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GAINS FROM GREEN CARDS：
IMMIGRANT PARENTS' LEGAL STATUS AND CHILDREN'S SCHOLASTIC ACHIEVEMENT*

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Abstract

In order to shed light on the intergenerational consequences of immigration legislation, this paper investigates the impact of the largest amnesty program in the U.S. history (IRCA) on scholastic achievement of immigrants' children. Using IRCA as a source of exogenous legal status, empirical estimates indicate that immigrants' legal status improves their children's math scores by 0.70 of a standard deviation and the reading scores by 0.50 of a standard deviation. The above results account for misreporting in legal status among illegal immigrants by using a two-step semi-parametric method to purge the misreporting bias from conventional IV estimates.

JEL Classifications: J18, O15, R23

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1. Introduction

During the past three decades, the population of unauthorized immigrants in the U.S. has been growing rapidly. Unauthorized immigrants are estimated to account for one third of the foreign-born population in the U.S. (Passel 2006). And they also produce a large number of the next generation of Americans. It is estimated that about five million children (6% of U.S. children) have one parent or both parents as illegal immigrants (Passel 2006). Two-thirds of these children are U.S. citizens by birth. And most of these children will likely live in the U.S. for their entire lives. This paper studies how scholastic development of immigrants' children is affected by their parents' legal status. In other words, if the illegal immigrants were to be legalized, could this act benefit their children's development?

There are several mechanisms through which immigrants' legal status could affect their children's scholastic achievements. Literature in education finds that children's scholastic performance is a function of parental income (Korenman et al. 1994, Duncan et al. 1998, and Dahl and Lochner 2005), type of neighborhood (Rosenbaum 1995; Ludwig et al. 2001), and parental involvement in school (Herman and Yeh 1983; Marschall 2006). All of these factors can be influenced by immigrant's legal status. For example, Rivera-Batiz (1999) and Kossoudji and Cobb-Clark (2002) finds that legal status has an impact on immigrants' earnings. And later part of this paper provides evidence that legal status influences immigrant households' parental school involvement and likelihood of living in ethnic enclaves. Therefore, the above parental factors can be the channels through which the intergenerational impact of legal status takes place.

In order to estimate the causal impact of immigrants' legal status on children's scholastic outcome, the endogeneity of legal status should be accounted for. Higher ability (more

intelligent or more self-motivated) people are more likely to be legal, as opposed to illegal immigrants. If ability is transmittable to children from parents, and if high ability parents know better how to educate their children, then legal status would just be a proxy for the inheritable ability. Consequently, the effect of legal status itself will be overestimated. The limited literature[1] on intergenerational impact of immigration status does not provide a solution to this endogeneity issue.

The Immigration Reform and Control Act (IRCA), the largest amnesty program in U.S. history, provides a good natural experiment in immigrants' legal status. This paper exploits this law to construct an instrument for the endogenous legal status. The IRCA was *unexpectedly* passed in 1986 and allowed all immigrants who entered the U.S. before 1982 to be legalized (Briggs 2004; Orrenius and Zavodry 2003). The consequence of this amnesty is that the probability of having legal status for pre-1982 arrivals is almost one; in contrast, the probability for post-1982 arrivals immediately drops. This discontinuous drop in 1982 cannot be explained by the effect of immigrants' duration of stay in the U.S. On the other hand, no evidence shows that the immigrants who entered a few years before 1982 are different in individual ability from the immigrants who entered a few years after 1982. Therefore, the indicator that an immigrant entered before or after 1982 is an eligible instrument for her legal status.

The data this paper uses are from the Los Angeles Family and Neighborhood Survey (LAFANS). This dataset provides records of immigrants' entry year and self-reported immigration status, which enable me to use the above instrument strategy. However, the self-reported immigration status brings another empirical obstacle: misreporting bias. It is not

[1] Kanaiaupini (2000) finds that in a small sample of immigrant families in Houston and San Diego, children of illegal immigrants faced more health risks than children of legal immigrants. Another related paper is Dustmann (2007), which employs a German survey and finds that immigrant fathers' return migration probability is negatively correlated with the probability of their children attending high school.

surprising that illegal immigrants tend to misreport their true status in surveys to avoid penalty and deportation.[2] When a binary variable, such as legal status, is measured with error, neither the OLS nor the IV estimate is consistent (Kane, et al. 1999). The OLS estimate is biased toward zero while the IV estimate is biased away from zero. Following the procedure proposed by Brachet (2005), which is heavily based on the model in Hausman et al. (1998), I use a two-step semi-parametric method to estimate the misreporting rate, and to recover the effect of true legal status on children's scholastic performance.

The main results of this paper can be summarized as follows: First, had the illegal Latino immigrant women who arrived in the US during 1982-1986 migrated before 1982 and thus been granted legal status by IRCA, their children's math scores could have raised by 0.65 of a standard deviation and reading scores by 0.50 of a standard deviation. Second, the above estimates have taken misreporting into account. The empirical result indicates that about 46% of truly illegal Latina immigrant women misreport their status. If the misreporting is ignored, the estimated impact of immigrants' legal status on their children's scholastic achievement using regular IV method could be twice as high as the results reported above. Third, parental income, residential location choice and parental involvement are found to be the main channels though which parental legal status influences children's scholastic performance.

The remainder of this paper is organized in six sections: Section 2 reviews the literature to provide a theoretical framework. Section 3 introduces the LAFANS data and the legislative background of the amnesty program IRCA (1986), and discusses the instrument in use. Section 4 introduces the empirical model to address the concern of the coexistence of omitted variables bias and the misclassification bias. Section 5 presents the empirical results. Section 6 analyzes

[2] Warren and Passel (1997) scrutinize census data and find that misreporting in citizenship widely exists among foreign-born people.

the four possible mechanisms through which the intergenerational impact of parental immigration status takes place, Section 7 concludes.

2. Theoretical Framework

Haveman and Wolfe (1995) review the economic theories of the determinants of children's educational outcome. A child's educational outcome is influenced by her parents in two ways. One is by inheriting her parents' endowments, including biological attributes (such as intelligence) and cultural attributes (such as commitment to learning). (Becker and Tomes, 1985) The second way parental influence works is from a variety of choices that parents make for the family. Given their preference and economic resources, parents make many decisions including consumption, investment in children's education and health, as well as residential location, fertility and family structure. A child's educational outcome, as one of the outputs of her family, is influenced by many of the parents' choices.

In this framework, legal status influences children's educational outcome by the second way stated above. The illegal status of unauthorized immigrants puts them at a disadvantage in bargaining for wages, limits their choice set of occupation and residential location and adds uncertainty to their life. Exogenous change in legal status, such as the one generated by IRCA (1986), removes many constraints in immigrants' economic and social activities, and improves immigrant families' economic resources and choice sets, through which children's educational outcome can be benefited.

First, illegal status imposes wage penalties, which restricts illegal immigrants' resources that can be invested in their children's education. Rivera-Batiz (1999) and Kossoudji and

Cobb-Clark (2002) both use Legalized Population Surveys (LPS) and finds the average wage of Mexican illegal immigrants grew by 15-20% after they were legalized under IRCA. About half of the growth cannot be explained by changes in observed characteristics, such as age, marital status and education attainment. Rivera-Batiz concludes that the unexplained part reflects discrimination against illegal status. Kossoudji and Cobb-Clark (2002) attribute the unexplained part to increased return to immigrants' skills, because legalization grants immigrants freedom to find jobs that better match their skills. In either case, legalization substantially increases the earnings of illegal immigrants. And this can have a positive impact on children's educational outcome, if the demand for investment in children's education is income elastic.[3]

Second, illegal status of unauthorized immigrants can also negatively affect their children's scholastic achievement by having the families be more likely to live in ethnic enclaves. Though there is no literature studying the relationship between legal status and the type of neighborhoods in which immigrants choose to live, it is reasonable to suppose that illegal immigrants are more prone to live in enclaves than legal immigrants due to the concern for security and survival. For illegal immigrants, a community with a large number of the same ethnic population is the best place to hide themselves from the attention of immigration law enforcement. In addition, the ethnic networks in enclaves help illegal immigrants in job-searching. Edin et al. (2003) use a natural experiment provided by the immigrant policy of Sweden and find that living in ethnic enclaves has a positive effect on the earnings of the first generation of low-skilled immigrants. However, such benefits may not pass to the second generation. Enclave residence gives children of immigrants little exposure to English and could result in limited English proficiency (Chiswick

[3] For example, Dahl and Lochner (2005) estimate that a $1,000 increase in family income, which is exogenously caused by a welfare program, raises Black or Hispanic children's math scores by 0.03 of a standard deviation and reading scores by 0.05 of a standard deviation.

and Miller 1995). A large number of studies in the fields of education, psychology, and linguistic study find that language proficiency affects students' acquisition of knowledge, participation in class activities, and self-expectation for learning.

In addition to the above mechanisms, there are other potential reasons why immigrants' legal status affects their children's scholastic achievement. For example, illegal immigrants probably don't want to be exposed to the public and they usually don't speak English well. Hence, they tend to be distant from teachers and counselors at schools and not to be involved in their children's school life. Lack of parent-school attachment could easily lead to students' absence from schools (Hanna 2003) and poor scholastic performance. The intergenerational effect of immigrant parents' legal status that this paper intends to estimate is the treatment effect that could work through all kinds of mechanisms.

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3. The Data and IRCA

3.1 The LAFANS Data

This study uses the Los Angeles Family and Neighborhood Survey (LAFANS) data. During the period of April 2000 and January 2002, 1,981 households with children from 65 census tracts of Los Angeles County completed the survey. In each household, one randomly selected child and the child's mother, who was designated the Primary Care Giver. In multi-child households, one of the siblings of the randomly selected child was also selected at random as a second child respondent. Because the survey did not particularly interview fathers, the immigration status of father is missing (See Appendix A for detailed discussion on this issue).

3.1.1 Definition of Immigrants' Legal Status

Figure I illustrates how immigrants' legal status was determined in the LAFANS questionnaire. The survey asked the foreign-born people a series of questions regarding to their citizenship, permanent residency ("green card"), refugee type, and visa status. One who reported to have the U.S. citizenship, or the permanent residency, or a refugee status, or a valid visa is classified as "legal immigrants." The others were classified as "illegal immigrants."[4] Using the definition of legal status described above, I am able to identify the immigration status of 1,871 mothers. 754 (40%) of them are native born; another 757 (40%) are legal immigrants; and the remaining 360 (20%) are illegal immigrants. Due to the fact that Latina immigrants account for 72% of legal immigrants and 99% of illegal immigrants in the survey, this study focuses on Latino immigrant families.

3.1.2 Measurement of Children's Scholastic Achievement

Three tests from the Woodcock Johnson-Revised Test of Achievement (WJ-R) were administered to the randomly selected children and siblings. Applied Problems assessment which is a *math test*, and Letter-Word Identification test, which is a *vocabulary tes*t, are administered to children ages 3-17. Passage Comprehension assessment, which is a *reading test*, is administered to children ages 6-17. Compared to vocabulary test, reading test assesses more advanced reading abilities. Tests could be completed in English or Spanish depending on the respondent's preference. All the raw scores are standardized to normative scores that show a LAFANS child's reading and math abilities in comparison to the national average for the child's

[4] This method of classifying legal status is well-accepted in the literature of illegal immigrants. For example, the same classification was adopted by Goldman et al. (2005) and Prentice et al. (2005).

age.[5] Standard scores have a population mean of 100 and a standard deviation of 15. I re-normalize the standard scores by subtracting 100 from the scores and dividing by 15. The detailed interpretation of the scores is presented by Table A.1.

The upper part of Table I presents the average test scores of children by their mothers' legal status.[6] Rows (1)-(3) indicate that legal immigrants' children on average perform better in all three tests than their illegal counterparts. The differences for math and reading tests are significant at 90% confidence level, while the difference for vocabulary test is insignificant. Row (4) indicates that legal immigrants' children are more likely than illegal immigrants' children to take tests in English. The difference is significant at 99% confidence level. However, whether the gap between the two types of children is caused by their mother's immigration status remains a question because legal status is not random.

The lower part of Table I compares the characteristics of Latino immigrant women by their immigration status. Illegal immigrant women are different from their legal counterparts in almost every aspect. One of the most striking differences is that about one in four legal Latina immigrant women migrates as a child (before age 14) while almost all illegal immigrant women migrate as adults (at age 14 or older). Immigrants arriving before age 14 are defined in immigration literature as the 1.5 generation The 1.5 generation has the benefit of exposure to U.S. norms, education, and language during their formative childhood years, and they are found to have a markedly different schooling and earnings trajectory than the first generation, who arrived as adults (Fry 2002). Hence, mixing children of those who themselves grow up in the U.S. and children of those who arrived as adults makes it complicated to disentangle the generation effect

[5] The scores of Spanish form users are normalized in the way that their scores are comparable to the scores of English form users.

[6] The negative mean of math and reading scores indicate that the sampled children perform worse than national mean.

from parental legal status effect. For this reason, the 1.5 generation immigrants and their children are excluded in the following analysis.[7] However, the ideal thing for identification is a natural experiment in immigrants' legal status.

3.2 The Legislative Background of IRCA 1986

After years of debate on how to best curb illegal immigration, Congress passed the bill known as the Immigration Reform and Control Act (IRCA) in October 1986. It was signed into law by President Ronald Reagan on November 6, 1986. The bill contained three key provisions. It mandated the intensification of Border Patrol activities; criminalized the act of knowingly hiring an illegal immigrant as well as established sanctions for such employers; and enacted two amnesty programs to address the concern of shortage in seasonal agricultural workers and to "wipe the slate clean".

Two amnesty programs offered legal status to two types of undocumented aliens:

1) Those who have continuously resided in the United States since January 1, 1982. This is the Legally Authorized Workers (LAW) program or so called pre-1982 program.

2) Those who have worked in agriculture for 90 days or more between May 1985 and May 1986. This is the Special Agricultural Workers (SAW) program.

About 1.7 million LAW applications and 1.3 million SAW applications were filed. Over 90 percent of the applications were approved, meaning over 2.7 million immigrants were granted amnesty under the two programs.

Though two amnesty programs were available, the only relevant program to LAFANS immigrant women was the pre-1982 program. The first reason is that agricultural workers are

[7] In fact, after the 1.5 generation is dropped, many differences between legal and illegal Latina immigrant women presented in Table I become smaller. Some of them even disappear.

mostly male. Chiswick (1988) documents that 83 percent of the SAW program were male as opposed to approximately half men and half women in the LAW applicants. The second reason is that Los Angeles County is an urban area. Only about 1% LAFANS interviewees work in agricultural industry. Figure II displays the ratio of legal Latina immigrant women to total Latina immigrant women by entry year. It is obvious among the plots that a discontinuity happens at the entry year of 1982. For each pre-1982 cohort, the fraction of legal immigrant is either one or very close to one, suggesting that pre-1982 immigrants benefited from LAW. In contrast, starting from the cohort of 1982, the fraction of legal immigrant drops. The highest fraction of legal immigrants among the post-1982 cohorts is 0.86 (1986 cohort), still much less than most of the pre-1982 cohorts.

The regressions in Table II further show that entering before 1982 is a good predictor of immigrant women's legal status, the sample in use is the 192 Latina immigrant women who arrived in the U.S. during 1977-86[8] at the age of at least 14. The dependent variable is the binary indicator of self-reported legal status. Both the Linear Probability Model (LPM) and Probit regressions are used. Columns (1) and (3) only use the entry year dummies as regressors, while columns (2) and (4) include several characteristics of these women as controls. The default cohort is the 1982 cohort. Two conclusions can be drawn from this table: First, the cut-off year is 1982, but not any other random year. Columns (1)-(4) all indicate that the likelihood of being legal for each pre-1982 cohort is significantly higher than that of the default cohort, while the likelihood of being legal for each post-1982 cohort is not significantly different from that of the default cohort. Second, since the immigrant women's duration in the U.S. is included in columns (2) and (4), the higher likelihoods of being legal for the pre-1982 cohorts

[8] The reason to restrict sample to these particular 10 years will be illustrated later in the section.

cannot be interpreted as a duration effect, but has to be understood as the effect of the amnesty.

Discontinuity at 1982 cohort also happens to children's test scores. Figures IIIa and IIIb display the average test scores of children[9] by their mothers' entry year. Within the 10-year window between 1977 and 1986, a striking decrease in average scores exists in 1982 in both figures, which indicates that children of pre-1982 immigrants have an advantage over children of later immigrants. Figure IIIc also shows an obvious discontinuous gap between children of pre-1982 immigrants and children of post-1982 (except 1983) immigrants in terms of taking test in English. The above analysis suggests that entering before or after 1982 can be a candidate of the instrument to immigrants' legal status.

3.3 The Validity of the Instrument

Exclusion restriction requires that a valid instrument has to be uncorrelated with any unobservable that could have an impact on the outcome. In this section, I examine this restriction, i.e. whether pre-1982 arrivals and post-1982 arrivals could be different types of immigrants. Since IRCA happened in 1986, two groups of post-1982 immigrants need to be separately compared with pre-1982 immigrants. One is 1982-1986 arrivals; the other is post-IRCA arrivals. I first examine post-IRCA arrivals and then examine 1982-1986 arrivals.

3.3.1 Pre-IRCA Immigrants Vs. Post-IRCA Immigrants

One of the unintended consequences of IRCA is that it did not deter new illegal immigrants from entering the U.S. but continued to draw them in (Orrenius and Zavodny 2003). Figure IV displays the number of Latina immigrant women in LAFANS data by their entry year. The

[9] Children are not older than 17 in 2000. Considering that their parents entered U.S. during 1977-1986, over 90 percent of the sampled children are US-born.

number of observations surges during 1988-1990. Latino illegal immigrants heavily rely on established immigrants in the U.S. to assist their migration. The immigrants legalized under IRCA lower the cost of their relatives' and friends' to attempt new migrations, and thus may induce those who had not previously sought migration to migrate. In 1988, the U.S. consulate in Tijuana experienced 48% increase in applicants for temporary visas (Cornelius 1989). Moreover, the desire for family reunion may have also changed the extent to which people value migration. Cornelius (1989) also documents that the Mexico consulates in the U.S. border cities reported a sharp increase in the number of undocumented children being detained by the Border Patrol in 1988. The above two reasons for the surge in the number of immigrants following IRCA suggests that post-IRCA immigrants may have different characteristics from pre-IRCA immigrants. In the LAFANS sample, post-IRCA Latina immigrant women on average were 2.2 years older at arrival and had one more year of schooling than their pre-IRCA counterparts. Both differences are statistically significant. Due to the concern that the pre/post-IRCA immigrants may have different unobservable endowments that would affect their children, post-1986 immigrants and their children are excluded from the empirical analysis of this paper.

3.3.2 Pre-1982 Immigrants Vs. 1982-1986 Immigrants

The next question is whether 1982-86 immigrants are homogenous as pre-1982 immigrants. First, I want to address a concern as to why 1982 was picked by the legislators as the cut-off year. The legislators' intention was to legalize those who had set up permanent households in the U.S. The belief was that those who had lived at least five years under illegal status could be very determined to stay in the U.S.. When the first version of IRCA was proposed, but failed to pass, in 1982, it included an amnesty program that would legalize pre-1978 immigrants (Ramirez 1983).

When IRCA was eventually passed in 1986, the cut-off year became 1982.[10] Therefore, 1982 was picked only because of the five-year duration rule, not because that the legislators thought pre-1982 immigrants had possessed better attributes than their post-1982 counterparts.

In each year between 1982 and 1986 (inclusive), an immigration reform bill including an amnesty program was passed by one house of Congress but failed to pass in the other. Years of debate over this issue might have led people in foreign countries somehow to believe that there would be an amnesty program ahead and thus decided to migrate even without documents. If such anticipation existed and particularly attracted low-ability people to migrate, 1982-86 arrivals could on average have lower abilities than pre-1982 arrivals. Orrenius and Zavodry (2003) examine the monthly border apprehensions during 1977-89 and find no association between border apprehensions and the year dummy variable which indicates at least one house of Congress passed an immigration reform bill. Therefore, there is no evidence to suggest that immigrants who crossed the border without documents during 1982-86 did so because they were more certain than their pre-1982 counterparts that an amnesty program was soon to be enacted.

Actually by the time that IRCA was passed, neither immigrants nor legislators themselves believe that the passage could actually happen. Briggs (2004) documented "… after failing to pass Congress in both 1982 and 1984, it appeared that the legislation would die in 1986 for this very reason." Orrenius and Zavodny (2003) also documented "On September 26, 1986, the House voted not to take up the immigration reform bill but then, in a 'stunning reversal', passed the amnesty on October 9."

In order to further provide evidence that the pre-IRCA immigrants are homogenous, Figure V displays Latino immigrant women's years of schoolings and age at arrival by entry year. Both

[10] Even recent new amnesty proposals, e.g. the Hagel-Martinez bill in 2006, continue to use the arbitrary five-year-old "root" criteria.

figures are smooth at 1981 to 1982. Table III compares a variety of characteristics of the 1977[11]-1981 arrivals and the 1982-1986 arrivals. Not surprisingly, the earlier cohorts are older and have stayed in the U.S. longer. Except for age and duration, the 1982-1986 arrivals show no difference in all other observed characteristics from the pre-1982 arrivals.

3.3.3 Selection of Migration and Return Migration

Figure IV shows that the number of immigrants fluctuates significantly by year of entry, and there is a large decline between 1980-1981 arrivals and 1982-1983 arrivals. Since the majority of immigrants come to the U.S. seeking jobs to increase personal and family's wealth, the macroeconomic conditions in the U.S. can affect aliens' intension of migration. In Figure VI, I plot the Californian unemployment rate together with the number of LAFANS immigrant women by entry year.[12] The clear negative correlation between the two variables indicates that immigrants responded very well to business cycle of the host country. When the U.S. economy was booming (or in recession), more (or less) people would migrate in. In 1981, the U.S. economy started a recession, which lasted through 1983. And the worst year was 1982 and 1983. This could explain why the number of immigrants sharply declines in 1982.

The coincidence that IRCA and the recession happened in the same year brings a concern that the people who self-selected to be immigrants under different economic situation could have different unobservables. Note that immigrants who moved to the U.S. during a recession and managed to survive and stay in the country potentially have higher unobservable abilities than immigrants who entered during a booming period. Consequently, if there is a selection-bias

[11] The starting year is set at 1977 in order to balance the number of years before and after the cut-off year 1982.
[12] I also plot the U.S. unemployment rate together with the number of Hispanic immigrant women in Census 2000 by entry year. The figure has the same pattern as Figure VI.

caused by the U.S. economic fluctuation and selection of migration, the direction of the bias probably works against finding that pre-1982 immigrant families outperform post-1982 ones.

Moreover, notice that the immigrants this paper studies stayed in the U.S. from 1980s to 2000. The immigrants who decide to permanently stay in the U.S. are only a proportion of the initial immigrants. Many others may have returned to their original country during the two decades. Another source of bias may arise from selection of return migration. In fact, the five-year-residence rule of IRCA can help relieve the concern. Lindstrom (1996) analyzes the data of Mexican Migrant Project and find that the duration of the first-trip of return migrants on average is 22 months and the standard deviation is 28 months. His finding suggests that the pre-1982 immigrants who planned to return probably had already done so before IRCA. Thanks to the design of IRCA, both pre-1982 and post-1982 arrivals who exist in a 2000 survey are those who intend to permanently stay in the U.S..

3.3.4 Fraud of IRCA Applicants

The large decline in the number of immigrants from 1981 to 1982 can bring another concern as follows. Some 1982 and 1983 arrivals perhaps used fraudulent documents indicating continuous residence since January 1982 and thus obtained legal status. These people could still lie about their year of entry in the LAFANS survey. If this is true, and if the ability of lying is correlated with parenting skills, which itself is hard to believe, the instrument strategy can be jeopardized. However, literature studying IRCA finds that it is the agricultural worker program (SAW), not the pre-1982 program (LAW), was the victim of fraud. The criteria of SAW, which requires only 90 days of farm work experience, are much lower than that of LAW, which requires five years of continuous residence in the U.S.. “Those who qualified for neither were quickly

attracted to the SAW program. Everyone in or near the legalization program recognized this situation."(North 2005) Before IRCA was practiced, the estimated SAW applicants were only a few hundred thousand. However, the actual applicants were 1.3 million. In contrast, the LAW applicants were estimated to be four million, but actually ended up with 1.7 million (Chiswick 1988). These numbers provide evidence that the SAW, rather than the LAW, was the target of fraudulent applications. In other words, immigrants who intended to cheat to get legalization would cheat about their occupations rather than the years of entry.

4. The Model of Estimation

4.1 The Empirical Model

The empirical specification can be derived from Becker and Tomes' (1986) model on intergenerational transmission of earnings and incorporates immigrant parents' legal status. The production function of a child's scholastic achievement can be represented by:

(1) $$y_{ij} = y(\Omega_i(T_i^*), H_i, w_{ij}) .$$

The subscript i represents an immigrant parent and j represents her child. y_{ij} represents the child's scholastic achievement. Ω_i represents a set of parental optimal choices, which is conditional on parental legal status, denoted by T_i^*. T_i^* is a binary indicator, which is one if a parent is a legal immigrant and zero if she is illegal. The elements of Ω_i include parental earnings, residential location, residential mobility and parental school involvement. H_i represents a set of parental characteristics and parental optimal choices, which is presumably independent of parental legal status, e.g., family size and family structure. w_{ij} represents a child's endowment, e.g., intelligence and commitment to learning. A child's endowment is

transmitted from her parents' endowment w_i both through biological mechanisms and social mechanisms (e.g., role model).

In the case that w_{ij} is observable to economists, the total effect of legal status can be obtained by estimating the linear regression:

(2) $$y_{ij} = \alpha_0 + \beta T_j^* + H_j \alpha_1 + w_{ij} \alpha_2 + u_{ij}.$$

However, economists usually are not able to observe all elements of w_{ij}. Since T_i^* is correlated with unobserved w_{ij} through w_i, the OLS estimate of β in fact captures both the effect of legal status and the effect of inherited endowment. The identification of β relies on some immigration policies that affect legal status of immigrants but meanwhile are orthogonal to immigrants' endowments. Section 3 indicates that IRCA provides a great candidate of instrument variable z, defined as followed:

$$z = \begin{cases} 1 & \text{if the mother is a pre-1982 immigrant} \\ 0 & \text{if the mother is a post-1982 immigrant} \end{cases}.$$

Therefore, the IV estimation model can be written as:

(3a) $$y_{ij} = \alpha_0 + \beta T_i^* + H_i \alpha_1 + X_{ij} \alpha_2 + \varepsilon_{ij};$$

(3b) $$T_i^* = 1(\theta_0 + \lambda z_i + H_i \theta_1 + X_{ij} \theta_2 + v_{ij} > 0),$$

where X_{ij} represents observed characteristics of a child, such as age and gender. ε_{ij} and v_{ij} include the unobserved endowments and other shocks (e.g. luck). The omitted variables problem is captured by the positive correlation between ε_{ij} and v_{ij}. However, equations (3a) and (3b) cannot be used as the ultimate empirical model, because T_i^* is likely to subject to non-trivial measurement error due to immigrants' misreporting.

4.2 Misclassification Bias

It can be risky for illegal immigrants to tell the truth about their migration status and many illegal immigrants lie in surveys. Warren and Passel (1987) analyze the discrepancy between Census 1980 and INS alien registration figures. They discover that a serious misreporting problem exists in self-reported citizenship in census data. The misreporting rate was the highest for aliens from Mexico, the largest sending country of illegal immigrants. About 65% self-reported Mexican naturalized citizens misreported their status. Since the data used by this paper is from a survey conducted in Los Angeles County, a place with a large population of Latin American immigrants, the misreporting of legal status by interviewees is likely to be extensive.

When a binary variable is measured with error, it is defined as a misclassification problem. Like classical measurement error, misclassification error causes attenuate bias to the OLS estimate (Aigner 1973, Hausman, Abrevaya and Morton 1998, Battistin and Sianesi 2006, and Lewbel 2007). However, unlike classical measurement error, misclassification error also biases IV estimate (Kane et al. 1999; Brachet 2005). The bias arises from the specialty of misclassification error. Unlike classical measurement error, the misreporting error term e is negatively correlated with the true treatment status indicator T^*. The reason is as follows. Define T as the self-reported status. When $T^*=1$, one can never over-report her treatment status, but can only under-report ($T=0$ and $e=-1$). Likewise, those who are truly untreated ($T^*=0$) can only over-report but never under-report themselves ($T=1$ and $e=1$). Since T^* is negatively correlated with e, any instrument z, which is (positively) correlated with T^*, will generally be (negatively) correlated with e (Kane et al. 1999). Therefore, the exclusion restriction of instrument is violated, IV estimate is inconsistent. Specifically, in the first-stage the estimate of the coefficient of z is biased toward zero and in the second-stage the estimate of treatment effect is biased away from zero.

4.2.1 The Misreporting Rates

Under certain assumptions, misclassification bias can be purged. Define the following two misreporting probabilities:

(5) $$m_0 = \Pr(T_i = 1 \mid T_i^* = 0) \text{ and } m_1 = \Pr(T_i = 0 \mid T_i^* = 1).$$

Specifically, under the scenario of misreporting in immigration status, m_0 and m_1, respectively, represent the probability that a truly illegal / legal immigrant misreports herself as a legal / illegal immigrant. One would expect that m_1 is zero, because it does not make sense for a truly legal immigrant to misrepresent herself as an illegal immigrant. The misreporting probabilities are assumed to be constant numbers that only depend on the true treatment status but are independent of any other observable or unobservable factors that would affect the outcome.[13] As an analog to the classical measurement error assumption for the continuous variable, this assumption is equivalent to saying that conditional on T^*, the misclassification error $T - T^*$ does not provide any information about the expected outcome y. This assumption can be violated if, under the scenario of this paper, the illegal immigrants who misrepresent themselves as legal immigrants are smarter or know better in educating children than those illegal immigrants who do not misreport.

Simple algebra shows that (See Brachet [2005] for detailed proof):

(6) $$E(T_i \mid z_i) = m_0 + (1 - m_0 - m_1) \cdot E(T_i^* \mid z_i).$$

Since the true treatment effect β is estimated by:

(7) $$E(y_{ij} \mid z_i) = \alpha_0 + \beta \cdot E(T_i^* \mid z_i),$$

substitute equation (6) into (7) to obtain,

[13] The constant misreporting probabilities assumption can be relaxed. Lewbel (2007), and Battistin and Sianesi (2006) provide different versions of the model in which misreporting is allowed to depend on covariates. However, this flexibility, in practice, adds many difficulties to estimation. The empirical part of this paper will provide evidences that it is reasonable to assume in this analysis that the misreporting rates are constant numbers.

(8) $$E(y_{ij} \mid z_i) = \alpha_0 - \beta \cdot (\frac{m_0}{1-m_0-m_1}) + \beta \cdot (\frac{1}{1-m_0-m_1}) \cdot E(T_i \mid z_i).$$

The IV estimation ignores misclassification, replacing $E(T_i^* = 1 \mid z_i)$ by $E(T_i = 1 \mid z_i)$. Therefore,

(9) $$p\lim \hat{\beta}_{IV} = \beta \cdot (\frac{1}{1-m_0-m_1}).$$

Given that normally $0 < m_0 + m_1 < 1$, the conventional IV estimate is biased away from zero.

4.2.2 A Two-step Semi-Parametric Method

In the case that the misreporting rates m_0 and m_1 are constant, they can be estimated as well as the other parameters by the following two-step semi-parametric method:

(a) The first step is based on Hausman, Abrevaya and Scott-Morton (1998).

Bring back the covariates X_{ij} and $H_{i,}$ and rewrite equation (6) as:

(10) $$\begin{aligned} \Pr(T_i = 1 \mid z_i, H_i, X_{ij}) &= m_0 + (1-m_0-m_1) \cdot \Pr(T_i^* = 1 \mid z_i, H_i, X_{ij}) \\ &= m_0 + (1-m_0-m_1) \cdot F_v(\theta_0 + \lambda z_i + H_i\theta_1 + X_{ij}\theta_2) \end{aligned}.$$

$F_v(\theta_o + \lambda z_i + H_i\theta_1 + X_{ij}\theta_2)$ is the distribution of v_{ij}, which is the error term of the first-stage equation (3b). If F_v is known, the set of parameters $(m_0\ m_1\ \theta_0\ \lambda\ \theta_1\ \theta_2)$ can be jointly estimated by MLE, where the log-likelihood function is given by:

(11)

$$L(m_0\ m_1\ \theta_0\ \lambda\ \theta_1\ \theta_2) = \sum_{ij}[T_i \ln(m_0 + (1-m_0-m_1)F_v(\bullet)) + (1-T_i)\ln(1-m_0-(1-m_0-m_1)F_v(\bullet))].$$

After obtaining $(\hat{m}_0\ \hat{m}_1\ \hat{\theta}_0\ \hat{\lambda}\ \hat{\theta}_1\ \hat{\theta}_2)$, the fitted probabilities that parent i is truly treated is computed as $F_v(\hat{\theta}_o + \hat{\lambda} z_j + H_j\hat{\theta}_1 + X_{ij}\hat{\theta}_2)$. Note that if F_v is known to be a logistic or normal distribution, equation (11) can be regarded as a transformed Logit or Probit model.[14]

(b) The second step is based on Brachet (2005):

[14] If there is no misclassification problem, meaning $m_0 = m_1 = 0$, then equation (13) collapses to the regular Logit or Probit model, and this two-step procedure is nothing but the conventional IV estimation.

Estimate the equation $y_{ij} = \alpha_0 + \beta T_j^* + H_j \alpha_1 + X_{ij} \alpha_2 + \varepsilon_{ij}$ by OLS, substituting T_j^* by $F_v(\hat{\theta}_o + \hat{\lambda} z_j + H_j \hat{\theta}_1 + X_{ij} \hat{\theta}_2)$. The resulting estimate of β is consistent if the assumption of the specification of F_v is correct. The standard errors of the coefficients are derived by viewing this sequential estimation as a method of moments, as detailed by Newey (1984) and Murphy and Topel (1985).

The equation (10) implies that identification of the parameters entirely comes from nonlinearity of the F_v (Hausman et al. 1998). In particular, the identification of m_0 and m_1 requires richness at the two ends of F_v (Brachet 2005), or in other words, for some individuals, $\Pr(T_j^* = 1 | z_j, X_{ij}, H_j)$ is extremely close to 0 or 1. This can be seen by taking the limits of equation (6):

(12) $$\lim_{F_v \to 0} \Pr(T_j = 1 | z_j, X_{ij}, H_j) = m_0 \quad \text{and} \quad \lim_{F_v \to 1} \Pr(T_j = 1 | z_j, X_{ij}, H_j) = 1 - m_1 .$$

The intuition is that if every immigrant is truly illegal, then the observed rate of legal immigrants is nothing but the misreporting rate m_0. Therefore, the identification of m_0 comes from the group of people who are very unlikely to be legal. Likewise, the identification of m_1 comes from the group of people who are very likely to be legal.

5. Results

The number of Latina immigrant women who entered the U.S. between 1977 and 1986 at the age of at least 14 in LAFANS is 192. The 192 women have 312 children who were surveyed. Out of the 312 children, 44 (14%) have an illegal immigrant mother. All children took math and vocabulary test. Only children at least six years old (279 out of 312) took reading test. The 312 children include 120 pairs of siblings and 72 single children. The unobservable

determinants to the scholastic performances between siblings may be correlated. To account for this concern, the standard errors of the following OLS and IV estimations are clustered by household, and robust standard errors are used in the two-stage semi-parametric estimations. The robust variance matrix estimator[15] does not impose any restrictive structure and fully allows for arbitrary serial correlation and heterogeneity (Wooldridge 2002 p.153, p.407 and p.496). In Appendix D, I provide a robustness test of the baseline two-step estimation by collapsing the sample by household and estimating the effect of mothers' legal status on the average test scores of siblings.

5.1 The OLS Estimation

Table IV presents the OLS results. Four outcomes of children's scholastic achievements are examined: math test score (columns (1)-(2)), reading test score (columns (3)-(4)), vocabulary test score (columns (5)-(6)), and the probability of taking tests in English (columns (7)-(8)). Mothers' immigration status strongly correlates with children's math scores, reading scores and probability of taking tests in English, even after the characteristics of both mothers and children are controlled. The difference in math scores and reading scores between the children of legal immigrant women and the children of illegal immigrant women are both around 0.5 of a standard deviation. And children of legal immigrants are more likely than their counterparts to take English tests by 14 percentage points. Nonetheless, no association between mothers' immigration status and children's vocabulary scores is found in columns (5)-(6). This result is consistent with what was shown by Table I. However, the OLS estimation of mothers' legal status effect is likely subject to both the omitted variables bias and the misreporting bias.

[15] The robust variance estimator of the first stage uses the formula (13.53) in Wooldridge (2002), p.407; the robust variance estimator of the second stage uses the formula (24) in Murphy and Topel (1985), p.376.

5.2 The Two-Step Semi-Parametric Estimation

Table V presents the first stage results of the semi-parametric estimation.[16] Four estimation models are used. Column (1) only controls for mother's duration in the U.S. Column (2) adds two pre-migration characteristics of mother: age and years of schooling. Column (3) controls for all observed mother's characteristics. Column (4) allows non-linearity in duration effect. The results in columns (1)-(4) show that entering the U.S. before 1982 raises the likelihood of having legal status by 61-68 percentage points. The estimated effect of pre-1982 entry on the probability of having legal status is consistent across models, which provides evidence that the instrument is exogenous. As a comparison to the first-stage semi-parametric method, the first-stage conventional IV[17] estimates of the four models are also presented in Table V. The first-stage conventional IV estimates are about half of the corresponding semi-parametric estimates, which indicates that the conventional IV estimation underestimates the correlation between the treatment status and the instrument because of the misreporting error.

The misreporting rate m_0 is estimated to be around 0.5, meaning that approximately 50 percent of truly illegal immigrants misrepresent themselves as legal immigrants. This magnitude of misreporting is not surprising, compared to Warren and Passel's findings from Census 1980. On the other hand, m_1 is consistently estimated to be zero across models, which means no truly legal immigrants misreport themselves to be illegal. This is consistent with expectations. To evaluate how well the two misreporting rates are estimated, I report the minimum and maximum of estimated $\Pr(\hat{T}_j^* = 1 | z_j, X_{ij}, H_j)$ to see whether they are close to 0 and 1. All the estimated

[16] Only the regressions using the sample of all 312 children are shown. The regressions using the sample of 279 children who have reading test scores were not shown here. But the results are very similar.
[17] See Appendix C for detailed procedures of the conventional IV estimation.

maximum probabilities are exactly one and all the estimated minimum probabilities are very close to zero, which means the estimates of the two misreporting rates are quite precise.

Table VI presents the estimation of the second stage of the semi-parametric method. The outcome is children's math scores. The controls in columns (1)-(4) are the same as those in Table V. The two-stage semi-parametric estimates indicate that if an illegal immigrant mother were legalized, her children's math scores should increase by approximately 0.70-0.78 of a standard deviation. To compare with the above results, OLS estimates and the second-stage conventional IV estimates are also presented. Notice that the second stage semi-parametric estimates are robust across models. In contrast, the OLS estimates, which drop from 0.75 in column (1) to 0.51 in columns (3)-(4), are more sensitive to control variables. This implies that the semi-parametric estimates are not the result of spurious relations. The semi-parametric estimates are all larger than the corresponding OLS estimates, suggesting that the misreporting bias dominates the potential omitted variables bias in the OLS estimations. This is very likely to happen considering that half of the illegal immigrants misreport their status. Moreover, the semi-parametric estimates are all smaller than the corresponding IV estimates, which confirms that the conventional IV estimates are upwardly biased by misreporting error.

Table VII presents the second stage semi-parametric results for other children's scholastic achievement outcomes. Odd numbered columns controls for mother's duration in the U.S. in a linear form. Even numbered columns allow a quadratic duration impact. Columns (1)-(2) indicate that mothers' legal status increases children's reading scores by 0.46-0.50 of a standard deviation. Columns (5)-(6) indicate that mothers' legal status increases children's probability of taking tests in English by 22 percentage points. Since illegal immigrants' children are more likely to take test in Spanish, the legal status effect on reading scores perhaps is understated. If

tests were only given in English, illegal immigrants' children, on average, would have lagged behind legal immigrants children by a larger gap.

Columns (3)-(4) show that mothers' legal status does not appear to affect children's vocabulary test scores.[18] This could be due to the specialty of the vocabulary test. This test assesses basic reading skills by having participants match a picture and a word, and read aloud as many letters and real words as possible in five seconds (as cited in Troia, 2004). In contrast, the reading test, along with the math test, assesses more advanced analytical skills that children have to learn and develop under instruction at school. It could be true that the disadvantages arising from parents' illegal immigration status do not hinder children's development in their basic skill but rather their advanced skills. This implies that illegal immigration status could affect the chances that illegal immigrants' children grow up to high-skilled adult workers and climb the social ladder.

6. Mechanism

Empirical results in Section 5 demonstrate the positive impact of immigrant women's legal status on their children's scholastic achievements. I now proceed to investigate the question of why parents' immigration status plays a role in determining children's scholastic outcome. I proposed in Section 2 that legal status affects a set of parental choices (e.g. parental income, neighborhood choice and parent-school contact), which ultimately affect children's scholastic performance. In this section, I empirically test the hypothesis that Latina immigrant women's

[18] The mothers' legal status effect on children's vocabulary scores may also be understated for the reason that some children take the test in Spanish. I estimated the effect of legal status using the sample only including children who take the test in English, the effect is still insignificant, though the magnitude dramatically increases to around 0.4 of a standard deviation.

legal status influences these three parental choices. The same two-step semi-parametric method is used in this section[19], except that the dependent variable becomes the value of household earnings, an indicator that whether an immigrant families lives in an ethnic enclave, and an indicator that whether an immigrant parent attend her child's school event. The results are presented in Table VIII. Odd numbered columns present OLS estimations and even numbered columns present the two-stage semi-parametric estimations.

Column (2) in Table VIII shows that the legal status of female immigrants[20] increases household earnings by 23%, which is consistent to findings in Rivera-Batiz (1999) and Kossoudji and Cobb-Clark (2002). The average household earnings in the sample is $20,000. Therefore, a 23% increase is $4,600. According to Dahl and Lochner's (2005) estimation, $1,000 increase in income raises Black or Hispanic children's cognitive test scores by roughly 4 percent of a standard deviation. If the same magnitude of income effect applies to LAFANS sample, the $4,600 increase in household earnings can induce an increase in children's test scores by 18.4 percent of a standard deviation. Remember that the total effect of parental legal status on children's test scores is estimated to be 50-70 percent of a standard deviation. Therefore, the channel of household earning accounts for one fourth to one third of the total effect.

In columns (3) and (4) of Table VIII, I test whether legal status affects the residential location choice of immigrant households. The outcome is whether a household lives in an ethnic enclave, which is defined in this paper as a very poor and predominantly Latino neighborhood.[21] Though the OLS estimate shows no correlation between women's legal status and households'

[19] The unit of observation is the household, not children. Hence, the sample size for the following estimations is 192 at most. Due to missing data of various household characteristics, the sample size could be even smaller.

[20] Appendix A shows that the legal status of the mother represents the legal status of both parents in the majority of sampled immigrant households.

[21] According to the LAFANS design, the very poor neighborhoods correspond to the tracts that are in the top 10 percent of the poverty distribution. The predominately Latino neighborhoods correspond to the tracts where the percentage of the Latino population in the total population is 70 and above. The neighborhoods satisfying both requirements are defined as ethnic enclaves.

residence choice, the two-stage semi-parametric estimate indicates that legal status decreases the probability of living in enclaves by 17.5 percentage points.

Lastly, I test whether illegal status prevents immigrant parents from having active contacts with children's school. The dependent variable is a binary variable which is one if a parent attended school events that her child was in. For households with two sampled children, I find that parents are more likely to attend the younger child's events than the older child's events. Hence, I drop the older children. The sample for this regression consists of children from single-child families and the younger children from multi-child families. Column (6) indicates that legal status improves the likelihood of immigrant parents to attend their children's school events by 42 percentage points.

7. Conclusion

About five million children in the U.S. live in families in which at least one parent is an unauthorized immigrant. This paper addresses the intergenerational impact of immigrants' legal status on their children's scholastic achievements. The empirical analysis exploits the exogenous variation in legal status as the result of IRCA, the largest amnesty program in the U.S. history, and uses a two-step semi-parametric method to purge the misclassification bias caused by misreporting in legal status by illegal immigrants. The empirical estimation indicates that: had the Latina illegal immigrant women who arrived in the U.S. between 1982-86 migrated before 1982 and been granted legal status by IRCA, their children on average would have improved their math scores by 0.7 of a standard deviation and the reading scores by 0.5 of a standard deviation. Immigrants' legal status is also found to increase children's probability of taking tests in English

rather than Spanish by 22 percentage points.

This paper also investigates the mechanisms through which immigrant parents' legal status affects children's scholastic performance. Empirical analyses using the same two-step semi-parametric method find that the exogenous change in immigrant women's immigration status from illegal to legal increases household earnings, reduces the probability of living in ethnic enclaves and increases parents' involvement in children's school events.

Considering that the population of the unauthorized Latino immigrants and their families has continued to grow in the past two decades, the negative intergenerational educational consequence of illegal status may contribute to the existing ethnic inequality in children's scholastic performance in the U.S.. The beneficiaries of IRCA had the opportunity to raise their children in more affluent and stable families and to provide more support to their children's education than if they had remained unauthorized. Hence, the children of these beneficiaries will be more likely to move upward in social class when they reach adulthood. The findings in this paper, which though was derived from a relatively small sample and needs future studies using other dataset to confirm, suggest the importance of taking into account the intergenerational impact of legal status when one intends to evaluate the consequences of a historic amnesty program or predict the possible consequences of new immigration legislations.

Appendix

A. Immigration Status of the Father and the Mother

Due to the design of LAFANS survey, only 25% of households provided father's information. In each household, a randomly selected adult (RSA) was interviewed. On the other hand, the mother (Primary Care Giver) of the children in the household was also interviewed. If the PCG coincidently was the RSA as well, the household only had one adult surveyed. Otherwise, the household had two adults surveyed.

Lack of fathers' information does not prevent us from estimating the effect of parental immigration status. I examine the 485 LAFANS families in which both the husband's and the wife's immigration status are available and find that women's self-reported immigration status is highly correlated with their husbands' self-reported immigration status. Table A.2 presents the matrix of husband-wife immigration status, where the diagonal elements dominate. 168 out of 205 (82%) legal immigrant women's husbands are also legal immigrants; 75 out of 100 (75%) illegal immigrant women's husbands are also illegal immigrants. Hence, women's self-reported status, in the majority of the cases, represents the reported status of both parents. The reason of the high correlation between husbands' and wives' status could be the matching mechanism in marriage, and also could be that the immigration policy in the U.S. favors family reunion, which makes it easy for one person to obtain legal status if her/his spouse is a legal immigrant.

If two parents' status perfectly matched, the estimated effect of women's legal status would actually capture the effects from both parents. However, notice that about one in four illegal women's husbands is a legal immigrant. Kanaiaupuni (2000) finds that the immigrant family with mixed legal status is slightly better-off than the family with two illegal parents in social and

economic status. His finding implies that, in a two-parent household, one illegal immigrant parent could be less harmful than two illegal immigrant parents. Therefore, the effect of women's legal status estimated from this survey should be understood as the lower bound of the effect of both parents' legal status and the upper bound of the effect of mother's legal status only.

C. Procedure of the IV Estimation

In Section 4, the empirical model of the IV estimation is represented by equations (5a) and (5b):

(5a) $$y_{ij} = \alpha_0 + \beta \cdot T_i + X_{ij}\alpha_1 + H_i\alpha_2 + \varepsilon_{ij};$$

(5b) $$T_i = 1(\theta_0 + \lambda z_i + X_{ij}\theta_1 + H_i\theta_2 + \nu_{ij} > 0).$$

Since the endogenous variable is a binary indicator of treatment, I use the procedure proposed by Woodridge (2001, p.623)

(a') Estimate the legal status T_i by a regular Logit or Probit model $\Pr(T_i = 1 \mid z_i, X_{ij}, H_i) = F_\nu(z_i, X_{ij}, H_i; \lambda)$. Obtain the fitted probability $\hat{F}_{\upsilon ij}$. This step is the same as the first step of the semi-parametric method, except that the misreporting rates are assumed absent.

(b') Estimate the equation of (5a) by IV using instruments 1, $\hat{F}_{\upsilon ij}$, X_{ij}, and H_i.

The second step (b') here is different from the second step (b) of the semi-parametric estimation, which is to run an OLS regression with $\hat{F}_{\upsilon ij}$ replacing T_i and then to derive the standard errors. The reasons for applying different second steps in different estimations are as follows: First, using (b') instead of (b) in the IV estimation has several nice features (Woodridge 2002, p.623). The standard errors are asymptotically valid and do not have to be adjusted. Also this approach exploits the binary nature of the endogenous explanatory variable, and thus is asymptotically efficient. However, the semi-parametric method cannot use this approach as the second step, because the T_i is measured with

error. Using $\hat{F}_{\upsilon ij}$ as the instrument is no better than using z_i as the instrument. The misclassification bias of the conventional IV estimation is the same for any instrument satisfying the usual IV assumption (Kane et al. 1999).

D. A Robustness Test

The robustness of the previous results is examined by estimating the effect of the mother's legal status on average scores of children by household. The original 312-child sample was collapsed to household level; the new sample size drops to 192 for math scores and 170 for reading scores. Table A.3 presents the results, which are generally similar to the results in Tables VI-VII. The effect of the mothers' legal status on children's math and reading scores is, respectively, 0.76 and 0.45 of a standard deviation. Both estimates are very close to the estimates using the individual children sample. The second stage semi-parametric estimates are also found to be much lower than the conventional IV estimates, while in the first stage the marginal effect of entering before 1982 estimated by semi-parametric method is much higher than the IV estimates. These evidences, again, indicates the existence of misreporting. The estimated misreporting rates are around 0.45 for truly illegal immigrants and 0 for truly legal immigrants, both of which confirm the previous estimates.

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Table I. Comparison between Legal and Illegal Latina Immigrant Women and Their Children

	Illegal	Legal	Difference
	(1)	(2)	(3)=(1)-(2)
Child			
Math	-0.302	-0.155	-0.146*
	[0.069]	[0.056]	[-0.089]
Reading	-0.549	-0.379	-0.170*
	[0.086]	[0.058]	[0.104]
Vocabulary	-0.017	0.058	-0.075
	[0.100]	[0.060]	[0.117]
Test in English	0.53	0.787	-0.257***
	[0.032]	[0.019]	[0.037]
Observations	439	735	
Mother			
Years of Schooling	8.163	9.17	-1.007***
	[0.296]	[0.251]	[0.388]
Age	32.977	39.112	-6.135***
	[0.499]	[0.529]	[0.727]
Duration in The U.S.	10.616	20.02	-9.404***
	[0.434]	[0.487]	[0.652]
Age at Entry	21.883	18.532	3.351***
	[0.571]	[0.521]	[0.773]
1.5 Generation	0.081	0.235	-0.154***
(=1 if arrived before age 14)	[0.023]	[0.026]	[0.034]
Speaking Spanish at Home	0.938	0.749	0.189***
	[0.024]	[0.026]	[0.036]
Living with Spouse	0.651	0.672	-0.02
	[0.0338]	[0.027]	[0.047]
Number of Children	2.844	3.134	-0.290*
	[0.143]	[0.090]	[0.169]
Employed	0.402	0.609	-0.207***
	[0.040]	[0.029]	[0.049]
Family Earnings	18.247	31.027	-12.780***
	[1.014]	[1.708]	[1.988]
Living in an Ethnic Enclave	0.278	0.147	0.131***
	[0.027]	[0.011]	[0.033]
Attended Children's	0.552	0.652	-0.100**
School Events	[0.036]	[0.024]	[0.043]
Observations	291	480	

Notes:

1. The means are weighted by the LAFANS sampling weights for PCGs or children.

2. Standard errors are in brackets. *** p<0.01, ** p<0.05, * p<0.1

Table II. The Year 1982 Is the Cut-off

Dependent Variable: Legal Status				
	Linear Probability		Probit (Marginal Effect)	
	(1)	(2)	(3)	(4)
Entered_77	0.424**	0.503*		
	[0.19]	[0.30]		
Entered_78	0.424**	0.484*		
	[0.19]	[0.27]		
Entered_79	0.408**	0.427*	0.166***	0.123***
	[0.19]	[0.24]	[0.04]	[0.05]
Entered_80	0.424**	0.439**		
	[0.19]	[0.21]		
Entered_81	0.416**	0.365*	0.226***	0.153***
	[0.19]	[0.19]	[0.06]	[0.05]
Entered_83	0.260	0.180	0.095	0.025
	[0.24]	[0.25]	[0.06]	[0.08]
Entered_84	-0.105	-0.182	-0.054	-0.278
	[0.25]	[0.24]	[0.14]	[0.29]
Entered_85	0.165	0.053	0.07	-0.095
	[0.21]	[0.25]	[0.07]	[0.22]
Entered_86	0.283	0.136	0.108**	-0.11
	[0.21]	[0.27]	[0.05]	[0.32]
Duration in the U.S.		-0.031		-0.041
		[0.05]		[0.04]
Other Controls	N	Y	N	Y
Observations	192	192	140	140
R^2 / psedo-R^2	0.25	0.29	0.23	0.32

Notes:

1. Other control variables include age, years of schooling, an indicator that whether speaks Spanish at home, an indicator that whether lives with spouse, and the number of children.
2. Regressions are weighted by the LAFANS sampling weights for PCGs.
3. Columns 1 and 2 use the Linear Probability model, because the linear regression can be run with the full sample. Columns 3 and 4 use the Probit regressions, which automatically drop observations who entered in 1977, 1978, and 1980 because immigrants who entered in those three years are all legal immigrants.
4. Robust standard errors are in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table III. Comparison between Pre-1982 and Post-1982 Immigrants and Children

	All	1977-81	1982-86	Difference
	(1)	(2)	(3)	(4)=(2)-(3)
Mother				
Legal	0.873	0.995	0.716	0.279***
	[0.031]	[0.003]	[0.063]	[0.063]
Years of Schooling	8.073	7.967	8.210	-0.243
	[0.348]	[0.491]	[0.488]	[0.693]
Age	40.373	42.515	37.614	4.901***
	[0.607]	[0.853]	[0.738]	[1.129]
Duration in the U.S.	18.926	21.064	16.171	4.893***
	[0.246]	[0.173]	[0.171]	[0.240]
Age at Entry	21.029	20.953	21.126	-0.172
	[0.589]	[0.855]	[0.781]	[1.160]
Speaking Spanish at home	0.845	0.805	0.898	-0.093
	[0.033]	[0.051]	[0.035]	[0.062]
Living with Spouse	0.712	0.729	0.690	0.039
	[0.040]	[0.053]	[0.060]	[0.081]
Number of Children	3.188	3.181	3.196	0.015
	[0.137]	[0.229]	[0.161]	[0.277]
Observations	192	99	93	
Child				
Math Test Score	-0.136	-0.045	-0.242	0.197
	[0.091]	[0.139]	[0.105]	[0.174]
Reading Test Score	-0.495	-0.375	-0.645	0.269
	[0.100]	[0.147]	[0.111]	[0.185]
Vocabulary Test Score	0.017	0.078	-0.054	0.132
	[0.099]	[0.145]	[0.132]	[0.196]
Tests in English	0.789	0.860	0.707	0.153**
	[0.038]	[0.040]	[0.065]	[0.077]
Female	0.482	0.452	0.517	-0.064
	[0.037]	[0.050]	[0.053]	[0.073]
Age	11.156	11.466	10.797	0.669
	[0.321]	[0.435]	[0.491]	[0.657]
Observations	312	162	150	

Notes:

1. The means are weighted by the LAFANS sampling weights for PCGs or children.
2. Standard errors are in brackets.
3. *** p<0.01, ** p<0.05, * p<0.1.

Table IV. The OLS Estimations

Dependent Variable:	Test Scores						Take Test	
	Math		Reading		Vocabulary		in English	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mother Has	0.656***	0.513***	0.658***	0.463**	0.194	0.141	0.289**	0.140*
Legal Status	[0.19]	[0.17]	[0.22]	[0.21]	[0.30]	[0.34]	[0.141]	[0.079]
Mother's		-0.030		0.013		0.013		0.006
Duration in US		[0.04]		[0.04]		[0.04]		[0.011]
Other Controls	N	Y	N	Y	N	Y	N	Y
Observations	312	312	279	279	312	312	312	312
R^2 / pseudo R^2	0.05	0.25	0.04	0.19	0.00	0.15	0.05	0.32

Notes:

1. Other control variables include Mother's age, years of schooling, an indicator that whether mother speaks Spanish at home, an indicator that whether both parents are present, the number of children in the household, and children's age dummies.
2. Regressions are weighted by the LAFANS sampling weights for children.
3. Robust standard errors are in brackets. Standard Errors are clustered by household.
4. *** p<0.01, ** p<0.05, * p<0.1.

Table V. The Effect of Pre-1982 Entry on Legal Status

Dependent Variable: Mother's Legal Status				
	(1)	(2)	(3)	(4)
Marginal Effect of	0.659**	0.676**	0.614*	0.670**
Entering before 1982	[0.277]	[0.282]	[0.351]	[0.331]
m_0	0.420	0.504***	0.511***	0.524***
	[0.333]	[0.205]	[0.111]	[0.118]
m_1	0.006	0.007*	0.004	0.004
	[0.004]	[0.004]	[0.003]	[0.003]
Min(Pr(legal))	$5.4*10^{-47}$	$2.2*10^{-4}$	$7.3*10^{-5}$	$5.3*10^{-4}$
Max(Pr(legal))	1	1	1	1
Reference (1^{st} stage of IV)				
Marginal Effect of	0.395***	0.305***	0.277***	0.253**
Entering before 1982	[0.140]	[0.111]	[0.099]	[0.098]
Other Covariates (coefficients, not marginal effects)				
Mother's Duration in US	-0.386	-0.493	-0.510	0.237
	[0.332]	[0.360]	[0.488]	[3.443]
Duration Squared				-0.019
				[0.109]
Characteristics at Entry	N	Y	Y	Y
Other Controls	N	N	Y	Y
Observations	312	312	312	312

Notes:

1. Column (1) only controls for duration in the U.S.. Column (2) adds two pre-determined characteristics: age at entry and years of schooling, as the additional controls. Column (3) adds more controls including an indicator that whether mother speaks Spanish at home, an indicator that whether the child live with both parents, an indicator that whether the child is the only child, child's gender, and child's age dummies. Column (4) adds the control variable of duration squared.
2. Marginal effects are calculated as $\Pr(T^* = 1 \mid z = 1, \overline{X}, \overline{H}) - \Pr(T^* = 1 \mid z = 0, \overline{X}, \overline{H})$, where $\overline{X}, \overline{H}$ are sample means.
3. m_0 is the misreporting rate of truly illegal immigrants and m_1 is misreporting rate of truly legal immigrants.
4. Regressions are weighted by the LAFANS sampling weights for children.
5. Robust standard errors are in brackets.
6. *** p<0.01, ** p<0.05, * p<0.1.

Table VI. The Effect of Mothers' Legal Status on Children's Math Scores

Dependent Variable: Child's Math Score				
	(1)	(2)	(3)	(4)
Mother Has Legal Status	0.764*	0.766**	0.700**	0.778***
(2-stage semi-parametric)	[0.393]	[0.320]	[0.282]	[0.302]
Reference				
OLS	0.753***	0.576***	0.513***	0.511***
	[0.189]	[0.171]	[0.190]	[0.167]
IV	1.205***	1.150***	0.954**	0.942***
	[0.454]	[0.370]	[0.374]	[0.364]
Other Covariates				
Mother's Duration in U.S.	-0.056	-0.054	-0.057	-0.296
	[0.034]	[0.035]	[0.036]	[0.365]
Duration Squared				0.006
				[0.009]
Characteristics at Entry	N	Y	Y	Y
Other Controls	N	N	Y	Y
R^2	0.10	0.20	0.25	0.25
Observations	312	312	312	312

Notes:

1. Column (1) only controls for duration in the U.S.. Column (2) adds two pre-determined characteristics: age at entry and years of schooling, as the additional controls. Column (3) adds more controls including an indicator that whether mother speaks Spanish at home, an indicator that whether the child live with both parents, an indicator that whether the child is the only child, child's gender, and child's age dummies. Column (4) adds the control variable of duration squared.
2. Regressions are weighted by the LAFANS sampling weights for children.
3. Robust standard errors are in brackets.
4. *** p<0.01, ** p<0.05, * p<0.1.

Table VII. The Effect of Mothers' Legal Status on Children's Other Scholastic Achievements

Dependent Variable	Reading Score		Vocabulary Score		Take Test in English	
	(1)	(2)	(3)	(4)	(5)	(6)
Mother Has Legal Status	0.507*	0.459*	0.122	0.054	0.229**	0.215*
(2-stage semi-parametric)	[0.287]	[0.281]	[0.346]	[0.311]	[0.112]	[0.115]
Reference						
OLS	0.463**	0.461**	0.141	0.152	0.140*	0.151*
	[0.214]	[0.214]	[0.335]	[0.333]	[0.082]	[0.080]
IV	0.911**	0.895**	0.127	0.126	0.555	0.575
	[0.449]	[0.443]	[0.656]	[0.657]	[0.588]	[0.879]
Other Covariates						
Mother's Duration in U.S.	0.004	-0.113	0.010	0.556	0.001	0.129
	[0.036]	[0.318]	[0.036]	[0.373]	[0.011]	[0.127]
Duration Squared		0.003		-0.014		-0.003
		[0.008]		[0.010]		[0.003]
Characteristics at Entry	Y	Y	Y	Y	Y	Y
Other Controls	Y	Y	Y	Y	Y	Y
R^2	0.18	0.18	0.15	0.16	0.28	0.28
Observations	279	279	312	312	312	312

Notes:

1. Characteristics at Entry include two variables: age at entry and years of schooling. Other controls include an indicator that whether mother speaks Spanish at home, an indicator that whether the child live with both parents, an indicator that whether the child is the only child, child's gender, and child's age dummies.
2. Regressions are weighted by the LAFANS sampling weights for children.
3. Robust standard errors are in brackets.
4. *** p<0.01, ** p<0.05, * p<0.1.

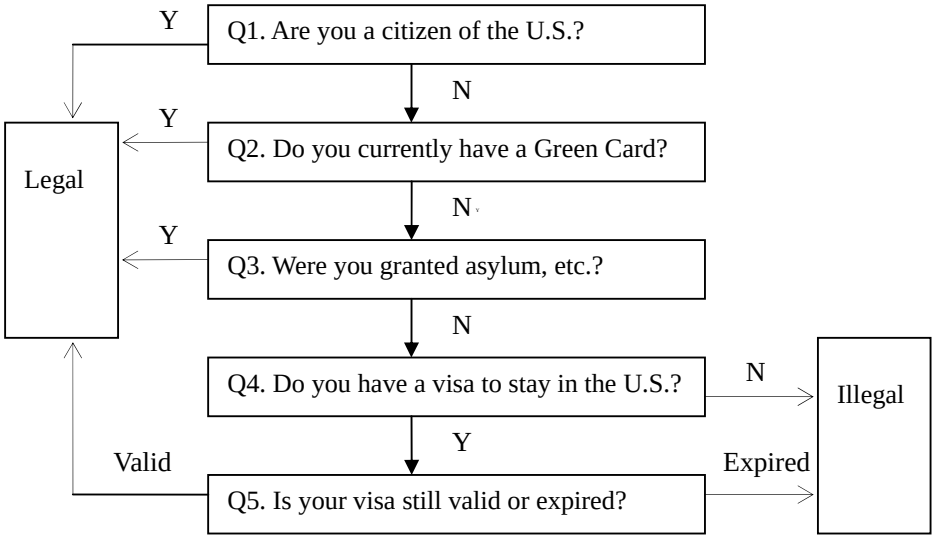
Table VIII. The Effect of Legal Status on Parental Opportunities and Choices

Dependent Variable:	ln(household earnings)		Living in an Enclave		Attend School Events	
	OLS	2-stage	OLS	2-stage	OLS	2-stage
	(1)	(2)	(3)	(4)	(5)	(6)
Legal Status	0.459*	0.236*	0.061	-0.175**	0.015	0.421*
	[0.270]	[0.121]	[0.087]	[0.085]	[0.141]	[0.236]
1st Stage						
before 1982		0.663***		0.725*		0.570*
(Marginal Effect)		[0.183]		[0.441]		[0.347]
m_0		0.509		0.453***		0.455**
		[0.724]		[0.096]		[0.191]
m_1		0.003		0.042		0.000
		[0.008]		[0.026]		[0.000]
Observations	161	161	192	192	186	186

Notes:

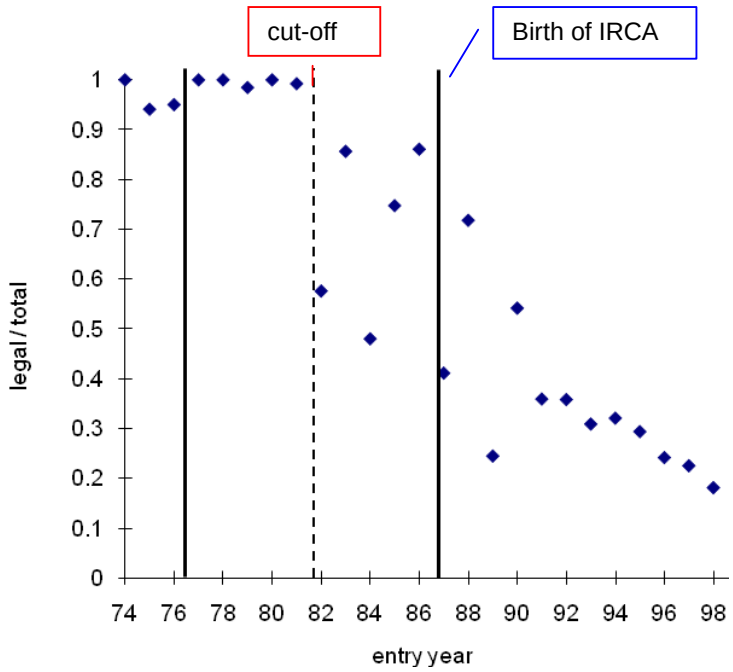
1. Earnings have been adjusted for inflation since the survey is conducted from 2000-2002.
2. The other covariates include immigrant women's years of schoolings, age, a quadratic form of duration in the U.S., language preference, living with spouse or not, the single child indicator, and the average value of children's age by household.
3. Marginal effect is the sample average of the effects of before 1982 on legal status, i.e. $\Pr(T_i^* = 1 \mid z_i = 1, X_i, H_i) - \Pr(T_i^* = 1 \mid z_i = 0, X_i, H_i)$.
4. m_0 is the misreporting rate of truly illegal immigrants and m_1 is misreporting rate of truly legal immigrants.
5. Regressions are weighted by the LAFANS sampling weights for PCGs.
6. Robust standard errors are in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Figure I. To Define Immigrants' Legal Status



Source: LAFANS

Figure II. The Ratio of Legal Immigrant Women to Total Immigrant Women by Entry Year

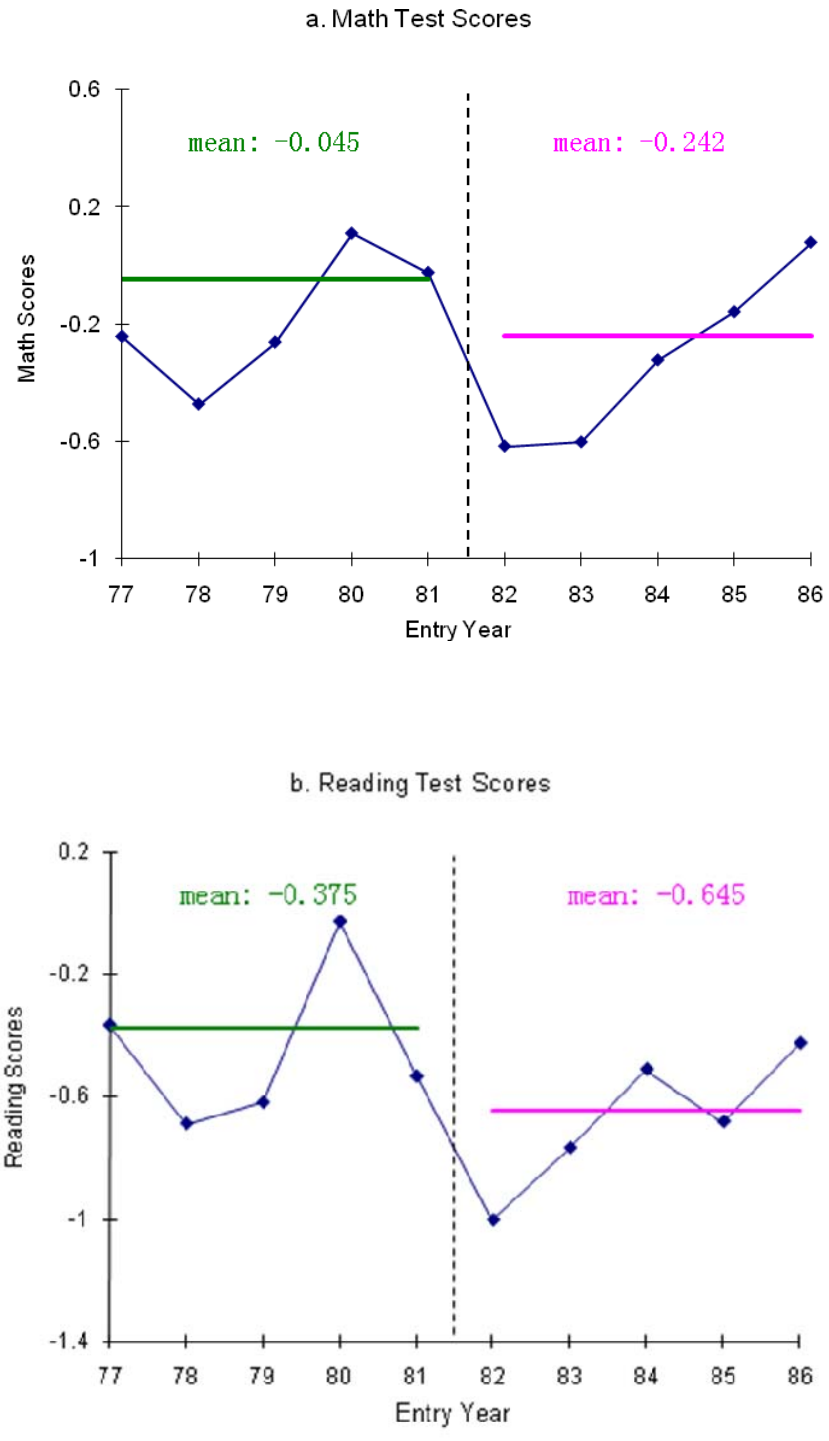


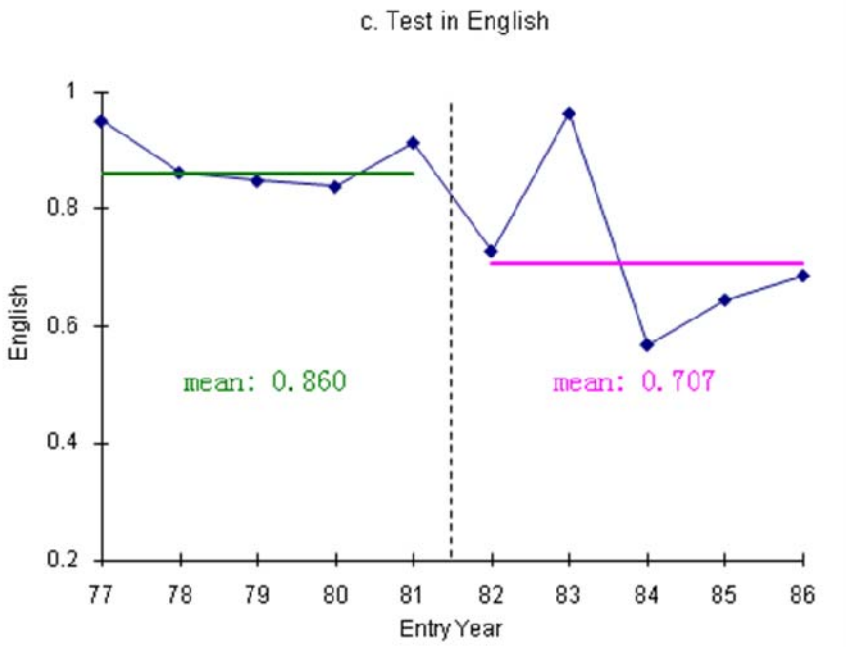
Source: LAFANS

Notes:

1. Only Latina immigrant women who entered the U.S. at age no less than 14 are in use (see text for details). The sample size is 696 Latina immigrant women (legal 389 / illegal 307).
2. The LAFANS sampling weights for PCGs are used to compute the ratios.

Figure III. Children's Test Scores by Mother's Entry Year



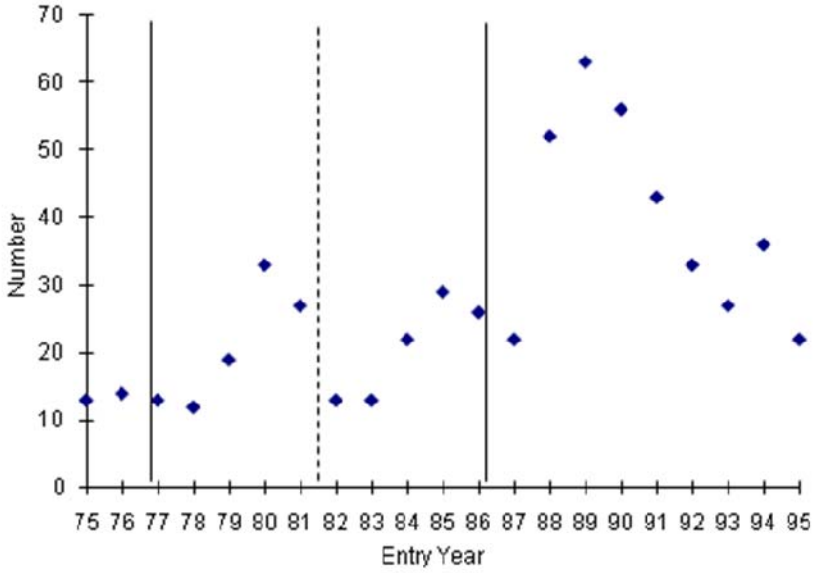


Source: LAFANS

Notes:

1. The numbers in Figures a and b are sample means of math and reading test scores. The numbers in Figure c are the ratio of children taking tests in English to total number of children.
2. The LAFANS sampling weights for children are used to compute the means and the ratio.

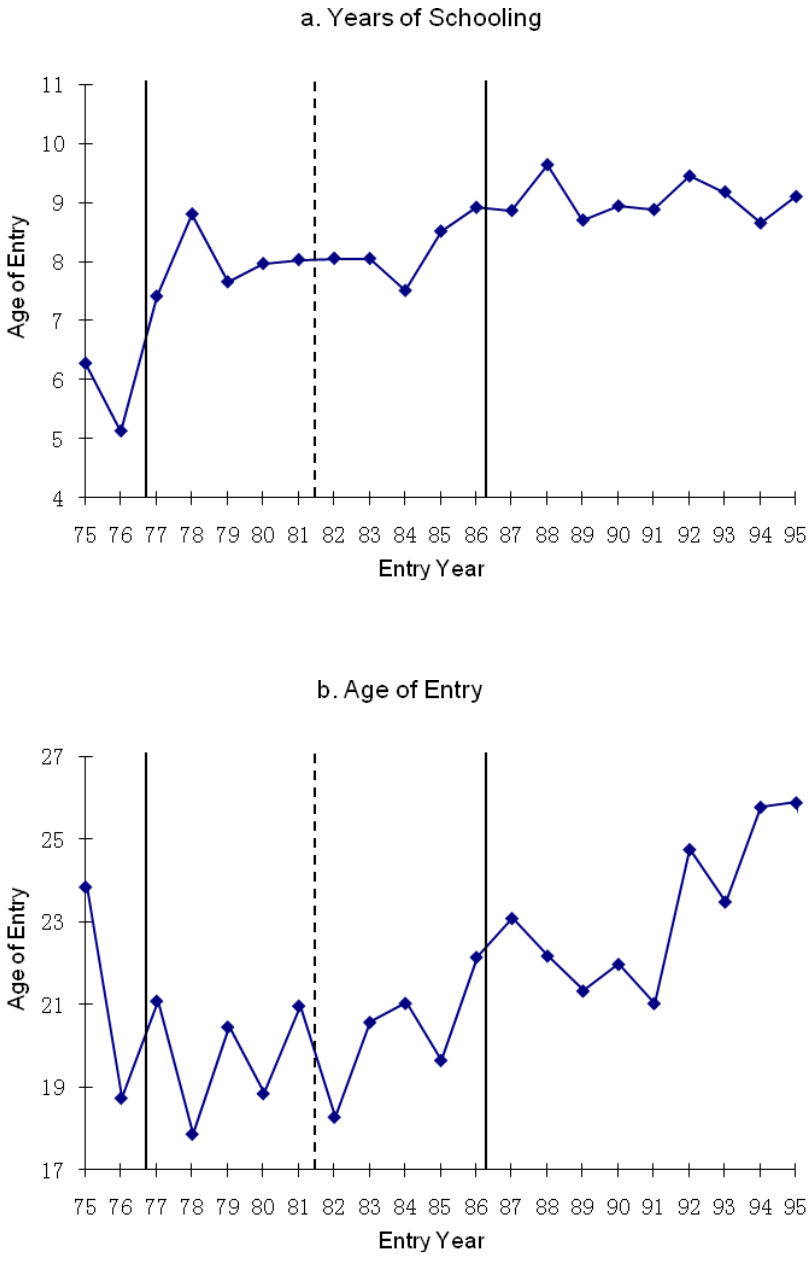
Figure IV. The Number of Latina Immigrant Women by Entry Year



Source: LAFANS

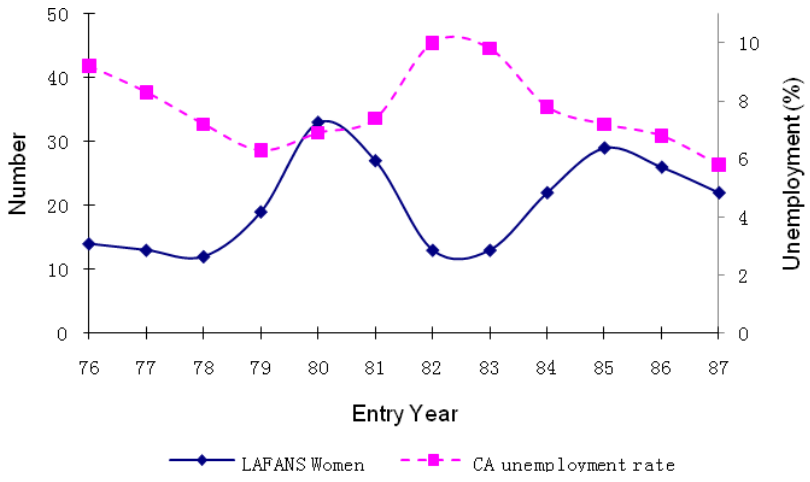
Note: Only Latina immigrant women who entered the U.S. at age no less than 14 are in use. The sample size is 696 Latina immigrant women.

Figure V. Latina Immigrant Women's Characteristics by Entry Year



Source: LAFANS
Notes:
1. Only Latina immigrant women who entered the U.S. at age no less than 14 are in use. The sample size is 696 Latina immigrant women (legal 389 / illegal 307).
2. The LAFANS sampling weights for PCGs are used to compute the ratios.

Figure VI. Immigrant Inflow and Economic Fluctuation in Destination



Sources: LAFANS, Census 2000, and Bureau of Labor Statistics.

Table A.1. Woodcock-Johnson Test of Achievement Scores

Renormalized Standard Score	Standard Score	Percentile Rank	WJ-R Classification
> 2	131 and above	98 - 99.9	Very Superior
1.334 - 2	121 - 130	92 - 97	Superior
0.668 - 1.333	111 - 120	76 - 91	High Average
-0.667 - 0.667	90 - 110	25 - 75	Average
-1.333 - -0.668	80 - 89	9 - 24	Low Average
-2 - -1.334	70 - 79	3 - 8	Low
< -2	69 and below	0.1 - 2	Low Poor

Source: LAFANS manual p.90.

Table A. 2.
The Correlation Between Husbands' and Wives' Self-reported Immigration Status

		Husband			
		Native	Legal	Illegal	Total
Wife	Native	**154**	24	2	180
	Legal	25	**168**	12	205
	Illegal	1	24	**75**	100
	Total	180	216	89	485

Source: LAFANS

Table A.3. The Effect of Immigration Status on Average Scores of Siblings by Households

Dependent Variable: Child's Test Score						
	Math Score			Reading Score		
2nd Stage	OLS	2-stage	IV	OLS	2-stage	IV
Legal	0.610***	0.764***	0.906***	0.530**	0.452***	1.062***
	[0.194]	[0.136]	[0.351]	[0.227]	[0.169]	[0.391]
Reference (Results in Table VI (col3) and Table VII (col1)						
Legal	0.513***	0.700*	0.954**	0.463**	0.507*	0.911**
	[0.190]	[0.282]	[0.374]	[0.214]	[0.287]	[0.449]
1st Stage						
before 1982		0.501*	0.197**		0.611**	0.204*
(Marginal Effect)		[0.270]	[0.097]		[0.263]	[0.106]
m_0		0.438**			0.454**	
		[0.213]			[0.183]	
m_1		0.000			0.000	
		[0.000]			[0.000]	
Reference (Results in Table V, col3)						
Marginal Effect of		0.614*	0.277***		0.419*	0.253**
Entering before 1982		[0.351]	[0.099]		[0.248]	[0.120]
m_0		0.511***			0.395***	
		[0.111]			[0.130]	
m_1		0.004			0.009*	
		[0.003]			[0.005]	
Observations	192	192	192	182	182	182

Notes:

1. The other covariates include immigrant women's years of schoolings, age, duration in the U.S., language preference, living with spouse or not, the single child indicator, the average value of sibling's gender indicator and the average values of sibling's age dummies.
2. Marginal effects are calculated as $\Pr(T^* = 1 \mid z = 1, \overline{X}, \overline{H}) - \Pr(T^* = 1 \mid z = 0, \overline{X}, \overline{H})$, where $\overline{X}, \overline{H}$ are sample means.
3. m_0 is the misreporting rate of truly illegal immigrants and m_1 is misreporting rate of truly legal immigrants.
4. Regressions are weighted by the average value of LAFANS sampling weights for children by households.
5. Robust standard errors are in brackets.
6. *** p<0.01, ** p<0.05, * p<0.1.