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Which Universities Should Provide Extension Services?

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Which Universities Should Provide Extension Services?

Abstract

Do cost considerations justify the current production of Extension services in which one or more providers exists in virtually all of the contiguous U.S. states? Using 1995-96 data, we estimate a multi-product cost function for 1,450 public institutions of higher education (IHEs) in the United States, including 65 that provide Extension services. We find significant (diseconomies) economies of scale with respect to the provision of Extension services by the (largest) smaller IHEs. We conclude that regionalizing the provision of Extension services and/or shifting the provision of Extension services from the largest 1862 institutions to smaller 1890 institutions would improve cost-effectiveness.

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Introduction

Given the importance of Extension within the agricultural sector, the relative merits of public versus private funding of Extension services surely command our collective scrutiny and debate (Dinar, 1992; Huffman & Just, 1994; Schuh, 1992; Schwartz & Zipp, 1994). Surprisingly, a related aspect of the discussion of the optimal provision of Extension services has been altogether missing: whether cost considerations justify the current structure of production in which one or more providers exists in virtually all of the contiguous U.S. states. Provision of Extension services has sizable cost implications for the host institutions. Yet, there has been virtually no analysis of the impact of Extension on higher education costs. Among a host of relevant questions, one might consider the following:

- Are the costs of providing Extension services fully recovered by universities from earmarked public appropriations?
- To what extent is provision of Extension services characterized by (dis)economies of scale?
- Are there cost synergies between Extension and other outputs produced by public universities, such as research and/or teaching?
- What are the implications of any observed (dis)economies of scale and/or scope for the cost efficiency of the current structure of producing Extension services and/or for the extent to which privatization might result in natural monopoly?

In an effort to provide an empirical starting point for addressing these and related questions pertaining to the impact of Extension on higher education, we used academic year 1995-96 data to estimate a multi-product cost function for 1,450 public institutions of higher education in the United States, including 65 that provide Extension services. We found evidence of significant economies of scale with respect to the provision of Extension services by smaller IHEs, significant diseconomies of scale for the largest IHEs, and evidence of small economies of scope between the provision of Extension and the production of research.

Overview of Research Methodology and Data

The general methodology for estimating how provision of certain types or levels of academic "products" affects an institution's costs is straightforward. Using detailed data on costs and "outputs" (typically the number of full-time equivalent undergraduate or graduate students taught, number of degree programs or academic departments, amount of externally-funded research, and the like) for a large number of academic institutions, the researcher employs multivariate regression to estimate the relationship between the level and type of output produced and the institution's costs. This permits the researcher to then estimate whether production of these outputs is characterized by general and/or specific economies of scale or economies of scope.

Production is characterized by general (dis)economies of scale when total institutional costs (rise) fall when the production of all outputs is increased simultaneously. Production is characterized by specific (dis)economies of scale when total institutional costs (rise) fall when the production of the specific output under consideration is increased, holding the production of all other outputs constant. An economy of scope is a cost savings triggered by producing one output in the presence of another. For example, it might well be the case that there is an economy of scope between production of graduate students and production of undergraduate students, when the former help provide low-cost instruction for the latter.

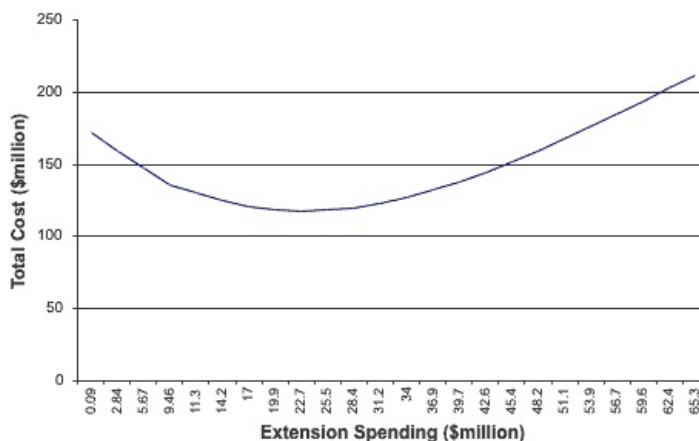
Our data came from the National Center for Education Statistics (NCES) 1995-96 fiscal year surveys on IHE finances, enrollments, and compensation. We identified a usable sample of 1,450 public institutions, of which 65 provided Extension services. In most states, Extension services were provided exclusively by the major land-grant university (the 1862 schools). However, in 16 states the production/distribution of Extension services was shared among multiple IHEs, typically the major land-grant school and a smaller, historically black institution (the 1890 schools). So the set of Extension-producing schools tends to be dominated by the state land-grant schools, which are large, research-oriented institutions with undergraduate and graduate programs.

The specific model and estimation technique we employed in our analysis can be found in Laband and Lentz (2003); the only difference is that the current discussion is based on our having added Extension as one of the products produced by public universities.

Findings

We estimated a "fixed cost" of providing ANY Extension services of nearly \$26 million in 1996. That is, holding other factors constant, public universities that produced Extension services, regardless of level of service, had total (annual) costs that averaged nearly \$26 million more than public universities that did not produce Extension services. Note that this is an annual "carrying cost" on the required start-up capital--at a 5% rate of interest, such an annual carrying cost implies an initial capital cost of approximately \$520 million. We then calculated the marginal impact of an additional dollar spent on Extension, starting from the mean level of Extension spending of the schools that produce Extension (\$21,099,000). At that level of Extension spending, an additional dollar spent decreased total university costs by approximately \$0.35. On average, then, Extension-producing universities are characterized by economies of scale. In Figure 1 we graph the relationship between Extension spending and total IHE costs. Economies of scale are exhausted at a level of Extension spending of approximately \$23 million annually.

Figure 1.
Total Cost as a Function of Extension Spending



We also found a slight, but statistically significant, economy of scope between production of Extension services and research. However, we find no evidence of either economies or diseconomies of scope between production of Extension and production of either undergraduate or graduate education.

Conclusion

In 1996, there were 27 universities that had Extension expenditures in excess of \$23 million, which

means that they were operating in a region of diseconomies of scale. The largest of these schools, with Extension expenditures near or above \$55 million in 1996, saw their total institutional costs increase by \$3 for every \$1 increase in Extension spending. It is not unreasonable to ask who paid this marginal cost. More generally, one might contemplate the extent to which the production of Extension under conditions of diseconomies of scale may be contributing to the increase in tuition at a number of the large, state land-grant universities (Kronholz, 2003).

Thirteen of the large 1862 universities operating under diseconomies of scale were located in states with considerably lower-funded 1890 institutions characterized by strong economies of scale. Indeed, when we consider just the set of states with multiple providers of Extension services, the mean expenditure by the large 1862 institutions was \$32,562,268, whereas the mean expenditure by the small 1890 institutions was \$6,496,843. Purely from a cost perspective, a strong case can be made to shift some of the Extension funding away from the 1862 institutions in favor of the 1890 institutions.

There also may be cost economies obtainable by regionalizing the production of Extension in some cases. For example, every single one of the New England states has an IHE that provides Extension. Every single one operates at a level of spending that is characterized by strong economies of scale. Assuming that at least some of the Extension outputs produced are applicable across state lines, there would appear to be a strong case for regionalizing the production of Extension in one or two New England universities, rather than the six that do so now. More generally, our analysis of costs suggests that structural reorganization and/or redistribution of Extension funding might be justified.

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