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The education and wages of immigrant children: the impact of age at arrival

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Abstract

Foreign-born children can attend American schools, but various immigration-related factors, such as language, and social acculturation, affect educational attainment. Age at arrival proxies for many of these factors, but the relationship between age at arrival and education is not empirically known for the nation's immigrant children. Age at arrival also affects the percentage of total schooling attained in the US, and therefore immigrants with more US schooling will earn more if the returns to US schooling are greater than the returns to foreign schooling, holding total education constant. In addition, this study asks whether families with young children should be admitted prior to the start of the first grade so that immigrant children can attend American primary and secondary schools. Only for Mexican and Latin American immigrants is it the case that the benefit outweighs the costs of 12 years of primary and secondary education.

JEL classification: I20; J31; J61

Keywords: Educational economics; Rate of return; Salary wage differentials; Human capital

1. Introduction

The continued entry of legal and illegal immigrants has significantly increased the number of foreign-born children attending American schools. The change in student demographics throughout the country has generated interest on the education of immigrant children, including such issues like fiscal concerns, academic, and social assimilation (Executive Office of the Governor and Florida Advisory Council on Intergovernmental Relations, 1994; Gandara, 1995; Kao & Tienda, 1995; Vernez, Abrahamse, & Quigley, 1996).

Since most recent immigrants come from developing countries in Asia and Latin America, children that enter the US at a young age will have a relative advantage in the classroom over immigrants who arrive at an older age. While older-arriving children need to adjust to the curriculum, language, and culture of the US, immigrant children that arrive at younger ages would be expected to have lower adjustment costs, and develop educational aspirations more in line with US-born students. Furthermore, if success in American schools depends on the transferability of the country-of-origin education, then immigrants from significantly different education systems will face increasing difficulty the later they arrive in the US. As a consequence, it is possible that immigrants that arrive at a relatively young age complete more years of education, and have a greater percentage of American-specific education than older-at-arrival immigrants.

Although Borjas (1995), Friedberg (1993), and Schoeni, McCarthy, and Vernez (1996) address the effect of age at arrival on the labor-market assimilation of immigrants, the economic literature lacks a thorough analysis

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of the impact of age at arrival on the educational attainment of immigrant children in the US.[1] Another strand of the immigrant-earnings literature considers how country-specific education affects immigrant earnings in the receiving country (Bratsberg & Terrell, 1994; Schoeni, 1997; Friedberg, 2000; Schaafsma & Sweetman, 2001). This study extends these two strands by examining the impact of age at arrival on educational attainment of US-raised immigrants, and the returns to domestic and foreign education. In addition, the study asks if it is reasonable, from a cost−benefit point of view, to encourage the migration of families with young children so that these children complete their primary and secondary education in American schools.

2. Data and average effect of age at arrival on years of schooling

The data for this study comes from the 1990 and 1980 5% US Census PUMS files. The sample consists of immigrants and a 20% random draw of native men 25–64 years old, not enrolled in school, employed in the private sector who worked at least some time during the year previous to the census and with wages between $1–$200 (in 1980 dollars). To reduce any bias introduced by immigrants admitted under a student visa, the sample is limited to those that arrived before the age of 19.[2] In addition, the sample includes only natives and immigrants who identified their ancestry as one of the following: Asian and Pacific Islander; African and Middle Eastern; European; Latin American; or Mexican. However, persons in group quarters, with allocated data for year of migration, income, or years of schooling, are excluded from the analysis. The sample consists of 54,573 immigrants and 479,789 US-born natives.

Table 1 presents the mean of completed years of education of immigrants disaggregated by ancestry and age at arrival, where age at arrival is defined as the difference between age and the midpoint of the years-since-migration interval.[3] Pooling the sample shows that immigrants who arrive at earlier ages attain more education than immigrants arriving at older ages. For example, immigrants who arrived before the age of 6 average slightly more than 13 years of schooling, while those that arrived in their late-teenage years (ages 15–18) average approximately 10 years of schooling. In general the greatest adverse effect of age at arrival occurs after the age at arrival of 11.

Separating immigrants by ancestry reveals important differences. In particular, Mexican immigrants exhibit the most pronounced effect from age at arrival. Although none of the age at arrival cohorts average a high school diploma, delayed entry puts Mexicans at a further disadvantage. For example, compared to the earliest age-at-arrival cohort, those arriving as 9–11 year-olds average about 1.5 fewer years less education. The low levels of education for the 12–14 and 15–18 entry-age cohorts of Mexican immigrants resemble the education profile of the general Mexican immigrant population, which averages about 8 years of schooling (Borjas, 1996; Gonzalez, 2002). In addition to Mexican immigrants, Latin Americans (not including Mexicans), and European immigrants also exhibit falling education levels with older entry age.

The immigrants with the highest average level of education are those of Asian and Pacific Islander, and African and Middle Eastern descent. Averaging over 14 years of education, these immigrants do not exhibit any particular relationship between years of school and age at arrival.

3. The impact of age at arrival

3.1. Completed years of school

While Table 1 shows some of the broad conclusions regarding age at arrival's effect on educational attainment, it is worthwhile to carry out a formal regression analysis of this relationship. The predicted values below capture the relationship between age at arrival and education based on regressions that control for ancestry, year of arrival, and the secular increase in education. Pooling natives and immigrants from both census years, the empirical specification is

$$ED_i = c_i + M_i\theta + y_i\alpha + C_i\beta + A_i\delta + \pi_i\gamma + \varepsilon_i, \quad (1)$$

where ED_i is the number of completed school years for person i (immigrants and natives), c is a constant term, M consists of a vector of age-at-arrival dummy variables for immigrants plus a dummy variable for natives, y and C are vectors of dummy variables indicating years in the

[1] Allensworth (1997), Carliner (1996) and Schoeni (1997) briefly examine the relationship between age at arrival and education. Jones (1987) and Schaafsma and Sweetman (2001) study the effect of age at arrival on Canadian immigrants.

[2] Since immigrants that attend only American colleges are likely to be self-selected and are not a random sample of immigrants, including such immigrants would bias the results. For example, Agarwal and Winkler (1985) show that 51% of foreign students that complete doctorate degrees from American universities remain in the country.

[3] In both Census years, years of completed education are defined as: 0=less than first grade; 2.5=first to fourth grade; 6.5=fifth to eight grade; 9=the ninth grade; 10=tenth grade; 11=eleventh or twelfth grade without a diploma; 12=high school diploma; 13=some college, no degree; 14=associate or technical degree; 16=BA degree; 17=MA degree; 20=professional or Ph.D. degree.

Table 1
Average completed years of school, by age at arrival and census year

		Age at arrival				
	All	1–5	6–8	9–11	12–14	15–18
All						
1980	11.74	13.17	13.24	12.72	11.57	10.65
	(3.96)	(2.68)	(2.86)	(3.37)	(3.88)	(4.40)
1990	11.24	13.29	12.92	12.46	11.03	9.89
	(4.35)	(2.74)	(3.12)	(3.50)	(4.30)	(4.76)
Mexican						
1980	8.50	11.60	11.02	9.94	8.41	7.47
	(3.93)	(3.32)	(3.29)	(3.76)	(3.79)	(3.69)
1990	8.09	11.48	10.61	9.95	8.07	7.06
	(4.17)	(3.10)	(3.52)	(3.85)	(4.08)	(3.97)
Latin American						
1980	12.41	13.02	13.18	13.38	12.72	11.91
	(3.21)	(2.43)	(2.93)	(2.91)	(2.80)	(3.46)
1990	12.10	13.33	13.05	12.83	12.39	11.09
	(3.47)	(2.63)	(2.51)	(2.79)	(3.09)	(3.95)
Asian, Pacific Islander						
1980	14.31	14.31	14.16	14.14	14.25	14.37
	(3.20)	(0.21)	(2.92)	(2.59)	(2.97)	(3.49)
1990	13.98	14.68	14.49	14.57	13.89	13.66
	(3.02)	(2.45)	(2.74)	(2.55)	(2.79)	(3.30)
African, Middle Eastern						
1980	13.64	12.88	14.18	13.85	13.31	13.82
	(3.49)	(2.68)	(2.91)	(4.07)	(3.37)	(3.70)
1990	14.54	14.31	14.14	13.86	14.36	14.75
	(2.82)	(2.42)	(2.23)	(2.98)	(2.60)	(2.94)
European						
1980	12.68	13.44	13.63	13.39	12.41	11.62
	(3.29)	(2.41)	(2.51)	(2.82)	(3.38)	(3.88)
1990	13.04	13.68	13.60	13.35	12.60	12.08
	(3.13)	(2.36)	(2.61)	(2.79)	(3.40)	(3.84)

Source: 1980 and 1990 5% US Census PUMS files.The sample consists of immigrant males, ages 25–53, not in school, who worked for a private firm for at least one week the previous year and with hourly wages between $1–$200 (in 1980 dollars), and not living in group quarters or with allocated information for education, migration, or income. Standard deviation in parentheses.

US and year of arrival, respectively, A is a fourth-order polynomial in age, and π is a dummy variable indicating if the observation is taken from the 1990 Census. Given the multicollinearity for immigrants ($M = C-A$, and $y = \pi(1990-C) + (1-\pi)(1980-C)$), one set of identifying restrictions is that the age and period effects are the same for natives and immigrants (Borjas, 1995; Friedberg, 2000). For space considerations, however, the coefficients from these regressions are not reported, but are available upon request. Instead, the predicted values based on these coefficients are given in Table 2, estimated at the mean values of the regressors.[4]

These estimates reinforce the previous discussion that age at arrival has a greater negative impact on immigrants of Mexican and European descent than on other immigrants. Given the 95% confidence interval of each predicted value, however, age at arrival does not impact Mexican- and European-descent immigrants until age at arrival 9 and 12, respectively. Prior to this, immigrants

[4] To examine if measurement error substantially affected these results, the sample was restricted to those with age at arrival less than 17 and who entered after 1959 (as this assured the true range of age at arrival did not exceed 18), and age at arrival was specified as intervals consistent with the years-since-migration interval: 1–3, 4–8, 9–13, and 14–18. The results from these changes were very similar to the original results used to derive the predicted values in Table 2. Lastly, controlling for countries with large incidence of non-returning college graduates among Middle Eastern immigrants did not change the results (see Huang, 1988).

Table 2
Predicted years of school for immigrants

Age at arrival	All Years	(St. Err.)	Mexican Years	(St. Err.)	Latin American Years	(St. Err.)	African, Middle Eastern Years	(St. Err.)	Asian, Pac. Isl. Years	(St. Err.)	European Years	(St. Err.)
1	12.05	(0.06)	10.38	(0.18)	11.83	(0.22)	12.66	(0.39)	13.34	(0.25)	13.16	(0.07)
2	12.32	(0.08)	10.52	(0.23)	12.23	(0.25)	12.93	(0.45)	14.01	(0.30)	13.38	(0.10)
3	12.39	(0.08)	10.85	(0.24)	12.36	(0.25)	13.13	(0.43)	14.09	(0.30)	13.40	(0.10)
4	12.30	(0.07)	10.62	(0.22)	12.53	(0.24)	12.81	(0.46)	13.59	(0.28)	13.39	(0.09)
5	12.42	(0.07)	10.73	(0.24)	12.64	(0.25)	13.86	(0.56)	14.22	(0.29)	13.50	(0.09)
6	12.33	(0.08)	10.24	(0.23)	12.47	(0.24)	13.78	(0.48)	14.26	(0.28)	13.49	(0.09)
7	12.32	(0.06)	10.35	(0.17)	12.41	(0.19)	13.70	(0.37)	13.59	(0.22)	13.45	(0.08)
8	12.27	(0.06)	10.28	(0.18)	12.50	(0.18)	13.37	(0.46)	13.86	(0.23)	13.43	(0.08)
9	12.17	(0.06)	9.99	(0.17)	12.53	(0.19)	13.22	(0.41)	14.00	(0.23)	13.28	(0.09)
10	12.08	(0.07)	9.81	(0.16)	12.39	(0.18)	13.73	(0.41)	14.12	(0.23)	13.21	(0.09)
11	12.00	(0.06)	9.50	(0.16)	12.37	(0.17)	13.25	(0.39)	14.00	(0.22)	13.32	(0.09)
12	11.62	(0.05)	8.91	(0.12)	12.20	(0.14)	13.95	(0.28)	14.05	(0.16)	12.81	(0.08)
13	11.40	(0.05)	8.32	(0.11)	12.54	(0.15)	13.77	(0.28)	13.76	(0.16)	12.81	(0.08)
14	11.04	(0.05)	7.75	(0.09)	12.70	(0.13)	14.49	(0.26)	14.08	(0.14)	12.39	(0.08)
15	10.85	(0.05)	7.63	(0.09)	12.18	(0.14)	14.37	(0.21)	14.09	(0.15)	12.19	(0.08)
16	10.76	(0.04)	7.36	(0.09)	11.75	(0.13)	14.80	(0.19)	14.28	(0.14)	12.29	(0.08)
17	10.66	(0.03)	7.25	(0.07)	12.00	(0.11)	15.06	(0.14)	14.15	(0.10)	11.97	(0.07)
18	10.71	(0.04)	7.32	(0.07)	11.76	(0.11)	14.81	(0.14)	14.23	(0.11)	12.09	(0.07)
Mean	11.40	(0.01)	8.19	(0.03)	12.18	(0.03)	14.34	(0.06)	14.06	(0.04)	12.88	(0.02)

Notes: Predicted values obtained from OLS regressions, estimated at the means of all regressors, where the set of regressors are age (fourth-order polynomial), year-of-arrival dummy variables, years-in-the-US dummy variables, a Census-year dummy variable, and a constant. The pooled regression also includes ancestry dummy variables. See Table 1 for sample selection.

are predicted to complete 10.4 and 13.4 years of education, respectively.[5]

The large drop-off in completed years of schooling for Mexicans, however, might be explained by the failure of many of these immigrants to enroll in American schools in the first place (Vernez et al., 1996).[6] Since Mexican immigrants in the labor force average less than eight years of schooling, immigrants arriving after the age of 15 will have been out of school for over two years. For this reason the results for Mexican teenagers should be interpreted with caution.

Other immigrant groups do not exhibit any negative relationship between years of schooling and age at arrival. In fact, the opposite is true, although the statistical significance of the age-at-arrival dummy variables indicate that African and Middle Eastern immigrants that arrive after the age of 9 are more likely to have higher levels of education than the omitted group. In contrast, Carliner (1996) uses a different sample of immigrants from the 1990 Census and finds a small decrease in average education level among Asian and Middle Eastern immigrants who arrive at older ages. Similarly, Latin American immigrants that arrive in their pre-teenage years have over half-a- year more education than those that arrive at age 1. Asian and Pacific Islander children are also likely to complete more years of education if they arrive at older ages, and the amount varies from 0.6 to 0.9 years for each year of delayed entry.

Among these immigrant groups, the quantitative effect of age at arrival on schooling is strongest for immigrants that arrive in their teenage years.To observe this consider a t-test of the hypothesis that the predicted years of education for each age at arrival is equal to the mean of all predicted values. This hypothesis is not rejected at the 1% level of significance for each age at arrival between 2 and 13 for immigrants of Latin American, African and Middle Eastern, and Asian descent. Only, for every age at arrival greater than 13 for Latin American, and African and Middle Eastern immigrants is it possible to reject the hypothesis at the 1% level that these immigrants complete the same number of school years as the ancestry-specific mean. For Asian-descent immigrants, this is the case for only those that enter at age 16 and 18. On the other hand, this hypothesis is not rejected for Mexican, and European immigrants. The implications are that for immigrants of Latin American, African and Middle Eastern, and Asian descent, there are *no negative consequences* from entering the US one year later.

3.2. Theoretical effect of age arrival on earnings

The US labor market may place higher value on domestic education because it is of higher quality than foreign education or because domestic schools do a better job of training students for American jobs. As shown empirically by Bratsberg and Terrell (1994), Carliner (1996), Schoeni (1997); Schaafsma and Sweetman (2001) and Friedberg (2000), variation in country-specific education potentially affects the domestic earnings of immigrants (y_d). In general, however, most studies assume one rate of return ($\hat{r}$) for total education (S_t). Yet if foreign (S_f) and domestic (S_d) education are not perfect substitutes in a non-discriminating, perfectly competitive labor market, then the rate of return to foreign schooling in the US (r_d) differs from the rate of return to domestic schooling (r_f).

Therefore, a simple earnings equation such as

$$y_d = \bar{y}_d + \hat{r}S_t, \tag{2a}$$

masks the effects of two types of education because $S_t = S_f + S_d$ and

$$\hat{r} = \left[\left(\frac{S_f}{S_t}\right)r_f + \left(\frac{S_d}{S_t}\right)r_d\right]. \tag{2b}$$

As a consequence, Eq. (2b) shows it is possible that earnings in the US can differ between immigrants with equal levels of education S_t, but different shares of foreign and domestic education.

The effect of age at arrival is important because age at arrival affects the total education, the percentage of American education, or both among certain immigrant groups. The indirect effect of age at arrival on earnings, then, can be decomposed as:

$$\frac{\partial y_d}{\partial M} = \frac{\partial \hat{r}}{\partial M}S_t + \frac{\partial S_t}{\partial M}\hat{r}. \tag{3}$$

The first term in the right-hand side of Eq. (3) shows that age at arrival affects wages by reducing the returns to total education, holding total education constant, as a consequence of the lower percentage of American schooling. For example, if delayed entry causes immigrants to substitute one less year of American schooling for one additional year of foreign schooling, the earnings of immigrants decrease by $(r_f - r_d)/S_t$ if the returns to American schooling is greater than the returns for foreign schooling. The second term is the loss of income attributable to the lost total amount of education that results from arriving at an older age.

[5] Allensworth (1997) finds that immigrants who enter at age 10 and 15 average 1.6 and 2.4 less years of education than natives, respectively.

[6] Return migration among Mexican immigrants may also bias the results (Borjas, 1996; Jasso & Rosenzweig, 1982; Massey, 1987; Reyes, 1997). However, return migration is more likely to be observed among young, unmarried workers and older, married men with family in Mexico (Massey, 1987). The Mexicans in this study, therefore, are unlikely to return to Mexico.

3.3. Estimating the indirect effect on earnings

To analyze the possibility that country-of-origin education matters, the assumption of equal returns to education is relaxed by accounting for the source of education in a standard log wage regression. By plugging Eqs. (2b) into (2a), the value of an extra year of American schooling can be estimated by the following empirical specification:

$$\ln w_i = ED_j\lambda_j + ED_n\lambda_n + C_j\beta + y_j\alpha + X_j\phi_j + X_n\phi_n + A_i\delta + \gamma\pi_l + \varepsilon_i \quad (4)$$

where ln w_j is the natural log of hourly wages of person i (j=immigrant, n=native), ED_j is a vector of education variables representing all combinations of country-specific schooling that immigrants may attain. In all, there are 19 possible education combinations in the vector ED_j including 0 years of schooling. Similarly, ED_n is a vector of dummy variables for the education attainment of natives: no schooling, grades 1–8, grades 9–11, high school diploma, or college degree. C_i is a vector indicating year of arrival, y_i is a vector indicating time in the US, X_i includes a constant term, marital status, English ability, division of residence and metropolitan residence, A_i is a vector of third-order age polynomials, and π is a 1990 period effect.

Since the focus is on the returns to the various education variables, Table 3 reports only the returns to education, with the omitted category being those with some college experience but without a bachelor's degree. Within each level of education, the source of cumulative primary (P) and secondary (S) education is subscripted as domestic (d), foreign (f), or a mix of both (m).[7] For example, the relative wage of a high school graduate with all foreign primary, and all domestic secondary education is given in the P_f, S_d row of the High School Graduate panel.

The point estimates for the pooled specification show that the location of education has a greater impact for those with at least high school diploma; for all lower education levels, the wage differential is generally lower or statistically insignificant. For instance, high school graduates with all US schooling (P_d, S_d) earn 3% less than college dropouts with only several years of American high school experience (P_f, S_m). On the other hand, high school graduates with the least amount of US education (P_f, S_m) earn 13% less. In other words, for high school graduates, American schools provide education, training and other benefits that translate into a wage premium of as much as 10%.

The overall trend is similar for other immigrant high school graduates, with the exception being African and Middle Eastern immigrants. The greatest wage differential between all- or mostly-American schooling and little- or no-American schooling is 10–12% for Mexican, Latin American, Asian, and European immigrants.

Ancestry is particularly important in explaining wage differentials among college attendees with different amounts of foreign and domestic education. For example, among those that did not attain a bachelor's degree, Mexican and Latin America immigrants with the most amount of US-specific schooling earn 10–12% more than similar immigrants with a few years of American schooling. All other immigrant groups show no similar economic gain. The same conclusion holds for immigrants with a bachelor's degree, and Mexicans, in particular, benefit the most from US schooling: Mexicans that have mostly American schooling earn 20–30% more than similar Mexicans with a couple of years of American schooling. While the difference between those with the highest and lowest amounts of US schooling is 6 and 12% for Africans/Middle Easterners and Latin Americans, respectively, the difference is −8 and 4% for Asians and Europeans, respectively.

Lastly, Table 3 reveals that there are cases in which immigrants with *less* US education earn *more* than other immigrants with the same level of total education. Consider, for example, high school dropouts with several years of American high school (P_d, S_m): Latin Americans, and Africans/Middle Easterners earn 4 and 7% more, respectively, than those with only American schooling.

4. Application: Immigrant children and immigration admissions

The findings above show that in certain cases, immigrants that arrive at younger ages complete more years of schooling, and as a consequence earn higher wages. Is it preferable to admit families with young children so these children complete more years of schooling, and as a consequence earn higher wages? The higher wages accruing to individuals also benefit society since this increases the taxes paid and possibly decreases the public services received by immigrants. On the other hand, the current public debate about the cost of educating immigrant children raises the question of whether or not the US should incur the cost of educating immigrants.[8] For

[7] "All US Primary" is assigned to those who arrived at or before the age of 7; "Mixed US Primary" to those who arrived between the ages of 8–13; "Foreign Primary" to those arriving after the age of 13. "All US Secondary" is assigned to immigrants who arrived at or before the age of 15; "Mixed Secondary" to those 16 and older at arrival.

[8] See, for example, Executive Office of the Governor and Florida Advisory Council on Intergovernmental Relations (1994).

Table 3
Returns to foreign and domestic schooling

	All		Mexican		Latin American		African, M.E.		Asian, Pac. Isl.		European	
No schooling	−0.286	(0.017)	−0.251	(0.030)	−0.207	(0.053)	−0.356	(0.191)	−0.098	(0.076)	−0.244	(0.049)
Primary (grades 1–8)												
P_d	−0.235	(0.034)	−0.201	(0.055)	−0.269	(0.121)	−0.108	(0.384)	−0.798	(0.272)	−0.176	(0.063)
P_m	−0.256	(0.022)	−0.24	(0.037)	−0.294	(0.072)	−0.223	(0.203)	−0.022	(0.139)	−0.205	(0.045)
P_f	−0.262	(0.012)	−0.233	(0.026)	--0.234	(0.031)	−0.232	(0.098)	−0.211	(0.056)	−0.222	(0.024)
High school dropout												
P_d, S_d	−0.158	(0.029)	−0.112	(0.054)	−0.226	(0.076)	−0.088	(0.215)	−0.289	(0.127)	−0.153	(0.047)
P_m, S_d	−0.152	(0.022)	−0.145	(0.039)	−0.156	(0.060)	0.055	(0.181)	−0.032	(0.089)	−0.145	(0.040)
P_f, S_d	−0.196	(0.021)	−0.150	(0.037)	−0.302	(0.055)	−0.154	(0.189)	−0.149	(0.083)	−0.165	(0.039)
P_f, S_m	−0.190	(0.015)	−0.148	(0.029)	−0.190	(0.033)	−0.084	(0.101)	−0.215	(0.048)	--0.188	(0.030)
High school graduate												
P_d, S_d	−0.031	(0.025)	0.009	(0.050)	−0.038	(0.065)	−0.042	(0.177)	−0.117	(0.086)	−0.049	(0.041)
P_m, S_d	−0.060	(0.020)	-0.059	(0.039)	−0.009	(0.054)	−0.002	(0.138)	−0.038	(0.068)	−0.088	(0.036)
P_f, S_d	−0.101	(0.018)	-0.095	(0.036)	−0.089	(0.043)	−0.123	(0.112)	−0.137	(0.055)	−0.086	(0.030)
P_f, S_m	−0.131	(0.013)	-0.119	(0.029)	−0.129	(0.026)	−0.135	(0.061)	−0.142	(0.030)	−0.112	(0.022)
Some College												
P_d, S_d	0.044	(0.025)	0.116	(0.052)	0.095	(0.064)	0.026	(0.174)	−0.003	(0.082)	−0.003	(0.041)
P_m, S_d	0.044	(0.021)	0.067	(0.042)	0.145	(0.054)	0.149	(0.132)	0.010	(0.066)	−0.007	(0.036)
P_f, S_d	0.039	(0.019)	0.045	(0.045)	0.086	(0.042)	−0.032	(0.092)	0.068	(0.049)	0.016	(0.032)
P_f, S_m	–	–	–	–	–	–	–	–	–	–	–	–
Bachelor's degree												
P_d, S_d	0.290	(0.025)	0.290	(0.062)	0.375	(0.067)	0.341	(0.171)	0.271	(0.080)	0.239	(0.041)
P_m, S_d	0.305	(0.021)	0.226	(0.059)	0.385	(0.057)	0.450	(0.131)	0.370	(0.066)	0.236	(0.036)
P_f, S_d	0.308	(0.019)	0.190	(0.079)	0.331	(0.048)	0.362	(0.081)	0.359	(0.046)	0.254	(0.032)
P_f, S_m	0.282	(0.014)	-0.003	(0.065)	0.256	(0.033)	0.275	(0.045)	0.349	(0.027)	0.203	(0.025)

Notes: The regressions also control for years in the US, year of arrival, region of residence, English ability, marital status, third-order polynomial in age, metropolitan dummy variable, and a constant. The omitted group is Some College with all foreign primary and mixed secondary schooling (P_f, S_m). Standard errors in parentheses.

Table 4
Discounted value of lifetime income and cost-benefit analysis of obtaining 12 years of US schooling

	All	Mexican	Latin American	African, Mid. East.	Asian, Pac. Isl.	European
Present Discounted Value of Additional Income						
High school graduate	$196,507	$178,893	$143,651	$176,257*	$58,093	$100,344
Some college	$87,289	$162,772	$149,060	$48,109*	−$6673	−$5298
Bachelor's degree	$14,856	$411,528	$187,317	$124,954	−$181,091	$57,743
Cost–benefit estimates[a]	$28,083	$17,653	$50,461	$21,439**	−$119,984	−$13,900

Notes: A discount rate of 5% is applied. These calculations use the estimates from Table 3 and the average wage (in 1989 dollars) of each immigrant group. The average wage of All immigrants is $13.58, $10.44 for Mexicans, $13.07 for Latin Americans, $15.14 for Africans and Middle Easterners, $15.07 for Asians and Pacific Islanders, and $15.98 for Europeans. Immigrants are assumed to work 2000 hours per year for 40 years. The age-earnings profile is predicted by adding the effect of years in the US and age at every point in the working life of immigrants, and is not adjusted for each year of arrival cohort.

[a] Defined as weighted lifetime benefit minus expenditure per pupil, where the weight is the percentage of immigrants completing each education level, including high school dropouts. Immigrants with less than a high school education provide no benefit. Discounted expenditure per-pupil is $62,055.

* Not statistically different from 0.

** Equal to −$48,298 if statistically insignificant figures are not used.

this reason, even if immigrants gain by earlier entry, the cost of educating them may be greater than the fiscal gain to society. For this reason, it is worthwhile to compare the marginal cost and benefit of proving more years of schooling to immigrants.

For simplicity, Table 4 only considers the income and cost resulting from substituting a mostly-foreign education for 12 years of all-US education. In other words, this is equivalent to having immigrants enter the US prior to the start of first grade. The analysis assumes that the only benefit is increased immigrant income, although there are non-monetary benefits to educating immigrant children (Funkhouser, 1996). Controlling for cost-of-living and need differences, the *total expenditure per student* in the US in 1989 is $4151 for primary and $5201 for secondary school (Parrish, Matsumoto, & Fowler, 1995). The future discounted value of expenditure per pupil for 12 years of schooling is $62,055.

Assuming that immigrants work 2000 hours per year for 40 years, the top panel of Table 4 translates the differences in the returns to education in Table 3 into lifetime earnings differentials. The discounted present values of lifetime earnings are given in the top panel of Table 4 (using a 5% discount rate).[9] In addition, given the findings that students with less than a high school education have no economic gain, as shown in Table 3, the bottom row of Table 4 defines the discounted cost-benefit for each immigrant group as the weighted benefit minus expenditure per pupil, where the weights are the percent of immigrants completing *each* education level (less than high school, high school, some college, and college degree). Even after considering the education of immigrants that do not complete high school, providing 12 years of primary and secondary education to Mexican and Latin American immigrants results in a net benefit of $17,653 and $50,461, respectively. Incorporating the conclusion that among African and Middle Eastern immigrants only those with a bachelor's degree have additional lifetime incomes statistically different from 0 (see Table 3), implies a cost-benefit estimate of −$48,300, rather than +$21,439. The remaining ancestry groups also do not earn sufficient income to offset the cost of providing them with 12 years of American schooling.

Therefore, the results of Table 4 show that should natives want to "charge" immigrants the full cost of 12 years of schooling, only Mexican and Latin American immigrants would be capable paying. It is up to policy makers to decide whether or not to impose such a fee, and how to allocate the collected fees among local, state, and federal agencies. Yet, Table 4 shows that it is possible to frame an immigration policy that improves the welfare of both natives and immigrants by giving greater preference to young Mexican and Latin American families in the existing pool of families from these countries

[9] The earnings differential due to the educational difference $A-B$ is $\Delta = (\hat{\beta}_A - \hat{\beta}_B)\bar{w}$, where $\bar{w}$ is the average wage and $\hat{\beta}_A$ and $\hat{\beta}_B$ are the returns to the two education levels. To account for the growth in earnings over a lifetime, Δ is multiplied by the growth in earnings due to age and experience in the US. However, for simplicity, cohort effects are not included.

intending to immigrate. Furthermore, Table 4 also shows that the benefits outweigh the cost among the full sample of immigrants.

5. Conclusion

Age at arrival is an important determinant of the educational attainment among immigrants from Mexico, and Europe, whose immigrants tend to have relatively high levels of education. For Mexicans, each year of delayed entry results in about 0.25 to 0.30 less years of school. This loss is greater than the loss estimated found by Allensworth (1997) using cross-sectional data (−0.16 per year of delayed entry). The negative impact for Europeans is not as strong as for Mexicans, but is still about −1.5 years of school for the most extreme estimates.

Delayed entry not only results in lower overall education, but also a lower percentage of US-specific education. Estimating the returns to domestic and foreign education across immigrant groups reveals that additional US schooling does not always lead to greater wages, especially for immigrants that do not complete high school, as well as to immigrants of Asian, and African and Middle Eastern descent, and, to a lesser extent, European immigrants. On the other hand, Mexican and Latin American immigrants that complete high school do benefit significantly from US schooling, with returns relative to a college dropout ranging from about 11% (12%) for Mexican (Latin American) high school graduates, to about 25% (8%) for Mexican (Latin American) college graduates. These conclusions are not surprising in light of the worldwide education-quality rankings in which Northern European countries are ranked in the top 10, three Asian countries in the top 15, five African and Middle Eastern countries in the top 30, while Mexico and other Latin American countries are ranked in the top 60 (Bratsberg & Terrell, 1994, Table 1). The schools in the latter countries are not substitutes for American schools, while the schools in the former countries are.

Although providing several more years of education increases the earnings of certain immigrants with at least a high school diploma, it is not always the case that the additional tax revenue is sufficient to pay for cost of 12 years of US primary and secondary education. Only Mexicans and Latin Americans would have high-enough wages to fully offset the cost of this amount of education. This conclusion is relevant given the current climate against less-educated immigrants from Mexico and Latin America, who constitute the largest percentage of immigrants from any part of the world. It must be pointed out that the higher income also reduces the number of immigrants eligible for welfare and possibly increases the tax bracket of these immigrants. As these features are not incorporated into the analysis, the benefits of exchanging American for foreign schooling are underestimated. Still, the total benefit of educating all immigrants in American primary and secondary schools is greater than the cost ($28,083).

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