# Economic and Noneconomic Outcomes for GED Credential Recipients

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# Economic and Noneconomic Outcomes for GED Credential Recipients

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## Abstract

The GED Tests are widely used to certify a high school level of academic knowledge and skills. The popularity and profound influence of the GED Tests have solicited numerous studies on the outcomes of obtaining a GED credential. Most studies on labor market outcomes for GED credential recipients have targeted specific groups for comparisons across age, gender, or geographic areas. Depending on the samples used and the research methodologies applied, the studies have yielded mixed results. Furthermore, scholars have noticed a scarcity of research on the noneconomic outcomes of GED credential recipients, such as their social participation, health, and parenting skills.

This study provides evidence through a recently released nationally representative sample of adults, the 2003 National Assessment of Adult Literacy (NAAL), on the economic outcomes as well as the noneconomic outcomes for GED credential recipients. On the economic outcomes, this study examines labor force participation, work history, weekly wage, and personal income. On the noneconomic outcomes, this study looks into political and social participation, family literacy, and health.

# Economic and Noneconomic Outcomes for GED Credential Recipients

The Tests of General Educational Development (GED Tests) are widely used in the United States, Canada, and the insular areas to certify a high school level of academic knowledge and skills. Since the 1970s, the GED Tests have gained increasing popularity, with more than 700,000 test takers per year and a peak testing volume of more than 1 million in 2001.

According to the 2000 U.S. Census, about 40 million adults 16 years and older were without a high school diploma (American Council on Education, 2007). GED testing is widely regarded as a major "second chance" mechanism for adults who did not finish high school for various reasons. Over the last several decades, the GED testing and preparation programs have been institutionalized through local, state, and federal adult education as well as workforce investment programs. The public spending on GED testing and test preparation is at a considerably high level. Proponents of GED testing believe that GED credential recipients have achieved the same skill levels as those who hold traditional high school diplomas and, therefore, share equal ability to attain employment and have access to higher education.

The wide popularity and profound influence of the GED Tests have solicited numerous studies on the outcomes of obtaining a GED credential. Researchers are most interested in the labor market outcomes and postsecondary success of the GED credential recipients, particularly when compared with traditional high school graduates. Most studies on labor market outcomes for GED credential recipients have targeted specific groups for comparisons across age, gender, or geographic areas. Depending on the sample used and the research methodologies applied, the studies have yielded mixed results. Studies on postsecondary education experiences of GED credential recipients have proven difficult to conduct because of a lack of adequate sample sizes and high-quality data. Furthermore, researchers (Tyler, 2003) have noticed a scarcity of research

on the noneconomic outcomes of GED credential recipients, such as their social participation, health, and parenting skills.

This study provides evidence through a recently released nationally representative sample of adults, the 2003 National Assessment of Adult Literacy (NAAL), on the economic outcomes as well as the noneconomic outcomes for GED credential recipients.

## Data Sources and Methods

The U.S. Department of Education released the comprehensive 2003 NAAL data set for public use in 2007. This data set contains information on literacy assessment of U.S. adults as well as a rich body of demographic information. The data were released only in AM format. AM is a statistical software package for analyzing data from complex samples, especially large-scale assessments such as the National Assessment of Educational Progress (NAEP) and the Third International Mathematics and Science Studies (TIMSS). The software can be downloaded from http://am.air.org/naal.asp. The authors converted the AM data set into SAS data set for regression analysis, because some functions are currently unavailable from the AM software.

The NAAL data set includes a nationally representative sample of 19,258 adults. To evaluate the economic outcomes for the adults, the authors excluded prison inmates and those adults who were still in school. To evaluate the noneconomic outcomes for the adults, only prison inmates were excluded. Table 1 lists the number of adults included for each study by highest educational attainment.

Table 1

*Number of Adults Included in the Studies, by Highest Educational Attainment*

| Highest Educational Attainment | Economic Outcomes Study N | (%) | Noneconomic Outcomes Study N | (%) |
|---|---|---|---|---|
| Still in high school | – | – | 595 | 3.3 |
| Less than/some high school | 3,470 | 22.4 | 3,752 | 20.7 |
| GED/high school equivalency | 766 | 5.0 | 811 | 4.5 |
| High school graduate | 3,534 | 22.9 | 3,800 | 21.0 |
| Vocational/trade/business school | 957 | 6.2 | 1,027 | 5.7 |
| Some college | 1,721 | 11.1 | 2,141 | 11.8 |
| Associate/two-year degree | 1,632 | 10.6 | 2,155 | 11.9 |
| College graduate | 1,831 | 11.8 | 2,024 | 11.2 |
| Graduate studies/degree | 1,553 | 10.0 | 1,782 | 9.9 |
| Total | 15,464 | 100.0 | 18,087 | 100.0 |

In the following sections, the authors will compare the economic and noneconomic outcomes for three groups of adults with no postsecondary education by using the 2003 NAAL data (i.e., adults with less than or some high school; adults with GED/high school equivalency credentials; and adults who are traditional high school graduates). All comparisons are based on the *t* statistic, using a 95 percent confidence interval (two-tailed). The AM technical manual shows that the formula used to compute the *t* statistic is as follows:

$$t = \frac{(P_1 - P_2)}{\sqrt{SE_1^{\,2} + SE_2^{\,2}}}$$

where $P_1$ and $P_2$ are the estimates to be compared between adults with less than a high school education and adults with GED credentials, and between adults with GED credentials and adults with traditional high school diplomas; $SE_1$ and $SE_2$ are their corresponding standard errors.

## Economic Outcomes for the GED Recipients

Education may affect the labor market in two ways: through human capital accumulation or sorting (Stiglitz, 2000). The former refers to the increased productivity of the workers resulting from the accumulation of human capital through education; the latter refers to a sorting signal—workers use education to signal their abilities, while employers use education to screen workers. As an education credential that certifies a holder's level of high school knowledge and skills, a GED credential would affect a dropout's labor market outcome in two ways: One is through human capital accumulation—as dropouts study to pass the GED Tests, they accumulate skills and knowledge valued in the labor market; the other is through sorting—employers may value a GED credential holder more than an uncredentialed dropout, regarding a GED credential holder as having better skills and higher motivation or commitment.

The impact of obtaining a GED credential has been widely studied by education economists. One of the most influential studies was by Cameron and Heckman (1993). Using a sample of males (ages 25 and 28) drawn from the National Longitudinal Survey of Youth (NLSY), Cameron and Heckman found that the GED credential recipients earned lower hourly wages and worked fewer hours than do traditional high school graduates. In 1998, the U.S. Department of Education published a research synthesis by Boesel, Alsalam, and Smith on educational and labor market performance of GED credential recipients. The authors summarized all major studies comparing labor market outcomes among GED credential recipients, high school graduates, and dropouts from the 1940s up to the late 1990s. The authors found that GED credential recipients earned higher hourly wages than uncredentialed dropouts but less than high school graduates, and that GED credential recipients, in general, tended to work fewer hours than high school graduates and had a higher turnover rate. The authors also

found that the introduction of years of secondary schooling, higher education attainment, and aptitude test scores as controls accounted for most of the wage differences among high school graduates, GED credential recipients, and dropouts, particularly for males.

Several recent studies (Murnane, Willett, & Boudett, 1999; Murnane, Willett, & Tyler, 2000; and Tyler, Murnane, & Willett, 2000, 2003) argued that economic returns to the GED credential are greatest for dropouts with relatively low skills and that the economic payoffs take time to accrue. Clark and Jaeger (2006) found that among the foreign-born, foreign-schooled GED credential recipients earned 8 percent to 10 percent more than individuals who hold traditional high school diplomas from their country of origin but without any credentials in the United States. Georges' study (2001) found that female GED credential recipients had a higher probability of living in poverty and had a lower probability of rising above the poverty level than high school graduates; however, they were less likely to live at the poverty level than uncredentialed dropouts. Tyler (2004) found that six years after taking the GED Tests, male GED credential recipients in Florida earned 13 percent to 20 percent more than those who attempted but did not pass the tests.

The literature review indicates that most of the published studies have focused on specific groups within the population, especially young males or females in the early stages of their career. A study based on a nationally representative sample of the whole adult population will effectively complement the previous studies and shed some light on the economic outcomes for the GED credential recipients in contrast with other adult groups.

To evaluate the economic outcomes for the GED credential recipients through the 2003 NAAL, this study has excluded the adults who were still in school or who were incarcerated at the time of survey. The study will first examine the economic outcomes for adults with highest

educational attainment of high school or less (i.e., adults with less than high school education, adults with GED credentials, and adults with traditional high school diplomas). The study will further investigate the economic outcomes for the adults with postsecondary education by their types of high school diploma received to assess if the economic outcomes for the adults who pursued education beyond high school differ by the types of high school–level credential (traditional high school diploma versus GED credential) they received.

The major variables on economic outcomes collected through the 2003 NAAL include weekly wage, personal income, labor force participation, and work history. The weekly wage and personal income variables are interval variables, while labor market participation and work history variables are ordinal or categorical variables.

*Statistical Comparison of the Economic Outcomes of Adults*

According to Table 2, among the adults who did not pursue postsecondary education, almost half (46 percent) of those who obtained high school diplomas or GED credentials are employed full time, which is over 10 percentage points higher than the adults who have less than a high school–level education. Compared with adults with less than a high school education (6 percent) and adults with traditional high school diplomas (4 percent), adults with GED credentials have a higher percentage (9 percent) of unemployment. However, the group of GED credential recipients has the lowest rate of being out of the labor force (28 percent), compared with 47 percent of the adults without a high school education and 36 percent of the adults with traditional high school diplomas.

Table 2

*Labor Force Participation of Adults with Highest Educational Attainment of High School or Less*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| Employment Status | Less than HS | GED | High School | Diff. | *t*-Statistic | Diff. | *t*-Statistic |
| Employed full time | 35.7 (1.4) | 46.5 (2.8) | 46.3 (1.3) | 10.8 | 3.39* | -0.2 | -0.06 |
| Employed part time | 9.2 (0.7) | 12.8 (2.2) | 10.1 (0.6) | 3.6 | 1.56 | -2.7 | -1.20 |
| Employed but not at work | 2.7 (0.4) | 3.1 (1.0) | 3.4 (0.5) | 0.4 | 0.45 | 0.3 | 0.26 |
| Unemployed | 5.7 (0.5) | 9.4 (1.6) | 4.4 (0.5) | 3.7 | 2.29* | -5.0 | -3.01* |
| Out of labor force | 46.7 (1.3) | 28.2 (2.2) | 35.7 (1.2) | -18.5 | -7.18* | 7.5 | 3.30* |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 3 displays the weekly wage distribution of the three groups of adults with lower educational attainment. Compared with 19 percent of the adults with less than a high school education, there are only 11 percent of GED credential recipients earning less than $300 weekly (i.e., more GED credential recipients are distributed in the middle and higher ends of the wage distribution). However, compared with GED credential recipients, there is a higher percentage of adults with traditional high school diplomas distributed in the higher end of wage distribution, particularly in the $650–$1,149 wage interval, where the difference is 10 percentage points and statistically significant.

Using the midpoints of the wage intervals for each adult provides a rough estimate of the mean weekly wage. It appears that adults with GED credentials on average earn about $80 more than the adults with less than a high school–level education on a weekly basis; and traditional high school graduates earn about $50 more weekly than the GED credential recipients. However, the difference in the weekly wages between traditional high school graduates and GED credential recipients is not statistically significant.

Table 3

*Weekly Wage of Adults with Highest Educational Attainment of High School or Less*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| Weekly Wage | Less than HS | GED | High School | Diff. | *t*-Statistic | Diff. | *t*-Statistic |
| Less than $300 | 18.6 | 10.6 | 10.3 | -8.0 | -2.62* | -0.3 | -0.09 |
| | (1.8) | (2.5) | (1.1) | | | | |
| $300–$499 | 41.1 | 38.5 | 28.9 | -2.6 | -0.48 | -9.6 | -1.84 |
| | (2.2) | (5.0) | (1.7) | | | | |
| $500–$649 | 18.4 | 20.9 | 20.2 | 2.5 | 0.51 | -0.7 | -0.14 |
| | (1.2) | (4.3) | (1.3) | | | | |
| $650–$1,149 | 16.3 | 21.0 | 31.4 | 4.7 | 1.23 | 10.4 | 2.72* |
| | (1.6) | (3.3) | (2.0) | | | | |
| $1,150–$1,949 | 3.6 | 6.4 | 6.2 | 2.8 | 1.52 | -0.2 | -0.10 |
| | (0.7) | (1.8) | (0.9) | | | | |
| $1,950 or more | 1.9 | 2.6 | 2.9 | 0.7 | 0.52 | 0.3 | 0.21 |
| | (0.5) | (1.3) | (0.6) | | | | |
| Mean Weekly Wage (by midpoint of each interval) | 566.40 | 645.54 | 698.80 | 79.15 | 2.55* | 53.26 | 1.66 |
| | (16.02) | (27.31) | (14.22) | | | | |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 4

*Personal Income of Adults with Highest Educational Attainment of High School or Less*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| Personal Income | Less than HS | GED | High School | Diff. | *t*-Statistic | Diff. | *t*-Statistic |
| Less than $5,000 | 25.0 | 21.7 | 13.8 | -3.3 | -1.28 | -7.9 | -3.64* |
| | (1.1) | (2.1) | (0.8) | | | | |
| $5,000–$9,999 | 24.8 | 14.9 | 13.2 | -9.9 | -4.96* | -1.7 | -0.89 |
| | (1.2) | (1.7) | (0.9) | | | | |
| $10,000–$14,999 | 17.8 | 14.8 | 15.1 | -3.0 | -1.57 | 0.3 | 0.14 |
| | (0.9) | (1.7) | (0.9) | | | | |
| $15,000–$19,999 | 10.6 | 13.1 | 10.7 | 2.5 | 1.21 | -2.4 | -1.03 |
| | (0.9) | (2.1) | (0.8) | | | | |
| $20,000–$29,999 | 11.5 | 17.2 | 18.0 | 5.7 | 2.53* | 0.8 | 0.35 |
| | (0.9) | (2.0) | (1.0) | | | | |
| $30,000–$39,999 | 4.6 | 9.1 | 13.1 | 4.5 | 2.43* | 4.0 | 2.23* |
| | (0.5) | (1.6) | (0.9) | | | | |
| $40,000–$59,999 | 4.3 | 5.6 | 11.3 | 1.3 | 1.08 | 5.7 | 4.24* |
| | (0.4) | (1.2) | (0.8) | | | | |
| $60,000 or more (%) | 1.4 | 3.6 | 4.9 | 2.2 | 2.26* | 1.3 | 1.20 |
| | (0.3) | (1.0) | (0.6) | | | | |
| Mean Personal Income (by midpoint of each interval) | 14,652 | 18,776 | 23,107 | 4,124 | 4.67* | 4,332 | 5.18* |
| | (344.14) | (852.88) | (497.28) | | | | |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 4 demonstrates the distribution of personal incomes of the adults of the three comparison groups. Compared with adults who did not complete a high school–level education, there is a lower percentage of GED credential recipients on the lower end of income distribution ($5,000–$9,999), and a higher percentage of GED credential recipients in the higher income intervals of $20,000–$29,999, $30,000–$39,999, and above $60,000. Compared with traditional high school graduates, there is a higher percentage of GED credential recipients distributed on the lower end of income (less than $5,000), and a lower percentage on the higher income intervals of $30,000–$39,999 and $40,000–$59,999. These differences are all significant at the 0.05 level.

Similar to Table 3, using the midpoints of the income intervals for each adult provides a rough estimate of the mean personal income. It appears that, on a yearly basis, adults with GED credentials on average earn about $4,100 more than adults with less than a high school–level education do; and traditional high school graduates earn about $4,300 more than GED credential recipients do. Both differences are statistically significant.

Table 5

*Work History of Adults with Highest Educational Attainment of High School or Less*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| Work History | Less than HS | GED | High School | Diff. | *t*-Statistic | Diff. | *t*-Statistic |
| Held a paying job within the last three years | 63.2 (1.2) | 81.6 (2.0) | 73.0 (1.1) | 18.4 | 9.25* | -8.6 | -4.15* |
| Held a paying job but not within the last three years | 29.5 (1.2) | 16.8 (1.8) | 24.4 (1.0) | -12.7 | -6.48* | 7.6 | 3.89* |
| Never been employed for pay full time or part time | 7.3 (0.6) | 1.6 (0.5) | 2.6 (0.4) | -5.7 | -9.65* | 1.0 | 1.49 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

The work history of the three groups of adults is summarized in Table 5. Compared with adults with less than a high school education and adults with traditional high school diplomas, GED credential recipients were more likely to hold a paying job within in the last three years. The percentages of adults who hold a paying job but not within the last three years, or those who had never been employed are highest among the adults who have less than a high school education.

*Regression Analysis of Economic Outcomes by Highest Educational Attainment*

Statistical comparison shows that adults with GED credentials substantially lead adults with less than a high school education in both weekly wage and personal income. GED credential recipients have comparable weekly wages with high school graduates, but are lagging behind in personal income by a considerable amount.

However, except for educational attainment, other variables such as age, gender, ethnicity, labor market participation, marital status, and occupation may all affect the incomes of adults. In this section, multiple regressions are used to assess the impact of educational attainment on weekly wage and personal income with controls for other variables.

The 2003 NAAL data report weekly wages and personal incomes as intervals and right-censored weekly wages at $1,950 and personal incomes at $60,000. Tobit models should be most appropriate to estimate interval-censored data. However, currently the SAS procedures designed to process interval-censored data (`LIFEREG`) only take into consideration the weights, but not other survey design effects like stratification and clustering. Therefore, the authors chose to use the midpoints of each wage/income interval as the dependent variable and report the GLS (`surveyreg` in SAS) regression results in this section, which show a good fit of the models and

are more intuitive to interpret. The Tobit model regression results are listed in the Appendix for interested readers.

The authors used a set of dummy variables to indicate the adult's highest educational attainment, with adults whose highest educational attainment is the GED credential as the reference group. To control for special industry effects, a dummy variable is used to indicate the higher paid occupations. Using teachers as the reference group, the authors conducted a regression analysis for weekly wages on a set of dummy variables of all other occupations and identified those pay higher wages. The higher paid occupations identified through this method are as follows: executive/administration/managerial, management related, math and computer sciences, engineering/architecture/surveying, physical sciences, social sciences and related, law related and legal support, and health diagnosing and treating.

Table 6

*Regression of Weekly Wage on Highest Educational Attainment: All Adults*[*]

| | Estimate | Standard Error | *t*-Statistic | $p > \|t\|$ |
|---|---|---|---|---|
| Constant | -161.03 | 66.48 | -2.42 | 0.0183 |
| Gender (Male=1) | 225.75 | 13.58 | 16.62 | <.0001 |
| Ethnicity (Black=1) | -33.98 | 17.94 | -1.89 | 0.0628 |
| Ethnicity (Hispanic=1) | -82.38 | 17.56 | -4.69 | <.0001 |
| Ethnicity (Other, including multiracial=1) | -38.33 | 27.27 | -1.41 | 0.1648 |
| Age | 26.25 | 3.47 | 7.57 | <.0001 |
| $Age^2$ | -0.27 | 0.04 | -6.26 | <.0001 |
| Employed full time | 108.53 | 31.36 | 3.46 | 0.0010 |
| Married/living as married | 61.48 | 13.83 | 4.45 | <.0001 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -76.62 | 26.19 | -2.93 | 0.0048 |
| Occupation (higher paid occupation=1) | 233.10 | 19.03 | 12.25 | <.0001 |
| Educational attainment: Less than/some high school | -114.58 | 28.59 | -4.01 | 0.0002 |
| Educational attainment: High school graduate | -0.92 | 30.22 | -0.03 | 0.9758 |
| Educational attainment: Vocational/trade/business school/some college/associate degree | 109.56 | 26.17 | 4.19 | <.0001 |
| Educational attainment: College graduate | 277.76 | 29.37 | 9.46 | <.0001 |
| Educational attainment: Graduate studies/degree | 457.65 | 30.66 | 14.93 | <.0001 |
| $R^2$ = 0.340 | | | | |
| $N$ = 6,861 | | | | |

*Prison inmates and those who are still in school are excluded.

Table 6 summarizes the regression results of weekly wages on highest educational attainment. The results suggest that GED credential recipients are likely to make $115 more weekly than the adults without a high school education, keeping other variables constant. There is no difference in terms of weekly wages earned between an individual holding a traditional high school diploma and one with a GED credential.

As to the other demographic variables, adults who are female or Hispanic are likely to make less than their counterparts. Adults who are older, employed full time, or married are likely to earn more than their counterparts. Adults with postsecondary education and academic degrees are likely to earn much more than those without postsecondary education. An interesting variable in this regression is the age upon which the adult graduated from high school or received a GED credential. The public-use data set has collapsed that information into a dummy variable—whether the age is over or under 20. The negative effect (-77) of this variable suggests that for individuals who postpone completing their high school education to an age after 20 (hence postponing possible postsecondary education), there can be a sizeable financial loss compared with those who finished high school education at or before 20.

Table 7 displays the regression result of personal income on highest educational attainment and other control variables. Personal income is more comprehensive than wages; it includes salary, investment income, interest income, welfare, and income from all other sources. A new dummy variable, whether the adult received dividend on stocks and investment, was used to measure the existence of investment income.

Table 7

*Regression of Personal Income on Highest Educational Attainment: All Adults**

| | Estimate | Standard Error | *t*-Statistic | *p* > \|t\| |
|---|---|---|---|---|
| Constant | -11146.92 | 1630.67 | -6.84 | <.0001 |
| Gender (Male=1) | 7799.90 | 365.75 | 21.33 | <.0001 |
| Ethnicity (Black=1) | -2454.77 | 531.81 | -4.62 | <.0001 |
| Ethnicity (Hispanic=1) | -3483.08 | 530.59 | -6.56 | <.0001 |
| Ethnicity (Other, including multiracial=1) | -2477.31 | 849.34 | -2.92 | 0.0049 |
| Age | 886.72 | 82.64 | 10.73 | <.0001 |
| Age$^2$ | -8.22 | 0.95 | -8.65 | <.0001 |
| Employed full time | 12961.83 | 444.83 | 29.14 | <.0001 |
| Married/living as married | 866.88 | 391.00 | 2.22 | 0.0302 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -2988.73 | 735.41 | -4.06 | 0.0001 |
| Occupation (higher paid occupation=1) | 8084.41 | 573.46 | 14.10 | <.0001 |
| Educational attainment: Less than/some high school | -3517.42 | 638.63 | -5.51 | <.0001 |
| Educational attainment: High school graduate | 1590.91 | 669.43 | 2.38 | 0.0205 |
| Educational attainment: Vocational/trade/business school/Some college/Associate's Degree | 4695.34 | 740.01 | 6.34 | <.0001 |
| Educational attainment: College graduate | 8128.04 | 771.62 | 10.53 | <.0001 |
| Educational attainment: Graduate studies/degree | 13832.21 | 992.28 | 13.94 | <.0001 |
| Received dividend in the past year | 5954.26 | 472.55 | 12.60 | <.0001 |
| $R^2$ = 0.488 | | | | |
| $N$ =14,303 | | | | |

*Prison inmates and those who are still in school are excluded.

The regression results show that, on average, adults who have investment income make $5,954 more a year than those who do not invest. Adults who have less than a high school education make $3,517 less annually than those who earned GED credentials. Adults who have GED credentials make $1,590 less than those who obtained traditional high school diplomas, keeping everything else constant. Adults from minority groups (black, Hispanic, and other ethnic groups) have less personal income than white individuals. The impacts of gender, ethnicity, marital status, employment status, occupation, and age upon graduation from high school or obtaining a GED credential on personal incomes are similar as those on weekly wages.

*Regression Analysis of Economic Outcomes for Adults with Postsecondary Education by Types of High School Diploma/Credential*

From the above regression analysis, with other demographic variables controlled, adults with GED credentials have comparable weekly wages and slightly less annual incomes than those who have traditional high school diplomas. Does holding a GED credential instead of a high school diploma influence people's income if they eventually pursue postsecondary education? Data exist from the 2003 NAAL survey indicating respondents who pursued postsecondary education and what type of high school diploma they received (e.g., traditional high school diploma from a school in the United States or an overseas school run by the U.S. government, traditional high school diploma from overseas schools (not run by the United States), or a GED credential). The authors further investigated the impact of the different types of high school diplomas/credentials on the economic outcomes for those whose highest educational attainment is beyond high school. The regression results are summarized in Tables 8 and 9.

Once again, the authors used a set of dummy variables to control for the adults' highest educational attainment, this time with those who attended vocational, trade, business schools, or had some college but earned no academic degrees as the reference group. The authors used another set of dummy variables to measure the types of diplomas/credentials received, with traditional high school diplomas from a school in the United States or an overseas school run by the U.S. government as the reference group.

The results in Table 8 show that among adults who have postsecondary education, those who obtained high school diplomas in foreign countries earn about $95 less in weekly wages than adults who hold U.S. high school diplomas. However, holding a GED credential instead of a traditional high school diploma does not have a statistically significant impact on adults' weekly wages.

Table 8

*Regression of Weekly Wage on Type of High School Diploma/Credential Received*

| | Estimate | Standard Error | *t*-Statistic | *p* > \|t\| |
|---|---|---|---|---|
| Constant | -228.87 | 112.09 | -2.04 | 0.0454 |
| Gender (Male=1) | 252.01 | 17.91 | 14.07 | <.0001 |
| Ethnicity (Black=1) | -25.56 | 26.88 | -0.95 | 0.3452 |
| Ethnicity (Hispanic=1) | -76.38 | 31.43 | -2.43 | 0.018 |
| Ethnicity (Other, including multiracial=1) | 0.32 | 40.57 | 0.01 | 0.9938 |
| Age | 31.04 | 6.10 | 5.09 | <.0001 |
| Age$^2$ | -0.31 | 0.07 | -4.28 | <.0001 |
| Employed full time | 128.09 | 36.86 | 3.48 | 0.0009 |
| Married/living as married | 63.52 | 19.51 | 3.26 | 0.0018 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) (20+=1) | -130.73 | 41.34 | -3.16 | 0.0024 |
| Received traditional diploma from overseas high schools | -95.45 | 39.95 | -2.39 | 0.0199 |
| Received GED credential | -79.02 | 54.47 | -1.45 | 0.1519 |
| Occupation (higher paid occupation=1) | 258.83 | 20.48 | 12.64 | <.0001 |
| Educational attainment: Associate degree | 76.90 | 24.82 | 3.10 | 0.0029 |
| Educational attainment: College graduate | 188.99 | 23.39 | 8.08 | <.0001 |
| Educational attainment: Graduate studies/degree | 361.13 | 23.48 | 15.38 | <.0001 |

$R^2 = 0.306$
$N = 3{,}932$

Table 9

*Regression of Personal Income on Type of High School Diploma/Credential Received*

| | Estimate | Standard Error | *t*-Statistic | *p* > \|t\| |
|---|---|---|---|---|
| Constant | -11853.39 | 3046.67 | -3.89 | 0.0002 |
| Gender (Male=1) | 8787.16 | 543.31 | 16.17 | <.0001 |
| Ethnicity (Black=1) | -1773.54 | 805.25 | -2.20 | 0.0313 |
| Ethnicity (Hispanic=1) | -3884.34 | 983.81 | -3.95 | 0.0002 |
| Ethnicity (Other, including multiracial=1) | -1824.58 | 1281.80 | -1.42 | 0.1595 |
| Age | 1078.96 | 153.70 | 7.02 | <.0001 |
| Age$^2$ | -10.06 | 1.71 | -5.87 | <.0001 |
| Employed full time | 14407.76 | 726.43 | 19.83 | <.0001 |
| Married/living as married | 44.08 | 559.43 | 0.08 | 0.9374 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -3685.81 | 1102.27 | -3.34 | 0.0014 |
| Received traditional diploma from overseas high schools | -2066.53 | 1332.75 | -1.55 | 0.126 |
| Received GED credential | -3099.83 | 1101.74 | -2.81 | 0.0065 |
| Occupation (higher paid occupation=1) | 8128.95 | 656.21 | 12.39 | <.0001 |
| Educational attainment: Associate degree | 1875.33 | 672.83 | 2.79 | 0.007 |
| Educational attainment: College graduate | 4054.62 | 592.59 | 6.84 | <.0001 |
| Educational attainment: Graduate studies/degree | 9763.25 | 904.71 | 10.79 | <.0001 |
| Received dividend in the past year | 4987.71 | 510.69 | 9.77 | <.0001 |

$R^2 = 0.433$
$N = 6{,}956$

Table 9 shows the regression results of personal income on types of high school diploma received. Controlling for other variables, the difference in personal incomes between adults who received traditional high school diplomas from overseas schools and adults who received U.S. high school diplomas are now statistically insignificant. However, for adults who earned GED credentials and then pursued postsecondary education, they are likely to make about $3,100 less a year than their counterparts with traditional U.S. high school diplomas.

## Noneconomic Outcomes for the GED Recipients

Education not only has a direct impact on economic payoffs, but also affects many other aspects of individual life and society as a whole. Other than labor market outcomes for GED credential recipients, the education community and general public are also interested in how well GED credential recipients function in the civil society, such as their political participation, family literacy, and health. In this section, the authors explore the differences between GED credential recipients and adults with less than a high school education or adults with traditional high school diplomas in these three aspects.

### *Political and Social Participation*

Educational attainment is a major component of socioeconomic status (SES). The SES-participation relationship has been well documented by many political scientists (Barnes & Kaase, 1979; Nagel, 1987; Rosenstone & Hansen, 1993; Verba & Nie, 1972). Individuals with higher socioeconomic status are more likely to participate in political activities. Brady, Verba, & Schlozman (1995) proposed a resource model of political participation, which shows that political participation depends on resources available to citizens: time, money, and civic skills. Brady et al. found that educational attainment is highly correlated with virtually every political

act. Education not only helps accumulate civil skills that facilitates participation, but also inculcates political interests and motivation.

The 2003 NAAL data provides information on the following aspects of U.S. adults' political and social participation:

1. Whether the respondent is currently registered to vote.
2. Whether the respondent voted in the most recent presidential election.
3. The respondent's unpaid volunteer experience.
4. Whether the respondent ever served on active duty in the U.S. Armed Forces.
5. How much government or public affairs information the respondent gets from various sources (newspaper, magazine, internet, radio, co-worker, and so forth).

The authors conducted statistical comparison on adults with GED credentials, adults with less than a high school–level education, and adults with traditional high school diplomas on each of the aspects above. The results are summarized in Table 10.

As demonstrated in Table 10, among the adults with less than a high school–level education, about 22 percent are not U.S. citizens, which is substantially higher than those who hold GED credentials or high school diplomas (less than 5 percent for each group). Among those who are eligible to vote, high school graduates lead GED credential recipients in the percentage of registered voters by 10 percentage points, which, in turn, surpassed the adults without a high school–level education by 10 percentage points. Among those who are eligible to vote and remembered if they voted in the most recent presidential election, adults with high school diplomas is the only group with more than half (60 percent) who voted. Only 48 percent of adults with GED credentials and 38 percent of adults without a high school–level education reported that they voted in the last presidential election. All these differences are statistically significant.

Table 10

*Political and Social Participation of Adults with Highest Educational Attainment of High School or Less*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Not a citizen | 21.6 (1.6) | 4.5 (1.2) | 4.6 (0.6) | -17.2 | -11.67* | 0.1 | 0.09 |
| Currently registered to vote | 57.7 (1.5) | 66.6 (2.3) | 75.8 (1.1) | 8.9 | 3.32* | 9.2 | 3.74* |
| Voted in the most recent presidential election | 38.3 (1.2) | 48.0 (2.0) | 59.6 (1.3) | 9.7 | 3.22* | 11.6 | 3.73* |
| Volunteered last year | 17.7 (0.9) | 24.2 (1.8) | 31.8 (1.1) | 6.6 | 3.09* | 7.6 | 3.75* |
| Frequency of volunteering: | | | | | | | |
| - Most days or a few times a week | 27.7 (2.6) | 25.9 (4.4) | 22.6 (1.8) | -1.8 | -0.37 | -3.3 | -0.81 |
| - Once a week | 23.5 (2.5) | 23.4 (3.3) | 24.5 (2.1) | -0.1 | -0.02 | 1.1 | 0.28 |
| - Less than once a week | 48.8 (3.2) | 50.7 (4.4) | 52.8 (2.0) | 1.9 | 0.40 | 2.1 | 0.49 |
| Ever served on active duty in the U.S. Armed Forces | 7.9 (0.7) | 13.3 (1.4) | 14.6 (0.7) | 5.5 | 3.82* | 1.3 | 0.81 |
| Getting a lot or some information about current events, public affairs, and the government from: | | | | | | | |
| - Newspapers | 48.6 (1.4) | 66.1 (2.5) | 65.9 (1.1) | 17.5 | 7.16* | -0.2 | -0.09 |
| - Magazines | 33.4 (1.2) | 39.8 (2.5) | 42.9 (1.2) | 6.4 | 2.42* | 3.0 | 1.17 |
| - Internet | 17.2 (1.1) | 30.5 (2.5) | 32.2 (1.3) | 13.2 | 5.32* | 1.7 | 0.60 |
| - Radio or TV | 82.8 (1.0) | 89.1 (1.2) | 91.0 (0.6) | 6.3 | 3.96* | 1.9 | 1.35 |
| - Books | 32.3 (1.5) | 43.0 (2.5) | 42.5 (1.1) | 10.7 | 3.79* | -0.5 | -0.19 |
| - Family members, friends, co-workers | 58.4 (1.3) | 63.9 (2.4) | 62.9 (1.0) | 5.5 | 2.01* | -1.0 | -0.41 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

When the respondents were asked about whether they gave any unpaid time as a volunteer to a group or organization, 32 percent of adults with traditional high school diplomas answered "yes," while only 24 percent of GED credential recipients and 18 percent of adults with less than a high school–level education did so. However, in terms of frequency of volunteering, there are almost no differences among the three groups.

The percentage of adults with GED credentials or traditional high school diplomas who serve on active duty in the U.S. Armed Forces is almost double that of the adults without a high school– level education who served.

The 2003 NAAL survey also asked respondents about the sources through which they get information about current events, public affairs, and the government. The percentages of adults with GED credentials obtaining public event information through each of the surveyed channels is considerably higher (and statistically significant) than those of adults without a high school–level education, particularly through newspapers, Internet, and books. The pattern of obtaining public event information does not differ much between adults with traditional high school diplomas and adults with GED credentials.

*Family Literacy*

Parents are children's first teachers. The ways parents use literacy and engage in educational activities with children at home have a deep impact on children's learning success. Studies have shown that parents who attain higher education levels are more likely to acknowledge the importance of education (Crane, 1996). Therefore, these parents are more devoted to their children's educational success and place a high priority on parental involvement (Legutko, 1998; Portes & MacLeod, 1996). In addition, some researchers (Grayson, 1999; Portes

& MacLeod, 1996) argue that improved education is an expression of the parents' desire to be involved in their children's education; they seek a higher education in order to provide better opportunity not only for themselves, but also for their children.

The 2003 NAAL data provide information on U.S. adults' family literacy practices. The authors examined the following aspects:

1. Frequency of library use.
2. Early childhood education for children younger than eight (including teaching children the alphabet, words, songs/rhymes, and so forth).
3. Parent involvement in the learning process of school-age children (including talking to children about school, helping with homework, and so forth).
4. Family literacy environment in terms of books, magazines, and computers owned.

The authors conducted statistical comparisons among adults with GED credentials, adults with less than a high school–level education, and adults with traditional high school diplomas on each variable. The results are summarized in Tables 11 to 14.

Table 11

*Frequency of Library Use*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| Frequency of Library Use | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Daily or weekly | 6.7 (0.6) | 9.1 (1.3) | 9.5 (0.7) | 2.4 | 1.61 | 0.4 | 0.26 |
| Monthly | 10.7 (0.8) | 14.7 (1.5) | 15.7 (0.9) | 4.0 | 2.40* | 1.0 | 0.71 |
| Once or twice a year | 22.3 (1.0) | 35.8 (1.8) | 31.4 (1.3) | 13.5 | 6.46* | -4.4 | -2.11* |
| Never use library | 60.3 (1.5) | 40.4 (2.2) | 43.4 (1.4) | -19.9 | -7.64* | 3.0 | 1.15 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 11 shows the frequencies of library use by highest educational attainment for adults with a high school education or less. Compared with GED credential recipients and high school graduates (about 40 percent), there is a larger percentage (60 percent) of adults with less than a high school–level education who never use library. The frequency of library use does not differ much between GED credential recipients and traditional high school graduates, except in the "once or twice a year" range.

Table 12 shows the frequencies of adults engaging in educational activities for their children under the age of eight. These activities include teaching children the alphabet, pointing out words to children, and singing songs or engaging in rhyming activities with children. More than half of the parents or guardians in each adult group teach children the alphabet. It appears that adults with traditional high school diplomas teach children more often than do adults with GED credentials; adults with GED credentials tend to teach children more frequently than do the adults with less than a high school–level education. These differences are not statistically significant.

In terms of pointing out words to children, a significantly higher percentage of adults who received traditional high school diplomas pointed out words to children at least a few times a week, compared with adults who received GED credentials. Furthermore, GED credential recipients are more likely to sing songs or engage in rhyming activities with children, compared with adults who have no high school education. These differences are both significant at the 0.05 level.

Table 12

*Early Childhood Education for Children Under Eight*

| Early Childhood Educational Activities | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Teaching Children the Alphabet | | | | | | | |
| - At least a few times a week (%) | 53.5 (2.5) | 55.7 (5.0) | 63.4 (2.8) | 2.2 | 0.41 | 7.7 | 1.38 |
| - Once a week (%) | 8.8 (1.4) | 10.0 (3.1) | 8.8 (1.3) | 1.2 | 0.40 | -1.2 | -0.38 |
| - Less than once a week (%) | 9.9 (1.3) | 12.8 (3.1) | 9.6 (1.4) | 2.9 | 0.84 | -3.2 | -0.97 |
| - Never (%) | 27.8 (2.5) | 21.4 (4.6) | 18.2 (2.5) | -6.4 | -1.15 | -3.2 | -0.60 |
| Pointing out Words to Children | | | | | | | |
| - At least a few times a week (%) | 55.2 (2.4) | 52.0 (5.0) | 64.9 (2.3) | -3.2 | -0.53 | 12.9 | 2.34* |
| - Once a week (%) | 8.0 (1.3) | 8.0 (3.0) | 7.8 (1.0) | 0.0 | -0.02 | -0.2 | -0.05 |
| - Less than once a week (%) | 9.2 (1.3) | 13.9 (3.2) | 7.7 (1.4) | 4.7 | 1.38 | -6.2 | -1.64 |
| - Never (%) | 27.5 (2.2) | 26.1 (4.8) | 19.6 (2.1) | -1.4 | -0.25 | -6.5 | -1.20 |
| Singing Songs or Engaging in Rhyming Activities with Children | | | | | | | |
| - At least a few times a week (%) | 60.5 (2.0) | 71.8 (4.2) | 70.7 (2.8) | 11.3 | 2.63* | -1.1 | -0.20 |
| - Once a week (%) | 10.0 (1.0) | 11.7 (3.2) | 10.6 (1.6) | 1.7 | 0.53 | -1.1 | -0.32 |
| - Less than once a week (%) | 10.1 (1.2) | 7.0 (2.5) | 7.7 (1.0) | -3.1 | -1.18 | 0.7 | 0.25 |
| - Never (%) | 19.4 (1.8) | 9.5 (3.0) | 11.0 (1.9) | -9.9 | -2.93* | 1.5 | 0.42 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 13 highlights the parents' involvement in their school-age children's studies. About 80 percent of adults with GED credentials talk to their children about school studies at least a few times a week, compared with 76 percent of adults with less than a high school education and 87 percent of adults with high school diplomas. The differences are not statistically significant. The percentage of adults who never talked with children about their school studies is lower

among GED credential recipients than among the adults with less than a high school education. About 68 percent of GED credential recipients help their children with homework at least a few times a week, compared with 56 percent of adults with less than a high school education. This difference is significant at the 0.05 level. It also appears that adults with high school diplomas tend to help their children with homework more frequently than adults with GED credentials; however, the differences are only statistically significant in the "once a week" category.

Table 13

*Parent Involvement in Education for School-Age Children*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Talk to Children about School Studies | | | | | | | |
| - At least a few times a week | 76.4 (1.8) | 80.4 (3.4) | 87.1 (1.3) | 4.0 | 1.04 | 6.7 | 1.72 |
| - Once a week | 9.7 (1.4) | 11.6 (3.5) | 6.9 (1.1) | 1.9 | 0.48 | -4.7 | -1.28 |
| - Less than once a week | 5.7 (1.0) | 3.3 (1.6) | 3.5 (0.9) | -2.4 | -1.23 | 0.2 | 0.16 |
| - Never | 8.3 (1.2) | 4.8 (1.7) | 2.5 (0.6) | -3.5 | -1.96* | -2.3 | -1.19 |
| Help Children with Homework | | | | | | | |
| - At least a few times a week | 56.3 (2.4) | 67.6 (3.7) | 68.7 (2.0) | 11.3 | 2.48* | 1.1 | 0.27 |
| - Once a week | 7.0 (1.0) | 4.3 (1.4) | 8.3 (1.0) | -2.7 | -1.47 | 4.0 | 2.26* |
| - Less than once a week | 12.8 (1.8) | 14.8 (3.1) | 11.5 (1.5) | 2.0 | 0.61 | -3.3 | -0.87 |
| - Never | 24.0 (1.8) | 13.3 (2.4) | 11.4 (1.2) | -10.7 | -3.82* | -1.9 | -0.64 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

The authors also selected variables for comparison concerning the family literacy environment of adults and summarized the results in Table 14. The results suggest that adults with less than a high school education have a less favorable family literacy environment,

measured by books, magazines, and computers owned at home, than the adults who have completed a high school–level education. The difference between adults with GED credentials and adults with less than a high school education on each measurement is large and significant at the 0.01 level.

Table 14

*Family Literacy Environment*

| | Less than HS | GED | High School | GED vs. Less than HS Diff. | GED vs. Less than HS *t*-Statistic | HS vs. GED Diff. | HS vs. GED *t*-Statistic |
|---|---|---|---|---|---|---|---|
| 25 or more books at home (% answering "Yes") | 69.0 (1.2) | 84.5 (1.8) | 86.9 (0.7) | 15.5 | 8.06* | 2.4 | 1.28 |
| Variety of magazines/reading materials at home (% answering "Yes") | 75.0 (1.3) | 86.2 (1.7) | 89.3 (0.6) | 11.2 | 4.92* | 3.1 | 1.69 |
| Number of computers at home that can be used for word processing | 0.56 (0.02) | 0.86 (0.05) | 0.96 (0.03) | 0.30 | 5.23* | 0.10 | 1.63 |
| Number of computers at home that can access Internet | 0.45 (0.02) | 0.69 (0.04) | 0.80 (0.03) | 0.24 | 5.36* | 0.11 | 2.06* |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

In terms of owning books, magazines, and computers that can be used for word processing at home, adults with GED credentials are very comparable with adults with high school diplomas. The only statistically significant difference is in the number of computers that can be used to access the Internet at home. About eight in 10 adults with high school diplomas who own computers can access the Internet at home, while only seven in 10 GED credential recipients have this ability.

*Health*

The positive association between education and health, including physical functioning, self-reported health, and longer life expectancy, has long been established in the field of medicine and public health (Baker & Clark, 1997; Guralnik, Land, Fillenbaum, & Branch, 2003; Pappas, Queen, Hadden, & Fisher, 1993). Ross and Wu (1995) reviewed and summarized theoretical explanations for this association through three aspects: (1) employment and economic conditions; (2) social-psychological resources; and (3) health lifestyle. They argued that people of higher education levels are more likely to have better paid, more fulfilling jobs, and experience less economic hardship. They also are more likely to have social-psychological resources, which bring high sense of personal control. The better educated are also more likely to live a healthier life, to exercise more, to drink moderately, to use health services, and less likely to smoke. These factors lead to the improvement of health through financial, psychological, and physical aspects.

The 2003 NAAL also introduces the first-ever national assessment of adults' health literacy (i.e., the ability to use literacy skills in understanding health-related materials and forms). Hsu (2007) found that adults with a GED/equivalency credential show (a) higher levels of health literacy than adults with less than or some high school and (b) comparable levels of health literacy with high school graduates across most demographic backgrounds examined.

This section will mainly focus on adults' overall health condition and practice. The authors examined the following variables:

1. Overall health (self-reported by the respondent).
2. Whether the respondent has health insurance, and what the source of his or her health insurance is.

3. Amount of health information the respondent gets from various sources.
4. Use of health services to maintain health: whether the respondent received various preventive health care, including flu shot, vision, dentistry, pap smear, mammogram, and so forth.

The authors conducted statistical comparison of the adults with GED credentials, adults with less than a high school–level education, and adults with traditional high school diplomas on each variable. The results are summarized in Tables 15 to 17.

Table 15 summarizes the statistics on adults' overall health and health insurance. About 47 percent of adults with GED credentials reported that they are in excellent or very good health, versus 41 percent of adults with less than a high school education and 57 percent of the adults with traditional high school diplomas. The differences are statistically significant.

About 69 percent of GED credential recipients reported that they have health insurance or are enrolled in programs that help pay for health care, compared with 66 percent of adults with less than a high school education and 81 percent of adults with traditional high school diplomas. About 83 percent of the parents with GED credentials reported that their children have medical insurance, which is comparable to that of the parents with less than a high school education but is 7 percentage points lower than that of the parents who are traditional high school graduates. The 12-percentage point difference in medical insurance for adults and the 7-percentage point difference in child insurance coverage between the GED credential recipients and traditional high school graduates are both statistically significant at the 0.05 level.

As to the source of health insurance, by far employer or school is the most common provider of health insurance. About 65 percent of adults with GED credentials reported that they have employer- or school- provided health insurance, versus 48 percent of adults with less than a

high school education and 71 percent of adults with traditional high school diplomas. The differences between any two groups are significant at the 0.05 level.

Table 15

*Overall Health and Health Insurance*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Overall Health (self-reported) | | | | | | | |
| Excellent or very good | 41.2 (1.2) | 46.6 (2.2) | 56.8 (1.1) | 5.4 | 2.33* | 10.2 | 4.90* |
| Good or fair | 49.9 (1.1) | 48.4 (2.1) | 39.7 (1.1) | -1.5 | -0.74 | -8.7 | -4.28* |
| Poor | 8.9 (0.7) | 5.0 (0.9) | 3.6 (0.4) | -3.9 | -3.37* | -1.4 | -1.59 |
| have medical insurance or enrolled in programs that help pay for health care | 65.7 (1.2) | 68.6 (2.3) | 81.2 (0.9) | 2.9 | 1.17 | 12.6 | 5.29* |
| Source of Medical Insurance: | | | | | | | |
| - From work/school | 48.2 (1.7) | 65.0 (2.6) | 70.9 (1.2) | 16.8 | 5.62* | 22.7 | 2.21* |
| - From Medicare | 38.8 (1.6) | 20.2 (2.6) | 26.7 (1.3) | -18.6 | -6.30* | 6.5 | 2.28* |
| - Directly from insurance company | 14.1 (1.3) | 8.9 (1.6) | 15.6 (1.0) | -5.2 | -2.53* | 6.7 | 3.41* |
| - From Military | 2.8 (0.5) | 7.3 (1.7) | 5.1 (0.6) | 4.5 | 2.55* | -2.2 | -1.32 |
| - From Medicaid | 26.3 (1.2) | 21.7 (2.3) | 8.2 (0.6) | -4.6 | -2.03* | -13.5 | -5.69* |
| - Other | 6.3 (0.7) | 5.1 (1.0) | 5.8 (0.8) | -1.2 | -1.00 | 0.7 | 0.59 |
| Children have medical insurance | 81.9 (1.3) | 82.6 (2.4) | 90.0 (1.0) | 0.7 | 0.28 | 7.4 | 2.94* |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 16 shows the various sources from which adults of lower educational attainment receive information on health issues. Radio/TV and health professionals are the two most popular channels through which these adults receive health-related information. The results

indicate that a higher percentage of adults with GED credentials receive health-related information through virtually every channel than that of adults with less than a high school–level education. The only statistically significant difference between adults with GED credentials and adults with traditional high school diplomas in receiving health-related information is through books or brochures, where the high school graduates lead the GED credential recipients by 8 percentage points.

Table 16

*Sources of Receiving Information on Health Issues*

| Receiving a Lot or Some Information from the Following Sources: | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Newspapers | 37.0 (1.2) | 45.6 (2.7) | 50.8 (1.2) | 8.6 | 3.11* | 5.2 | 1.74 |
| Magazines | 36.1 (1.5) | 49.1 (2.5) | 52.9 (1.4) | 13.0 | 4.68* | 3.8 | 1.40 |
| Internet | 15.0 (1.0) | 28.3 (2.2) | 31.1 (1.2) | 13.3 | 5.77* | 2.8 | 1.11 |
| Radio and Television | 67.4 (1.5) | 73.0 (2.1) | 72.2 (1.2) | 5.6 | 2.39* | -0.8 | -0.37 |
| Books or Brochures | 38.9 (1.4) | 47.3 (2.2) | 55.3 (1.1) | 8.4 | 3.53* | 8.0 | 3.25* |
| Family Members/Friends/Co-workers | 56.7 (1.5) | 58.4 (2.2) | 62.1 (1.2) | 1.7 | 0.69 | 3.7 | 1.51 |
| Health care professionals | 62.5 (1.3) | 69.3 (2.0) | 68.6 (1.2) | 6.8 | 2.88* | -0.7 | -0.35 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Table 17 displays adults' use of health services to maintain health. Among adults with GED credentials, a little more than half visited dentists in the past year, versus about 43 percent

among adults with less than a high school education and about 60 percent among adults with traditional high school diplomas. Both differences are significant at the 0.01 level. About 52 percent of GED credential recipients had their vision checked, compared with 50 percent of adults without high school education and 56 percent of high school graduates. The differences are not statistically significant.

Table 17

*Use of Health Services to Maintain Health*

| | Percentage by Educational Attainment | | | GED vs. Less than HS | | HS vs. GED | |
|---|---|---|---|---|---|---|---|
| Health Services | Less than HS | GED | High School | Diff. | *t*-statistic | Diff. | *t*-statistic |
| Visiting dentist | 43.1 (1.3) | 50.5 (1.9) | 59.5 (1.2) | 7.4 | 3.62* | 9.0 | 3.69* |
| Checking vision | 49.8 (1.2) | 51.8 (2.7) | 55.9 (1.2) | 2.0 | 0.64 | 4.1 | 1.38 |
| Pap smear | 62.0 (1.8) | 57.1 (3.8) | 65.3 (1.7) | -4.9 | -1.16 | 8.2 | 1.88 |
| Mammogram | 55.1 (2.0) | 51.9 (4.1) | 58.9 (1.9) | -3.2 | -0.71 | 7.0 | 1.56 |
| Flu shot | 31.3 (1.1) | 28.4 (2.0) | 34.9 (1.1) | -2.9 | -1.42 | 6.5 | 3.42* |
| Pneumonia shot | 38.1 (2.7) | 35.1 (7.8) | 38.9 (2.4) | -3.0 | -0.37 | 3.8 | 0.44 |
| Screening for colon cancer | 35.0 (1.8) | 39.9 (4.6) | 37.7 (1.9) | 4.9 | 0.96 | -2.2 | -0.43 |
| Screening for osteoporosis | 26.0 (1.5) | 23.6 (4.1) | 27.3 (1.3) | -2.4 | -0.52 | 3.7 | 0.84 |
| Screening for prostate cancer | 24.3 (1.4) | 28.1 (3.0) | 28.8 (1.3) | 3.8 | 1.17 | 0.7 | 0.21 |

Note: Values enclosed in parentheses represent standard errors.
* $P < 0.05$, two-tailed.

Among applicable female adults, over 57 percent had Pap smear tests and over 52 percent had mammograms in the past year. The difference is not statistically significant between females with GED credentials and females with less than a high school education, nor between female GED credential recipients and high school graduates.

For other less widely used health services (i.e., flu shot, pneumonia shot, screening for colon cancer, osteoporosis, or prostate cancer), between 28 percent and 40 percent of the applicable adults used such services in the past year. The differences between adults with GED credentials and the other two adult groups are not statistically significant except that a higher percentage of high school graduates had a flu shot than did GED credential recipients.

Overall, it appears that adults with GED credentials differ from adults with less than a high school education, but generally lag behind high school graduates on their use of preventive health services. However, it should be noted that the use of health services is highly associated with the adults' health insurance coverage.

## Summary and Discussion

Statistical comparison through the 2003 NAAL study shows that, among the adults who have no postsecondary education, GED credential recipients lead adults with less than a high school education in both weekly wages and personal incomes substantially. Adults with GED credentials have comparable weekly wages with high school graduates, but are lagging behind in personal income by a considerable amount. However, by controlling for other demographic variables in regression analysis, the wage and income gaps between the adults with less than a high school education and adults with GED credentials are still large and significant—earning a GED credential may bring an increase of $115 in weekly wages and $3,500 in annual income.

With other demographics controlled, GED credential recipients earn the same level of weekly wages as high school graduates, but make about $1,590 less in annual income than high school graduates.

For those who eventually pursue postsecondary education, holding a GED credential has no statistically significant impact on wage earning versus holding a traditional high school diploma. However, adults holding traditional high school diplomas may have about $3,060 more annually in personal incomes than those who hold GED credentials.

Two other important messages conveyed through this study: (1) there is a sizable income disadvantage for adults who postpone completing their high school education after the age of 20; and (2) any postsecondary education will bring significant increases in incomes, as shown by the effect size of having postsecondary education versus that of holding a GED credential or high school diploma. Therefore, the adult education community should encourage adult learners to complete a high school–level education as early as possible and inspire adult learners toward higher education.

On the noneconomic side, the authors found major differences between adults with GED credentials and the other two adult groups:

1. GED credential recipients show a higher level of political and social participation than adults with less than a high school education, but generally lag behind adults with high school diplomas.
2. GED credential recipients have a better family literacy environment than do adults with less than a high school education and a comparable environment with high school graduates.
3. GED credential recipients reported in “excellent or good” health more than adults

with less than a high school education but less than adults with high school diplomas.

4. GED credential recipients have a comparable percentage of having health insurance with adults with less than a high school education but lag behind traditional high school graduates, particularly in having employer-provided insurance.
5. GED credential recipients obtain information on public events as well as health issues more often than the adults with less than high school education, and comparable with adults with high school diplomas through every source surveyed.

Education is widely recognized as a vehicle for social upward mobility. Attainment of a GED credential, a "second chance" to certify high school education and a stepping stone to better employment and higher education, has been used by many adult education programs as well as workforce investment programs as a major measurement of program success. However, it should be emphasized that the GED Tests are designed to measure high school–level knowledge and skills; they do not measure noncognitive skills nor should they be used to predict future economic or education success. Economic or higher education success depends on many other factors, including noncognitive skills. Given the evidences presented in this paper, it may be the time for the adult education community to consider enhancing efforts in improving adults' noncognitive skills and aiming for higher education, in addition to the current focus on teaching and certifying high school–level skills for the less educated.

This study provides new evidence on economic and noneconomic outcomes for GED credential recipients through a nationally representative sample of adults. Particularly, it is one of the first studies on political and social participation, family literacy, and health of GED credential recipients through a national sample. This study will join the rich collection of

literature on the outcomes of GED credential recipients and will help educators, policy makers, researchers, and the general public understand and address the high school dropouts and adult education issues that are increasingly challenging our society.

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# Appendix

## Tobit Models

Table A1

*Tobit Model: Regression of Weekly Wage on Highest Educational Attainment (All Adults)*

| | Estimate | Standard Error | 95% Confidence Limits | | Chi-Square | Pr>Chi Sq |
|---|---|---|---|---|---|---|
| Constant | 5.611 | 0.001 | 5.609 | 5.613 | 4.30E+07 | <.0001 |
| Gender (Male=1) | 0.281 | 0.000 | 0.281 | 0.281 | 5453532 | <.0001 |
| Ethnicity (Black=1) | -0.012 | 0.000 | -0.012 | -0.012 | 3926.92 | <.0001 |
| Ethnicity (Hispanic=1) | -0.110 | 0.000 | -0.110 | -0.109 | 348497 | <.0001 |
| Ethnicity (Other, including multiracial=1) | -0.020 | 0.000 | -0.021 | -0.020 | 6633.29 | <.0001 |
| Age | 0.034 | 0.000 | 0.034 | 0.035 | 839446 | <.0001 |
| $Age^2$ | 0.000 | 0.000 | 0.000 | 0.000 | 590994 | <.0001 |
| Employed full time | 0.081 | 0.000 | 0.080 | 0.082 | 76227.1 | <.0001 |
| Married/living as married | 0.077 | 0.000 | 0.077 | 0.077 | 374528 | <.0001 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -0.062 | 0.000 | -0.063 | -0.062 | 45002.7 | <.0001 |
| Occupation (higher paid occupation=1) | 0.277 | 0.000 | 0.277 | 0.278 | 3486980 | <.0001 |
| Educational attainment: Less than HS | -0.120 | 0.000 | -0.120 | -0.119 | 111824 | <.0001 |
| Educational attainment: HS graduate | 0.005 | 0.000 | 0.004 | 0.005 | 198.33 | <.0001 |
| Educational attainment: Vocational/trade school/some college/associate degree | 0.122 | 0.000 | 0.121 | 0.122 | 143609 | <.0001 |
| Educational attainment: College graduate | 0.323 | 0.000 | 0.322 | 0.324 | 873708 | <.0001 |
| Educational attainment: Graduate studies/degree | 0.516 | 0.000 | 0.516 | 0.517 | 2105799 | <.0001 |
| Scale | 0.458 | 0.000 | 0.458 | 0.458 | | |
| Weibull Shape | 2.185 | 0.000 | 2.185 | 2.186 | | |
| N = 6,199 | | | | | | |

Table A2

*Tobit Model: Regression of Personal Income on Highest Educational Attainment (All Adults)*

| | Estimate | Standard Error | 95% Confidence Limits | | Chi-Square | Pr>Chi Sq |
|---|---|---|---|---|---|---|
| Constant | 8.573 | 0.001 | 8.572 | 8.574 | 2.04E+08 | <.0001 |
| Gender (Male=1) | 0.296 | 0.000 | 0.296 | 0.296 | 9049924 | <.0001 |
| Ethnicity (Black=1) | -0.096 | 0.000 | -0.097 | -0.096 | 386614 | <.0001 |
| Ethnicity (Hispanic=1) | -0.132 | 0.000 | -0.133 | -0.132 | 702667 | <.0001 |
| Ethnicity (Other, including multiracial=1) | -0.067 | 0.000 | -0.067 | -0.066 | 88900.1 | <.0001 |
| Age | 0.055 | 0.000 | 0.055 | 0.055 | 3929514 | <.0001 |
| $Age^2$ | -0.001 | 0.000 | -0.001 | -0.001 | 3441968 | <.0001 |
| Employed full time | 0.329 | 0.000 | 0.328 | 0.329 | 9002937 | <.0001 |
| Married/living as married | 0.110 | 0.000 | 0.110 | 0.110 | 1185558 | <.0001 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -0.123 | 0.000 | -0.123 | -0.122 | 305369 | <.0001 |
| Occupation (higher paid occupation=1) | 0.333 | 0.000 | 0.332 | 0.333 | 4969664 | <.0001 |
| Educational attainment: Less than HS | -0.242 | 0.000 | -0.243 | -0.242 | 815778 | <.0001 |
| Educational attainment: HS graduate | 0.035 | 0.000 | 0.035 | 0.036 | 19903.2 | <.0001 |
| Educational attainment: Vocational/trade school/some college/associate's degree | 0.174 | 0.000 | 0.174 | 0.175 | 486367 | <.0001 |
| Educational attainment: College graduate | 0.329 | 0.000 | 0.328 | 0.329 | 1374010 | <.0001 |
| Educational attainment: Graduate studies/degree | 0.586 | 0.000 | 0.585 | 0.586 | 3910746 | <.0001 |
| Dividend | 0.279 | 0.000 | 0.279 | 0.279 | 5768870 | <.0001 |
| Scale | 0.514 | 0.000 | 0.514 | 0.514 | | |
| Weibull Shape | 1.945 | 0.000 | 1.945 | 1.945 | | |
| N = 12,099 | | | | | | |

Table A3

*Tobit Model: Regression of Weekly Wage on Types of High School Diploma/Credential Received*

| | Estimate | Standard Error | 95% Confidence Limits | | Chi-Square | Pr>Chi Sq |
|---|---|---|---|---|---|---|
| Constant | 5.561 | 0.001 | 5.559 | 5.564 | 2.24E+07 | <.0001 |
| Gender (Male=1) | 0.290 | 0.000 | 0.290 | 0.291 | 3790742 | <.0001 |
| Ethnicity (Black=1) | -0.011 | 0.000 | -0.011 | -0.010 | 1718.04 | <.0001 |
| Ethnicity (Hispanic=1) | -0.071 | 0.000 | -0.071 | -0.070 | 63116.5 | <.0001 |
| Ethnicity (Other, including multiracial=1) | -0.015 | 0.000 | -0.015 | -0.014 | 2153.09 | <.0001 |
| Age | 0.038 | 0.000 | 0.038 | 0.038 | 467440 | <.0001 |
| $Age^2$ | 0.000 | 0.000 | 0.000 | 0.000 | 329930 | <.0001 |
| Employed full time | 0.133 | 0.000 | 0.132 | 0.133 | 136987 | <.0001 |
| Married/living as married | 0.093 | 0.000 | 0.093 | 0.094 | 342271 | <.0001 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -0.186 | 0.000 | -0.187 | -0.185 | 213177 | <.0001 |
| Occupation (higher paid occupation=1) | -0.127 | 0.000 | -0.128 | -0.126 | 160346 | <.0001 |
| Educational attainment: Less than HS | -0.019 | 0.000 | -0.020 | -0.018 | 1926.47 | <.0001 |
| Educational attainment: HS graduate | 0.288 | 0.000 | 0.288 | 0.288 | 3193401 | <.0001 |
| Educational attainment: Vocational/trade school/some college/associate degree | 0.085 | 0.000 | 0.085 | 0.085 | 172404 | <.0001 |
| Educational attainment: College graduate | 0.231 | 0.000 | 0.231 | 0.231 | 1363574 | <.0001 |
| Educational attainment: Graduate studies/degree | 0.419 | 0.000 | 0.419 | 0.420 | 3885983 | <.0001 |
| Scale | 0.431 | 0.000 | 0.431 | 0.431 | | |
| Weibull Shape | 2.320 | 0.000 | 2.319 | 2.320 | | |
| N = 3,722 | | | | | | |

Table A4

*Tobit Model: Regression of Personal Income on Types of High School Diploma/Credential Received*

| | Estimate | Standard Error | 95% Confidence Limits | | Chi-Square | Pr>Chi Sq |
|---|---|---|---|---|---|---|
| Constant | 8.600 | 0.001 | 8.599 | 8.602 | 9.91E+07 | <.0001 |
| Gender (Male=1) | 0.316 | 0.000 | 0.316 | 0.316 | 5497091 | <.0001 |
| Ethnicity (Black=1) | -0.058 | 0.000 | -0.058 | -0.057 | 62608.1 | <.0001 |
| Ethnicity (Hispanic=1) | -0.116 | 0.000 | -0.116 | -0.115 | 194558 | <.0001 |
| Ethnicity (Other, including multiracial=1) | -0.026 | 0.000 | -0.027 | -0.026 | 8071.61 | <.0001 |
| Age | 0.064 | 0.000 | 0.064 | 0.064 | 2356565 | <.0001 |
| $Age^2$ | -0.001 | 0.000 | -0.001 | -0.001 | 2092802 | <.0001 |
| Employed full time | 0.281 | 0.000 | 0.281 | 0.281 | 3533393 | <.0001 |
| Married/living as married | 0.048 | 0.000 | 0.048 | 0.048 | 117760 | <.0001 |
| Age upon graduation from high school or upon receiving GED credential (20+=1) | -0.156 | 0.000 | -0.157 | -0.156 | 207264 | <.0001 |
| Occupation (higher paid occupation=1) | -0.091 | 0.000 | -0.092 | -0.091 | 99153.3 | <.0001 |
| Educational attainment: Less than HS | -0.132 | 0.000 | -0.133 | -0.132 | 142350 | <.0001 |
| Educational attainment: HS graduate | 0.325 | 0.000 | 0.325 | 0.326 | 3827233 | <.0001 |
| Educational attainment: Vocational/trade school/some college/associate degree | 0.095 | 0.000 | 0.095 | 0.095 | 295929 | <.0001 |
| Educational attainment: College graduate | 0.187 | 0.000 | 0.187 | 0.188 | 1112000 | <.0001 |
| Educational attainment: Graduate studies/degree | 0.434 | 0.000 | 0.433 | 0.434 | 4778107 | <.0001 |
| Dividend | 0.251 | 0.000 | 0.250 | 0.251 | 2982349 | <.0001 |
| Scale | 0.480 | 0.000 | 0.480 | 0.480 | | |
| Weibull Shape | 2.083 | 0.000 | 2.082 | 2.083 | | |
| N = 6,278 | | | | | | |

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