

What's The Value Of An Associate's Degree?

The Return On Investment For Graduates And Taxpayers



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Executive Summary

Never before has so much attention been paid to the return on investment (ROI) from a college degree. Given the high cost associated with earning a degree—and its frequently accompanying debt burden—students, parents, policymakers, and the media are questioning the value of higher education. For this report, we investigated one aspect of the value of higher education by looking at the labor market success of students who have graduated with an associate's degree from a community college as their highest academic credential.

Analyzing data from the U.S. Department of Education supplemented by data from PayScale, Inc.—a company that collects and analyzes salary and career data reported by individuals and employers—we estimated the added wages earned by graduates from nearly 600 community colleges and estimated the ROI for the graduates. In addition, we assessed the degree to which taxpayers benefit from the added wages that graduates with associate's degrees typically earn compared with wages of workers who have earned only a high school diploma.

In particular, we focused on two critical questions:

- Do graduates who earn an associate's degree and participate in the labor force experience returns, such as higher wages, that justify the costs incurred by them in obtaining that degree?
- Do taxpayers receive a positive return on their investment in the production of associate's degrees?

These questions are difficult to answer given currently available data. And it bears noting that students enroll in community colleges to pursue a variety of goals, not all of which culminate in earning a credential or transferring to a four-year institution in pursuit of a bachelor's degree. Additionally, many students enroll in only one or two courses solely to learn specific skills. Unfortunately, there is no way to credibly measure the ROI for these “non-completers” so we have limited our study to only the ROI for graduates who have earned no higher than an associate's degree.

We measured the costs and benefits of an associate's degree from two perspectives:

- The graduate's perspective:
 - Costs: actual outlays for earning the degree, including tuition paid, books, and foregone wages
 - Benefits: current salaries and earnings over the graduate's work-life
- The taxpayer's perspective:
 - Costs: state, local, and federal grants, contracts, and appropriations and grants to students
 - Benefits: taxes derived from the higher salaries and earnings of graduates

High dropout rates represent significant costs for students, community colleges, and taxpayers. Therefore, to calculate the ROI, we accounted for the likelihood that students will actually earn an associate's degree from the community colleges in our study and the average length of time it takes for them to earn the degree.

Gains for Graduates and Taxpayers

In 2011, the median starting salary for graduates of the community colleges in our sample was about \$35,000. On average, graduates from the lowest performing community colleges in our study (20th percentile) earned a median starting salary of about \$31,600 (or about \$3,400 less than the median starting salary), and graduates from the highest performing community colleges in our study (80th percentile) earned a median starting salary of about \$38,500 (or about \$3,500 more than the median starting salary). The spread between colleges with the best paid and least well paid graduates widened when we examined mid-career earnings. At mid-career, students graduating from the lowest performing schools (20th percentile) earned on average less than \$44,000, while those graduating

from the highest performing schools (80th percentile) earned on average more than \$57,100.

Even after factoring in the costs that graduates incur when earning the degree, the associate's degree is a good investment: with a median net gain during a 40-year work-life of more than \$259,000 compared with that of a high school graduate in the state where the community college is located. This translates into an annualized median rate of return of more than 4 percent.

However, there is a wide range in net gain, with students graduating from some community colleges realizing gains of less than \$100,000 on their college investment during their work-life, while graduates from other schools experience gains of more than \$400,000.

As graduates earn more, they pay more in taxes. In turn, taxpayers also benefit, gaining on average \$67,000 in additional tax revenues from a graduate of a median community college. But the range here is also substantial, from a net gain of \$27,000 drawn from graduates of schools with a starting salary at the 20th percentile to more than \$100,000 drawn from graduates of schools at the 80th percentile.

However, the annualized benefit to the taxpayer is low—with a median taxpayer ROI of -0.8 percent.

This study explored only some of the many factors that are likely associated with the variation between earnings and ROI—such as urban versus rural location, ethnic makeup of the community college's student body, and choice of major or field of study. Although some determinants of the variation in ROI are beyond the school's control, others, such as graduation rates and the programmatic mix chosen by students, can be affected by decisions made in the college or district.

We concluded that community colleges, states, and the nation as a whole should:

1. Reward progression, retention, and completion through performance funding formulas
2. Distribute resources in an informed manner to promote student success

3. Emphasize technical training and close ties between schools and their local labor market
4. Promote the collection of better data at the student and program levels, and make the data publicly available

Our data clearly support the first, second, and fourth conclusions. We also believe that our data lend support to the third conclusion, which is well documented in the work of College Measures and the Center on Education and the Workforce at Georgetown University and which many of the high graduate ROI schools in our study demonstrate¹: A community college that works closely with local industries and promotes technical training (for instance, in health care, petrochemicals, high-end manufacturing, and engineering support) can significantly increase the likelihood that its graduates will enjoy substantial income gains relative to high school graduates. The importance of close ties between colleges and local employers underlies the Obama Administration's plan for an \$8 billion Community College to Career Fund, which was announced at the end of July 2013,² and was the motivating force behind the \$2 billion Trade Adjustment Assistance Community College and Career Training Program that started in 2010.³

With better data in hand and with growing experiences that identify what works in individual community colleges and at the state policy level, we believe that strong two-year college leaders, working with state and local businesses and with state policymakers, can and will become more central players in the economic development of the nation. With that, community

colleges will stop being viewed as the weak link in the higher education continuum, and their students will no longer be identified as higher education's second-class citizens. With informed and decisive leadership in place, community colleges can continue to progress on fulfilling their mission of providing inexpensive and successful paths to middle-class jobs.

1 On the importance of technical training and the resulting payoff in higher wages, see the work of College Measures (<http://www.collegemeasures.org/esm>) and the Center on Education and the Workforce at Georgetown University (<http://cew.georgetown.edu/publications/reports/>). Appendix II presents a list of the high graduate ROI schools in this study.

2 See <http://www.whitehouse.gov/the-press-office/2013/07/30/fact-sheet-better-bargain-middle-class-jobs>.

3 See <http://www.insidehighered.com/news/2013/05/14/labor-department-grants-may-be-paying-community-colleges-and-students#ixzz2ad1ZwRSE>.

Introduction

Given the high cost associated with earning a degree—and its frequently accompanying debt burden—students, parents, policymakers, and the media are questioning the value of higher education. For this report, we investigated one aspect of the value of higher education by looking at the labor market success of students who have graduated with an associate's degree from a community college as their highest academic credential. We estimated the added wages earned by graduates of nearly 600 community colleges and estimated the costs and benefits of an associate's degree from two perspectives: the graduate and the taxpayer. For taxpayers, we assessed the degree to which they benefit from the added wages that graduates with associate's degrees typically earn compared with wages of workers who have earned only a high school diploma. This exploration focused on two questions:

- Do graduates who earn an associate's degree and participate in the labor force experience returns, such as higher wages, that justify the costs incurred by them in obtaining that degree?
- Do taxpayers receive a positive return on their investment in the production of associate's degrees?

Data Limitations

These are difficult questions to answer, and the data needed to fully understand what, on average, a degree is worth to a graduate or what the tax benefit of that degree is to taxpayers, is not currently available.⁴ Consequently, any attempt to pin down a degree's ROI for graduates or taxpayers must necessarily entail approximations that are subject to future revisions. This study is no different.

In a previous report, we calculated the ROI for graduates and taxpayers on bachelor's degrees by analyzing data from the U.S. Department of Education (ED) and supplemental data from PayScale, Inc., a company that collects and analyzes salary and career data for individuals and employers.⁵ The present study focuses solely on associate's degrees from public two-

4 For summary views of the problem, see Nelson, L. A. (2013, May 13). Idea whose time has come? Retrieved from <http://www.insidehighered.com/news/2013/05/13/political-winds-shift-federal-unit-records-database-how-much>; and Kelly, A. P. (2013, May 7). *Students need better information*. Retrieved from <http://thehill.com/opinion/op-ed/298359-students-need-better-information#ixzz2SisjRXxv>.

5 Klor de Alva, J., & Schneider, M. (2011) *Who wins? Who pays? The economic returns and costs of a bachelor's degree*. San Francisco: Nexus Research and Policy Center; Washington, DC: American Institutes for Research. Retrieved from <http://www.nexusresearch.org>.

year colleges and, again, relies mainly on data from ED and PayScale. This time, however, we used the latter's extensive information about pay reported by graduates who earned an associate's degree from a public two-year college as their highest academic credential.

Public two-year colleges, which enroll nearly one-third of the nation's postsecondary students,⁶ are widely recognized as vital to preparing the nation's workforce⁷ and educating seekers of bachelor's degrees who are looking for an affordable first two years of college. Community colleges generally offer low rates of tuition and open access. The Obama Administration has emphasized the role of community colleges as key to achieving its goal of the United States having the highest proportion of college graduates in the world by 2020.⁸ Because of their importance in the development of workplace skills, community colleges are expected to play a significant role in helping to maintain America's competitive edge, especially as the skills required for most jobs are rising and the prospect of a lifetime of career changes necessitates lifelong learning.⁹

Meanwhile, community colleges are a source of great concern, even among supporters who are committed to

their success. For example, California is home to nearly 25 percent of the nation's community college students, but approximately only half of those seeking a degree, certificate, or transfer meet their goal within six years. Hispanic and Black students in California fare even worse.¹⁰ Nationwide, nearly 28 percent of community college graduates obtain their associate's degree within four years (which is the longest time frame for community college graduation rates reported by ED), although some additional students receive their degree after four years.¹¹ Of course, other students transfer to four-year institutions or re-enroll after stopping-out (stop-outs) or are not accounted for as they swirl through other two-year and vocational schools (swirlers).¹² Still, others may abandon their studies after completing one or more courses, either because they did not want to continue or because they gained specific skills and did not need additional courses.¹³

The net effect is that some researchers (and critics) have questioned the quality of the education offered

6 Snyder, T. D., & Dillow, S. A. (2011). Table 201. Total fall enrollment in degree-granting institutions, by control and type of institution, age, and attendance status of student: 2009. In *Digest of Education Statistics 2010* (p. 295). Washington, DC: U.S. Department of Education. Retrieved from <http://nces.ed.gov/pubstudies/2011/2011015.pdf>. The 2013 Community College Fact Sheet of the American Association of Community Colleges estimates that 45 percent of all undergraduates in the fall of 2012 were community college students (http://www.aacc.nche.edu/AboutCC/Documents/fastfacts13_full.jpg).

7 Mullin, C. M., & Phillippe, K. (2013, January). *Community college contributions* (Policy Brief 2013-01PB). Washington, DC: American Association of Community Colleges. Retrieved from http://www.aacc.nche.edu/Publications/Briefs/Documents/2013PB_01_gray.pdf.

8 See <http://www.whitehouse.gov/issues/education/higher-education/building-american-skills-through-community-colleges>.

9 Mangam, K. (2013, February 13). *Community colleges are heeding the call to close the skills gap*. Retrieved from http://chronicle.com/article/Community-Colleges-Are-Heeding/137309?cid=at&utm_source=at&utm_medium=en; Friedman, T. (2013, January 29). It's P.Q. and C.Q. as much as I.Q. *New York Times*. Retrieved from <http://www.nytimes.com/2013/01/30/opinion/friedman-its-pq-and-cq-as-much-as-iq.html?src=recg&r=0>. Again, see <http://www.whitehouse.gov/the-press-office/2013/07/30/fact-sheet-better-bargain-middle-class-jobs> and <http://www.insidehighered.com/news/2013/05/14/labor-department-grants-may-be-paying-community-colleges-and-students#ixzz2ad1ZwRSE>.

10 California Community Colleges Student Success Task Force. (2012). *Advancing student success in the California community colleges*. Sacramento, CA: California Community Colleges Chancellor's Office, p. 4. Retrieved from http://www.californiacommunitycolleges.cccco.edu/Portals/0/StudentSuccessTaskForce/SSTF_FinalReport_Web_010312.pdf.

11 American Association of Community Colleges. (2012, April 4). *AACC statement on the American Enterprise Institute's "Completion matters: The high cost of low community college graduation rates."* Retrieved from <http://www.aacc.nche.edu/newsevents/News/articles/Pages/04042012.aspx>. In California many students ("a majority") get their degrees in years 4-6; however, this is a commingled full-time and part-time cohort (personal communication, Patrick Perry, Vice Chancellor, California Community Colleges Chancellor's Office).

12 Because the data from ED on graduation rates are institution-based, the rates for graduating with an associate's degree are underestimated at the institutional level because approximately 20 percent of students transfer and get their associate's degree from a different institution.

13 On the importance of transfers as markers of completion success, see Mullin, C. M. (2012, October). *Transfer: An indispensable part of the community college mission* (Policy Brief 2012-03PBL). Washington, DC: American Association of Community Colleges. Retrieved from <http://www.aacc.nche.edu/Publications/Briefs/Pages/pb10082012.aspx>. As for non-completers, approximately 30 percent of the headcount of the California Community Colleges system take only one course; however, this represents only approximately 4 percent of the total system's FTE enrollment (personal communication, Patrick Perry, Vice Chancellor, California Community Colleges Chancellor's Office).

by some two-year schools,¹⁴ as well as their cost effectiveness.¹⁵ But students enroll in community colleges to pursue a variety of goals, not all of which culminate in earning a credential or transferring to a four-year institution in pursuit of a bachelor's degree. This means that while some stop-outs, dropouts, and swirlers may be expensive to the institution and taxpayers by taking up seats that are subsidized by governments while not mastering marketable skills, other non-completers may be achieving their goal of acquiring certain mastery from taking a few courses at a community college. Additionally, many students enroll to learn only specific skills. For instance, in automotive technology many students stop their studies once they know how to fix some features on an engine or master some auto body repair techniques. These students do not complete the full degree because they are able to be employed, and even this partial education is likely to generate significant net economic gain for them and the taxpayer. Likewise, students who master a particular welding technique that is in high demand may be employed on the spot, foregoing the completion of the degree, and a network engineer may go to a community college to become certified in cyber security and leave after gaining the needed certification.

Earning a degree or certificate or transferring to a four-year school are therefore not the only factors determining the economic value of studying in a community college. From a conceptual standpoint we did not consider such skill-seekers to be “taxpayer losses,” but due to the absence of any systematic links between student-level data and wage data, we were without the data needed to measure the taxpayer gain from students who take only one or a few courses.¹⁶

14 Fain, P. (2013, May 7). *Low bar, high failure*. Retrieved from <http://www.insidehighered.com/news/2013/05/07/community-college-students-struggle-meet-low-academic-standards-study-finds>.

15 See, for example, Wellman, J. P. (2011, December 1-2). *Financial characteristics of broad access public institutions: Background paper prepared for the Stanford University Conference on Mapping Broad Access Higher Education*. Retrieved from [http://cepa.stanford.edu/sites/default/files/wellman\(full\).pdf](http://cepa.stanford.edu/sites/default/files/wellman(full).pdf).

16 Studies based on national surveys, such as the National Education Longitudinal Study, can point to a return overall for taking courses without earning a degree, but these studies cannot drill down to the individual

To repeat, we recognize that students matriculating at a two-year school may have one or more goals: earning an associate's degree, learning a specific skill, obtaining an industry-recognized certificate, taking noncredit courses to improve professional credentials or remedial courses to prepare for further postsecondary education, taking credit-bearing courses to prepare for transfer to a four-year college or university, or taking courses to improve the quality of their life. Furthermore, transfer students, with or without an associate's degree, represent a significant percentage of the successes to be realized at community colleges. Christopher Mullin, formerly a policy analyst at the American Association of Community Colleges, maintains that the transfer enterprise at community colleges is logically an “indispensable” part of the community college mission, calculating that 28 percent of all bachelor's degree holders began college at a two-year institution and 47 percent of all bachelor's degree holders completed at least one course in a community college.¹⁷

campus level nor can they produce such estimates for different programs of study. See, for example, Marcotte, D., Bailey, T., Borkoski, C., & Kienzl, G. (2005). The returns of a community college education: Evidence from the National Education Longitudinal Study. *Educational Evaluation and Policy Analysis*, 27(2), 157-175. Further, two recent state-level studies shed light on the topic. For Kentucky, see Jepsen, C., Troske, K., & Coomes, P. (2012). *The labor-market returns for community college degrees, diplomas, and certificates* (Discussion Paper Series No. DP 2009-08). Lexington, KY: University of Kentucky, Center for Poverty Research. Retrieved from <http://www.ukcpr.org/Publications/DP2009-08.pdf>. For Washington, see Dadgar, M., & Weiss, M. J. (2012). *Labor market returns to sub-baccalaureate credentials: How much does a community college degree or certificate pay?* (CCRC Working Paper No. 45). New York: Teachers College, Columbia University, Community College Research Center. Retrieved from <http://ccrc.tc.columbia.edu/publications/labor-market-returns-sub-baccalaureate.html>. For another relevant study that focused on four-year institutions, see Owen, S., & Sawhill, E. (2013). Should everyone go to college? (CCF Brief No. 50). Washington, DC: Center on Children and Families at Brookings. Retrieved from <http://www.brookings.edu/~media/research/files/papers/2013/05/07%20should%20everyone%20go%20to%20college%20owen%20sawhill/08%20should%20everyone%20go%20to%20college%20owen%20sawhill.pdf>. The message in this source supports our major theme reported here that the payoff that students get from a college education varies and that the returns for not finishing also vary widely: “While the average return to obtaining a college degree is clearly positive, we emphasize that it is not universally so. For certain schools, majors, occupations, and individuals, college may not be a smart investment. By telling all young people that they should go to college no matter what, we are actually doing some of them a disservice” (p. 1).

17 Mullin, C. M. (2012, October). *Transfer: An indispensable part of the community college mission* (Policy Brief 2012-03PBL). Washington, DC: American Association of Community Colleges, p. 5. Retrieved from <http://www.aacc.nche.edu/Publications/Briefs/Pages/pb10082012.aspx>.

In addition, in 2012, more than 600,000 certificates were awarded, and 11 percent of those in the labor force reported certificates as their highest postsecondary credential.¹⁸ Clearly, offering certificates is now integral to the community college mission. In fact, we began this study with extensive research into certificates. However, we could find no sources that would have made it possible to analyze certificates across all states the way we can analyze the returns on degrees. As Anthony Carnevale noted in a study about certificates, “only one of the major government socioeconomic surveys has information on certificate holding” and therefore certificates have received limited evidence-based attention.¹⁹ Although we recognize their importance, including the fact that some certificates permit students to earn starting salaries that are higher than those earned by associate’s or even bachelor’s degree holders,²⁰ we were unable to include them in our study. However, certificate seekers and transfers are not counted as dropouts in our calculations.²¹

In short, we recognize the multiple dimensions of the community college mission and that for many students, attaining an associate’s degree is not why they enrolled. That said, the awarding of associate’s degrees is widely recognized as one of the most important roles

of community colleges and certainly one of the main reasons for which taxpayers are willing to subsidize them. Consequently, the focal points of this study are *the labor market successes of graduates with associate’s degrees as their highest credential and the associated benefits (or losses) to taxpayers resulting from those degrees.*²²

Do All Associate’s Degrees Have Sufficient Market Value to Compensate for Their Cost?

Data from the U.S. Census and recent research²³ show that, on average, students with associate’s degrees earn more income than high school graduates and are less likely to be unemployed, even in harsh economic times. Further, data from Virginia, Tennessee, Colorado, and Texas show that graduates with technical- or occupation-based associate’s degrees can earn more in their first year after graduation than many graduates with bachelor’s degrees,²⁴ a finding that is congruent with the research of Carnevale and others.²⁵ However, the data in these detailed College Measures studies

18 The number of certificates included longer term certificates (between 1 and 2 years in length) and short-term ones, as reported in IPEDS. The 11-percent estimate comes from Carnevale, A., Rose, S., & Hanson, A. (2012 June). *Certificates: Gateway to gainful employment and college degrees*. Washington, DC: Center on Education and the Workforce, Georgetown University. Retrieved from <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/Certificates.ExecutiveSummary.071712.pdf>.

19 Carnevale, A., Rose, S., and Hanson, A. (June 2012) *Certificates: Gateway to gainful employment and college degrees*, (Executive Summary). Washington, DC: Center on Education and the Workforce, Georgetown University, pp. 1, 3. Retrieved from <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/Certificates.ExecutiveSummary.071712.pdf>.

20 Mangan, K. (2013, April 25). *Tech training may provide fatter paychecks than 4-year degrees, study finds*. Retrieved from http://chronicle.com/article/Tech-Training-May-Provide/138831/?cid=cc&utm_source=cc&utm_medium=en; and Greenhouse, S. (2013, March 18). *The great aid gap*. *New York Times*. Retrieved from <http://www.nytimes.com/2013/03/19/education/financial-aid-is-scarce-for-job-training-certificates.html?pagewanted=all&r=0>.

21 See Appendix I: Weighted total benefit (cost) to taxpayers per degree; Step 2: Calculate the number of true dropouts (and rate of true dropouts) using data from Beginning Postsecondary Students.

22 We recognize that critics or colleges identified as having a low ROI are likely to use this study’s absence of information about certificates as the reason to explain their standing in our database. However, it is important to remember that this absence applies to all the schools in our sample, including those with high student ROI. While we lament this limitation, without appropriate data, we could not proceed in our initial effort at including certificates. We also recognize that in some cases, such as California, the inclusion of “transfer associate’s” degrees make the economic value of these degrees, in and of themselves, questionable, while some of the highest paying wages are in certificate programs offered by California community colleges (personal communication, Patrick Perry, Vice Chancellor, California Community Colleges Chancellor’s Office). See also the data reported for Tennessee and Texas on certificates available at <http://www.Collegemeasures.org>. The differences in wages for academic/transfer versus occupation/technical associate’s degrees in these two states, plus Virginia and Colorado, are also available at <http://www.collegemeasures.org>.

23 See, for example, Belfield, C. R., & Bailey, T. (2012). *The benefits of attending a community college: A review of the evidence*. *Community College Review*, 39(1), 45–60.

24 See <http://collegemeasures.org/category/Reports.aspx>. Note also that several of the Texas schools that are listed in the highest quintile of student ROI in Appendix II have close ties to the petrochemical and oil industries.

25 See, for example, Carnevale, A., Jayasundera, T., & Hanson, A. (2012 September). *Career and technical education: five ways that pay along the way to the B.A.* Washington, DC: Center on Education and the Workforce, Georgetown University. Retrieved from <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/CTE.FiveWays.ExecutiveSummary.pdf>.

also show that not all community colleges are equally successful—graduates from some campuses do far better than students from others—even those with the same major and even when adjusted for differences in cost of living among states.²⁶

Much of the difference among campuses in the ROI for graduates and taxpayers results from local economic conditions and, in the case of taxpayer benefits, state taxation policies. To be sure, most of the critical variables that we identified as affecting student and taxpayer returns from an associate's degree are not controlled by the community college, such as its student population, the strength of the regional economy, and the associated regional cost of living. Consequently, we do not advocate that our results be used for accountability purposes; instead, our goal is to provide information about the relative successes of different schools in order to help guide both administrators and policymakers.

Moreover, students and taxpayers should know their ROI and investigate further what can be done to increase it. For students, this may be achieved by choosing a different community college with a better ROI or by thinking more carefully about majors or fields of study (even in lower ROI community colleges, some programs will have more successful graduates than others). For states and local communities that subsidize community colleges, legislators should be alerted to low ROI and inquire about what might be done to improve it—for example, improving retention and graduation rates or investigating the extent to which the mix of programs at a community college meshes with the needs of the local economy.

26 See Appendix III for the example of California that uses the cost-of-living adjustments available at <http://www.relocationessentials.com/aff/www/tools/salary/col.aspx>.

What Did We Measure and How Did We Calculate It?

This study is based on data drawn from 579 community colleges, representing nearly 60 percent of all U.S. community colleges and more than 80 percent of full-time equivalent (FTE) enrollment.²⁷ To estimate the ROI that graduates and taxpayers make on an associate's degree, we combined wage data—gathered by PayScale.com—and publicly available data about enrollments, graduation rates, revenues and expenditures, and other measures of the resources for each of these community colleges.

These data and our calculations are explained in the following pages and in more detail in Appendix I. As we go through these explanations, we need to be clear that our calculations *are limited to direct, measurable economic costs and benefits that can be compared across institutions nationwide*. As previously stated, the focal points of this study are *the labor market successes of students with associate's degrees as their highest credential and the associated benefits (or losses) to taxpayers resulting from those degrees*.²⁸

27 In 2011, there were 967 U.S. Title I associate's degree- and certificate-granting, public, two-year colleges, with an average FTE enrollment of 4,359. As we show later, the 579 schools in our set of community colleges are larger, with an average FTE enrollment of more than 6,000.

28 We reiterate that students may gain financially even by investing in one or two courses that improve their skills and, thereby, their employability. Likewise, we are aware that in investing in higher education, taxpayers receive many other benefits beyond higher income tax receipts—such as avoided costs of incarceration, social services, and taxpayer-supported health care. They also benefit substantially from the receipts generated by college staff payrolls and the increased activity in the local economy that more educated workers generate. Important as these contributions are, these indirect benefits (whose study requires complex economic modeling of the localities in question) necessarily fall outside the focus of this study. For a recent summary about what investing in higher education does for the economy, see Spradley, M. M. (2013, January 9). Investing in higher education pays big dividends for the economy. *The Baltimore Sun*. Retrieved from <http://www.baltimoresun.com/news/opinion/bs-ed-federal-spending-20130109,0,5838499.story>. For an attempt to quantify the economic benefits provided by a community college district in California, see Economic Modeling Specialists, Inc. (2010). Economic contribution of Foothill De Anza Community College District: Analysis of investment effectiveness and economic growth. Retrieved from <http://www.research.fhda.edu/documents/3.FHDAEISMainRptFY09-10Final.pdf>; on the economic benefits provided by a community college district in Texas see Economic Modeling Specialists, Inc. (2010). *Economic contribution of San Jacinto College District: Analysis of investment effectiveness and economic growth*. Retrieved from http://sites.hccs.edu/thetarget/files/2012/03/SanJacinto_MainReport_0809_Final.pdf; and on the economic benefits

We measured the costs and benefits of an associate's degree from two perspectives:

- The graduate's perspective
 - Costs: actual outlays for earning the degree, including tuition paid, books, and foregone wages
 - Benefits: current salaries and earnings over the graduate's work-life
- The taxpayer's perspective:
 - Costs: state, local, and federal grants, contracts, and appropriations; capital appropriations; and grants to students
 - Benefits: taxes derived from the higher salaries and earnings of graduates

High dropout rates represent significant costs for students, community colleges, and taxpayers.²⁹ Therefore, to calculate the ROI, we accounted for the likelihood that students will actually earn an associate's degree from the community colleges in our study and the average length of time it will take students to earn the degree.³⁰

Determining the cost of dropouts requires defining with care who is to be included in any estimate. As noted previously, we cannot calculate the ROI for non-completers (many of whom may actually receive the benefit they seek in taking only one or more courses). We also did not calculate separately the actual costs

provided by two- and four-year public colleges in Florida, see Troop, D. (2013, March 18). *Public colleges contribute \$26.6-billion annually to Florida economy, report says*. Retrieved from http://chronicle.com/blogs/bottomline/public-colleges-contribute-26-6-billion-annually-to-florida-economy-report-says/?cid=cc&utm_source=cc&utm_medium=en.

29 See, for example, Schneider, M. (2010). *Finishing the first lap: The cost of first-year student attrition in America's four-year colleges and universities*. Washington, DC: American Institutes for Research. Retrieved from http://www.air.org/files/AIR_Schneider_Finishing_the_First_Lap_Oct101.pdf.

30 See Appendix I, "Weighted total benefit (cost) to taxpayers per degree," for how we accounted for students who accumulated credits but did not use them for any high-order outcome, such as a certificate or to transfer. Once again, for the reasons noted in this study, we do not account for the benefits that accrue to non-completers from taking one or more courses, but we recognize that these benefits could be substantial for the individual.

represented by single course takers, or even one-term students, although we assume it is relatively small (e.g., approximately 30 percent of the headcount of the California Community Colleges system take only one course; however, this represents only about 4 percent of the total system's FTE enrollment³¹). And, for example, a student taking only recreational physical education cannot really be considered a true dropout if he/she never earns a degree or transfers. Nonetheless, that student, along with all others attending for one course or one term, is supported by taxpayers through state and local appropriations and subsidies. Together, these single course takers when added to the number of students who accumulate a larger number of credits without achieving a successful outcome, represent a significant cost to taxpayers.³²

The wages of graduates from each school are critical to this study. PayScale provided us with estimated starting median pay for graduates of the 579 community colleges in our database. Starting median pay is the key labor market outcome measure for this analysis. This pay represents earnings for graduates roughly two years after completing their associate's degrees. On average, these graduates were 25 years of age. PayScale also calculated the mid-career median pay of each school's graduates, which are earnings approximately 15 years after degree completion.³³

As detailed in Appendix I, ROI for graduates is driven by (1) the costs of earning the degree (including direct costs for tuition and fees plus the opportunity costs encapsulated by lost wages³⁴); (2) their starting and

31 Personal communication, Patrick Perry, Vice Chancellor, California Community Colleges Chancellor's Office.

32 See, for example, Schneider, M., & Yin, L. (2011 October). *The hidden costs of community colleges*. Washington, DC: American Institutes for Research. Retrieved from http://www.air.org/files/AIR_Hidden_Costs_of_Community_Colleges_Oct2011.pdf.

33 Appendix I has more information about PayScale and its quality assurance methods.

34 We recognize that approximately 75 percent of community college students work, and the actual foregone wages should be the difference between average earnings while attending school versus earnings of high school students at the appropriate ages. But because data necessary to reliably calculate that average at the school level is not available, we

mid-career earnings; (3) the calculation of their work-life earnings; and (4) the taxes they pay on the higher incomes that they earn.

To compute the taxpayer benefits, we accounted for their investments in the production of the degrees by way of government subsidies. Just as we calculated the added wages that students with a degree earn compared with a high school graduate, we also measured the extent to which taxpayers share in the resulting higher wages through the additional taxes these wages produce.³⁵

The ROI for graduates and taxpayers was based on calculating the present value of the added income associated with earning the degree over a 40-year work-life³⁶ and then computing an annualized rate of return from those added earnings minus the costs of the degree. Our unit of analysis is the individual community college. (The data used for each of the colleges in our sample is available as a downloadable spreadsheet from the Nexus website: <http://nexusresearch.org/reports/valueof2yrdegree>.) Appendix II lists the top and bottom quintile of performers. Appendix III, by way of example, demonstrates the importance of cost-of-living adjustments applied to the community colleges in our

calculate foregone wages as the equivalent of the average earnings of high school graduates during the average number of years it takes to earn an associate's degree from each campus. This likely drives up the costs of earning the degree, as we calculate them, and reduces ROI—but just how much is impossible to gauge in the absence of the relevant data.

35 Unfortunately, we could not adjust these ROI calculations by estimating the fraction of credit hours taken by students who left the school because they genuinely never intended to complete a degree or certificate or to transfer, because we lack a reliable method to account for the fact that financial aid and local requirements lead some applicants to provide inaccurate or false information about their intent. In addition, without federal student-unit record data associated with wage data, we cannot get salary information for non-completing students, whether enrolled in organized non-degree programs or not, or for students who left their studies but are now in the workforce with “some college credits and no certificate or degree.” In Arizona alone, more than 800,000 people are in the workforce with “some college credits and no certificate or degree” (personal communication, Chris Bustamante, President, Rio Salado College).

36 Here we follow the U.S. Census practice of limiting a work-life to 40 years. See, for example, Day, J. C., & Newburger, E. C. (2002). *The big payoff: Educational attainment and synthetic estimates of work-life earnings*. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. Retrieved from <http://www.census.gov/prod/2002pubs/p23-210.pdf>.

study by focusing on those located in California. Where appropriate in the analysis below, we report state and national averages based on the schools in our sample weighted by FTE students.³⁷

Community Colleges in the Study

The 579 community colleges in our study represent more than half of the community colleges in the nation and approximately 80 percent of FTE students. The set of community colleges resulted from a multistep process. Using ED's Integrated Postsecondary Education Data System (IPEDS), we first identified 967 community colleges with the following characteristics: United States, Title IV, degree granting, public, two-year, and primarily associate's and certificate institutions. However, to measure ROI, we needed earnings data for graduates from these community colleges—something not collected by the federal government. For these data, we contracted with PayScale to comb their large database to identify community colleges that had a sufficient number of graduates to generate earnings estimates.³⁸ PayScale reported to us only community colleges with a 90-percent confidence interval around their estimated earnings, as of June 1, 2011. Reporting was dependent on the confidence interval around the observation, which is a function of both the number of observations and the extent of variation across the wages reported by alumni of the community colleges. Because we were also interested in work-life earnings, we asked PayScale to produce estimates of mid-career earnings. As noted in Appendix I, these mid-career earnings estimates were used to adjust projected work-life earnings that are estimated using U.S. Census-based income growth curves.

37 As noted, these averages are based on the community colleges in our sample. These averages do not necessarily represent the averages that would be calculated using all community colleges in the nation. That said, because the 579 schools we analyze represent over 80 percent of the FTEs enrolled in community colleges, as is evident in Table 1, except for size and urban location, there are only limited differences between the colleges in our sample and all community colleges.

38 For a description of how PayScale collects its data, see PayScale, Inc. (n.d.). *PayScale methodology*. Retrieved from http://www.PayScale.com/resources_methodology.

Table 1: Characteristics of Community Colleges in Sample Versus All Community Colleges, 2010

Characteristic	In Subset	All Community Colleges
Number of institutions	579	967
Average 12-month FTE enrollment, 2009-10	6,111	4,481
Percent of undergraduate enrollment, Black	13.1	14.4
Percent of undergraduate enrollment, Hispanic	11.9	11.3
Percent of undergraduate enrollment, Asian descent	3.95	3.23
Percent of undergraduate enrollment, women	57.4	60.1
Percent of undergraduate enrollment receiving Pell Grants	34.3	36.4
Graduation rate, total cohort (percent)	22.3	22.9
Student-to-faculty ratio	22.1	21.4
Retention rate of full-time students (2010)	59.5	57.9
Retention rate of part-time students (2010)	41.9	40.8
Current year Graduation Rate Survey (GRS)* cohort, as a percentage of entering class	36.8	38.5
Average revenues from state appropriations per FTE enrollment**	\$2,991	\$3,198
Average revenues from local appropriations per FTE enrollment**	\$1,722	\$1,665
Total expenditures per FTE enrollment***	\$10,219	\$10,877
Percent city	34.2	29.6
Percent suburb	21.2	17.1
Percent town	16.9	21.6
Percent rural	27.6	31.6

* The GRS cohort includes only first-time, full-time, degree- or certificate-seeking students who begin their studies in the fall term.

** Governmental Accounting Standards Board.

***IPEDS reports expenditures in seven different categories. This is the sum of those.

We matched these earnings data with institutional data from the 967 community colleges that we identified through IPEDS. We encountered some data issues in the matched set (e.g., in some cases, such as the Lone Star College System in Texas, we could not include its community colleges because the individual campuses reported their data at the system level). After cleaning the data, we ended up with a set of 579 institutions. On average, PayScale reported 279 observations per community college in our analysis.³⁹

39 Thirteen schools have less than 50 observations; 97 have between 50 and 100; 244 have between 100 and 250; and the remaining 225 have more than 250 observations.

Selected Characteristics of the Community Colleges in Our Sample

Table 1 compares selected characteristics from the community colleges analyzed in this study with all community colleges in the nation. Size of enrollment is the most pronounced difference between the two sets of schools: Schools in our dataset are almost 50 percent larger than the national average. This difference results from the requirement of a sufficient number of observations within an institution to generate earnings estimates. Also notable is the difference in urban or suburban location. Per the last four rows in Table 1, community colleges in our sample are more likely to be located in cities (34 percent vs. 29 percent) or suburbs (21 percent vs. 17 percent) than would be expected.

Most other differences are small, usually less than 1 percentage point or a few hundred dollars, suggesting that the community colleges in our set of schools

Table 2: Variance in Earnings and ROI

Wage Outcomes	School Performance		
	20th Percentile	Median	80th Percentile
Student Returns			
Starting salary	\$31,600	\$35,000	\$38,500
Mid-career salary	\$43,800	\$50,900	\$57,100
Average work-life earnings gain	\$86,299	\$259,200	\$437,000
Student ROI	1.7%	4.4%	5.9%
Taxpayer Returns			
Net gain to taxpayers	\$27,000	\$67,000	\$101,000
Taxpayer ROI	-1.4%	-0.8%	0.001%

are fairly representative of the nation’s entire set of community colleges.

The Labor Market Success of Community College Graduates and Resulting Benefits for Taxpayers

Table 2 presents the distribution of key outcome earnings measures among graduates who earned an associate’s degree as their highest credential in the sample of schools in our study. Specifically, Table 2 identifies the median gains to graduates and, to give some sense of range, those numbers from schools performing at the 20th percentile (lowest quintile) and at the 80th percentile (the highest quintile). We used these earnings data, combined with the costs of earning those degrees, to produce estimates of the gain in earnings across a 40-year work-life. We then calculated an annualized ROI for the graduate.⁴⁰

Gains for Graduates and Taxpayers

In 2011, the median *starting salary* for graduates of the community colleges in our sample was about \$35,000. On average, graduates from the lowest performing community colleges in our study (at the 20th percentile) earned a median starting salary of about \$31,600 (or about \$3,400 less than the median starting salary), and graduates from the highest performing community colleges in our sample (at the 80th percentile) earned a median starting salary of about \$38,500 (or about

\$3,500 more than the median starting salary). The spread between colleges with the best paid and least well paid graduates widened when we examined *mid-career earnings*. At mid-career, students graduating from the lowest performing schools (20th percentile) earned on average less than \$44,000, while those graduating from the highest performing schools (80th percentile) earned on average more than \$57,100.

Even after factoring in the costs that graduates incur when earning the degree, the associate’s degree is a good investment: with a median net gain during a 40-year work-life of more than \$259,000 compared with that of a high school graduate in the state where the community college is located.⁴¹ This translates into an annualized median rate of return of more than 4 percent. (The sidebar describes how these numbers are calculated.) However, there is a wide range in the net gain, with students graduating from some community colleges realizing gains of less than \$100,000 on their college investment during their work-life, while graduates

41 We are aware that given the focus of this study—graduates whose highest credential was an associate’s degree—we may be underestimating the earnings gain from attending community college. First, we are not counting the earnings of the approximately 14 percent of graduates with associate’s degrees who went on to earn a bachelor’s degree—this we have done in a previous study [Klor de Alva, J., & Schneider, M. (2011). *Who wins? Who pays? The economic returns and costs of a bachelor’s degree*. San Francisco: Nexus Research and Policy Center; Washington, DC: American Institutes for Research. Retrieved from <http://www.nexusresearch.org>]. Second, we assume students who do not earn a degree continue to make the wage earned by those with only a high school diploma, although we recognize that almost as many community college students get a certificate as earn an associate’s degree. While, on average, the certificate earnings premium is not as high as the premium gained from earning an associate’s degree, we recognize that these two points bias our results downward.

40 Appendix I describes in detail how we calculate both the work-life earnings and ROI.

Example of How Student and Taxpayer ROI Are Calculated

Colby Community College Kansas IPEDS UNITID 154934

We begin with the estimated wage data from PayScale.

Starting salary	\$39,600
Mid-career	\$52,400

Next, we calculate student returns. Student returns are driven by the estimated earnings gain a graduate with an associate's degree experiences relative to those of a high school graduate. We have to subtract the costs (both direct outlays and opportunity costs through lost wages) from those gains.

Student Gains

Net Lifetime Financial Return To Student by Associate's Degree vs. High School Diploma	\$354,057	From the net income gain, subtract out costs of earning the degree and create the current value of the lifetime earnings gain
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Costs of Earning the Degree

Total Budget Minus Annual Aid per Student	\$4,735	Estimated annual costs of tuition, books, and fees minus average grants multiplied by the average time to degree
Annual Foregone Wages	\$14,538	Estimated annual earnings of a high school graduate in his/her early 20s
Total Foregone Wages per Student	\$31,984	Multiply the annual wages by the average time to degree to produce estimated lost wages during the pursuit of the degree (opportunity costs)
Total Cost of the Associate's Degree	\$36,719	The sum of total budget and total foregone wages
ROI (Return to Student- Cost to Student)/ Cost to Student	8.64	
Calculated Annualized Student ROI	5.83%	Calculate the annual rate of return to the associate's degree compared with just a high school diploma from Net Lifetime Financial Return.

Taxpayer Benefits

Taxpayer Gain

Average Lifetime Financial Return to Taxpayer	\$93,603	Student income gain multiplied by existing tax rates
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Taxpayer Subsidies and Returns

Student Grants for Tuition	\$2,138,578	These are from IPEDS, summed and turned into a per FTE student measure.
Earnings on Loans	\$254,370	
State and Local Grants and Appropriations	\$5,941,598	
Federal Grants and Appropriations	\$1,110,861	
Sum Amount Received from Government	\$8,936,667	
Net Amount Received from Government	\$8,636,252	
Taxes Paid/Forgone	-\$1,530,688	
Amount Paid to the Government	-\$1,543,439	
Total Annual Benefit (Cost) to the Taxpayer	-\$10,179,690	
Annual Benefit (Cost) to the Taxpayer per Student	-\$9,880	
Weighted Total Benefit (Cost) to Taxpayers per Degree	-\$38,997	
ROI (Lifetime gain to taxpayer-cost to taxpayer)/ Cost to taxpayer	1.40	
Calculated Annualized Taxpayer ROI	2.21%	

from other schools experience gains of more than \$400,000.⁴²

As graduates earn more, they pay more in taxes. Consequently, taxpayers also benefit, gaining on average \$67,000 in additional tax revenues from a graduate of a median community college. But the range here is also substantial, from a net gain of \$27,000 drawn from graduates of community colleges at the 20th percentile to more than \$100,000 drawn from graduates of schools at the 80th percentile. However, the annualized benefit to the taxpayer is low: with a median taxpayer ROI of -0.8 percent and even lower from community colleges at the 20th percentile.⁴³ This negative return is driven in large part by the low student success rates at community colleges. Taxpayers subsidize the attendance of all students in community colleges, but in our calculations, since on average nearly half of community college students fail to earn an associate's degree (or a certificate or a transfer), these expenditures represent significant costs going to educate students who are not earning a degree (or a certificate or a transfer⁴⁴), thus reducing taxpayer ROI.⁴⁵

42 As discussed in this report and detailed by Carnevale and others, the graduate's major or field of study is also a key factor in determining the net gain in earnings. See, for example, Carnevale, A., Strohl, J., & Melton, M. (n.d.). *What's it worth: The economic value of college majors*. Washington, DC: Center on Education and the Workforce, Georgetown University. Retrieved from <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/whatsitworth-complete.pdf>.

43 We recognize that this is a snapshot based on one year's data on costs and wages. However, relative wage data for four-year schools, which PayScale has been reporting for several years, is remarkably stable.

44 Our study does not include a calculation of ROI for certificate or transfer students, nor does it count them as dropouts (see Appendix I). As noted previously, we recognize that certificate earners and transfers to four-year institutions gain value from their community college experience, and many of the former earn more than many graduates with associate's degrees or even bachelor's degrees. It is also worth repeating that there is some ROI for students who do not complete a degree or certificate or transfer to another school that results from the education/training they received in one or several courses completed at a community college. However, that ROI is not the subject of this study because it is impossible to get accurate data on the earnings of such students at the national level in the absence of nationwide student unit-record data that are associated with a database with salary data.

45 The results of the Kentucky and Washington studies (cited previously) support the conclusion that, in general, graduates gain greater returns than do certificate holders or those with "some college, no degree." See Jepsen,

Explaining the Variation in Starting Salary

Several important factors may be driving the variation observed in starting wages among community college graduates: location, gender and ethnicity, major (field of study), and resources.

Location

The rural location of a community college may affect starting wages of graduates. In our calculations, starting wages for graduates from community colleges located in rural areas averaged only \$33,900. These earnings are lower than those observed among graduates from community colleges in towns (\$34,500), cities (\$35,800), and suburban areas (\$36,000).

Numerous factors are causing the rural-urban disparity, including the preponderance of low-paying, low-skilled jobs in rural areas. This means that the premium which rural college graduates earn in comparison with high school graduates is significantly lower than that experienced by their urban peers.⁴⁶ As the work of the Economic Research Service of the U.S. Department of Agriculture has shown, another distinguishing factor is that as the level of education increases, the gap between rural and urban pay increases.⁴⁷

C., Troske, K., & Coomes, P. (2012). *The labor-market returns for community college degrees, diplomas, and certificates*. Retrieved from <http://www.ukcpr.org/Publications/DP2009-08.pdf>; and Dadgar, M., & Weiss, M. J. (2012). *Labor market returns to sub-baccalaureate credentials: How much does a community college degree or certificate pay? (CCRC Working Paper No. 45.)* New York: Teachers College, Columbia University. Retrieved from http://capseecenter.org/wp-content/uploads/downloads/2012/07/332_1101.pdf.

46 Note, our calculations include a built-in bias, because the high school figure being used is a state average that includes both urban and rural schools, rather than a more local figure. Consequently, the premium might be lower. Furthermore, we are assuming people generally continue to live in the area where they went to college (a reasonable assumption for community colleges, but obviously not for many four-year institutions).

47 (2008, March 3). Explaining the gap in pay between rural and urban work. Daily Yonder. Retrieved from <http://www.dailyyonder.com/explaining-gap-pay-between-rural-and-urban-work>. This example points to the importance of considering cost-of-living differences when comparing earnings, especially starting wages. For an application of cost-of-living adjustments to the earnings of graduates with associate's degrees from community colleges in California, see Appendix III. In future work, we will explore more fully the impact of variance in cost of living on student returns.

When we shifted our analysis from the campus level to state averages, it was no surprise to find that rural states also lag behind other states in starting and mid-career salaries. Table 3 shows the 10 states with the lowest average starting- and mid-career salaries among community college graduates. In most of these states, according to recent Census counts, more than 50 percent of the population lives in small cities or rural areas.⁴⁸

Table 3: States With the Lowest Average Starting and Mid-Career Salaries Among Community College Graduates

State	Starting Wages	Mid-Career Wages
National Median	\$35,000	\$50,900
Montana	\$25,500	\$32,900
Vermont	\$29,900	\$41,600
Idaho	\$30,300	\$43,700
Missouri	\$30,300	\$39,800
Georgia	\$30,400	\$41,100
South Dakota	\$31,000	\$40,100
Nebraska	\$31,100	\$41,000
Louisiana	\$31,300	\$42,000
Arkansas	\$31,500	\$44,200
North Dakota	\$31,600	\$46,000

Gender and Ethnicity

Table 4 presents additional factors that are associated with variations in starting earnings.⁴⁹ The numbers in the second column show how much starting salaries change with a “one-unit” change in a specific characteristic of a community college. For example, for every increase in the percentage of the student body that is female, the average starting salary of graduates falls by more than \$80. This reflects the unfortunate but well-known fact that despite recent advances in the workforce by women, they still earn, on average,

approximately 75 percent of what males earn.⁵⁰ Furthermore, compared with men, greater proportions of women major in programs of study that tend to offer low pay. Not surprisingly, community colleges with larger concentrations of females have graduates with lower average starting wages.⁵¹

The numbers in the third column indicate how likely (or probable) the findings reported are the result of chance. A 0.05 significance level is usually considered the standard—meaning there is only a 5 percent chance that the reported results differ from no effect. A 0.01 significance level is a more robust standard (only a 1 in 100 chance of finding the outcome by chance).⁵²

Table 4 also shows the effects of ethnicity on starting earnings. For example, for every percentage point increase in the student population that is of Asian descent,⁵³ the average starting salary of graduates increases by more than \$190. Meanwhile, a 1-percent increase in the concentration of Blacks improves average starting earnings by nearly \$35—although there is much less certainty here (0.031) than the effect reported for people of Asian descent (0.0001). When we apply the same calculations to the effect on starting wages if the percentage of Hispanics increases by 1 point, the result is small (just \$1.00) and not statistically significant (0.93).

48 http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=DEC_10_113_P2&prodType=table

49 The regression coefficients reported in Table 4 are based on an equation that also included variables for which state the community college was located in a city, suburb, town, or rural area. Hence, these effects are “net” of location.

50 See, for example, <http://www.americanprogress.org/issues/labor/news/2012/04/16/11391/the-top-10-facts-about-the-wage-gap/>

51 Recent data on women in the workforce show that this trend is already starting to be reversed in some areas, as women now have higher college completion rates and are making significant strides in the workforce. See, for example, Appelbaum, B. (2013, March 20). Study of men’s falling income cites single parents. *New York Times*. Retrieved from http://www.nytimes.com/2013/03/21/business/economy/as-men-lose-economic-ground-clues-in-the-family.html?nl=afternoonupdate&emc=edit_au_20130320&_r=0. However, while large numbers of females do go into health-care fields—such as nursing, which is a fairly well-paying career—they also are over-represented in a range of low paying fields, such as early childhood education, cosmetology, and home care.

52 While significance tests are not, strictly speaking, appropriate because this is not a random sample of community colleges, we used these tests to give readers a sense of the robustness of the findings.

53 Because there are so many distinct Asian ethnicities and heritages that do not see themselves as sharing a common culture, tradition, or history, we decided to use the most neutral descriptor possible: “Asian descent.”

Table 4: Changes in Starting Salary per Unit of Change

Campus Characteristic	Regression Coefficient (Change in Starting Salary per Unit Change)	Probability
Total state/local appropriations (\$1,000)	\$257.00	0.023
Percent Asian descent	\$193.00	0.0001
Percent completions in health-related fields	\$155.00	0.0001
Percent Black	\$35.00	0.031
Percent of entering class in GRS cohort	\$23.00	0.11
Retention rate of full-time students	\$8.00	0.732
Percent Hispanic	\$1.00	0.933
Unemployment rate (county)	-\$5.00	0.952
Percent Pell Grants	-\$29.00	0.103
Percent female	-\$84.00	0.003
Student-faculty ratio	-\$113.00	0.004

Major (or Field of Study/Concentration)

The major or field of study in which a college student concentrates greatly affects his/her post-graduation earnings.⁵⁴ Consequently, the benefits of any particular associate’s degree may vary as much or more among graduates within community colleges than across them. For example, a 1-point increase in the percentage of graduates with health-related degrees was associated with a \$154 increase in starting salary. As documented in recent College Measures reports on Tennessee, Texas, Virginia, and Colorado,⁵⁵ community college graduates who major in health-related fields often have the highest earnings compared with graduates of any other major—and our data confirm that finding using a wider set of schools.

54 See, for example, Carnevale, A., Strohl, J., & Melton, M. (n.d.). *What’s it worth: The economic value of college majors*. Washington, DC: Center on Education and the Workforce, Georgetown University. Retrieved from <http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/whatsitworth-complete.pdf>; and CareerBuilder. (2013, January 31). *CareerBuilder and EMSI release best-paying jobs for two-year and four-year degrees*. Retrieved from http://www.careerbuilder.com/share/aboutus/pressreleasesdetail.aspx?sd=1%2f31%2f2013&siteid=cbpr&sc_cmp1=cb_pr737_&id=pr737&ed=1%2f31%2f2099.

55 See <http://www.collegemeasures.org/category/Reports.aspx>.

Resources⁵⁶

As public institutions, community colleges are subsidized by taxpayers, but there is considerable variation in public support across schools in our study. We found a positive relationship between appropriations per FTE enrollment and higher earnings. For each additional \$1,000 per FTE student, starting wages of graduates increased on average by \$257—a significant amount, especially compared with the other variables that we have studied.

Also of significance is the negative relationship between the student-faculty ratio and the earnings of graduates—whereby greater numbers of students taught per faculty member resulted in lower average starting wages.⁵⁷ Assuming the student-faculty ratio is a reasonable surrogate for the importance of attention to

56 Our calculations included appropriations as reported by IPEDS. Local ad valorem taxes may come into play (e.g., property taxes play a big role in funding community colleges in Texas); however, we did not include these taxes in our calculations because of their local, idiosyncratic nature.

57 Our calculations do not account for the mix of courses in the college. That is, our regression model did not account for the ratio of technical or health-related programs to nonmedical/nontechnical programs at the reporting institutions or the limited student-faculty ratios required for specialized accreditation. Some of these programs likely require smaller class sizes, and those smaller class sizes are for programs with higher earnings potential (e.g., nursing). Furthermore, we did not partition costs (appropriations) across different types of students. Some programs, such as nursing, are more expensive than others, and some students taking a few courses for their personal improvement may drive up appropriations (based on enrollment), thus distorting any FTE enrollment calculations.

teaching and student-faculty interaction, and therefore contributes to the quality of instruction, together both variables—appropriations per FTE enrollment and student-faculty ratio—suggest that smart investments in community colleges can produce better results for students than those we frequently find.

It is important to note that many of the factors that affect the ROI for graduates from a specific campus are not in the control of the campus. However, some very important factors determining ROI are very likely to be affected by administrative decisions made (or avoided) in individual campuses and districts, including student-faculty ratio, retention and graduation rates, the programmatic mix a college offers that permits higher percentages of completions in the better paying career paths, and the degree to which campuses collaborate with neighboring employers to ensure the best match between programs offered and the needs of the local economy.⁵⁸ Although this study did not focus on the relationships between the community college and the local labor market, we believe that—based on research both previously undertaken and in preparation for this study⁵⁹—the practices of many of the high graduate ROI schools (Appendix II) demonstrate that a community college that works closely with local employers and promotes technical training (e.g., in health care, petrochemicals, high-end manufacturing, and engineering support) can significantly increase

the likelihood that its graduates will enjoy remarkable income gains relative to high school graduates.

Moving Beyond Starting Salaries to Work-Life Earnings and ROI

Because starting salaries of graduates are central to our calculations, we have explored them (and factors associated with them) in some depth. However, our central analytic concern focuses on how those starting salaries translate into the income gains that graduates with associate's degrees accumulate relative to the work-life earnings of high school graduates.

Figure 1 presents the state patterns of average income gains by graduates with associate's degrees during a 40-year work-life relative to the earnings of high school graduates in the state. These patterns are based on the weighted average from community colleges in our set and are not derived from population estimates that come from, for example, the U.S. census or Current Population Survey.⁶⁰

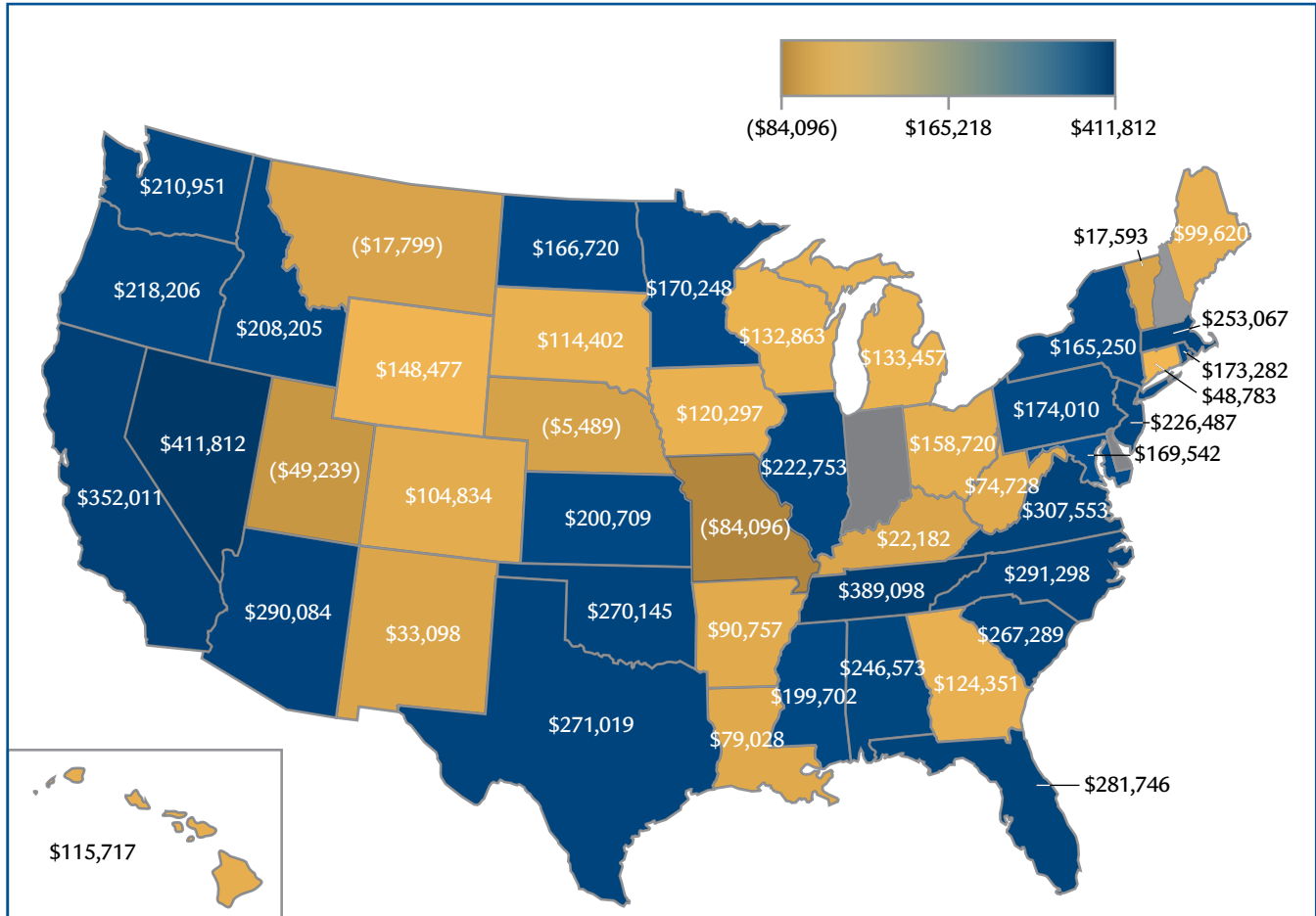
Graduates with associate's degrees in eight states have nominal work-life income gains below \$50,000: Missouri, Utah, Montana, Nebraska, Vermont, Kentucky, New Mexico, and Connecticut. Recall that this reflects the *added* income that a graduate with an associate's degree earns relative to a high school graduate. Among these states, Utah, Connecticut, and Vermont have among the highest costs in the nation associated with earning an associate's degree, which drives down the return. However, in states such as Montana and Missouri, where the costs associated with earning an associate's degree are lower, the mid-career earnings of graduates with associate's degrees are less than \$40,000—with Nebraska and Vermont slightly higher but still less than \$42,000. In contrast, we estimated that graduates with associate's degrees in Tennessee, Nevada, California, and Virginia experience

58 Although we used various college characteristics to explain differences in ROI, we did not adjust those differences for some of the characteristics noted, especially program mix, the economic status of students, or the strength of the local economies. The use of risk-adjusted metrics adds another level of complexity that we did not undertake at this point; however, we are currently working on another research project, with a more limited set of schools, to develop metrics that can account for those differences—these metrics will then be applied in future studies. Additionally, given the importance of major in determining future earnings, once good program enrollment data is available, it will be important to repeat our analyses at the program rather than institutional level.

59 See the reports by College Measures on graduates from Tennessee, Virginia, Colorado, and Texas (<http://www.collegemeasures.org/esm>) and the reports prepared by the Center on Education and the Workforce at Georgetown University (<http://cew.georgetown.edu/publications/reports/>). Conversations with our reviewers concerning practices in their community colleges further attest to the importance of close ties between colleges and the local labor market.

60 A downloadable spreadsheet with the data used to arrive at state averages for student and taxpayer income gains and ROI can be found at <http://nexusresearch.org/reports/valueof2yrdegree>.

Figure 1: Net Income Gains by Graduates With Associate's Degrees Relative to High School Graduates, by State⁶¹



Student Income Gain, centered on the median of \$165,218 computed across all states, with yellow states below this and blue states above. The intensity of the color corresponds to the degree to which it varies from the median. Note that this map employs the median across states. In contrast, medians reported in the text refer to the median across the 579 community colleges.

the largest increments in work-life gains, in excess of \$300,000.⁶²

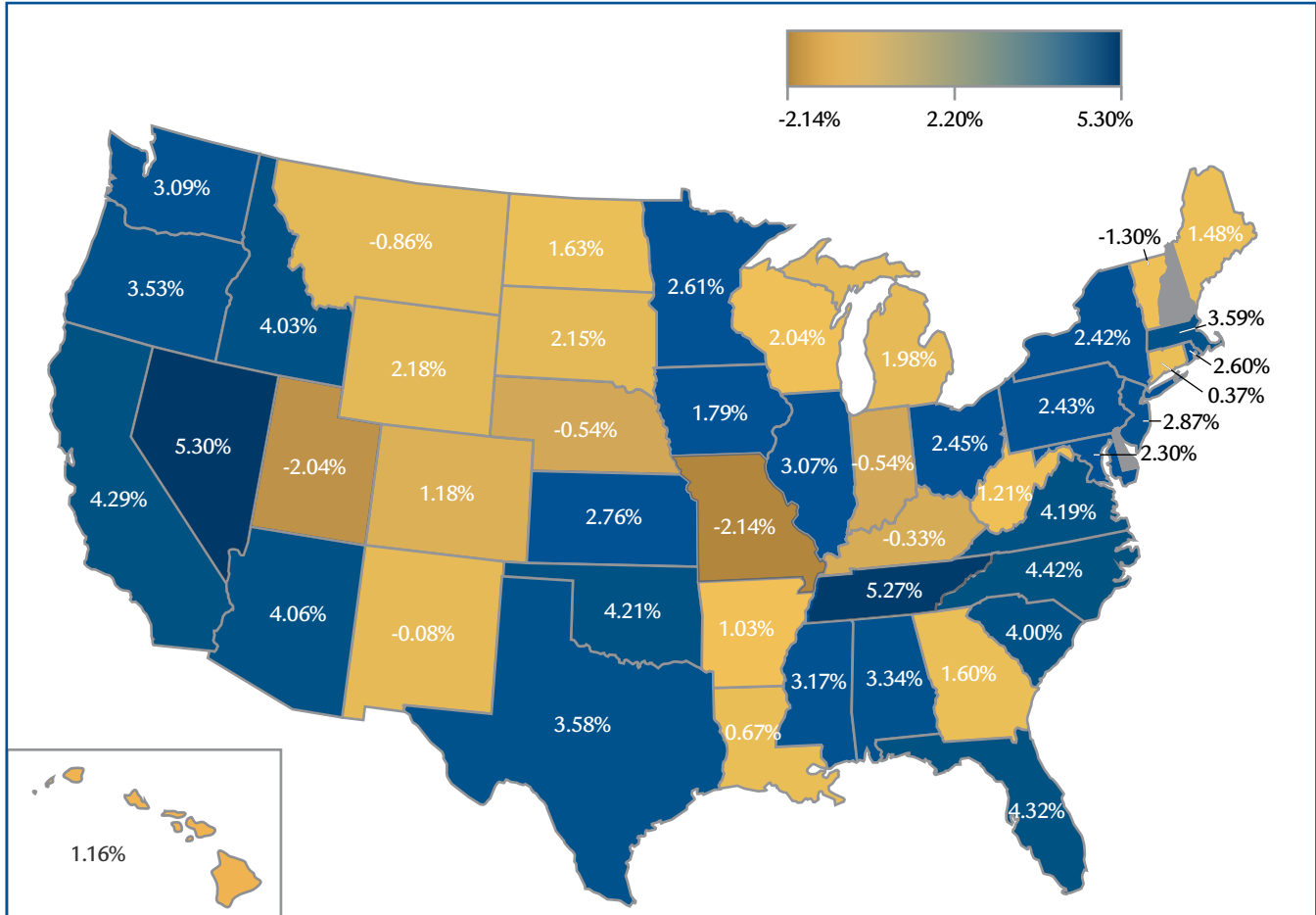
Figure 2 shows the annualized rate of return on the graduate's investment by state. Because there is a high correlation (.93) between net income gain and the graduates' ROI, Figure 2 serves as an alternate expression of the same underlying pattern.

61 In this and the other maps, the numbers reported are based on the weighted averages across the community colleges in that state. Three states, Alaska, Indiana and New Hampshire, do not have community colleges in our sample; consequently, Alaska has been omitted and the other two are gray.

62 Appendix III adjusts the nominal figures of one state (California) by presenting cost-of-living-adjusted differences by campus across all community colleges in the state. In future work, we will explore how these cost-of-living adjustments can be integrated into the ROI analysis that we used here.

Although the overall patterns by state may be driven in large part by the rural and urban characteristics of the state, clearly there is more than that. For example, Tennessee, a largely rural state, emphasizes technical training and close ties between community colleges and their local economies. Per Figure 1, this is associated with a significant benefit for its graduates, whose net income gains relative to high school graduates is nearly \$390,000. Likewise, graduates from some of the non-urban community colleges in Texas that serve the needs of the petrochemical sector, experience relatively high earnings.

Figure 2: Annualized ROI by Graduates With Associate's Degrees, by State



Student ROI, centered on the median of 2.20% computed across all states, with yellow states below this and blue states above. The intensity of the color corresponds to the degree to which it varies from the median. Note that this map employs the median across states. In contrast, medians reported in the text refer to the median across the 579 community colleges.

Taxpayer Benefits by State

Students are not the only ones who invest in earning a postsecondary degree. Given their relatively low cost to students, community colleges must be subsidized by state and local governments. In contrast, direct federal support of community colleges is relatively low, with most federal monies coming in the form of financial aid, especially Pell Grants.⁶³

As noted previously, states invest in postsecondary

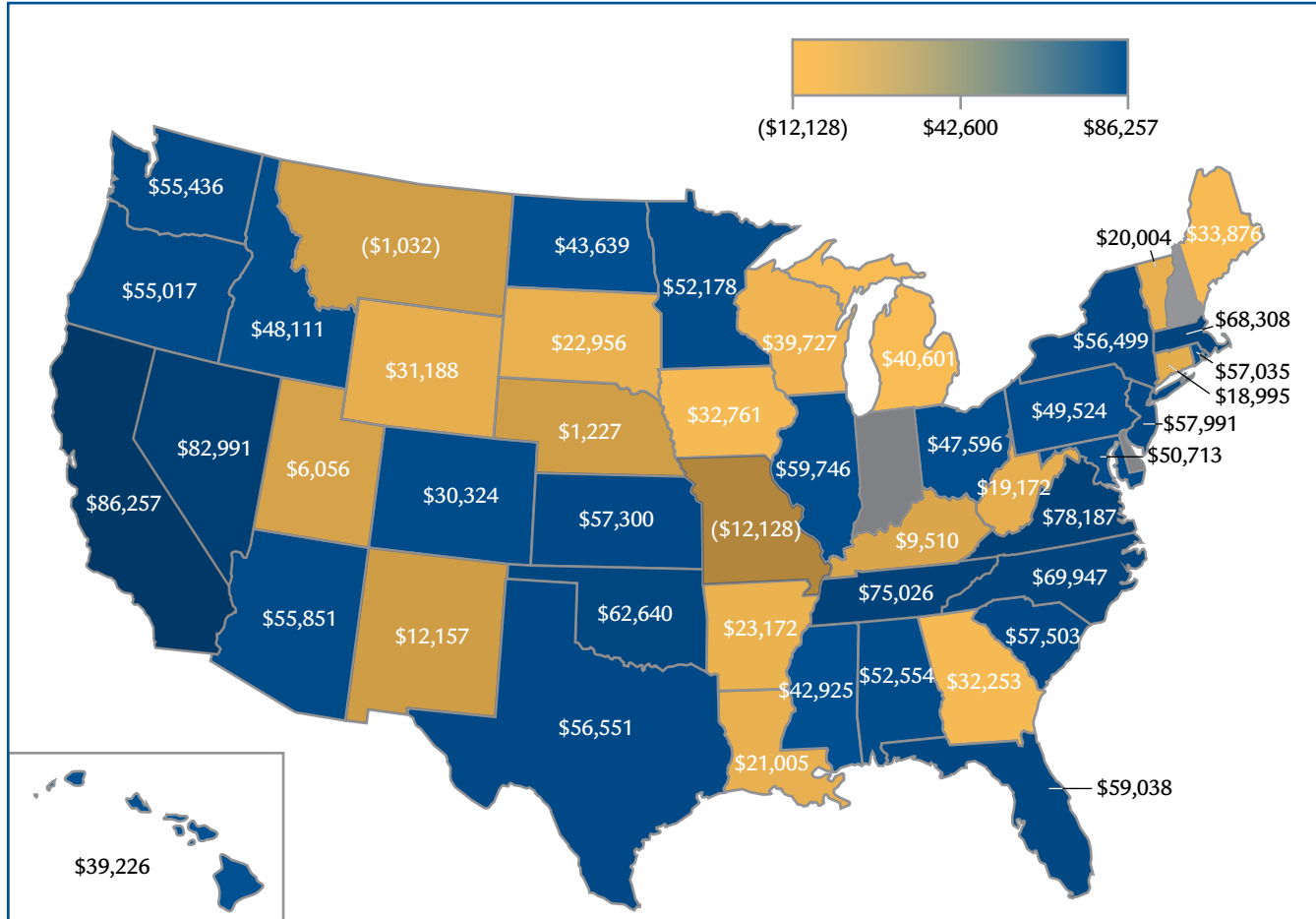
63 According to the American Association of Community Colleges, the federal contribution to public community colleges represents 16.6 percent of their total revenue, but this does not include federal grant aid applied to tuition and fees (see http://www.aacc.nche.edu/AboutCC/Documents/2013facts_fold_revised.pdf). Of course, as tuition increases and as state support of higher education declines, revenues from tuition and, therefore, Pell Grants will become more important.

institutions because they desire a more educated and productive workforce. Furthermore, states and localities benefit *directly* from the higher incomes earned by credentialed students, especially through the higher income taxes they pay on their higher earnings.⁶⁴ Appendix I describes how we estimated the benefit to taxpayers.⁶⁵

64 Residents of states with low or no income taxes are likely to have more disposable income that increases sales tax revenue to the state and possibly property tax revenue.

65 The local impact of ad valorem property taxes, precisely for their being local, is not included in our study, which takes into consideration only income and sales taxes. However, we recognize that these taxes and their impact can be significant. For example, community colleges in Texas can assess property taxes for maintenance and operations and debt service to fund capital projects. This may contribute to why so few community colleges in Texas show up on the highest quintile in taxpayer ROI (Appendix II).

Figure 3: Taxpayer Income Gain, by State



Taxpayer Income Gain, centered on the median of \$42,600 computed across all states, with yellow states below this and blue states above. The intensity of the color corresponds to the degree to which it varies from the median. Note that this map employs the median across states. In contrast, medians reported in the text refer to the median across the 579 community colleges.

Figure 3 displays the average benefit gained by taxpayers from the added income accrued by graduates with associate's degrees. One key factor differentiating these calculations from those of graduates is that the cost of the degree is tied to state/local appropriations rather than to student-based tuition and fees. The benefit to the taxpayer also depends on state and local tax rates. Graduates with high income gains in a low-tax state (e.g., Texas) may not produce as much of a *direct* benefit to taxpayers as would be the case in a state with higher taxes.⁶⁶ In contrast, taxpayers in some states (notably

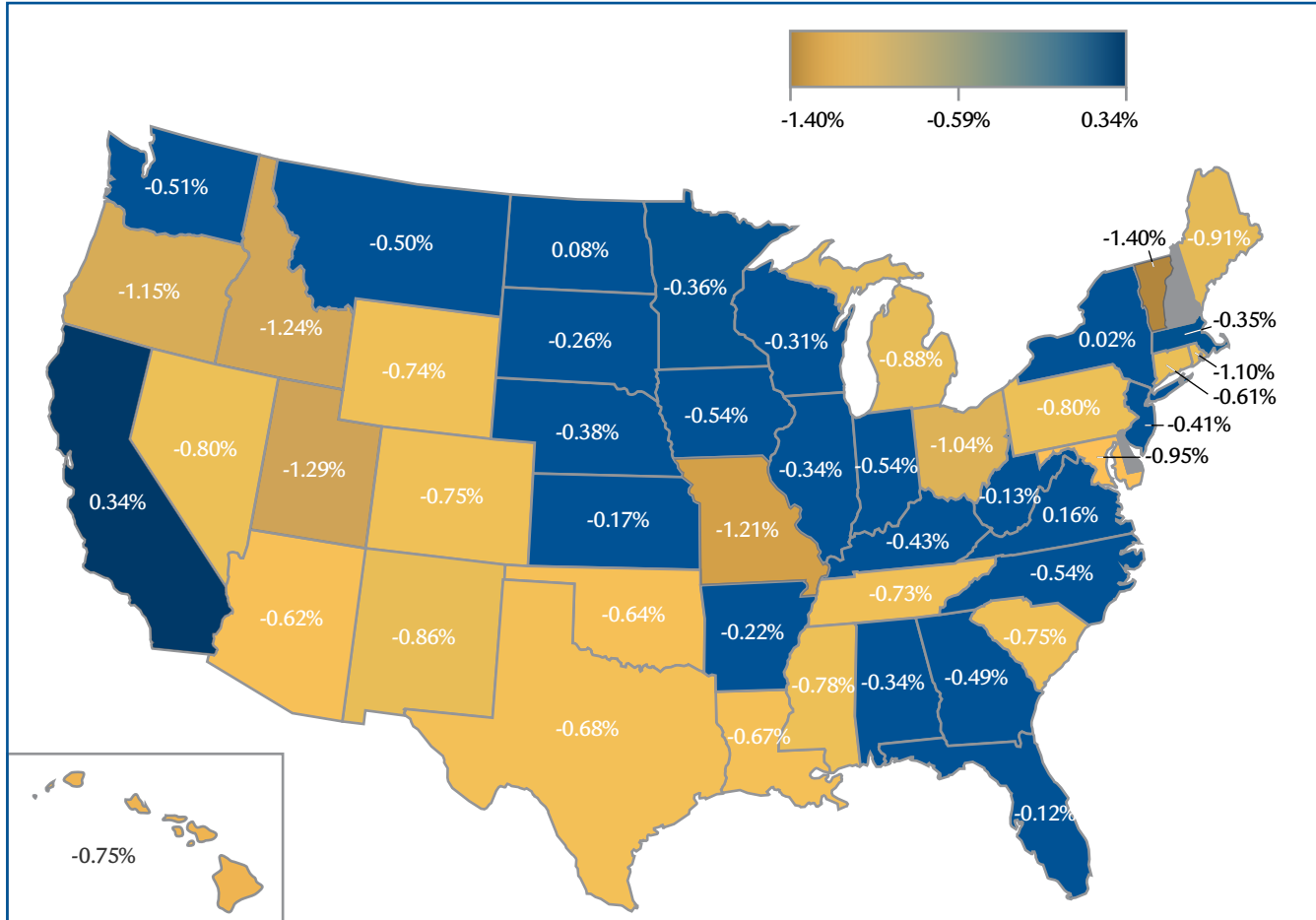
New York and Wisconsin) benefit more than taxpayers in other states, even though the average net income gain of graduates with associate's degrees is at or even below the median. Therefore, the correlation between taxpayer benefit and taxpayer ROI is less than the correlation between these two measures for graduates (.70 compared with .93).

In six states (Missouri, Montana, Nebraska, Utah, Kentucky, and New Mexico), taxpayers gain less than \$15,000 from the added income earned by graduates with associate' degrees. In contrast, taxpayers benefit by more than \$75,000 in four states: Tennessee,

66 Once again, we focused on income and income taxes because of limited data sources. Texas looks low on taxpayer ROI because it has no income tax, which leads to low revenues for taxpayers; however, if we had captured property taxes, the revenues to the taxpayer would have increased. But it is not clear how the taxpayer would benefit since these added revenues are

dedicated to the community college. (In Texas, community colleges can assess property taxes for maintenance and operations and to service debt to fund capital projects.)

Figure 4: Taxpayer Annualized Return on Investment, by State



Taxpayer ROI, centered on the median of -0.59% computed across all states, with yellow states below this and blue states above. The intensity of the color corresponds to the degree to which it varies from the median. Note that this map employs the median across states. In contrast, medians reported in the text refer to the median across the 579 community colleges.

Virginia, Nevada, and California. California tops the list, as taxpayers gain more than \$86,000 from a combination of high taxes and high incomes among graduates with associate's degrees.

Although localities derive substantial indirect financial and non-financial benefits from the presence of a community college, for most states taxpayer ROI in our study is negative (Figure 4). Taxpayers experience the highest ROI in New York, North Dakota, Virginia, and California and the lowest ROI in Vermont, Utah, Idaho, Missouri, Oregon, Rhode Island, and Ohio (all below -1 percent).

Three factors drive ROI lower:

- The earnings gains of graduates
- The fact that ROI is also affected by the state's tax rate
- The rate at which students succeed in earning their degrees

The last factor is critical because high dropout rates drive down the ROI for taxpayers given that students absorb subsidies from taxpayers but fail to earn significantly higher wages and therefore do not pay the associated higher taxes.⁶⁷

⁶⁷ Our calculations do not include in the dropout rate those who have succeeded in their studies by having earned a certificate or successfully

Accounting for Students Enrolled Part-Time But Not Seeking Formal Credentials

We experimented with one further correction to our data, in an attempt to account for students who are enrolled part-time and are not seeking formal credentials. The only estimate we found for the size of this population was noted previously for the state of California, where approximately 30 percent of the students in the California Community Colleges system take only one course, but represent only about 4 percent of the total system FTE enrollment.

A key variable in calculating the taxpayer ROI (as evident in the previous sidebar) is the Weighted Total Benefit (Cost) to Taxpayers per Degree. This variable summarizes the size of the taxpayer's investment in the community college. To reflect the part-time, non-credential seeking population of students, we adjusted this investment down by 4 percent and re-calculated the taxpayer ROI. Not surprisingly, the overall effect was quite small: an adjusted median of -.077 percent, compared with an unadjusted annualized taxpayer median ROI of -.08 percent.

Moreover, since we had only one estimate, which was calculated at the state level for only one state (albeit with approximately 25 percent of all community college students), using this estimate as a correction translated into adjusting all taxpayer ROI calculations by a constant. But there are two further reasons we decided not to pursue this correction.

transferred. Even so, from IPEDS data, we know that much of this low ROI stems from the success rates of community colleges. To repeat, without student-unit records linked to a wage database, such as the one used by the Social Security Administration, we cannot go to a data source to credibly calculate the ROI for students who have taken only one or more courses—although we recognize that taking a few credits (e.g., in accounting) may be the only reason a student enrolled. The analogy is to a production process wherein the value of the products produced at the end of the cycle is based on the input. If only half of the units that enter the production process reach market, the cost of producing the latter has to include the costs invested in all the units, even those that do not complete the cycle successfully.

First, since this is a statewide estimate, it ignores the campus-by-campus variation that is the focus of this report. That is, applying this correction is not appropriate because it assumes that all schools have the same student population composition. Second, computationally, adjusting by a constant would shift the mean of the distribution a bit but would not affect the relative rankings of campuses. Given these considerations, we chose not to report the ROIs adjusted for part-time enrollment *and call upon colleges and policymakers to more carefully document the intentions of their enrolled students, so that we can better measure the success of community colleges in satisfying their multiple audiences.*

Institutional Characteristics Associated With High ROI for Graduates and Taxpayers

Next we turn to a campus level analysis to identify the correlates of high graduate and high taxpayer returns. This analysis focused on the community colleges that fall into the top quintile (20 percent) of schools for each of the two ROIs.

Because this is a dichotomous indicator (a college is either in the top category or is not), we used a logit model to examine the campus characteristics associated with the probability of being in that top group. Table 5 shows the relationship between specific campus characteristics and the probability that a college is high performing. An odds ratio greater than 1 indicates that the characteristic increases the probability of a school being in the top category, while an odds ratio less than 1 indicates a negative relationship, reducing the likelihood of being in the high performing category.⁶⁸

68 The estimating equation underlying the results in Tables 5 and 6 include separate “dummy” variables for state and urban location.

Table 5: Campus Characteristics and Their Relationship to High ROI for Graduates

Campus Characteristic	Odds Ratio	Probability
Percent Asian descent	1.101	0.00
Percent associate's degrees in health-related fields	1.049	0.00
Percent Hispanic	1.029	0.00
Percent Black	1.025	0.01
Percent entering class in GRS cohort	1.019	0.03
Total state/local appropriations	1.000	0.03
Instructional expenses per FTE enrollment	1.000	0.17
Academic support expenditures per FTE enrollment	1.000	0.20
Student service expenditures per FTE enrollment	1.000	0.15
Percent female	0.997	0.91
Percent Pell Grants	0.988	0.31
Graduation rate	0.981	0.12
Student-faculty ratio	0.936	0.01

Institutional Characteristics Associated With High ROI for Graduates

Per Table 5, the two *institutional* characteristics with the strongest statistically significant effect on high ROI for graduates were the percent of students of Asian descent and the percent of associate's degrees granted in health and health-related programs.⁶⁹ The achievement levels of students of Asian descent (both in secondary and postsecondary education) have received a considerable amount of attention.⁷⁰ Although we do not weigh in on that debate, we do show that empirically community colleges that enroll a larger proportion of students of Asian descent are more likely to fall into the high graduate ROI category. As previously discussed, we also see that community colleges that grant more health-related degrees are more likely to fall into the high graduate ROI category. Administrative records in

69 Other technical associate's degrees may have the same strong statistically significant effect, but the most widespread of these programs are in the health-related area, so we used these as representative of the importance of promoting technical degrees to improve student ROI.

70 For summaries of statistical data and speculation on causes, see, for example, Kiderra, I. (2011, May 4). *Is there a 'tiger mother' effect? UC San Diego News Center*. Retrieved from http://ucsdnews.ucsd.edu/newsrel/soc/5-4-11tiger_mother.asp; Paslay, C. (2012, December 16). *Ancient Chinese secret: Why Asian students excel academically*. Retrieved from <http://chalkandtalk.wordpress.com/2012/12/16/ancient-chinese-secret-why-asian-students-excel-academically/>; and Seal, K. (2010, December 13). *Asian-American parenting and academic success*. Retrieved from <http://www.psmag.com/culture-society/asian-american-parenting-and-academic-success-26053/>.

several states show that graduates from community colleges who earned health-related degrees are consistently among the highest paid graduates in their state.⁷¹

Unexpectedly, given substantial media attention to the gap between the achievements of Black/Hispanic and White/Asian descent students, and after accounting for geographic location, we found that schools with higher percentages of Blacks and Hispanics are more likely to be in the high graduate ROI category. We further see that schools with higher state/local appropriations are more likely to be in the top quintile. In contrast, schools with a high student-faculty ratio are less likely to be in this high ROI category—giving some indication that what community colleges do, in addition to whom they enroll, can affect the success of their graduates.⁷²

While, as previously noted, much that contributes to a high graduate ROI is exogenous to the institution, there are many practices that institutions can implement to achieve a higher ROI. To promote student success, it is

71 See the reports by College Measures on graduates from Tennessee, Virginia, Colorado, and Texas available at <http://www.collegemeasures.org/esm>.

72 There is likely an interaction effect here between the student-faculty ratio and the focus on technical training, such as in health care, where many of the programs producing graduates with higher earnings likely require smaller classes.

Table 6: Campus Characteristics and Their Relationship to High ROI for Taxpayers

Campus Characteristic	Odds Ratio	Probability
Percent Asian descent	1.120	0.00
Graduation rate	1.073	0.00
Percent associate's degrees in health-related fields	1.053	0.00
Percent entering class in GRS cohort	1.022	0.01
Percent Hispanic	1.019	0.08
Percent Black	1.014	0.21
Percent female	1.002	0.91
Student faculty ratio	1.001	0.95
Instructional expenses per FTE enrollment	1.000	0.98
Total state/local appropriations	1.000	0.03
Academic support expenditures per FTE enrollment	1.000	0.12
Student service expenditures per FTE enrollment	0.999	0.07
Percent Pell Grants	0.939	0.00

worth noting that some of the recent experimentation in performance-based funding seems to be meeting with success in such states as Tennessee, Pennsylvania, and Washington. Critical to this is thoughtful implementation of state funding based on rewarding both completion (certificates, degrees, or transfers to four-year colleges) and student progress (based on critical momentum points such as credit accumulation milestones, completion of college-level math and English courses, and rate of term-to-term persistence)—while considering the type of institution (two-year vs. four-year) and student status (e.g., being “at-risk” or eligible for Pell Grants).⁷³

Institutional Characteristics Associated With High ROI for Taxpayers

In Table 6, we replicated the same analysis that was performed for graduates, but here we substituted a variable indicating whether a community college was in the top 20 percent of schools judged by the ROI to taxpayers.

Again, the *institutional* characteristic with the strongest effect was the percent of the student body that is of

Asian descent.⁷⁴ Graduation rate was the next strongest factor. This is not surprising, because a high graduation rate (or transfer rate to a four-year college) indicates less taxpayer money was spent on students who merely accumulated credits. Hence, taxpayers are more likely to reap the tax benefit that flows from students earning the degree.

Similarly, community colleges with a higher percentage of traditional, full-time students (i.e., those included in the official IPEDS GRS) are more likely to be in the high taxpayer ROI category. In comparison to non-traditional students, students in the GRS cohort are younger, more likely to be recent high school graduates, less likely to be burdened by risk factors (such as being married, being a parent, being financially independent, or working full-time), and consequently, more likely to be focused on earning their degree and completing it in a timely fashion.⁷⁵ The percentage of graduates in health professions also affects the likelihood of a school being in the top quintile: the higher wages

73 Miao, K. (2012, August). *Performance-based funding of higher education: A detailed look at best practices in 6 states*. Washington, DC: Center for American Progress. Retrieved from http://www.americanprogress.org/wp-content/uploads/issues/2012/08/pdf/performance_funding.pdf.

74 It bears repeating that California, where large numbers of people of Asian descent reside, is home to nearly 25 percent of all community college students and tops the list of states with high taxpayer ROI due to a combination of high taxes and high student incomes.

75 Soares, L. (2013). *Post-traditional learners and the transformation of postsecondary education: A manifesto for college leaders*. Washington, DC: American Council on Education. Retrieved from <http://www.acenet.edu/news-room/Pages/Post-traditional-Learners-and-the-Transformation-of-Postsecondary-Education.aspx>.

these graduates earn translates into overall higher tax benefits. In contrast, larger concentrations of students who receive Pell Grants are associated with a lower probability of being in the high tax benefits group. This likely reflects the more difficult challenges that lower income students face in the job market.⁷⁶

⁷⁶ We looked at the community colleges that were in the top 20 percent on both of the two ROI measures. However, upon inspection, too few schools were in both categories, so the empirical analysis of the factors associated with being in that small group was not productive.

Conclusions

Several broad policy considerations can be garnered from the data and analysis presented in this report.

- **Reward progression, retention, and completion.**

If we are to increase the ROI for graduates and the benefit to taxpayers from their investment in community colleges, then the nation must focus its resources and policies on incentivizing and facilitating degree and certificate completions and transfers to four-year institutions.

One way to do this is to help community colleges refocus their efforts from not only access—as they have done for most of recent history—to completions. It seems logical that increased certificate and degree completions and transfers to four-year schools will follow, and more retention and persistence of students will be realized by many more community colleges, if this refocus is assisted by thoughtful and informed funding formulas. One way to do this—which is already in place or being discussed in 35 states⁷⁷ and is becoming an important part of

planning for the future among the nation's higher education associations⁷⁸ —is for state governments and local districts to make a significant share of their appropriations based not only on enrollment but also on specific performance benchmarks of student success. As noted, the promotion of performance-based funding is increasingly common across the states, with Tennessee, a leader in this movement, allocating 100 percent (approximately \$800 million) of its higher education operating funds through an outcomes-based formula. Despite many questions about the effects of outcomes-based funding, the experience in Tennessee over the past three years attests to the fact that this can be done successfully.⁷⁹

Massachusetts to Tie Community College Funding to Performance. Retrieved from <http://diverseeducation.com/article/55243/#>

78 Scott, J. (2013, June 24). New measure of success. Retrieved from <http://www.insidehighered.com/news/2013/06/24/college-associations-introduce-new-ways-measure-student-completion>; and Mangan, K. (2013, June 24). Higher-ed groups unveil alternative to federal student-success measures. Retrieved from <http://chronicle.com/article/Higher-Education-Groups-Unveil/139981/>.

79 For instance, Austin Peay State University increased its number of bachelor's degree recipients 22.5 percent from 2007–08 to 2011–12. And Tennessee institutions have increased productivity across most outcomes since the advent of the new formula. While there is always a question of cause and effect, the financial impact of those changes are clearly shown

77 As of February 2013, 12 states had performance funding in place, 4 were transitioning to performance funding, and 19 were in formal discussions about performance funding; see <http://www.ncsl.org/issues-research/educ/performance-funding.aspx>. Massachusetts is the most recent state to add performance based funding measures, see Roach, R. (2013, August 13)

Other useful examples of success metrics that could be rewarded can be found in *Advancing Student Success in the California Community Colleges- Recommendations of the California Community Colleges Student Success Task Force*, for instance:

The success metrics included on the scorecard would include both intermediate “momentum” points and completion outcomes. Examples of intermediate outcomes include: rate of earning 15 units, 30 units, and 60 units; completion of a degree-applicable or higher-level course in math and English; basic skills improvement rate; rate of term-to-term persistence; and ESL [English as a second language] improvement rate. Completion outcomes would include earning a certificate, an associate’s degree, and transferring to a four-year institution. In assessing progress, each college would be compared against its own past performance rather than statewide averages or artificially created peer groups.⁸⁰

In effect, to properly serve the many traditional and nontraditional students looking for a two-year college experience that can lead to family-sustaining wages, states and the federal government must support funding formulas that facilitate campus decisions that promote student success rather than reward only enrollment.

- **Distribute resources to promote student success.** We found a positive relationship between appropriations per FTE enrollment and higher earnings of graduates: for each additional \$1,000 per FTE student, starting wages increased on average by \$257. Also important is the negative relationship between the student-faculty ratio and

in the data being generated from both their qualitative and quantitative studies of the effects of their performance-based funding (personal communication from Russ Deaton, Associate Executive Director of Fiscal Policy and Administration, Tennessee Higher Education Commission).

80 California Community Colleges Student Success Task Force. (2012). *Advancing student success in the California community colleges*. Sacramento, CA: California Community Colleges Chancellor’s Office, p. 59. Retrieved from http://www.californiacommunitycolleges.cccco.edu/Portals/0/StudentSuccessTaskForce/SSTF_FinalReport_Web_010312.pdf.

earnings—where the greater the number of students taught per faculty member, the lower the average starting wages. Assuming the student-faculty ratio is a reasonable surrogate for the importance of attention to teaching and student-faculty interaction, and is therefore a critical contributor to the quality of instruction, together both variables—appropriations per FTE enrollment and student-faculty ratio—suggest that smart investments in community colleges can produce better results for students than those we frequently find.⁸¹

- **Emphasize technical training and close ties between schools and their local labor market.** While our data clearly support the first two conclusions, we believe our data also support a conclusion that is not as well-documented by our data: that associate’s degrees focused on occupational and technical skills have more market value than most other types of associate’s degrees. More specifically, we believe that the importance of the health care variable in our models of wages and ROI complements the work done by College Measures and the Center on Education and the Workforce at Georgetown University, which has demonstrated in detail the relationship between technical/occupational associate’s degrees and high wages. Building on these studies, we believe that to increase ROI, community colleges should develop closer ties to their local economies and emphasize technical training that prepares students to enter the local and regional labor markets. We believe that the 2010 Trade Adjustment Assistance Community College and Career Training Program is an important step in the right direction.⁸² We further believe that the Obama administration’s call in July 2013 for an \$8 billion Community College to Career Fund is promising and should be studied

81 We assume, of course, cases where these two variables are not due primarily to specialized accreditation requirements.

82 See <http://www.insidehighered.com/news/2013/05/14/labor-department-grants-may-be-paying-community-colleges-and-students#ixzz2ad1ZwRSE>.

further to assess the extent to which it would help to build the ties between community colleges and the local labor market.⁸³ Moreover, we believe that the practices of many of the high graduate ROI schools (in Appendix II) demonstrate that a community college that works closely with the local labor market and promotes technical training (e.g., in health care, petrochemicals, high-end manufacturing, and engineering support) can significantly increase the likelihood that its graduates will enjoy strong income gains relative to high school graduates.⁸⁴

- **Assure that better data are gathered at the student and program levels and made available.** Because community colleges are critical to the nation's economic health, it is important that we understand which colleges are doing well and which ones are doing poorly in providing education that leads to family-sustaining wages. As this study amply attests, without reliable publicly available data—on transfers, certificates, re-enrollment, dual enrollment, bachelor's degrees in community colleges, and post-school employment—at the institutional and program levels, policymakers and administrators are left with a poor understanding of the performance of community colleges. We believe state and federal policy discussions about how and what to fund must be informed by reliable data drawn from institutions across all sectors. These data must be in the public domain and must address what any credential actually costs students and taxpayers. This ultimately will require the end of IPEDS in favor of a federal data system based on student-unit records—linked to a salary database, such as the one held by the Social Security Administration—that can measure the financial success of all students, including the growing number of “new-traditional” (i.e., non-full time, first-time) college students who make up the

majority of community college students across the nation.

With these data in hand, and with growing experience identifying what works in individual community colleges and at the state policy level, we believe that strong two-year college leaders, working with state and local businesses and with state policymakers, can and will become more central players in the economic development of the nation. With that, community colleges will stop being identified as the weak link in the higher education continuum, and their students will no longer be identified as higher education's second-class citizens. Furthermore, with such informed and decisive leadership in place, community colleges can continue to progress on fulfilling their mission of providing inexpensive and successful paths to middle-class jobs.

83 See <http://www.whitehouse.gov/the-press-office/2013/07/30/fact-sheet-better-bargain-middle-class-jobs>.

84 See College Measures (<http://www.collegemeasures.org/esm>), the Center on Education and the Workforce at Georgetown University (<http://cew.georgetown.edu/publications/reports/>), and Appendix II for the list of high graduate ROI schools in our study.

Appendix I: Methods and Data Sources

Data and Sample

The dataset for this analysis included only public, two-year degree-granting institutions across the United States for which PayScale Inc. was able to report starting- and mid-career wages in 2011 for full-time workers with an associate's degree as their highest earned degree. Our analysis focused on public institutions because only a few private not-for-profit and proprietary institutions met reporting requirements. The dataset from PayScale included only earnings data for schools that had a 90-percent confidence interval that is smaller than plus or minus 10 percent of true pay. All pay data was reported as of June 1, 2011. PayScale's data collection procedures and methods are described at http://www.payscale.com/resources_methodology.

Calculating Benefits to Graduates and Taxpayers

Work-Life Returns of High School Graduate

To measure the benefits and costs of pursuing an associate's degree, we first created a baseline for comparison—in this case, the median income of a

high school graduate from the U.S. Census Bureau's Current Population Survey (CPS). We then constructed a national income growth model for high school graduates using the CPS earnings data.⁸⁵ We applied the national income growth model to state-level median wage data for high school graduates from CPS's 2011 Annual Social and Economic Supplement to calculate work-life income streams for high school graduates for each state. To calculate work-life earnings, we used *synthetic* work-life earnings estimates—grounded in previous work by Day and Newburger (2002),⁸⁶ Kantrowitz (2007),⁸⁷ and PayScale's Return on Investment methodology.⁸⁸ Also see the 2011 work by

85 Table P-28. Educational attainment—Workers 18 years old and over by mean earnings, age, and sex: 1991 to 2010. Retrieved from <http://www.census.gov/hhes/www/income/data/historical/people/>.

86 Day, J. C., & Newburger, E. C. (2002). *The big payoff: Educational attainment and synthetic estimates of work-life earnings*. Washington, DC: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau. Retrieved from <http://www.census.gov/prod/2002pubs/p23-210.pdf>.

87 Kantrowitz, M. (2007). The financial value of a higher education. *Journal of Student Financial Aid* 37(1): 19-27. Retrieved from http://www.nasfaa.org/research/Journal/subs/The_Financial_Value_of_a_Higher_Education.aspx.

88 On PayScale's ROI methodology, see PayScale, Inc. (n.d.). *2013 college ROI rankings: Methodology*. Retrieved from <http://www.payscale.com/data-packages/college-roi-2013/methodology>.

the U.S. Census Bureau.⁸⁹ These estimates depend on creating income streams that show earnings for each year of a person's working life and then summing across these years. For details, see "Calculating Income Streams" below.

We summed earnings among those aged 25–65 years to produce 40-year work-life earnings. We applied both federal and state tax rates to these earnings streams to calculate returns to the taxpayers from these salaries.⁹⁰

Average Financial Return to Graduates from an Associate's Degree

To calculate the average returns to the graduate, we first estimated the income stream earned by a graduate starting at age 25 and projected through age 65 using PayScale and CPS data (following the U.S. Census, we used a 40-year work-life). Again, see "Calculating Income Streams" for more detail. These work-life earnings estimates were not the actual dollars people earned or can expect to earn over the complete working life of an individual (which would require us to have retrospective earnings data for the 40 years of their work-life). Instead, they were estimated using data from a cross-sectional survey based on a single point in time. PayScale gives a concise explanation as follows (using 30 years, not 40 years):

We calculate 30-year median pay for a graduate of 2010 from a specific school by summing up the median pay for graduates who graduated between 1981 and 2010 from that school. We are using data over the last year so these earnings figures are in current dollars. By using this method, we

are effectively taking future potential earnings and deflating them down to current dollars by wage inflation. In other words, this amount represents a present value of future earnings discounted by wage inflation.

But before we compared the earning streams of those with high school diplomas with those with associate's degrees, we needed to adjust for the cost of earning the associate's degree.

Average Student Cost of Associate's Degree

Our calculations involved the following intermediate steps. As a reminder, the sidebar in the body of the report shows all of these calculations with actual values for Colby Community College in Kansas.

Annual budget minus annual aid

Annual budget was determined for each community college by calculating the average tuition per student and then adding the costs for books and supplies.⁹¹ Annual aid was calculated as the average amount of financial aid per student. These data were from the IPEDS UNITID campus-level and were adjusted to 2010 dollars using the Consumer Price Index (CPI).⁹²

Total budget minus total aid

Total budget minus total aid was the annual budget minus annual aid weighted by the institution-specific average number of years to degree. The average time-to-degree was calculated from IPEDS.⁹³

89 Julian, T. A., & Kominski, R. A. (2011). *Education and synthetic work-life earnings estimates* (American Community Survey Reports 14). Washington, DC: U.S. Census Bureau. Retrieved from <http://www.census.gov/prod/2011pubs/acs-14.pdf>.

90 Federal tax rates were taken from the IRS: Table 1.1. Selected Income and Tax Items, by Size and Accumulated Size of Adjusted Gross Income, Tax Year 2009 (<http://www.irs.gov/pub/irs-soi/09in11si.xls>). State tax rates were taken from Davis, C., Davis, K., Gardner, M., McIntyre, R. S., McLynch, J., & Sapozhnikova, A. (2009). *Who pays? A distributional analysis of the tax systems in all 50 states* (3rd ed.). Washington, DC: Institute on Taxation and Economic Policy. Retrieved from <http://www.itepnet.org/whopays3.pdf>.

91 We assumed that a student's cost of housing did not change based on their decision to attend a community college because even if they did not attend that college, they would still have to live somewhere. Furthermore, because of the complexity involved and lack of adequate data, we also did not consider the costs of attendance depending on in-state/out-of-state, in district/out of district, living with family, not living with family, etc. To complete such a study, we would have to make a number of simplifying assumptions about the modal category of student and housing costs that were outside the scope of this study.

92 U.S. Bureau of Labor Statistics. (n.d.). CPI inflation calculator. Retrieved from http://www.bls.gov/data/inflation_calculator.htm.

93 This methodology was adapted from Klor de Alva, J., & Schneider, M. (2011) *Who wins? Who pays? The economic returns and costs of a bachelor's*

Annual foregone wages

Annual foregone wages are the state-specific wages at age 21, as calculated in the High School Graduate Income Stream.⁹⁴

Total foregone wages

Total foregone wages are the annual foregone wages weighted by the estimated number of years to degree.

Annual cost of the associate's degree

The annual budget minus annual aid plus annual foregone wages. This is a campus-level estimate.

Total cost of the associate's degree

The total budget minus total aid plus total foregone wages.

Net financial return to graduate for an associate's degree versus a high school diploma

This is the difference in total income between a person with an associate's degree and a person in their state with a high school diploma over the entire work-life adjusted for taxes (federal and state) and for the cost of earning any associate's degree.

degree. San Francisco: Nexus Research and Policy Center; Washington, DC: American Institutes for Research. Retrieved from <http://www.nexusresearch.org>. Note: IPEDS does not include graduation rates for two-year institutions beyond 200-percent time.

94 We equated the income from part- or full-time work while attending school to having a second job. We assumed that going to college does not make you any more or less likely to have a "second job" (assuming that class time replaces "first job"). Consequently, this second job is not the result of earning an associate's degree.

Calculating Costs to Taxpayers

Description of Variables and Calculations

Funds Received from Government

Student grants

Student grants include all monies from federal, state, and local governments that are applied to student fellowships and scholarships, including Pell Grants. This is an institution-level variable calculated from IPEDS.

Earnings on loans

According to a Congressional Budget Office report from 2010 and using estimates from 2010 from the Federal Credit Reform Act of 1990 (FCRA),⁹⁵ the federal government earns \$0.18 for every dollar loaned via the Direct Loan program and \$0.11 on every dollar loaned via the Federal Family Education Loan Program (this program ended in 2010).

For each year from 2006 to 2010, we summed the unsubsidized, subsidized, and Parent PLUS disbursement amounts for each loan program, and then multiplied each amount by the 2010 FCRA estimate (the U. S. Government Accountability Office [GAO] reported only a 2010 estimate, which we used for each year) to calculate the total amount of money the government earned by lending the money to students.⁹⁶

95 Congressional Budget Office. (2010). *Costs and policy options for federal student loan programs*. Washington, DC: Author. Retrieved from <http://www.cbo.gov/ftpdocs/110xx/doc11043/03-25-StudentLoans.pdf>.

96 To obtain these numbers, go to "Direct Loan" and "Federal Family Education Loan Program" at <http://federalstudentaid.ed.gov/datacenter/programmatic.html>. Click on drop-down menus under "Loan Volume" and select "AY YEAR, Q4" data files and the "Award Year" worksheets in those files.

State and local grants and appropriations

We summed state and local operating and non-operating grants and appropriations. IPEDS does not provide flags for institutions to indicate whether grants by state and local governments that are reported for scholarships were also included in the amount reported in state and local non-operating grants and contracts. Based on discussions with staff from IPEDS, we assumed that the amounts reported for scholarships and fellowships at the state and local levels were not included in the state and local grants reported as revenues.

Federal grants and appropriations (not related to tuition, scholarships, and fellowships)

Public institutions report their revenues and expenditures according to guidelines established by the Governmental Accounting Standards Board. Given these accounting standards, we subtracted the amount of Pell Grants from the federal non-operating grants amount, and then added the result to the federal operating grants and contracts and federal appropriations. This is needed because federal non-operating grants explicitly include Pell Grants.

Capital appropriations

Capital appropriations, reported separately for public institutions reporting to the Governmental Accounting Standards Board, were included in our calculations.

Amount of taxpayer dollars spent

For each institution, we summed student grants; state, local and federal grants, contracts, and appropriations; and capital appropriations and then subtracted the earnings on loans.

Research expenses

Although most two-year colleges do not have research expenditures, more than 100 two-year colleges in our database reported them. Because these expenditures are generally not related to the pursuit of a degree, for the purposes of this study, they are subtracted from overall taxpayer expenses.

Monies Paid to the Government

Taxes paid and taxes foregone

Foregone taxes are funds that the government has foregone; therefore, they are marked as a cost *to the government*.

Taxes foregone on investment income

Investment income includes income from endowments, interest, dividends, rentals, and royalties.⁹⁷ This income is not considered part of revenues, so we account for it separately.

To arrive at the taxes foregone on investment income, we multiplied the investment return (i.e., the investment income and investment gains [losses] included in net income⁹⁸) by the federal corporate tax rate.⁹⁹ We then added the investment return multiplied by the state tax rate.¹⁰⁰

97 National Center for Education Statistics. (n.d.). *Glossary*. Retrieved from <http://nces.ed.gov/ipeds/glossary/?charindex=1>.

98 See "05—Investment income and investment gains (losses) included in net income" (<https://surveys.nces.ed.gov/ipeds/VisInstructions.aspx?survey=5&id=473&show=all>).

99 Tax Policy Center. (n.d.). *Historical corporate top tax rate and bracket: 1909–2010*. Retrieved from http://www.taxpolicycenter.org/taxfacts/Content/PDF/corporate_historical_bracket.pdf.

100 Tax Foundation. (2013, March 22). *State corporate income tax rates, 2000–2013*. Retrieved from <http://www.taxfoundation.org/taxdata/show/230.html>.

Taxes foregone on endowment contributions

The GAO found incomplete information for endowments and, additionally, for those schools that had endowment information, the endowments were very small relative to four-year schools. Therefore, we omitted these from our report.

Taxes paid/foregone on revenues

We used revenues as the base against which to estimate taxes. While tax liabilities vary among for-profit higher education institutions, from previous research we know that some large for-profit colleges pay 12.5 percent of their total revenues in corporate taxes (federal plus state) and additional .05 percent in sales and other taxes. Consequently, to roughly estimate what public institutions would have paid had they been private and therefore taxed, we multiplied total revenues (reported in IPEDS) by 13 percent.

Amount paid to the government in 2010 dollars

This is the total of the taxes paid (foregone) for each year converted to 2010 dollars using the CPI. We then took the converted dollar amounts for years 2006–07 through 2009–10 and calculated an average amount paid to the government per year.

Total annual benefit (cost) to the taxpayers

This is the average annual amount paid to the government minus the average net amount spent per year.

Annual benefit (cost) to the taxpayers per student

This is the total annual benefit (cost) to the taxpayers divided by the total number of FTE enrollments, using an average of FTE enrollments over the relevant time span.¹⁰¹

101 We did not partition costs (appropriations) across different types of students. Some programs (such as nursing) are more expensive than others, and some students taking only a few courses for their personal betterment may drive up appropriations (based on enrollment), thus distorting

Weighted total benefit (cost) to taxpayers per degree

This is the estimate of what a degree benefits (costs) taxpayers when taking into account graduation rates. This is a three-step process:

Step 1: Estimate the number of first-time, full-time (FTFT) degree or certificate seekers that are pursuing associate's degrees at a campus level.

Using the FTFT degree- or certificate-seeking cohort,¹⁰² we calculated the percentage of the cohort that graduated within 150% normal-time from programs of two-years but less than four-years in length. (Note: we recognize the importance of 200% graduation rates, but graduation rates for 200% normal time are not available by program length.) This percentage is deemed to be the percentage of the FTFT cohort who pursued associate's degrees.¹⁰³

Step 2: Calculate the number of "true" dropouts (and rate of true dropouts) using data from Beginning Postsecondary Students (BPS).

Although IPEDS provides information about first-to-second year retention rates, it does not provide data on students who truly drop out. Thus, we first used the retention rate reported in IPEDS to determine how many students returned—and, therefore, how

somewhat the FTE enrollment calculations.

102 The current data gathering methods of the U.S. Department of Education limited our sample to using first-time, full-time (FTFT) degree- or certificate seekers. We are well-aware that this sample, then, does not represent a full picture of the student population at community colleges. Nonetheless, the most reliable information available is on FTFT students because these are the ones captured by the GRS survey. Everything else concerning who is in or out at a two- or four-year college is primarily a matter of estimates based on assumptions and guesswork. Also, while we recognize that community colleges have large contingents of part-time students, FTFTs represent a large share of their populations. According to data from IPEDS (http://nces.ed.gov/programs/digest/d12/tables/dt12_354.asp), in fall 2011, FTFT degree- or certificate seekers represented 37 percent of the total entering class enrolling in public two-year institutions, or approximately 770,000 enrolled students.

103 Because of the lack of available data, our calculations did not eliminate the cost of certificate training from our cost data. Consequently, the costs related to the production of associate's degrees are necessarily overestimated. We also did not include the costs or benefits resulting from interstate migration. Many states are exporters of educated labor, while others, such as Colorado and Washington, have relatively weak state systems but highly educated populations. But while some states get bigger benefits than others, our data suggests that at least in the short run community college students tend to stay in the state in which they were educated.

many did not return—to an institution after their first-year of study. We then turned to data from the Beginning Postsecondary Students Longitudinal Study¹⁰⁴ for a national estimate of how many full-time students drop out from two-year schools over a four-year time span, and how many transfer to other institutions. To estimate true dropouts, we used BPS’s “no degree from first institution, left first institution, never enrolled in another institution” measure from the 2002–03 BPS, which is defined as survey respondents who “had not attained a degree or certificate at the first institution and had left this institution and never enrolled at another institution by [the sixth year of the study].”¹⁰⁵ We then applied these numbers to our associate’s degree-seeking cohort to calculate the number and rate of true dropouts among those seeking an associate’s degree.

As an example, let us say that BPS shows, for a certain group of colleges, 50 percent of all non-returners are true “dropouts.” Now, say a particular school in the group reports a 60-percent retention rate. Of the 40 percent that do not return, we multiply this by the 50 percent number from BPS to say that $(.4) \times (.5) = .2$ or 20 percent of all non-returners are true dropouts. We are aware that some students “stop out” and re-enroll after a given time frame. However, there is very little evidence that any significant number of students who “stop out” come back and complete their studies later. *In the absence of such evidence, we cannot say that returning “stop-outs” represents a significant number of future completers.*

Step 3: Calculate a weighted total cost to taxpayers per degree.

Using our cost per FTE, number of graduates, average time to graduation, number of dropouts,

and average time to dropout metrics, we calculated a weighted total cost to taxpayers to degree:

$$\frac{\text{(Annual Benefit [Cost] to the Taxpayers per Student} \times ((\text{Graduates} \times \text{Average Time to Graduation}) + (\text{Dropouts} \times \text{Average Time to Dropout})))}{\text{Graduates}}$$

Net Weighted Total Benefit (Cost) to Taxpayers per Degree

Here, we subtracted “weighted total benefit (cost) to taxpayers per degree” from “average financial return to taxpayers by an associate’s degree versus a high school diploma” to create a net benefit number that accounts for the inputs to create the degree and the returns from higher taxes paid.

Calculating Income Streams

Setting Age and Income Pin Points

We used the CPS’s mean annual wages by age bracket and educational attainment to help set the pay increases by age bracket for our work-life income stream.

For each year from 2006 to 2010, we calculated the wage growth rate between the mean salary for the following age brackets: 18–24, 25–34, 35–44, 45–54, 55–64, and 65 and older. We then averaged the wage growth rates for each age bracket from 2006 to 2010 to eliminate any large variances. So, as in the table below, between the ages of 25 and 45, a graduate with an associate’s degree, on average, will see his/her salary grow by 29% (e.g., from \$30,000 at age 25 to \$38,700 at age 45).

Age Bracket (Years)	Total Salary Growth Rate
25–45	+29%
45–55	-8%
55–65	-27%

104 National Center for Education Statistics. (n.d.). Beginning postsecondary students. Retrieved from <http://nces.ed.gov/surveys/bps/>.

105 Radford, A. W., Berkner, L., Wheeless, S. C., & Shepherd, B. (2010). *Persistence and attainment of 2003–04 beginning postsecondary students: After 6 years* (NCES 2011-151). Washington, DC: National Center for Education Statistics, p. A-3. Retrieved from <http://nces.ed.gov/pubs2011/2011151.pdf>.

Applying Data From PayScale

PayScale provided us with two data points for each institution in our study: starting median pay, which is earnings at average age 25, and mid-career median pay, which is earnings at average age 45. We used starting earnings at age 25 and grew the salary according to data from CPS. We used the earnings at age 45 to adjust the growth rate from 25 to 45, and then used CPS growth rates for earnings at ages 45–65.

Checking Calculated Income Stream Against PayScale, 15-Year And 30-Year Cumulative Wages

To check our income stream model, we compared our model's 15-year and 30-year cumulative earnings estimates with the cumulative earnings reported by PayScale. We summed annual income streams for ages 25–39 to generate our 15-year cumulative earnings estimate, and summed annual income streams for ages 25–54 to generate our 30-year cumulative earnings estimate. We then compared our estimated 15-year and 30-year cumulative earnings to the 15-year and 30-year cumulative wages provided by PayScale. Despite wide variation between the 15-year comparison estimates from our calculations and data from PayScale data, the model performed substantially better at the 30-year comparison mark. As such, we felt comfortable using the model to extend annual wage estimates to age 65.¹⁰⁶

15-year comparison	Percent of all values
Estimated earnings are within 5% of PayScale data	37%
Estimated earnings are within 10% of PayScale data	68%
30-year comparison	Percent of all values
Estimated earnings are within 5% of PayScale data	76%
Estimated earnings are within 10% of PayScale data	97%

¹⁰⁶ PayScale does not assume that, for example, the 20-year earnings effects of going to college now are the same as the current effects of having gone to college 20 years ago, because PayScale uses in its calculations only the current wages of students who graduated 20 years ago.

Calculating the annual return on investment (ROI):

To estimate the return on investment to graduates with an associate's degree, we calculated the added earnings to the graduate over a 40-year work-life relative to a baseline defined by what a high school graduate would have earned. From this, we subtracted the cost that the graduate invested in earning that degree, including both direct outlays for attending plus an estimate of lost wages. We calculated an overall ROI as $(\text{work-life earnings benefit} - \text{cost of degree}) / (\text{cost of degree})$. We then calculated the annualized rate of return as the 40th root of total ROI+1. We used the 40th root to correspond to the 40-year work-life. We then subtracted 1 from this number and converted the decimal number to a percentage.¹⁰⁷

To calculate the taxpayer ROI, we substituted the net benefits to the taxpayer (mostly through higher income tax returns) minus the net costs to the taxpayer (mostly through subsidies to the community college) and followed the same calculations as for calculating the student ROI. The details in calculating each component of the ROI were described previously.¹⁰⁸

¹⁰⁷ As we have explained throughout this study, we did not assume zero benefits to anyone who did not earn an associate's degree. We were simply unable to calculate what that benefit might be and consequently focused solely on the ROI for those obtaining an associate's degree.

¹⁰⁸ We reiterate that there are numerous other taxpayer benefits beyond those obtained from the extra taxes paid on the incremental earnings gained by graduates with associate's degrees. That said, *what we are calculating are the minimum ROI based solely on the additional taxes paid on income numbers alone.*

Appendix II: Highest and Lowest Quintile Return to Graduates and Taxpayers

The following lists are based on data reported by IPEDS using the National Center for Education Statistics UNITID, which is the unique six-digit identifier assigned to all institutions that have submitted data to IPEDS. In multi-campus systems, PayScale used information in alumni responses to pair them with a specific campus.

Panel A: Returns to Graduates

HIGHEST QUINTILE NET WORK-LIFE FINANCIAL RETURN TO GRADUATES AND ANNUALIZED ROI

(Presented in alphabetical order by state and then by institution)

STATE	UNITID	INSTITUTION	NET WORK-LIFE FINANCIAL RETURN TO GRADUATES	ANNUALIZED GRADUATE ROI
AL	102429	Bevill State Community College	\$492,395	6.70
AL	102030	Bishop State Community College	\$519,934	6.90
AL	101028	Chattahoochee Valley Community College	\$487,495	6.40
AL	101240	Gadsden State Community College	\$483,141	6.70
AL	101286	George C. Wallace State Community College-Dothan	\$545,962	6.80
AL	101499	Jefferson Davis Community College	\$486,882	7.00
AL	101505	Jefferson State Community College	\$554,633	6.40
AL	101736	Northwest Shoals Community College-Muscle Shoals	\$480,012	6.30
AR	367459	NorthWest Arkansas Community College	\$520,348	6.40
AZ	104160	Arizona Western College	\$443,656	6.70
AZ	105154	Mesa Community College	\$578,246	6.50
AZ	105206	Mohave Community College	\$654,435	7.40
AZ	105428	Phoenix College	\$621,682	7.00
CA	109350	Antelope Valley College	\$483,451	6.40
CA	109819	Bakersfield College	\$511,007	6.40
CA	110334	Cabrillo College	\$512,265	6.00
CA	111920	Chabot College	\$670,751	6.70
CA	111939	Chaffey College	\$492,456	5.80
CA	112190	City College of San Francisco	\$540,514	6.10
CA	118347	College of Marin	\$533,627	6.30
CA	122791	College of San Mateo	\$509,241	5.90
CA	111461	College of the Canyons	\$526,746	5.90
CA	113573	College of the Desert	\$482,117	5.80
CA	123217	College of the Sequoias	\$437,452	5.90
CA	112826	Contra Costa College	\$490,946	6.00
CA	113236	Cypress College	\$579,373	6.40
CA	113634	Diablo Valley College	\$591,060	6.30
CA	113856	East Los Angeles College	\$444,550	5.70
CA	114266	Evergreen Valley College	\$705,787	7.00
CA	114716	Foothill College	\$745,334	7.30
CA	114789	Fresno City College	\$548,289	6.50
CA	114859	Fullerton College	\$485,367	6.00
CA	114938	Gavilan College	\$492,742	5.80
CA	115126	Golden West College	\$711,812	7.00
CA	115296	Grossmont College	\$608,369	6.40
CA	117247	Laney College	\$582,835	7.00
CA	117645	Long Beach City College	\$529,338	6.10

STATE	UNITID	INSTITUTION	NET WORK-LIFE FINANCIAL RETURN TO GRADUATES	ANNUALIZED GRADUATE ROI
CA	117690	Los Angeles Harbor College	\$531,688	6.20
CA	117894	Los Medanos College	\$462,613	5.70
CA	118930	Mission College	\$589,780	6.20
CA	118976	Modesto Junior College	\$475,860	5.90
CA	119137	Moorpark College	\$534,205	6.10
CA	119164	Mt. San Antonio College	\$446,777	5.70
CA	119331	Napa Valley College	\$623,165	6.90
CA	120290	Ohlone Community College	\$740,292	6.70
CA	120342	Orange Coast College	\$557,795	6.40
CA	121044	Pasadena City College	\$522,588	6.20
CA	122180	Sacramento City College	\$560,070	6.30
CA	122205	Saddleback College	\$444,512	5.60
CA	123527	San Bernardino Valley College	\$461,995	5.80
CA	122384	San Diego Miramar College	\$489,699	6.10
CA	122658	San Joaquin Delta College	\$483,312	6.00
CA	121619	Santa Ana College	\$506,751	5.90
CA	123013	Santa Rosa Junior College	\$465,773	5.60
CA	125028	Ventura College	\$459,999	5.60
CA	125471	West Los Angeles College	\$508,441	6.00
CA	126119	Yuba College	\$509,563	6.20
CO	126748	Colorado Northwestern Community College	\$850,903	7.60
FL	137315	South Florida Community College	\$451,456	6.30
GA	138691	Darton College	\$501,011	6.40
GA	244437	Georgia Perimeter College	\$451,808	5.80
GA	244446	Georgia Piedmont Technical College	\$570,755	7.30
IL	147411	Morton College	\$438,429	5.50
IL	147800	Oakton Community College	\$465,069	5.50
IL	148007	Prairie State College	\$758,267	7.20
IL	149532	Triton College	\$510,903	5.80
KS	155098	Fort Scott Community College	\$516,138	6.90
KS	155292	Kansas City Kansas Community College	\$451,908	6.40
KY	157438	Gateway Community and Technical College	\$437,609	5.60
MD	163657	Prince George's Community College	\$501,085	5.70
MN	174428	Normandale Community College	\$527,982	5.70
MS	175935	Meridian Community College	\$450,753	6.80
NC	197887	Asheville-Buncombe Technical Community College	\$530,286	7.20
NC	198260	Central Piedmont Community College	\$549,354	6.60
NC	198367	Craven Community College	\$463,117	6.60
NC	198534	Fayetteville Technical Community College	\$470,928	6.00
NC	198552	Forsyth Technical Community College	\$559,330	7.40
NC	198640	Halifax Community College	\$601,098	7.90
NC	199856	Wake Technical Community College	\$512,673	7.20
NC	199892	Wayne Community College	\$459,979	6.50

STATE	UNITID	INSTITUTION	NET WORK-LIFE FINANCIAL RETURN TO GRADUATES	ANNUALIZED GRADUATE ROI
NC	199908	Western Piedmont Community College	\$470,820	6.90
NJ	183743	Bergen Community College	\$507,414	5.40
NJ	184180	County College of Morris	\$497,205	5.40
NY	193478	Nassau Community College	\$438,085	5.40
NY	194240	Orange County Community College	\$537,864	5.90
NY	195058	Rockland Community College	\$508,202	6.50
SC	218113	Greenville Technical College	\$474,511	6.40
SC	218353	Midlands Technical College	\$456,428	5.90
TN	219824	Chattanooga State Community College	\$541,115	6.40
TN	219888	Columbia State Community College	\$573,295	6.70
TN	221184	Nashville State Community College	\$528,188	6.60
TN	221397	Roane State Community College	\$442,867	6.40
TN	221485	Southwest Tennessee Community College	\$472,894	6.30
TN	222062	Walters State Community College	\$446,223	6.20
TX	222567	Alvin Community College	\$442,700	5.60
TX	222576	Amarillo College	\$472,322	6.10
TX	222822	Angelina College	\$495,656	5.90
TX	222992	Austin Community College District	\$510,591	5.90
TX	226408	College of the Mainland	\$658,026	6.70
TX	224961	Galveston College	\$723,769	7.50
TX	225070	Grayson County College	\$536,360	6.70
TX	226578	McLennan Community College	\$441,802	6.10
TX	224110	North Central Texas College	\$664,833	6.60
TX	227304	Odessa College	\$505,185	7.00
TX	227924	San Antonio College	\$468,419	5.90
TX	227979	San Jacinto College	\$647,486	6.80
TX	228699	Texarkana College	\$537,967	6.30
TX	228680	Texas State Technical College Waco	\$492,962	6.40
TX	229504	Vernon College	\$632,508	7.40
TX	229841	Wharton County Junior College	\$682,457	6.90
VA	232946	Northern Virginia Community College	\$529,985	6.00
VA	233037	Paul D. Camp Community College	\$704,255	7.30
WA	234933	Clark College	\$437,535	5.50
WA	236610	Shoreline Community College	\$456,269	5.70
WI	239488	Northeast Wisconsin Technical College	\$450,227	6.10

LOWEST QUINTILE NET WORK-LIFE FINANCIAL RETURN TO GRADUATES AND ANNUALIZED ROI

STATE	UNITID	INSTITUTION	NET WORK-LIFE FINANCIAL RETURN TO GRADUATES	ANNUALIZED GRADUATE ROI
AL	101897	Northeast Alabama Community College	\$43,234	0.90
AR	107664	Pulaski Technical College	\$2,160	-1.70
CA	121707	College of the Redwoods	\$33,275	-0.70
CA	113193	Cuesta College	-\$18,284	-2.20
CA	366401	Las Positas College	\$69,911	0.90
CA	117867	Los Angeles Mission College	-\$28,345	-2.40
CA	118684	Mendocino College	-\$71,503	-3.10
CA	120421	Oxnard College	-\$90,166	-3.40
CA	117052	Reedley College	-\$60,554	-3.10
CO	126863	Community College of Aurora	-\$66,392	-3.00
CO	127200	Front Range Community College	\$83,989	1.10
CO	127820	Pikes Peak Community College	-\$63,986	-3.00
CO	128258	Trinidad State Junior College	\$53,643	0.80
CT	129543	Housatonic Community College	-\$66,347	-2.90
CT	130217	Quinebaug Valley Community College	-\$183,333	-4.20
FL	135188	Lake-Sumter Community College	\$42,855	-0.30
GA	138682	Albany Technical College	-\$126,676	-4.80
GA	138840	Atlanta Technical College	\$33,735	-0.10
GA	138956	Augusta Technical College	\$8,241	-1.40
GA	139010	Bainbridge College	-\$16,659	-2.30
GA	140599	Moultrie Technical College	-\$50,877	-3.30
GA	140678	North Georgia Technical College	\$53,549	1.40
GA	366465	Ogeechee Technical College	\$19,340	-0.90
GA	140942	Savannah Technical College	\$587	-1.70
GA	139986	Southern Crescent Technical College	\$77,788	2.20
GA	141158	Southwest Georgia Technical College	\$69,085	1.80
GA	141255	Wiregrass Georgia Technical College	\$86,299	2.50
HI	141811	Leeward Community College	-\$104,942	-3.40
IA	153214	Des Moines Area Community College	\$46,427	0.30
IA	153445	Hawkeye Community College	\$23,673	-1.10
IA	153533	Iowa Lakes Community College	-\$95,895	-3.70
IA	153922	Marshalltown Community College	\$7,182	-1.50
IA	154059	North Iowa Area Community College	\$80,230	1.60
ID	142179	Eastern Idaho Technical College	\$63,798	1.90
IL	384342	Heartland Community College	\$26,538	-0.90
IL	146205	John A. Logan College	\$31,791	-0.70
IL	146278	John Wood Community College	\$40,295	-0.30
IL	148991	Spoon River College	\$75,059	1.30
KS	154642	Allen County Community College	-\$102,705	-4.10
KS	154952	Cowley County Community College	-\$250,238	-5.40

STATE	UNITID	INSTITUTION	NET WORK-LIFE FINANCIAL RETURN TO GRADUATES	ANNUALIZED GRADUATE ROI
KS	156107	Wichita Area Technical College	-\$102,669	-3.70
KY	156392	Bluegrass Community and Technical College	-\$48,216	-2.90
KY	156338	Bowling Green Technical College	\$19,624	-1.30
KY	157331	Maysville Community and Technical College	-\$97,607	-3.50
KY	157483	West Kentucky Community and Technical College	-\$9,858	-2.00
LA	437103	Baton Rouge Community College	-\$42,840	-2.60
LA	158431	Bossier Parish Community College	-\$61,421	-3.30
MA	164775	Berkshire Community College	\$56,606	0.40
MD	405872	Carroll Community College	-\$19,188	-2.10
MD	164313	Wor-Wic Community College	\$52,015	0.10
ME	161077	Central Maine Community College	-\$28,616	-2.40
ME	161192	Kennebec Valley Community College	\$11,733	-1.40
MI	168607	Alpena Community College	-\$144,606	-4.30
MI	169521	Delta College	-\$31,043	-2.40
MI	171155	Mid-Michigan Community College	\$40,302	-0.80
MI	171483	Northwestern Michigan College	\$13,307	-1.40
MN	173203	Central Lakes College-Brainerd	-\$37,041	-2.70
MN	174473	Northland Community and Technical College	\$63,883	1.00
MN	173115	Northwest Technical College	\$81,474	1.80
MN	173063	Riverland Community College	\$59,189	1.00
MN	175041	Saint Paul College-A Community and Technical College	\$80,163	1.70
MO	177135	Crowder College	-\$250,800	-5.20
MO	177250	East Central College	-\$15,281	-2.20
MO	177676	Jefferson College	-\$104,823	2.90
MO	177977	Linn State Technical College	-\$236,495	-5.30
MO	178217	Mineral Area College	-\$192,985	-4.60
MO	178448	Moberly Area Community College	\$49,518	0.50
MO	177472	Ozarks Technical Community College	-\$264,841	-5.00
MO	262031	St. Charles Community College	-\$17,840	-2.10
MO	179539	State Fair Community College	-\$145,857	-4.10
MS	175652	East Mississippi Community College	-\$256,979	-5.90
MS	175883	Jones County Junior College	-\$68,898	-3.50
MT	180197	Flathead Valley Community College	-\$63,858	-3.10
NC	198251	Central Carolina Community College	\$42,942	0.40
NC	198817	Lenoir Community College	\$82,867	1.70
ND	200341	Williston State College	-\$65,746	-3.50
NE	180902	Central Community College	-\$18,930	-2.20
NE	181312	Mid-Plains Community College	-\$11,391	-2.10
NE	181817	Western Nebraska Community College	-\$47,600	-3.00
NJ	184995	Hudson County Community College	-\$43,742	-2.50
NJ	186034	Passaic County Community College	-\$465	-1.80
NJ	247603	Sussex County Community College	-\$215,409	-4.30
NM	187532	Central New Mexico Community College	-\$6,568	-1.90

STATE	UNITID	INSTITUTION	NET WORK-LIFE FINANCIAL RETURN TO GRADUATES	ANNUALIZED GRADUATE ROI
NY	189839	Cayuga County Community College	\$53,492	1.10
NY	191339	Genesee Community College	\$37,632	-0.40
NY	191612	Herkimer County Community College	\$1,001	-1.70
NY	195322	Schenectady County Community College	-\$46,588	-2.80
OH	204440	Northwest State Community College	-\$94,777	-3.50
OH	206446	Washington State Community College	-\$12,400	-2.10
OH	204255	Zane State College	-\$47,038	-2.80
OR	428392	Klamath Community College	-\$197,441	-4.70
OR	209940	Rogue Community College	\$64,641	0.90
PA	211343	Butler County Community College	-\$4,331	-1.90
PA	213525	Lehigh Carbon Community College	\$78,523	1.00
PA	414911	Pennsylvania Highlands Community College	-\$489,330	-6.30
PA	216825	Westmoreland County Community College	-\$5,588	-1.90
SD	219189	Mitchell Technical Institute	-\$78,154	-3.70
SD	219480	Western Dakota Technical Institute	\$47,845	0.70
TX	223773	Cedar Valley College	-\$56,070	-3.00
TX	246354	Palo Alto College	-\$53,790	-2.90
TX	229328	Texas State Technical College-West Texas	-\$16,901	-2.30
UT	230746	Salt Lake Community College	-\$6,254	-1.90
UT	230597	Snow College	-\$368,518	-5.50
VA	231697	Central Virginia Community College	\$54,347	0.40
VA	231882	Danville Community College	-\$15,227	4.60
VA	233648	Southwest Virginia Community College	\$78,036	1.60
VT	230861	Community College of Vermont	\$17,593	-1.30
WA	235671	Bates Technical College	\$54,159	0.50
WA	439190	Cascadia Community College	-\$139,058	-4.00
WA	234845	Centralia College	-\$184,440	-4.70
WA	235334	Grays Harbor College	\$17,242	-1.20
WA	236708	Spokane Falls Community College	\$64,380	0.80
WA	237039	Whatcom Community College	\$52,689	0.10
WI	239008	Lakeshore Technical College	-\$21,625	-2.30
WI	239220	Mid-State Technical College	\$5,840	-1.60
WI	240198	Wisconsin Indianhead Technical College	\$80,289	1.50

Panel B: Returns to Taxpayers

HIGHEST QUINTILE AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS AND ANNUALIZED ROI

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
AL	101286	George C. Wallace State Community College-Dothan	\$115,670	0.60
AL	101499	Jefferson Davis Community College	\$98,659	0.60
AR	367459	NorthWest Arkansas Community College	\$121,888	0.70
AZ	105206	Mohave Community College	\$123,616	0.40
CA	109208	American River College	\$84,631	0.20
CA	109350	Antelope Valley College	\$110,155	0.40
CA	110334	Cabrillo College	\$118,302	0.90
CA	111920	Chabot College	\$148,366	1.20
CA	111939	Chaffey College	\$113,361	0.20
CA	112190	City College of San Francisco	\$125,839	0.40
CA	112385	Coastline Community College	\$99,828	0.80
CA	122791	College of San Mateo	\$119,623	1.20
CA	111461	College of the Canyons	\$120,693	1.30
CA	112826	Contra Costa College	\$113,352	0.60
CA	113236	Cypress College	\$130,067	1.30
CA	113634	Diablo Valley College	\$131,707	2.40
CA	113856	East Los Angeles College	\$105,033	0.10
CA	114266	Evergreen Valley College	\$153,626	1.40
CA	114716	Foothill College	\$161,567	3.40
CA	114789	Fresno City College	\$122,490	0.20
CA	114859	Fullerton College	\$110,944	0.50
CA	115126	Golden West College	\$154,356	1.90
CA	115296	Grossmont College	\$139,005	3.40
CA	116439	Irvine Valley College	\$99,638	0.90
CA	117247	Laney College	\$132,581	2.80
CA	117690	Los Angeles Harbor College	\$119,879	0.20
CA	117894	Los Medanos College	\$107,810	0.10
CA	118930	Mission College	\$134,287	0.50
CA	118976	Modesto Junior College	\$110,813	0.60
CA	119137	Moorpark College	\$122,681	3.70
CA	119164	Mt. San Antonio College	\$104,815	0.70
CA	119331	Napa Valley College	\$138,490	0.50
CA	120290	Ohlone Community College	\$162,476	2.30
CA	120342	Orange Coast College	\$126,020	2.20
CA	120971	Palomar College	\$100,387	0.70
CA	121044	Pasadena City College	\$119,975	1.30
CA	122180	Sacramento City College	\$126,608	1.30
CA	122205	Saddleback College	\$106,702	1.20
CA	122384	San Diego Miramar College	\$111,489	0.70

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
CA	122658	San Joaquin Delta College	\$110,937	0.40
CA	121619	Santa Ana College	\$117,516	1.00
CA	122889	Santa Barbara City College	\$81,650	0.60
CA	122977	Santa Monica College	\$96,441	0.60
CA	123013	Santa Rosa Junior College	\$109,774	1.20
CA	123509	Skyline College	\$101,482	1.40
CA	123563	Solano Community College	\$98,403	0.70
CA	125028	Ventura College	\$107,780	2.80
CA	126119	Yuba College	\$115,445	0.50
CO	126748	Colorado Northwestern Community College	\$168,269	2.80
CO	127909	Red Rocks Community College	\$38,309	0.20
FL	134495	Hillsborough Community College	\$72,364	0.30
GA	246813	Athens Technical College	\$67,370	0.40
GA	244446	Georgia Piedmont Technical College	\$137,567	1.20
GA	140243	Lanier Technical College	\$56,680	0.20
IA	153524	Iowa Central Community College	\$68,909	1.20
IA	153737	Kirkwood Community College	\$64,591	0.10
IL	145831	Illinois Valley Community College	\$76,437	0.20
IL	146366	Kaskaskia College	\$56,781	0.10
IL	148007	Prairie State College	\$178,004	0.40
IL	148256	Rend Lake College	\$53,845	0.30
IL	148937	Southeastern Illinois College	\$83,144	0.40
IL	149532	Triton College	\$129,500	1.00
IL	149727	Waubonsee Community College	\$105,061	0.10
KS	154697	Barton County Community College	\$87,549	1.60
KS	154934	Colby Community College	\$93,603	2.20
KS	155098	Fort Scott Community College	\$133,964	2.20
KS	155292	Kansas City Kansas Community College	\$118,242	0.30
KS	155487	Manhattan Area Technical College	\$46,594	0.50
KS	155715	Pratt Community College	\$91,368	0.70
KY	157438	Gateway Community and Technical College	\$110,054	0.80
KY	156851	Henderson Community College	\$78,473	0.20
KY	157304	Madisonville Community College	\$82,053	1.40
MA	166647	Massachusetts Bay Community College	\$99,977	0.50
MA	167525	Quincy College	\$98,537	4.40
MI	168883	Bay de Noc Community College	\$94,400	0.20
MN	174428	Normandale Community College	\$147,856	0.60
MN	174376	North Hennepin Community College	\$101,496	0.30
MN	175236	Ridgewater College	\$95,196	1.50
MN	174756	St. Cloud Technical and Community College	\$85,137	1.10
MS	175810	Holmes Community College	\$91,567	1.10
MS	175935	Meridian Community College	\$96,616	0.40
NC	197887	Asheville-Buncombe Technical Community College	\$125,228	0.40

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
NC	198640	Halifax Community College	\$139,756	0.10
NC	198774	Johnston Community College	\$88,026	0.40
NC	199740	Stanly Community College	\$89,940	0.40
ND	200305	North Dakota State College of Science	\$92,878	0.70
NJ	183743	Bergen Community College	\$119,898	1.00
NJ	184180	County College of Morris	\$116,760	2.00
NJ	185536	Middlesex County College	\$95,761	0.60
NJ	185873	Ocean County College	\$62,049	0.40
NJ	186645	Raritan Valley Community College	\$90,908	0.40
NY	189547	Broome Community College	\$92,375	0.80
NY	190053	Clinton Community College	\$101,446	1.50
NY	190840	Dutchess Community College	\$106,378	1.40
NY	191302	Fulton-Montgomery Community College	\$84,416	0.10
NY	191719	Hudson Valley Community College	\$134,572	1.50
NY	193478	Nassau Community College	\$140,795	0.80
NY	194240	Orange County Community College	\$164,919	0.40
NY	195058	Rockland Community College	\$152,202	0.20
NY	366395	Suffolk County Community College	\$121,651	0.50
OH	201672	Central Ohio Technical College	\$92,739	0.40
OH	203881	Marion Technical College	\$77,335	0.40
OK	207281	Northern Oklahoma College	\$94,454	0.10
TN	219888	Columbia State Community College	\$104,980	0.10
TX	222822	Angelina College	\$101,023	0.20
TX	227146	Navarro College	\$69,564	0.20
TX	224110	North Central Texas College	\$130,359	0.20
TX	229504	Vernon College	\$122,971	0.20
TX	229841	Wharton County Junior College	\$132,787	1.60
VA	232195	Germanna Community College	\$68,903	1.20
VA	232946	Northern Virginia Community College	\$129,939	1.60
VA	233019	Patrick Henry Community College	\$99,472	0.30
VA	233037	Paul D. Camp Community College	\$162,781	0.90
VA	233116	Piedmont Virginia Community College	\$89,138	0.10
VA	233639	Southside Virginia Community College	\$73,236	0.70
VA	234377	Wytheville Community College	\$58,861	0.20
WA	234933	Clark College	\$112,624	0.50
WA	235343	Green River Community College	\$86,570	0.40
WA	235431	Highline Community College	\$99,178	0.70
WA	236610	Shoreline Community College	\$117,164	0.90
WI	239372	Moraine Park Technical College	\$71,417	0.10
WI	239488	Northeast Wisconsin Technical College	\$127,021	0.60

LOWEST QUINTILE AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS AND ROI

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
AL	101462	J. F. Drake State Technical College	\$48,701	-1.40
AR	107664	Pulaski Technical College	\$9,514	-1.60
AZ	104346	Central Arizona College	\$23,512	-1.40
AZ	364025	Chandler/Gilbert Community College	\$23,512	-1.40
AZ	104425	Cochise College	\$84,876	-1.40
CA	110246	Butte College	\$27,597	-1.40
CA	121707	College of the Redwoods	\$16,476	-1.60
CA	113193	Cuesta College	\$5,940	-1.60
CA	117274	Lassen Community College	\$38,561	-1.50
CA	117867	Los Angeles Mission College	\$4,811	-1.70
CA	118684	Mendocino College	-\$3,866	-1.80
CA	120421	Oxnard College	-\$6,760	-1.90
CA	117052	Reedley College	-\$3,197	-1.80
CO	126863	Community College of Aurora	-\$3,428	-1.80
CO	127820	Pikes Peak Community College	-\$2,727	-1.80
CO	128258	Trinidad State Junior College	\$15,357	-1.40
CT	129729	Naugatuck Valley Community College	\$54,568	-1.40
CT	129367	Capital Community College	\$47,823	-1.60
CT	129543	Housatonic Community College	-\$2,982	-1.80
CT	130217	Quinebaug Valley Community College	-\$31,518	-2.00
FL	135188	Lake-Sumter Community College	\$20,195	-1.40
GA	138682	Albany Technical College	-\$20,586	-2.30
GA	138840	Atlanta Technical College	\$12,987	-1.60
GA	138956	Augusta Technical College	\$7,884	-1.50
GA	139010	Bainbridge College	\$2,789	-1.70
GA	140599	Moultrie Technical College	-\$4,488	-1.90
GA	366465	Ogeechee Technical College	\$10,023	-1.50
GA	140942	Savannah Technical College	\$6,174	-1.60
GA	141158	Southwest Georgia Technical College	\$20,100	-1.50
GA	141255	Wiregrass Georgia Technical College	\$23,331	-1.40
HI	141811	Leeward Community College	-\$9,826	-1.80
IA	153533	Iowa Lakes Community College	-\$6,608	-1.90
IA	153922	Marshalltown Community College	\$9,764	-1.60
ID	142559	College of Southern Idaho	\$39,442	-1.40
ID	142179	Eastern Idaho Technical College	\$16,178	-1.60
IL	384342	Heartland Community College	\$15,666	-1.50
IL	146205	John A. Logan College	\$16,629	-1.50
IL	146278	John Wood Community College	\$18,759	-1.40
KS	154952	Cowley County Community College	-\$45,827	-2.50
KS	155566	Neosho County Community College	\$91,269	-1.40
KY	156392	Bluegrass Community and Technical College	-\$895	-1.80

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
KY	157331	Maysville Community and Technical College	-\$11,369	-2.00
KY	157483	West Kentucky Community and Technical College	\$7,684	-1.50
LA	437103	Baton Rouge Community College	\$2,448	-1.70
LA	158431	Bossier Parish Community College	-\$4,516	-1.80
LA	158662	Delgado Community College	\$89,126	-1.40
MA	164775	Berkshire Community College	\$21,434	-1.60
MD	161864	Baltimore City Community College	\$47,005	-1.60
MD	405872	Carroll Community College	\$9,082	-1.60
MD	162168	Chesapeake College	\$37,916	-1.50
MD	164313	Wor-Wic Community College	\$21,905	-1.60
ME	161077	Central Maine Community College	\$4,465	-1.70
ME	161192	Kennebec Valley Community College	\$13,954	-1.50
MI	169521	Delta College	\$4,955	-1.70
MI	171155	Mid-Michigan Community College	\$22,996	-1.40
MI	171483	Northwestern Michigan College	\$15,682	-1.60
MI	172617	Washtenaw Community College	\$38,526	-1.40
MN	173203	Central Lakes College-Brainerd	\$809	-1.70
MN	174136	Minneapolis Community and Technical College	\$47,997	-1.40
MO	177135	Crowder College	-\$43,613	-2.30
MO	177250	East Central College	\$5,703	-1.70
MO	177676	Jefferson College	-\$14,790	-2.00
MO	177977	Linn State Technical College	-\$42,391	-2.40
MO	178217	Mineral Area College	-\$32,368	-2.30
MO	177472	Ozarks Technical Community College	-\$45,405	-2.50
MO	262031	St. Charles Community College	\$7,762	-1.60
MO	179539	State Fair Community College	-\$22,670	-2.10
MS	175652	East Mississippi Community College	-\$54,047	-2.30
MS	175883	Jones County Junior College	-\$7,392	-1.80
MT	180197	Flathead Valley Community College	-\$3,703	-1.80
NC	198251	Central Carolina Community College	\$16,223	-1.50
NC	198817	Lenoir Community College	\$25,948	-1.60
NC	199087	Nash Community College	\$76,611	-1.40
NC	199485	Rockingham Community College	\$39,688	-1.40
NC	199768	Surry Community College	\$26,353	-1.40
NC	199926	Wilkes Community College	\$26,662	-1.50
ND	200341	Williston State College	-\$5,502	-1.90
NE	180902	Central Community College	\$8,132	-1.60
NE	181312	Mid-Plains Community College	\$7,371	-1.60
NE	181817	Western Nebraska Community College	-\$3,127	-1.80
NJ	184481	Essex County College	\$39,373	-1.60
NJ	184995	Hudson County Community College	\$2,415	-1.70
NJ	186034	Passaic County Community College	\$9,700	-1.70

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
NJ	247603	Sussex County Community College	-\$29,196	-2.40
NM	187532	Central New Mexico Community College	\$8,043	-1.70
NM	188137	Santa Fe Community College	\$77,537	-1.50
NY	189839	Cayuga County Community College	\$28,274	-1.50
NY	191612	Herkimer County Community College	\$11,753	-1.50
NY	195322	Schenectady County Community College	-\$682	-1.80
NY	195988	Sullivan County Community College	\$70,901	-1.40
OH	201973	Clark State Community College	\$56,441	-1.40
OH	202356	Cuyahoga Community College District	\$68,657	-1.60
OH	203748	Lorain County Community College	\$40,488	-1.60
OH	204440	Northwest State Community College	-\$12,515	-1.90
OH	205470	Sinclair Community College	\$50,298	-1.40
OH	206446	Washington State Community College	\$5,989	-1.60
OH	204255	Zane State College	-\$1,185	-1.80
OR	208406	Clackamas Community College	\$58,226	-1.40
OR	208415	Clatsop Community College	\$66,609	-1.50
OR	428392	Klamath Community College	-\$27,516	-1.90
OR	209074	Linn-Benton Community College	\$51,736	-1.40
OR	209940	Rogue Community College	\$23,097	-1.60
PA	211343	Butler County Community College	\$11,293	-1.60
PA	211079	Community College of Beaver County	\$32,302	-1.40
PA	215239	Community College of Philadelphia	\$72,362	-1.40
PA	414911	Pennsylvania Highlands Community College	-\$92,688	-2.80
PA	216825	Westmoreland County Community College	\$9,824	-1.60
SC	217615	Aiken Technical College	\$42,351	-1.40
SD	219480	Western Dakota Technical Institute	\$11,320	-1.40
TN	221485	Southwest Tennessee Community College	\$88,828	-1.40
TX	222992	Austin Community College District	\$104,106	-1.40
TX	223773	Cedar Valley College	-\$1,359	-1.80
TX	226408	College of the Mainland	\$129,674	-1.40
TX	227304	Odessa College	\$99,918	-1.40
TX	246354	Palo Alto College	-\$1,036	-1.80
TX	229799	Weatherford College	\$21,382	-1.60
UT	230597	Snow College	-\$62,653	-2.90
VA	231882	Danville Community College	\$4,882	-1.60
VA	233648	Southwest Virginia Community College	\$26,800	-1.40
VT	230861	Community College of Vermont	\$20,004	-1.40
WA	235671	Bates Technical College	\$18,258	-1.50
WA	234711	Big Bend Community College	\$30,658	-1.40
WA	439190	Cascadia Community College	-\$13,534	-1.90
WA	234845	Centralia College	-\$19,328	-2.00
WA	235334	Grays Harbor College	\$10,942	-1.60

STATE	UNITID	INSTITUTION	AVERAGE WORK-LIFE FINANCIAL RETURN TO TAXPAYERS	ANNUALIZED TAXPAYER ROI
WA	236638	Skagit Valley College	\$39,460	-1.40
WA	236708	Spokane Falls Community College	\$22,726	-1.50
WI	239008	Lakeshore Technical College	\$4,960	-1.70
WI	239220	Mid-State Technical College	\$12,590	-1.60
WV	445018	Kanawha Valley Community and Technical College	\$62,455	-1.40
WY	240505	Casper College	\$28,554	-1.40

Appendix III: Adjusting for Cost of Living

Several reviewers pointed out the importance of taking into consideration the widespread differences in the cost of living that graduates from different community colleges face when they enter the labor market. We recognize that high wages in a high-cost metropolitan area may buy far less than low wages in a low-cost area. To get a sense of the significance that cost-of-living adjustments could play, in the table below we adjust the observed PayScale starting wages of graduates from California community colleges by differences in the cost of living as measured by <http://www.relocationessentials.com/aff/www/tools/salary/col.aspx>.

We set as the baseline the largest metropolitan region in the state (Los Angeles). We then constructed the cost-of-living adjustment by obtaining the ratio of the community in which each community college was located to that of Los Angeles. We then multiplied the observed PayScale data by that ratio. Not surprisingly, some of the cost-of-living differences are quite large. For example, graduates from Bakersfield College had an observed starting salary of \$40,800 but that was equivalent to more than \$50,000 standardized by the cost of living for Los Angeles. Four other colleges had

adjustments greater than \$8,000: Merced College, Shasta College, College of the Sequoias, and Yuba College. Their observed starting salaries were all below the state median, but when we adjusted for cost of living, their graduates on average earned above the state median.

On the opposite end of the spectrum, graduates of three colleges—Skyline College, College of San Mateo, and the City College of San Francisco—had observed wages above the state median, but these wages fell below the state median when we accounted for cost of living.

For two reasons, we decided to forego in this study the attempt at systematically fine-tuning the returns to graduates by incorporating these types of adjustments for regional cost of living. First, before we tried to adjust for cost of living, we needed to understand which of our measures should reflect such differences, especially given the obvious problem of mobility (graduates may move from low cost to high cost areas and vice versa). Second, we needed to be clear whether ROI should reflect such regional cost-of-living adjustments. That said, in future work, we will endeavor to resolve these questions.

Adjusted Starting Salaries in California Standardized by the Cost of Living in Los Angeles

UNITID	INSTITUTION	COST-OF-LIVING-ADJUSTED STARTING SALARY	STARTING SALARY (PayScale)	DIFFERENCE
108667	College of Alameda	\$30,099	\$30,400	-\$301
108807	Allan Hancock College	\$32,268	\$31,300	\$968
109208	American River College	\$39,770	\$34,600	\$5,170
109350	Antelope Valley College	\$35,500	\$35,500	\$0
109819	Bakersfield College	\$51,000	\$40,800	\$10,200
110246	Butte College	\$41,566	\$34,500	\$7,066
110334	Cabrillo College	\$38,922	\$39,700	-\$778
111461	College of the Canyons	\$38,700	\$38,700	\$0
111887	Cerritos College	\$36,900	\$36,900	\$0
111920	Chabot College	\$40,000	\$40,400	-\$400
111939	Chaffey College	\$42,262	\$35,500	\$6,762
112172	Citrus College	\$33,600	\$33,600	\$0
112190	City College of San Francisco	\$35,000	\$45,500	-\$10,500
112385	Coastline Community College	\$37,216	\$36,100	\$1,116
112686	El Camino College-Compton Center	\$37,800	\$37,800	\$0
112826	Contra Costa College	\$37,959	\$37,200	\$759
113096	Cosumnes River College	\$36,322	\$31,600	\$4,722
113111	Crafton Hills College	\$44,048	\$37,000	\$7,048
113193	Cuesta College	\$35,556	\$32,000	\$3,556
113218	Cuyamaca College	\$37,576	\$37,200	\$376
113236	Cypress College	\$41,546	\$40,300	\$1,246
113333	De Anza College	\$40,093	\$42,900	-\$2,807
113573	College of the Desert	\$44,235	\$37,600	\$6,635
113634	Diablo Valley College	\$37,347	\$36,600	\$747
113856	East Los Angeles College	\$37,700	\$37,700	\$0
114266	Evergreen Valley College	\$36,355	\$38,900	-\$2,545
114716	Foothill College	\$41,028	\$43,900	-\$2,872
114789	Fresno City College	\$42,000	\$35,700	\$6,300
114859	Fullerton College	\$35,361	\$34,300	\$1,061
114938	Gavilan College	\$34,860	\$37,300	-\$2,440
115126	Golden West College	\$37,835	\$36,700	\$1,135
115296	Grossmont College	\$48,889	\$48,400	\$489
116439	Irvine Valley College	\$44,639	\$43,300	\$1,339
117052	Reedley College	\$36,235	\$30,800	\$5,435
117247	Laney College	\$47,018	\$47,489	-\$470
366401	Las Positas College	\$33,960	\$34,300	-\$340
117274	Lassen Community College	\$43,775	\$36,333	\$7,442
117645	Long Beach City College	\$39,600	\$39,600	\$0
117690	Los Angeles Harbor College	\$36,200	\$36,200	\$0
117706	Los Angeles Pierce College	\$33,700	\$33,700	\$0
117733	Los Angeles Valley College	\$38,700	\$38,700	\$0
117788	Los Angeles City College	\$36,700	\$36,700	\$0

UNITID	INSTITUTION	COST-OF-LIVING-ADJUSTED STARTING SALARY	STARTING SALARY (PayScale)	DIFFERENCE
117867	Los Angeles Mission College	\$31,800	\$31,800	\$0
117894	Los Medanos College	\$36,531	\$35,800	\$731
118347	College of Marin	\$45,494	\$46,404	-\$910
118684	Mendocino College	\$37,439	\$30,700	\$6,739
118718	Merced College	\$40,253	\$31,800	\$8,453
118912	MiraCosta College	\$35,859	\$35,500	\$359
118930	Mission College	\$42,710	\$45,700	-\$2,990
118976	Modesto Junior College	\$44,390	\$36,400	\$7,990
119067	Monterey Peninsula College	\$45,495	\$41,400	\$4,095
119137	Moorpark College	\$43,085	\$40,500	\$2,585
119164	Mt. San Antonio College	\$36,200	\$36,200	\$0
119331	Napa Valley College	\$46,495	\$45,100	\$1,395
120290	Ohlone College	\$41,782	\$42,200	-\$418
120342	Orange Coast College	\$42,268	\$41,000	\$1,268
120421	Oxnard College	\$32,128	\$30,200	\$1,928
120971	Palomar College	\$38,485	\$38,100	\$385
121044	Pasadena City College	\$40,300	\$40,300	\$0
121619	Santa Ana College	\$40,825	\$39,600	\$1,225
121707	College of the Redwoods	\$40,610	\$33,300	\$7,310
121886	Rio Hondo College	\$39,900	\$39,900	\$0
121901	Riverside Community College	\$45,059	\$38,300	\$6,759
122180	Sacramento City College	\$47,241	\$41,100	\$6,141
122205	Saddleback College	\$41,340	\$40,100	\$1,240
122339	San Diego City College	\$36,869	\$36,500	\$369
122375	San Diego Mesa College	\$34,646	\$34,300	\$346
122384	San Diego Miramar College	\$34,444	\$34,100	\$344
122658	San Joaquin Delta College	\$40,920	\$35,600	\$5,320
122746	San Jose City College	\$35,607	\$38,100	-\$2,493
122791	College of San Mateo	\$39,107	\$43,800	-\$4,693
122889	Santa Barbara City College	\$38,557	\$37,400	\$1,157
122977	Santa Monica College	\$39,200	\$39,200	\$0
123013	Santa Rosa Junior College	\$41,183	\$38,300	\$2,883
123217	College of the Sequoias	\$43,457	\$35,200	\$8,257
123299	Shasta College	\$40,000	\$31,600	\$8,400
123341	Sierra College	\$39,759	\$33,000	\$6,759
123509	Skyline College	\$34,643	\$38,800	-\$4,157
123527	San Bernardino Valley College	\$45,357	\$38,100	\$7,257
123563	Solano Community College	\$39,560	\$36,000	\$3,560
125028	Ventura College	\$36,489	\$34,300	\$2,189
125471	West Los Angeles College	\$33,800	\$33,800	\$0
125499	West Valley College	\$35,701	\$38,200	-\$2,499
126119	Yuba College	\$40,125	\$32,100	\$8,025

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