J Popul Econ
DOI 10.1007/s00148-005-0037-8

ORIGINAL PAPER

Melissa A. Clark · David A. Jaeger

Natives, the foreign-born and high school equivalents: new evidence on the returns to the GED

Received: 22 September 2003 / Accepted: 28 June 2005

Abstract We explore the labor market returns to the General Education Development (GED) exam for US natives and the foreign-born. We find that foreign-born men with a GED who received all of their formal schooling abroad earn significantly more than either foreign-schooled high school dropouts or graduates. In contrast, among US natives, GED recipients earn less than high school graduates but significantly more than dropouts. The returns for natives become larger over the life cycle and are not due to cohort effects. Our findings indicate that the GED may be more valuable in the labor market than some previous research suggests.

Keywords GED · Immigration · Sheepskin effects

JEL Classification J31 · J61 · I2

1 Introduction

The degree to which the estimated return to education represents the return to a signal vs human capital has been debated since the publication of Spence's (1973) path-breaking article. One testable implication of the signaling model is the existence of "sheepskin" effects—returns to a diploma or degree over and beyond the return to an additional year of schooling. While sheepskin effects were initially discounted as a potential explanation of the returns to education (Chiswick 1973;

Responsible editor: Klaus F. Zimmermann

M. A. Clark
Mathematica Policy Research, Princeton, NJ 08543-2393, USA
E-mail: mclark@mathematica-mpr.com

D. A. Jaeger (✉)
Department of Economics, College of William and Mary and IZA,
Williamsburg, VA 23185-8795, USA
E-mail: djaeger@wm.edu

Layard and Psacharopoulos 1974), a variety of authors (Hungerford and Solon 1987; Belman and Heywood 1991; Card and Krueger 1992; Jaeger and Page 1996) have presented evidence of relatively large sheepskin effects in the returns to education for high school and college graduation.

In this paper, we examine the returns to a high school equivalency credential, the General Education Development (GED) exam, using new information from the Current Population Survey (CPS). We examine the return to the GED for a population for whom it may play a particularly important signaling role—individuals who received their formal schooling outside of the US. If employers lack information about the quality or content of foreign schooling, the GED may provide a way for individuals to signal that they possess (otherwise unobservable) US-relevant skills.

Previous authors (Cameron and Heckman 1993; Cao et al. 1996) have argued that the labor market returns to the GED are small, casting doubt on the usefulness of the GED as a substitute for a traditional high school degree. We found, however, that the wages of GED recipients (both native and foreign-born) are substantially larger and statistically significantly different from those of high school dropouts. Moreover, we found that the wages of foreign-born, foreign-schooled GED recipients were substantially greater than the wages of individuals who received a traditional high school degree outside of the USA. This suggests that the GED, while relatively rare among the foreign-born, may be important in the assimilation of low-skilled migrants to the US labor market. Our results are consistent with the literature on the differences between foreign and domestic schooling in Israel. Friedberg (2000) found that the returns to education received abroad for most groups were lower than for persons schooled in Israel. Schoeni (1997) found that, in general, the returns to education for foreign-born men were higher if they received some of their education in the USA. Bratsberg and Ragan (2002) presented a similar finding that was robust to the inclusion of controls for proficiency in English and Armed Forces Qualification Test (AFQT) scores.

While it is difficult to attach a purely causal interpretation to our findings, they support the conclusions of Murnane et al. (2000) and Tyler et al. (2000, 2003) that the GED may play a significant signaling role in the labor market, at least for some groups. We also present evidence that the return to the GED increases during the life cycle. This result does not appear to be an artifact of differences between birth cohorts—when we limit our samples to men in their mid-twenties, we estimate returns to the GED that are quite similar to those estimated by Cameron and Heckman (1993) for men in the same age range but an earlier birth cohort.

In Section 2, we briefly discuss the role that the GED may play in the determination of wages. Section 3 describes our data and the available information on the GED in the CPS. In Section 4, we examine the prevalence of the GED among both natives and the foreign-born. In Section 5, we present our estimates of the return to the GED, and in Section 6, we compare our results to those of Cameron and Heckman (1993). In Section 7, we offer some conclusions.

2 The role of the GED

The role the GED plays in the labor market is potentially multifaceted. On the one hand, individuals who take the GED might acquire significant levels of human

capital in preparing for the exam. Most previous studies dismiss this possibility, citing the fact that the median amount of time spent preparing for the GED exam is quite low (only 30 h in 1989). Over 24% of test-takers spend more than 100 h preparing for the exam, however, and it is at least possible that they appreciably increase their skills in the process, leading to higher wages than they otherwise would have earned (Boesel et al. 1998). Human capital acquisition might be especially important for migrants whose formal schooling was earned outside the USA if they acquire US-specific skills (e.g., English-language proficiency) in the process. If so, we would expect the returns to the GED to be greater for the foreign-schooled than for natives.

On the other hand, the GED might act solely as a signal to employers of greater productivity if certain US-specific skills are difficult for employers to observe. To the extent that employers in the USA are unfamiliar with the types of high school degrees offered in foreign countries or with the quality of the schooling in those countries, we would expect the GED to have a larger credentialing effect for the foreign-schooled than for natives. Moreover, given this uncertainty, we would expect the GED to have a larger return than high school degrees earned elsewhere.

Ordinary least squares estimates of the returns to the GED may be biased, but the direction of the bias is indeterminate. The well-known omitted variable problem in estimating the return to education (Griliches 1977 and Willis 1986, among many others) may induce a correlation between wages and GED receipt that is due solely to unobserved factors such as motivation or ability and not to any causal effect of GED acquisition on earnings. The CPS lacks traditional proxies for "ability" such as test scores or parental education, and our results may suffer from omitted variable bias. However, the sign of this potential bias is unclear. Individuals who obtain a GED might simply be more motivated or possess higher (unmeasured) ability than high school dropouts. Alternatively, dropouts with greater ability might have less use for an additional credential like the GED than those with lower ability.

While we cannot determine the sign or extent of the potential selection bias in our ordinary least square (OLS) estimates, evidence from the previous literature on the return to the GED suggests that the bias may be small or even negative. For instance, the simple inclusion of test scores as a proxy for ability in previous studies (Cameron and Heckman 1993; Cao et al. 1996) did not greatly alter the finding that the GED had no significant effect on earnings. In contrast to these OLS results, studies that included more sophisticated controls for ability have generally found positive effects of the GED. Exploiting a natural experiment that utilized cross-state variation in GED passing thresholds, Tyler et al. (2000) found positive and significant effects of the GED on earnings. This suggests that our inability to control for ability might bias our estimates downward, if at all, and that any significant evidence of returns to the GED we find might in fact understate the true returns. Nonetheless, because of the potential for omitted variables bias and potential differences in the ways US natives and the foreign-born select into GED taking, we are hesitant to attach a causal interpretation to our findings.

3 Data

Prior to 1997, information on the GED in the CPS was only available in periodic supplements. Partially in response to the GED literature discussed above, however, the CPS began in 1997 to differentiate between high school graduates who received their credential via a traditional diploma and those who were certified via the GED. These data were included in the public-use CPS files beginning in 1998, along with a variety of other additions to the education questions (Jaeger 2003). Individuals who reported that their highest degree received was a "high school... diploma or equivalent (GED)" were asked whether they received this degree via graduation from high school or a "GED or other equivalent." GED recipients were also asked their highest level of education attained prior to receiving the GED.

Since those who completed a traditional high school diploma were not asked their highest grade completed, we assign 12th-grade completion to natives and foreign-born individuals who received a traditional high school degree in the USA. Following Betts and Lofstrom (2000), we assign either 10th-, 11th-, or 12th-grade completion to individuals born outside the USA who also completed secondary school outside of the USA based on the typical number of years taken to complete a high school degree in their country of birth.[1]

The CPS began collecting information on the country of birth and citizenship status of respondents in 1994. Combined with the new information on the GED, the CPS is the only data set we know of that permits an examination of the effects of the GED for the foreign-born. The CPS also permits the examination of returns to the GED for a wider age range than that examined in previous studies. We utilize this feature of the data, combined with results from Cameron and Heckman (1993), who used data from the National Longitudinal Survey of youth (NLSY), to examine changes over the life cycle in returns to the GED. Unlike the NLSY, however, the CPS only has information on the highest level of education an individual received, and we are unable to identify GED recipients among those who completed some college or more. This prevents us from exploring a separate set of interesting questions regarding the use of the GED as a "stepping stone" to postsecondary education (see Boesel et al. 1998 for an overview of the literature on postsecondary outcomes of GED recipients). An additional advantage of the new data from CPS is the large sample size—our sample is more than 20 times the size of those analyzed in most previous studies.

[1] Typical years to complete secondary school are taken from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) survey of national education systems. These data are available at http://www.uis.unesco.org/pagesen/DBSysCri.asp. We use the typical years required in 1990, although for nearly all countries, this remained unchanged from 1980. Some countries require 13 years of primary and secondary schooling (e.g., the UK) before conferring a secondary school degree. Because the years-of-schooling variable for GED recipients is top-coded at 12 years, we top-code the imputed years of education for the foreign-born, foreign-schooled secondary school recipients at 12 years as well. For the foreign-born, foreign-schooled, the top years of schooling category should therefore be interpreted as "12 or more."

Our data are drawn from 4 years of the CPS outgoing rotation groups from January 1998 through December 2001.[2] Our sample comprises individuals between the ages of 20 and 64 who received a high school degree (either traditional or GED) or less.[3] We restrict the sample of foreign-born individuals to those who entered the USA after the 1964 changes in immigration law that introduced the system of family reunification and employment visas that essentially prevails today. We also include only the foreign-born that we can firmly identify as having completed some schooling in the USA or completing all of their schooling abroad.[4]

4 The prevalence of GED receipt

Table 1 presents the distribution of high school dropouts, GED recipients, and traditional high school graduates in our data (these categories are defined to be mutually exclusive; data shown are proportions). Statistics for US native men and women are displayed in the top panel, foreign-born men and women who received some US schooling are in the middle panel, and foreign-born, foreign-schooled men and women are shown in the bottom panel. Within sex × race/ethnicity groups,

[2] The CPS is structured so that households are interviewed for 4 consecutive months, not interviewed for the next 8 months, and then interviewed for 4 more consecutive months. The CPS outgoing rotation groups comprise individuals in their fourth and eighth months of the survey. To avoid having a particular individual appear in our sample twice, we use only those who are in their fourth month of the survey, except for the first year, for which we take individuals who are in either their fourth or eighth month. Data were obtained from the Bureau of Labor Statistics (BLS)/Census web site at http://www.bls.census.gov/cps.

[3] We exclude individuals with more than a high school education; individuals younger than 20 or older than 64 at the time of the survey; foreign-born individuals who cannot be firmly classified as having some formal US schooling or as having only foreign formal schooling; foreign-born individuals who entered the USA prior to 1965; foreign-born individuals whose country of birth was not identified (i.e. "Other"); those living in Alaska or Hawaii; those whose ethnicity is American Indian, Aleut, or Eskimo; those born abroad to US parents or born in outlying areas; and those whose education was allocated. In addition, we exclude Canadians, as Canada also offers the GED and could confound our exploration of the returns to the GED as a postmigration credential. Because the remaining non-Mexican North American sample is extremely small (approximately 30 individuals, mostly from Bermuda) we drop them as well. Our regression samples also exclude individuals whose wages were less than $1 or greater than $200 per hour and individuals who reported that they were either self-employed or worked without pay in their main job.

[4] Because both low levels of schooling and the year of entry to the US are coded in brackets in the CPS, we are not able to identify precisely where some individuals completed their schooling. We use the year of entry and age to identify the minimum and maximum number of years the individual could have spent in the USA We also use the years-of-schooling variable to identify the minimum and maximum years of schooling that the individual could have received for the 1st–4th grade, 5th–6th grade, and 7th–8th grade categories. We code individuals as "foreign-born, foreign-schooled" (i.e., no formal US schooling) if (age—maximum years in US—6) is more than maximum years of schooling. Similarly, we code individuals as "foreign-born, some US schooling" if (age—minimum years in US—6) is less than the minimum years of schooling. We exclude from the sample individuals who were born abroad but who do not meet one of these criteria. Approximately 10% of the foreign-born fall into the "indeterminate" category, while approximately 16 percent fall into the "foreign-born, some US schooling" category, and the vast majority are categorized as "foreign-born, foreign-schooled."

Table 1 Distribution of educational attainment for individuals with a high school diploma or less

Education group	Men					Women				
	All	White non-Hispanic	Black non-Hispanic	Hispanic	Asian	All	White non-Hispanic	Black non-Hispanic	Hispanic	Asian
Natives										
Dropouts, no GED	0.234	0.209	0.295	0.381	0.160	0.217	0.182	0.303	0.390	0.183
Dropouts, with GED	0.088	0.091	0.069	0.101	0.067	0.078	0.079	0.064	0.096	0.044
Traditional high school diploma	0.678	0.700	0.636	0.519	0.773	0.706	0.739	0.632	0.514	0.773
GED share of dropouts	0.274	0.304	0.190	0.209	0.296	0.263	0.303	0.175	0.197	0.195
GED share of those with HS credentials	0.115	0.115	0.098	0.163	0.080	0.099	0.096	0.092	0.157	0.054
Share of natives	0.492	0.381	0.076	0.033	0.002	0.509	0.387	0.085	0.036	0.001
Sample size	94,158	76,841	11,583	5,476	258	100,213	79,434	14,483	6,043	253
Foreign-born, some US schooling										
Dropouts, no GED	0.366	0.247	0.248	0.424	0.189	0.343	0.217	0.215	405	0.188
Dropouts, with GED	0.044	0.046	0.073	0.040	0.046	0.039	0.044	0.035	0.039	0.036
Traditional high school diploma	0.591	0.707	0.679	0.536	0.765	0.618	0.739	0.750	0.556	0.776
GED share of dropouts	0.107	0.157	0.227	0.086	0.196	0.102	0.170	0.141	0.088	0.161
GED share of those with HS credentials	0.069	0.061	0.097	0.070	0.057	0.059	0.057	0.045	0.066	0.044
Share of foreign-born, some US schooling	0.551	0.062	0.041	0.388	0.060	0.449	0.053	0.035	0.309	0.051
Sample size	2,492	317	153	1,733	289	2,108	286	158	1,413	251

Table 1 (continued)

Education group	Men					Women				
	All	White non-Hispanic	Black non-Hispanic	Hispanic	Asian	All	White non-Hispanic	Black non-Hispanic	Hispanic	Asian
Foreign-born, foreign-schooled										
Dropouts, no GED	0.650	0.362	0.431	0.780	0.402	0.608	0.325	0.416	0.768	0.421
Dropouts, with GED	0.019	0.029	0.052	0.015	0.020	0.021	0.025	0.055	0.015	0.023
Traditional high school diploma	0.331	0.610	0.517	0.205	0.579	0.375	0.650	0.529	0.217	0.557
GED share of dropouts	0.028	0.073	0.108	0.019	0.047	0.033	0.072	0.116	0.020	0.051
GED share of those with HS credentials	0.054	0.045	0.092	0.070	0.033	0.052	0.037	0.094	0.066	0.039
Share of foreign-born, some US schooling	0.492	0.057	0.031	0.347	0.057	0.508	0.067	0.036	0.315	0.091
Sample size	11,402	1,498	708	7,803	1,393	10,500	1,787	882	7,343	2,187

Source: calculations using weighted CPS outgoing rotation groups from January 1998–December 2001
Data are displayed as proportions. See text for subsample definitions

the foreign-born, foreign-schooled are least likely to have attained a traditional high school diploma. Somewhat surprisingly, the foreign-born that received some US schooling are about as likely to have completed a traditional high school diploma as natives. Native dropouts, as a whole, are more than twice as likely as the foreign-born with some US schooling to earn a GED, and about eight times as likely as the foreign-born, foreign-schooled to get a GED.

There is substantial variation across race/ethnicity groups, however, in the incidence of the GED among dropouts. Foreign-born, foreign-schooled Hispanic dropouts are about seven times less likely than native Hispanic dropouts to earn a GED, while native black non-Hispanic dropouts are only about 1.5 times as likely as their foreign-born, foreign-schooled counterparts to earn a GED. Natives are most likely to have earned their high school credential via the GED, with roughly 10% of our sample doing so. Among the foreign-born, those who entered the USA at an age early enough to have completed some US schooling are generally more likely to have received a GED than those who entered after completing all of their formal schooling, although these differences tend to be relatively small.

The differences across race/ethnicity groups in the likelihood of receiving a GED are reflected in the distribution of educational attainment by region of national origin shown for the foreign-born in Table 2; because of the relatively small number of foreign-born GED recipients in our sample, we are not able use a finer level of geographic detail. For all region-of-birth groups, foreign-schooled dropouts are less likely to earn a GED than those who received some US education. However, there is substantial variation across regions. Africans are more likely to have a traditional high school diploma than other groups, and they are also more likely to have received a GED. Mexicans are the least likely to have a traditional high school diploma among the groups, and Mexican dropouts are the least likely to earn a GED in the USA. Mexicans with a high school credential, however, are as or more likely than most other groups to have earned that credential via the GED.

Migrants to the USA are likely to have a higher incidence of English-language ability than their nonmigrating country folk. Nevertheless, there appears to be a relationship between GED receipt and whether English is spoken in the country of birth of the foreign-born. Foreign-born, foreign-schooled dropouts who were born in English-speaking countries are substantially more likely to earn a GED than those who were born in non-English-speaking countries. The foreign-born, foreign-schooled from English-speaking countries are also more likely to earn their high school credential via the GED than those from non-English-speaking countries.[5] Among the foreign-born with some US schooling, the GED is as prevalent among those from non-English-speaking countries as those from English-speaking countries, but those GED recipients from English-speaking countries are a larger share of dropouts and a smaller share of high school credential holders.

[5] Note that, unlike the decennial Census, the CPS does not ask respondents about the language spoken in their home. Categories of the CPS country-of-birth variable for which English is the primary or official language are American Samoa, Australia, the Bahamas, Belize, the Caribbean, Dominica, Fiji, Ghana, Great Britain, England, Guyana, India, Ireland/Eire, Jamaica, New Zealand, Nigeria, Northern Ireland, Pakistan, the Philippines, Puerto Rico, Scotland, South Africa, and Trinidad and Tobago. Canada and Bermuda would also be classified as English-speaking countries, but, as noted above, we exclude non-Mexican North Americans from our samples.

Table 2 Distribution of educational attainment for the foreign-born with a high school diploma or less by region of birth

Country or region	Dropouts		Traditional HS diploma	GED share of		Share of group	Sample Size
	No GED	GED		Dropouts	HS credentials		
Foreign-born, some US schooling							
Mexico	0.467	0.037	0.496	0.073	0.069	0.492	2,163
Central America	0.305	0.042	0.653	0.120	0.060	0.227	1,055
South America	0.191	0.060	0.749	0.239	0.074	0.064	294
Europe	0.232	0.046	0.722	0.165	0.060	0.080	430
Asia	0.195	0.040	0.765	0.171	0.050	0.125	592
Africa	0.084	0.139	0.777	0.625	0.152	0.007	37
Oceania	0.121	0.131	0.748	0.520	0.149	0.005	29
English-speaking	0.169	0.048	0.783	0.222	0.058	0.101	420
Non-English-speaking	0.375	0.041	0.584	0.099	0.066	0.899	4,180
Sample size	1,604	197	2,799				4,600

Table 2 (continued)

Country or region	Dropouts		Traditional HS diploma	GED share of		Share of group	Sample Size
	No GED	GED		Dropouts	HS credentials		
Foreign-born, foreign-schooled							
Mexico	0.846	0.012	0.142	0.014	0.080	0.456	10,179
Central America	0.635	0.028	0.337	0.043	0.078	0.218	5,279
South America	0.359	0.032	0.609	0.082	0.050	0.062	1,502
Europe	0.310	0.034	0.655	0.100	0.050	0.079	2,136
Asia	0.411	0.018	0.571	0.042	0.031	0.166	4,057
Africa	0.246	0.050	0.704	0.170	0.067	0.014	347
Oceania	0.288	0.014	0.698	0.045	0.019	0.005	100
English-speaking	0.324	0.044	0.632	0.120	0.065	0.093	2,118
Non-English-speaking	0.675	0.018	0.307	0.026	0.055	0.907	21,482
Sample size	14,965	495	8,140				23,600

Source: calculations using weighted CPS outgoing rotation groups from January 1998–December 2001
Data are displayed as proportions. See text for subsample definitions. English-speaking countries include American Samoa, Australia, the Bahamas, Belize, the Caribbean, Dominica, Fiji, Ghana, Great Britain, England, Guyana, India, Ireland/Eire, Jamaica, New Zealand, Nigeria, Northern Ireland, Pakistan, the Philippines, Scotland, South Africa, and Trinidad and Tobago
Individuals born in Canada and North American countries other than Mexico are excluded from this sample

As shown in Table 3, recent entry cohorts are more likely to possess a traditional high school degree. Those with some US schooling are more likely than the foreign-born, foreign-schooled to have a traditional high school degree, although the percentage change across cohorts in this incidence is substantially larger among the foreign-born, foreign-schooled. This may be in part due to selective outmigration of the less skilled among earlier cohorts, although previous evidence is mixed (Betts and Lofstrom 2000). The incidence of GED receipt also declines across entry cohorts. This effect is partly due to the fact that earlier foreign-born cohorts have had a longer time in the US to earn a GED.

While the GED is considered a high school equivalency degree, the amount of formal schooling that GED recipients complete is typically somewhat less than the usual 12 years that it takes to complete a traditional high school degree. In Table 4, we present the distribution of formal educational attainment of GED recipients and dropouts among both natives and the foreign-born. Years of schooling are imputed from the categorical primary CPS education question using the scheme proposed by Jaeger (1997). The table shows that for all groups, GED recipients complete, on average, about 10 years of schooling. Compared to native GED recipients, however, both groups of foreign-born GED recipients (but especially the foreign-schooled) are more likely to report having completed 12 years without earning a diploma. This likely reflects the fact that in many countries, more than 12 years of schooling are required to earn a high school diploma. Foreign-born dropouts with some US schooling and without a GED complete about half a year more of schooling than their native counterparts, while the foreign-born, foreign-schooled dropouts complete substantially less schooling than either of the other groups.

Table 3 Distribution of educational attainment for the foreign-born with a high school diploma or less by cohort of entry to the USA

Entry cohort	Dropouts		Traditional HS diploma	GED share of		Share of group	Sample size
	No GED	GED		Dropouts	HS credentials		
Foreign-born, some US schooling							
1965–1979	0.354	0.057	0.588	0.139	0.089	0.428	1,917
1980–1989	0.374	0.035	0.592	0.085	0.055	0.420	1,936
1990–2001	0.311	0.021	0.669	0.062	0.030	0.151	747
Sample size	1,604	197	2,799				4,600
Foreign-born, foreign-schooled							
1965–1979	0.689	0.027	0.284	0.037	0.086	0.204	4,665
1980–1989	0.656	0.021	0.324	0.030	0.060	0.355	8,291
1990–2001	0.615	0.017	0.368	0.027	0.045	0.441	10,644
Sample size	14,965	495	8,140				23,600

Source: calculations using weighted CPS outgoing rotation groups from January 1998–December 2001

Data are displayed as proportions. See text for subsample definitions

Table 4 Highest grade completed by high school dropouts

Education level	Natives				Foreign-born, some US schooling				Foreign-born, foreign-schooled			
	Men		Women		Men		Women		Men		Women	
	No GED	GED	No GED	GED	No GED	GED	No GED	GED	No GED	GED	No GED	GED
Less than 1st grade	0.014	0.016	0.013	0.014	0.002	0.012	0.000	0.021	0.060	0.042	0.061	0.022
1st–4th grade	0.019	0.001	0.015	0.001	0.012	0.000	0.003	0.000	0.159	0.011	0.157	0.019
5th–6th grade	0.039	0.004	0.032	0.004	0.064	0.000	0.053	0.000	0.345	0.050	0.339	0.056
7th–8th grade	0.142	0.053	0.135	0.063	0.067	0.024	0.088	0.018	0.141	0.078	0.154	0.089
9th grade	0.142	0.110	0.141	0.127	0.133	0.051	0.150	0.070	0.131	0.101	0.128	0.080
10th grade	0.240	0.268	0.253	0.303	0.193	0.262	0.220	0.207	0.068	0.141	0.065	0.120
11th grade	0.290	0.392	0.308	0.372	0.276	0.363	0.292	0.336	0.047	0.149	0.044	0.197
12th grade, no diploma	0.114	0.155	0.102	0.117	0.252	0.288	0.195	0.347	0.050	0.428	0.051	0.417
Mean years of schooling	9.6	10.3	9.6	10.2	10.1	10.7	10.1	10.7	6.3	10.0	6.3	10.1
Sample size	21,253	8,371	20,749	7,866	895	106	709	91	7,473	234	7,492	261

Source: calculations using weighted CPS outgoing rotation groups from January–December 2001
Data are displayed as proportions. See text for subsample definitions. Years of schooling imputed following Jaeger (1997)

5 Returns to the GED

We turn now to our estimates of the wage returns to the GED. In Tables 5a (men) and b (women), we present results of OLS regressions of log hourly wages on schooling, estimated separately for natives, the foreign-born with some US schooling, and the foreign-born, foreign-schooled. To calculate hourly wages from the variety of ways that individuals can report their earnings in the outgoing rotation data, we follow the algorithm outlined in Polivka (1999), Table 7 (Appendix). Because dropping out, receiving a GED, or receiving a traditional high school diploma is very likely to be correlated with a variety of background characteristics that also affect earnings, we include a broad set of control variables in the regressions. In all regressions, we include a quadratic in potential labor market experience (measured as age–imputed years of schooling–6), a dummy variable for being married with the spouse present, nine dummy variables each for father's and mother's world region of birth (those shown in Table 2 plus a category for those reporting "Other"), a fourth-order polynomial in calendar time (measured in months from January 1998) to control for business cycle effects, dummy variables for each month of the year to address seasonal effects, and dummy variables for state of residence, noncentral city, and nonmetropolitan area residence. Where appropriate, we include race/ethnicity dummy variables for non-Hispanic black, Hispanic, and Asian. Regressions for the foreign-born groups also include dummy variables for US citizenship, having been born in an English-speaking country, world region of birth (as described above), and dummy variables for ten entry cohorts. Reported standard errors are heteroskedasticity-consistent and estimated via the bootstrap with 500 replications and never differ from those calculated by the Huber–White method by more than .001. Descriptive statistics of the dependent and independent variables for the regression samples of all natives and both foreign-born groups are shown in Tables 7a and b (Appendix) for men and women, respectively.

The top panels of Tables 5a and b presents results of regressions of log wages on a dummy variable indicating GED receipt, a dummy variable representing high school graduation, and the aforementioned covariates. The coefficients therefore represent the conditional mean of log wages of GED and traditional high school diploma recipients relative to that of high school dropouts. Both native men and native women with a GED earn approximately 8% less than their counterparts with a high school diploma; these differences are statistically significantly different from zero. The estimated traditional high school diploma–GED difference varies somewhat across race/ethnicity groups, with non-Hispanic blacks having the smallest difference for both men and women. Asians are included in the "all natives" columns, but we do not present a separate regression for them due to small sample sizes.

For the foreign-born, the pattern is generally reversed. The GED premium for foreign-born, foreign-schooled men is nearly twice as large as that for native men, while for women, this premium is about 50% larger. Moreover, because the high school premium is lower for the foreign-born, foreign-schooled than for natives, the traditional high school diploma–GED difference is negative for the foreign-born, foreign-schooled. This difference is statistically significant for foreign-born, foreign-schooled men at the 5% level but not at any conventional level for women. For the foreign-born with some US schooling, the high school diploma–GED

Table 5 Estimated return to a traditional high school diploma and GED receipt for men and women (heteroskedasticity-consistent standard errors in parentheses)

	Natives				Foreign-born	
	All	White non-Hispanic	Black non-Hispanic	Hispanic	Some US schooling	Foreign-schooled
a. Men						
Model 1: No years of schooling controls (reference group is high school dropouts)						
High school diploma	0.220 (0.005)	0.218 (0.006)	0.213 (0.014)	0.245 (0.016)	0.113 (0.023)	0.161 (0.013)
GED	0.139 (0.007)	0.139 (0.009)	0.146 (0.024)	0.125 (0.027)	0.167 (0.055)	0.247 (0.042)
High school diploma with GED	0.081 (0.007)	0.079 (0.008)	0.066 (0.021)	0.121 (0.025)	−0.054 (0.054)	−0.086 (0.042)
Adjusted R^2	0.205	0.184	0.147	0.222	0.179	0.191
Model 2: dummy variables for years of schooling (reference group is high school dropouts who completed 12 years of schooling)						
High school diploma	0.173 (0.011)	0.184 (0.013)	0.145 (0.027)	0.156 (0.032)	0.073 (0.034)	0.135 (0.021)
GED	0.131 (0.008)	0.133 (0.009)	0.142 (0.024)	0.096 (0.027)	0.143 (0.056)	0.231 (0.044)
High school diploma with GED	0.042 (0.011)	0.051 (0.014)	0.003 (0.031)	0.060 (0.034)	−0.070 (0.056)	−0.096 (0.042)
Adjusted R^2	0.207	0.186	0.148	0.232	0.193	0.193
Bootstrap test of equality across models, model 1–model 2 difference						
High school diploma	0.047 (0.009)	0.034 (0.011)	0.068 (0.023)	0.089 (0.028)	0.040 (0.026)	0.026 (0.016)
GED	0.008 (0.002)	0.007 (0.002)	0.005 (0.004)	0.029 (0.007)	0.024 (0.011)	0.016 (0.009)
High school diploma with GED	0.039 (0.009)	0.027 (0.011)	0.064 (0.022)	0.061 (0.025)	0.016 (0.027)	0.010 (0.008)
Sample size	63,763	52,632	7,020	3,937	1,945	8,862

Table 5 (continued)

	Natives				Foreign-born	
	All	White non-Hispanic	Black non-Hispanic	Hispanic	Some US schooling	Foreign-schooled
b. Women						
Model 1: No years of schooling controls (reference group is high school dropouts)						
High school diploma	0.235 (0.005)	0.238 (0.006)	0.202 (0.011)	0.272 (0.016)	0.195 (0.027)	0.183 (0.013)
GED	0.161 (0.008)	0.156 (0.009)	0.150 (0.21)	0.205 (0.025)	0.119 (0.059)	0.229 (0.041)
High school diploma with GED	0.075 (0.007)	0.083 (0.008)	0.051 (0.018)	0.066 (0.025)	0.077 (0.056)	−0.046 (0.042)
Adjusted R^2	0.140	0.123	0.149	0.187	0.199	0.167
Model 2: dummy variables for years of schooling (reference group is high school dropouts who completed 12 years of school)						
High school diploma	0.165 (0.012)	0.160 (0.015)	0.143 (0.024)	0.245 (0.035)	0.146 (0.047)	0.135 (0.018)
GED	0.158 (0.008)	0.154 (0.009)	0.153 (0.021)	0.196 (0.025)	0.098 (0.060)	0.199 (0.042)
High school diploma with GED	0.006 (0.014)	0.006 (0.015)	−0.010 (0.028)	0.049 (0.037)	0.048 (0.070)	−0.064 (0.42)
Adjusted R^2	0.142	0.125	0.150	0.189	0.204	0.168
Bootstrap test equality across models, model 1–model 2 difference						
High school diploma	0.071 (0.011)	0.079 (0.012)	0.058 (0.021)	0.027 (0.030)	0.049 (0.037)	0.048 (0.013)
GED	0.002 (0.001)	0.002 (0.001)	−0.003 (0.003)	0.010 (0.004)	0.021 (0.013)	0.030 (0.008)
High school diploma with GED	0.068 (0.011)	0.077 (0.013)	0.061 (0.021)	0.017 (0.030)	0.029 (0.033)	0.018 (007)
Sample size	58,572	46,787	8,147	3,481	1,223	5,774

Source: calculations using weighted CPS outgoing rotation groups from January 1998–December 2001

Dependent variable is log hourly wages. Estimated by ordinary least squares. Standard errors calculated using 500 bootstrap replications. Both models include a quadratic in potential experience, a quartic in calendar time, dummy variables for month of year, central city status, state of residence, married, and world region of parents' birth. Where appropriate, the models include dummy variables for race/ethnicity. Regressions for foreign-born include dummy variables for entry cohort, world region of birth, birth in English-speaking country, and US citizenship. Model 2 includes dummy variables for CPS categories of years of completed education. See text for subsample definitions

difference is negative for men and positive for women; however, neither difference is statistically distinguishable from zero.

As shown in Table 4, there is substantial variation across groups in the amount of formal schooling obtained by dropouts and GED recipients prior to receiving the GED. Because foreign-schooled dropouts have substantially less education than those who receive a GED, part of the difference in conditional mean wages between these groups may simply be due to differences in formal schooling levels. In the middle panels of Table 5a and b, we add dummy variables for all levels of the CPS completed education question (0, 1–4, 5–8, 9, 10, and 11) to the specification of the top panel. This specification is similar to that of Jaeger and Page (1996), where the coefficients on the indicators for GED receipt and high school diploma receipt can be interpreted as "sheepskin" effects. The bottom panel of Table 5 presents differences in the GED and high school coefficients between the two models and the difference in the high school diploma–GED difference between the two models. The standard errors on these differences are computed by drawing 500 replicates, estimating both models, calculating the difference between the coefficients (or difference in difference between coefficients) of interest between the two models, and then calculating the bootstrap standard error based on those replications. This procedure is akin to performing a Hausman–Wu test on the statistical difference between the two models and takes into account that we are estimating both models with the same data (i.e., that the estimates are not independent of one another). In this case, we test whether we can statistically distinguish between the estimated returns to the degree variables between the two models.

For natives, controlling for formal schooling still yields positive and statistically significant effects of receiving both the GED and a traditional high school diploma. The magnitude of the GED effect falls less than one percentage point for all groups except Hispanics, while the high school diploma effect falls by substantially more, both in levels and as a percentage of the high school diploma effect in model 1. Combined, these changes lead to a substantial decrease in the estimated high school diploma–GED difference for all native groups, particularly non-Hispanic blacks. For all native groups except Hispanic women, we can reject the null hypothesis that the estimated high school–GED difference is the same in both models. Moreover, when controlling for years of schooling, we cannot reject the null hypothesis that the returns to the GED and a traditional high school diploma are the same for all native groups except non-Hispanic white men.

For all four foreign-born groups, we also find that the estimated high school diploma premium fell when we added years of schooling to the model. The estimated GED premium also fell for all four groups, although not by as much as the high school diploma effect. The magnitude of the high school diploma–GED difference therefore decreased (i.e., got more negative or less positive) across models when we added the schooling dummy variables, but we cannot reject the hypothesis that the difference was the same across the models.

Taken as a whole, these results suggest that wages of GED recipients are closer to those of traditional high school degree recipients than to dropouts. They stand in contrast to the findings of Cameron and Heckman (1993) and Cao et al. (1996), who find no statistically significant sheepskin effects of the GED for men or women, respectively. Our results are closer to the findings of Tyler et al. (2000), who found positive and significant sheepskin effects for the GED of roughly

the same magnitude in log annual earning regressions after controlling for ability differences as measured by GED test scores.

While our results, particularly for the foreign-born, foreign-schooled, suggest that obtaining a GED may be a path toward higher earnings, there are also a variety of reasons to be cautious in our conclusions. As is usually the case with estimating the returns to education via OLS, omitted variables and/or measurement error may lead to bias in our estimates. This may be particularly true for the foreign-born, for whom there are a variety of unmeasured characteristics (in particular, English-language ability) that may be correlated both with earnings and with the propensity to receive a GED. As noted by Kane and Rouse (1999) and Kane et al. (1999), if completed years of schooling are measured with more error than degree completion, OLS estimates of "sheepskin" effects will overstate the true value of degree completion. It is also possible that, given global differences in educational systems, traditional high school completion is measured with more error than GED receipt for the foreign-born, foreign-schooled, which could induce the "inversion" we observed in the estimated relative returns.

6 Changes in the returns to the GED over the life cycle

Although our OLS estimation approach is similar to that of Cameron and Heckman (1993) and Cao et al. (1996), we find a positive and significant sheepskin effect for the GED, whereas these previous studies do not. There are several possible reasons why our results may differ, and an exploration of these differences may shed light on the returns to the GED over the life cycle for US natives.

Our sample consists of individuals aged 20–64, while those of the previous NLSY studies consisted of individuals under the age of 28. If we think that the effects of the GED might grow in significance over the life cycle, then the returns we estimate, which reflect the average effect of the GED for individuals between the ages of 20 and 64, should exceed the returns to the GED estimated in previous studies. Alternatively, the low returns to the GED observed in these previous studies may have been specific to the cohort that they examined, men who were 25 and 28 in 1982–1987. By comparing our results to those of Cameron and Heckman (1993), we can examine how the returns to the GED have changed for the cohort examined by Cameron and Heckman because this cohort has aged.

In Table 6, we present estimates from models similar to those estimated by Cameron and Heckman (1993) using the NLSY of the effects of GED and high school diploma receipt. In the top panel, we include dummy variables for race/Hispanic origin and the year in which the survey was fielded; in the bottom panel, we add dummy variables for years of education completed. The first two columns present results for men who were 25 years old at the time of the survey, and the next two columns present results for those who were 28 at the time of the survey (1998–2001 for our results in the CPS and 1982–1987 for the results of Cameron and Heckman from the NLSY). The results in the top panel are taken from the first column of Table 9 of Cameron and Heckman, and those in the bottom panel are taken from their Table 15. Standard errors for their results are those implied by their reported coefficients and *t* ratios. Note that our samples comprise only native men with a high school education or less, while the samples of Cameron and Heckman consist of men with all levels of education. Our results should be roughly

Table 6 Estimated return to a traditional high school diploma and GED receipt: comparison of Clark and Jaeger (CPS) with Cameron and Heckman (1993) (NLSY) estimates (heteroskedasticity-consistent standard errors in parentheses)

	25-year-old men		28-year-old men		CPS estimates for NLSY cohorts	
	CPS (1998–2001)	NLSY (1982–1987)	CPS (1998–2001)	NLSY (1982–1987)	Men who were 25 in 1982–1987	Men who were 28 in 1982–1987
Model 1: no control for years of schooling (reference group is high school dropouts)						
High school diploma	0.163 (0.034)	0.144 (0.022)	0.171 (0.033)	0.174 (0.037)	0.248 (0.009)	0.277 (0.010)
GED	0.065 (0.056)	0.060 (0.040)	0.004 (0.047)	0.062 (0.062)	0.180 (0.016)	0.208 (0.016)
High school diploma with GED	0.097 (0.048)	0.048 (0.036)	0.167 (0.039)	0.112 (0.054)	0.068 (0.014)	0.068 (0.014)
Model 2: control for years of schooling (reference group is high school dropouts)						
Years of schooling	0.015 (0.016)	0.057 (0.011)	0.020 (0.015)	0.034 (0.014)	0.020 (0.003)	0.019 (0.003)
High school diploma	0.136 (0.048)	−0.009 (0.030)	0.136 (0.046)	0.080 (0.057)	0.197 (0.012)	0.224 (0.013)
GED	0.065 (0.055)	−0.016 (0.023)	−0.002 (0.049)	0.015 (0.038)	0.163 (0.016)	0.187 (0.016)
High school diploma with GED	0.071 (0.056)	0.007 (0.011)	0.138 (0.042)	0.065 (0.052)	0.034 (0.015)	0.037 (0.015)
Sample size	1,435	2,308	1,550	1,016	20,689	19,445

Sources: Clark and Jaeger, calculations using weighted CPS outgoing rotation groups from Jan. 1998–Dec. 2001 and Cameron and Heckman (1993) calculations from National Longitudinal Survey of Youth, 1982–1987

Dependent variable is log hourly wages. Estimated by ordinary least squares. All models include dummy variables for race, Hispanic origin, and year of survey. Standard errors calculated using the Huber–White method

comparable, however, because Cameron and Heckman include variables for levels of education greater than 12 years.

In the top panel, our results and those from Cameron and Heckman (1993) are remarkably similar, particularly for 25-year-olds. Both the NLSY and CPS show that there is a positive, but not statistically significant, return to the GED and a statistically significant return to a traditional high school diploma. The estimated high school diploma–GED difference is somewhat bigger in our samples than in the samples of Cameron and Heckman, but the results are roughly comparable.

When we control for years of schooling in the bottom panel, our results diverge somewhat from the results of Cameron and Heckman (1993). Our estimated return to years of schooling is smaller than the estimated return to years of schooling of Cameron and Heckman, and the estimated GED and high school diploma premia also drop by less when we add the years of schooling measure. In neither sample can Cameron and Heckman reject the null hypothesis that the diploma effects for high school and the GED are the same, while for 28-year-olds we find a positive and statistically significant difference between the high school diploma and GED premia. Here, the differences in samples may be in part responsible for the differences in results. The years of schooling variable in the model of Cameron and Heckman reflects not only variation among high school diploma and GED recipients but also among those with a college education. If the marginal return to an additional year of college or postgraduate study is greater than the marginal return to a year of primary or secondary school, then we would expect the estimated return in the sample of Cameron and Heckman (the average return across all years of schooling, conditional on degree receipt) to be greater than the estimated return in our sample (the average return across all years of primary and secondary school, conditional on degree receipt). However, like the results of Cameron and Heckman, our results suggest that, for both 25- and 28-year-olds, the GED premium over dropping out is statistically indistinguishable from zero.

The last two columns of Table 6 show estimates of the same model for the birth cohorts that Cameron and Heckman (1993) examined, i.e., men who were 25 or 28 years old in 1982–1987. Comparing these two models essentially allows us to see how the return to the GED has changed as this particular cohort has aged, so we are able to measure the age effect as distinct from the cohort effect. For both groups, we find substantially higher returns to the GED and high school diploma receipt than Cameron and Heckman, with the returns to the GED recipients falling more than halfway between those for dropouts and high school graduates. Because the returns to the GED grew faster than those for the high school diploma, our results for these cohorts suggest that GED recipients do "catch up" somewhat to those with a high school diploma over time. These findings hold when we control for years of schooling as well; we find statistically significant degree effects for GED receipt and a decrease in the high school diploma–GED difference over the roughly 15 years between the estimates of Cameron and Heckman and ours. Our results are consistent with those of Tyler (2004), who finds that individuals who pass the GED have faster wage growth than individuals who attempt the GED test but fail. Tyler's findings are robust to a variety of controls for unobserved heterogeneity. Tyler et al. (2000), among others, have also documented that the benefits of the GED may take some time to become apparent. Taken together, these results suggest that there may be substantial benefits to holding a GED that are not manifested early in the life cycle.

7 Conclusion

We conclude from our results that, while the GED may not yield wages that are equivalent to those of traditional high school graduates among US natives, GED recipients do appear to earn more than observationally similar dropouts. For the foreign-born who received some schooling in the USA, returns to the GED are not statistically different from the returns to a traditional high school diploma (presumably earned in the USA). For foreign-born men and women who received their formal schooling outside of the USA, holding a GED—a recognized US credential—seems to lead to substantially higher wages than a traditional high school diploma earned outside the USA, and for men, these results are statistically significant. Our results are robust to controlling for years of schooling, indicating that a fair portion of the return to the GED and a traditional high school diploma may be due to sheepskin effects. While Tyler et al. (2000), exploiting a natural experiment that allows them to control for unobserved differences between dropouts and GED recipients, present similar findings, we are cautious about attaching a purely causal interpretation to our results.

The inclusion of a broader age range in our samples appears to explain the differences between our estimates and those of Cameron and Heckman (1993) and Cao et al. (1996). We find that the returns to the GED appear to increase with age. When examining the same cohorts as Cameron and Heckman (1993) (who found little evidence of significant returns to the GED) 11–19 years after the data used in their study, we find large and statistically significant returns to the GED. While GED recipients' wages are not equivalent to those of traditional high school degree recipients later in life, neither are their wages the same as high school dropouts. We find that this is true even when we control for years of completed schooling.

Whether our results represent the presence of signaling in the labor market for low-skilled workers is, of course, open to debate. We find it plausible, however, that firms would take a US-specific credential like the GED as a greater signal of productivity in the US labor market than a traditional high school degree earned elsewhere. Alternatively, it is possible that some individuals, and the foreign-born in particular, may accumulate significant levels of US-relevant human capital in preparing for the GED. Given that we are unable to control for unobserved ability in our analysis, it is possible that our results may be biased due to omitted variables. In particular, the foreign-born who opt to obtain a GED may possess greater unobserved ability than those who obtained a traditional high school diploma in their country of origin. Further progress on these issues for the foreign-born will require additional data on the ability of individuals (e.g., test scores and English-language skills), the qualities of schools that they attended, and greater detail on the timing of their migration and postmigration schooling decisions.

Acknowledgement The authors thank Darren Lubotsky, Anne Polivka, Bob Schoeni, Leslie Stratton, John Tyler, Diane Whitmore, participants of the labor lunch at Princeton University and seminars at the College of William and Mary, Hunter College, and IZA, as well as two anonymous referees for helpful comments. Both authors thank the Industrial Relations Section at Princeton University for financial support while they worked on this paper.

Appendix

Table 7 Descriptive statistics for regression samples for men and women

Variable	Natives		Foreign-born			
			Some US schooling		Foreign-schooled	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
a. Men						
Wages						
Log (wage)	2.5076	0.4790	2.2827	0.4494	2.2116	0.4443
Wage	13.7920	7.3852	10.9544	6.2702	10.2023	5.9663
Education						
GED	0.0870	0.2818	0.0449	0.2071	0.0211	0.1436
High school diploma	0.7221	0.4479	0.5941	0.4911	0.3024	0.4593
Less than 1st grade	0.0022	0.0470	0.0017	0.0416	0.0372	0.1893
1st–4th grade	0.0020	0.0445	0.0048	0.0688	0.1045	0.3060
5th–6th grade	0.0057	0.0752	0.0202	0.1407	0.2404	0.4273
7th–8th grade	0.0257	0.1582	0.0258	0.1585	0.0949	0.2930
9th grade	0.0350	0.1838	0.0487	0.2153	0.0975	0.2966
10th grade	0.0710	0.2568	0.0886	0.2842	0.0760	0.2649
11th grade	0.0964	0.2952	0.1098	0.3126	0.751	0.2635
12th grade	0.7620	0.4258	0.7004	0.4581	0.2745	0.4462
Race						
White non-Hispanic	0.7862	0.4100	0.0945	0.2926	0.0952	0.2935
Black non-Hispanic	0.1398	0.3467	0.0666	0.2494	0.0627	0.2424
Hispanic	0.0712	0.2571	0.7373	0.4401	0.7399	0.4387
Asian	0.0029	0.0538	0.1016	0.3021	0.1022	0.3029
Potential experience	21.2382	11.6416	10.7819	6.3048	24.1657	11.0894
Potential experience^2/100	5.8659	5.4937	1.5600	1.6680	7.0696	6.0180
US citizen	–	–	0.3257	0.4686	0.1963	0.3972
Married, spouse present	0.5863	0.4925	0.4840	0.4997	0.6173	0.4860
Geography						
Central city	0.1884	0.3910	0.4295	0.4950	0.4585	0.4983
Metropolitan, noncentral city	0.3996	0.4898	0.4299	0.4951	0.3962	0.4891
Nonmetropolitan area	0.2541	0.4353	0.0574	0.2326	0.0675	0.2509
Mother's country of birth						
USA and territories	0.9597	0.1967	–	–	–	–
Europe	0.0137	0.1162	0.0717	0.2580	0.0635	0.2439
Asia	0.0022	0.0468	0.1091	0.3118	0.1152	0.3192
Africa	0.0004	0.0210	0.0079	0.0888	0.0167	0.1280
Oceania	0.0010	0.0323	0.0055	0.0741	0.0044	0.0662
Mexico	0.0146	0.1200	0.5356	0.4987	0.5462	0.4979
Central America	0.0042	0.0646	0.2192	0.4137	0.2046	0.4034

Table 7 (continued)

Variable	Natives		Foreign-born			
			Some US schooling		Foreign-schooled	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
South America	0.0011	0.0325	0.0542	0.2265	0.0535	0.2251
Canada, other N.A.	0.0034	0.0581	–	–	0.0001	0.0100
Other, not specified	0.0007	0.0271	0.0022	0.0472	0.0002	0.0139
Father's country of birth						
USA and territories	0.9578	0.2010	–	–	–	–
Europe	0.0147	0.1202	0.0722	0.2589	0.0652	0.2469
Asia	0.0022	0.0472	0.1131	0.3167	0.1154	0.3195
Africa	0.0002	0.0156	0.0045	0.0666	0.0126	0.1115
Oceania	0.0001	0.0112	0.0033	0.0573	0.0040	0.0634
Mexico	0.0163	0.1265	0.5337	0.4989	0.5431	0.4981
Central America	0.0038	0.0616	0.2161	0.4116	0.2061	0.4045
South America	0.0010	0.0319	0.0557	0.2294	0.0533	0.2246
Canada, other N.A.	0.0029	0.0539	–	–	0.0001	0.0108
Other, not specified	0.0009	0.0297	0.0014	0.0375	0.0002	0.0139
Country of birth						
USA	1.0000	0.0000	–	–	–	–
Europe	–	–	0.0702	0.2554	0.0620	0.2412
Asia	–	–	0.1084	0.3109	0.1149	0.3189
Africa	–	–	0.0050	0.0705	0.0130	0.1132
Oceania	–	–	0.0041	0.0641	0.0042	0.0647
Mexico	–	–	0.5376	0.4986	0.5490	0.4976
Central America	–	–	0.2159	0.4114	0.2028	0.4021
South America	–	–	0.0588	0.2353	0.0541	0.2263
English-speaking	1.0000	0.0000	0.0821	0.2745	0.0712	0.2571
Entry cohort						
1965–1969	–	–	0.0902	0.2865	0.0227	0.1490
1970–1974	–	–	0.1235	0.3290	0.0563	0.2305
1975–1979	–	–	0.1731	0.3783	0.0887	0.2844
1980–1981	–	–	0.1235	0.3290	0.0707	0.2563
1982–1983	–	–	0.0707	0.2564	0.0467	0.2110
1984–1985	–	–	0.0857	0.2799	0.0716	0.2578
1986–1987	–	–	0.0666	0.2493	0.0668	0.2496
1988–1989	–	–	0.0965	0.2953	0.1054	0.3071
1990–1991	–	–	0.0728	0.2599	0.0953	0.2936
1992–1993	–	–	0.0471	0.2119	0.0822	0.2747
1994–1995	–	–	0.0276	0.1637	0.1025	0.3034
1996–2001	–	–	0.0227	0.1489	0.1909	0.3930
Sample size	94,158		2,492		11,402	

Table 7 (continued)

Variable	Natives		Foreign-born			
			Some US schooling		Foreign-schooled	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
b. Women						
Wages						
Log (wage)	2.2420	0.4378	2.1214	0.4057	2.0304	0.4037
Wage	10.4183	5.6502	9.0913	4.1803	8.3254	4.4216
Education						
GED	0.0765	0.2658	0.0418	0.2002	0.0277	0.1640
High school diploma	0.7702	0.4207	0.6761	0.4680	0.3976	0.4894
Less than 1st grade	0.0019	0.0437	0.0008	0.0275	0.0252	0.1568
1st–4th grade	0.0010	0.0321	0.0011	0.0330	0.0883	0.2838
5th–6th grade	0.0037	0.0608	0.0133	0.1147	0.1940	0.3954
7th–8th grade	0.0188	0.1358	0.0237	0.1521	0.0951	0.2934
9th grade	0.0289	0.1676	0.0514	0.2209	0.0760	0.2650
10th grade	0.0632	0.2433	0.0673	0.2506	0.1092	0.3119
11th grade	0.0840	0.2773	0.0948	0.2930	0.0944	0.2924
12th grade	0.7984	0.4012	0.7476	0.4344	0.3177	0.4656
Race						
White non-Hispanic	0.7646	0.4243	0.1106	0.3136	0.1225	0.3278
Black non-Hispanic	0.1641	0.3704	0.0878	0.2831	0.0954	0.2938
Hispanic	0.0683	0.2522	0.6864	0.4640	0.5980	0.4903
Asian	0.0030	0.0547	0.1152	0.3192	0.1841	0.3875
Potential experience	22.8360	11.6549	11.6357	6.5490	26.6707	10.6546
Potential experience^2/100	6.5732	5.5944	1.7828	1.7922	8.2485	5.9636
US citizen	–	–	0.4236	0.4941	0.3006	0.4585
Married, spouse present	0.5583	0.4966	0.5062	0.5000	0.6009	0.4897
Geography						
Central city	0.2044	0.4033	0.4106	0.4919	0.4453	0.4970
Metropolitan, noncentral city	0.4012	0.4901	0.4507	0.4976	0.4231	0.4941
Nonmetropolitan area	0.2372	0.4253	0.0540	0.2260	0.0505	0.2190
Mother's country of birth						
USA and territories	0.9611	0.1934	–	–	–	–
Europe	0.0150	0.1216	0.0813	0.2733	0.0849	0.2788
Asia	0.0021	0.0462	0.1177	0.3222	0.1930	0.3947
Africa	0.0004	0.0195	0.0135	0.1152	0.0188	0.1359
Oceania	0.0011	0.0332	0.0083	0.0910	0.0052	0.0721
Mexico	0.0133	0.1145	0.4569	0.4981	0.3485	0.4765
Central America	0.0031	0.0557	0.2536	0.4351	0.2697	0.4438
South America	0.0007	0.0270	0.0750	0.2634	0.0846	0.2783
Canada, other N.A.	0.0035	0.0593	–	–	0.0001	0.0120
Other, not specified	0.0007	0.0272	0.0020	0.0452	0.0002	0.0154

Table 7 (continued)

Variable	Natives		Foreign-born			
			Some US schooling		Foreign-schooled	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Father's country of birth						
USA and territories	0.9601	0.1956	0.0000	0.0000	0.0000	0.0000
Europe	0.0153	0.1228	0.0821	0.2746	0.0852	0.2792
Asia	0.0018	0.0425	0.1182	0.3228	0.1940	0.3954
Africa	0.0001	0.0098	0.0069	0.0829	0.0136	0.1159
Oceania	0.0001	0.0112	0.0063	0.0791	0.0047	0.0686
Mexico	0.0142	0.1184	0.4566	0.4981	0.3462	0.4758
Central America	0.0032	0.0566	0.2530	0.4347	0.2706	0.4443
South America	0.0008	0.0290	0.0740	0.2618	0.0841	0.2775
Canada, other N.A.	0.0032	0.0565	0.0008	0.0277	0.0006	0.0247
Other, not specified	0.0011	0.0324	0.0020	0.0452	0.0010	0.0312
Country of birth						
USA	1.0000	0.0000	–	–	–	–
Europe	–	–	0.0790	0.2697	0.0853	0.2793
Asia	–	–	0.1173	0.3217	0.1921	0.3940
Africa	–	–	0.0090	0.0945	0.0134	0.1150
Oceania	–	–	0.0055	0.0742	0.0050	0.0708
Mexico	–	–	0.4589	0.4983	0.3494	0.4768
South America	–	–	0.0789	0.2695	0.0846	0.2783
English-speaking	1.0000	0.0000	0.1077	0.3101	0.1215	0.3267
Entry cohort						
1965–1969	–	–	0.1040	0.3052	0.0344	0.1823
1970–1974	–	–	0.1679	0.3738	0.0698	0.2548
1975–1979	–	–	0.1944	0.3957	0.1030	0.3040
1980–1981	–	–	0.1409	0.3479	0.0868	0.2815
1982–1983	–	–	0.0640	0.2448	0.0526	0.2231
1984–1985	–	–	0.0686	0.2527	0.0731	0.2604
1986–1987	–	–	0.0718	0.2582	0.0705	0.2560
1988–1989	–	–	0.0617	0.2407	0.0989	0.2985
1990–1991	–	–	0.0555	0.2290	0.0975	0.2966
1992–1993	–	–	0.0345	0.1826	0.0852	0.2792
1994–1995	–	–	0.0192	0.1372	0.0842	0.2777
1996–2001	–	–	0.0175	0.1310	0.1440	0.3511
Sample size	100,213		2,108		12,198	

Source: calculations using weighted CPS outgoing rotation groups from January 1998–December 2001

Regressions also include a quartic in calendar time from January 1998, month-of-year dummy variables, and state-of-residence dummy variables

References

Belman D, Heywood JS (1991) Sheepskin effects in the returns to education: an examination of women and minorities. Rev Econ Stat 73(4):720–724

Betts JR, Lofstrom M (2000) The educational attainment of immigrants: trends and implications. In: Borjas GJ (ed) Issues in the economics of immigration. University of Chicago Press, Chicago, pp 51–115

Boesel D, Alsalam N, Smith TM (1998) Educational and labor market performance of GED recipients. National Library of Education, Office of Educational Research and Improvement, US Department of Education, Washington, DC

Bratsberg B, Ragan JF Jr (2002) The impact of host-country schooling on earnings—a study of male immigrants in the United States. J Hum Resour 37(1):63–105

Cameron SV, Heckman JJ (1993) The nonequivalence of high school equivalents. J Labor Econ 11(1):1–47

Cao J, Stromsdorfer EW, Weeks G (1996) The human capital effect of general education development certificates on low income women. J Hum Resour 31(1):206–228

Card D, Krueger AB (1992) Does school quality matter? Returns to education and the characteristics of public schools in the United States. J Polit Econ 100(1):1–40

Chiswick B (1973) Schooling, screening and income. In: Solmon L, Taubman P (eds) Does college matter? Some evidence on the impact of higher education. Academic, New York, pp 151–159

Friedberg RM (2000) You can't take it with you? Immigrant assimilation and the portability of human capital. J Labor Econ 18(2):221–251

Griliches Z (1977) Estimating the returns to schooling: some econometric problems. Econometrica 45(1):1–22

Hungerford T, Solon G (1987) Sheepskin effects in the returns to education. Rev Econ Stat 69 (1):175–177

Jaeger DA (1997) Reconciling the old and new census bureau education questions: recommendations for researchers. J Bus Econ Stat 15(3):300–309

Jaeger DA (2003) Estimating the returns to education using the newest current population survey education questions. Econ Lett 78(3):385–394

Jaeger DA, Page ME (1996) Degrees matter: new evidence on sheepskin effects in the returns to education. Rev Econ Stat 78(4):733–740

Kane TJ, Rouse CE (1999) The community college: educating students at the margin between college and work. J Econ Perspect 13(1):63–84

Kane TJ, Rouse CE, Staiger D (1999) Estimating returns to schooling when schooling is misreported. Industrial Relations Section Working Paper No. 419. Princeton University, Princeton

Layard R, Psacharopoulos G (1974) The screening hypothesis and the returns to education. J Polit Econ 82(5):985–998

Murnane RJ, Willett JB, Tyler JH (2000) Who benefits from obtaining a GED? Evidence from high school and beyond. Rev Econ Stat 82(1):23–37

Polivka AE (1999) Using earnings data from the current population survey after the redesign. Mimeo. Bureau of Labor Statistics, Washington, DC

Schoeni RF (1997) New evidence on the economic progress of foreign-born men in the 1970s and 1980s. J Hum Resour 32(4):683–740

Spence M (1973) Job market signaling. Q J Econ 87(3):355–374

Tyler JH (2004) Does the GED improve earnings? Estimates from a sample of both successful and unsuccessful GED candidates. Ind Labor Relat Rev 57(4):579–598

Tyler JH, Murnane RJ, Willett JB (2000) Estimating the labor market signaling value of the GED. Q J Econ 115(2):431–468

Tyler JH, Murnane RJ, Willett JB (2003) Who benefits from a GED? Evidence for females from high school and beyond. Econ Educ Rev 22(3):237–247

Willis RJ (1986) Wage determinants: a survey and reinterpretation of human capital earnings functions. In: Ashenfelter OC, Layard R (eds) Handbook of labor economics, vol 1. North-Holland, Amsterdam, pp 525–602