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The Nonequivalence of High School Equivalents

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This article analyzes the causes and consequences of the growing proportion of high-school-certified persons who achieve that status by exam certification rather than through high school graduation. Exam-certified high school equivalents are statistically indistinguishable from high school dropouts. Whatever differences are found among exam-certified equivalents, high school dropouts and high school graduates are accounted for by their years of schooling completed. There is no cheap substitute for schooling. The only payoff to exam certification arises from its value in opening postsecondary schooling and training opportunities, but completion rates for exam-certified graduates are much lower in these activities than they are for ordinary graduates.

This article examines the causes and consequences of a neglected social phenomenon—the recent rapid growth in the fraction of persons who achieve high school certification by means of an equivalency exam rather than through the traditional route of high school graduation. In 1968, only 5% of all new high school certificates were awarded through equivalency

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exams. By 1987, the corresponding figure was in excess of 14%. In 1968, only 2% of all persons who completed their education with high school degrees were exam-certified. In 1987, the corresponding figure was almost 11%.

It is widely believed that exam-certified high school equivalents are the equals of traditional high school graduates in all relevant behavioral dimensions. This view is fostered in part by the American Council on Education, a private organization representing institutions of higher education as well as regional education associations. That organization administers the most widely used equivalency exam, the GED (for general equivalency diploma). Researchers affiliated with the American Council on Education claim that "persons who meet state/provincial established minimum score levels for the high school equivalency credential based on GED tests should be considered high school graduates for admissions, military, licensing and employment purposes. The test results . . . demonstrate this achievement equivalency" (Malizio and Whitney 1982, p. 10). The two types of high school certification are treated as identical in the U.S. Census and the Current Population Surveys (CPS) widely used to monitor national social and economic well-being.

This article challenges the conventional wisdom. Exam-certified high school equivalents are not identical to traditional high school graduates in terms of their ability as measured by a standard psychometric test (the Armed Forces Qualifying Test), in terms of their wages and hours of work or in terms of their postcertification education and training decisions. Exam-certified high school equivalents are psychometrically inferior to traditional high school graduates. Elsewhere we establish (Cameron and Heckman 1991, 1992) that the determinants of high school certification by exam are very different from the determinants of traditional high school graduation. We demonstrate here that the economic consequences of the two avenues of high school certification are quite different. Exam-certified persons are indistinguishable in many relevant labor market dimensions from high school dropouts who are uncertified. Differences in wages among high school graduates, exam-certified equivalents, and dropouts are accounted for by years of schooling attained. There is little evidence of value added from exam certification beyond the effect of years of schooling completed on wages. However, exam-certified graduates are more likely to take vocational and technical training, while traditional high school graduates are more likely to attend academic 4-year colleges and complete academic programs when they begin them. Exam-certified high school graduates are more likely to participate in some form of postsecondary training than are non-exam-certified high school dropouts. Exam-certified persons who take postsecondary schooling and training earn lower wages than high school graduates undertaking the same activity. The return to high school equivalency certification, such as it is, comes from the return to postsecondary training. Accordingly, it is not appropriate to consider the GED as an

educational end in itself—the emphasis in many contemporary state and federal programs.

In light of our evidence, the growing use of GED certification suggests the possibility of widespread misperception on the part of test takers. We establish in this article that the growth in the level and proportion of exam-certified high school credentials is a direct consequence of federal and state human resource policies that make GED test taking privately rational even if it is socially unproductive. Since the mid-1960s, both federal and state governments have increasingly subsidized adult basic education programs that have placed a growing emphasis on adult equivalency as a clearly identified and desirable objective. In addition, a high school degree or an exam-certified equivalent is required for participation in a host of post-secondary vocational and academic financial support programs increasingly subsidized by federal and state governments over this period. The demand for participation in these subsidized programs induced a derived demand for high school certification on the part of high school dropouts.

One major conclusion of this article is that the GED is a vehicle for participation in postsecondary education due to its value in satisfying bureaucratically determined qualifications for admission and financial support. Subsidization of these programs by governments reconciles the apparent conflict between low economic returns to obtaining the GED and the large and growing demand for GEDs.

A second major conclusion concerns the limited value of psychometric measurements for predicting labor market outcomes. Our evidence about the labor market inadequacy of exam-certified graduates calls into question the value of psychometric evidence on the efficacy of private schools. (See Coleman, Hoffer, and Kilgore [1982]; and Chubb and Moe [1990], who rely on such evidence.) Tests like the GED measure skills that are only weakly related to the skills valued by employers.

This article develops in the following way. Section I documents basic facts about high school equivalency. Psychometric and market evidence demonstrate the nonequivalence of high school equivalents. Section II presents more refined evidence on the economic returns to high school equivalency. Section III presents reasons for growth in exam certification in the presence of low economic returns from the activity. The article concludes with a summary.

I. The Changing Structure of High School Certification and Its Consequences

A. The Growth in High School Equivalency Certification

There are three main routes through which Americans achieve certification as high school graduates: (*a*) through traditional course attendance, culminating in graduation at the end of the twelfth grade; (*b*) through night school and other formal schooling programs for those who drop out

of traditional high school programs; and (*c*) through certification on a standardized exam for high school dropouts. Although the vast majority (84.5% in 1987) of all new high school credentials are issued through traditional route *a*, a sizable proportion of new graduates come from the less traditional avenues *b* and *c*. The largest nontraditional source is from persons certified by an equivalency exam—roughly 14% of all newly issued high school credentials obtained in 1987 were secured by this means. Virtually all of these credentials come from individuals who passed the nationally normed GED exam developed by the American Council on Education. Graduation through formal adult secondary schooling produced no more than 2% of all new high-school-certified persons in 1987.

There has been a dramatic change in the number of exam-certified high school graduates over the period 1953–88. Figure 1 plots the percentage of GED recipients relative to all high school graduates for each year over the period. (The reasons for this growth, summarized below the figure, are discussed in Sec. III below.) It rises from less than 2% in 1954 to more than 14% in 1986. The period 1965–85 is one of especially rapid growth. There has been concomitant growth in the percentage of all persons with high school diplomas (and no further academic degree) who achieve that status by GED certification. Figure 2 reveals that, of the total stock of persons with only high school degrees by 1987, more than 10% achieved their degree by taking a GED exam. In 1968, only 2% of the total stock was exam-certified. Figure 3 documents the near stability in non-GED sources of nontraditional high school graduates. Certification through adult education courses ("other programs") has grown over the period 1974–87, but the level is low (ranging between 1% and 2% of all new high school graduates), and the growth rate is small. The major change in the source of high school credentials is growth in GED certification.

The GED testing program began in 1942 as the Veterans Testing Service and was a joint venture of the United States Armed Forces Institute and the American Council on Education. One premise of the testing program was that the life experience of military personnel could substitute for classroom training in developing skills associated with high school certification. A second premise was that the relevant skills could be measured by an exam. By 1952, all but three states issued certificates of high school equivalence to veterans and servicemen who passed the Veterans Testing Service exam. The armed forces then accepted exam-certified equivalents as the equals of high school graduates in making their enlistment and screening decisions—even for service academies. A commission on accreditation of service experiences in 1952 documented the widespread acceptance of the GED as a high school certificate by major firms and state and local governments. In that same year the American Council on Education began to offer the exam to nonveteran civilians, and its name was changed to the GED. By 1963, all 50 states used the GED exam to certify high school dropouts.

B. Some Features of the Recent GED Exam and Those Who Take It

The age distribution of GED test takers has remained roughly constant over time, although the influence of the baby boom and subsequent baby bust on the time series of exam-certification rates is evident. Most GED test takers are less than 25 years old. Assuming temporal stability of pass rates by age, the baby boom accounts for part of the post-1970 growth in GED-certified graduates as a fraction of total high-school-certified persons. Between 1970 and 1987, the ratio of 16–19-year-olds to 20–24-year-olds fell from .89 to .75. Over the same period, the proportion of persons age 17 relative to ages 20–44 declined from .056 to .040. Relatively more persons were in the age brackets at risk for the GED than in the age brackets at risk for traditional high school graduation. However, rough calculations suggest that changing population proportions by age can account for, *at most,* 2 points of the 8-percentage-point growth in GED-certified persons as a proportion of total new certified persons that occurred over this period, and it does not explain the increase in test taking over the whole period.

The growth in exam-certified equivalents explains an apparent contradiction in the data on high school dropouts. Figure 4 plots the proportion of traditional high school graduates for cohorts of 17-year-olds over the period 1951–88. The proportion declines after 1968, although it slightly rebounds in the late 1970s and 1980s. The figure shows a very different pattern over the period 1971–86 for high-school-certified persons ages 20–24. The recent growth in exam certification explains the discrepancy between the two figures (see Finn 1987). There appear to be sharp differences in the use of GED certification by race. Table 1 documents that black CPS-measured high school equivalents are almost twice as likely as whites to possess a GED. Part of the measured convergence of black and white high school attainment rates demonstrated by Kominski (1990) is due to the growing high school certification of blacks by GED examination.

High school certificates awarded by adult education institutes reward students for completing a traditional high school curriculum at a somewhat later stage of life than do typical high school graduates. Equivalency examination programs operate on a radically different principle. Since the GED certifies the vast majority (well in excess of 90%) of all exam-certified high school graduates over the period 1970–87, we focus our attention on that exam.

GED candidates are tested on a total of 290 items in five subject area tests: writing skills (80 items), social studies (60 items), science (60 items), reading skills (40 items), and mathematics (50 items). Conceptual—and not factual—knowledge is stressed. The focus is on general knowledge and not specific details (Malizio and Whitney 1982). Individual states set pass standards, but these vary within a fairly narrow band. The majority of the states (29) require a minimum score of 35 (out of 80 possible—20 is the minimum score) on each exam and an average of 45 over all exams.

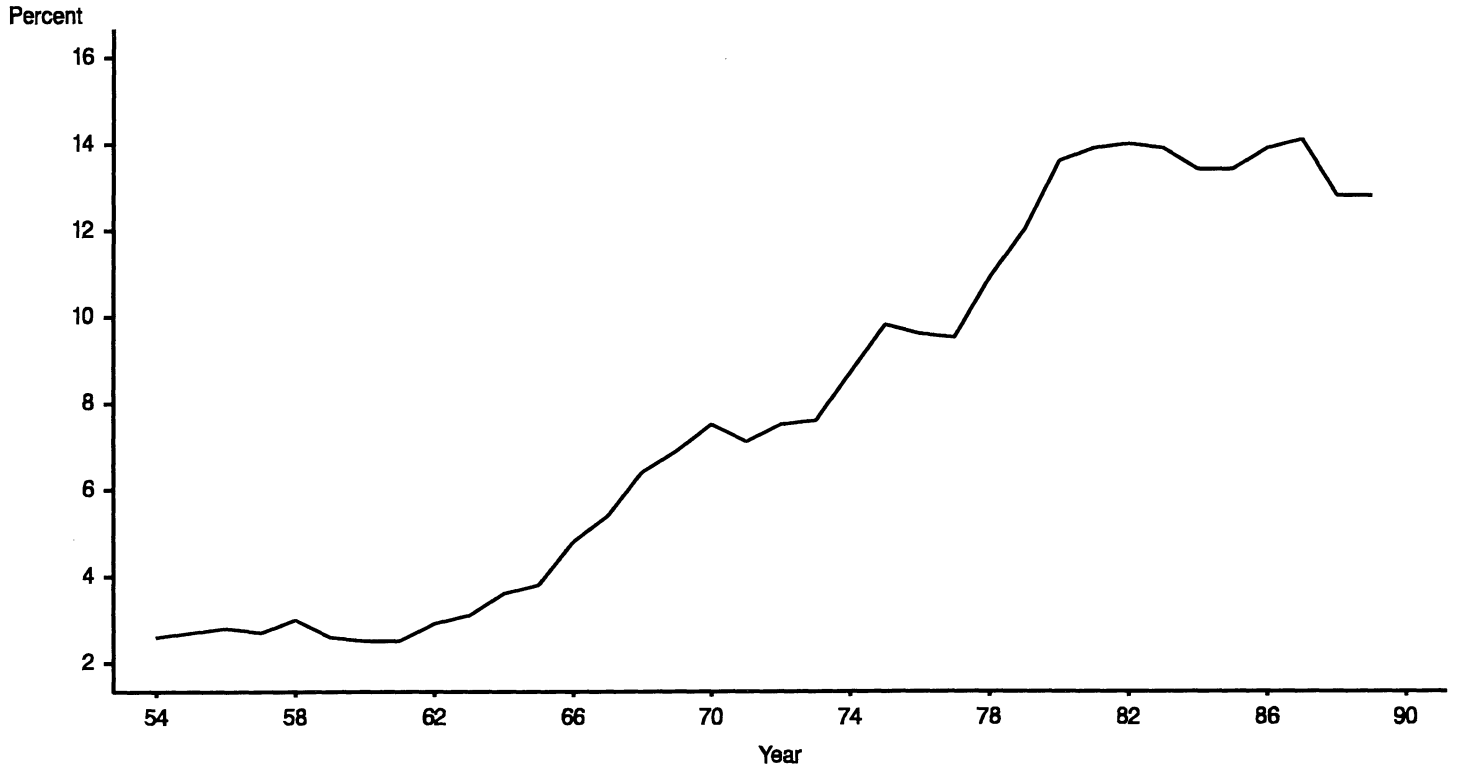

FIG. 1.—New GED recipients as a percentage of total new recipients of high school credentials (GED + high school graduates). Source: U.S. Department of Education (1989); GED Testing Service (1990); U.S. Bureau of the Census (various years).

Summary of Reasons For GED Growth

1953-1963
1) Opening of the GED to civilians. The name of Veterans' Testing Service changed to GED Testing Service in 1963.

1965
1) Higher Education Act and National Vocational Student Loan Insurance Act are signed into law.
2) Beginning of the Adult Basic Education program.

1973
1) Beginning and rapid expansion of the Pell grant program.
2) Expansion of Adult Basic Education and a new emphasis on high school completion through the GED.

1976
Family income limits on Pell grants and Guaranteed Student Loans are liberalized.

FIG. 1.—(*Continued*)

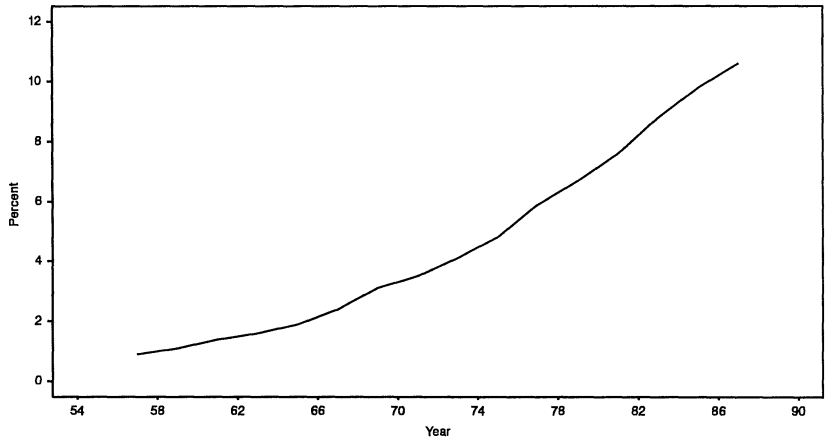

FIG. 2.—GED recipients as a percentage of the total stock of persons ages 15 and older with high school credentials only (GED + high school graduates only). Source: see fig. 1.

Most of the rest require a minimum of 40 and an average of 45 (GED Testing Service 1989, p. 30). Graduating high school seniors are used to norm the test. Fifty percent of graduating high school seniors score 50 points or higher.

Because the minimum pass level is set at 35 on the distribution of graduating seniors with a range of scores set at 20–80, GED graduates necessarily outperform graduating high school seniors on the test over a range of test scores.[1] This is an artifact of test construction, although Malizio and Whitney (1982) offer such evidence to conclude that GED-certified persons are the equals or superiors of high school graduates. Below and elsewhere (Cameron and Heckman 1992), we demonstrate that GED recipients are psychometrically inferior to high school graduates in terms of their performance on the Armed Services Qualifying Test and its components.

Candidate preparation for the GED is limited. In April and May 1980, a survey was conducted of 13,000 GED candidates at 250 randomly selected GED testing centers throughout the United States. The median examinee spent 20 hours preparing for the test and spent $10 in preparation costs. Seventy-five percent of the examinees spent 60 hours or less in preparation. The upper fifth percentile reported more than 200 hours in preparation. The upper quartile of the candidates spent $25 in direct-out-of-pocket costs or $30, including lost salary (Malizio and Whitney 1981, table 18).

[1] More precisely, GED recipients must score better than high school graduates scoring less than 35. If the distributions of ability were identical in the two groups, then mean, median, and all quantile test scores would necessarily be higher for GED recipients. The evidence in Malizio and Whitney (1982) suggests that GED recipients have a thinner right tail of test scores compared to high school graduates, so their mean score could still be lower than that of high school graduates, but in fact it is higher.

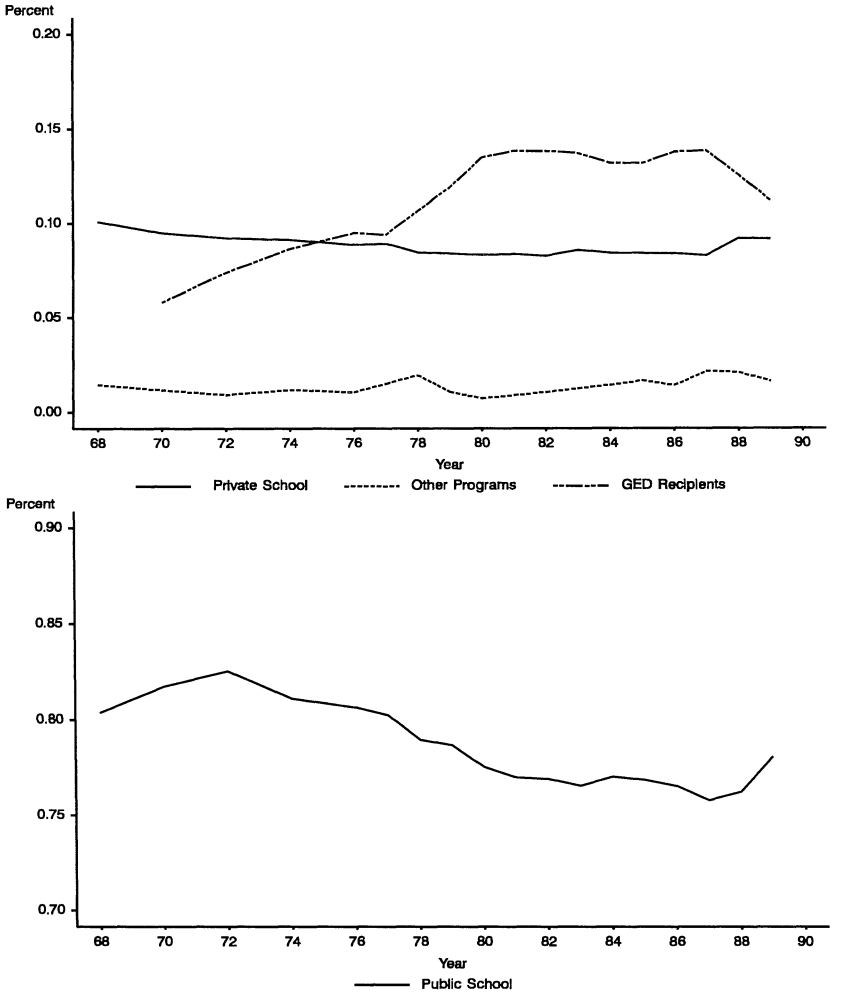

FIG. 3.—Proportion of individuals completing high school by type of program. Source: U.S. Department of Education (1989); GED Testing Service (1990).

Even at the upper fifth percentile point in the distribution of costs, the corresponding figures are $100 and $106. Twenty-one percent did not prepare in any way. Only 22% took the GED practice test, and 40.5% studied from a book or manual. Less than 1% of the candidates incurred any expenses for individual tutoring. Despite the generally low level of preparation, usually more than 70% of those taking the exam pass it in any given sitting. Candidates who fail may retake the exam without penalty, although there is a short (2–3 month) waiting period in some states. In 1991 we observed a federally sponsored GED program that gave persons initially certified at fourth-grade levels in numeracy and literacy 4 weeks of intensive instruction. The program has a first-time pass rate of 80%. If

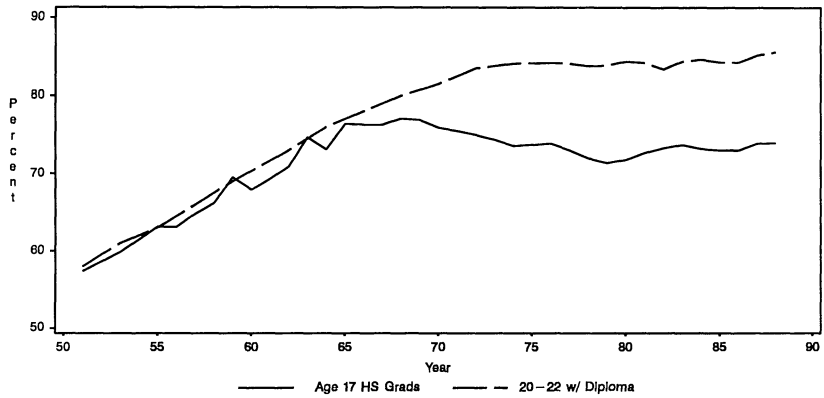

FIG. 4.—The percentage of 17-year-olds who are high school graduates and the percentage of 20–24-year-olds with at least a high school diploma. The 17-year-old graduates include graduates of regular day programs and excludes graduates of other programs, when separately reported, and high school equivalency recipients. Source: U.S. Department of Education (1989); U.S. Bureau of the Census (various years).

GED certification is so easy to attain, it is natural to conjecture that its intrinsic economic value might be low.

C. Psychometric and Other Evidence on the Nonequivalence of Exam-certified Equivalents

There is considerable evidence that GED-certified persons do not possess the same skills or motivation as high school graduates. Laurence (1983, table 1) notes that high school dropouts and GED-certified high school equivalents had basically the same attrition rates from the U.S. military over the period 1977–79, and both groups attrited at *twice* the rate of high school graduates. She goes on to note that, in 1982, the U.S. Army required for minimal admission standards that GED-certified graduates and high school dropouts should be in the thirty-first percentile of the Armed Forces Qualifying Test (AFQT) distribution. High school graduates were only required to be in the sixteenth percentile. The higher minimum scores were judged necessary to guarantee successful completion of basic training courses by GED-certified applicants. Recently (1991), the U.S. Army has refused to accept persons possessing only a GED.

A recent study of Iowa GED test takers (Beder 1992) claims strong positive effects of GED certification on labor market outcomes. The evidence in that study is based on before-after comparisons for those who attain the GED. Contrary to accepted practice, the study uses no control group of high school dropouts or high school graduates, as we do below. It attributes all of the labor market effects of life-cycle work experience, job changing, maturation, and geographic mobility to the GED. It greatly

Table 1
Proportion of Individuals Receiving a GED or Graduating High School

	Black	Hispanic	White
A. Age 25 males:			
GED	.11 (.01)	.11 (.01)	.07 (.01)
High school graduate	.68 (.02)	.60 (.02)	.81 (.01)
% of Current Population Survey measured high school equivalents who are GED certified	14	15	8
Sample size	1,088	693	1,820
B. Age 25 females:			
GED	.07 (.01)	.11 (.01)	.07 (.01)
High school graduate	.77 (.01)	.64 (.02)	.84 (.01)
% of Current Population Survey measured high school equivalents who are GED certified	9	13	8
Sample size	1,082	674	1,719

NOTE.—These proportions do not change much at age 28. The sample was constructed using the 1979–87 waves of the NLSY (see App. A). Individuals must have reached age 25 by 1987 to be included in the above calculations. Standard errors of the means are in parentheses.

exaggerates the contribution of the GED to life-cycle socioeconomic improvements.

An extensive study of the performance of GED recipients in the University of Wisconsin system was performed by Pawasarat and Quinn (1986). At the University of Wisconsin—Milwaukee, GED-certified persons had lower completion rates for the first four semesters of college attendance than did high school graduates from the *bottom* twentieth percentiles of their high school class (31% vs. 41%). The 4-semester-completion rates for high school graduates in the top 50% of their class was 62%—twice that of the GED graduates. At the University of Wisconsin—Madison, only 73% of GED holders admitted to the school enrolled for a second semester, compared to a 95% rate for all entrants to the school. At Milwaukee Area Technical College, a vocational school, GED holders seeking a 2-year associate degree had attrition rates comparable to those of high school dropouts. Over the period 1980–83, 8% of GED entrants attained the 2-year associate degree, compared to 10% of high school dropouts and 30% of high school graduates. A study of the Milwaukee labor market by Pawasarat and Quinn finds that 48% of the firms interviewed preferred hiring conventional high school graduates to GED-certified graduates, while the rest of the employers were indifferent between persons with the two types of high school credentials.

Psychometric evidence from the National Longitudinal Survey of Youth (NLSY), ages 13–20 in 1978, contradicts the claims of psychometric equivalency for the two types of high school certification made by the American Council on Education. (The survey is described in App. A.)

Table 2 displays the results for males of the Armed Forces Qualifying Test administered to all members of the NLSY sample. For the random subsample of the data, AFQT scores for the deciles going from the bottom to the top are presented, as well as mean scores. High school graduates have statistically significantly higher mean test scores than do GED holders, who, in turn, have statistically significantly higher mean test scores than do high school dropouts. The pattern is the same at each decile of the test score distribution from the top to the bottom. The pattern holds true for a sample standardized to have the same approximate age, 16 or 17, at the time they take the exam, or for an enriched sample that oversamples blacks and Hispanics (results are not shown).[2] The same pattern is found for persons who do not complete 4-year colleges both for the entire sample and for those who were 16 or 17 at the time the test was given: GED recipients are not the test-taking equivalents of high school graduates. (Cameron and Heckman 1992). However, they dominate high school dropouts in test taking. Similar patterns appear for each race group: whites, blacks, and Hispanics. A Wilcoxon test for stochastic dominance (Bickel and Doksum 1977)—a statistical concept that compares distributions of the same outcome for different groups and determines if higher outcomes are more common in one group than another—is presented in the first row of table 3. It reveals that the high school graduate AFQT distribution first-order-stochastically dominates the GED-AFQT distribution, and the latter distribution first-order-stochastically dominates the AFQT distribution of high school dropouts. The same pattern is found for persons who do not attend college and for disaggregated components of the AFQT exam (see Cameron and Heckman 1992).

D. Direct Behavioral Comparisons

This subsection presents simple mean-difference and univariate distributional comparisons among high school dropouts, GED recipients, and high school graduates. Using the NLSY data for male youth ages 13–20 in 1978, we compare the determinants and labor market and educational consequences of the three types of high school certification status.

Table 4 reveals that high school dropouts are more likely to be minority group members and come from larger families with lower incomes and less educated parents than do GED recipients, who, in turn, have poorer background characteristics than high school graduates.[3] A Wilcoxon test,

[2] These results are available on request from us in a separate App. B. This appendix was not included here for the sake of brevity.

[3] The anomalously high number of siblings is a consequence of size-biased sampling in the NLSY. If one child is included in a unit, so are all of his or her siblings—provided they share common family characteristics. This sampling induces a stochastic dependence among sibling observations that we analyze elsewhere (Cameron and Heckman 1992), where it is shown to have a minor effect on the estimated standard errors of the coefficients of wage equations.

Table 2
Means and Deciles of Test Scores on the AFQT Exam for the Random Sample

	N	Mean (SE)	Deciles (Lowest to Highest)								
			10	20	30	40	50	60	70	80	90
High school graduate	2,168	75.8 (0.40)	48	61	68	74	79	84	88	93	97
GED	209	64.7 (1.28)	38	48	54	61	66	70.5	76	82	88.5
Dropout	436	45.5 (0.79)	25	30	35	39	43	48	53	60	70
Total	2,813	70.1 (0.40)	37	49	60	68	74	80	85	90	96

NOTE.—The sample was constructed using the 1979–87 waves of the NLSY. Only the random sample portion of the data was used above. Approximately 6% of the data did not take AFQT. The results are similar using the combined black, Hispanic, and random samples, though the sample sizes are much larger.

reported in table 3, reveals that the family income distribution of traditional high school graduates stochastically dominates (i.e., has more weight on higher incomes) that of GED recipients and dropouts. The family income distribution of GED recipients in turn dominates the family-income distribution of dropouts.

Table 5 presents evidence on labor market outcomes for individuals with the three types of high school degree status. At age 25 (table 5, pt. A), the mean labor market status of high school dropouts is the same as that of GED recipients. The small premium in hourly wages and salary for GED recipients over that of dropouts is not statistically significant. Both groups are inferior to high school graduates in terms of hours, wages, salaries, weeks worked, and length of time on their current job. The lower work experience of high school graduates is a consequence of their greater

Table 3
Wilcoxon Tests for First-Order Stochastic Dominance (with χ^2 Approximations): Family Background and Outcome Measures, Random Samples

	High School > GED		GED > Dropout	
Variable	χ^2	Prob > χ^2	χ^2	Prob > χ^2
A. 25-year-olds:				
AFQT score	46.04	.0001	68.40	.001
Annual hours	7.31	.0068	.04	.840
Hourly wage	10.31	.0001	2.37	.130
Family income	28.30	.0001	11.40	.007
County average earnings (unskilled)	4.31	.0381	3.17	.075
B. 28-year-olds:				
AFQT score	20.9	.0001	20.6	.0001
Annual hours	4.84	.028	1.02	.31
Hourly wage	9.71	.0014	.78	.38
Family income	13.61	.0002	2.26	.133
County average earnings (unskilled)	.82	.52	.10	.77

Table 4
Mean Family Background Characteristics of Random Sample at Age 25

	Number of Observations	Family Income (1967$)	Highest Grade Completed of Father	Highest Grade Completed of Mother	Proportion Hispanic	Proportion Black
Dropout	303	7,072 (247.7)	9.102 (.190)	9.786 (.157)	.130 (.020)	.222 (.025)
GED	147	8,791 (436.2)	11.102 (.276)	10.784 (.212)	.079 (.025)	.149 (.034)
High school diploma	1,666	11,530 (151.3)	12.390 (.089)	12.056 (.067)	.058 (.006)	.089 (.007)

NOTE.—This sample uses only the random sample subset of our data who are at least age 25 in the 1987 wave. Standard errors of means are in parentheses.

Table 5
Labor Market Outcomes at Ages 25 and 28: Sample Means

	A. At Age 25			B. At Age 28		
	High School Dropouts	GED	High School Graduates	High School Dropouts	GED	High School Graduates
N: working/in sample*	542/616	224/277	2,156/2,478	225/253	82/95	920/1,025
Hourly wage (1988 dollars)†	6.84(.17)	7.33(.23)	8.52(.09)	7.51(.24)	8.43(.46)	10.22(.17)
Salary income (1988 dollars)†	10,379.0(353.1)	11,777.2(558.7)	15,213.9(208.1)	12,411.8(557.9)	13,921.7(968.8)	20,195.7(355.2)
Weeks worked last year	40.8(.6)	40.7(.9)	44.7(.3)	42.3(.86)	40.9(1.3)	47.1(.3)
Hours worked last year†	1,747.1(34.8)	1,738.2(50.2)	1,905.6(15.6)	1,836.4(47.6)	1,719.8(76.3)	2,083.7(20.7)
Job tenure†	96.3(3.9)	75.1(4.8)	108.5(2.0)	129.7(8.0)	91.1(9.3)	166.5(4.1)
Total work experience‡	242.6(4.2)	210.8(6.0)	256.0(2.0)	355.4(7.3)	292.6(11.2)	363.4(3.4)
No job last year§	.12(.01)	.19(.02)	.13(.01)	.11(.02)	.14(.03)	.10(.01)

NOTE.—Standard deviations are in parentheses.

* People working were not in college and had a job in the previous year. The sample was constructed using the 1979–87 waves of the NLSY (see App. A). Individuals must have reached age 25 (for pt. A) or 28 (for pt. B) by 1987 to be included in the these calculations.

† These variables are defined only if a person worked in the year of the survey.

‡ Total work experience includes tenure at current or last job.

§ Not counting individuals who had been in college in the previous year.

schooling. The relationships in means carry over to first-order-stochastic dominance on these variables: GED and high school dropouts are indistinguishable, and both groups have labor market outcome distributions that are first-order-stochastically dominated by those of high school graduates (see table 3, pt. A, for 25-year-olds and pt. B for 28-year-olds). Similar descriptions apply to table 5, part B.

A focus on mean outcomes, while traditional, masks much important detail in the wage distributions. Figure 5*a* places GED recipients and high school dropouts in the wage distribution of high school graduates at age 25. These figures plot the proportion of the dropout and GED wage distribution located in the deciles of the high school graduate wage distribution. A flat line at 10% in these figures would indicate that GED recipients and high school graduates are indistinguishable from high school graduates at all deciles of the high school graduate wage distribution. Shortfalls or excesses around the 10% line indicate shortfalls or excesses in the wage distribution of GED recipients or high school dropouts compared to that of high school graduates. The near parity in the top 10% of the GED distribution at age 25 might be termed the "Bill Cosby" effect—named for the most famous GED recipient. There is a group of highly motivated and able GED recipients who achieve the goals of the program.[4] For most GED recipients, however, disparity and not parity is the rule. The mass of the GED recipients is located in the bottom half of the high school graduate wage distribution. Placing GED recipients in the wage distribution of high school dropouts (fig. 5b) demonstrates that, except for the motivated top tenth percentile and the evacuated bottom tenth percentile, there is a lot of similarity between the two distributions at age 25.[5]

One way to gauge the economic significance of these results is to examine their implications for the estimated "rate of return" to education arising from the Current Population Survey convention that equates GED recipients and high school graduates. Using a sample of NLSY observations of young men age 25 (enriching the random sample with black and Hispanic subsamples), we compute a least-squares regression of log hourly wages on dummy variables that measure whether or not a person has a high school diploma (= 1 if a person has a high school diploma irrespective of subsequent achievement), or 2 years of college, or 4 years of college; see

[4] The median of the adjusted AFQT test for GED recipients in the top decile of the high school wage distribution for those who do not go on to college is virtually the same as that of the high school graduates. High school graduates in that decile are at the sixty-eighth percentile in the AFQT distribution, while GED recipients are at the sixty-third percentile in that distribution. High school dropouts at the top decile of the high school wage distribution have a median AFQT score of 31.

[5] The figures for 28-year-olds are strikingly similar. They are available on request in App. B.

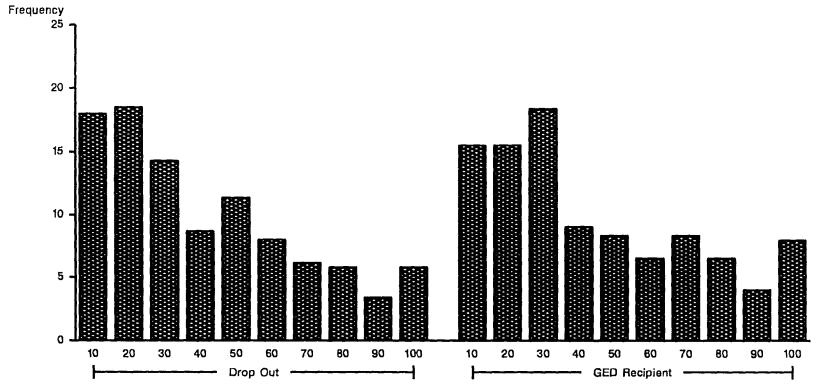

FIG. 5*a*.—NLSY males, age 25: how the GED recipient and dropout hourly wage distributions fit into the high school graduate wage distribution, by %. Source: NLSY (1979–87 data).

table 6, column 1. (Results for 28-year-olds are available in App. B, which is available on request.) Column 2 shows the effect of distinguishing how the high school diploma was achieved: through a GED or through a traditional degree program.

Defining a high school diploma in the CPS-Census manner produces a differential effect on wages at age 25 of 4-year college attendance compared to high school graduation of 21% (col. 1). Breaking out the GED from the traditional high school diploma produces a college/high school differential of only 19.6% for the traditional high school degree. The comparable figures at age 28 are 21.9% and 20.7%, respectively.[6] *F*-tests based on robust McKinnon-White (1985) jackknifed standard errors reject the hypothesis that GED recipients should be considered the same as high school graduates, but they do not reject the hypothesis that GED recipients are indistinguishable from high school dropouts. The CPS-Census convention of equating GED recipients to high school graduates overstates the returns to college education relative to traditional high school graduation. Inappropriate pooling of the two types of high school credentials would cause the college/high school differential to increase over the period of the late 1970s and 1980s, as GED certification became a widespread phenomenon, but the effect appears to be relatively small. Approximately 3.6% of the growth of the 4-year college/high school differential documented for younger workers (with 5 years of work experience) documented by Katz and Revenga (1989) arises from falsely attributing the market productivity of traditional high school graduates to GED recipients.

Additional evidence on the nonequivalence of high school equivalents is presented in tables 7 and 8, which look at postcertification educational

[6] The table for age 28 is available on request in App. B.

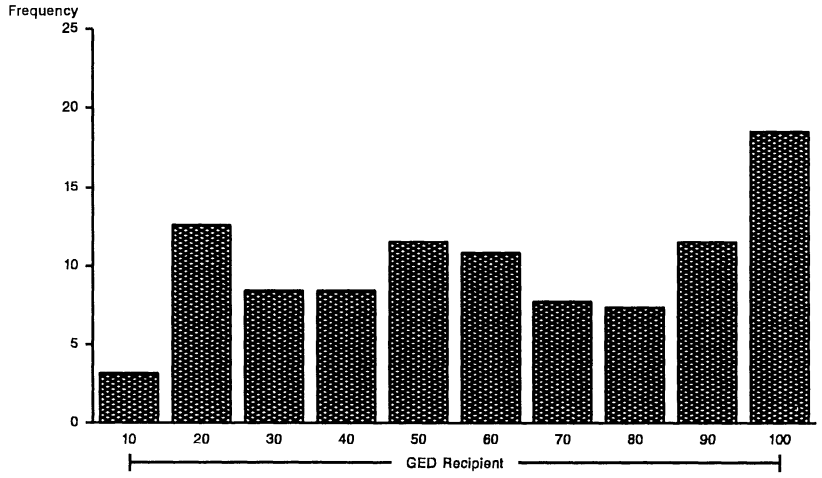

FIG. 5*b*.—NLSY males, age 25: how the GED recipient hourly wage distribution fits into the dropout wage distribution, by %. Source: NLSY (1979–87 data). See table 9 notes for a definition of the sample.

choices for both types of degrees. Table 7 shows first choices after completing certification. GED-certified persons are much less likely to attend 4-year colleges and are more likely to enter the military or not undertake any postsecondary education. Table 8 reveals that GED graduates are less likely than high school graduates to attend 2- or 4-year colleges or to graduate from them if they attend them.

The evidence from the NLSY and the other studies indicates that GED recipients are not the equivalents of high school graduates. Their labor market outcomes and performance in the military suggest that GED recipients are similar to high school dropouts. GED recipients are less likely to pursue postsecondary academic education and are less likely to finish an educational program they begin. Evidence from the Panel Survey of Income Dynamics reported in Cameron and Heckman (1992) corroborates these results for age-groups comparable to those in the NLSY. In the balance of this paper and in our companion papers (Cameron and Heckman 1991, 1992) we present a more refined statistical analysis of the NLSY that supports these basic conclusions.

II. Econometric Evidence on the Nonequivalence of Exam-certified Equivalents

A. Introduction

Unadjusted comparisons of means or distributions can be misleading. This is likely to be true in evaluating the impact of the GED on labor market outcomes. GED recipients attain 1 more year of high school before

Table 6
Log Hourly Wage Equations at Age 25 (N = 2,308)

	Combine GED and High School Graduate (1)	Disaggregate GED and High School Graduate (2)
Intercept	.690(22.9)	.690(23.0)
High school graduate	.130(5.5)	.144(6.5)
GED	N.A.	.060(1.5)
2 years college + high school	.231(5.0)	.236(5.4)
2 years college + GED	N.A.	.169(1.1)
4 years college	.340(10.2)	.340(10.2)
Black	−.190(9.1)	−.190(9.1)
Hispanic	−.050(1.8)	−.050(1.8)
Year 1982	.024(.9)	.023(.7)
Year 1983	.001(.0)	.001(.1)
Year 1984	−.036(1.1)	−.032(1.0)
Year 1985	−.071(1.1)	−.070(.9)
Year 1986*	−.036(2.0)	−.038(1.8)
F-test: probability > F:		
GED = 0	N.A.	.13
GED = high school graduate	N.A.	.02

NOTE.—Persons in college at age 25 are deleted, as are persons not working. Wage equations are with education dummies; all education dummies are defined exclusively. t-statistics are in parentheses and are calculated using modified McKinnon-White standard errors to correct for heteroscedasticity. N.A. = not applicable.
* Year 1987 is the left-out year indicator.

they drop out of school than do dropouts who do not attain the GED. Unadjusted comparisons of GED recipients and dropouts would show greater earnings for GED recipients, but this could be attributable solely to attained years of schooling. GED recipients are older than high school graduates and have more work experience. Both of these factors produce a bias in favor of higher wages and earnings for GED recipients compared to high school dropouts who do not attain the GED. These factors suggest that the weak effects of the GED on economic returns demonstrated in Section I are, if anything, overstated.

Table 7
Random Sample NLSY: First Action after Completing Degree (in %)

	Attend 4-Year College	Attend 2-Year College	Vocational Training	On-the-Job Training/ Apprenticeship	Military	Other*
Graduate high school (N = 1,902)	36.6	23.3	7.6	3.4	4.8	24.3
GED (N = 164)	15.0	23	10	3.3	10	40

SOURCE.—NLSY (see App. A and the note to table 8).
* Other = work with no training, unemployment, and out of labor force.

Table 8
Random Sample NLSY (in %)
A. All Educational Decisions after Receiving Degree

	Attend 4-Year College	Attend 2-Year College	No College
High school diploma (N = 1,902)	30.3	32.3	37.4
GED (N = 164)	16	27	58

B. Completion Rates for 4-Year College for Those Who Decide to Attend 4-Year College to Graduation*

	Attend 4-Year College	Attend 2-Year College	No College
High school diploma (N = 566)	75	N.A.	N.A.
GED (N = 42)	5	N.A.	N.A.

C. Completion Rates for 2-Year College Attendance

	Attend 4 Years and Graduate	Finish 2 Years	Complete Less Than 2 Years
High school diploma (N = 584)	34.7	21	44.3
GED (N = 42)	2	25	73

NOTE.—N.A. = not applicable. Only 3.2% of the sample attended a 2-year college and then went on to a 4-year school.
* These are persons who start at 4-year colleges.

Conversely, if receipt of a GED starts a high school dropout on the career path of a high school graduate, work experience at the new educational certification level should be distinguished from that at the old in comparing high school graduates and GED recipients. The latter persons will have less work experience at the high school equivalent level than the former. Failure to control for this difference biases downward the estimated economic returns to exam certification if the return to work experience is greater for high school graduates and GED recipients than for dropouts.

Although it is currently fashionable to ignore selection bias in studies of labor market outcomes, it is likely to be an important problem in this study. Wages are not available for nonworkers. Young persons may be nonworkers because they are attending school or because they cannot get a job. Persons with missing wages are unlikely to be typical of those for whom wage data are available.

In this section, we examine the robustness of the evidence reported in Section I to a variety of statistical adjustments. The simple story of that section holds up in a more rigorous econometric analysis. Before turning to the data, we first sound a cautionary methodological note.

B. Sample Size and the Choice of a Significance Level

The evidence presented in this section of the article is largely based on classical testing theory for multivariate regression models. Because we use "robust" jackknife procedures (Efron 1982; or McKinnon and White 1985), we do not rely on standard, and controversial, normality assumptions for producing standard errors. Nonetheless, there is ambiguity in the classical theory about the choice of a correct significance level for conducting tests and how it should be adjusted in different sample sizes (Lindley 1957). These considerations are especially relevant for this article in light of the small samples available in the NLSY compared to those in the widely used Current Population Survey.

In order to avoid placing undue—and increasing—weight on minimizing type II errors (the probability of accepting a false null hypothesis) as sample sizes increase, the probability of type I errors (i.e., the significance level) should be adjusted downward with sample size. Given that p values are to be used in judging hypotheses, we should be more tolerant—less likely to reject a null for any p value—in a small sample like the NLSY than in a large sample like the CPS or Decennial Census Microdata samples.

Two principles are important to keep in mind in reading the evidence reported below and comparing it to evidence obtained from CPS or Census surveys: (a) when one rejects a null hypothesis in a model fit on the NLSY, one can be relatively confident in doing so; (b) when one does not reject a hypothesis, but the sign pattern of estimated differences is plausible and points to rejection, one should not be too confident in accepting a null hypothesis of no difference.

C. The Direct Effects of Certification on Wages and Hours Worked

We demonstrate that GED-certified males are more like high school dropouts than high school graduates in terms of their labor supply and wages. Table 9 presents estimates of alternative specifications of labor supply and wage equations that distinguish GED recipients from traditional high school graduates. We estimate wage and labor supply equations at ages 25 and 28 for samples of young men not in college (2-year or 4-year) at ages 25 or 28 who also are working at those ages. A second specification reported in Cameron and Heckman (1992) is fit on samples of young men who have not attended any college up to age 25 or 28 and who work in the year following the date at which the age is attained. The evidence from those samples corroborates the evidence reported here. The samples are defined so that data on hourly wages are available for each observation and so that persons holding low-wage part-time student jobs are excluded from our analysis. In order to correct for potential sample-selection bias

Table 9
Ordinary Least Squares Regressions for Log-Wages and Log-Hours (Year Effects Are Not Reported)

	Log-hourly Wages				Log-annual Hours	
	Simple Wage Equation, No Selection	Simple Wage Equation, with Selection	Augmented Wage Equation, No Selection	Augmented Wage Equation, with Selection	Hours Equation, No Selection	Hours Equation, with Selection
A. Model 1: at age 25 (N = 2,308):						
Intercept	.690(23.0)	.59(11.8)	.45(8.9)	.34(6.7)	2.85(68.7)	2.9(60.7)
GED	.060(1.5)	.030(.9)	.071(2.1)	.044(1.4)	.041(.8)	.027(.8)
High school graduate	.144(6.5)	.108(5.0)	.108(4.8)	.075(3.1)	.143(5.8)	.132(4.8)
Selection γ_1*	...	.310(3.4)	...	.38(3.2)	...	−.102(.50)
Selection γ_2†	...	−.710(3.0)	...	−.021(.8)	...	−.86(3.2)
Tenure	...	...	.15(10.7)	.148(10.8)	...	...
Tenure squared	...	...	−.01(5.6)	−.010(5.5)	...	...
Experience‡	...	...	.044(7.0)	.042(6.2)	...	...
Unemployment rate	...	...	−.020(6.9)	−.020(3.9)	−.010(2.7)	−.001(.2)
2 years of college + GED	.169(1.1)	.104(.7)	.147(1.0)	.077(.6)	.088(.5)	.102(.5)
2 years of college + high school	.236(5.4)	.167(3.6)	.205(5.0)	.151(3.6)	.321(5.2)	.304(4.8)
College graduate	.340(10.2)	.241(6.7)	.341(10.7)	.256(7.4)	.250(6.2)	.274(5.3)
Black	−.190(9.1)	−.080(2.1)	−.13(6.0)	−.093(2.5)	−.20(6.4)	−.10(2.4)
Hispanic	−.050(1.8)	−.021(.5)	−.03(1.1)	−.006(.2)	−.05(1.3)	−.03(1.0)
R^2	.10	.12	.20	.21	.04	.06
F-test: probability > F:						
GED = 0	.13	.37	.04	.14	.38	.41
GED = high school graduate	.02	.03	.38	.35	.01	.02

B. Model 1: at age 28 (N = 1,016):						
Intercept	.84(19.6)	.78(12.5)	.67(8.0)	.55(5.6)	3.1(40.9)	3.24(28.2)
GED	.062(1.0)	.037(.6)	.115(1.7)	.101(1.5)	−.053(.8)	−.074(1.2)
High school graduate	.174(4.7)	.134(3.6)	.154(4.4)	.121(4.0)	.090(2.2)	.061(1.9)
Selection γ_1*	. . .	.59(2.5)	. . .	.59(2.2)	. . .	−.210(1.8)
Selection γ_2†	. . .	−.68(2.0)	. . .	−.10(.8)	. . .	−1.42(4.5)
Tenure	. . .	. . .	.12(7.2)	.124(7.6)	. . .	. . .
Tenure squared	. . .	. . .	−.010(5.0)	−.010(5.8)	. . .	. . .
Experience‡	. . .	. . .	.023(3.0)	.021(2.6)	. . .	. . .
Unemployment rate	. . .	. . .	−.020(5.1)	−.02(2.6)	−.019(3.8)	−.010(1.5)
2 years of college + GED	.112(.6)	.085(.70)	.150(.9)	.100(1.4)	.121(1.3)	−.110(2.0)
2 years of college + high school	.355(6.7)	.297(5.8)	.322(6.0)	.290(6.0)	.153(2.7)	.123(2.2)
College graduate	.382(7.9)	.317(5.5)	.38(8.2)	.301(5.7)	.166(3.7)	.135(3.0)
Black	−.16(4.8)	−.05(1.00)	−.13(4.0)	−.09(2.1)	−.110(3.5)	−.041(.9)
Hispanic	−.02(.60)	.02(.30)	−.01(.2)	.01(.2)	−.81(1.8)	−.020(.8)
R^2	.12	.14	.22	.022	.06	.10
F-test: probability > F:						
GED = 0	.38	.49	.09	.13	.42	.26
GED = high school graduate	.04	.06	.52	.72	.02	.03

NOTE.—Persons in college at age 25 (for pt. A) and age 28 (for pt. B) are deleted, as are persons not working, although they may have taken postsecondary vocational training. t-statistics are in parentheses and are calculated using modified McKinnon-White standard errors to correct for heteroscedasticity and estimated parameter (see App. B, which is available on request).

* Corresponds to the coefficient on selection correction term controlling for working and not attending college in App. eq. (B2) (available on request).

† Corresponds to the coefficient on selection correction term controlling for college enrollment in App. eq. (B2) (available on request).

‡ Total work experience does not include current job tenure.

problems that arise from excluding workers on the basis of their labor force or educational activity, we estimate a bivariate-selection-correction model discussed at length in Cameron and Heckman (1992). Details of the estimation procedure are available from us on request.[7] The variables used in the analysis are defined in Appendix A, although the common English meanings are precise enough.

For all specifications of the wage and labor supply equations with and without selection corrections, we are unable to reject the hypothesis that GED recipients are indistinguishable from high school dropouts (see the p values for the test of the hypothesis "GED = 0" given at the base of table 9, pts. A and B). For all specifications of the labor-supply equations and for specifications of the wage functions that exclude job tenure and work experience, we reject the hypothesis that the GED degree is equivalent to the high school diploma ("GED = HS GRAD"). When job tenure and work experience are entered as regressors in wage equations, there is less evidence of a distinction between the two forms of high school certification. There is a strong negative relationship between total work experience and GED status. In Cameron and Heckman (1992), we also document that GED recipients are like high school dropouts and unlike high school graduates in their job tenure and in their high levels of annual unemployment.

Using conventional statistical significance levels, the NLSY data strongly reject the hypothesis that GED recipients are the labor market equals of high school graduates. The same data do not reject the hypothesis that high school dropouts and GED recipients are indistinguishable. A closer look at the evidence indicates, however, that GED recipients lie between dropouts and graduates in their economic standing but are much closer to dropouts.

It is plausible that differences in economic outcomes among GED recipients, dropouts, and high school graduates are largely due to differences in ability. (Recall the ordering reported in table 2.) Table 10 presents estimates of augmented versions of the models presented in table 9, part A, when an AFQT test score—interpreted as a measure of ability—is added to wage and hours of work equations. The test scores may be as much a consequence as a cause of schooling, so the results shown in these tables should be interpreted with caution. Introduction of the AFQT variable tends to reduce the precision and size of the estimated GED and high

[7] The selection-correction procedure used here does not play a central role in producing these inferences. However, it does affect the strength of the inference in the specifications of the wage function that include tenure and experience. In Cameron and Heckman (1992), we examine the fit of estimated selection-corrected and uncorrected wage and labor supply functions to the data. The selection-corrected wage models fit the data, although the uncorrected wage models do not. Neither corrected nor uncorrected hours models fit the data.

school graduation coefficients, as would be expected if the test score proxies schooling. However, the *F*-tests reveal that the central inference of table 9, part A, is not reversed. The same is true for 28-year-olds (see table 10, pt. B). GED recipients are statistically indistinguishable from high school dropouts in terms of their hourly wages and hours of work and have lower wages and hours of work than traditional high school graduates.

The evidence presented in tables 9 and 10 adjusts for differences in work experience among high school dropouts, GED recipients, and high school graduates. It implicitly assumes that a year of work experience has the same effect on wages irrespective of educational attainment. If advocates of the GED testing program are correct, GED recipients enter a new career track after attaining their certificate. Such work experience is likely to have greater training and wage-enhancing content than work experience obtained as a high school dropout. Accordingly, the evidence presented in tables 9 and 10 understates the contribution of the GED to lifetime earnings and occupational advance by failing to recognize that GED recipients have relatively fewer work experience years at the high school graduate level than do traditional high school graduates.

Table 11 sheds light on this issue. It presents estimates of a wage equation that segments work experience by the years of educational attainment at the time the experience was generated. The results indicate a high value of work experience for high school dropouts who do not attain a GED, but a low value of work experience for those who do. Post-GED work experience produces virtually the same economic return as work experience for dropouts who never attain the GED. Post-high-school-graduation work experience produces a higher economic return, but it is not statistically significantly different from the effect of dropout/post-GED work experience on wages. Adjustment for work experience by educational attainment does not reverse our conclusions.

Table 11 also indicates that, controlling for work experience, there is little difference in the economic returns to GED certification or high school graduation. These results reinforce a conclusion already gleaned from tables 9 and 10: that a major difference between GED recipients and high school graduates is in labor supply and work experience, not in wages paid standardizing for those characteristics. Consistent with the Milwaukee surveys cited above (Pawasarat and Quinn 1986), employers are reluctant to hire GED recipients.

Table 12 presents additional evidence on this point for the bulk of GED recipients (those who receive their degrees between the ages of 17 and 19). GED recipients are much less likely than high school graduates to be

Table 10
Selection-corrected Log-Wage and Log-Hour Regressions (Year Effects Not Reported), Including the Score on the AFQT Test (cf. Table 9)

	Log-hourly Wages				Log-annual Hours	
	Simple Wage Equation, No Selection	Simple Wage Equation, with Selection	Augmented Wage Equation, No Selection	Augmented Wage Equation, with Selection	Hours Equation, No Selection	Hours Equation, with Selection
A. Model 1: at age 25:						
Intercept	.39(9.0)	.41(9.1)	.213(3.8)	.175(3.0)	2.70(44.1)	2.80(32.0)
GED	−.038(1.0)	−.045(1.1)	−.011(.2)	−.012(.30)	−.058(1.0)	−.067(1.0)
High school graduate	.032(1.3)	.029(1.1)	.021(.5)	.001(.0)	.121(3.3)	.110(3.0)
Selection γ_1*	. . .	.16(2.3)	. . .	.240(2.7)	. . .	−.180(.5)
Selection γ_2†	. . .	−.41(4.0)	. . .	−.010(.1)	. . .	−.910(4.1)
Tenure	. . .	. . .	.144(10.5)	.144(10.3)	. . .	. . .
Tenure squared	. . .	. . .	−.010(5.3)	−.010(5.1)	. . .	. . .
Experience‡	. . .	. . .	.040(6.5)	.039(5.8)	. . .	. . .
Unemployment rate	. . .	. . .	−.020(6.8)	−.020(4.0)	−.010(2.4)	−.001(.1)
2 years of college + GED	−.04(.3)	−.05(.4)	−.041(.3)	−.059(.4)	.010(.1)	.025(.1)
2 years of college + high school	.061(1.4)	.034(.8)	.051(1.2)	.036(.8)	.253(3.6)	.240(3.6)
College graduate	.120(3.0)	.077(2.0)	.144(3.8)	.115(3.0)	.203(3.6)	.200(3.4)
Black	−.056(2.3)	−.06(2.1)	−.026(1.0)	−.018(2.6)	−.139(3.5)	−.062(1.4)
Hispanic	.017(.6)	−.01(.3)	.031(1.3)	.036(1.5)	−.010(.3)	−.043(.2)
AFQT score	.006(12.4)	.004(4.5)	.005(9.4)	.004(8.0)	.003(4.0)	.003(3.0)
R^2	.14	.15	.17	.17	.06	.06
F-test: probability > *F*:						
GED = 0	.33	.23	.85	.57	.30	.23
GED = high school graduate	.02	.04	.59	.96	.00	.0005

B. Model 1: at age 28:						
Intercept	.56(8.7)	.31(2.6)	.414(4.8)	.350(2.9)	3.03(32.0)	3.5(34.1)
GED	−.02(.4)	−.026(.50)	.070(1.2)	.065(1.0)	−.150(1.7)	−.19(2.0)
High school graduate	.08(2.0)	.07(1.7)	.081(1.7)	.060(1.4)	.090(1.7)	.07(1.2)
Selection γ_1*	. . .	.29(4.1)	. . .	.449(1.9)	. . .	−.401(1.5)
Selection γ_2†	. . .	−.17(2.8)	. . .	−.050(.2)	. . .	−1.48(4.0)
Tenure	. . .	. . .	.118(7.0)	.119(7.1)	. . .	. . .
Tenure squared	. . .	. . .	−.008(4.6)	−.008(4.1)	. . .	. . .
Experience‡	. . .	. . .	.022(2.8)	.021(2.6)	. . .	. . .
Unemployment rate	. . .	. . .	−.025(5.2)	−.021(2.6)	−.022(3.2)	−.014(1.9)
2 years of college + GED	−.11(.6)	−.11(.7)	.027(.2)	.007(.1)	−.160(.8)	−.15(0.7)
2 years of college + high school	.17(2.9)	.16(2.9)	.200(3.3)	.187(3.0)	.152(1.8)	.10(1.3)
College graduate	.18(3.1)	.14(2.4)	.189(3.4)	.190(3.0)	.17(2.2)	.12(1.5)
Black	−.04(1.4)	−.1(2.1)	−.038(1.1)	−.016(.3)	−.130(2.5)	.05(.5)
Hispanic	.04(1.0)	−.002(.1)	.047(1.2)	.050(1.1)	−.08(1.4)	−.04(.8)
AFQT score	.005(5.6)	.005(6.2)	.005(5.4)	.004(4.2)	.001(1.0)	.002(1.7)
R^2	.15	.16	.08	.09	.06	.08
F-test: probability > F:						
GED = 0	.75	.57	.25	.30	.08	.05
GED = high school graduate	.04	.05	.92	.96	.00	.00

NOTE.—t-statistics are in parentheses and are calculated using modified McKinnon-White standard errors to correct for heteroscedasticity and estimated parameter (see McKinnon and White 1985).

* Corresponds to the coefficient on selection correction term controlling for working and not attending college in App. eq. (B2) (available on request).

† Corresponds to the coefficient on selection correction term controlling for college enrollment in App. eq. (B2) (available on request).

‡ Total work experience does not include job tenure.

Table 11
Ordinary Least Squares Log-hourly Wage Regressions at Ages 25 and 28 (Year Effects Not Reported), Interacting Work Experience with Dropout, GED, and High School Graduation Status and Breaking out Work Experience for GED Recipients into Pre- and Post-GED Components

	Age 25, No Selection	Age 25, with Selection	Age 28, No Selection	Age 28, with Selection
Intercept	.437(6.8)	.331(5.0)	.655(5.8)	.541(4.5)
GED	.137(1.2)	.110(.9)	.262(1.4)	.260(1.1)
High school graduate	.141(2.1)	.125(1.1)	.334(2.8)	.310(2.2)
Selection γ_1*	...	.342(2.6)	...	.531(2.2)
Selection γ_2†	...	−.02(.1)	...	−.190(.7)
Dropout experience	.071(6.7)	.072(6.3)	.047(3.2)	.047(2.6)
Post-GED experience	.067(3.6)	.067(3.2)	.040(1.6)	.038(1.2)
Pre-GED experience	−.035(1.3)	−.028(1.0)	−.045(1.3)	−.045(.9)
Post high school experience‡	.075(9.8)	.073(9.7)	.031(3.1)	.030(2.7)
Unemployment rate	−.019(6.1)	−.019(3.7)	−.024(5.2)	−.021(3.0)
2 years of college + GED	.190(.9)	.131(.4)	.271(.2)	.244(.1)
2 years of college + high school	.240(3.2)	.210(2.3)	.481(4.0)	.420(3.3)
College graduate	.354(5.3)	.310(3.7)	.522(4.4)	.461(3.4)
Black	−.128(5.8)	−.100(2.5)	−.142(4.2)	−.091(1.9)
Hispanic	−.020(.8)	−.002(.0)	−.000(.0)	.017(.2)
R^2	.17	.18	.16	.17
F-test: probability > *F*:				
GED = 0	.21	.25	.15	.28
GED = high school graduate	.98	.98	.58	.86
Post-GED experience = dropout experience	.76	.86	.78	.89
Post high school experience = dropout experience = GED experience	.77	.88	.32	.54

NOTE.—Compare results for age 25 with table 9, pt. A, and results for age 28 with table 9, pt. B. *t*-statistics are in parentheses and are calculated using modified McKinnon-White standard errors to correct for heteroscedasticity and estimated parameters (see App. B, which is available on request).

* Corresponds to the coefficient on the selection term controlling for working and not attending college in App. eq. (B2).

† Corresponds to the coefficient on selection correction term controlling for college enrollment in App. eq. (B2) (available on request).

‡ A variable measuring experience before high school graduation was dropped; it was insignificant and small in all specifications.

employed or in the military over the ages 20–28. Their labor force activity resembles that of high school dropouts. These inferences are sustained in the statistical tests reported in the final two columns of the table. Similar results are found for those who receive their GED in their early twenties (Cameron and Heckman 1992). GED recipients are not working the same hours or acquiring the same work experience as high school graduates.

The observed ordering in economic status among dropouts, GED recipients, and high school graduates may simply be due to differences in years of schooling completed. Table 13, part A, reveals that on average

Table 12
NLSY Males: Proportion of Time during the Last Calendar Year Spent neither Working nor in the Military for Dropouts and High School Graduates and GED Recipients Who Received Their Degrees between Ages 17 and 19 and Never Attended College

Age	High School Graduate	GED Recipient	Dropout	Wilcoxon Test: High School > GED (p-Value)	Wilcoxon Test: GED > Dropout (p-Value)
20	.25(.01)	.39(.02)	.43(.01)	.00	.16
21	.20(.01)	.34(.02)	.37(.01)	.00	.21
22	.18(.01)	.30(.02)	.35(.01)	.00	.06
23	.17(.01)	.31(.02)	.35(.01)	.00	.05
24	.15(.01)	.27(.02)	.31(.01)	.00	.21
25	.15(.01)	.22(.02)	.27(.01)	.00	.14
26	.14(.01)	.26(.03)	.29(.02)	.00	.38
27	.13(.01)	.23(.04)	.24(.02)	.00	.36
28	.12(.01)	.28(.06)	.21(.02)	.00	.69

NOTE.—Standard errors of the means are in parentheses.

dropouts have completed one fewer year of schooling than GED recipients. Table 13, part B, establishes that almost 60% of the GED recipients have completed 11 years of schooling compared to only 33% for the dropouts. About 45% of the dropouts have 9 or less years of schooling compared to only 10% of the GED recipients. If the ordering in labor market outcomes among graduates, GED recipients and dropouts is simply due to years of schooling completed, the value of high school exam certification as *an end in itself* is in doubt. Government programs with such an emphasis are misguided.

Table 14 sheds valuable new light on this question. That table displays the effect on wages of interacting dropout and GED indicator variables

Table 13
School Completion for GED Recipients and Dropouts at Age 25
A. Mean Years of Secondary School Completed

	N	Mean	Standard Error of Mean
Dropouts	238	9.46	.08
GED recipients	125	10.40	.07

B. % Distribution of Years of School Completed

	Years Completed				
	7 or Less	8	9	10	11
Dropouts	8.1	13.2	24.3	21.8	32.6
GED recipients	1.8	3.6	5.2	31.2	58.2

Table 14
Log-Wage Regressions Interacting GED and Dropout with Years of Secondary School Completed (Year Effects Not Reported)

	Age 25	Age 28
Intercept	.613(17.6)	.800(19.4)
Dropout after 10 years	.100(2.1)	.046(.9)
Dropout after 11 years	.179(3.7)	.120(1.5)
GED after 9 years or less	−.156(1.7)	−.020(.6)
GED after 10 years	.113(1.6)	−.010(.3)
GED after 11 years	.191(3.9)	.151(2.1)
High school graduate	.225(7.5)	.211(4.6)
2 years of college + GED	.249(1.3)	.152(1.0)
2 years of college + high school	.318(6.3)	.390(5.9)
4 years of college	.421(11.2)	.422(7.3)
Black	−.189(8.9)	−.160(4.8)
Hispanic	−.040(1.6)	−.024(.6)
R^2	.11	.12
F-test: probability > F:		
1. GED 11 = dropout 11	.58	.49
2. GED 10 = dropout 10	.69	.76
3. GED 9 = dropout 9	.09	.52
4. High school graduate = GED 11	.62	.40
5. High school graduate = GED 10	.05	.04
6. High school graduate = GED 9	.00	.00
7. High school graduate = dropout 11	.24	.13
8. High school graduate = dropout 10	.01	.01
9. High school graduate = dropout 9	.00	.00
10. 2-year college and high school = 2-year college and GED	.20	.13
11. Joint test: GED = dropout	.52	.84
12. Joint test: GED = high school graduate (excludes 2-year college)	.00	.14
13. Joint test: GED = high school graduate (includes 2-year college)	.00	.12

NOTE.—Education dummies are defined exclusively. Dropout after 9 years or less is the left-out indicator. t-statistics are in parentheses and use the McKinnon-White procedure for heteroscedasticity.

with actual years of schooling completed. The benchmark group is dropouts with 9 or fewer years of schooling. Dropouts with an additional year of completed schooling earn 8%–10% higher wage rates. The same is true for GED recipients holding postsecondary schooling constant. Differences between GED recipients and dropouts are almost completely accounted for by years of schooling. At the same *completed* schooling level, a GED recipient earns only 1% more than a high school dropout. GEDs with 11 years of completed schooling earn only 3% less than high school graduates. Dropouts with 11 years of schooling earn only 4% less than high school graduates. Using the p values shown at the bottom rows of table 14, we do not reject the hypothesis that GED recipients and dropouts with the same years of schooling earn the same wages (see the first three rows of the lower part of table). High school graduates and GED recipients or high school dropouts with 11 years of schooling are also indistinguishable

(see rows 4 and 7). High school graduates earn statistically significantly higher wages only compared to GED recipients *or* dropouts with 10 or fewer years of schooling. Note further that high school graduates who complete 2-year colleges earn 6% more than GED-certified males with 2 years of college, but this difference is not statistically strong (as measured by p values). Too few GED-certified persons completed 4 years of college to make a meaningful comparison at that education level.

Table 15 pushes the analysis of table 14 a bit further. When the total number of years of schooling completed are added to the models in table 6, one cannot reject the Mincer (1974) specification that the coefficients on the dummy variables indicating GED, high school graduation, and various years of college certification are jointly insignificant at conventional significance levels. There are no statistically precise "sheepskin" or "certification" effects in the data controlling for the total number of years of schooling completed. There is no cheap way to acquire the skills obtained from conventional classroom instruction.

Cameron and Heckman (1992) present a parallel analysis for hours of work. Again, years of schooling completed, *not* certification levels, account for differences in labor-supply behavior.

The effects of adjusting for race, work experience, years of schooling completed, local unemployment rates, and year effects on the wage distributions of holders of different credentials at age 25 is depicted in figures

Table 15
Log-Wage Regressions at Ages 25 and 28, Controlling for the Total Number of Years of School and College Combined (Year Effects Not Reported)

	Age 25	Age 28
Intercept	.152(1.6)	.509(3.4)
GED	−.016(.7)	.015(.4)
High school	−.009(.3)	.080(1.4)
2 years of college + GED	−.094(.6)	−.045(.2)
2 years of college + high school	−.024(.4)	.200(2.2)
4 years of college	−.029(.4)	.149(1.3)
Black	−.188(8.9)	−.160(5.0)
Hispanic	−.034(1.3)	−.015(.4)
Years of school	.057(5.4)	.034(2.4)
R^2	.11	.12
F-test: probability > F:		
GED = 0	.46	.72
GED = high school graduate	.52	.21
Joint test: all education dummy variables = 0	.54	.16
Joint test: college education dummy variables = 0	.78	.16

NOTE.—Education dummies are defined exclusively. We failed to reject the hypothesis at the 10% level that years of school have statistically different effects for years of college and years of secondary school at ages both 25 and 28. t-statistics are in parentheses and are calculated using the McKinnon-White procedure to correct for heteroscedasticity.

6*a*–6*c*.[8] Figure 6*a* shows the unadjusted figures for persons with no college. Adjustments make both dropouts and GED recipients more like high school graduates (fig. 6*b*). However, the mass of GED recipients is still concentrated in the lower deciles of the high school wage distribution. The GED recipient wage distribution is almost identical to the dropout distribution except for the top decile (fig. 6*c*). The results for 28-year-olds show the same pattern. GED recipients as a whole are much more like high school dropouts than high school graduates.

D. Indirect Effects of Certification

The GED effects just discussed are *partial* or *direct* measures that hold constant any effects of GED acquisition on postsecondary schooling and training. The total effect of GED acquisition on wages also includes the effect of certification on the volume of postsecondary schooling and training multiplied by the return to this activity. Tables 7 and 8 reveal that GED recipients are more likely to take postsecondary training and schooling than are high school dropouts although they are less likely to attend and complete such programs than are high school graduates.

Table 16 presents evidence on the indirect effect of GED certification and high school graduation on wage rates. The wage equations reported in table 9 are augmented to partition years of college completed more finely and to include off-the-job training, apprenticeship and company training, and military training as additional postsecondary training and schooling choices.

Table 17 reports the components needed to estimate the indirect effects reported in table 16 for 25-year-olds (results for 28-year-olds are available in App. B, available on request). In the columns labeled "Estimated Returns," the estimated effect of an extra unit of postsecondary schooling or training on log wages is reported for GED recipients and high school graduates. The rates of return to postsecondary activity for the two forms of certification are statistically indistinguishable (see the first test at the base of the table). However, by age 28, the returns to college for high school graduates are higher than they are for GED recipients. With the exception of military training, GED recipients take less postsecondary training or schooling than high school graduates. The product of the rate of return and the volume of training taken is the contribution of the form of the postsecondary activity reported in each row to wages. The sum across rows is the estimated total indirect effect. The estimated direct effect is the coefficient on GED or high school graduation holding constant year

[8] We use common work experience variables for all levels of education. This appears to be justified in light of the evidence in table 11. Comparable figures for 28-year-olds are available on request in App. B.

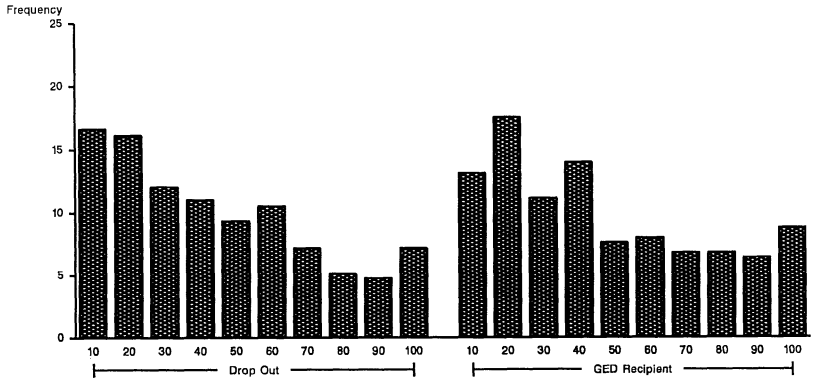

FIG. 6*a*.—NLSY males, age 25, who have completed no college: how the GED recipient and dropout hourly wage distributions fit into the high school graduate wage distribution, by %. Source: NLSY (1979–87 data).

effects, postsecondary schooling, and dummy variables for race. The omitted educational category is high school dropouts.

The indirect effect of high school graduation ranges between 34% and 42% of the total effect on wages. For GED recipiency, the indirect effect ranges between 100% (at age 25) and 63% (at age 28) of the estimated total effect. Although the estimated parameters for GED recipients are not precisely determined, the evidence assembled in table 16 indicates the effect of the GED on wages comes primarily through its effect on certification for postsecondary training. The indirect effects for high school graduates and GED recipients are nearly identical at age 25 and statistically indistinguishable at age 28.

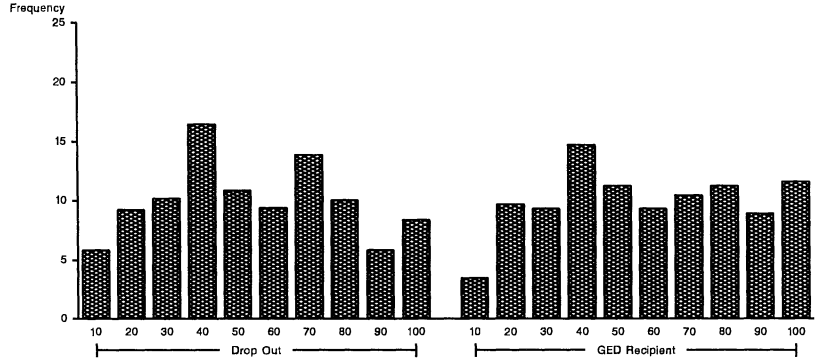

FIG. 6*b*.—NLSY males, age 25, who have completed no college: how the GED recipient and dropout hourly wage distributions fit into the high school graduate wage distribution, adjusted for experience, race, unemployment rate, year effects, and the highest grade completed. Source: NLSY (1979–87 data). See table 9 notes for a definition of the sample.

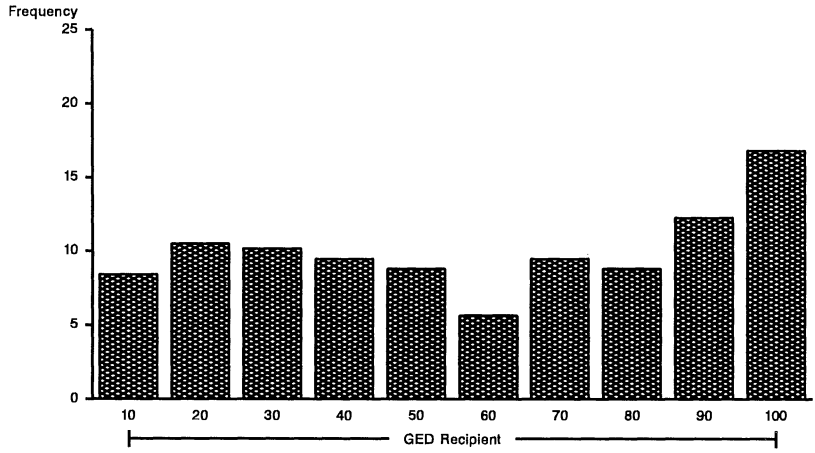

FIG. 6*c*.—NLSY males, age 25: how the GED recipient hourly wage distribution fits into the dropout wage distribution, adjusted for experience, race, unemployment rate, year effects, and the highest grade completed, by %. Source: NLSY (1979–87 data). See table 9 notes for a definition of the sample.

The evidence reported in tables 6, 9, and 17 also weakly indicates that the return to postsecondary schooling and training differs between high school graduates and GED recipients. These differences are only partly accounted for by the lesser amount of time spent in postsecondary education by GED recipients. One possible source of these differences is the choice of curriculum within each type of postsecondary education, but we have no direct evidence on this possible explanation.

E. Some Longitudinal Evidence

Using the longitudinal structure of the NLSY, we compare a variety of characteristics of GED recipients in the year before and after they receive their certificate. Table 18 excludes persons in the military in the year before or after receiving the GED.[9] There is little evidence of any GED-induced change in labor market outcomes in these tables, although the small sample sizes may preclude precise determination of these changes.

Another way to study the impact of the GED on life-cycle wage growth is to follow a cohort of young GED recipients over a period of time and compare their experience to a group of young high school dropouts who have not received the GED by age 25. Figures *7a–7f* present the position

[9] The exclusion of military personnel is done to avoid making pay comparisons between military and civilian wage scales. However, inclusion of military personnel does not affect our conclusions.

Table 16
Direct and Indirect Effects of GED and High School Graduation on Log Wages

	A. Age 25		B. Age 28	
	High School Graduate	GED	High School Graduate	GED
College (combined)	.0430(4.8)	.0090(.8)	.0890(5.4)	.0118(.5)
Weeks of off-the-job training	.0080(.3)	.0150(.9)	.0028(.7)	.0190(.8)
Apprenticeship/company training	.0130(5.5)	.020(2.5)	.0154(3.6)	.0066(.3)
Military training	.0040(1.2)	.028(1.9)	.0002(.3)	.0036(.8)
Total indirect effect	.068(5.4)	.072(1.6)	.017(4.6)	.041(.6)
Total direct effect	.129(5.3)	−.003(.2)	.142(3.6)	.024(.5)
Total effect	.197(5.2)	.069(1.1)	.249(4.2)	.065(.6)

NOTE.—*t*-statistics are in parentheses. These numbers are calculated from the log-wage specification presented in the first column of table 9, pt. A—controlling for the effects of GED recipiency, high school graduation, 2- and 4-year college education, year effects, and black and Hispanic race variables as well as year dummies—augmented with variables to control for weeks of off-the-job training, weeks of military training, and completion of 1 year of college. Weeks of off-the-job training include total weeks of training from a vocational-technical school, nursing school, flight school, business college, barber school, or beauty college. Weeks of military training are the total weeks of military training taken while on active military duty, including active duty in the reserves. Weeks of off-the-job training, weeks of military training, and the college education indicators are interacted with dummies for GED recipiency and high school graduation to estimate separate returns for college, off-the-job-training, and military training for both GED recipients and high school graduates. To construct the indirect effect of off-the-job training and military training, the estimated coefficient associated with each variable is multiplied by the sample mean number of weeks of off-the-job weeks and military training. To calculate the college indirect effects, the sample proportions for GED recipients and high school graduates for 1 year of college, 2 years of college, and 4 years of college are multiplied by the return to each level of education estimated from the augmented wage equation. The sum is the indirect effect of college education. The estimate of the variance is described in table 17. The total indirect effect is simply the sum of these components. The direct effect is the value of the estimated coefficient associated with the indicator for GED recipiency and high school graduation. The total effect is the sum of the direct and indirect effects.

of GED recipients in the wage distribution of high school dropouts sampled at ages 20, 22, and 25. The same persons are followed over time. The unadjusted distributions (figs. 7*a*–7*c*) display the "Cosby effect," but by age 25 there is great similarity in the distributions below the top decile. The adjusted distributions are even more striking. By age 25, there is much similarity in the two distributions below the median wage. Any initial advantage of GED recipients below the top decile seems to have been dissipated.

In Cameron and Heckman (1992), we document that GED recipients are more likely to change jobs than are high school dropouts. Since a significant portion of the wage growth of young men comes from job changing, it is interesting to compare the wage growth of GED recipients who change jobs *after* they receive the GED with the wage growth of GED recipients who stay put. Results in Appendix B, available on request, reveal that post-GED job changers receive some increase in wages while job stayers receive little increase in wages. It is unclear, however, how much of this growth in job changers' wages to attribute to job changing and how much to attribute to receipt of the GED.

Table 17
Direct and Indirect Effects of GED Recipiency and High School Graduation on Log-Wages, at Age 25: Estimated Returns and Sample Means

	High School Graduates			GED Recipients		
	Estimated Returns*	Sample Means†	Product‡	Estimated Returns*	Sample Means†	Product‡
1 year of college	.047(1.4)	.10(.007)	.005(1.3)	.045(.5)	.07(.019)	.003(.5)
2 years of college	.086(1.6)	.11(.008)	.009(1.5)	.110(.9)	.05(.016)	.006(.9)
4 years of college	.190(6.6)	.15(.009)	.029(6.3)	N.A.§	N.A.	N.A.
Weeks of off-the-job training	.001(.4)	8.0(.7)	.008(.3)	.002(1.1)	7.6(1.6)	.015(.9)
Weeks of apprenticeship or company training	.003(5.9)	4.0(.5)	.013(5.5)	.007(2.8)	2.9(1.0)	.020(2.5)
Weeks of military training	.002(1.3)	2.2(.3)	.004(1.2)	.005(2.5)	5.5(1.3)	.028(1.9)
Total indirect effect	...	...	.068(5.4)	...	...	.072(1.6)
Total direct effect	...	...	.129(5.3)	...	...	−.003(.2)
Total effect	...	...	.197(5.2)	...	...	.069(1.1)
						Probability > F
Joint test: estimated returns for high school graduates = estimated returns for GED recipients						.16
Joint test: sample means for high school graduates = sample means for GED recipients						.00

NOTE.—Sums and products may not appear exact due to rounding of the numbers presented above.
* t-statistics are in parentheses and are constructed using McKinnon-White standard errors.
† Standard errors of the mean are in parentheses.
‡ The variance of the product is calculated using the delta method to get $\text{var}(\hat{\beta}\hat{\mu}) = \mu^2\text{var}(\hat{\beta}) + \hat{\beta}^2\text{var}(\hat{\mu}) + \text{var}(\hat{\beta})\text{var}(\hat{\mu})$, where $\text{var}(\hat{\beta})$ is the variance of the estimated return and $\text{var}(\hat{\mu})$ is the variance of the sample mean. There is no covariance since $\hat{\beta}$ and $\hat{\mu}$ are orthogonal. Note that ignoring the variance of the sample mean gives us the same t-statistic for the products as for the estimated returns. Including this term as we do makes little if any difference in the t-statistic of the product.
§ There were no GED recipients who had completed college by age 25.

III. Reasons for Growth in GED Certification

The evidence presented in previous sections of this article suggests that the direct economic payoff to GED recipiency is low. If so, one must look for explanations other than market benefits to account for the rapid growth in GED recipiency.

The post-1963 growth in the proportion of high-school-certified persons taking the GED evident in figure 1 is directly linked to the large-scale and unprecedent expansion of the federal government and state programs in human resources that began in the Kennedy-Johnson era. The two main social programs that fueled the post-1963 growth in GED recipiency are (*a*) the 1966 Adult Basic Education Act and subsequent amendments to it and (*b*) a variety of federal programs for postsecondary education that created a demand for high school credentials to qualify for program benefits.

Table 18
Means for Those Working before and after Obtaining the GED (for Individuals out of School and Holding a Civilian Job in the Year before and the Year after Receiving the GED; $N = 107$)

	Before		After	
Variables	Mean	Standard Error of the Mean	Mean	Standard Error of the Mean
Hourly wage (1988 dollars)	6.18	.28	6.36	.28
Annual earnings (1988 dollars)	10,249.0	736.6	10,406.6	749.7
Annual hours	1,541.4	76.61	1,563.3	73.3
Annual weeks worked	38.0	1.46	37.7	1.44

Surprisingly, manpower-training programs that expanded greatly in the 1960s and 1970s contribute little to the growth in GED recipiency.

The Adult Basic Education Act of 1966 was a War on Poverty program designed to provide adults with levels of education that were thought likely to elevate them out of poverty. Throughout the course of the Adult Basic Education program, the emphasis has shifted from an amorphous goal of improving basic skills to a more easily specified and monitored goal of producing GED-certified high school equivalents (DeSantis 1979). Enrollment in this activity expands by a factor of five throughout the period 1966–82.

Total expenditure on this program ceased to expand after 1973, and the federal share in total program expenditure declines after that date.

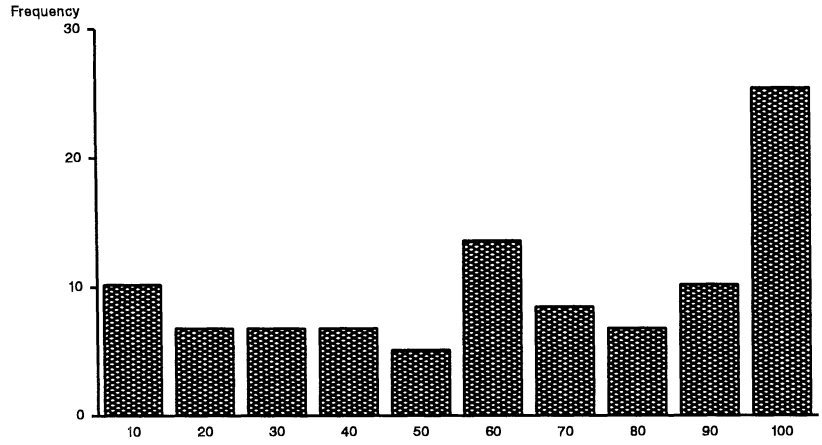

FIG. 7*a*.—NLSY males, age 20: how the GED recipient hourly wage distribution fits into the dropout wage distribution, by % (GED received by ages 17–19). Sample includes only observations with nonmissing wages at ages 20, 22, and 25. Source: NLSY (1979–87 data).

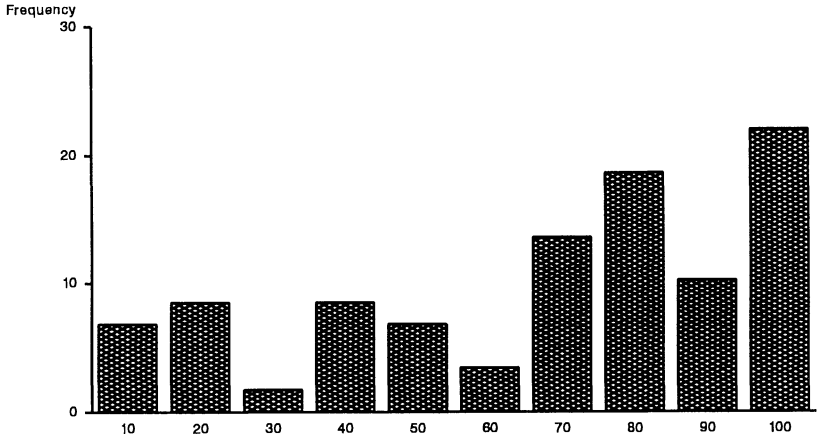

FIG. 7*b*.—NLSY males, age 22: how the GED recipient hourly wage distribution fits into the dropout wage distribution, by % (GED received by ages 17–19). Source: NLSY (1979–87 data).

Figure 8 demonstrates that, in 1972, 24% of all GED recipients were produced by Adult Basic Education programs, and the time series of GED recipiency closely tracks the time series of GED credentials produced by these programs. (These data are not available before 1972.) Amendments to the 1966 act set forth in 1970 drop the age of eligibility for participation in this program from 18 to 16 and add an explicit emphasis on high school completion via the GED or by night school as a main objective of the

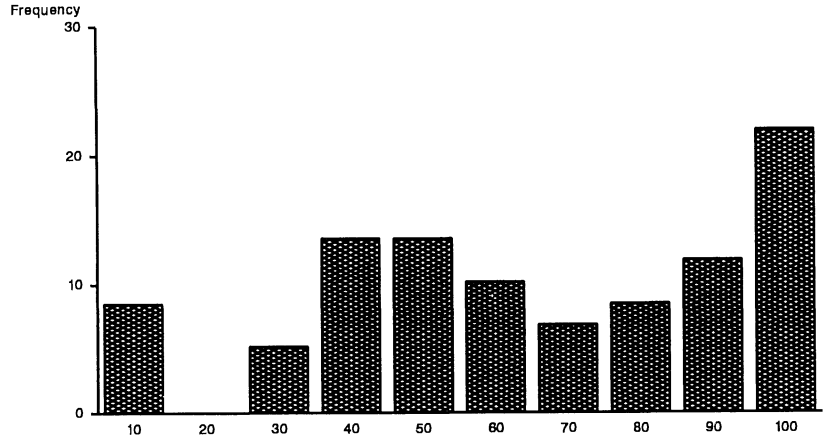

FIG. 7*c*.—NLSY males, age 25: how the GED recipient hourly wage distribution fits into the dropout wage distribution, by % (GED received by ages 17–19). Sample includes only observations with nonmissing wages at ages 20, 22, 25. Source: NLSY (1979–87 data).

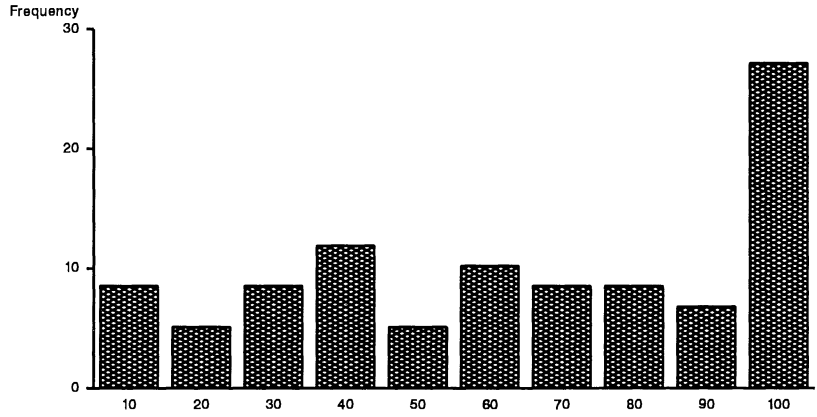

FIG. 7*d*.—NLSY males, age 20: how the GED recipient hourly wage distribution fits into the dropout wage distribution adjusted for experience, unemployment rate, race, year effects, and highest grade completed, by % (GED received by ages 17–19). Sample includes only observations with nonmissing wages at ages 20, 22, 25. Source: NLSY (1979–87 data).

program. The amendments became operative in 1972. States responded to the reduced age requirements by lowering minimum age requirements for taking the GED. Most states began to allow persons who were out of school at least 6 months to take the exam irrespective of their age. Waiting periods for retaking the exam after failure were scaled down to 0–90 days instead of the previous 90–180 days. In 1973, 20% of all GED degrees were produced by Adult Basic Education Act programs. By 1980, almost 40%

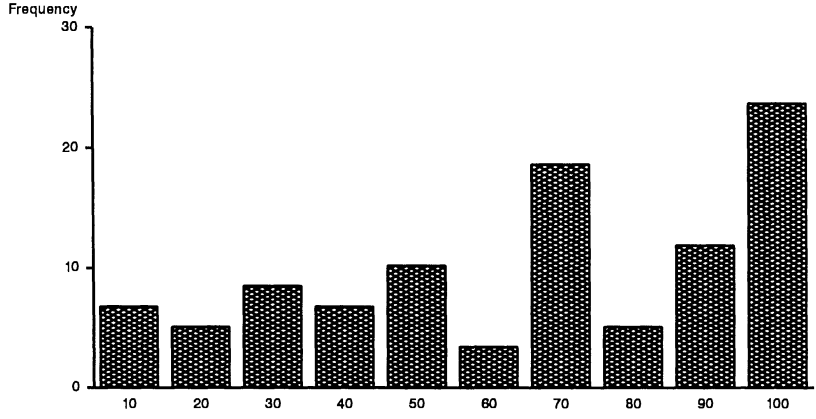

FIG. 7*e*.—NLSY males, age 22: how the GED recipient hourly wage distribution fits into the dropout wage distribution adjusted for experience, unemployment rate, race, year effects, and highest grade completed, by % (GED received by ages 17–19). Sample includes only observations with nonmissing wages at ages 20, 22, and 25. Source: NLSY (1979–87 data).

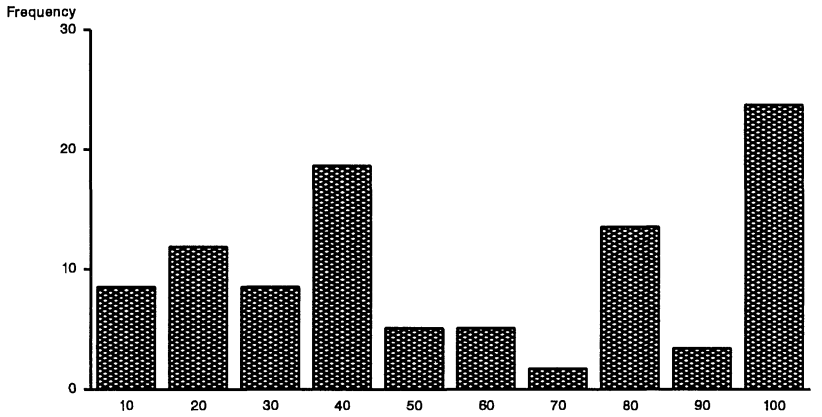

FIG. 7*f*.—NLSY males, age 25: how the GED recipient hourly wage distribution fits into the dropout wage distribution adjusted for experience, unemployment rate, race, year effects, and highest grade completed, by % (GED received by ages 17–19). Sample includes only observations with nonmissing wages at ages 20, 22, and 25. Source: NLSY (1979–87 data).

of all GEDs were trained by this program. Total enrollment increased fourfold between 1970 and 1980.

Manpower training programs were introduced and expanded during the early 1960s, beginning with the Manpower Development and Training Act (MDTA) of 1962. The set of programs created by the act did not emphasize academic training. Job Corps was an exception and did produce GED recipients. However this manpower program was never large. In

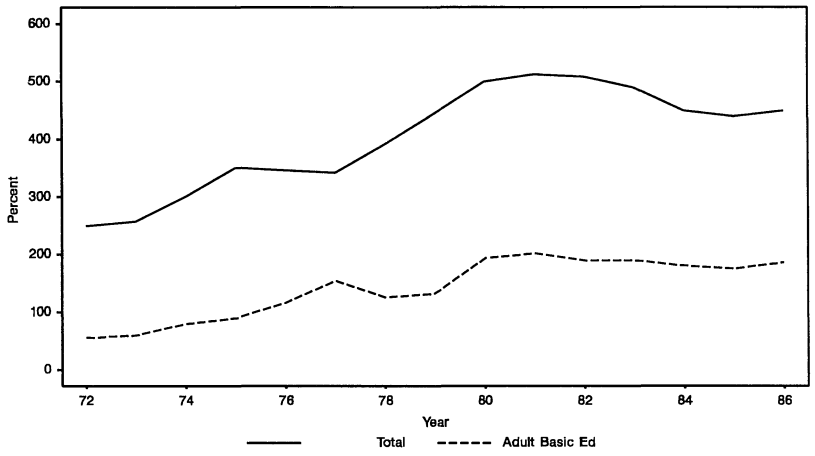

FIG. 8.—Total number of GED credentials issued and the number produced by the adult basic education program (in thousands). Source: Council on Adult Education (various years); GED Testing Service (1990).

1975, the number of Job Corps GED recipients was less than 2% of the total granted. The successor programs to MDTA maintained its disinterest in high school certification as a major objective and were negligible contributors to the level or rate of growth of GED recipiency (Levitan and Gallo 1989).

In addition to the growth in programs that made attainment of the GED a main objective, there was substantial expansion in programs that required high school degrees or their equivalents to receive benefits. These programs fueled the demand for high school certification. Figure 9 charts the growth in expenditure on major postsecondary educational funding programs that required high school certification for eligibility. There is a corresponding increase in numbers. There was gradual growth in National Defense Student Loans, work-study support programs, and the Supplementary Educational Opportunity Grant program during the period 1963–75 when GED certification was growing steadily. All of these programs required a high school degree or its equivalent for eligibility. Not only did the scale of these programs increase over the period 1963–75, but their benefits became applicable to less academically oriented postsecondary institutions such as not-for-profit proprietary training centers.

The most dramatic development in postsecondary educational finance was the growth in the Pell grant program in the period 1973–81 (see figs. 10*a* and 10*b*). Starting in 1973, benefits for all components of this program could be used to finance proprietary training. Family-income restrictions were relaxed, and loans became more widely available to the middle class in 1976. Pell grants to proprietary students continued to grow after 1978,

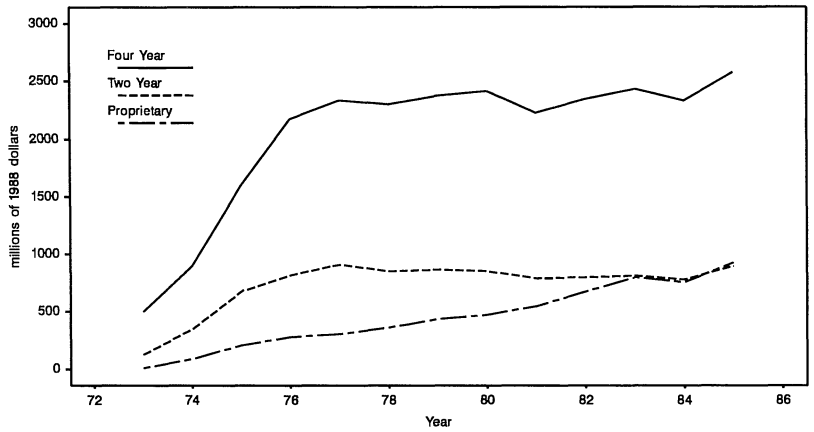

FIG. 9.—Federal expenditures on major postsecondary education programs: Pell grants, work-study, and Supplemental Education Opportunity grants, by type of institution (in millions of 1988 dollars). Sources: U.S. Department of Education (1981); National Center for Education Statistics (1990).

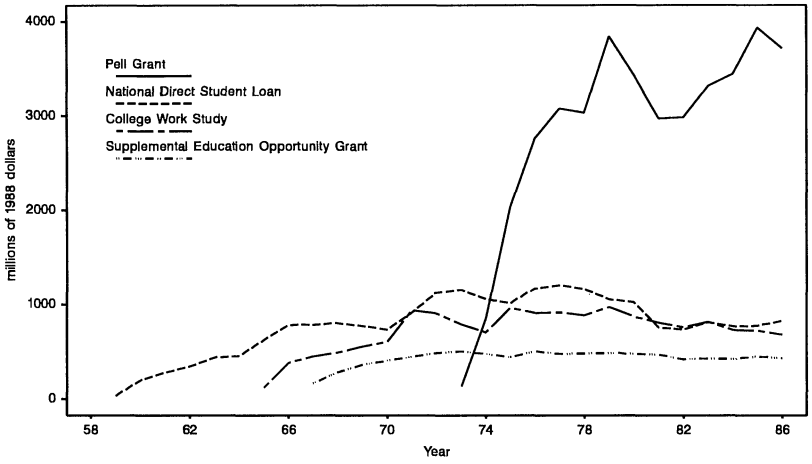

FIG. 10*a*.—Federal expenditures on major postsecondary education programs (in millions of 1988 dollars). Source: see fig. 9.

while payments to 2- and 4-year college students stabilized after 1976. Between 1977 and 1981, guaranteed disbursements rose sharply with the passage of new student loans amendments that allowed students at all nonprofit and proprietary postsecondary institutions access to government grants and loans to high school graduates and GED degree holders and that liberalized family income restrictions on loan eligibility (see App. B for figures, available on request). Annual commitments and annual par-

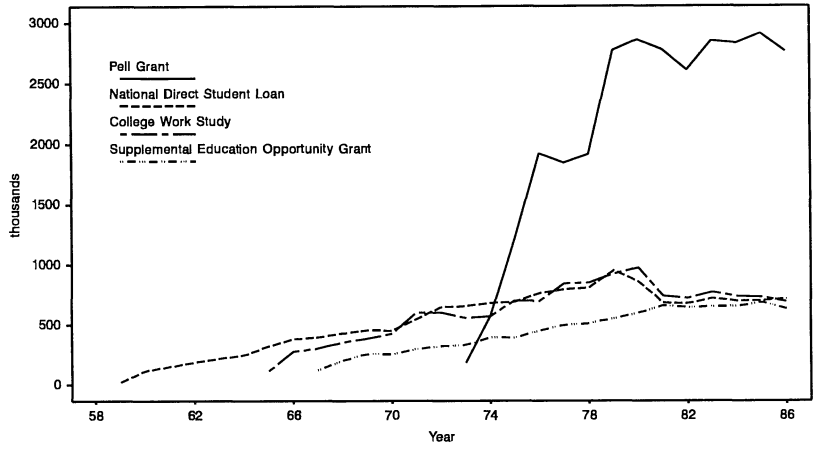

FIG. 10*b*.—Participants in major federal postsecondary education programs (in thousands). Source: see fig. 9.

ticipants in the Guaranteed Student Loan program grew more than threefold in these 4 years. A sharp rise occurs in the number of GED degrees issued relative to all high school credentials during this same period (fig. 1).

In 1979 and 1980, new regulations became operative that allowed any individual with the "ability to benefit," *including high school dropouts,* to participate in any of these programs. A General Accounting Office study of proprietary institutions in 1984 found dropouts to be more likely than high school graduates and GED holders to drop out from their programs and more likely to default on loans and on grant obligations (U.S. General Accounting Office, 1984, p. 56). Because of the threat of federal sanctions imposed on institutions with loan default rates exceeding 15% for 2 consecutive years, lending agencies had an incentive to screen out dropouts so that GED status was still a valuable attribute for participation in these programs.

Temporal coincidence can never establish causation. However, the close association between the growth in GED recipiency and the growth in government programs that subsidize attainment of the GED or require high school certification for eligibility is strongly suggestive of an important role for government subsidy policies in accounting for the growth in GED certification (see fig. 1). This evidence helps to reconcile the growth in GED certification and the low economic return to obtaining a GED that we have documented in this article.

IV. Summary and Conclusion

Over the past 25 years, there has been dramatic growth in the proportion of high school credentials achieved by means of exam certification rather than by the traditional route of high school graduation. The growth in exam certification helps to reconcile the recent decline in the proportion of 17-year-old high school graduates and the constancy in the proportion of 20–24-year-olds with high school certificates. Exam certification is the principal vehicle through which black and Hispanic high school certification rates have approached that of whites. This article explores the causes and consequences of this phenomenon.

The main conclusion of this article is that exam-certified high school equivalents are statistically indistinguishable in their labor market outcomes from high school dropouts. Both dropouts and exam-certified equivalents have comparably poor wages, earnings, hours of work, unemployment experiences, and job tenure. GED-certified persons are closer to high school dropouts than traditional graduates in their measured ability and in their market status. Even after controlling for ability, GED-certified males have inferior labor market status compared to high school graduates. GEDs have lower employment rates and less work experience than high school

graduates. Both anecdotal and empirical evidence suggests that employers and the military discount the GED.

This conclusion is strengthened when account is taken of years of schooling completed. Whatever difference is found among GED recipients, dropouts and high school graduates is largely accounted for by years of schooling. There is no cheap substitute for classroom instruction. Educational programs that focus on the GED as an end in itself are misguided.

Whatever economic return exists from GED recipiency arises from its value in opening postsecondary schooling and training opportunities. GED recipients take less postsecondary training than high school graduates (military training is an exception to this rule), and they receive lower returns—especially for their college education. The available evidence indicates that GED recipients who attend college take a more vocationally oriented curriculum than high school graduates. Both anecdotal and econometric evidence suggests little direct market value for the GED controlling for returns from postsecondary training.

An important qualification to our analysis should be stated. The sampling frame of the NLSY has forced us to confine our attention to the early stages of adulthood. It is possible that GED recipients and high school dropouts will look more dissimilar at older ages and that GED recipients and high school graduates will look more similar. That issue can only be settled by looking at later waves of the NLSY data or by using other data sources with older persons. We are currently engaged in that task.

Since the economic value of GED recipiency is low, its recent dramatic growth as a means of high school certification is apparently paradoxical. Our investigation of the political economy of the GED resolves this paradox. Federal and state Adult Basic Education programs subsidize GED test taking and use GED recipiency as a measure of monitoring bureaucratic performance in these programs. The growth in funding and participation in these programs tracks the time series of GED recipiency closely. In addition, over the past 25 years, there has been dramatic growth in the federal subsidy to postsecondary schooling and training programs. High school certification is a requirement for participation in these programs. This subsidy has created a derived demand for GED certification.

The dramatic rise in GED certification is a consequence of federal and state government policies. The direct subsidy to certification and the derived demand for GED certification in order to receive subsidies for postsecondary training reconcile the low gross economic returns to certification and the rapid growth in GED recipiency.

Our study sheds new light on the value of psychometric test scores in predicting labor market outcomes. Much of the debate about the success and failure of public and private schools focuses on psychometric measures of cognitive ability. Our evidence on the irrelevance of successful exam

performance on labor market success and success in postsecondary education suggests that current evidence in the private schooling debate is of little relevance for gauging the importance of schooling organization on the long-term economic success of students.

Appendix A

The National Longitudinal Survey of Youth and Description of Variables

This appendix contains a brief description of the NLSY and the variables used in the analysis of wages and labor supply. Appendix B contains a full description and is available from us on request.

The micro data we use are from the 1979–87 waves of the National Longitudinal Survey of Youth. The NLSY includes a randomly chosen sample of 6,111 U.S. youths and a supplemental sample of 5,296 randomly chosen black, Hispanic, nonblack, non-Hispanic, economically disadvantaged youths. The youths were ages 14–21 in 1979 and were interviewed annually beginning in 1979. Our sample consists of males who were in the random sample, the black supplemental sample, and the Hispanic supplemental sample. We have a total of 4,837 individuals.

To examine the effects of having a GED or high school diploma on hourly wages and labor supply, we take a subset of our data, which were sampled at ages 25 and 28. For 25-year-olds, we include everyone between ages 16 and 20 in January 1978. Altogether, 3,139 individuals from the random, Hispanic supplement, and black supplement are interviewed at age 25. For our study of wages at age 28, we could include only those ages 19 and 20 and a portion of those who were age 18 in January 1978, for a total of 1,284. Of these, approximately 6.5% were dropped at each age because of missing values in the job tenure variables or because hourly wages were greater than $60 or less than $1.50 (1988 dollars). Our sample has 2,926 males age 25 and 1,199 males age 28. If an individual was enrolled in college during the past survey year, he was excluded from our analysis of wages. Those who were counted as unemployed or out of the labor force for a reason other than school attendance were those with no job during the survey year who were not in school. These individuals were also excluded. Definitions of all the variables used in this analysis should be straightforward. The following is for added clarity:

Hourly wage	Hourly wage is 1988 dollars at the current or most recent job
Annual earnings	Earnings for last year in 1988 dollars
Annual weeks, annual hours	Total weeks or total hours worked last calendar year
Tenure	Tenure in weeks at the current or most recent job

Experience	Total experience in weeks excluding weeks worked in high school. Weeks at the current or most recent job since the individual was 16 years old were subtracted only when this variable was used in regressions.

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