USING COST-VOLUME-PROFIT ANALYSIS IN DECISION MAKING

GABRIELA BUŞAN, IONELA-CLAUDIA DINA *

ABSTRACT: *The cost-volume-profit study the manner how evolve the total revenues, the total costs and operating profit, as changes occur in volume production, sale price, the unit variable cost and / or fixed costs of a product. Managers use this analysis to answer different questions like: How will incomes and costs be affected if we still sell 1.000 units? But if you expand or reduce selling prices? If we expand our business in foreign markets*?

KEY WORDS: *cost-volume-profit, marginal contribution, break-even, the equation method, the marginal contribution method, graphical method*

The cost-volume-profit is a necessary tool for forecasting also for management control. The method includes a number of techniques and methods of solving problems based on understanding patterns of evolution characteristics of business costs. The techniques express the relationship between incomes, sales structure, costs, production volume and profits and include break-even analysis and profit forecasting processes. This relationship provides a general model of economic activity, which management can use to short-term forecasts for business performance evaluation and analysis of decision alternatives.

The marginal contribution is the difference between total revenue and totals variable costs and explains how changes the operating profit as changing the number of units sold. Can be calculated thus:

$$\textit{Marginal contribution} = \textit{Marginal contribution per unit} * \textit{Number of units sold} \quad (1)$$

$$\textit{Marginal contribution per unit} = \textit{Selling price} - \textit{Unit variable cost} \quad (2)$$

Marginal contribution can be expressed as a percentage, called the marginal contribution rate, being equal to the ratio of the marginal contribution per unit and

* *Lecturer, Ph.D., „Constantin Brâncuşi" University of Tg.-Jiu, Romania,* gabriela_busan@yahoo.com
Assist.Prof., Ph.D. Student, „Constantin Brâncuşi" University of Tg.-Jiu, Romania, dina.claudia@yahoo.com

selling price. *The break-even* is the amount of production sold for that total revenues equal total costs. This indicator tells managers how much the minimum production must sell for no loss.

In economic theory and in practice has imposed the cost-volume-profit analysis and as the critical point or threshold of profitability. This type of analysis is a very effective tool in risk analysis, since break-even can be defined as a measure of flexibility and enterprise in relation to fluctuations in its business. The result of the company is subject to unforeseen events that accompany work in all areas. The concept of "risk" is most often substituted by "flexibility". Regardless of economic or financial capacities of predominantly assigned, flexibility can be defined by the ability of business to adapt and to respond effectively to environmental changes.

The break-even is the point where incomes from operations cover the entire amount of operating expenses, operating result was nil. It represents the minimum level at which the company must work in order not to record a negative result (loss). The work undertaken by the company above that level evolve a positive result (profit). By several criteria, determining the break-even may be in physical or value units, and the level of a product or group of products or the whole of the work.

The methodology for analysis of operational critical point in the case of single-productive enterprises or when we refer to a single product (product group). Implicit assumptions underlying the analysis are: can not be changed the price to buy production factors, can not influence the price of goods manufactured and sold, fixed costs do not vary over time, the expenditure variables are proportional to the level of activity

Therefore, the only lever that can be driven by the enterprise to mitigate the effects of operating risk, to increase profitability, remains the level of activity. In order to determine the break even it uses three methods: method of equation, the marginal contribution method and graphical method.

The equation method involves expression of the results Account as the following equation:

$$(PV * Q) - (CV_U * Q) - CF = PE \quad (3)$$

where:
PV - sale price
Q - quantity of product units manufactured and sold
CV_U - unit variable cost
CF - fixed costs
PE - operating profit

This equation gives the most general way to address/approach the cost-volume-profit analysis.

The marginal contribution method first involves reformulating the first method as:

$$(PV * Q) - (CV_U * Q) - CF = PE \quad (4)$$

$$(PV - CV_U) * Q = CF + PE \quad (5)$$

$$CM_U * Q = CF + PE \tag{6}$$

$$Q = \frac{CF + PE}{CM_U} \tag{7}$$

where:
CM_U – unit marginal contribution,

$$CM_U = PV - CV_U \tag{8}$$

Considering that the break-even operating profit is by definition zero, we get:

$$Q = \frac{CF}{CM_U} \tag{9}$$

$$Break\text{-}even\ in\ units\ number = \frac{Fixed\ costs}{Unitm\arg inal\ cost} \tag{10}$$

The graphical method representation involves costs and total revenues as of right on a graph. Point where these two lines intersect corresponds to the threshold of profitability. At this point, total revenues equal total costs. Evolution of revenue and total costs is shown in figure 1.

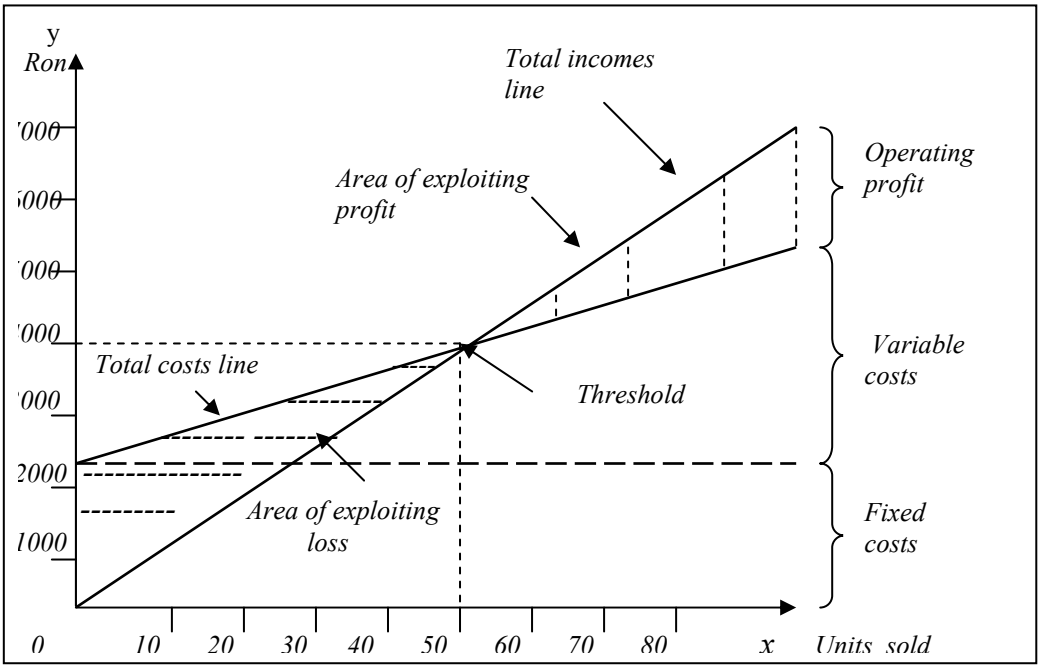

Figure 1. Total incomes and costs evolution

The cost-volume-profit analysis is useful only in certain circumstances and only when certain assumptions are valid:

- revenue and cost changes resulting solely due to changes in the number of units of goods or services produced and sold;
- total costs can be decomposed into a fixed component that does not vary with production volume and a component which varies with the size of production;
- developments in total revenues and total costs are linear in relation to volume production within a relevant period;
- selling price, unit variable cost and fixed costs are known and constant within a relevant period;
- analysis refer either to a single product, being assumed that the proportion of different products in total will remain constant as change in the total number of units sold;
- all revenues and costs can be aggregated and compared without taking into account the time value of money.

If one or more of these assumptions are lacking, the cost-volume-profit analysis may give wrong results. In sum, cost-volume-profit model is useful because it provides an overview of business management. In order to forecast, management can use the cost-volume-profit analysis for profit calculation for a given volume of sales or settle the sales to the level necessary in order to achieve planned profits. In addition, cost-volume-profit analysis is used increasingly in the budget process.

REFERENCES:

[1]. Budugan, D.; Georgescu, I.; Berneci, I.; Bețianu, L. - *Financial Accounting*, CECCAR Publishing House, Bucharest, 2007

[2]. Buşan, G.; Ecobici, N. - *The Role of Costs in Evaluation of Companies' Performances*, 5rd International Scientific Conference Eco-Trend, Economics and Globalization, Tg-Jiu, 2008

[3]. Firescu, V. - *Financial Accounting*, Economic Tribune Management, Bucureşti, 2006

[4]. Horngren, C.; Datar, S.; Foster, G. - *Costs Accounting, Management Approach*, The XIth edition, translate, ARC Publishing House, 2006

[5]. *** - Minister of Public Finance Order no.1826/2003 for approval the specifications for of measures concerning the organization and management of financial accounting, published in the Official Gazette of Romania, part I, nr.23/12.01.2004