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ASSORTED ASPECTS AND PERSPECTIVES OF PRODUCTIVITY ACCOUNTING

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Abstract

Productivity measures permit managers to separate profit changes due to productivity factors and sales activity from those due to changes in output prices relative to input costs. Further, by linking productivity measures year to year, we obtain a dynamic, multiperiod evaluation of the organization's performance. The annual change in productivity and the organization's long-term productivity trend provide a convenient summary of operating performance. In principle, managers wishing to show annual improvement in operations could compare usage variances from year to year. But this would not be meaningful if standards change from one year to the next, or if significant annual fluctuations in output occur. Usage variances are typically not computed as ratios and hence are not normalized for actual levels of output.

Keywords: Productivity Accounting, Productivity Accounting and Use Cases Productivity Accounting and Scenarios

Introduction

Basically, variance analysis provides only a static, one-period retrospective analysis of performance. Although we will show, in a subsequent segment of this segment, how to make variance analysis more dynamic, in practice we have not observed organizations adopting a multiperiod perspective without using a summary measure of productivity. That is, when operating managers describe their improved performance, they tend to say, "Our productivity has been increasing by about 6 percent annually."

We do not hear them saying,' 'Our usage variances improved from $7 million unfavorable to $1.5 million favorable." Note that the latter statement, while telling us that operating performance has improved, does not help us understand the significance of the cost improvement—whether it is a 3 percent or a 15 percent improvement. Productivity measurement systems analyze performance based on actual outputs and inputs in different time periods. The productivity measurement system can be viewed as a variance analysis of the actual costs incurred in successive periods. In contrast, traditional management accounting systems analyze performance within a given period by comparing actual quantities and prices to predetermined standards for quantities and prices.

When using an aggregate measure such as productivity, executives do not have to specify in detail how an annual productivity improvement should be achieved. Discretion is left to operating managers as to whether, for this year, the productivity gain will come from improved material utilization; more efficient, less nonproductive labor use; new capital investment; process improvement efforts; or overhead reductions. Variance analysis is also a poor substitute for productivity measurement if standards are unrealistic or obsolete. In this unfortunately not uncommon situation, variances become difficult to interpret within a period, much less period to period. Even with a reasonably well-functioning standard cost system, the method of assigning overhead to products^ can lead to mysterious variances. These variances arise from using cost centers and burden rates that are too aggregate and that do not reflect the actual consumption of overhead resources by products passing through the cost centers. Thus, relying on usage variances alone for motivating and evaluating productivity improvements can be ineffective if the standard cost system does not accurately reflect the current operating environment [1-3].

In contrast, productivity measurement compares the ratio of actual outputs to actual inputs in each period and hence does not depend on having a well-functioning standard cost system. But productivity measurement is not without its own significant problems. Issues of aggregating multiple outputs and multiple inputs and how to measure and control for the use of capacity or fixed resources are among the set of issues we address in the remainder of this segment [4-7].

The accountant's standard cost analysis implicitly assumes a separable and linear technology. The separable technology assumption requires that the quantities of each input (each material, labor, and overhead category) depend only on the quantity of output produced and not on the quantity used of any other input. That is, no trade-off exists among different classes of material, labor, capital, or other overhead resources. A standard for consumption of a certain material is defined without reference to the amount of labor or any other materials consumed to produce the output. Linear (or constant marginal productivity) production technology assumes that each of the variable inputs is consumed prop)ortionally to increases in production volume. Therefore, to determine the standard amount of material consumption for a given volume of output, we multiply the standard unit consumption of materials by the quantity of output produced. Since most productivity measurement systems also implicitly assume a linear and separable production function, we maintain these assumptions throughout our analysis in this segment too.

Discretionary overhead, in contrast, consists of most plant overhead expanses that are incurred at the discretion of management and can be influenced by managerial decisions. Therefore, a primary focus of productivity programs may be to accomplish the same amount of work with fewer discretionary overhead resources [8].

Discretionary overhead resources may be fixed with respect to short-term fluctuations in the volume of production, but they will vary with other transactions or managerial decisions. For example, the costs of the set-up department and the production control department will vary with the number of set-ups and the degree of diversity in the product line (Cooper and Kaplan [1987]).

Therefore, the quantity of discretionary overhead can be lowered by reducing complexity or product diversity in the factory, or by process-improving innovations, such as reducing set-up times and implementing just-in-time production systems. Such complexity reductions and process improvements will lower the demand for personnel in departments responsible for set-ups, inventory control, scheduling, and quality assurance, thereby permitting productivity gains with respect to discretionary overhead resources. In general, any overhead department or cost center with more than one employee or one machine should be considered either a variable or a discretionary overhead account. For simplicity in our numeric example, we assume that all discretionary fixed" overhead is driven by one type of transaction, such as number of set-ups [9, 10].

$$\frac{\Delta Y}{Y} = \frac{\Delta A}{A} + \alpha_K \frac{\Delta K}{K} + \alpha_N \frac{\Delta N}{N}$$

$\Delta Y/Y$ is the rate of output growth;
$\Delta K/K$ is the rate of capital growth;
$\Delta N/N$ is the rate of labour growth;
$\Delta A/A$ is the rate of productivity growth.

Note that the productivity variance is not simply an aggregation of the typically computed usage variances for direct or variable costs. The productivity variance includes a component for efficient use of discretionary fixed costs. Since discretionary fixed costs constitute a significant percentage of total costs in today's complex manufacturing environments, productivity improvements must arise not only from controlling variable costs, but also from controlling the quantity of discretionary fixed overhead resources. Most accounting systems do not decompose fixed overhead costs into quantity (usage) and price components as they do when disaggregating material and labor variances. We can achieve this separation into quantity and price effects for overhead because we identify the transactions or cost drivers that cause the quantity of discretionary fixed overhead resources to vary.

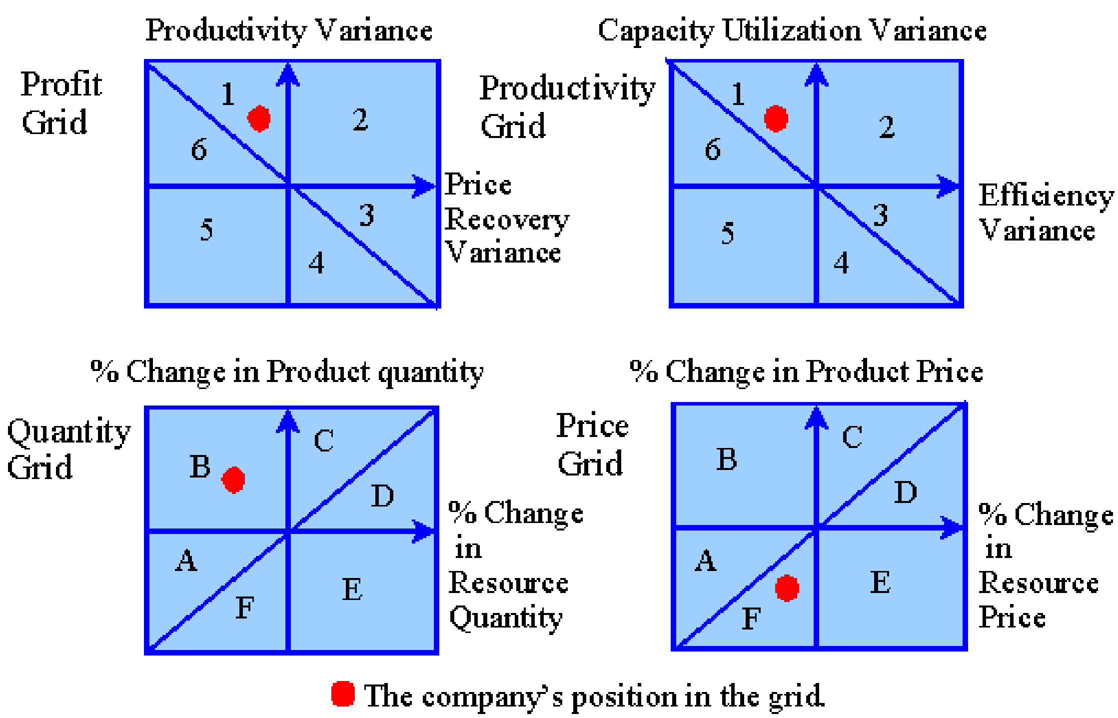

Figure 1 : Framework with Productivity Aspects

The accounting variances computed in the previous segment help separate a total profit variance into components caused by increases in the volume of sales, changes in relative prices between outputs and inputs, and productivity effects.

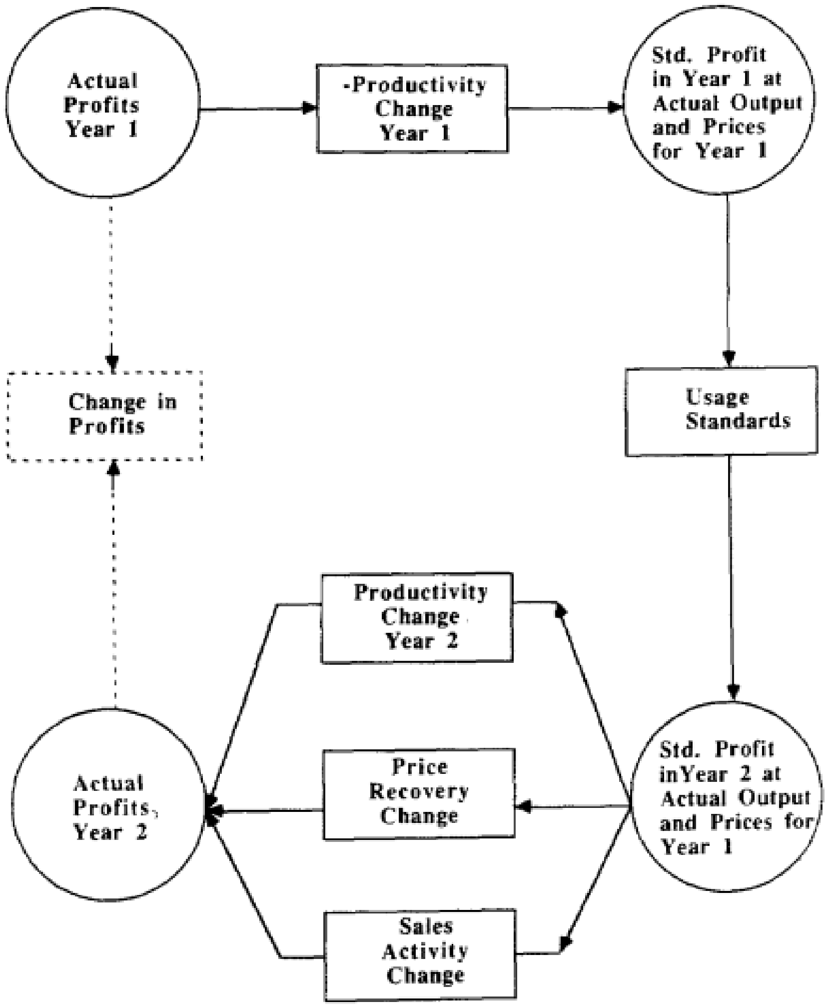

Figure 2 : Productivity Aspects

But the variance components are themselves absolute numbers and do not translate readily into percentage improvements. Particularly when measuring productivity changes, managers generally find it easier to evaluate productivity improvements by percentages, such as by specifying a target for overall productivity improvement of, say, 7 percent annually. The percentage comparison facilitates comparison both to the scale of operations and to previous years. A favorable productivity variance of $200,000 is more impressive when total operating costs are $2 million than when they are $200 million. And a company that sets a goal of improving productivity by 7 percent each year will not find it immediately informative to team that its productivity variance this year was a favorable $200,000. In this segment, we demonstrate how to represent the arithmetic productivity, price recovery, and sales activity variances of the preceding segment as percentage or ratio measures. These ratio measures also permit us to compute elasticity numbers that indicate the sensitivity of overall profits to percentage changes in each of the three operating factors. In order to obtain percentage measures for the three aggregate variance measures, we must choose an appropriate denominator to normalize each measure. '^ Standard costs or margins represent plausible bases for computing the percentage changes in productivity, price recovery, and sales activity. To summarize, because the APC measure assumes a constant product mix between periods, it can signal productivity improvements when there have been no productivity improvements in the use of labor, material, or overheads. False productivity improvements can be signaled merely by changes in the mix of output. Unrecognized fluctuations in the prices of outputs and inputs will further distort the productivity measure. The dependence of the APC productivity measure on the mix and prices of outputs is not a weakness that can be fixed, given the limited data assumed by traditional productivity measurement systems. We were able to demonstrate the problem by relying on the technological specification of standard quantities of inputs required for each unit of output produced, information that exists in any well-functioning standard cost system.

Conclusion

Traditional productivity measurement systems lack such data on budgets and standards since they attempt only to compare actual performance from period to period. Without any data on standard quantities and prices, the weights typically used to aggregate across multiple outputs and inputs are the weights from output and input values. In the productivity computations we derived in Segment 4, we used weights derived from standard quantities of inputs, at actual output, to aggregate across multiple inputs and thereby avoided having our productivity ratio distorted by fluctuations in the mix and prices of outputs. The goal of explaining changes in actuai profits from one period to the next sounds straightforward but actually differs from both the goal of traditional productivity measurement systems and that of standard cost accounting systems. The APC measurement system only explains changes in profits not caused by changes in output levels. Recall from Segment 5 that the APC system signaled a 3.08 percent profitability change between two periods when actual profits increased 34 percent. Standard cost vadance analysis, as a one-pedod retrospective analysis of performance, can explain differences between actual and budgeted profits in a pedod (as accomplished by SC) but does not explain pedod-to-period changes in profitability.

References

[1] Degasperi, M., & Fredholm, T. (2010). Productivity accounting based on production prices. Metroeconomica, 61(2), 267-281.

[2] Molden, D. (1997). Accounting for water use and productivity (No. 42). Iwmi.

[3] Gollop, F., & Swinand, G. P. (2001). Total Resource Productivity. Accounting for changing environmental quality. In New developments in productivity analysis (pp. 587-608). University of Chicago Press.

[4] Hasselback, J. R., Reinstein, A., & Schwan, E. S. (2003). Prolific authors of accounting literature. Advances in Accounting, 20, 95-125.

[5] Molden, D., & Sakthivadivel, R. (1999). Water accounting to assess use and productivity of water. International Journal of Water Resources Development, 15(1-2), 55-71.

[6] Färe, R., Grosskopf, S., & Pasurka, Jr, C. A. (2001). Accounting for air pollution emissions in measures of state manufacturing productivity growth. Journal of regional science, 41(3), 381-409.

[7] Crafts, N. (2004). Productivity growth in the industrial revolution: A new growth accounting perspective. The Journal of Economic History, 64(2), 521-535.

[8] Crafts, N. (2004). Productivity growth in the industrial revolution: A new growth accounting perspective. The Journal of Economic History, 64(2), 521-535.

[9] Ball, E., Färe, R., Grosskopf, S., & Zaim, O. (2005). Accounting for externalities in the measurement of productivity growth: the Malmquist cost productivity measure. Structural change and economic dynamics, 16(3), 374-394.

[10] Chang, H., Choy, H. L., Cooper, W. W., & Ruefli, T. W. (2009). Using Malmquist Indexes to measure changes in the productivity and efficiency of US accounting firms before and after the Sarbanes–Oxley Act. Omega, 37(5), 951-960.