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Thomas J. Kane; Cecilia Elena Rouse

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By THOMAS J. KANE AND CECILIA ELENA ROUSE*

Despite their importance as providers of postsecondary education, we have known little about the labor-market payoffs to a community-college education.[1] This is a particularly regrettable gap in the literature, not simply because community colleges currently enroll more than half of first-time first-year students, but because they almost certainly contain an even larger share of those whose decisions to attend college are affected by state and federal financial-aid subsidies.[2] For instance, simulations by Charles Manski and David Wise (1983) suggest that a disproportionate share of those enrolled in 1979, who would not have enrolled in college in the absence of the federal Pell Grant program, were attending two-year colleges.[3] Most previous estimates of the payoffs to two-year colleges (based upon data for youth seven or fewer years out of high school) suggested little or no wage effect (David Breneman and Susan Nelson, 1981; Kristine Anderson, 1984). Others have reported significant payoffs for associate's degree holders (Harry Heineman and Edward Sussna, 1977; Larry Blair et al., 1981). Nevertheless, a number of authors have expressed doubts about the labor-market value of a community-college education (e.g., see Fred Pincus, 1980; Kevin Dougherty, 1987; Steven Brint and Jerome Karabel, 1989). Unfortunately, this skepticism is largely based upon the concentration of low-income students in community colleges and the high student attrition rates, rather than any direct evidence on the economic value of such an education.[4]

*John F. Kennedy School of Government, Harvard University, Cambridge, MA 02138, and Industrial Relations Section, Firestone Library, Princeton University, Princeton, NJ 08544, respectively. We thank John Bound, Anne Case, Gary Chamberlain, David Ellwood, Claudia Goldin, Guido Imbens, Larry Katz, Lisa Lynch, Charles Manski, Rob Meyer, Steve Pischke, Gary Solon, Doug Staiger, David Wise, and Richard Zeckhauser for helpful discussions, and seminar participants at the University of Chicago Business School, Harvard University, the University of Michigan, Northwestern University, members of the Princeton Labor Lunch, and the NBER Conference on Higher Education for useful comments. Anonymous referees also provided helpful comments. Kane acknowledges the generous support of the Social Science Research Council through funding provided by the Rockefeller Foundation. We also thank Peter Capelli at the National Center on the Educational Quality of the Workforce at the University of Pennsylvania for providing us with the updated transcript data used in earlier versions of the paper and Mark Lopez for excellent research assistance. All errors in fact or interpretation are our own.

[1] In *The American Junior College*, Arthur Cohen and Florence Brawer (1982 pp. 5–6) define the junior college as, "...any institution accredited to award the associate's in arts or science as its highest degree." This definition includes comprehensive two-year colleges and community colleges, and it excludes publicly funded vocational schools, adult education centers, and most proprietary schools. We will use the terms junior college, community college, and two-year college interchangeably.

[2] Twenty percent of Federal Pell Grants, 10 percent of Guaranteed Student Loans (GSL's), and over 20 percent of state expenditures for postsecondary education go to community colleges. However, these estimates also understate the importance of two-year colleges since they include subsidies to students who would have gone to college in the absence of aid. We draw the estimate of the proportion of Pell and GSL money spent at community colleges from the National Center for Education Statistics, *Undergraduate Financing of Postsecondary Education* (1988 pp. 48–49). Kent Halstead (1989) estimates that the cost of a full-time-equivalent (FTE) enrollment at a community college is roughly 70 percent of the average. Since community-college students represent 30 percent of FTE enrollment nationwide, we estimate that roughly 21 percent of state and local postsecondary education subsidies flow to community colleges.

[3] These calculations are based upon Table 7.4 in Manski and Wise (1983 p. 124).

[4] More recently, W. Norton Grubb (1993) used the NLS-72 data to conclude that only A.A. degree recipients benefit from a community-college education and that two-year-college drop-outs fared no differently than high-school graduates with no postsecondary education. However, those results are due to computational errors which, when corrected, yield results similar to those reported here (Kane and Rouse, 1995).

The lack of data has been the primary obstacle to learning more about the payoffs to community colleges. For 50 years since the decennial census of 1940, the Bureau of the Census has collected data on years of school completed, with no questions to distinguish former two-year and four-year college students. We attempt to fill this gap by employing two different data sets which allow one to distinguish between two-year and four-year college attendance: the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the National Longitudinal Survey of Youth (NLSY). The NLS-72 is particularly well-suited to the pursuit of this question, since it contains data from postsecondary transcripts, actual work-experience measures, standardized test scores, high-school performance, and family background. The NLSY, while relying upon self-reported education and not transcripts, provides data for more recent cohorts.

Using the NLS-72, we find that the average person who attended a two-year college earned about 10-percent more than those without any college education, even without completing an associate's degree. Further, contrary to the widespread skepticism regarding the value of a community-college education, the estimated returns to a credit at a two-year or four-year college are both positive and remarkably similar: roughly 4–6 percent for every 30 completed credits (two semesters). We also find evidence of the additional value of an associate's degree for women and a bachelor's degree for men. Although community-college students from the high-school class of 1972 may have entered institutions quite different from those today, we find similar results for more recent cohorts in the NLSY, who graduated from high school between 1976 and 1983.

The similarity of wage differentials for two-year and four-year college credits may not be surprising if students choose between the two types of institutions on the margin. Although tuition is generally lower at two-year colleges, the opportunity costs of college enrollment, which represent the bulk of college costs, are similar at two- and four-year colleges.

In the next section of the paper, we briefly describe the data and our empirical strategy. In the second section, we use the NLS-72 to describe two- and four-year college students. In Section III we present the results. Section IV presents our conclusions.

I. Data and Empirical Strategy

A. *Data*

The National Longitudinal Survey of the High School Class of 1972 (NLS-72) is a longitudinal survey that originally sampled 22,652 seniors from the high-school class of 1972. The data contain extensive family-background ability measures as well as a supplement, the Post-secondary Education Transcript Survey (known as PETS), which contains transcript information on all post-secondary schools reported by the students through 1979 and includes course credits by field, grades, and any degrees obtained. Survey participants were last contacted in 1986, 14 years after graduating from high school.

The National Longitudinal Survey of Youth (NLSY) consists of 12,686 14–21-year-olds in 1979, who were surveyed annually from 1979 through 1990. In 1990, 82 percent of the original respondents were sampled. While the NLS-72 has more complete schooling information, the NLSY (which also has extensive family-background measures) has the advantage of following more recent cohorts and containing better labor-force information.

Broadly speaking, we used standard criteria for creating both samples, limiting the analysis to those who are working and excluding the self-employed. Our experience measures represent actual rather than potential experience. Details of both data sets and the samples are contained in the Data Appendix.[5]

[5]Sample means and standard deviations are available from the authors upon request.

B. *Empirical Strategy*

The results reported here improve on previous research on college wage differentials in several ways. First, with the NLS-72 data, actual postsecondary-school transcripts are used to measure the number and type of courses taken as well as degrees obtained, thereby minimizing a portion of the total measurement error in the schooling variable which Orley Ashenfelter and Alan Krueger (1994) estimate to be on the order of 8–12 percent. Second, we evaluate wage and annual earnings differentials 14 years after high-school graduation in the NLS-72 and 6–13 years after high school in the NLSY, allowing sufficient time to observe the returns to different types of human-capital investment. Third, as others working with earlier waves of the NLS-72 have done, we attempt to control for family background and ability by controlling explicitly for parental family income, high-school class rank, and a battery of test scores measured at the time of the base-year survey.

II. Two- and Four-Year College Students

Almost two-thirds (62 percent) of the high-school class of 1972 attended college at some point before 1979. One-third of these students started at a two-year college, 80 percent entering within 15 months of high-school graduation.[6] As reported in Table 1, only slightly more than one-quarter of initial community-college entrants ever completed an associate's degree, and less than one-fifth finished a B.A. degree. Although they rarely completed B.A. degrees, roughly one-third of community-college entrants did complete some credits at a four-year college at some point. (The flow in the other direction, from four-year colleges into two-year colleges, was much less frequent.)

In Table 1, we also present the distribution of course credits in three broad categories: vocational credits, math and science credits, and other credits.[7] Among both men and women who started in community college, approximately half of their community-college credits were from vocational and math and science courses. This distribution was similar to the four-year college credits of those who start in a four-year college.

Studies that focus solely on the returns to an associate's degree present an incomplete picture of the returns to a community-college education. In fact, many community-college students complete very few credits. Figure 1 reports the number of courses completed by those attending only a two-year college, those attending a four-year college, and dropouts from each. (The 13 percent of the sample with both types of credits were excluded in generating Figure 1.) Of those who dropped out of two-year colleges without going on to four-year schools, 40 percent completed fewer than a semester's worth of credits (15 credits).

In order to assess the extent to which two-year college students resemble four-year college dropouts and high-school graduates, we constructed an index of family background by first regressing total number of college credits completed on a rich set of family-background and ability measures.[8] We then generated a predicted number of college credits for each youth. Figure 2 presents separate kernel densities of the predicted number of college credits for three groups: high-school graduates, students who

[6]The latter of these figures is drawn from Clifford Adelman (1990).

[7]Vocational credits include courses such as agriculture, business and management, marketing and distribution, health (including nursing), trades and industry, education, public service, and communications. Math and science credits include all engineering, science, and math courses. Finally, other credits include courses in the humanities, social sciences, fine arts, liberal arts, and remedial and avocational education. This taxonomy is based on Grubb (1987).

[8]In particular, we regress total college credits on gender, race, region, community size, parents' income, percentage high-school rank, total ability score, parents' education, parents' occupation, a flag indicating that the school had no record for the individual, and interactions among race and sex, region, parents' income, ability score, and high-school rank.

TABLE 1—EDUCATIONAL ATTAINMENT BY TYPE OF FIRST COLLEGE ATTENDED, NLS-72 (WEIGHTED)

	Type of first college attended			
	Men		Women	
Variable	Two-year college	Four-year college	Two-year college	Four-year college
Ever attended two-year college	1.00	0.11	1.00	0.12
Ever attended four-year college	0.36	1.00	0.28	1.00
A.A.	0.27	0.04	0.29	0.05
B.A.	0.19	0.54	0.15	0.54
(Number of vocational credits)/ (total two-year college credits)	0.26	0.26	0.36	0.33
(Number of math and science credits)/ (total two-year college credits)	0.26	0.26	0.17	0.21
(Number of other credits)/ (total two-year college credits)	0.47	0.47	0.47	0.46
(Number of vocational credits)/ (total four-year college credits)	0.31	0.23	0.39	0.29
(Number of math and science credits)/ (total four-year college credits)	0.25	0.28	0.13	0.17
(Number of other credits)/ (total four-year college credits)	0.43	0.49	0.48	0.54
Total number of two-year college credits	42.05	2.71	40.41	2.73
Total number of four-year college credits	26.60	110.87	19.50	103.13

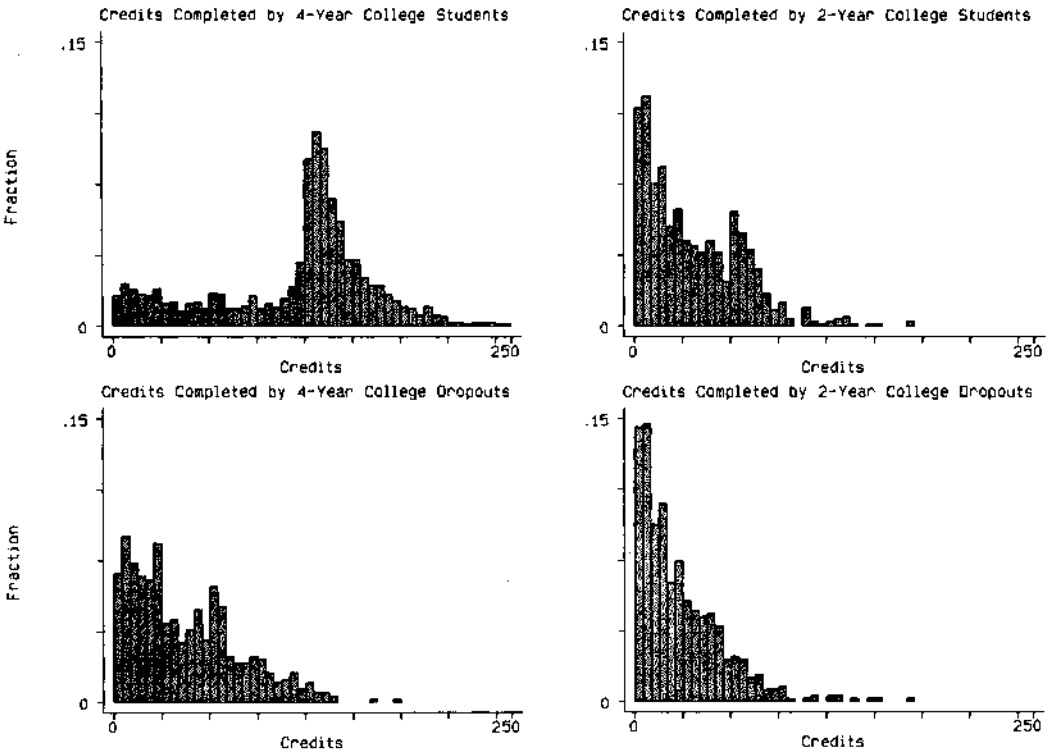

FIGURE 1. CREDITS COMPLETED BY TWO- AND FOUR-YEAR COLLEGE STUDENTS

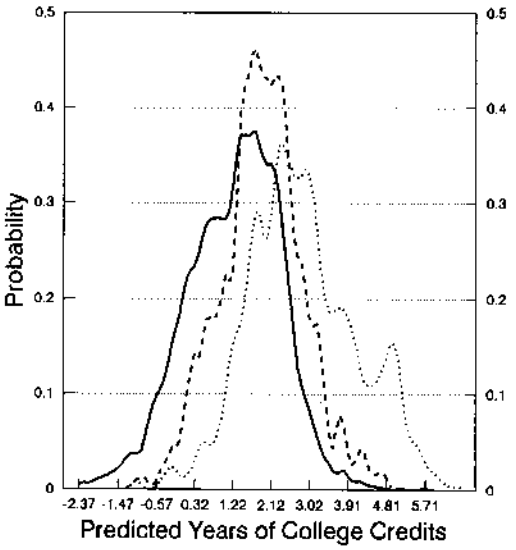

FIGURE 2. KERNEL DENSITIES OF PREDICTED COLLEGE CREDITS BY TYPE OF COLLEGE ATTENDED

Notes: Solid line, high-school graduates; dashed line, two-year college only; dotted line, four-year college only (no B.A.).
Source: Authors' calculation using NLS-72.

only attended a two-year college, and students who only attended a four-year college and did not complete a B.A.[9] While two-year college students appear to have more advantaged backgrounds, on average, than high-school graduates, and less advantaged backgrounds than four-year college students, the distributions show that there is considerable overlap. We will control for family background in the regression analysis because the family-background means are different.[10] Nevertheless, it is overly simplistic to think of two-year college students (at least in the NLS-72) as being completely distinct from four-year college students.

[9] We use a biweight kernel, and the bandwidth (0.2 times the standard deviation of the predicted number of credits) was chosen after some experimentation (B. W. Silverman, 1986).

[10] The mean [standard deviation] of the index was 1.25 [1.09] for high-school graduates, 1.89 [0.97] for two-year college students, and 2.84 [1.26] for four-year college dropouts.

III. Results

A. *Comparing the NLS-72 and NLSY with the Current Population Survey*

We begin by developing a baseline for comparing our data with estimates from the Annual Merge file of the Current Population Survey (CPS), replicating the typical log-wage specification (using log hourly wages) controlling for region, experience, and race, but not using family-background and ability controls. (See the Data Appendix for details on the samples.) In the 1986 CPS, the estimated wage differential per year of schooling for 25–35-year-olds was 9.6 percent for men and 10.7 percent for women. The estimated wage differential, for both men and women, was roughly 7 percent in the NLS-72 and 8–9 percent in the NLSY, before conditioning upon family background and ability. Therefore, the educational differentials reported here are roughly consistent with estimates from the CPS, although slightly smaller.

B. *Estimated Returns to Credits and Degrees Completed in the NLS-72*

Table 2 reports ordinary least-squares (OLS) estimates of wage and annual earnings differentials associated with credits completed and degrees received at two-year and four-year colleges entered before 1979.[11] To convert credit counts into units comparable to a year of schooling, we divide the total number of credits by 30, the rule of thumb suggested in the CPS Interviewer's Manual for a year of college credit. The first column suggests a wage or annual earnings differential for a year of credit of 4–7 percent for men and 7–10 percent for women.

[11] Given the very low response rates of the vocational schools and widely varying methods for assigning credits for courses completed, we did not count credits from vocational schools. Therefore, the estimates using numbers of credits should be understood as estimating the difference between college students and high-school graduates who may also have attended some vocational schools.

This was true before conditioning upon family background or ability.[12]

Despite the large overlap in the distribution of family background for high-school graduates, and two- and four-year college students, the average family backgrounds do differ. For instance, in these data there was a 30-percentage-point difference in average high-school class rank, and a one-standard-deviation difference in average standardized test scores between those attending four-year colleges only and those not attending college at all. Two-year college students fell roughly in the middle of these two groups. To the extent that two-year and four-year college students have different family backgrounds from high-school graduates and from each other, we might have expected college students—particularly those attending four-year colleges—to have had higher earnings even without attending colleges.

In columns (ii) and (v), we condition on a standardized test score, percentile high-school class rank, and parental family income in an attempt to control for this source of selection bias. Indeed, for men, including the measures of ability and family background led to a decline of 9–13 percent in the estimated two-year-college wage differential and a 23-percent decline in the differential for a year of four-year college. For women, there was a decline of 5–6 percent in the two-year differential and a decline of 13–20 percent in the four-year differential. The magnitude of this ability/background effect is consistent with that found in earlier work by Jere Behrman et al. (1980). We also report p values for the F test of the constraint that a two-year college credit was equivalent to a four-year college credit. In general, once we controlled for ability and background differences between two-year and four-year college students, the hypothesis could not be rejected.

Columns (iii) and (vi) of Table 2 report the wage and earnings differentials associated with two-year-and four-year college credits after conditioning upon degree attainment and setting credits to zero for those with degrees. The returns to credits are, therefore, identified by variation in credits among those not receiving degrees. We generally continue to find positive and significant coefficients on numbers of credits completed, as each year's worth of credits was associated with an increase of 4–7 percent in both hourly wages and annual earnings. However, using annual earnings, it appears that males with two-year-college credits actually fared better than similar four-year-college students.

We also report tests of the hypothesis that two years of community-college credits are equivalent to having an associate's degree and that having four years of four-year-college credits is equivalent to having a B.A. degree. In several specifications, the estimated "sheepskin effects" of degree completion over and above the value of the credits completed were small when studying wages and earnings. However, there is evidence for the value of B.A. completion for men and A.A. completion for women. This result for women possibly reflects the value of the associate's degree in nursing, since one-quarter of associate's degrees for women were awarded in the field of nursing. (The coefficient on completing an A.A. in the annual-earnings equation falls by 33 percent when a dummy is included for nurses.)[13]

There is growing interest in the community college as an institution in which to provide vocational as opposed to "academic" training. Due to large standard errors, we often did not find statistically significant differences in the returns to different types of credits or degrees.

[12]The full set of coefficient estimates is available from the authors upon request.

[13]Using merged CPS data from before and after the change in education codes Paul Siegel (1991) also finds that, even without controlling for ability differences, years of schooling completed rather than degrees account for the bulk of postsecondary educational wage differentials. David Jaeger and Marianne Page (1994) take a similar strategy and work with matched CPS data from March 1991 and 1992. They find large associate's degree effects for women and bachelor's degree effects for men. Associate's degree effects for men were sometimes significantly different from zero but were small relative to the results for women.

TABLE 2—RETURNS TO COLLEGE CREDITS: OLS RESULTS, NLS-72

A. *Males:*

Independent variables	Dependent variable: log hourly wages (i)	(ii)	(iii)	Dependent variable: log annual earnings (iv)	(v)	(vi)
(Total number of two-year college credits)/30	0.0467	0.0424	0.0412	0.0406	0.0353	0.0571
	(0.0096)	(0.0095)	(0.0170)	(0.0109)	(0.0108)	(0.0189)
(Total number of four-year college credits)/30	0.0602	0.0458	0.0022	0.0728	0.0561	0.0262
	(0.0036)	(0.0042)	(0.0132)	(0.0041)	(0.0048)	(0.0145)
A.A. (highest degree)			0.0412			0.0734
			(0.0407)			(0.0458)
B.A. (highest degree)			0.2291			0.2808
			(0.0218)			(0.0251)
Graduate degree (highest degree)			0.2997			0.3746
			(0.0325)			(0.0378)
Hypothesis-testing (p values):						
Two-year credit = four-year credit	0.1617	0.7266	0.0599	0.0033	0.0578	0.0030
Two years of two-year credits = A.A.			0.4070			0.4624
Four years of four-year credits = B.A.			0.0000			0.0015
Includes ability/family background?	no	yes	yes	no	yes	yes
R^2:	0.1485	0.1665	0.1778	0.1555	0.1729	0.1801

B. *Females:*

Independent variables	Dependent variable: log hourly wages (i)	(ii)	(iii)	Dependent variable: log annual earnings (iv)	(v)	(vi)
(Total number of two-year college credits)/30	0.0689	0.0643	0.0583	0.0693	0.0658	0.0655
	(0.0092)	(0.0091)	(0.0165)	(0.0141)	(0.0141)	(0.0260)
(Total number of four-year college credits)/30	0.0769	0.0620	0.0679	0.0982	0.0859	0.1007
	(0.0033)	(0.0036)	(0.0130)	(0.0051)	(0.0058)	(0.0202)
A.A. (highest degree)			0.2337			0.2561
			(0.0318)			(0.0499)
B.A. (highest degree)			0.2841			0.3898
			(0.0186)			(0.0296)
Graduate degree (highest degree)			0.4239			0.6074
			(0.0301)			(0.0474)
Hypothesis testing (p values):						
Two-year credit = four-year credit	0.3869	0.7987	0.6371	0.0425	0.1579	0.2762
Two years of two-year credits = A.A.			0.0061			0.0630
Four years of four-year credits = B.A.			0.8055			0.8695
Includes ability/family background?	no	yes	yes	no	yes	yes
R^2:	0.2797	0.2984	0.3056	0.2342	0.2432	0.2511

Notes: Also included in all regressions are an intercept, race, parents' income, percentage rank in high school, NLS-72 test score, years of actual experience and experience squared, dummies for region and size of the city of residence in high school, dummies for part-time employment (for wages) and for the region of the respondent's high school, and education dummies for self-reported education begun after 1979. Dummies were included for various combinations of missing variables. The excluded group from the race dummies is white, non-Hispanic. For males, there are 3,249 observations in the hourly wage equations and 3,524 in the annual earnings equations; for females, there are 3,514 observations in the hourly wage equations and 3,160 in the annual earnings equations.

Although we have attempted to control for selection bias by including measures of family background and ability as regressors, we may not have captured all the relevant differences between college entrants and high-school graduates that would have led to differences in mean earnings. In additional work not reported here, we used the distance of one's high school from the closest two-year and four-year college as well as public tuition levels in the state as instruments for college attendance. Although the

results would not have led us to reject the OLS estimates, there was simply not much power in the test.

We also attempted to address any biases implied by measurement error in the transcripts caused by school misreporting or institutional differences in credit counts. Any such error would be magnified when conditioning upon family background and ability, to the extent that these measures are more related to the true variation in schooling levels than to the measurement error. To the extent that the measurement error in self-reported education is uncorrelated with the transcript errors, self-reported education would serve as a valid instrument.[14] Although we could not study the differential impact of errors-in-variables on the payoffs to two-year and four-year credits, the estimated return to schooling increased by one-quarter. Therefore, correcting for measurement error, we were left with estimates of the return to schooling of roughly the same magnitude as we observed before conditioning upon family background and ability effects. The two biases appeared to be roughly offsetting in our data.

C. *Comparing Results in the NLS-72 and NLSY*

The nature of the education received at two-year and four-year colleges has changed since the cohort of 1972 entered school. Between 1970 and 1981, the proportion of associate's degrees that were granted in occupational curricula grew from 40 percent to nearly 70 percent.[15] Male two-year-college students turned to business management and other vocational programs such as engineering technologies, and women shifted primarily into business management and health fields (which includes nursing).[16]

As a result, we sought to compare the NLS-72 results against the experience of more recent cohorts. Although college transcript data are not available, the NLSY provides data on college enrollment and wages for a sample of individuals who would have graduated from high school roughly between 1976 and 1983. In defining educational attainment in both data sets, we first categorized people by their highest degree. For instance, if a person had an A.A. as well as a B.A., we classified that individual as a B.A. recipient. A graduate degree took precedence over a B.A. We classified college students without degrees by the type of institution they attended; if they had attended more than one institution, we used a category "both two-year and four-year college" since we could not observe the number of courses taken at each. Hence, the categories (only attended vocational school, only attended two-year college, only attended four-year college, A.A., B.A., graduate, and other degree) are mutually exclusive.

Results using the NLSY are presented in Table 3. The wage results suggest returns for male college dropouts of roughly 7–9 percent for community-college dropouts and a bit more for four-year-college dropouts. The wage results for women suggest very small wage differentials, though annual earnings differentials are more similar to the results found elsewhere. These results are consistent with the finding that community colleges generate positive wage differentials even for those not completing an associate's degree. Therefore, it does not seem to be the case that the experience of the NLS-72 cohort was dramatically different from that of high-school classes graduating more recently.

[14] In fact, if the measurement errors are positively correlated, one would expect the resulting instrumental-variables estimator to be biased in the same direction as the OLS estimator, under assumptions described in Kane and Rouse (1993).

[15] This figure was drawn from the *Digest of Education Statistics, 1985–86* (National Center for Education Statistics, 1986 table 134).

[16] Authors' calculations using the high-school class of 1980 in *High School and Beyond* (U.S. Department of Eudcation, 1986).

TABLE 3—RETURNS TO POSTSECONDARY EDUCATION: OLS RESULTS, NLSY

	Males		Females	
	Dependent variable		Dependent variable	
Independent variable	Log hourly wage	Log annual earnings	Log hourly wage	Log annual earnings
Only attended vocational school (no degree)	0.0421 (0.0283)	0.0726 (0.0383)	0.0035 (0.0289)	0.1102 (0.0449)
Only attended two-year college (no degree)	0.0759 (0.0303)	0.0713 (0.0404)	0.0360 (0.0287)	0.1323 (0.0436)
Only attended four-year college (no degree)	0.0833 (0.0351)	0.1603 (0.0473)	0.0307 (0.0346)	0.0866 (0.0535)
Attended both two- and four-year college (no degree)	0.0880 (0.0404)	0.1340 (0.0538)	0.0543 (0.0386)	0.1266 (0.0578)
A.A. (highest degree)	0.2068 (0.0396)	0.2357 (0.0537)	0.1877 (0.0361)	0.3085 (0.0542)
B.A. (highest degree)	0.3386 (0.0304)	0.4223 (0.0407)	0.3311 (0.0305)	0.5130 (0.0461)
Graduate degree (highest degree)	0.4424 (0.0541)	0.6692 (0.0706)	0.4265 (0.0558)	0.5727 (0.0813)
Other degree (highest degree)	0.0781 (0.0663)	0.1789 (0.0897)	0.3152 (0.0633)	0.3483 (0.0938)
Includes measured ability/ family background?	yes	yes	yes	yes
R^2:	0.3134	0.3452	0.3424	0.3846
Number of observations:	2,271	2,253	2,277	2,119

Notes: Also included in all regressions are an intercept, controls for region and urban area in 1990, a dummy variable indicating employed part-time, a dummy variable indicating missing type of college, age in 1979, race, a supplemental sample dummy, parents' education, an AFQT score, and actual experience (see Data Appendix). The excluded group from the race dummies is not-black, not-Hispanic. The base group for the education effects comprises high-school graduates with no postsecondary education. The base group for parents' education comprises those with no high-school diploma. A complete set of regression results is available from the authors upon request. Variables are defined as follows (all categories are mutually exclusive):

Variable	Definition
Only attended two-year/four-year college	Only attended the one type of institution and earned no degrees
Attended both	Attended both types of colleges but earned no degrees
Only attended vocational school	Attended vocational school, but earned no degree. (Note: This excludes apprenticeships, employer-provided training, and "other" forms of training.) If attended both vocational school and two-year or four-year college, then do not count as having attended vocational school.)
Other degree	Obtained a degree other than a high-school diploma, A.A., B.A., or graduate-school degree as highest degree
A.A.	Obtained an A.A. as highest degree
B.A.	Obtained B.A. as highest degree
Graduate degree	Obtained a graduate degree

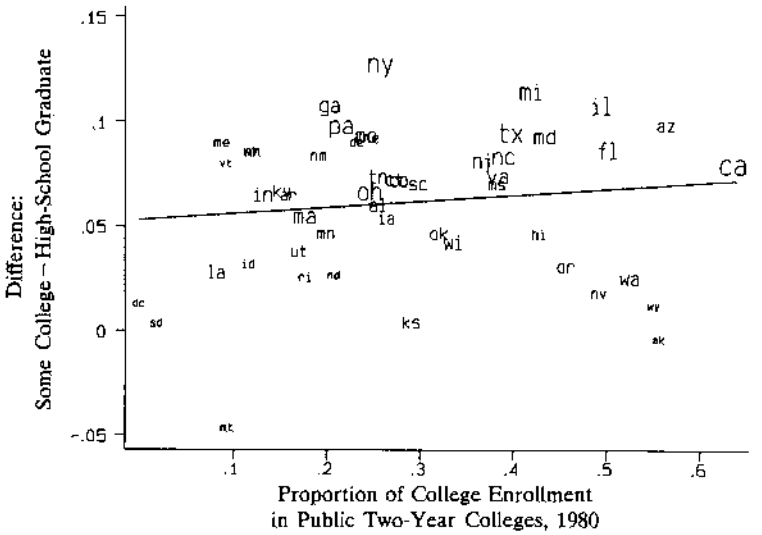

FIGURE 3. WAGE DIFFERENCES FOR INDIVIDUALS WITH SOME COLLEGE BUT NO DEGREE

Note: The plot shows log wage differentials for 25–34-year-old males by state, as estimated using the 5-percent public-use micro-data sample (PUMS) from the 1990 Census of Population and Housing.

D. *Time Series and Cross-Sectional Variation in Two-Year College Attendance and the Payoff to "Some College"*

There has been considerable variation in the mix of two-year and four-year college enrollment across states and over time which might be used to gain some leverage on the issue of relative labor-market returns. First, there is substantial variation in the extent to which state and local governments have built community colleges. One simple approach to evaluating the relative payoffs to community colleges is to compare the payoffs to "some college" in states with large and small community-college enrollments. If the return to community college were substantially below that of four-year college, we would expect that in those states with a higher proportion of two-year-college students, the return to "some college" would be lower. The vertical axis in Figure 3 reports log wage differentials between 25–34-year-olds with "some college" (and no degree) and high-school graduates by state from the 1990 census.[17] The horizontal axis reports the proportion of college students enrolled in community colleges in the state in 1980, roughly the period when these students would have been enrolled in college. We have also included the regression line from a regression of the "some college" payoff on the composition of college enrollments. There is no systematic relationship between the payoffs to some college and the extent of community-college enrollment in the state. In California, the state with the highest proportion of college students enrolled in community college, the payoff to "some college" was 8 percent, which was quite similar to the national average of 7.6 percent.

There has also been time-series variation in community-college enrollment to be ex-

[17]To minimize the effects of cross-state migration, each person was categorized by the state of residence in 1985. These were estimated with single-year age dummies and race/ethnicity dummies. There were 653,083 observations in the full sample.

TABLE 4—AVERAGE ANNUAL SALARY BY EDUCATIONAL ATTAINMENT AND TWO-YEAR-COLLEGE ENROLLMENTS: 1970, 1980, AND 1990, MEN

Ratio	Year		
	1970	1980	1990
(Average income, some college)/(average income, college graduate)	0.83	0.86	0.89
(Total two-year college enrollment)/(total college enrollment 10 years earlier)	0.18[a]	0.27	0.35

Notes: Enrollment figures are from the *Digest of Educational Statistics, 1993* (National Center for Education Statistics, 1993). "Salaries" are annual salaries for men aged 25–34 years. The figures are based upon the authors' calculations using the decennial censuses for 1970 and 1980, from the annual merge file of the Current Population Survey Outgoing Rotation Groups for 1990.

[a]Figure from 1963. It also includes women; enrollments in two-year-college branches of four-year institutions are counted as four-year-college enrollments.

ploited. Community-college enrollment has increased more rapidly than enrollment at four-year colleges over time. Therefore, an increasing proportion of those with "some college" have been educated in community colleges. If the return to a community-college education were substantially lower than that provided by four-year colleges, we would expect to have seen a decline in the payoff to "some college" over the last four decades. In Table 4, we report the ratio of earnings of those with some college to those with four or more years of college using the decennial censuses from 1970 and 1980, and the annual merge file of the outgoing rotation groups from the Current Population Survey for 1990 for men aged 25–34 years old.[18] We also present the percentage of total college enrollments in community colleges ten years earlier when these men would have been attending school. We see that both the proportion of college students enrolled in two-year college and the return to some college relative to four years of college have increased since 1970. Again, there is no aggregate evidence that, as two-year colleges have become more prevalent, the payoff to "some college" has fallen.

IV. Conclusion

It may not be surprising to find similar returns to two-year and four-year college credits, if students decide between the two types of institutions on the margin. Although tuition levels can be quite different, forgone earnings, which represent the bulk of the cost of postsecondary education, are presumably the same once one controls for the ability and background of the students. For instance, in 1975, the average annual earnings of a male 18–24-year-old high-school graduate working full year and full time was $20,845 (1991 dollars). In contrast, the average tuition in 1975–1976 at public two-year institutions was $701, and the average tuition at public four-year institutions was $1,172 (1991 dollars). The full cost of a year of full-time study is, therefore, quite similar at the two types of institutions, despite the differences in tuition levels.

These results come against a backdrop of skepticism regarding the value of a community-college education. Much of this skepticism is due to their high attrition rates. Critics of community colleges might interpret our results as suggesting that the magnitudes of the wage differentials for those completing only a few credits are too small to be economically meaningful. Indeed, as reported in Figure 1, many community-college students complete very few credits. However, it is important to keep in mind two considerations. First, using the cost estimates above, if an individual completes only one semester of schooling (approximately 13 weeks), the cost of college is roughly $5,211 in forgone earnings and $351 in tuition. Thus, the increased earnings for the two-year college student need only compensate

[18]We use the CPS for 1990 to maintain consistency in the measures of educational attainment.

the individual for this difference, at the margin. A simple cost–benefit analysis shows that, over 30 years, the community-college student who completes even only one semester will earn more than enough to compensate him for the cost of the schooling.[19]

Second, we have estimated an *ex post* wage differential. As Yochanan Comay et al. (1973), Manski (1989) and Joseph Altonji (1991) have argued, there may be an "option value" to college entry if students are able to gain more information about the costs and benefits of further investments. When one is uncertain about the prospects of completing college before entry, there will be a value attached to enrolling in order to discover whether one is "college material." The pattern of course-taking in Figure 1, with very high dropout rates early in both two-year and four-year colleges, is consistent with such a view of the demand for education. Those who do not exercise the option of completing college and leave after only a few credits may enjoy only small wage differentials. However, it would be inaccurate to describe college as not having been worthwhile for this group, because the *ex ante* returns may indeed have been large enough to justify the public and the private investments. This insight is particularly important in considering the desirability of such policies as graduation-contingent student aid.

As an increasing proportion of high-school graduates seek to improve their skills in the face of rising wage inequality, the community college is an increasingly vital institution in the U.S. labor market. Roughly 50 percent of those entering college today do so at community colleges (National Center for Education Statistics, 1990). However, even this figure probably understates their importance since community colleges are the port of entry for a disproportionate share of those students most likely to be affected by state and federal financial-aid policies (Manski and Wise, 1983; Rouse, 1994). Despite the increasing importance of the community college as a labor-market institution, the lack of data has resulted in little work in the area. There is a clear need for more data with which to evaluate the economic value of a community-college education.

[19]Assuming an interest rate of 3 percent and a return of 2 percent (one-half of 4 percent) to one semester at a community college, or $417 per year, the male community-college student who completes one semester will earn about $8,000 more over his working lifetime (30 years) than a similar high-school graduate.

Data Appendix

The National Longitudinal Survey of the High School Class of 1972

The National Longitudinal Survey of the High School Class of 1972 (NLS-72) is a longitudinal survey that originally sampled 22,652 seniors from the high-school class of 1972. The respondents were surveyed in the spring of 1972, fall 1973, fall 1974, fall 1976, fall 1979, and winter 1986; the 1986 wave represents a subsample of roughly 60 percent of the original students. In 1984, transcripts were requested from all of the schools that survey participants had reported attending in the first four follow-ups. The Post-secondary Education Transcript Survey, known as PETS, contains roughly 19,000 transcripts on about 14,000 sample members. (Clifford Adelman of the Department of Education was responsible for cleaning the transcript data used in this paper.) The transcripts contain information on all postsecondary schools reported by the students through 1979 and include course credits by field, grades, and any degrees obtained. The survey enjoyed a 94-percent response rate from four-year schools and a 91-percent response rate from two-year schools. Because the response rate for proprietary vocational schools was much lower (43 percent) we are more cautious in interpreting those results (Calvin Jones et al., 1986).

We used several criteria in creating the sample. First, we limited the analysis to those who were working and not self-employed in 1986. The wage data were drawn for one's current or most recent job between 1979 and 1986. Approximately three-quarters of the wages are from 1986, although we converted all wages into 1986 dollars. The annual earnings are the average of reported earnings in 1984 and 1985. Those with zero earnings in either year were excluded. Our results are robust to the exclusion of the self-employed. Second, since we sought a measure of actual work experience, we only included those sample members who participated in all five follow-ups of the survey. We trimmed those with reported hourly wages less than $1.67 (half the minimum wage at the time) and above $60 (roughly the 98th percentile). In working with annual earnings, we only excluded those who reported zero earnings in 1984 or 1985 and those with average annual earnings less than $1,000. We excluded an additional 1,046 individuals for whom any transcript data was missing

because their schools did not return the information or because the schools could not be found. There were 316 others who reported periods of enrollment for which the schools had no record (i.e., the schools responded but reported that such a student had not attended). We did not exclude this last group but included a dummy variable to test whether these "liars" had average wages different from those other high-school graduates. In fact, they did not.

Counting Credits with the PETS

A credit at a school on the quarter system was considered at two-thirds the weight of a semester credit, using a rule of thumb suggested by the Association of Independent Colleges and Universities. In addition, students were given two credits for courses for which no number of credit hours was recorded but for which they had passing grades (2 percent of all college courses) and two credits for courses with neither credits nor grades recorded (0.42 percent of college courses). Failed courses or courses with alphanumeric course grades indicating "Incomplete," "Withdrawn," or "Unsatisfactory" were not counted in the total credits. Courses accompanied by credits but no grades were counted as having been passed (1.5 percent of all courses). The maximum number of credits allowed per course was 12 (0.2 percent of two-year and four-year college courses had more than 12 credits indicated). Transfer courses were not double-counted. In addition, we included dummies for two different categories of degrees. The first is for degrees completed and recorded on an official transcript for a school entered before 1979 and the degree completed by 1984, 12 years after high-school graduation. The second includes self-reported degrees between 1979 and 1986 reported in the fifth follow-up. Those with multiple degrees were classified by their highest degree.

The National Longitudinal Survey of Youth

The National Longitudinal Survey of Youth (NLSY) consists of 12,686 14–21-year-olds in 1979, who have been surveyed every year since 1979, and most recently in 1990. In 1990, 82 percent of the original respondents were sampled. We ignored members of the special military subsample (1,269 observations), those who had not participated in all waves of the survey (2,658 people), and those who were enrolled in school in 1990 (581 people). We got similar results from selecting individuals whose primary activity had been working for the past two years and those who had not been enrolled in the past year and from not selecting based on either schooling or work. The measure of ability reported in the survey is the military's ASVAB test of skills which was administered to all of the respondents in 1980. From these tests we constructed an AFQT score, a linear combination of the arithmetic reasoning, word knowledge, paragraph completion, and numerical operation tests. Because participants were of different ages in 1980, we adjust the score for age by regressing the raw score on age dummies and using the residual.

In constructing the NLSY sample, we imitated our NLS-72 sample to the extent possible. Thus, our sample consists of high-school graduates who were working and not self-employed in 1990. (About 5 percent of the sample was self-employed [636 persons], although our results are not sensitive to their exclusion.) We excluded those with hourly wages below $1.67 (half the minimum wage until April 1, 1990) or over $72 in current dollars ($72 in 1990 is equivalent to $60 in 1986, the wage criterion we used in the NLS-72). To construct a measure of actual experience, we used total weeks worked in each year since 1975. If a respondent missed one survey, we imputed weeks worked only if she had worked in the preceding and proceeding years. The effect of our imputation is mainly to decrease standard errors, with little effect on coefficients. Finally, 87 people either reported attending college or having completed 13 or more years of schooling but did not identify a college type. We include a dummy variable to identify them.

Samples for Comparing NLS-72, NLSY, and CPS

The NLS-72 estimates use actual (i.e., from transcripts) years of schooling completed in any school entered before 1979. Those with associate's, bachelor's, master's, and Ph.D. or M.D. degrees were assigned 14, 16, 18, and 20 years of schooling, respectively. For those without degrees, years of schooling were determined by the number of credits actually completed (30 credits equals one year, a rule of thumb suggested in the Current Population Survey interviewer's manual). Both data sets use measures of actual rather than potential experience (age − years of education − 6). The CPS estimates derive from the annual merge file of the outgoing rotation groups. The sample included full-time, non-self-employed workers aged 25–35 who earned at least half of the minimum wage in the relevant year. Top-coded earnings were multiplied by 1.45.

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