



# COMMUNITY COLLEGES

*A Route of Upward  
Economic Mobility*

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## TABLE OF CONTENTS

<b>I. Executive Summary.....</b>	<b>5</b>
Advantages of Community Colleges.....	5
Who Are Community College Students?.....	5
Economic Payoffs .....	5
Along Different Paths .....	6
From a Community College to a Bachelor’s Degree .....	6
Long-Term Educational Outcomes .....	6
Long-Term Labor Market Outcomes .....	7
Concluding Remarks .....	7
<b>II. Introduction .....</b>	<b>9</b>
Advantages of Community Colleges.....	10
Community College Students .....	10
Labor Market Returns.....	11
Returns to an Associate Degree .....	11
Along Different Paths .....	13
From a Community College to a Bachelor’s Degree .....	14
Long-Term Educational Outcomes .....	15
Long-Term Labor Market Outcomes .....	21
<b>III. Concluding Remarks .....</b>	<b>24</b>
References .....	25
Endnotes .....	26
<b>IV. Appendix .....</b>	<b>27</b>
A. Census Bureau–designated areas .....	27
B. Category Definitions of Carnegie Foundation Classification of Institutions of Higher Education .....	28
Notes on Definitions .....	28



## I. EXECUTIVE SUMMARY

Of all U.S. undergraduates, community college students constitute a remarkable 46 percent. Given the significant role community colleges play in U.S. higher education, it is important to have as much information as possible about community college students, their goals, educational choices and outcomes.

This report takes a look at community colleges compared to traditional, four-year colleges—the advantages, the types of students, the economic returns and the students' educational objectives. It also looks at whether a community college education affects a person's chances of obtaining a more advanced degree and whether students who receive an associate degree prior to obtaining a bachelor's degree have different educational and labor market outcomes than their counterparts who do not have an associate degree.

### **Advantages of Community Colleges**

Compared to a traditional four-year college, a community college has several important advantages for students: an open admission policy, making it easier to enroll regardless of prior academic record; lower tuition and fees; savings on room and board; and a more flexible curriculum and class schedule.

### **Who Are Community College Students?**

The population of community college students is diverse.<sup>1</sup> They are 60 percent white, 15 percent black, and 14 percent Hispanic. Forty-one percent are males. In comparison, students attending four-year colleges are more likely to be white (70 percent) and male (45 percent).

Community colleges have more so-called nontraditional students than four-year colleges. Community college students are more likely to be older; and only 31 percent of them are enrolled full time, in part because they are more likely to also be working. Furthermore, 40.8 percent of community college students work full time, compared to 22.8 percent of their four-year college counterparts. More students in community colleges are first-generation college students.

### **Economic Payoffs**

Most studies have found that students who attended community college, but did not complete a degree, earn 9 percent to 13 percent more than those with a high school diploma only.<sup>2</sup> There is also an increase in annual earnings of 5 percent to 8 percent associated with each year of education at a community college. This finding is particularly interesting because it is very similar to the return to a year of schooling in a four-year college.

Other researchers looked at retraining efforts by community colleges for older, high-tenure displaced workers.<sup>3</sup> Researchers found that one year of community college schooling increases the long-term earnings of displaced workers by about 9 percent for men and about 13 percent for women, compared to earnings for similar workers who did not attend community college. While there is a high return to technically oriented and math and science courses (about 14 percent for men and 29 percent for women), less technically oriented courses yield very low and possibly zero returns.

Another way to think about the value of a community college education is to ask how much more a person with an associate degree earns compared to someone who has only a high school diploma. Previous studies estimated the labor market return with an associate degree is about 16 percent to 27 percent.<sup>4</sup>

This study finds significant differences between demographic groups. Women of all races have higher returns with an associate degree than men, mostly because women are more likely to major in nursing and related fields. There is also variation among racial groups in the return with an associate degree. Hourly wages of white men with an associate degree are 18 percent higher than wages of those who stopped their formal education at high school. The returns are much higher for black and Hispanic men—25 percent and 27 percent, respectively.

Also, the return with an associate degree is different across cities in the United States. White men with associate degrees are paid only 4 percent more than white high school graduates in Seattle, but as much as 30 percent more in Miami. For

Hispanic men, the return with an associate degree is 16 percent in Washington, D.C., but more than twice as much, 39 percent, in Atlanta. Cross-city differentials for white women are not as big, but they are significant for minority women.

In four large metropolitan areas in the Federal Reserve Bank of St. Louis' district, white men with an associate degree earn on average 11 percent more in St. Louis, 16 percent more in Memphis, 22 percent more in Little Rock and 18 percent more in Louisville than similar men with only a high school diploma. For black men, returns with an associate degree are 13 percent in St. Louis, 22 percent in Memphis and 17 percent in Louisville. Consistent with the rest of the country, women's returns are higher than men's. For example, black women in St. Louis with an associate degree earn 43 percent more than those with only a high school education.

### **Along Different Paths**

Community college students have various educational goals. Although many plan to obtain an associate degree, some students take just a couple of classes to improve their skills or want to obtain certification in a certain field. Some intend to transfer to a four-year institution without any formal community college credentials.

Critics of community colleges point out that a significant proportion of students complete relatively few college credits. One study calculated that the majority of community college students complete one year or less and 35 percent complete one semester of study or less.<sup>5</sup> The study also showed that less than one-half of community college students complete any degrees.

One view is that easy access to community college sidetracks students from a four-year college, where they are more likely to obtain a bachelor's degree. On the other hand, many nontraditional students would not have attended four-year colleges. For them, community colleges provide a chance for a post-secondary education they would not have had otherwise. Various studies argue that, even if attending a community college instead of a four-year college might lower educational attainment for some students, more students have access to higher education, which makes overall educational attainment in society higher.

A study by the U.S. Department of Education found that about 90 percent of students entering community college intended to obtain a formal credential or to transfer to a four-year college. The report estimated that between 51 percent and 63 percent (depending on data used) of these students had fulfilled their expectations within six to eight years after initial enrollment. Overall, about 29 percent of community college students had transferred to four-year colleges.

### **From a Community College to a Bachelor's Degree**

It is important to evaluate how students who do transfer fare compared to their counterparts who started at four-year institutions. A recent study evaluates whether there is what the authors call a "community college penalty" and finds that there is, indeed, a "penalty" for those entering post-secondary education at a community college.<sup>6</sup> The rates of dropping out without a degree are much higher for those who start at community colleges than for those who start at four-year institutions.

For example, community college students were 36 percent less likely to obtain a bachelor's degree than similar students who started at four-year colleges. Even community college students who expressed an intention to obtain a four-year bachelor's degree were significantly less likely to do so within nine years of starting their post-secondary studies. Only 26 percent of this group achieved their goal.

To put it in perspective, 50 percent and 73 percent of those who start at nonselective and selective four-year institutions, respectively, obtained a bachelor's degree.

The negative effect of starting post-secondary education at a community college remains, even after the authors adjust for selection bias by controlling for students' race, gender, age, ability (ACT scores) and family income. The authors suggest that "it is worth comparing the size of the penalty to the difference in costs at two-year versus four-year institutions."

### **Long-Term Educational Outcomes**

Though many community college students do not go on to receive a bachelor's degree or

higher, some do. Among people who have at least a bachelor's degree, 17 percent report having received an associate degree. This study finds that people with a prior associate degree were significantly more likely to attend less selective (and perhaps less expensive) institutions for their bachelor's studies. Students with an associate degree are also more likely to be enrolled in public colleges than those who do not have an associate degree and less likely to attend private colleges. People with an associate degree are less likely to major in sciences and engineering and are more likely to major in health, technology and management than their counterparts.

About 70 percent of those with both a bachelor's degree and an associate degree do not continue their education beyond their first bachelor's degree. This compares to less than 60 percent of their counterparts without an associate degree. Among those who received a master's degree, only 14.3 percent have an associate degree. The proportion of people with an associate degree is even smaller among those with a doctorate or professional degree (5.8 and 9.5 percent, respectively).

### **Long-Term Labor Market Outcomes**

Analyzing salaries of people with at least a bachelor's degree, this study finds differences in annual salaries for individuals with an associate degree and for those without it. Regardless of the highest degree, people who started their post-secondary education with an associate degree earn less on average than those who started at a four-year college. The difference is particularly large for those who have a doctorate or a professional degree.

Careful statistical analysis shows that college graduates with a prior associate degree earn \$2,426 less a year. The earnings gap is smaller for bachelor's and master's degree holders (\$2,269 and \$2,117, respectively) and larger for people with doctorates and professional degrees (\$6,884 and \$7,768, respectively).

One could argue that community college students are more likely to have attended poor performance schools and fall so far behind even before entering the post-secondary education system that this disadvantage affects their educational and labor market outcomes.

### **Concluding Remarks**

Community colleges play a significant role in U.S. higher education. They offer an opportunity to receive a post-secondary education to many students who would not have attended college otherwise. Attending a community college even without completing a degree results in economic payoffs and better job opportunities.

There are downsides as well. Only about 29 percent of community college students transfer to four-year institutions and only about 16 percent eventually receive a bachelor's degree or higher. In addition, there is a persistent salary gap between those who have a degree from a traditional college and a prior associate degree and similar individuals who do not have an associate degree.

Still, for many students, community colleges offer the best chance to obtain a college education. It is important, however, for individuals to know both the benefits and the disadvantages of attending a community college when making decisions about education.

Better understanding of all the aspects of the extremely complicated subject of education provided by community colleges should be an important priority for researchers and policy makers. ■





## II. INTRODUCTION

Joliet Junior College, the oldest community college in the nation, was founded in 1901. Since then, community colleges have become increasingly important for the U.S. education and training system. Today, 11.5 million students (6.5 million of whom are studying for college credits) are enrolled in almost 1,200 community colleges, according to the American Association of Community Colleges. Of all U.S. undergraduates, community college students constitute a remarkable 46 percent.

The term “junior college” originally referred to any two-year, post-secondary school. Over the last few decades, the term “community college” became more popular to describe public, two-year institutions as it better conveys the mission of these colleges to serve their local communities. This distinction was not prevalent before the 1980s and the two terms are still often used interchangeably. However, in 1992 the American Association of Junior Colleges did change its name to the American Association of Community Colleges.

The original goal of two-year colleges was to prepare students, through an associate degree program, to transfer to a four-year college. Over time, the purpose evolved to include workforce training programs, schooling toward certification in areas such as nursing and other professions, and adult continuing education classes. Lately, some community colleges have started to offer bachelor’s degrees in a number of fields.

However, there are big differences across states in how the community college system is used. Rouse (1998) found evidence suggesting that states tend to focus their resources on either a community college or a four-year college system. California has the largest network of the former, with 66 percent of the state’s current undergraduates attending community colleges. Nevada and Vermont have only 16 percent of their undergraduates in community colleges.<sup>7</sup>

All of Arkansas and parts of Missouri, Mississippi, Illinois, Indiana, Tennessee and Kentucky comprise the Federal Reserve System’s Eighth District, which is served by the Federal Reserve Bank of St. Louis. Among the states within the Eighth District, Illinois and Mississippi have the larg-

est proportion of undergraduates—about half—in community colleges. Indiana has the lowest percentage—19 percent. Table 1 summarizes enrollment statistics for the Eighth District states.

<b>Table 1 Comparisons for the Federal Reserve’s Eighth District: Enrollment</b>		
	<b>Enrollment in CC, Fall 2005</b>	<b>Percent of All Undergraduates, Fall 2005</b>
<b>United States</b>	<b>6,184,000</b>	<b>41(%)</b>
<b>Eighth District States</b>		
Arkansas	47,771	37
Illinois	352,824	51
Indiana	59,969	19
Kentucky	84,669	39
Mississippi	66,298	50
Missouri	86,742	28
Tennessee	74,829	31
SOURCE: U.S. Department of Education, National Center for Education Statistics		

Given the significant role community colleges play in U.S. higher education, it is important to have as much information as possible about community college students, their goals, educational choices and outcomes. This report concentrates on several of these topics. In particular, it addresses the following questions:

- What are the advantages of community colleges compared to traditional four-year colleges?
- Do students attending community colleges differ from students at traditional four-year colleges?
- What are the economic returns of attending a community college?
- What are the intentions of community college students toward their educational objectives?
- Does starting post-secondary education at a community college affect a person’s chances of obtaining a bachelor’s degree and above?
- Do students who attended a community college and received an associate degree prior to obtaining a bachelor’s degree have different educational and labor market outcomes than their counterparts who do not have an associate degree?

## Advantages of Community Colleges

Compared to a traditional four-year college, a community college has several important advantages for students. To begin, the open admission policy makes it easier to enroll regardless of prior academic record.

The cost to attend community college is less because of lower tuition and other fees than what four-year colleges charge. Community college students on average paid \$2,017 in tuition and fees for the 2006–07 academic year, which is less than half of what students in public four-year universities paid (\$5,685) and only about one-tenth of the tuition and fees for students in private four-year universities (\$20,492), according to the U.S. Department of Education.

Table 2 presents a comparison of tuition costs and other fees for the Federal Reserve’s Eighth District. Mississippi has the lowest tuition among the states of the Eighth District. Attending a four-year private college here costs \$12,300 a year on average. Attending a four-year public college costs significantly less: \$4,457 a year. Community college tuition in Mississippi is \$1,709 a year. Even the state with the highest community college tuition in the District, Indiana, charges only \$2,713 a year. In comparison, tuition at a private four-year college in Indiana costs on average \$22,060 a year. Illinois has the highest tuition for four-year public universities in the District (\$8,038).

In addition, most community college students live at home, thus saving room and board expenses incurred by students at other institutions.

Finally, community colleges offer a more flexible curriculum, and their schedule includes evening and weekend classes. That gives students an opportunity to attend college while working.

## Community College Students

The population of community college students is diverse and is different from the population at four-year colleges. Community college students are 60 percent white, 15 percent black, 14 percent Hispanic and 5 percent Asian.<sup>8</sup> Forty-one percent of community college students are males. In comparison, students attending four-year colleges are more likely to be white (70 percent) and male (45 percent).

<b>Table 2 Comparisons for the Federal Reserve’s Eighth District: Tuition</b>			
	<b>Average Tuition and Required Fees, 2006-07</b>		
	<b>Four-year public (in-state)</b>	<b>Four-year private</b>	<b>Two-year community college</b>
<b>United States</b>	<b>\$5,685</b>	<b>\$20,492</b>	<b>\$2,017</b>
<b>Eighth District States</b>			
Arkansas	\$ 4,937	\$ 13,396	\$ 1,890
Illinois	\$ 8,038	\$ 20,181	\$ 2,252
Indiana	\$ 6,284	\$ 22,060	\$ 2,713
Kentucky	\$ 5,821	\$ 14,739	\$ 2,633
Mississippi	\$ 4,457	\$ 12,300	\$ 1,709
Missouri	\$ 6,320	\$ 16,539	\$ 2,284
Tennessee	\$ 5,009	\$ 17,576	\$ 2,474
SOURCE: U.S. Department of Education, National Center for Education Statistics			

Because of the flexibility they offer, and the relatively low monetary and time costs of attending, community colleges have more so-called nontraditional students than four-year colleges. Community college students are more likely to be older: 35 percent of them are 30 years old or older compared to 16 percent in four-year colleges. The average community college student is 28 years old, with a median age of 24. The corresponding ages for students in four-year colleges are 24 and 21.

Only 31 percent of community college students are enrolled full time, in part because students attending community colleges are more likely to also be working. In contrast, 63 percent of students at four-year colleges are enrolled full time. Only 21.4 percent of all community college students do not work, compared with 30.5 percent at four-year colleges. Furthermore, 40.8 percent of community college students work full time, compared with 22.8 percent of their four-year college counterparts.

More students in community colleges are first-generation college students than are students attending four-year colleges. More than 40 percent of the former have parents with only a high school education or less. In contrast, only 27 percent of four-year college students have parents with a high school education or less.

Not surprisingly, most community college students attend an institution that is close to their

home. They live on average 40 miles away from the college they attend. In comparison, students at four-year institutions attend colleges on average 230 miles away from their home. More than 95 percent of community college students attend colleges in their states compared with 83 percent of students at four-year colleges.

### **Labor Market Returns**

What is the economic payoff to attending community college? This turns out to be a rather complicated question to answer. One reason is the lack of available data. Until 1990, the U.S. Census Bureau recorded only the number of years of education, making it impossible to identify individuals attending community college specifically. In the 1990 and 2000 U.S. censuses, the highest educational attainment was recorded instead of years of education. This makes it possible to focus on individuals with a completed associate degree. Still, this information does not make it possible to identify an institution students attended if they did not complete a degree.

Several available studies used data from surveys instead. Most of the surveys recorded data on various characteristics of respondents, starting with their teenage years and following them through the years.<sup>9</sup> One limitation of these studies is that, given the timeline of surveys, they include only students who enrolled in community college soon after graduating from high school.

Most studies found that students who attended community college, but did not complete a degree, earn 9 percent to 13 percent more than those with a high school diploma only. The estimation technique usually attempts to control for differences in academic preparation between the two groups as measured by test scores and class rank. Furthermore, researchers found that there is an increase in annual earnings of 5 percent to 8 percent associated with each year of education at a community college. This finding is particularly interesting because it is very similar to the return to a year of schooling in a four-year college.

Jacobson, LaLonde and Sullivan (2005) looked at a very different group—older, high-tenure, displaced workers. Much of the retraining efforts for this group is done at community colleges. Researchers found that one year of community

college schooling increases long-term earnings of displaced workers by about 9 percent for men and about 13 percent for women compared to earnings for similar workers who did not attend community college. Another important fact reported by the authors is that while there is a high return to technically oriented and math and science courses (about 14 percent for men and 29 percent for women), less technically oriented courses yield very low and possibly zero returns.

### **Returns to an Associate Degree**

Another way to think about the value of a community college education is to ask how much more a person with an associate degree earns compared to a similar person who has only a high school diploma.<sup>10</sup>

Studies done separately by Kane and Rouse (1995) and by Leigh and Gill (1997) estimated the labor market return to an associate degree of about 16 percent to 27 percent.

Using the much larger dataset from the U.S. 2000 census,<sup>11</sup> it is possible to address more detailed questions. For instance, are there differences in labor market returns to an associate degree between different demographic groups? Are the returns the same across different cities? Data also allow looking at the differentials in hourly wages rather than annual earnings.

The sample consists of men and women 25 to 55 years old with an associate degree or a high school diploma who live either in the 20 largest metropolitan areas of the United States (including St. Louis) or in large metropolitan areas of the Eighth District (Memphis, Little Rock and Louisville).

A simple matching estimator was used to calculate, for each metropolitan area  $j$ , the rate of return to an associate degree. Intuitively, people who do have an associate degree were matched with those who do not but who have otherwise similar demographic characteristics. We can ask, then, how their wages differ. It is assumed that productivity, which translates into wages, is a function of education and age, since older workers tend to have more work experience.

More precisely, for an individual with age  $x=X$  in metropolitan area  $j$  we would like to estimate

the causal effect of an associate degree ( $AD=1$ ):

$$\Delta(X, j) = E(\gamma_1 | x = X, AD = 1, j) - E(\gamma_0 | x = X, AD = 1, j),$$

the difference between the earnings of an individual with an associate degree and his potential earnings if he would have stopped his education at the high school level. Here,  $\gamma_1$  is the logarithm of the worker's wage if the individual has an associate degree, and  $\gamma_0$  is the logarithm of the worker's wage if the individual stops his or her education at high school. Of course, we cannot directly observe the second term in the above equation; we never observe what a person with an associate degree would have earned if he or she had only a high school education.

If we are willing to assume away selection problems, though (including the issue of ability bias that has received close attention in the literature), we have

$$E(\gamma_0 | x = X, AD = 1, j) = E(\gamma_0 | x = X, AD = 0, j).$$

This equation simply means that the earnings of a person with an associate degree would have been the same as the earnings of a similar person with a high school degree if he or she did not receive an associate degree.

Then the mean return to an associate degree in a particular metropolitan area  $j$ , which I denote  $\Delta(j)$ , is

$$\Delta(j) = \int \Delta(x|j) dF(x|j),$$

where  $dF(x|j)$  is the distribution of  $x$  in the metropolitan area.

In principle,  $\Delta(j)$  might vary across cities owing simply to differences in the age distributions in these cities. Those differences would be of little interest, so I "standardize" the estimates, using the national cumulative distribution function of  $x$ , i.e., calculate

$$\Delta_n(j) = \int \Delta(x|j) dF_n(x),$$

where  $dF_n(x)$  is derived from the national data.

<b>Table 3 Labor Market Returns to Associate Degree (Relative to High School) for Women</b>			
	<b>White</b>	<b>Black</b>	<b>Hispanic</b>
<b>United States</b>	<b>0.29</b>	<b>0.30</b>	<b>0.29</b>
<b>20 Largest Metropolitan Areas</b>			
Atlanta	0.27	0.29	0.53
Baltimore	0.28	0.28	0.20
Boston	0.29	0.33	0.31
Chicago	0.25	0.23	0.21
Dallas	0.30	0.27	0.24
Detroit	0.32	0.19	0.25
Houston	0.24	0.45	0.20
Los Angeles	0.20	0.26	0.30
Miami	0.25	0.30	0.33
Minneapolis	0.23	0.28	0.24
New York	0.26	0.35	0.28
Philadelphia	0.28	0.24	0.38
Phoenix	0.24	0.33	0.18
Pittsburgh	0.29	0.19	—
Riverside-San Bernardino	0.31	0.40	0.36
San Diego	0.23	0.21	0.28
San Francisco	0.26	0.21	0.30
Seattle	0.25	0.29	0.39
<b>St. Louis</b>	<b>0.24</b>	<b>0.43</b>	—
Washington	0.23	0.26	0.37
<b>Eighth District Large Metropolitan Areas</b>			
<b>Memphis</b>	<b>0.23</b>	<b>0.31</b>	—
<b>Little Rock</b>	<b>0.37</b>	—	—
<b>Louisville</b>	<b>0.32</b>	<b>0.32</b>	—

NOTE: Author's calculation. Data are from 2000 Public Use Micro Sample (PUMS) of the U.S. Census. Results are missing if data were insufficient because of small sample size. The numbers can be interpreted as percentage increases in wages. (See footnote 12 for more information.) St. Louis is in the Federal Reserve's Eighth District.

I perform this estimation separately for men and women and for different racial groups.

One immediate feature of the results is that, though the estimated average returns to an associate degree are consistent with other researchers' findings, there are significant differences between demographic groups (Tables 3 and 4). Women of all races have higher returns to an associate degree than men do, mostly because women are more likely to major in nursing and related fields.

<b>Table 4</b>	<b>Labor Market Returns to Associate's Degree (Relative to High School) for Men</b>		
	<b>White</b>	<b>Black</b>	<b>Hispanic</b>
<b>United States</b>	<b>0.18</b>	<b>0.25</b>	<b>0.27</b>
<b>20 Largest Metropolitan Areas</b>			
Atlanta	0.21	0.26	0.39
Baltimore	0.15	0.26	0.19
Boston	0.17	0.06	0.25
Chicago	0.10	0.21	0.19
Dallas	0.24	0.28	0.29
Detroit	0.21	0.22	0.34
Houston	0.19	0.21	0.27
Los Angeles	0.16	0.35	0.30
Miami	0.30	0.25	0.30
Minneapolis	0.17	0.27	0.32
New York	0.11	0.24	0.21
Philadelphia	0.15	0.17	0.32
Phoenix	0.18	0.42	0.24
Pittsburgh	0.16	0.17	—
Riverside-San Bernardino	0.20	0.15	0.24
San Diego	0.15	0.36	0.24
San Francisco	0.12	0.48	0.23
Seattle	0.04	0.22	0.17
<b>St. Louis</b>	<b>0.11</b>	<b>0.13</b>	—
Washington	0.18	0.22	0.16
<b>Eighth District Large Metropolitan Areas</b>			
<b>Memphis</b>	<b>0.16</b>	<b>0.22</b>	—
<b>Little Rock</b>	<b>0.22</b>	—	—
<b>Louisville</b>	<b>0.18</b>	<b>0.17</b>	—
NOTE: Author's calculation. Data are from 2000 Public Use Micro Sample (PUMS) of the U.S. Census. Results are missing if data were insufficient because of small sample size. The numbers can be interpreted as percentage increases in wages. (See footnote 12 for more information.) St. Louis is in the Federal Reserve's Eighth District.			

There is also variation in the return to an associate degree among racial groups. Hourly wages of white men with an associate degree are 18 percent higher than wages of white men who stopped their formal education at high school.<sup>12</sup> The returns are much higher for black and Hispanic men—25 and 27 percent, respectively.

Furthermore, the return to an associate degree is not the same across different cities in the United States. For example, white men with

associate degrees are paid only 4 percent more than white high school graduates in Seattle, but as much as 30 percent more in Miami. For Hispanic men, the return to an associate degree is 16 percent in Washington, D.C., but it is more than twice as much, 39 percent, in Atlanta. Cross-city differentials for white women are not as big, but they are significant for minority women.

Tables 3 and 4 also present estimated returns to an associate degree in four large metropolitan areas of the Eighth District. White men with an associate degree earn on average 11 percent more in St. Louis, 16 percent more in Memphis, 22 percent more in Little Rock and 18 percent more in Louisville than similar men with only a high school diploma. For black men, returns to an associate degree are 13 percent in St. Louis, 22 percent in Memphis and 17 percent in Louisville. Consistent with the rest of the country, women's returns are higher than men's. For example, black women in St. Louis with an associate degree earn 43 percent more than black women with only a high school education.

Why is there such a big variation in returns to an associate degree across cities? Although no formal research has been done on this topic, possible explanations might be locational differences in labor market conditions and in industrial composition.

### Along Different Paths

Community college students have various educational goals and intentions when they enter college. Although many of them plan to obtain an associate degree, some students enroll to take just a couple of classes to improve their skills or to become certified in a certain field. Some intend to transfer to a four-year institution without any formal community college credential.

This ability of community colleges to offer students many options provides a unique opportunity to have post-secondary education for many students who would not have it otherwise. On the other hand, because the educational objectives of students—and, thus, their paths—are so different, it is difficult to track their progress through college and to assess the effect of community college education on their educational

attainment and labor market outcomes. The fact that most students attend community colleges part time and take longer to complete their program makes the task even more complicated.

Critics of the community college system often point out that a significant proportion of community college students complete relatively few college credits. Kane and Rouse (1999) calculated that the majority of community college students complete one year or less and 35 percent complete one semester of study or less. The study also showed that less than one-half of community college students complete any degrees. In particular, about 15 percent receive a certificate, 16 percent complete an associate degree and another 16 percent eventually receive a bachelor's degree or higher. Kane and Rouse (1999) point out that, on the contrary, among four-year college entrants, almost 60 percent receive at least a bachelor's degree.

Does this mean that enrolling in a two-year college somehow reduces an individual's educational attainment? One view is that easy access to community college sidetracks students from a four-year college, where they are more likely to obtain a bachelor's degree. On the other hand, many nontraditional students would not have attended four-year colleges. For them, community colleges provide a chance for a post-secondary education they would not have had otherwise. Therefore, researchers argue, even if attending community college instead of four-year college might lower educational attainment for some students, more students have access to higher education, which makes overall educational attainment in society higher.

To better answer a question about the effect of community colleges on educational attainment, it is necessary to consider students' intentions toward their educational objectives together with their outcomes. The problem is a lack of reliable data that measure students' goals and preparation.

The U.S. Department of Education is among those that attempted to study educational outcomes of community college students. Its report used data from several sources, including those tracking students over time.

The study found that about 90 percent of students entering community college intended to obtain a formal credential or to transfer to

a four-year college. One could argue that it is more reasonable to consider completion rates only for those who intended to obtain a degree in the first place. The report estimated that between 51 percent and 63 percent (depending on data used) of these students had fulfilled their expectations within six to eight years after initial enrollment. In particular, about 11 percent had earned a certificate, 17 percent to 18 percent had earned an associate degree, 11 percent to 28 percent (depending on data used) had attained a bachelor's degree or higher, and 12 percent to 13 percent had transferred to a four-year college without attaining a formal degree.

Keeping in mind that one of the main goals of two-year colleges is to prepare students for continuing their studies at four-year institutions, it is particularly important to evaluate their transfer rates. The U.S. Education Department report indicated that, overall, about 29 percent of community college students had transferred to four-year colleges. Interestingly, 51 percent of those who intended to complete a bachelor's degree when they first started had transferred. At the time data was collected, 80 percent of those who did transfer either obtained a bachelor's degree or were still working toward it.

What about the students who left community college without any formal credential? This amounts to more than half of them. According to the report, about one-third of this group said that post-secondary education improved their salary. For 47 percent, attending community college led to increased job opportunities. About 43 percent reported improvement in job performance, and 47 percent said they had more job responsibilities.

Students who did receive a certificate or a degree were more likely to be satisfied with their outcomes. About 80 percent of them said their salaries had increased. Almost 85 percent reported having a better job or more responsibilities.

### **From a Community College to a Bachelor's Degree**

As discussed above, even though community colleges initially were introduced to help prepare students for studying at four-year colleges, less than a third of community college students transfer to four-year colleges. Still, it is important

to evaluate how those students who do transfer fare compared to their counterparts who initially started at four-year institutions.

A recent study by Long and Kurlaender (2008) evaluates whether there is what the authors call a “community college penalty.” The study uses a unique longitudinal data set that includes everyone who entered Ohio public institutions of higher education in the fall of 1998 and follows them over nine years. It provides information on students’ high school preparation, entrance exams, degree intentions, family background, college performance and, finally, degree completion. As long as students transfer between Ohio’s public colleges and universities, they remain in the data set. It is possible then to track most students’ progress from starting post-secondary education at a community college to receiving a bachelor’s degree from a four-year college.

The study finds that there is indeed a “penalty” from entering post-secondary education at a community college level. The rates of dropping out without a degree are much higher for those who start at community colleges than for those who start at four-year institutions. For example, community college students were 36 percent less likely to obtain a bachelor’s degree than similar students who started at four-year colleges.

One possible explanation for this result is that four-year college students start with an intention to graduate while community college students have different educational objectives. The study finds, however, that even community college students who expressed an intention to obtain a four-year bachelor’s degree are significantly less likely to do so within nine years of starting their post-secondary studies. Only 26 percent of this group have a bachelor’s degree nine years after starting their post-secondary education. To put it in perspective, 50 percent and 73 percent of those who start at nonselective and selective four-year institutions, respectively, obtain a bachelor’s degree. In addition, students who start at community colleges have fewer total earned credits than students who start at four-year colleges.

It is possible that the observed differences in educational outcomes occur because of the differences between the students at two-year and four-year institutions. Demographic, family and other

characteristics of students who begin at community colleges are different from those of students who begin at four-year institutions. This might lead to a selection bias of the estimates. However, the negative effect of starting post-secondary education at a community college remains even after the authors adjust for selection bias by controlling for students’ race, gender, age, ability (measured by ACT scores) and family income. The authors find “a persistent community college penalty,” but they suggest that “it is worth comparing the size of the penalty to the difference in costs at two-year versus four-year institutions.”

### **Long-Term Educational Outcomes**

Not many community college students go on to receive a bachelor’s degree. Still, some successfully transfer to four-year colleges and obtain a bachelor’s degree or higher. This section compares these individuals to those who started post-secondary education at traditional four-year colleges.

The National Survey of College Graduates (NSCG) is a joint project of the U.S. Census Bureau and the National Science Foundation. The 2003 survey included a sample of respondents to the 2000 Decennial Census long form who indicated they have a bachelor’s degree or higher in any field of study. The survey collected detailed information about their education, current and past employment, current salary and demographic characteristics. In particular, the dataset reports educational background characteristics, such as type of college attended, major field of study, number of degrees and the highest degree. Most importantly, for my purposes, it identifies respondents who have an associate degree or attended a community college. One shortcoming of these data, however, is a lack of family background information and ability measures.

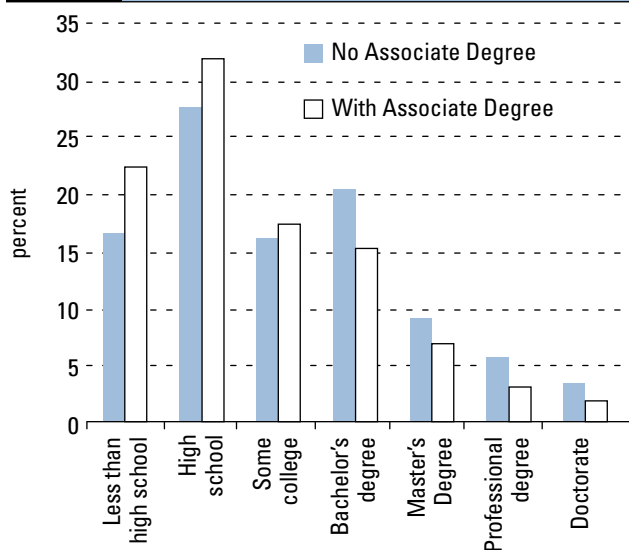
Among people who have at least a bachelor’s degree, 17 percent report having received an associate degree. I am assuming that these people started their post-secondary education at a community college and, after receiving an associate degree, continued their education at a four-year college. In what follows, I compare this group to the rest of the respondents with at least a bachelor’s degree.<sup>13</sup>



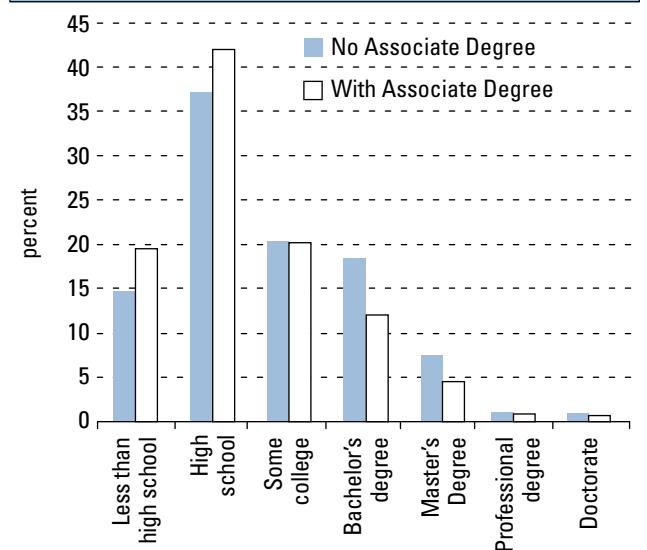
<b>Table 5</b> Proportion of Bachelor's Degree Holders with Associate Degrees by Region of Residence		
Region	Proportion of Bachelor's Degree Holders Who...	
	Have Associate Degree (%)	Attended CC (%)
New England	14	31
Middle Atlantic	15	34
East North Central	15	42
West North Central	15	44
South Atlantic	18	45
East South Central	17	43
West South Central	15	48
Mountain	15	50
Pacific	20	58

<b>Table 6</b> Proportion of Bachelor's Degree Holders with Associate Degrees by Region of Birth		
Region	Proportion of Bachelor's Degree Holders Who...	
	Have Associate Degree (%)	Attended CC (%)
New England	15	34
Middle Atlantic	16	38
East North Central	15	44
West North Central	16	44
South Atlantic	18	47
East South Central	16	42
West South Central	15	48
Mountain	18	48
Pacific	24	60

**Figure 1** Parents' Education—Father's Education



**Mother's Education**



I start the comparison of the two groups by presenting some descriptive statistics.

Table 5 reports the proportion of bachelor's degree holders who either attended a community college or have an associate degree by region of residence.<sup>14</sup> Between 14 percent and 20 percent of four-year college graduates have an associate degree, depending on the region. Bachelor's degree holders in the Pacific and South Atlantic regions are most likely to have an associate degree (20 percent and 18 percent, respectively), while people in New England are

least likely to have an associate degree (14 percent). As many as 58 percent of bachelor's degree holders attended a community college at some point in the Pacific region, but only 31 percent did in New England.

Table 6 reports similar statistics by region of birth. People with a bachelor's degree who were born in the Pacific region are significantly more likely to attend community college (60 percent) or have an associate degree (24 percent) than people who were born in other regions. This is not surprising given that the Pacific region

Carnegie Classification of Institution	All Bachelor's Degree Holders (%)	No Associate Degree (%)	With Associate Degree (%)
Research University I	24.57	25.88	18.29
Research University II	7.39	7.52	6.74
Doctorate Granting I	6.68	6.89	5.72
Doctorate Granting II	5.78	5.57	6.79
Master's I	28.5	26.95	36.02
Master's II	2.24	2.03	3.23
Baccalaureate (Liberal Arts) I	5.08	5.86	1.32
Baccalaureate (Liberal Arts) II	7.62	7.51	8.18
Associate of Art Colleges	0.27	0.15	0.84
Other	2.62	2.49	3.35
Missing info	9.23	9.17	9.54

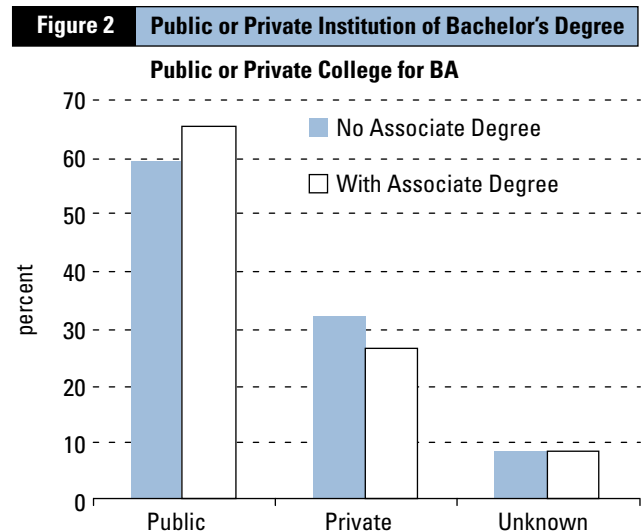
includes California, the state that has the highest enrollment in community colleges.

Figure 1 presents a distribution of parental education. Consistent with other studies, I find that associate degree holders are much more likely to be first-generation college students than those who do not have an associate degree. Most have parents with a level of education less than a college degree.

Next, I examine whether there are differences in educational choices between those who obtained an associate degree before enrolling in a four-year college and those who did not.

Table 7 summarizes the types of four-year institutions that respondents attended. The Carnegie Foundation Classification of Institutions of Higher Education is used to categorize universities as Research Universities (I and II), Doctorate Granting (I and II), Master's Granting (I and II), Liberal Arts (I and II) and Associates of Art Colleges that include community colleges.<sup>15</sup>

While it is hard to directly compare the quality of education provided by different universities, traditionally, research and doctorate-granting universities are seen as being more selective and



having better resources than master's-granting and liberal arts colleges.

Table 7 shows that people with a prior associate degree were significantly less likely to attend Research I universities (18 percent versus 26 percent) and slightly less likely to attend Doctorate Granting universities (6 percent versus 7 percent). On the other hand, a much higher proportion of them attended Master's Granting universities (36 percent versus 27 percent). It also seems that people with a prior associate degree were much less likely to go to better Liberal Arts I colleges than their counterparts (1 percent versus 6 percent). To sum up, it appears that associate degree recipients went to less selective (and perhaps less expensive) institutions for their bachelor's studies.

Figure 2 shows that students with an associate degree are also more likely to be enrolled in public colleges than students who do not have an associate degree and less likely to attend private colleges.

Are there differences in major fields of study between the two groups? One of the main objectives of community colleges is to prepare students for four-year college studies. Do students who have taken classes at a community college choose different fields of study than students who did not go to community college prior to attending a four-year institution?

Fortunately, NSCG data provide detailed information on respondents' degree majors. As reported in Table 8, fewer people with an associate degree major in sciences and engineering than people with no associate degree. Instead, people

<b>Table 8 Distribution of Major Fields of Study of First Bachelor's Degree</b>			
	<b>All Bachelor's Degree Holders (%)</b>	<b>No Associate Degree (%)</b>	<b>With Associate Degree (%)</b>
<b>Computer and math sciences</b>	<b>3.86</b>	<b>3.87</b>	<b>3.82</b>
Computer and information sciences	1.99	1.86	2.66
Mathematics and statistics	1.87	2.01	1.16
<b>Biological, agricultural, environmental</b>	<b>6.2</b>	<b>6.48</b>	<b>4.87</b>
Agricultural and food sciences	0.8	0.83	0.69
Biological sciences	4.97	5.27	3.54
Environmental life sciences	0.43	0.38	0.64
<b>Physical and related sciences</b>	<b>2.9</b>	<b>3.14</b>	<b>1.71</b>
Chemistry, except biochemistry	1.51	1.67	0.73
Earth, atmospheric and ocean sciences	0.57	0.59	0.46
Physics and astronomy	0.62	0.68	0.32
Other physical sciences	0.2	0.2	0.2
<b>Social and related sciences</b>	<b>14</b>	<b>14.27</b>	<b>12.69</b>
Economics	2.16	2.4	1.04
Political and related sciences	3.11	3.34	2.01
Psychology	4.61	4.55	4.9
Sociology and anthropology	2.76	2.64	3.32
Other social sciences	1.36	1.34	1.42
<b>Engineering</b>	<b>7.7</b>	<b>7.99</b>	<b>6.35</b>
Aerospace, aeronautical and astronautical	0.29	0.31	0.22
Chemical engineering	0.6	0.68	0.22
Civil and architectural engineering	1.16	1.19	1.02
Electrical and computer engineering	2.39	2.43	2.2
Industrial engineering	0.48	0.5	0.41
Mechanical engineering	1.76	1.81	1.48
Other engineering	1.02	1.07	0.8
<b>Health, Science Education, Technology</b>	<b>9.57</b>	<b>9.46</b>	<b>10.21</b>
Health	6.6	6.51	7.08
Science and mathematics teacher education	1.15	1.19	0.97
Technology and technical fields	1	0.88	1.62
Other science- and education- related fields	0.82	0.88	0.54
<b>Business, Management, Art</b>	<b>55.75</b>	<b>54.79</b>	<b>60.32</b>
Management and administration fields	17.61	16.6	22.45
Education, except science and math teacher education	13.51	13.39	14.08
Social service and related fields	2.28	2.19	2.71
Sales and marketing fields	2.61	2.56	2.86
Art and humanities fields	12.69	13.22	10.15
Other non-science and education fields	7.05	6.83	8.07

<b>Table 9 Proportion of Males by Major Field of Study</b>			
	<b>All Bachelor's Degree Holders (%)</b>	<b>No Associate Degree (%)</b>	<b>With Associate Degree (%)</b>
<b>Computer and math sciences</b>	<b>64</b>	<b>64</b>	<b>64</b>
Computer and information sciences	67	69	61
Mathematics and statistics	60	59	71
<b>Biological, agricultural, environmental</b>	<b>57</b>	<b>57</b>	<b>59</b>
Agricultural and food sciences	68	66	76
Biological sciences	54	54	53
Environmental life sciences	71	70	75
<b>Physical and related sciences</b>	<b>74</b>	<b>74</b>	<b>73</b>
Chemistry, except biochemistry	68	68	64
Earth, atmospheric and ocean sciences	81	80	86
Physics and astronomy	84	84	81
Other physical sciences	64	64	65
<b>Social and related sciences</b>	<b>48</b>	<b>49</b>	<b>46</b>
Economics	72	73	67
Political and related sciences	63	63	62
Psychology	33	33	32
Sociology and anthropology	37	34	46
Other social sciences	52	53	51
<b>Engineering</b>	<b>89</b>	<b>89</b>	<b>89</b>
Aerospace, aeronautical and astronautical	92	93	83
Chemical engineering	80	80	67
Civil and architectural engineering	89	88	91
Electrical and computer engineering	90	89	91
Industrial engineering	85	84	91
Mechanical engineering	93	93	92
Other engineering	88	89	83
<b>Health, Science Education, Technology</b>	<b>37</b>	<b>37</b>	<b>37</b>
Health	22	23	21
Science and mathematics teacher education	51	51	51
Technology and technical fields	86	86	87
Other science- and education-related fields	75	74	76
<b>Business, Management, Art</b>	<b>45</b>	<b>45</b>	<b>47</b>
Management and administration fields	63	64	61
Education, except science and math teacher education	22	22	25
Social service and related fields	48	49	45
Sales and marketing fields	57	59	51
Art and humanities fields	42	42	41
Other non-science and education-related fields	44	42	51

<b>Table 10 Age at First Bachelor's Degree</b>			
	All	No Associate Degree	With Associate Degree
Mean	26.8	26.2	29.5
Std. Dev.	5.3	4.6	7.3
Min	15	15	16
Max	74	71	74
10%	23	22	23
25%	24	24	25
Median	25	25	27
75%	28	27	32
90%	32	30	40
<b>Age at Highest Degree</b>			
	All	No Associate Degree	With Associate Degree
Mean	29.7	29.3	31.7
Std. Dev.	7.2	6.8	8.3
Min	15	15	16
Max	77	77	73
10%	23	23	24
25%	25	25	26
Median	27	27	29
75%	32	31	36
90%	40	38	44

with an associate degree are more likely to major in health, technology and management than their counterparts. Preference for the health and technology fields is expected, given that community colleges often focus more on these disciplines. It is somewhat surprising that so many more associate degree holders choose to major in management than people without an associate degree (23 percent versus 17 percent).

Interestingly, there is very little difference in gender distribution across major fields of study between the two groups (Table 9). There are some exceptions, however. Among people with associate degrees, more women choose to major in computer and information sciences, economics, aerospace engineering, chemical engineering and marketing; and more men choose to major in mathematics and statistics, agriculture, environmental and earth sciences, sociology, and industrial engineering than among people without an associate

<b>Table 11 Years from Bachelor's Degree to Master's Degree</b>			
	All	No Associate Degree	With Associate Degree
Mean	7.8	7.9	7.4
Std. Dev.	6.8	6.9	6.6
<b>Years from Bachelor's to Doctorate</b>			
	All	No Associate Degree	With Associate Degree
Mean	11.1	10.9	12.8
Std. Dev.	7.0	6.9	8.5
<b>Years from Bachelor's to Professional</b>			
	All	No Associate Degree	With Associate Degree
Mean	5.4	5.4	5.3
Std. Dev.	4.4	4.4	4.8

<b>Table 12 Proportion of Associate Degree Holders by Highest Degree</b>		
Highest Degree		With Associate Degree (%)
Bachelor's Degree		20.7
Master's Degree		14.3
Doctorate		5.8
Professional		9.5

degree. It is hard to know whether it is a result of being exposed to some subjects before entering a four-year institution or something else that affects some students' choice of a major field of study.

Not surprisingly, associate degree holders are older on average when they obtain a bachelor's degree. Their mean age is 29.5 years old, compared to the mean age of 26.2 years of those who obtain a bachelor without an associate degree (Table 10).

Almost 70 percent of bachelor's degree holders with an associate degree do not continue their education beyond their first bachelor's degree. This compares to less than 60 percent of their counterparts without an associate degree (Figure 3). A higher fraction of people with no associate degree goes on to receive a master's degree, a doctorate or a professional degree, such as a J.D. or an M.D. (Figure 4). Table 11 shows that, for those who continued beyond a bachelor's

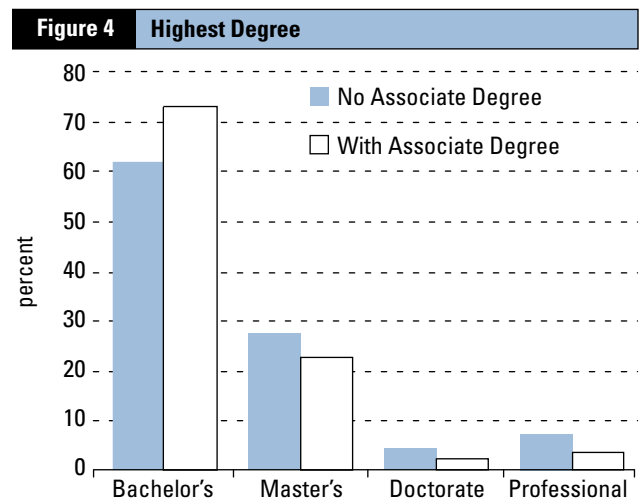
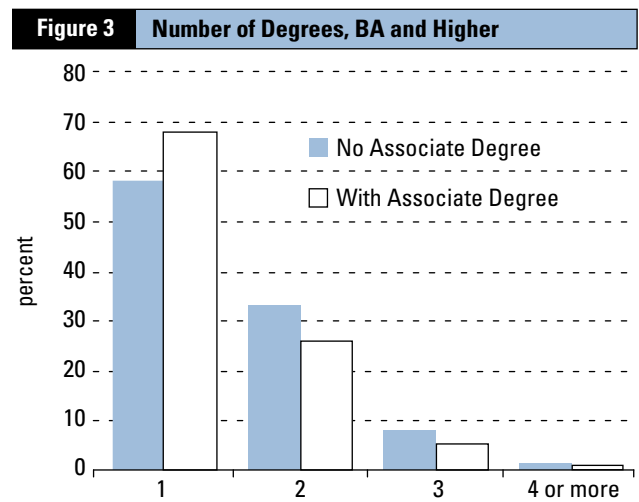
<b>Table 13 Salaries, by Education Level</b>			
<b>Panel A. All</b>			
	<b>All</b>	<b>No Associate Degree</b>	<b>With Associate Degree</b>
Mean	\$57,686	\$58,559	\$53,696
Std. Dev.	\$29,660	\$30,218	\$26,597
<b>Panel B. Bachelor's Degree</b>			
	<b>All</b>	<b>No Associate Degree</b>	<b>With Associate Degree</b>
Mean	\$54,126	\$54,667	\$52,022
Std. Dev.	\$28,319	\$28,855	\$26,029
<b>Panel C. Master's Degree</b>			
	<b>All</b>	<b>No Associate Degree</b>	<b>With Associate Degree</b>
Mean	\$60,676	\$61,323	\$56,997
Std. Dev.	\$28,663	\$29,030	\$26,185
<b>Panel D. Doctorate</b>			
	<b>All</b>	<b>No Associate Degree</b>	<b>With Associate Degree</b>
Mean	\$70,711	\$71,246	\$62,906
Std. Dev.	\$29,837	\$29,832	\$28,851
<b>Panel E. Professional Degree</b>			
	<b>All</b>	<b>No Associate Degree</b>	<b>With Associate Degree</b>
Mean	\$78,705	\$79,491	\$70,349
Std. Dev.	\$36,711	\$36,793	\$34,799

degree, it took slightly less time on average to obtain a master's or a professional degree if a person had an associate degree but longer to finish a Ph.D. program.

Table 12 presents another way to compare the highest education levels of people with and without an associate degree. Among people who only have a bachelor's degree, about 21 percent have a prior associate degree. Among those who received a master's degree, only 14.3 percent have an associate degree. The proportion of people with an associate degree is even smaller among those with a doctorate or a professional degree (5.8 and 9.5 percent, respectively).

### Long-Term Labor Market Outcomes

This section compares labor market outcomes of people with an associate degree who proceeded to receive a bachelor's degree or higher and the labor market outcomes of their coun-



terparts with no associate degree. In particular, it concentrates on one measure of labor market outcome: annual salary.

This analysis considers only individuals of prime age (23 to 55 years old) who are employed. Since salaries are top-coded in the NSCG dataset, I dropped from the sample those above the 95th percentile of salary distribution. I also dropped those below the 5th percentile to keep the distribution symmetric. Thus, individuals who earn less than \$10,000 or more than \$150,000 a year are not included.

Table 13 presents the first piece of empirical evidence. It shows an average annual salary by education level for the full sample and then separately for individuals without an associate degree and with an associate degree.

As expected and well-documented in many other studies, people with a higher level of education have, on average, higher earnings. Bachelor's

<b>Table 14A Regression Analysis, All</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Age	541.9	13.7	39.6
Woman	-12136.5	233.5	-52.0
Black	-4943.0	410.5	-12.0
Hispanic	-5768.8	460.1	-12.5
Asian	-2558.6	416.9	-6.1
Associate Degree	-3854.1	283.1	-13.6
<i>Controls: Major Field of Study Highest Degree</i>	Yes Yes		
Number of observations	59,346		
Adjusted $R^2$	0.22		

<b>Table 14D Regression Analysis, Doctorate</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Age	1078.1	58.4	18.5
Woman	-8176.1	884.1	-9.3
Black	-7725.4	1839.1	-4.2
Hispanic	-3055.8	1937.8	-1.6
Asian	-3544.6	1116.6	-3.17
Associate Degree	-9565.3	1679.5	-5.7
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	4,521		
Adjusted $R^2$	0.21		

<b>Table 14B Regression Analysis, Bachelor's Degree</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Age	487.6	17.6	27.73
Woman	-12724.9	300.1	-42.4
Black	-6017.6	522.7	-11.5
Hispanic	-6807.9	577.8	-11.8
Asian	-3267.3	565.7	-5.78
Associate Degree	-3620.8	346.0	-10.46
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	34,067		
Adjusted $R^2$	0.19		

<b>Table 14E Regression Analysis, Professional Degree</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Age	984.4	81.7	12.1
Woman	-7949.2	1349.9	-5.9
Black	-2325.0	2921.2	-0.8
Hispanic	-3006.2	2775.5	-1.1
Asian	-2473.6	2393.2	-1.0
Associate Degree	-9423.2	2416.5	-3.9
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	2,955		
Adjusted $R^2$	0.08		

<b>Table 14C Regression Analysis, Master's Degree</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Age	574.1	24.3	23.6
Woman	-11460.2	421.3	-27.2
Black	-2198.1	716.5	-3.1
Hispanic	-3549.5	865.6	-4.1
Asian	-980.5	707.4	-1.4
Associate Degree	-3379.1	536.7	-6.3
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	17,803		
Adjusted $R^2$	0.23		

degree holders earn \$54,125 a year; people with master's degree earn \$60,676 a year; people with a doctorate earn \$70,711 a year; and people with professional degrees earn \$78,705 a year, on average. Remarkably, there are differences in annual salaries for individuals with an associate degree and without it for all education levels. Regardless of the highest degree, people who started their post-secondary education with an associate degree earn less on average than those who started at a four-year college. The difference is particularly big for those who have a Ph.D. or a professional degree.

To better understand this phenomenon, a regression analysis can be used. In particular, I estimate the following equation:

$$S = \beta_0 + \beta_1 * X + \beta_2 * I_{AD} + \varepsilon,$$

<b>Table 15A Regression Analysis, All</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Experience	605.2	13.4	45.2
Woman	-12100.4	232.5	-52.0
Black	-4342.6	409.1	-10.6
Hispanic	-5412.6	458.6	-11.8
Asian	-3018.7	414.9	-7.3
Associate Degree	-2426.1	281.2	-8.6
<i>Controls: Major Field of Study Highest Degree</i>	Yes Yes		
Number of observations	59,346		
Adjusted $R^2$	0.23		

<b>Table 15C Regression Analysis, Master's Degree</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Experience	532.9	23.7	22.5
Woman	-11671.3	421.2	-27.7
Black	-1349.4	718.7	-1.9
Hispanic	-3534.4	866.9	-4.1
Asian	-1836.0	705.9	-2.6
Associate Degree	-2117.2	537.3	-3.9
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	17,803		
Adjusted $R^2$	0.23		

<b>Table 15B Regression Analysis, Bachelor's Degree</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Experience	574.8	17.2	33.4
Woman	-12681.1	298.6	-42.5
Black	-5583.1	520.2	-10.7
Hispanic	-6345.7	575.4	-11.0
Asian	-3627.2	562.9	-6.4
Associate Degree	-2268.7	342.8	-6.6
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	34,067		
Adjusted $R^2$	0.20		

<b>Table 15D Regression Analysis, Doctorate</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Experience	1374.1	55.5	24.8
Woman	-7583.2	860.7	-8.8
Black	-6014.6	1791.7	-3.4
Hispanic	-2556.2	1885.4	-1.4
Asian	-3012.9	1086.6	-2.8
Associate Degree	-6883.8	1625.8	-4.2
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	4,521		
Adjusted $R^2$	0.25		

where  $S$  is an individual's annual salary in dollars,  $X$  is a vector of various characteristics that will be defined shortly, and  $I_{AD}$  is an indicator of whether a person has an associate degree, in which case it is equal to 1, otherwise, it is 0. The goal is to compare individuals who have the same characteristics  $X$  but different values of an indicator  $I_{AD}$ , 0 or 1. The question is how having an associate degree affects one's salary. Relevant characteristics include age, gender, race, major field of study and highest degree.

The estimation results are reported in Table 14A. The dependent variable is salary  $S$ . The results indicate that an annual salary increases by about \$542 a year as people age and accumulate more work experience. Women, on average, earn \$12,137 a year less than men with similar characteristics. Minority groups earn less compared to whites. The annual salary of blacks is \$4,943

<b>Table 15E Regression Analysis, Professional Degree</b>			
	<b>Coefficient</b>	<b>St. Error</b>	<b>t-statistic</b>
Experience	1185.5	81.5	14.6
Woman	-7061.9	1340.0	-5.3
Black	-2025.1	2890.2	-0.7
Hispanic	-2899.1	2745.9	-1.1
Asian	-2455.6	2362.8	-1.0
Associate Degree	-7767.6	2392.3	-3.3
<i>Controls: Major Field of Study</i>	Yes		
Number of observations	2,955		
Adjusted $R^2$	0.10		



lower on average than that of comparable whites. The corresponding difference for Hispanics is \$5,769, and it is \$2,559 for Asians. These facts are well-documented in the economics literature. The most striking finding, however, is that, even when we control for other factors, people with an associate degree earn \$3,854 less a year than their counterparts with no associate degree. All coefficients are statistically significant at a 5 percent level or better.

The same equation is also estimated separately for each education-level group: bachelor's degree, master's degree, doctorate degree and professional degree. Tables 14B-14E report the results of the estimations. For each education-level group, we observe the same pattern: older workers earn more, women and minorities earn less. More importantly, those who earn an associate degree and then a more advanced degree have lower earnings than those who earn a bachelor's degree or higher but no associate degree. For example, bachelor's degree holders earn \$3,621 less a year when they have a prior associate degree. What is striking is that we observe earning gaps even for those community college students who went on to receive a doctorate or a professional degree. Their salaries are \$9,565 and \$9,423 lower, respectively, than salaries of their counterparts who started at a traditional four-year college.

There is a possibility that the quality of education the two groups receive is different. For example, labor markets might put an additional premium on a degree from an elite college. To test this possibility, I include controls for the type of institution awarding a bachelor's degree. Results remain virtually unchanged, which allows me to reject this explanation.<sup>16</sup>

One might also be concerned that when we compare people of the same age with and without an associate degree, we in fact compare people with different levels of experience. People who start at a community college take longer, on average, to graduate with a bachelor's degree. So they have less work experience after receiving a bachelor's degree. It could be argued, however, that these people are accumulating work experience while in school, if they study part time and continue to work. Still, to check the robustness of the results, I replaced the age variable in the

analysis with the experience variable. "Experience" is defined as the number of years from the time a person received the highest degree until the time of the survey. It is assumed that a person has been working continuously.

The results are presented in Tables 15A-15E. They show that, when work experience is measured more carefully, the estimated negative effect of having an associate degree is somewhat smaller. Overall, people with an associate degree earn \$2,426 less a year than people with the same highest degree who have no associate degree. The earnings gap is smaller for bachelor's and master's degree holders (\$2,269 and \$2,117, respectively) and larger for people with doctorates and professional degrees (\$6,884 and \$7,768, respectively). Note that gender and race effects remain almost unchanged when compared to Tables 14A-14E.

Why is there an observed, persistent salary gap between people who had a prior associate degree and those who had not, even among the highly educated? Data available from the NSCG survey are not sufficient to answer this question. A caveat of the above analysis is a lack of ability and school performance measures and data on family characteristics, such as family income. One could hypothesize that because community college students are more likely to come from families with lower incomes and education, they are also more likely to attend poor performance schools for their elementary and secondary education. It is possible that they fall far behind even before entering the post-secondary education system and that this disadvantage affects their educational and labor market outcomes throughout their lives.

### III. CONCLUDING REMARKS

Community colleges play a significant role in U.S. higher education, enrolling 46 percent of current U.S. undergraduates. They offer an opportunity to receive a post-secondary education to many students who would not have attended college otherwise: first-generation college students, students from low-income families and older students who continue to work as they attend classes part time. Attending a community college even without completing a degree results

in economic payoffs—in particular, annual earnings increase by 5 percent to 8 percent for each year of community college education—and better job opportunities. Today, the number of U.S. undergraduates is at an all-time high as more and more people understand the necessity of having higher education in our technology-intensive world. In addition, historically, college enrollments in general go up during times of economic downturns. Community colleges are very important in helping to absorb this increasing number of students. Currently, community colleges have an additional appeal because tuition and fees at four-year colleges continue to increase while financial aid and student loans are getting harder to secure.

For all the benefits of community colleges, there are downsides as well. The original goal of community colleges was to prepare students to transfer to four-year colleges. Associate degree programs were intended to accomplish that goal. However, only about 29 percent of community college students transfer to four-year institutions and only about 16 percent eventually receive a bachelor's degree or higher. Even those who start their post-secondary education intending to receive a bachelor's degree have only a 26 percent chance of accomplishing it. They are also much less likely to continue their education beyond a bachelor's degree.

In addition, there is a persistent salary gap between those who have a bachelor's degree or higher and a prior associate degree and similar individuals who do not have a prior associate degree. This gap remains even for people of the same gender, race, education, experience level, field of study and type of college they attended.

Still, for many students, community colleges offer the best chance to obtain a college education. It is important, however, for individuals to know both the benefits and the disadvantages of attending a community college when making decisions about education.

A better understanding of all aspects of the extremely complicated subject of education provided by community colleges should be an important priority for researchers and policy makers. ■

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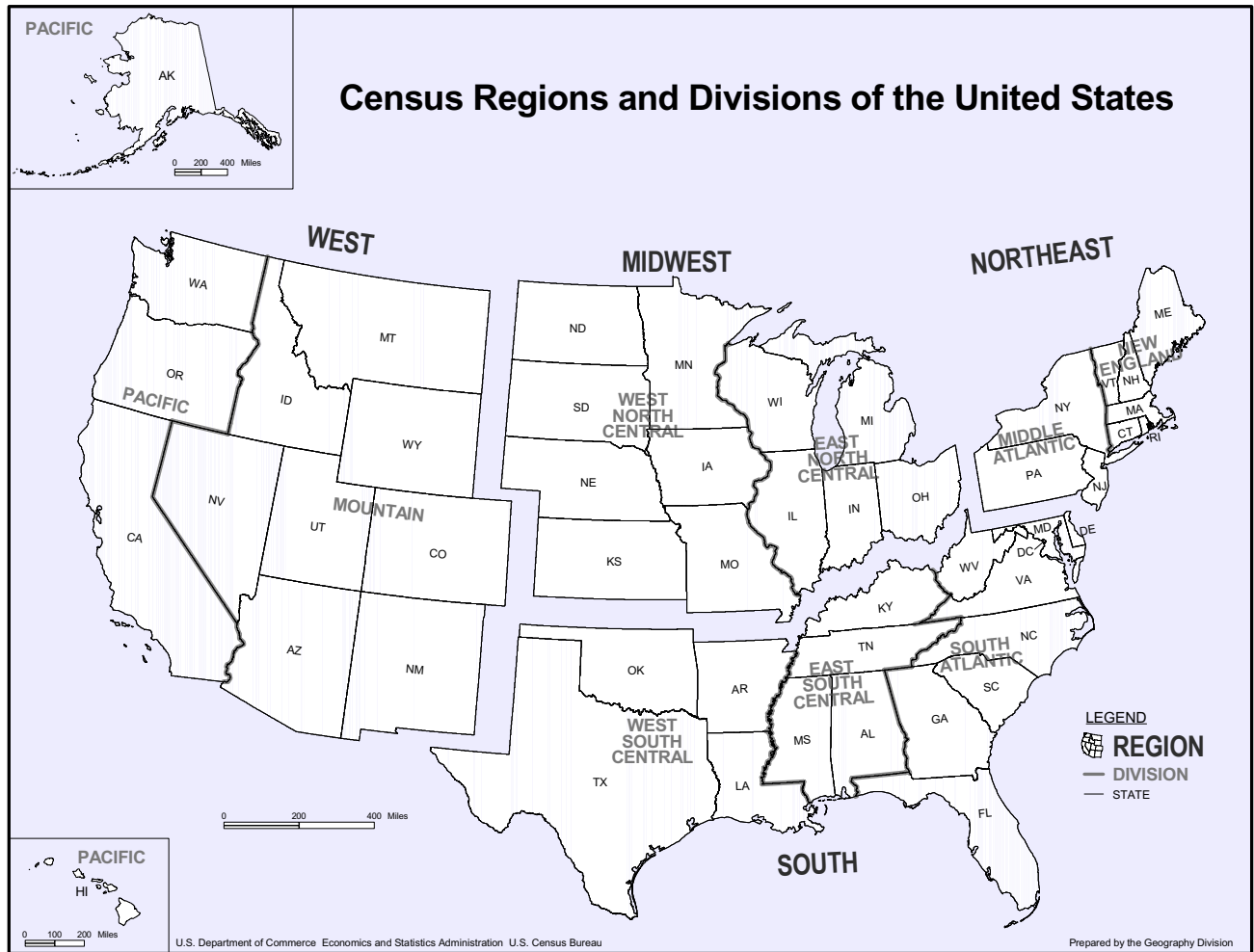
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## Endnotes

- <sup>1</sup> Data in this section are from the U.S. Department of Education, National Center for Education Statistics, 2003–04 as presented in Horn and Griffith (2006) report.
- <sup>2</sup> See Kane and Rouse (1999) for a survey of these studies and a more detailed description of data.
- <sup>3</sup> See Jacobson, LaLonde and Sullivan (2005).
- <sup>4</sup> See Kane and Rouse (1995) and Leigh and Gill (1997).
- <sup>5</sup> See Kane and Rouse (1999).
- <sup>6</sup> See Long and Kurlaender (2008).
- <sup>7</sup> These are the latest state-level statistics available. Source: U.S. Department of Education, 2005.
- <sup>8</sup> Unless noted otherwise, the data in this section are from the U.S. Department of Education, National Center for Education Statistics, 2003–04 as presented in Horn and Griffith (2006) report.
- <sup>9</sup> See Kane and Rouse (1999) for a survey of these studies and a more detailed description of data.
- <sup>10</sup> For more on non-parametric estimation of returns to schooling, see Black, Kolesnikova and Taylor (2008).
- <sup>11</sup> Data are from 2000 Public Use Micro Sample of the U.S. Census. See Ruggles et al (2004).
- <sup>12</sup> Tables 3 and 4 report differences in mean log wages between associate degree holders and high school graduates. Differences in mean log wages, called log points differences, approximate percentage differences.
- <sup>13</sup> The data set also identifies individuals who attended a community college but not what they were studying. It is impossible to know whether a person took classes for credit in preparation for college or not. Because of this, I ignore these individuals' community college experience.
- <sup>14</sup> The definition of the region in this context is provided in Appendix A. Region is the smallest geographic unit of analysis available in NSCG dataset.
- <sup>15</sup> See Appendix B for definitions of the Carnegie Foundation Classification of Institutions of Higher Education categories.
- <sup>16</sup> These results are not reported here but are available from the author upon request.

## IV. APPENDIX

### A. Census Bureau-designated areas



WEST		MIDWEST		NORTHEAST		SOUTH		
Mountain	Pacific	East North Central	West North Central	New England	Mid-Atlantic	South Atlantic	East South Central	West South Central
Idaho	Alaska	Wisconsin	North Dakota	Maine	New York	Delaware	Kentucky	Oklahoma
Montana	Washington	Michigan	South Dakota	New Hampshire	Pennsylvania	Maryland	Tennessee	Texas
Wyoming	Oregon	Illinois	Nebraska	Vermont	New Jersey	District of Columbia	Mississippi	Arkansas
Nevada	California	Indiana	Kansas	Massachusetts		Virginia	Alabama	Louisiana
Utah	Hawaii	Ohio	Minnesota	Rhode Island		West Virginia		
Colorado			Iowa	Connecticut		North Carolina		
Arizona			Missouri			South Carolina		
New Mexico						Georgia		
						Florida		

## **B. Category Definitions of Carnegie Foundation Classification of Institutions of Higher Education**

The following is excerpted from *A Classification of Institutions of Higher Education*, 1994 edition (Carnegie Foundation, 1994, pp. xix-xxi).

The 1994 Carnegie Classification includes all colleges and universities in the United States that are degree-granting and accredited by an agency recognized by the U.S. Secretary of Education.

*Research Universities I:* These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate, and give high priority to research. They award 50 or more doctoral degrees<sup>1</sup> each year. In addition, they annually receive \$40 million or more in federal support.<sup>2</sup>

*Research Universities II:* These institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate and give high priority to research. They award 50 or more doctoral degrees<sup>1</sup> each year. In addition, they annually receive between \$15.5 million and \$40 million in federal support.<sup>2</sup>

*Doctoral Universities I:* These institutions offer a full range of baccalaureate programs and are committed to graduate education through the doctorate. They award at least 40 doctoral degrees<sup>1</sup> annually in five or more disciplines.<sup>3</sup>

*Doctoral Universities II:* These institutions offer a full range of baccalaureate programs and are committed to graduate education through the doctorate. They annually award at least 10 doctoral degrees in three or more disciplines or 20 or more doctoral degrees in one or more disciplines.<sup>3</sup>

*Master's (Comprehensive) Universities and Colleges I:* These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 40 or more master's degrees annually in three or more disciplines.<sup>3</sup>

*Master's (Comprehensive) Universities and Colleges II:* These institutions offer a full range of baccalaureate programs and are committed to graduate education through the master's degree. They award 20 or more master's degrees annually in one or more disciplines.<sup>3</sup>

*Baccalaureate (Liberal Arts) Colleges I:* These institutions are primarily undergraduate colleges with

major emphasis on baccalaureate degree programs. They award 40 percent or more of their baccalaureate degrees in liberal arts fields<sup>4</sup> and are restrictive in admissions.

*Baccalaureate Colleges II:* These institutions are primarily undergraduate colleges with major emphasis on baccalaureate degree programs. They award less than 40 percent of their baccalaureate degrees in liberal arts fields<sup>4</sup> or are less restrictive in admissions.

*Associate of Arts Colleges:* These institutions offer associate of arts certificate or degree programs and, with few exceptions, offer no baccalaureate degrees.<sup>5</sup>

### **Notes on Definitions**

- <sup>1</sup> Doctoral degrees include doctor of education, doctor of juridical science, doctor of public health, and the Ph.D. in any field.
- <sup>2</sup> Total federal obligation figures are available from the National Science Foundation's annual report called Federal Support to Universities, Colleges, and Nonprofit Institutions. The years used in averaging total federal obligations are 1989, 1990 and 1991.
- <sup>3</sup> Distinct disciplines are determined by the U.S. Department of Education's Classification of Instructional Programs 4-digit series.
- <sup>4</sup> The liberal arts disciplines include English language and literature, foreign languages, letters, liberal and general studies, life sciences, mathematics, philosophy and religion, physical sciences, psychology, social sciences, the visual and performing arts, area and ethnic studies, and multi- and interdisciplinary studies. The occupational and technical disciplines include agriculture, allied health, architecture, business and management, communications, conservation and natural resources, education, engineering, health sciences, home economics, law and legal studies, library and archival sciences, marketing and distribution, military sciences, protective services, public administration and services, and theology.
- <sup>5</sup> This group includes community, junior and technical colleges.