AN ESTIMATE OF DEPARTMENTAL COST FUNCTIONS

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ABSTRACT

This study presents an estimate of departmental cost functions at selected private liberal arts colleges. Longitudinal data for seven academic departments at 31 institutions were analyzed separately by a multiple regression data analytic procedure. The general least squares estimates are then used to calculate average and marginal costs at the average value for each department. These latter estimates indicate that departmental costs are relatively inelastic, a finding that indicates that the financial problems will be compounded by increases in average departmental costs in an era of enrollment decline.

The study of the cost structure of the postsecondary institutions has been confined almost entirely to “descriptive” cost analyses (Carlson, 1977; Adams et al., 1978). These studies, while useful for some purposes, have their limitations (Balderston, 1975; Hopkins, 1971). For instance, such studies incorporate historical inefficiencies in departmental operations. To the extent that past practices deviate from the most efficient combination of resources, these studies are unable to determine “efficiency” of any given department operations. Aside from such problems associated with determining “efficient” costs, these studies provide little guidance when the level of operations is changing substantially.

In periods of enrollment growth, such deficiencies are less serious than in periods of enrollment decline. For instance, public institutions that receive state appropriations according to a funding formula are offered an implicit, economic incentive to employ these descriptive cost analyses (Boutwell, 1973). Specifically, tying state appropriations to historical, average costs will generally result in the generation of discretionary income. This increase in discretionary income is true as long as each additional student enrolled is added at less than average costs.
In periods of enrollment decline, the reverse is true. If the deduction from total costs for each student lost is less than the average cost for a particular unit, then the average cost for the unit will increase. Consequently, the use of historical, unit cost studies will penalize public institutions twice; once in terms of reduction in the institutional revenues, and once due to the lag in adjusting to the average cost of educating a student (Mortimer and Tierney, 1979).

In the forthcoming era of declining enrollments, public and private institutions alike will require greater understanding of their cost structures. Specifically, a knowledge of the departmental cost functions will become increasingly important if institutions are to avoid underestimating the continuing "cost-income squeeze" of the 1980s (Cheit, 1973). The purpose of this paper is to address some of the problems surrounding the estimation of departmental cost functions. These problems will be divided into three categories; conceptual, methodological, and statistical.

Theory of Departmental Costs

The conceptual problems surrounding the estimation of cost functions concerns the theory of costs for any particular producing entity. These problems are captured in the following questions. First, what is the appropriate unit of analysis? Second, what is the appropriate measure of activity for these units? Third, what resources are consumed by these units? And fourth, what is the appropriate time frame to employ? Each of these questions will be addressed below.

THE APPROPRIATE PRODUCING ENTITY

Maynord (1971) employs the entire college or university as the producing entity in his study of long-run costs. His justification for this position is two-fold. First, to employ a department or even a course as the unit for analysis would include at most 60 to 70 percent of the institution's total operating budget, thus underestimating the institution's total operating costs. Second, data collection at the departmental or course level is substantially more difficult.

These considerations notwithstanding, this paper employs the department as the unit of analysis. This decision is consistent with the position that departments constitute the fundamental organizational unit of colleges and universities. These units are generally the locus of decisions on the curriculum, academic degree standards, and the recruitment and promotion of faculty (Smart and Montgomery, 1976). Further, these departments are relatively autonomous, although their interdependencies are increasingly visible in a period of decreasing organizational slack (Dressel and Simon, 1976).