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# **The Community College: Educating Students at the Margin Between College and Work**

Thomas J. Kane and Cecilia Elena Rouse

**C**ommunity colleges have assumed an increasingly central role in the nation's education and training system. Between 1980 and 1994, the proportion of 18 to 24 year-olds enrolled in college grew by more than one-third, from 26 to 36 percent. Nearly half of this increase in enrollment was absorbed at community colleges (U.S. Department of Education, 1997, Tables 178 and 186, p. 188, 196). Yet despite the increasing interest in community colleges among both students and policymakers as a potential source of education for workers seeking to upgrade their skills, relatively little is known about them.

We have four goals in this paper. The first is to provide background on the history and development of community colleges in the United States in the last half century. Second, we survey the available evidence on the impacts of community colleges on educational attainment and earnings. Third, we weigh the evidence on the impact of public subsidies on enrollment at community colleges and explore some weaknesses in the current higher education financing structure. Finally, we reflect on how the students who have been responding to the rise in the payoff to education are to be absorbed by our postsecondary training institutions.

## **The History and Development of Community Colleges**

In the late 19th century, when William Rainey Harper, founding president of the University of Chicago, developed a plan to separate the first two years of college

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from the second two years, he started a movement that would revolutionize higher education. The plan, modeled after the German "Gymnasium," was to create university-affiliated six-year high schools and two-year colleges, called "junior colleges," that would teach students the lower-division "preparatory" material. Although their evolution differed across the country, junior colleges were generally designed to increase access to higher education without compromising and burdening the existing four-year colleges. These colleges are generally defined as "any institution accredited to award the associate's in arts or science as its highest degree" (Cohen and Brawer, 1982, pp. 5–6). This definition includes comprehensive two-year colleges and many technical institutes (both public and private), but it excludes publicly funded vocational schools, adult education centers, and most proprietary schools. In this article, we use the terms "community college," "junior college," and "two-year college" interchangeably.<sup>1</sup>

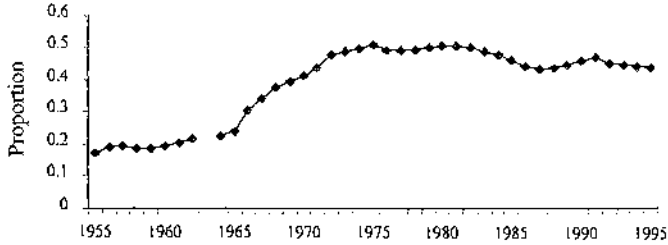
The first phase in the expansion of junior colleges began after World War II when millions of former military personnel were given a tuition voucher under the GI Bill to attend college. Between 1944 and 1947, enrollments in junior colleges nearly doubled. The end of the Korean War brought another similar increase in junior college enrollments (Witt et al., 1994). The final phase in the expansion occurred in the 1960s, when the first baby boomers began to reach college age, Vietnam War veterans began to return home, and Americans enrolled in college to avoid the military draft. Over the 1960s, the number of junior colleges more than doubled and enrollments quadrupled (Witt et al., 1994). This immense expansion led Clark Kerr, an architect of the California higher education system, to term the junior college the great innovation in American higher education in the 20th century (Brint and Karabel, 1989, p. v).

Originally, junior colleges focused on what is termed the "transfer function": students would complete two years of a general undergraduate education and earn an associate's degree (AA) at the two-year college, and those who wanted and were capable would transfer to a four-year college to complete a bachelor's degree. Since then, two-year colleges have broadened their mission to include vocational degree programs, continuing adult education programs, and workforce, economic and community development programs. In addition, community colleges have traditionally striven to increase access to higher education through an open admissions policy—often not even requiring a high school diploma—and low, or no, tuition. In 1996–97, full-time students paid, on average, \$1,283 for annual tuition and required fees at public two-year colleges compared to \$2,986 at public four-year colleges (U.S. Department of Education, 1997).

Although private junior colleges were common at the turn of the century—at that time, only 26 percent of two-year colleges were public—96 percent of the 5.5 million students enrolled in two-year colleges in 1995 were enrolled in public institutions (U.S. Department of Education, 1997). These 5.5 million students rep-

<sup>1</sup> Although we use the terms interchangeably, we know of no private "community" colleges while "junior" and "two-year" colleges are both public and private.

Figure 1

**Proportion of First-time First-year Students in Public Two-year Colleges**

Source: *Digest of Education Statistics* (1997).

resent 38 percent of enrollments in all postsecondary institutions and 48 percent of enrollments in public institutions (U.S. Department of Education, 1997). Figure 1 shows the importance of community colleges by graphing the proportion of first-time first-year students enrolled in public two-year colleges from 1955 through 1995. In 1955, only 17 percent of all such students were enrolled in a public two-year college; today, that percentage has grown to 44 percent.

This explosion in enrollment in community colleges was powered primarily by the growth in part-time students. Part-time enrollments in public two-year colleges increased 222 percent between 1970 and 1995, compared to an increase of 63 percent in full-time enrollments. Today, roughly 65 percent of community college students attend part-time.

Although community colleges exist nationwide, they are not equally represented in all states. In California, which enrolls one-fifth of all students enrolled in public two-year colleges, 47 percent of all college enrollments are in public two-year colleges—compared to Louisiana and Montana which each have less than 7 percent. States with more developed four-year college systems tend to have less developed two-year college systems, and vice versa, suggesting that states choose to invest in one system or the other (Rouse, 1998).

The faculty at two-year colleges also differs from that at four-year colleges. The master's degree is the highest degree of 64 percent of full-time faculty in public community colleges, while 68 percent of four-year comprehensive college faculty have doctorates. Almost two-thirds (60 percent) of the faculty at public two-year colleges teach part-time, compared to one-third of comprehensive four-year college faculty. Only 32 percent of the full-time faculty at public two-year colleges hold a rank of either associate or full professor, compared to over 60 percent at public four-year universities. Instead, community colleges rely more heavily on non-tenure track faculty; 40 percent of community college faculty hold a rank of instructor or lecturer and 11 percent have no rank; for comparison, 11 percent of faculty at comprehensive and 8 percent at public research universities hold the rank of instructor or lecturer, and fewer than 1 percent have no rank (U.S. Department of

Education, 1997). Of course, the heavy reliance on part-time and adjunct faculty help maintain community colleges' flexibility to respond to changing educational needs in the community.

Community college faculty also spend far more time on teaching than their four-year college counterparts. Two-year college faculty spend 69 percent of their time teaching and 4 percent of their time conducting research or scholarship (the bulk of the rest of their time is spent on administration, non-teaching service, and professional development), while faculty at comprehensive public four-year colleges spend 60 percent of their time teaching, and faculty at public research universities spend 40 percent of their time teaching. Similarly, 58 percent of faculty at community colleges teach more than 15 hours per week, compared to 18 percent of faculty at comprehensive four-year colleges and 7 percent of faculty at public research universities (U.S. Department of Education, 1997). The focus on teaching both lowers the educational costs and is hailed by many students as an advantage of attending a community college, particularly for those who seek more personal attention in the classroom.

### **Who Goes to Community College?**

About one-third of all high school graduates will attend a community college at some point in their lives (Rouse, 1994). Compared to students who first enroll in a four-year college, community college students are more likely to be the first in their family to attend college and are much less likely to have parents who have graduated from a four-year college. The combined student body of community colleges is 70 percent white, 11 percent black, and 11 percent Hispanic. Almost 36 percent of community college students are at least 30 years old, compared to only 22 percent of public four-year college students. As noted above, most community college students attend part-time.

A community college education appeals to many students because of the lower costs of attendance. The average tuition is less than one-half that at public four-year colleges, and because community colleges are located in most towns and cities, many students can live at home while attending college.<sup>2</sup> Community colleges have also lowered other costs of attendance. Courses are not only offered during the "traditional" daytime hours, but also at night and on weekends. Many community colleges offer courses at work sites, or via audio, video, or computer technologies. As a result, 84 percent of community college students work while also attending college compared to 78 percent of students attending public comprehensive four-year colleges. Although the proportion of students reporting some employment is comparable at two-year and comprehensive four-year colleges, roughly one-half of those attending a community college who are employed report work as their pri-

<sup>2</sup> Rouse (1994) shows that college proximity is an important determinant of college attendance. We discuss the literature on the effects of tuition below.

mary activity, compared to only one-quarter of those attending public comprehensive four-year colleges (Horn, Beckett and Malizio, 1998).

Do the attractively low tuition and neighborhood convenience of community colleges divert students from four-year colleges? Or do they provide a place in higher education for those who would not have otherwise attended college? Of course, the social importance of this issue ultimately depends on the extent to which the type of institution one attends affects one's educational attainment, as we discuss below. The few studies that attempt to address such issues tend to find that community colleges draw both types of students, although it appears that slightly more than half of community college students are non-traditional students who probably would not have attended four-year institutions (Grubb, 1989; Rouse, 1995, 1998). This suggests that community colleges have increased overall educational attainment, and that a major role of community colleges is to provide a place in higher education for those not traditionally served by the four-year college system.

### **The Changing Shape of a Community College Education**

Originally, students at community colleges completed courses that mimicked the first two years of a university curriculum before transferring to a four-year college. As a result, most students followed an academic curriculum delivered in a traditional manner. Today, however, community college courses have taken a variety of other approaches.

A significant fraction of community college students enroll in terminal (usually vocational) degree programs. Community colleges also serve an important remedial function within our higher education system. In 1995, almost all public two-year colleges provided remedial courses, compared to 81 percent of public four-year institutions (Lewis, Farris and Greene, 1996). About 41 percent of community college students took at least one remedial course compared to only 22 percent of public four-year college students. There seems to be an increased interest in limiting the amount of remediation done at four-year colleges; for example, the trustees of the City University of New York (CUNY) voted in May 1998 to deny admission to students who cannot pass reading, writing, and mathematics proficiency tests (Arenson, 1998). If educational offerings of four-year colleges are limited in this way, the remediation role of community colleges is likely to increase.

As another example of their flexibility in adapting to labor market conditions, a growing number of community colleges are providing contract training—that is, classes offered to employees of a business, industry, labor union, or public agency—often at a site designated by the contracting agency. As of the late 1980s, 94 percent of community colleges provided at least one course by contract. The most common form of contract training was teaching the job-specific skills needed to perform a job, to improve current performance, or to prepare for advancement on a contract basis with firms; 93 percent of community colleges provided such courses (Lynch, Palmer and Grubb, 1991). Sixty percent of community colleges provided contract courses in basic reading, writing, or math skills. The median ratio of contract en-

rollment (in 1988–89) to regular credit enrollment was 0.22, indicating that at one-half of colleges there was one or fewer contract students for every five or so regularly enrolled students (Lynch, Palmer and Grubb, 1991). Krueger and Rouse (1998) evaluated one such workplace education program in which a community college provided basic literacy education to employees at a manufacturing company and a service company. They reported positive and significant effects of the training on the wage growth and job progression of employees at the manufacturing company, but no such effects at the service company.

### **The Net Effect of Community Colleges on Educational Attainment**

One concern among observers of community colleges is that as they provide education services in non-traditional ways, the quality of such services may suffer. Critics point to the fact that community college students typically do not complete many college credits. Figure 2 shows the distribution of credits completed at two-year colleges.<sup>3</sup> The credits have been divided by 30 so as to represent years of enrollment on the horizontal axis. The figure shows that a majority of students who ever enroll in a two-year college complete one year or less; 35 percent of students complete only one semester or less.

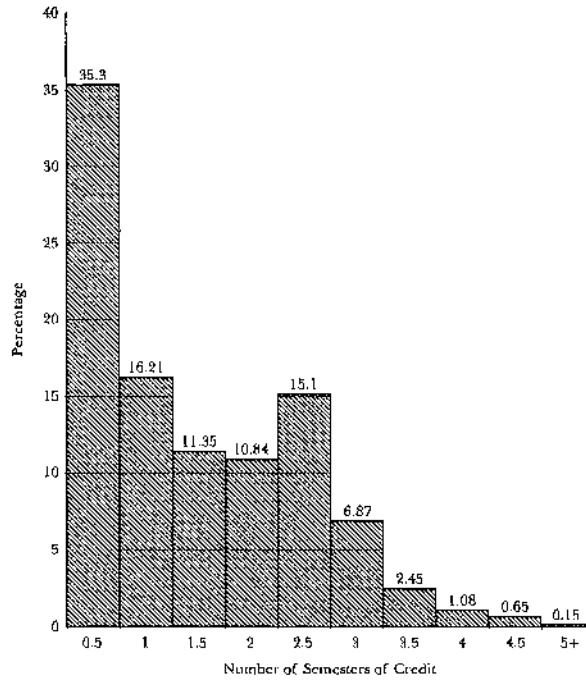
Similarly, Table 1 shows degree attainment, 10 years after high school, by whether students first attended a two- or four-year college.<sup>4</sup> Of all students who enroll in a two-year college, over one-half do not complete any degrees. About 15 percent complete a certificate, another 16 percent attain an associate's degree and about 16 percent complete at least a bachelor's degree. In contrast, nearly 60 percent of four-year college entrants complete at least a bachelor's degree. The remaining columns of the table refer to opinions that the students expressed about their own future while seniors in high school. While the percentages of students who complete a degree increases among two-year college students who would either be "disappointed if they do not complete college," or feel they are "'definitely' able to complete college," or for whom "a bachelor's degree is the lowest level of education with which they would be satisfied," degree completion still lags considerably behind that of four-year college students.

The skewed distribution of completed credits and the relatively small proportion of students who complete degrees raises an important question: Do two-year college students simply maintain modest educational objectives or is there some aspect of two-year colleges that discourages students from completing more

<sup>3</sup> Figure 2 is based on authors' calculations from the *High School and Beyond Post-secondary Transcript* file, which is for students who were sophomores in 1980 (the "sophomore cohort"). The figure includes only students who had a complete set of (cumulative) transcripts and who had earned any credits at a two-year college as of 1992; the distributions are weighted by the post-secondary transcript weight. If the sample is limited to those who have no four-year credits, the distribution looks quite similar.

<sup>4</sup> Proprietary schools were not counted as college for this exercise; therefore, if a student first attended a proprietary school and then attended either a two- or four-year college, we count the two- or four-year college as the "first" school attended.

Figure 2  
**Distribution of Two-year College Credits**  
 (among those with positive two-year college credits)



Source: Authors' calculations using the *High School and Beyond*.

courses? Policymakers in certain states, such as California and New York, are considering limiting enrollment at four-year colleges and encouraging students to begin at a two-year college (Trombley, 1991; Kelley, 1998, p. 2). A key question is whether such a policy will affect the educational attainment of those students denied admission to a four-year college. If educational outcomes of students who begin in a community college only differ from those who begin in a four-year college because the two-year college students desire less education, then students who begin at a two-year college with a certain level of desire for schooling should fare as well as those who begin at a four-year college. However, if it appears that some aspect of community college discourages otherwise equally motivated and prepared students from completing more courses, which is one possible interpretation of Table 1, policymakers might ask why.

One could argue that two-year college students attain less education than four-year college students because, although two-year and four-year college students have the same aspiration levels while seniors in high school, their desired level of schooling changes over time and this change is unrelated to the type of institution that the individuals attend. Of course, if this is the case, policymakers need not be concerned about differences in educational attainment between the two types of



Table 1

**Degree Attainment by Type of First College Attended and by Degree Aspirations in the 12<sup>th</sup> Grade***(among high school seniors in 1982/degree attainment as of 1992)*

<i>Highest Degree Attained</i>	<i>All</i>	<i>Disappointed if Do Not Complete College</i>	<i>"Definitely" Able to Complete College</i>	<i>BA+ is Lowest Level of Education With Which Would be Satisfied</i>
<i>Two-year College Students</i>				
None	53.7	47.8	60.1	44.9
Certificate	14.6	12.8	12.9	8.5
Associate's Degree	16.1	18.7	14.8	12.8
Bachelor's Degree	14.8	19.5	11.3	31.0
Graduate Degree	0.8	1.1	0.8	2.9
All		68.0	73.4	17.9
<i>Four-year College Students</i>				
None	29.4	26.7	39.4	22.5
Certificate	5.3	3.8	6.1	2.5
Associate's Degree	6.4	6.1	7.7	2.8
Bachelor's Degree	48.5	52.2	41.8	56.8
Graduate Degree	10.4	11.3	5.0	15.5
All		87.1	83.5	56.0

*Note:* Authors' calculations using the High School and Beyond sophomore cohort (self-reported post-secondary attendance and degree attainment). The cells represent percentages of the column. All percentages are weighted using the fifth follow-up panel weight. "Two-year Students" are those who started at a two-year college; "Four-year Students" are those who started at a four-year college.

institutions. However, it is also possible that the difference is due to some effect of community colleges. Clark (1960) and Brint and Karabel (1989) argue that the vocational education and terminal degree programs of community colleges are not conducive to completing four years of college, even for those who aspire to a four-year college degree. Their thesis is that two-year colleges are not appropriate institutions for students interested in completing a four-year degree because transferring can be costly and burdensome; conversely, they argue, the four-year college environment helps to keep students focused on the bachelor's degree. Essentially these authors argue that many students lack the necessary information to make an informed decision between two- and four-year colleges, and so they do not fully realize in attending a two-year college that they are reducing their chances of completing a four-year degree.

The potential importance of starting at a two-year or four-year college on eventual educational attainment is an empirical issue. But the effect is difficult to estimate, because desired levels of schooling and academic preparation are difficult to measure. Some authors have concluded that students who begin at a two-year college complete less education, on average, than similar students who begin at a four-

year college (Alba and Lavin, 1981; Anderson, 1981; Breneman and Nelson, 1981; Dougherty, 1987; Velez, 1985). However, these studies limit their analysis to students who have already started at a college. As a result, they not only miss an important component of the mission of community colleges—to include students who ordinarily would not attend college—but they also bias their estimates of the effect of having been diverted from a four-year college on educational attainment. Rouse (1995) accounts for all students, not just those who have started college, and also uses college proximity as an instrumental variable that is correlated with the type of college first attended, but hypothetically uncorrelated with educational attainment (conditional on the type of college attended). As with other authors, she finds that students who begin at a two-year college (and who otherwise would have attended a four-year college) complete less schooling—about three-quarters of a year—than those who begin at a four-year college. However, unlike the previous literature, she also finds that starting at a two-year college does not appear to affect the likelihood of attaining a bachelor's degree for those diverted from a four-year college. Therefore, it appears there is some negative effect of starting at a two-year college on years of education completed for an individual who would otherwise have attended a four-year college, perhaps because with so few students living on-campus, peer effects are not as strong as on four-year campuses and because transferring from a two-year to a four-year college can be difficult and burdensome.

## **Labor Market Payoffs to Community College**

Despite the fact that community colleges enroll a large share of those starting college—and an even larger share of those persuaded by public subsidies to enter college—we know relatively little about the relationship between community college coursework and future earnings. The standard educational attainment question used by the U.S. Bureau of the Census inquires about years of schooling completed (or, more recently, degrees received)—not about the type of institution one attended. The resulting lack of data has been a serious limitation for research on community colleges.

### **Evidence from Panel Survey Data**

The handful of available analyses of the labor market payoffs to community colleges has relied on panel surveys beginning with high school-age youth, which follow respondents through college and beyond, eventually observing sample members' earnings in the years after college. Table 2 summarizes the results from six papers estimating the relationship between community college attendance and earnings.<sup>5</sup> Five of the papers attempt to control for prior differences in academic

<sup>5</sup> Hollenbeck (1993) and Surette (1997) also report results consistent with those in Table 2 using the National Longitudinal Study of the Class of 1972 (NLS-72) and the National Longitudinal Survey of Youth (NLSY) respectively.

**Table 2**  
**Summarizing Research on Labor Market Effects of Community College Education**

Authors:	Data Sources:	Covariates:	Annual Earnings Differential: (relative to high school graduates)		
			A.A. Degree Holders:	Some College No Degree:	
Leigh and Gill (1997)	NLSY (1993)	Ability Measure: AFQT Score	.235	2-Yr	.118
		Other Covariates: Race, ethnicity, age, gender, work exp., region, part-time emp.	(.040) (No sig. diff. over age 25)	Coll 4-Yr	(.031) .093
				Coll	(.035)
Kane and Rouse (1995)	NLSY (1990)	Ability Measure: AFQT Score	.271	2-Yr	.100
		Other Covariates: Race, ethnicity, age, gender, work exp., region, part-time emp., parents' education.	(.038)	Coll 4-Yr Coll	(.030) .125 (.036)
	NLS-72 (1986)	Ability Measure: H.S. Class Rank, NLS-72 Test Score	.159 (.034)	Per Year: 2-Yr	.061
		Other Covariates: Race, ethnicity, gender, work exp., region, part-time employment, parental income.	(Differential larger for women)	Coll 4-Yr Coll	(.016) .061 (.012)
Grubb (1995)	NLS-72 (1986)	Ability Measure: NLS-72 Test Scores, H.S. Grades	Voc. .106 AA (.033)	Per Year: Voc 2-Yr Voc	.046 (.042) .120
		Other Covariates: Race, ethnicity, parental income, an index of parental socio-economic status, work experience, tenure on current job, indicators for firm-provided training.	Acad -.021 AA (.044)	4-Yr Acad 2-Yr Acad 4-Yr	(.025) .047 (.025) -.012 (.014)
			—	2-Yr, PA	.015
					(.004)
				4-Yr, WA	.052
					(.005)
Monk-Turner (1994)	Parnes NLS	Ability Measure: IQ Score (on H.S. Transcript)		Per Year: 2-Yr	.054
		Other Covariates: Race, gender, parental educ., region, work exp. marital status, educational plans.		Coll 4-Yr Coll	(.02) .079 (.01)
Heineman and Sussna (1977)	HS Graduates (Class of 1964 and 1967)	Ability Measure: H.S. Class Rank	.150	—	
		Other Covariates: Race, age, gender, work exp., parental family income, parental education, religion, military service.			

*Note:* In the studies which report impacts by year or by gender, the above estimates represent weighted averages using sample sizes as weights. Standard errors for the pooled estimates were calculated under the assumption of independence. Where impacts were reported in dollars, we divided by the relevant average annual earnings to convert to percentages. Where impacts were reported in units of log earnings, we reported log earnings differentials, which approximate percentage differences.

preparation between college entrants by using either a standardized test score or high school class rank (or both) as regressors. The paper by Jacobson, LaLonde and Sullivan (1997) uses information on earnings prior to college entry to "control for" such differences.

One could draw two primary generalizations from the results reported in Table 2. First, as reported by Leigh and Gill (1997) and Kane and Rouse (1995), the average community college entrant (who never attended a four-year college), who enrolls but does not complete a degree, earns 9 to 13 percent more than the average high school graduate with similar high school grades and/or test scores between the age of 29 and 38. Second, Kane and Rouse (1995), Grubb (1995), and Monk-Turner (1994) estimate that each year of credit at a community college is associated with a 5–8 percent increase in annual earnings—which happens to be the same as the estimated value of a year's worth of credit at a four-year college.

Most of the above results are based on the labor market experiences of those who entered community college soon after high school. However, given the recent policy interest in retraining for older workers, the earnings impacts for older adults is of particular interest. The papers by Leigh and Gill (1997) and by Jacobson, LaLonde and Sullivan (1997) provide what evidence we have on this issue. Leigh and Gill test for differences in the educational wage differentials for those entering college at different ages, and do not find evidence that the earnings differentials associated with associate degrees or with community college coursework are any different for the one-third of those who attend community college after age 25. Jacobson, LaLonde and Sullivan's analysis of samples of displaced workers suggests that the earnings differential associated with a year of community college coursework is approximately 2–5 percent. However, the authors estimate substantially larger returns (on the order of 15 percent per year) for courses in more quantitatively or technically-oriented courses such as vocational health, technical/professional, and technical trade courses, and science and math academic courses, but find negligible returns to non-quantitative courses like sales/service, non-technical vocational, social science/humanities, health/physical education/consumer-oriented, and basic education. Despite these gains, the average earnings of displaced workers did not return to pre-displacement levels.

### **Evidence from Differentials by State and Over Time**

An alternative approach to analyzing the labor market effects of community colleges is to use evidence on historical differences in the prevalence of community and four-year colleges between states and over time. We used the micro-data from the 1990 census to estimate the difference in each state in the log of annual earnings between high school graduates (with no postsecondary training) and those with "some college, no degree," for 25–34 year-old males.<sup>6</sup> (In an attempt to categorize the men by the states in which they were trained, the income differentials were

<sup>6</sup> To match as closely as possible the state where the person was educated, sample members were categorized by their state of residence in 1985, when they would have been 20 to 29. The regressions also adjusted for race/ethnicity and year of age.

measured by the state in which men were living five years earlier.) In Figure 3, we then plot these state average earnings differentials by the proportion of enrollment in each state in community colleges. If those attending community colleges were receiving lower earnings differentials from college attendance than those attending four-year colleges, we might expect to see a downward sloping graph. As is apparent from Figure 3, there is no strong relationship between the "some college" earnings differential and the proportion of enrollment in community colleges.<sup>7</sup> In fact, the "some college/high school graduate" earnings difference in California—with relatively large community college enrollments—is higher than the national average. Moreover, as we reported in Kane and Rouse (1995), there is no evidence that the "some college" earnings differential has fallen over time as community college enrollments have risen.

### **Experimental Evidence**

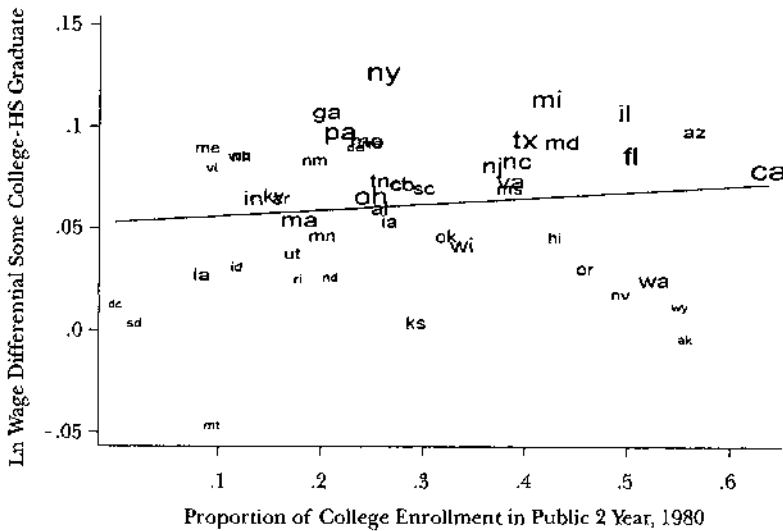
The non-experimental evidence summarized to this point suggests substantial effects of community college training on annual earnings. However, experimental evaluations of training programs have offered a much less optimistic appraisal of the impacts of classroom training for the unemployed and out-of-school youth.<sup>8</sup> For instance, in 1986, the U.S. Department of Labor commissioned an experimental evaluation of training provided to adults and out-of-school youth under the Job Training Partnership Act. Because many of the training providers under the Job Training Partnership Act (JTPA) were community colleges—indeed, over one-half of community colleges receive JTPA funds (Lynch, Palmer and Grubb, 1991)—the results of the JTPA evaluation provide another indirect assessment of the labor market value of a community college education.

The primary difference between the non-experimental results summarized above and the results of the typical randomized controlled experiment lies in the fact that the experiments can only estimate the incremental impact of a new opportunity for training—not the value of the training itself. For instance, many members of the control group in the JTPA experiment received classroom training at the very same institutions where the treatment group members received their training—they just paid for the training themselves or took advantage of other government programs, such as the federal Pell Grant program, to help pay the cost. Thus, the experimental evidence provides no direct evidence on the value of training vs. no training, but rather estimates only the difference between the training opportunities provided to the treatment group and the training opportunities available elsewhere. The more similar JTPA training was to training available elsewhere, the more likely one would find a zero incremental impact of the JTPA program.

<sup>7</sup> Weighting by the reciprocal of the standard error of each estimate, the slope coefficient in Figure 3 was .038 with a standard error of .029, meaning that for every 10 percentage point increase in the proportion of students in the state enrolled in community colleges, the estimated wage differential is estimated to rise by a statistically insignificant third of a percentage point.

<sup>8</sup> For instance, in a recent summary in this journal, LaLonde (1995) concluded: "Finally, the National JTPA Study found that . . . those men assigned to a strategy that offered classroom training did not appear to benefit from JTPA services."

Figure 3  
 The "Some College" Wage Differential and Community College Enrollment by State



Note: Ln wage differentials for 25-34 year-old males estimated by state using the 1990 5% PUMS. The wage differentials were estimated with separate log wage equations for each state, including regressors for age (10 categories), race/ethnicity, and category of educational attainment. The size of the symbol for each state reflects the reciprocal of the standard error on the estimated coefficient.

Source: Kane and Rouse (1995).

Indeed, this may explain the divergence between the results of the JTPA evaluation and the non-experimental estimates cited above. The impacts of the JTPA program on earnings were not statistically distinguishable from zero for several subgroups—leading some observers to conclude that classroom training had little impact. However, the differences in the amount of classroom training received by the treatment and control groups were also quite small.

In fact, if one translates the point estimates of the educational wage differentials arising out of the JTPA experiment into the framework we have been using, the results are quite comparable in magnitude. For example, during the final year of the JTPA evaluation follow-up, the average adult woman assigned to classroom training earned \$282 (5.1 percent) more than those in the control group (Orr et al., 1994). They also received 147 hours more training than those in the control group. If there are 420 hours of classroom training in a typical academic year (that is, 14 weeks per semester, 15 classroom hours per week, and two semesters a year), then our point estimate would be that receiving an academic year's worth of training would have been associated with an annual earnings differential per year of 14.6 percent. Similar results hold for the adult male and female youth groups, although the impacts for male youth were smaller than the 5 to 8 percent differential implied by the non-experimental estimates. In other words, even though the

JTPA experimental estimates were generally not statistically distinguishable from zero, because alternative training opportunities were so readily available to the control group, the implied estimates of the differential per year of training received were generally on the high end of the non-experimental estimates above. Heckman, Hohmann, Khoo and Smith (1997) have used the JTPA data to generate non-experimental estimates of the value of classroom training. Their results also suggest substantial private internal rates of return to classroom training, albeit with more ambiguous social returns.

### **The Payoff to Completing an Associate's Degree**

With only about 16 percent of community college entrants completing an associate's degree, the incremental value of degree completion itself has been central to the policy debate over community colleges. While the evidence presented in the last section suggests there are returns to completing community college credits, some argue that the main return to attending a community college comes with completing an associate's degree.

The evidence in Table 2 reports the total earnings differential between associate's degree recipients and high school graduates, inclusive of any credits completed. (One exception: the associate's degree effects reported for Grubb (1995) should be interpreted as incremental to the number of credits completed.) Completing an associate's degree appears to be associated with a 15 to 27 percent increase in annual earnings. Since estimates suggest that two years of community college credit is associated with a 10 to 16 percent increase in earnings (that is, the 5 to 8 percent annual gain times two), there appears to be some additional gain to the associate's degree itself. The evidence also suggests that this differential is larger for women, largely reflecting the value of nursing degrees where the earnings gain is especially pronounced (Kane and Rouse, 1995; Grubb, 1995).<sup>9</sup>

Discontinuities in the relationship between average log earnings and years of schooling completed at 14 and 16 years of schooling have traditionally been interpreted as reflecting the value of completing an associate's or bachelor's degree (Hungerford and Solon, 1987).<sup>10</sup> However, before 1992, the standard Census Bureau question on educational attainment did not allow one to distinguish between those who had completed an associate's or bachelor's degree and those who had completed 14 or 16 years of schooling without degrees. To assess whether the return to the associate's degree reflects a "sheepskin effect" or the effect of having completed two years of college, Jaeger and Page (1996) exploit a 1992 change in the Census Bureau educational attainment question; the earlier question focused solely on years of schooling completed, while the new one inquires about degree completion. After matching responses in the March 1991 *Current Population Survey* (in-

<sup>9</sup> The estimated earnings differential for associate's degree completion for women falls by one-third when one includes a dummy variable for nurses.

<sup>10</sup> In contrast, studies of the relationship between log earnings and the number of years of schooling suggest that the percentage increase in earnings between the 13th and 14th years of schooling is similar to that between the 12th and 13th years of schooling; there is no discontinuity (for example, Park, 1994).

cluding the question regarding years of schooling completed) and March 1992 survey (with data on degree completion), they found that white men with associate's degrees earn 8–19 percent more than men reporting similar years of schooling completed, but no degrees, and white women with associate's degrees earn 24–31 percent more than women reporting similar years of schooling completed, but no degrees. Again, it seems that nursing degrees account for much of the importance of associate's degrees for women (Kane and Rouse, 1995).

However, such estimates likely overstate the direct effect of degree completion for two reasons. First, the estimates are not adjusted for prior differences in family background and ability between degree completers and dropouts—because such information is not available on the Current Population Survey. It appears that those completing degrees not only have higher earnings than others with similar years of schooling, but they also seem to have higher prior test scores and more advantaged family backgrounds as well, and so controlling for these other factors would shrink the effect of degree completion.

Second, the magnitude of sheepskin effects may partially reflect the nature of measurement error in self-reported measures of educational attainment. Kane, Rouse and Staiger (1997) develop a technique for estimating the amount of measurement error in both self-reported and transcript-reported schooling in the NLS-72. Their findings suggest that respondents are more likely to misreport the number of years of college they have completed than they are to misreport degrees completed. While more than 95 percent of those who report a bachelor's degree 7 years after graduating from high school are estimated to be reporting accurately, one-third of those who report 3 years of college credit are estimated to have completed only 0, 1 or 2 years of college. Similarly, among those who report 1 year of college, 30 percent are estimated to actually have 0, 2 or 3 years of college. As a result, estimates based on self-reported schooling are likely to provide an accurate estimate of the earnings of those with a bachelor's degree and underestimate the differences in earnings per year of college for those without a bachelor's degree. Any discontinuity of earnings between those reporting 3 years of college and those reporting a bachelor's degree is likely to be exaggerated. In other words, the "sheepskin" effects reported in the literature may well be due in part to the nature of the reporting error in educational attainment.

Finally, even what remains of the "sheepskin" effect, after controlling for individual heterogeneity and measurement error, overstates the relative value of degrees and understates the anticipated value of postsecondary entry for those who do not complete degrees. There may be an option value to college entry for those uncertain of their prospects for finishing (Manski, 1989; Altonji, 1991; Comay et al., 1973). If the returns to education are uncertain or if youth are uncertain as to whether they are "college material," youth may gain some information in the first few months of college which helps to resolve the uncertainty. The wage differentials only reflect later monetary payoffs to college attendance. However, to the extent that the decision to enroll in college is an experiment for many, the anticipated outcome of that experiment may be sufficient to justify the public and private investments required, even if, after running the experiment, students do not finish



the degree. This argument also suggests that we might wish to avoid proposals which seek to limit aid to those who complete degrees, as is occasionally suggested as a policy response to the high non-completion rates at community colleges (for example, Fischer, 1987).

### **A Rough Approximation of the Private and Social Rates of Return**

How do the earnings differentials associated with a year at a community college compare to the costs of attendance? Using the average annual earnings of current 25–64 year-old workers (employed full-time, full-year) to estimate future earnings and employing a discount rate of 6 percent, the present value of expected lifetime earnings for the average male high school graduate in 1992 would have been \$480,500 (in 1997 dollars).<sup>11</sup> The present value of a 5 to 8 percent increase in lifetime earnings for someone with career income of \$480,500 would be \$24,000 to \$38,400 before taxes or \$15,600 to \$25,000 after taxes (assuming a combined federal and state tax rate of 35 percent).

The full cost to a family of a year at a community college includes both the earnings foregone by students as well as the cost of tuition. (We have left out room and board, since individuals would have to eat even if they were not in school). In 1992, the average income of a male 18–24 year-old high school graduate working full-time, full-year was \$19,400 (in 1997 dollars). Foregoing nine months at that salary would imply costs of \$14,600 before taxes or \$9,500 after taxes. As mentioned above, a minority of students actually seem to forego nine months of full-time earnings, since a majority of both two-year and four-year college students work while they are in school. Nevertheless, such calculations provide a rough approximation of the “unit price” of a year of full-time schooling, even if relatively few students decide to “purchase” a full nine months away from work.

Adding in the private cost of tuition at the average public two-year college, the rise in after-tax lifetime income of \$15,600 to \$25,000 would be larger, but not dramatically larger, than the estimated private cost of \$10,800 (\$9,500 in foregone after-tax earnings plus \$1,300 per year for tuition).

Calculations along these lines also reveal why it may not be surprising that the earnings differential associated with a year at a community college is similar in magnitude to that associated with a year at a four-year college. Although the tuition charges at community colleges are typically lower (\$1,300 per year compared to \$3,000 at the average public four-year institution), the vast majority of the private cost of attendance is foregone earnings, not tuition. To the extent that students are choosing on the margin between two-year and four-year colleges, we might expect students to attend each type of college to the point where the payoffs were similar.

<sup>11</sup> This may be a conservative estimate since we are implicitly assuming no real wage growth. However, it may also be overly optimistic, since the continuing increases in college enrollment may eventually lead to a decline in earnings differentials.

Given the size of the public subsidies directed at community colleges, the average tuition families face (\$1,300) is considerably less than the actual cost of a year of full-time education. Rouse (1998) estimates that average variable cost of a year in community college is \$6,300 (in 1997 dollars).<sup>12</sup> However, this figure does not include capital costs, which Winston and Lewis (1997) estimate to be an additional \$1,700 per student (27 percent of expenditures per student). To the extent that the private cost families face is considerably lower than the actual cost of the resources required to produce a year at a community college, we might fear students would over-invest in post-secondary education. However, even if we were to count only the earnings increases associated with community colleges (and ignore any of the other hard-to-measure benefits, such as civic participation or greater social mobility), the estimated 5 to 8 percent earnings differential would imply gains roughly the same as the full cost of the resources used: the combined cost of pre-tax earnings and expenditures per pupil of \$22,600 is comparable in magnitude to the \$24,000 to \$38,400 estimate of the present value of future earnings differentials.

Although these back-of-the-envelope calculations can of course be subjected to criticism on many dimensions, it thus appears possible that a year of community college increases earnings by an amount roughly equal to the value of the resources used to produce that year.

## **Student Financing Issues**

Community colleges are heavily dependent upon public subsidies for their operations; 62 percent of current-fund revenues are appropriated by state and local governments (U.S. Department of Education, 1997, Table 328, p. 344). Because students must be enrolled at least half-time to qualify for many federal aid programs such as the guaranteed student loan programs, only a quarter of community college students report receiving state or federal grant aid to help cover the cost of tuition and fees (U.S. Department of Education, 1992-93, Table 3-1a, p. 62).

Future demographic trends are likely to strain the ability of states to maintain this commitment in coming years. The size of the traditional college-age population (that is, 15 to 24 year-olds) has declined by 15 percent since 1980, partially relieving the cost pressure produced by rising college enrollment rates. However, this college-age population is now projected to rise by one-fifth over the next 15 years (Campbell, 1994). The rise is projected to be particularly dramatic in California, where the number of 15 to 24 year-olds is projected to increase at roughly twice the national rate. If the labor market wage premiums favoring college entry persist, and college enrollment rates remain high, states are likely to be forced to choose between raising tuition and increasing public expenditures on higher education.

Should states decide to increase tuition, it is likely to have an unusually large

<sup>12</sup> Excluding "fixed costs" such as research, administration, student services and admissions, her estimate would be \$4,200.

impact on community college enrollments. The demand elasticities with respect to up-front costs of college entry are quite high. After reviewing 25 estimates of tuition price responses, Leslie and Brinkman (1988) reported a median estimate of a 4.4 percentage point difference in postsecondary entry for every \$1,000 difference in tuition costs (in 1997 dollars).<sup>13</sup> A number of others have found similar results, including Cameron and Heckman (1998b), Rouse (1994), Kane (1995), Kane (1994) and McPherson and Schapiro (1991). Enrollment at two-year colleges appears to be particularly sensitive to tuition changes (Kane, 1995; Rouse, 1994; Manski and Wise, 1983).

In addition, students seem to be more sensitive to tuition changes than to changes in future wage differentials. While the payoff to college was rising dramatically during the 1980s, the proportion of high school graduates entering college within two years of high school rose by only 7 percentage points, from 65 to 72 percent (U.S. Department of Education, *Condition of Education, 1997*, p. 64). Using the estimates of tuition sensitivity described above, a tuition increase of \$1500 would have been enough to have wiped out that rise in college entrance rates—even though the present value of the college earnings differential rose by far more than \$1500 during the 1980s.

One potential explanation for the sensitivity of students to the tuition costs at community colleges is that they face borrowing constraints in the private capital market. Indirect evidence on this point is provided by Card (forthcoming), who summarizes evidence suggesting higher marginal returns to schooling for disadvantaged groups than for the population as a whole. Such findings may result from the fact that lower-income families have more difficulty arranging financing for college. In a similar vein, most studies find that large differences in college entry by family income remain, even among those with similar test scores and academic performance in high school.<sup>14</sup>

The most obvious constraints which limit family borrowing for community college are the explicit limits on student borrowing in the federal student loan programs. Since 1992, the most a dependent student could borrow under the Stafford loan program has been \$2,625 during the freshman year, \$3,500 during the sophomore year and \$5,500 per year thereafter. Independent students who are married, have dependents, are veterans or are over age 24 can borrow an additional \$4,000 per year during their first two years and an additional \$5,000 per year thereafter. However, such amounts may not be sufficient to pay living expenses on top of tuition bills. Some states and institutions have their own loan programs, but in 1992–93, less than 1 percent of undergraduates received either a state loan (0.5 percent) or an institutional loan (0.4 percent); in contrast, 20 percent of undergraduates received federal loans. A third

<sup>13</sup> Leslie and Brinkman's (1988, appendix table 6) actual estimate was that a \$100 increase in tuition in 1982–83 dollars was associated with a .7 percentage point decline in enrollment among 18–24 year-olds. We have converted to 1997 dollars in the text.

<sup>14</sup> Kane (1998), Manski and Wise (1983) and Hauser and Sweeney (1997) report differences in postsecondary entry by family income, conditioning on both parental education and student test scores. Using the NLSY, Cameron and Heckman (1998a) find differences in college entry by family income to be greatly reduced, but not eliminated, after including controls for AFQT scores.

source of borrowing constraints may be the confusing nature of the application process. Several studies cited in Orfield (1992) suggest that low-income families are often unaware of eligibility rules and procedures.

An important challenge will be to create a financing structure that will allow community colleges to expand in the next few years to meet the training needs of the population—and then eventually to contract as the relevant population declines. The current system of “backward-looking” means-testing, which looks back at the parents’ income to determine student eligibility for financial aid, is more appropriate for the student of traditional college age and is less well-suited to the population of community college entrants. If community colleges are to remain an engine of innovation in postsecondary education, we will require similarly creative and flexible financing strategies to match. As an alternative to the current form of financing with several advantages would be greater reliance on income-contingent loans—that is, loans where the amount of repayment depends to some extent on future income earned—as discussed in this journal in Krueger and Bowen (1993). The expected subsidy implicit in an income-contingent loan is lower than the cost of a dollar in appropriations to public institutions, which in turn means that families and youth would have a stronger incentive to allocate society’s educational resources in a prudent manner. Moreover, the means-test implicit in income-contingent loans does not involve the same difficulty in distinguishing students who are “dependent” on parents’ resources from those who are “independent.”

## **Conclusion**

For the past five decades, the debate over access to higher education and the role of higher education in economic development has implicitly been a debate about community colleges. In any discussion involving marginal incentives, community colleges have been the margin. They have been the gateway for those on the verge of enrolling in college: older students, those who cannot afford to attend full-time, and those who need to develop their basic skills. Ironically, though, we know less about community colleges than about other sectors of higher education. The evidence we do have, as summarized above, suggests that community colleges increase aggregate educational attainment, and are associated with higher wages, even for those not completing degrees.

If current labor market conditions persist, we can expect significant increases in demand for postsecondary training slots in the future, due to the projected growth in college-age cohorts. Historically, community colleges have been the buffer, absorbing much of the increase in enrollment when veterans returned from war or when demand for skilled labor outpaced supply. Enrollment at community colleges also has swelled much more dramatically than at other institutions during economic downturns, when opportunity costs of such investments in training are lowest (Betts and McFarland, 1996).

Recent technological developments in distance learning will likely allow col-

leges to be even more responsive to changes in demand for higher education and have raised hopes of improving productivity in instruction.<sup>15</sup> Community colleges are participating in this growing trend. In 1995, 58 percent of public two-year colleges were offering distance learning courses serving over 400,000 students (or about 7 percent of their total enrollment).<sup>16</sup> However, community colleges are not the only institutions turning to distance learning: two-thirds of public four-year colleges offered such courses in 1995 and an additional 25 percent were planning to offer such courses by 1998. To the extent that geographic accessibility and flexible scheduling have been a traditional source of community colleges' market niche, the technological revolution may allow other institutions, such as four-year colleges and private for-profit institutions, to compete more effectively in the markets traditionally served by community colleges.<sup>17</sup> The net result of these technological changes—whether they lead to an increasing or decreasing role for community colleges in the future—remains to be seen.

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<sup>15</sup> The Department of Education defines distance learning as "... education or training courses delivered to remote (off-campus) locations via audio, video, or computer technologies" (Lewis et al., 1997).

<sup>16</sup> The most common form of the distance learning is one-way pre-recorded video classes (67 percent), although half of public two-year colleges also offer two-way interactive video.

<sup>17</sup> We thank Michael Rothschild for pointing out the potential vulnerability of community colleges as the technology for distance learning improves.

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