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FOR PUBLIC POLICY RESEARCH

**Graduation Rates at America's Universities:
What We Know and What We Need to Know**

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At first glance, it may seem relatively straightforward to meet President Obama's goal that "by 2020, America will once again have the highest proportion of college graduates in the world."¹ After all, the United States led the world in educational attainment for generations. According to the most recent figures, 55- to 64-year-olds in the United States are more educated than their counterparts in every other OECD country, with a postsecondary attainment rate six points higher than the next-place countries (30 versus 24 percent).² But this dominance slowly eroded over time. Americans in the 45-54 age group were also the most educated, but only two points ahead of the Netherlands and Norway. The next youngest Americans, those ages 35 to 44, lagged only behind the Norwegians in terms of postsecondary attainment, and only by a percentage point (34 versus 33 percent).

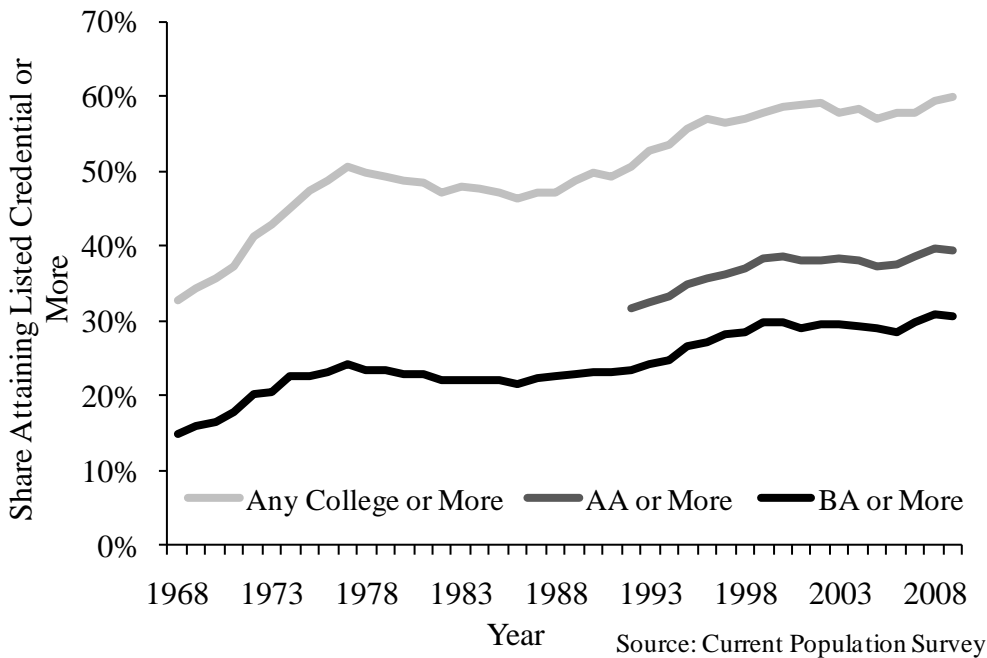
The current generation of young Americans—those ages 25 to 34—is in a three-way tie for seventh place among the OECD countries, with an attainment rate fully ten percentage points behind Norway, the world leader (31 versus 41 percent). There are five countries with attainment rates only one or two points lower than the U.S., all of which have made substantial gains in recent years. Most notable is Poland, which in less than a generation increased the share of its population with a college education from 18 to 30 percent. The U.S. is one of only two out of the 30 OECD countries that has fewer college graduates among its 25- to 34-year-olds than among the 35-44 age group.

The U.S. has not only lost its dominant position in the world—our stagnation coupled with the rapid progress being made by other countries means that we are quickly slipping towards the bottom of the list. In order to meet President Obama's goal, in a single decade the U.S. would need to reverse the current trend and increase the share of young people that earn college degrees by at least one third and perhaps by one half or more, from its current level of 31

percent.³ Such an increase is not unprecedented—bachelor’s degree attainment increased by approximately this amount from the late 1960s to the late 1970s, although on a substantially smaller initial rate of 15-20 percent, as shown in Figure 1.⁴ There were also steady (albeit more modest) gains from the late 1980s to the late 1990s, when BA attainment rose from 22 percent to its current level of about 30 percent.

Figure 1 also shows that only about half of Americans age 25-29 that start college earn a bachelor’s degree (another 15 percent earn an associate’s degree), a ratio that has remained more or less unchanged for decades. The 30 percent of Americans who start college but never finish are an obvious pool of candidates who might be converted to college graduates. The main purpose of this paper is to review what is known—and what is not known—about how institutions of higher learning might increase their graduation rates.

Figure 1. Educational attainment of 25- to 29-year-olds, 1968-2009



Colleges and universities are certainly not the only important players in efforts to increase educational attainment. The college enrollment rate in the U.S. lags behind that of several other countries, and there is surely great progress to be made in the academic preparation of students in elementary and secondary schools.⁵ Efforts to graduate more students from high school and to improve the skills of high school graduates clearly need to continue, but that does not mean that postsecondary institutions get a free pass until those efforts succeed. In this paper I will review the evidence that there are opportunities for colleges and universities to increase their productivity. Research on specific strategies aimed at improving graduation rates is much more limited, and has focused on relatively modest changes that tinker at the margins as compared to more fundamental reforms. In my view this reflects a need for more research and not a lack of opportunities for institutional improvement.

An important theme I will return to later is that improvements cannot be costly, especially in the current fiscal environment. Institutions of higher learning need to learn to do more with less—that is, they need to increase their productivity. An important new paper by Douglas N. Harris and Sara Goldrick-Rab makes the argument that proposed policies and programs need to be considered in terms of both their costs and their benefits.⁶ They carefully summarize a large number of studies and estimate cost-benefit ratios for each one, an exercise that I will not repeat here but one that should be conducted in every study and not left for readers to try to sort out on their own.

The primary aim of this paper is to review the lessons learned from the relatively small number of high-quality studies of the factors that shape college graduation rates and discuss some promising areas for future research. I focus mostly on institution-level factors—those that are (theoretically, at least) within the control of the institution. However, I begin with a related

but distinct question: could overall attainment be substantially improved by improving the “match” quality between students and the colleges they attend? If the answer is “no”—that is, moving some students to more selective colleges and others to less selective colleges does not improve overall attainment—should we expect colleges to be able to do better with the existing stock of students? In recent years there have been calls to fund public universities based at least in part on the number of students they graduate (rather than solely based on enrollment), but do we even know how institutions could improve their performance in response to such incentives?

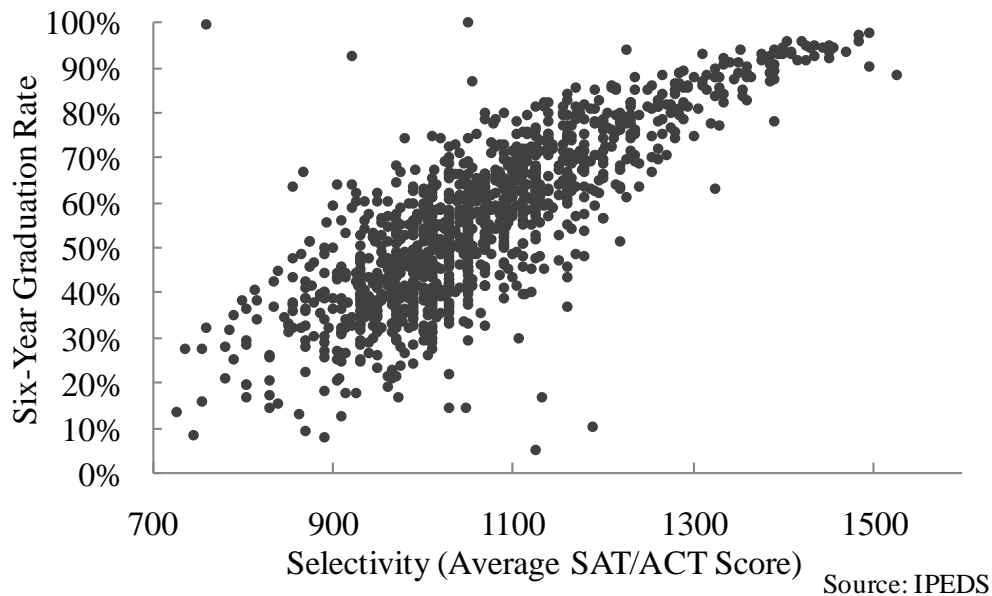
Institutional Selectivity and Student-College Match

There is consistent, strong evidence that institutional selectivity is strongly correlated with—and causally linked to—graduation rates. Students that attend more selective institutions are more likely to graduate than students who attend less selective institutions. The simple (unadjusted) relationship between graduation rates and selectivity (as measured by average SAT/ACT scores) is depicted in Figure 2.⁷ On average, a 100-point in average SAT/ACT score is associated with a six-year graduation rate that is 11 points higher. Additionally, there is not a large amount of variation in graduation rates among institutions with similar SAT scores (that is, the data points in Figure 2 are fairly tightly clustered around a line). There simply are not many unselective institutions with high graduation rates or highly selective institutions with low graduation rates.

Of course, students that attend institutions with higher average test scores are better prepared academically (on average) and thus are more likely to graduate regardless of where they go to college. It is not possible to compare the graduation rates of students with similar test scores at different institutions using institution-level data such as the Integrated Postsecondary Education Data System (IPEDS) data on which Figure 2 is based, but my coauthors and I were

able to do exactly that using student-level data in a study of graduation rates at public universities.⁸ We found the same selectivity-graduation relationship, even after controlling for students' academic preparation (test scores and high schools grades). For example, among students with a high school GPA of at least 3.5 and SAT/ACT score of at least 1200, 89 percent graduated at the most selective universities but only 59 percent of these well-qualified students graduated at the least selective universities.⁹

Figure 2. Graduation rates versus selectivity (N=1,219)



Numerous other studies have shown that students that attend more selective schools benefit from doing so—in terms of future earnings, in addition to graduation rates—including studies that employ more rigorous quasi-experimental designs.¹⁰ Of course selectivity only varies across institutions that are selective. By definition, open access institutions cannot vary in terms of their selectivity.¹¹ Among college-going students in a nationally representative survey, 5 percent attended nonselective four-year institutions and 38 percent attended two-year colleges (most of which are nonselective).¹² It certainly matters whether a student starts at a two-year or a

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four-year institution—bachelor’s-degree-seeking students who start out at two-year institutions are substantially less likely to earn that degree (or any degree, including an associate’s, for that matter) than similarly qualified students that start out at a four-year institution (even one that is not very selective).¹³ This finding holds even among students with the weakest academic credentials, who might be expected to benefit from the less demanding environment of a community college.¹⁴

An important implication of the institutional effects literature is that where a student goes to college has enormous consequences for his or her chances of success at earning a degree. Recent evidence that academically talented students from low-income and less-educated families are much less likely to attend a more selective college than their more advantaged peers partly explains the troubling gaps in educational attainment by socioeconomic status that are so pervasive in the U.S.¹⁵ Efforts to mitigate disparities in the college choices of similarly prepared high school graduates are clearly warranted on equity grounds alone, but what impact could such programs and policies have on the overall bachelor’s degree attainment rate?

In order for policies aimed at improving college match quality to have a positive impact on overall attainment while holding the number of places at each institution constant, it would have to be the case that low-SES (socioeconomic status) students benefit more from attending a more selective college than high-SES students. This is because encouraging well-qualified students who would otherwise attend less selective institutions to attend more selective universities means that students who would otherwise have attended the more selective universities will be displaced and have to attend less selective institutions.

The evidence on this point is limited, but University of Washington economist Mark C. Long presents evidence that low-SES students benefit disproportionately from attending a higher

quality college in terms of the likelihood that they will earn a bachelor's degree. Specifically, using data from the National Education Longitudinal Study (NELS) he finds that a one standard deviation increase in a college quality index is associated with increases in bachelor's degree attainment of 4, 10, and 15 percentage points for high-, middle-, and low-SES students, respectively.¹⁶

This finding suggests that a modest reshuffling of the college choice deck could improve overall attainment, but by how much? To get a rough sense of the answer to this question, I performed a simple simulation using the NELS data. First, I classified the first postsecondary institution each student attended into the following selectivity categories from Barron's College Admissions Selector Ratings: most or highly competitive, very competitive, competitive, less competitive, and noncompetitive.¹⁷ These categories only apply to four-year institutions, so I created a separate category for students who first attended a two-year institution. Second, I sorted students according to a measure of their academic preparation and then assigned them to the type of college that they would have attended if college choices were made solely based on this measure and the share of students attending each type of college remained exactly the same.¹⁸ For example, 7.7 percent of college entrants attended a four-year college in the most or highly competitive category, so in the simulation I assigned the 7.7 percent of students with the highest values of the academic preparation index to this category.

Third, I estimate the relationship between bachelor's degree attainment rates and the category of college attended, controlling for high school GPA and the standardized test score. I estimate this relationship separately for low-, middle-, and high-SES students in order to allow the college selectivity effect to vary.¹⁹ Finally, I predict each student's probability of earning a bachelor's degree *if they had attended a college in the selectivity category determined only by*

*their academic qualifications.*²⁰ The average of this probability is the simulated bachelor's degree attainment rate in a world where students' college-going decisions are only affected by their academic qualifications.

The results of the simulation show, as we would expect, a modest drop in disparities in bachelor's degree attainment rates—the adjusted gap (controlling for test scores and grades) between low- and middle-SES students falls from 8 to 6 percentage points, and the gap between high- and low-SES students falls from 27 to 21 points. But the overall bachelor's degree completion rate (among students who attended college) barely budes at all—the simulation indicates an increase of just 0.2 percentage points, from 32.8 to 33.0 percent. This small change likely results from the fact that low-SES students are disproportionately unlikely go to college at all, and even less likely to have the qualifications necessary for admission to a selective university. So while improvements can and should be made in the college choices of talented low-SES students, the pool is just not large enough to have much of an impact on the overall attainment rate.²¹

This simulation is admittedly crude, but because my estimate of the simulated change in the overall attainment rate is so small, even quadrupling it (from 0.2 to 0.8 percentage points) would still yield a similar conclusion: desirable as it is to improve college match quality (particularly among disadvantaged students), this strategy likely will not yield payoffs in terms of the overall bachelor's degree attainment rate. The numbers of affected students simply are not large enough.²²

Given that improving student-college matches appears unlikely to significantly boost the national bachelor's degree attainment rate, a natural question to turn to is whether institutions can improve the graduation rates of the students that they are already enrolling. Is there room for

institutions to educate students better, rather than just trying to recruit better students? How much (or little) is known about strategies that boost graduation rates?

Institutional Characteristics and Policies

One interpretation of Figure 2 is that individual institutions do not have much control over their graduation rates if the characteristics of the student body are taken as fixed (and graduation requirements are not relaxed). After all, 71 percent of the variation in six-year graduation rates is explained by a single variable: the average SAT/ACT score of the entering freshmen class. Add student gender, race/ethnicity, and age and whether the university is public or private into the mix and that statistic jumps to 82 percent.²³

This view—that institutions are doing about as well as could be expected given their student bodies—is likely incorrect for two main reasons. First, there is still a fair amount of variability in graduation rates even after controlling for these variables—the standard deviation of institutions' divergence from their predicted graduation rates is seven percentage points.²⁴ Second, interpreting the data in this way is probably misleading because measures of student body quality such as average SAT/ACT scores are strongly correlated with other institutional characteristics. For example, average test scores and instructional expenditures per full-time equivalent (FTE) student are positively correlated ($r=0.84$) meaning that it is not just the average quality of the student body that explains so much of the variation in graduation rates in Figure 2. Variation in how much institutions spend on student services could also shape graduation rates. Higher average SAT/ACT scores are also associated with higher expenditures per FTE on student services ($r=0.37$) and academic support ($r=0.48$). These are factors that are clearly

within the control of the institution (or the legislative body overseeing it, as in the case of many public universities).

The conundrum is that while we know that the average student is best off going to the most selective college that will admit them, the research tells us nothing about *why* a student is more likely to graduate from a more selective university. Is it because the other students are highly qualified and there are high expectations that students will graduate? Or is it because more selective universities also tend to spend more educating their undergraduates? Or yet some other factor that is associated with both selectivity and graduation rates?

This gap in our knowledge is partly rooted in how difficult it is to document the causal effect of a given policy or institutional characteristic with existing observational data. For instance, although it is straightforward to estimate the relationship between graduation rates and factors such as spending in various categories while holding student characteristics constant, the fact that these variables are associated with both each other and the student characteristics (not to mention unobserved differences across institutions) means that it is difficult to tease out their various *causal* effects. The bottom line is that it is difficult, if not impossible, to make credible inferences about the causal effects of institutional policies using traditional cross-sectional methods.

This does not mean that analyses of institution-level datasets such as IPEDS are not worthwhile. For example, a recent study used IPEDS data to examine whether certain categories of spending are more strongly associated with graduation rates than other categories.²⁵ The authors found that, on average, marginal changes in student service expenditures were more strongly associated with graduation rates than were similar marginal changes in instructional expenditures, especially at less selective institutions. It is not clear that these results should be

interpreted as causal, given that they are based mainly on comparisons across institutions that may differ in other (unobserved) ways.²⁶ However, these results raise several interesting questions, such as: what types of student service spending are particularly productive and what instructional expenditures are less productive? They also suggest that future research on the potential for productivity gains in higher education might benefit from focusing on less selective institutions.

One topic where studies with different methodologies have produced different results is the effectiveness of full- and part-time faculty. Two studies using institution-level data found that employing a greater share of part-time, adjunct, or non-tenure-track faculty is associated with lower graduation rates at both four-year colleges and community colleges.²⁷ However, another study that used student-level data from Ohio and exploited variation in the composition of departments' faculty over time found an apparently opposing result: adjuncts often have a small positive effect on the number of courses the student takes in a given subject, particularly in fields tied to particular occupations.²⁸ These studies differ in several ways besides methodology that might explain the divergent results, including context, the level of aggregation of the data, and the outcome measures examined. But the broader point is that using methods that do not allow for strong causal inferences coupled with data at a high level of aggregation make it difficult to make specific policy recommendations. For example, the results of the Ohio study might justify hiring more adjuncts in certain fields but such a precise course of action could not be drawn from either of the two studies that used institution-level data.

There are a handful of rigorous (experimental or quasi-experimental) studies on three general types of policies that might affect graduation rates: pricing and financial aid, student

support services, and remediation. I will briefly review some of the key lessons that emerge from these studies, without any presumption of being comprehensive.

It is not surprising that increasing grant aid (that is, reducing the cost of college) causes more students, particularly those from low-income families, to enroll in and complete college.²⁹ But marginal changes in costs are just one part of the college dropout story, and not a large one perhaps due to existing aid programs such as Federal Pell grants. Even programs that make college free have no more than a modest impact on graduation rates.³⁰ A less obvious lesson than “money matters, but not enough to solve the dropout problem” is that the way that aid is provided can matter just as much as, if not more than, the amount that is provided. A recent randomized experiment showed that helping lower income families complete the Free Application for Federal Student Aid (FAFSA) increased the odds that their children would enroll in college the following fall, suggesting that the sheer difficulty of filling out the FAFSA was an impediment to families eligible for need-based aid.³¹ An evaluation of West Virginia’s PROMISE scholarship program, which only provides aid to students as long as they maintain a full-time course load, found that this policy not only increased bachelor’s degree attainment but also decreased time-to-degree.³²

Studies of student support services have found that these programs often are most effective when coupled with financial incentives. A large Canadian university offered students support services or financial incentives for earning a target GPA, or a combination of both as part of a randomized experiment (which also included a control group). Neither the support services nor the financial incentives had consistently positive effect in isolation, but the combined treatment had a positive effect on the academic outcomes of women (but not men).³³

Elements of this program were also part of MDRC's Opening Doors initiative, a randomized experiment conducted at six community colleges. On top of receiving services and additional financial aid (which was often tied to behaviors such as making use of services or earning a certain GPA), students were part of "learning communities"—small groups of entering students that took classes together. The results from many of the campuses were promising. For example, program participants in New Orleans (who, in addition to participating in learning communities, were offered \$1,000 per semester if they enrolled at least half-time and maintained a C average) were 18 percentage points more likely to remain enrolled the following semester.³⁴

The final area where there are multiple high-quality studies is remediation, whereby students deemed academically underprepared for college are encouraged or required to take supplementary courses (without receiving college credit) before they begin college-level work. Two studies, one of community colleges in Florida and the other of both two- and four-year colleges in Texas, measure the causal effect of remediation by comparing students right around the cut score in the exam used to place students in remedial courses.³⁵ It is more or less random which students score just above the cutoff (and thus are not placed in remedial courses) and which students score just below the cutoff (and are placed in remedial courses as a result). As a result, the causal effect of remediation can be calculated as the average difference in college outcomes between students just above and just below the cutoff. Both studies find few benefits of remediation, and some evidence of negative effects (perhaps resulting from students being discouraged by having to take remedial courses).³⁶

What We Need to Know

So what do we know about successful strategies for improving graduation rates? A relatively small number of high-quality studies yield credible evidence about the effectiveness of a handful of policies, such as financial aid, student support services, and remediation. More generous aid that is better targeted (and tied to academic progress) has positive effects, as do student support services coupled with financial incentives. Remediation probably has few positive effects, and may have some negative effects, despite being quite costly.

Based on this evidence, a university might reallocate some resources away from remediation and toward incentive-based aid and student services. Such an approach might well make a difference, but it is hard to imagine that tinkering at the margins is going to result in substantial increases in graduation rates. And costly policies that require an increase in overall spending are going to be extremely difficult to pursue in the near future, as institutions continue to weather the recent economic recession. In the words of Harvard education professor and Gates Foundation official Thomas J. Kane, “public higher education must learn to do more with less... we must fundamentally rethink the function, pricing, and operation of public colleges.”³⁷

It seems obvious that fundamental reform is needed, but of exactly what type should it take? The disappointing conclusion of this paper is that we don't really know, but that does not mean that there aren't ideas worthy of further investigation. In the remainder of this paper, I will discuss some promising possibilities, focusing on strategies aimed at improving the quality of instruction. It seems reasonable to expect that improvements in the quality of undergraduate education will lead to students persisting and graduating at higher rates, and strategies focused on quality have the added benefit of mitigating concerns that pressure to increase graduation

rates will lead universities to lower their standards in order to graduate more students (but without a commensurate increase in what students have actually learned).

One of the most promising strategies to increase productivity in higher education is to leverage recent advances in information technology to deliver higher-quality instruction at a lower cost. There is a certainly a great deal of variation in the quality of computer-based courses, so this is an area where attention to quality is particularly important. Simply taking existing course materials and putting them online is unlikely to increase productivity, and one recent randomized experiment demonstrated that such a crude form of online instruction may be less effective than traditional modes of instruction.³⁸

But a sophisticated course that is primarily computer-based can have substantial advantages. Each student can learn at her own pace, and built-in feedback loops can identify the areas where the student is proficient as well as areas where she needs additional help. This information can be instantaneously provided to both the student as he goes through the course and to instructors, most of whom previously had little information about how well their students were learning the course material until after the first exam. Studies of the sophisticated courses developed by the Open Learning Initiative at Carnegie Mellon University have found these courses to produce outcomes at least as good as traditional face-to-face learning, although more evidence is needed before such courses can be taken to scale.³⁹ It is relatively straightforward (albeit logistically challenging) to test the effectiveness of specific online courses by randomly assigning students to either the face-to-face or online version of the same course and then comparing their learning outcomes (such as scores on a common final exam). It is also important to collect data on the relative costs of the two modes of instruction, as a reduction in costs would imply an increase in productivity even in the absence of an increase in learning.

The greatest productivity gains can be realized from computer-based learning only if the substantial cost of developing high-quality courses is shared by many institutions. A campus-by-campus approach is unlikely to yield real cost savings, especially in the short run. An added benefit to standardizing certain large introductory courses across campuses (particularly within large state systems) is the reduction of barriers to transferring between campuses, as many students do. This issue is particularly salient at community colleges, where the use of computer-based courses that are also used at four-year institutions would smooth the transition between sectors for BA-seeking students that start at two-year schools. Online courses also have obvious appeal for use as part of remediation programs that could be made available to students *before* they arrive on campus for their first year of college.

This potential innovation has obvious applications at traditional brick-and-mortar colleges and universities, which could replace some traditional face-to-face large lecture courses with high-quality computer-based versions that are offered online. Such online courses would be taught in a fundamentally different way from other courses at the same institution, but they would still be part of the same credit-hour based system and could have a face-to-face component such as weekly question and answer sessions with a teaching assistant. Online courses without an in-person component could be offered to students who did not live near the institution, but those students would still need to earn a certain number of credit hours in order to graduate with a degree.

But one can also imagine a more radical shift in which progress towards a degree would be measured by knowledge acquired by the student rather than the number of credit hours worth of courses a student completed. In theory such a self-paced, competency-based system could be applied at residential or commuter campuses, but it has the most obvious appeal for degrees that

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are offered entirely online and thus for whom the credit hour (which was historically roughly based on the amount of time a student spent in class) doesn't make much sense.⁴⁰ Students that needed twice the normal amount of time to successfully complete a course would not be lost in a class that moved too quickly, and students that could learn the material in half the normal time could breeze through and move on to more advanced courses. Self-pacing would be particularly advantageous to older students trying to balance their studies with work and family responsibilities (in 2007-08, 40 percent of undergraduates in the U.S. were 24 or older, with more than half of these students age 30 or above).⁴¹

Quality control would be crucial to the success of this idea, as made clear by the existence of “diploma mills” that promise degrees in exchange for evidence of life experience (and tuition payments!). It would also be desirable to have some way of ensuring that the person completing the online courses is the same person awarded the degree. Clearly much more evidence is needed before such a fundamental shift should be pursued on a large scale. For example, researchers might examine the completion rates of students in entirely online programs and the economic returns to degrees earned in this way. An important task for researchers is to identify the most promising versions of this innovation and then rigorously evaluate how well they work, so that they might be replicated if found successful. Identifying programs that appear ill-conceived from the outset and then showing that they are ineffective is much less useful.

Instruction that is primarily computer-based may well make sense for certain courses or even entire degree programs—but what about courses that are best taught in the traditional face-to-face manner? Presumably students would benefit from an increase in the quality of their instructors, but is such an increase possible? Currently very little systematic direct evidence is available as to the quality of undergraduate instruction. There is some research on the relative

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quality of different types of instructors, such as adjuncts compared to tenure-track faculty (as discussed above), but there could well be enormous variation in quality within each type of instructor. There is an obvious parallel to elementary and secondary education, where research has found that there are few differences in average quality between teachers with different observable characteristics (such as whether and how they were certified), but large differences among teachers with similar characteristics.⁴²

Large differences in instructor quality in higher education, if they exist, would imply the existence of opportunities to improve undergraduate instruction by selectively retaining the superior instructors or improving the quality of the inferior teachers. Measuring instructor quality would be a challenging task, as it would require access to student-instructor matched data with consistent outcome data for students taught by different instructors. However, data constraints may relax as state-level longitudinal systems proliferate. Currently the only rigorous study of postsecondary instructor quality uses data from the U.S. Air Force Academy, an atypical institution in American higher education.⁴³

If there are opportunities to improve undergraduate education by increasing the quality of instruction, would the incentives currently embedded in the higher education system permit the realization of such gains? Or would the dual mission of many institutions to both teach and produce research complicate any such efforts? Once again, the possibility of competing interests of students and employees echoes debates in K-12 education. Might some of the ideas embedded in reforms currently being experimented with in the nation's public schools also hold promise for higher education? For example, one might compare those who blame low college graduation rates on poorly prepared students with those who blame the poor academic performance of elementary and secondary students on their families and larger social problems.

Of course educational institutions at all levels are affected by forces larger than themselves, but the important question is whether they can do better even in the face of factors beyond their control. The stellar performance of some “no excuses” charter elementary and secondary schools suggests that they can.⁴⁴ One might well imagine the creation of an undergraduate college aimed at taking underprepared students and providing them with a high-quality education—making up for past deficiencies if need be.

These types of questions clearly cannot be adequately covered in a single brief review piece such as the present one. And there are certainly many other proposals worthy of consideration, such as creating stronger incentives for students to finish college in four years (rather than five or six) and tying the funding of public institutions to the number of graduates produced instead of the number of students enrolled. My primary aim in this section is not to cover every one of these proposals, but rather to illustrate the types of larger questions that institutions and their critical friends in the research community need to consider if real progress is going to be made on the graduation rate issue.

One general principle worth keeping in mind is that different contexts call for different programs and policies—the steps a flagship public university should take to improve its graduation rate should not necessarily be pursued by the nearby community college. As obvious as this may seem, one often sees common practices across higher education that should not be so common. For example, the SAT was created at the behest of a 1930s-era Harvard president with the goal of identifying promising candidates for admission to Harvard. To this day, students’ scores on the SAT remain a reasonable predictor (in combination with other factors) of how well they will do at places like Harvard. But SAT and ACT scores are a poor predictor of graduation rates at institutions outside of the most elite publics and privates—that is, the institutions

attended by most students in this country.⁴⁵ Why then are SAT and ACT scores used at so many places where they appear to add so little value?

Are there other policies and practices of the small number of elite research-intensive institutions—faculty tenure and the importance of research productivity in the faculty hiring and tenure review process, to name two candidates—that have trickled down, perhaps to ill effect, to the institutions whose primary mission is to educate undergraduates? Returning briefly to the question of instructor quality, does it make sense for less selective institutions to hire the cast-off PhDs of the more elite institutions instead of recruiting individuals who are passionate about teaching undergraduates?

Clearly there is no shortage of questions for researchers to tackle, even if many of the most important questions are also the most challenging. Additionally, the urgency that many feel to improve educational attainment will not wait for the results of carefully conducted studies, so lessons may be learned from steps (or missteps) taken in the absence of hard evidence. For this to happen, individual institutions and state higher education systems must be willing to allow researchers to track student outcomes. Several states systems already have longitudinal databases that allow for such research, including the incredibly detailed data system in Ohio that has been used in several important studies by economists Eric Bettinger and Bridget Terry Long.

The federal government as well as its counterparts in the states can help sustain this trend by funding (if not mandating) the development and maintenance of such databases, the best of which link records from postsecondary institutions to other sources such as the state's K-12 education database, the National Student Clearinghouse (to track transfer to private and out-of-state institutions), state unemployment insurance records (to track the subsequent earnings of college graduates and dropouts), and other sources of data on students' later-life outcomes.

The federal Department of Education also plays an important role in the support of research by providing funding through its Institute of Education Sciences (IES). However, of its 15 research grant programs, only one is devoted specifically to postsecondary education (several others are aimed solely at K-12 education).⁴⁶ Likewise, higher education is not included in the “What Works Clearinghouse,” an IES-created effort to identify rigorous education research and make the results readily available to educators, policy makers, and the public.⁴⁷

In addition to increased commitments to higher education research through its current programs, the federal government might also play a more active role in postsecondary R&D by funding experimentation at individual campuses. In a recent paper, Dominic Brewer and William Tierney propose a competitive proposal process designed to encourage “traditional higher education institutions to develop and test operational innovations.”⁴⁸ Successful innovations that confer a competitive advantage on the institutions that adopt them might then spread on their own to other campuses (perhaps including previously recalcitrant ones).

Conclusion

America’s institutions of higher learning cannot drastically increase the level of educational attainment in the country on their own. College students need to arrive on campus better prepared academically, and more students need to graduate high school with the skills needed to attend college at all. But the poor preparation of many college students should not be used as an excuse for poor graduation rates. At many institutions, even students with impressive high school grades and test scores graduate at mediocre rates. Data points like this one make it clear that institutions can do better with their current students, without lowering academic standards. The research community has a vital role to play in identifying promising strategies for

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improvement and evaluating the efforts of institutions seeking to better fulfill their mission of educating undergraduates.

¹ Barack Obama, “Remarks of President Barack Obama—Address to Joint Session of Congress,” Text of a speech released by the White House Press Office, February 24, 2009.

² The statistics reported in this paragraph and the next are drawn from Organisation for Economic Co-operation and Development, *Education at a Glance 2010: OECD Indicators* (Paris: Organisation for Economic Co-operation and Development, 2002), Table A1.3a, columns labeled “Tertiary-type A and Advanced research programmes.” According to the OECD glossary, “Tertiary-type A programmes have a minimum cumulative theoretical duration (at tertiary level) of three years’ full-time equivalent, although they typically last four or more years.” Available at <http://stats.oecd.org/glossary/detail.asp?ID=5440>.

³ If Norway stagnates at 41 percent, then the U.S. needs to increase attainment by about one third. If Norway increases its attainment rate to 45 percent, then the U.S. needs to increase attainment by about half.

⁴ The largest recorded 10-year increase in both relative and absolute terms was 1968-1978, when the BA attainment rate increased by 9 percentage points, from 15 to 23 percent (a 58 percent increase).

⁵ Whereas the U.S. tied for seventh place among OECD countries in postsecondary attainment, we rank 12th in terms of college access rates; see Organisation for Economic Co-operation and Development, *Education at a Glance 2010: OECD Indicators* (Paris: Organisation for Economic Co-operation and Development, 2002), Table A2.3. Countries where more than 64 percent (the U.S. rate) of citizens enroll in college include Norway (71 percent) and Poland (83 percent); For a recent international comparison of student achievement, see Eric A. Hanushek, Paul E. Peterson, and Ludger Woessmann. *U.S. Math Performance in Global Perspective: How Well Does Each State Do at Producing High-Achieving Students?* Program on Education Policy and Governance Report, No. 10-19 (Cambridge, MA: Harvard University, 2010).

⁶ Douglas N. Harris and Sara Goldrick-Rab, “The (Un)Productivity of American Higher Education: From ‘Cost Disease’ to Cost-Effectiveness,” La Follette School Working Paper No. 2010-023 (Madison, WI: University of Wisconsin, 2010).

⁷ This figure, which is based on Integrated Postsecondary Education Data System (IPEDS) data from 2007-08 compiled by the Delta Cost Project, only includes four-year colleges and universities that reported both six-year graduation rates and average SAT/ACT scores and enrolled at least 100 first-time, full-time freshmen. Average SAT/ACT score is calculated based on the test taken by the greatest share of students (averaging the 25th and 75th percentiles), with ACT scores converted to the SAT scale. Institutions where fewer than 50 percent of students took the SAT or the ACT are excluded.

⁸ William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America’s Public Universities* (Princeton, NJ: Princeton University Press, 2009), chapter 10.

⁹ William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America’s Public Universities* (Princeton, NJ: Princeton University Press, 2009), as reported in David Leonhardt, “Colleges Are Failing in Graduation Rates,” *New York Times*, September 9, 2009. The most selective universities had average SAT/ACT scores greater than 1200; the least selective universities had average scores below 1000. More detailed regression analyses yielded similar results.

¹⁰ See Caroline M. Hoxby, “The Changing Selectivity of American Colleges,” *Journal of Economic Perspectives* 23, no. 4 (Fall 2009) for a brief summary of some of these studies. The one oft-cited exception is a study that compared the earnings of students who were accepted to a similar set of schools but attended different schools, and found no selectivity effect (except among low-income students) (see Stacy Berg Dale and Alan B. Krueger, “Estimating the Payoff to Attending a More Selective College: An Application of Selection on Observables and Unobservables,” *Quarterly Journal of Economics* 117, no. 4 (November 2002)). However, the range of selectivity of the institutions included in that study is extremely limited, and the results are only based on students who applied to a similar set of schools and thus do not reflect the large amount of variation in college choices that results from student decisions about where to apply.

¹¹ Non-selective institutions can vary in terms of the average quality of their students. However, it is often difficult to measure such variation since most non-selective institutions do not require or record admissions data such as students’ SAT/ACT scores.

¹² Author's calculations from the National Education Longitudinal Study (NELS).

¹³ See, for example, William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America's Public Universities* (Princeton, NJ: Princeton University Press, 2009), Curtis Lockwood Reynolds, "Where to Attend? Estimating the Effects of Beginning College at a Two-Year Institution" (working paper, Kent State University, Kent, OH, 2009), and Bridget Terry Long and Michal Kurlaender, "Do Community Colleges Provide a Viable Pathway to a Baccalaureate Degree?" *Educational Evaluation and Policy Analysis*, forthcoming.

¹⁴ William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America's Public Universities* (Princeton, NJ: Princeton University Press, 2009), chapter 7.

¹⁵ Melissa Roderick, Jenny Nagaoka, Vanessa Coca, and Eliza Moeller, *From High School to the Future: Making Hard Work Pay Off* (Chicago: Consortium on Chicago School Research, 2008) and William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America's Public Universities* (Princeton, NJ: Princeton University Press, 2009).

¹⁶ Mark C. Long, "Changes in the Returns to Education and College Quality," *Economics of Education Review* 29, no. 3 (June 2010), Table 4.

¹⁷ I did not classify students who attended an institution in the "special" category or a four-year institution for which the Barron's rating was not available.

¹⁸ Specifically, I estimated an academic preparation index for each student based on their high school GPA and score on a standardized test administered in the 12th grade as part of the NELS study as the linear predictions from an ordered probit regression of the college category variable on high school GPA and the standardized test score. I use the standardized test score instead of SAT/ACT scores because the SAT/ACT is only taken by a self-selected sample of students. For students for whom a 12th-grade standardized test score was not available, I predicted a score using the results from a similar test administered in the 10th grade. All analyses using the NELS data are weighted using the appropriate survey weights.

¹⁹ I estimate these relationship using probit regressions. I define low-SES students as those from families in the bottom half of the income distribution where neither parent earned a college degree, high-SES students as those from families in the top half of the income distribution where at least one parent earned a college degree, and middle-SES students as all other students. I also estimate this relationship separately for students for whom data on SES are missing.

²⁰ Students who did not attend any college (or attended a college that was not included in one of the selectivity categories) are assigned their actual bachelor's degree attainment.

²¹ This simulation admittedly makes a number of potentially faulty assumptions. A simple regression analysis is unlikely to yield accurate estimates of the causal relationship between college selectivity and bachelor's degree attainment. The college selectivity categories likely miss a good amount of variation in college characteristics within each of these categories. And there may well be general equilibrium effects from resorting large numbers of students, which would not be reflected in my analysis.

²² It could well be that a more ambitious re-engineering of the college match process (for example, one that gave admission preferences to low-SES students at selective universities) could boost overall attainment rates, but such a thought experiment is beyond the scope of this paper. I did run an additional simulation where I increased the shares of students attending most, highly, and very competitive colleges by 20 percent, kept the shares of students attending non-competitive and two-year colleges the same, and allocated the remaining students to competitive and less-competitive colleges in proportion to the original shares in those categories. In other words, I simulated an increase in the number of available spaces at the more selective colleges and a decrease in the number of spaces at less selective (but not open enrollment) four-year colleges. Students were still assigned to colleges based purely on their grades and test scores. This reallocation of spaces only increased the simulated bachelor's degree attainment rate by an additional 0.2 percentage points, to 33.2 percent.

²³ These statistics are r-squared values from linear regressions that are weighted by student full-time equivalent (FTE) enrollment. The unweighted statistics are 65 and 73 percent.

²⁴ This figure is based only on four-year institutions that report average SAT/ACT scores. The variation among two-year and nonselective four-year institutions could be larger or smaller.

²⁵ Douglas A. Webber and Ronald G. Ehrenberg, “Do Expenditures Other than Instructional Expenditures Affect Graduation and Persistence Rates in American Higher Education?” *Economics of Education Review* 29, no. 6 (December 2010).

²⁶ The authors technically use panel data but do not take advantage of the panel structure of the data using methods such as fixed effects because, they argue, there is not enough variation in spending within institutions over the four cohorts covered by their panel.

²⁷ The study of four-year colleges is Ronald G. Ehrenberg and Liang Zhang, “Do Tenured and Tenure-Track Faculty Matter?” (Cambridge, MA: National Bureau of Economic Research Working Paper 10695, 2004) and the study of community colleges is Daniel Jacoby, “Effects of Part-Time Faculty Employment on Community College Graduation Rates,” *The Journal of Higher Education* 77, no. 6 (November/December 2006).

²⁸ Eric P. Bettinger and Bridget Terry Long, “Does Cheaper Mean Better? The Impact of Using Adjunct Instructors on Student Outcomes,” *Review of Economics and Statistics* (forthcoming).

²⁹ For a review of this literature, see William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America’s Public Universities* (Princeton, NJ: Princeton University Press, 2009) and David Deming and Susan Dynarski, “Into College, Out of Poverty? Policies to Increase the Postsecondary Attainment of the Poor,” National Bureau of Economic Research Working Paper 15387 (Cambridge, MA: NBER, 2009).

³⁰ Susan Dynarski, “Building the Stock of College-Educated Labor,” *Journal of Human Resources* 43, no. 3 (Summer 2008) and Ralph Stinebrickner and Todd R. Stinebrickner, “Understanding Educational Outcomes of Students from Low-Income Families: Evidence from a Liberal Arts College with a Full Tuition Subsidy Program,” *Journal of Human Resources* 38, no. 3 (Summer 2003).

³¹ Eric P. Bettinger, Bridget Terry Long, Philip Oreopoulos, and Lisa Sanbonmatsu, “The Role of Simplification and Information in College Decisions: Results from the H&R Block FAFSA Experiment,” National Bureau of Economic Research Working Paper 15361 (Cambridge, MA: NBER, 2009).

³² Judith Scott-Clayton, “On Money and Motivation: A Quasi-Experimental Analysis of Financial Incentives for College Achievement,” *Journal of Human Resources* (forthcoming).

³³ Joshua Angrist, Daniel Lang, and Philip Oreopoulos, “Incentives and Services for College Achievement: Evidence from a Randomized Trial,” *American Economic Journal: Applied Economics* 1, no. 1 (January 2009).

³⁴ An excellent summary of the Opening Doors demonstrations (and citations to the original studies) is contained in David Deming and Susan Dynarski, “Into College, Out of Poverty? Policies to Increase the Postsecondary Attainment of the Poor,” National Bureau of Economic Research Working Paper 15387 (Cambridge, MA: NBER, 2009).

³⁵ The Florida study is Juan Carlos Calcagno and Bridget Terry Long, “The Impact of Postsecondary Remediation Using a Regression Discontinuity Approach: Addressing Endogenous Sorting and Noncompliance (Cambridge, MA: National Bureau of Economic Research Working Paper 14194, 2008) and the Texas study is Paco Martorell and Isaac McFarlin Jr., “Help or Hindrance? The Effects of College Remediation on Academic and Labor Market Outcomes,” Working paper, RAND and the University of Michigan (2010).

³⁶ Another reasonably high-quality study (Eric P. Bettinger and Bridget Terry Long, “Addressing the Needs of Underprepared Students in Higher Education: Does College Remediation Work?” *Journal of Human Resources* 44, no. 3 (Summer 2009)) finds evidence that students in remediation have higher persistence rates than non-remediated students. However, the identifying assumption made in this paper (that distance to the nearest college only affects student outcomes through the remediation policies at that college) is a stronger assumption than the assumption made by the regression discontinuity analyses.

³⁷ Quote is from back cover (endorsements) of William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America’s Public Universities* (Princeton, NJ: Princeton University Press, 2009).

³⁸ David N. Figlio, Mark Rush, and Lu Yin, “Is it Live or is it Internet? Experimental Estimates of the Effects of Online Instruction on Student Learning,” National Bureau of Economic Research Working Paper 16089 (Cambridge, MA: NBER, 2010).

³⁹ See, for example, Marsha Lovett, Oded Meyer, and Candace Thille, “The Open Learning Initiative: Measuring the Effectiveness of the OLI Statistics Course in Accelerating Student Learning,” *Journal of Interactive Media in Education* special issue (May 2008).

⁴⁰ One example of such a competency-based, entirely online university is Western Governor’s University, which was founded by the governors of 19 states. Available online at http://www.wgu.edu/about_WGU/overview.

⁴¹ “Who Are the Undergraduates?” *The Chronicle of Higher Education*, December 12, 2010, available online at <http://chronicle.com/article/Who-Are-the-Undergraduates-/123916/>.

⁴² See, for example, Thomas J. Kane, Jonah E. Rockoff, and Douglas O. Staiger, “What Does Certification Tell Us About Teacher Effectiveness? Evidence from New York City,” *Economics of Education Review* 27, no. 6 (December 2008).

⁴³ Scott E. Carrell and James E. West, “Does Professor Quality Matter? Evidence from Random Assignment of Students to Professors,” *Journal of Political Economy* 118, no. 3 (June 2010).

⁴⁴ See, for example, Caroline M. Hoxby, Sonali Murarka, and Jenny Kang, *How New York City’s Charter Schools Affect Achievement* (Cambridge, MA: New York City Charter Schools Evaluation Project, 2009).

⁴⁵ William G. Bowen, Matthew M. Chingos, and Michael S. McPherson, *Crossing the Finish Line: Completing College at America’s Public Universities* (Princeton, NJ: Princeton University Press, 2009), chapter 6.

⁴⁶ List of grant programs (with links to their descriptions) available online at http://ies.ed.gov/funding/ncer_progs.asp.

⁴⁷ List of “What Works Clearinghouse” topic areas available at <http://ies.ed.gov/ncee/wwc/reports/>.

⁴⁸ Dominic J. Brewer and William G. Tierney, “Barriers to Innovation in U.S. Higher Education” (Washington, DC: American Enterprise Institute conference paper, June 2010).



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