The Return to a Sub-Baccalaureate Education: The Effects of Schooling, Credentials and Program of Study on Economic Outcomes

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Executive Summary

Over the last 20 years, technological changes in the workplace have placed considerable pressure on the U.S. educational system to adequately prepare students for occupations that increasingly require specific skills. As evidenced by the growing wage gap between high school and college graduates, employers reward new hires for having the skills or credentials needed for their jobs, thus underscoring the importance of having either the requisite "tools in your toolbox" or at least some basic academic preparation to continue on into postsecondary education. However, certain educators and policy-makers have raised the question of whether vocational education at the high school level, with its focus on immediately entering the workforce after high school, adequately prepares students for college. At the postsecondary level, the debate has centered on whether vocational education restricts access to a four-year college, which may hamper future earnings because students who begin in occupational programs are less likely to obtain a bachelor's degree. A small number of studies have examined the economic payoff for students who enroll in postsecondary occupational programs compared with high school graduates, but few have investigated whether the earnings of occupational students are statistically different than those of students in other types of postsecondary programs. Some of the criticism about vocational education could be allayed if the economic benefits are equal to or greater than those of other types of education.

This report, therefore, estimates the returns to a sub-baccalaureate education. The analyses emphasize the effect of a student's program of study (occupational or academic), the amount of schooling accumulated with and without attaining a degree, and the type of credential

earned. We test whether the earnings of degree attainers are significantly larger than those of similar students with the same amount of postsecondary education but no credential. This difference is commonly referred to as the *sheepskin effect*. We also examine whether economic gains from occupational education are realized not only for students who concentrated on vocational education in high school but also for special subpopulations such as older students, racial-ethnic minorities, and academically or economically disadvantaged students.

The findings in this report are based on three nationally representative samples of young adults in each of the last two decades, namely, the Beginning Postsecondary Students Longitudinal Study (BPS89), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS). BPS89 allows us to examine the immediate economic outcomes of sub-baccalaureate students approximately one to two years after college, while HS&B and NELS extend that period to roughly five to seven years. We measure the benefits to postsecondary education and degrees using the annual income (in log form) of all individuals from the last observable year of each study: 1993 in BPS89;[1] 1991 in HS&B; and 1999 in NELS. For BPS89 and HS&B, postsecondary enrollment is based on student self-reported monthly enrollment, which we converted to a full-time equivalent (FTE) enrollment measure. However, enrollment information with this level of detail was not available in the last six years of NELS (from 1994 to 2000). Instead, students were asked to report their highest degree. Those who had not completed a degree were asked to estimate the total FTE years of postsecondary education

[1] We caution the reader when examining the economic returns analysis using BPS89. To allow for at least one year of work experience after leaving college, we restricted the BPS89 sample to those who completed or left college after six semesters. Although this period is sufficient time for most sub-baccalaureate students to earn a credential, it is two semesters fewer than what is typically needed for a bachelor's degree. Thus, our economic outcome results for baccalaureate students in BPS89 are weak.

completed, but this figure is capped at three years. Nevertheless, our NELS estimates are robust and consistent with previous studies.

The findings from our analysis of economic outcomes are summarized as follows.

(1) *Higher levels of education are associated with more stable and economically sustaining employment outcomes*. The pattern is unmistakable: Employment outcomes improve as individuals complete more years of education. For example, sub-baccalaureate students are more likely to be employed, work full-time, and have higher pay rates than high school graduates. However, at similar levels of education, men enjoy a clear advantage over women. At the sub-baccalaureate level, nearly 97 percent of men are currently employed whereas 85 percent of women are. In terms of pay rate, sub-baccalaureate men earn $3 more per hour than women. Nevertheless, the difference in employment outcomes between men and women diminishes as education increases.

(2) *Completing a certificate increases women's earnings, but it provides no statistically significant economic benefit for men.* In the 1990s, women who complete a certificate earn between 15 and 16 percent more than the average female high school graduate, but the economic gains are not statistically greater than those of similar women who complete a year of postsecondary education but do not attain a degree. In other words, there is no certificate sheepskin effect for women. In comparison, men who attain a certificate do not earn significantly more than high school graduates.

(3) *Attaining an associate degree is highly beneficial for both women and men, and this benefit is higher for occupational students than it is for academic students*. Women who enroll in occupational programs and earn an associate degree enjoy a substantial premium (39 percent), compared with women who have no postsecondary education. Evidence also indicates a significantly positive sheepskin effect associated with an associate degree for female occupational students. The overall return to an associate degree for men during the same time period was 16 percent. Men in occupational programs who attained an associate degree earned more than those with no postsecondary education. However, the difference in earnings between men with an associate degree and those with two years of postsecondary education and no degree are not significant, indicating little evidence of the existence of a sheepskin effect for men.

(4) *Substantial returns to a bachelor's degree for both genders.* Our analysis shows that the economic benefit to bachelor's degrees in the 1990s is quite substantial, between 66 and 67 percent higher for women than similar high school graduates and 37 percent greater for men, *ceteris paribus*. For both men and women, the returns to a bachelor's degree is more than four times the return to a year of postsecondary education for a baccalaureate student without a degree. However, despite the high returns to the bachelor's degree, the data do not support the presence of a sheepskin effect.

(5) *Students who took postsecondary course work without earning a credential experienced some economic benefit from their education.* Women who are in baccalaureate programs but who do not attain a degree still earn 14 to 15 percent more than women without any

postsecondary education in the 1990s. Women in sub-baccalaureate programs who do not attain a credential have lower returns to a year of course work than similar baccalaureate women, but their economic outcomes are still 10 percent higher than of those without any postsecondary education. Men who do not earn a credential in postsecondary education also experience economic benefit, but the returns are not as large as they are for women. Specifically, the economic value of a year of baccalaureate postsecondary education for men is 10 percent whereas the return to a year of sub-baccalaureate education for a similar population is 6 percent.

(6) *Among sub-baccalaureate occupational students who do not earn a credential, women experience little economic benefit from their postsecondary course work while men have modest benefits.* Women who are in occupational sub-baccalaureate programs but who do not earn a degree or credential have significantly lower returns to a year of course work than do similar academic women (5 percent compared with 15 percent). In contrast, men who are in occupational programs but who do not attain a degree or credential earn 8 percent more than men without any postsecondary education and 4 percent more than those in academic programs.

(7) *Occupational sub-baccalaureate students who had a vocational curriculum in high school earn no more than those without high school vocational preparation*. The one exception to this finding is for women who earn associate degrees. Women who had vocational high school curricula who complete any associate degree experienced

significantly higher earnings than those without high school vocational curricula. However, small cell sizes raise some doubt as to the robustness of this finding.

(8) *Younger students (under 24 years old) generally experience economic benefits to postsecondary education while those for older students are negligible*.[2] The economic outcomes of older men and women with postsecondary education were no different (and, in some cases, worse) than those of similar-aged individuals with no college. Moreover, some evidence indicates that attaining a certificate lowers earnings for older students. In contrast, the returns for younger students who earn a credential are generally positive. Young occupational women who earn an associate degree get 37 percent higher economic returns than those without postsecondary education. The return coefficients are positive for young men with certificate and associate degrees, but they are not statistically different from the returns of high school graduates.

(9) *Black men earn less than white men with similar levels of education, but the difference is insignificant for black (and Hispanic) women when compared with white women*. Black men earn on average 38 percent less than white men irrespective of level of education.[3] However, for women, immediate economic outcomes were not statistically different along lines of race and ethnicity.

[2] Small sample sizes for older students in BPS89 may make the accuracy of these findings problematic.
[3] The sample sizes in the BPS89 and NELS datasets do not allow us to distinguish between occupational and academic students among different racial-ethnic groups.

(10) *For students who are academically challenged, sub-baccalaureate occupational education can lead to positive earnings outcomes*.[4] The average economic returns for academically challenged women who attain an associate degree are large and significant, roughly 44 percent greater than those without any postsecondary education. However, women who are academically challenged and who fail to earn any postsecondary credential earn no more (or less) than high school graduates. Academically challenged men experience economic gains from both earning an associate degree and occupational course work not leading to a credential. This finding suggests an incentive for academically challenged women in occupational programs to persist and attain a sub-baccalaureate degree whereas, for academically challenged men, no such incentive exists because economic benefits accrue for them with just postsecondary course work.

(11) *Economically disadvantaged students gain economic benefit from sub-baccalaureate occupational education, though the effects are different by gender*.[5] There is a positive and significant effect on earnings for economically disadvantaged, occupational females who attain an associate degree, yet they get no significant benefit from occupational course work without a credential. Conversely, men in this category experience sizeable returns to occupational course work without a credential, but those who attain an associate degree realize no significant additional gains. As with academically challenged students, women who are in occupational programs and who are economically

[4] For the purposes of this study, we define "academically challenged" as any postsecondary student ranked in the lower two quartiles of those taking the standardized reading and math tests administered in 12th grade as part of the NELS survey.
[5] For the purposes of this study, we define "economically disadvantaged" as any postsecondary student whose total family income in the year before starting postsecondary education was less than $20,000.

disadvantaged have incentive to earn a degree whereas men in this category do not have a similar economic motivation toward completion.

In summary, our findings generally support the conclusion that students benefit from sub-baccalaureate education compared with those achieving only a high school diploma. We also find that among sub-baccalaureate students, those in occupational programs do economically at least as well as, and in some cases significantly better than, students in academic programs. Moreover, those who attain certificate and associate degrees generally have significantly higher returns to education than those with similar years of postsecondary education but no credential (the sheepskin effect), but the difference is often not statistically significant. However, noticeable differences are evident in the returns to postsecondary education and degrees by gender, with women generally experiencing greater economic benefit from schooling and credentials than men.

I. Introduction

During the past two decades, the importance of education beyond high school in determining economic well-being has grown substantially. By the early 1990s, economists understood that, for decades, changing skill demands in the labor market have favored workers with more education.[6] Although the large influx of college-educated workers (created by the entrance of the Baby Boom generation into the workforce in the 1970s) temporarily suppressed the wage advantage associated with postsecondary education, by the early 1980s, the large supply shift abated, and the relative wages of workers with a college education began a dramatic and persistent increase.[7]

Though the technological and economic changes affecting the shift in labor demand are signs of a vibrant economy, they raise concerns about the economic reality faced by workers without any postsecondary education whose real wages have stagnated for the past 30 years. In response to these shifts, most policy-makers and analysts have focused on efforts to encourage high school students (and perhaps those already in the workforce) to enroll in postsecondary education. Unfortunately, policy and research on postsecondary education have tended to focus on education within four-year postsecondary institutions. Both in the arena of higher education policy and in the general perception of what postsecondary education means, two-year or sub-

[6] See Levy and Murnane (1992) for an early review.
[7] Murphy and Welch (1989, 2002) have written extensively on wage inequality, but this strand of research is beyond the scope of this study.

baccalaureate education receives little attention, and even less attention has been paid to occupationally oriented education.[8]

At the bachelor's degree level over the last two decades, the number of college students majoring in liberal arts or academic subjects such as English, sociology or chemistry has declined both in absolute numbers and relatively while applied fields such as health, business, and education have increased. In fact, occupational fields now account for a majority of sub-baccalaureate enrollments (Bailey, Leinbach et al. forthcoming; National Center for Education Statistics 2002). What are the implications of this trend? Do occupational fields at the sub-baccalaureate level offer students good opportunities or do they lead them into educational pathways and occupations that limit their options and provide more restricted earnings potential?

Because this report is part of the National Assessment of Vocational Education (NAVE), we have a particular interest in the economic returns to occupational education. Occupational programs prepare students more or less directly for work while academic programs presumably provide a broader education. Many employers want to be able to hire workers who can start work without initial extensive training. Thus, one hypothesis might be that sub-baccalaureate students who pursue a more academic program might be more easily trained whereas those in an occupational program would need less training to be immediately productive. In evaluating occupational education, we would like to know what employers pay for workers with these different types of education. If employers value the specific preparation of an occupational program, are they, at least in the relative short run, willing to pay extra? An academic education

[8] Community colleges are two-year postsecondary institutions that primarily award associate degrees. This category includes junior colleges but not vocational-technical institutes and many proprietary schools.

at the sub-baccalaureate level may be useful but only as preparation for completing a bachelor's degree. A wage premium for an occupational education would suggest that it would make sense for students to pursue an occupational course of study if they were not going to go beyond an associate degree.

Data are available to address many of these questions, yet higher education researchers and labor economists who analyze the returns to various levels of education have paid little attention to a sub-baccalaureate education in general and even less to an occupational sub-baccalaureate education. Many studies of the earnings effect of education simply use an "undifferentiated years of schooling" variable or categorize any person without a bachelor's degree but with education beyond high school as having "some college." Only a handful of studies have sought to estimate the economic effect of a two-year or sub-baccalaureate education, with or without a certificate or degree, and even fewer have attempted to estimate the returns for occupational students. Moreover, those few analysts who have addressed these questions have used data from the 1970s and 1980s. The higher education system, the community college role within that system, the demographics of the student population and labor force, the nature of the labor market, and the technological characteristics of jobs have all changed in the last 30 years, casting doubt on the conclusions implied by these studies.

This report presents an analysis of the economic returns to postsecondary education. It adds to the current knowledge in this area both by focusing on the returns to occupational sub-baccalaureate education and by using a newly released dataset, the National Education Longitudinal Survey of 1988 (NELS). NELS comprises a nationally represented sample of

eighth grade students in 1988. To get some understanding of trends, we also conducted a similar analysis of the High School and Beyond (HS&B) dataset that is composed of students who were high school sophomores in 1980. HS&B follows this cohort of young adults until 1992, when most were in their late 20s. Both of these datasets provide detailed information with respect to investments in postsecondary education and economic outcomes from a representative sample of more than 7,000 men and women who finished high school in the early 1980s and 1990s. Our analysis is based on data on annual earnings collected eight years (NELS) and 10 years (HS&B) after scheduled high school graduation.

We also used the Beginning Postsecondary Students Longitudinal Survey (BPS89) dataset, which tracks a cohort of first-time beginning students in the 1989–90 academic year for four years. With BPS89, short-term (one to two years after college) returns to education are estimated, but there are several caveats that will be explained in the following discussion. Unlike NELS and HS&B, a major advantage of this dataset is that education and work experiences of older students can be observed (27 percent of the sample are age 24 and older). However, to allow for at least one year of work experience after leaving college, we had to restrict the sample to those who completed or left college after six semesters, which is two semesters fewer than what is typically needed for a bachelor's degree. We recognize that the estimates from the restricted sample do not necessarily represent those of all first-time beginners in BPS89. Therefore, caution must be taken when reading the returns from this analysis.

In this report, we present findings from our analyses of economic benefits using the HS&B and NELS data and briefly discuss our analysis of immediate economic outcomes of

special populations using BPS89. Our analyses have been designed to answer the following questions:

(1) What are the average earnings benefits associated with sub-baccalaureate degrees?

(2) How do the earnings of sub-baccalaureate students (those who complete degrees and those who do not) compare with the earnings of individuals who have no more than a high school diploma?

(3) Do occupational students who earn degrees earn more than those who complete an equivalent amount of education but do not earn degrees (referred to as the sheepskin, or program, effect)?

(4) Is the sheepskin effect stronger or weaker for occupational students than it is for academic students?

(5) What is the effect of enrollment in a high school vocational track on the subsequent earnings of sub-baccalaureate students, and does the high school track have a different effect on the earnings of academic and occupational sub-baccalaureate students?

(6) Is occupational education beneficial for subpopulation groups such as students who are older, students who belong to a racial-ethnic minority, or students who are academically or economically disadvantaged?

This report is structured as follows. First, we provide a brief review of the literature, with a specific focus on the returns to different aspects of occupational education. Second, we describe the datasets and the samples studied here, highlighting both educational experiences and economic outcomes. Next, we describe average earnings and employment differences among students in the NELS, HS&B and BPS89 samples who engaged in various forms of postsecondary study. Finally, we present results from a variety of multivariate models estimated to identify returns to enrollment and credentials from sub-baccalaureate programs and to answer the questions posed above.

To maintain terminological coherence with the other reports we have done on this subject,[9] *sub-baccalaureate* refers to those students who began at a two-year college or those who had a less-than-bachelor's degree goal at their initial postsecondary institution. In all analyses, a college student can be either a *baccalaureate* (attending a four-year college) or a *sub-baccalaureate*. Sub-baccalaureate students are further divided into *occupational* and *academic*, based on their initial program of study.[10] Students who did not declare a major at their first postsecondary institution are retained in the sample and identified as such. Throughout this report, when we refer to a *high school graduate*, we mean a student who graduated from high school but who has no postsecondary education. In most of our analyses, high school graduates are the reference category; therefore, the coefficients on educational variables can be interpreted

[9] Bailey, T., M. Alfonso, M. Scott, D. T. Leinbach, G. Kienzl, B. Kennedy, and D. Marcotte (Forthcoming); Bailey, T., D. T. Leinbach, M. Scott, M. Alfonso, G. Kienzl, B. Kennedy, and D. Marcotte (Forthcoming).
[10] Our classification of majors is based on Choy and Horn (1992) and further discussed in Bailey, T., D. T. Leinbach, M. Scott, M. Alfonso, G. Kienzl, B. Kennedy, and D. Marcotte (Forthcoming).

as the earnings difference between whatever group the variable represents (say, those who completed an associate degree) and high school graduates with no postsecondary education.

II. Literature Review

Research on the impact on students of enrolling in sub-baccalaureate educational programs has principally focused on two issues. First, researchers have examined the role of sub-baccalaureate programs on educational attainment. Evidence and debate have centered around whether sub-baccalaureate programs have (or should) facilitate transfer to four year institutions and degrees. Particularly important here has been the distinction between vocational and academic sub-baccalaureate programs. A second major focus of research has been on identifying the ultimate employment and wage outcomes of sub-baccalaureate education. An important issue here has been identifying causal effects from non-experimental data. We turn to each of these major research foci, in turn.

Postsecondary Education Options

Over the last 20 years, certain educators and policy-makers have challenged the wisdom of high school vocational education, arguing that high school studies should be focused on basic academic skills that provide the foundation for subsequent education.[11] This argument is based on the notion, reinforced by the evidence on the growing wage gap between high school and college graduates, that some education beyond high school is now necessary to gain access to the types of jobs that generate enough income to support a family. Thus, high school vocational

[11] See Eaton (1993) and Dougherty (1994) for comprehensive reviews.

programs that prepare students for work immediately after high school rather than prepare them for college restrict the potential earnings of students who enroll in them.

The same critique has been leveled against sub-baccalaureate education and, in particular, occupational programs at the postsecondary level. Some critics have challenged the economic value of an associate degree, arguing that these degrees confer little benefit beyond the value of a high school education (Brint and Karabel 1989; Dougherty 1994). According to this perspective, community colleges are most effective when they lead to transfer to a four-year program and, eventually, to a bachelor's degree. This view would suggest that community college students would be best served by enrolling in a program oriented toward transfer. Thus, although occupational programs in community colleges can lead to a transfer, academic programs are explicitly designed to prepare students for upper division studies in a bachelor's program, so students should be encouraged to pursue academic rather than occupational studies in community colleges.

In contrast, community college advocates suggest that this perspective is a distorted view of the role of community colleges. Although the transfer function is one important role of the community colleges, many students can benefit from a sub-baccalaureate education that does not lead to a bachelor's degree. According to this view, associate degrees prepare students for a growing number of technical and technician-level jobs that play key roles in the economy. While in these jobs, workers do not earn as much on average as bachelor's degree holders, but they do earn more than high school graduates, and the education also takes less time and money. Many community college faculty and administrators will even argue that students can benefit from

education that does not result in an associate degree. Many students enroll in certificate programs that take one year or less and others simply enroll in courses with the objective of learning some specific targeted skills. For students with these types of well-defined goals, completing all of the requirements for a degree may not be efficient, leading them to spend time and money on extra courses that do not serve their needs.

The resolutions of these controversies have profound implications for the design of our educational system. In another of our reports (see Bailey, Leinbach et al. forthcoming), we show that millions of students enroll in community colleges every year and, of those, most are enrolled in occupational programs. However, a majority of these students neither transfer nor graduate with associate degrees. We have also shown that some evidence indicates that, among sub-baccalaureates, occupational students are less likely than academic students either to earn an associate degree or to transfer, although that difference is stronger with respect to transfer than to degree completion (Bailey, Alfonso et al. forthcoming).

Are these observations an indication of a massive misallocation of resources? Should community colleges focus on academic transfer-oriented programs and redouble their efforts to retain students? Or are these varied outcomes an indication of an efficient allocation of resources that provides many different levels of education corresponding to the varied needs of students and the economy? Although students might earn more by completing their programs of study or by seeking ever-higher degrees, they would also need to spend more time and resources to achieve those higher levels of education. This perspective would also view sub-baccalaureate occupational education in a much more favorable light. Focused occupational programs would

seem to be better suited for students expecting to work (rather than transfer) after achieving an associate degree or for those who seek specific skills through either some collection of courses or short-term certificate programs. Indeed, the large majority of certificate students are in occupational areas.

Returns to a Sub-Baccalaureate Education

A great deal of empirical research has been conducted over the years to determine the causal effect of postsecondary education on earnings. The evidence supports the view that college is a profitable investment: More schooling leads to higher earnings.[12] Young people have responded to those incentives, enrolling in college after high school in increasing numbers.[13] But most of the research on the economic returns to college has focused on the four-year level, even though more than half of the students who attend college soon after high school enroll in a community college (National Center for Education Statistics 2002). Moreover, a majority of students at community colleges enroll in occupational program of study, but little empirical research has been conducted to determine whether students benefit economically from these kinds of programs.

Kane and Rouse (1995) wrote one of the most influential articles on the returns to a sub-baccalaureate education and, subsequently, wrote a similar piece for a broader audience (Kane and Rouse 1999). According to their research, students who attain a baccalaureate degree

[12] Schultz (1961), Becker (1964) and Mincer (1974) are considered to be the forefathers of the early empirical work. For a more recent review of the literature, see Card (1999) and Grubb (2002). Grubb (2002) offers a thorough review of recent studies conducted on the return to a sub-baccalaureate education.

experience a 10 to 20 percent increase in earnings compared with an associate degree holder. In addition, the economic returns to a sub-baccalaureate degree are roughly 15 to 25 percent higher than a high school diploma. The authors also argue that the return to a year of course work at a community college is the same as the return to a year at a four-year college: approximately 5 to 8 percent.[14] Although some variation exists in the estimated return to postsecondary education, one commonality is the existence of a wage premium for those who complete a degree (otherwise known as the sheepskin effect) compared with those who have completed similar years of postsecondary schooling but who have not gotten the credential.[15] In fact, some have even suggested that attaining a postsecondary credential appears to matter more than acquiring work-related skills while in college.[16]

Grubb (2002) provides a comprehensive review of the research on not only the returns to sub-baccalaureate credentials but also course work without degrees. He reports that most analyses find that individuals who complete associate degrees earn about 20 to 30 percent more than high school graduates, with estimates for men at the lower end of that range (and sometimes below the range) and those for women at the higher end of the range (and sometimes above it). He also concludes that a single year of course work (without completing a degree) at either a two- or a four-year school increases earnings by about 5 to 10 percent. Returns to certificates are varied and often not measurable, but this occurrence may be because of small sample sizes and

[13] In 1972, about half (49 percent) of all high school completers between the ages 16 to 24 enrolled in a two- or four-year college immediately after high school. A generation later, the proportion of young adults in college increased to 63 percent (U.S. Department of Commerce 2001).
[14] Of course, the quality of two- and four-year institutions may lead to measurable differences in earnings, but this point is beyond the scope of this report.
[15] Kane and Rouse (1995) do find a positive sheepskin effect but argue that there are still benefits to accumulating credits without a degree. Heineman and Sussna (1977); Blair, Finn and Stevenson (1981); and Jaeger and Page (1996) also find sheepskin effects.
[16] See Card (1999) for a discussion.

the small amount of education that the certificate represents. Grubb's (2002) work is unusual in that it focuses on different fields of study at the sub-baccalaureate level. In general, he finds varied returns to different occupational fields but concludes that academic associate degrees have little value. Although he does not present estimates that differentiate between the aggregated academic and occupational fields, the implication is that the positive benefits that are found for associate degrees are the result of positive returns to occupational degrees. Thus, if the overall estimates of the returns to associate degree are in the 20 to 30 percent range, then the returns to occupational degrees could be even higher.

Another purpose of this study is to examine whether the effect of education differs for certain subpopulations such as students who are older, who belong to a racial-ethnic minority, or who are economically or educationally disadvantaged. As shown by Bailey, Leinbach et al. (forthcoming), a disproportionate number of these students attend community colleges, and they are also overrepresented in occupational programs. These groups are largely forgotten in the literature on returns to education, but in the past few years, three noteworthy studies have been published,[17] and their findings are summarized in the following discussion.

Leigh and Gill (1997) estimate the returns for a cohort of older students—those between the ages 28 and 35. On the one hand, they found that older female students who earned sub-baccalaureate degrees did not earn significantly more than those without a credential. On the other hand, the value of a bachelor's degree to older students over a high school diploma ranged from 46 percent to 73 percent increases in earnings, which is quite substantial. Finally, they reported the value of attending a community college without receiving a credential was higher

for older men than for younger men, which Leigh and Gill (1997) suggest is because older men are more likely to enroll for specific, employment-related purposes. Our findings differ slightly from Leigh and Gill (1997), which may be contributed to the different samples or may signal a temporal shift in the returns to education for older students.

Education is widely viewed as a means to reduce the inequality in earnings between racial-ethnic minorities and whites. Given that black and Hispanic students make up a disproportionately larger share of community college enrollment, pressure is mounting on sub-baccalaureate and occupational education to erase the existing disparity. However, although Averett and D'Allesandro (2001) indicate few statistically significant differences in the returns to education between black and white students (which they attribute to small sample sizes), they identified a consistent pattern in the data: The returns to an associate degree for blacks are generally higher than returns for whites. The authors point out that the slightly higher returns for blacks are offset by lower completion rates, which is a finding supported by Bailey, Leinbach et al. (forthcoming) using different data.

On final subgroup of interest consists of those who are academically or economically disadvantaged. With respect to economically disadvantaged students, Jacobson, LaLonde and Sullivan (1997) estimated the effects of community college programs in their study of displaced (and hence, unemployed) workers in Pittsburgh in the early 1980s and in Washington State in the early 1990s. Most had completed 26 to 30 credits, but slight gains in earnings resulted. Yet these overall effects masked substantial differences among fields of study, with sizeable positive

[17] See Leigh and Gill (1997); Averett and D'Allesandro (2001); Jacobson, LaLonde and Sullivan (1997).

returns to health-related credits and negative effects to basic or remediation education as well as to the humanities.

Thus, our project extends the research on the returns to sub-baccalaureate education in three important ways. First, we build on the work of Grubb and others by focusing on sub-baccalaureate and, specifically, on occupational education. Second, we examine the differences in the returns to education for nontraditional, or special, populations. Finally, although most of the research so far has been based on data from the 1980s or earlier, this report makes use of the latest national data, which report information on education in the mid- and late-1990s.

III. Data

To study the employment and earnings impacts of sub-baccalaureate education in the United States, we examine data from three nationally representative samples of young adults in each of the last two decades. We make use of data from the National Education Longitudinal Study of 1988 (NELS) High School and Beyond (HS&B), and the Beginning Postsecondary Students Longitudinal Study (BPS89). The BPS89 allows us to examine the immediate economic outcomes of sub-baccalaureate students approximately one to two years after college, while HS&B and NELS extend that period to roughly five to seven years. Each of these data sets has its own strengths. Collectively they can enable us to develop a richer, more informed assessment of the economic impacts of sub-baccalaureate education on the lives of students. We describe each of these datasets, and how they were used in our analyses below.

National Education Longitudinal Study

The National Education Longitudinal Study of 1988 (NELS) presents data that track a nationally representative sample of eighth grade students in 1988 for 12 years. The National Center for Education Statistics (NCES) conducted follow-up interviews in 1990, 1992, 1994 and 2000. The information on postsecondary education and labor market experiences was collected in the spring of 2000, and annual earnings data for 1999 were used in the NCES analysis. Our analysis of this dataset represents a compromise between using the most recent data on postsecondary schooling and being able to track students' employment for a reasonable number

of years. We wanted to observe earnings many years after graduation because it may take young people some time to settle into their long-term careers that would, thus, best reflect their earnings potential. But as the time series lengthens, the data on the students' educational experiences become out of date. Thus, most of the recent analysis of the outcomes of postsecondary education has been based on education that took place during the 1980s or earlier. In the case of NELS, we have data on education during the mid-1990s, and we have earnings data up to eight years after scheduled high school graduation and six years after scheduled graduation from a two-year program.

The NELS data are particularly useful in assessing early outcomes from schooling because NELS provides detailed information about (a) student educational tracks, including the highest degree earned, whether or not the student began at a community college, the type of track (vocational or academic) chosen in high school and the type of college enrollment and (b) whether the student attended full time, worked or transferred. This level of detail in a dataset permits extensive analysis of the returns to a wide variety of schooling experiences.

Although the NELS data do provide rich information on economic behavior and early educational investments, the data have an important limitation. The survey did collect information on degrees received, types of educational institutions where respondents enrolled and FTE credit hours. However, the information collected after 1994 is not as extensive as what was collected between 1992 and 1994.

Between 1992 and 1994 (the period during which most sample students had just finished high school and either had begun working or had enrolled in postsecondary education), much more extensive information about the type, intensity and persistence of college enrollment was collected. We made use of this information to construct variables characterizing the educational experiences of the sample. The variables include measures of whether the student's first enrollment was at the sub-baccalaureate level and whether the program was occupational or academic. The survey did not ask students to report in detail on their enrollments after August 1994. Rather, in 2000, they were asked to report on their highest degree. Those students who had not completed a degree were asked to estimate the total FTE years of postsecondary enrollment completed, which was capped at three years. In other words, all students in NELS who had spent more than three FTE years in college without earning a degree were recorded as having spent the same amount of time in college.

An additional limitation of the NELS data is that respondents were not asked about their total work experience in the years after high school. Work experience is known to affect observed labor market outcomes. Because students with no postsecondary education are likely to have more work experience in the early years after high school graduation, we anticipated that the failure to control for work experience would result in underestimates of the true returns to postsecondary schooling.

To limit this problem, we made use of other information collected in the NELS survey. We divided the years between 1992 and 2000 into two distinct periods: time in school and time out of school. For the period when a student was not in school, we assumed he or she worked the

same number of hours that was reported during 1999, the most recent year for which detailed employment information is available. To estimate the work experience of a student during the years enrolled in school, we made use of the detailed employment information collected at the third follow-up interview in 1994. At the third follow-up, information on the monthly employment status of each respondent between the 1992 and 1994 interviews was collected. For those enrolled, we observed the number of months worked while enrolled. We then assumed that the average annual months worked during this period while enrolled was the same as the average annual months during any enrollment period after the 1994 interview. We then added the total work experience during all enrolled periods with the work experience in periods not enrolled to obtain an estimate, in months, of each sample member's total work experience. We used this measure of work experience, in quadratic form, in all earnings analyses.

Each individual in NELS was given a variety of tests to measure their aptitude in mathematics, reading, science and history. For our analyses, we used the normalized scores on the math and reading tests, expressed in quartiles, with the lowest quartile test score serving as the reference category. Other family background variables used included family income and highest parental education. Family income was measured in 13 categories of various ranges, and the midpoint value of the range was used. For parental education, we created two binary variables. The first indicates whether at least one parent had enrolled in college or completed an associate degree and the second indicates whether a parent had attained a bachelor's degree or higher.

High School and Beyond

To develop a sense of the trends in earnings, we also conducted similar analyses using High School and Beyond (HS&B). HS&B follows a nationally representative panel of 1980 sophomores for 12 years, or approximately 10 years after their expected high school graduation. The study design provided for a highly stratified national probability sample of more than 1,100 secondary schools as the first-stage units of selection. In the second sampling stage, 36 seniors and 36 sophomores were selected from each school; overall, more than 30,000 sophomores participated in the base year (1980) survey. In high schools with fewer than 36 students in either of these groups, all eligible students were included. Longitudinal information was collected for less than half of the 1980 sophomore cohort, and no data were collected for 1980 seniors after the base year. Follow-up surveys were conducted in 1982, 1984, 1986 and 1992.

To control for social and educational backgrounds, math and reading test scores and family income were used. Highest level of parental education was also used, and the variable was coded in a way similar to NELS. Self-reported enrollment and work experience information was collected in HS&B, so the problems associated with these data in NELS are not an issue. Students provided starting and ending months for each continuous period of work with a single employer and for each continuous (excluding summers) period of enrollment. We do not have information on the intensity of the work, but we have enrollment intensity from fall 1980 to the end of the survey. Part-time enrollment was coded as one-half the intensity of full-time enrollment, and less-than-part-time enrollment was coded as one-quarter the intensity. These

weighted enrollment values were then aggregated to produce a FTE enrollment value, which is used throughout the analysis.

Beginning Postsecondary Students

To estimate the returns to education for older students, we used the Beginning Postsecondary Students Longitudinal Survey (BPS89), which consists of individuals who were first-time college beginners at any time between July 1, 1989, and June 30, 1990. On average, students in the sample have been out of school two-and-a-half to three years, which is judged to be sufficiently long enough to estimate the short-term returns to a sub-baccalaureate education. In addition to the limitations mentioned earlier, we had to modify the dataset to permit a conventional interpretation of the estimates. Because BPS89 does not contain a proper comparison group—students with a high school diploma but no postsecondary education—one was constructed for the analysis. It includes students who achieved less than three FTE months of college experience and did not obtain a formal award. All of the estimates in the full sample are in reference to this "artificial" high school graduate group. The full sample includes individuals either who attained a certificate, associate or bachelor's degree by December 1992 or who did not obtain a formal award and were no longer enrolled by the same period.

IV. Student Sample Demographics

Before considering analyses of economic outcomes from sub-baccalaureate education, it is important first to develop a sense of the characteristics of the students in each of the samples studied here. This is especially important here, because these data were collected in different decades, and reflect changes in the demographics of students enrolled in sub-baccalaureate programs. We present and discuss descriptive statistics of each sample, in turn.

National Education Longitudinal Study

We restricted our analysis of the NELS data to respondents who, at the time of the 2000 interview, were not enrolled in a postsecondary institution. We also eliminated students who reported earning a graduate or professional degree and those whose only postsecondary enrollment occurred after 1994. This limiting was necessary because NELS provides very little information on the nature of enrollments for those who started their postsecondary education after August 1994, and thus, we were not able to determine whether these students were enrolled in occupational or academic programs. Finally, we also dropped all individuals who were still enrolled in 1999. We dropped this group for the same reason that we dropped students from HS&B who were still enrolled in 1991.

These restrictions left us with a sample of 7,021 students. As Table 1 shows, 34 percent of the sample enrolled in a sub-baccalaureate program after high school. This percentage is

comparable with the 33 percent that enrolled in a baccalaureate program. Of those in sub-baccalaureate programs, most were in occupational programs (18 percent of the total).

Although enrollment in sub-baccalaureate programs is fairly high, relatively few respondents reported their highest degree as being an associate degree or a certificate by the year 2000. Only 6 percent of the sample reported that their highest degree was an associate degree, and 6.7 percent reported a certificate as the highest degree. By 2000, 30 percent of the sample reported earning a bachelor's degree. Of those reporting a bachelor's degree as their highest degree, 21 percent of them started as students in sub-baccalaureate institutions.

High School and Beyond

Of the 14,825 sophomores in the HS&B dataset, 7,799 students met the criteria for selection into the sample. The criteria were that the students (a) did not attain more than a bachelor's degree, (b) started college by 1984 and (c) were no longer enrolled in college by December 1990. The first criterion is self-explanatory. The second, excluding students who delayed their college enrollment more than two years, was needed to make the sample comparable to NELS.[18] Finally, students still enrolled in 1991 were also dropped because our earnings data are from 1991. A student enrolled in school during 1991 might have lower earnings because he or she was still enrolled. Moreover, a student in this sample still enrolled in 1991 probably had more years of education than average. Therefore, including these students would cause a negative bias in our estimate of the returns to a year of schooling. Table 1 presents

[18] We made an equivalent exclusion in NELS because, for students who enrolled initially after 1994, the survey did not provide enough information for us to categorize students as academic or occupational.

descriptive statistics of the basic educational and demographic characteristics of the sample. The sample is evenly split by gender.

Overall, high school dropouts (9 percent of the sample) were retained, along with GED recipients (7.1 percent). Of the students in the HS&B sample, 38 percent began at a two-year college or had a less-than-baccalaureate degree goal at a four-year institution, which qualified them as sub-baccalaureate under the definition applied in this study. Sub-baccalaureate students were then divided into two categories based on their initial program of study, academic or occupational. Nearly 70 percent of sub-baccalaureate students reported an occupational program of study at their first institution while 22 percent reported an academic major. The remainder of students did not report a program of study.

Although no significant difference in race-ethnicity composition and citizenship status appears to be evident in the male and female subsamples, discernible variations exist along the schooling and employment dimensions. Males and females report similar years of schooling (males, slightly less than two FTE years, and females, slightly more), but female sub-baccalaureate students were more likely to choose an occupational program of study. Degree attainment rates, however, appear to vary by gender, with males more likely to earn a bachelor's degree and females more likely to attain an associate degree or certificate. Because females are overrepresented at the sub-baccalaureate level compared with males, it is not surprising that they attain sub-baccalaureate credentials at higher rates.

Beginning Postsecondary Students

In some respects, the sample of first-time beginners in BPS89 closely mirrors that of HS&B and NELS. As shown in table 1, the gender and racial-ethnic compositions and, to a lesser extent, the highest parental education levels are quite similar across the three datasets. However, the enrollment and degree information is strikingly distinct. Slightly more associate degree recipients are present in BPS89 (8.9 percent) compared with the other two datasets (5 and 8 percent in NELS and HS&B, respectively), but the most noticeable distinctions are the rates of certificate and bachelor' s degree attainment, which is to be expected given the short time frame of the BPS survey. There were three times more certificate holders and one-sixth fewer bachelor's degree attainers in BPS89 than in HS&B or NELS. Although far fewer students in the BPS89 dataset received a bachelor' s degree, when expressed as a proportion, sub-baccalaureate students made up a similar share of bachelor's degree attainers in BPS as they did in NELS.

Another difference lies in students' initial enrollment. Of the 1,302 observations, nearly 70 percent of the students in BPS89 enrolled in a sub-baccalaureate program of study, which is twice a large as the sample in NELS, yet BPS89 showed proportionately fewer occupational majors than were found in HS&B and NELS. Overall, however, BPS89 indicated nearly twice as many occupational students as were identified in the other two datasets.

V. Economic Outcomes

Our examination of the economic impact of sub-baccalaureate education begins with an examination of employment and earnings differences between individuals who complete different levels of post-secondary education. This analysis illustrates the basic patterns of the economic value of post-secondary learning. We then turn to a more focused analysis of the economic returns to sub-baccalaureate study. We examine benefits of enrollment in sub-baccalaureate programs as well as credentials earned in such programs. We examine whether and how these benefits vary by students characteristics, and among populations of special interest.

Earnings by Level of Postsecondary Education

As a first attempt to understand the economic consequences of sub-baccalaureate education, we present mean wage and employment outcomes for the NELS sample as a whole as well as by postsecondary enrollment and degree. We discuss only the NELS figures because they more closely represent current economic outcomes. As shown in table 2, these figures indicate that economic outcomes improved with education in expected ways. The average wage and salary income in 1999 for the sample as a whole was $26,028. Among high school dropouts, mean wage and salary income was $20,295. Individuals who enrolled in a sub-baccalaureate course of study reported earnings of $25,600, and those in a baccalaureate course of study earned $32,804, on average. Among sub-baccalaureate students, those in occupational programs reported slightly higher earnings.

Individuals who enrolled in postsecondary education were also much more likely to be employed. Ninety-one percent of initial sub-baccalaureate students and 95 percent of initial baccalaureate students were employed in 2000 whereas only 80 percent of high school dropouts were employed. Those with a postsecondary education were also more likely to be employed full-time.

Economic outcomes are similarly higher for students with higher degrees. Individuals with a general equivalency diploma (GED) reported mean earnings in 1999 of $20,280 whereas those with no more than a high school diploma reported mean earnings of $23,297. Respondents who received associate degrees earned $27,225 on average. The exception is the relatively low earnings reported by those members in the sample who received certificates. Among this group, mean earnings were $22,426.

Table 3 compares separately, by gender, economic outcomes among sub-baccalaureate students with outcomes among students who have no postsecondary education. On average, men without any postsecondary enrollment earned $26,712 in 1999. Men who enrolled in sub-baccalaureate education earned $30,897; those in occupational programs earned $32,599. More than 97 percent of men in occupational programs were employed. For women, those with no postsecondary enrollment earned $12,508 on average, and only 67 percent were employed. Women who enrolled in sub-baccalaureate education earned $20,367 on average, and 85 percent were employed. Unlike men, however, women in occupational programs did not fare significantly better that those in other sub-baccalaureate programs.

Returns to Sub-Baccalaureate Enrollment and Degrees

To develop a more complete understanding of the economic effects of sub-baccalaureate education, we estimated a series of models to identify the returns to years of FTE postsecondary education, highest degree received, program of study and other features of students' postsecondary education. The most common model used to derive rates of return estimates is the Mincerian method using Ordinary Least Squares (OLS). As shown in equation 1, the specific econometric framework for individual, i, is

$$\log(W_i) = X_i B_X + S_i B_S + E_i B_E + E^{\wedge 2}_i B_{E^{\wedge 2}} + u_i \qquad (1)$$

where $\log(W_i)$ is the log of observed earnings of individuals, i, who reported earnings and at least one month of work; X_i is a vector of personal and parental background characteristics; E_i represents total years of work experience; $E^{\wedge 2}_i$ represents total years of work experience squared;[19] and u_i is an error term, which is assumed to be orthogonal to the observed covariates. The coefficient B_S is commonly referred to as the rate of return to education—the percentage of increase in earnings associated with a change in years of FTE postsecondary schooling, S_i.[20]

[19] The standard Mincerian wage equation typically includes a quadratic term for work experience to pick up declines in productivity (or hours worked) later in the life cycle.

[20] It is common to interpret coefficients from log-linear models as percentage change. We adopted this convention here because almost all of the research on the returns to sub-baccalaureate education does so (see Grubb 2002 and Kane and Rouse 1999). It facilitates a comparison between our results and those in the literature. This comparison is only an approximation, however. More precisely, one must exponentiate coefficients and subtract one (e^b -1) to obtain the effect of a one unit change in an independent variable as a percentage change in a dependent variable. This approximation is accurate for coefficients of .2 and below. Thus, a coefficient of 0.2 actually represents a return of 22 percent. But the distortion is greater for larger coefficients. For example, a coefficient of 0.5 represents a return of 65 percent. Thus, this distortion will be greatest for estimates of the returns to bachelor's, but our focus is on the returns to sub-baccalaureate education and degrees, so the problem will be less serious for those issues that are of most concern to us.

We ran separate regressions for men and women because of the different influences that shape their schooling and work decisions. In all of our analyses, we also controlled for a student's race, ethnicity, nativity as well as high school preparation and diploma type. Black and Hispanic students tend to enroll in occupational programs at higher than average rates; therefore, if race or ethnicity has an effect on earnings, for example, through discrimination, then failing to control for these variables would distort the estimates of the effects of occupational education. Our controls for work experience were described earlier.

For the primary focus of our analysis, we extended this model to distinguish between students who chose occupational programs from those who chose academic majors during their enrollment in sub-baccalaureate programs. In doing so, we examined the earnings effects of two separate features of postsecondary education. We were interested in the returns to individual years of schooling taken by baccalaureate and sub-baccalaureate students and, within the sub-baccalaureate group, years of schooling taken by academic and occupational students. In addition, we measured the effects of completing a certificate, an associate and a bachelor's degree. Within the associate degree group, we also measured the returns to degrees earned by students enrolled in academic and occupational programs.

We further tested whether a statistically significant difference exists between the returns to a year of postsecondary schooling earned by an occupational and an academic sub-baccalaureate student and between the returns to an associate degree earned by these two types of students. Finally, we tested the independent value of earning a degree over and above the

value of completing the years of schooling required to earn the degree (the sheepskin effect) to determine whether a sheepskin effect exists for certificates, associate degrees and bachelor's degrees as well as for occupational and academic students.

Thus, our full specification is shown in equation (2):

$$\log(W_i) = X_i B_x + S^{bac}{}_i B_S + S^{sub\text{-}ac}{}_i B_S + S^{sub\text{-}oc}{}_i B_S + D^{ct}{}_i B_D + D^{aa\text{-}ac}{}_i B_D + D^{aa\text{-}oc}{}_i B_D + D^{ba}{}_i B_D + E_i B_E + E^{\wedge 2}{}_i B_{E\wedge 2} + u_i \quad (2)$$

The baseline model was extended to include four dummy variables for highest degree completion: a certificate ($D^{ct}{}_i$), an associate degree for an academic student ($D^{aa\text{-}ac}{}_i$), an associate degree for an occupational student ($D^{aa\text{-}oc}{}_i$), and a bachelor's degree ($D^{ba}{}_i$). The coefficients on these variables estimated the overall economic returns to completing these degrees. For some specifications, we estimate the returns to an associate degree without differentiating between academic and occupational students.

We also extended the baseline model by changing the years-of-education variable in two ways. First, we set this variable equal to zero for every student who earned a degree. For students who did not earn a degree, we set this variable equal to the FTE years of schooling reported by the student. The coefficient on this variable is a measure of the returns to one FTE of postsecondary education for students who did not complete a degree. We could then compare this coefficient with the returns to earning a degree to determine whether a student would get a benefit from completing the degree in addition to the value of the years of schooling required to

earn the degree (the sheepskin effect). Note that by setting the FTE years of schooling equal to zero for degree completers, we are potentially losing some information. Some students may have completed additional years of schooling after completing their degree, and we are not taking account of this possibility. The effect of doing so inflated the value of the degrees, and, thus, the sheepskin effect since the value of any postdegree schooling will be included in the coefficient for the degrees. But we followed this strategy for two reasons. First, NELS does not report any years of schooling for students who complete degrees, so this strategy is the only option that we had. And, to make the analyses of the two datasets comparable, we also used this approach for HS&B. Second, this strategy is a commonly used approach in the literature (see Grubb 1993 and Kane and Rouse 1995), so using this specification will facilitate comparison to other studies.

We also disaggregated the FTE years of schooling variable by baccalaureate (S^{bac}_i) and sub-baccalaureate occupational ($S^{sub\text{-}oc}_i$) and academic ($S^{sub\text{-}ac}_i$) students.[21] Thus, we could test whether occupational students benefit more from taking courses without finishing degrees than academic students. It is important to emphasize that this specification does not provide a direct test of the sheepskin effect. The coefficient on the degree variables measures the total return to the degree including the direct effects of the years of schooling and the extra effect of the degree (the sheepskin effect). To test for the sheepskin effect for an associate degree, for example, we multiplied the coefficient of the FTE years of schooling variable by 2 and compared that with the coefficient on the associate degree. If the latter was higher, then we could conclude that the student gets an extra benefit from the degree. We formally tested this hypothesis using an *F* test of the restriction that twice the coefficient for one FTE year of schooling is equal to the coefficient for an associate degree.

The central econometric problem with all of these models is that students are not randomly distributed among the different educational programs under study. Students who choose to pursue their education beyond high school may be different from those who choose not to do so. Those who enroll in baccalaureate programs may differ from those who enroll in sub-baccalaureate programs. Those in academic majors may differ from those in occupational majors, and students who complete degrees may have important differences from those who leave college with no degree. A comprehensive treatment of these issues would require a multi-equation structural model with several instrumental variables. These datasets do not have enough information to analyze this complex decision process. We could, however, control for family background characteristics and test scores that reflect academic talent and pre-college academic performance. Thus, in both datasets, we have measures of family income, parental educational levels, and scores on standardized tests taken during high school. These variables can control for many of the factors that determine student allocation into these different types and levels of postsecondary education. Nevertheless, it is important to remember that some returns to degrees or FTE years of schooling may result both from the effects of the education and from unmeasured characteristics of students choosing to enroll in those different types of programs.

Outcomes by Gender

The results of these models, estimated separately for women and men, are presented in tables 4 and 5. Columns (i) and (iii) of each table show the results of the basic model in which we included measures of the years of postsecondary schooling, differentiating between

[21] In some specifications, we aggregated all sub-baccalaureate students.

baccalaureate and sub-baccalaureate students, and an indicator of the highest degree earned: certificate, associate or bachelor's. In columns (ii) and (iv), we further divide the sub-baccalaureate years of schooling into those experienced by occupational students, academic students and students with no declared major. We also divided the students receiving associate degrees into those who declared occupational and academic majors and those with no declared major. Note that all specifications reported in these tables include controls for years of work experience, family socioeconomic status and test scores.

Tables 6 and 7 present results from a hypothesis test of sheepskin effects for certificates, associate degrees for academic and occupational students, and bachelor's degrees. We also tested the equivalence of the value of one year of postsecondary schooling for occupational and academic students, the value of associate degrees for academic and occupational students, and the value of a year of schooling for baccalaureate and sub-baccalaureate occupational students.

Outcomes for Students Who Do Not Complete a Degree

The data presented on tables 4 through 9 provide evidence that students do benefit from postsecondary education, even when they do not complete a degree. Female students who do not complete a degree earn between 10 percent (NELS) and 14 percent (HS&B) more per year than a high school graduate. The analysis using NELS suggests that students get a larger benefit per year of schooling from enrolling in a baccalaureate program than in an occupational sub-baccalaureate program, which is usually in a community college (table 6, row 1). The NELS analysis suggests that women who enroll in occupational sub-baccalaureate programs do not

benefit from years of schooling unless they complete a degree. The coefficient implies that, if a female occupational student completes one year of postsecondary schooling, she will earn 5 percent more than a high school graduate, but the coefficient is not statistically significant (table 4, column ii). In the earlier cohort (HS&B), female occupational students experienced a 12 percent return for each year of postsecondary schooling.

The results for men are mixed. For the later cohort (NELS), the value of a year of postsecondary schooling is between 6 percent and 10 percent. Once again, a year of education in a bachelor's program appears to have higher returns, although that difference is also not statistically significant. Nevertheless, the HS&B analysis shows no returns to postsecondary education without a degree, either for baccalaureate or sub-baccalaureate men.

Outcomes for Students Who Earn a Certificate

Completing a certificate has no statistically significant value for men, although it does appear to raise women's earnings. The analysis neither of NELS nor of HS&B indicates a statistically significant non-zero return to earning a certificate for men. The results presented in table 5 (column ii) indicate that a male occupational student who completes a year of schooling without completing a degree may earn more than a male student who completes a certificate, although the difference is not statistically significant (table 7, row 4). In contrast, in the NELS analysis, women who completed a certificate earned about 15 to 16 percent more than high school graduates. The analysis of the earlier cohort (HS&B) suggests an even higher return. Moreover, it appears that the certificate does raise earnings for women above the earnings of

female occupational students who complete a year of schooling without a degree, although this difference is not statistically significant (table 6, row 4).

Outcomes for Students Who Earn an Associate Degree

Over the past 20 years, many analysts have expressed skepticism about the economic value of a community college or sub-baccalaureate education. Our study suggests that sub-baccalaureate students do indeed benefit economically from their education. We have already shown that women benefit from a sub-baccalaureate education even when they do not complete their degrees, and the analysis of NELS suggests the same for men, although this conclusion is primarily true for men in occupational programs. The results presented in tables 4 and 5 on the overall returns to associate degrees reinforce that positive conclusion. Women who complete associate degrees earn about 37 percent to 39 percent more than high school graduates (table 4, columns i and iii) whereas male associate degree graduates enjoy about a 12 percent to 16 percent earnings advantage (table 5, columns i and iii). The evidence here suggests that the associate degree is much more valuable for occupational students than it is for academic students, especially for men. Indeed, no statistically significant return to an academic associate degree for men is evident, and our hypothesis tests show that the difference between the returns to an associate degree for occupational and academic students is significant at the 10 percent level (table 7, row 3). For the later cohort, men with occupational associate degrees earned almost one quarter more than comparable high school graduates (table 5, column ii). The returns to an associate degree for a female occupational student are also higher than for an academic student, but in this case, the difference is not statistically significant.

There is also some evidence for a sheepskin effect associated with an associate degree for sub-baccalaureate occupational students. In the NELS analysis for women, two FTE years of sub-baccalaureate occupational education generates about an 11 percent return whereas an associate degree is worth a 39 percent return for a female occupational student. Clearly, a statistically significant sheepskin effect occurs for women in the later cohort (table 6, row 5). The same is true for women in HS&B, although here it is significant only at the 7 percent level. However, although both datasets indicate that, for male occupational students, the associate degree is worth more than twice the value of an FTE of postsecondary education not resulting in a degree, these differences are not statistically significant.

How do the returns to occupational associate degrees compare with those returns for bachelor's degrees? Because it takes twice as long to earn a bachelor's degree and it costs more than twice as much (since tuition at four-year schools is greater than it is at two-year schools), we might expect that the returns to a bachelor's degree would be at least double those for an associate degree. Indeed, for women in both cohorts and for men in the later cohort, twice the return to an associate degree for occupational students equals or exceeds the returns to the bachelor's degree (tables 6 and 7, row 8). Only in the analysis of men using HS&B do the returns to the bachelor's degree exceed twice the returns to an associate degree for occupational students, and this difference is not statistically significant.

Outcomes for Students Who Earn a Bachelor's Degree

The data displayed in tables 4 and 5 indicate very large returns to bachelor's degrees. Indeed, according to the analysis of NELS, women who complete a bachelor's degree earn about two-thirds more than high school graduates. Moreover, these returns grew during the 1990s.[22] Although these estimates are higher than for most previous studies, other studies have also found high returns to bachelor's degrees. For example, Kane and Rouse (1995) presented estimates for returns to bachelor's degrees for women of almost 40 percent, and their data showed that men who complete a bachelor's degree earn between 35 and 40 percent more than high school graduates.

Is there a sheepskin effect associated with completing a bachelor's degree? Certainly the analysis of HS&B for men suggests that men gain a large benefit from completing their bachelor's degree (table 7, row 7). Indeed, there are no returns for FTE years of postsecondary education for baccalaureate students who do not complete their degree (table 5). Moreover, for all of the other analyses—women in NELS and HS&B and men in NELS—the returns to the bachelor's degree are more than four times the returns to a year of postsecondary education for a

[22] We have previously suggested that our specification may result in an overestimate of the returns to degrees because we do not take account of any credits or time in school spent subsequent to earning the highest degree. If a student benefits from this kind of extra education, then that benefit will be reflected in the returns to the degree. However, we are interpreting the coefficients as the returns to education. As we have pointed out, these coefficients should be exponentiated to derive the returns. This process will cause the most problems when the coefficients are large; therefore, interpreting the coefficients as the percentage returns to education will cause the largest underestimation of those returns to the bachelor's.

bachelor's student. This finding suggests a sheepskin effect. Nevertheless, none of these differences are statistically significant (tables 6 and 7, row 7).[23]

Effect of High School Vocational Track

Next, we turn to the question of whether students who had enrolled in vocational tracks while in high school experienced higher than average earnings gains from enrolling in sub-baccalaureate occupational programs. We conducted an analysis of the NELS dataset in which we included measures of high school track, based on student transcripts, as predictors of wage outcomes. We included two dummy variables: the first equal to 1if the student's high school curriculum was vocational, the second equal to 1 if the student's high school curriculum was academic. The omitted category is general curriculum, and students concentrating in general study served as our reference group.[24]

We first included measures of high school curriculum, by themselves, to see whether they had any direct effect on earnings outcomes. Next, we included interaction terms between high school vocational track and (a) subsequent enrollment in a sub-baccalaureate occupational program and (b) receipt of an associate degree with a major in an occupational field. These interaction terms allowed us to test whether those who study and earn degrees from sub-

[23] Using the exponentiated coefficients for these tests is more likely to find a sheepskin effect; therefore, the estimates presented here are an underestimate of the value of completing a degree compared with accumulating an equivalent *amount* of postsecondary education.

[24] Because of the transcript-derived information about high school curriculum in NELS, we are able to define high school track only for those students who graduate from high school. Consequently, we are forced to eliminate high school dropouts and GED recipients from the analyses of the subsequent earnings effects of vocational high school study.

baccalaureate occupational programs fare better if they had concentrated in vocational study while in high school.

The results (not shown here) indicate that, overall for women, there is no significant direct effect of a high school vocational curriculum on subsequent earnings in the NELS and HS&B cohorts. In other words, the coefficients on the measure of concentration in vocational studies in high school are small and negative, but the coefficients are dwarfed by their respective standard errors. Our estimates do suggest, however, that a female student who pursues an occupational track in high school and who completes an associate degree does benefit from her high school track.

For men, the data show no evidence of a direct effect of study in a high school vocational track on wage outcomes. Further, the data show no evidence that students who enroll in sub-baccalaureate occupational programs or who earn degrees from those programs fare any better if they had studied in a vocational track while in high school. However, note that these are not very powerful statistical tests because cell sizes are somewhat small. For example, only 40 men in our sample both earned occupational associate degrees and had studied in a vocational program while in high school. Given the small sample sizes, we would expect that only very powerful effects would be picked up in these tests.

Nontraditional and Special Populations

In this section, we examine the extent to which nontraditional and special populations benefit from a sub-baccalaureate education. We use the same specification shown in equation 2,

but restrict the sample to the subpopulation of interest—in this case, students who are older, a racial-ethnic minority, or academically or economically disadvantaged.[25] Overall, the findings suggest that sub-baccalaureate and occupational education are not equally beneficial for all groups, which is generally consistent with findings in earlier studies. More important, however, they underscore the point that certain groups are still struggling economically despite having a higher education and, in some cases, despite attaining degrees.

Older Students

We begin with an analysis of immediate earnings for older students in BPS. We use the term *immediate* to differentiate the BPS89 analysis from NELS and HS&B because, on average, the earnings in BPS89 are observed after only a year or two postcollege. Some students in NELS and HS&B could also be out of college a year, but that is more the exception than the rule. As mentioned previously, because of the way in which the sample was created, caution should be taken when reading the returns from this analysis.

As shown in table 10, the economic outcomes of older men and women were no different (and, in some cases, worse) than similar-aged individuals with no college. Moreover, some evidence indicates that attaining a certificate lowers earnings in the first several years after college. For instance, older women and men who receive a certificate earn roughly 42 percent less than high school graduates. Older men in occupational programs are significantly worse off

[25] Note that, in some instances, the restricted samples left too few observations in certain key cells, which can compromise the reliability of the estimates. If the restricted sample was too small, we estimated the direct effect of the subgroup by adding a dummy variable to the model. We also added a series of enrollment and degree interactions to estimate the indirect effect.

if they attain an associate degree. Their earnings are nearly 78 percent lower than high school graduates. No sheepskin effect occurs for sub-baccalaureate degrees. However, note that only 84 observations occur in this analysis, so the short-term earnings effects for older students should be interpreted with care.[26]

Turning our attention to the immediate economic outcomes of younger (age 24 or younger) students, we find that the returns to postsecondary education are generally positive, but the key is attaining a degree. Young, occupational females earn 37 percent more than high school graduates if they attain an associate degree. This coefficient is statistically different from the return to an associate degree for academic students, which indicates that a premium, or sheepskin effect, exists for those completing occupational programs. The coefficients on certificate and associate degrees are positive for young men, but they are not statistically different from high school graduates. One possible explanation for men may be the existence of a strong labor market for workers with a high school education. Yet, as our long-term earnings analysis shows, the economic parity between male high school and college students is short-lived. Our NELS and HS&B analysis shows that, if an average male occupational student attains an associate degree, his earnings gains over a high school graduate will materialize in the long term.

For the most part, the findings from our immediate earnings analysis agree with those of Leigh and Gill (1997). They found that older female students who attained a sub-baccalaureate degree did not earn significantly more than those without a credential. Our findings mainly

[26] As stated earlier, the findings using NELS and HS&B are much more reliable than the short-term analysis, but it is still possible that our long-term economic outcomes analysis underestimates the effects of these background variables because they may influence earnings by increasing the probability that students will enroll in particular types of education. For example, we do know that students from lower-income families are more likely to enroll in

support this conclusion. The one exception is that, in our analysis, females in occupational programs who attain an associate degree earn substantially more than high school graduates and other sub-baccalaureate students.

Racial-Ethnic Minority Students

We now turn our attention to racial-ethnic minorities, who have consistently earned less than whites with the same level of education. Some evidence indicates that this trend persists into the 1990s, especially for black men, but the results for women are generally positive (see tables 11 and 12). As shown in table 12, even after controlling for a similar set of background characteristics, black men earn almost 28 percent to 38 percent less than white men immediately after college. However, the earnings of Hispanic men are statistically indistinguishable from white men. The findings from BPS89 also indicate that being a racial-ethnic minority does not have a significant effect on the immediate earnings of women.

In our analysis of long-term economic effects (tables 4 and 5), black women do relatively well in the later cohort, and Hispanic women earn more in the earlier cohort compared with white women. But once again, black men earn substantially less than whites in both cohorts. We concur with Averett and D'Allesandro (2001), who point out that higher economic returns of racial-ethnic minorities are undermined by lower completion rates, but further analysis is needed to determine other reasons why these disparities continue to exist.

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sub-baccalaureate education. Thus, the coefficients on these educational variables will absorb some of the overall effect of low socioeconomic status.

Academically or Economically Disadvantaged Students

Our final subpopulation analysis involves individuals who are academically or economically disadvantaged. We define academically disadvantaged students as those who scored in the lower two quartiles of a math and reading test administered in tenth grade. We define economically disadvantaged students as those who earned, or are part of a family that earned, less than $20,000 the year before college attendance. Many of these students enroll in occupational education because of those programs' less than rigorous academic standards[27] or because the student can acquire an employable labor market skill quickly and at a low cost, which is highly attractive. The key question, therefore, is whether this economic strategy is beneficial in the long term.

We begin with academically disadvantaged students. We could not estimate short-term economic effects for this subpopulation, so our discussion will focus only on the long-term effects using NELS. As with many of the findings in this section, the evidence is encouraging, but not for all groups. As reported in tables 13 and 14, female occupational students who fail to attain a credential earn roughly the same as high school students. Moreover, they do not experience the same economic benefit as academic students, who earn 24 percent more than high school graduates even without attaining a credential. In fact, female occupational students could experience a strong incentive to attain at least an associate degree because the average returns are quite strong: 44 percent. However, because of small sample sizes, we are unable to determine whether occupational students are at an economic advantage compared with other program completers or to test for sheepskin effects. Academically disadvantaged men, in contrast, appear

to benefit from taking occupational course work and from attaining an associate degree (table 15, column ii, and table 16), but the presence of a positive sheepskin effect from the associate degree cannot be formally tested.

Our findings suggest that, in the short run, postsecondary education cannot compensate for being economically disadvantaged. Tables 11 and 12 show that the earnings of economically disadvantaged men and women are, on average, not statistically different from high school graduates, but again, this finding may possibly be because of limitations of the sample. In time, however, postsecondary education can greatly benefit economically disadvantaged students, particularly men. In fact, even if they do not attain a formal credential, men experience sizeable returns to schooling. The benefit to a year of occupational course work is 15 percent, but the return to the same year of academic course work is more than double (table 15, column iii). The difference between the returns to a year of occupational and academic course work, however, is not statistically significant. Overall, attaining a certificate or associate degree greatly enhances economic outcomes, but if a male occupational education student attains an associate degree, his earnings are similar to a high school graduate. This finding may partly explain why associate degree completion rates for occupational males are low; disadvantaged men experience no economic incentive to continue and attain a degree.

Unlike men, there is a significant associate degree return, 29 percent, for female occupational education students who are economically disadvantaged, but no return to occupational course work. The difference is large enough that a test for a sheepskin effect was significant at the 10 percent level. Economically disadvantaged women in academic programs do

[27] In some cases, no remediation or developmental education is offered in occupational programs of study.

not benefit from either enrolling in course work or attaining an associate degree. Using the same argument as above, the evidence suggests that women in occupational education programs have a strong incentive to earn an associate degree and an even stronger incentive to get a bachelor's degree. Even receiving a certificate will increase earnings 26 percent over a high school graduate, an option that may be a more feasible for women who face significant economic disadvantages.

VI. Conclusion

Our findings from data based on a nationally representative sample of young adults in each of the last two decades generally support the overall conclusion that students benefit from a sub-baccalaureate education whether they complete degrees or not, although some differences occur between men and women and among various subpopulations. Moreover, occupational sub-baccalaureate students do at least as well financially as academic students. More surprisingly, we found less evidence for the sheepskin effect than we expected, especially for the bachelor's degree, although our analysis probably understates the sheepskin effect for that degree. We did find a strong sheepskin effect for associate degrees for female occupational students and somewhat weaker evidence for male occupational students. In the following discussion, we review our answers to the six questions that we posed at the beginning of this report.

Summary of Findings

1. What are the average earnings benefits associated with sub-baccalaureate degrees? We found that, on average (not controlling for any background variables), with the exception of certificates, each additional degree was associated with higher earnings. Students whose highest degree was a certificate earned less, on average (not controlling for any background characteristics), than students who had no more education beyond high school. At the sub-baccalaureate level, occupational students who completed associate degrees earned, on average, more than academic students who completed those degrees.

2. How do the earnings of sub-baccalaureate students (those who complete degrees and those who do not) compare with the earnings of individuals who have no more than a high school diploma? In most cases, we found that sub-baccalaureate students who did not complete degrees still had higher earnings than high school graduates. For the analysis of HS&B men, we found no statistically significant effect for years of postsecondary education for those without degrees, but for women and for men in the later cohort (NELS), we estimated that an additional year of sub-baccalaureate education was worth between 5 percent and 10 percent in additional earnings. These findings accord closely with the conclusions from Grubb's (2002) review. For occupational students, the return was about 5 percent for women (not statistically significant) and 8 percent for men. For both sexes and both datasets, the overall returns to an associate degree for occupational students were positive and statistically significant. For men, this estimate rose from 12 percent in HS&B to 26 percent in NELS. For women, the estimates from both datasets were approximately 39 percent. These estimates are also similar to those reported by Grubb (2002). Male occupational students benefit much more from an associate degree than academic students, and the difference is statistically significant. The estimates for women also suggest that occupational students who complete degrees benefit more than academic students, although the difference is not statistically significant. Certificates, which are overwhelmingly occupational, resulted in higher earnings only for women (15 percent in NELS). Men who complete certificates do not earn any more than similar high school graduates. Uneven returns to certificates have also been found in other studies (Grubb 2002).

3. Do occupational students who complete degrees earn more than those who complete an equivalent amount of education but do not earn degrees? For occupational

students who earn associate degrees, a sheepskin effect exists for women in both NELS and HS&B and for men in HS&B. For example, in NELS, female occupational students who complete two years of sub-baccalaureate education without a degree experience a return of about 11 percent above the earnings of a high school graduate, whereas women in occupational programs who earn an associate degree enjoy a 39 percent earnings advantage compared with a high school graduate. This difference is statistically significant, which indicates the existence of a positive sheepskin effect from the associate degree. For men, earnings rise from 15 percent to 26 percent, but that difference is not statistically significant.

4. Is the sheepskin effect stronger or weaker for occupational students than it is for academic students? In contrast to the results for occupational students, no associate degree sheepskin effect occurs for academic students, but it should be emphasized that, for men in both NELS and HS&B and for women in HS&B, no statistically significant overall effect occurs for academic associate degree students. Students who complete an academic associate degree do not earn more than either (a) students who complete two years of sub-baccalaureate education but earn no degree or (b) high school graduates. In NELS, female occupational students do benefit from academic associate degrees compared with high school graduates, but they get no benefit from the degree in addition to the returns to two years of postsecondary schooling.

5. What is the earnings effect of enrollment in a high school vocational track on the subsequent earnings of sub-baccalaureate students, and does the high school track have a different effect on the earnings of academic and occupational sub-baccalaureate students? High school track has no direct effect on earnings after controlling for background characteristics

and postsecondary enrollment and achievement variables. However, female occupational students who complete an associate degree do earn more if they also had a vocational concentration in high school. This effect is not true for men. These results should be interpreted with caution, however, because much of the effect of high school track may operate through its influence on the type of postsecondary program in which the student enrolls.

6. Is occupational education beneficial for subpopulations such as older students, racial-ethnic minorities, academically challenged students, and economically disadvantaged students? Unlike older students, young females in occupational programs receive a substantial return to an associate degree. This return is statistically greater than the return to an associate degree for younger academic students, which is an indication of a degree premium or sheepskin effect. The return to a certificate and associate degrees is positive for young men in occupational programs, but they are not statistically different from high school graduates. However, our long-term economic analysis seems to suggest that, if a male occupational student attains an associate degree, he will experience a significant earnings premium over a high school graduate.

All things being equal, black men continue to earn less than white men with similar levels of education, and this earnings gap persists over time. In contrast, black and Hispanic women show positive and significant earnings gains in the long run, and their earnings are at least statistically similar to white women in the short term.

For students who are academically or economically disadvantaged, the results are encouraging, but in no way should occupational education be considered a panacea.

Academically disadvantaged, female occupational students who fail to attain a credential earn roughly the same as high school graduates with no postsecondary education, but there could be a strong incentive for them to attain at least an associate degree because the average returns are significant. Academically disadvantaged men, in contrast, appear to benefit from occupational course work and from attaining an associate degree. Although it does not appear to affect short-term economic outcomes, an occupational postsecondary education can greatly benefit economically disadvantaged students, particularly men. Even if they do not attain a degree, economically disadvantaged men experience sizeable returns to occupational course work, but the gains are not realized for those who attain an academic associate degree. In comparison, a significant associate degree effect occurs for occupational females who are economically disadvantaged, but women in this group experience no return to occupational course work. Thus, a strong incentive exists for economically disadvantaged women in occupational programs to persist and attain a sub-baccalaureate degree, an incentive that does not exist for men.

The results presented in this report suggest a generally positive picture of postsecondary occupational education. For sub-baccalaureate occupational students, the returns to a year of postsecondary education are close to or equal with the returns to a year of schooling for a student in a baccalaureate program or a sub-baccalaureate academic student. The value of an associate degree for an occupational student often exceeds the value of an associate degree for an academic student and, in some cases, exceeds one-half the value of a bachelor's degree. Occupational programs appear to be particularly useful for students whose highest credential is an associate degree.

Policy Implications

Two broad policy conclusions emerge from this analysis. First, sub-baccalaureate occupational education is a viable and productive educational alternative for many students. In general, students pursing an occupational program in a community college do not suffer in the sense that they earn less than either baccalaureate or academic students with equivalent amounts of education. Indeed, some evidence indicates that they earn more than academic students. Thus, Congress can continue to support sub-baccalaureate occupational education and be confident that, on average, students will benefit from the programs supported.

Second, earning an associate degree is important. In general, sub-baccalaureate students benefit from years of postsecondary schooling even if they do not complete a degree, although our analysis of NELS shows no independent years-of-schooling effect for female occupational students. Thus, a very large and statistically significant sheepskin effect occurs for female occupational students who earn an associate degree. For male occupational students, the value of an associate degree considerably exceeds the value of two years of a sub-baccalaureate education, although the difference is not statistically significant. Thus, although many students do appear to benefit from a community college education without earning a degree (as many college personnel argue), students, especially women, can gain significant additional benefits from graduating. And although our analysis has shown that a sub-baccalaureate academic education has lower returns than an occupational education, we suspect that it is because most of the benefits for these students would come from transfer to a bachelor program and completion of a bachelor's degree. Thus, completion and transfer are important objectives for sub-

baccalaureate students, and Congress should develop strategies and incentives to encourage students to achieve these educational outcomes.

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Tables

Table 1: Student Sample Demographics

	NELS	HS&B	BPS89
Initial Control Variables			
Black	0.120	0.138	0.115
	0.011	0.008	0.013
Hispanic	0.101	0.081	0.084
	0.008	0.005	0.012
Nonnative	0.045	0.036	0.027
	0.004	0.003	0.006
High school dropout (No GED)	0.105	0.089	
	0.009	0.005	
GED	0.079	0.071	0.101
	0.006	0.004	0.011
Enrollment Variables			
Baccalaureate	0.310	0.219	0.160
	0.010	0.007	0.012
Sub-baccalaureate	0.327	0.377	0.682
	0.010	0.008	0.018
By Field of Study			
Occupational	0.550	0.693	0.440
	0.018	0.011	0.020
Academic	0.325	0.219	0.139
	0.018	0.010	0.016
No major	0.122	0.088	0.103
	0.011	0.007	0.013
Degree Variables			
Highest Degree: Certificate	0.063	0.078	0.181
	0.005	0.005	0.013
Highest Degree: Associate	0.050	0.077	0.089
	0.003	0.004	0.010
Highest Degree: Bachelor's	0.283	0.216	0.047
	0.010	0.007	0.006
Started as a baccalaureate	0.807	0.730	0.794
	0.014	0.013	0.068
Started as a sub-baccalaureate	0.193	0.270	0.206
	0.014	0.013	0.068
Family Characteristics Variables			
Parents completed some college	0.411	0.284	0.225
	0.010	0.007	0.014
Parents have bachelor's degree	0.249	0.236	0.197
	0.010	0.008	0.014

Note: Standard errors are below coefficient.
Source: National Education Longitudinal Study:1988/2000, High School and Beyond:1980/1992, and Beginning Postsecondary Students:1989/1994.

Table 2: Economic Outcomes by Enrollment and Degree

		BY ENROLLMENT					BY DEGREE				
				Sub-baccalaureate							
	Sample average	No PSE	Total	Occ	Non-occ	Bacca-laureate	GED	High school diploma	Certificate	Associate	Bachelor's
Wages and salary income (1999)	$26,028	$20,295	$25,600	$25,603	$25,596	$32,804	$20,280	$23,297	$22,426	$27,225	$33,733
Hourly rate of pay (1999)	$13.68	$11.34	$13.75	$13.71	$13.79	$16.28	$12.02	$12.15	$12.62	$13.78	$16.47
Weeks worked (1999)	47.4	45.9	48.1	47.9	48.4	48.3	45.8	47.6	46.8	49.4	48.7
Hours worked per week (1999)	43.4	43.0	42.7	42.9	42.4	44.6	41.6	42.9	41.7	42.5	44.6
Proportion currently employed (2000)	88.2%	79.7%	90.9%	90.9%	91.0%	95.2%	78.4%	85,7%	88.6%	94.8%	95.9%
Proportion employed full-time (2000)	80.9%	72.1%	82.8%	83.3%	82.3%	89.3%	71.1%	77.1%	77.2%	85.8%	90.8%

Source: National Education Longitudinal Study:1988/2000.

Table 3: Economic Outcomes by Gender and Sub-baccalaurate Program of Study and Degree

	MALES								
			Sub-baccalaureate		Highest Degree				
	No PSE	Total	Occ	Non-occ	GED	High school diploma	Certificate	Associate	Bachelor's
Wages and salary income (1999)	$26,712	$30,897	$32,599	$29,170	$29,051	$28,854	$30,198	$32,200	$38,392
Hourly rate of pay (1999)	$13.51	$15.25	$15.99	$14.48	$15.04	$14.04	$14.76	$15.22	$17.98
Weeks worked (1999)	47.9	49.1	48.6	49.6	47.3	49.2	49.6	49.8	49.5
Hours worked per week (1999)	46.0	45.1	46.2	44.0	44.1	45.6	46.7	44.4	46.3
Proportion currently employed (2000)	90.6%	96.9%	97.2%	96.6%	90.1%	92.4%	97.9%	97.8%	97.5%
Proportion employed full-time (2000)	86.5%	92.5%	94.2%	90.6%	86.7%	86.8%	95.1%	91.2%	94.0%

	FEMALES								
			Sub-baccalaureate		Highest Degree				
	No PSE	Total	Occ	Non-occ	GED	High school diploma	Certificate	Associate	Bachelor's
Wages and salary income (1999)	$12,508	$20,367	$19,425	$21,584	$12,820	$15,151	$17,133	$22,668	$29,564
Hourly rate of pay (1999)	$8.71	$12.25	$11.64	$13.02	$9.25	$9.39	$11.13	$12.49	$15.14
Weeks worked (1999)	42.9	47.0	47.2	46.8	44.2	45.0	44.8	49.0	48.0
Hours worked per week (1999)	38.7	39.9	39.5	40.4	38.9	38.5	38.1	40.8	42.9
Proportion currently employed (2000)	67.0%	85.0%	85.2%	84.7%	67.7%	76.2%	82.3%	92.3%	94.4%
Proportion employed full-time (2000)	55.2%	73.3%	73.5%	73.0%	57.1%	63.6%	65.1%	81.3%	87.9%

Source: National Education Longitudinal Study:1988/2000.

Table 4: Returns to Degree and Enrollment: Women

	NELS		HS&B	
Independent Variables	(i)	(ii)	(iii)	(iv)
Initial Control Variables				
Black	0.078	0.073	**0.236**	**0.238**
	0.061	0.059	**0.062**	**0.062**
Hispanic	**0.119**	**0.117**	-0.008	-0.002
	0.059	**0.059**	0.111	0.112
Nonnative	0.133	0.123	0.041	0.048
	0.105	0.098	0.101	0.102
High school dropout (No GED)	**-0.363**	**-0.362**	-0.703	-0.713
	0.108	**0.108**	0.422	0.422
GED	-0.058	-0.058	0.346	0.340
	0.075	0.073	0.212	0.212
Years of Schooling (FTE) Variables				
Baccalaureate	**0.141**	**0.148**	**0.113**	**0.108**
	0.026	**0.026**	**0.028**	**0.028**
Sub-baccalaureate	**0.099**		**0.135**	
	0.033		**0.026**	
Occupational		0.053		**0.122**
		0.043		**0.031**
Academic		**0.152**		**0.149**
		0.056		**0.036**
No major		**0.173**		**0.115**
		0.044		**0.041**
Degree Variables				
Highest Degree: Certificate	**0.151**	**0.155**	**0.228**	**0.215**
	0.073	**0.074**	**0.072**	**0.072**
Highest Degree: Associate	**0.365**		**0.387**	
	0.064		**0.065**	
Associates * Occupational		**0.385**		**0.373**
		0.064		**0.066**
Associates * Academic		**0.335**		0.292
		0.129		0.202
Associates * No major		**0.549**		0.172
		0.179		0.096
Highest Degree: Bachelor's	**0.662**	**0.667**	**0.582**	**0.563**
	0.048	**0.048**	**0.061**	**0.060**
Number of observations	**2,342**	**2,312**	**2,398**	**2,398**
R-squared	**0.360**	**0.365**	**0.268**	**0.266**

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000 and High School and Beyond:1980/1992.

Table 5: Returns to Degree and Enrollment: Men

	NELS		HS&B	
Independent Variables	(i)	(ii)	(iii)	(iv)
Initial Control Variables				
Black	**-0.230**	**-0.232**	**-0.132**	-0.123
	0.064	**0.064**	**0.067**	0.068
Hispanic	-0.011	-0.015	0.021	0.023
	0.059	0.059	0.066	0.065
Non-native	-0.037	-0.036	0.127	0.123
	0.065	0.066	0.094	0.094
High school dropout (No GED)	**-0.216**	**-0.221**	-0.379	-0.384
	0.082	**0.082**	0.205	0.206
GED	-0.012	-0.011	-0.187	-0.188
	0.054	0.055	0.128	0.127
Years of Schooling (FTE) Variables				
Baccalaureate	**0.099**	**0.101**	0.007	0.005
	0.022	**0.023**	0.028	0.028
Sub-baccalaureate	**0.057**		0.021	
	0.022		0.023	
Occupational		**0.077**		0.039
		0.029		0.027
Academic		0.036		0.004
		0.040		0.036
No major		0.041		-0.069
		0.032		0.065
Degree Variables				
Highest Degree: Certificate	0.063	0.061	0.051	0.045
	0.047	0.047	0.056	0.055
Highest Degree: Associate	**0.158**		**0.115**	
	0.064		**0.051**	
Associates * Occupational		**0.264**		**0.121**
		0.064		**0.045**
Associates * Academic		0.022		-0.107
		0.140		0.234
Associates * No major		-0.057		**0.338**
		0.098		**0.162**
Highest Degree: Bachelor's	**0.374**	**0.370**	**0.374**	**0.364**
	0.048	**0.050**	**0.046**	**0.045**
Number of observations	**2,410**	**2,363**	**2,331**	**2,331**
R-squared	**0.157**	**0.162**	**0.169**	**0.171**

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000 and High School and Beyond:1980/1992.

Table 6: Tests of Sheepskin Effects and the Equivalence of Different Types of Education: Women

		NELS				HS&B			
F-tests of joint significance of:									
1	Baccalaureate FTE = Occupational FTE	0.148	vs.	0.053	p>0.01	0.108	vs.	0.122	p>0.70
2	Occupational FTE = Academic FTE	0.053	vs.	0.152	p>0.16	0.122	vs.	0.149	p>0.51
3	Occupational*Associate = Academic*Associate	0.385	vs.	0.335	p>0.14	0.373	vs.	0.292	p>0.69
4	Occupational FTE = Certificate	0.053	vs.	0.185	p>0.18	0.122	vs.	0.215	p>0.18
5	2*Occupational FTE = Occupational*Associate	0.106	vs.	0.385	p>0.00	0.244	vs.	0.373	p>0.07
6	2*Academic FTE = Academic*Associate	0.304	vs.	0.335	p>0.84	0.298	vs.	0.292	p>0.97
7	4*Baccalaureate FTE = Bachelor's	0.592	vs.	0.667	p>0.28	0.432	vs.	0.563	p>0.18
8	2*Occupational*Associate = Bachelor's	0.770	vs.	0.667	p>0.37	0.244	vs.	0.583	p>0.11

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000 and High School and Beyond:1980/1992.

Table 7: Tests of Sheepskin Effects and the Equivalence of Different Types of Education: Men

		NELS				HS&B			
F-tests of joint significance of:									
1	Baccalaureate FTE = Occupational FTE	0.101	vs.	0.077	p>0.39	0.005	vs.	0.039	p>0.33
2	Occupational FTE = Academic FTE	0.077	vs.	0.036	p>0.37	0.039	vs.	0.004	p>0.40
3	Occupational*Associate = Academic*Associate	0.264	vs.	0.022	p>0.10	0.121	vs.	-0.107	p>0.33
4	Occupational FTE = Certificate	0.077	vs.	0.061	p>0.80	0.039	vs.	0.045	p>0.91
5	2*Occupational FTE = Occupational*Associate	0.154	vs.	0.264	p>0.16	0.078	vs.	0.121	p>0.49
6	2*Academic FTE = Academic*Associate	0.072	vs.	0.022	p>0.75	0.008	vs.	-0.107	p>0.63
7	4*Baccalaureate FTE = Bachelor's	0.404	vs.	0.370	p>0.27	0.020	vs.	0.364	p>0.00
8	2*Occupational*Associate = Bachelor's	0.528	vs.	0.370	p>0.18	0.242	vs.	0.364	p>0.13

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000 and High School and Beyond:1980/1992.

Table 8: Estimates from Full Model: Women

	NELS	HS&B
Independent Variables		
Initial Control Variables		
Black	0.073	**0.238**
	0.059	**0.062**
Hispanic	**0.117**	-0.002
	0.059	0.112
Non-native	0.123	0.048
	0.098	0.102
Family Income	**0.002**	**0.038**
	0.000	**0.012**
Parental Ed: Some college/Associate	**-0.115**	0.032
	0.040	0.050
Parental Ed: Bachelor's degree or higher	**-0.099**	0.090
	0.048	0.053
Composite test score: Second quartile		-0.006
		0.065
Composite test score: Third quartile		0.232
		0.068
Composite test score: Fourth quartile		0.077
		0.072
Math test score: Second quartile	**0.158**	
	0.056	
Math test score: Third quartile	**0.134**	
	0.060	
Math test score: Fourth quartile	**0.186**	
	0.063	
Reading test score: Second quartile	0.047	
	0.062	
Reading test score: Third quartile	0.059	
	0.057	
Reading test score: Fourth quartile	0.060	
	0.062	

Note: Standard errors are below coefficient.
Bolded coefficients are significant at the 0.05 level.
Source: National Education Longitudinal Study:1988/2000 and High School and Beyond:1980/1992.

Table 9: Estimates from Full Model: Men

	NELS	HS&B
Independent Variables		
Initial Control Variables		
Black	**-0.232**	-0.123
	0.064	0.068
Hispanic	-0.015	0.023
	0.059	0.068
Non-native	-0.036	0.123
	0.066	0.094
Family Income	**0.002**	**0.044**
	0.000	**0.100**
Parental Ed: Some college/Associate	-0.063	-0.002
	0.037	0.040
Parental Ed: Bachelor's degree or higher	-0.050	**-0.105**
	0.042	**0.040**
Composite test score: Second quartile		0.063
		0.055
Composite test score: Third quartile		0.077
		0.063
Composite test score: Fourth quartile		**0.118**
		0.057
Math test score: Second quartile	0.040	
	0.044	
Math test score: Third quartile	-0.020	
	0.047	
Math test score: Fourth quartile	0.035	
	0.054	
Reading test score: Second quartile	-0.016	
	0.043	
Reading test score: Third quartile	0.009	
	0.044	
Reading test score: Fourth quartile	-0.040	
	0.048	

Note: Standard errors are below coefficient.
Bolded coefficients are significant at the 0.05 level.
Source: National Education Longitudinal Study:1988/2000 and High School and Beyond:1980/1992.

Table 10: Immediate Returns to Degree and Enrollment by Age (Under 24 & 24 and Over)

	BPS89			
	Females		Males	
	Under 24	24 and Over	Under 24	24 and Over
Independent Variables	(i)	(ii)	(iii)	(iv)
Initial Control Variables				
Black	-0.069	**-0.741**	-0.225	**-1.088**
	0.188	**0.235**	0.145	**0.239**
Hispanic	0.109	**-1.251**	0.169	0.009
	0.127	**0.371**	0.110	0.253
Non-native	0.225	0.469	-0.491	-0.173
	0.219	0.453	0.268	0.477
GED	-0.641	-0.316	-0.290	-0.269
	0.365	0.224	0.164	0.176
Years of Schooling (FTE) Variables				
Baccalaureate	0.036	-0.453	-0.033	#
	0.064	0.299	0.056	
Sub-baccalaureate				
Occupational	-0.020	-0.419	-0.014	-0.172
	0.091	0.214	0.094	0.170
Academic	-0.029	-0.266	-0.036	#
	0.112	0.149	0.063	
No major	-0.032	#	-0.013	#
	0.115		0.059	
Degree Variables				
Highest Degree: Certificate	0.042	**-0.422**	0.116	**-0.435**
	0.168	**0.170**	0.141	**0.186**
Highest Degree: Associate				
Associate * Occupational	**0.367**	-0.146	0.178	**-0.780**
	0.143	0.219	0.114	**0.285**
Associate * Academic	-0.501	#	0.106	#
	0.323		0.187	
Associate * No major	0.214	#	0.381	#
	0.174		0.225	
Highest Degree: Bachelor's	0.129	#	-0.333	#
	0.175		0.188	
Number of observations	**620**	**162**	**488**	**84**
R-squared	**0.156**	**0.356**	**0.173**	**0.310**

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient number of observations in cell.
Models also control for parental education and work experience.
Source: Beginning Postsecondary Students:1989/94.

Table 11: Immediate Returns to Degree and Enrollment: Women

	BPS89			
Independent Variables	(i)	(ii)	(iii)	(iv)
Initial Control Variables				
Black	-0.238	-0.165	-0.249	-0.171
	0.177	0.181	0.174	0.169
Hispanic	-0.071	0.053	-0.071	0.057
	0.179	0.142	0.177	0.140
Non-native	0.296	0.231	0.263	0.266
	0.260	0.215	0.263	0.213
GED	**-0.702**	**-0.536**	**-0.685**	**-0.528**
	0.273	**0.254**	**0.272**	**0.253**
Economically disadvantaged		-0.276		-0.264
		0.157		0.157
Years of Schooling (FTE) Variables				
Baccalaureate	-0.024	-0.024	-0.027	-0.035
	0.063	0.072	0.063	0.067
Sub-baccalaureate	-0.094	-0.115		
	0.076	0.080		
Occupational			-0.100	-0.182
			0.096	0.128
Academic			-0.105	-0.091
			0.093	0.115
No major			-0.082	-0.044
			0.108	0.089
Degree Variables				
Highest Degree: Certificate	-0.067	-0.022	-0.075	-0.051
	0.135	0.160	0.135	0.156
Highest Degree: Associate	-0.089	-0.228		
	0.183	0.231		
Associate * Occupational			0.227	0.241
			0.136	0.156
Associate * Academic			-0.598	**-0.774**
			0.323	**0.347**
Associate * No major			0.127	0.036
			0.173	0.170
Highest Degree: Bachelor's	-0.068	-0.119	-0.080	-0.149
	0.191	0.179	0.187	0.171
Interaction: Econ disadvantaged * Years of Schooling (FTE)				
Sub-baccalaureate		0.099		
		0.131		
Occupational				0.190
				0.168
Academic				-0.126
				0.218
No major				
Interaction: Econ disadvantaged * Degree				
Highest Degree: Certificate		-0.047		-0.049
		0.293		0.291
Highest Degree: Associate		0.428		
		0.261		
Associate * Occupational				-0.071
				0.216
Associate * Academic				**0.950**
				0.368
Associate * No major				
Highest Degree: Bachelor's		0.209		0.207
		0.373		0.367
Number of observations	**782**	**755**	**782**	**755**
R-squared	**0.120**	**0.135**	**0.141**	**0.166**

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient degrees of freedom.
Models also control for parental education and work experience.
Source: Beginning Postsecondary Students:1989/94.

Table 12: Immediate Returns to Degree and Enrollment: Men

	BPS89			
Independent Variables	(i)	(ii)	(iii)	(iv)#
Initial Control Variables				
Black	**-0.376**	**-0.279**	**-0.375**	
	0.110	**0.125**	**0.110**	
Hispanic	0.147	0.165	0.152	
	0.098	0.099	0.101	
Non-native	-0.280	-0.268	-0.283	
	0.233	0.228	0.234	
GED	**-0.292**	**-0.285**	**-0.292**	
	0.125	**0.128**	**0.125**	
Economically disadvantaged		**-0.417**		
		0.185		
Years of Schooling (FTE) Variables				
Baccalaureate	-0.074	**-0.118**	-0.074	
	0.050	**0.048**	0.050	
Sub-baccalaureate	-0.051	-0.105		
	0.057	0.055		
Occupational			-0.053	
			0.084	
Academic			-0.073	
			0.060	
No major			-0.033	
			0.060	
Degree Variables				
Highest Degree: Certificate	-0.036	-0.106	-0.039	
	0.114	0.128	0.115	
Highest Degree: Associate	0.038	-0.185		
	0.117	0.129		
Associate * Occupational			0.014	
			0.118	
Associate * Academic			0.027	
			0.194	
Associate * No major			0.188	
			0.163	
Highest Degree: Bachelor's	**-0.459**	**-0.708**	**-0.459**	
	0.174	**0.238**	**0.174**	
Interaction: Econ disadvantaged * Years of Schooling (FTE)				
Sub-baccalaureate		0.215		
		0.144		
Occupational				
Academic				
No major				
Interaction: Econ disadvantaged * Degree				
Highest Degree: Certificate		0.284		
		0.225		
Highest Degree: Associate		**0.655**		
		0.242		
Associate * Occupational				
Associate * Academic				
Associate * No major				
Highest Degree: Bachelor's		0.653		
		0.344		
Number of observations	**572**	**562**	**572**	
R-squared	**0.160**	**0.180**	**0.161**	

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient degrees of freedom.
Models also control for parental education and work experience.
Source: Beginning Postsecondary Students:1989/94.

Table 13: Returns to Degree and Enrollment by Disadvantaged Status: Women

	NELS					
	Economically Disadvantaged			Academically Disadvantaged		
Independent Variables	(i)	(ii)	(iii)	(i)	(ii)	(iii)#
Initial Control Variables						
Black	0.061	0.066	0.068	0.152	0.135	
	0.097	0.098	0.099	0.085	0.077	
Hispanic	**0.191**	**0.196**	**0.191**	0.047	0.033	
	0.096	**0.097**	**0.095**	0.096	0.095	
Non-native	0.009	0.002	-0.003	0.216	0.171	
	0.142	0.139	0.138	0.224	0.202	
High school dropout (No GED)	**-0.297**	**-0.291**	**-0.289**	-0.274	-0.285	
	0.134	**0.135**	**0.135**	0.153	0.153	
GED	0.002	0.010	0.011	-0.032	-0.046	
	0.109	0.110	0.112	0.104	0.098	
Years of Schooling (FTE) Variables						
Baccalaureate	**0.202**	**0.206**	**0.207**	**0.226**	**0.226**	
	0.054	**0.055**	**0.054**	**0.039**	**0.038**	
Sub-baccalaureate	-0.024			**0.137**		
	0.088			**0.052**		
Occupational		-0.069	-0.071		0.050	
		0.110	0.110		0.064	
Academic		0.023	0.025		**0.236**	
		0.145	0.146		**0.091**	
No major		**0.229**	**0.225**		**0.240**	
		0.106	**0.108**		**0.053**	
Degree Variables						
Highest Degree: Certificate	**0.254**	**0.262**	**0.261**	0.081	0.076	
	0.117	**0.116**	**0.116**	0.123	0.122	
Highest Degree: Associate	0.105	0.121		**0.436**	**0.434**	
	0.148	0.150		**0.087**	**0.087**	
Associate * Occupational			**0.268**			
			0.115			
Associate * Academic			-0.127			
			0.294			
Associate * No major						
Highest Degree: Bachelor's	**0.882**	**0.897**	**0.883**	**0.734**	**0.736**	
	0.124	**0.122**	**0.123**	**0.085**	**0.085**	
Number of observations	**441**	**441**	**438**	**780**	**780**	
R-squared	**0.427**	**0.431**	**0.433**	**0.370**	**0.378**	

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient degrees of freedom.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000.

Table 14: Tests of Sheepskin Effects and the Equivalence of Different Types of Education: Women

		Economically Disadvantaged				Academically Disadvantaged#
F-tests of joint significance of:						
1	Occupational FTE = Academic FTE	-0.071	vs.	0.025	p>0.58	
2	Occupational*Associate = Academic*Associate	0.268	vs.	-0.127	p>0.20	
3	2*Occupational FTE = Occupational*Associate	-0.142	vs.	0.268	p>0.10	
4	2*Academic FTE = Academic*Associate	0.050	vs.	-0.127	p>0.66	

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient degrees of freedom.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000.

Table 15: Returns to Degree and Enrollment by Disadvantaged Status: Men

	NELS					
	Economically Disadvantaged			Academically Disadvantaged		
Independent Variables	(i)	(ii)	(iii)	(i)	(ii)	(iii)#
Initial Control Variables						
Black	-0.157	-0.152	-0.158	-0.103	-0.108	
	0.122	0.121	0.120	0.061	0.062	
Hispanic	-0.061	-0.037	-0.051	0.095	0.097	
	0.093	0.093	0.093	0.093	0.093	
Non-native	0.065	0.051	0.058	**-0.141**	**-0.140**	
	0.098	0.102	0.107	**0.065**	**0.065**	
HS dropout (No GED)	-0.039	-0.045	-0.037	-0.065	-0.069	
	0.141	0.140	0.140	0.083	0.083	
GED	-0.042	-0.032	-0.032	-0.139	-0.140	
	0.084	0.084	0.085	0.089	0.090	
Years of Schooling (FTE) Variables						
Baccalaureate	**0.148**	**0.151**	**0.145**	0.078	0.070	
	0.052	**0.052**	**0.053**	0.044	0.044	
Sub-baccalaureate	**0.206**			**0.091**		
	0.057			**0.038**		
Occupational		**0.144**	**0.151**		**0.097**	
		0.059	**0.060**		**0.047**	
Academic		**0.288**	**0.306**		0.049	
		0.097	**0.099**		0.058	
No major		**0.123**	**0.128**		0.065	
		0.053	**0.054**		0.049	
Degree Variables						
Highest Degree: Certificate	**0.209**	**0.213**	**0.219**	0.108	0.103	
	0.100	**0.101**	**0.100**	0.068	0.068	
Highest Degree: Associate	**0.281**	**0.284**		**0.282**	**0.275**	
	0.132	**0.133**		**0.080**	**0.080**	
Associate * Occupational			0.241			
			0.137			
Associate * Academic			**0.809**			
			0.139			
Associate * No major			**0.488**			
			0.235			
Highest Degree: Bachelor's	**0.641**	**0.662**	**0.681**	**0.412**	**0.400**	
	0.121	**0.122**	**0.123**	**0.078**	**0.077**	
Number of observations	**446**	**446**	**440**	**840**	**840**	
R-squared	**0.194**	**0.200**	**0.205**	**0.175**	**0.175**	

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient degrees of freedom.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000.

Table 16: Tests of Sheepskin Effects and the Equivalence of Different Types of Education: Men

		Economically Disadvantaged				Academically Disadvantaged#
F-tests of joint significance of:						
1	Occupational FTE = Academic FTE	0.151	vs.	0.306	p>0.15	
2	Occupational*Associate = Academic*Associate	0.241	vs.	0.809	p>0.00	
3	2*Occupational FTE = Occupational*Associate	0.302	vs.	0.241	p>0.72	
4	2*Academic FTE = Academic*Associate	0.612	vs.	0.809	p>0.32	

Note: Standard errors are below coefficient. Bolded coefficients are significant at the 0.05 level.
# denotes insufficient degrees of freedom.
Models also control for parental education, family income, test scores, and work experience.
Source: National Education Longitudinal Study:1988/2000.