

Fixed Costs of Long-Term Assets:

« Allocation and Analysis of Variance »

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INTRODUCTION :

At the time management decides to acquire plant capacity, it chooses among many alternatives. Each of these alternatives has a particular impact on costs which the accountant classifies as fixed costs or variable costs. Actually, management makes trade-offs between fixed and variable costs. Management may invest in highly automated production techniques with the intention of trading higher fixed costs for a considerable reduction of variable costs. Also, management may decide to work a single plant on a multi-shift basis as opposed to providing the total fixed capacity needed for production on a single shift-basis. In this situation, the trade-off is for higher variable costs with lower fixed costs (1).

Fixed resources are considered a potential resource of services available for current and future utilization. Acquiring and utilizing these resources should be subjected to planning and control. Management must concern itself with the maximum and optimal utilization of these fixed resources. Maximum utilization of fixed resources means that the firm uses its resources at their highest available capacity. Optimal utilization of fixed resources means that the firm uses these resources in terms of producing the proper mix of outputs which results in maximum contribution margin per constraint factor «machine—hours».

(1) Jacob G. Birnberg and Nicholas Dopuch, **Cost Accounting: Accounting Data for management's Decisions** (New York : Harcourt, Brace and World Inc., 1969), p. 350.

INVESTMENT DECISIONS :

Since resources are scarce, it is important to estimate, in advance, the return of capital expenditures. This implies many questions for which appropriate answers must be found before approval of a new investment.

Long—term investments may affect many departments of the firm. The process of acquiring new fixed assets does not come to its end by approval of the acquisition. This process should be extended during the expected life of these fixed assets. Follow-up becomes more important in many facets which include :

1 — Determination of the responsibility for the economic utilization of fixed assets. If this economic utilization does not materialize, someone should be held responsible.

2 — The costs of idle capacity as a result of uneconomical utilization of fixed assets should be treated separately and should be traced to the responsible department. These costs should be excluded from allocation to other departments.

3 — Follow—up after acquiring fixed assets should continue during the life of the assets so as to provide management with valuable information for decision making processes in the future.

The Base of Allocating Fixed Costs :

Fixed costs represent investment in capacity to make and sell. There is a direct relationship between the size and the quality of this capacity and the total amount of fixed costs. On the other hand, there is a direct relationship between the degree of utilization of the capacity and the volume of activities, or the volume of outputs. Regardless of the degree of utilization of capacity, the firm still bears the same amount of fixed costs. The key question here is 'What should be the base of allocation ?'. If the plants are running at full capacity, there is no problem at all other than

agreement on the definition of capacity. In many cases, the degree of utilization of capacity is often less than the available capacity. This means that there is an idle capacity. The main problem here is 'How can we assign the costs of idle capacity?'

This paper suggests that the base of allocation should be normal capacity. Accounting literature and Accounting practices reflect several different concepts of normal capacity. Various concepts are reflected in the following statements⁽²⁾ :

« Normal capacity may be defined as that capacity of a plant at which it produces a physical volume of goods sufficient to meet the average sales demand over a period of time long enough to level out the peaks and valleys resulting from seasonal and cyclical causes.» (Lang, Mcfarland and Schiff, Cost Accounting).

« Normal capacity is obtained by listing the expected quantities of each product to be manufactured in normal month or year, the total volume usually being approximately 80 per cent of the maximum possible output of the plant.» (Henrici, Standard costs for Manufacturing).

« The term ' normal capacity ' is difficult to define or formulate because of uncertainty as to what is normal In some respects, it is sufficiently accurate to say that normal capacity is the estimate of a qualified authority as to the amount of production that should usually be secured in a factory. » (Lawrence, Cost Accounting, revised by Ruswinckle).

The normal capacity concept actually consists of two concepts:

- 1 — The long-term concept which relates the selling phase

(2) Robert I. Dicky, Accountants, Cost Handbook (New York: Roland Press Co., 1964), P. 103.

of the business to the production phase over a long period of time, levelling out fluctuations that are of a short duration and of comparatively minor significance.

2 — The short-term concept which is helpful to management in analyzing changes or fluctuations that occur during an operating year (Matz-Curry-Frank, Cost Accounting.).

For purposes of this paper, the concept « normal capacity » consists of three components :

1 — Physical capacity which is determined initially when management acquired the plants to produce goods or services. This physical capacity is expressed in terms of machine-hours or some other specific amount of inputs or outputs.

2 — The ability to produce and sell a particular amount of goods or services which is determined by management, which takes into account all the considerations of the industry and the firm.

3 — The span of time over which management can set a long-term plan to achieve some specific goals.

The relationships of the three factors are illustrated below in Figure (1).

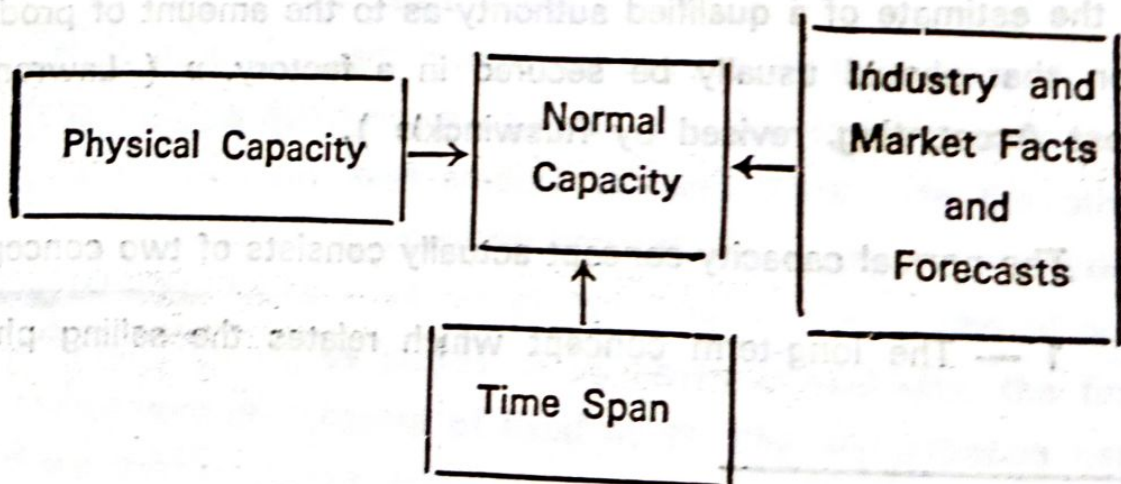


Figure (1)

From the above illustration, it is noted that normal capacity is affected by the elements previously mentioned and as a result of managerial decision over a span of time.

To control, you should first plan and compare actual performance with your plan. Normal capacity or normal activity is the basis on which a fixed costs rate is calculated.

$$\text{Normal activity rate} = \frac{\text{Budgeted fixed costs at normal capacity}}{\text{Normal activity level}}$$

Such rates are determined by calculating the ratio between normal fixed costs for a time interval and a measure of a normal activity for the same time interval. This determination of the time span is of prime significance. Yearly intervals are the usual practice. By using a year or operating cycle, if longer, the effects of seasonal variations are smoothed. The following list of using normal capacity as defined above is offered :

- 1 — Excess costs and idle capacity costs provides information to management in the form of unabsorbed costs.
- 2 — Product costs are not inflated by low production volume, so will the resultant overstatement of inventories.
- 3 — Costs are computed upon relatively fixed and determinable base, according to high level managerial decision, with a minimum amount of subjective decision, with regard to activity level resulting in less «slack» being introduced into the process.
- 4 — Normal capacity provides a systematic approach to apply accounting responsibility with respect to the utilization of scarce resources.
- 5 — Efficiency and effective variances are forthcoming and can be subjected to explanation and interpretation.

Analysis of Fixed Costs Variance :

Accountants generally consider two kinds of variances when they deal with fixed costs variance : denominator variance and spending variance. This paper goes beyond these two traditional measures by expanding the scope of the more traditional analysis of fixed overhead variance.

Fixed costs are a measure of the costs of fixed resources which were acquired in order to accomplish economical utilization. Economical utilization means maximum and optimal utilization of fixed resources through time. We can measure this economical utilization in terms of dollars and percentage. The following section offers one approach to allocating capacity (denominator or volume) variances based on the cause of rationale underlying managerial decisions affecting the utilization of the plant.

To illustrate the notion in respect to this measurement, suppose we have the following data set :

1 — The normal capacity of the physical plants is 10,000 machine—hours a year.

2 — Fixed costs of fixed resources are \$ 10,000 a year.

3 — Outputs at normal activity—level are 10,000 units.

4 — Variable costs per unit are \$ 7.00.

5 — Sale price per unit is \$ 10.00.

6 — Fixed costs rate based on normal capacity (2 ÷ 1) is \$ 1.00.

The following illustrates the analysis given the data set presented above :

— Contribution margin of normal activity : contribution margin per machine—hour (constraint factor).

chine— hours for actual outputs)
multiplied by Budgeted rate.
 $= (10,000 - 9,000) \times \$ 1.00$
 $= \$ 1,000 \text{ U}$

— Spending variance = Budgeted fixed costs minus Actual fixed costs.
 $= \$ 10,000 - \$ 12,000 = \$ 2,000 \text{ U}$

The notion of efficiency variance is that 1,000 more machine— hours were used than it should have been; there was no extra cost incurred, but instead of using the added 1,000 machine — hours for producing output units or another alternate product, these hours were wasted. The expected life of these scarce resources was decreased by 1,000 hours.

Effective variance of fixed costs represents the effectiveness or ineffectiveness of utilizing fixed resources. The variance identifies the ineffectiveness of achievement associated with the budgeted goal of «normal activity». This goal was stated as 10,000 machine— hours of production. This ineffectiveness cost the firm \$ 1,000 in addition to the opportunity cost measured by the lost contribution margin associated with the failure to utilize these machine— hours.

This differentiation between these three kinds of variances is necessary if one wishes to assign the variances to responsibility center, for example.

Classifying fixed costs variance in this manner would facilitate accurate measurement of various variances associated with responsibility centers.

It is hoped that such identification would lead to more effective correction action and, in the long run, better utilization of resources.

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