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The Educational Outcomes of Hispanics and Non-Hispanics in Arizona: Implications for National and State Policy Makers

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The majority of the literature dealing with Hispanic and immigrant education focuses primarily on large states to the detriment of other states, such as Arizona. Using the 1990 5% Census Public Use Microdata Sample file for Arizona, this study estimates the role of ethnicity and immigration at different education levels after controlling for individual and household variables. The study also links state fiscal revenue to a high school diploma, arguing that policy makers have this economic incentive to increase high school graduation rates. The study's findings argue for a reconsideration of funding priorities to shore up the weakest points in the education pipeline.

THE STATE OF HISPANIC EDUCATION IN ARIZONA AND THE NATION

Hispanics are the largest minority group in the United States, yet they remain at the bottom of most socioeconomic measures, including lower than average personal and family income and higher than average poverty and unemployment rates (Gonzalez, 2002). At the root of the socioeconomic gap between Hispanics and non-Hispanic Whites (hereafter, Whites) is the lower education of Hispanics. Studies by Trejo (1997) and Santos and Seitz (1992),

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among others, found that about 50% of the wage gap between Hispanics and Whites is explained by years of schooling, whereas the remaining gap is due to demographic characteristics such as age, English ability, and place of residence. Because education is inexorably linked with socioeconomic status, explaining and increasing the education of Hispanics is particularly relevant to policy makers because it results in a more stable tax base that is less likely to participate in transfer programs. For education and community leaders, however, increased education promises a more dynamic, democratic, and economically independent community.

Although studying the relative educational performance of Hispanics is widely recognized as an important research question, much of the literature has focused on outcomes in the largest states, such as California, Texas, Florida, and New York, or on the nation as a whole (e.g., see Baca, Bryan, & McKinney, 1993; Chapa, 1998; Dickey & Paez, 1999; Hurtado & Carter, 1997; Vernez, Abrahamse, & Quigley, 1996; Wycoff, 1996). Arizona in particular has been omitted from the national discussion even though it has the third largest number of Mexican Americans of any other state, with a population that is nearly 25% Hispanic, and is becoming a major point of entry for immigrants (Gonzalez, 2002).

At the same time, many quantitative studies limit their measure of education outcome to one or two dependent variables, such as years of schooling, high school completion, college enrollment, and so forth. This article presents a more general approach to educational outcomes by examining the determinants of educational outcomes for Hispanics, Whites, and Asians in Arizona. In particular, the framework considers the factors affecting the transition from one grade level to the next using 1990 census data for Arizona.[1] Arizona is particularly attractive because, unlike Texas and California, as of 1990, there had been few legislative measures aimed at limiting the educational aspirations of Hispanics. Furthermore, the influx of immigrants into Arizona was generally smaller than that of other immigrant-receiving states. Therefore, educational outcomes by Hispanics in Arizona are less likely to be contaminated by unmeasurable exogenous factors than in other states. In addition, the education outcomes of Hispanics in Arizona have not been documented to permit a comparison with other states.

Worse than national trends, the educational situation of Hispanics in Arizona is particularly precarious, both in secondary and postsecondary schooling. Figure 1 plots the educational outcomes of persons in Arizona by ethnicity, place of birth, age (25 years and older), and whether enrolled in school. Mexican immigrants are the least educated group, averaging 8 years of schooling. U.S.-born Mexicans average 11.4 years of schooling, which is similar to other Hispanic immigrants. U.S.-born other Hispanics are, on

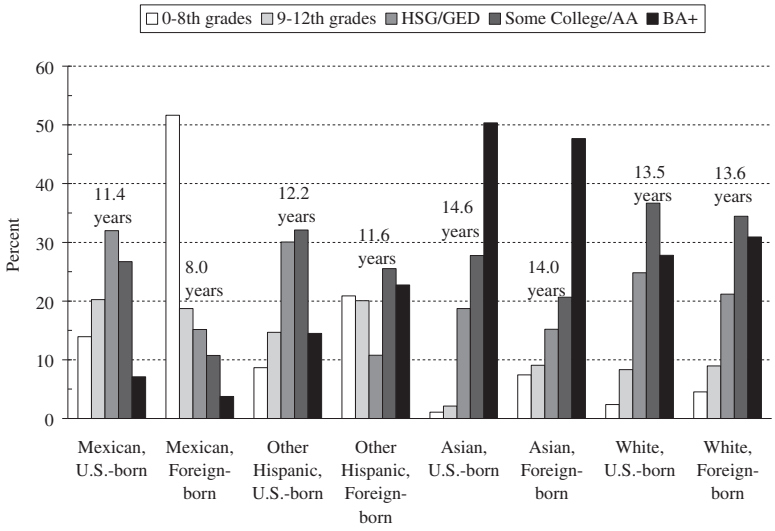

Figure 1. Percentage and Average Completed Years of School in Arizona, by Ethnicity and Place of Birth

Source. 1990 5% U.S. Census Public Use Microdata Sample file for Arizona.

Note. HSG/GED = high school graduate/General Educational Development graduate; AA = associate's degree; BA = bachelor's degree or higher. The sample includes persons ages 25 to 64 not enrolled in school and not living in group quarters who stated they were the heads of households or children of the heads of households. Sample weights are used.

average, likely to have a high school diploma and are therefore the most educated Hispanic group in Arizona. The most educated are U.S.-born Asians (14.6 years), whereas Asian immigrants and Whites average 13.5 to 14.0 years of schooling. Mexican immigrants are particularly concentrated in the lower end of the education distribution, with more than 50% having less than an eighth-grade education. About 5% of all Mexican-origin persons have a bachelor's degree or more, compared to more than 15% of other Hispanics, about 30% of Whites, and about 50% of Asians.

Nationally, 50% of Hispanics 25 and older did not have a high school diploma as of 1990 (U.S. Department of Education, 1997c, Table 12). Although more than half of the status dropout rate observed among Hispanics is partially explained by the fact that many are immigrants who never enrolled in U.S. schools, the status dropout rate among U.S.-born Hispanics is still significantly higher than for non-Hispanics (U.S. Department of Education, 1997d, Table 7; Vernez et al., 1996). On the other hand, the event

dropout rate, or the percentage of 10th to 12th graders who are 15 to 24 years old and have stopped going to school without completing a high school diploma, is also higher for Hispanics than for any other group. From 1972 to 1995, this dropout rate averaged 9.1% nationally for Hispanic students, 4.7% for Whites, and 7.4% for Blacks (U.S. Department of Education, 1997b, Table 7-2). In the 1996-1997 academic year, however, the dropout rate for Hispanic students in Arizona was 16.6%, the highest among all states (U.S. Department of Education, 2000, Table 106).

Although a higher percentage of Hispanics drop out before completing high school, after controlling for socioeconomic characteristics, Hispanics that graduate from high school are nearly as likely to attend college as non-Hispanic Whites (Ganderton & Santos, 1995). Nevertheless, unadjusted data from 1976 to 1998 dramatically show that the college enrollment of Hispanics has generally fallen below Whites (U.S. Department of Education, 2000, Table 186).[2] The findings by Ganderton and Santos are supported by other data: 92.9% of 1992 Hispanic seniors in the upper quartile of the socioeconomic distribution enrolled in college 2 years after graduating, compared to 91.2% of similar Whites (U.S. Department of Education, 1997b, Table 9-2).[3] As a consequence of these enrollment outcomes, about 6.5% of all Hispanics 25 and older in Arizona completed at least a bachelor's degree by 1990.

It is widely recognized that more education is one remedy to economic development of persons that have historically been at the bottom of most measures of socioeconomic status. Therefore, by isolating the factors associated with educational attainment, it is possible to predict the economic future of Hispanics given different levels of education. The second goal of this study, then, is to systematically link educational attainment to wages and government finances—state income tax revenues in particular.

Data from the 5% 1990 Census Public Use Microdata Sample (PUMS) (U.S. Bureau of the Census, 1990) for Arizona allow such an analysis. National studies, such as those by Solorzano and Solorzano (1995), Ganderton and Santos (1995), and Kao and Tienda (1995), establish individual and household background factors as important determinants of educational attainment, and the census data permit similar analysis at the state level. However, it is likely that these factors affect educational attainment differently depending on the education level being examined (i.e., primary, postsecondary, and college). For this reason, this article comprehensively examines the impact of these factors at different levels of education using econometric methods. Because no single education level is excluded and the analysis considers different combinations of demographic variables, the study provides findings that are relatively free of restrictive models.

This study provides evidence that individual and household variables explain much of the educational differences between Hispanics and U.S.-born Whites in Arizona. Furthermore, the educational deficit between younger generations has decreased compared to earlier (older) generations. Moreover, Hispanics that reach the 11th or 12th grade are still less likely than Whites to graduate from high school, and the discrepancies in high school completion among ethnic groups are also the result of students dropping out in earlier grades. Also, college attendance and graduation are strongly influenced by the educational path chosen (i.e., community college attendance) as well as by background factors.

ETHNICITY OR SOCIOECONOMIC STATUS?

National quantitative analyses of educational attainment rely on individual, family, school, and various other demographic variables to explain the educational outcomes (number of school years completed, attainment of degrees, school delay, test scores, etc.) of students. Studies by Santos and Seitz (1992), Fligstein and Fernandez (1985), Kao and Tienda (1995), and Zsembik and Llanes (1996) and literature reviews by Solis (1995) and Hernandez (1973), among others, provide the foundation for this study to examine academic performance. The goal is to examine the extent to which ethnic differences in educational outcomes are explained by demographic variables in the 1990 census "long form." In addition, as Figure 1 makes clear, it is important to separate immigrants from U.S.-born persons of the same ethnicity. For these reasons, econometric methods are used to test the hypothesis that a large portion of the educational gap between Whites and Hispanics is due to background variables rather than to being Hispanic per se.

The 1990 U.S. PUMS (5% sample) for Arizona is the data used because it contains a sufficient sample size as well as a large set of individual and household information to answer the two questions of this study. For the sake of consistency with other studies, the set of variables are broken down into three categories: ethnicity, individual, and household. A brief review of how the literature pertaining to these variables follows.

It Matters Who You Are: Individual-Level Variables

Young and Smith (1997) and Rumberger (1991), among others, provided an overview of the literature pertaining to effect of individual-specific factors on educational outcomes. Besides student ability, among the most commonly examined individual background variables in studies of Hispanic education are English ability and immigration status. Low English ability is a common characteristic of Hispanic students because many are concentrated in ethnic

enclaves where Spanish is often the primary household language, and greater than two thirds of Hispanics are either first- or second-generation Americans (Gonzalez, 1998, 2002). Both socially and educationally, children who do not grow up speaking English at home face greater obstacles at school. However, low English ability is not necessarily limited to immigrant children. Trejo (1997), for example, found that 90% of third-generation Mexican Americans speak English very well, in contrast to 99.9% of Whites and African Americans. It is not surprising to discover that 44% of high school dropouts in 1995 had difficulty speaking English (U.S. Department of Education, 1997e, Table 4-1).

A factor strongly correlated with English ability is immigration status. Because the majority of first- and second-generation students have parents for whom English is their second language, children with immigrant parents will not necessarily learn English in the household. It is not surprising, then, that the increase in immigration since 1980 has resulted in a greater number of Hispanic students who must adjust to the new language, education system, and culture.

Although immigration status might have a negative effect on educational outcome from its relationship with English ability, children with immigrant parents are generally characterized as high achievers when compared to demographically similar native students. Kao and Tienda (1995) and Fligstein and Fernandez (1985), for example, found evidence that children with immigrant parents perform better because their parents emphasize the importance of education and positive values, such as respect for teachers, which enhances success at school.

In addition to these variables, other individual-level variables that are used in this study include gender, age, pre-1980 immigration, and whether females have children.

It Matters Where You Grow Up: Household-Level Variables

Along with individual traits, family and household background affects educational attainment. Researchers have found that the education of the parents, family income, family size, access to reading material in the home, and family type all contribute to the education of children. However, Santos and Seitz (1992) and Fligstein and Fernandez (1985) concluded that family demographics affect Hispanic students differently than they affect White students; these factors merit separate attention for Hispanics. For example, family type, that is, whether the household is a married-couple household, female-headed household, or male-headed household, is of particular interest given the recent debates over the decline of the nuclear family and its effect on children.[4] However, it is often the case that female-headed households

have a higher incidence of poverty, so it is possible that poverty and not the structure of the household explains differences in educational attainment. Rumberger (1991) noted that studies find contradictory evidence as to the effect of family structure on the probability of dropping out of high school.

The household variables that are available from the census data and used in this study are poverty level, family type, receipt of public assistance, the education and English ability of the head of household, and census place of residence.

However, because household-level variables are usually the outcome of an individual's educational status (which may have been completed decades earlier), it is not statistically feasible to include an individual's own household characteristics so long as they are his or her own. But for children, this is not the case. Children grow up in households with parents of different education and other socioeconomic characteristics. Therefore, it is accepted practice in the literature to include the characteristics of the household in the analysis of the education of children. Therefore, to include household factors in the analysis, heads of households and their offspring are separately analyzed, and the household-level variables are included only in the regressions for offspring.

INFORMATION FROM THE 1990 ARIZONA CENSUS

To determine a valid statistical relationship between education and these two sets of factors, data from the 1990 5% PUMS file for Arizona are used. These data represent a random sample of 5% of Arizona's 3,665,228 residents in April of 1990. Unlike the 100% count of the 1990 census, this file provides detailed household and personal information as well as a large sample size for each ethnic-immigrant group. The sample analyzed consists of persons between the ages of 25 and 64 who are not enrolled in school, who are either the head of a household or the son or daughter of the head of household, and who are living in a household.[5] Only those not enrolled in school are analyzed to reduce the negative bias on educational attainment that results when currently enrolled students are included. Because the focus of this study is interethnic differences in education and work, only those who identify their ethnicity are included. In all, 43,112 persons are included in the sample.

The analysis of educational attainment compares individuals who have completed different levels of education and estimates the probability of continuing to the next grade level. Rather than asking the total years of schooling, the census emphasizes degree completion, and as a consequence, the methodology concentrates on various levels of education. The educational levels

are Grades 0 through 8, Grade 9, Grade 10, Grades 11/12 (no diploma), high school diploma or equivalent, associate's degree, and bachelor's degree (including master's, professional, and Ph.D. degrees).

Unlike longitudinal data, however, the census data only permit a snapshot at one point in time—April 1990—and therefore caution should be taken in drawing inferences regarding transitions of persons over time. In addition to this shortcoming, the data used here do not contain other variables such as motivation, intelligence, and school achievement, which although not imperfect measures of individual ability, are nevertheless important determinants of educational achievement.[6] But despite these shortcomings, the large sample size and generally universal coverage of the decennial census make this data preferable to others.

REGRESSION ANALYSIS—WHAT IS THE EFFECT OF ETHNICITY ON EDUCATION?

The model of educational attainment posits that at each education level, students are affected by background as well as other environmental variables and decide whether to complete that level. Therefore, the model is a grade transition model as described by Cameron and Heckman (2000) and the studies cited by them. That is, given that a student has completed a particular grade level, what is the likelihood that he or she will make the transition to the next grade level? To answer this question, a regression model commonly used in economic studies is used.

The regression model is based on an index function that postulates that the decision for an individual to complete education level G, given completion of level $G-1$, depends on a comparison between the marginal benefit (MB) and the marginal cost (MC) of completing level G, where the net difference is

$$MB - MC = y^*. \tag{1}$$

Although y^* is not observable, the difference between marginal cost and marginal benefit is a function of a vector of observable household and personal characteristics x and coefficients B and a random component, which is normally distributed with mean 0 and variance 1. In other words, the ideal equation to estimate is

$$y^* = B'x + \varepsilon, \tag{2}$$

where B'x is the index function. Although it is impossible to observe the net benefit of education, it is known whether the next grade is completed or not. Therefore, let y take on the value of 1 if an individual completes level G and 0 otherwise. More formally,

$$y = \begin{Bmatrix} 1, \textit{ if } MB - MC = y^* > 0 \\ 0, \textit{ if } MB - MC = y^* \leq 0 \end{Bmatrix}. \tag{3}$$

The probability that an individual completes level G is

$$Prob(y^* > 0) = Prob(B'x + \varepsilon > 0) = Prob(\varepsilon > -B'x).$$

In the case of the normal distribution, which is symmetric, the probability is

$$Prob(y = 1) = Prob(\varepsilon < B'x).$$

That is, the probability of observing an individual completing Grade G is given by the area below the normal distribution for the index function $B'x$.

Given the assumption of a normal distribution in Equation 2, the relative probabilities that an individual from a specific ethnic-immigrant group completes Grade G are derived from a probit regression model. With slight changes in notation, the probit regression model is

$$yi = X_i\beta + E_i\delta + \varepsilon_i, \tag{4}$$

where y_i and ε_i are defined as before, X_i consists of individual and household variables that are related to educational attainment as discussed above, and E_i is the ethnic-immigrant group to which individual i belongs. The individual-level variables are age, dummy variables for gender, English ability, pre-1980 immigrants, and whether females have a child. Household variables are a government-defined measure of poverty, whether the household received any public assistance, the education of the head of household, the English ability of the head of household, and a census-defined place-of-residence variable. As different education levels are examined, y is separately defined for each education level. Using self-identified information from the census, E_i is equal to 1 if i is a U.S.-born Mexican, Mexican immigrant, U.S-born other Hispanic, other Hispanic immigrant, U.S.-born Asian, Asian immigrant, or White immigrant and 0 otherwise. The comparison group is U.S.-born Whites, and therefore, the coefficient vector δ gives probability that a

particular ethnic-immigrant group *j* is more ($\delta_j > 0$) or less ($\delta_j < 0$) likely to continue to the next education level than are U.S.-born Whites.

Due to the fact that household variables are endogenous for heads of households but are given for their offspring, both groups are separately analyzed. Therefore, household-level variables are included only in the regressions for offspring. Along with a constant, three different sets of independent variables are included for each pair of education levels: (a) ethnicity variables, (b) individual and ethnicity variables, and (c) household, individual, and ethnicity variables. The coefficients from the first specification approximate the difference in average educational attainment between U.S.-born Whites and each ethnic-immigrant group. By controlling for individual and household factors, the coefficients from the second and third specifications measure the extent to which education differences between U.S.-born Whites and other groups are explained by background variables.

Because the goal of the study is to isolate ethnic-immigrant differences, Tables 1 and 2 show only the estimated coefficients, $\hat{\delta}$, from the ethnic-immigrant variables for the three different sets of characteristics *X* at each educational level.

The Attainment of a Bachelor's Degree

There are many roads to a bachelor's degree. Traditionally, it has meant enrolling at a 4-year institution directly from high school. More recently, however, an indirect path involves enrolling in a community college and then transferring to a 4-year college. For Hispanics, this is becoming more and more a viable option. In 1994, for example, Hispanic high school graduates were equally likely to enroll in a community college as in a 4-year college, as opposed to non-Hispanic Whites, who were twice as likely to start at a 4-year college (U.S. Department of Education, 1997a, 1997e).

In the first two educational transitions in Tables 1 and 2, the rows labeled "Ethnicity" show the relative likelihood of making the transition from an associate's to bachelor's degree and from a high school diploma to a bachelor's degree. The two main findings with regard to completion of a 4-year degree is that household-level variables explain the majority, if not all, of the difference in graduation rates between Whites and non-Whites and that the community college experience is important for Mexican-origin heads of households wishing to complete a bachelor's degree. In addition, Mexicans are less likely, on average, to complete college with a bachelor's degree than are U.S.-born Whites, regardless of the postsecondary path taken.

In general, the regression results in Tables 1 and 2 indicate that individual-level socioeconomic factors do not always fully explain the lower 4-year completion rates among high school and community college graduates,

(text continues on p. 301)

Table 1
Relative Probability of Completing the Next Education Level, Head of Household

	Mexican		*Other Hispanic*		*Asian*		*White*	
Control	*Immigrant*	*U.S. Born*	*Immigrant*	*U.S. Born*	*Immigrant*	*U.S. Born*	*Immigrant*	n
Associate's to bachelor's degree								
Ethnicity	–0.152**	–0.233*	–0.029	–0.053	0.106**	0.061	–0.038*	13,360
Individual	–0.090*	–0.188**	–0.004	–0.027	0.113**	0.069*	–0.040*	13,360
High school diploma to bachelor's degree								
Ethnicity	–0.324**	–0.348**	0.167**	–0.193**	0.227**	0.220**	0.065**	19,987
Individual	–0.328**	–0.350**	0.146**	–0.198**	0.208**	0.206**	0.044*	19,987
11th/12th grade to high school diploma								
Ethnicity	–0.207**	–0.083**	–0.304**	–0.046	–0.128**	0.070	–0.060**	11,796
Individual	–0.105**	–0.053**	–0.190**	–0.024	–0.017	0.077	–0.029	11,796
10th to 11th/12th grade								
Ethnicity	–0.002	–0.016	–0.078	–0.018	0.122	—	0.035	3,185
Individual	–0.078	–0.053	–0.125	–0.062	0.079	—	0.031	3,185
9th to 10th grade								
Ethnicity	–0.253**	–0.121**	–0.173*	–0.065	–0.212	—	0.015	1,715
Individual	–0.069	–0.075	–0.028	–0.033	0.024	—	0.082	1,715
0 to 8th grade to 9th grade								
Ethnicity	–0.220**	–0.075**	–0.090**	–0.058	–0.092**	–0.021	–0.100**	3,204
Individual	–0.185**	–0.046*	–0.051	–0.034	–0.062	–0.060	–0.062	3,204

Source. 1990 5% U.S. Census Public Use Microdata Sample file for Arizona.
Note. *Individual* variables are ethnicity-immigration terms plus age, dummy variables for gender, English ability, pre-1980 immigrants, and whether female has own child. Dashes indicate that data were dropped due to lack of variability in the dependent variable.
*Significant at the 10% level. **Significant at the 5% level.

Table 2
Relative Probability of Completing the Next Education Level, Sons and Daughters

	Mexican		*Other Hispanic*		*Asian*		*White*	
Control	*Immigrant*	*U.S. Born*	*Immigrant*	*U.S. Born*	*Immigrant*	*U.S. Born*	*Immigrant*	n
Associate's to bachelor's degree								
Ethnicity	–0.495**	–0.340**	—	–0.038	0.013	—	–0.196	501
Individual	–0.584**	–0.406**	—	–0.085	–0.180	—	–0.264**	500
Household	–0.520**	–0.274**	—	–0.087	–0.115	—	–0.272*	490
High school diploma to bachelor's degree								
Ethnicity	–0.166**	–0.168**	—	–0.130**	0.263	0.195	–0.026	1,403
Individual	–0.179**	–0.182**	—	0.156**	0.284	0.174	–0.064	1,403
Household	–0.084	–0.063	—	–0.083	0.399*	0.067	–0.049	1,403
11th/12th grade to high school diploma								
Ethnicity	–0.206**	–0.105**	–0.051	–0.144	–0.061	—	0.100	1,360
Individual	–0.209**	–0.124**	–0.079	–0.177**	–0.018	—	0.102	1,360
Household	–0.160	–0.111*	–0.012	–0.158	–0.025	—	0.090	1,360
10th to 11th/12th grade								
Ethnicity	0.020	–0.002	–0.114	0.268**	—	—	0.069	436
Individual	–0.041	–0.058	–0.266	0.250**	—	—	0.053	436
Household	–0.024	–0.003	–0.053	0.287**	—	—	–0.090	436
9th to 10th grade								
Ethnicity	–0.357**	–0.104	–0.489**	–0.305	—	—	–0.040	236
Individual	–0.327**	–0.163	–0.438	–0.334	—	—	0.006	236
Household	–0.331	–0.263*	–0.530*	–0.588**	—	—	0.161	220

(continued)

Table 2
Continued

	Mexican		*Other Hispanic*		*Asian*		*White*	
Control	*Immigrant*	*U.S. Born*	*Immigrant*	*U.S. Born*	*Immigrant*	*U.S. Born*	*Immigrant*	n
0 to 8th grade to 9th grade								
Ethnicity	0.034	0.007	0.676**	–0.132	—	—	–0.033	333
Individual	0.214	0.082	0.751**	–0.117	—	—	0.075	333
Household	0.529**	0.225*	0.817**	–0.030	—	—	0.108	313

Source. 1990 5% U.S. Census Public Use Microdata Sample file for Arizona.
Note. *Individual* variables are ethnicity-immigration terms plus age, dummy variables for gender, English ability, pre-1980 immigrants, and whether female has own child. *Household* variables include individual-level variables plus standardized poverty level, dummy variables for family type, whether received any public assistance, the education and English ability of the head of household, and place of residence. Dashes indicate data were dropped due to lack of variability in the dependent variable.
*Significant at the 10% level. **Significant at the 5% level.

regardless of ethnicity and immigration status. Comparing the two postsecondary paths, community colleges offer a relative advantage to heads of households, whereas the younger generation benefits more from directly enrolling in a 4-year college out of high school. For example, after controlling for individual variables, U.S.-born Mexican heads of households with an associate's degree are 18.7% less likely to complete a bachelor's degree than are Whites, compared to –35.0% if they only have a high school diploma. The figures are –39.7% and –17.8%, respectively, for the sons and daughters. In addition, Asian immigrant heads of households are about 11% more likely than Whites to transfer from a community college and complete a bachelor's degree, whereas Hispanic heads of households are as likely as Whites.

Therefore, these results indicate that community colleges are important academic institutions for older minorities. The lower probability of completing the bachelor's degree among Mexican-origin community college graduates is perhaps an outcome of the type of student that enrolls in a community college. One possible scenario is that finances, lack of academic preparation, or family responsibilities may detour more minorities than Whites away from 4-year colleges. But after a certain number of years, minority students who wish to return to college can do so more easily by first enrolling in community colleges and then transferring to a university. But if academic, financial, or other personal reasons kept such students from enrolling in 4-year universities in the first place, then it is possible that they will have difficulties attaining a bachelor's degree for the same reasons.

Last, individual-level variables generally do not affect the relative college-completion rate of most ethnic-immigrant groups. Rather, controlling for household-level factors explains the lower continuation rates of various groups. This is seen in Table 2, where most of the average differences between Whites and other groups disappear after household-level variables are added for the offspring of the head of household. For example, although Mexican-origin high school graduates are, on average, about 17% less likely to complete a bachelor's degree than are U.S.-born Whites, this gap is fully explained by such variables as parent's education and place of residence (and hence, school attended): There is no statistical difference in college completion rates between Mexican and U.S.-born White high school graduates once household factors are included.

Thus, the key to increasing the number of Hispanic college graduates—Mexicans in particular—lies in eliminating the side effects of poverty and other household variables. One interpretation of these two findings is that 4-year colleges are now more accessibile to younger Hispanics that to older Hispanics, but that despite lack of accessibility in earlier times, older Hispanics use community colleges as a backdoor into 4-year colleges. In addition, it

is necessary to maintain and increase accessibility to universities. At the same time, because many Hispanics attempt to complete a bachelor's degree via community colleges, it is important that future research examine the underlying causes and solutions to their lower completion rates.

High School Graduates and Dropouts

The offspring are more relatively likely than heads of households to successfully transition from one grade to the other at the high school level. For heads of households, immigration status as well as socioeconomic factors are important factors explaining the lower high school completion rates by 11th graders. For example, Asian and other Hispanic immigrants are about 13% and 30%, respectively, less likely than U.S.-born Whites to finish high school. But controlling for individual-level variables eliminates about 10 percentage points of the gap for all immigrant groups, with Mexican and other Hispanic immigrants being 11% and 19%, respectively, less likely to finish high school if they complete the 11th grade. Among U.S.-born minorities in Table 1, only Mexican-origin persons are less likely to attain a high school diploma, but this amount is about –5%. Thus, even among persons of the same ethnicity, immigrants are less likely to finish high school.

Interestingly, the status dropout rate for 11th graders is similar for the Mexican-origin offspring as for the Mexican-origin heads of households. Yet with the exception of U.S.-born Mexican-origin persons, household-level factors explain all of the differences in graduation rates for those groups who had statistically lower completion rates.

Getting to the 11th grade is not a problem for either the older or younger generation of ethnic minorities (the exception being U.S.-born other Hispanic offspring). One break in the education pipeline, however, for Hispanic immigrants is in the transition to the 10th grade. Relatively speaking, Hispanic immigrant offspring are particularly more vulnerable to stopping their schooling at the 9th grade than are their parents. The likelihood is as much as 36% and 49% lower for Mexican and Hispanic immigrants, respectively. As is noted previously, however, one explanation is that Hispanic immigrant children never enroll in school in the first place, and so the gap is wider than would be expected by an "event dropout rate," or the dropout rate among those actually enrolled in school (Vernez et al., 1996). One possible explanation for this outcome is an increase in immigrant children who struggle in schools not prepared to teach them.

Thus, when the transitions in lower grade levels (i.e., Grades 0 through 8 to Grade 9) are examined, offspring are as likely as Whites to enroll in the ninth grade. Therefore, with the exception of other Hispanic immigrant children ($n = 65$), the break in the education pipeline does not occur in the ninth

grade. One explanation is that the existing school attendance laws are successful in keeping all students from dropping out prior to reaching high school. However, this is not meant to imply these grades are not important. In fact, it is likely that educational expectations and goals are formed in the presecondary grades (Dickey & Paez, 1999). Thus, given the characteristics of the households of Mexican-origin children in the bottom row of Table 2, they would be expected to be 23% to 53% less likely to continue to the ninth grade after completing previous grades.

Summary of Results

Regardless of the educational level analyzed, the majority of ethnic groups have lower average continuation rates than native non-Hispanic Whites in the secondary and college level. Much of the average educational disparity between U.S.-born Whites and Hispanic groups is explained by individual- and household-level variables, especially in the 10th grade and final year of high school. Controlling for household factors reveals that sons and daughters in particular are more likely than their parents to approach the educational attainment of native Whites. College completion among minorities hinges on eliminating socioeconomic differences or, at a very least, their indirect effects on educational attainment. The results therefore suggest increasing financial aid as well as linking the university experience to the household.

THE MONETARY COST OF LOST EDUCATION

It is well established that more schooling is generally associated with greater earnings, especially among college graduates. Completely eliminating educational differences between minority groups and non-Hispanic Whites has positive consequences for the economic well-being of all citizens, not just minorities who would benefit from gains in education. Because workers with higher levels of education earn more, they are less likely to be on welfare or use unemployment insurance. Most important, they contribute more in state and federal taxes. While a full analysis is beyond the scope of this article, this section shows how failing to increase education level results in foregone tax revenues and hence affects both the individual and state economy. This section considers the relationship between education and the labor market to illustrate the monetary benefits to society.

To reduce statistical problems that result when a large percentage of a population is not employed, such as females, this section considers only male workers with calculated hourly wages between $1 and $200 between the ages of 25 and 64 and not enrolled in school. The sample size is 26,281 for this

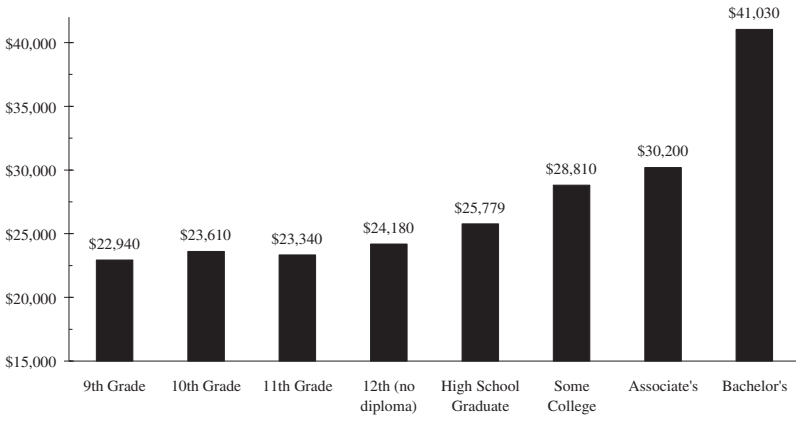

Figure 2. Predicted Annual Earnings by Education Level
Note. The predicted values are from an ordinary-least-squares regression of hourly log wages on education, age, ethnic-immigrant identifiers, industry of employment, English ability, marital status, and county of residence. Sample weights are used in the regression.

exercise. Figures 2 and 3 show the predicted wages derived from a wage determination model, where the dependent variable, log of hourly wages, is regressed on various worker characteristics, specifically, education, age, ethnic-immigrant identifiers, industry of employment, English ability, marital status, and county of residence. The unreported results from these regressions are used to predict differences in earnings solely due to different levels of education.[7]

The estimated coefficients from the log wage regression are used to predict the annual earnings associated with each level of education. Figure 2 associates different education levels with a specific monetary value after adjusting for differences in worker characteristics. It is clear that there is a monotonic increase in income associated with each grade completed from the 9th to the 12th grade. Although small increases in income are documented from the 9th grade on, the largest change at the high school level is for those that complete the 12th grade (about $1,600 per year).

The value of a college education is clearly demonstrated in Figure 2, because those with a college education earn significantly more than do high school graduates. Those with some college experience but without a degree earn about $3,000 more than similar high school graduates; community college graduates earn approximately $4,400 more. Workers with at least a

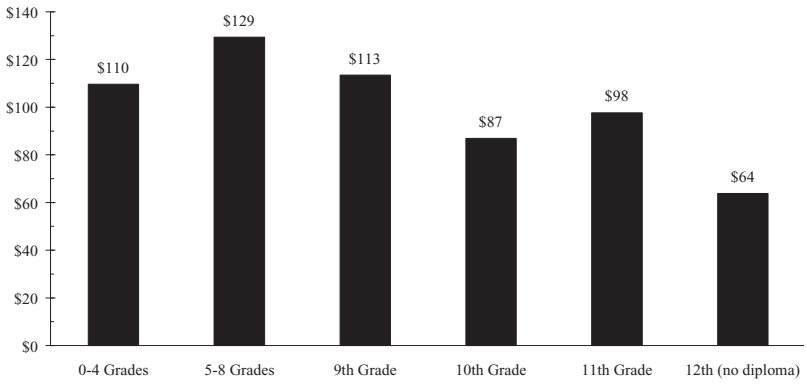

Figure 3. Lost Tax Revenues by Grade per Person per Year due to Failing to Complete High School

Note. A marginal tax rate of 4% is assumed. Estimates based on wage regression results.

bachelor's degree, however, earn an average of more than $15,300 more per year than do demographically identical high school graduates.

The fact that many Arizona workers fail to attain a high school diploma (or its equivalent) has serious policy implications. One consequence of a lower educated workforce is lost tax revenues. Because workers without a high school diploma education earn less, they are taxed at a lower rate and pay less in total taxes for their existing tax rate. Assuming, for simplicity, a marginal tax rate of 4% on taxable income, Figure 3 shows the lost revenue per person per year associated with failing to graduate from high school, holding the tax rate constant.[8]

The lost revenue that results from Arizonans not finishing high school ranges from $64 to more than $130 per person per year using income in 1989. If 2,500 men in each education group from the 0-to-4th-grade through 12th-grade levels completed high school, state tax revenues would have been about $1.5 million greater per year since 1989. With six education categories, this implies that for every 15,000 who complete high school, the state increases its tax revenue by $1.5 million for each year that these persons work. Furthermore, over the course of a lifetime, these workers will be subject to higher wage increases, lower unemployment spells, and lower utilization rates of public assistance programs. They will also enjoy other benefits associated with more education. The "$1.5 million/year for 15,000 high-school graduates" estimate, therefore, underestimates the benefits of having

a better educated workforce. Furthermore, as demonstrated by Figure 2, the gains are even greater when people attend and/or graduate from college.

CONCLUSION AND POLICY IMPLICATIONS

There are several key findings from this study. Perhaps the most critical findings are those rooted in the educational experience of Mexican-origin students in Arizona. It appears that for Arizona's minority youth, the risk of dropout occurs at the 10th and 12th grades. Completion of the 10th grade is important because it will increase the student's prospects of completing high school. This goal becomes more elusive for all Hispanic immigrants, because they are particularly less likely than White students to finish this grade.

The offspring of Hispanic households in Arizona are showing some progress in educational attainment, especially once parents and offspring from the same household are compared. Nevertheless, Mexican-origin students still experience lower continuation rates in pre- and postsecondary education. Central to addressing these issues are policies that focus on socioeconomic differences that affect minority student educational performance as well as efficacy studies that evaluate school performance based on proposed interventions.

Many of the current problems faced by Hispanic students in Arizona may be attributed to the state and school district policies (such as the recently passed proposition eliminating bilingual education programs) that fail to effectively identify key factors that affect retention and persistence rates of minority students and fail to implement appropriate targeted educational policies for these groups.[9] This is not to say that there have not been positive major state and institutional initiatives addressing these issues. An example of this would be the state's Board of Regents'—which sets public policy for the state's three largest public 4-year universities—ad hoc Committee on University Access and Retention. This committee recommended not only outreach programs to minority communities but also collaborative and student progress tracking that would be articulated through the entire educational system. Thus, their proposed educational policy articulated an evaluation system that would gauge the progress of minority students (Callan & Finney, 1998). This ad hoc committee also provided the institutional momentum for further collaborative endeavors with the state's leaders in higher education, K-12, and minority communities. However, based on the current data of minority—especially Hispanic—student outcomes, it is not clear if these broader state initiatives have successfully trickled down to local schools with large minority and low-income students.

As schools become more segregated by race, ethnicity, and class across the nation, the issue of educational attainment will become even more pressing for states such as Arizona with large segments of its minority student population at the lowest tiers of the socioeconomic ladder. Orfield and Yun (1999), for example, rank Arizona as the 10th most segregated state in the nation in terms of the percentage of Latinos in 90%-to-100% minority schools. Although Orfield and Yun stated that the increase in segregation is linked to the demographic shift of the overall increase in the Latino population, they also pointed out that this does not explain why there are high levels of White-student segregation in these states. As there is little policy discussion on this rapidly shifting concentration of minority students within school districts, there is a growing fear that the problems faced in the urban core will resurface in these highly segregated districts (Orfield & Yun, 1999). Thus, in addition to focusing on individual and household factors that may influence educational outcomes for minority students, educational policy makers should also begin assessing the impact of the hypersegregation of minority students in school districts and the impact of this segregation on educational performance.

Beyond the net benefit to individual minority students from improved educational outcome are the net gains to Arizona if the state invests in a successful educational policy for these students. An important finding from this study illustrates the net gains to the state from investing in the education of its minority population. By increasing retention and persistence of minority students in grades kindergarten through 12, these students will have the similar probability of completing a college education as do Whites. The disparities in low-wage jobs is clearly correlated with educational attainment of these groups and, if successfully mediated, will allow for higher incomes and better occupations for minority students. With higher wages, minority individuals will be able to contribute greater tax revenue for the state. As indicated in the text, the lost revenue resulting from low completion rates is significant. The conservative estimate of $1.5 million per 15,000 high school graduates shows the value of a better educated workforce.

Clearly, there is a significant body of literature that points to factors influencing the performance of Hispanic students in public schools. In the case of Mexican-origin students, the research suggests that problems such as teachers who have lower expectations for students who speak accented English may contribute to lower academic performance levels. In addition, teacher mentorship of at-risk students may improve the educational performance of these students (Hernandez, 1973; Solis, 1995; Solorzano & Solorzano, 1995; Wycoff, 1996). Finally, “academically successful students seem to have a

supportive network of family members, friends, neighbors and teachers which they rely on for counsel and advice in difficult or stressful situations" (Wycoff, 1996, pp. 147-148).

The literature on community colleges strongly points to the need for early outreach in high school as well as support programs to mediate academic weaknesses that certain community college students may experience as they enter from less academically rigorous schools. Similarly, the literature in successful programs in 4-year colleges points to similar strands of intervention strategies, that is, outreach, mentorship, and academic and financial support that will allow for a smoother transition from community colleges or from their high school (Hilmer, 1997; Rendon & Garza, 1996). Thus, there is a wide body of literature that points to localized strategies to intervene programmatically in ways that will improve minority student educational outcomes. Placing these strategies within the context of a broader state and institutional commitment to improve the current educational profile of the nation's Hispanic population is important.

NOTES

1. Cameron and Heckman (2000) discussed other studies that employed a "grade progression" model in their analysis.

2. In this table, *White* includes persons of Hispanic origin. The data do not permit separating those of Hispanic origin from the White racial category.

3. However, Hispanics are more than 10 percentage points less likely to enroll in 4-year colleges than are Whites, meaning that Hispanics make disproportionate use of 2-year and vocational and technical schools.

4. Young and Smith (1997, Figure 4) noted that there has been a 10-percentage-point increase in the number of children younger than 18 living in single-parent Hispanic households.

5. Stepsons and stepdaughters are included in the analysis.

6. Such variables are found in data sets such as the National Longitudinal Survey of Youth or the High School and Beyond. Combined with the fact that the sample sizes of these data sets are generally smaller and attrition from these surveys is generally high, these data do no permit a state-by-state analysis (Gonzalez & Hilmer, 2001).

7. The unreported results show that years of schooling is the most important variable explaining the wage differentials between Whites and non-Whites, eliminating, for example, 50% of the wage difference between U.S.-born Mexicans and Whites. Results are available upon request.

8. In 1989, the marginal income tax rate in Arizona for single or married but filing separately individuals with incomes between $10,001 and $25,000 was 4% (U.S. Advisory Council on Intergovernmental Relations, 1995, Table 19).

9. These failures may be due to discrimination or lack of a fundamental understanding of the unique factors affecting the educational experience of Mexican-origin students. Many of these failures are rooted in the historical nature of educational delivery to Mexican-origin students (Bernal, 1998).

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