

Cost-volume-profit analysis benefits and limitations



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ABSTRACT

It is widely accepted that Cost-Volume-Profit Analysis has been a phenomenon recently, and it uses in not only accounting but also economics, finance and manufacturing because the analysis is directly addressing to solutions of some problems that a company faces.

The paper intends to display Cost-Volume-Profit Analysis' starting point is to show the relationship between the cost of goods, the activity's volume and the profit of the company.

The study of Cost Volume Profit Analysis provides that the importance of Cost Volume Profit Analysis in companies, the requirements of an effective CVP Analysis, and the limitations of the analysis. Besides, the paper designates to prove that although CVP Analysis has some limitations, it is actually a useful resource for a company in terms of decision making, planning and controlling.

1. INTRODUCTION

It is an inevitable fact that resources are scarce, and managers have to handle both the company's and external resources wisely. Therefore, they can use different systems from diverse disciplines to see how to use their resources. " Cost-Volume-Profit Analysis" is one of the crucial analysis methods in accounting. It helps companies to analyze where they are in terms of cost, how many quantities will they have (volume) and their profit.

The CVP Analysis can be used to understand how alters in cost and volume influence a company's operating income and net income. It needs the

company's all costs such as manufacturing, selling and administrative costs, which can be identified as fixed or variable costs. Moreover, CVP examines the relationship between cost, volume (how much quantity sold), and profit. Sometimes, price and revenue can be added to this relationship.

In planning, decision making, and control aspects, CVP analysis plays a critical role, but it is limited to be short-term usage. Therefore, it can be said that it is a weak tool to use.

On the other hand, CVP is a good start for decision making, but in an uncertain environment, it may be challenging because of multiple products, many uncertain elements, and demand. For that reason, if a manager is willing to use CVP Analysis, then s/he should figure out the environment (both internal and external), and the relationship between variables themselves.

2. LITERATURE REVIEW

2. 1. Cost Volume Profit Analysis: An Instrument of Managerial Control of The Economic Entities in the Extractive Industry

The article states that the economy has been based on natural resources for the last century. Therefore, it is crucial but hard to evaluate which resources need major concern for companies. In this context, Cost-Volume-Profit Analysis is very effective in the progress of work and a managerial control mechanism in terms of defining the relationship between cost, quantity, and profit. The basis of the method lies in the separation of physical quantity variation in manufacturing and distribution, in variable and fixed costs, while

considering only variable expenses for the unit cost of the manufactured article. The article highlights that break-even analysis can be a starting point because it gives an insight about profit and required sales level.

Moreover, since it can be thought an appropriate case for optimizing profits, it can be used in the calculation of the specific indicators of the direct costing method and the article has been prepared from data.

Additionally, the article looks at the effects on Cost-Volume-Profit Analysis. According to the article, the increase of selling prices, the rise of total fixed costs, the decline in variable costs and the cutback goods' volume may create the growth of balance point, the loss of coverage factor, the deterioration of safety coefficient and range and at the end, it causes the decline of profit.

It can be assumed that this can be a performance management system for economic entities in this area of activity by using the cost volume profit method. Economic entities remain competitive in an uncertain and highly competitive environment only if they have adequate control management, plan and analyze the cost volume and profit activities of the company. Also, these activities are integrated which means that if a company approaches this analysis strategically, it will gain a competitive advantage.

2. 2. Cost Volume Profit Analysis Under Uncertainty: A Model with Fuzzy Estimators based on Confidence Intervals

Break Even analysis can clarify a large number of business decisions, often called to as cost-volume-profit analysis. Break Even analysis can generally be

utilized in three different ways. It may be needed in decision – making on new products by contributing to the definition of the level of sales of the new product indicated for profit. One of the usages may be in modernization and automation programs that empower the company to replace Variable Costs with Fixed Costs frequently.

However, break-even analysis has some constraints. The break-even analysis considers that It assumes that the total cost of fixed and variable costs can be analyzed. During the analysis, the fixed cost remains the same. Volume is one of the determinants of the variable cost. During the analysis, the product price remains the same. Both profits and costs can be analyzed in terms of volume.

Nevertheless, it cannot be said that this assumption is entirely valid.

Particularly, the break-even analysis arranges the company the ability to measure each product's breakeven point, but it cannot distinguish between the two products. This deficiency is due to the fact that break-even analysis thinks cost and volume as certain variables.

The article mentions that CVP Analysis may lack uncertainty. As a result, the authors proposed a CVP Analysis with stochastic elements. In other words, they analyzed CVP Analysis with user demand and average cost functions. They built a relationship between the estimated profit and breakeven in general and also in an uncertain environment.

As a result, Fuzzy estimators were applied by the authors in a well-known method (based on profit and risk), which can help a company decide which product to produce and also in an uncertain breakpoint analysis. In other

words, we used a new methodology in the traditional break-even analysis to contribute to this research area under uncertain conditions.

2. 3. Cost-Volume-Profit Analysis Incorporating the Cost of Capital

The CVP Analysis is a mathematical image of the producer's economy. The CVP analysis is used to assess the financial consequences of a variety of strategic and operational decisions. It makes more painless to measure the sensitivity of a product to changes in one or more of its underlying parameters. CVP Analysis may be used to regulate the profitability and risk offsets resulting from alternative product design and production options.

Although it is a very effective tool, it has some limitations. CVP Analysis is regularly criticized for utilizing simplifying assumptions like deterministic and linear cost and revenue functions. Furthermore, CVP is degraded by its focus on a single product and its one-time analysis. And sometimes, a company needs more complicated financial analysis. Nonetheless, companies find CVP analysis easy to use and the model can be applied in strategic and long-run planning and decision making.

Like other methods, CVP analysis uses accounting profitability as the primary decision criteria for assessing resource allocation decisions. CVP analyzes capital costs and treats them as zero. If CVP Analysis fails, then cost of capital may be wrong, and as a result, profitability may be estimated erroneous. In fact, CVP analysis sometimes tends to support managers to select false choices.

CVP analysis is generally carried out with financial data from the accounting system of the company. The financial data required for CVP can be obtained either from a traditional cost accounting system or from a costing system based on the activities. Capital costs are traced to products, such as overhead costs, using the principles of activity-based costing. Unlike overhead costs, the opportunity costs of the funds invested are deducted from the operating income of a product after taxes to measure its economic income. When the economic income of a product over its lifetime is reduced to when production begins, it is equivalent to the NPV of a product. It allows managers to carry out CVP analysis that takes into account the cost of capital used in the production of a proposed product. The CVP model, based on a product's reduced economic income, allows managers to calculate the sales quantity of a product, measure the profitability of a product over the range of its sales and determine the rate of change in its profitability. The CVP also facilitates the appraisal of trade-offs in alternative investment and cost structures and the estimation of the impact of the process improvement program on the profitability of a product.

The article has proposed a new technique via using an incorporate cost of capital. The CVP model that incorporates capital costs is more complex and more expensive to develop than the traditional CVP. His simplicity is one of the reasons for the conventional CVP analysis. Simplicity, however, is not a desirable feature when it comes to cost systems or management techniques. Managers and managerial accountants must, therefore, consider how the CVP model, which incorporates capital costs, would change their product mix

decisions and payoffs concerning the increased cost and complexity of the model.

2. 4. Using Different Probability Distributions for Managerial Accounting

Technique: The Cost-Volume-Profit Analysis

Like all financial models, CVP is based on a set of simplifying assumptions that reduce the complexity of variables in input and output to make a decision – making more traceable. To figure out a financial model and its usefulness, it is necessary to understand its assumptions and its role in the decision. The article highlights that the CVP model has ten assumption and constraints: behavior of costs and revenue is linear, constant selling prices, prices of production input, all costs can be grouped into fixed and variable costs, total fixed costs stay constant and total variable costs are proportional to volume, constant efficiency and productivity, steady sales mix or one product, revenues and costs are being compared over a unit-volume base and volume is the driver of costs. A CVP model that incorporates uncertainty would, therefore, provide a good introduction to the crucial but challenging issue of uncertainty decision – making. Practically all real business decisions take place under uncertain circumstances and at least a modest degree of familiarity with an analytical decision – making approaches under uncertainty could benefit future leaders in business.

Uncertain CVP analysis may be attributed to the diversity and complexity of research, i. e., multi-product, multiple uncertainty resources, the assumption that demand exceeds, equals or lower than product sales, the use of the basic accounting model CVP vs economic demand related to the amount sold

to price and unit cost functions. The CVP analysis is anticipated to be complicated and connects with various economic and mathematical concepts. In order to simplify the assumption of the CVP analysis, managers should consider more sophisticated analytical approaches. The CVP analysis is believed to provide an excellent context for the introduction of these analytical approaches. The intense simplicity of the basic deterministic CVP model makes it possible to perceive the added elements more clearly by generalizing the model to a stochastic model. Decision making under uncertainty can be described as a trade-off between anticipated profit and the breakeven.

Certainly, the CVP analysis is its popularity as a decision – making tool used to determine the volume or sales breakeven, but its usefulness is limited by the deterministic nature of the relationship. A CVP analysis can be treated as a random variable for one or all of these input variables. Overall, input and output variables are assumed to have unimodal distributions. Most CVP models have been distributed continuously. In other words, the CVP model utilizes continuous distribution. Instead of a continuous distribution, CVP model uses different approaches such as Lognormal, PERT, and Kumaraswamy.

The intense simplicity of the basic deterministic CVP model allows the elements to be perceived more clearly by generalizing the model to stochastic elements. When input independence is suspected when the CVP model cannot produce the factual reality of risk, a faulty decision is therefore taken, as in the case of normal distribution. The correlation between these variables should start with the most common and simple Pearson correlation

method. Managers must, therefore, overcome these obstacles and appreciate a deeper understanding of the dependence problem needed to shape the real facets of uncertainty in the world.

2. 5. The Analysis of Cost Volume Profit Relationships

The statement on profit and loss indicates what profit was on the specific volume of business carried out during the period for which the statement was prepared. This form of statement is appropriate if consideration is limited to a given volume, as it is when historical results are reported or when the statement represents the expected results at a predicted volume.

Analysis of the relationships between cost, volume and profit can be made to predict the likely effect on profits expected to result from a volume change. An understanding of the relationships between costs, volume and profits, together with factual information on the effects of volume changes on the company, is helpful for management through a wide range of planning and control problems.

The analysis of the relationship between cost and volume and profit begins with determining how the costs vary with volume. To this end, costs are classified as fixed or variable in order to determine the number of fixed costs and the rate at which variable costs change with volume. Since profit is the difference between revenue and cost, the profit rate varies with volume. These three figures are constant for any volume within the scope of the analysis, insofar as non-volume factors remain the same. Together they describe what can be called the company's profit structure.

Where flexible budgets and standard costs are available, the cost data for the cost-volume-profit analysis are provided. These budgets are used to obtain amounts of the variable expenditure at the predicted volume level. When these variable costs are combined with direct material and direct labor, the total variable cost is determined by volume. Fixed manufacturing, sales and administrative cost components as determined in the respective budgets are added to the total.

Companies without budgets rely on historical records as the main sources for the preparation of CVP analysis. However, volume-related cost variations are usually more or less obscured by changes in prices, products, methods and equipment used in manufacturing and sales, changes in cost accounting classification. Financial statements are sometimes advocated as the data source for CVP studies related to investment or credit risk analysis.

Like break-even analysis, some of the ratios are important in CVP analysis. The marginal revenue ratio is the percentage of the dollar available to cover fixed costs and profits after the percentage required for variable costs has been deducted. It supplements the cost ratio of the variable. The marginal income ratio determines the increase/decrease in profit expected from volume changes if no change occurs in other factors. When the marginal income ratio is known, it is possible to determine the effect of adding or losing a certain block of business on the marginal balance of the company and therefore on its profit. The safety margin indicates the decline in sales volume that can occur before profits disappear. The trend in the ratio between sales volume and break-even point also indicates fundamental changes in the company's ability to make profits. The breakpoint indicates

the sales volume to be obtained by the company to cover its costs without profit. It coincides with the crossing of total cost and revenue lines. A confusing problem that often arises from the mixing factor when determining breakpoints by product lines. When the individual product break is added, even points differ from the total breakpoint, unless the sales figure for each product line is the same as the total sales figure for the individual product break point for the total break point.

There are many cases in which large differences in products and methods with which they are manufactured and sold make it impossible to combine them without destroying the meaning of the figures. While cost and sales data expressed in dollars can be added together, the aggregates obtained for none of the components can be representative. Under these conditions, separate analyzes must be carried out for groups of products that are reasonably similar.

Volume is the only factor that causes costs to vary. Sales figures are also influenced by non-volume factors like unit prices and mixtures. To study the variation in costs and profits with volume, the analysis is acceptable for a constant period. By changing these underlying assumptions, break-even points that are quite different can be obtained, and each of these break-even points is equally valid for the specific assumptions.

What if a company's fixed costs have changed? The change in fixed costs may follow a change in variable cost and selling price. Besides, break-even volume may be affecting due to the change in fixed costs. Under other conditions, it is obvious that variable cost can change too. A unit change in

variable cost may affect the marginal income ratio and the break-even point. Wages, salary, operating efficiency, product specifications, manufacturing and selling methods can be defined as a variable cost and a change in one of them may also change marginal income ratio and break even.

The paper says that CVP analysis may be a useful tool for overcoming some problems in business planning. On the other hand, some short and long-range problems may arise from CVP analysis. In the long run, it is thought that fixed costs are used for short periods and variable costs are used for a longer period. Therefore, if a manager wants to use the analysis for a long-term, s/he will use for the impact of costs and profits of proposed investment plans (especially plant and equipment). On the other hand, in the short run, managers can use it for short-term budget planning and strategic decisions regarding sales and pricing.

3. CONCLUSION

Cost-Volume-Profit Analysis helps companies and gives fundamental insight a lot in terms of its current and estimated future. When each term is analyzed one by one, it can be observed that they are very crucial items for a company to sustain itself. “ Cost” is the term which is about the required amount of money before starting an activity or it can be defined the forecasted price of an action. Then, the term “ Volume” means the quantity of the company produces. “ Profit” can be characterized as the difference between the amount earned and spend during activities such as buying, operating or producing. Moreover, a company has four basic functions: planning, controlling, organizing and directing. For four of them, the Cost-

Volume-Profit analysis is the very primary tool. Therefore, CVP Analysis helps managers to estimate budget by looking at it. To analyze CVP, a manager has to look at some data such as break-even analysis, contribution margin, contribution margin ratio, or margin of safety. All of them gives a deep analyze of CVP Analysis.

Of course, CVP Analysis has some drawbacks. For example, CVP Analysis may be confusing if the company has multiple product lines. Because it is a general thought that each product line has its own break-even point, but if it is multiple, then the break-even has to be the whole line. Since they are not equal to each other, it may create complexity.

Although CVP Analysis has some obstacles, it is one of the useful analysis of the company. On the other, CVP analysis may not fit for the long-term; therefore, it is better to use for short-term plans.

4. REFERENCES

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