the southern zone of the Republic of Moldova, in order to ensure expanded reproduction, enterprises need to consistently ensure an average sales margin of at least 22% [8, p.107]. Consequently, the value of price leverage, ensuring the stability of production and sales of products should not exceed 4.55.

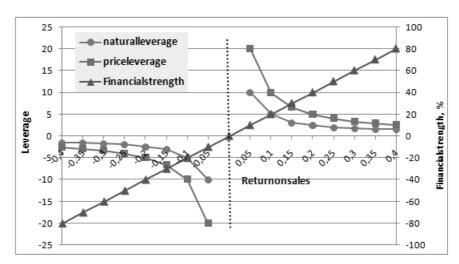


Fig. 3. The dependence of the stock of financial strength, price and natural operating leverage by return on sales.

Source: done by the authors.

We consider the validity of the above on the example of the Agrogled limited liability company of the Taraclia district for 2017. The established indicators of production and sales of main crops are presented in table 1.

Table 1 - Baseline production and sales of major crops in LLC Agrogled for 2017

Indicators	Wheat	Corn	Sunflower	Grapes
Selling price (p), lei / c	246,7	190,2	477,8	405,7
Cost price. lei / c	169,1	188,5	371,3	407,9
Fixed costs (FC), lei / ha	3350	6261	7284	18201
Specific variable costs (AVC), lei / c	109,93	91,43	133,30	135,83
Specific marginal income (d), lei / c	136,77	98,77	344,5	269,87
Productivity (q), c / ha	56,6	64,5	30,6	66,9
Cost (z), lei / c	169,1	188,5	371,3	407,9

Source: Forms 7 and 9 of the Agro-Industrial Complex LLC Agrogled for 2017.

Using formula 2, we define the break-even point (critical yield), formula 5 – the margin of financial strength, formulas 7 and 9 – the operating price and natural leverage in the production of wheat, corn, sunflower and grapes in the selected enterprise. The calculation results are summarized in table 2. They show that in 2017 the enterprise had the lowest operational risk in the production of wheat and sunflower, since the price leverage value is lower than the benchmark indicator of 4.55, and the return on sales ratio is above the minimum threshold (0.22) required for maintaining extended reproduction. Cultivation of corn and grapes at a price leverage of 111.5 and -122, respectively, turned out to be unprofitable.

Table 2 - Estimated production and sales of basic products crops in LLC Agrogled for 2017

Indicators	Wheat	Corn	Sunflower	Grapes
Revenue (N), lei / ha	13693	12268	14621	27141
Costs (TS), lei / ha	9572	12158	11363	27288
Profit (P), lei / ha	4121	110	3258	-147
Critical yield, (qmin), c / ha				
-	24,5	63,4	21,1	67,4
Natural Leverage (Lnat)	1,81	57,9	3,24	-122,8
Leverage price (Ltsen)	3,32	111,5	4,49	-184,6
Return on sales	0,301	0,009	0,22	-0,005

Source: performed according to table 1.

The dependence of price operating leverage on the level of sales prices can be visualized on the chart. Figures 4 and 5 show the indicated dependence in the production of wheat and sunflower, respectively, at Agrogled LLC for 2017.

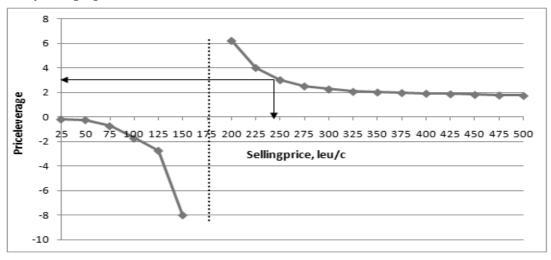


Fig. 4. The dependence of price leverage on the selling price in the production of wheat in LLC Agrogled for 2017.

Source: performed by the formula 7 and the data in table 2.

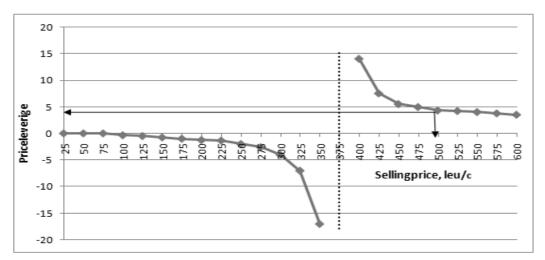


Fig. 5. The dependence of price leverage on the selling price at the production of sunflower in LLC Agrogled for 2017.

Source: performed by the formula 7 and the data in table 2.

It is important to note that the leverage curve is divided into two parts: the first reflects negative values, which are located up to the profitability threshold (break-even point), the second is a positive zone, which tends to decrease. On the charts, the break-even point is shown by a vertical dashed line, and the actual value of price leverage and selling price, an arrow connecting the leverage curve with the horizontal and vertical axis.

We believe that the methodical approach adopted by us for calculating the operating leverage index for the agricultural enterprises management system will allow us to carry out a comprehensive assessment of the degree of risk of production and sales of products, using both the price transaction leverage and the profitability ratio of sales.

**Discussion.** The conducted studies allowed to adapt the developed methodical toolkit on the use of the indicator of the operating leverage to assess the stability of plant production in agricultural enterprises. We believe that in the future there is a need to study the relationship of operational and financial leverage, as well as to calculate the operating and financial leverage for making sound management decisions on the formation of a production and sales program, optimizing the size and cost structure, the rational balance of own and borrowed capital in order to minimizing the risk of loss of enterprise sustainability.

Conclusions. Since operating leverside shows a change in operating profit as a result of a change in sales revenue, which will achieve the desired return on investment at an acceptable level of risk. It has been established that in most cases, the operating lever is considered as a tool for solving tactical tasks of the enterprise by scientists and practitioners. However, the use of this indicator is appropriate in developing a strategic plan for the production program of crop production, as this document contains indicators of the target profit, planned production costs and forecast price parameters in terms of certain types of crop production. Management of an agricultural enterprise based on the use of the indicator of the operating leverage will be able to adjust the monitoring by the size of operating profit, ensuring the minimization of the impact of risks on the sustainability of production activities. Obviously, the use of the operating leverage in the tactical and strategic planning of the crop production program will allow predicting the planned amount of operating profit, determine the most economically feasible for the production of crop production, cost structure and other indicators that will contribute to ensuring the set of current and strategic goals in the development of agricultural enterprises.

## REFERENCES

1. Sarkar S. (2018). Opty`mal`ny`j DOL (stupin` operacijnogo vazhelya) z gnuchkistyu investy`cij ta vy`robny`cztva. Mizhnarodny`j zhurnal ekonomiky` vy`robny`cztva. [Optimal DOL (degree of operating leverage) with investment and production flexibility]. International Journal of Production Economics [Mizhnarodny`j zhurnal ekonomiky` vyrobnycztva]. Vol. 202, pp. 172–181. DOI: 10.1016/j.ijpe.2018.05.022.

- 2. Musavi, S.H., Zare, I. (2013). Zv'yazok mizh DOL, DFL i DTL z systematychnym ryzykom [Relation between DOL, DFL and DTL with systematic risk]. Zhurnal nauk pro zhy`ttya [Life Science Journal]. Vol. 10. Issue SUPPL. 5, pp. 611–615. ISSN: 10978135.
- 3. Altukhov A.I. (2016). Udoskonalennya organizacijno-ekonomichnogo mexanizmu stalogo rozvy`tku agropromy`slovogo vy`robny`cztva [Improvement of the Organizational-Economic Mechanism for the Sustainable Development of Agro-Industrial Production]. Ekonomika silskogospodarskyh ta pererobnyh pidpry`yemstv [Economics of Agricultural and Processing Enterprises]. No 7, pp. 2–11.
- 4. Rasskazova, R. Zhdanova. (2017). Osnovni ponyattya ekonomichnoyi efekty`vnosti upravlinnya staly`m zemlekory`stuvannyam [Basic Concepts of the Economic Efficiency of Sustainable Land Management]. Mizhnarodny`j sil`s`kogospodars`ky`j zhurnal [International Agricultural Journal]. No 1, pp.23–25.
- 5. Siptits S. (2017). Metody` proektuvannya efekty`vnyh i stijkyh variantiv rozmishhennya sil`skogospodarskogo vyrobnycztva [Design Methods for Efficient and Sustainable Allocation Options for Agricultural Production]. Mizhnarodny`j silskogospodarskyj zhurnal [International Agricultural Journal]. No. 6, pp.56–59.
- 6. Romanenko I.A., Evdokimova N.E. (2017). Cenologicheskij pidxid pry` analizi stijkosti rozmishhennya sil`s`kogo gospodarstva po regionax Rosiyi [The cenological approach in analyzing the sustainability of agriculture by regions of Russia]. Mizhnarodny`j sil`s`kogospodars`ky`j zhurnal [International Agricultural Journal]. No 6, pp. 60–63.
- 7. Stratan Alexandru (2014). Dy'lema moldavs'koyi agroprodovol'choyi galuzi: sxid abo zaxid? [Moldovan agri-food sector dilemma: east or west?]. Ekonomika sil's'kogo gospodarstva [Economics of agriculture]. Belgrade. No 3 (553-828), pp. 615–632.
- 8. Vronskih M.D. (2011). Zmina klimatu i ry`zy`ky` sil`s`kogospodars`kogo vy`robny`cztva Moldovy` [Climate change and the risks of agricultural production in Moldova]. K.: "Grafema Libris" SRL. 560 p.
- 9. Hillier D., Ross S., Westerfield R., Jaffe J. and Jordan B. (2010). Corporate finance. 1. European ed. Berkshire: McGraw-Hill Higher Education. 971 p. Available at: http://www.aep.neu.edu.vn/FileManager/ThuVien/166085925-Ross-Westerfield-Jordan-Fundamentals-of-Corporate-Finance-9th-Ed-20101.pdf.
- 10. Triest, van, S., & Bartels, A. (1998). On the theoretical relation between operating leverage, earnings variability, and systematic risk. (BETA publicatie: preprints; Vol. 25). Eindhoven: Technische Universiteit Eindhoven, BETA. Available at: https://pure.tue.nl/ws/files/4238082/515629.pdf.
- 11. Baxter, N., Vazheli, ry`zy`k rujnuvannya ta vartist` kapitalu [Leverage, Risk of Ruin and the Cost of Capital]. Zhurnal finansiv [Journal of Finance]. Vol. 22. No. 3, pp. 395–403.
- 12. Lev B. (1974). Pro asociaciyu mizh operacijny`m vazhelem i ry`zy`kom [On the Association Between Operating Leverage and Risk]. Zhurnal kil`kisnogo analizu [The Journal of Quantitative Analysis]. Vol. 9. No. 4, pp. 627–641.
- 13. Mandelker G.N. & Ghon Rhee S. (1984). Vply'v stupeniv operacijnogo ta finansovogo vazhelya na sy'stematy'chny'j ry'zy'k spil'nogo zapasu [The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock]. Zhurnal finansovogo ta kil'kisnogo analizu [The Journal of Financial and Quantitative Analysis]. Vol. 19. No. 1, pp. 45–57.
- 14. Duett E., Merikas H.A.& Tsiritakis M.D. (1996). Pedagogichna eksperty`za vidnosy`n mizh operacijny`m i finansovy`m vazhelem i sy`stematy`chny`m ry`zy`kom [A Pedagogical Examination of The Relationship Between Operating and Financial Leverage and Systematic Risk]. Zhurnal finansovy`x i strategichny`x rishen [Journal of Financial and Strategic Decisions]. Vol. 9. No 3, pp.1–28.
  - 15. Bodie Zvi, Kane Alex, Marcus, Alan J. (2009). Investy'ciyi [Investments]. Vol. 8. ed. Boston: McGraw-Hill. 990 p.
- 16. Huffman, L. Operating Leverage, Financial Leverage, and Equity Risk. (1983). Journal of Banking and Finance. Vol. 7. No. 2, pp. 197–212. Available at: https://www.sciencedirect.com/science/article/pii/0378426683900328.
- 17. Lord, R.A. (1995). Interpretaciya ta vy`miryuvannya operacijnogo plecha. Py`tannya buxgalters`koyi osvity`[ Interpreting and Measuring Operating Leverage. Issues in Accounting Education]. Vol. 10. No 2, pp. 317–329. ISSN 0739-3172.
- 18. Staty`sty`chny`j shhorichny`k Respubliky` Moldova [Statistical Yearbook of the Republic of Moldova], 2016. Ch Statistica. 384 p. and 2015 (Tipogr. "Centrografic"). 274 p.

## Операційний леверідж як важливий економічний показник Пармаклі Д.М., Тодорич Л.П., Дудогло Т.Д.

Встановлено необхідність розробки методики оцінки економічної стійкості виробництва та реалізації продукції як в теоретичному, так і практичному аспектах.

Уточнено, що при максимізації прибутку підприємства мають бути враховані зростаючі виробничі ризики. Оцінено стабільність і ризикованість виробленої та реалізованої продукції, застосовуючи показник цінового операційного левериджу і коефіцієнт рентабельності продажів.

У статті узагальнено методичні підходи до визначення показника операційного левериджу (важеля) у зарубіжній економічній літературі. Наведено практичні розрахунки натурального та цінового операційного важеля, сформовані критерії для допустимого рівня підприємницького ризику із урахуванням запасу фінансової стійкості сільськогосподарського підприємства.

Систематизовано статистичну інформацію про величину та структуру собівартості виробництва окремих видів продукції рослинництва (пшениця, кукурудза, соняшник, виноград) сільськогосподарських підприємств. Визначено структуру постійних та змінних витрат при виробництві даних культур, а також вивчено кон'юнктуру ринків продукції рослинництва.

Доведено, що розрахунок рівня операційного левериджу при виробництві конкретного виду рослинницької продукції дозволяє оцінити стан економічної стійкості та відповідно формувати раціональні управлінські рішення щодо досягнення допустимого рівня ризику та підвищення ефективності виробничої діяльності. Механізм управління виробничою програмою базується на зміні значення сили операційного важеля при різних тенденціях розвитку кон'юнктури товарного ринку відповідної продукції.

Обґрунтовано, що на величину операційного важеля впливають галузеві особливості сільськогосподарського виробництва, рівень технічного забезпечення, обсягу виробництва продукції, цінова кон'юнктура внутрішнього та зовнішнього ринків відповідної продукції, інші показники. Авторами висвітлено, що основною перевагою операційного аналізу для системи менеджменту підприємства  $\epsilon$  можливість розробки сценаріїв впливу на величину прибутку, яку одержить підприємство за умови зміни декількох факторів: обсягу виробництва, складу та величини затрат, ціни на продукцію, структурних змін у продуктовому складі виробничої програми.

Ключові слова: стійкість, ризикованість, операційний леверидж, рентабельність продажів, дохід, прибуток.

## Операционный леверидж – важный экономический показатель Пармакли Д.М., Тодорич Л.П., Дудогло Т.Д.

Установлена необходимость разработки методики оценки экономической устойчивости производства и реализации продукции как в теоретическом, так и практическом аспектах.

Уточнено, что при максимизации прибыли предприятия должны быть учтены растушие производственные риски. Опенены стабильность и рискованность произведенной и реализованной продукции, применяя показатель пенового операционного левериджа и коэффициент рентабельности продаж.

В статье обобщены методические подходы к определению показателя операционного левериджа (рычага) в зарубежной экономической литературе. Приведены практические расчеты натурального и ценового операционного рычага, сформированы критерии для допустимого уровня предпринимательского риска с учетом запаса финансовой устойчивости сельскохозяйственного предприятия.

Систематизировано статистическую информацию о величине и структуре себестоимости производства отдельных видов продукции растениеводства (пшеница, кукуруза, подсолнечник, виноград) сельскохозяйственных предприятий. Определена структура постоянных и переменных издержек при производстве данных культур, а также изучено конъюнктуру рынков продукции растениеводства.

Доказано, что расчет уровня операционного левериджа при производстве конкретного вида растениеводческой продукции позволяет оценить состояние экономической устойчивости и соответственно формировать рациональные управленческие решения по достижению допустимого уровня риска и повышение эффективности производственной деятельности. Механизм управления производственной программой базируется на изменении значения силы операционного рычага при различных тенденциях развития коньюнктуры товарного рынка соответствующей продукции.

Обосновано, что на величину операционного рычага влияют отраслевые особенности сельскохозяйственного производства, уровень технического обеспечения, объема производства продукции, ценовая конъюнктура внутреннего и внешнего рынков соответствующей продукции и др. показатели. Авторами освещено, что основным преимуществом операционного анализа для системы менеджмента предприятия является возможность разработки сценариев влияния на величину прибыли, которую получит предприятие при условии изменения нескольких факторов: объема производства, состава и величины затрат, цены на продукцию, структурных изменений в продуктовом складе производственной программы.

**Ключевые слова**: устойчивость, рискованность, операционный рычаг, рентабельность продаж, доход, прибыль.

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