
The Benefits of Attending Community College: A Review of the Evidence

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Abstract

This article reviews the existing literature on the economic and other benefits of attending community college. First, the article reports on the earnings gains across all students and reviews the evidence for subgroups by gender, minority status, and credits accumulated. The article then reviews the methodological challenges associated with calculating earnings gains from attending a community college. Despite these challenges, the evidence for the significant earnings gains from community college attendance appears to be compelling. The second part of the article reviews the literature on a broader spectrum of gains, such as health, crime, and welfare reliance. This literature is very limited and potentially offers an important area for further research to establish the full returns from community college attendance.

Keywords

economic research, educational attainment, outcomes of education, income, welfare recipients, crime

This article reviews the literature on the education-earnings premium for students who attend community colleges. The research evidence on the earnings gains from additional education is substantial (see Rouse, 2007), yet relatively few studies have focused specifically on the community college sector. Specific attention is warranted, because the sector is extremely heterogeneous, with many institutional types, varied program offerings, and multiple student pathways. Also, a review of this literature is timely in light of two countervailing developments. One is an increasingly skeptical

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commentary on the expense of attending a 4-year college (e.g., Steinberg, 2010). The other is the recent claim that many students are “undermatched” and should enroll at a 4-year college instead of a community college (Bowen, Chingos, & McPherson, 2009).¹

As well, it is important not to present a narrow picture of the consequences of going to a community college. A growing body of research has identified large benefits of education beyond those found in the labor market (e.g., Attewell & Lavin, 2007; Belfield & Levin, 2007). This review covers such benefits of community college attendance, including changes in health status, well-being, criminal activity and incarceration, and welfare reliance. It may be that these benefits are as large as the earnings gains (as suggested by Wolfe & Zuvekas, 1997); if so, current policy discussions on community college attendance are missing half of the picture.

Thus, the earnings gains and benefits are the full set of advantages from attending community college. It is against these full benefits that enrollees should consider the costs of attendance (such as tuition and foregone earnings) when deciding on whether to enroll, for what award, and for how long. The goal of this review is to set out systematically what is known about the labor market and other advantages of community college attendance and to highlight areas where more research would be beneficial. Methodological and data quality issues that researchers have faced are also considered. In these respects, this review updates and expands on two earlier reviews by Grubb (2002a, 2002b), although our interpretations are based on the original sources directly.

Evidence Base

The goal here is to set out the evidence in the research literature on the benefits of attending community college. The literature uses many terms to describe these benefits. In this review, the evidence is summarized in terms of gains in earnings that derive from attending community college over not attending community college. Specifically, all the literature is reported in terms of annual earnings gains (advantages or premiums) in percentage terms (e.g., a student who completes an associate’s degree earns $x\%$ more than a person who did not choose to enroll). The gains are reported for earnings, not wages; differences in hours of work are therefore accounted for.² As such, the gains reflect both higher productivity and greater labor market participation or employment. This is appropriate insofar as more education increases the likelihood that a person will be employed as well as have a higher wage. Of course, these earnings advantages should be set against the costs of tuition and lost earnings while in college; this allows for calculation of the “returns” or net gains to community college.³ However, these costs are often unavailable and will vary significantly depending on the students’ enrollment choices and pathways. Therefore, this review is restricted to reporting the gross advantages or gains from community college attendance.

Notwithstanding the mass of evidence on the gains from education, research on the labor market advantages of community college attendance per se is relatively limited. One reason why there are so few directly pertinent studies is that the research literature typically analyzes education in units that are not straightforwardly interpreted in relation to community college attendance. Much of the literature estimates the gains to

education in terms of years accumulated. If it is assumed that attending community college is equivalent to two additional years of education, and that the effects of education are linear across all years of education, it is possible to include all of this relevant literature. Other studies do report earnings gains by education level, but they typically classify higher education levels as either *any college graduate* or *some college* versus *bachelor's degree*. Clearly, *any college graduate* will combine graduates from all institutions. The *some college* classification, which typically includes persons with associate's degrees, is the most applicable for community college students, but it will include many persons who fail to complete a bachelor's degree from a 4-year college. Also, significant proportions of community college students progress through to complete bachelor's degrees.⁴ Thus, this review of evidence focuses primarily on the studies that specifically examine community college students.

The search strategy used to identify relevant research evidence included a keyword search of the Web of Science database (specifically, the ERIC, JSTOR, and ProQuest databases); citation tracking from key publications; specific author searches; and a "hand search" of relevant journals (including *Economics of Education Review*, *Journal of Labor Economics*, and *Educational Evaluation and Policy Analysis*). The search was restricted to studies published after 1980 (the review that follows also includes two very recent unpublished studies).

The studies itemized below represent the best available evidence; that is, research that rates highest on a set of methodological criteria. The primary methodological criterion relates to the likelihood that the research has established a causal link. The general methodological hierarchy favors random assignment, followed by natural experiments or other situations in which some students are constrained in their enrollment choices (e.g., by the availability of a college nearby). However, almost all studies in this field are fundamentally correlation studies; any methodological rating should therefore be based on the quality of baseline data, the extent of adjustment for covariates, and how selection into the community college was modeled. (Some of the studies do model how students might face differential costs of accessing the community college in a "quasi-experimental" fashion). The greater the extent to which these studies can address these issues, the closer they come to approximating a causal effect. A secondary methodological criterion might relate to the quality of the data used in the study; more recent data sets with formal sampling frames were preferred.

Although the methods used in these studies cannot establish causality, the research findings summarized below may still be regarded as strong or compelling. Many studies have investigated whether education coefficients in Mincerian earnings equations are biased.⁵ These biases might include *ability bias*, (i.e., observed earnings premiums are actually a return to innate ability not education); *selection bias*, in that differences in earnings are conditional on (unobservable) individual choices about college or about where to work after college; *imputation bias* in matching individuals to earnings profiles; *misreporting bias* on occupations; and *sampling or measurement error*. For a detailed treatment of each bias, see, respectively, Arcidiacono (2004); Dahl (2002), and Black, Kolesnikova, and Taylor (2009); Bollinger and Hirsch (2006); Abraham and Spletzer (2009); and Schmitt and Baker (2006).

In their reviews for the general labor market, both Card (1999) and Rouse (2007) concluded that at least some of these biases do not significantly distort the results obtained from simple earnings functions and that many studies include controls for ability—another potentially biasing factor. Nevertheless, although this conclusion might be valid in general, it may not be valid for estimating gains to particular subgroups, such as sex or race. Some of the subgroup gains may therefore be biased upward or downward. For example, findings from a recent investigation by Hamermesh and Donald (2008) suggest that sampling or nonresponse bias is significant in estimations of the impact of college major on earnings. Perhaps more importantly, most studies do not adjust for failure to complete community college programs but typically estimate the effect of community college on those who have actually completed these programs. Thus, they are not *ex ante* (or “intention-to-treat”) estimates of the earnings gains. However, few of the studies adjust directly for employment probabilities or for “full-wage” effects. If community college attendance increases the probability of employment (as seems likely if attendance increases productivity), then the earnings gains should be adjusted upward to account for the higher probability of being employed. Similarly, if community college attendance increases the probability of receiving fringe benefits at work (such as a health plan or pension contribution), this too should be counted as part of the full earnings gain.

Earnings Gains From Community College Attendance

Aggregate Gains

There is strong evidence that associate’s degrees and years of community college education yield extra earnings compared to high school graduation. There is also evidence that vocational certificates and basic credits contribute positively to subsequent earnings. This evidence is summarized in Tables 1 and 2. The evidence is reported as percentage differences in annual earnings across educational categories; as such, they do not need to be adjusted for inflation.

Almost all studies have found positive earnings gains from an associate’s degree, with an average estimate across the studies of 13% for males and 22% for females. (The lowest estimates—by Ishikawa and Ryan [2002]—control for literacy skills, which are highly correlated with education levels). However, these estimates rely on data from only five surveys, with seven studies using data from the National Longitudinal Study of Youth, 1979 (NLSY79). Nevertheless, very similar estimates were found in the one econometrically similar study that looks at community college attendance using administrative data maintained by the state of Washington on displaced workers (Jacobson, LaLonde, & Sullivan, 2005a).

Similarly, almost all studies have found gains to credits or years of study at community college that do not lead to a completed degree. The average earnings gain for attending community college without obtaining a credential is estimated at 9% for

Table 1. Earnings Premiums to Associate's Degrees, by Gender

Source	Data set	Earnings Premiums (%)	
		Male	Female
Kane and Rouse (1995a, 1995b)	National Longitudinal Survey of the High School Class of 1972 (NLS72)	8	29
Kane and Rouse (1995a, 1995b)	National Longitudinal Survey of Youth, 1979 (NLSY79)	29	36
Hollenbeck (1993)	NLS72	-1	12
Grubb (1993, 1995) ^a	NLS72	0	10
Grubb (1993, 1995) ^b	NLS72	4	3
Jaeger and Page (1996) ^a	Current Population Survey, 1991 (CPS91)	8	31
Jaeger and Page (1996) ^b	CPS91	20	23
Grubb (1997)	Survey of Income and Program Participation (SIPP)	18	23
Surette (2001)	NLSY79	7	13
Leigh and Gill (1997)	NLSY79	24	29
Gill and Leigh (2000)	NLSY79	13	21
Averett and Dalessandro (2001) ^c	NLSY79	18	19
Averett and Dalessandro (2001) ^d	NLSY79	19	33
Ishikawa and Ryan (2002) ^c	National Adult Literacy Survey (NALS)	2	5
Ishikawa and Ryan (2002) ^d	NALS	-1	0
Ishikawa and Ryan (2002) ^e	NALS	6	3
Gill and Leigh (2003)	NLSY79	22	29
Light and Strayer (2004) ^f	NLSY79	19	19
Bailey et al. (2004)	High School and Beyond (HS&B) Survey	12	47
Marcotte et al. (2005)	National Education Longitudinal Study of 1988 (NELS)	17	40
Jepsen et al. (2009)	KY administrative data	20	39
Unweighted average		13	22

Source: Grubb (2002a, pp. 305-306) and original sources.

Note: Studies cited use annual earnings measures (various dates).

a. Vocational-occupational programs.

b. Academic programs.

c. Whites.

d. Blacks.

e. Hispanics.

f. Hourly earnings.

Table 2. Earnings Premiums to Vocational Certification and Credits or Years Completed Without Credentials

Source	Data set	Earnings premiums (%)	
		Male	Female
Premiums to vocational certificate			
Grubb (1997)	SIPP	8	20
Marcotte et al. (2005)	NELS	7	24
Jepsen et al. (2009) ^a	KY administrative data	22	41
Jepsen et al. (2009) ^b	KY administrative data	9	3
Premiums to credits or years completed without credentials			
Grubb (1993, 1995) ^c	NLS72	4	2
Grubb (1993, 1995) ^d	NLS72	2	0
Kane and Rouse (1995b)	NLS72	6	7
Jaeger and Page (1996)	CPS91	9	9
Leigh and Gill (1997) ^e	NLSY79	21	4
Grubb (1997)	SIPP	7	22
Gill and Leigh (2000)	NLSY79	15	8
Surette (2001) ^f	NLSY79	12	13
Averett and Dalessandro (2001) ^g	NLSY79	6	11
Averett and Dalessandro (2001) ^h	NLSY79	20	18
Bailey et al. (2004)	HS&B	0	14
Marcotte et al. (2005)	NELS	6	9
Jacobson et al. (2005a) ⁱ	WA administrative data	9	11
Jacobson et al. (2005a) ^j	WA administrative data	12	15

Source: Grubb (2002a, pp. 305-306) and original sources.

Note: Studies cited use annual earnings measures (various dates). KY refers to unemployment and college administrative data from Kentucky. WA refers to unemployment insurance and college administrative data from Washington state. In addition to the studies noted here, Light and Strayer (2004), analyzing NLSY79 data, calculated an overall earnings premium of 9% for men and women combined.

- a. Diploma.
- b. Certificate, any subject.
- c. Vocational only.
- d. Academic only.
- e. Two-year college with no credential.
- f. Hourly earnings.
- g. Whites only.
- h. Blacks only.
- i. Age 35 or older.
- j. Under 35 years of age.

males and 10% for females. In addition, Heckman, Lochner, and Todd (2008) used Census data to calculate the internal rate of return to progressing from 12 to 14 years of schooling for males; this progression path is close to that from community college.

Table 3. Internal Rates of Return by Years of Schooling

Year	Internal rates of return (%) to advancing from 12 years of schooling to 14 years of schooling		Internal rates of return (%) to advancing from 14 years of schooling to 16 years of schooling	
	White males	Black males	White males	Black males
1960	6-12	5-11	12-25	10-25
1970	6-13	7-12	13-24	12-23
1980	5-11	8-12	11-21	12-31
1990	7-14	15-18	14-26	16-35
2000	8-14	15-19	14-29	18-31

Source: Data are from Heckman et al. (2008, pp. 12-14).

Note: Data reflect Mincerian earnings equations estimated using Census data. Ranges depend on specification of Mincerian earnings equation. Tuition costs are excluded. The internal rate of return refers to the value that equalizes the present value stream of benefits with the present value of costs.

Overall, they estimated that the gains to two more years of schooling beyond high school were between 8% and 19% in 2000 (see Table 3). In addition, research has found that earnings gains rise with the numbers of credits accumulated (see appendix Tables A1, A2, and A3) and that earnings gains are found for a semester's worth of credits or more (Jacobson, Lalonde, & Sullivan, 2005b); but below this amount, there is no earnings advantage (Jepsen, Troske, & Coomes, 2009).⁶

Finally, despite recent emphasis on stronger links between community colleges and their local labor markets, only two studies (Grubb, 1997; Marcotte, Bailey, Borkoski, & Kienzl, 2005) have reported on the earnings effects from vocational certificates. Both studies found significant earnings gains ranging from 7% to 24%.

Earnings Gains by Subgroup

Gender. Earnings gains from community college are much higher for females than for males. Table 1 shows this differential, which is evident at the associate's degree level for graduation, and for credits obtained without a credential. Gill and Leigh (2000) found that this male-female gap remains stable as community college graduates gain experience in the labor market.

Age. There is also evidence that older college enrollees get less of an earnings advantage than younger enrollees. Using unemployment insurance (UI) data from Washington state in the 1990s, Jacobson, LaLonde, and Sullivan (2005a) estimated gains by age stemming from the community college attendance of displaced workers. The earnings gains were 7% to 16% per year for males less than 35 years of age but ranged from 3% to 14% for males aged more than 34; the rates for females in these age categories were 11% to 18% and 6% to 15%, respectively. Using UI data from Kentucky in the 2000s, Jepsen et al. (2009) also found positive earnings effects for degrees, diplomas, and certificates that decrease with age. Using data from the National Education Longitudinal

Study (NELS), Bailey, Kienzl, and Marcotte (2004) estimated an earnings effect of community college attendance that is zero or even negative for older workers. Using NLSY79 data, Light (1995) found smaller advantages to schooling for males who drop out and then reenter formal education. However, earnings gaps by education do grow with age: Using the Census Bureau's Current Population Survey (CPS) data from 1998 to 2003 as well as NLSY79 data, Heckman and Lafontaine (2006) found much higher earnings gaps for persons aged 30 to 39 than for those aged 20 to 29.

Race. Earnings gains may also vary by race, but the evidence for this is not consistent. On balance, the most that one might say is that minority students may experience higher earnings gains from community college attendance. Averett and Dalessandro (2001) reported higher estimates for Blacks than for Whites, either from an associate's degree or from credits accumulated. Gill and Leigh (2003) also reported generally higher earnings gains for Blacks either from completion of a program or transfer from a community college to obtain a bachelor's degree. In addition, Heckman et al. (2008) reported that Black males experienced larger earnings gains by advancing from 12 to 14 years of schooling than did White males (Table 3), and Heckman and LaFontaine (2006) reported higher gains to years of education for Blacks using a range of data sets.

However, using the National Adult Literacy Survey (NALS) database, Ishikawa and Ryan (2002) reported very mixed results (although their model specification differed from the norm). They found that Blacks earned the lowest gains for post-high school vocational training, associate's degrees, and completing some college (controlling for literacy levels in adulthood); but they also found that Hispanic males had higher gains than White males and that Hispanic females had lower gains than White females. In addition, Jaeger and Page (1996) similarly found that the highest gains accrued to White females, with other groups having lower gains.

Immigrants. No U.S. study has looked at labor market advantages to immigrants over domestic-born community college students.⁷ However, the college-high school wage premium for foreign-born persons appears to be at least as high as, and probably higher than, the wage premium of U.S.-born workers. Using CPS data from 1998 to 2003, Heckman and LaFontaine (2006) reported that male and female foreign-born college graduates earned, respectively, 57% and 61% more than male and female foreign-born high school graduates. Using NALS data from 1992, the authors estimated the differences at 41% and 56% (males and females, respectively).

Subjects of study. The earnings gains to education vary significantly across the students' chosen subjects of study. Broadly, studies have found higher gains to quantitative and vocational subjects than to other disciplines. Using UI data from Washington state in the 1990s, Jacobson et al. (2005a) estimated returns of 10% per year for students in quantitative or technically oriented vocational courses and 3% to 5% for less quantitative courses (e.g., sales and service, social sciences or humanities, and basic skills). Jepsen et al. (2009) found that the highest gains were linked to associate's degrees in vocational subjects, with health degrees at the top, followed by other vocational degrees, degrees in business subjects, and then degrees in humanities disciplines (with the last being, in some cases, not significantly different from zero). Using 1984,

1987, and 1990 data from the Survey of Income and Program Participation (SIPP), Grubb (1997) also reported advantages by subject of study. For certificates, gains were highest in health, business and vocational-technical courses. For associate's degrees, gains were highest in health and quantitative courses (business, mathematics and science, and engineering and computers). Gill and Leigh (2000) reported mixed results, albeit with few differences across subjects: Gains were lower for males in business and education, higher for females in sciences. Similarly, mixed evidence was reported by Jaeger and Page (1996) across occupational versus academic associate's degrees.⁸ Based on state administrative data from California, Texas, and Washington state, Grubb (2002b) reported unadjusted salaries by field of study for community college students 3 years after graduation. Raw salaries were highest in more technical fields and in nursing. Finally, Jacobson and Mokher (2009) reported unadjusted salaries in Florida and estimated that, relative to students with a 2-year credential in the humanities, health fields paid 42% more, vocational-technical fields paid 20% more, and science-related fields paid 13% more.⁹

It appears that the higher earnings gains to vocational subjects are genuine, but two cautions should be noted. First, vocational subjects often lead to licensure or certification in a trade or profession, and it may be the license or certificate that is being rewarded. Of course, if the licensing or certification system is demanded by consumers as a way to guarantee quality of service, then these earnings gains are still real (rather than reflecting a restrictive practice in the labor market). Second, courses that lead to licensing or trade certification (or any formal work-related training) may differ in duration or flexibility from other courses leading to associate's or bachelor's degrees. Clearly, shorter courses would yield higher net returns for a given earnings gain. This consideration might bias the returns even more toward vocational courses if they are shorter, offered at more convenient times outside the working day, or linked with job placements.

Findings over time. Finally, there is evidence that the earning premiums to education have grown over recent decades. Using SIPP data, Grubb (1997) calculated earnings gains over high school graduates from 1984 through to 1990 (see appendix Table A2). Labor market advantages to bachelor's degrees and vocational certificates grew over the 6-year period, but gains to associate's degrees fell slightly. Also, the evidence from Marcotte et al. (2005) shows higher gains using the more recent NELS data set. This evidence is consistent with the general literature on the labor market advantages of education. Using Census data, Heckman et al. (2008) reported internal rates of return for White and Black males from the 1960s to the 2000s (see Table 3). For White males going from 12 to 14 years of schooling, the rates were a few percentage points higher for more recent cohorts; for Black males, the returns to two more years of schooling grew substantially more. Using CPS data from 1979 to 2002, Fortin (2006) identified a growing college-high school earnings premium over the period from 1980 to 2000 for both males and females. Also using CPS data from 1970 to 1997, Card and Lemieux (2001) similarly showed a growing college-high school earnings premium over time and across age cohorts; that is, gains for persons of a given age were higher in 1994 than they were in 1967.

Sheepskin Effects

A proportion of the earnings gains may reflect the possession of a credential (a *sheepskin effect*) rather than necessarily any additional skills. Unfortunately, it is often difficult to estimate the size of this sheepskin effect because of data limitations. It is rare for surveys to ask individuals for both years of education attained and terminal qualification earned, such that the two might be distinguished.¹⁰

Using the Current Population Survey from 1991 to 1992, Jaeger and Page (1996) estimated sheepskin effects across levels of higher education.¹¹ Without accounting for sheepskin effects, the study found that a White male with 14 years of education earned 18% more than a White male who was a high school graduate. However, taking out the sheepskin effect reduced that premium to 5%, with the remainder (13%) attributable to the credential. Using NLSY79 data on earnings in 1996, Gill and Leigh (2003) estimated the gains to students who enroll at 2-year colleges. Students who completed an associate's degree earned 11% more than students who enrolled but who did not complete an associate's degree. In their response to Grubb (1993), Kane and Rouse (1995b) tested for the equivalence of 2 years of community college against an associate's degree using data from the National Longitudinal Survey of the High School Class of 1972 (NLS-72). In all specifications, they failed to reject the hypothesis of equivalence, indicating that sheepskin effects were not evident.

Finally, Bailey et al. (2004) tested for sheepskin effects for certificates, associate's degrees, and bachelor's degrees using NELS data. They found that—for females—the earnings of certificate holders were not statistically greater than the earnings of comparable students with equivalent coursework but no certificate. (For males, they found no earnings gain from certification). For associate's degrees, Bailey et al. found sheepskin effects for female students studying occupational subjects, but no sheepskin effects for men. Last, Bailey et al. did not find evidence of sheepskin effects for bachelor's degrees.

Overall, the research consensus appears to be that there are sheepskin effects but that these effects are not always evident, that they vary across levels of education and by sex, and that they do not eliminate the earnings gains from years of noncredentialed college attainment.

Transfer Effects

The question of whether students gain from starting in a community college or lose out because they are diverted from attending a 4-year college—"democratization" versus "diversion"—has received considerable attention in the literature. Both forces appear to be influential.

Some students might have been better off attending a 4-year college initially. Early literature found a small diversion effect (Rouse, 1995); subsequent studies have found a larger diversion effect in terms of reduced attainment or degree completion (Alfonso, 2006; Bowen et al., 2009; Long & Kurlaender, 2008; Reynolds, 2006; Sandy, Gonzalez, & Hilmer, 2006). But the tremendous methodological challenge is in isolating—from

the large and heterogeneous pool of community college attendees—the students who genuinely should have begun at a 4-year college.

Moreover, the democratization effect is also strong for the general student population. Many students have no intention of completing a 4-year degree and want to enroll in (shorter) vocational or technical courses that lead to certification. As noted above, many of these courses yield high earnings gains.

For this review, the focus is on the economic gains from community college attendance. Thus, the democratization and diversion effects should be interpreted in terms of how they affect earnings, not completion or attainment effects.¹²

Extant research indicates that in terms of postcollege earnings, transfer students do not fully catch up with students who attend a 4-year college throughout. A student who “should” have gone to a 4-year college in his or her first year therefore loses out. Using NLSY79, Gill and Leigh (2003) estimated that community college transfer students who completed a bachelor’s degree earned less than students who enrolled in a 4-year college throughout. Using NELS data, Reynolds (2006) also found a significant earnings penalty for those starting at a 2-year college. But the extent of the disparity may not be great: Using the Baccalaureate and Beyond (B&B) Survey, Hilmer (2002) reported little or no difference in the earnings gains that might be attributed to transfer from a relatively low quality 4-year institution (as measured by selectivity in terms of student ACT or SAT scores) to a higher quality 4-year institution.

Moreover, it is not obvious which students “should” have gone to a 4-year college from the start. Many students—including those at flagship 4-year colleges—are not certain about their college decisions. They may be unsure of their own ability, of the academic standards of the college, or of the quality of human capital that the college is producing (leaving aside the social environment). Because the community college is relatively inexpensive, and because many students may be risk averse (i.e., wishing to avoid failing courses more than they value getting high grades), it may make sense for many of them to start at community college. This will give students the opportunity to become more sure about their decision, with the option to transfer to a 4-year college if they ultimately decide to do so. This is the *option value* of starting out at a community college (Kane & Rouse, 1995a). As more information is revealed—either about one’s own aptitude or college quality—the student may transfer to a 4-year college if desirable. Critically, the “diversion” argument assumes that the option value for those starting at a community college is very low or negative (i.e., students gain very little or indeed lose out by not starting out at a 4-year college).

For the option value to be very low, several conditions must hold. First, the expense of attending community college must not differ much from that of attending a 4-year college. Second, the barriers to transferring out of community college must be high. Third, for students who do transfer, their earnings gains (a) must not exceed those of students who stayed behind and did not transfer, and (b) must be far below the earnings gains of equivalent students who started at a 4-year college. Overall, these assumptions seem more wrong than right. Community college tuition is considerably lower than that of 4-year, bachelor’s-degree-granting colleges. Certainly, many students

Table 4. Earnings Gains for Community College Students Over High School

	Earnings gains (%) for students who enroll in terminal training programs	Earnings gains (%) for students who transfer to complete a bachelor's degree
Aggregate	38-68	64-85
White male	31-60	50-69
White female	34-64	73-94
Black male	45-77	57-76
Hispanic male	38-69	62-82

Source: Gill and Leigh (2003, pp. 149-150).

Note: Gill and Leigh used the NLSY79 data set in their analysis. The earnings gains were calculated from unconditional and conditional log points and reflect earnings in 1996.

do transfer from community colleges to 4-year colleges. Finally, the evidence indicates that students who transfer and then obtain advanced credentials obtain higher earnings advantages than those who do not transfer. (This is assumption “a” as noted in the previous paragraph; assumption “b” is not strongly evident: Transfers students only lose out a small percentage to those who start at a 4-year institution.) Using NLSY79 data on earnings in 1996, Gill and Leigh (2003) estimated the gains for students who enrolled at a 2-year college and then transferred to complete a bachelor’s degree. These students earned 22% more than all 2-year enrollees (see Table 4 for more detailed data from this study). Using NLSY79 data on earnings from 1979 to 1996, Light and Strayer (2004) estimated that students who initially enrolled at a 2-year college and then completed a bachelor’s degree earned 23% to 43% more than high school graduates; this rate was greater than the rate experienced by those who earned associate’s degrees only.¹³ The advantage of transferring may also be inferred from Hilmer (2002). Using the Baccalaureate & Beyond data set, Hilmer found that the quality of both institutions (original and terminal) mattered for earnings; when community college students transfer up to a higher quality institution (i.e., to an institution that is more selective), their earnings should rise also.¹⁴

Other Benefits of Community College Attendance

In addition to private earnings gains from community college attendance, there are also likely to be additional economic benefits. These benefits might include gains in health and general economic well-being (e.g., through improved consumption efficiency or assortative mating), as well as benefits from lower welfare reliance and lower involvement in the criminal justice system; in turn, this accumulation of advantage might lead to higher levels of subjective well-being. Potentially, these benefits may be monetized and added either to the private earnings gains or counted as part of the social benefit of community college attendance. Yet these gains are rarely discussed by policymakers, despite the fact that they may be as large as the earnings

gains and—from an economic perspective—equally valid.¹⁵ As a point of caution, it is possible that some of these benefits are included in the earnings gains. For example, healthier workers may be more productive. But many studies of health gains do control for labor market status.

The research literature on these benefits is much smaller and more disparate than the literature on earnings gains; it is particularly scarce with regard to studies specifically on the benefits from community college attendance. Generally, this literature adopts the same method used to estimate earnings gains (regression analysis controlling for covariates) but with little scrutiny of possible estimation biases. However, many of these benefits are strongly correlated with income, so it may be appropriate to infer an indirect, income-driven impact from community college attendance. Finally, as with research on earnings, it may be possible to infer benefits of community college attendance from estimates of the benefits derived either from persons with additional years of schooling (again, if the effect of education is linear in years of schooling) or from the general college-educated population (adjusting for expected graduation rates, college quality, or attenuation, if any, of the effect of education after high school).

Here the summary is restricted to three domains—health, welfare, and crime. Notably, there appear to be no studies that have examined whether community college raises subjective well-being.¹⁶

Health Status

The association between years of education and health status and health behaviors is extremely strong. Using the National Health Interview Surveys from 1990 to 2000, Cutler and Lleras-Muney (2010) estimated the health impacts of additional years of education (controlling for covariates). Each additional year of education reduced the probability of smoking by 3 percentage points, of being obese by 1.4 percentage points, and of being a heavy drinker by 1.8 percentage points. Years of education were also positively associated with a range of health behaviors (wearing a seat belt, mammogram testing, getting a colonoscopy, and getting a flu shot). Moreover, many of these indicators appear to be linear with years of education, such that they can be applied to community college attendance.

Education appears to be positively associated with other health indicators, but the evidence base is not conclusive. Lleras-Muney (2005) found strong evidence that education reduces mortality, but this evidence was based on an examination of the relationship between mortality and changes in state laws raising the levels of compulsory schooling. Using data from the National Longitudinal Mortality Study (NLMS) covering the years 1979 to 1989, Backlund, Sorlie, and Johnson (1999) concluded that there is no difference in death rates and mortality rates between high school graduates and those with some college (but no degree). Finally, research suggests that mothers with a college education are also more likely to promote health in their children. Using SIPP data, Cheng (2006) found that mothers with more education were more likely to have taken their children to the physician or dentist and to have used a prescription (but the data only made distinctions between mothers with at least some college education,

whether they graduated or not, mothers with a high school diploma, and mothers who had not obtained a high school diploma).

Welfare Receipt

It is likely that community college attendance and graduation reduces welfare reliance, if only through their effect in raising income. However, because very few college graduates receive welfare, they are typically grouped with persons with “some college” in analyses of the impact of education on the receipt of welfare. Using CPS data, Waldfogel, Garfinkel, and Kelly (2007) reported lower reliance on housing assistance (by 34%) and food stamps (by 22%) for those with some college education or above relative to high school graduates. For females, Grogger (2004) calculated that welfare spells for those with some college education or above were 15% lower than those who are high school graduates. Using data from the Panel Study of Income Dynamics, Rank and Hirschl (2005) tracked food stamp reliance by education level over time; but their estimates were for dropouts versus the rest of the population. More apposite is recent research by London (2006), who used SIPP and NLSY data to track employment and welfare for females who were attending college during a welfare spell. After a welfare spell, those who had graduated from college during their welfare spell were much more likely than those who had not attended college to be employed and to avoid subsequent welfare or family poverty. Five years after exiting a welfare spell, college graduates—as compared to high school graduates—had higher rates of employment (86% versus 81%), lower rates of return to welfare (20% versus 50%), and lower rates of family poverty (43% versus 68%). Finally, Wallace (2007) used SIPP data from the 1990s to examine probabilities of enrollment in welfare (Aid to Families with Dependent Children [AFDC] or Temporary Assistance for Needy Families [TANF]) for females. College attendance had a strong effect on entry onto AFDC or TANF rolls, but no effect on exit rates from AFDC or TANF.

In addition, unadjusted administrative data show lower rates of welfare receipt. Based on Washington state administrative data in 1993-1994, Grubb (2002b) reported the impact—three years out—of community college attendance on receipt of unemployment insurance (falling from 8.3% to 5.7%), AFDC (4.2% to 3.6%), and food stamps (11.3% to 8.9%). Based on state administrative data from Florida in 1995, Grubb also reported welfare receipt rates for high school graduates at 7.4% and for community college associate’s degree holders at 1.7% (unadjusted for covariates).

Criminal Involvement

It is plausible to assume that community college enrollment will reduce criminal activity. There is a substantial evidence base on the negative association between education and crime and between income and crime (Farrington, 2003). For example, Lochner and Moretti (2004) identified the impact of education on rates of arrest (for murder, rape, violent crime, property crime, and drugs offenses) and on the probability of incarceration. Using NLSY79 data, the identification strategy employed

by Lochner and Moretti included a full set of background control variables, but results were reported either for years of schooling or for high school graduation versus dropping out. In addition, Lochner and Moretti used pooled 1960-1980 Census and FBI data to examine the relationship between change in compulsory schooling laws and criminal involvement; these results, too, are salient for persons graduating from high school (as opposed to college attendance). Moreover, the data are (mostly) over 20 years old (when incarceration rates were lower), and there was no adjustment for underreporting of crimes. However, Lochner and Moretti drew on Census data to report incarceration rates over the period 1960-1980 by years of schooling (with a limited set of residence and cohort controls). Both White and Black males with 13 to 14 years of education had lower rates of incarceration relative to high school graduates, which is suggestive of an effect from community college enrollment.

Other administrative and survey data show lower rates of criminal activity among those who attend community college. But these data are not adjusted for covariates. Based on state administrative data from Florida in 1995, Grubb (2002b) reported rates of involvement with the Department of Corrections for high school graduates at 1.8% and for community college associate's degree holders at 0.5%. Using 1997 data from the Survey of Inmates in State and Federal Correctional Facilities, Harlow (2003) reported basic cross-tabulations by education level. Only 9% of the state prison populations and 16% of the federal prison populations had "some college," significantly below their representation in the general population (approximately 25% to 30%).

Conclusion

This review reaffirms that there are strong positive earnings gains from community college attendance and completion, as well as from progression to a 4-year college. This evidence is based on more than 20 studies, many of which control for observable personal characteristics that might also be associated with higher earnings. (One note of caution is the reliance on only a few data sets from earlier decades). Moreover, in general these gains appear to be increasing over time. Equally important, these earnings gains underestimate the full returns to community college. They do not account for the significantly higher rates of employer-provided health insurance and pension plans that are associated with more education. (Also, many studies do not fully adjust for differences in labor market participation.)

The earnings literature provides some guidance on which subgroups obtain the biggest advantages, although there are important omissions, notably on the gains across socioeconomic status, for immigrants, for part-time versus full-time enrollment, and for most subject areas (beyond a simple distinction between vocational and academic programs). In addition, there is no literature on the advantages to online degrees or those provided by for-profit institutions. Yet it is also important to generate research that allows for a better interpretation of differences in earnings gaps. Controlling for ability, the returns should be equivalent across students of all characteristics (Hirsch, 2008).

Where some groups obtain larger advantages, this might reflect reduced labor market discrimination at the community college level relative to high school graduates; or it may reflect enrollment decisions or college offerings. Without a better understanding of what the earnings gaps mean, it is hard to prescribe policy.

Perhaps most important, there is limited research on the *ex ante* net present value or internal rate of return (IRR) to community college enrollment. Yet these are the appropriate metrics for evaluating whether community college attendance is a worthwhile investment from the private and public perspective. The earnings gains discussed above would have to be predicted over the student’s lifetime, and the tuition costs of college would have to be subtracted. As reported in the study by Jacobson et al. (2005a) for Washington state, the IRR is likely to vary across student characteristics and by choice of program at community college.

Finally, this review has examined the literature on the many other possible benefits—improved health status, enhanced economic independence—from community college attendance, many of which may be inferred from the evidence on earnings gains. However, this evidence is far from conclusive. First, these benefits are typically correlated with years of education, not community college attendance, and are thus not informative as to the specific contribution of a community college education. Second, the research evidence concerning these broader benefits does not include systematic investigations of potential biases in the returns to education (in the way that the literature on earnings returns does). Nevertheless, the research literature has not yet enumerated all the potential implications of community college attendance on such benefits as subjective well-being, asset management, intergenerational well-being, or marital success. A full accounting of these implications would appear to be a promising area for research.

Appendix

Table A1. Annual Earnings Gains Over High School, by Gender and by Credential Earned or Years Enrolled Without Earning a Credential

	Annual earnings gains (%)	
	Males	Females
Bachelor’s degree	46	92
Associate’s degree	17	40
Certificate	8	20
Any number of years enrolled, no credential earned	6	9
2 or more years enrolled, no credential earned	17	25
1.5 years enrolled, no credential earned	13	17
1 year enrolled, no credential	8	9
0.5 years enrolled, no credential	0	7

Source: Marcotte et al. (2005, pp. 164-165, 170-171).

Table A2. Annual Earnings Gains Over High School, by Gender and by Credential Earned or Years Enrolled Without Earning a Credential, 1984, 1987, and 1990

	Annual earnings gains (%) for males			Annual earnings gains (%) for females		
	1984	1987	1990	1984	1987	1990
Bachelor's degree	51	48	55	43	37	53
Associate's degree	20	24	18	36	26	23
Vocational certificate	2	16	7	18	18	24
4 years of college, no credential	35	29	39	46	-2	51
3 years of college, no credential	24	27	22	28	27	9
2 years college, no credential	14	13	7	2	6	22
1 year college, no credential	13	17	10	11	9	6
Less than 1 year of college, no credential	13	4	7	3	7	3

Source: Grubb (1997, p. 240).

Note: Grubb's analysis was based on SIPP data and apply to individuals aged 25 to 64.

Table A3. Annual Earnings Gains Over High School for Community College Noncompleters, by Credits earned and by Gender

Credits earned	Annual earnings gains (%)	
	Males	Females
1-5	-10	-1
6-10	-4	-2
11-20	0	3
21-35	5	9
36-50	0	10
51 or more	-1	16

Source: Jepsen et al. (2009, pp. 44).

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Notes

1. Using North Carolina data, Bowen et al. (2009) found that of all students who were “presumptively eligible” to attend a selective college (i.e., their grade point averages or Scholastic Aptitude Test scores were high enough), 40% did not (p. 102). Moreover, these “under-matched” students had lower graduation rates.
2. Some of the studies report wages and earnings. Only the latter are included in this review, although we note that there is some ambiguity in the use of these terms.
3. Some studies use the term *returns* to refer to the gross wage or earnings advantages. Except where the studies explicitly address at least some of the costs of enrollment, the term *returns to college* is not used here.
4. Therefore, including this literature would require us to model the expected probability of completing a bachelor’s degree, conditional on enrolling at community college, and adjust for the quality of college degrees that community college students obtain. We do not perform this modeling or adjustment here but recognize that the first would almost certainly reduce the wage returns to community college and the second would likely do so also. There is a growing literature on general college quality indicating that higher quality institutions are associated with higher returns (see Black & Smith, 2006; and Dale & Krueger, 2002; Long, 2008).
5. The term *Mincerian* refers to the pioneering research of Professor Jacob Mincer, who set out models of earnings, including a formulation that earnings increase with work experience but at a declining rate.
6. Other studies have also found positive wage returns to community college education. Using national data on registered nurses, Septz (2002) found that wage returns to associate’s degrees in nursing were equivalent to, and in some years exceed, wage returns to a bachelor’s degree in nursing. Based on state administrative data from California and North Carolina, Grubb (2002b) reported unadjusted salaries by certificate. Raw salaries for associate’s degrees were higher than for certificates, which in turn were significantly higher than those for persons with at least 12 units but no credential. Based on state administrative data from Washington, Grubb (2002b) also reported pre- and postcollege wage gains by credits accumulated (but unadjusted for covariates). In addition, using the public-use microdata samples from the U.S. Census Bureau for 2000, Albrecht and Albrecht (2009) reported significant earnings advantages for persons with some college over those with a high school diploma or below (unadjusted for covariates). Finally, Jacobson and Mokher (2009) analyzed data on young adults in 2005 in Florida. Unadjusted salary advantages over those who leave college without a credential were 8% for those who obtained associate’s degrees and 27% for those with certificates.
7. For Canada, Ferrer and Riddell (2008a) estimated that the returns for immigrants appear to be higher than for the native born.

8. Looking across the entire college population, Arcidiacono (2004) found higher returns to natural sciences and business.
9. We are aware of only one study that has looked at the returns to a double major over a single major across all college graduates. Del Rossi and Hersch (2008) used data from the 2003 National Survey of College Graduates, which sampled individuals who declared having a bachelor's degree or higher on the 2000 Census (and which therefore included some community college graduates). Overall, there appeared to be statistically significant returns to earning a double major. The average earnings gain was 2.3% over a single major, although the gains depended dramatically on the particular subjects in which the student earned double majors.
10. For Canadian community colleges, Ferrer and Riddell (2002) estimated a sheepskin effect of approximately 5% for completion of a community college degree. However, at least 20% of this sheepskin effect may be attributable to the higher skills levels of completers (Ferrer & Riddell, 2008b).
11. In all other years of the CPS, no distinction is made between years of education and credentials.
12. Attainment effects are the main focus of chapter 7 in Bowen et al. (2009), although the authors also consider the equity implications of the diversion argument.
13. As well, Bowen et al. (2009) found that these transfer students graduated at comparable rates to students who started as freshman at 4-year colleges (albeit at slightly lower rates than the 4-year colleges' "homegrown" juniors). That said, the fact that these transfer students do so well suggests that a high proportion could have started out at the 4-year college.
14. This literature is salient for identifying institutional characteristics associated with higher earnings. However, there are no studies that link earnings with the specific characteristics of community colleges (such as size or the proportion of the faculty employed full time). Some studies have examined how completion rates vary with these characteristics (e.g., Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008).
15. The economic perspective emphasizes opportunity costs and resource use, not nominal dollar amounts. The latter is simply a metric by which to compare resource usage.
16. A study by Dee (2004) used proximity to a community college to identify the impacts of education on voter participation and found very strong benefits.

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