THE RELATIONSHIP BETWEEN PERFORMANCE INDICATORS FOR ACADEMIC RESEARCH AND FUNDING: DEVELOPING A MEASURE OF RETURN ON INVESTMENT IN SCIENCE*

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Public universities reflect the aspirations a state or society has for its young people and for itself. In this study our interest has been to examine the level of public funding for universities and its relation to quality. In order to do this we collected funding data for a sample American universities. Additionally, we collected data on the production of science by faculty at the institutions in our American sample. The results indicated a strong relation between investment in higher education and quality. We then developed a measure of return on investment in research which combined these measures of funding and research production. We conclude by examining the nature of the relationship between funding and research quality at public universities.

Introduction

In order to measure the quality of research being produced by universities previous studies have relied on reputational ratings derived from surveys of key faculty.1-3 The major limitation with these reputational ratings is that they measure perceived quality and are not directly based on scientific performance.4 The advent of large bibliometric databases and rapid electronic retrieval now make it feasible to improve on measures of institutional performance.

When faculty at major universities are reviewed for promotion and tenure decisions, the major interest is with assessing the quality and quantity of their scholarship and research. Their performance has primarily been assessed by examining the quantity and quality of publications produced.5-6 Since individuals are assessed by their publications, it makes sense that these same measures could be aggregated to assess the performance of the university as a whole. The resulting measure would be more equitable than previous prestige rankings because they would be based on actual performance rather than faculty opinion.7-8

* Dedicated to the memory of Michael J. Moravcsik

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Universities are scholarly communities with a deep interest in the ideals of science. Few scientists enter careers in the academy motivated by financial gain. Nevertheless, there has always been an implied relationship between scientific productivity and funding in higher education. Individuals who achieve distinguished records of performance receive higher salaries, more rapid promotion, stipends, and associated awards. At the university level, it has long been argued that funding is related to quality. Those universities which received strong financial support are better able to achieve distinguished records of scholarship and research upon which university reputations are made. In this sense, public universities represent an investment for their constituencies with those constituencies making the greater investment deriving, in large part, the greater universities.

The focus of this study is on the investment states in the Pacific Ten conference have made in their public universities. With this information in hand, we will then examine the performance of the universities in the Pacific Ten in terms of their production of science. The study will then examine the relationship between funding and scientific production. The study will conclude with the development of a model for determining the return on investment in science for member institutions in the Pacific Ten.

Determining state support

The determination of state support for higher education has often proven to be a knotty problem. Each year the United States Department of Education's National Center for Education Statistics produces an annual edition of State Higher Education Profiles that details state by state support of higher education. The report includes blended data for all the colleges and universities in each state. The limitation with this blended data is that it does not permit institution by institution comparison.

Our interest is to examine the individual institutions in the Pacific Ten Conference. These schools compete with each other in sports and provide an ideal group to compare in terms of state support. In this study we define state support as the general funds provided by the state government less the funds provided by students' tuition and fees. Also excluded from state funds were university generated income. In short, our interest was in the amount of money the state provided from its general tax funds to support the university.