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The Future of the Land Grant University System

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Since 1980, incremental state and national policy decisions concerning public higher education have had a variety of effects on students and institutions. Although there has been very little research, most of these effects appear to be detrimental to the health of the system of public higher education and to the nation's stock of human capital. A thorough economic analysis of the effects of policy changes on public higher education is needed to guide the system into the 21st century.

Introduction

Any consideration of the future of the Land Grant university system, should be within the context of the future of all U.S. public higher education, from the community college through the Land Grant universities. This total system of public higher education is in a critical transition. Indications of this transition are evident from the negative shifts in public perceptions of public higher education, in reduced public funding of public higher education, and in changing enrollment patterns that have all occurred over the past decade or more. At stake is nothing less than the Nation's ability to compete and prosper into the next century.

Surprisingly little is known about the causes and effects of this transition. There are information gaps in basic areas of required knowledge such as the demand structure for public and private higher education, consumer preference of product attributes of public higher education, and the effects of changes in enrollment patterns within the total system on the stock of the nation's human capital. There is a critical need for research in these areas and we, the applied economists in the public universities, are the ones who should take on the task. Furthermore, a major public policy education effort is also required so that university presidents, deans and other administrators, and elected officials can best incorporate the results of this research into the decision and policy process.

Public higher education is defined as the national system of institutions including two year

community and junior colleges, state colleges, state universities, and Land Grant universities including 1890' colleges and universities, that are governed by state authorities. Most of our comments are directed at the Land Grant university portion of this system, as that was our original charge. However, we strongly advocate for a more comprehensive overview as all of the participants in the system compete for students, scarce state and national resources, create human capital, and provide students and staff for one another's programs.

The Morrill Act of 1862 established Land Grant colleges to bring about the liberal and practical education of the industrial classes. In speaking before the Vermont House of Representatives in 1888, John Morrill explained his act's intent in these words, "The useful was to have greater prominence in the eyes of the students, as it will have in their after life, and not stand unequal and shamefaced even in the presence of ancient literature. . . . the fundamental ideal was to offer an opportunity in every state for a liberal and larger education to larger numbers, not only to those destined for sedentary professions, but to those much needing higher instruction for the world's business, for the industrial pursuits and professions of life." The question must be asked if indeed the mantel for this charge has been, or should be, passed wholly or in part to other institutions within the public system of higher education and if so, what are the implications nationwide for human capital formation and the role of our Land Grant universities?

Current Perception of Transition

As a starting point for understanding the current state of affairs, we reviewed the published pro-

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ceedings for the last decade of the National Association of State Universities and Land-Grant Colleges, (NASULGC). These are from the annual meeting of an organization of university presidents, college deans, and other administrators whose numerous committees and councils meet to identify issues and coordinate solutions to the problems of the times. We were looking for insights into what might be wrong, and what were the prescriptions our highest administrators are recommending to carry us alive, if not intact, into the 21st century.

Much of the directed discussion, over the past decade, at the annual NASULGC meetings (and also Farm Foundation National Public Policy Education Conferences), regarding the future of the Land Grant university system, is focused on food and agriculture and the changes that will have to take place in colleges of agriculture in order to survive into the next century. There is surprisingly little reference to what is going on for example, in colleges of engineering, medicine, business, and even arts and sciences. We are willing to assume that papers presented at the professional meetings of disciplines other than our own address the implications of the changing circumstances in public higher education for those disciplines. But, there is no evidence that this has resulted in an analysis of the total system.

Overall, the NASULGC proceedings reveal University administrators and invited speakers who fearfully see a system that has fallen from prominence in the public eye and may no longer meet the needs of our changing society. They are reeling from university bashing at both the state and national levels for such crimes and sins among other things as ripping off the government in excessive indirect cost rates, sexual harassment and inappropriate liaisons with students, faculty, and staff, allowing exorbitant faculty salaries to be charged to grants and contracts, fraud in research, conflict of interest, price gouging, collusion in setting tuition and fees, defaults in student loans, misplaced values in intercollegiate athletics, improperly allowing exploitation by foreign competitors of university research laboratories, lack of ethnic diversity, excessive university administration costs indicative of poor management, and perhaps more than anything else, indifference to the quality of undergraduate education.

Some are critical of the extent to which basic research and theory have gotten too far out in front of applications, and suggest that there is an urgent need for relevance in research, particularly at the state and local level. In his 1987 centennial address, Frank Rhodes, President of Cornell Univer-

sity bemoaned the passing of the "old guard of solid, discerning 'dirt under the fingernails' faculty with those more chosen for their disciplinary research specialties than for their commitment to land grant ideals." At the same meeting Russel Mawby, of the W.K. Kellogg Foundation admonishes that "our public universities must demonstrate their capacity to be ever more socially useful to a society under stress" (NASULGC, 1987).

There is real urgency and concern for the future in the statements of university administrators and particularly from the invited speakers. For example: "the greatness of a nation is closely related to the education of its citizens and the corollary . . . yes, if we're going to celebrate the tricentennial of our freedom, we better be considerably smarter as a people than we are right now" (Cronkite, NASULGC 1987); "clearly, we do seem to be losing ground daily in the race to broaden and deepen the talent pool this nation needs" and "how well is the public interest served when our biomedical research community is steadily graying?" (Healy NASULGC 1991). D.A. Bromley in 1991 warned, "We have to be very careful in all this that we don't screw up the one thing we do well, graduate education. I keep emphasizing that because there's a great tendency to focus on one problem at a time, thereby generating some beautiful ones in areas that are otherwise okay." (NASULGC 1991).

Empirical Basis of Transition

In an attempt to understand the transition in public higher education, we considered four areas: the cost and accessibility of undergraduate education; the cost and accessibility of graduate education; the sources of funding for higher education; and the institutional structure of higher education. All of these effect the condition and the course of higher education and each of these has undergone considerable change in the past decade.

Undergraduate Education

The cost of undergraduate education has increased drastically since 1980 as the result of a policy shift transferring responsibility for the financing of public higher education away from government and onto the student. As an example of this increase consider that from 1980-92 in-state tuition, room, and board at four-year public institutions increased by 52% in real terms on average (DES 92). At the same time, loans have become the most significant part of the financing package, replacing govern-

ment grants. To the student, the two-fold effect is an increase in the net cost of education due to rapidly rising tuition and the burgeoning debt load.

The effect of increases in net costs to undergraduates on the decision to pursue higher education has not been subject to economic analysis in the current high tuition and load dominated financial aid environment. Previous studies, all of which use data from the 1970's and early 1980's, generally find a slight negative response to tuition increases (see Leslie and Brinkman 1987 for literature review). They also find low income groups the most price sensitive and price sensitivity the greatest at the lower cost least selective institutions (McPherson and Shapiro 1991, Hearn and Longanecker 1985, Manski and Wise 1983). None of this research however, analyzes the changes that have occurred during the last decade. A recent study commissioned by Congress, although not an economic analysis, recommends reducing the net costs to undergraduates through increased federal government commitment (National Commission on Responsibilities for Financing Postsecondary Education 1993). Much of this commitment will likely be through increased loans.

The effect of debt on the decision to pursue higher education is not well understood. Previous studies of undergraduate debt find the level of debt low and the effects slight, but used data prior to the policy shift of the 1980's and 1990's (Hansen and Rhodes 1988, Fox 1992). A comparison of average debt loads at the University of California in 1983 (Hansen and Rhodes 1988) to the University of Rhode Island in 1992 shows that, at least in this instance, undergraduate indebtedness has more than doubled in the last ten years. Importantly, we know very little about actual levels of indebtedness and how debt influences undergraduate enrollment and retention. There is some suggestion that the economically disadvantaged, including many minority students, may be particularly sensitive to indebtedness and that student debt load is inversely related to family income (Savoca 1991).

Current tuition levels and the financial aid environment increase the importance of institutional financial aid packages. There may be an increasing tendency to base this institutional financial assistance on SAT scores. Schools with relatively large holdings of institutional money are at an advantage in this recruiting environment. These schools seek out desired students with financial incentives often valued in the tens of thousands of dollars over the course of the undergraduate years. Schools that do not have sufficient institutional funds to supplement government financial aid are finding it difficult to attract high scoring enrollees. How this af-

fects the distribution of the benefits of higher education is unknown. Another financing strategy is to charge high tuition and base institutional assistance on the student's ability to pay. This strategy has not been thoroughly studied in the current public higher education environment. Some evidence from private institutions suggests that this pricing strategy is not having the anticipated outcome of increasing access to needy students. (Rose and Sorensen 1992).

It may be hypothesized that the combination of high tuition, loan dominated financial aid, and the selectivity of institutional assistance prohibits low income high school graduates from attending even their local Land Grant university due to financial circumstances. If the student's SAT scores are not highly competitive and the student is either unwilling or unable to assume the tens of thousands of dollars in debt load required to pursue full time study, what are the alternatives? Part-time study may or may not be feasible considering the logistics of work schedules, travel time, and costs. This scenario reduces the possibility of advancement through education that can raise a family out of poverty and restricts the Nation's stock of human capital.

Graduate Education

The cost and accessibility of graduate education has critical implications for national human capital formation. We were able to locate very few studies related in any way to the economics of graduate education. This conclusion is shared by the Council of Graduate Schools which knows of no systematic information on changes in the real cost of graduate education to the student or of the institutional costs of graduate education (Personal communication). However, the charge is frequently made but not substantiated that undergraduate tuition is subsidizing graduate education at Land Grant universities.

The 1993 final report of the National Commission on Responsibilities for Financing Postsecondary Education is almost entirely focused on the cost of undergraduate education. What the commission did find concerning graduate education is that the financing policy for American graduate education generally lacks focus and that basic information about the use of graduate education programs, their cost, the number of aid recipients, and the effectiveness of programs is not comprehensively collected or analyzed. The Commission's sole recommendation for graduate education is to make graduate assistantships exempt from income taxes.

There has been little analysis of the extent to which undergraduate debt load is a factor in the decision to pursue a graduate degree (Fox 1992). However, in a 1989 exit survey of graduating Boston College baccalaureates 20% indicated that their accumulated debt load had strongly affected their decision to postpone graduate school (Delaney 1990). We know of no study that attempts to measure the various factors that contribute to the decision to leave the workforce to pursue full-time graduate study. The potentially enormous graduate school debt load may be a particularly important consideration for economically disadvantaged students.

The funding of foreign graduate students is a contentious issue raising concerns from teaching assistants unable to communicate in English to equity issues related to the training of U.S. minority students. The number of federal stipends declined in the 1980's and the total doctoral recipients dropped around 10 percent during the same time. Between 1972 and 1987, the percentage of Ph.D.'s received by U.S. citizens fell from 79 to 61 percent in the physical sciences and from 67 to 41 percent in engineering (DES 1992). It is estimated that upon graduation fifty percent of foreign graduate degree holders return to their native country. No one tracks the remainder to see if they have taken post-doctoral positions and return home after completion or if they have become part of the U.S. work force (Council of Graduate Schools, personal communication). The implications of all this for human capital resources available to this nation in the next century are totally unknown.

The relative decrease in U.S. Ph.D.'s may be an example of unwanted outcomes that result from uninformed policy decisions made in isolation. Consider how these recent policy decisions contribute to the current unavailability and high cost of graduate assistantships:

- IRS ruling that fellowships and assistantships are taxable
- Ruling that FICA is to be charged on graduate hourly earnings
- Increasing number of federal grants which will not allow the payment of graduate tuition
- Increasing university reluctance to remit graduate tuition
- Rapid increase in out of state tuition
- Decreases in state funding for teaching assistantships
- Increasing number of one and two year project cycles to be fit into four to five year Ph.D. programs.

The following hypothesis may be indicative of the unknown results of current policies towards graduate education. Assume that the more talented foreign graduates of advanced countries return home attracted by important positions in government and industry while the more talented students from third world countries tend to stay on in the U.S. Increasingly these returning students staff their home country's universities which effectively compete internationally with U.S. universities for graduate students. Enrollments at U.S. graduate programs decrease due to competition from abroad and the declining pool of U.S. applicants. Over time U.S. graduate programs close due to lack of students and budget constraints and the nation suffers a loss of research and teaching capacity. The reduction in human capital and the loss of innovative ability inhibit economic growth and competitiveness as markets for both goods and services become ever more global in the next century.

Funding of Public Higher Education

The level of government funding for public higher education at both the graduate and undergraduate levels reflects the national commitment to public higher education. Percentage contributions to total annual revenue of public institutions of higher learning from both state and federal governments fell from 1980 through 1989. (47% to 42% for state and 13% to 10% for federal). At the same time tuition and fees increased to 16% of total annual revenue on average (DES 1992). As an example, at the University of Rhode Island in 1992-93 tuition revenues were approximately 25% greater than that year's state appropriation for the University. For the school year 1990-91, each of the New England states was above the national average in the relative importance of tuition as a source of funds for public institutions of higher education and collectively average one third higher than the national average. Public institutions of higher education in Vermont and New Hampshire both have a greater reliance on tuition funds than Rhode Island institutions (Halstead 1991).

The withdrawal of state and federal support to public higher education and the resultant increased reliance on tuition revenues has brought forth an array of marketing strategies as individual universities struggle to balance budgets. Consider that a decrease in enrollment of only two hundred out of state students at some of the Land Grant universities in the Northeast results in an immediate revenue decrease of two million dollars at today's tuition rates. The typical response is likely to be

decreased operating funds and/or unfilled positions. Schools attempt to maintain and even increase out of state enrollments through aggressive recruitment. Other means of balancing budgets include "right sizing" which decreases the size of or combines certain departments and "niche finding" which closes some departments altogether, focusing the research and teaching areas of the school to a narrower scope. The cumulative effect on the nation's teaching capacity and stock of human capital is totally unknown.

Decreased public funding has caused a budget crisis at numerous institutions. Some universities may be forced to accept all applicants provided they can pay a substantial portion of the tuition. A possible outcome of this response to a budgetary crisis is that the quality of Freshman classes diminishes as the school becomes the university of last resort for low scoring high school graduates. The school is then branded with a reputation of poor academic quality causing a decrease in applications which further justifies the "take all comers" policy. Increasingly, it becomes difficult to attract new faculty and the quality of teaching and research decline as well. The university in this scenario survives at the expense of the quality of education it offers and at the expense of the service it provides the nation through teaching and research.

Institutional Structure of Public Higher Education

Changes in the structure of the system of public higher education effect the system's ability to meet the needs of society. Of particular concern are changes that may be taking place as a result of decreases in both state and federal resources. Consider graduate education and research, activities in which individual universities have developed areas of excellence which may be more important to the nation as a whole than to the particular state. Cutbacks in these programs may be based more in internal university priorities and state financial circumstances rather than on the national interest. At the current time there is no mechanism to bring this issue into the budgeting process.

Another concern with the structure of public higher education has to do with the fulfillment of the land grant mission. At what public institutions will the Morrill vision be realized, if that is still the objective of our public education policy? For example, in 1970 enrollments at public two year institutions were equivalent to 52% of enrollments at public four year institutions. In 1990 that figure increased to 85%. Are these two-year institutions

now providing the educational opportunities implied in the Morrill vision? Is this increase in enrollment more a response to debt loads associated with the high cost of going away to school, or lower admission standards at the community colleges, or the location of the institution being more convenient to working, part-time students, or the declining value of a four year degree program? If this is the fulfillment of the land grant mission, should we be satisfied with the level of human capital which it is creating?

At both two and four year public institutions part-time enrollments grew at a faster rate than full-time enrollments during the 80's (DES 1992). Is this a problem associated with the rising costs of higher education or simply a reflection of changing social patterns and attitudes towards career changes? Again we might ask if this pattern is efficient for the creation of human capital?

At the 1991 national meeting of heads of agricultural and resource economics departments, G. Edward Schuh points out that changes in constituents, the debate over the nature of a liberal arts education, and the structure of higher education are raising serious issues for the future of the Land Grant universities. He offers a hypothesis about over investment in large public universities in the sense that public budgets have outpaced the fiscal resources necessary to support them (Schuh 1991). This may be the case but as yet we have no studies which document that this is the situation or that suggest corrective policies consistent with public values regarding public higher education.

Conclusions

The primary conclusion of this analysis is that applied economists at the public universities, have an enormous research opportunity, and in fact responsibility. The nation's system of public higher education (and private as well) is undergoing a major transition. The nation is suspect of losing its grounding in an educated citizenry and along with it an essential condition for maintaining a free and democratic society. Changes in the accessibility of higher education may well be adding to the polarization of society in terms of wealth and education. We are admonished by some, consistent with the observations of anthropologists of societies under stress, to apply the fashions of the past, that is to experience a revitalization movement in education (Boyer 1990). While prescriptions calling for traditional methods may be appropriate, they do not address the issues of costs, equity, and structure that drive so much of public higher education.

We believe that there is an immediate need for a research program directed at the economics of public higher education in the 1990's and beyond. Research must individually address the demand structure for public higher education, the product attributes of public higher education, and relate these findings to effects on the nation's stock of human capital. This research program would be welcome by at least some of our administrators and would give needed guidance to public policy makers at the state and national levels.

Studies are needed concerning price effects in higher education including income and price elasticities of demand for undergraduate and graduate education. We know almost nothing about these elasticities since the few available studies predate the shift in public policy towards higher education. Administrators, including those at our public institutions in the Northeast, compete with pricing and recruiting in targeted markets in an atmosphere of secrecy and intrigue. The distribution effects that arise from current pricing and recruiting strategies may well be substantial and must also be estimated to assess the overall effects on the national stock of human capital.

The extent to which price is the motivation in the increase in enrollment in community colleges is unknown but significant. Are community colleges replacing the Land Grant universities in fulfillment of the Morrill vision of public higher education? If so, is this a desired outcome of the current transition? For example, enrollment at one public community college in the Northeast has increased from thirteen thousand to eighteen thousand students in the past five years. No records are kept on the SAT scores of these students nor their high school class rank. What is known is that after six semesters only 25% of these students are graduated, 12% have transferred to four year institutions, 16% are still enrolled and the remainder have dropped out. No one keeps further track of where these students came from or where they go once they leave the institution.

The research program must identify the effects of availability of various sources of financial aid on the demand for higher education. We do not know the effect of debt loads or expected return from education on the demand for undergraduate or graduate education at current prices and aid environment. The willingness of individuals to assume debt in an uncertain world of rising tuition and decreasing grants is unknown. The little evidence available shows that the increased undergraduate debt loads of the 90's may have a significant impact on both the decision to pursue graduate study and the choice of field of study (Fox

1992, Delaney 1989). No one has yet analyzed the effects of expected graduate school debt load on baccalaureates considering graduate school. The relation between financial aid and the increase in the number of foreign graduate students and the implications for the nation's stock of human capital is a critical issue that needs to be explored.

Studies of product attributes are required. There is little analysis of the basis of consumer choice among the education alternatives available (Moore, Studenmund, and Slobko 1991). We know more about wholesaler preferences for salmon and nursery product characteristics than we know for higher education. In our discussions with various administrators in the Northeast, none has included quality of education as one of the marketing factors in recruiting freshmen. It is evident that there are difficulties identifying appropriate recruitment strategies and product improvement goals when basic consumer choice information is lacking.

The research output of the Land Grant university must also be considered. The rate of return on research as an element in the research investment decision, particularly at the state level, demands further analysis. Studies at the national level show consistently high rates of return to university research (Yee 1992). Since there is so much reliance on state funding, it would seem useful to quantify for decision makers the returns from applied research directed at state and local problems. This is consistent with the admonitions of our administrators to be more concerned and involved with the issues of society.

We mentioned at the onset, that we were of the opinion that what was needed was not only a significant research effort by members of our profession, but a major public policy education program as well. We found total agreement from university institutional research offices, from the National Research Council and the Council of Graduate Schools that there was a desperate need for studies on the economics of higher education. We are by no means sanguine however that the results and implications of those studies would be readily understood or accepted by policy makers and administrators.

The results of research into the demand structure of public higher education, into the product attributes of public higher education, and into the effects on the nation's stock of human capital would be a significant input into the policy making process. The information is needed by our university presidents, provosts and deans, and by national and state legislators. They are all critical to an efficient transition of our public system of higher education

to meeting the needs of the 21st century. The danger is that, as has currently been the case, decisions made in isolation will continue to have unknown cumulative effects. Without utilizing the knowledge embodied in this required research we risk the Nation's most valuable asset and with it the ability to prosper into the future.

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