Young GED® Credential Recipients in the 21st Century: A Snapshot from NLSY97

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Acknowledgments

Abstract

Ever since achieving a high school credential by passing the GED Tests became widely institutionalized through the adult education programs in the United States, the outcomes for GED credential recipients have continued to be of great interest to the adult education community and the general public. Does earning a GED credential bring positive life changes to the adults who did not complete a high school education? Does obtaining a GED credential help the recipients find better employment opportunities and earn higher wages? Among the studies on labor market outcomes of GED credential recipients, the most influential was the 1993 study by Cameron and Heckman, which was based on the NLSY79 data and argued that GED credential recipients are "nonequivalence of high school equivalents," and that they are "indistinguishable in many relevant labor market dimensions" from uncredentialed high school dropouts.

Now, almost two decades after the Cameron and Heckman study, has anything changed with a new generation of American youth? Based on a new wave of NLSY data (NLSY97), this paper aims to examine how GED credential recipients compare with other young adults who had not completed a high school education and with traditional high school graduates on their labor market performance.

The study found that GED credential recipients' hourly compensation on their most recent job is much higher than that of the high school dropouts and is closer to that of the high school graduates, both of which are in the $14 range. For GED credential recipients and high school graduates at five years or more after obtaining their credential or diploma, the hourly wages are about the same, around $15. In terms of work hours, wage income, family income, and poverty ratio, GED credential recipients seem to fall between high school dropouts and high school graduates. The study also looked into job satisfaction, employer size, fringe benefits, industry, and occupation.

The study then uses multiple regressions to assess the impact of educational status on hourly compensation and hours of work for the NLSY97 members who did not pursue postsecondary education. After controlling for individual demographic, ability, work experience, and employer industry, GED credential recipients' hourly wages on average could be 6.7 to 9.3 percent higher than those of high school dropouts, while the high school graduates' hourly wages could be 6.2 to 6.7 percent higher than those of GED credential recipients. GED credential recipients' annual hours could also be 120 hours (approximately 11 percent) longer than those of high school dropouts, while high school graduates' work hours could be 120 to180 hours (approximately 10 to 15 percent) longer than those of GED credential recipients.

Finally, this paper discusses the findings from earlier sections and suggests policy implications and future research studies.

Introduction

Ever since achieving a high school credential by passing the GED Tests became widely institutionalized through the adult education programs in the United States, the outcomes for GED credential recipients have continued to be of great interest to the adult education community and the general public. Does earning a GED credential bring positive life changes to the adults who did not complete a high school education? Does obtaining a GED credential help the recipients find better employment opportunities and earn higher wages? Does a GED credential serve as a stepping stone to further education? A majority of the studies on outcomes for GED credential recipients have focused on their labor market performance. Among these studies the most influential one was the 1993 study by Cameron and Heckman, which argued that GED credential recipients are "nonequivalence of high school equivalents," and that they are "indistinguishable in many relevant labor market dimensions" from uncredentialed high school dropouts.

The National Longitudinal Survey of Youth (NLSY) is a series of longitudinal surveys sponsored by the U.S. Department of Labor on a nationally representative sample of youth. It collects extensive information on the respondents' labor market behavior and educational experience to help study the transition from school to work and from adolescence to adulthood. The 1993 Cameron and Heckman study mainly examined the male youth in the NLSY79 cohort, who were born in the years 1957–64. By 1987, the latest round of NLSY79 data that the Cameron and Heckman study used, these males were aged 23 to 30.

Now, almost two decades after the Cameron and Heckman study, has anything changed with a new generation of American youth? Given the enormous social and economic changes that occurred in the last 30 years, have the disadvantages experienced by the GED credential recipients compared with traditional high school graduates in labor market shifted? In 1997, a new cohort of the NLSY study started (NLSY97). The survey sample was designed to represent U.S. residents in 1997 who were born during the years 1980 through 1984. By 2008, in the latest round of the NLSY97 data that is currently available, the respondents were aged 24 to 28, comparable to the NLSY79 cohort in the Cameron and Heckman study. **Table 1** presents some basic information about these two longitudinal studies.

Table 1.
An Overview of NLSY79 and NLSY97

	NLSY79	NLSY97
Sample Size	12,686	8,984
Birth Year	1957–1964	1980–1984
Age at First Round	14–22	12–16
Frequency of Survey	Annually through 1994 and biennially since	Annually
Male (%)	50.5%	51.2%
Black (%)	25.0%	26.0%
Hispanic (%)	15.8%	21.2%
Non-black, Non-Hispanic (%)	59.2%	51.9%

The information from the NLSY97 allows researchers to compare the progress of this cohort with that of other NLSY cohorts. Some researchers (Heckman, Humphries, & Mader, 2010) have started to explore the demographic characteristics of the GED credential recipients in the NLSY97, but none has examined their labor market outcomes. As we turned the page from the 20th century, it is now time to examine how the GED credential recipients have transitioned to meet the challenges of the new century, and how they compare with other young adults who had not completed a high school education and with traditional high school graduates.

Literature Review

Generally, education may affect labor market outcomes in two ways: through human capital accumulation or sorting (Stiglitz, 2000). The former refers to the increased productivity of workers resulting from accumulation of human capital through education (Becker, 1964); the latter serves as a sorting signal—workers use education to signal their ability, and employers use education to screen workers (Spence, 1973). As an education credential that certifies a holder's high school–level knowledge and skills, a GED credential could affect a dropout's labor market outcome in the same two ways: through human capital accumulation—as dropouts study to pass the GED Tests, they accumulate skills and knowledge valued in the labor market; and through sorting (also called "sheepskin effects")—with a lack of better information, employers may value a GED credential recipient more than an uncredentialed dropout and regard a GED credential recipient as having better skills, higher motivation, and/or more commitment. In addition, dropouts who attempt to earn a GED credential may increase their self-esteem by obtaining that credential and may raise their career expectations through the expanded networking opportunities and higher self-confidence built up in a GED Tests preparation program (Boudett, Marnane, & Willett, 2000).

Previous studies (e.g., Cameron & Heckman, 1993; Tyler, 2005) have claimed that the human capital accumulation effect of the GED credential is limited. Cameron and Heckman's 1993 study has attributed the earning differences between GED credential recipients and high school dropouts to the fact that the GED credential recipients have one more year of schooling. Two other cross-sectional studies based on the NLSY79 data (Cameron, 1995; Cao, Stromsdorfer, & Weeks, 1996) found that the modest differences between average hourly wages of GED credential recipients and uncredentialed high school dropouts could be explained by higher test scores and years of education in school. These studies also found few sheepskin effects derived from the GED credential.

The cross-sectional studies on GED credential recipients in general have motivated researchers to further examine the impact of the GED credential from a longitudinal perspective or within subgroups, with a focus of comparing GED candidates with dropouts instead of high school graduates. Using the NLSY79 data, Murnane, Willett, and Boudett (1999) found that, five years after receipt of a GED credential, low-skilled male GED holders have wages 6 percent higher and earnings 10 percent higher than low-skilled uncredentialed dropouts. Boudett, Murnane, and Willett (2000) estimated that, controlling for other on-the-job or off-the-job training, by the 10th year after dropping out of high school, a female GED recipient earns $1,328 or 25 percent more than a woman without a GED credential. Through a natural experiment

design and use of unique Social Security income data, Tyler, Murnane, and Willett (2000) found that for white male and female dropouts, having a GED credential resulted in earnings five years later that were 10 to 19 percent higher than they would have been otherwise. Based on a longitudinal dataset from Florida GED Administration and Unemployment Insurance, Tyler (2004) found that six years after taking the GED Tests, male GED credential recipients in Florida earned 13 to 20 percent more than those who attempted but did not pass the tests.

In addition, two cross-sectional studies based on the High School and Beyond Survey (Murnane, Willett, & Tyler, 2000; Tyler, Murnane, & Willett, 2003) showed that, among dropouts who left school with weak skills, GED credential recipients had substantially higher annual earnings (25–36 percent) at age 27 than uncredentialed dropouts. And most recently, through the Current Population Survey, Clark and Jaeger (2006) examined a sample across a long age span (20 to 64) and found substantial economic benefits to obtaining a GED credential that are not manifested in early career. Through 2003 National Assessment of Adult Literacy (NAAL) data analyses, Song and Hsu (2008) examined a larger sample of adults and found that GED credential recipients substantially led adults with less than a high school education in both weekly wages and personal incomes, while GED credential recipients had comparable weekly wages with high school graduates, but were lagging behind in personal incomes.

The literature review suggests that the labor market outcomes of GED credential recipients may fall between those of traditional high school graduates and high school dropouts, that the economic returns for a dropout to obtain a GED credential take time (at least five years) to accrue, and that the returns to GED credential recipients are higher for low-skilled dropouts.

NLSY97 Data Overview

As discussed earlier, the NLSY97 survey sample was designed to represent U.S. residents in 1997 who were born during the years 1980 through 1984. The original sample of NLSY97 included 8,984 respondents. By 2008, a vast majority of them had completed a high school education and some moved further up the postsecondary education ladder. **Table 2** on the following page summarizes the NLSY97 cohort members' education attainment by 2008.

As shown in Table 2, among the NLSY97 respondents who reported their highest educational attainment by 2008, 15 percent were high school dropouts; 11 percent obtained GED credentials; 48 percent were traditional high school graduates without postsecondary degrees; and the rest, 26 percent, obtained associate degrees or above. The purpose of this paper is to examine the labor market performance of the GED credential recipients, with comparisons made to the other two groups without postsecondary degrees—high school dropouts and traditional high school graduates. In the following sections, the three groups' demographic characteristics and labor market outcomes will be examined.

Table 2.
Education Attainment of the NLSY97 Cohort by 2008

Highest Degree Received	N	(%)
High School Dropout	1,319	14.7
GED	944	10.5
High School Diploma	4,320	48.2
Associate/Junior College (AA)	513	5.7
Bachelor's Degree (BA, BS)	1,659	18.5
Master's Degree (MA, MS)	157	1.8
PhD	7	0.1
Professional Degree (DDS, JD, MD)	42	0.5
Subtotal	8,961 (99.7%)	100.0
Missing	23 (0.3%)	
Total	8,984 (100.0%)	

The NLSY97 Cohort Members Who Had No Postsecondary Education

A. Demographic Characteristics

Table 3, located on the following page, summarizes some demographic characteristics of the three groups that had not obtained postsecondary degrees by 2008. In terms of gender, 48 percent of high school graduates were female, while only 43 percent of dropouts and 41 percent of GED credential recipients were female. All three groups were relatively evenly distributed at each age from 24 to 28 years (ranging from 17 percent to 23 percent), with a mean age of 26. The ethnicity distribution of GED credential recipients differed significantly from the other two groups: GED credential recipients had the highest percentage of black youth (36 percent versus 30 percent of high school dropouts and 28 percent of high school graduates), and the lowest percentage of Hispanic youth (20 percent versus 30 percent of high school dropouts and 23 percent of high school graduates). The high school graduates had the highest percentage of non-black, non-Hispanic cohort members (49 percent versus 40 percent of high school dropouts and 43 percent of GED credential recipients).

The NLSY97 members also reported their highest grade level completed. For the three groups that had no postsecondary degrees, it is not surprising that almost all (96 percent) high school graduates completed 12th grade, while the median highest grades completed by the high school dropouts and GED credential recipients were both 10th grade. The dropouts and GED credential recipients basically obtained the same years of schooling. In NLSY79 members, GED credential recipients on average had obtained one more year of schooling than the dropouts (Cameron & Heckman, 1993), which may represent an underlying social/demographic change.

Table 3. Demographic Characteristics of Dropouts, GED Credential Recipients, and High School Graduates

	High School Dropouts (N=1,319)	GED Credential Recipients (N=944)	High School Graduates (N=4,320)
Gender (Percent)			
Male	56.8	59.3	52.5
Female	43.2	40.7	47.5
Age in 2008			
24 (%)	19.6	17.4	21.6
25 (%)	21.2	20.6	19.8
26 (%)	21.8	19.5	19.7
27 (%)	20.1	23.1	19.9
28 (%)	17.3	19.5	19.1
Mean Age (years)	25.9	26.1	26.0
Race/Ethnicity (Percent)			
Black	30.1	35.6	27.5
Hispanic	29.5	19.8	23.0
Mixed Race, Non-Hispanic	0.7	1.2	0.8
Non-black/Non-Hispanic	39.7	43.4	48.7
Highest Grade Completed			
7th Grade and below (%)	5.2	1.4	0.1
8th Grade (%)	18.3	10.3	0.4
9th Grade (%)	23.1	21.8	0.5
10th Grade (%)	24.1	31.2	0.6
11th Grade (%)	27.3	29.8	2.0
12th Grade (%)	1.7	5.4	96.4
- Mean Highest Grade Completed	9.8	10.0	12.0
- Median Highest Grade Completed	10th Grade	10th Grade	12th Grade
Age When Leaving/Graduating from High School			
15 and younger (%)	9.7	6.0	0.2
16 (%)	20.3	19.9	0.7
17 (%)	27.7	29.5	21.6
18 (%)	22.5	27.5	58.0
19 (%)	8.6	9.3	15.6
20 and older (%)	11.2	7.9	3.9
Mean (Years)	17.5	17.5	18.0
Age When Earning a GED Credential			
16 and younger (%)	NA	4.3	NA
17 (%)	NA	14.2	NA
18 (%)	NA	24.1	NA
19 (%)	NA	17.9	NA
20 (%)	NA	13.7	NA
21 (%)	NA	8.2	NA
22 and older (%)	NA	17.6	NA
Mean (Years)	NA	19.4	NA
Years Until Obtaining a GED Credential After Leaving HS			
Before Leaving HS (%)	NA	9.3	NA
Within One Year (%)	NA	36.0	NA
One to Two Years (%)	NA	18.1	NA
Two to Three Years (%)	NA	12.9	NA
Three to Five Years (%)	NA	12.5	NA
More than Five Years (%)	NA	11.3	NA
Mean (Years)	NA	1.8	NA
High School Overall GPA	2.3	2.3	2.7
AFQT Score	21	31	42

For both high school dropouts and GED credential recipients, the majority of them (70 percent and 77 percent, respectively) left school between ages 16 and 18. The mean ages for both groups leaving high school were the same—17.5 years,[1] which is about a half year younger than the average age when the high school graduates graduated from high school.

For GED credential recipients, nearly 70 percent of them earned their GED credential between ages 17 and 20. The mean age for the GED credential recipients to obtain a GED credential was 19.4, which is about two years after they left high school. Thirty-six percent of them obtained the GED credential within one year after leaving high school. Finally, Table 3 includes two variables for the three groups' academic performance and ability. The NLSY study collected the respondents' high school GPA information from transcripts requested from the high schools they attended. The mean high school overall GPA was 2.3 for both high school dropouts and GED credential recipients, and 2.7 for high school graduates. In addition, the NLSY97 study administered the Armed Forces Qualification Test (AFQT) to all eligible cohort members between the ages of 12 and 18. AFQT scores were combined from four tests from the Armed Services Vocational Aptitude Battery (ASVAB), which is a multiple-aptitude test battery most widely used to determine if a test-taker is qualified to enlist in the military and to assign that person to an appropriate job in the military. The AFQT scores were reported as percentiles ranging from 1 to 99 based on a reference group of a nationally representative sample of 18- to 23-year-old youth. Previous studies based on the NLSY data have used the AFQT scores as a measurement of ability. In the NLSY97 study, the AFQT scores were 21, 31, and 42, for dropouts, GED credential recipients, and high school graduates, respectively.

The statistics presented in Table 3 show that, on average, high school graduates had two more years of schooling than the high school dropouts and GED credential recipients, they had higher GPA and AFQT scores, and they were more likely to be non-black and non-Hispanic. In terms of years of schooling, age leaving high school, and high school GPA, the averages for the GED credential recipients and high school dropouts were very similar. However, the GED credential recipients' mean AFQT score was higher than that of the high school dropouts.

B. Labor Market Performance

This section presents simple mean-difference and univariate distributional comparisons among the three groups without postsecondary degrees—uncredentialed dropouts, GED credential recipients, and traditional high school graduates—on their labor market outcomes. In addition to the most commonly reported measurements like hourly wage, family income, and hours of work, this section also reports information on the cohort members' occupation and employers, including employer industry, size, and fringe benefits.

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[1] Even though the mean highest grade completed for the high school dropouts and GED credential recipients was 10th grade, the mean age for their leaving high school was only a half year younger than the high school graduates, most of whom had completed 12th grade. This is due to two possible reasons: Students could have dropped out in 11th grade before completion, and nearly half of high school dropouts and GED credential recipients repeated one or more grades.

In this section, only the cohort members who had no postsecondary degrees and who were not enrolled in an educational program in 2008 are included, because enrolling at school could significantly reduce a person's work hours and income. As a result, there are 849 high school dropouts, 584 GED credential recipients, and 1,460 high school graduates included for analysis.

Table 4.
Wage, Income, Work Hours, and Job Satisfaction of Dropouts, GED Credential Recipients, and High School Graduates

	High School Dropouts (N=849)	GED Credential Recipients (N=584)	High School Graduates (N=1,460)
Hourly Compensation from Most Recent Job (in 2008 dollars)	12.33	14.08	14.67
Hourly Compensation if >5 Years after Obtaining HS Diploma or GED Credential (in 2008 dollars)		14.97	15.00
Total Work Hours at Employee-type Jobs in 2008 (N)	1,057	1,183	1,351
Total Work Hours at All Jobs in 2008 (N)	1,157	1,350	1,447
Total Weeks Worked at Employee-type Jobs in 2008 (N)	25.3	28.4	32.1
Total Weeks Worked at All Jobs in 2008 (N)	27.5	31.7	34.5
Wage Income (in 2008 dollars)	18,963	21,694	25,714
Family Income (in 2008 dollars)	31,553	43,767	55,077
Ratio of Household Income to Poverty Level in Previous Year	1.64	2.38	3.09
Labor Force Participation in the Last 3 Years as of 2008			
Weeks Being Employed (N)	89.2	101.2	112.1
Weeks Being Unemployed (N)	15.1	13.4	9.7
Weeks out of Labor Force (N)	45.2	34.0	23.3
Weeks in Military Service (N)	0.4	1.1	4.3
Weeks Being Employed (%)	57.2	64.9	71.9
Weeks Being Unemployed (%)	9.7	8.6	6.3
Weeks out of Labor Force (%)	29.0	21.8	15.0
Weeks in Military Service (%)	0.2	0.7	2.8
Job Satisfaction: Most Recent Job			
Like it (%)	54.2	62.9	65.6
Neutral (%)	37.2	29.1	26.9
Dislike it (%)	8.6	8.0	7.5

Table 4 summarizes some major labor market outcomes for NLSY97 high school dropouts, GED credential recipients, and high school graduates. In 2008, the latest round of NLSY97 data available, the mean hourly compensation on the cohort member's most recent job

was $12.33, $14.08, and $14.67 for dropouts, GED credential recipients, and high school graduates, respectively. GED credential recipients' hourly compensation was much higher than that of the high school dropouts and was closer to that of the high school graduates. A further look at the hourly compensation amounts of GED credential recipients and high school graduates who had obtained their credential or diploma more than five years earlier, which were about 47 percent of the GED recipients and 69 percent of the high school graduates, shows the mean hourly compensation amounts were $14.97 and $15.00 for these two groups, respectively. This statistic supports the findings in some earlier studies (Murnane, Willett, & Boudett, 1999; Tyler, Murnane, & Willett 2000; Tyler, 2004; Clark & Jaeger, 2006) that the economic returns on a GED credential take time to accrue. For hourly wages of the cohort members with postsecondary education, interested readers may refer to Table A.1 in the appendix.

For hours of work in 2008, GED credential recipients seemed to fall between high school dropouts and high school graduates. The total work hours on employee-type jobs[2] for dropouts, GED credential recipients, and high school graduates were 1,057, 1,183, and 1,351 hours, or just over 25, 28, and 32 weeks, respectively. The work hours on all types of jobs (including freelancing and self-employed hours) followed the same pattern. On average, GED credential recipients worked more hours than the high school dropouts but fewer hours than the high school graduates. It appears that all three groups did not work to their full capacity.

For wage income, family income, and poverty ratio (i.e., ratio of household income to poverty line), GED credential recipients also fell between high school dropouts and high school graduates. The wage income for dropouts, GED credential recipients, and high school graduates was $18,963, $21,694, and $25,714, respectively. The family incomes for dropouts, GED credential recipients, and high school graduates were $31,553, $43,767, and $55,077. Although the hourly compensation amounts for GED credential recipients and high school graduates were close, high school graduates had higher wage income and family income, probably due to more hours of work, availability of other income sources, or income from other family members with similar or higher education background.

The recent labor force participation of these three groups was also examined. NLSY97 collects information on the respondent's employment status in each week; thus it would be more informative to examine the cohort members' labor force participation over a longer period of time, such as a three-year time period. From 2006 to 2008, very few members in the three groups had changed their school enrollment status. Thus the labor force participation of the three groups during 2006 to 2008 was based on the same school enrollment status as of 2008. The results are summarized in Table 4. As shown in the table, the number of weeks being employed in the last three years was 89 for dropouts, 101 for GED credential recipients, and 112 for high school graduates. All three groups spent a considerable number of weeks being unemployed or out of the labor force (60, 47, and 33 weeks, respectively), which accounts for 39 percent, 30 percent, and 21 percent of their time in the last three years.

Further, all respondents were asked about their job satisfaction on each job they reported. On their most recent job, nearly 63 percent of GED credential recipients and 66 percent of high

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[2] An *employee-type job* is defined as a situation in which the respondent has an ongoing relationship with a specific employer.

school graduates reported that they liked it very much or fairly well, which is considerably higher than the 54 percent of high school dropouts who reported so.

Table 5 presents the industry of the most recent employers of the NLSY97 high school dropouts, GED credential recipients, and high school graduates. The industries in the NLSY97 study were coded according to the 2002 U.S. Census industry classification system. Most of the members of the three education groups tended to work in one of six industries: construction; manufacturing; retail trade; professional and related services; educational, health, and social services; or entertainment, accommodations, and food services. A noticeable difference across groups was that approximately 20 percent of high school dropouts and GED credential recipients worked for entertainment, accommodations, and food service, while only 13 percent of high school graduates were working in this industry.

Table 5.
Employer Industry of High School Dropouts, GED Credential Recipients, and High School Graduates

	High School Dropouts (N=667)	GED Credential Recipients (N=512)	High School Graduates (N=1,277)
Industry (Percent)			
Construction	14.5	13.1	11.8
Manufacturing	8.3	10.9	11.8
Wholesale Trade	3.5	2.3	2.6
Retail Trade	12.6	14.5	15.5
Transportation and Warehousing	5.7	3.9	3.5
Finance, Insurance, and Real Estate	1.7	2.5	3.8
Professional and Related Services	12.4	12.1	9.3
Educational, Health, and Social Services	10.5	9.8	12.5
Entertainment, Accommodations, and Food Services	21.7	19.3	12.8
Public Administration	0.5	1.4	2.6
Other Services	5.6	5.7	7.8

Note: Only industries in which at least 2 percent of one education group members worked are listed in this table, thus the columns do not sum to 100 percent.

The cohort members were surveyed on the size of their employers' staff. Traditionally, being employed by a large employer brings more job security and better fringe benefits. Information on the cohort members' employer size is presented in **Table 6** on the following page. In NLSY97, a large proportion of the three groups—49 percent of high school dropouts, 44 percent of GED credential recipients, and 41 percent of high school graduates—worked for employers hiring 20 or fewer people at their most recent work location. About 19 percent of high school dropouts worked for very small businesses with five employees or less, compared with 14 percent of GED credential recipients and 13 percent of high school graduates. About 20 percent of the high school graduates worked at locations with more than 200 employees, compared with

13 percent of high school dropouts and 15 percent of the GED credential recipients who reported so.

An additional indicator of employment outcome is fringe benefits. Fringe benefits such as medical insurance and retirement planning are an important part of employment conditions. The NLSY97 survey asked if the respondents' employers provided any benefits to them; **Table 7** summarizes the findings on employer-provided benefits. Approximately 40 percent of high school dropouts reported that they did not receive any benefits from their most recent employers, while only 31 percent of GED credential recipients and 24 percent of high school graduates reported so.

Table 6.
Employer Size of High School Dropouts, GED Credential Recipients, and High School Graduates

	High School Dropouts	GED Credential Recipients	High School Graduates
Employer Size			
Number of Employees at Current Location	(N=443)	(N=333)	(N=958)
1 to 5 (%)	18.5	13.8	12.9
6 to 20 (%)	30.3	30.0	28.0
21 to 50 (%)	20.8	21.9	19.8
51 to 100 (%)	8.1	12.0	10.7
101 to 200 (%)	9.0	7.5	8.8
201 to 500 (%)	9.0	9.3	11.8
501 to 1000 (%)	1.4	3.3	4.3
1001 and above (%)	2.9	2.1	3.8
	(N=449)	(N=340)	(N=966)
There are employees at other location(s) (%)	52.6	59.7	57.6
	(N=223)	(N=198)	(N=542)
With 1,000+ employees at other location(s) (%)	68.6	65.7	63.1

Table 7.
Fringe Benefits from Most Recent Employer for High School Dropouts, GED Credential Recipients, and High School Graduates

	High School Dropouts	GED Credential Recipients	High School Graduates
Whether Employer Provided Benefits	(N=491)	(N=369)	(N=1,014)
Provided Benefit (%)	59.7	68.6	75.9
No Benefit (%)	40.3	31.4	24.1
Percent of Employers Providing the Following Benefits	(N=293)	(N=253)	(N=770)
Medical Insurance	76.1	77.9	82.6
Life Insurance	41.3	54.2	55.5
Dental Benefits	59.0	72.3	70.1
Paid Maternity/Paternity Leave	21.5	26.9	32.1
Unpaid Maternity/Paternity Leave	21.2	22.5	26.8
Retirement Plan	38.6	47.0	56.9
Tuition Reimbursement	12.0	20.6	25.2
Company Provided or Subsidized Childcare	6.8	5.9	8.3
Employee Stock Ownership Plan	13.7	22.9	21.0

Overall, the employers of GED credential recipients and high school graduates provided better benefits to their employees than did the employers of high school dropouts. Among those whose employers did provide benefits, 76 percent of high school dropouts, 78 percent of GED credential recipients, and 83 percent of high school graduates reported they were provided with medical insurance. Forty-one percent of high school dropouts, 54 percent of GED credential recipients, and 56 percent of high school graduates were provided with life insurance from their employers. High school dropouts also lagged behind GED credential recipients and high school graduates substantially in availability of dental benefits, retirement plans, tuition reimbursement, and employee stock ownership plans.

Compared with high school graduates (76 percent), the percentage of GED credential recipients whose employers provided benefits was lower, at 69 percent. In all categories of benefits provided by their employers, GED credential recipients lagged behind or were almost the same as high school graduates in the availability of those benefits.

Finally, **Table 8** lists the occupations of high school dropouts, GED credential recipients, and high school graduates on their most recent jobs. The occupations in the NLSY97 study were coded according to the 2002 Census occupational classification system. The most popular occupations for these three groups were food preparations and serving related workers, sales and related workers, office and administrative support workers, construction trades and extraction workers, and transportation and material moving workers. Each of these occupations was reported by at least 8 percent of the members in all of the individual education groups.

Table 8. Percent of High School Dropouts, GED Credential Recipients, and High School Graduates in Selected Occupations on Their Most Recent Jobs

	High School Dropouts (N=667)	GED Credential Recipients (N=512)	High School Graduates (N=1,277)
Executive, Administrative, and Managerial	1.1	2.9	3.2
Health Care Technical and Support	3.3	5.5	6.0
Protective Service	1.7	1.8	2.9
Food Preparations and Serving Related	15.6	11.9	8.9
Cleaning and Building Service	10.0	7.2	4.9
Personal Care and Service Workers	4.7	4.3	5.9
Sales and Related Workers	11.7	11.9	10.4
Office and Administrative Support Workers	8.0	9.4	13.6
Construction Trades and Extraction Workers	14.5	14.5	10.9
Installation, Maintenance, and Repair Workers	3.9	4.7	5.8
Production and Operating Workers	1.5	2.9	2.0
Setter, Operators, and Tenders	6.9	6.5	7.1
Transportation and Material Moving Workers	11.4	10.4	10.3

Note: Only occupations reported by at least 2 percent of members in one education group are listed in this table, thus the columns do not sum to 100 percent.

Differences among the three education groups are observed in a few occupations. For example, 10 percent of high school dropouts worked as cleaning and building service workers on their most recent jobs, compared with 7 percent of the GED credential recipients and 5 percent of the high school graduates who reported so. High school graduates were more likely to work as office and administrative support workers (14 percent) on their most recent jobs than were high school dropouts (8 percent) and GED credential recipients (9 percent). The percentage of GED credential recipients and high school graduates who reported working as executive, administrative, and managerial workers (both were about 3 percent) and health care technical and support workers (both near 6 percent) were higher than those of high school dropouts (about 1 percent and 3 percent, respectively).

In summary, GED credential recipients' hourly compensation on their most recent job is much higher than that of the high school dropouts and is closer to that of the high school graduates, both of which are in the $14 range. For GED credential recipients and high school graduates at five years or more after obtaining their credential or diploma, the hourly wages are about the same, around $15. In terms of work hours, wage income, family income, and poverty ratio, GED credential recipients seem to fall between high school dropouts and high school graduates.

In 2008, both high school graduates' and GED credential recipients' job satisfaction was higher than that of the high school dropouts. More than 40 percent of the members of these three groups worked for employers hiring 20 or fewer people. But a higher percentage of the high school dropouts worked for employers with five or fewer employees. In terms of availability of

fringe benefits from the employer, the percentage of GED credential recipients whose employers provided benefits fell between those of high school dropouts and high school graduates.

Most of the members of the three education groups tended to work in one of six industries: construction; manufacturing; retail trade; professional and related services; educational, health, and social services; or entertainment, accommodations, and food services. A noticeable difference across groups is that a higher percentage of high school dropouts and GED credential recipients worked for entertainment, accommodations, and food service.

In terms of occupation, the most popular occupations for these three groups were food preparations and serving related workers, sales and related workers, office and administrative support workers, construction trades and extraction workers, and transportation and material moving workers. High school dropouts worked more as cleaning and building service workers than the GED credential recipients and the high school graduates. High school graduates worked more as office and administrative support workers than high school dropouts and GED credential recipients.

C. Regression Analysis on Wage and Work Hours

Direct comparison of means and frequencies can be misleading because, besides education attainment, other variables such as age, gender, ethnicity, marital status, and occupation may all affect the hourly wages and work hours of adults. In this section, multiple regressions are used to assess the impact of educational status on hourly compensation and hours of work for the NLSY97 members who did not pursue postsecondary education.

Table 9 presents estimates of wage and labor supply for the three NLSY97 groups without postsecondary education and not enrolled in an education program in 2008. Model A estimates hourly wage and hours of work based on education attainment status and the most common demographic variables such as gender, race/ethnicity, and highest grade completed before leaving high school. High school dropouts (Dropout=1) and high school graduates (High school graduate=1) are coded as two dummy variables indicating different education attainment; the GED credential recipients (Dropout=0 and High school graduate=0) are used as the reference group. Another set of dummy variables indicating cohort members born in different years, with those born in 1980 as the reference group, is also included.

Table 9.

Ordinary Least Squares Regression Coefficients for Log-Wages and Work Hours

	Log-Hourly Compensation		Annual Work Hours	
	Model A	*Model B*	*Model A*	*Model B*
Intercept	2.613**	2.340**	1418.4**	1459.2**
Female	-0.222**	-0.207**	-347.5**	-181.7**
Black	-0.152**	-0.086**	-176.7**	-165.5**
Hispanic	-0.044	0.022	68.3	75.6
Married	0.147**	0.143**	85.9*	99.5*
Dropout	-0.089**	-0.063	-124.6*	-127.1*
High School Graduate	0.060*	0.085*	184.8**	124.9*
Highest Grade Completed	0.001		-9.5	
Birth Year=1981	-0.015		20.2	
Birth Year=1982	0.000		33.4	
Birth Year=1983	-0.043		48.8	
Birth Year=1984	-0.075*		11.2	
Female with Children		-0.048		-242.7**
Years After Leaving HS		0.018**		-14.2
AFQT (ASVAB)		0.002**		1.2
N	2,279	1,771	2,763	2,111
R²	0.112	0.137	0.062	0.071

** $p<0.01$
* $P<0.05$

The results of Model A show that, keeping other variables constant, compared with GED credential recipients, high school dropouts tend to earn lower hourly wages and work fewer hours, while high school graduates tend to earn higher hourly wages and work more hours. Female and black cohort members tend to earn lower hourly wages and work fewer hours. Married people tend to earn higher hourly wages and work more hours. For example, a married black female dropout who was born in 1984 could be expected to earn $9.33 an hour, while a white unmarried male high school graduate who was born in 1982 could be expected to earn $14.65 an hour, as predicted by this model.

The highest grade completed turned out to be insignificant, probably because high school graduates all completed 12th grade, and the mean highest grade completed for both dropouts and GED credential recipients is 10th grade. Birth years are also not significant except for the year of 1984 on hourly wages. This lack of significance may be attributed to the fact that the NLSY97 members were all born in a relatively narrow span of five years (versus the eight-year span of the NLSY79 members), thus indicating that two or three years of additional work experience may not have a significant affect on hourly wages. In addition, age may not be an accurate measure of work experience, as some students might have repeated grades in school. Therefore, to better reflect work experiences, the number of years after leaving high school could be used.

The effect that living with children has on wages also may be different for men and women. Further, AFQT scores, which are often used in the NLSY studies as a measurement of ability, can also be added into the regression analysis. Thus the equations of Model A were modified by removing the highest grade completed variable and the birth year variable, and adding the number of years after leaving high school, an interactive term to indicate the respondent is female and living with children, and AFQT score.

With the modification in Model B, gender, ethnicity, marital status, high school dropout, and high school graduate status are still statistically significant with the same signs on both hourly wages and hours of work, except that lacking a GED credential is now only marginally significant on hourly wages of the high school dropouts ($p=0.056$). Being female and having children does not have a statistically significant effect on hourly wages, but does reduce a mother's hours of work. The number of years after leaving high school has a positive association with hourly wages, reflecting the effects of accumulating work and life experiences. But it has no relationship with work hours. Finally, the AFQT scores positively affect hourly wages but not work hours.

One major concern from the models presented in Table 9 is that they did not consider the impact of occupation and industry on the cohort members' earnings. The NLSY97 collected information on the respondents' occupation and their employers' industry on each of their jobs reported. There might be some collinearity problems with including occupation in addition to the students' ability and schooling variables in the equation, because people with certain abilities and certain types of schooling may go into certain (related) occupations, affecting the respondents' earnings. Compared with occupation, employer's industry may be less affected by the respondents' ability or schooling—people with the same ability or schooling may go into different industries; and people working in different industries may end up having very different incomes. Therefore, to further assess the impact of different education attainment on wage and labor supply, the industries in which the cohort members worked need to be controlled for. Dummy variables are used to indicate the seven most popular industries in which the cohort members worked, with "other industries" as a reference group. "Other industries" are typically the industries in which fewer cohort members worked, including agriculture, forestry, fishing, mining, utilities, and wholesale trade.

Table 10.
Ordinary Least Squares Regression Coefficients for Log-Wages and Work Hours,
Controlling for Industry

	Log-hourly Compensation	Annual Work Hours
Intercept	2.439**	937.4**
Female	-0.089*	-248.9**
Black	-0.051	-145.8**
Hispanic	0.021	66.2
Married	0.118**	151.7**
Dropouts	-0.065*	-63.6
High School Graduates	0.065*	165.5**
Female with Children	-0.053	-201.3**
# Years After Leaving High School	0.016**	
AFQT (ASVAB)	0.002**	
Construction	0.102**	424.9**
Manufacturing	-0.061	812.7**
Retail Business	-0.238**	631.2**
Information, Finance	0.095	915.2**
Professional Service	-0.133**	390.3**
Education, Health Care	-0.283**	688.5**
Entertainment, Food Service	-0.308**	565.0**
N	1,771	2,807
R^2	0.2123	0.1584

** $p < 0.01$
* $P < 0.05$

As shown in **Table 10**, including employers' industry greatly improves the goodness of fit for both models on log hourly wages and annual work hours. Keeping other variables constant, a high school dropout's hourly wage would be 93.7 percent of that of a GED credential recipient, i.e., a dropout's hourly wage could increase by 6.7 percent if he or she earned a GED credential. Interestingly, the hourly wage differences between GED credential recipients and high school graduates are of the same magnitude. Holding other variables constant, high school graduates' hourly wages could be 6.7 percent higher than those of the GED credential recipients.

Females still tend to work fewer hours and earn lower hourly wages than males. Being black is not related with hourly wages but is still negatively associated with work hours. Married people tend to earn higher hourly wages and work longer hours. Both number of years after leaving high school and the AFQT scores are positively associated with hourly wages.

All industry dummy variables included in the models turned out to be significant and positive on work hours. Compared with employees in "other industries," working in the manufacturing industry or the information/finance industry seemed to have no effect on hourly

wages. Working in the construction industry tended to bring positive wage changes and working in the retail sales, education, health care, professional services, entertainment and food services industries tended to result in lower hourly wages. For regressions on the log hourly wages and hours of work for all cohort members, including those with postsecondary education, interested readers may refer to Table A.2 in the appendix.

In summary, the above regression analyses show that, after controlling for individual demographic, ability, work experience, and employer industry, GED credential recipients' hourly wages on average could be 6.7 to 9.3 percent higher than those of high school dropouts, while the high school graduates' hourly wages could be 6.2 to 6.7 percent higher than those of GED credential recipients. GED credential recipients' annual hours could also be 120 hours (approximately 11 percent) longer than those of high school dropouts; while high school graduates' work hours could be 120–180 hours (approximately 10 to 15 percent) longer than those of GED credential recipients.

The R-squares in the above models are generally in line with previous cross-sectional research on the NLSY79 members' labor market outcomes (Cameron & Heckman, 1993; Cao, Stromsdorfer, & Weeks, 1996). However, even the best-fit model in this paper only explains 21 percent of the variances in the cohort members' hourly wages, or 16 percent of the variances in hours of work. It should be noticed that other than the GED credential status and the individual demographics, schooling, ability, experience, and occupation variables that are included in our models, there are many other factors at play that could affect the person's hourly wages or hours of work.

Discussion

The statistics and analyses in the previous sections suggest that in the NLSY97 cohort, the GED credential recipients are very similar to high school dropouts in their schooling experience. On average, they both completed 10th grade and left high school at the age of 17.5; their high school GPAs are the same, at 2.3. This information indicates a demographic shift from the previous NLSY79 cohort—the GED credential recipients in the new NLSY97 cohort were no longer an elite group of high school dropouts when they started to earn a GED credential.

Yet both comparisons of mean differences and multivariate regressions show that the GED credential recipients hold a statistically significant advantage over high school dropouts in terms of hourly wages and annual hours of work. GED credential recipients are also more likely to work for employers who provide better benefits. These differences can no longer be explained by the differences in years of schooling or high school academic performance as in previous studies (Cameron & Heckman, 1993; Cao, Stromsdorfer, & Weeks, 1996).

The better labor market outcomes of the GED credential recipients in the NLSY97 cohort may be attributed to two factors. First, when preparing for the GED Tests, high school dropouts accumulated human capital. Previous studies tended to underestimate the human capital accumulation of the GED candidates. Studies have cited very modest hours spent in preparing for the GED Tests, for example, average preparation hours of 20 (Malizio & Whitney, 1981 in

Cameron & Heckman, 1993) to 30 hours (Baldwin, 1990 in Tyler, 2005), as evidence of very limited human capital accumulation. However, these statistics are incomplete information for hours spent on test preparation. Most likely, these data came from surveys conducted at GED testing centers when candidates registered for testing, i.e., before testing. The surveys asked the candidates how many hours they spent preparing for the GED Tests. This question could only capture a fraction of the time the candidates spent in test preparation for two major reasons. First, different candidates might have read this question differently—some might have included the hours they spent in instruction programs such as adult basic education classes, some might have only reported the hours they spent preparing on their own. Second, the GED Tests are a test battery of five different content area tests, so when candidates registered for testing they would have only reported the hours they had spent preparing for the first test(s) they were going to take. The candidates might have spent significantly more hours preparing for the rest of the test battery or retests at a later time. Therefore, the GED candidates, as a matter of fact, should have spent considerably more time studying and preparing for the GED Tests than reported in previous studies.

Second, there might be some "sheepskin" effect or sorting function of the GED credential. GED credential recipients are a subgroup of high school dropouts, many of whom dropped out of school under adverse life circumstances. By taking the GED Tests and earning a GED credential, they took the initiative to regroup their lives and move forward. Employers may value the GED credential recipients over uncredentialed dropouts, regarding GED credential holders as having higher motivation and commitment, in addition to better skills and discipline.

Further, the labor market gaps between the GED credential recipients and traditional high school graduates, as found in NLSY79 studies (Cameron & Heckman, 1993; Cameron, 1995; Cao, Stromsdorfer, & Weeks, 1996), still exist with the NLSY97 cohort. However, the gaps in hourly wages tend to close up five years after obtaining the GED credential. This finding is another indication that the economic returns on the GED credential take time to accrue (Murnane, Willett, & Boudett, 1999; Tyler, Murnane, & Willett, 2000; Tyler, 2004). Future studies should continue to examine the trend after five to ten years, to investigate how the differences develop between the earnings of GED credential recipients and high school graduates.

However, as today's economy continues to evolve into a technology-based economy, earning a GED credential or high school diploma is no longer as sufficient to earn a family-sustaining wage as it was 40 or 50 years ago. A recent report (the Georgetown Report, Carnevale, Smith, & Strohl, 2010) shows that, between 1970 and 2007, the percentage of high school graduates in the middle and upper-income classes dropped from 78 percent to 64 percent. At the same time, the percentage of people with bachelor's degrees in the middle and upper-income classes has slightly increased from 84 percent to 86 percent, with the proportion in the upper-income class showing an 11-percentage point jump from 37 percent to 48 percent.

The NLSY97 data also show that among workers ages 24 to 28, those with a postsecondary education earn higher hourly wages and work more hours than the GED credential recipients and high school graduates, and thus have higher wage incomes and family incomes (see Table A.1 in appendix). Young workers with a two-year college degree have 29 percent

higher hourly wages, 22 percent more annual work hours, 29 percent higher annual wage incomes, and 47 percent higher family incomes than workers with only a high school–level education. The differences between workers with four-year college degrees and workers with only a high school–level education is even larger, with the former having 41 percent higher hourly wages, 44 percent higher annual wage incomes, and 54 percent higher family incomes than the latter. After controlling for demographic and industry differences (see Table A.2), the hourly wages of two-year college graduates and four-year college graduates are 40 percent and 54 percent higher, respectively, than those of people with only a high school–level education.

Other data sources (see Table A.1) also show the large earning gaps between people with a postsecondary education and those without it. The American Community Survey by the U.S. Census shows that, among all age groups, the median annual earnings for adults with some college or two-year college degrees are 22 percent higher than those of workers with only a high school–level education in 2007, while the median earnings of adults with four-year college degrees are 71 percent higher than those of adults with only a high school–level education. The Current Population Survey by U.S. Census and the Department of Labor provides earning statistics on different age groups. In the 25- to 34-year-old age group, the group to which the NLSY97 cohort members currently belong or will mature into in the near future, the median earnings for adults with two-year college degrees are about 30 percent higher those of the adults with only a high school–level education in 2007 (27 percent for males and 32 percent for females). Furthermore, the median earnings for adults with four-year college degrees are over 60 percent higher than those of the adults with only a high school–level education (76 percent for males and 51 percent for females).

It will be more difficult for adults with lower educational attainment to find jobs in the future. The Georgetown Report (Carnevale, Smith, & Strohl, 2010) projects that nearly two-thirds of the 46.8 million jobs that the U.S. economy will create by 2018 will require workers with at least some college education, with 34 percent requiring a bachelor's degree or higher. During the same time period, the current postsecondary system in the United States will have produced 3 million fewer college graduates than the labor market demands.

While building sophisticated statistical models can explain a few percentage points of differences in hourly wages between the GED credential recipients and traditional high school graduates, society needs to pay more attention to the warning signs of major social and economic changes. To meet the challenges of the evolving economy and the potential shortage of postsecondary graduates, it is essential for people with only a high school–level education to continue their education. It is particularly urgent that the adult education system move away from the view that the GED credential is an end point in itself. GED credentialing can be valued as an important step in a high school dropout's life, and yet it should be viewed more appropriately as a stepping stone to further education.

Appendix

Table A.1
Labor Market Outcomes by Degree Type, from Various Data Sources

	High School Dropouts	High School Graduates (including GED)	Some college	Two-year college	Four-year college	Graduate degree
NLSY97 (2008 Data, Ages 24-28):						
Hourly Compensation from Most Recent Job ($)	12.33	14.50	15.61	18.72	20.46	25.03
Total Annual Work Hours at Employee-type Jobs (N)	1,057	1,303	1,417	1,594	1,756	1,755
Family Income ($)	31,553	51,878	62,303	76,448	79,756	80,695
Wage Income ($)	18,963	24,647	27,389	31,913	35,518	38,952
2008 American Community Survey (based on 2007 Data)						
Median Earnings ($), All Age Groups	20,268	27,479	33,447†		47,094	62,179
Current Population Survey (2007)						
Mean Earnings, 25- to 34-Year-Old Male	28,475	35,995	41,551	45,691	63,175	72,069*
Mean Earnings, 25- to 34-Year-Old Female	20,899	30,092	34,561	39,606	45,328	55,475**

Note: For consistency with the education attainment categories reported in the American Community Survey and the Current Population Survey, the results of GED credential recipients and high school graduates for NLSY97 are grouped together.

†: The American Community Survey reports the earnings of people with some college education and those with two-year college degrees as one group.

Table A.2
Ordinary Least Squares Regression Coefficients for Log-Wages and Work Hours:
All Education Groups

	Log-Hourly Compensation		Annual Work Hours	
	Model A.	*Model B*	*Model A.*	*Model B*
Intercept	2.315**	2.388**	1362.8**	1049.5**
Female	-0.114**	-0.059**	-22.9	-61.3
Black	-0.068**	-0.061**	-62.6	-34.8
Hispanic	0.037	0.029	40.6	53.0
Married	0.097**	0.079**	36.9	61.5*
Female with Children	-0.107**	-0.096**	-384.9**	-365.1**
Dropout	-0.142**	-0.131**	-240.5**	-198.6**
Some College	0.066**	0.074**	75.2*	73.9*
Two-year College	0.340**	0.339**	281.1**	277.9**
Four-year College	0.438**	0.426**	355.3**	349.8**
Graduate Degree	0.684**	0.672**	359.7**	298.5**
# Years After Degree	0.031**	0.028**	8.2	10.2
AFQT (ASVAB)	0.002**	0.002**	0.9	1.1
Construction		0.098**		331.6**
Manufacturing		0.006		601.2**
Retail Business		-0.221**		463.3**
Information, Finance		0.076		415.5**
Professional Service		-0.042		338.9**
Education, Health Care		-0.142**		468.7**
Entertainment, Food Service		-0.235**		329.2**
N	4,393	4,393	4,982	4,982
R²	0.186	0.226	0.088	0.137

** p<0.01
* P<0.05

References

Baldwin, J. (1990). *GED candidates: A decade of change.* Washington, DC: American Council on Education.

Becker, G. (1964). *Human capital: A theoretical and empirical analysis, with special reference to education.* New York: Columbia University Press (for the National Bureau of Economic Research).

Boudett, K. P., Murnane, R. J., & Willett, J. B. (2000). 'Second-chance' strategies for women who drop out of school. *Monthly Labor Review*, *123*(12), 19–31.

Cameron, S. V., & Heckman, J. J. (1993). The nonequivalence of high school equivalents. *Journal of Labor Economics*, *11*, 1–47.

Cameron, S. V. (1995). *Assessing high school certification for women who drop out*. Paper presented at the annual meeting of the American Economics Association, Washington, DC, January 1995.

Cao, J., Stromsdorfer, E., & Weeks, G. (1996). The human capital effect of General Education Development certificates on low income women. *Journal of Human Resources*, *31*(1), 206–228.

Carnevale, A., Smith, N., & Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University Center on Education and the Workforce. Retrieved February 20th, 2011 from http://www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf.

Clark, M. A., & Jaeger, D. A. (2006). Natives, the foreign-born and high school equivalents: new evidence on the returns to the GED. *Journal of Population Economics*, *19*, 769–793.

Georges, A. (2001). The GED certificate and the poverty status of adult women. *Journal of Children and Poverty*, *7*(1), 49–61.

Heckman J. J., Humphries, J. E., & Mader N. S. (2010). The GED (NBER Working Paper 16064). Cambridge, MA: National Bureau of Economic Research.

Malizio, A., & Whitney, D. (1981). Who Takes the GED Tests? A National Survey of Spring 1980 Examinees. GED Testing Service, Research Studies Number 1. Washington, DC: American Council on Education.

Murnane, R. J., Willett, J. B., & Boudett, K. P. (1999). Do male dropouts benefit from obtaining a GED, postsecondary education, and training? *Evaluation Review*, *23*, 475–503.

Murnane, R. J., Willett, J. B., & Tyler, J. H. (2000). Who benefits from obtaining a GED? Evidence from High School and Beyond. *The Review of Economics and Statistics*, *82*(1), 23–37.

Song, W., & Hsu, Y. (2008). *Economic and noneconomic outcomes for GED credential recipients.* Paper presented at the annual conference of the American Educational Research Association (AERA), held March 24–28, 2008, in New York, New York.

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics, 87*(3), 355–374.

Stiglitz, S. E. (2000). *Economics of the public sector* (3rd ed.). New York: W. W. Norton & Company.

Tyler, J. H. (2005). The General Educational Development (GED) credential: History, current research, and directions for policy and practice. In J. Comings, B. Garner, & C. Smith (Eds.), *Review of Adult Learning and Literacy, Vol. 5.* Mahwah, NJ: Lawrence Erlbaum Associates.

Tyler, J. H. (2004). Does the GED improve earnings? Estimates from a sample of both successful and unsuccessful GED candidates. *Industrial & Labor Relations Review*, *57*(4), 579–598.

Tyler, J. H., Murnane, R. J., & Willet, J. B. (2000). Estimating the labor market signaling value of the GED. *Quarterly Journal of Economic*s, *115*(2), 431–468.

Tyler, J. H., Murnane, R. J., & Willet, J. B. (2003). Who benefits from a GED? Evidence for females form High School and Beyond. *Economics of Education Review*, *22*, 237–247.