

# THE IMPORTANCE OF USING THE PROFITABILITY THRESHOLD METHOD IN TRADE AND SERVICE ENTERPRISES' MANAGEMENT

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*Abstract:* The profitability threshold method or critical point is used both to substantiate a new investment and to analyze the use of existing production capacities. The profitability threshold also referred to as critical point or equilibrium point, represents that level of production where neither profit nor loss is obtained that is the expenditure is equal to the income from the sale of the production. Metoda pragului de rentabilitate sau a punctului critic este utilizată atât în fundamentarea unei noi investiții cât și în analiza utilizării capacităților de producție existente. Pragul de rentabilitate, denumit și punct critic sau punct de echilibru reprezintă acel nivel al producției la care nu se obține nici profit și nici pierdere, adică la care cheltuielile sunt egale cu veniturile obținute din vânzarea producției.

**Keywords:** cost of production, critical point, equilibrium point, profitability threshold, risk. cost de producție, prag de rentabilitate, punct critic, punct de echilibru, risc

## INTRODUCTION

Within the relationship between the cost of production and profit, it is necessary to know the profitability threshold or the critical point of the enterprise (Sârbovan 2015: 73).

The profitability threshold method of the exploitation is one of the methods used to determine the level of operating risk that characterizes one activity or another (Untaru 2013: 122).

The profitability threshold is the point where the turnover covers the operating expenditures or the point at which the selling price is equal to the unit cost, the result being null. In terms of risk, we say that starting from this point, the enterprise is becoming profitable. Regarding the activity level as it gets farther away of from this point, the risk level decreases and the enterprises' activity is more profitable (Sabău, Uher, Nagy 2015: 177).

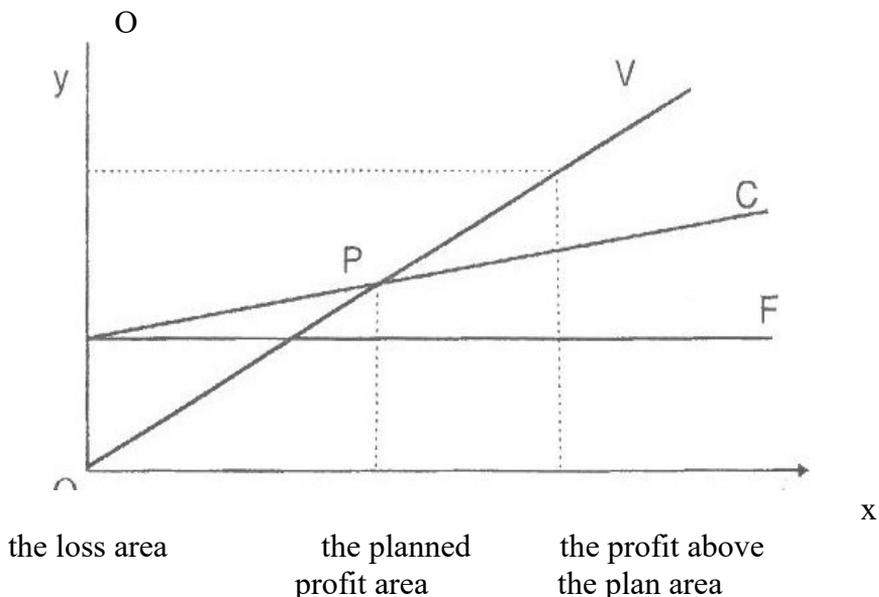
The profitability threshold is the point where the turnover covers operating expenses delimited in fixed and variable expenses, calculated in value or physical units, for a product or for the entire activity (Achim 2015: 91).

The profitability threshold is represented graphically in Figure 1.

In the graph presented in Figure 1 we have the following meanings:

- Ox axis represents the physical volume of production;
- Oy axis represents total expenses and total income;
- Line F – the line of fixed expenses;

- Line C – the line of total expenses;
- Line V – the line of income;
- Point P represents the profitability threshold.



The profitability threshold can be represented by the following equation system:

$$\begin{cases} y = ax \\ y = bx + c \end{cases}$$

where:

y – represents total income (in the first equation) and total expenses in the second equation;

a – unit selling price;

x – physical volume of production;

b – variable unit expenses;

c – total fixed expenses.

From solving the system of equations above we obtain:

$$ax = bx + c, \text{ where it follows: } x = \frac{c}{a-b}$$

This relationship is the mathematical definition of the profitability threshold, meaning the physical volume of production at which expenses are equal to the income.

If the enterprise proposes to obtain a planned profit (Pp), the system of equations will be:

$$y = ax$$

$$y = bx + c + Pp, \text{ from which results that: } x = \frac{c+Pp}{a-b}$$

It is also possible to determine the profit that could be obtained by maximizing the production capacity, meaning:

$$X_{\max} = \frac{c+P_{\max}}{a-b},$$

$$\text{from which results that: } P_{\max} = X_{\max}(a-b) - c$$

where:

Pmax – represents the maximum profit achieved by maximizing the production capacity.

An analysis of the profitability threshold on the company's total income can also be made. For this analysis, the following mathematical model is used:

$$Y = \frac{Cf}{1 - \frac{Cv}{Ct}}, \text{ in which:}$$

Y – represents income related to the profitability threshold;

Cf – fixed expenses of the enterprise;

Cv – variable expenses of the enterprise;

Ct – total expenses of the enterprise.

This model is used to diagnose the company's profitability under a certain predicted dynamics of fixed and variable income and expenses.

If an enterprise is close to the profitability threshold, a cost-cutting strategy is recommended because cost-cutting actions produce immediate effects, faster than the revenue-generating actions (Sabău, Uher, Nagy 2015: 177).

„Among the measures an enterprise needs to take to reduce costs are:

- ☒ monitoring and reducing administrative and research expenses;
- ☒ development, marketing and personnel;
- ☒ adequate management of stocks of raw material and finished products;
- ☒ taking measures to increase productivity;
- ☒ improving the supply activity;
- ☒ taking all measures for the full recovery of claims;
- ☒ using more efficient control systems;

- ☒ changing the organization of production processes;
- ☒ simplifying and standardizing products;
- ☒ outsourcing some activities” (Sabău, Uher, Nagy 2015: 59).

## CASE STUDY

Forward we will exemplify the application of this method to a hypothetical enterprise.

We consider that the restaurant "TURIST" has a serving capacity of 50 portions per day. It concluded a convention with a commercial company to provide meals for 40 persons per day for 20 days each month. The price charged is 20 lei/ portion.

The restaurant's total costs are 12.000 lei/ month, of which fixed costs are 5.000 lei/ month.

Based on this information, the following can be calculated:

- a) *The rate of return of the restaurant in the situation presented in the enunciation of the problem:*

$$Rr = \left(\frac{P}{Ct}\right) * 100 = \left(\frac{Vt - Ct}{Ct}\right) * 100 = \left(\frac{40 * 20 * 20 - 12.000}{12.000}\right) * 100 = \left(\frac{400}{12.000}\right) * 100 = 33,33\%.$$

- b) *Profitability threshold ( $Q_0$ ):*

$$Q_0 = \frac{Cf}{pu - cvu}$$

$$c_{vu} = \frac{Cvt}{\text{No. of portions served monthly}} = \frac{Ct - Cf}{\text{No. of portions served monthly}} = \frac{12.000 - 5.000}{40 * 20} = \frac{7.000}{800} = 8,75 \text{ lei/ portion}$$

$$Q_0 = 5.000 / (20 - 8,75) = 5.000 / 11,25 = 444, 44 \text{ portions/ month.}$$

- c) *Quantities sold monthly ( $Q_{plan}$ ) to obtain a profit of 5.125 lei/ month:*

$$Q_{pl} = \frac{Cf + Ppl}{pu - cvu} = \frac{5.000 + 5.125}{11,25} = 900 \text{ portions/ month.}$$

- d) *The maximum profit achieved ( $P_{max}$ ) n the conditions of full use of the restaurant's capacity to serve:*

$$Q_{\max} = \frac{Cf + P_{\max}}{p_u - c_{vu}}$$

Where  $P_{\max} = Q_{\max} (p_u - c_{vu}) - Cf = 50 * 20 * 11,25 - 5000 = 6.250$  lei/month.

The degree of use of the restaurant serving capacity in the situations described in points a, b, c and d.

$$G_a = (40:50) * 100 = 80\%$$

$$G_b = (444 / 50 * 20) * 100 = 44,4\%$$

$$G_c = (900 : 1000) * 100 = 90 \%$$

$$G_d = 100\%$$

The results of these calculations provide decision makers the following information:

1. In the present situation the restaurant "Turist" has a profitability of 33.33%, in the conditions of using the serving capacity in proportion of 80%.
2. The restaurant's profitability threshold is 444.44 portions in a month, compared to 800 portions served per month in the current situation. In this hypothesis, the degree of use of the restaurant's serving capacity is only 44.4%.
3. The company aims to increase the volume of profit from 4.000 lei / month to 5.125 lei/ month. For this, the restaurant will have to serve 900 portions/ month, and the degree of use of serving capacity will be 90%.
4. In the case of maximum using the serving capacity of the restaurant it might obtain revenue from collections worth:  
 $50 \text{ portions/ day} * 30 \text{ days} * 20 \text{ lei/ portion} = 30.000 \text{ lei/ month.}$

Total expenses would be:  
 $1.500 \text{ portions/ day} * (12.000 \text{ lei} - 5.000 \text{ lei}) / 40 \text{ portions} * 20 \text{ days} + 5.000 \text{ lei/ month} = 18.125 \text{ lei/ month.}$

Results a profit of:  
 $30.000 / 18.125 = 11.875 \text{ lei/ month}$  and a rate of return of  $(11.875/18125)*100 = 65,5\%$ .

An analysis can also be made of the profitability threshold on the enterprise's total income, using the mathematical model presented previously, namely:

$$Y = \frac{Cf}{1 - Cv/Ct} .$$

In this case, the profitability threshold would be:

$$Y = \frac{5.000}{1 - \frac{7.000}{12.000}} = \frac{5.000}{1 - 0,5833} = 12.000 \text{ lei/ month}$$

Forecasting studies show that the company could increase sales by 20% as long as fixed expenses remain at the same level.

In this situation, the total income would be 16.000 lei \* 1,2 = 19.200 lei.

Variable expenses: 7.000 lei \* 1,2 = 8.400 lei.

Total expenses: 8.400 lei variable expenses + 5.000 lei fixed expenses = 13.400 lei.

The profit would be: 19.200 lei total income – 13.400 lei total expenses = 5.800 lei.

The profit rate would be: (5.800/13.400) \* 100 = 43,28%, compared to 33,33% calculated for the current situation.

## CONCLUSIONS

The profitability method offers the following **benefits** to the profitability analysis:

- determining the size at which production becomes profitable;
- quantifying the physical volume of production required to obtain a certain planned volume of profit;
- determining the degree of use of production capacity in relation to a certain planned volume of profit;
- highlights the correlations between income dynamics and expenses' dynamics grouped into variable and fixed ones;
- offers the possibility of correlating the profit with the variation in demand, the working capital, the share of research and development expenses, and so on.

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