

Access and Success with Less: Improving Productivity in Broad-Access Postsecondary Institutions

Davis Jenkins and Olga Rodríguez

Summary

Achieving national goals for increased college completion in a time of scarce resources will require the postsecondary institutions that enroll the majority of undergraduates—community colleges and less-selective public universities—to graduate more students at a lower cost. Davis Jenkins and Olga Rodríguez examine research on how these “broad-access” institutions can do so without sacrificing access or quality.

Research indicates that the strategies broad-access institutions have relied on in the past to cut costs—using part-time instructors and increasing student-faculty ratios—may in fact reduce productivity and efficiency. The limited evidence available suggests that some of the most popular strategies for improving student success are not cost-effective. New strategies to cut costs and improve college success are therefore imperative.

Some believe that redesigning courses to make use of instructional technologies will lead to better outcomes at lower cost, although the evidence is mixed. Recently, a growing number of institutions are going beyond redesigning courses and instead changing the way they organize programs and supports along the student’s “pathway” through college. These efforts are promising, but their effects on cost per completion are not yet certain. Meager funding has so far hampered efforts by policy makers to fund colleges based on outcomes rather than how many students they enroll, but some states are beginning to increase the share of appropriations tied to outcomes.

Jenkins and Rodríguez argue that as policy makers push colleges to lower the cost per graduate, they must avoid providing incentives to lower academic standards. They encourage policy makers to capitalize on recent research on the economic value of postsecondary education to measure quality, and urge colleges and universities to redouble efforts to define learning outcomes and measure student mastery.

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State and national efforts to achieve goals of increasing college attainment and expanding equity within postsecondary education depend critically on community colleges and less-selective public four-year colleges and universities, which enroll nearly 60 percent of all U.S. college students.¹ These broad-access colleges and universities have completion rates lower than those of more-selective institutions and are struggling financially as declining state budgets and competing priorities have led states to scale back their financial commitments to public higher education. To contribute to increased college attainment, they must improve student completion rates without sacrificing access or quality as public resources decline. In short, they must become more productive, and in the face of dwindling public resources, that means becoming more efficient as well.

In this paper we review research on the productivity of broad-access public postsecondary institutions and examine what they can do, given fiscal constraints, to improve undergraduate completion rates without sacrificing access or quality. Although much of the debate among policy makers and the public about the rising costs and uncertain quality of higher education has centered on elite private colleges and public research universities, we focus on public broad-access institutions because of their important societal role in providing access and addressing inequality. As Michael Kirst, Mitchell Stevens, and Christopher Proctor write, “Colleges are not more or less selective. They are more, less, and variably accessible. Broad access—by which we mean the ability to enroll regardless of socioeconomic and academic background—should be regarded as a positive educational, institutional, and societal value.”² Kirst and his coauthors

include under the “broad access” rubric the for-profit postsecondary institutions discussed by Claudia Goldin, Larry Katz, and David Deming in their article in this issue.³ Because of limited research on the economics of the for-profit sector, we exclude those institutions and focus instead on public two-year colleges and public master’s institutions (four-year colleges that grant master’s degrees), whose mission is teaching rather than research.⁴

Broad-access public institutions are much more dependent than selective public and private institutions on public funding, an increasingly constrained resource. State and local appropriations have declined in the wake of the “Great Recession” after being mostly flat for a decade. Given that providing access to postsecondary education is central to their mission, a key reason for their dependence on public funding is that they are more constrained than other institutions, including public research universities, in their ability to raise tuition and private donations to replace declining public dollars. Community colleges in particular, with their “open door” mission, are reluctant to increase tuition and fees so as not to limit access. During the Great Recession, community college enrollment soared, and tuition increases did not fully compensate for the decline in public funding. Per-student revenues at broad-access public universities also declined.⁵ A 2012 survey by Sallie Mae found that families are increasingly seeking to cut college costs by choosing lower-cost institutions.⁶ In fact, during the 2011–12 academic year more than half of families eliminated more expensive institutions as options based on price even before applying. Because community colleges and public four-year master’s universities have the lowest tuition and fees, they will likely continue to draw students seeking more affordable access to higher education.

As the plethora of state and national initiatives related to college attainment indicates, increasing the number of graduates from broad-access colleges and universities while maintaining access and quality is of key social and economic importance. Yet how to accomplish that goal without additional resources—in effect, how to bend the cost curve down as mentioned in the article by Sandy Baum, Charles Kurose, and Michael McPherson in this issue—is far from obvious.⁷ In this article we review research for ideas on how to meet this challenge. Because of rising costs and funding constraints, we examine not just productivity—which measures how many degrees and credits institutions produce with a given amount of labor and other inputs—but also efficiency or unit cost, defined as the amount of resources spent to produce one graduate. Broad-access institutions would become more efficient by spending less to produce a graduate of equal quality.⁸ We also explore the strategies that broad-access institutions have used to improve productivity and efficiency in the past and what innovations and policy strategies hold promise for the future.

Measuring the Productivity and Efficiency of Postsecondary Institutions

The concept of productivity in postsecondary education is as elusive as it is important. In public discourse and to some extent in research the term “productivity” is often used interchangeably with “efficiency” and “cost-effectiveness,” though all have different meanings. Even seemingly concrete terms such as cost, expenditure, and tuition are frequently used in imprecise ways.⁹ And even when it is clearly defined, productivity in higher education is hard to measure, especially in the absence of clear ways to understand the quality of graduates produced.

As defined by a 2012 National Research Council (NRC) report on measuring productivity in higher education, productivity is the ratio of changes in output (degrees completed and credit hours passed) to changes in inputs (labor as well as nonlabor resources).¹⁰ The NRC report noted that inputs, in particular, are difficult to measure, in part because of data infrastructure constraints at colleges, which do not routinely and consistently collect data on fields of study, faculty use of time, and student effort.

Given the difficulty of measuring productivity as defined above, it is not surprising that it has rarely been attempted. The NRC report notes that because of varying missions, levels of selectivity, and the heterogeneity of inputs and outputs among postsecondary institutions, the measure is more appropriate for analyzing the performance of large groups of institutions than that of individual colleges and universities. A 2012 research review by Clive Belfield found only one study that measures it. According to Belfield, other studies claiming to measure productivity at four-year institutions in reality measure efficiency or unit cost—the cost of producing a graduate. Unit cost does capture productivity in that, faced with the same input costs, more productive institutions will have lower unit costs than less productive institutions.¹¹ Unlike productivity, however, efficiency also accounts for changes in the cost of inputs. For example, a factory that increases its shoe production from 100 to 150 pairs a day with the same inputs can be considered to have become 50 percent more productive. But if the cost of labor and other inputs also rises 50 percent, say from \$100 to \$150 a day, the factory is no more efficient, because it still costs \$1 to produce a pair of shoes. Because of the finite—and even declining—resources available to

broad-access public institutions, if they increase productivity without also improving efficiency, they will fail to achieve the goal that educators and policy makers seek—graduating more students at lower cost.

Some scholars point to structural barriers to improving productivity within higher education. Drawing on the work of economists William Baumol and William Bowen, some have argued that the primary reason for rising costs and lagging productivity in higher education is the difficulty of substituting capital for labor, as other industries do.¹² Because of this so-called “cost disease,” wages in education must rise to allow postsecondary institutions to compete to attract and retain talent with other sectors of the economy that employ highly skilled workers. At the same time, because postsecondary education is so labor-intensive and because colleges have not yet been able to develop and implement instructional technologies to substitute for teachers (to offset the rising cost of labor), they must raise prices. A competing hypothesis, “revenue theory,” holds that the difficulty colleges and researchers face measuring the quality of the products of higher education means that availability of revenues, not calculated need, drives spending levels.¹³ Recent research by Robert Archibald and David Feldman suggests that the cost disease has likely been the primary driver of the rising cost of higher education.¹⁴ By comparing changes in the cost of higher education with price changes in other industries from 1929 to 1995, they show that the trend in the cost of higher education (that is, cost for each full-time equivalent student) was very similar to the trend in the cost of personal services that depend on highly educated labor. Archibald and Feldman look at costs of higher education generally and do not disaggregate their findings by different type of institution. Jane

Wellman, however, sees the revenue theory as being more applicable for broad-access institutions, which face less competition for students and for faculty and receive a negligible share of revenues from private resources.¹⁵ Although Wellman’s argument is compelling, there is no definitive evidence about which theory is best suited to broad-access institutions.

In this article we follow the existing literature in focusing more on institutional efficiency, or unit cost, than on productivity (although we do discuss the latter). Measuring unit cost may be less difficult than measuring productivity in that it does not require measuring inputs, which can be highly variable (as with student ability) and substitutable (as when colleges use adjunct instructors instead of full-time professors).¹⁶ Measuring costs does, however, require confronting confusion surrounding definitions, inconsistencies in accounting methods, and the need to distinguish spending on different categories of students.¹⁷ Still, measuring costs is arguably easier for broad-access institutions than for research institutions, because of the additional complexities associated with measuring research costs.¹⁸ One final argument in favor of a focus on efficiency is that policy makers’ focus on the use of public resources leads them to be more receptive to conversations about unit cost than about productivity in the technical sense.

The Quality Conundrum

There is no commonly accepted method for measuring the quality of a college education, and efforts to measure productivity or efficiency in higher education are confounded by the challenge. Colleges are not more productive if they graduate more students but with weaker skills; they are more productive only if the added graduates have at least

equivalent skills. Similarly, measures of unit cost must be adjusted for quality of output, because a college or university that manages to reduce the cost of graduating students can be considered more efficient only if the less costly degrees produced are of equal or greater quality. Absent a clear way of measuring quality, using productivity or efficiency measures in accountability frameworks or as the basis for funding decisions risks creating perverse incentives. Using those measures without adjusting them for quality could lead institutions, for example, to reduce access for disadvantaged students because they are less likely to graduate. It could also lead to lower standards for passing courses and earning degrees or to credentials of limited value in education or the workplace. The NRC panel on measuring productivity in higher education warned that not addressing quality could spur a “race to the bottom.”¹⁹ Ultimately, then, our interest is in quality-adjusted productivity and efficiency.

Traditionally the quality of postsecondary institutions has been assessed by measuring the quality of the inputs, such as student readiness, faculty salaries, or student-faculty ratios. Efficiency and productivity measures depend on the quality of outcomes, rather than of inputs. More recently, efforts have been made to measure the quality of the *outputs* of undergraduate education. Such measures fall into four categories.

Standardized tests. One proposal has been to establish a uniform college exit exam to indicate quality. Some colleges are already using instruments such as the Collegiate Learning Assessment to measure how much students are learning. Some experts, however, argue that standardized tests are inadequate to measure the breadth of learning in college.²⁰

External certification. In some occupational fields, such as accounting and nursing, certification or licensure assessment systems established by industry or by professional groups can be used as an indicator of quality.²¹ Such certifications, designed to ensure that entrants to a field have the knowledge and skills they need, are, however, available only in a few fields, such as health care, manufacturing, mechanics, and information technology.²²

Learning outcomes standards. Over the past twenty years, standards stipulating the knowledge and skills that students are expected to master in a course or program have become a major focus of the higher education accreditation process. Precisely how to assess and provide evidence of student learning, however, remains uncertain.²³ A 2009 survey of college leaders by the National Institute for Learning Outcomes Assessment found that many undergraduate institutions have not fully adopted such assessments, although community colleges are more likely than selective and doctoral-granting institutions to have done so and to use them to improve instruction and allocate resources.²⁴ The Lumina Foundation is spearheading an effort (modeled on Europe’s “Bologna Process”) to develop degree profiles specifying what U.S. students should know and be able to do when they have earned a postsecondary credential at a particular level. That effort is still in the early stages, however, and until different institutions subscribe to a common set of learning outcomes, it will not be possible to compare quality and thus efficiency or productivity across institutions.

Earnings of graduates. Postgraduation earnings are a salient way of measuring the economic benefit of a college degree, and thus its quality. Until recently, linking the

earnings of graduates with their degrees has posed many challenges, including the limited availability of data spanning graduates' years in college and in the workforce, as well as the need to adjust for previous employment, field of study, region, and other factors.²⁵ A growing body of research on the returns to education links student educational records with Unemployment Insurance wage records, thus addressing some of these challenges. Such research makes it possible to assess the economic benefits of college credentials of particular types and in particular fields.²⁶

Not being able to measure quality consistently makes it difficult for college administrators and researchers to accurately gauge changes in efficiency and productivity in an institution—and among programs within an institution. For this reason, studies of efficiency or productivity generally assume that educational quality is constant across degrees. Some researchers maintain that because the readiness, or input, of students entering community colleges in particular has declined, the quality of graduates, or output, from these institutions may also have declined.²⁷ Others question that conclusion, arguing that the economic returns to a college education, whether from a two- or four-year institution, have remained positive for some time, indicating that in the aggregate the value of college degrees has not declined.²⁸ Community colleges and other open-access institutions are obliged by their mission to serve the students who come to them. Yet a decline in students' readiness does not necessarily translate into a decline in the quality of the education provided to students.

Although state governments and accrediting agencies play a part in monitoring quality, their role has been more to ensure a minimum level of quality than to differentiate

colleges by quality or to determine trends in quality of outcomes over time.²⁹ Accreditation agencies generally do not directly examine outcomes such as graduation rates or the quality of degrees. Still, state governments are showing signs of interest in motivating better performance by higher education institutions, though their efforts generally focus on performance measures such as completion rates and not on quality per se. Many states are also adopting or exploring policies to fund postsecondary education based on performance rather than on enrollment. States and independent organizations are building tools to allow consumers to compare institutions by graduation rates and other measures. The federal government too is trying to measure the returns to higher education and ensure a minimum level of quality. For occupational programs, the new “gainful employment” rule, discussed in the article in this issue by Andrea Venezia and Laura Jaeger, is an example of the federal government trying to measure employability and the returns to higher education to ensure a minimum level of output quality.³⁰

In what follows we examine trends in productivity and efficiency in broad-access institutions as well as strategies for increasing both. Until analysts are better able to answer questions about how to adjust for quality, these measures are best used with caution. In our conclusion, we consider how to ensure that broad-access institutions do not increase efficiency and productivity at the expense of quality.

Trends in Productivity and Efficiency among Broad-Access Institutions

Broad-access institutions are often considered efficient because of their comparatively low cost both to taxpayers and to students. In

Table 1. Completion Rates by Type of Postsecondary Institution

Institutional control	Type of institution	Graduation rate (percent)
Public	Two-year	20
	Four-year, overall	56
	Open admissions	29
	Less than 25 percent accepted	82
Private nonprofit	Two-year	55
	Four-year, overall	65
	Open admissions	36
	Less than 25 percent accepted	91
For-profit	Two-year	58
	Four-year	28

Source: Thomas D. Snyder and Sally A. Dillow, "Digest of Education Statistics, 2011," NCES 2012-001 (Washington: U.S. Department of Education, National Center for Education Statistics, 2011).

Note: "Graduation rate" is percentage of first-time, full-time students who complete in 150 percent of the expected time to complete a given program.

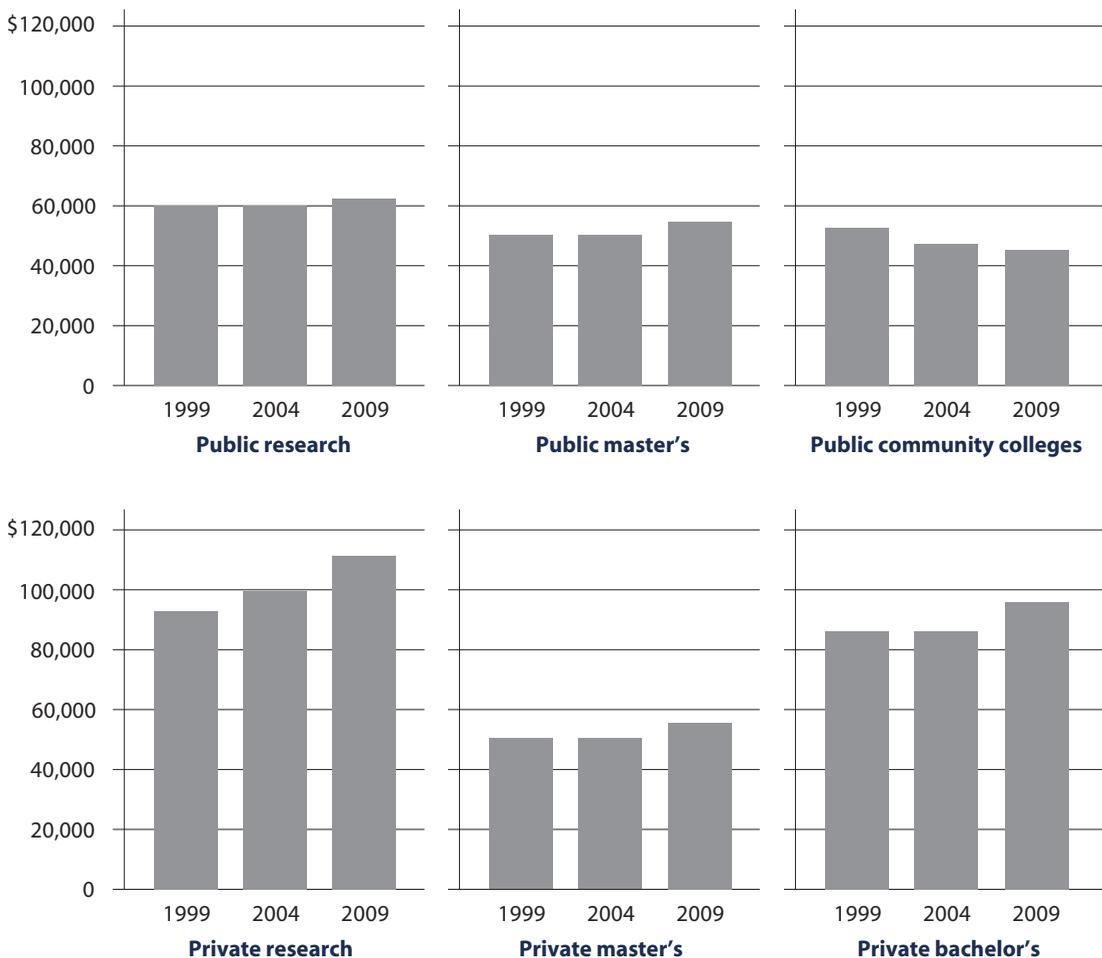
2009, public two-year colleges spent an average of \$10,242 per student on education and related expenditures (\$7,124 in state and local funding and \$3,118 in tuition), and public master's institutions spent \$12,364 (\$6,441 in state and local funding and \$5,923 in tuition). In comparison, public research institutions spent an average of \$15,919 (\$7,889 in state and local funding and \$8,030 in tuition) while private research institutions spent \$25,596.³¹ These two sources—state and local funding and tuition—together with financial aid make up the majority of resources available to broad-access institutions, while private institutions and research institutions typically have private donations and endowment income available as well.

Lower expenditures, however, do not necessarily translate into greater efficiency. While cost per *student* is generally the lowest at community colleges, the cost per *degree* is

not as low as one might expect. In 2009, public research institutions spent an average of \$65,632 per bachelor's degree; broad-access four-year institutions, \$55,358 per bachelor's degree; two-year colleges, \$73,940 per associate's degree.³² Differences across these sectors cannot be fully understood without looking at the underlying degree completion rates—in particular, the comparatively low degree completion rates at broad-access institutions (table 1).

Such comparisons, however, do not place a value on access for disadvantaged populations. In addition, comparing two- and four-year colleges on the basis of cost per degree is probably not fair given that two-year colleges produce credentials other than associate's degrees. Taking into account both certificates and diplomas reduces cost per completion for community college substantially—from \$73,940 to \$46,757 in 2009.³³

Figure 1. Average Education and Related Spending Per Completion, AY 1999–2009 (in 2009 dollars)



Source: Donna M. Desrochers and Jane V. Wellman, *Trends in College Spending, 1999–2009* (Washington: Delta Cost Project, 2011).

And even this adjustment does not account for either the value community colleges offer in providing general education courses to students seeking to transfer to bachelor's programs or the "option value" of trying out a postsecondary education.

Because our focus is on the prospects for improving productivity and efficiency, we are particularly interested in trends in measures such as degree production and cost per graduate. We turn to these next.

Trends in Degree Production

According to a 2011 report by the Delta Cost Project, broad-access institutions increased their output on a number of measures over the most recent ten years for which data are available. Between 1999 and 2009, they increased the total number of degrees and certificates they produced for each student attending, although quality questions and degree mix complicate the comparison.³⁴ For example, although community colleges in

particular made sizable gains, the largest gain was the substantial increase in the number of short-term certificates awarded.³⁵

Trends in Efficiency, or Unit Cost

That broad-access institutions increased their degree production over the past ten years does not mean they became more efficient in that they spent less per graduate. In fact, among public universities generally, spending per graduate *increased* during the ten years from 1999 to 2009, although the increases were less rapid among broad-access public universities than among public and private research universities (figure 1).³⁶ Among all types of postsecondary institutions, only community colleges spent less per completion (and even less if occupational certificates are counted) in 2009 than they did in 1999, although the average cost per community college credential has remained fairly stable since the 2001 recession. Belfield's in-depth study of cost efficiency among community colleges found that the average cost per completion among community colleges with an academic transfer focus declined by nearly a quarter (24 percent) between 1987 and 2008; average cost per completion among two-year public technical colleges declined by nearly one-third (30 percent).³⁷

No research has yet explained definitively why unit costs declined in community colleges and increased in public master's colleges at a lower rate than in research universities and private universities. A logical explanation, discussed in the article by Baum, Kurose, and McPherson in this issue and consistent with the revenue theory, is that amid declines in state and local funding, broad-access institutions were more constrained than public research institutions or private institutions in their ability to raise tuition.³⁸ Because of their mission,

the composition of their student body, and the priorities of legislatures in many states, broad-access institutions face pressure to keep student tuition and fees low. As a result, in 2009, community colleges spent less per student than they did ten years earlier on instruction and academic support, although per student spending on student services increased modestly.³⁹ During the same period, public master's universities increased their spending on instruction and academic support, but did so more slowly than did public research universities, which already spent considerably more on instruction and student support than did the less selective public universities and far more than community colleges.

As Wellman notes, in all states the share of state funding going to higher education has declined over time, and the trend is most pronounced in broad-access institutions.⁴⁰ Even so, these institutions have not reduced output in proportion to their losses in funding, and so appear to have become more efficient. If we assume that quality of output has remained constant, the trends in unit cost look promising. The lack of widely accepted measures of quality of the credentials awarded, however, makes it impossible to be sure whether efficiency has increased—or whether the budget-driven decreases in cost per degree (at two-year colleges in particular) have come at the expense of quality.

Strategies for Improving College Productivity and Efficiency

Given the limited understanding of the concepts of productivity and efficiency both among the public and among postsecondary institutions, it is perhaps not surprising that certainty about how to improve them is in short supply. Institutions can improve

performance either by increasing degree production with a given level of resources or by reducing the cost of producing degrees. Although broad-access institutions are able to do both, they have focused on the latter. Below, we review research on the effects of their cost-cutting measures and then examine the prospects for improving productivity and efficiency using other strategies.

Effects of Cost-Cutting Strategies

Both community colleges and public master's universities have increasingly relied on part-time instructors to control costs. At public two-year colleges, in fall 1992, 46 percent of the faculty was employed part time; by fall 2010, the share had risen to 70 percent. At public four-year universities, the share of part-time faculty rose from 12 percent to 37 percent during that interval.⁴¹ Though the only available research is nonexperimental (an experimental study would be extremely complicated to design), it offers reasons to think that greater use of part-time faculty may be harmful to productivity if not educational quality.

Several studies find that increased use of adjunct faculty is associated with poor student completion and transfer rates in two- and four-year institutions, although other research finds a small positive effect of using adjuncts, especially in occupational fields, such as allied health, information technology, and business.⁴² Moreover, one study provides evidence that switching from part-time to full-time instructors would be an efficient way to increase completion rates in both two- and four-year institutions, although the estimated gains for four-year institutions are less given their higher costs for full-time faculty.⁴³ For community colleges and broad-access universities, both of which have relied heavily on the use of part-time instructors to respond

to declining public funding and increasing enrollment, the implication is that rethinking their strategies could help them be more efficient and productive.

Another cost-cutting strategy that broad-access institutions have pursued for decades is to increase the number of students served by faculty. In fall 1999, the number of full-time equivalent (FTE) students per FTE faculty at community colleges was 18.4; at public four-year institutions, it was 14.5.⁴⁴ By fall 2009, these figures had risen to 21.7 at the former and 15.3 at the latter.⁴⁵ John Bound, Michael F. Lovenheim, and Sarah Turner found that between 1972 and 1992, mean student-faculty ratios fell among the top fifty public-sector universities and highly selective private institutions, while rising 14 percent in the public non-top-fifty sector and 40 percent in community colleges.⁴⁶

Bound, Lovenheim, and Turner estimated that increasing the student-faculty ratio by 1 percentage point would decrease degree completion by 4.0 percentage points in less-selective public four-year institutions, but only 0.5 percentage point in community colleges, where, they found, student characteristics have a larger impact on completion rates than institutional practices do.⁴⁷ Examining these findings in relation to estimated costs and prevailing efficiency levels, Douglas Harris and Sara Goldrick-Rab estimated that decreasing the student-faculty ratio would do little to improve cost per completion in community colleges. They found that reducing the student-faculty ratio would also not be cost-effective in four-year colleges generally, although the stronger effects estimated by Bound and his co-authors for less-selective public four-year colleges may make this strategy an effective way to improve efficiency in these institutions.⁴⁸

These studies suggest that the two common strategies used by such institutions to cut instructional costs—increased use of part-time instructors and increased student-faculty ratio—have done little to improve productivity and efficiency and could well harm both. How they affect the quality of graduates is unknown, but there is little reason to assume that they have improved it.

Strategies for Increasing Degree Production While Cutting Costs

The research cited above suggests that using more full-time instructors could actually increase productivity and efficiency in broad-access institutions and that lowering student-faculty ratios could have a similar effect, particularly in four-year institutions. Despite the plethora of student success initiatives being pursued by colleges and universities, surprisingly little rigorous research exists either on strategies for improving persistence and completion among students in undergraduate programs or on the cost-effectiveness of student success strategies. We next examine research on several different strategies, starting with discrete programmatic interventions and moving to more systemic reforms.

Programmatic interventions. Using existing studies to assess the cost-effectiveness of a wide range of strategies for improving student success, including college access programs, student services, and counseling, Harris and Goldrick-Rab found few programmatic interventions whose estimated effects on student completion justified their costs.⁴⁹ Only call centers, which contact struggling students to recommend assistance, were found to be cost-effective, although the effects on completion are, unsurprisingly, small. The benefits of some of the most common approaches to improving college access

and success, such as Upward Bound and enhanced student services, were found not to be cost-effective. While Harris and Goldrick-Rab focused on more methodologically rigorous studies of program effects, their analysis does not collect detailed cost data and instead relies on program budgets or data on average college spending to estimate costs. Thus the estimates of the impact on the cost per outcome of particular interventions may lack precision.

Remediation. The extensive use of remediation at community colleges and other broad-access institutions has raised the question of whether it can be delivered more cost-effectively. As discussed in the article in this issue by Eric Bettinger, Bridget Terry Long, and Angela Boatman, rigorous studies of the effect of remediation on completion have produced mixed results, with some studies finding no benefits and others positive effects.⁵⁰ Furthermore, other findings suggest that the impact of remediation varies by type of student. Depending on which set of findings one accepts, Harris and Goldrick-Rab estimate that the effect of remediation on the cost of completion is either zero or positive.⁵¹

As part of its multisite Opening Doors demonstration, the social science research organization MDRC conducted a rigorous study of another remediation strategy—a learning community program at Kingsborough Community College in Brooklyn, New York.⁵² In this one-semester program, cohorts of freshmen took three classes together and received enhanced counseling and tutoring as well as textbook vouchers. The study, which compared a group of students randomly assigned to the learning communities program with a control group who received Kingsborough's standard services and courses, found that the program increased

the proportion of students who earned a degree by 4.6 percentage points after six years. It also found the program cost-effective, with the cost per degree earned lower for the program group than for the control group. Another random-assignment study by MDRC of learning communities programs at six other community colleges, however, found them less cost-effective than the regular college services.⁵³ MDRC researchers argued that the Kingsborough model was more comprehensive than models examined in the other study and that it linked courses more strategically and provided enhanced support services.⁵⁴ They concluded that the positive impacts of the Kingsborough model may not be easily replicated at other institutions.

Online learning. Online learning is often mentioned in policy discussions as a way to increase access to higher education while also improving efficiency. But as Bradford Bell and Jessica Federman discuss in their article in this issue, research on the effectiveness of online learning is mixed.⁵⁵ While some types of online learning may be more effective than face-to-face instruction for some learners, recent studies suggest that academically underprepared students of the sort frequently served by community colleges and other broad-access institutions generally do worse in online courses than in those where instruction is face-to-face.⁵⁶ For online courses to work for poorly prepared students, colleges would need to rethink how they are designed and delivered and provide stronger supports for students. Whether that can be done cost-effectively and thus fulfill the promise of online learning to improve access to quality postsecondary education at a reduced cost remains to be seen. As noted by Bell and Federman, most practitioners believe that the substantial start-up costs and ongoing

costs of coordination and technical support make online courses at least as expensive as traditional ones.

Course redesign. The approach taken by the National Center for Academic Transformation (NCAT) to help faculty at scores of colleges and universities redesign courses using instructional technology and labs or studios may be effective in reducing the costs and improving outcomes in individual courses, particularly large lecture courses. NCAT has reported positive results, including both reduced course cost and improved student learning and course completion. Based on its initial work with thirty institutions, NCAT reported an average cost savings of 37 percent (ranging from 20 percent to 77 percent). Of the twenty-four institutions that measured course completion, eighteen showed increases.⁵⁷ The NCAT approach, however, has not been rigorously evaluated by outside researchers.

Redesign of instructional programs and services. Whether the NCAT course-redesign model translates into increased completion and reduced costs (and thus increased efficiency) of entire academic programs and institutions is unclear. Research on organizational effectiveness in and outside of higher education suggests that no one innovative practice or even set of practices can bring about improvements in organizational performance, that such practices must be implemented in a coordinated, complementary way and at a substantial scale.⁵⁸ The implication is that colleges and universities will have to fundamentally redesign the way they structure and manage programs and support services. Observational studies by Patrick Terenzini, Hyun Kyoung Ro, and Alexander Yin find that the way in which colleges organize and manage instruction and student supports

has a strong effect on student learning and persistence that is independent of student characteristics and the type of institution in question—verifying that organization matters for performance.⁵⁹ Other observational studies find that colleges and universities that are more effective in graduating students align their policies and practices generally to facilitate student completion.⁶⁰

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Research on community colleges in particular finds that their practices are often not well-aligned to facilitate completion. Students face a confusing maze of bureaucratic processes and a plethora of course and program choices, often with little guidance.⁶¹ Drawing on principles from behavioral economics, Judith Scott-Clayton argues that students who come poorly prepared for college would be more likely to complete a program with a more limited set of options and clearly defined and prescribed pathways leading toward further education and career advancement. Creating

more structured, well-aligned programs could accelerate completion by “mainstreaming” students needing remediation directly into college courses with added supports and prescribing course sequences to prevent students from taking unnecessary courses.

To date no rigorous studies have examined the cost-effectiveness of creating such programs. Some institutions have nevertheless attempted this approach based on the behavioral economics research cited above and on nonexperimental findings that students who enter a coherent program of study sooner are more likely to graduate.⁶² Their hypothesis is that redesigning programs to help students progress more quickly and take fewer courses that do not count toward a degree will decrease cost per completion and thus increase efficiency.

Studies of organizations both inside and outside of higher education signal that the major changes in practice and culture involved in such systemic reforms require close faculty and staff involvement.⁶³ Broad-access institutions cannot easily engage faculty in major change efforts, in part because many work part time and may have little time beyond their teaching to participate in such college activities. Studies provide little guidance on how to engage part-time faculty and other personnel in reforms, making this an issue ripe for further research.

Policy Incentives for Institutional Improvement

Substantially improving postsecondary productivity and efficiency will likely require fundamental changes in the organization and culture of broad-access institutions. Leading such an effort is difficult and risky for college leaders because of uncertainty over whether it will succeed. Although some institutions

and state systems have undertaken initiatives to improve productivity on their own, other colleges and universities may need outside pressure and incentives to do so. Because public two- and four-year institutions are funded primarily based on enrollment, they have few incentives to improve completion rates except insofar as it helps in recruitment. Policy makers therefore have few direct levers for improving outcomes such as degree completion.

There is some evidence that market mechanisms will also be insufficient to motivate broad-access institutions to improve. Compared with their middle- and high-income peers, low-income students lack access to advising and information that can help them prepare for college and make well-informed decisions about which college to attend.⁶⁴ They are thus more likely to confine their college search to broad-access institutions even if their academic performance qualifies them to attend more selective colleges.⁶⁵ They are also more likely to choose a college close to home. Indeed, proximity to college is known to affect students' decision to attend college.⁶⁶ At least two studies find that, controlling for student background, proximity to college has a greater effect on college enrollment for children of less-educated parents than for other children.⁶⁷ Because broad-access institutions already enroll the majority of undergraduates, it is unclear whether most students have any real alternative to the college they attend, because they are often choosing between attending a broad-access institution or not going to college at all.

Spurred to improve college completion while limiting college costs, state and federal policy makers are exploring new approaches to motivating colleges to improve performance.

State Performance Funding

State lawmakers determined to get the most out of every tax dollar have used performance funding as one tool to improve postsecondary institutional outcomes. Performance funding differs from traditional enrollment-based funding in that it shifts the basis of funding from educational inputs to outputs that reflect state priorities. Specifically, some states fund colleges and universities based not on how many students they enroll, but at least in part on how many they graduate, transfer, or place in jobs. Performance funding policies are often linked with efforts to make transparent and comparable measures of college performance more readily available to the public. Tennessee was the first state to adopt performance funding and reporting policies for higher education in 1979. Since then twenty-five states, including Ohio and Washington, have adopted such policies in an

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attempt to increase the performance of public institutions, although some have since revised or dropped their policies.⁶⁸

There are at least three theories about why performance funding might motivate colleges to improve outcomes.⁶⁹ One is that such funding spurs colleges to improve performance to gain increased funding in much the way the profit motive drives private businesses. A second theory is that performance funding improves institutional performance by increasing colleges' awareness of the state's higher education priorities and their awareness of their own performance with respect to these priorities. A third is that such policies increase competition among colleges and capitalize on their desire to rank well against their peers.

To date, most research on performance funding has been qualitative in nature. Findings suggest that performance funding incentives for colleges and universities have fallen short of their goals.⁷⁰ Interviews with college leaders provide some evidence that performance funding helps to raise awareness about state priorities among educators but little evidence that it has led to any substantial changes in institutional practice or effectiveness.⁷¹ Although the policies may have increased top administrators' attention to their institution's performance, the heightened attention has not translated into the systemic reforms in instruction or student services necessary to improve student learning and completion substantially.⁷²

Policy researchers have advanced a variety of explanations for the shortfall.⁷³ One is that performance funding policies have sometimes been designed with little involvement by college educators, who may not embrace the definitions of performance reflected

in the chosen metrics. Policies that reward completion alone are especially unpopular with educators at broad-access institutions, who fear that such policies would encourage broad-access institutions to turn away from their historic mission to serve underprepared students who are less likely to succeed and therefore more costly to serve.

In 2006, the Washington State Board for Community and Technical Colleges adopted a performance funding policy that attempted to address this shortcoming by rewarding colleges for increasing the rate at which students achieve key intermediate milestones across the full spectrum of students' pathways through college, including those who enter needing remediation.⁷⁴ Students reaching those milestones—completing a college-level math course, for example, or earning a specified number of college credits in a given program—are known to be more likely to complete a degree or credential. Other states have adopted or are considering adopting similar performance funding measures for community colleges.

Another reason for the limited effects of performance funding policies on institutional practice and performance is that they have often been financially unstable and unsustainable.⁷⁵ Proposals to carve performance funding from college base budgets are generally met with stiff political resistance. But funding systems that rely on "new" bonus money often fall victim to budget cuts as institutions fight to protect their base budgets at the expense of special funding streams.⁷⁶ Such struggles make it difficult for administrators to plan and execute initiatives intended to improve performance. If the policies are to work as intended, performance incentives must be predictable and sustainable over the long term.⁷⁷

Perhaps the most important reason performance funding has fallen short of expectations is inadequate investment in it. In interviews, college leaders frequently say that the funding at stake has generally been too small to motivate institutions to change.⁷⁸ The share of state appropriations tied to performance funding has generally been less than 5 percent.⁷⁹ As a result, some states have recently begun to consider allocating larger shares of the total appropriations by institutional performance. By 2014, Ohio, Indiana, Louisiana, and Tennessee will each tie at least 20 percent of their appropriations to outcomes.⁸⁰ Tennessee will lead the way with 80 percent of unrestricted state appropriations (which translates into approximately about a quarter to a half of the operating budgets of public two- and four-year colleges in the state) based on student outcomes.

The Tennessee program represents a fundamental shift in the focus of higher education funding formulas from enrollments to persistence and completion. The state will monitor performance by examining such outcomes as student credit accumulation, remedial and developmental success, transfers with at least twelve credit hours, degrees awarded, six-year graduation rates, and job placement. In addition, institutions would be eligible for a 40 percent bonus for credit and degree completion for low-income students and adult learners.⁸¹ The policies in Tennessee, Indiana, and other states will be closely watched to see if they have the intended impact on institutional behavior—and, if so, how much funding is necessary to motivate institutions to undertake fundamental changes in practice that research suggests are needed to improve performance.

Federal Performance Incentives

Perhaps because of the popularity of performance incentives among states, the federal government has also explored their use. For example, in 2012, the Obama administration proposed a series of postsecondary policies, including “Race to the Top for College Affordability and Completion,” designed to reward colleges for being more affordable, effective, and consumer-friendly.⁸² The key postsecondary policy lever for the federal government is the financial aid, including Perkins loans, work-study funds, and supplemental grants for low-income students, that it gives directly to institutions. Changes made in 2011 to federal regulations governing eligibility for Pell grants, such as the more rigorous definition of “satisfactory academic progress,” may also encourage colleges to push students to complete college programs more quickly. Based on states’ experience with performance incentives, the success of the federal policies may depend on the amount and predictability of the funding available and on how well the performance measures are aligned with the mission and goals of the institutions they are designed to motivate.

Conclusion

Achieving national goals for college completion in a time of scarce resources will require efforts to improve productivity and efficiency in the institutions that enroll the majority of undergraduates: broad-access public colleges and universities.

Measuring productivity and efficiency in higher education is complicated. To measure productivity, it is necessary to collect data on the inputs of higher education—not only faculty and staff labor but also student ability and effort. This is a daunting task. Efficiency or unit cost is somewhat easier to measure

than productivity. Unit costs appear to have declined in community colleges and to have risen more slowly in broad-access public universities than in other postsecondary institutions. The likely explanation is that because tuition increases conflict with these institutions' broad-access mission, they have sought to reduce spending rather than raise tuition unduly to make up for cuts in state and local funding.

Research indicates that the strategies broad-access institutions have relied on in the past to cut costs—in particular, the use of part-time instructors and increased student-faculty ratios—may in fact reduce productivity and efficiency. What is more, the little evidence available suggests that some of the most popular strategies for improving college success are not cost-effective. New strategies to cut costs and improve college success are therefore imperative. Research on the effectiveness of both college remediation and online learning is mixed, with some studies finding positive effects for certain groups of students and others finding none. Thus it is premature to say whether such strategies lead to greater productivity or efficiency.

Although many policy makers believe that redesigning courses to make use of instructional technologies will lead to better outcomes at lower cost, evidence on that strategy too is mixed (see the article on e-learning by Bradford Bell and Jessica Federman in this issue).⁸³ Moreover, research on organizational effectiveness in and outside of higher education indicates that colleges whose goal is to improve *program* completion without harming quality and increasing costs must go beyond redesigning courses and instead change the way they organize and manage programs and support services along the student's "pathway" through college.

Studies of community colleges in particular suggest that they might be able to improve productivity by creating more structured and prescribed programs of study. Through initiatives such as the Gates Foundation-funded Completion by Design, a growing number of community colleges have begun to test this hypothesis. These colleges are creating more clearly defined and prescribed programs and aligning them with requirements for further education and employment. They are also building "on ramps" to help students choose a program of study and customizing instruction in foundation skills to students' chosen program. Longitudinal student record data and department cost data make it possible to measure the costs incurred as students progress along their pathways through college. Such data also make it possible to calculate the cost per completion for students in particular groups, giving colleges a tool for measuring the effect on unit cost of efforts to systemically redesign programs and services. The cost of implementing these reforms is not yet known, however; even if they do improve productivity, they might not lead to lower cost per completion.

Because the prevailing enrollment-based approach to funding offers little incentive for public postsecondary institutions to make major changes in practice and culture, policy makers in many states have enacted policies that tie funding to performance. Studies suggest that such policies have had little impact on college practice to date, perhaps in part because, until recently, they have been meagerly funded. By 2014, four states will tie at least 20 percent of their state appropriations for undergraduate education to outcomes. If sustained, these efforts will make it possible to learn whether and how much performance funding can change college practices.

As policy makers push colleges to lower the cost per graduate, they must take care to avoid unintended consequences. Cutting costs without measuring the quality of the credentials produced risks giving colleges incentives to lower program standards or to curtail programs such as nursing, for which there is strong labor market demand but which are costly to offer.

As yet, there are no commonly accepted methods for measuring quality of outcomes in higher education, even within particular sectors. As the 2012 National Research Council panel on productivity in higher education concluded, efforts to develop measures of quality that can be compared across institutions are likely to be long in coming to fruition.

In the meantime, policy makers and institutions could advance the discussion of quality by stepping up efforts to measure the economic returns to credentials. As noted, research on the returns to college credentials has begun to take advantage of state data that link student educational records to labor market outcomes using Unemployment Insurance wage records. These studies make it possible to look at the outcomes of specific institutions and even particular programs within those institutions. Colleges in states where such data are not available might be able to rely on more general research on the returns to particular types of credentials in specific fields as proxies for their quality.

Although studies of the returns to education do not measure what students are learning, they do gauge the economic value of the education students are receiving and the credentials they earn. Such a quality measure is meaningful to students, policy makers, and the public and, indeed, can be

used to calculate the return on the investment in higher education by students and by taxpayers. Efforts to measure the returns to a college education should not be confined to employment outcomes, but should also examine students' success in pursuing further education. Preparing students to move to and succeed in education at the next level not only helps to further student learning, but also has economic value both for students and for the public. It is now possible to follow students as they move from one postsecondary institution to another, thanks to databases such as the National Student Clearinghouse, which tracks student enrollment and credentials earned. Such information can be supplemented by transcript-level data for students in public systems maintained by many states.

Although labor market returns and further education outcomes are valuable metrics, they are not by themselves adequate measures of the quality of a college education. Colleges and universities must continue and even redouble efforts to define learning outcomes and measure student mastery. Such data would be useful to let students and other stakeholders know what students are learning and to help faculty determine how to improve instruction. At the same time, measuring labor market returns and further education outcomes can go far to help address the expectations of policy makers and taxpayers that the public and private investment in higher education is worthwhile and can help demonstrate that efforts to raise completion rates and reduce the cost of completion are succeeding without sacrificing quality. This in turn might give space to college educators to achieve their goal of ensuring that students not only complete programs in a cost-effective way, but are learning in the process.

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