



Improving Productivity in Higher Education

William Poole*

President, Federal Reserve Bank of St. Louis
Webster University
St. Louis, Mo.
April 7, 2005

*I appreciate comments provided by my colleagues at the Federal Reserve Bank of St. Louis. Thomas A. Garrett, Senior Economist in the Research Division, provided special assistance. I take full responsibility for errors. The views expressed are mine and do not necessarily reflect official positions of the Federal Reserve System.

Correction: In the eighth paragraph, the last sentence should have said that total instructional expenditures per student rose 17 percent between 1990 and 2001 and that administrative expenditures jumped 54 percent over the same period. (*Correction posted Oct. 31, 2005*)

Improving Productivity in Higher Education

The subject of productivity in higher education is one that has long interested me. I do not pretend to be an education productivity expert, but rather an observer of the scene who cannot help applying the economist's view of the world to the provision of education services.

I'll start with a story reflecting an early experience after finishing my graduate work at Chicago. When I arrived at my first regular teaching position, I put together reading lists for my courses and sent them to the library so that books and articles could be placed on library reserve for students to read. After a couple of classes, my students complained that the reserve items were not available. I checked with the library and was informed that faculty members had to go into the stacks and pull the items to be placed on reserve, something I had not been told. I complained: why should faculty members, even lowly new assistant professors, do such work when students paid substantially less could do the work? Did it make sense to use employees with Ph.D.s to pull books off library shelves?

Over the years I've observed many other examples of inefficient use of faculty time. Historically, universities have simply not paid much attention to productivity. In fact, I know of no other large U.S. industry where productivity enhancement is such a low priority. That said, one of my delights from serving on the Webster board is that this university is so well structured to deliver education services efficiently. My lecture is not primarily about Webster, although perhaps I can encourage an active discussion among faculty and administration about opportunities for productivity enhancements at this

university. In fact, I believe that in today's world every firm needs a culture that includes a continuing search for better and more efficient ways to conduct business, and that the culture should involve every employee.

Before proceeding, I want to emphasize that the views I express here are mine and do not necessarily reflect official positions of the Federal Reserve System. I thank my colleagues at the Federal Reserve Bank of St. Louis for their comments. Tom Garrett, Senior Economist in the Research Division, provided special assistance. However, I retain full responsibility for errors.

Recent Trends in Higher Education Costs

College tuition has increased dramatically over the past decade.(1) Between 1990 and 2000, tuition increases averaged 5.9 percent per year at public institutions and 5.5 percent at private institutions. These increases may be compared to the average annual rate of CPI inflation of 2.7 percent. Tuition increases are driven largely by increases in labor costs. Total education employment—education at all levels—has risen from about 8½ percent of total national employment in 1990 to over 10 percent today. The increase in tuition and fees has outpaced the growth of disposable personal income. Tuition increases are straining family budgets, a trend that certainly cannot continue indefinitely. For many families, the outlay for children's education is the second largest family expense, exceeded only by housing expense.

Economists and educators have cited several reasons for the rapid increase in college tuition seen across the country.(2) One reason is an increase in university costs. Total inflation-adjusted expenses at public universities increased 28 percent between 1990 and 2000, whereas full-time enrollment at public institutions increased 9.4 percent over this same period.

The lack of cost-saving incentives faced by public universities compared to private sector enterprises may explain the rise in tuitions. Weak incentives to improve efficiency can result in the continued existence of excessive staff and underutilized academic programs or research centers, all possibly coming at the expense of student instruction. Data from the National Center for Education Statistics support this view.

Instructional expenditures as a percent of total expenditures at public institutions have decreased from 39 percent in 1977 to 34 percent in 2001. In addition, administration expenditures increased from 30 percent of instructional expenditures in 1976 to 50 percent in 2001. More alarming is the fact that total instructional expenditures per student dropped 14 percent between 1990 and 2001 while administrative expenditures per student increased 14 percent over the same period.(3)

Some of the increase in administrative expense arises from growing federal and state requirements. Public universities, especially, should document the cost of these requirements so that state legislatures can decide whether the benefits are worth the costs. If not, state mandates should be scaled back. More generally, we need a better understanding of the costs and benefits of regulatory provisions that have propelled growth in administrative expenses.

Another reason for tuition increases is the recent recession and ensuing state budget crises. Fourteen states reduced state appropriations for higher education between fiscal years 2002 and 2003.(4) Missouri experienced the second largest decrease in the nation with a 10 percent cut in higher education funding. In response to state budget cuts for higher education, colleges and universities increased tuition by an average of 10 percent nationally between 2002 and 2003. This average 2002-2003 tuition increase was nearly double the average annual increase over the past decade. Webster University fared relatively better, increasing tuition only 6.4 percent in 2003.(5) The average tuition increases in Missouri, Iowa, and Texas were the second highest in the nation at 20 percent, behind only Massachusetts where tuition increased nearly 24 percent. Some, but only some, of these increases have been offset by increases in financial aid. Perhaps paradoxically, the availability of financial aid may be a reason for tuition increases. Discussion of the affordability of higher education has focused attention of both governments and donors on the need for financial aid to the almost complete exclusion of attention on productivity enhancements that might constrain tuition increases.

The percentage of students at four-year universities who received some financial aid increased from 60 percent in 1990 to 74 percent in 2000. At Webster University, the number of undergraduates receiving some form of financial aid increased 18 percent between 1999 and 2003.(6) Nationwide, financial aid is now covering a larger percentage of tuition expenses. For example, financial aid covered 47 percent of tuition at four-year universities in 1990 compared with 54 percent in 2000. The increase in the use of financial aid reflects the great importance society places on education and its general belief that education should be available to all. I am certainly not opposed to financial aid but believe that constraining gross tuition levels deserves equal emphasis.

Another way to view financial aid is that it reflects what economists call “price discrimination.” Price discrimination simply means that firms charge different prices for the same product or service. Many firms engage in price discrimination, such as the movie theater that gives a discount to senior citizens. For the economist, the word “discrimination” in this context does not carry negative connotations; the practice is sensibly related to profit or revenue maximization in many contexts. Universities increasingly charge different tuition to different students, depending on ability to pay and university efforts to recruit students with special academic or athletic skills. The growth of financial aid suggests that universities are increasingly using sophisticated pricing policies.

Nevertheless, even net of financial aid tuition increases have been substantial. Thus, in an increasingly global and technology-driven marketplace, enhancing productivity in higher education should be of great concern to parents, students, educators, and the citizenry. In the wake of rising costs and increasing competition from growing for-profit and on-line education such as the University of Phoenix, universities must develop strategies to reverse the downward trend in productivity.

Note that I have said “downward trend in productivity.” We are using more real resources—especially, more university employees—to educate each graduating student and it is hard to claim that the quality of the graduate is improving commensurately with the increase in educational resources expended. Thus, productivity in higher education is falling—more inputs per unit of output. Declining productivity in higher education is a distressing state of affairs.

Productivity in Higher Education

Economists define productivity, in the simplest terms, as a measure of output per unit of input. Productivity in education can be measured in terms of units, such as average class size, or it can be measured in terms of dollars, such as the quality or value to students relative to the cost of educating students. These definitions allow one to evaluate how a change in costs, quality, or quantities influences productivity. Productivity will increase if student quality increases more than the cost of educating students. By “student quality” I mean the skills a graduating student has. Similarly, a reduction in costs while student quality remains the same or rises will also increase productivity. This latter possibility reflects the basic idea of doing more with less. Higher education, unfortunately, has seen a decrease in productivity over the past decade. Total inflation-adjusted operating costs per student of colleges and universities have increased while there has been little or no increase in student quality.(7)

How can universities reduce costs and increase student quality in an effort to increase productivity in higher education? Before I can address this question, it is important that I discuss several issues that must first be considered before any cost-saving or quality enhancing policies can be implemented. These issues are 1) defining the objectives of the college or university, 2) defining productivity inputs and outputs, 3) measuring productivity, and 4) demonstrating productivity improvements.(8) Once these issues are addressed, strategies to enhance productivity can be analyzed.

Defining Objectives. Defining the university’s objective or objectives is the crucial first step in evaluating productivity. Objectives of the university may include increasing student quality, increasing access and diversity, greater cost-efficiency, a better contribution to the needs of the community and basic research.(9) There may be divergent views among university officials and state legislators regarding the top objectives of a university, but improving student quality is typically the most important higher education objective claimed by universities and state legislators.(10)

Defining Productivity. While the economist’s general definition of productivity, namely outputs relative to inputs, is straightforward, it is too simple a definition to guide management strategies aimed at increasing productivity. A more thorough definition of productivity recognizes that productivity can be divided into two parts: efficiency and effectiveness. Efficiency refers to the level and quality of service that can be obtained given an organization’s fixed resources. Thus, an organization is considered more efficient if it can increase the level or quality of service without increasing the amount of inputs used. Effectiveness, on the other hand, refers to how well an organization meets the demands of its customers. The customers in higher education are students, parents, and state legislatures. Customer demands may include such outcomes as a specialization of knowledge in a specific area, career assistance and job placement, and probably most importantly, graduating well-educated and productive students. Improving productivity in higher education thus requires undertaking measures that increase efficiency and effectiveness. Measures to cut costs, as universities across the country have done in the wake of the recent recession and state budget crises, only address the cost-efficiency dimension of productivity. Sound management practices to improve productivity in higher education must also look at the effectiveness of the organization, be it an academic department, college, or the entire university.

Measuring Productivity. Productivity measurement is difficult in most service industries, and education is certainly no exception. In education, we need to be wary of simple measures such as the number of students per faculty member. Some observers seem to assume that quality “must” be higher when the student-faculty ratio is lower. Although one-on-one teaching has its place, my own experience is that a class of 25 is often better than a class of 5 because of student interaction. In any event, when we study productivity it is important to do the best we can in measuring output directly and not make assumptions about what “must” be the case.

Before any measurement of productivity can occur, administrators need to decide on what level or levels of the organization’s productivity should be measured. For example, is the concern the productivity of an individual, say a professor or an administrative assistant, or is the concern the productivity of an academic department or the university as a whole? All are relevant and should be measured. An important point in measuring productivity is that measures should not be constructed prior to setting goals and objectives—doing so will lead administrators to value something that is measurable rather than measuring something with value.

Measuring productivity in higher education requires a measure of both efficiency and effectiveness. Efficiency is often measured using ratios, such as physical output relative to an input or dollar cost of an input relative to an output. The exact efficiency measure used depends upon the objective set by the administration.(11) Efficiency ratios such as enrollment per section or contact hours per faculty member are reasonable and useful. An objective of improving students’ progress toward a degree would require measures such as a withdrawal rate and average course load taken. Examples of cost-efficiency measures include instructional costs per student, library expenditures per student, and administrative costs per student.

Measuring effectiveness can be difficult, though not impossible. Several ideas have been suggested in the literature.(12) One way to measure effectiveness is to assess community or client conditions and benchmark them to community standards or those standards of other institutions of higher learning. An example could be the number of graduates who find a job within three months of graduation. Another option is to measure accomplishments, such as the number of graduates or the percentage of students taking a class that requires relatively advanced work, such as technical research paper. The number of graduates going on to receive advanced degrees is another such measure. Finally, client satisfaction is a third avenue to measure effectiveness. Clients can include alumni or businesses that frequently hire a university’s graduates. Assessing the satisfaction of these clients can be done via surveys, focus groups, or personal contacts with top administrators.

Showing Productivity Improvements. After setting productivity objectives, defining productivity, and measuring productivity, the next step is to demonstrate productivity improvements, which can be done in several ways.(13) One is to show an increase in revenue or participation that results from efforts that did not require an increase in tuition, fees, or taxes. Another is to show a significant increase in effectiveness, such as the employment rates of recent graduates, without increasing costs or using additional resources. Numerous measures are possible, and each university should concentrate effort on those that best fit its own circumstances.

Strategies to Increase Productivity

There is an abundant literature on possible strategies for increasing productivity in higher education, which can help universities to understand how they can reduce costs and increase student quality. Many of these strategies require changes in the administrative culture and the mindset of faculty and administrators. Attempts to implement these strategies may be met with resistance or even legal challenges from the various professional organizations and associations that support faculty and administrators.

Strategies for increasing productivity focus on improving the two key components of productivity that were defined earlier—effectiveness and efficiency. These strategies include privatization, decentralization, improving student quality, and increasing the flexibility of faculty.

Privatization. One way of increasing the cost-efficiency of higher education is through the privatization of certain services.⁽¹⁴⁾ Most universities are vertically integrated, meaning they not only provide education but also provide food service, student and faculty housing, cleaning and maintenance, and records management. While these services contribute to student learning, there is no reason why these services cannot be performed by private contractors.

When vertical integration exists, the full costs of inside staff, such as wages and benefits, may be accounted for in other budget or service categories, thus making it difficult to assess the full costs of a certain service. The fees charged by outside contractors, however, will more clearly represent the full cost of providing a particular service. In addition, competitive pressures will increase the likelihood that private contractors will provide an efficient quantity and quality of labor for each service. An issue that arises regarding the privatization of various university services is student employment. Currently, many students work for universities as library assistants, food preparers, and custodians as part of a financial aid arrangement. Privatization may result in a reduction of staff, forcing some students to find alternative financial aid packages. However, even when contractors find that hiring students is not cost effective, concern over student employment ought to be minimal relative to concern over the growing costs of universities.

Decentralization. Privatization is part of a larger strategy aimed at increasing productivity in higher education—the decentralization of the current administrative structure. While decentralization frequently occurs in the private sector, universities have generally not followed suit. Centralized administrative structures in universities have been criticized for several reasons.⁽¹⁵⁾ For one, administrators can generally add staff to meet their needs without having to justify the additions to anyone except other administrators.

Decentralization can result in several benefits for universities. First, academic departments will have more control over their costs and staffing needs. Departments will have more flexibility in aligning their resources to meet changes in student demands. My own experience is that universities provide too little in the way of support staff for faculty, thus forcing faculty to perform clerical duties. If individual academic departments had more control over their own budgets, they might decide to replace a faculty position with several support staff to improve efficiency. At the same time, university administrators would have to resist the temptation to cut support staff in times of budget stringency.

Creating a structure that gets the incentives right is not easy, but will be an essential feature of longer run reforms to improve efficiency.

A case-study of successful administrative decentralization at Antioch University provides some insights into the challenges of decentralization.(16) One such challenge was that a centralized administration had to reach a decision to decentralize the administration itself. While paradoxical, the administration realized that decentralization was, in Antioch's case, the only real way to control costs. Another challenge was to realize and accept that some important senior and middle managers would be let go, and that these individuals would resist any change in administrative structure. Antioch cut its centralized administration by 14 people, a reduction of 60 percent, and realized a 25 percent reduction in central administration costs.(17) Resistance by lower management, faculty, and staff to any change in the administrative structure required ever more vigilant leadership by upper management. All employees were involved in decisions, ensuring that the process to decentralize remained a collaborative one between all ranks of administrators and faculty, and ensuring a continuing commitment to the decision to decentralize despite opposition.

Improving Student Quality. The quality of students—the knowledge and skills they gain from a university education—should be the primary goal of any institution of higher learning. Just how to increase student quality, however, remains unclear to many faculty. One reason for this lack of clarity is that many faculty, especially those at research institutions, see teaching as a secondary job responsibility behind publishing in academic journals and acquiring research grants. Another reason is that most faculty members do not have training in good teaching strategies.(18)

Arthur Chickering and Zelda Gamson summarize good teaching practices in their article, "Seven Principles for Good Practices in Undergraduate Teaching."(19) These practices include encouraging student/faculty contact, encouraging active learning, encouraging cooperation among students, giving prompt feedback, communicating high expectations, encouraging more time on each task, and respecting diverse talents and ways of learning. An important point is that the current passive lecture format in most universities does not account for most of the practices just discussed. Even in smaller teaching-oriented colleges many of these practices are likely to be absent. And, there are huge new opportunities to employ new technologies such as the Internet to improve efficiency. For example, there is no reason for libraries to subscribe to statistical publications when the same data are readily available through the Internet.

Increased Flexibility of Faculty Staffing. Instructional expenditures have historically accounted for nearly 35 percent of total university expenditures nationwide.(20) Although universities spend roughly one-third of every dollar on instruction, different productivity concepts are appropriate for research and teaching functions. With respect to research, it is appropriate to measure productivity in terms of the quantity and quality of academic research and the amount of external funding acquired. With respect to teaching, it is appropriate to measure productivity by teaching loads and academic advising.(21) The important issue of how best to balance research and teaching would take me too far afield, but I do want to comment on the issue of how best to allocate faculty teaching time. Much of the discussion relating to the role of faculty in contributing to productivity in higher education involves increasing the time that faculty spend in the classroom, enhancing the quality of instruction, and increased flexibility of faculty staffing. Given the expense of instruction relative to overall university expenditures, an important cost-

saving and quality-enhancing strategy is to better align faculty with student needs.(22) Currently, in many universities, as student demands for certain majors or classes ebb and flow over time there is little change in the number of faculty in each department. A failure to match teaching capacity with student demand is completely opposite the private sector, where changes in business conditions directly influence staffing levels. To rein in costs, universities must have the flexibility to hire more faculty or increase teaching loads of current faculty when demand for a major increases and, conversely, universities must have the flexibility to reduce the number of faculty when demand for a major decreases. Everyone understands that an auto producer must be able to shift production from large SUVs to small cars when energy prices soar; why are universities so resistant to making similar adjustments when student interest in subject X soars and interest in subject Y sags?

Several policies can increase the flexibility of faculty.(23) But, arguably, the greatest obstacle to increased flexibility of faculty is tenure.(24) An economic argument for tenure is that it saves initial expense on the part of the university. The saving arises because faculty with tenure, or those hired with the possibility of tenure, will work at a lower salary in return for the guarantee of lifetime employment. However, while there may be initial cost savings from tenure, the resulting inflexibility imposed by tenure has greater costs in terms of both dollars and student quality.(25) Tenure prevents significant staffing changes in response to changes in student demands, and also may prevent lower quality faculty from being replaced by higher quality faculty.

Administrators and management professionals have suggested strategies that can increase faculty flexibility in the presence of tenure, although each of these strategies is not without problems.(26) Some of these strategies may be met with opposition from faculty or even legal challenges. One strategy is to impose tenure quotas on the number or percentage of the faculty who may hold tenure at any one time.

Here is an example of where decentralization could pay dividends. If a department feels strongly that it wants to tenure a brilliant scholar, who promises to greatly enhance the prestige of the department, the university could permit the department to exceed the tenure quota provided that it agrees on some other mechanism to reduce future outlays should student enrollments drop. Department members might agree to accept proportional pay cuts, or that one or more would go on unpaid leave in the future if necessary. Strong department leadership would be willing to take such risks, as is typical of strong leadership in the business world.

Concluding Note

When discussing the difficulty created by tenure of reallocating faculty resources, I suggested several possible approaches. Here is another: A university might even consider using the price system, by raising tuition for courses in high demand and cutting tuition for courses in slack demand. That is what auto producers do when the demand for SUVs falls and for small cars rises.

I know that many will dismiss such an idea out of hand, and that is part of the reason universities have a productivity problem. Yes, education is different but it is not all that different. Too few administrators and faculty are willing to even consider innovations that could make a real difference. We need thinking on all levels about innovative ways to

deliver educational services. Not every idea will turn out to be a good idea, but every idea needs a hearing. Great universities have a culture of scholarly excellence, of nurturing students, and of open and free inquiry. They need to add to that culture a spirit of productivity enhancement so that tuition resources raised from families, and funds from state legislatures and donors are used wisely. To my knowledge, at most universities there is no culture of productivity enhancement nor are university trustees much interested in the issue.

Universities that can deliver high quality education at an attractive price will make a difference—an enormous difference—to our society. I must say that my experience as a Webster board member convinces me that Webster is such an institution. Its growth is evidence that educational innovation works, and I am proud that I have been able to make a small contribution as a Webster board member.

Footnotes

1. Tuition data are from the National Center for Education Statistics, various years.
2. Vedder (1999, 2004a).
3. Expenditure data are from the National Center for Education Statistics, various years.
4. Trombley (2003).
5. Webster University (2004, page 89).
6. Webster University (2004, page 90).
7. Vedder (2004a).
8. Gates and Stone (1997).
9. Gates and Stone (1997) and Ruppert (1995).
10. Gates and Stone (1997).
11. Gates and Stone (1997) and Bottrill and Borden (1994).
12. Gates and Stone (1997) and Epstein (1992).
13. Epstein (1992).
14. See Hackett (1992).
15. See Guskin (1996).
16. Guskin (1996), pp. 12-16.
17. Guskin (1996, page 14).
18. Guskin (1996).
19. Chickering and Gamson (1991).
20. From the National Center of Education Statistics, various years.
21. Brown and Gamber (2002).
22. Waggaman (1991).
23. Mortimer, et al. (1985) and Waggaman (1991).
24. The following discussion of tenure is from McGee and Block (1991).
25. McGee and Block (1991, page 545).
26. Mortimer et al. (1985)

References

- Bottrill, K. and Borden, V. (1994). "Appendix: Examples from the Literature." In Borden, V. and Banta, T. (eds.), *Using Performance Indicators to Guide Strategic Decision Making*. Jossey-Bass, San Francisco.
- Brown, Walter and Cayo, Gamber (2002). *Cost Containment in Higher Education*. Jossey Bass, San Francisco.
- Chickering, Arthur and Gamson, Zelda (1991). "Seven Principles for Good Practices in Undergraduate Teaching," in *New Directions in Teaching and Learning* no. 47, Jossey Bass, San Francisco.
- Epstein, Paul (1992). "Measuring the Performance of Public Services." In Holzer, Marc (ed.), *Public Productivity Handbook*, Marcel Dekker Inc., New York.
- Gates, Susan and Stone, Ann (January 1997). "Understanding Productivity in Education," Institute on Education and Training, RAND.
- Guskin, Alan E. (1996). "Reducing Student Costs and Enhancing Student Learning: The University Challenges of the 1990s." Occasional Paper No. 27, Association of Governing Boards of Universities and Colleges, Washington, D.C.
- Hackett, John T. (1992). "Productivity Through Privatization." In Anderson, Richard and Meyerson, Joel (eds.), *Productivity and Higher Education*, Peterson's Guides, Princeton, New Jersey.
- McGee, Robert W. and Block, Walter E. (Spring 1991). "Academic Tenure: An Economic Critique." *Harvard Journal of Law and Public Policy*, vol. 14, no. 2, pages- 545-572.
- Mortimer, Kenneth; Bagshaw, Marque, and Masland, Andrew (1985). *Flexibility in Academic Staffing*. ASHE-ERIC Higher Education Report no. 1, The George Washington University, Association for the Study of Higher Education, Washington, D.C.
- National Center for Education Statistics, *Digest of Education Statistics*, Washington, D.C.
- National Commission on the Cost of Higher Education (1998). *Straight Talk About College Costs and Prices*. Oryx Press, Phoenix.
- Norman, Donald (1993). *Things That Make us Smart: Defending Human Attributes in the Age of the Machine*. Addison-Wesley, Reading, Massachusetts.
- Ruppert, Sandra (1995). "Roots and Realities of State-Level Performance Indicator Systems." In Gaither, G. (ed.), *Assessing Performance in an Age of Accountability: Case Studies*. Jossey-Bass, San Francisco.

- Trombley, William (Winter 2003). "The Rising Price of Higher Education." The National Center for Public Policy and Higher Education. San Jose, California.
- Vedder, Richard (February 1999). "The Tuition Puzzle: Putting the Pieces Together," The Institute for Higher Education Policy, Washington, D.C.
- Vedder, Richard (2004). *Going Broke by Degree: Why College Costs too Much*. American Enterprise Institute Press for Public Policy Research, Washington, D.C.
- Vedder, Richard (December 2004). "Ugly Truths About Runaway College Tuition." The Education Economist, The American Enterprise Institute.
- Waggaman, J. (1991). *Strategies and Consequences: Managing the Costs in Higher Education*. ASHE-ERIC Higher Education Report no. 8, The George Washington University, School of Education and Human Development, Washington, D.C.
- Webster University (2004). *Sum and Substance*.