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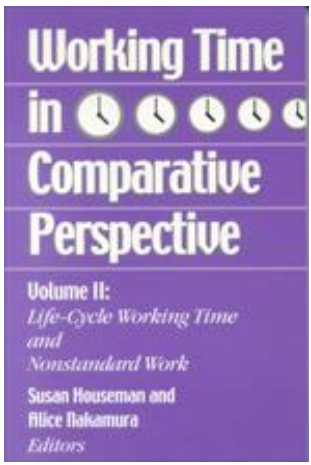

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Adults Returning to School—Payoffs from Studying at a Community College

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In his well-known survey article, Willis (1986, p. 526) pointed out that as an empirical tool, the Mincer human capital earnings function is one of the great success stories of modern labor economics. As he noted, the Mincer earnings function has been used in hundreds of studies using data from virtually every historical period and country for which suitable data exist. The great advantage of the Mincer earnings function is that, with a few simplifying assumptions, the internal rate of return to education can be estimated from cross-section data limited to information on current earnings of those in the labor force, their age, and their years of schooling. One of these simplifying assumptions is that individuals complete their schooling early in their lifetimes and only then enter the labor force, the state in which they remain until retirement.[1]

Accumulating evidence indicates, contrary to this Mincerian assumption, that the work and schooling patterns of U.S. workers are such that schooling investments no longer necessarily occur early in life. An early article by Corman (1983) showed for the 1970s that a growing proportion of postsecondary students were older than the traditional college ages of 18 to 22. Moreover, an increasing number of these older students enrolled in nondegree programs at postsecondary vocational schools. More recently, several studies have appeared demonstrating the empirical significance of nontraditional schooling patterns (see Light 1995; Oettinger 1995; and Leigh and Gill 1997). Using the National Longitudinal Survey of Youth (NLSY), all three of

these studies indicate that school enrollment histories are frequently characterized by lengthy interruptions in attendance. For example, Light reports that 35 percent of white males who left school for the first time between 1979 and 1988 returned to school before 1989.

Another strand of the education literature makes it clear that community colleges, rather than vocational schools, have become the major alternative to four-year colleges in meeting society's demand for postsecondary education and training.[2] Labor economists and policymakers' interest in community colleges has recently been stimulated by a widely cited working paper by Kane and Rouse (1993). (The published version of this paper is Kane and Rouse 1995a.) Using data from the National Longitudinal Survey of the Class of 1972 (NLS72), as well as the NLSY, their study provides evidence of a substantial return to college credits, whether provided by a two- or four-year college and whether the credits lead to a degree or not. The Kane-Rouse study does not, however, address the issue of nontraditional schooling patterns. Specifically, they do not distinguish between returning adults and continuing high school graduates in estimating the earnings effects of postsecondary education. Leigh and Gill (1997) made this distinction and find that returns to community college training are positive and of essentially the same size for returning adults as they are for continuing students. Among males, in fact, returning adults enjoy an earnings increment from nondegree community college programs above that received by comparable continuing students.

One explanation of differential returns to alternative groups of people possessing the same level of education is that individuals in the two groups made different choices regarding their major field of study. At the level of four-year educational institutions, there is considerable evidence that the returns to college vary widely by major field (Altonji 1993; Berger 1988; Grogger and Eide 1995; James et al. 1989; and Rumberger and Thomas 1993). Grogger and Eide, for example, showed that a substantial portion of the rising college wage premium observed during the 1980s can be attributed to the decisions of college students to select more financially remunerative majors.

Differential returns to alternative fields of study have attracted much less attention at the community college level. In one of the few available empirical studies, Jacobson, LaLonde, and Sullivan (1997) examined a large sample of displaced workers in their mid thirties who

participated in a classroom program operated at a community college located in Allegheny County, Pennsylvania. This study suggested that there is a good deal of variation in the returns to what the authors term "hard" and "easy" classes.[3] The authors found that there is no gain for completing easy courses, while substantial labor market returns are enjoyed by those who make it through hard courses. In a second empirical study, Grubb (1992) showed using NLS72 data that substantial variation in annual earnings exists by field of study at two-year institutions and proprietary schools. Once work experience has been controlled for, however, most of the positive earnings impacts disappear, leading him to question why individuals choose to enroll in these postsecondary institutions.

It is interesting to note that Grubb's results in his 1992 paper and in a closely related 1993 paper are in direct conflict with evidence presented by Kane and Rouse (1993) in their analysis of NLS72 data. Recently, Kane and Rouse (1995b) reexamined Grubb's NLS72 sample finding, after correcting for the mislabeling and mismeasurement of several key variables, that both men and women who attended a two-year college earn more than comparable high school graduates, whether or not they completed the degree. Moreover, these positive labor market effects remain even after controlling for labor market experience.

Using NLSY data, we examine the payoffs to returning adults from studying at a community college. Our objectives are twofold. First, we seek to establish whether returning adults differ from continuing high school graduates in terms of the field-of-study choices they make. An important element of this aspect of our analysis is investigating gender differences in community college field of study. Second, we estimate the earnings effect of community college schooling for returning adults as opposed to continuing students, exploring how these effects vary by major field of study and demographic characteristics including gender.

THE DATA

Kane and Rouse (1993) developed a useful hierarchy for organizing the detailed information on postsecondary education programs

available in the NLSY. Following their empirical strategy, we first establish whether a respondent has completed a postsecondary degree. Working backward from 1991, we record the highest degree reported. Thus an individual who had earned an Associate of Arts (AA) degree and later a Bachelor of Arts (BA) degree would be classified as a BA degree holder. Next, respondents without postsecondary degrees are classified by the type of college they attended; that is, a two- or four-year institution. Again, it is the most recent college attended that takes precedence. Finally, individuals for whom we could not assign a highest degree or a postsecondary educational institution attended were checked for participation in an occupational training program, excluding regular school programs. This question appears in the training (as opposed to the regular schooling) section of each questionnaire, and a number of possible sources of occupational training are listed. Following the classification scheme of Kane and Rouse, we classify respondents by whether or not they attended an occupational training program in a vocational or technical institute. A summary of these variable definitions appears in Table 1.

Table 1 Definitions of Postsecondary Education Variables

Variable[a]	Definition
Highest degree	
AA	Obtained an AA degree
BA	Obtained a BA or BS degree
Graduate degree	Obtained an MA, Ph.D., or professional degree
Other	Most recent college attended is a two-year institution and earned no degree
Most recent college attended	
Two-year	Most recent college attended is a two-year institution and earned no degree
Four-year	Most recent college attended is a four-year institution and earned no degree
Voc/tech	Attended a vocational or technical institute occupational training program but did not attend college. (Note: This excludes apprenticeships, correspondence courses, and other forms of training.)

[a] Categories are mutually exclusive.

To make our results comparable to those of Kane and Rouse, we impose the following restrictions on our NLSY sample:

1) Respondents must have been working but not self-employed in 1993.

2) Respondents must not have been enrolled in school in 1993.

3) Respondents must have participated in all waves of the survey.

4) Respondents must have reported a l993 hourly wage rate of between $1.67 and $100.

The third restriction allows us to easily construct a measure of actual work experience. Restriction 4 has the effect of trimming from the sample a handful of respondents who reported extremely high or low wage rates. These restrictions result in a total sample of 5,015 respondents. Note that we do not restrict from our sample high school dropouts.

Since we are interested in distinguishing postsecondary educational enrollment of returning adults as opposed to continuing high school students, it is crucial for us to determine the timing of the variables specified in Table 1. NLSY data provide information on the year the highest degree was obtained, the year the most recent educational institution (two- and four-year) was attended, and the last year training in a voc/tech institution was received. Using this information, we can calculate the age at which a respondent obtained his or her highest degree, last attended college, or was last enrolled in a voc/tech. Table 2 presents frequency distributions for the age at which respondents earned an AA or BA degree, most recently attended a two-year college, or last attended a voc/tech.

To better understand how these frequency distributions were calculated, it may be useful to focus on the distributions shown in columns 1 and 4 for AA and BA degree holders, respectively. (Age of two-year college attendance and of voc/tech enrollment are constructed in the same manner.) Letting AGEDEG represent the age at which the highest postsecondary degree was awarded,

$$AGEDEG = YRDEG - 79 + AGE79,$$

Table 2 Percentage Distributions of Age at which Respondents Received an AA or BA Degree, Last Attended a Two-Year College, or Last Participated in a Voc/Tech Program

	Postsecondary education variables					
	1	2	3	4	5	6
Age	AA degree	Two-year college	Voc/tech	BA degree	Grad degree	BA returnees
<18	0.3	1.8	9.6	0.1	--	--
18	1.8	9.1	11.0	0.3	0.5	--
19	13.3	15.5	8.9	0.2	--	--
20	15.9	10.5	7.5	1.2	0.5	3.2
21	14.1	8.5	6.8	30.7	0.0	1.6
22	9.7	7.2	6.4	27.4	4.9	6.4
23	8.9	6.7	5.5	16.4	6.9	6.5
24	5.4	5.6	7.8	8.0	12.2	8.1
25	6.1	7.5	6.2	4.1	18.6	14.5
26	4.6	6.8	6.2	3.5	10.3	11.3
27	6.4	4.2	6.4	3.1	16.7	16.1
28	3.8	2.9	5.9	1.6	13.2	6.5
29	2.0	3.4	4.3	1.2	5.9	8.1
30+	7.7	10.3	7.5	2.2	10.3	17.7
N	391	789	438	835	204	62
% of total sample	(7.8)	(15.7)	(8.7)	(16.7)	(4.1)	(1.2)

NOTE: The sample includes respondents working but not self-employed in 1993, excludes those enrolled in school in 1993, includes those who participated in all waves of the survey, and includes those reporting a 1993 hourly wage rate of between $1.67 and $100 ($N = 5,000$).

where YRDEG is the year the respondent reported his or her highest degree was awarded, and AGE79 is the respondent's age in 1979. The distribution presented in column 1 is specific to respondents who reported that their highest degree is the AA, and column 4 is specific to BA degree holders. Overall, nearly 8 percent and 17 percent, respectively, of the sample possess AA and BA degrees, another nearly 16

percent attended a community college, and an additional almost 9 percent were enrolled in a voc/tech. Across all seven of the postsecondary education variables defined in Table 1, we were unable to calculate AGEDEG for just 15 individuals. Thus our analysis is based on a sample of 5,000 respondents.

Our main interest in presenting Table 2 is to gain insight into the number of respondents represented in the table who can reasonably be interpreted as returning adults as opposed to continuing high school students. Looking specifically at community college attendance in columns 1 and 2, the central tendency of the distributions is, as expected, at about age 20 for the AA degree and at about age 19 for two-year college students. Nevertheless, there are a considerable number of students in their mid twenties and older who returned to school at a community college and earned the AA. The particular age chosen to distinguish returning adults from continuing students is inevitably somewhat arbitrary.[4] However, it seems reasonable to follow Corman (1983) in choosing an age threshold of 25, since such a threshold would allow an individual who graduated from high school at 18 to accumulate four or five years of work experience before enrolling in a community college and graduating with an AA degree at 25. Using age 25 as our threshold, about 31 percent of AA degree holders and 35 percent of two-year college students are classified as returning adults. Indeed, fully 10 percent of two-year college students are in their thirties. In column 3, about 37 percent of voc/tech students are classified as returning adults, while just 16 percent of BA degrees in column 4 were earned by respondents we classify as returning adults.

The last two columns of Table 2 examine the quantitative importance of two often-heard statements, namely, that large numbers of "mid career" students obtain advanced and professional university degrees at older ages, and that many BA degree holders return to local community colleges to enroll in nondegree vocational programs. Column 5 indicates that about 4 percent of our sample earned graduate or professional degrees. Of these individuals, just 10 percent are 30 years of age or older when they received their degree. The central tendency of the distribution seems to be at about age 25 or 26, indicating, at least for our sample, that it is fairly uncommon for college graduates with substantial labor market experience to return to school to study for an advanced or professional degree. Column 6 suggests that it is even less

common for BA degree holders to subsequently enroll in a two-year college program.

Stratifying the data by gender, Table 3 compares community college field-of-study choices made by returning adults and continuing high school students. Represented in the table are all AA recipients and enrollees in nondegree two-year college programs in our sample. Table 2 indicates that a total of 1,180 respondents are either AA degree holders or two-year college attendees. The sample size reported in Table 3 is slightly smaller at 1,110 respondents because we were unable to assign a field of study to 70 individuals.[5] It is also worth noting that although males outnumber females in the total sample of 5,000 respondents (2,555 males vs. 2,445 females), females are considerably more likely than males (25.8 percent versus 19.4 percent) to enroll in a community college.

Aggregating the NLSY codes for detailed fields of study at postsecondary educational institutions, the fields of study we distinguish in Table 3 are the following:

- business and management,
- nursing,

Table 3 Distributions of Field Study of AA Degree Recipients and Two-Year College Attendees, by Gender, Age of Threshold of 25 and Older

	Males			Females		
Field of study	All	Continuing students	Returning adults	All	Continuing students	Returning adults
Business	0.209	0.217	0.194	0.325	0.357	0.268
Nursing	0.012	0.012	0.012	0.119	0.116	0.125
Health professions/ physical sciences	0.070	0.058	0.094	0.124	0.111	0.147
Engineering/ computer science	0.320	0.299	0.363	0.117	0.111	0.130
Education	0.047	0.046	0.050	0.080	0.063	0.112
Social science/ public service	0.094	0.088	0.106	0.064	0.065	0.063
Letters, humanities, and other	0.248	0.281	0.181	0.170	0.178	0.156
N	488	328	160	622	398	224

- health professions (excluding nursing), physical sciences, and agricultural and natural resources,
- engineering, computer and information sciences, mathematics, and architecture and environmental design,
- education,
- social sciences, psychology, and public affairs and services, and
- letters, area studies, communications, fine and applied arts, foreign languages, home economics, law, theology, and interdisciplinary studies.

At the community college level, the fields of study health professions/physical sciences and engineering/computer science correspond, respectively, to science technology and engineering technology education. These two fields warrant special notice in view of a National Science Foundation program—the Advance Technological Education program—designed to promote curriculum development and program improvement for technician training in the application of advanced technologies. In a recent NSF report that is part of this program, Burton and Celebuski (1995) discussed the important role of community colleges in contributing to the nation's resources in science and engineering. As they suggested, two-year colleges ". . . take seriously their service to the community by offering courses designed to help the workforce upgrade and renew job skills and [to help] others to pursue lifelong learning."[6] The authors also pointed out an interesting contrast between the time trends in degrees earned and in course enrollment for the two technology programs. For the 1989–1992 period, while the number of engineering technology associate degrees awarded fell and science technology degrees flattened out, course enrollment in engineering technology and science technology programs increased by 11 percent and 30 percent, respectively. Their interpretation of this evidence is that community college students are enrolling in courses to obtain specific course work rather than an AA degree.

In Table 3, nearly one-third of males in our community college subsample indicate an engineering/computer science field of study. The next most popular field at about 21 percent is business, with about 7 percent of the sample emphasizing course work in the health professions/physical sciences (excluding nursing). Among women, the most

popular field of study by far is business, at about one-third of the subsample. Approximately 12 percent of female respondents is found in each of three fields including nursing, health professions/physical sciences, and engineering/computer science. Differences by gender in choice of field of study also show up in data for four-year institutions. Rumberger and Thomas (1993) reported for the 1985–1986 period that the most popular college majors of employed male BA recipients are, in descending order, business, science/mathematics, and engineering. In contrast, the top three majors for employed female BA holders are health professions, education, and business.

Making the returning adult/continuing student distinction, the major difference shown for males in Table 3 is that returning adults are 10 percentage points less likely than continuing students to have enrolled in course work in the letters, humanities, and other category. The bulk of this difference is explained by a more than 6 percentage point greater representation of returning adults in engineering/computer science. One interpretation of this evidence is that male returning adults are more interested, relative to male continuing students, in fields of study that have immediate application in the labor market. For females, returning adults are seen to be about 9 percentage points less likely to be studying business courses than continuing students. On the other hand, female returning adults are about 5 percentage points and 4 percentage points, respectively, more likely to report as their field of study education and health professions/physical sciences.

ESTIMATED RETURNS

Using an age threshold like age 25, our empirical strategy for estimating the labor market payoffs to postsecondary education programs is to define a dummy variable ADULT representing returning adults. This variable is then interacted with the education variables in an earnings regression with which we can estimate the payoffs to postsecondary education programs for returning adults as distinct from continuing students. To simplify the discussion, suppose that we collapse the postsecondary education outcomes into a composite variable called POSTSEC. Our regression framework would thus look as follows:

(1) $\ln W = a_1 + a_2\text{POSTSEC} + a_3(\text{POSTSEC} \times \text{ADULT}) + a_4\boldsymbol{X} + u,$

where W is a measure of earnings, $\boldsymbol{X}$ is a vector of control variables, and u is a disturbance term. Controlling for factors expected to affect earnings in $\boldsymbol{X}$, a_1 is our estimate of the return to postsecondary education for continuing high school graduates, while a_2 measures how this payoff may differ for returning adults.

Columns 1 and 4 of Table 4, which is taken from our companion paper (Leigh and Gill 1997), report return estimates to alternative types of postsecondary education in terms of the hourly wage rate and annual earnings measured as of 1993. Following the specification of Kane and Rouse (1993), control variables in the regressions include age in 1979, race/ethnicity, actual weeks worked, weeks worked squared, Armed Forces Qualification Test score, region and urban residence in 1993, and part-time employment in 1993. Because we do not restrict our sample to high school graduates, we also include a dummy variable measuring less than 12 years of schooling.

As noted in the first section, a key finding presented by Kane and Rouse (1993) is that community college programs generate positive wage differentials, even for those not completing an AA degree. In Table 4 this result shows up strongly for men and somewhat less strongly for women. Relative to high school graduates, estimated differentials for males enrolled in two-year college programs are seen to be 10.2 percent and 18.9 percent, respectively, measured in terms of hourly wages and annual earnings. The two-year nondegree point estimates for women are lower at 5.7 percent and 4.4 percent, although return estimates to AA degrees are higher for women than for men. Also apparent in the table is confirmation of the Kane-Rouse finding that enrollees at two- and four-year colleges who did not earn degrees fared about equally well in the labor market.[7]

Following the empirical strategy laid out in Eq. 1, columns 2 and 3 and columns 5 and 6 of Table 4 present for hourly wages and annual earnings, respectively, estimates of the returns to education for continuing students and the increments in these returns, which may be either positive or negative, for returning adults. The age threshold distinguishing returning adults in these results is receipt of degree or most recent postsecondary school attendance at an age not younger than 25. Beginning with males, a glance down columns 3 and 6 indicates as

Table 4 Returns to Selected Categories of Postsecondary Education, by Gender, Age Threshold of 25 and Older[a,b]

	Col. 1	2	3	4	5	6
	Log hourly wage			Log annual earnings		
Explanatory variables	All	Continuing students	ADULT increment	All	Continuing students	ADULT increment
Males						
Highest degree						
AA	0.200**	0.209**	–0.028	0.218**	0.198**	0.071
	(0.036)	(0.042)	(0.070)	(0.055)	(0.063)	(0.105)
BA	0.311**	0.354**	–0.137**	0.440**	0.464**	–0.140*
	(0.029)	(0.031)	(0.055)	(0.044)	(0.046)	(0.083)
Most recent college						
Two-year	0.102**	0.075**	0.084*	0.189**	0.157**	0.101
	(0.027)	(0.031)	(0.046)	(0.041)	(0.047)	(0.070)
Four-year	0.103**	0.136**	–0.110**	0.075**	0.226**	–0.168**
	(0.031)	(0.035)	(0.056)	(0.047)	(0.053)	(0.084)
Voc/tech	0.035	0.011	0.072	0.108**	0.099*	0.028
	(0.029)	(0.034)	(0.054)	(0.045)	(0.053)	(0.084)
Adj. R^2	0.339	0.342		0.325	0.327	
N	2,555	2,555		2,446	2,446	

Females						
Highest degree						
AA	0.243**	0.235**	0.026	0.263**	0.228**	0.083
	(0.031)	(0.035)	(0.055)	(0.057)	(0.065)	(0.101)
BA	0.336**	0.320**	0.100*	0.407**	0.380**	0.170*
	(0.028)	(0.030)	(0.053)	(0.051)	(0.054)	(0.094)
Most recent college						
Two-year	0.057**	0.051*	0.015	0.044	0.054	–0.023
	(0.025)	(0.029)	(0.038)	(0.046)	(0.053)	(0.071)
Four-year	0.073**	0.063**	0.037	0.007	0.009	0.000
	(0.028)	(0.032)	(0.050)	(0.052)	(0.059)	(0.090)
Voc/tech	–0.013	–0.004	–0.025	–0.003	0.032	–0.090
	(0.032)	(0.041)	(0.059)	(0.060)	(0.075)	(0.110)
Adj. R^2	0.406	0.406		0.413	0.413	
N	2,445	2,445		2,311	2,311	

[a] Control variables included in the regressions are race/ethnicity, age in 1979, total weeks worked, weeks worked squared, AFQT score, and dummy variables for 1993 residence classified by region and urban/rural, high school dropout, and part-time employment in 1993. Graduate degree and other postsecondary degree are also included.

[b] ** indicates significance at the 5% level; * indicates significance at the 10% level Standard errors are in parentheses.

many negative adult increment estimates as positive estimates. The positive estimates appear for AA degrees and two-year college programs. In particular, incremental effects of two-year college programs of 8.4 percent and 10.1 percent, respectively, are reported in the hourly wage and annual earnings equations. That is, a nondegree community college program boosts earnings for returning adult males by 8 to 10 percent more than it does for male continuing students. In contrast, there is little evidence of a positive additional effect for returning adult males of an AA degree. Estimated adult increments are uniformly negative (and statistically significant) for BA degree holders and enrollees in four-year college programs.

A note of caution is worth mentioning in connection with our estimated returns to a BA degree and potentially also to attendance at a four-year college. While Table 2 shows that receipt of a BA is concentrated at the ages of 21 and 22, it is certainly possible that at least some older BA degree recipients we classify as returning adults are really continuing students who took longer than normal to complete their degree requirements. For example, a respondent receiving a BA at age 25, rather than being a returning adult, might be a continuing student who needed seven or eight years to complete the degree because he or she was only able to attend college on a part-time basis. The problem of misclassifying returning adults is less of an issue for community college students because of the shorter length of their programs.[8]

Turning to females, with one exception the ADULT increment estimates are small and/or statistically insignificant. The exception is receipt of a BA degree. In contrast to the results for men, completion of a BA is estimated to increase the wages of returning adult females by 10 percent and annual earnings by 17 percent relative to the wages and earnings of continuing students.[9]

The positive incremental effect we estimate for returning adult males enrolled in nondegree two-year programs might be due to 1) older males choosing in greater numbers to study more remunerative fields, or 2) older males enjoying a larger payoff to the same fields of study compared to younger males. We considered the first of these possibilities in Table 3. Turning to the second, Tables 5 and 6 report estimated returns to community college fields of study for males and females, respectively. In Table 5, for example, all the male observations in our sample are used in estimation except for a small number of

Table 5 Returns to Community College Fields of Study for Males, Age Threshold of 25 and Older[a,b]

	Log hourly wage			Log annual earnings		
Field of study	All	Continuing students	ADULT increment	All	Continuing students	ADULT increment
Business	0.123***	0.112**	0.039	0.193**	0.142*	0.162
	(0.044)	(0.051)	(0.088)	(0.067)	(0.079)	(0.132)
Health/science, incl. nursing	0.112*	0.273**	–0.379**	0.062	0.221*	–0.385*
	(0.067)	(0.087)	(0.131)	(0.100)	(0.129)	(0.197)
Engineering/computer science	0.171**	0.129**	0.115*	0.237**	0.208**	0.082
	(0.038)	(0.045)	(0.068)	(0.056)	(0.067)	(0.102)
Education	0.069	0.070	–0.001	0.116	0.084	0.090
	(0.087)	(0.107)	(0.179)	(0.132)	(0.164)	(0.269)
Social science/public service	0.150**	0.109	0.112	0.273**	0.212*	0.165
	(0.063)	(0.078)	(0.125)	(0.093)	(0.115)	(0.185)
Letters, humanities, and other	0.095**	0.070	0.105	0.156**	0.125*	0.137
	(0.041)	(0.046)	(0.087)	(0.061)	(0.068)	(0.131)
Mean dep. var.	2.401	2.401		10.040	10.040	
Adj. R^2	0.339	0.341		0.328	0.329	
N	2,521	2,521		2,413	2,413	

[a] Included in the regressions, in addition to the control variables specified in the note to Table 4, are BA degree, four-year college, graduate degree, other degree, and voc/tech.

[b] **indicates significance at the 5% level; *indicates ignificance at the 10% level. Standard errors are in parentheses.

Table 6 Returns to Community College Fields of Study for Females, Age Threshold of 25 and Older[a,b]

	Log hourly wage			Log annual earnings		
Field of study	All	Continuing students	ADULT increment	All	Continuing students	ADULT increments
Business	0.064**	0.068*	–0.013	0.103*	0.103	0.001
	(0.032)	(0.036)	(0.059	(0.059)	(0.067)	(0.110)
Nursing	0.276**	0.263**	0.035	0.381**	0.348**	0.085
	(0.048)	(0.059)	(0.092)	(0.088)	(0.110)	(0.169)
Health/science	0.181**	0.222**	–0.094	–0.005	0.003	–0.017
	(0.047)	(0.061)	(0.089)	(0.086)	(0.111)	(0.162)
Engineering/computer science	0.085*	0.112*	–0.068	0.086	0.124	–0.097
	(0.048)	(0.060)	(0.092)	(0.090)	(0.113)	(0.173)
Education	0.126**	0.039	0.174	0.088	0.023	0.129
	(0.057)	(0.079)	(0.109)	(0.104)	(0.144)	(0.199)
Social science/public service	0.099	0.085	0.039	0.164	0.056	0.287
	(0.063)	(0.077)	(0.128)	(0.117)	(0.147)	(0.233)
Letters, humanities, and other	0.058	0.059	–0.004	–0.026	0.032	–0.178
	(0.041)	(0.049)	(0.080)	(0.075)	(0.089)	(0.146)
Mean dep. var.	2.220	2.220		9.646	9.646	
Adj. R^2	0.403	0.402		0.413	0.413	
N	2,409	2,409		2,277	2,277	

[a] Included in the regressions, in addition to the control variables specified in the note to Table 4, are BA degree, four-year college, graduate degree, other degree, and voc/tech.

[b] ** indicates significance at the 5% level; * indicates significance at the 10% level. Standard errors are in parentheses.

males who attended a community college but failed to report a field of study. The regressions estimated are the same as those in Table 4 except that separate field-of-study variables measured for all AA degree and two-year college respondents are used in place of the AA and two-year college variables. The reference category is, as before, high school graduates.

For males in Table 5, all of the return estimates are positive, as expected, in both the wage and annual earnings equations. However, there are sizable differences in returns across fields. (Note that for males, nursing is included in the health professions/physical sciences category.) Point estimates in the wage regression range from a low of 6.9 percent for education to highs of 15.0 percent for social science/public service and 17.1 percent for engineering/computer science. Even greater variation is exhibited for annual earnings, with point estimates ranging from 6.2 percent for health professions/physical sciences to 23.7 percent for engineering/computer science and 27.3 percent for social science/public service.

Compared with males, the female estimates in Table 6 tend to be lower at the low end and higher at the high end. In the wage equation, for example, estimates range from 5.8 percent for the letters, humanities, and other category up to 27.6 percent for nursing. Nursing has an even larger return estimate of 38.1 percent in the annual earnings equation.

Comparing these return estimates with the field-of-study decisions reflected in Table 3, the evidence, at least for males, is consistent with our earlier speculation that returning adults may be more sensitive to market wage differentials in making their career training decisions than are continuing students. The relatively low-wage field of letters, humanities, and other is the choice of a lower percentage of returning adult males than male continuing students, while the high-wage engineering/computer science field attracts a relatively high percentage of returning adult males.

We might also briefly compare the variation exhibited in these community college return estimates to variation in returns calculated for four-year institutions. Holding constant a variety of demographic, labor market, and other variables, Rumberger and Thomas (1993) report that starting annual salaries of males majoring in engineering or in a health-related field—the highest-paying of the seven fields they

examine—are over one-third higher than starting salaries for male humanities graduates (their reference category). Consistent with our community college findings, the variation in returns to BA degrees appears to be greater for females than males. Rumberger and Thomas report that female engineering and health profession majors command starting salaries that are over 40 percent higher than the salaries of female humanities majors.

A final result to note in Tables 5 and 6 draws on the returning adult/continuing student distinction. Large standard errors lead to estimated adult increments that for women are uniformly not significantly different from zero at customary significance levels. This evidence is consistent with our Table 4 finding for females that neither an AA degree nor a two-year nondegree program provides an additional return to returning adults above that received by continuing students. For males, we estimate statistically significant adult increments, of opposite signs, for engineering/computer science and health professions/physical sciences. The large negative estimates for health professions/physical sciences in both the wage and the earnings regressions appear to be an anomaly associated, at least in part, with the very low wages and annual earnings of just two returning adult males with nursing training whose earnings strongly influence the coefficient estimates because of a small cell size. The more reliable result is the positive 11.5 percent increment in wages we obtain for returning adult males with training in engineering/computer science. Recalling the estimated returns presented in Table 4, it appears that the incremental effect of 8 to 10 percent reported there for returning adult males in two-year programs is associated with a disproportionate representation of returning adults in engineering/ computer science coupled with a statistically significant incremental effect, at least for wages, of engineering/computer science.

For all male community college enrollees (both AA recipients and nondegree two-year program attendees), Table 7 presents the results of a decomposition analysis intended to measure the extent to which differences in wages between returning adults and continuing students are due to differences in choice of major field of study versus differences in the returns to any selected major. The column 1 differences in major field are based on Table 3, while the differences in returns to alternative majors shown in column 2 make use of the adult increments reported in Table 5. Table 7 makes it clear that the positive wage differential

Table 7 Decomposition of the Effects of Community College Field of Study on the Wages of Male Returning Adults and Continuing Students

Field of study	Differences in choice of field[a]	Differences in returns[b]	Total
Business	–0.003	0.008	0.005
Health/science, including nursing	0.010	–0.040	–0.030
Engineering/computer science	0.008	0.042	0.050
Education	0.000	0.000	0.000
Social science/public service	0.002	0.012	0.014
Letters, humanities, and other	–0.007	0.019	0.012
Total[c]	0.011	0.040	0.051

[a] Weighted by coefficients estimated for continuing students.
[b] Weighted by field-of-study choices made by returning adults.
[c] Totals may be off due to rounding.

enjoyed by returning adult males who attended a community college is largely driven by a favorable difference in returns estimated for training in engineering/computer science.

CONCLUSION

Using NLSY data through 1993 (when respondents were between 28 and 35 years of age), this study examined the payoffs to studying at a community college, looking specifically at choices among and the returns to different fields of study for returning adult students as opposed to continuing high school graduates. We report that it is not uncommon for respondents in their mid twenties or even thirties to return to school in a community college program. Among community college students, NLSY data allow us to distinguish between AA degree recipients and those who attended a community college program but did not receive an AA.

Our results indicate, not surprisingly, that both male and female community college attendees earn at least as much as comparable high

school graduates regardless of their field of study. The size of the earnings premium varies substantially by field of study, however, with engineering/computer science and social science/public service the highest paying fields for men, and nursing the highest paying field for women. Looking at the distributions of respondents by field of study, there are substantial differences between men and women and between returning adults and continuing students. A question that is yet to be answered is explaining the greater propensity of women to enroll in community colleges.

Comparing the field-of-study distributions with our estimated earnings premiums, there is evidence, particularly for men, that returning adults are more sensitive to market wage differentials in making career training decisions than are continuing students. Especially noteworthy are the findings for engineering/computer science, the field of study distinguished in NLSY data that corresponds to community college engineering technology programs. We find that 1) engineering/computer science attracts a relatively high percentage of returning adults compared to continuing students, and 2) returning adults in engineering/computer science programs command an 11.5 percent wage premium relative to comparable continuing students. Thus our earlier result (Leigh and Gill 1997) indicating an incremental earnings effect of 8 to 10 percent from two-year nondegree programs seems to be associated with both more-than-proportionate enrollment of older adult males in the relatively high paying field of engineering/computer science and a higher return to returning adults from engineer/computer science programs. This finding is consistent with Burton and Celebuski's (1995) evidence that students in engineering technology programs are increasingly enrolling in courses to obtain some specific course work rather than an AA degree. Further research is needed to determine whether the incremental earnings effect for returning adult males enrolling in engineering technology programs can be accounted for by their greater participation in nondegree short courses and customized technical courses developed by community colleges to meet the particular skill requirements of local employers.

Notes

The comments of our discussant, Shelly Lundberg, are gratefully acknowledged. Susan Houseman also provided us with a number of helpful comments.

1. The other assumptions are that the only cost of schooling is foregone earnings, and that the length of each individual's working life is independent of his or her years of education.
2. Kane and Rouse (1995a) pointed out that community colleges currently enroll more than half of first-time, first-year postsecondary school students, and an even larger share of those whose decisions to attend college are affected by state and federal financial aid programs. Grubb (1991) and Osterman and Batt (1993) documented the long-term shift in emphasis from academic to vocational programs within community college systems, making them natural subcontractors for government-sponsored retraining programs.
3. Hard classes are defined as academic math and science courses and as vocational courses in nursing, other health-related fields, trades and repair, and computer information systems. All other vocational and academic courses are classified as easy courses.
4. In our companion paper (Leigh and Gill 1997), we experimented with different threshold ages and with an alternative approach to making the returning adult/continuing student distinction based on a gap in continuous school enrollment.
5. In the NLSY, field of study is asked in a sequence of questions providing detail about the respondent's two- and four-year college program rather than about his or her highest degree. Hence, there is not perfect matching between the available information on highest degree and college field of study.
6. Burton and Celebuski (1995) also mentioned that community colleges 1) support a diversity of learning objectives, including remedial courses that prepare students for further career-oriented training as well as courses for transfer to four-year institutions; and 2) provide access to higher education for many who might otherwise not have the opportunity, including large numbers of minority and female students.
7. An apparent anomaly in the female earnings regression in column 4 is the small and statistically insignificant return estimates for two-year and especially for four-year college programs. We find that our annual earnings estimates are quite sensitive to the inclusion of female respondents with very low annual earnings. Imposing a lower bound restriction of just $1,500 per year, for example, raises our estimates to 6.1 percent (from 4.4 percent) and 8.1 percent (from 0.7 percent), respectively, for two- and four-year colleges. These coefficient estimates are also statistically significant.
8. Distinguishing returning adults from continuing high school students by a gap in continuity of schooling rather than AGEDEG, we reported in Leigh and Gill (1997) that the negative incremental effects for the BA degree and for four-year college disappear for returning adult males. Positive incremental effects of a BA

degree for returning adult women, noted below in the text, also disappear. However, the estimated return to males for nondegree two-year college programs remains in the 8 to 10 percent interval.

9. In our companion paper (Leigh and Gill 1997), we also attempted to control for self-selection in the decisions to enroll in a postsecondary education program, and among those choosing to enroll, determining choice of educational institution. Our approach to the self-selection issue is simply to augment the regression model summarized in Table 4 with explanatory variables—measures of family background and motivation—expected to influence both enrollment and choice of educational institution. The results suggest the presence of a small upward bias in measured returns to education and a slight narrowing of returning adult/continuing student differentials. Nevertheless, the incremental impact of a nondegree community college program for returning adults remains at 8 to 10 percent in terms of wages and annual earnings.

References

Altonji, Joseph G. 1993. "The Demand for and Return to Education when Education Outcomes Are Uncertain." *Journal of Labor Economics* 11(January, Part 1): 48–83.

Berger, Mark C. 1988. "Predicted Future Earnings and Choice of College Major." *Industrial and Labor Relations Review* 41(April): 418–429.

Burton, Lawrence, and Carin A. Celebuski. 1995. *Technical Education in Two-Year Colleges*. HES Survey Number 17, National Science Foundation, Division of Science Resources Studies.

Corman, Hope. 1983. "Postsecondary Education Enrollment Responses by Recent High School Graduates and Older Adults." *Journal of Human Resources* 18(Spring): 246–267.

Grogger, Jeff, and Eric Eide. 1995. "Changes in College Skills and the Rise in the College Wage Premium." *Journal of Human Resources* 30(Spring): 280–310.

Grubb, W. Norton. 1991. "The Decline of Community College Transfer Rates: Evidence from National Longitudinal Surveys." *Journal of Higher Education* 62: 194–222.

_____. 1992. "Postsecondary Vocational Education and the Sub-baccalaureate Labor Market: New Evidence on Economic Returns." *Economics of Education Review* 11: 225–248.

_____. 1993. "The Varied Economic Returns to Postsecondary Education: New Evidence from the Class of 1972." *Journal of Human Resources* 30(Winter): 205–221.

Jacobson, Louis S., Robert J. LaLonde, and Daniel G. Sullivan. 1997. "The Returns from Classroom Training for Displaced Workers." Working paper, Westat, Inc., Rockville, Maryland.

James, Estelle, Nabeel Alsalam, Joseph C. Conaty, and Duc-Le To. 1989. "College Quality and Future Earnings: Where Should You Send Your Child to College?" *American Economic Review Papers and Proceedings* 79(May): 247–252.

Kane, Thomas J., and Cecilia E. Rouse. 1993. "Labor Market Returns to Two- and Four-Year Colleges: Is a Credit a Credit and Do Degrees Matter?" Working paper no. 4268. National Bureau of Economic Research, Cambridge, Massachusetts.

_____. 1995a. "Labor Market Returns to Two- and Four-Year College." *American Economic Review* 85(June): 600–614.

_____. 1995b. "Comment on W. Norton Grubb: 'The Varied Economic Returns to Postsecondary Education: New Evidence from the Class of 1972.'" *Journal of Human Resources* 30(Winter): 205–221.

Leigh, Duane E., and Andrew M. Gill. 1997. "Labor Market Returns to Community Colleges: Evidence for Returning Adults." *Journal of Human Resources* 32 (Spring): 334–353.

Light, Audrey. 1995. "The Effects of Interrupted Schooling on Wages." *Journal of Human Resources* 30(Summer): 472–502.

Oettinger, Gerald S. 1995. "Do Borrowing Constraints Cause School Interruption?" Working paper, Texas A&M University, College Station, Texas.

Osterman, Paul, and Rosemary Batt. 1993. "Employer-Centered Training for International Competitiveness: Lessons from State Programs." *Journal of Policy Analysis and Management* 122(Summer): 456–477.

Rumberger, Russell W., and Scott L. Thomas. 1993. "The Economic Returns to College Major, Quality and Performance: A Multilevel Analysis of Recent Graduates." *Economics of Education Review* 12: 1–19.

Willis, Robert J. 1986. "Wage Determinants: A Survey and Reinterpretation of Human Capital Earnings Functions." In *Handbook of Labor Economics,* Vol. I, Orley C. Ashenfelter and Richard Layard, eds. Amsterdam: North Holland, pp. 525–602.

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Susan Houseman
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