

Break-Even Analysis as a powerful tool in Decision-Making

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Abstract - This research paper is based on the contemporary techniques presented in the discipline of CVP Analysis. Techniques applied to carry out a complete and accurate financial analysis based on the CVP Analysis. In this paper, an application of theoretical concepts of the CVP Analysis has been realized. The quality of information and the recognition of specific features of business activity influence the achievement of a qualitative analysis. The cost-volume-profit analysis (CVP Analysis) is a powerful tool for planning and making decisions. Since the CVP analysis highlights the reciprocal cost ratio, the quantity sold and the price, it brings together all the financial information of the enterprise.

Keywords- CVP; Profitability Point on Unit; Product Multiple Analysis; Graphic Presentation of CVP Relationships; Changes in CVP Variables.

1. INTRODUCTION

The CVP Analysis or Break-Even Analysis represents the sold amount of a product that would deliver a business volume that is balanced with the overall cost. Put another way, it is a lot of sales that the company has to make at a certain price to have neither loss nor profit. Cost-Volume-Profit analysis simplifies the real world in which entities survive. As many models that abstract from reality, cost-to-profit analysis is subject to a number of conjectures and limitations. Regardless of this, it is a powerful tool for making decisions.¹

CVP analysis can be a valuable tool in identifying the extent and magnitude of economic problems faced by the company and helps locate the solution needed.

It should be noted that CVP analysis is an integral part of financial planning and decision making, any accountant and manager should be totally familiar with its concepts.

The CVP analysis is elaborated in five objectives:

Objective 1: Profitability Point on Unit

Objective 2: Profitability Point of Sale

Objective 3: Multiple product analysis

Objective 4: Changes in CVP Variables

2. PROFITABILITY POINT ON UNIT

To find the profitability point, two methods are usually used:

- The method of operating income, and

- Contribution Rate Method.

The initial decision of the enterprise to implement the method of units sold into CVP analysis is to determine what actually a unit is. The second decision focuses on allocating costs into fixed and variable components. The CVP analysis focuses on factors that cause a change in profit components. With regard to units sold, it is necessary to determine the fixed and variable components of cost and revenues associated with the units. Consequently, variable costs imply costs that increase with unit sales growth, including direct material, direct labor, indirect variable costs, and variable sales and administration costs. Similarly, fixed costs include indirect fixed costs and fixed sales and administration costs.

2.1 The Method of Operating Income

The operating income method focuses on the revenue ratio as a useful tool in organizing firm costs in fixed and variable categories. The income ratio can be expressed as an exponential equation:

Operating Income = Sales Revenue - Variable Costs - Fixed Costs.

If there is a measure of units sold, the operating income equation may be expanded, expressing revenue from sales and variable costs in terms of amounts in unit dollars and unit numbers. Specifically, revenue from sales is presented as the selling price of the unit, multiplied by the number of units sold. In these terms, the operating income formula is:

¹ Lati, Lindita & Naço, Manjolla: "Kontabiliteti i Drejtimit", University of Tirana, 2003, Tirana pg.59

Operating Revenues = (price x number of units) - (variable cost per unit x number of units) - total fixed costs.

The question of how many units should be sold in order to achieve profitability or zero profit can be answered by setting the operating income to zero and then settling the unit equation for the unit number.

2.2 Contribution Rate Method

A refinement of operating income method is the method of contribution rate. In fact, it is simply noticed that at the point of break-even, the total contribution margin is equal to fixed expenditures. Margin of contribution represents revenue from sales minus total variable costs. If we replace the entity's contribution margin with the price, minus the unit's variable cost, and we solve it per unit number, we will get the following equation for the profitability:

Number of units = fixed costs / unit contribution margin.

3. PROFITABILITY POINT IN SALES DOLLARS

In some cases when using CVP² analysis, managers may prefer to use revenue from sales as a measure of sales activity instead of units sold. The amount of units sold can be converted into the amount of sales revenue, simply by multiplying the sales price of the unit with the units sold. To calculate the profitability sales point, variable costs are defined more as a percentage of sales than as the amount per unit sold.

The question is, how do the fixed costs fit into this?

Since the contribution margin represents the remaining income after the variable costs are covered, it should present the income available to cover fixed costs and to contribute to profitability. Here, the method of determining the profitability point in the unit can also be used. The result is the same, only the method is a slightly different. Meqenëse marzha e kontributit paraqet të ardhurat që mbeten pasi që të jenë mbular kostot variabël, ajo duhet të paraqesë të ardhurat në dipozicion, për të mbuluar kostot fikse dhe për të kontribuar në fitim. Këtu mund të përdoret edhe metoda e përcaktimit të pikës së rentabilitetit në njësi. Rezultai është e njëjta përgjigje, vetëmse është një metodë pak e ndryshme.

4. PRODUCT MULTIPLE ANALYSIS

Allocation of the usual fixed costs for each product line, before calculating the rentable point³, can solve this difficulty. The problem with this method is that the allocation of the usual fixed cost is arbitrary. Therefore, no meaningful volume of profitability is displayed.

Another solution is to convert the problem of multiple product into single product problem. If this can be done, then the entire CVP methodology of the single product can be implemented directly. The key to this conversion is to identify the mix of expected sales in units of the products being traded.

4.1 Sales mix and CVP analysis

Determining a unique mix of sales enables us to convert a multiple product problem into a CVP format with a single product⁴. Having defined the product as a package, multiple product problem turns into that of a single product.

To use the profitability method of the unit, the selling price of the package and the variable cost per package should be known. To calculate these package values, mixing sales, individual product prices, and individual product costs are needed.

4.2 Assumptions of Cost-Volume-Profit analysis

Volume-profit and cost-volume-profit, are based on some important assumptions. Some of these assumptions are as follows:

The analysis assumes a linear income function and a linear cost function.

The analysis assumes that the price, total fixed and variable cost of the unit can be accurately identified and remain constant over a significant space.

The analysis assumes that what is produced is sold.

For the analysis of many products, mixing of sales is supposed to be known.

Costs and sales prices are assumed to be accurately known.

5. CHANGES IN CVP VARIABLES

Since firms operate in a dynamic world, they need to be aware of changes in prices, variable costs, and fixed costs. They should also count on the effects of risk and uncertainty.

5.1 Risk and Uncertainty

An important assumption of the CVP analysis is that prices and costs are provided with certainty. This happens rarely. Risk and uncertainty are part of making business decisions. Formally, the risk varies from uncertainty such as with the risk the probability distributions of the variables are known. When it comes to uncertainty, probability distributions are unknown. How do managers cope with risk and uncertainty? A variety of methods may be used. Initially, managers need to understand the nature of uncertainty of prices, costs, and future amount.

Two key concepts for management are safety margins and operational leverage.

² JAKUPI Shefket, OSMANI Elez "Kontabiliteti Financiar", Ulqin, 2012, pg. 270-71

³ JAKUPI Shefket, OSMANI Elez "Kontabiliteti Financiar", Ulqin, 2012, pg. 272

⁴ OSMANI Elez, JAKUPI Shefket "Kontabiliteti Financiar" Ulqin, 2012, pg. 271

5.2 Safety Margins

The safety margin represents units sold or expected to be sold, or income derived or expected to be derived over the profitability volume. For example, if the profitability volume for a company is 200 units and the company sells 500 units, the safety margin is 300 units (500-200). Safety margin can also be expressed in sales revenue. If the profitability volume is \$200,000 and the current revenue is \$350,000, then the safety margin is \$150,000. The safety margin can be seen as a crude measure of risk. Whenever plans are made, we always have unfamiliar events that can reduce sales below the expected level.

If the safety margin of a firm is big, considering sales for the next year, the risk of suffering losses if sales take a nosedive, is smaller than when the safety margin is small. Managers facing small safety margin have the option of considering sales growth or lowering costs.

5.3 Operating Lever

In **physics**, the lever is a simple machine, used to multiply the force. Basically, leverage increases the amount of efforts made to create a great effect. The greater the burden to move with many efforts, the greater is the mechanical advantage. In **financial terms**, the operating leverage is related to the relative mix of fixed costs and variable costs in an organization. Sometimes it is possible to exchange fixed costs with variable costs. With the reduction of variable costs, the unit contribution margin increases, making the contribution of each sold unit larger. In this case, the effect of sales volatility increases. Fixed costs are used as leverage to increase profits. Unfortunately, it is always true that firms with high operating leverage, will experience the greatest reduction in profits by reducing sales. Therefore, the operating leverage is the use of fixed costs to generate higher rates of profits, while the sales activity varies. The greater the degree of the operating leverage, the more changes in sales activity will affect profits. The operating leverage rate can be measured for a given sales level, taking a rate of contribution margin as a gain, as follows:

Degree of Operating Leverage= Contribution Margin / Profit

If fixed costs are used to lower variable costs so that the margin of the contribution increases, while profit drops, then the leverage rate increases - signaling a risk increase.

5.4 Sensitivity Analysis and CVP

The increase in usage of personal computers and work programs has made it possible for most managers to do cost analysis. An important tool is the sensitivity analysis, a 'what-if' technique that studies the impact of changes in the underlying assumptions of a response.

It is relatively simple to set input data for pricing, variable costs, fixed costs, and mixing sales, and set the formula to calculate the profitability point and the expected profits. Then, the data can be changed at will, to see what impact the changes might have on the expected profit.

Finally, we should note that the workbook, even though wonderful for extracting numerical answers, can not do

the most difficult job of CVP. And that is determining which data should be put first.

The accountant should have knowledge about the cost and price distribution of the firm as well as the impact the economic conditions' changes have on these variables. The fact that variables are rarely accurately recognized is not a justification for ignoring the impact of uncertainty in the CVP analysis. Fortunately, sensitivity analysis can also give managers a sense of the degree, according to which the poorly predicted variable can affect a response. This is also an advantage.

6. RECOMMENDATIONS

1. Cost-Volume-Profit analysis focuses on prices, revenue, volumes, costs, profits and sales mixes.
2. It can be used to determine the volume of sales and the necessary income, in order to be profitable or to achieve a profit target.
3. Changes in the features of fixed and variable costs, affect the profit of the firm. The firm can use the CVP analysis to see how a certain change in price or cost may affect the profitability point.
4. CVP is based on several assumptions to be taken into consideration for its application to business problems.
5. The analysis assumes linear functions of income and costs.
6. Also CVP analysis assumes that the sales prices as well as fixed and variable costs, are known with precision.
7. These assumptions form the basis for a simple graphical analysis, using profit-volume graph, and cost-volume-profit graph. The subject of cost-volume-profit analysis leads us naturally to the use of different rates.

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