

THE OPORTUNITY AND NEED OF THE COST - VOLUME - PROFIT ANALYSIS IN AGRICULTURE

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Cost is in reality an interface between financial accounting and management accounting. The aim of the paper is to determine the need and opportunity of the cost - volume – profit analysis for the economic entities in the field of agriculture. Taking into account the peculiarities of agricultural production, the research is based on analysis of the following indicators: the threshold of profitability, coverage factor, the factor of balance and safety. The results of our research suggest that cost - volume – profit analysis is a necessary tool for cost forecasting as well for management cost control. The opportunity of such an analysis in the agricultural sector is justified through that it helps the managers find the best cost, in the sense of the most adequate cost for their administrative problems. The best cost for a firm isn't necessarily the lowest, but that cost that comes at the right time. This analysis is necessary to evaluate new types of crops to plant and to undertake studies on the structure of sales.

Key words: cost, analysis, agriculture, necessity, opportunity.

Any agricultural firm must also evaluate from time to time its work. In determining the final results of the activity of particular importance are pursuing a different product costs by comparing which creates the possibility of selecting the performance with a low yield. For this it is necessary to study the structure and the dynamics and costs.

Through cost it is ensured the "measurement of the required effort in a product or service" [8]. The cost is "an amount, usually expressed in local currency, the expenditure necessary to purchase or produce a good or a service." [9]. Knowledge of costs is "one of the basic imperatives of decision making, whether it is about the enterprise or not." [2] In terms of management, the effective management of costs cannot be achieved without management control. It is the process by which managers ensure that resources are obtained and used with efficiency, effectiveness and relevance " [6]. Under the control of management, cost analysis on departments, activities, products or processes becomes increasingly used for knowledge of the agricultural company's activity.

MATERIAL AND METHOD

A powerful tool of analysis based on direct costing method is the cost - volume – profit analysis. It is one of the most effective tools that managers have at their disposal. This analysis oppugns correlations between costs, revenues, selling prices, volume of

production and profit. [10] The mentioned correlations provide a general model of the economic activity, which management can use for short-term forecasts to evaluate the enterprise's performance and analyze the decision alternatives [7].

The cost - volume - profit analysis calculation is based on the following indicators: the point of equilibrium or critical point, the coverage factor, range and safety factor of safety. For a period of time fixed costs are borne entirely by the company, whatever its level of activity is. As a result it will have to reach a certain volume of sales to cover fixed costs. Any company wants work to be profitable, so that after sales to achieve a favourable result. These are the ideas that lead to the concept of equilibrium point or critical point. This indicator is called in literature, the threshold of profitability [1]. Critical point is that level of sales where one achieves a void result.

The coverage factor is the indicator which expresses the percentage of turnover required to cover costs and achieve a profit. The safety range is the indicator that shows how much sales may fall for the undertaking to achieve the critical point. It is the total turnover which can be suppressed by an unfavourable juncture, without loss of practice for the undertaking. The coefficient of safety expresses with how much one can reduce the turnover in relative sizes so that the enterprise doesn't produce losses.

RESULTS AND DISCUSSION

Using the cost - volume - profit analysis, the calculation of the cost is only based on the cost of whose size varies directly with production volume. Excluding the fixed costs from the calculation is based on the grounds that they are period costs and not costs of the products. Considering the variability of expenditure structure allows different profit calculation as well as the threshold of profitability, an indispensable tool for an estimate management.

The variability criterion allows studies of the consequences of this approach as well as incidence rates and structure changes on the behaviour of costs. In this case, the aim is a simplified representation of the behaviour of expenditure to enable the study of real and complex situations.

In order to establish such a behaviour pattern of spending that allows a simplification of reality and determine the need and opportunity of the cost - volume – profit analysis in agriculture, we will determine and interpret specific indicators based on this analysis the following example:

A company in the agricultural sector obtains and sells products A and B. For June there are known information on production volume, selling price and variable costs for two product categories: A and B (*table 1*). Fixed costs (CF) registered by the enterprise in June are of 120 000 lei.

Table 1

Information regarding products A and B

Elements	Product A	Product B
The volume produced and sold output (Q)	80 000 kg	150 000 kg
Unit price (P)	5 lei / kg	8 lei / kg
Variable expenditure per unit (CV)	2 lei / kg	4 lei / kg

We will calculate specific indicators for the cost - volume - profit analysis in the following hypostases:

- the agricultural entity cultivates and markets only product A;
- the agricultural entity cultivates and markets only product B;
- the entity cultivates and markets agricultural products A and B.

1. Equilibrium point

To determine the equilibrium point we will consider margin on the variable cost margin (M / CV). This is the difference between revenue and expenditure variables.

Since the point of equilibrium profit is 0, we obtain the following relations account:

$$\text{Turnover} = \text{variable costs} + \text{fixed costs}$$

$$P \times Q = CV \times Q + CF$$

$$Q \times (P - CV) = CF$$

$$Q \times M / CV = CF$$

$$Q = \frac{CF}{M / CV}$$

$$\text{Quantity to reach the critical point} = \frac{\text{Fixed expenses}}{\text{The variable cost margin}}$$

If the agricultural farm markets only product A, or the balance of return threshold is obtained for a quantity $Q = 120\,000 / 3 = 40\,000$ kg. Turnover is critical: $40\,000 \text{ kg} \times 5 = 200\,000$ lei.

Where agricultural farm markets only product B, the critical point is obtained for a quantity $Q = 120\,000 / 4 = 30\,000$ kg. Under these conditions, turnover is critical: $30\,000 \text{ kg} \times 8 = 240\,000$ lei.

In the option in which the farm cultivates and sells agricultural products A and B, we note with Q_1 and Q_2 the quantity of products A and B, necessary to achieve the critical point. To determine the critical point it is necessary to browse the following reasoning:

$$\text{Turnover} = \text{variable costs} + \text{fixed costs}$$

$$5 \times Q_1 + 8 \times Q_2 = 2 \times Q_1 + 4 \times Q_2 + 120\,000$$

$$3 Q_1 + 4 Q_2 = 120\,000 \text{ lei (1)}$$

We calculate the margin on average variable costing the conditions in which there are sold 80 000 kg from product A and 150 000 kg from product B

$$\text{Margin on average variable cost} = \frac{(3 \times 80\,000) + (4 \times 150\,000)}{80\,000 + 150\,000} = 3,65 \text{ lei}$$

$$Q_1 + Q_2 = \frac{\text{Fixed costs}}{\text{The variable costs margin}}$$

$$Q_1 + Q_2 = 120\,000 / 3,65$$

$$Q_1 + Q_2 = 32\,876,71 \text{ kg (2)}$$

Based on equations (1) and (2) we obtain the following quantities for the critical point:

$$Q_1 = 11\,504 \text{ kg}$$

$$Q_2 = 21\,372 \text{ kg.}$$

$$\text{Critical turnover} = 11\,504 \times 5 + 21\,372 \times 8 = 228\,496 \text{ lei.}$$

This critical turnover is obtained for a critical point that requires the production and sale of 11 504 kg of product A and 21 372 kg of product B.

2. Coverage factor

To determine the percent of turnover that provides critical coverage of fixed costs we will relate fixed costs to critical turnover.

If the agricultural farm produces and markets only product A, coverage factor is determined as follows:

$$\text{Coverage factor} = \frac{\text{Fixed costs}}{\text{Critical turnover}} \times 100 = \frac{120\,000}{200\,000} \times 100 = 60\%$$

The result means that 60% of the critical turnover covers fixed operating costs the rest ensuring the coverage of variables costs and obtaining profit.

In the situation in which the agricultural farm cultivates and markets only product B, the coverage factor $= \frac{120\,000}{240\,000} \times 100 = 50\%$. Under these conditions, 50% of the critical turnover covers fixed operating costs the rest ensuring the coverage of variables and helps to obtain profit.

In the case in which the farm cultivates and sells agricultural products A and B the coverage factor $= \frac{120\,000}{228\,496} \times 100 = 52,51\%$. In this situation, we can say that it takes 52.51% of the turnover to cover fixed costs.

3. Safety range

The safety range is determined as the difference between turnover achieved and the critical turnover.

In the condition in which they sell 80 000 kg of product A, the backup is:

$$\text{The safety range} = 80\,000 \times 5 - 200\,000 = 200\,000 \text{ lei.}$$

If the company sells 150 000 kg of product B, the backup is:

$$\text{Safety range} = 150\,000 \times 8 - 240\,000 = 960\,000 \text{ lei.}$$

In the case of selling both products, the safety is:

$$\text{Safety range} = 80\,000 \times 5 + 150\,000 \times 8 - 228\,496 = 1\,371\,504 \text{ lei}$$

4. Safety factor

The coefficient of safety expresses with how much we can reduce turnover in the relative sizes so that the farm does not acquire agricultural loss. Formula for calculation is:

$$\text{Safety range} = \frac{\text{acomplished turnover} - \text{critical turnover}}{\text{acomplished turnover}} \times 100$$

For the firm, the coefficient of safety in case of selling 80 000 kg of product A is:

$$\text{Safety coefficient} = \frac{400\,000 - 200\,000}{400\,000} \times 100 = 50\%.$$

In case of selling 150 000 kg of product B, the safety coefficient is:

$$\text{Safety coefficient} = \frac{1\,200\,000 - 200\,000}{400\,000} \times 100 = 80\%.$$

If the company is cultivating and selling 80 000 kg of product A and 150 000 kg of product B, the coefficient of safety is:

$$\text{Safety coefficient} = \frac{1\,600\,000 - 240\,000}{1\,600\,000} \times 100 = 85\%.$$

In the following we will centralize data for the specific indicators of the cost - volume - profit analysis in order to determine the best decisions on farm agricultural activities. (table 2)

Table 2

Specific indicators of the cost - volume - profit analysis

Indicators	Product A	Product B	Products A and B
Critical quantity	40 000 kg	30 000 kg	11 504 kg product A 21 372 kg product B
Critical turnover	200 000 lei	240 000 lei	228 496 lei
Coverage factor	60%	50%	52,51%
Safety range	200 000 lei	960 000 lei	1 371 504 lei
Safety coefficient	50%	80%	85%

Analyzing the data obtained, we believe that the agricultural farm should opt for the cultivation and marketing of both products. This would entail obtaining economic yield with minimum risk. Although critical turnover allows coverage only for 52.51% of fixed costs, actual turnover (1 600 000 lei) could decrease by up to 85% so that the firm does not acquire loss.

In the activity of farms may be changes in operating conditions, dependent or independent by the management unit's activity. These changes can have influence over the balance point. For example, in extra-season we cannot make a proper - actual cost calculation, but expenses incurred by the maintenance of production equipment and preparing future crops are registered. These costs are considered expenses, and their value will influence the level of fixed costs to be taken into account in determining the balance point.

Margin on variable costs can be influenced by changing the selling price, wage rates, working time and tariffs transport. An increase in margin on variable costs reduces the agricultural company's effort to achieve the balance point, and lowering them increases its effort in this regard.

CONCLUSIONS

The cost - volume - profit analysis is a necessary tool for business forecasting and managerial control in farms.

The cost - volume - profit pattern provides management an overview of the expenditure, thus being appropriate in the establishment of short-term previews.

The cost-volume-profit analysis can be used to report in decision analysis, especially when we must choose over the continuation of a type of plant culture or

a business segment livestock. This analysis is appropriate and necessary to evaluate new types of crops to plant and to undertake studies on the structure of sales. The cost - volume – profit analysis allows comparisons over time between performances of the products that form the portfolio of the agricultural farm.

In order to forecast its activity, management can use cost - volume – profit analysis for the calculation of profit corresponding to a certain volume of sales. Based on this analysis, management may determine the level of sales necessary to achieve planned profits.

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