



Completion Matters: The High Cost of Low Community College Graduation Rates

By Mark Schneider and Lu Michelle Yin

An ever-increasing number of individuals are turning to community college for their higher education. However, the majority of students entering community college fail to complete their degrees, and as a result, earn lower wages throughout the course of their lives. If community college retention rates were increased, graduates could become part of a wholly different income bracket, and taxpayers in the nation and the states would likewise experience substantial monetary gains. Cost-cutting and time-saving strategies and resources such as online delivery of classes, competency-based models of higher learning, and for-profit colleges and universities should be employed to increase the number of Americans completing their associate's degrees.

Community colleges are a vital component of the US postsecondary education system, serving about 30 percent of all students in higher education. In the context of the current economic downturn and high unemployment rates, the relative low tuition of two-year colleges and their open enrollment policies have drawn an increasing number of students to these institutions. Even as community colleges have become more important to the nation's system of higher education, however, their record of success remains open to question.

Most significantly, community college three-year graduation rates average in the low 20 percent range, with many colleges graduating far fewer than this average.¹ In 2009, the last year for which the federal government has reported data, close to four hundred community colleges had graduation rates less than 15 percent.² For the

minority of students who do receive an associate's degree, there are labor market rewards in terms of

Key points in this Outlook:

- Community colleges are serving more and more students, but how well they're serving them (or taxpayers) is debatable: only 1 in 4 graduates, compared to 3 in 5 at four-year schools.
- Cutting the dropout rate by half would generate substantial gains: the 160,000 "new" graduates would earn \$30 billion more in lifetime income—and create an additional \$5.3 billion in total taxpayer revenue.
- Community colleges can boost graduation rates and save money by streamlining the degree path, using online courses, and borrowing innovations from for-profit schools. Another potential game-changer is the competency-based model, which has helped Florida's Valencia College achieve a 40 percent graduation rate.

Mark Schneider (mschneider@air.org) is a visiting scholar at AEI and vice president at the American Institutes for Research, and Lu Michelle Yin (myin@air.org) is an economist and a researcher at the American Institutes for Research.

higher salaries,³ yet most students do not complete their studies and suffer economic losses compared to what they would have earned as graduates.

In this *Outlook*, we examine the high costs of low graduation rates by estimating the direct wage gains for graduates and the associated gains that taxpayers would experience if community colleges increased their graduation rates and reduced the number of dropouts by half.

In 2009, over 320,000 full-time degree-seeking students who entered community colleges in 2006 had not earned their degree, and most were no longer enrolled in any postsecondary institution.

We begin by describing the students we focused on and note the current number of community college dropouts. We concentrate on only one cohort of students—those who entered community college in 2006 as first-time full-time students, the group the federal government tracks most thoroughly.

According to federal statute, completing a “two-year” associate’s degree is expected to take three years, when community colleges must report the numbers of graduates and the graduation rate for the degree-seeking students who entered colleges three years earlier. According to these guidelines, in 2009, over 320,000 full-time degree-seeking students who entered community colleges in 2006 had not earned their degree, and most were no longer enrolled in any postsecondary institution.

As a measure of the labor market need for these students, the Bureau of Labor Statistics (BLS) estimates that the nation has an unmet need of around 300,000 new employees with associate’s degrees per year. If community colleges were to halve the number of current dropouts, these additional graduates would likely find a receptive market for their skills.⁴ Assuming the BLS numbers are correct and that these students would indeed find employment, our calculations estimate what the effect on income and income taxes would be if community colleges cut the number of dropouts in half.

While community college students often face substantial hurdles in completing their studies—for example, far too many students are not college ready, often have to work long hours while they study, and are supporting families while they study—community colleges

can undertake concrete steps to improve graduation rates. We outline some of these actions later in this *Outlook*, but first, we document some of the financial implications of “business as usual,” where only a minority of students actually earn their degrees.

First-Year Gains

Using the latest federal government statistics from the students who entered community college in 2006, we calculate the number of dropouts from each of the nation’s community colleges. (Refer to the appendix for more details on how we generate these estimates.) We also calculate the wage premium associate’s degree holders enjoy compared to high school graduates. We then calculate the total salary gain for each state by multiplying that state’s wage premium by the number of dropouts across all community colleges in the state.

If community colleges cut the number of dropouts in half, we estimate that this one cohort of students nationwide would earn an additional \$1.4 billion in income in 2010, the first full year after their expected graduation date. Applying federal tax rates to this added income, the federal government would have collected over \$200 million dollars in income taxes in 2010 from this expanded set of graduates.

Using each state’s income tax schedule⁵ to calculate the additional taxes that states would have collected, together, states would have collected close to \$60 million dollars in income taxes in 2010.

These findings represent one cohort of students over the course of one year. While these annual income and subsequent tax gains are substantial, they would accumulate much more over a lifetime of work. We next estimate these cumulative gains over a forty-year work life. This requires turning a lifetime of earning streams into what is called present value (PV).

Estimating Cumulative Gains: Present-Value Analysis

We first estimate income growth over time using data from the 2010 US Census and then convert that amount into present value using a “discount rate” (which reflects the fact that a dollar earned in the future is worth less than a dollar earned today).⁶ We calculate the present value for the expected earnings over a forty-year work life for a community college graduate and compare that to the present value of the forty-year expected work life

earnings of a dropout (equivalent to a high school degree holder). As noted, if we assume half of the former community college dropouts obtain their degrees, the estimated cumulative income gain for this one cohort is equal to the dollar difference of salary multiplied by the 160,000 “new” graduates. Therefore:

- We estimate that over their working lives, the added number of graduates would earn over \$30 billion in additional income.
- Applying current federal tax rates, we estimate that the nation’s taxpayers would gain more than \$4 billion in tax revenues from the higher wages these new graduates would generate.
- Applying each state’s income tax rates, we estimate that states would collect over \$1.3 billion in additional income taxes.

Gains by State

Because our data are based on campus-level numbers, we can calculate the cumulative sum across campuses within each state to produce a statewide estimate of gains. Moreover, since the US Census Bureau reports income by educational attainment for each state, we can calculate the added income and taxes for each state.

In nine states, the income gains from halving the number of dropouts exceed \$50 million annually, ranging from Texas, with around \$150 million in added income, to Florida, New Jersey, and Arizona, all of which stand to gain well over \$50 million of income from this cohort (see table 1). This translates into federal income tax gains ranging from over \$20 million per year in Texas to over \$7 million per year in Arizona. (See tables 4 and 5 for data on all states.)

These gains are for a single year. To capture the size of gains over a forty-year work life, we calculate the present value of additional salaries and taxes (see table 2). According to these calculations, in sixteen states, this new set of community college graduates would earn over \$750 million during their work lives and pay an additional \$100 million in federal taxes. A lion’s share of these gains would be seen in California and Texas, where the federal government would gain approximately \$500 million more in income taxes. In New York, these new associate’s degree graduates would gain around \$3 billion

TABLE 1
STATES THAT STAND TO GAIN THE MOST IN INCOME AND FEDERAL INCOME TAXES IN 2010

State	Potential Salary Gains (\$)	Potential Added Federal Taxes (\$)
Texas	\$152,178,000	\$22,826,000
California	\$110,184,000	\$16,527,000
New York	\$107,223,000	\$16,083,000
North Carolina	\$74,672,000	\$11,200,000
Ohio	\$68,363,000	\$10,169,000
Minnesota	\$59,923,000	\$8,988,000
Florida	\$59,279,000	\$8,157,000
New Jersey	\$57,552,000	\$8,632,000
Arizona	\$53,133,000	\$7,309,000

SOURCE: Author’s calculations.

TABLE 2
STATES THAT WOULD GAIN THE MOST IN PRESENT VALUE (PV) OF LIFETIME INCOME AND LIFETIME FEDERAL INCOME TAXES

State	PV of Potential Salary Gains (\$)	PV of Potential Added Federal Taxes (\$)
California	\$3,342,459,000	\$477,173,000
Texas	\$3,122,954,000	\$463,696,000
New York	\$2,893,128,000	\$415,989,000
North Carolina	\$1,425,392,000	\$198,296,000
Michigan	\$1,088,976,000	\$152,911,000
Minnesota	\$1,033,088,000	\$157,685,000
New Jersey	\$947,230,000	\$150,102,000
Missouri	\$946,493,000	\$139,481,000
Florida	\$919,538,000	\$135,462,000
Mississippi	\$865,161,000	\$116,083,000
Louisiana	\$816,398,000	\$115,729,000
South Carolina	\$815,135,000	\$116,606,000
Ohio	\$798,259,000	\$115,755,000
Pennsylvania	\$793,952,000	\$105,173,000
Arizona	\$764,230,000	\$108,263,000
Georgia	\$755,855,000	\$106,616,000

SOURCE: Author’s calculations.

in earnings over their lifetime and pay over \$400 million in federal taxes.

Tables 1 and 2 demonstrate massive gains for both students and taxpayers nationally. But states would also gain additional revenues through their own income tax systems (see table 3). Ten states would gain over \$2 million in state income taxes for the added graduates *in this one cohort in this one year alone*. New York could have collected over \$7 million in state income tax in 2010 and over \$175 million in state income tax throughout the course of the work lives of these new graduates. North Carolina and California could have gained more than \$4 million in state income tax in 2010 and, over the lifetime of this cohort, around \$100 million in North Carolina and \$150 million in California. We should point out that Florida and Texas have no state income tax. Hence, the added income gained by reducing the number of dropouts by 50 percent does not translate into added state tax revenues.⁷

What Can We Do About It?

Community colleges have claimed a central role in increasing the number of adults in the United States with postsecondary degrees. As a result, foundations, the federal government, and states are now focusing on low community college graduation rates. The issue recently gained popular attention when a series of billboards, paid for by the Texas Association of Business, appeared along Texas highways in December 2011. One billboard, referring to the Dallas County Community College District (DCCCD), read: “8% of DCCCD students graduate in 3 yrs. Is that fair to the students?” This followed a similar billboard the same group had posted in October, citing Austin Community College’s 4 percent graduation rate and asking: “Is that a good use of tax \$?”⁸

The answer to both questions? A resounding “no.”

The low graduation rates of community colleges incur significant costs for students who fail to graduate, such as tuition and fees, and these students are limited from garnering the high wages that come with an associate’s degree. But as the Texas billboards note, low graduation rates are also unfair to taxpayers, who have spent millions upon millions of dollars in direct appropriation and student grants to support dropouts.

What can be done to turn this around?

Complete College America, an organization that works closely with the National Governors Association to increase graduation rates, recently recommended a

TABLE 3
STATE INCOME TAX GAINS: ANNUAL AND PRESENT VALUE (PV) OF LIFETIME GAINS

State	Potential Additional State Taxes (\$)	PV of Additional State Taxes (\$)
New York	\$7,761,000	\$175,857,000
North Carolina	\$5,227,000	\$98,003,000
California	\$4,394,000	\$150,642,000
Minnesota	\$3,617,000	\$64,549,000
South Carolina	\$3,109,000	\$50,837,000
Iowa	\$2,604,000	\$42,764,000
Missouri	\$2,310,000	\$56,202,000
Ohio	\$2,278,000	\$26,755,000
Georgia	\$2,236,000	\$44,496,000
Michigan	\$2,026,000	\$47,370,000

SOURCE: Author’s calculations.

series of reforms to address the problem of low graduation rates at community colleges. The title of their report, “Time Is the Enemy,” captures their argument: the longer a student takes to complete his studies, the more likely it is that something will derail his plans. Some important strategies they recommend to solve this issue include streamlining remediation programs (so that students earn college credits more quickly) and restructuring traditional college programs, for example, through block scheduling (so that students can plan their lives around a fixed schedule).⁹

In a forthcoming book, Mark Schneider, one of the authors of this paper, along with Andrew Kelly, a research fellow at the American Enterprise Institute, identified three other approaches that could increase graduation rates while potentially saving money: online delivery of courses, competency-based models of education, and for-profit colleges and universities as potential “game-changers.”¹⁰

Online delivery of class content renders the traditional limitations of geographic distance, physical capacity, and time moot. Students can take online courses from anywhere and at any time, instructors can teach far more students online than in a traditional format, and online courses can start any day of any week, any week of the year. For example, Rio Salado College, a community college based physically in Arizona, enrolls about 35,000 students from across the country in more than five hundred online courses. Most online courses at Rio

Salado provide a flexible schedule with approximately fifty starting dates throughout the year.¹¹ Rio Salado boasts a 42 percent graduation rate, about twice the national average for community colleges.

A second potentially transformative innovation is the competency-based model of higher education, which allows students to move at their own pace through a course of study, progressing from one concept to the next after proving mastery on an assessment. Because of their emphasis on learning outcomes rather than seat time, competency-based models allow for the certification and credentialing of prior learning. Valencia College in Florida is leading the way in this area among two-year institutions.¹² Valencia's graduation rate, 40 percent, is far above the national average, and the Aspen Institute recently recognized Valencia as the best community college in the country.¹³

Finally, for-profit institutions embody a host of ideas that could alter community colleges. Despite being the subject of negative scrutiny over the past year or so, for-profit colleges are leading the way in developing new online learning platforms and redefining the approach to curriculum development and faculty training to encourage

uniformity in instruction across multiple sites and instructors. Faculty at institutions such as the University of Phoenix, ITT Tech, and American Public University are evaluated on the basis of their students' learning outcomes, and promotion and salary decisions are based in part on these metrics. While graduation rates at four-year for-profit colleges lag behind public and not-for-profit schools (in part because of the number of high-risk students they enroll), graduation rates at two-year degree programs are much higher among for-profit institutions than at public community colleges (58 percent at for-profits and 21 percent at public community colleges, according to the latest available data).¹⁴

Reforms identified by organizations like Complete College America and the more transformative reforms emerging throughout the higher education landscape could disrupt the inefficient community college system that we now support. Together, these reforms are not necessarily expensive, especially in relation to the tax dollars lost each year through lower income and lower tax collections, as well as the billions of dollars in government appropriations that subsidize the tuition of dropouts.

TABLE 4
ANNUAL GAINS FOR COMMUNITY COLLEGE DROPOUTS FROM THE 2008–09 COHORT

State	Number of Dropouts	Potential Salary Gains (\$)	Added Federal Tax (\$)	Added State Tax (\$)
Alabama	3,385	\$30,199,000	\$4,251,000	\$1,509,000
Alaska	8	\$92,000	\$13,000	\$0
Arizona	2,797	\$53,133,000	\$7,309,000	\$1,537,000
Arkansas	1,610	\$27,209,000	\$4,081,000	\$1,089,000
California	18,364	\$110,184,000	\$16,527,000	\$4,394,000
Colorado	1,917	\$10,773,000	\$1,582,000	\$142,000
Connecticut	1,551	\$31,125,000	\$4,668,000	\$1,463,000
Delaware	652	\$1,865,000	\$279,000	\$96,000
District of Columbia	—	\$0	\$0	\$0
Florida	5,389	\$59,279,000	\$8,157,000	\$0
Georgia	5,027	\$37,280,000	\$5,592,000	\$2,236,000
Hawaii	746	\$7,440,000	\$1,116,000	\$759,000
Idaho	718	\$8,305,000	\$1,245,000	\$614,000
Illinois	5,743	\$28,715,000	\$4,307,000	\$861,000
Indiana	1,653	\$27,274,000	\$4,091,000	\$927,000
Iowa	2,627	\$39,928,000	\$5,989,000	\$2,604,000

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TABLE 4 (continued)

ANNUAL GAINS FOR COMMUNITY COLLEGE DROPOUTS FROM THE 2008–09 COHORT

State	Number of Dropouts	Potential Salary Gains (\$)	Added Federal Tax (\$)	Added State Tax (\$)
Kansas	2,045	\$7,769,000	\$1,165,000	\$485,000
Kentucky	2,205	\$25,351,000	\$3,802,000	\$1,470,000
Louisiana	2,720	\$29,887,000	\$4,483,000	\$1,195,000
Maine	540	\$3,641,000	\$546,000	\$259,000
Maryland	3,839	\$24,012,000	\$3,601,000	\$1,140,000
Massachusetts	3,443	\$6,423,000	\$963,000	\$340,000
Michigan	5,728	\$46,576,000	\$6,878,000	\$2,026,000
Minnesota	3,829	\$59,923,000	\$8,988,000	\$3,617,000
Mississippi	4,365	\$23,955,000	\$2,998,000	\$1,053,000
Missouri	3,459	\$38,513,000	\$5,777,000	\$2,310,000
Montana	371	\$5,559,000	\$820,000	\$362,000
Nebraska	1,066	\$11,726,000	\$1,758,000	\$645,000
Nevada	186	(\$111,000)	(\$16,000)	(\$0)
New Hampshire	509	\$8,047,000	\$1,207,000	\$402,000
New Jersey	7,218	\$57,552,000	\$8,632,000	\$1,108,000
New Mexico	1,913	\$15,304,000	\$2,295,000	\$732,000
New York	12,185	\$107,223,000	\$16,083,000	\$7,761,000
North Carolina	5,744	\$74,672,000	\$11,200,000	\$5,227,000
North Dakota	501	\$3,438,000	\$515,000	\$63,000
Ohio	5,430	\$68,363,000	\$10,169,000	\$2,278,000
Oklahoma	2,149	\$12,077,000	\$1,811,000	\$664,000
Oregon	1,731	\$8,641,000	\$1,296,000	\$777,000
Pennsylvania	4,589	\$29,493,000	\$4,424,000	\$905,000
Rhode Island	542	\$1,083,000	\$162,000	\$40,000
South Carolina	3,506	\$45,571,000	\$6,835,000	\$3,109,000
South Dakota	179	\$2,533,000	\$380,000	\$0
Tennessee	3,781	(\$3,781,000)	(\$430,000)	(\$226,000)
Texas	15,258	\$152,178,000	\$22,826,000	\$0
Utah	858	\$2,573,000	\$385,000	\$128,000
Vermont	48	\$57,000	\$8,000	\$2,000
Virginia	3,788	\$30,068,000	\$4,510,000	\$1,728,000
Washington	2,245	\$16,918,000	\$2,537,000	\$0
West Virginia	769	\$584,000	\$87,000	\$23,000
Wisconsin	2,158	\$22,340,000	\$3,351,000	\$1,383,000
Wyoming	397	\$3,314,000	\$497,000	\$0
TOTAL	161,470	\$1,414,273,000	\$209,750,000	\$59,237,000

SOURCE: Author's calculations.

NOTE: Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming do not have a state income tax. In Nevada and Tennessee, the average income for associate's degree holders is lower than for high school degree holders. Therefore, instead of annual loss of income and taxes, we actually observe a short-term gain for dropping out of community colleges in these two states. However, when we calculate the present value of lifetime income and taxes (table 5), the associate's degree eventually pays off even in these two states. The number of dropouts reported in this table is half the number of the estimated dropouts.

TABLE 5
PRESENT VALUE (PV) OF LIFETIME STATE INCOME AND TAX GAINS

State	Number of Dropouts	PV of Potential Salary Gains (\$)	PV of Additional Federal Tax (\$)	PV of Additional State Tax (\$)
Alabama	3,385	\$642,015,000	\$89,305,000	\$32,100,000
Alaska	8	\$1,881,000	\$324,000	\$0
Arizona	2,797	\$764,230,000	\$108,263,000	\$12,597,000
Arkansas	1,610	\$306,769,000	\$44,676,000	\$15,676,000
California	18,364	\$3,342,459,000	\$477,173,000	\$150,642,000
Colorado	1,917	\$270,743,000	\$38,598,000	\$12,535,000
Connecticut	1,551	\$570,737,000	\$96,837,000	\$27,415,000
Delaware	652	\$49,956,000	\$7,578,000	\$2,724,000
District of Columbia	—	\$0	\$0	\$0
Florida	5,389	\$919,538,000	\$135,462,000	\$0
Georgia	5,027	\$755,855,000	\$106,616,000	\$44,496,000
Hawaii	746	\$137,065,000	\$20,586,000	\$10,098,000
Idaho	718	\$129,216,000	\$21,080,000	\$10,479,000
Illinois	5,743	\$430,848,000	\$61,835,000	\$12,925,000
Indiana	1,653	\$426,748,000	\$60,806,000	\$14,509,000
Iowa	2,627	\$646,852,000	\$96,964,000	\$42,764,000
Kansas	2,045	\$156,113,000	\$22,451,000	\$3,329,000
Kentucky	2,205	\$404,761,000	\$56,551,000	\$23,417,000
Louisiana	2,720	\$816,398,000	\$115,729,000	\$30,786,000
Maine	540	\$112,504,000	\$16,049,000	\$7,961,000
Maryland	3,839	\$535,628,000	\$76,223,000	\$25,442,000
Massachusetts	3,443	\$377,543,000	\$41,525,000	\$20,052,000
Michigan	5,728	\$1,088,976,000	\$152,911,000	\$47,370,000
Minnesota	3,829	\$1,033,088,000	\$157,685,000	\$64,549,000
Mississippi	4,365	\$865,161,000	\$116,083,000	\$39,536,000
Missouri	3,459	\$946,493,000	\$139,481,000	\$56,202,000
Montana	371	\$47,391,000	\$6,456,000	\$2,813,000
Nebraska	1,066	\$211,112,000	\$30,894,000	\$10,741,000
Nevada	186	\$20,613,000	\$2,895,000	\$0
New Hampshire	509	\$153,517,000	\$24,411,000	\$7,675,000
New Jersey	7,218	\$947,230,000	\$150,102,000	\$23,773,000
New Mexico	1,913	\$477,963,000	\$65,522,000	\$20,074,000
New York	12,185	\$2,893,128,000	\$415,989,000	\$175,857,000
North Carolina	5,744	\$1,425,392,000	\$198,296,000	\$98,003,000
North Dakota	501	\$83,702,000	\$12,006,000	\$1,540,000
Ohio	5,430	\$798,259,000	\$115,755,000	\$26,755,000
Oklahoma	2,149	\$242,860,000	\$34,781,000	\$13,343,000
Oregon	1,731	\$299,982,000	\$44,704,000	\$26,977,000
Pennsylvania	4,589	\$793,952,000	\$105,173,000	\$24,374,000
Rhode Island	542	\$18,594,000	\$3,105,000	\$912,000

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TABLE 5 (continued)
PRESENT VALUE OF LIFETIME STATE INCOME AND TAX GAINS

State	Number of Dropouts	PV of Potential Salary Gains (\$)	PV of Additional Federal Tax (\$)	PV of Additional State Tax (\$)
South Carolina	3,506	\$815,135,000	\$116,606,000	\$50,837,000
South Dakota	179	\$36,070,000	\$5,194,000	\$0
Tennessee	3,781	\$419,122,000	\$53,688,000	\$25,147,000
Texas	15,258	\$3,122,954,000	\$463,696,000	\$0
Utah	858	\$69,275,000	\$10,061,000	\$3,463,000
Vermont	48	\$6,342,000	\$1,138,000	\$293,000
Virginia	3,788	\$641,338,000	\$92,400,000	\$35,929,000
Washington	2,245	\$320,055,000	\$47,307,000	\$0
West Virginia	769	\$257,841,000	\$45,225,000	\$12,613,000
Wisconsin	2,158	\$547,171,000	\$83,138,000	\$33,444,000
Wyoming	397	\$46,482,000	\$7,070,000	\$0
TOTAL	161,470	\$30,427,057,000	\$4,396,403,000	\$1,302,167,000

SOURCE: Author's calculations.

NOTE: Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming do not have a state income tax. The number of dropouts reported in this table is half the number of the estimated dropouts.

Appendix

To estimate potential income gains and corresponding gains in income taxes, we used the US Department of Education's Integrated Postsecondary Education Data System (IPEDS) and the *Beginning Postsecondary Students (BPS) Longitudinal Study*.¹⁶

Using these data, we estimate the number of dropouts from each public two-year degree-granting institution (community colleges) that participates in federal student financial aid programs. IPEDS graduation rates do not include transfer students, and since some of the students who drop out from one community college eventually earn degrees, using only IPEDS numbers would overestimate the number of dropouts. We use BPS to generate a more accurate number, by estimating the number of transfer students who likely graduated from another campus and by adjusting our count of dropouts by that estimate. We then sum up these individual campus numbers to the state level to estimate the number of dropouts in each state.¹⁷

We then divide these numbers in half. According to federal law, students in two-year degree programs are expected to graduate in three years. We then use the last cohort covered by federal law for whom data are currently available: the entering class of 2006, with graduation rates and dropouts calculated in 2009.

To calculate potential gained income, we obtained 2010 income data by educational attainment for each state from the US Census. The census does not differentiate between students who attended but did not graduate from a four-year college and those who attended but did not graduate from a two-year one. Therefore, our comparison group is high school graduates, even though we recognize that students who drop out of community college likely experienced some increased labor market returns.

The second component defining our reference group pertains to the age group: according to the BPS, the average age of community college graduates is twenty-six years old. In this report, therefore, we compare wages for community college graduates to those of high school graduates in the twenty-five to thirty-four age group. The potential income gains for students earning an associate degree is estimated as the difference between the median earnings for adults ages twenty-five to thirty-four with a high school degree and the median earnings for young adults with an associate's degree, around \$8,000 nationwide but differing across the United States.

We now have two intermediate measures: an estimate of the number of dropouts for each community college in the nation and an estimate of the average potential income each new graduate could earn.

To summarize: in our calculations, we first estimate overall income losses as 50 percent of the number of dropouts times the difference in earnings of associate degree holders and high school graduates.

We calculate these income losses at the campus level and then sum up to the state and national levels. We then calculate lost income in 2010, the first full year after the 2009 expected graduation date. We apply both federal and individual state income tax rates to the median associate degree and high school degree salary to calculate the federal and state tax premium and then multiply the tax premiums by the increased number of dropouts to estimate income tax returns.

Notes

1. The official six-year graduation rate for four-year public universities is 57 percent compared to the official three-year graduation rate of 22 percent for public two-year colleges. These data are from table 341 in National Center for Education Statistics, *Digest of Education Statistics*, 2010, www.nces.ed.gov/programs/digest/d10/tables/dt10_341.asp (accessed February 28, 2012).
2. These numbers improve somewhat when we take into account transfer students. According to the authors' calculations using the federal government's *Beginning Postsecondary Students Longitudinal Study*, 18 percent of students in public community colleges, 15 percent in private not-for-profit community colleges, and 8 percent in private for-profit two-year colleges transferred into four-or-more-year colleges. Among those students who transferred, around 10 percent of them will obtain at least an associate's degree somewhere else. See Institute of Education Sciences, *The Beginning Postsecondary Students Longitudinal Study*, National Center for Educational Statistics, April 2009, <http://nces.ed.gov/surveys/bps/> (accessed March 2, 2012).
3. According to the most recent data from the US Census Bureau, the average median annual income premium for adults age twenty-five to thirty-four is \$8,002, when comparing an associate's degree holder to a high school graduate. See US Census Bureau and the Bureau of Labor Statistics, "Current Population Study," n.d., www.census.gov/cps/ (accessed March 2, 2012).
4. We recognize that the abilities and innate endowments of students who successfully complete their studies may be different than those who drop out. Nonetheless, in our calculations we assume that students who dropped out of community colleges would, if they instead graduated, be able to command similar salaries to students with associate's degrees in the labor market. For projected 2020 employment and total job openings by education, see Bureau of Labor Statistics, "Table 9: Employment and Total Job Openings by Education, Work Experience, and On-the-Job Training Category, 2010 and Projected 2020," February 1, 2012, Economic News Release, www.bls.gov/news.release/ecopro.t09.htm (accessed February 28, 2012).
5. See Tax Foundation, "State Individual Income Tax Rates, 2000–2012," February 16, 2012, www.taxfoundation.org/publications/show/228.html (accessed February 28, 2012).
6. We use the federal Office of Management and Budget's 2010 discount rate of 4.5 percent [Office of Management and Budget, "Budget Assumptions: Nominal Treasury Interest Rates for Different Maturities," November 16, 2011, www.whitehouse.gov/sites/default/files/omb/assets/a94/dischist-2012.pdf (accessed March 6, 2012)] to reflect the 2010 value of future earnings (as all other data are from 2010). Income data from the 2010 US Census Bureau report are clustered into five-year and ten-year age cohorts, and based on these cohort income levels, we calculate an annual income growth rate for associate degree and high school degree holders respectively, and then use this rate to estimate the income streams for a forty-year work life. See US Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 2010, www.census.gov/apsd/techdoc/cps/cpsmar10.pdf (accessed March 7, 2012).
7. The states would obviously benefit from higher sales taxes, property taxes, and other similar revenues.
8. Paul Fain, "Behind the Billboards," *Inside Higher Ed*, December 14, 2011, www.insidehighered.com/news/2011/12/14/texas-business-groups-billboard-campaign-completion-rates (accessed March 2, 2012).
9. See Complete College America, "Time Is the Enemy," September 2011, www.completecollege.org/docs/Time_Is_the_Enemy.pdf (accessed January 2, 2012).
10. The book *Getting to Graduation* will be published by Johns Hopkins University Press in 2012. The chapters in that book are based on the proceedings of an AEI conference called "Degrees of Difficulty," details of which can be found at www.aei.org/events/2011/02/15/degrees-of-difficulty-can-american-higher-education-regain-its-edge-event/.
11. See Rio Salado College's profile: College Choices for Adults, "Transparency by Design," www.collegechoicesforadults.org/institutions/9 (accessed February 28, 2012).
12. Western Governors University is the leading example of competency-based education at the bachelor's and master's level.
13. See the Aspen Institute, "Florida's Valencia College Named Top US Community College," news release, December 12, 2011, www.aspeninstitute.org/news/2011/12/12/valencia-college-wins-aspen-prize (accessed February 28, 2012).
14. National Center for Education Statistics, "Graduation Rates of First-Time Postsecondary Students Who Started as Full-Time Degree-Seeking Students . . . : Selected Cohort Entry

Years, 1996 through 2005," Digest of Education Statistics, table 341, July 2010, http://nces.ed.gov/programs/digest/d10/tables/dt10_341.asp (accessed February 27, 2012).

15. The IPEDS website is available at <http://nces.ed.gov/ipeds/>.

16. The *Beginning Postsecondary Students Longitudinal Study* (BPS) currently surveys cohorts of first-time, beginning students at three points: at the end of their first year, and then three and six years after first starting in postsecondary education. It collects data on a variety of topics, including student demographic characteristics, school and work experiences, persistence, transfer, and degree attainment.

17. To refine our dropout estimate, we first calculate the percentage of students enrolled in two-year colleges who transferred and obtained associate's degrees from a different institution three

years later using BPS by level and control of the institutions. In the most recent BPS study, of the 5,572 students enrolled in public two-year colleges, by the end of their sixth year, 9 percent of them had transferred and graduated with an associate's degree from a public institution, 7 percent had transferred and earned an associate's degree from a private not-for-profit institution, and 10 percent had transferred and graduated with an associate's degree from a private for-profit institution. Although BPS does not use the same cohort of students as our sample, theirs could be a close proxy for a 2006 cohort. Taken together with the IPEDS cohort and graduation numbers, the final number of dropouts for each institution equals the GRS cohort (full-time, first-time degree/certificate-seeking cohort) minus an estimate of the number of transfer students who obtained a degree six years later.