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"Disappearing Hispanics? The Case of Los Angeles County, California 1990-2000."

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Abstract

The identification of people by race and ethnicity is an important demographic activity in the United States, but it has been found to be subject to varying levels of error in census and vital statistics records. We explore this issue in a case study that examines the number of births recorded for the Hispanic population of Los Angeles County between 1990 and 1999 relative to the number of children aged 0 to 9 years reported in the 2000 Census for the Hispanic Population of Los Angeles County. Using research that shows there is a significant exodus of U.S.-Born Mexican Americans from the Census, we expect that relative to the corresponding births in the years preceding a census, Hispanic children will be “undercounted” in the census itself. In this exploration, we use a standard method of demographic analysis, the forward life table survival method (FLTSM), but not with the ultimate goal of estimating net migration. Instead we use it to generate net migration estimates that form the basis for examining the correspondence between the number of births and the number of children. The results suggest that there is a mismatch between the births and census counts. On the one hand, the mismatch suggests that relative to the identification of children as Hispanic in the 2000 Census, Hispanic births were over-recorded between 1990 and 1999; on the other, it suggests that the identification of children as Hispanic in the 2000 Census was under-recorded relative to the Hispanic Births reported between 1990 and 1999. The mismatch appears to be better explained by the latter, in that Hispanic births do not appear to be over-reported while there are findings of a Hispanic ‘exodus’ as identified by the U.S. Census. After discussing the limitations of our findings as well as their implications and possible reasons for them, we suggest avenues of future research.

Introduction

Having both a good conceptual and operational relationship between vital events data and census data is an important component of the U.S. health and population information system (Bryan, 2004; Bryan and Heuser, 2004). From the perspective of those engaged in the recording of vital events, Lunde and Groves (1966: 567) suggest that demographers can encourage the acceptance of new concepts and collaborate in the improvement of vital events by "...indicating an interest in vital registration and by making their research needs known..." From the standpoint of those engaged in demographic research, Steffey and Bradburn (1994: 138), writing on behalf of the Committee on National Statistics, state that "…tabulations of birth and death records and extracts from tax and social security records are important inputs to the Census Bureau's current population estimates program and in the demographic analyses that have played a significant role in the evaluation."

Using these two observations as a general starting point, we examine the relationship between, on the one hand, Hispanic birth data for the period 1990 to 1999 and, on the other, 2000 census data for the Hispanic children in Los Angeles County, California, who correspond to these births. That is, a number of the children aged 0-9 in the 2000 census are those who survived from the births recorded between 1990 and 1999.

The exploration is of interest because the identification of people by race and ethnicity in the United States is an important activity, but one that has been found to be subject to varying levels of error in census and vital statistics records (Baumeister, Marchi, Pearl, Williams, and Braveman, 2000; Cresce, Schmidley, and Ramirez, 2004; Edmonston, Goldstein, and Lott, 1996; Fernandez, 1995; Mulrey, 2006).

The population in our case study is of interest because of the growth of the Hispanic population in the United States (see, e.g., Niner and Rios, 2007; Murdock, 1995; and Myers, 2007) and the fact that as of 2007, Los Angeles County has the largest number of Hispanics (4,677,411) of any US county (Fry, 2008: 2).

While we use as a general starting point the work of Bryan (2004), Bryan and Heuser (2004), Lunde and Groves (1966), and Steffey and Bradburn (1994: 138), we sharpen our focus using work reported by Alba and Islam (2009), who demonstrate that there is a significant exodus of U.S.-Born Mexican-Americans from the census. This research suggests that relative to the births corresponding to them in the years preceding a census, we would expect Hispanic children to be "undercounted" in the census itself. This is a reasonable expectation because in 2000 about 2/3rds of the 35 million US Hispanics were of Mexican origin and of the latter about 60 percent (13.65 million) were born in the U.S. (Alba and Islam, 2009; U.S. Census Bureau, 2006).

The basic tool we use in our exploration is the forward life table survival method (FLTSM), a standard method used in demographic analysis, especially for purposes of estimating net migration (Edmonston and Michalowski, 2004; Hamilton, 1966; Morrison, Bryan, and Swanson, 2004; Smith, Tayman, and Swanson, 2001: 116-118). We, in fact, use FLTSM for this purpose, but our goal is not the estimation of net migration itself; instead, we use it as a means of assessing the consistency between reported births and census counts. Toward this end, we also employ Child-Woman ratios (Pullum, 2004: 423).

As a preview of our findings, the results suggest that there is a mismatch between the births and census counts. On the one hand, the mismatch suggests that relative to the identification of children as Hispanic in the 2000 Census, Hispanic births were over-recorded between 1990 and 1999; on the other, it suggests that the identification of children as Hispanic in the 2000 Census was under-recorded relative to the Hispanic Births reported between 1990 and 1999. As already touched upon and as will be discussed in more detail later, the mismatch appears to better explained by the latter, in that Hispanic births do not appear to be over-reported. This result is inline with our expectation, which stems from the finding by Alba and Islam (2009) of a U.S.-Born Mexican American 'exodus' from the Census. However, before discussing our results and providing suggestions for future areas of research, we first describe our data and analytic methods along with their inherent errors and our procedures for constraining the effect of these and other errors.

Data and Methods

In our case study, we use three primary sets of data: (1) annual Hispanic births reported by the state of California for Los Angeles County for 1990 through 1999 (California Department of Finance, no date); (2) the Hispanic population of Los Angeles County by age and sex as reported in the 1990 Census (U.S. Census Bureau, 1990); and (3) the Hispanic population of Los Angeles County by age and sex as reported in the 2000 Census (U.S. Census Bureau, 2000). In part of our analysis, we also employ an 'adjustment factor' for the 2000 Census that is specific to Los Angeles County (U.S. Census Bureau, 2003).

As already mentioned, we employ the Forward Life Table Survival Method (FLTSM) as our primary analytic tool. The FLTSM is an operational variant of the Fundamental Demographic Equation:

$$P_t = P_0 + B - D + I - O \qquad [1]$$

Where

P_0 and P_t represent the total of a given area at time 0 and time 0+t, with 0 and 0+t, usually representing successive census dates

B = Births to this population during the period 0 to 0+t

D = Deaths to this population during the period 0 to 0+t

I = the Number of In-Migrants to this population during the period 0 to 0+t

O = the Number of Out-Migrants from this population during the period 0 to 0+t

Note that $$N = I - O = P_t - B + D - P_0 \qquad [1.a]$$

Where

N = The Net Number of Migrants for this population during the period 0 to 0+t

Equation [1] is extremely flexible and as indicated by equation [1.a], has a number of variants. The FLTSM is such a variant in that the number of deaths to the population in question is generated indirectly by surviving P_0 forward to time t. This is done by finding a life table appropriate to P_0 and applying its age-specific survivorship values to the age groups (and, as needed, age by sex, by race, by ethnicity, and so on) of P_0 as follows:

$$\hat{p}_{i+t,t} = P_{i,0} * S_{i,t} \qquad [2]$$

where

$\hat{p}_{i+t,t}$ = Expected number age i+t at time t

$P_{i,0}$ = Population age i at time 0

$S_{i,t}$ = the t-year survivorship rate for age i

and

$p_{k,t}$ = Expected number less than age i+t at time t

where $k < t$ and

$\hat{p}_{k,t} = B_k * S_{i,t}$

where B_k = Births at time k $(0<K<t)$

By summing $\hat{p}_{i+t,t}$ across all age groups, adding to it, $(\sum\hat{p}_{k,t})$, and subtracting the sum $((\sum\hat{p}_{i+t,t}) + (\sum\hat{p}_{k,t}))$, from P_0, one has an estimate of the deaths to P_o and B_k that occurred during the period from time 0 to time t, which can serve as "D," in equation [1]. By subtracting $((\sum\hat{p}_{i+t,t}) + (\sum\hat{p}_{k,t}))$ from P_t, one obtains an estimate of "N," as shown in equation [1.a].

Pertinent to our paper, by subtracting $(\sum\hat{p}_{k,t})$ from $\sum P_{k,t}$, one obtains an estimate of the number of net migrants who are children (aged 0 to k) at time t. This takes us directly to the objective of this paper, an assessment of the correspondence between the number of children aged 0-9 in the 2000 census and the births recorded between 1990 and 1999. At this point, an appropriate question is if the FLTSM can provide a valid and reliable means of assessing the correspondence between births and census data, given it is subject to census net undercount and other errors and that it is aimed at estimating net migration. The short answer is that the errors can be dealt with and that the FLTSM is appropriate for our task because these children did not move on their own. They moved with adults, the vast majority of whom are their parents (and in particular, their mothers) and the FLTSM provides an estimate of both the children who moved and the adults with whom they moved. With this information in hand, we can then examine the Child-Woman Ratio (CWR) specific to four groups: (1) the 1990 population; (2) the survived population estimated for 2000; (3) the net migrant population, 1990-2000; and (4) the population enumerated in 2000.

While a standard demographic tool, the CWR is not formally standardized in terms of which age groups of children correspond to the age groups in which their mothers are found. However, because it is often used to estimate fertility in the absence of vital events data (see, e.g., Pullum, 2004: 423) or as a part of the Hamilton-Perry forecasting method (see, e.g., Smith, Tayman, and Swanson, 2001: 153-158), it conventionally is defined as the -ratio of children aged 0-4 to all females of child-bearing age, usually defined as ages 15-44 or 15-49 (Swanson and Stephan, 2004: 756) . However, as is immediately apparent, the correspondence of females above the age of 40 to children aged 0-4 is negligible and not much better for those aged 30 to 39. This leads us to defining a CWR that more closely links children aged 0-9 with the ages of their mothers. To do this, we take into consideration the fact that the Total Fertility Rate for Hispanic Women in the Los Angeles region was 2.6 in 2000, a sharp decline from 3.41 in 1990 (Southern California Association of Governments, 2004) and that for Hispanic females (as well as females in all other race and ethnic groups), the highest age-specific fertility rates in California are found for ages 20-24 and 25-29 in 2000 and other years

(State of California, 2009).The preceding numbers suggest that children aged 0-4 are most likely to be associated with females aged 20-29 and we construct a CWR for children aged 0-4 accordingly:

$$CWR_{0\text{-}4} = Children_{0\text{-}4}/Females_{20\text{-}29} \qquad [3.a]$$

For children aged 5-9, we shift the denominator upward five years so that they are associated with females aged 25-34, which produces a CWR for 5-9 year olds as follows:

$$CWR_{5\text{-}9} = Children_{5\text{-}9}/Females_{25\text{-}34} \qquad [3.b]$$

The survivorship values used in the FLTSM are taken from a life table specific to the Hispanic population (by sex) for the period 1995-97 that was created by the California Department of Health Service (1999). Along with survivorship values, the life table for Hispanic females is displayed as Table 1 and that for Hispanic males as Table 2, respectively.

(TABLES 1 and 2 ABOUT HERE)

As can be seen in Table 1, Hispanic females born in California in the 1990s are expected to live, on average to 81.90 years. Table 2 shows that Hispanic males are expected to live to 76.76, on average. A large hurdle to overcome to meet the expected averages is the first year of life. Table 1 shows that 99.66% of newborn Hispanic females are expected to reach their first birthday and while Table 2 shows that 99.59% of newborn Hispanic males are expected to do so.

The survivorship values shown in tables 1 and 2 are used to take the 1990 population forward ten years to 2000 so that net migration estimates an be calculated. For example, the ten-year survivorship for Hispanic females aged 0-4 in 1990 is .997948 while for Hispanic males aged 0-4 in 1990 it is .997324.

Error and Error Containment Procedures

Everything that can be classified or measured is subject to error and social scientists are generally sensitized to these errors and their sources (Babbie, 2009; Dillman, Smyth, and Christian, 2009). When one enters the realm of race and ethnicity, even the idea of what constitutes an error becomes tricky because a person's racial and ethnic identity reflects both his or her sense of self and society's views of race and ethnicity (Alba, 1990; Alba and Nee, 2003; Edmonston, Goldstein, and Lott, 1996; Lee and Tafoya, 2006; Waters, 1990). As noted, for example, by Edmonston, Goldstein, and Lee (1996), people may be classified by themselves (self-identification, which is the preferred means) or by others (observer identification), and these different approaches may result in different classifications.

For our purposes, one type of error that is very important is nonrandom error, which results from coverage error, non-response, incorrect answers, coding and processing errors (Swanson and Stephan, 2004: 768). In a census, these errors are often summarized under the heading of "net undercount error." It is important to note that because we are dealing with "100 percent count" census data and both death and birth registration data, there is no “random error,” which occurs only in a sample survey (Swanson and Stephan, 2004: 768).

All of the types of nonrandom error affect the accuracy of the count of the Hispanic population and births of Hispanic children. In addition, there were changes to both the wording of the Hispanic-origin question across censuses done in 1980, 1990, and 2000 (Alba and Islam, 2009; del Pinal, 2004) and to the identification of ethnicity on birth records in 1989 (National Center for Health Statistics, 1990). For our purposes, the change between the 1990 and 2000 census wording is pertinent. However, the change in the identification of ethnicity in birth records that occurred in 1989 is not (although we discuss it later).

Nonrandom error also affects our primary analytic method, the FLTSM. Although he uses terms other than ‘nonrandom error, Hamilton (1966) provides a summary of how this type of error affects the “fundamental demographic equation” when it is used to estimate net migration (see, e. g., Equation [1.a] shown earlier in this paper). Hamilton’s discussion (1966) includes variants of the fundamental demographic equation, including the FLTSM.

Using Hamilton’s work in this area, we have developed a strategy aimed at containing the effects of nonrandom error on our results. It is based on the “high, medium, and low” scenarios commonly used in population projections (Smith, Tayman, and Swanson, 2001: 331-334). Specifically, we develop three sets of net migration scenarios. There is a high scenario, designed to produce the highest estimate of the net number of Hispanic migrants for Los Angeles County for the period 1990-2000, as well as medium and low scenarios.

High Scenario. To generate the high scenario, we adjusted upward the 2000 census count and adjusted downward the expected survivors from the 1990 to 1999 births. For the former, we inflated all age and sex groups of the Hispanic population of Los Angeles counted in the 2000 census by the "total net undercount" factor for the entire population of Los Angeles County in 2000, which is 1.0056 (U.S. Census Bureau, 2003). We know that there are specific factors for the Hispanic population and for selected age-sex groups. However, the use of the common factor is designed to provide a maximum 2000 count. Because we want to maximize our estimate of net migration, we do not make any adjustment to the 1990 population because doing so would increase it, thereby, all else being equal, decreasing our estimate of the number of net migrants.

In regard to adjusting downward the survivors of the Hispanic births that were recorded for residents of Los Angeles County from 1990 to 1999, we used a two step process. In the first step, we survived each annual birth cohort one year and in the second we aggregated these survivors into two sets, births 1990-1994 and 1995-1990 and then applied a ten year survivorship rate to the former (generating the survivors who would be aged 5-9 in the 2000 census) and a five year survivorship rate to the latter (generating the survivors who would be aged 0-4 in the 2000 census). The survivorship values used in this two step process are found in tables 1 and 2.

Medium Scenario. To generate the medium scenario, we adjusted upward the 2000 census count as was described for the High Scenario. We did not adjust downward the expected survivors from the 1990 to 1999 births. Only the ten year survivorship rate was applied to the births (by sex) in the period 1990-1994 (generating the survivors who would be aged 5-9 in 2000) and a five year survivorship rate (again, by sex) to the births in the period 1995-1999 (generating the survivors who would be aged 0-4 in the 2000 census). The survivorship values are found in tables 1 and 2.

Low Scenario. To generate the low scenario, we neither adjusted upward the 2000 census count nor adjusted downward the expected survivors from the 1990 to 1999 births. Again, only the ten year survivorship rate was applied to the births (by sex) in the period 1990-1994 (generating the survivors who would be aged 5-9 in 2000) and a five year survivorship rate (again, by sex) to the births in the period 1995-1999 (generating the survivors who would be aged 0-4 in the 2000 census). Again, the survivorship values are found in tables 1 and 2.

As can be seen in the three scenarios, there is no adjustment for 1990 census errors. Had this been done, the resulting survivors would be higher and the estimated net numbers of net migrants lower. As will be seen in the results, this would have created even larger inconsistencies in the Child-Woman ratios estimated for the net migrant population.

There is another type of "error" that is important, but it represents a potential interpretation error, not an error in measurement. This stems from the fact that we are using net migration, which conceptually is similar to profit. That is, there are actual people moving in and actual people going out, like actual money coming in and actual money going out, but we can neither point to a net migrant as an actual person nor profit as an actual dollar. Both net migration and profit are useful, but they are research constructs (Smith and Swanson, 1998). This means in certain situations that mis-matches can occur between the direction and volume of the migration of children and the direction and volume of the female adults with whom the children are associated. For example, if there is a large university in an otherwise sparsely populated area, there may be substantial in-migration levels for young women aged 20-24 and a low level of out-migration for them. The women aged 20-24 moving in are not as likely to have children as the women moving out. However, in such a case, the net migration for children could easily be negative while the net migration for women aged 20-24 would be positive. Other situations that could generate this type of pattern that come to mind often involve “special populations” such as college students, prisoners, military personnel, and members of religious orders. In addition, it may be the case that an area might be a “jobs magnet” for women aged 20-24 and like incoming university students, they are not as likely to have children with them as the women moving out. For such an area, we may see negative net migration for children and positive net migration for women aged 20-24.

The preceding types of areas keep us mindful that we need to take care when interpreting results for Hispanics in Los Angeles County. However, the size of the Hispanic population (over 4 million in the 2000 Census) means that it is not dominated by “special populations,” which suggests that we are not likely to make an error of interpretation based on them. It is more likely that Los Angeles County is serving as a jobs magnet that attracts young females without accompanying children (as well as young males without accompanying children).

To investigate this issue, a classic single source of net migration estimates across different areas of the United States, was consulted, “Net Migration of the Population, 1950-60 by Age, Sex, and Color,” which was produced by the U.S. Department of Agriculture (Bowles and Tarver, 1965). The examination revealed that of the 50 states and the District of Columbia, only four (DC, Alaska, Texas, and Virginia) showed net out migration of children and net in-migration of the females with whom they would be associated. In evaluating these four areas, we will first show the numbers and then discuss them.

For the District of Columbia, there was a net loss of -15,354 children aged 0-4 and -32,692 children aged 5-9. In contrast, there was a net gain of +12,081 females aged 20-24 and +3,793 females aged 25-29. For females aged 30-34, there was a net loss of - 9,574. These numbers result in a CWR_{0-4} of -0.9672 and a CWR_{5-9} of 5.6551.

For Alaska, there was a net loss of -2,239 children aged 0-4 and -1,478 children aged 5-9. In contrast, there was a net gain of +3,960 females aged 20-24, +5,449 females aged 25-29, and +3,906 females aged 30-34. These numbers result in a CWR_{0-4} of -0.238 and a CWR_{5-9} of -0.158.

For Texas, there was a net loss of -35,984 children aged 0-4 and -26,802 children aged 5-9. In contrast, there was a net gain of +19,726 females aged 20-24, +21,282 females aged 25-29, and for females aged 30-34, +10,052. These numbers result in a CWR_{0-4} of -0.8775 and a CWR_{5-9} of -0.8554.

For Virginia, there was a net loss of -61 children aged 0-4 and -3,913 children aged 5-9. In contrast, there was a net gain of +4,079 females aged 20-24, +344 females aged 25-29 and for females aged 30-34, +221. These numbers result in a CWR_{0-4} of -0.0138 and a CWR_{5-9} of -6.9257.

In discussing these results, recall that for the medium scenario, the CWR_{0-4} was -0.559 and -1.423 for CWR_{5-9}. In regard to the former, it is smaller in an absolute sense than the CWR_{0-4} for DC and Texas and larger than those for Alaska and Virginia. In regard to the latter, it is smaller in an absolute sense than the CWR_{5-9} for both DC and

Virginia, on the one hand, and larger, on the other, than those for both Alaska and Virginia.

Looking at each of the areas in turn, Washington, DC clearly served as a "jobs magnet" for the period 1990 to 2000 and to some extent, so did Virginia during this period in that many who work in DC live in nearby areas of Virginia. Alaska also falls into this group. Of the four, Texas is perhaps the most interesting because, like California it has a large Hispanic population. To some extent both states served as jobs magnets for migrants coming from Mexico (and elsewhere in Latin America) 1990-2000. However, like California, it also has a substantial number of Hispanics who are US-Born. We return to these points later in the discussion.

Results

Table 3 shows the estimated number of Hispanic female and male net migrants by age under the low scenario for Los Angeles during the period 1990 to 2000. Along with the net number of migrants, Table 3 also shows the 1990 and 2000 population count of Hispanic females and males by age along with the reported Hispanic births, 1990 to 1999. Child-Woman Ratios for children aged 0-4 and 5-9 under the low scenario are found to the left of Table 3. They are given for all four of the data sets found in Table 3: (1) the 1990 census count; (2) the 2000 census count; (3) the expected survivors in 2000, and (4) the net number of migrants estimated using the FLTSM. Table 4 shows the same information found in Table 3, but under the medium scenario; Table 5 shows it under the high scenario.

(TABLES 3, 4 and 5 ABOUT HERE)

Starting with Table 3, the low scenario, we see that there was a net loss for Hispanic children in terms of the net migration estimates: for males aged 0-4 and 5-9 in 2000, the net losses are estimated as -27,757 and -48,188, respectively. For female Hispanic children a similar result is found: the net loss for females aged 0-4 in 2000 is -27,567 while for females aged 5-9 it is -46,748. Taking them altogether, the net loss is -150,260. For age 0-4, the total loss is -55,324 and for age 5-9 it is -94,936. By looking at the adult females with who these children would be generally to be moving, we see that there is a gain of 92,303 in the net number of Hispanic female migrants aged 20-29 and a net gain of 62,697 in the net number aged 25-34.

The results of these estimates under the low scenario are that we have for net migrants, a $CWR_{0\text{-}4}$ of -0.599 and -1.5142 for $CWR_{5\text{-}9}$. In terms of 1990, $CWR_{0\text{-}4}$ is 1.09156 and 0.99551 for $CWR_{5\text{-}9}$; for 2000, they are 1.17970 and 1.23844, respectively, while for the survivors they are 1.75121 and 1.77721, respectively. We will return to the 'inconsistent" CWRs for the net migrants in the low scenario later.

Table 4 shows the results for the medium scenario. Again, we see that there was a net loss for Hispanic children in terms of the net migration estimates, although they are less than those found in the low scenario: for males aged 0-4 and 5-9 in 2000, the net losses are estimated as -26,464 and -46,832, respectively. For female Hispanic children a similar result is found: the net loss for females aged 0-4 in 2000 is -26,329 while for females aged 5-9 it is -45,448. Taking them altogether, the net loss for the medium scenario is -145,073. For age 0-4, the total loss is -52,793 and for age 5-9 it is -92,280. By looking at the adult females with who these children would be generally to be moving, we see that there is a gain of 94,441 in the net number of Hispanic female migrants aged 20-29 and a net gain of 64,842 in the net number aged 25-34.

The results of these estimates for the medium scenario are that we have for net migrants, a CWR_{0-4} of -0.559 and -1.423 for CWR_{5-9}. In terms of 1990, CWR_{0-4} is 1.09156 and 0.99551 for CWR_{5-9}; for 2000, they are 1.18311 and 1.23844, respectively, while for the survivors they are 1.75121 and 1.77721, respectively. Figure 1 shows the age-related pattern of net migration under the medium scenario.

(FIGURE 1 ABOUT HERE)

The results for the High Scenario are found in Table 5. As was the case in both the low and medium scenarios, there is a net loss for Hispanic children in terms of the net migration estimates, although they are less. For the high scenario: for males aged 0-4 and 5-9 in 2000, the net losses are estimated as -24,897 and -45,074, respectively. For female Hispanic children the net loss for age 0-4 in 2000 is -25,077 while for females aged 5-9 it is -44,041. Taking them altogether, the net loss for the medium scenario is -139,089. For age 0-4, the total loss is -49,947 and for age 5-9 it is -89,115. By looking at the adult females with who these children would be generally to be moving, we see that there is a gain of 94,441 in the net number of Hispanic female migrants aged 20-29 and a net gain of 64,842 in the net number aged 25-34.

The results of these estimates for the high scenario are that we have for net migrants, a CWR_{0-4} of -0.529 and -1.374 for CWR_{5-9}. In terms of 1990, CWR_{0-4} is 1.09156 and 0.99551 for CWR_{5-9}; for 2000, they are 1.18311 and 1.23844, respectively, while for the survivors they are 1.74174 and 1.76733, respectively.

Discussion

As acknowledged earlier, all methods used to estimate net migration in the U.S. are subject to errors and the primary source when census data are used is "nonrandom" (aka "net undercount") error. Additionally, for the FLTSM there are errors that result the fact that the life table used will not generate the exact number of deaths that would be reported. This would not be the case if we used the basic expression of the fundamental demographic equation (see equation [1.a]) to estimate net migration in conjunction with reported births and reported deaths between the two census counts. However, it would be an onerous task to generate the expected survivors using reported deaths rather than the estimated deaths via the survivorship values generated by a life table. We can, however, conduct a sensitivity test by comparing the number of total deaths generated via the FLTSM to the reported deaths during the same period. In so doing, we find that there were 105,507 reported deaths to the Hispanic population between the two census counts (California Department of Finance, 2005). In comparison the FLTSM produced 112,472 deaths to the Hispanic population of 1990 and the Hispanic births reported for 1990 to 1999. The FLTSM results are not so different than the reported deaths that the estimates it produces of survivors and net numbers of migrants are invalid.

Various errors that are present in our estimates may distort the magnitude of the inconsistencies found in the Child-Woman Ratios for the net numbers of migrants, but it is not plausible that they can explain them for any of the three scenarios. Moreover, the ratios for the survivors are not only internally consistent in each of the scenarios, but also consistent with the ratios for the 1990 and 2000 census counts.

As described earlier, there are clearly situations in which "mis-matches" occur between the direction and volume of the migration of children and the direction and volume of the female adults with whom the children are associated. Moreover, the general pattern of 1990-2000 net migration for Hispanics in Los Angeles County is similar to the "Central City" type described by Pittenger (1976: 190) in his migration typology. However, we stress that the Los Angeles pattern, while similar, is more much more extreme in terms of the child-woman ratios expected from Pittenger's Central City type. Thus, while there is likely some of the "jobs magnet" effect occurring in Los Angeles, the sharp difference found for the net migration of children between the Central City Type and Los Angeles County suggest that there are Hispanic children "missing" in the 2000 census of Los Angeles County.

As explained in detail in Appendix 1, there are errors noted in the identification of Hispanic births, but again, even in combination with the census and other errors as well as the 'jobs magnet" effect, they cannot explain by themselves the inconsistencies found for the Child-Woman Ratios in any of the three scenarios. A study in California hospitals, for example, provided consistent matches (between 99 or 96.4, depending on the measure) between the self-reported Hispanic ethnicities of mothers who gave birth between August 1994 and July 1995, making the consistency between birth data and self-reported ethnicity (i.e. birth certificates and the Census) consistent (Baumeister et. al. 2000).

We believe that an explanation for the inconsistencies found in the CWRs for the net migrant is provided by Alba and Islam (2009), who argue that individuals identifying as Mexican during earlier censuses "disappear" during in later Censuses, suggesting that many Mexican Americans choose to instead identify with a "pan-ethnic" character (i.e. "Other Hispanic"). Conversely, the authors show evidence of Mexicans who eschew their "Hispanic/Latino/Spanish" ethnicity, reflecting what may be due to processes of assimilation and avoiding the stigma associated with the Hispanic/Latino term. The disappearing specific nationalities of Hispanics may also deal with a survey-instrument artifact. Assessments of the imputation procedures to the 1990 Census (more on this below) report a few problems with the Census results, including higher than expected allocation rates and a misreporting of the "Mexican, Mexican American, and Chicano" and "Other Spanish/Hispanic" categories.[i] In contrast, the 2000 Census question wording seems to have encouraged greater "generic" Hispanic terms (i.e. "other Hispanic") rather than reporting on specific countries of origin – a finding of the Alternate Questionnaire Experiment which was used to assess the changes that may ensue from differing survey instruments (Cresce, Schmidley, and Ramirez 2004).[ii]

Conclusions and recommendations for future work

Our results are consistent with the argument made by Alba and Islam (2009) that identity shifts are going on among US-Born Mexican Americans such that they are moving out of the Mexican-American category in regard to census counts. Given that our results are reasonably valid, it would appear that this process goes beyond census-to-census shifts and includes shifts from birth records to subsequent census counts. To the extent that our results include all Hispanics, some of this shifting among US-Born Mexican-Americans is likely to be masked.

Alba and Islam (2009) point out that the shifting identities of US-Born Mexican Americans may put them into either one of two broad categories: (1) Pan-Hispanic; and (2) non-Hispanic. That is, some may identify themselves as mainly Hispanic rather than Mexican-American and others may identify themselves as not Hispanic whatsoever.

In general, we do not believe that there is anything for us to recommend in terms of improving the accuracy of birth (and death) record registration or census counts beyond what others have noted. We do believe, however, that points made by Alba and Islam (2009) are worth repeating in terms of being implicit recommendations.

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APPENDIX 1

"In California, despite the lack of uniform training or quality control measures, our interviews with birth clerks indicated that they generally use self-identification by the mother to determine her "race" and "Hispanic ethnicity" as instructed by the local registrars and the birth registration handbook" (Baumeister et al. 2000).

According to the 1990 Public Use Data Tape Documentation, a live birth is defined as "Every product of conception that gives a sign of life after birth, regardless of the length of the pregnancy" (p.246). Certificates to document live births were first developed in 1900 and have continuously been modified and revised as determined necessary by the National Vital Statistics Agency (p.248). Data documented on these birth certificates are compiled from electronic files based upon individual records which are processed by each State and provided to the National Center for Health Statistics through the Vital Statistics Cooperative Program. Data are limited to births occurring within the U.S., including those occurring to U.S. residents and nonresidents. Births to nonresidents of the United States have been excluded from all tabulations by place of residence since 1970 (Documentation of the Detail Natality Tape File for 2000 pg 220).

Race and Ethnicity

Beginning in 1989, race and ethnicity of a newborn child is identified as the race of the mother. In this same data year a question to determine whether or not the child was of Hispanic ethnicity was added to the U.S. birth certificate (Public Use Data Tape

Documentation 1990). Prior to 1989, a child's race was determined based upon the reported race of both mother and father using an algorithm. This was done for statistical purposes. In the case that both parents identified as the same race, the child would be labeled as such. However, if one parent identified as white and the other parent identified with another race, the child would be classified as the race of the non-white parent. If both parents identified themselves as a race other than white, the child was identified as the race of the father. This applied in all circumstances unless either parent identified as Hawaiian, in which case the child was identified as Hawaiian (Public Use Data Tape Documentation. 1990. (Public Use Data Tape Documentation p.252).

Three justifications were provided in the 1990 Public Use Data Tape Documentation (p.253) for using the race of the mother:

> (1) The 1989 decennial revision of the U.S. Standard Certificate of Live Birth. This revision added several new health related questions targeted at the mother (i.e. alcohol and tobacco use, weight gain during pregnancy, medical risk factors, etc.). In addition, majority of the questions which were previously on the certificate were to be answered by the mother (i.e. marital status, education level).
>
> (2) The increasing occurrence of interracial parentage.
>
> (3) The growing percentage of births with race of father not stated which mirrors the rising number of child born out of wedlock. In such cases, the race of the child was already assigned as the race of the mother on a de facto basis.

Challenges are presented by the assignment of a newborns' race according to that of their mother mainly because the number of births classified as white will go up and the number for all other racial groups will go down. These challenges are expected to be most severe when looking at data on races other than white and black, specifically for trend data (Use Data Tape Documentation. p.254).

Hispanic race and origin are reported independently on the birth certificate. Hispanic origin is most commonly reported as one of the five following subgroups: Mexican, Puerto Rican, Cuban, Central and South American, and other (and unknown) Hispanic. When tabulating race data only, data for persons of Hispanic origin are included in the data for each race group according to the mother's reported race. The category "White" comprises births reported as white and births where race, as distinguished from Hispanic origin, is reported as Hispanic. In tabulations of birth data by race and Hispanic origin, data for persons of Hispanic origin are not further classified by race because the vast majority of births to Hispanic women are reported as white (97 percent in 2000). In these tabulations, data for non-Hispanic persons are classified according to the race of the mother because there are substantial differences in fertility and maternal and infant health between Hispanic and non-Hispanic white women. A re-code variable is available that provides cross tabulations of race by Hispanic origin.

In the case that data on the race of the mother is not available but the race of the father is, the child is identified as the father's race. When information for both mother and father is unavailable, the race of the mother is allocated electronically according to the specific race of the mother on the preceding record with a known race of mother. It is important to note that only .4 percent of cases in 2000 were missing data for both parents.

Residence and Occurrence

In the case of residence, births occurring inside the United States, whether to U.S citizens or resident aliens, are tabulated as the usual place of residence of the mother in the United States. Births to U.S. Citizens outside of the United States are not included in the tabulations for place of residence. The total count of births for the United States by place of residence and by place of occurrence will not be identical because births to nonresidents of the United States are included in data for by place of occurrence but excluded from data by place of residence (1990 Public Use Data Tape Documentation. p 221).

Residence error was measured in 1950 using a nationwide test of birth-registration completeness. According to the test, births to residents of urban areas and other areas, tend to be overstated and understated, respectively. This tendency was found for the country as a whole. Such a test has not been repeated. There are several reasons these results such caution future researchers. First, there has been an increased utilization of hospitals in cities by residents of nearby places. This results in an increased number of births inaccurately being reported as having occurred to residents of urban areas. Another factor leading to the error in data on urban births is the traditional practice of using "city" addresses for persons living outside the city limits. According to the 1990 Public Use Data Tape Documentation (p. 221), residence error should be taken into consideration in interpreting data for small areas and for cities, because both birth and infant mortality patterns can be affected. In the case that information on city for place of residence is unavailable, and the State listed for place of occurrence differs from that which is listed for place of residence, the largest city corresponding to the State of residence is allocated. This began in 1973. In such circumstances prior to 1973, place of occurrence was used (1990 Public Use Data Tape Documentation. p 221).

The reliability of vital records and issues of consistency between ethnic categorization across data sets can also lead to different results when estimating Latinos. There is concern, for example, on the reliability of birth clerks to properly follow procedures in classifying racial and ethnic information directly from the informant. A study in California hospitals, however, provided consistent matches (between 99 or 96.4, depending on the measure) between the self-reported Hispanic ethnicities of mothers who gave birth between August 1994 and July 1995, making the consistency between birth data and self-reported ethnicity (i.e. birth certificates and the Census) consistent (Baumeister et. al. 2000). On the other hand, Smith and Bradshaw (2006) argue that the Census omitted about 5% of births for Hispanic infants. Furthermore, inter-ethnic children may lead to differing reported rates of Hispanic children. Lee and Edmonston (2006) estimate that around 2/3rds of children of intermarried Hispanic were listed as Hispanic, which may conceivably lead to an "overestimation" of births of children of Hispanic ethnicity.

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[i] Cited in Cresce, Schmidley, and Ramirez (2004), but making reference to McKenney and Cresce (1992), and Cresce (2002).

[ii] Somewhat contracdictory, the Content Reinverview Survey indicated that the consistency of edited data for "Not Hispanic," "Mexican," "Cuban," and "Puerto Rican" were in the good range – whereas "Other Hispanic" was moderate, and "Multiple Hispanic" was poor (del Pinal 2003).

Table 1. CALIFORNIA LIFE TABLE, 1995-97 with Survivorship Values
California Hispanic Females 1995-97

								Five Year Survivorship values	
AGE	nQx	lx	ndx	nLx	Tx	ex	AGE	Female	Male
0	0.00504	100,000	504	99,662	8,190,336	81.90	0-4	0.998692	0.998392
1	0.00104	99,496	103	397,777	8,090,674	81.32	5-9	0.999255	0.99893
5	0.0007	99,393	70	496,789	7,692,896	77.40	10-14	0.99874	0.995522
10	0.00079	99,323	78	496,419	7,196,108	72.45	15-19	0.998015	0.991429
15	0.00173	99,244	172	495,793	6,699,689	67.51	20-24	0.997835	0.991928
20	0.00224	99,073	222	494,809	6,203,896	62.62	25-29	0.997935	0.992468
25	0.00209	98,851	207	493,738	5,709,087	57.75	30-34	0.997106	0.99049
30	0.00204	98,644	201	492,718	5,215,349	52.87	35-39	0.995262	0.987759
35	0.00375	98,443	369	491,292	4,722,631	47.97	40-44	0.992869	0.984119
40	0.00573	98,074	562	488,964	4,231,338	43.14	45-49	0.988617	0.978225
45	0.00854	97,512	833	485,478	3,742,374	38.38	50-54	0.982101	0.96976
50	0.01425	96,679	1,378	479,952	3,256,896	33.69	55-59	0.97207	0.95546
55	0.0216	95,301	2,059	471,361	2,776,945	29.14	60-64	0.95579	0.932484
60	0.0344	93,243	3,208	458,196	2,305,584	24.73	65-69	0.931686	0.898616
65	0.05437	90,035	4,895	437,939	1,847,388	20.52	70-74	0.897625	0.848926
70	0.08306	85,140	7,072	408,022	1,409,449	16.55	75+	0.851098	0.789725
75	0.12344	78,068	9,637	366,250	1,001,427	12.83		0.509247	0.497541
80	0.17795	68,432	12,177	311,715	635,177	9.28			
85	1	56,254	56,254	323,462	323,462	5.75			

Table 2. CALIFORNIA LIFE TABLE, 1995-97 with Survivorship Values
California Hispanic Males 1995-97

							Ten Year Survivorship Values		
AGE	nQx	lx	ndx	nLx	Tx	ex	AGE	Female	Male
0	0.00606	100,000	606	99,594	7,675,833	76.76	0-4	0.997948	0.997324
1	0.00131	99,394	130	397,316	7,576,239	76.22	5-9	0.997996	0.994457
5	0.00084	99,264	83	496,111	7,178,923	72.32	10-14	0.996758	0.986989
10	0.0013	99,180	129	495,580	6,682,812	67.38	15-19	0.995854	0.983426
15	0.00766	99,051	759	493,361	6,187,233	62.46	20-24	0.995774	0.984457
20	0.00949	98,293	933	489,132	5,693,872	57.93	25-29	0.995047	0.983029
25	0.00664	97,360	646	485,184	5,204,740	53.46	30-34	0.992381	0.978365
30	0.00843	96,713	815	481,529	4,719,557	48.80	35-39	0.988165	0.972072
35	0.0106	95,898	1,017	476,950	4,238,028	44.19	40-44	0.981567	0.96269
40	0.0139	94,882	1,319	471,111	3,761,078	39.64	45-49	0.970922	0.948643
45	0.01789	93,563	1,674	463,629	3,289,967	35.16	50-54	0.954671	0.926566
50	0.02573	91,889	2,364	453,534	2,826,338	30.76	55-59	0.929094	0.890951
55	0.03487	89,525	3,122	439,819	2,372,804	26.50	60-64	0.890496	0.837945
60	0.05456	86,403	4,714	420,229	1,932,985	22.37	65-69	0.836304	0.762859
65	0.08122	81,689	6,635	391,857	1,512,755	18.52	70-74	0.763967	0.670419
70	0.12333	75,054	9,256	352,129	1,120,898	14.93	75+	0.323001	0.304075
75	0.18272	65,798	12,023	298,932	768,769	11.68			
80	0.24399	53,775	13,121	236,074	469,837	8.74			
85	1	40,654	40,654	233,763	233,763	5.75			

Table 3. The Low Scenario

MALES age in 1990	number	Sx	age in 2000	survivors	actual	net n of migrants	proportion of total Net
births1995-99	259,037	0.998391956	0-4	258,620	230,863	-27,757	0.36171
births1990-94	291,025	0.997323773	5-9	290,246	242,058	-48,188	0.62795
0-4	193,153	0.997323773	10-14	192,636	200,596	7,960	-0.10373
5-9	165,433	0.994456956	15-19	164,516	190,797	26,281	-0.34248
10-14	148,607	0.986988969	20-24	146,673	203,734	57,061	-0.74357
15-19	171,959	0.983425911	25-29	169,109	214,759	45,650	-0.59488
20-24	226,619	0.984456984	30-34	223,097	206,940	-16,157	0.21054
25-29	208,453	0.983029206	35-39	204,915	174,123	-30,792	0.40127
30-34	168,786	0.978364803	40-44	165,134	137,161	-27,973	0.36453
35-39	127,619	0.972072157	45-49	124,055	103,047	-21,008	0.27376
40-44	89,291	0.962690147	50-54	85,960	73,937	-12,023	0.15667
45-49	63,681	0.948643414	55-59	60,411	50,305	-10,106	0.13169
50-54	45,794	0.926566171	60-64	42,431	36,468	-5,963	0.07771
55-59	36,379	0.890950725	65-69	32,412	27,421	-4,991	0.06504
60-64	30,139	0.83794512	70-74	25,255	21,221	-4,034	0.05257
65-69	22,151	0.762859119	75-79	16,898	14,138	-2,760	0.03597
70-74	12,902	0.670418654	80-84	8,650	6,945	-1,705	0.02222
75-79	8,765	0.304074885	85+	5,319	5,086	-233	0.00304
80-84	5,082		MALE TOTAL	2,216,337	2,139,599		
85+	3,647				Male Total	-76,738	1.00000

births 1990-99	males	females	Total
1999	49,534	47,591	97,125
1998	50,026	48,065	98,091
1997	51,124	49,119	100,243
1996	53,658	51,554	105,212
1995	54,694	52,550	107,244
1994	55,720	53,535	109,255
1993	57,871	55,602	113,473
1992	59,475	57,142	116,617
1991	59,902	57,553	117,455
1990	58,057	55,780	113,837

FEMALES age in 1990	number	Sx	age in 2000	survivors	actual	net n of migrants	proportion of total Net
births1995-99	248,878	0.998691932	0-4	248,553	220,986	-27,567	-16.91946
births1990-94	279,612	0.997947922	5-9	279,038	232,290	-46,748	-28.69237
0-4	185,073	0.997947922	10-14	184,693	192,355	7,662	4.70251
5-9	159,472	0.99799614	15-19	159,152	175830	16,678	10.23606
10-14	142,449	0.996757907	20-24	141,987	184736	42,749	26.23762
15-19	148,240	0.995854434	25-29	147,625	197,179	49,554	30.41409
20-24	173,432	0.995774361	30-34	172,699	185,842	13,143	8.06659
25-29	173,069	0.995046823	35-39	172,212	164,182	-8,030	-4.92836
30-34	153,302	0.992381446	40-44	152,134	138,974	-13,160	-8.07715
35-39	122,065	0.988164684	45-49	120,620	110,024	-10,596	-6.50362
40-44	90,281	0.98156745	50-54	88,617	83,509	-5,108	-3.13503
45-49	65,884	0.970922351	55-59	63,968	58,816	-5,152	-3.16226
50-54	50,352	0.954671158	60-64	48,070	45255	-2,815	-1.72750
55-59	42,048	0.92909442	65-69	39,067	36632	-2,435	-1.49424
60-64	37,384	0.890495799	70-74	33,290	30,908	-2,382	-1.46216
65-69	28,937	0.83630436	75-79	24,200	21,685	-2,515	-1.54370
70-74	19,620	0.76396654	80-84	14,989	12,292	-2,697	-1.65533
75-79	14,682	0.323001026	85+	10,069	11,119	1,050	0.64431
80-84	9,199		FEMALE TOTAL	2,100,985	2,102,614		
85+	7,293				Female Total	1,629	1.00000

Total net migration = -75,109

child woman ratio	0-4	5 -9
1990	1.09156	0.99551
2000	1.17970	1.23844

survivors child woman ratio	0-4	5 -9
2000	1.75121	1.77721
		\

net migrants child woman ratio	0-4	5-9
2000	-0.59938	-1.51422

Table 4. The Medium Scenario

MALES

age in 1990	number	Sx	age in 2000	survivors	actual	ADJUSTED for CENSUS ERROR*	net n of migrants	proportion of total Net
births1995-99	259,037	0.998391956	0-4	258,620	230,863	232,156	-26,464	0.40867
births1990-94	291,025	0.997323773	5-9	290,246	242,058	243,414	-46,832	0.72321
0-4	193,153	0.997323773	10-14	192,636	200,596	201,719	9,083	-0.14027
5-9	165,433	0.994456956	15-19	164,516	190,797	191,865	27,349	-0.42234
10-14	148,607	0.986988969	20-24	146,673	203,734	204,875	58,201	-0.89878
15-19	171,959	0.983425911	25-29	169,109	214,759	215,962	46,853	-0.72352
20-24	226,619	0.984456984	30-34	223,097	206,940	208,099	-14,998	0.23160
25-29	208,453	0.983029206	35-39	204,915	174,123	175,098	-29,817	0.46045
30-34	168,786	0.978364803	40-44	165,134	137,161	137,929	-27,205	0.42012
35-39	127,619	0.972072157	45-49	124,055	103,047	103,624	-20,431	0.31550
40-44	89,291	0.962690147	50-54	85,960	73,937	74,351	-11,609	0.17926
45-49	63,681	0.948643414	55-59	60,411	50,305	50,587	-9,824	0.15170
50-54	45,794	0.926566171	60-64	42,431	36,468	36,672	-5,759	0.08893
55-59	36,379	0.890950725	65-69	32,412	27,421	27,575	-4,837	0.07470
60-64	30,139	0.83794512	70-74	25,255	21,221	21,340	-3,915	0.06046
65-69	22,151	0.762859119	75-79	16,898	14,138	14,217	-2,681	0.04140
70-74	12,902	0.670418654	80-84	8,650	6,945	6,984	-1,666	0.02572
75-79	8,765	0.304074885	85+	5,319	5,086	5,114	-205	0.00317
80-84	5,082		MALE TOTAL	2,216,337	2,139,599	2,151,581		
85+	3,647				Male Total		-64,756	1.00000

FEMALES

age in 1990	number	Sx	age in 2000	survivors	actual	ADJUSTED for CENSUS ERROR*	net n of migrants	proportion of total Net
births1995-99	248,878	0.998691932	0-4	248,553	220,986	222,224	-26,329	-1.96429
births1990-94	279,612	0.997947922	5-9	279,038	232,290	233,591	-45,448	-3.39061
0-4	185,073	0.997947922	10-14	184,693	192,355	193,432	8,739	0.65197
5-9	159,472	0.99799614	15-19	159,152	175830	176,815	17,662	1.31769
10-14	142,449	0.996757907	20-24	141,987	184736	185,771	43,783	3.26646
15-19	148,240	0.995854434	25-29	147,625	197,179	198,283	50,658	3.77932
20-24	173,432	0.995774361	30-34	172,699	185,842	186,883	14,184	1.05817
25-29	173,069	0.995046823	35-39	172,212	164,182	165,101	-7,110	-0.53047
30-34	153,302	0.992381446	40-44	152,134	138,974	139,752	-12,382	-0.92374
35-39	122,065	0.988164684	45-49	120,620	110,024	110,640	-9,980	-0.74457
40-44	90,281	0.98156745	50-54	88,617	83,509	83,977	-4,640	-0.34618
45-49	65,884	0.970922351	55-59	63,968	58,816	59,145	-4,823	-0.35981
50-54	50,352	0.954671158	60-64	48,070	45255	45,508	-2,561	-0.19108
55-59	42,048	0.92909442	65-69	39,067	36632	36,837	-2,229	-0.16633
60-64	37,384	0.890495799	70-74	33,290	30,908	31,081	-2,209	-0.16482
65-69	28,937	0.83630436	75-79	24,200	21,685	21,806	-2,394	-0.17858
70-74	19,620	0.76396654	80-84	14,989	12,292	12,361	-2,628	-0.19608
75-79	14,682	0.323001026	85+	10,069	11,119	11,181	1,112	0.08296
80-84	9,199		FEMALE TOTAL	2,100,985	2,102,614	2,114,389		
85+	7,293				Female Total		13,404	1.00000
					Total net migration =		-51,352	

births 1990-99

	males	females
1999	49,534	47,591
1998	50,026	48,065
1997	51,124	49,119
1996	53,658	51,554
1995	54,694	52,550
1994	55,720	53,535
1993	57,871	55,602
1992	59,475	57,142
1991	59,902	57,553
1990	58,057	55,780

child woman ratio

	0-4	5 -9
1990	1.09156	0.99551
2000	1.18311	1.23844

survivors child woman ratio

	0-4	5 -9
2000	1.75121	1.77721

net migrants child woman ra

	0-4	5-9
2000	-0.55901	-1.42317

* Net undercount adjustment factor taken from A.C.E. Revision II estimates by County by State for Census 2000 (http://www.census.gov/dmd/www/ACEREVII COUNTIES.txt, last accessed 10 DEC 09)
where the 2000 census count = 9519463 for Los Angeles County and the ACE REV II adjusted count = 9572428
(Net undercount adjustment factor = 9572428/9519463 = 1.0056)
U. S. Census Bureau (2003) "Technical Assessment of A.C.E. Revision II" March 12,2003. U. S. Census Bureau.

Table 5. The High Scenario

MALES

age in 1990	number	Sx	age in 2000	survivors	actual	ADJUSTED for CENSUS ERROR*	net n of migrants	proportion of total Net
births 1995-99	257,467	0.998391956	0-4	257,053	230,863	232,156	-24,897	0.40529
births 1990-94	289,261	0.997323773	5-9	288,487	242,058	243,414	-45,074	0.73374
0-4	193,153	0.997323773	10-14	192,636	200,596	201,719	9,083	-0.14786
5-9	165,433	0.994456956	15-19	164,516	190,797	191,865	27,349	-0.44521
10-14	148,607	0.986988969	20-24	146,673	203,734	204,875	58,201	-0.94744
15-19	171,959	0.983425911	25-29	169,109	214,759	215,962	46,853	-0.76270
20-24	226,619	0.984456984	30-34	223,097	206,940	208,099	-14,998	0.24414
25-29	208,453	0.983029206	35-39	204,915	174,123	175,098	-29,817	0.48538
30-34	168,786	0.978364803	40-44	165,134	137,161	137,929	-27,205	0.44286
35-39	127,619	0.972072157	45-49	124,055	103,047	103,624	-20,431	0.33259
40-44	89,291	0.962690147	50-54	85,960	73,937	74,351	-11,609	0.18897
45-49	63,681	0.948643414	55-59	60,411	50,305	50,587	-9,824	0.15992
50-54	45,794	0.926566171	60-64	42,431	36,468	36,672	-5,759	0.09375
55-59	36,379	0.890950725	65-69	32,412	27,421	27,575	-4,837	0.07875
60-64	30,139	0.83794512	70-74	25,255	21,221	21,340	-3,915	0.06373
65-69	22,151	0.762859119	75-79	16,898	14,138	14,217	-2,681	0.04364
70-74	12,902	0.670418654	80-84	8,650	6,945	6,984	-1,666	0.02712
75-79	8,765	0.304074885	85+	5,319	5,086	5,114	-205	0.00334
80-84	5,082		MALE TOTAL	2,213,011	2,139,599	2,151,581		
85+	3,647				Male Total		-61,430	1.00000

births 1990-99

	males	females	Total
1999	49,534	47,591	97,125
1998	50,026	48,065	98,091
1997	51,124	49,119	100,243
1996	53,658	51,554	105,212
1995	54,694	52,550	107,244
1994	55,720	53,535	109,255
1993	57,871	55,602	113,473
1992	59,475	57,142	116,617
1991	59,902	57,553	117,455
1990	58,057	55,780	113,837

FEMALES

age in 1990	number	Sx	age in 2000	survivors	actual	ADJUSTED for CENSUS ERROR*	net n of migrants	proportion of total Net
births 1995-99	247,624	0.998691932	0-4	247,300	220,986	222,224	-25,077	-1.56114
births 1990-94	278203	0.997947922	5-9	277,632	232,290	233,591	-44,041	-2.74178
0-4	185,073	0.997947922	10-14	184,693	192,355	193,432	8,739	0.54404
5-9	159,472	0.99799614	15-19	159,152	175830	176,815	17,662	1.09956
10-14	142,449	0.996757907	20-24	141,987	184736	185,771	43,783	2.72573
15-19	148,240	0.995854434	25-29	147,625	197,179	198,283	50,658	3.15369
20-24	173,432	0.995774361	30-34	172,699	185,842	186,883	14,184	0.88300
25-29	173,069	0.995046823	35-39	172,212	164,182	165,101	-7,110	-0.44265
30-34	153,302	0.992381446	40-44	152,134	138,974	139,752	-12,382	-0.77083
35-39	122,065	0.988164684	45-49	120,620	110,024	110,640	-9,980	-0.62132
40-44	90,281	0.98156745	50-54	88,617	83,509	83,977	-4,640	-0.28888
45-49	65,884	0.970922351	55-59	63,968	58,816	59,145	-4,823	-0.30025
50-54	50,352	0.954671158	60-64	48,070	45255	45,508	-2,561	-0.15945
55-59	42,048	0.92909442	65-69	39,067	36632	36,837	-2,229	-0.13879
60-64	37,384	0.890495799	70-74	33,290	30,908	31,081	-2,209	-0.13753
65-69	28,937	0.83630436	75-79	24,200	21,685	21,806	-2,394	-0.14902
70-74	19,620	0.76396654	80-84	14,989	12,292	12,361	-2,628	-0.16362
75-79	14,682	0.323001026	85+	10,069	11,119	11,181	1,112	0.06923
80-84	9,199		FEMALE TOTAL	2,098,326	2,102,614	2,114,389		
85+	7,293				Female Total		16,063	1.00000
					Total net migration =		-45,367	

child woman ratio

	0-4	5 -9
1990	1.09156	0.99551
2000	1.18311	1.23844

survivors child woman

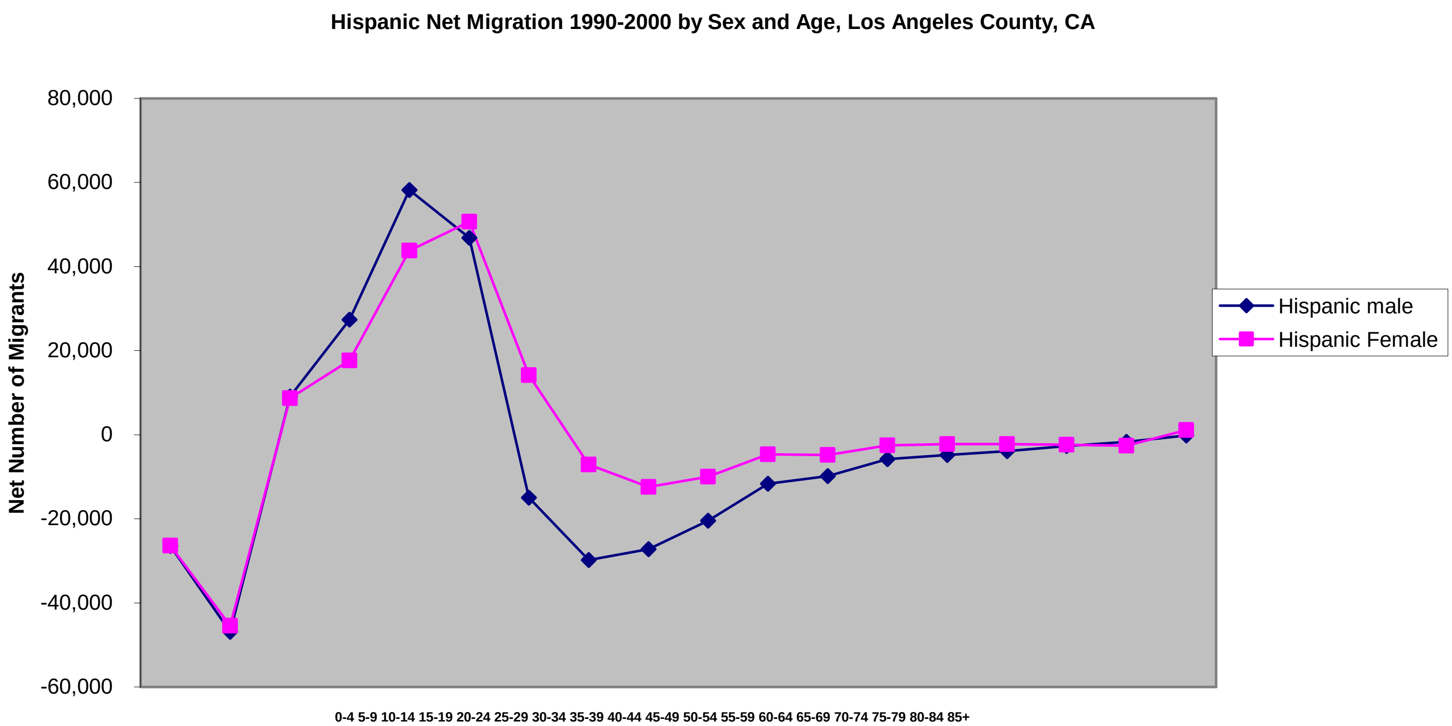
	0-4	5 -9
2000	1.74147	1.76733

net migrants child woman ratio

	0-4	5-9
2000	-0.52915	-1.37435

* Net undercount adjustment factor taken from A.C.E. Revision II estimates by County by State for Census 2000 (http://www.census.gov/dmd/www/ACEREVII COUNTIES.txt, last accessed 10 DEC 09)
where the 2000 census count = 9519463 for Los Angeles County and the ACE REV II adjusted count = 9572428
(Net undercount adjustment factor = 9572428/9519463 = 1.0056)
U. S. Census Bureau (2003) "Technical Assessment of A.C.E. Revision II" March 12,2003. U. S. Census Bureau.

Figure 1



Hispanic Net Migration 1990-2000 by Sex and Age, Los Angeles County, CA
80,000
60,000
40,000
20,000
0
-20,000
-40,000
-60,000
Net Number of Migrants
0-4 5-9 10-14 15-19 20-24 25-29 30-34 35-39 40-44 45-49 50-54 55-59 60-64 65-69 70-74 75-79 80-84 85+
Hispanic male
Hispanic Female