Mexico-U.S. Migration: Views from Both Sides of the Border[1]

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ABSTRACT

Migration to the United States increased sharply in the 1980s and 1990s, raising political concerns. The flow from Mexico, of both documented and undocumented migrants, was particularly large. Good data would contribute to rational discussion of this politically-charged issue, but data on immigration, particularly of the undocumented, are notoriously poor. This paper applies residual estimation techniques to data from the 1990 and 2000 population censuses of Mexico and the United States (Mexico-born population) to quantify the intercensal migration flow, arguing that the reasons why undocumented migrants might avoid enumeration in the U.S. would not adversely affect data from Mexico. Results suggest that the annual net flow of migrants from Mexico to the U.S. averaged between 300,000 and 450,000 between 1990 and 2000. A sensitivity analysis indicates that these results are quite robust (especially those using U.S. data) to likely errors.

Introduction

The proportion foreign-born of the total population recorded by decennial censuses of the U.S. declined steadily from14.7 percent in 1910 to 4.7 percent in1970, but has climbed sharply since then to 10.4 percent in 2000 as immigration increased (U.S. Census Bureau 2002). In fiscal year 2000, the annual number of permanent immigrants admitted had climbed to nearly 850,000 (U.S. Immigration and Naturalization Service 2001). According to the U.S. Census estimates, the foreign-born population increased by over 50% in the 1990-2000 period, compared to an increase of 9.3% for the natives and 13% for the overall population of the U.S. (U.S. Census Bureau 2003). This rise in immigration has been accompanied by increasingly vociferous calls to implement new entry restrictions. Although the volume of overall inflow is sometimes an issue, unauthorized immigration often dominates as the major concern. Perceived increases in flows of unauthorized migrants have resulted in enhanced border enforcement and several legislative initiatives such as the 1986 Immigration Reform and Control Act (Massey et al. 2002). The majority of unauthorized immigrants are believed to originate in Mexico, where the phenomenon is also regarded with concern (Canales 2002), partly because it is a cause of friction with its northern neighbor, and partly because the remittances from Mexicans working in the United States are an important contribution to Mexico's economy (the second largest source of foreign exchange after oil). In such a charged political atmosphere, good data would greatly assist the formation of sound policy, but unfortunately the data are far from good. Almost by definition, unauthorized immigrants are not documented, so direct records of their numbers do not exist. The substantial excess (6.8 million) of the enumerated population of the United States in the 2000 census over the Census Bureau's projected figure has added impetus to the study of immigration and of unauthorized immigration. The combination of a politically-charged issue and poor data provides fertile soil for inflammatory and poorly-supported claims.

Estimates of unauthorized migration made with U.S. data have generally been based on the difference between an observed population of migrants (for example in the decennial Census or other surveys) and an estimate of the size of the *authorized* migrant population (Bean 1998, Warren and Passel, 1987[2]). A problem with this approach is that the unauthorized population may be seriously undercounted in censuses and surveys, thus producing an erroneous count of the total migrants. A wide variety of approaches to assessing the magnitude of this problem are documented by Bean et al. (1998), but all rely on heroic assumptions or observations from potentially-unrepresentative surveys.

Mexico has taken steps over the last decade to assess the magnitude of the migratory flow to the U.S., and, most importantly, to measure the characteristics of the population involved with international movements. A number of household surveys since 1992 have

[2] Another approach to estimate unauthorized migration has consisted in using U.S. data on apprehensions among Mexicans trying to enter the U.S. without legal documents (see for example Massey and Singer 1995; Espenshade 1995).

included questions concerning household members who had lived outside Mexico within the previous five years. Data collected in Mexico have a clear advantage over those collected in the U.S. in that there is no incentive to avoid reporting on unauthorized persons living in the U.S. Various researchers have used data from Mexico to estimate the magnitude of net emigration to the U.S. (Corona, 1997; CONAPO, 1995).

Despite the political interest in the topic, there has been little attempt to analyze the U.S. and the Mexico data jointly as a way of attempting to surmount possible data errors. A notable exception is the work during the 1990s by the Mexico-U.S. Binational Study of Migration (Bean et al., 1998). Most efforts to assess the volume of migration have had as their objective the estimation of the unauthorized migrant population from Mexico, although deriving it as the difference between total migrants and authorized migrants. In this paper, we focus on overall migration, rather than unauthorized migration, and obtain estimates of net migration from Mexico using data from the 1990 and 2000 population censuses of both Mexico and the U.S. We also examine data from the household surveys conducted in Mexico concerning household members who live or have lived abroad. The paper is organized as follows: first, we present a review of the residual methods. Next, we apply these methods to the Mexico data from the censuses and vital registration to estimate net outflow to the U.S., followed by the equivalent exercise using U.S. data from the 1990 and 2000 censuses on the Mexico-born population. We end with a discussion of the results and future directions for the improvement of estimates of international migration with a binational methodological perspective.

Residual Methods

Lacking the equivalent of vital statistics, net migration is often estimated through the use of residual methods, whereby contributions of known components of population change (births and deaths) are subtracted from actual population change over a time period. The Demographic Balancing Equation (DBE) provides a simple residual method for estimating net migration by age (Hill, 1987). The advantages of this residual approach over the more usual intercensal cohort survival approach are that it provides estimates for specific age groups instead of for specific cohorts, and that there is no equivalent of the forward or backward projection choice that affects cohort survival analysis. The DBE states that the change in population between two time points is equal to the net balance between entries and exits. This tautology applies not only to entire populations but also to any population subgroup, such as an age group. Thus

$$ {}_5N2_x \equiv {}_5N1_x + B_x - B_{x+5} - {}_5D_x + {}_5NM_x \qquad (1) $$

where ${}_5N1_x$ and ${}_5N2_x$ are the initial and final populations aged (x,x+5), and, for the intervening period,
B_x and B_{x+5} are the entries into and exits from the age group (x,x+5) as a result of birthdays at age x and x+5 respectively,
${}_5D_x$ is the number of deaths of residents age (x,x+5), and
${}_5NM_x$ is the number of net migrants age (x,x+5)

Rearranging,

$$ {}_5NM_x = {}_5N2_x - {}_5N1_x = B_x + B_{x+5} + {}_5D_x \qquad (2) $$

The number of birthdays, B_x, can be estimated from two age distributions from censuses separated by between five and 10 years as follows:

$$ B_x = (t/5)({}_5N1_{x-5} * {}_5N2_x)^{1/2} \qquad (3) $$

where t is the intercensal interval in years.

The idea behind this approximation is that the persons aged (x-5,x) at the first census will (if they survive) have an x^{th} birthday during the intercensal interval, whereas the persons aged (x,x+5) at the second census are the survivors of those who have had an x^{th} birthday during the intercensal period. The approximation does not work for age 0: registered births can be used for Mexico, and births into the U.S. population born in Mexico are by definition zero. Nor does the approximation work for the open-ended age group: one age group has to be sacrificed.

Numbers of deaths can be obtained for Mexico from vital records or (for the U.S.) by applying age-specific mortality rates from a U.S. life table to estimated person-years lived by each age group.

$$ {}_5D_x = t * {}_5M_x * ({}_5N1_x * {}_5N2_x)^{1/2} \qquad (4) $$

where ${}_5M_x$ is the appropriate age-specific mortality rate for the age group.

The above methodology is applied to intercensal population change for the population of Mexico and the Mexico-born population of the U.S.. We also apply it to information from the U.S. 2000 census, using data from the reported residence five years before the census of persons born in Mexico. This population can be reverse-projected to estimate the 1995 population born in Mexico resident in Mexico in 1995 but resident in the U.S. in 2000.

The View from Mexico

Residual Estimates from Census and Vital Registration Data

Table 1 shows the application of equation (1) to the data from the 1990 and 2000 censuses of Mexico for males and females separately. Both births and deaths are the numbers recorded by the Mexico vital registration system, with no adjustment. The population counts used are for the overall population; we would have preferred to have used the Mexico-born population, but the required numbers were not available to us. We do however know that the foreign-born population is small, about one-half of one percent

in 2000 for both males and females. Figure 1 summarizes the estimated annual net emigration (a negative sign in Table 1 implies net emigration).

This analysis indicates average annual net emigration from Mexico between the 1990 and 2000 censuses of 404,000 males and 308,000 females, for a net total of 712,000. However, inspection of Table 1 or Figure 1 reveals that, for both males and females, over half the total is made up of emigrants aged 0 to 4, a most implausible result. There is then apparently substantial net immigration between the ages of 5 and 9. We will later discuss possible reasons for these results, but for now we will focus on the estimate of net emigration between the ages of 10 and 80, amounting to 197,000 males and 129,000 females. Figure 1 suggests a plausible distribution of this emigration by age: a sharp peak in the twenties, somewhat earlier for males than females, and little net migration after age 30. Indeed, for males, there is some indication of return migration for males in their 30s.

Estimates from Surveys in Mexico

During the last decade, Mexico's National Statistics Office (Instituto Nacional de Estadística, Geografia e Informática, INEGI) has included questions in four household surveys on household members living outside the country: two National Surveys of Population Dynamics -- ENADID -- (1992 and 1997), the Inter-Censal Population and Housing Survey – CONTEO -- (1995), and as a sample topic in the 12th Population and Housing Census (2000). The objective of including suitable questions in these surveys was to arrive at estimates of the approximate magnitude of emigration and to collect socio-economic information about the emigrants. Each household was asked whether any members of the household had left to live abroad within the five years prior to the survey. If the answer was yes, the sex, age at departure, month and year of departure, country of destination, country of present residence, and month and year of return of each such member was collected.

For each of these surveys, it is therefore possible to estimate the total number of members of households that are still in existence at the time of the survey, who had left to live in the U.S. during the time periods 1987-1992, 1990-1995, 1992-1997, and 1995-2000, and the number who had returned by the date of the survey. The survey estimates of gross outflow to the U.S. are remarkably consistent, ranging from an annual number of 311,000 per year for the period 1995 to 2000 from the 2000 census, to 364,000 per year for the period 1992 to 1997 from the 1997 survey. The estimates of net outflow (subtracting those reported to have returned) are less consistent, reflecting different apparent rates of return. They range from an outflow of 183,000 for the period 1987 to 1992 to 273,000 for the period 1990 to 1995. Proportions reported as having returned range from 47 percent for those reported to have left between 1987 and 1992 to 23 percent for those reported to have left 1990 to 1995 and 1995 to 2000[3].

[3] Durand et al. (2001) use data from the ENADID 1992 survey in Mexico to construct cohorts of migrants from 1970 to 1992, and report a rise in the rate of return migration in Mexico from the U.S. during the early 1990s. The authors interpret this as a reflection of the legalization efforts of the late 1980s.

It is not possible to compare these numbers directly with the residual estimates from the 1990 and 2000 censuses. First, the household survey estimates exclude any component of emigration that consists of entire households, because no household member remains behind to report the move. Second, the net outflow is not defined in the same way as the residual estimate: the survey net estimates count departures less returns of those same departures, whereas the residual estimates count departures less returns regardless of time of departure. Detail from the survey data, reporting year of departure by year of return, suggests (regardless of cohort) that between 60 and 75 percent of those departing who stay away for a year or more do not return (the 1992 ENADID reports higher rates of return). A detailed inspection of the data on year of return by year of departure also reveals patterns that are unlikely to be correct: for each survey, the number of persons reported as leaving in the year before the survey is double the number reported as leaving in earlier years.

Caveats aside, the household survey data indicate lower net emigration than the total residual estimates. Taking only the figures for the year immediately preceding the survey, gross outflow is close to 650,000, of whom at least 25 percent return, indicating a maximum net outflow per year of about 490,000 (males and females combined). The residual estimate in Table 1suggests an average net outflow of 712,000 per year, though the figure for ages between 10 and 80 is 327,000.

The survey data provide useful indicators of the migration. The vast majority of Mexico's emigrants are reported to go to the U.S. to live – 97 percent of males and 93 percent of females, according to the 2000 census data. The surveys show a very young distribution by age at migration that gets gradually younger over the 1990s. For both males and females, the modal age at departure is around 18 or 19. The sex ratio of departures varies somewhat by source, ranging from about 250 males per 100 females from the 1992 ENADID to 313 males per 100 females from the 1997 ENADID. The residual estimate, by contrast, is only about 130 males per 100 females. This huge discrepancy may be related to the use of households as the source of data: it may be that when females leave, the whole household is likely to depart, leaving no one behind to report the migration to the U.S. Cerrutti and Massey (2001) report that the migration of Mexican women and men follow quite different patterns. Women tend to follow other family members (a spouse or a parent), whereas men are more likely to leave Mexico without a wife or parent.

(KEN: Are there U.S. estimates of recent Mex-born migrants to calculate sex ratios to compare with the Mexican surveys ratios, above?? Shall we use the Census data on recent immigrants?)

The View from the United States

Residual Estimates from 1990 and 2000 Census and Vital Registration Data

Table 2 shows the application of equation (1) to the data on the Mexico-born population of the United States from the 1990 and 2000 censuses of the U.S. for males and females

separately. This population has by definition zero births. Deaths have been estimated as follows. First, age-sex-specific death rates were calculated for both 1990 and 2000 by dividing U.S. registered deaths of persons born in Mexico by the U.S. census population of persons born in Mexico. The 1990 and 2000 death rates were then averaged to approximate intercensal mortality risks. These rates were then applied to the estimated person-years lived 1990 to 2000 by the Mexico-born population of the U.S., with no adjustment. These rates may not be error-free: both the census counts and the deaths (Patel et al. 2004) may be under-recorded, but net bias may be small. Residual migration estimates are not sensitive to mortality assumptions since the age range of peak net migration is an age range of low mortality in any mortality regime.
Figure 2 summarizes the estimated annual net immigration by age group.

This analysis indicates average annual net immigration from Mexico between the 1990 and 2000 censuses of 291,000 males and 228,000 females, for a net total of 519,000. Inspection of Table 2 or Figure 2 reveals a plausible age distribution: peak immigration in the age groups 15-19 and 20-24, with over half (for males) and almost half (for females) of all net migration concentrated in the age range 15-29. These estimates of average annual total net movement from Mexico are substantially lower than those obtained from the Mexico analysis -- 404,000 males and 308,000 females. However, if we focus on the estimates of net movement between the ages of 10 and 80, the totals are higher: 252,000 compared to 197,000 for males and 191,000 compared to 129,000 for females. Another feature in Table 2 worthy of comment is the fact that, for both males and females, net migration above age 60 is close to, but always greater than, zero. There is no feature of the estimation that guarantees such an outcome; even moderate changes in enumeration completeness of the Mexico-born population between the two censuses would generate a substantial positive or negative balance. The fact that the results are so close to zero suggests that the coverage of the two censuses was very similar, though this does not imply anything about the absolute level of coverage.

Residual Estimates from the 2000 Census and Vital Registration Data

The 2000 U.S. census included a question on place of residence five years before the enumeration (as did the 1990 census). It is thus possible to quantify by age and sex the Mexico-born population reported as resident in the U.S. five years earlier.
This population can be reverse-projected (using life table survivorshipratios) to estimate the Mexico-born population resident in the U.S. in 1995. The residual method of equation (1) can then be applied to the estimated Mexico-born population in 1995 and the enumerated Mexico-born population in 2000. Life table survivorship ratios have been calculated from a life table based on the age-specific mortality rates for 2000 described in the previous section. Results of the residual method are shown in Table 3.

The age pattern shown in Figure 3 is strikingly similar to that in Figure 2, with the exception of greater net inflow in the age group 0-4. This analysis indicates average annual net immigration from Mexico over the 5 years before the 2000 censuses of 230,000 males and 160,000 females, for a net total of 390,000. Although these estimates of average annual total net movement from Mexico are substantially lower than those

obtained from either the Mexico analysis or the 1990-2000 U.S. census analysis, the estimates of net movement between the ages of 10 and 80 are remarkably similar to the residual analysis of the Mexico censuses: 195,000 compared to 197,000 for males and 128,000 compared to 129,000 for females. Net migration above age 60 is close to zero, and is negative for males above age 70 and for females above age 85. Since this analysis is based entirely on the 2000 U.S. census data (on birthplace and residence 5 years earlier) plus a minor component from registration of deaths in the U.S. of persons born in Mexico, the estimates will be unaffected by changes in enumeration completeness between 1990 and 2000, though their absolute magnitude will be affected by coverage of the 2000 census.

The View from Above

Data on the population of Mexico and the Mexico-born population of the U.S. can be usefully combined to give a "view from above." Data from the Mexican household surveys (ENADID, CONTEO and the 2000 census)report that over 95 percent of Mexican emigrants go to the United States; Mexican censuses, in turn, suggest that the foreign-born population of Mexico is very small – about one half of one percent – and that 60 percent of the foreign born are U.S. born children of Mexican families (Bean et al., 1998). It is therefore close to correct to view the combination of the population of Mexico and the Mexico-born population of the U.S. as a closed system. Residual estimates of net migration for the closed system (combining the U.S. and Mexico data) should be more revealing of data errors than of any true process since the true processes should be very small. It should be noted that the residual estimate for the closed system is simply the difference between the Mexico-based estimate of emigration in Table 1 and the U.S.-based estimate of immigration in Table 2. This net result is shown by age and sex in Figure 4; the large and negative estimate for the 0-4 age group has been omitted to permit differences at other age groups to be visible.

The age pattern of these residuals is strikingly similar by sex, except for the age group 15-19 (large and negative for males, slightly positive for females). Values are positive for the age group 5-9, turn negative (especially for males) between 15 and 24, and then turn positive between 25 and 40. Overall, the residuals are positive, indicating that U.S. estimates of net immigration are higher than the corresponding Mexico estimates of net emigration, though at ages where we expect little net migration (over 50) the residuals are quite small. This pattern is not consistent with the view that a high proportion of unauthorized Mexican residents in the U.S. are not covered by the U.S. censuses: if a high proportion were not included in the census, the residuals would be negative. The age pattern of the residuals, however, does suggest some omission, especially of males, in the age range 15-24, where the balance is negative; the positive balance 25 -39 also supports this interpretation, since it could be explained by the unrecorded youths resident in the U.S. in 1990 reappearing (as net "immigrants" to the system) in the 2000 Mexico census.

Summary of Residual Estimates

Table 4 summarizes the residual estimates of average annual net migration from Mexico to the U.S. for persons between the ages of 10 and 80. The estimates range from about 200,000 to 250,000 for males, and from 130,000 to 190,000 for females. The residual estimates from the 1990 and 2000 Mexican censuses are astonishingly consistent with the quasi-residual estimates from the 2000 U.S. census using information both on country of birth and on residence 5 years before the census. It is not easy to find other estimates for comparison, since most research has focused on stocks of unauthorized migrants. However, Bean et al. (2001) arrive at "median" estimates for 1996 of authorized and unauthorized Mexican migrants of 4.50 and 2.54 million respectively, and extrapolate these forward to rough estimates of 5.05 and 3.90 million respectively for 2000, for an average annual increase of close to half a million (both sexes combined).

Data Errors and Sensitivity Analysis

Residual estimates are notoriously sensitive to error. Even small measurement errors in the component parts can add up in the residual to a large proportionate error. Certain errors in the data are evident. Most dramatic is the huge estimate of net emigration of Mexicans aged 0-4 using Mexican census and vital registration data. This error probably consists of several components. First, the population 0-4 is probably undercounted relative to the rest of the population; such an error is very common in developing country censuses. Second, it is possible that the number of deaths under 5 is under-recorded in the vital statistics. Third, it seems likely that the number of births is over-recorded, at least relative to census coverage; one possible mechanism for such over-recording would be that births that actually occurred in the U.S. (and were registered there) were subsequently also registered in Mexico. It is also possible that births get registered more than once in Mexico, for example in the case of a lost birth certificate that is needed to register a child for school. A second error is evident from Figure 4: a net deficit of persons aged 15-24 from the Mexico-U.S. system is followed by a net surplus aged 25-39; this pattern as suggested above is probably the result of undercoverage of unauthorized Mexicans in the U.S. censuses, who subsequently reappear as residents in the Mexico censuses. A third likely error probably accounts for the high apparent immigration of children under age 10 based on the analysis of the 2000 U.S. census; the error may be the result of inappropriate imputation of missing birthplace or residence information for young children.

Typical errors likely to have a major impact on residual estimates of net migration are those associated with census coverage (and particularly *change* in census coverage), age misreporting (in Mexico, probably associated with the saw-tooth patterns in Figures 1 and 4) and errors in measuring mortality. In order to test the possible magnitude of these errors, we have adjusted the basic data as if they suffered from specific problems. The errors we tested were: a 3 percent undercount in 1990 relative to 2000, a 3 percent undercount in 2000 relative to 1990, 10 percent underestimation of deaths, and 10 percent over-estimation of deaths, both for Mexico and for the U.S. We have not explicitly tested

the effects of a level of undercoverage that does not change from one census to the next because the effect of such an error on the estimates will be exactly equal to the level of undercoverage. If, for example, both the 1990 and 2000 censuses of Mexico were undercounts by 5 percent, the effect would be to under-estimate the net emigration by 5 percent; if the Mexico-born population of the U.S. is undercounted in 1990 and 2000 by 10 percent, the estimates of net immigration would be 10 percent too low. Results for males are shown in Table 5 in terms of net migration between the ages of 10 and 80.

It is clear from Table 5 that a moderate change in census coverage (of 3 percent) makes a very large difference (roughly plus or minus 50 percent) to the residual estimate of emigration from Mexico, but makes a much smaller difference to the residual estimate of Mexican immigration into the U.S. (little more than plus or minus 5 percent). As noted above, a constant level of undercoverage of 3 percent would affect both estimates by 3 percent. The reason that the Mexico residual is much more affected than the U.S. residual is that the former residual is a much smaller proportion of the total population being analyzed than is the latter. Errors in mortality, by contrast, make much less difference: even a 10 percent under-recording of deaths in Mexico would only affect the estimate of emigration by 10 percent or so. An error of 10 percent in the death rates for the U.S. has only a tiny effect on the residual estimate, less than half of one percent, primarily because most of the Mexico-born population of the U.S. is in low mortality age groups. The residual estimates based on reverse projection of the 2000 U.S. population born in Mexico and resident in the U.S. five years before the census are virtually unaffected by data errors: a 3 percent U.S. undercount in 2000 affects the estimate by 3 percent, and errors of 10 percent in the death rates have trivial effects.

Conclusions

This analysis of 1990 and 2000 census data from Mexico and the U.S. suggests an annual level of net emigration from Mexico during the decade of persons aged 10 to 80 of somewhere between 300,000 and 450,000 persons. Internal patterns by age and sex appear plausible, except for errors under the age of 10. Although residual estimates of emigration from Mexico are quite sensitive to possible changes in enumeration completeness of the Mexican censuses, the residual estimates of immigration into the U.S. are much less sensitive. In particular, the estimates derived from reverse-projecting the Mexico-born population of the U.S. in 2000 resident in the U.S. 5 years before the census to 1995 are remarkably robust to likely errors. Even if the Mexico-born population had been under-enumerated in 2000 by as much as 50 percent, the true net inflow would not have exceeded 600,000 annually. Although we do not address directly the issue of the size of the unauthorized U.S. population of Mexican origin, these estimates are not consistent with the more alarmist estimates, and appear to be somewhat lower than the more conservative estimates of Bean et al. (2001).

The binational approach has highlighted advantages of comparing data on international migration from the perspective of the sending and the receiving countries. Specifically, the Mexico-U.S. experience offers at least two important lessons. First, the international migration data gathered from any one country may be too sensitive to errors to be used in

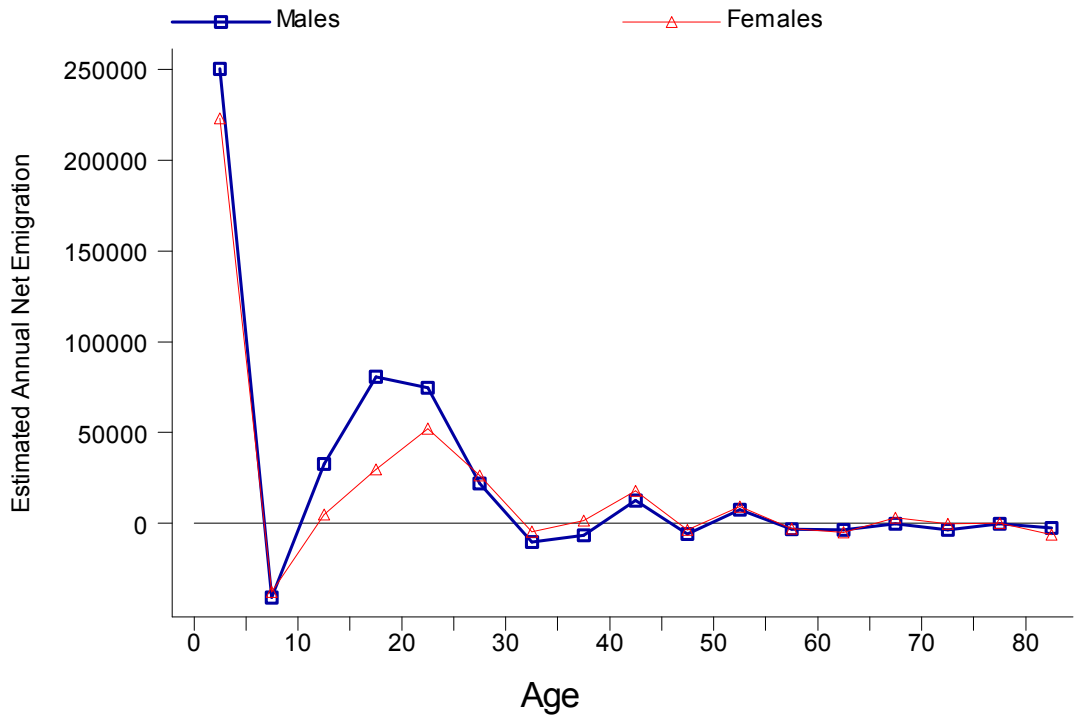
isolation. By having the other-country source of data as a supplement, the quality of the data in both countries can be "checked." Second, collecting information at both the sending and the receiving end of a migration stream provides a much better basis for understanding the processes involved. Survey data in the origin and destination countries do not have to be gathered for the purposes of measuring only international migration; many countries have general demographic or health surveys or censuses within which the migration or country of birth/residence questions could be included. It will often be advantageous to open the channels of collaboration to include supplementary survey questions in the origin and destination countries involved.

Table 1: Residual Estimates of Net Emigration from Mexico Using Census Data from Mexico

Age Group	Males: Population of Mexico 1990	Males: Population of Mexico 2000	Males: Deaths 1990-2000	Males: Estimated Birthdays	Males: Annual Net Migration	Females: Population of Mexico 1990	Females: Population of Mexico 2000	Females: Deaths 1990-2000	Females: Estimated Birthdays	Females: Annual Net Migration
0-4	5,191,052	5,521,224	340,361	14,150,586	-250,232	5,065,883	5,343,102	266,507	13,476,749	-223,004
5-9	5,370,408	5,803,765	25,507	10,977,731	40,638	5,255,807	5,653,203	18,609	10,702,984	37,910
10-14	5,262,133	5,556,419	26,277	10,925,243	-32,678	5,189,893	5,411,403	16,489	10,666,075	-4,961
15-19	4,788,534	5,018,650	62,087	10,277,899	-80,627	4,934,421	5,188,578	25,730	10,378,471	-29,734
20-24	3,760,622	4,399,147	88,568	9,179,426	-74,676	4,115,984	4,867,051	29,339	9,801,240	-52,320
25-29	3,068,952	3,947,213	90,954	7,705,576	-22,057	3,374,371	4,385,940	29,990	8,497,638	-26,471
30-34	2,594,253	3,458,472	92,564	6,515,791	10,400	2,826,013	3,831,510	33,894	7,191,366	4,634
35-39	2,223,867	3,090,451	99,288	5,663,007	6,573	2,382,996	3,398,703	41,756	6,198,316	-1,502
40-44	1,715,273	2,550,159	98,643	4,762,862	-12,440	1,803,690	2,756,423	48,614	5,125,834	-17,770
45-49	1,461,314	2,000,629	107,996	3,704,929	5,745	1,528,552	2,159,060	60,471	3,946,784	3,400
50-54	1,168,866	1,660,089	118,541	3,115,067	-7,673	1,239,429	1,770,114	75,982	3,289,809	-9,337
55-59	924,393	1,261,470	136,413	2,428,572	3,270	981,570	1,352,820	96,841	2,589,768	2,785
60-64	774,550	1,068,614	157,926	1,987,782	3,557	846,531	1,176,804	123,714	2,149,526	4,970
65-69	571,057	796,976	174,035	1,571,366	142	619,767	899,511	145,069	1,745,239	-3,137
70-74	396,402	602,185	185,932	1,172,829	3,526	435,637	670,273	157,922	1,289,051	226
75-79	279,507	420,326	178,649	816,378	146	314,910	463,551	164,062	898,754	-59
80-84	180,902	222,155	167,592	498,373	2,501	223,366	272,110	176,099	585,457	6,335
85+	160,440	214,309	260,669	.		215,319	291,002	348,283	.	
Total	39,892,523	47,592,253	2,412,001		-403,886	41,354,138	49,891,159	1,859,371		-308,036

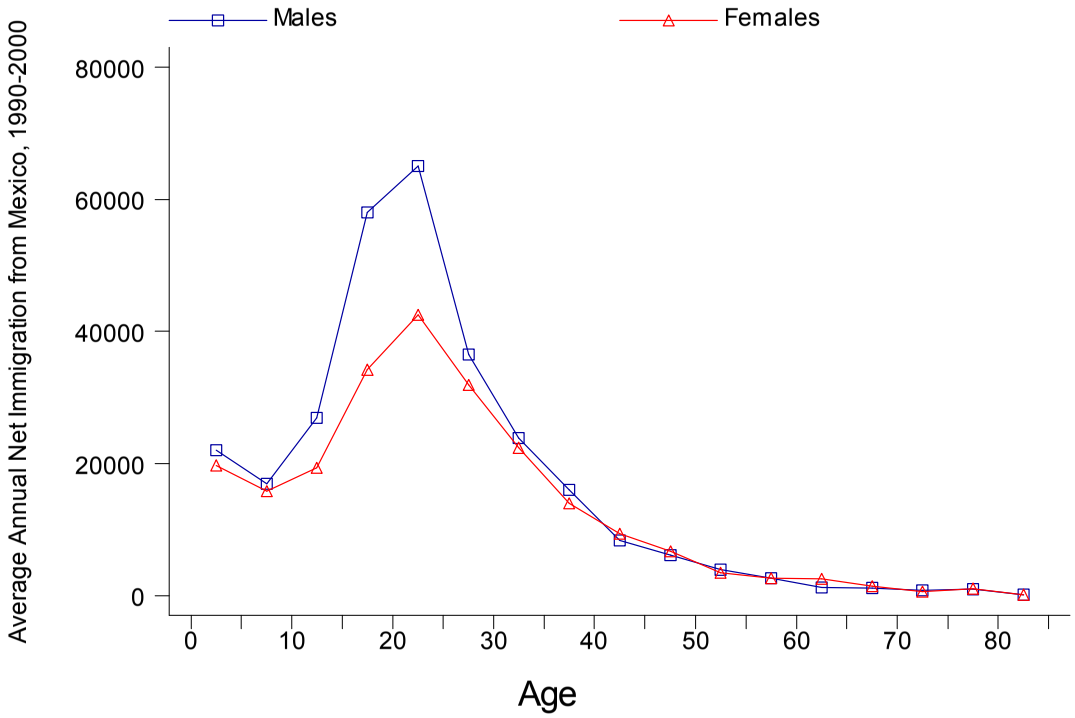
Source: Data from the 1990 and 2000 censuses of Mexico and registered deaths

Figure 1: Residual Estimates of Annual Net Emigration from Mexico 1990-2000, using data from the Mexican 1990 and 2000 Censuses



Source: Estimates in Table 1

Figure 2: Residual Estimates of Average Annual Net Migration to the U.S. from Mexico, using data from the U.S. 1990 and 2000 Censuses



Source: Estimates in Table 2

Table 2: Residual Estimates of Net Immigration from Mexico: Mexico-Born Population of U.S., 1990 and 2000

	Males						Females					
Age Group	Mexican-born pop in U.S. 1990	Mexican-born pop in U.S. 2000	ASMR 1990-2000 (Mexico-Born Population)	Deaths 1990-2000	Estimated Birthdays	Annual Net Migration	Mexican-born pop in U.S. 1990	Mexican-born pop in U.S. 2000	ASMR 1990-2000 (Mexico-born Population)	Deaths 1990-2000	Estimated Birthdays	A N M
0-4	52,120	89,095	0.00068	460	0	21,942	48,339	76,395	0.00056	340	0	
5-9	80,009	158,860	0.00026	293	181,987	16,915	78,102	146,905	0.00017	177	168,538	
10-14	101,984	231,155	0.00034	514	271,989	26,957	100,243	212,820	0.00021	299	257,850	
15-19	218,882	415,855	0.00148	4,450	411,876	58,166	168,291	286,395	0.00037	801	338,875	
20-24	388,973	716,640	0.00195	10,295	792,110	65,306	257,035	468,550	0.00040	1,371	561,615	
25-29	379,572	787,910	0.00168	9,160	1,107,205	36,697	268,873	582,000	0.00035	1,385	773,549	
30-34	311,506	735,410	0.00165	7,873	1,056,676	23,856	242,746	561,530	0.00046	1,698	777,124	
35-39	242,184	598,350	0.00185	7,023	863,457	15,871	188,635	474,765	0.00059	1,751	678,962	
40-44	163,300	448,260	0.00211	5,709	658,973	8,120	140,575	371,465	0.00099	2,251	529,420	
45-49	110,588	309,325	0.00299	5,530	449,501	5,848	111,866	267,915	0.00155	2,675	388,135	
50-54	77,440	208,530	0.00442	5,617	303,716	3,614	82,139	193,785	0.00266	3,356	294,469	
55-59	61,242	133,230	0.00667	6,025	203,149	2,279	60,616	137,060	0.00455	4,143	212,207	
60-64	42,798	89,320	0.01044	6,452	147,921	877	49,795	101,095	0.00714	5,062	156,563	
65-69	33,948	62,840	0.01846	8,524	103,719	829	39,430	76,500	0.01309	7,189	123,439	
70-74	20,270	40,975	0.02737	7,888	74,593	430	23,985	53,755	0.01956	7,022	92,077	
75-79	19,340	31,210	0.04712	11,577	50,304	680	26,338	37,000	0.03259	10,174	59,580	
80-84	13,796	14,645	0.07580	10,774	33,659	-102	16,912	21,855	0.05595	10,757	47,984	
85-89	8,883	8,005	0.11564	9,751	21,018	-168	9,542	15,035	0.10088	12,082	31,892	
90+	3,677	4,860	0.21968	9,286	.		5,572	8,195	0.22201	15,002	.	
Total	2,330,512	5,084,475	0.00370	127,202		288,116	1,919,034	4,093,020	0.00312	87,534		2

Source: Data from the 1990 and 2000 U.S. Censuses and NCHS data

Table 3: Residual Estimates of Average Annual Net Immigration to U.S., 1995 to 2000, Based on 2000 U.S. Census Data on Place of Residence 5 Years Earlier

	Males						Females		
	Population Born in Mexico						Population Born in Mexico		
Age Group	Estimated 1995	Enumerated 2000	1998 U.S. ASMR	Deaths 1995-2000	Estimated Birthdays	Average Annual Net Migration	Estimated 1995	Enumerated 2000	1998 U.S. ASMR
0-4	97542	89,095	0.00030	140	0	23,235	91,280	76,395	0.00026
5-9	169106	158,860	0.00014	115	124,481	12,620	162,825	146,905	0.00011
10-14	242393	231,155	0.00028	331	197,711	21,775	193,410	212,820	0.00021
15-19	430745	415,855	0.00096	2,032	317,491	45,050	304,980	286,395	0.00030
20-24	601177	716,640	0.00134	4,398	555,598	50,500	460,897	468,550	0.00034
25-29	624758	787,910	0.00112	3,929	688,239	31,334	486,711	582,000	0.00029
30-34	525941	735,410	0.00112	3,483	677,830	19,220	427,692	561,530	0.00038
35-39	410451	598,350	0.00136	3,370	560,978	11,846	339,905	474,765	0.00048
40-44	286255	448,260	0.00171	3,063	428,939	6,739	246,981	371,465	0.00082
45-49	195243	309,325	0.00251	3,084	297,567	4,275	180,995	267,915	0.00132
50-54	125316	208,530	0.00362	2,926	201,777	2,715	129,369	193,785	0.00236
55-59	86031	133,230	0.00549	2,939	129,213	1,717	95,633	137,060	0.00413
60-64	62434	89,320	0.00967	3,611	87,660	1,095	74,029	101,095	0.00626
65-69	41997	62,840	0.01592	4,089	62,637	756	52,860	76,500	0.01132
70-74	35241	40,975	0.02413	4,585	41,483	400	38,791	53,755	0.01686
75-79	17398	31,210	0.04307	5,018	33,164	326	23,925	37,000	0.02688
80-84	11871	14,645	0.06239	4,113	15,962	135	19,658	21,855	0.04820
85-89	10228	8,005	0.14412	6,520	9,748	-118	11,704	15,035	0.09090
90+		4,860		.				8,195	0.22507
Total	3974130	5,084,475	0.00257	57,745		233,618	3,341,646	4,093,020	0.001969

Source: Data from the 2000 U.S. Census and NCHS

Table 4: Residual Estimates of Average Annual Net Migration of Persons Aged between 10 and 80 from Mexico to the U.S. Between 1990 and 2000

Source of Estimate	Males '000	Females '000
U.S. 1990, 2000 Censuses	250	190
Mexico 1990, 2000 Censuses	197	129
U.S. 2000 Census	198	126

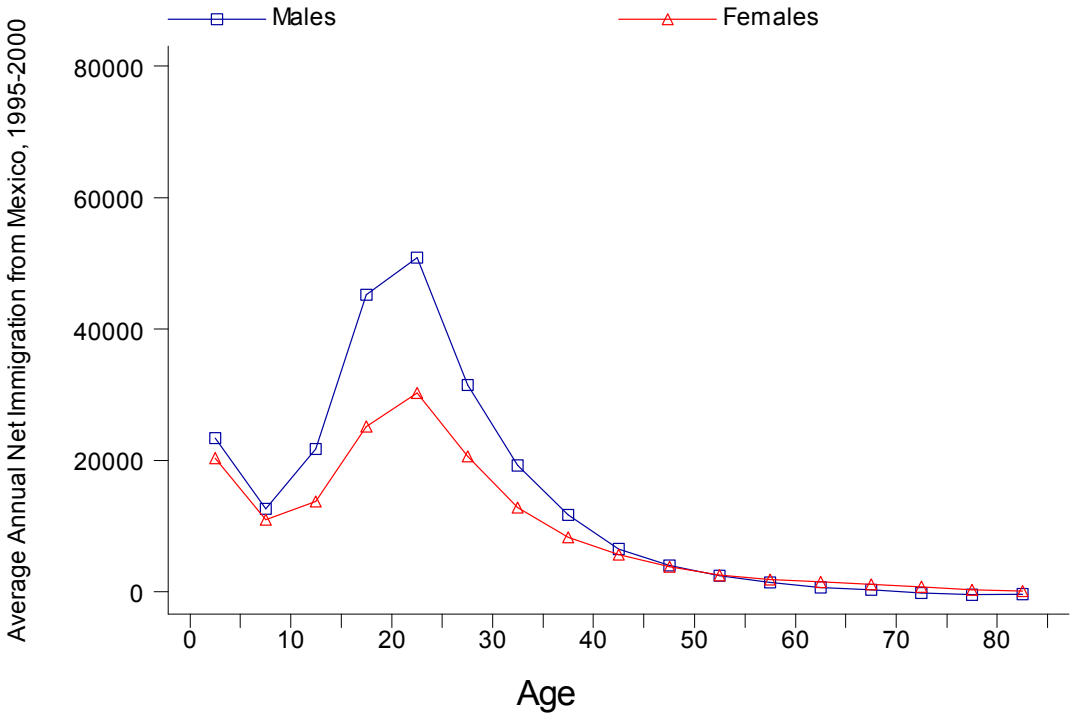
Source: Tables 1 through 3

Table 5: Sensitivity of Residual Estimates of Average Annual Net Emigration (Mexico) or Immigration (U.S.) between the ages of 10 and 80 to Simulated Errors - Males

Method	Simulated Error	Mexico Data	U.S. Data
Intercensal Change	No Error	197	250
	3% Undercount in 1990 relative to 2000	303	243
	3% Undercount in 2000 relative to 1990	102	264
	10% Underestimation of Deaths/ Mortality Rates	179	251
	10% Overestimation of Deaths/ Mortality Rates	N/A	248
Reverse-Projection of 2000 U.S. Pop	No Error	N/A	198
	3% Undercount in 2000 U.S. Census	N/A	204
	10% Underestimation of Deaths/ Mortality Rates	N/A	198
	10% Overestimation of Deaths/ Mortality Rates	N/A	198

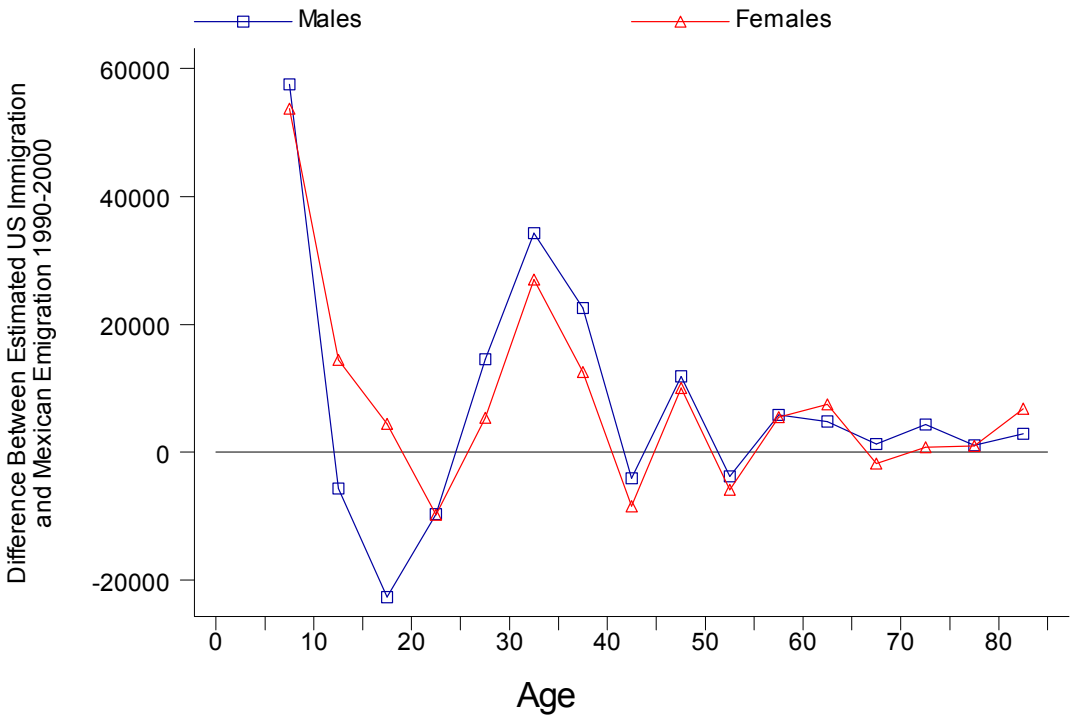
Source: Additional calculations based on Tables 1 through 3.

Figure 3: Residual Estimates of Average Annual Net Immigration from Mexico 1995-2000, using U.S. Census 2000 Data on Residence Five Years Earlier



Source: Table 3

Figure 4: Difference Between Average Annual Estimate of Immigration into the U.S. and Emigration from Mexico: 1990-2000



Source: Tables 1 and 2.

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