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Producing migration data using household surveys and other sources

Recent efforts by Mexico to measure migration flows and stocks

Note by INEGI, Mexico ¹

Summary: the paper focuses on the use of different sources for the study of migration to and from Mexico. From 2006, the rotation pattern of our quarterly labour-force survey has been used to follow changes in household composition. Arrivals or departures of dwellers over 3-month periods are recorded. Quarterly birth-, death-and migration-rates are produced. In turn, stocks of immigrants are mainly determined through population censuses and household demographic surveys. Regarding those of emigrants, we have been looking at the administrative “paper trail” they leave in destination countries. Specifically, we have used American Department of Health Statistics (DHS) information from birth certificates regarding the mother’s place of birth. With these and with the ACS’ estimated birth-rates and age-sex structures for the Mexico-born population we have come up with an estimate for the size of such population residing in the USA larger than those provided by other sources. This on-going work is still being looked at more thoroughly but our contention is that an approach such as this could also be used in other regions. School-enrolment and health data are likely candidates for this purpose.

FLOWS

Source: *ENOE, Mexico's Quarterly Labour Force Survey*

This statistical project is one of the longest standing in the country after the population census. Its primary purpose is the production of quarterly information on the Mexican labor market, at both national and state levels. Among other statistics, it produces open unemployment rates and the size of the economically active and inactive populations.

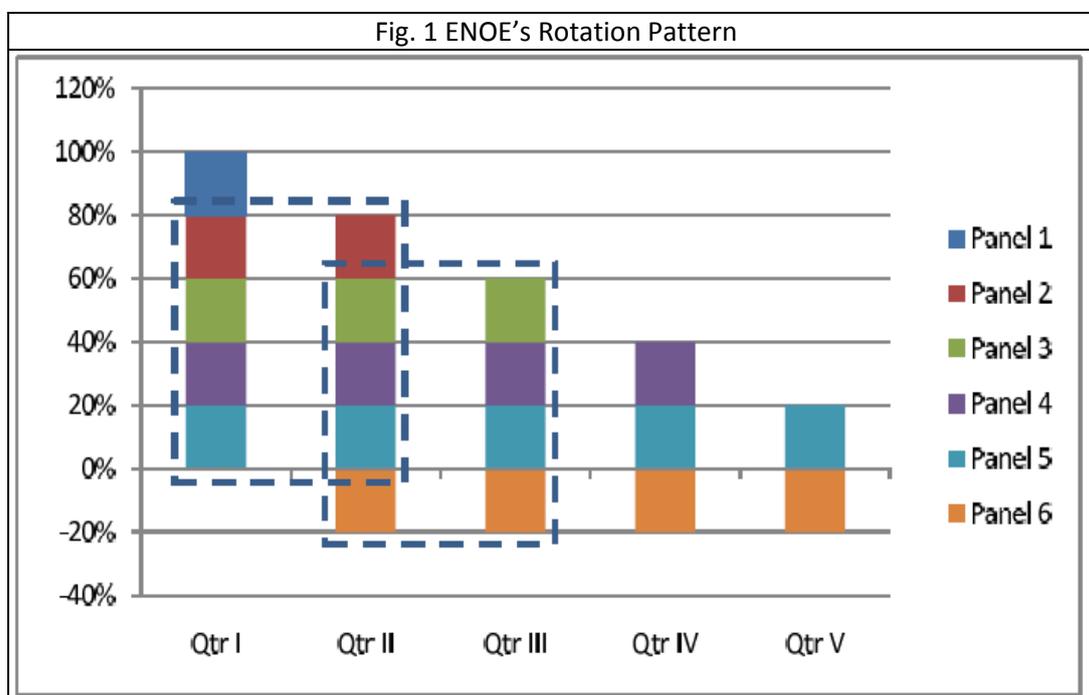
¹ Prepared by Alfredo Bustos.

The information is continuously collected through interviews conducted in 120.600 households each quarter. The sample design includes five simultaneous panels in each period. One of these panels is replaced once it has been in sample five successive quarterly interviews. The new households are randomly selected with unequal probabilities from a stratified sampling frame of PSUs.

Thus, quarter to quarter, 80% of the sample is common to two successive waves of interviews, as shown in Figure 1. This feature is useful when you want to track changes to households, from one quarter to the next. Other topics of interest include change in household composition and in occupational status.

Monitoring Household Composition

In the first case it is of interest to determine the number of people who are no longer part of the household for various reasons, including death and emigration. Also recorded is the addition of new individuals to the household, either by birth or immigration. In order to achieve this, during the first interview to households in new panel, a complete list of the individuals who compose it is developed. Among the socio-demographic information collected birthplace, age, sex, relationship to head of household and some educational characteristics of individuals are recorded.



During subsequent interviews, for each identified immigrant, information is also collected on their former place of residence (state or country, if applicable) and their reasons to migrate are explored: study or work, marriage or divorce, by reason of illness, to join his family, for environmental reasons, and for reasons of violence, whether criminal or social. Information is collected also on emigrants including the name of their destination (state or country, if applicable). Their reasons for migrating are also inquired.

Consequences of the rotation pattern

In view of the special conditions under which they are carried out, comparisons with the previous quarter, in particular by the fact that it only 80% of the sample of each of the quarters is available, it is necessary to make some technical considerations. With respect to expansion factors it is necessary to take into account changes experienced by the population size between successive quarters since, even in the best of cases, they only expand to 80%

of the size of one or other of the populations involved. It is suggested to refer to the concept of "population at risk" which is the population at the beginning of the quarter. Since comparisons can only be carried out when there is information about both quarters, observed non response in one of them affects also the sample size available in the other, giving rise to a further reduction of the information available for this reason and, accordingly, to the need to correct again such factors to allow for this circumstance. The available databases include expansion factors corrected only for non response in the reference quarter.

It is necessary to give further consideration for the immigration case because there is no current and complete information about the "population at risk to immigrate to Mexico". Instead of the above, it was decided to consider the population of households as the one at risk of receiving one or more immigrants. From this consideration it is possible to estimate the size of the immigrant population in a given quarter, which may be published relative to the total population size during that quarter. The corresponding expression is given as follows

$$I_t = \sum \frac{y_{it}}{\pi_{it}^{(h)}}$$

where y_{it} is the number of immigrants in sample household i at time t and $\pi_{it}^{(h)}$ is the expansion factor for the same household and the same period.

Numerical Results

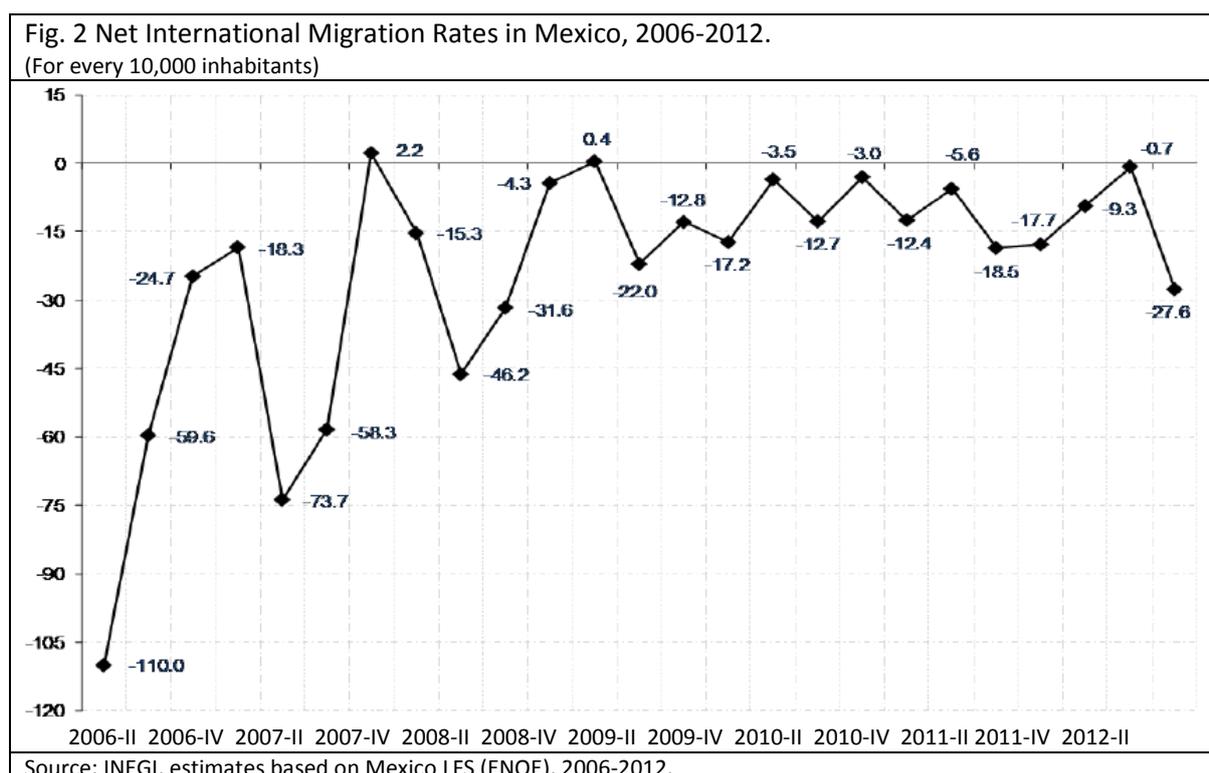
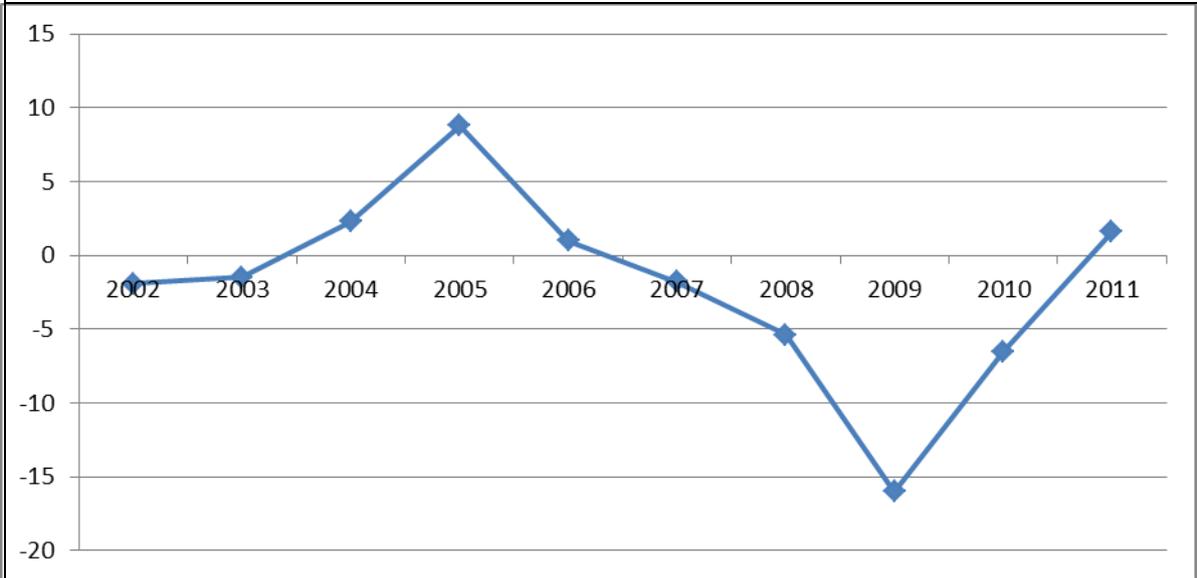


Figure 2 shows the evolution of the net migration rate for the period 2006-2011, in Mexico. Towards the beginning of this period there was a significant seasonal pattern which, however, seems to disappear as the value of the trend of the series decreases to almost zero. Presumably this decrease is a result of the contraction of the construction sector in the United States, important Mexican labor employer, contraction that begins in 2006 and that

seems to initiate a recovery only until 2011. This nascent recovery could explain, at least in part, the unexpected increase in the latest available net migration rate.

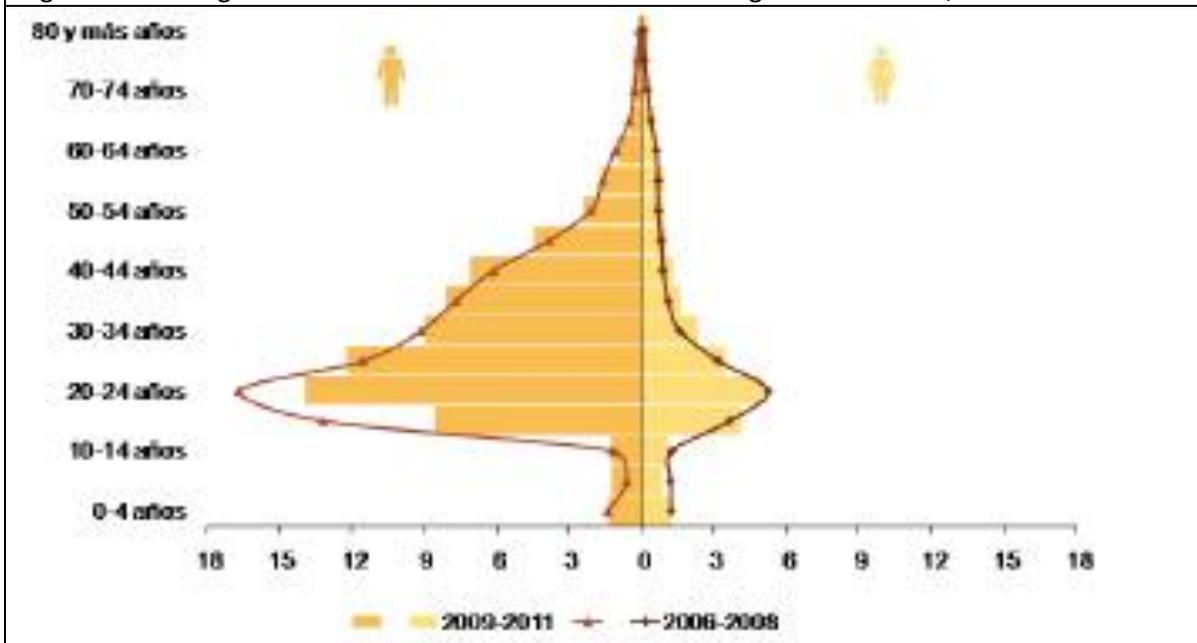
Fig. 3. Year-over-Year Job Growth, Selected Metropolitan Areas, USA (Natural Resources, Mining Construction))



Source: http://www.pittsburghtoday.org/view_economy_job_growth_years_change.html

Figure 4, meanwhile, allows comparison of age and sex structures regarding international migration from Mexico for two recent periods. Consequently, one can conclude that recent Mexican migration is predominantly male and occurs mainly in the productive ages.

Fig. 4. Relative Age and Sex Structure of International Out-migrants in Mexico, 2006-2011.



Source: INEGI, ENOE, 2006-2012.

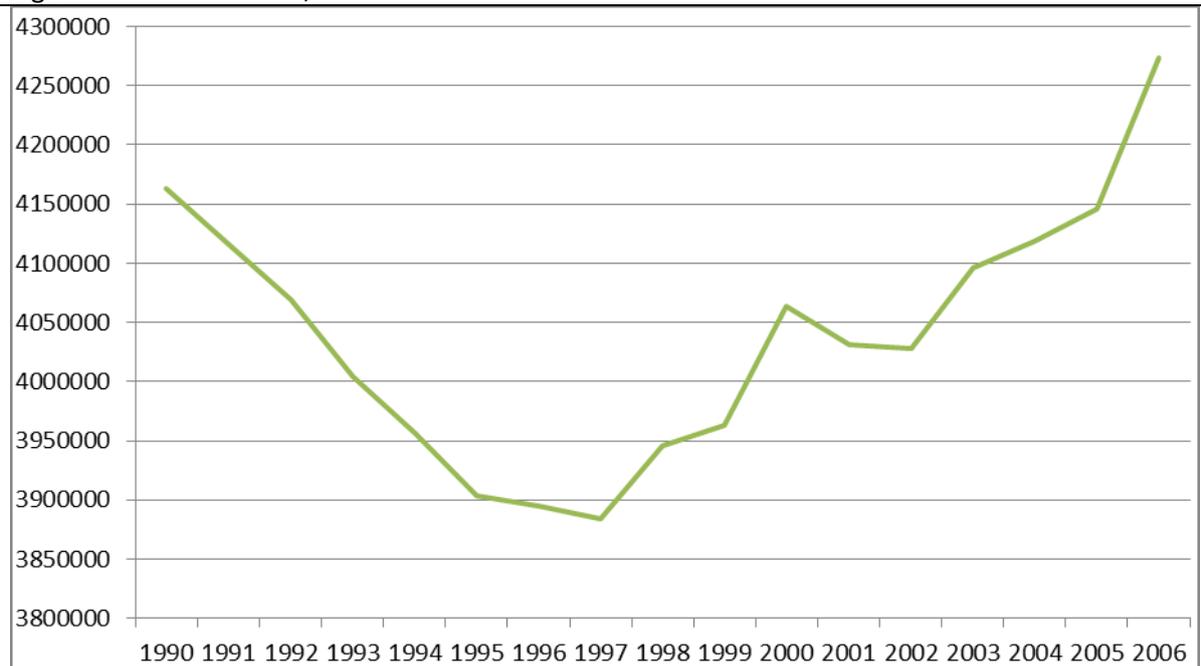
STOCKS

Sources

It is common to refer to various statistical sources of the United States in the study of migration from Mexico. Undoubtedly, the source most used by Mexican demographers is the decennial census of that country. This census is also the basis from which population sizes are projected for various sub-populations in inter census years and from these said projections expansion factors used in multiple surveys are obtained. Sample surveys such as the Current Population Survey (CPS) and the American Community Survey (ACS) are other sources that are used in the study of the size and conditions of the population born in Mexico and living in U.S.. Finally, various administrative records created and maintained by agencies of the U.S. government may be accessed, though I believe these are not sufficiently exploited. These records trace the "paper route" that immigrants leave behind while in that territory. This is the case of birth, school attendance, and health records, to name a few.

In particular, for the remainder of this note specific reference will be made to births records for the 1990-2006 period, whose databases were kindly made available by the National Center for Health Statistics (NCHS), in an attempt to compare the sizes of the population born in Mexico and living in the United States with others reported in the literature. For purposes of exemplification, particular emphasis will be given on the estimates provided by the ACS. The comparison between these two sources, as well as their simultaneous use, suggests an opportunity to refine the estimates and track the evolution of the size of the population of interest.

Fig.5. Total births in USA, 1990-2006



Source: Own calculations using birth registration data from NCHS-CDC, 1990-2006

The basis of the above statements can be seen in Figure 5, which exhibits significant change in trend around 1997 in the total number of births in the United States between 1990 and 2006. Similar changes in trend have received media attention, is the case of an article

published in the edition of the New York Times in 2007², whose header reads: "A Mexican Baby Boom in New York Shows the Strength of a New Immigrant Group". The text of this note stresses that "the number of births to Mexican women increased 28% from 2000 to 2005, a time in which the city's overall births were down".

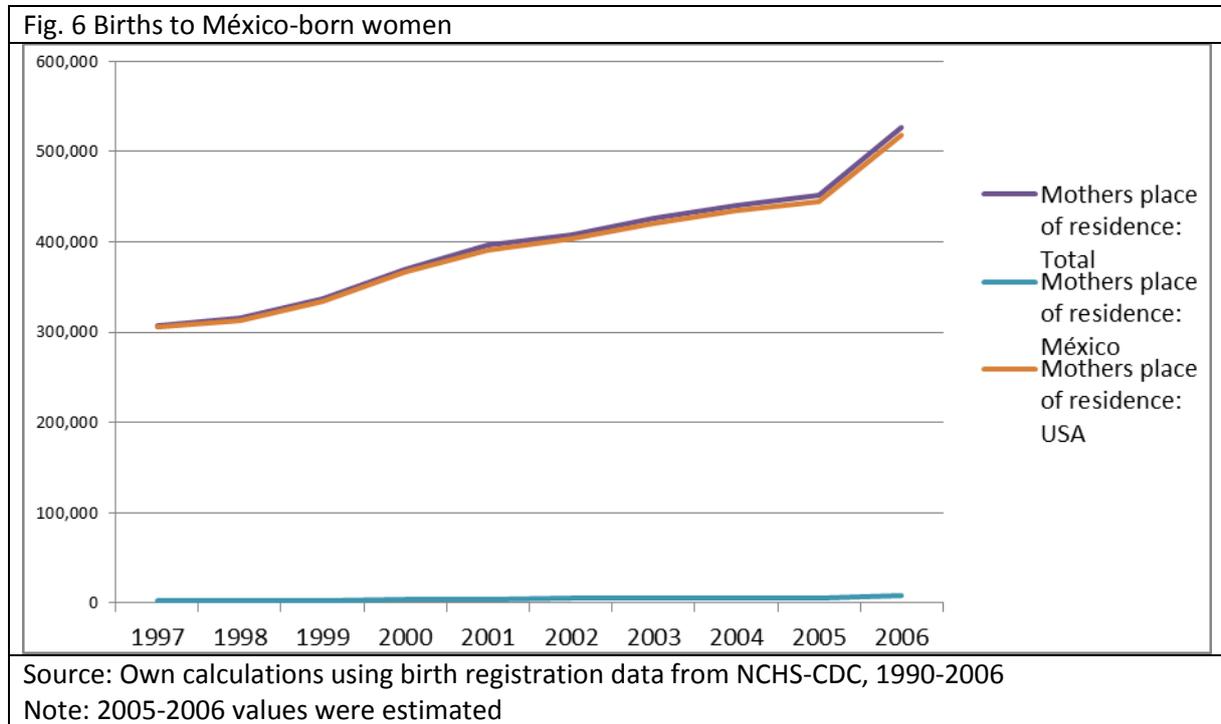


Table 1. Mexico-born fertility in the United States, avge. 2005-2007.

FERTILITY	Total	Precision	Mexico-born	Precision
Women 15 to 50 years(1)	75,871,980 (1)	NA	3,763,363 (1)	NA
Women 15 to 50 years who had a birth in the past 12 months (1)	4,188,747 (1)	NA	357,860 (1)	NA
Ratio, as percentage of total	5.52%		9.51%	
Birth Certificates (2)	4,273,225 (2)	NA	435,065 (3)	NA
Ratio, as percentage of total	5.63%		11.56%	

(1) USBC, Data Ferret, 2005-2007 ACS 3-Year Estimates, United States, Country of Birth: Mexico
 (2) Own from NCHS-CDC data bases, 1990-2006
 (3) 2004 Value

It is noteworthy that the turnaround is evident two years after the beginning of the banking crisis that afflicted Mexico since 1995. This crisis led to a substantial increase in the number of people who emigrated from Mexico to the United States, increase which I believe is still insufficiently studied. Of course, the question is whether the change in the trends of births and of migration shows a relationship beyond a casual coincidence.

² <http://www.nytimes.com/2007/06/04/nyregion/04births.html?th&emc=th>

The data on the registration of births in the United States over almost one and a half decades shows, both in relative and in absolute terms, a substantial increase in the number of births in that country to mothers who were born in Mexico. Figure 6 shows that between 1995 and 2006³ these births increased by more than 150,000, or almost half the increase for the total number of births between 1997 and 2006.

Meanwhile, the first column of Table 1 allows a comparison between the average total births that occurred in the United States between 2005 and 2007, as reported by the ACS and by the birth certificates data. The small difference between the reported values shows the excellent work carried out behind the projection of the total population of that country.

	Births to México-born women, 15-50, 2006 (A)	Women 15 to 50 years (B)= A1/A2	Estimated México-born population living in the USA, 2006 (C)=B1/B2	ACS estimated México-born population living in the USA, 2006
1	435,065 (1)	4,575,274 (3)	14,101,807 (3)	11,599,353 (2)
2	9.51% (2)	32.44% (2)		82.25% (3)

(1) Source: Own calculations based on NCHS birth certificate data-bases, 1990-2006
 (2) USBC, Data Ferret, ACS 2005-2007 American Community Survey 3-Year Estimates
 (3) Own calculations, as shown.

However, it is a well known fact that as estimation of smaller populations is attempted, the chances of achieving equally successful results go down dramatically; this is only worsened when the members of such a group do not want to be counted in a census. Thus, the number of births whose mothers were born in Mexico reported by both sources show a discrepancy of greater consideration. Under the assumption that the adjustment made to the census data in 2000 was not able to incorporate the increase in the size of the migrant population from 1994, it would be expected that subsequent estimates are affected by an underestimation like that shown in table 1.

When both numerator and denominator come from the same survey source, it is expected that ratios will be less affected by under- or over-enumeration. This allows for a first and very coarse correction for the size of the population born in Mexico residing in the United States. To this end, divide the number of births to mothers born in Mexico (435,065, using the 2004 figure) by the ratio of women who gave birth in the last 12 months and the total number of women of childbearing age provided by the ACS (9.51%). This results is a new size of the population of Mexico-born women of childbearing age who live in the United States (4'593,132). ACS itself states that in the year in question this population represented 32.44% of the total population born in Mexico and living in the United States. The ratio of these two values indicates that the size of the latter population would have reached 14'156,849 people, which is almost 22% larger than the result shown by the ACS.

Of course, the previous estimate must be favorably to include a greater detail as shown in Table 3

³ The 2005 and 2006 figures were estimated via linear regression since the data base did not include the mother's place of birth.

Table 3. Estimated Birth Rates by Age and Total Fertility Rate for Women Born in Mexico based on American Community Survey Question on Births in the Previous Year

Age	Female population born in Mexico	Birth in last year:		Birth rate
		Yes	No	
Total, 15 to 44	3,282,345	354,779	2,927,566	108.1
Between 15 and 19	289,828	23,992	265,836	82.8
Between 20 and 24	460,121	81,975	378,146	178.2
Between 25 and 29	630,694	104,561	526,133	165.8
Between 30 and 34	701,257	84,147	617,110	120.0
Between 35 and 39	667,416	46,677	620,739	69.9
Between 40 and 44	533,029	13,427	519,602	25.2
Total Fertility Rate				3209.2

Source: Gregg Robinson, private communication, ACS 2005-2007 Public Use file
 ACS question 19: "Have you given birth to any children in the past 12 months"

Conclusion

Both the use of a household survey and of administrative records for the study of international migration are discussed. It is shown that the rotation factor of the Mexican labour survey proves useful in determining changes in household composition, specifically by way of migration. In turn, a proposal outlined for the use of birth data suggests that in the study of migration it is worth exploring the use of administrative records when those referring to this issue do not exist or are unavailable. One possible reason for this to occur is an integration process such as the one in Europe that allows the free flow of people between countries. We therefore consider that the proposal put forward may also be of interest for the countries in the region