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## **Abstract**

This paper demonstrates that the apparently much higher Hispanic/Mexican fertility is almost exclusively the product of period estimates obtained for immigrant women and that period measures of immigrant fertility suffer from 3 serious sources of biases that together significantly overstate fertility levels: difficulties in estimating the size of immigrant groups; the tendency for migration to occur at a particular stage in life; and most importantly the tendency for women to have a birth soon after migration. Once these sources of bias are taken into consideration the fertility of native Hispanic/Mexican women is very close to replacement level. In addition, the completed fertility of immigrant women in the United States is dramatically lower than the level obtained from period calculations. Findings are consistent with classical theories of immigrant assimilation but are a striking departure from the patterns found in previous studies and published statistics. The main implication is that, without a significant change in immigration levels, current projections based on the premise of high Hispanic fertility are likely to considerably exaggerate Hispanic population growth, its impact on the ethno-racial profile of the country, and its potential to counteract population aging.

## **Keywords**

Biases, CFR, Childbearing, CPS June supplement, Completed fertility rate, Demographic processes, Ethno-racial composition, Fertility, Fertility rates, Hispanic, Immigrant fertility, Immigration, Measures of fertility, Mexico, Migration, National Survey of Family Growth, Population projections, TFR, Total fertility rate

## **Disciplines**

Demography, Population, and Ecology | Social and Behavioral Sciences | Sociology

## **Comments**

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## How high is Hispanic/Mexican fertility in the U.S.? Immigration and tempo considerations<sup>1</sup>

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## **Abstract**

This paper demonstrates that the apparently much higher Hispanic/Mexican fertility is almost exclusively the product of period estimates obtained for immigrant women and that period measures of immigrant fertility suffer from 3 serious sources of biases that together significantly overstate fertility levels: difficulties in estimating the size of immigrant groups; the tendency for migration to occur at a particular stage in life; and most importantly the tendency for women to have a birth soon after migration. Once these sources of bias are taken into consideration the fertility of native Hispanic/Mexican women is very close to replacement level. In addition, the completed fertility of immigrant women in the United States is dramatically lower than the level obtained from period calculations. Findings are consistent with classical theories of immigrant assimilation but are a striking departure from the patterns found in previous studies and published statistics. The main implication is that, without a significant change in immigration levels, current projections based on the premise of high Hispanic fertility are likely to considerably exaggerate Hispanic population growth, its impact on the ethno-racial profile of the country, and its potential to counteract population aging.

The rapid growth of the Hispanic population in recent decades, fueled largely by immigration, has increased awareness of its impact on the United States. One such area of both research and public attention is the fertility of Hispanic origin groups. Estimates of Hispanic fertility are persistently higher than those of non-Hispanic whites and blacks, and do not seem to fall across immigrant generations to the same extent as prior immigrant groups. The implications of these patterns have been viewed as potentially beneficial in some arenas and deeply problematic in others. On the one hand, fertility levels are a major determinant of populations' growth rate and age composition (Preston and Hartnett 2010). Thus the unusually high levels of Hispanic fertility could potentially mitigate population aging and help extend the solvency of the Social Security system (Jonsson and Rendall 2004; Sevak and Schmidt 2008). On the other hand, differential fertility rates across groups are important determinants of relative group size. Hispanics have already replaced non-Hispanic blacks as the largest minority group in the country. If their apparently significantly higher fertility levels were to persist, Hispanics would comprise an ever larger share of the U.S. population in the future, even if Latin American immigration were to abruptly end. In tandem with the projected substantial decline in the white population over time, these changes have been portrayed as dramatically altering the racial and ethnic order of the United States (Chavez 2008). Moreover, the persistence of high Hispanic fertility has been portrayed as a larger failure of Hispanics to assimilate into the U.S. mainstream that could contribute to the fragmentation of society across racial and ethnic lines (Huntington 2004).

Given the centrality of Hispanic fertility to projections regarding the age and ethno-racial composition of the future United States, it is essential to ensure that the high Hispanic fertility rates on which they are based are accurate. In this paper, we examine and compare numerous data sources for Hispanic fertility, and critically evaluate the reliability of the period fertility estimates produced from them. We argue that the apparently much higher Hispanic/Mexican fertility is almost exclusively the

product of the behavior of the immigrant population and that period fertility estimates for immigrant women suffer from 3 serious sources of bias and error. The first is difficulties in estimating the size of immigrant groups which serve as denominators in the computation of fertility rates. The second is the tendency for migration to occur at a particular stage in life that distorts the age and marital composition of immigrant groups. Finally and most importantly, the timing of migration and family formation are often tightly linked, with a marked tendency for women to have a birth soon after migration. Because period measures of fertility cannot adequately distinguish between changes in the timing and quantity of births, period fertility estimates are dramatically overstated.

We demonstrate the impact of each of these sources of bias on estimates of Hispanic fertility, including a detailed comparison of period and completed fertility measures. We show that once these sources of bias are accounted for the fertility of native Hispanic/Mexican women is very close to replacement level, contradicting the perception that Hispanics maintain high fertility in the United States. In addition, we show that the completed fertility of U.S. immigrant women is dramatically lower than the level obtained from period estimates. In fact, the completed fertility of U.S. immigrant Hispanic women is considerably lower than that of women in Latin America and has been declining steadily over time. These findings are consistent with classical theories of immigrant assimilation but are a striking departure from the patterns found in previous studies and published statistics. The main implication is that, absent a significant change in immigration levels, current projections based on the premise of high Hispanic fertility are likely to considerably exaggerate the growth of the Hispanic population, its impact on the ethno-racial profile of the country, and its potential to counteract population aging.

## Background: Hispanic fertility estimates and population projections

Most discussions about Hispanic/Mexican fertility in the U.S. rely on period estimates of the number of children born to women. The most commonly used measure is the total fertility rate (TFR), which is defined as the number of children a woman would have if she were to live throughout her reproductive years (typically ages 15-44) and give birth according to the prevailing age-specific fertility rates (ASFRs). The TFR is calculated by aggregating ASFRs observed in a particular year which are obtained by dividing the number of births to women of a given age range, typically for 5-year age groups, by the total population of women that age in that year.<sup>2</sup> As an estimate of completed fertility, the TFR is a hypothetical measure; no group of women actually experienced or will experience the ASFRs observed in a particular year. Rather, period rates are treated as if they characterize the lifetime trajectories of birth cohorts. The actual childbearing experience of cohorts is given by the completed fertility rate (CFR) that measures the average number of births that women actually had by the end of their reproductive lives, ideally after age 50.

Each of these fertility measures has unique advantages and disadvantages. The main advantage of CFR is that it is a direct measure of the true childbearing experience of actual cohorts, rather than a hypothetical estimate. The main disadvantage of the CFR is that it reflects past experiences, since older women bore most of their children during their 20s or 30s, and thus does not necessarily capture current behaviors. Because women must be towards the end of their reproductive careers to ascertain CFR, it cannot be used to measure the fertility of younger cohorts of women. The main advantage of the TFR is that it estimates the level of fertility implied by childbearing behaviors observed in a particular year, and thus provides insight into contemporary fertility levels and trends. This information can be

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<sup>2</sup> Formally, the TFR for year  $t$  can be written  $TFR(t) = \sum_x f(x, t) = \sum_x (B(x, t)/N(x, t))$  where  $B(x, t)$  equals the number of births to women aged  $x$  at time  $t$  and  $N(x, t)$  is the number of women aged  $x$  at time  $t$ . The index of summation  $x$  ranges over all childbearing years.

readily included in population projections which together with assumptions about mortality and immigration predict the future growth, age composition, and ethno- racial profile of the U.S. population. The main disadvantage of the TFR is that it reflects the interplay of two components: the tempo (timing) and quantum (level) of fertility. The TFR is an accurate estimate of the eventual completed fertility of young cohorts when the timing of childbearing is not changing. However, TFR estimates can differ significantly from actual CFR when women accelerate or delay births. Under such circumstances, changes in birth timing affect the ASFRs on which TFR is based, even if actual CFR ultimately remains the same (Bongaarts 1998; Schoen 2004). In years when births are accelerated TFR overestimates CFR; when births are delayed, TFR underestimates CFR.

Using TFR as a measure for 2006, the National Center for Health Statistics (NCHS) reported Hispanic/Mexican women to have an average of 2.95/3.11 children throughout their lifetime, which is considerably higher than the 1.85 average for non-Hispanic White women (Martin et al. 2009). In their most recent 50-year projection, the Census Bureau (2008) assumed a TFR of 2.73 for Hispanic women in 2001. It also assumed Hispanic “fertility schedules ... to converge to the fertility levels of the non-Hispanic, [non-Black] population in the year 2100,” with TFR declining slowly to 2.70, 2.53, and 2.29 in 2010, 2025, and 2050, respectively. The fertility level for non-Hispanic, non-Black groups was assumed to remain almost constant around 1.9 for the period. As a result of these fertility differentials and assumptions about immigration<sup>3</sup> the Census Bureau projects that the Hispanic population will nearly triple between 2008 and 2050, when nearly one-third of U.S. residents will be Hispanic, representing a dramatic change in the ethno-racial profile of the country.

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<sup>3</sup> Net immigration from Latin America including Mexico was assumed to increase from 627 to 1,040 thousand from 2001 to 2050.

The expectation of rapid Hispanic population growth, fueled in large part by high fertility, is not constrained to Census Bureau projections. Jonsson and Rendall (2004), for instance, evaluate different methodologies for assessing the fertility contribution of Mexican immigration to U.S. population growth and its potential for mitigating population aging. All of the four methods summarized in their analysis assume a TFR for immigrant Hispanic women in 1994 of at least 3.0 with one method assuming it as high as 3.9. In their own calculations Jonsson and Rendall assume a TFR for second and third generation Mexican women of 3.18 and 2.46 in 1994, respectively, which are derived as a proportion of the 3.9 TFR assumed for immigrant Mexican women. Given these high fertility assumptions they not surprisingly conclude that the fertility contribution of Mexican migration to U.S. population will be dramatic. In fact, they criticize Census Bureau estimates for averaging Hispanic fertility across immigrant generations, which they argue reduces fertility rates and under-predicts Mexican births.

Passell and Cohn (2008) assume a Hispanic TFR of 2.5 in 2001, which they expect to decline to 2.1 by 2050. Similar to census estimates, they conclude that Hispanics will comprise 29% of the U.S. population and that whites will become a minority (47%) by 2050. Such projections, especially the Census Bureau calculations, have received considerable attention in public debates about U.S. population trends and the rapidly declining representation of the non-Hispanic white population. However, the volatility in the rates and projections of Hispanic fertility reported above highlights potential biases in the computation of Hispanic fertility.

### **Data and analytic strategy**

Our paper critically evaluates the validity of TFR estimates of Hispanic/Mexican fertility. Our overall focus is on anomalies in period calculations, including disparities between TFR and CFR measures. We explain these disparities as the product of three main sources that specifically affect TFR

estimates for immigrant women, namely the size of the denominator in the computation of rates, the age and marital composition of immigrant groups, and most importantly disruptions in the timing of childbearing associated with migration.

The first part of the paper uses published vital statistics reports as well as information from countries of origin to document anomalies in TFR estimates. We also use birth data from the vital registration system to produce our own TFR estimates of Hispanic/Mexican fertility separately by nativity to stress that these distortions primarily affect immigrant fertility estimates. We argue that difficulties in estimating the size of the Hispanic immigrant population are central to these distortions.

The second part of the paper compares TFR and CFR estimates of Hispanic/Mexican fertility obtained from the 2000 and 2008 American Community Survey (ACS), the 2002 National Survey of Family Growth (NSFG), and the 2006 and 2008 June Supplement of the Current Population Survey (CPS), to document that anomalies in fertility estimates are also present in survey results of immigrant fertility, even though they do not suffer from under enumeration. We use NSFG data to document two main processes affecting immigrant period fertility estimates: differences in the age and marital composition of immigrant and native groups and, more importantly, changes in the timing of childbearing associated with migration. We highlight the salience of timing distortions in TFR estimates for immigrant women by reporting trends in first birth rates obtained from the vital registration system by nativity. We also elaborate of the implications of the immigrant effect for understanding regional disparities in Hispanic/Mexican fertility by plotting fertility estimates obtained from vital statistics reports against the proportion of the Hispanic population that is recently arrived by state.

The final part of the analysis uses data from the 1995, 1998, 2000, 2002, 2004, 2006, and 2008 CPS June Supplement to construct trends in CFR estimates of Hispanic/Mexican fertility for native and immigrant women and compares them to period results. We document the much lower completed

fertility obtained from the actual experience of Hispanic/Mexican women, including immigrants, in the U.S. relative to the period estimates that are commonly used in population projections.

## **Results**

### **Anomalies in vital registration estimates of Hispanic fertility**

Despite their importance for population projections, a careful consideration of fertility estimates derived from vital registration data reveals important anomalies that should be taken into consideration before assessing the contribution of Hispanic fertility to U.S. population growth. These anomalies, which have largely been overlooked, call into question the precision of available estimates of Hispanic fertility. Figures 1a and 1b plot the TFR for Hispanics/Mexican women in the U.S. and in Latin America/Mexico. Fertility estimates for the U.S. are obtained from National Center for Health Statistics (NCHS) reports published at two points in time, in 2002 (Martin et al. 2002) and 2009 (Martin et al. 2009). Fertility estimates for Latin America and Mexico were obtained from U.S. Census Bureau International Database for Latin America (<http://www.census.gov/ipc/www/idb>) and the Consejo Nacional de Población (Conapo <http://www.conapo.gob.mx>), respectively.

At least since the 1970s Latin America and Mexico in particular have experienced very rapid, substantial, and nearly linear declines in fertility that occurred in conjunction with educational expansion, increased female labor force participation, and the diffusion of family planning (Brea 2003; Guzman et al. 1989; Lindstrom 1998; Parrado 2000). Figures 1a and 1b show that between 1990 and 2006 TFR declined steadily in Latin America/Mexico from 3.2/3.5 to 2.4/2.2 children per woman, respectively.

Figures 1a and 1b document very different trends in fertility for Hispanic/Mexican women in the U.S. Contrary to the relatively low and consistently declining fertility levels in countries of origin, vital

registration estimates show recent TFR estimates of Hispanic/Mexican fertility in the U.S. as being both relatively high and rising. In 2006 vital registration estimates suggest that Hispanic/Mexican women in the U.S. are having close to one child more, on average, than women in Latin America (3.0/3.1 among Hispanic/Mexican women in the U.S. relative 2.3/2.2 in countries of origin). It is noteworthy that estimates in the U.S. are not only for immigrant women but for all U.S. Hispanic/Mexican women, including the native born.

In addition, Figures 1a and 1b show that the fertility decline of U.S. Hispanics/Mexicans appears to *reverse* over time. NCHS estimates published in 2009 report U.S. Hispanic/Mexican fertility declining between 1990 and 1999 from 2.9/3.2 to 2.6/2.8 children per woman, but then returning to 1990 levels by 2006 (Marin, et al. 2009). The reversal in U.S. Hispanic/Mexican fertility is in direct contradiction to the consistent decline experienced in Latin America/Mexico. Interestingly, the upward trend reported since 2000 contradicts the Census Bureau's assumption of a long term decline in Hispanic/Mexican fertility applied in their population projections.

Two tentative explanations can be suggested for these patterns.<sup>4</sup> The first relates to population composition. If Hispanic/Mexican women in the U.S. are socioeconomically disadvantaged relative to women in their countries of origin, perhaps as a result of negative selectivity in the immigration flow, then fertility in the U.S. could be higher than in Latin America. However, there is little evidence supporting this interpretation. Social disparities between Latin America and the U.S. are still quite pronounced, and when native and immigrant women are considered together, Hispanic/Mexican women in the U.S. average markedly higher educational attainment and labor force participation than their counterparts abroad. For instance, only 34% of women aged 25-44 in Mexico had more than 9 years of education in 2005 (estimates obtained from the "II Censo de Población y Vivienda - 2005")

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<sup>4</sup> For a review of different perspectives see Landale and Oropesa (2007).

Inegi)<sup>5</sup> compared to 67% among Mexican origin women in the U.S. in 2008 (estimates obtained from the 2008 ACS).

Even if we restrict the comparison to foreign born women in the U.S., there is little evidence of negative selection into migration. For instance, 47% of immigrant Mexican women in the U.S. aged 25-44 attained more than 9 years of education in 2008 (ACS), compared to only 34% among their counterparts in Mexico in 2005 (Inegi, Conteo de Población, 2005). There is also no indication that migrants are becoming more negatively selected over time. With educational attainment rising steadily in Mexico and Latin America, recent immigrants to the U.S. are actually better educated than their counterparts who entered the country in previous generations. For instance, in Mexico the proportion of women aged 15-44 with more than primary education increased from 50 to 71% between 1990 and 2005 (estimates obtained from Inegi).<sup>6</sup> Moreover, fertility has been declining even within educational groups; the TFR for women in Mexico with less than elementary education fell from 4.6 in 1990-91 to 3.1 in 2004-2005 (Welti 2010). Given the powerful relationship between education and fertility,<sup>7</sup> these trends make it unlikely that compositional factors account for the higher fertility among U.S. Hispanics.

The second potential explanation relates to segmented assimilation theories and the possibility that Hispanics/Mexicans in the U.S. could be reacting to their minority status by developing an oppositional culture that includes, among other things, the maintenance of high fertility. This perspective would view high Hispanic fertility as part of a general response to exclusion and lack of socioeconomic progress in the U.S. However, there is little evidence of stagnation or dramatic

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<sup>5</sup> Data available at <http://www.inegi.org.mx/est/contenidos/proyectos/ccpv/cpv2005/Default.aspx>

<sup>6</sup> Data for the 1990 Mexican Census can be obtained at Inegi - <http://www.inegi.org.mx/est/contenidos/proyectos/ccpv/cpv1990/default.aspx>

<sup>7</sup> The generally strong negative relationship between fertility and education is well-established in the literature on fertility decline in developing countries (Jejeebhoy, 1995). In Mexico in 2004-2005 the TFR for women with 6 or less years of education was 3.1, compared to 2.5 and 1.6 among those with 6 to 9 and more than 9 years of schooling, respectively (Welti Chanes, 2009).

deterioration in the socioeconomic position of Hispanic/Mexican women in the U.S. that could explain their much higher fertility levels than in countries of origin. In fact, data from the 1990 census and 2008 ACS show considerable improvements in educational attainment for both native and immigrant Hispanic women over time; average years of education for native Hispanic/Mexican women increased from 10.9/10.6 in 1990 to 12.8/12.6 in 2008. A similar upward trend is evidenced for immigrant Hispanic/Mexican women in the U.S, among whom years of education increased from 8.7/6.6 to 10.3/8.7 during those years. Again, the upward trend in educational attainment is inconsistent with the maintenance of high fertility.

Even if compositional differences or minority status explanations of fertility behavior could explain some of the differences between Hispanic/Mexican fertility in the U.S. and Latin America/Mexico, they cannot account for the initial decline and subsequent *reversal* of fertility trends reported after 2000. We argue that a more likely source of these counterintuitive findings is errors in estimating the size of the Hispanic/Mexican population between census years.

The estimates reported above were made by combining 2 pieces of information from different data sources: the number of births recorded in vital registration systems (numerator) and the size of the Hispanic population estimated by the U.S. Census Bureau (denominator). Since most births in the U.S. occur in hospitals, and since hospitals are extremely effective at registering births, vital statistics on the number of births are nearly perfectly complete. However, miscalculations in projecting the number of Hispanic/Mexican women are common and can seriously bias the denominator. In fact, the difficulty of estimating population size are well-known and errors in calculations are regularly reported and corrections promptly issued by NCHS.

The impact of these corrections on fertility estimates can be profound. In addition to the trends published in 2009 (Martin et al. 2009) Figures 1a and 1b also report the fertility trends published in 2002

(Martin et al. 2002). The 2002 trends depict fertility calculations produced by the NCHS based on estimates of the Hispanic/Mexican population derived from the 1990 census. The 2009 trends represent the corrected figures once actual population sizes from the 2000 census became available. The calculations made in 2002 estimated that rather than falling as in Latin America, U.S. Hispanic fertility rose between 1990 and 2000. The corrected calculations reported in the 2009 publication, in contrast, show that U.S. Hispanic/Mexican fertility actually fell consistently from 1990 to 2000. After 2000, fertility rates began to rise again. However, these calculations are once again based on projections of the denominator and are thus susceptible to errors.

While difficulties in estimating population sizes affect all groups, they are particularly acute with immigrants, whose population size can change dramatically and unpredictably in response to economic or political forces. If the resulting underestimate of immigrant population size is sufficiently large, it can affect fertility estimates for the entire group, immigrant and non-immigrant. Figure 2 highlights this effect. The figure plots our own calculations of vital registration-based estimates of TFR for Hispanic/Mexican women by nativity between 1990 and 2005.<sup>8</sup> Three trends are apparent. First, the fertility level for native Hispanic/Mexican women is stable throughout the period and hovers around replacement level (2.1). The estimate stands below the level registered in sending countries and contradicts the perception that U.S. born Hispanic/Mexican women are maintaining high fertility.

Second, fertility estimates for the foreign-born population are unreasonably high. In 1990, for instance, estimates suggest that U.S. immigrant women averaged nearly *two* more children than their counterparts in Latin America. Finally, while native fertility estimates remained flat, results show a

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<sup>8</sup> In addition to ethnicity, birth certificates collect information on mother's place of birth. Similar to standard estimates, rates were obtained combining birth data ([http://www.cdc.gov/nchs/data\\_access/Vitalstatsonline.htm](http://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm)) with population estimates for native and foreign-born Hispanics/Mexicans from the 1990 and 2000 Censuses and the 2005 American Community Survey.

reversal in fertility decline for immigrant women starting in 2000 similar to that registered for the Hispanic/Mexican population as a whole. Because the undercount of the foreign born, especially between census years, can potentially be sizeable,<sup>9</sup> this suggests that the under-enumeration of immigrant Hispanics contributes to the high fertility estimates produced with vital registration/census projection data.

### **Anomalies in survey estimates of Hispanic fertility**

If the unreasonably high fertility estimates of immigrant Hispanic/Mexican women were only the product of underestimating the size of the denominator in the computation of rates, then the problem would be corrected with the use of survey data. TFR estimates obtained from surveys have the advantage that they can be computed directly for the women included in the sample without the need to combine different data sources. In addition, if surveys include information on children ever born, then CFR measures of the actual number of children borne by the end of women's reproductive life can also be computed, allowing us to compare TFR measures with CFR estimates for older aged women.

Table 1 reports period TFR and CFR<sup>10</sup> for cohorts aged 35-39 and 40-44 for Hispanic/Mexican women by immigrant status obtained from the 2000 and 2008 American Community Survey (ACS), the 2002 National Survey of Family Growth (NSFG) as well as the combined 2006-2008 June CPS, which

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<sup>9</sup> For instance, estimates of the size of the undocumented population, including those conducted by the Department of Homeland Security, typically assume some level of undercount, usually around 10 percent, for the foreign-born population (Hoefer, Rytina and Baker 2009). A similar undercount was assumed in a recent report assessing the effect of underrepresentation of the foreign born on labor statistics (GAO 2009).

<sup>10</sup> One limitation of CFR is uncertainty about the age at which women have completed their reproductive lives. We report estimates for two age groups 35-39 and 40-44. Older ages are generally preferable since they increase the likelihood of women not having additional children. Childbearing, however, is already relative unlikely after age 35, as evidenced by the similarity in reported estimates across age groups in Table 1. In 2006, for instance, only 8 and 2% of Hispanic births occurred to mothers aged 35-39 and 40-44, respectively; with 94% of births occurring to mothers younger than 37.5 years (NCHS 2009). Including the 35-39 age-group in our analysis contributes to the robustness of our findings by adding an additional cohort to our comparison.

include a fertility supplement. In addition, we report TFR and CFR in Mexico obtained from the 2006 Encuesta Nacional de la Dinámica Demográfica (ENADID) (Welti 2010). Columns 1-5 report period TFR estimates and columns 6-11 report cohort CFR. Overall, results are remarkably consistent across data sets.

As expected, survey-based TFR estimates in the U.S. are significantly lower than those based on vital registration data. The estimated TFR for Hispanic/Mexican women for the year prior to the 2000 and 2008 ACS (columns 1 and 2) is, in both cases, 2.5/2.7. For the two year period prior to the 2002 NSFG (column 3) the TFR for Hispanic/Mexican women is 2.4/2.6; and 2.5/2.6 for the year prior to the CPS (column 4). In all samples, the estimate is around 0.5 children lower than the 3.0/3.1 TFR reported in vital statistics for the year 2006 (Marin et al. 2009).

However, some of the same anomalies that plagued vital registration estimates are also present in survey data even though they do not suffer from under-enumeration of the denominator. Specifically, the TFR of U.S. Hispanics/Mexicans (columns 1-4) is higher than that of women in their countries of origin (column 5), and this is driven by the much higher fertility estimates for immigrant Hispanic women. In addition, results show considerable disparities between TFR and CFR measures, particularly among immigrant women.

Among Hispanic/Mexican women born in the U.S. fertility rates are uniformly low (generally 2.0/2.1) across data sources. Moreover, there are practically no differences between TFR (columns 1-4) and CFR (columns 6-7 and 9-10) estimates, independently of the data source under consideration. The correspondence between period and cohort rates supports the utility of the TFR as a measure of completed fertility among native Hispanic/Mexican women.

For immigrant women, on the other hand, there are dramatic disparities between TFR and CFR measures. Results show that TFR estimates for immigrants consistently exceed CFR by a wide margin

across the multiple sources of data. For instance, the 3.3/3.6 TFR estimate for Hispanic/Mexican immigrant women obtained from the NSFG in Column 3 is more than 1 child higher than the 2.3/2.4 and 2.4/2.7 CFR estimate obtained for the cohorts aged 35-39 and 40-44 using the same data source (columns 6 and 9), respectively. Similar dramatic disparities are evidenced when we compare the TFR and CFR estimates for immigrant women obtained using the CPS, column 4 against columns 7 and 10. The uncharacteristically high period fertility estimate for immigrant women is the reason TFR is higher than CFR for U.S. Hispanics/Mexicans overall.

It is important to note that women ages 35-39 and 40-44 in the NSFG (2002) and CPS (2006-2008) correspond to cohorts born in the 1960s. For foreign-born women this implies a context of relatively high fertility in countries of origin, so we would expect their fertility to be higher than among the more recent cohorts captured in period estimates. This is not what period estimates of fertility show, however. The last line in Table 1 (columns 5, 8, and 11), reports TFR and CFR estimates for comparable years and cohorts in Mexico. Results show the TFR for women in contemporary Mexico to be around 2.2 which is higher than the TFR of Mexican women born in the U.S. (2.1) estimated across data sources, as we would expect. However, the Mexican TFR is *lower* than the TFR of immigrant Mexican women in the U.S., which ranges from 3.0 in the 2008 ACS (column 2) to 3.6 in the 2002 NSFG (column 3). In fact, these estimates imply that immigrant women average one whole child more than their counterparts who remained in Mexico.

The cross-national pattern described by the TFR stands in stark contrast to that evidenced for CFR. The final column of Table 1 shows that CFR for women 40-44 is lowest for native U.S. Mexican women (2.2), intermediate for immigrant Mexican women in the U.S. (2.6), and highest for women in Mexico (3.2). The same pattern holds if we compare CFR estimates among the 35-39 age group (column 7). Thus the pattern for CFR is in keeping with major theories of immigrant assimilation and the

experience of previous generations of immigrants; the social behavior of immigrants falls between that of the native born and countries of origin (Parrado and Morgan 2008). The hypothetical level described by the TFR seems to be the anomaly. Most previous studies have concluded that anomalously high TFR among Hispanics indicates either a failure to assimilate or changing socioeconomic composition. We argue that it reflects well known limitations in period fertility measures.

### **Demographic processes undergirding the high TFR of Hispanic immigrant women**

#### ***Age and marital composition of the foreign-born population***

There are at least two processes affecting the estimation of period fertility rates for immigrant women. The first relates to differences between immigrant and native Hispanic women in age and marital composition. Using information from the 2002 NSFG, Figure 3 documents these differences for all Hispanics. Migration is not a random event but rather is closely tied to other life-course transitions. In particular, migration is most likely in early adulthood, as men and women enter the labor market and form families. In the case of women's migration from Latin America, especially Mexico, to the U.S., migration is often motivated by a desire to reunite with a husband who migrated earlier (Massey and Cerrutti 2001). Even when an unmarried woman migrates, she tends to form a union rapidly after entering the United States (Parrado and Flippen 2005). As a result, as illustrated in Figure 3, a disproportionate share of immigrants is both in their prime childbearing ages and married. For instance, over half of 15 to 19 year old immigrant women are in a union compared to less than 20% among native born Hispanics. In fact, the share in a union is higher for immigrant relative to native women at all ages. Compositional differences between native and foreign-born women are even more pronounced among the Mexican population (not reported). The close association between migration and union formation contributes to higher period fertility estimates. Standardizing the marital distribution of immigrant

women in the 2002 NSFG according to the distributions observed for the native born reduces the TFR of Hispanic/Mexican immigrants by more than 10%, from 3.3/3.7 to 2.9/3.2, respectively. Such compositional differences need to be taken into consideration when comparing fertility levels across groups and even in population projections, since assumptions about immigration will also affect the age and marital composition of the Hispanic population.

### ***Migration and birth timing***

Even after correcting for marital composition, period estimates of immigrant fertility remain unreasonably higher than those observed for native Hispanic/Mexican women, women residing in countries of origin, and cohort estimates of CFR. Arguably, the main factor distorting period fertility estimates for immigrants is changes in the timing of childbearing associated with migration.

Demographers have long been aware of the inability of period TFRs to distinguish between changes in the timing and overall number of births. For instance, if a young generation of women begins to significantly delay childbearing, the ASFRs for younger ages will be lower than those of older cohorts of women, resulting in a lower TFR even if completed fertility is ultimately the same. This phenomenon has received renewed attention in recent years in the literature on below replacement fertility in Europe, where studies have found that delays in the timing of childbearing lead to TFRs that are biased downward (Bongaarts and Feeney 1998; Kohler and Ortega 2002; Schoen 2004).

In the context of migration, timing changes have the opposite effect of biasing TFRs upward. In his analysis of childbearing behavior among foreign women in Sweden, Andersson (2004) shows that immigrants tend to display higher levels of childbearing soon after migration. He concludes that “migration and family building...are interrelated processes and that it is always important to account for time since migration when fertility of immigrants is studied” (2004: 747). In the Mexican-U.S. case, Lindstrom and Giorguli Sucedo (2007) also find that first births accelerate after Mexican women migrate

to the U.S. Similar findings are reported by Toulemon (2004) in France. Relying on longitudinal data, he shows that the fertility of immigrant women is lower before migration but accelerates rapidly in the years shortly after arriving in France.

Thus ASFRs computed in the receiving country can significantly distort the period TFR if migration accelerates the *timing* of childbearing without changing the ultimate number of children born.<sup>11</sup> Direct evidence of temporal distortions has generally been assessed by disaggregating the TFR into its birth-order components, especially first birth. First-birth order TFR ( $TFR_1$ ) is defined as the sum of age-specific first birth rates and provides an estimate of the number of first births women would have by the end of their reproductive lives. By definition,  $TFR_1$  cannot exceed unity since it is impossible for women to have more than one first birth.  $TFR_1$  higher than unity were observed in the United States during the baby boom years in the late 1940s and early 1950s, when women entered into childbearing at significantly younger ages than their predecessors (Bongaarts and Feeney 1998). This acceleration of childbearing produced TFRs higher than the actual number of children that women ultimately bore.

Figure 4 reports  $TFR_1$  calculated from vital registration for Hispanic/Mexican women by nativity between 1990 and 2005. Once again results document dramatic anomalies for immigrants. For native Hispanic/Mexican women  $TFR_1$  is close to constant over the period and hovers around 0.8, a rate very similar to that observed among non-Hispanic white women (not reported). The  $TFR_1$  for immigrant Hispanic/Mexican women, on the other hand, is above 1 for the entire period of 1990 to 2005, which is

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<sup>11</sup> It is also possible for migration to delay childbearing. Such an association would reduce period fertility estimates. How migration and childbearing are related is likely to vary across groups and contexts. In a comparison of fertility levels across immigrant groups in the U.S. Camarota (2005) finds that the fertility of people from China, Canada, and the United Kingdom in the U.S. is higher than in their home countries. The opposite applies to immigrants from the Philippines or Vietnam. Bledsoe and colleagues (2007) also find considerable variation in differences in fertility levels between sending and receiving contexts across immigrant groups in Spain. In both cases, the authors do not discuss problems in the computation and interpretation of period fertility rates for immigrant groups. In our case, given the much higher fertility obtained for Hispanic immigrant women we concentrate on its accelerating effects.

literally impossible. The shape of the curve, which declines from 1990 to 2000 and then rises again, is similar to the overall trend in TFR and likely also reflects errors in estimating the size of the foreign-born population. Regardless,  $TFR_1$  for immigrant women is so far above unity (1.8 and 1.6 for Mexican women in 1990 and 2000, respectively), that the average for Hispanics as a whole (including native women) is also above unity throughout the period.

The main mechanism undergirding the disruption in period  $TFR_1$ , and consequently overall TFR estimates, is the close association between migration and family formation. Figure 5 documents this association. The figure uses retrospective fertility information from the 2002 NSFG to construct fertility rates by age cohort according to time in the United States. The X-axis represents time since arrival with 0 indexing rates before and after migration. In a pattern consistent with the one observed in Europe, fertility rates among immigrant Hispanics are low before migration but rise dramatically after arrival, peaking during the first 5 years in the United States and subsequently declining rapidly, *independent of age*. As a result, timing issues among immigrant women, combined with rapid immigration, are in large part responsible for the inflation of period fertility estimated for the Hispanic/Mexican population.

As a corollary the finding implies that the regional differences in Hispanic fertility observed across the United States are in large part the product of the relative size of the immigrant population and its recency of arrival. Regional disparities in fertility behavior have garnered increased attention in recent years as the Hispanic population has dispersed to new destinations across the United States. One concern is that Hispanics' high fertility will rapidly alter the racial/ethnic makeup of local communities. Figure 6 plots estimates from vital registration reports (Sutton and Mathews, 2006) of TFR and  $TFR_1$  by state ranked according to the share of Hispanic immigrants who are recently arrived (i.e., during the previous 5 years) according to estimates from the 2000 census. Results show that state-level variation in

fertility rates is positively associated with the size of the recently arrived immigrant population.<sup>12</sup> To illustrate, New Mexico has the smallest share of recently arrived immigrants, 6.4%, and the TFR for the Hispanic/Mexican population is around 2.3 for both groups. At the other extreme, in North Carolina 51.1% of Hispanic immigrants are recently arrived and the Hispanic/Mexican TFRs are estimated at 3.7 and 4.4, respectively.

Moreover, first birth estimates show that while rates above unity are registered across almost all states, they increase in conjunction with the share of the immigrant population that is recently arrived. To illustrate, in New Mexico  $TFR_1$  for Hispanic/Mexican women is .8; in North Carolina the rate is 1.5 and 1.7 for Hispanics and Mexicans, respectively. The main implication is that these distortions in fertility estimates are even more pronounced within local areas and studies elaborating on the fertility behavior of Hispanic/Mexican women in particular areas of destination need to pay explicit attention to how immigration affects their estimates.

### **Cohort estimates of Hispanic/Mexican fertility**

A straightforward way to avoid tempo distortions is to rely on measures of completed fertility (Schoen, 2004). As discussed above, CFR captures the actual childbearing of cohorts of women that have completed their reproductive lives, rather than the hypothetical estimate obtained from period TFR. While they are not meaningful for younger cohorts of women, who have yet to complete their reproductive careers, in our case they provide the most robust test for assessing how high Hispanic/Mexican fertility actually is. Moreover, examining their trends over time can provide

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<sup>12</sup> The shape of the association cannot be inferred from the graph due to differences in scales. Individual scatter plots of the relationship, though, show the association to be nearly linear.

meaningful insights about fertility differentials across groups and the potential impact of Hispanic/Mexican fertility on U.S. population growth.

Figure 7 uses data from the fertility supplement in June CPS at seven time points (1995, 1998, 2000, 2002, 2004, 2006, and 2008) to trace CFR for Hispanic women aged 35-39 and 40-44 by nativity status. Similar findings are obtained for Mexican women, for whom estimates are reported in the Appendix. To make CFR estimates comparable to period fertility, the X-Axis reports the year at which the different cohorts were approximately age 25.<sup>13</sup> In addition, to facilitate the interpretation, the figure plots a 3-year moving average trend applied to CFR estimates as well as the TFR obtained from published vital statistics reports already reported in Figure 1 (Marin et al. 2009).

Even going as far back as 1978, the completed fertility of Hispanic/Mexican women was never as high as the TFR reported in vital reports after 1990. In 1989, the most recent year when cohort and period estimates overlap, the cohorts of Hispanic women averaged 2.3 children per woman. The period TFR counterpart was 2.9. Moreover, between 1978 and 1996 observed levels of CFR closely conform to a pattern of linear decline over time. The observed fertility level for all Hispanic women declined from 2.5 to 2.3 between 1978 and 1996.

In addition, the declining pattern obtains for both native and immigrant Hispanics, although it is much more pronounced among the latter. The CFR for foreign-born Hispanics fell from 2.7 in 1978 to 2.3 in 1996. Once again, this is below the fertility levels in countries of origin documented in Figure 1a, but higher than the fertility of women born in the U.S. The CFR of native Hispanic women was already close to replacement levels in 1978, 2.3 children per woman, and declined slightly during the period, reaching 2.2 in 1996. While the level and trends in CFR are sharply at odds with current representations and

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<sup>13</sup> For instance, in the 1995 CPS women aged 40-44 were born in 1951-55. Taking the midpoint, 1953, and adding 25, which approximately corresponds to the mean age at childbearing, yields 1978 - the year at which cohort and period measures can be compared.

projections of Hispanic fertility, they are consistent with the fertility levels registered in countries of origin and among U.S. born Hispanic women.

Given the levels of CFR observed in the early 1990s and the clear and continuous downward trend in fertility since 1978 among both foreign and native born women, how reasonable are current estimates of TFR and assumptions in population projections? Even if we assume no change in fertility levels, the 2.25 CFR observed for Hispanics in 1996 is *half a child lower* than the 2.73 assumed five years later, in 2001, by the Census Bureau in their population projections. By 2005, vital registration estimates report TFR for Hispanic women to be 2.9.

We have provided robust evidence that current fertility of native Hispanics is near replacement levels with no sign of an upward trend in any data source. The CFR reported in Figure 7 show the actual completed fertility for natives already fluctuating around 2.3 and 2.0 between 1978 and 1996.

Continuing this trend, the TFR estimates obtained from vital registration statistics (Figure 2) as well as from the 2000 and 2008 ACS, the 2002 NSFG, and the 2006-2008 CPS (Table 1) show recent fertility levels to be around 2.0 or 2.1 among native Hispanics. Such levels of native fertility imply that to reach 2.73 for all Hispanics in 2001, as assumed in Census Bureau's population projections, immigrant fertility would have to increase by 0.9 children in 5 years, from 2.3 in 1996 to 3.2 in 2001. Moreover, to achieve the 2.9 level in estimated TFR in 2005, immigrant fertility would have to increase by 1.2 children, reaching 3.5 children per woman in 9 years. For comparative purposes, between the bust and peak of U.S. baby boom fertility increased by 0.9 children over the course of 21 years, from 2.3 in 1937 to 3.2 in 1958 (Schoen, 2004).

Given the lack of obvious change in the composition or minority group status of Hispanics after 1996, care must be taken in all analyses based on TFR to ensure that the assumptions embedded in period measures are not producing biased results. If researchers are to argue that the fertility of the

most recent cohorts of women is so dramatically higher than what would obtain from trends in CFR, they must explain the social, economic, or political mechanisms that are producing this dramatic and unprecedented change in behavior, including the social processes accounting for the 0.5 child disparity between CFR and TFR estimates between 1989-1996 as well as  $TFR_1$  well above unity.

## **Discussion**

In this paper we argue that current and commonly cited estimates considerably overstate the level of U.S. Hispanic fertility. The distortion arises almost exclusively from problems in estimating period fertility measures for the immigrant population. Three main processes distort period estimates of immigrant fertility. The first stems from difficulties in estimating the size of the immigrant population used as the denominator in calculating fertility rates based on vital registration systems. Second, even in survey data the composition of the foreign-born with respect to age and marital status influences period estimates. The third and most dramatic distortion is produced by the acceleration in the timing of childbearing associated with migration. Together, these three factors lead to large overestimates of Hispanic immigrant fertility, particularly in years that are further away from the decennial census. Because a relatively large share of Hispanics are foreign born (roughly 40%), these overestimates of immigrant Hispanic fertility also bias upward the fertility estimates for Hispanics as a whole.

We do not dispute that the U.S. Hispanic population is growing in absolute or relative terms. In fact, the share of births attributable to Hispanic women increased from 15 to 25% between 1990 and 2006, even though they accounted for only 16% of women of childbearing age in 2006. The increase was even more pronounced for the Mexican population, whose share of births nearly doubled from 9 to 17%, even though they accounted for only 11% of women in childbearing ages in 2006 (Martin et al.,

2009).<sup>14</sup> Continued immigration from Latin America, combined with the youthful age structure of the immigrant population, will no doubt increase Hispanics' share of the U.S. population in future generations. However, most of the overrepresentation of Hispanics in the number of U.S. births stems from the contribution of immigrant women and the close association between migration and childbearing *not* from the maintenance of high fertility rates over the reproductive life.

The distinction is of substantial importance to assessing both the impact of Hispanic immigration on the United States and the potential for Hispanic assimilation. First, assumptions of very high Hispanic fertility overstate the increase in Hispanic and decline in non-Hispanic white populations central to projections of the future racial and ethnic makeup of the United States. These assumptions imply that even if immigration from Latin America were to stop completely, the Hispanic population would continue to grow in relative size due to their higher fertility rates. Biased fertility estimates also misrepresent the behavior of native born Hispanic women, leading to the erroneous conclusion that Hispanic fertility is persistently high and does not follow the pattern of assimilation described by prior waves of immigrants. Taken together, these 2 misperceptions are often used to add fuel to anti-immigrant rhetoric. To provide one example as an illustration, Mac Donald (2006) wrote in *City Journal*, a publication by the influential Manhattan Institute: "Hispanic population over the next couple of decades does not bode well for American social stability. Hispanic immigrants bring near-Third World levels of fertility to America... The dimensions of the Hispanic baby boom are startling. The Hispanic birthrate is twice as high as that of the rest of the American population. That high fertility rate—even more than unbounded levels of immigration—will fuel the rapid Hispanic population boom in the

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<sup>14</sup> However, when we disaggregate by nativity, native Hispanic/Mexican women contributed 9/6 percent of all births while representing 7/5 percent of all women of reproductive ages. Foreign-born Hispanic/Mexican women, in turn, contributed 15/11 percent of all birth while representing a much smaller 6/4 percent of women in reproductive ages. The difference again underscores the significance of immigrants for understanding Hispanic fertility.

coming decades. By 2050, the Latino population will have tripled, the Census Bureau projects. One in four Americans will be Hispanic by mid-century, twice the current ratio.”

While this may sound like an extremist position, distorted representations are also prevalent among the general public. Alba and colleagues (2005) document that in 2000 roughly half of Americans believe that whites had already become a numerical minority and that among whites overestimates of the size of racial and ethnic minorities were positively associated with negative attitudes towards immigrants, blacks, and Hispanics. Similarly, in a detailed examination of media representations, Chavez (2008) concludes that the perception of abnormally high Hispanic fertility is increasingly being framed as a threat to the social fabric of the United States.

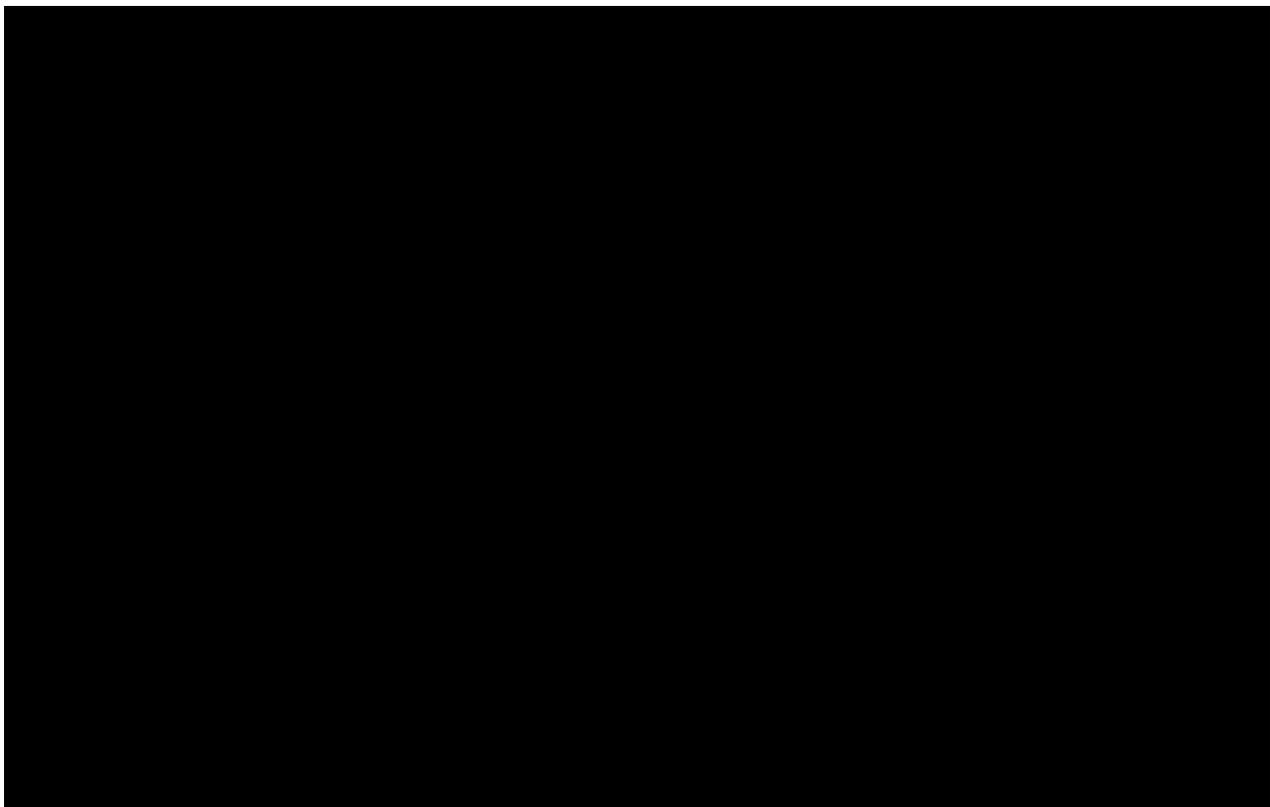
These distorted representations can be fueled by official statistics. As such, subsequent analyses should pay explicit attention to the applicability of standard demographic measures to immigrant populations. Separating the behavior of native and immigrant women is a required first step for producing population estimates among subpopulations with large immigrant representations. To the extent that birth certificates collect information on mothers’ place of birth, this distinction could also be included in vital statistics reports. A careful consideration of the interplay between the timing of major life-course domains, such as marriage and migration, is also in order in studies of immigrant family behavior.

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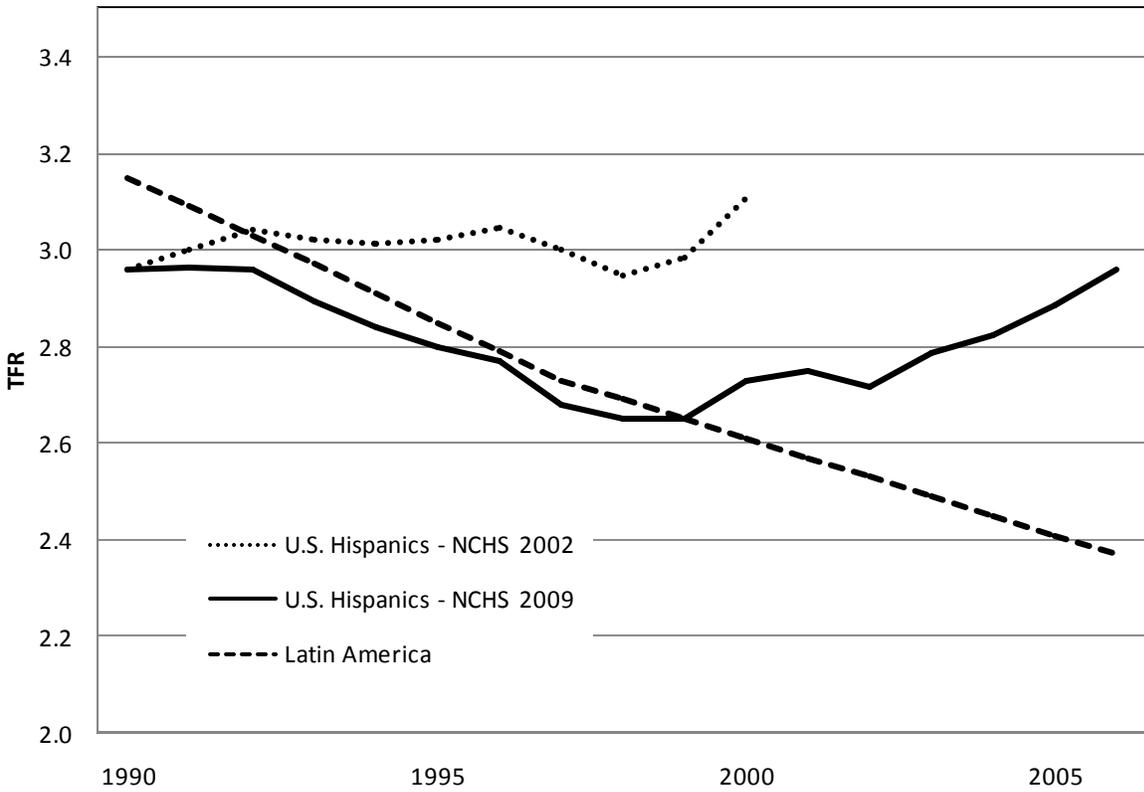
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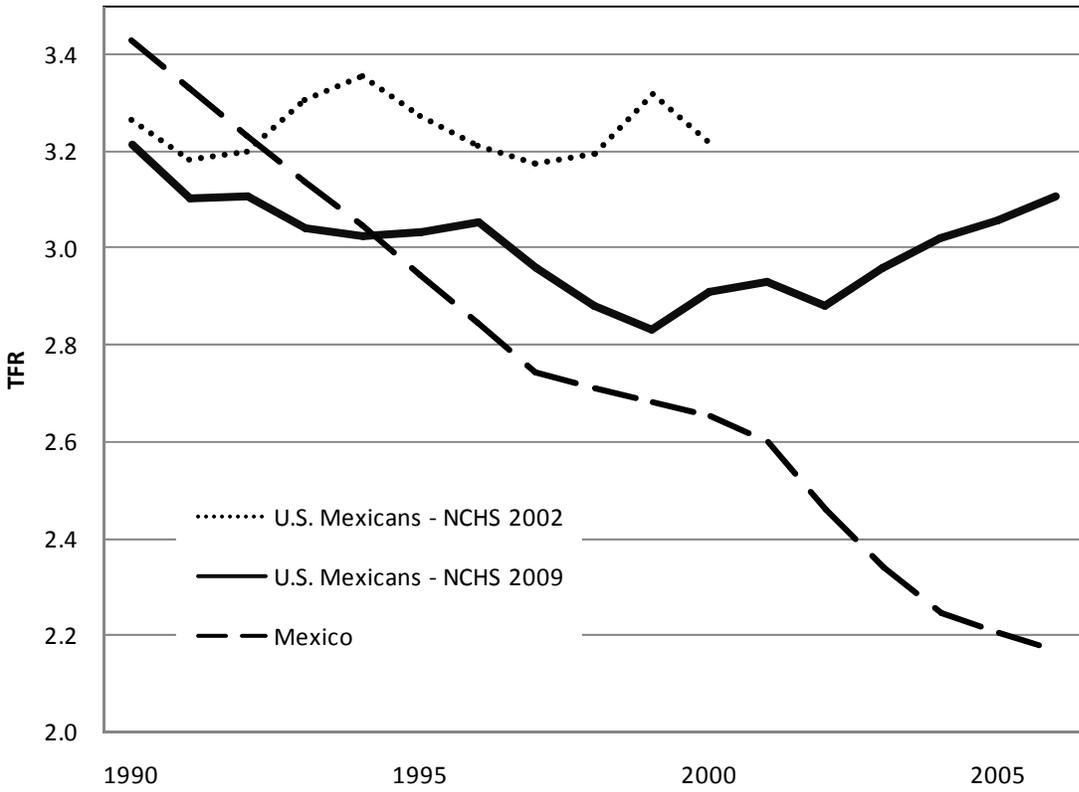
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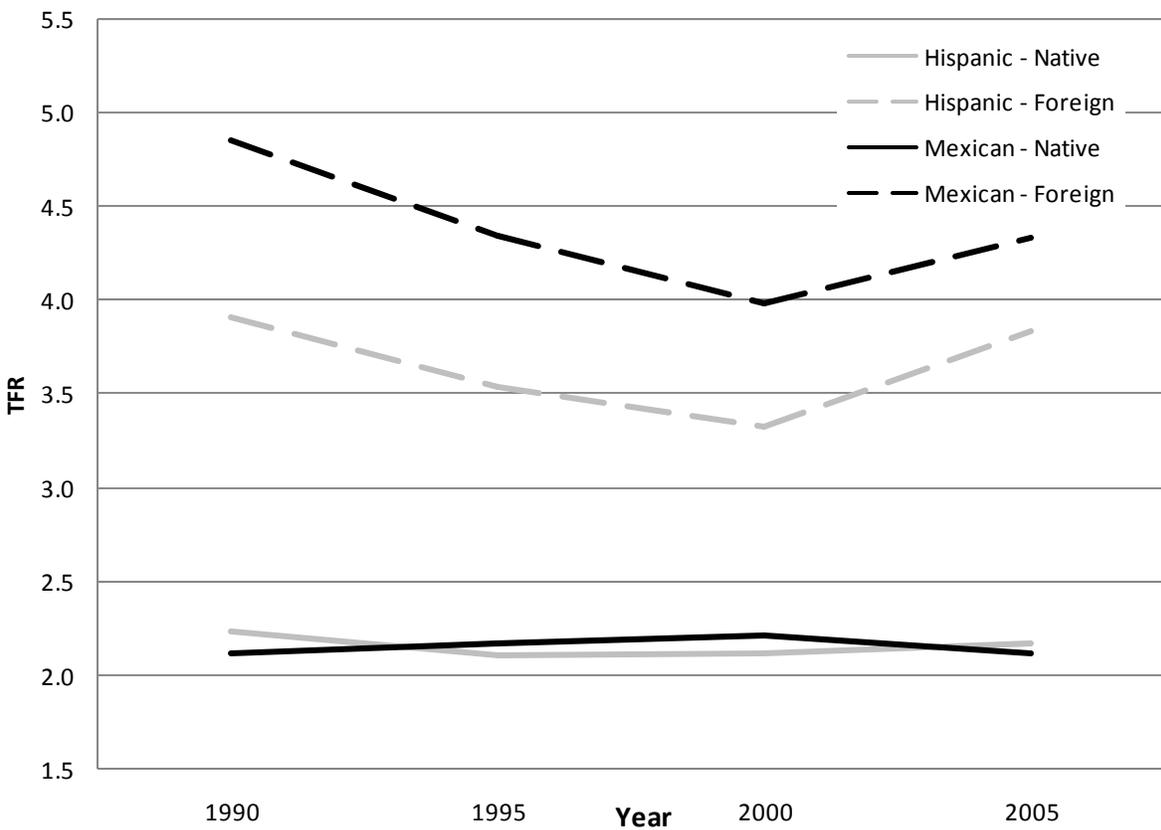
**Figure1a: Vital Statistics Estimates of Total Fertility Rate for Hispanics in U.S. and in Countries of Origin**



**Figure1b: Vital Statistics Estimates of Total Fertility Rate for Mexicans in U.S. and in Mexico**

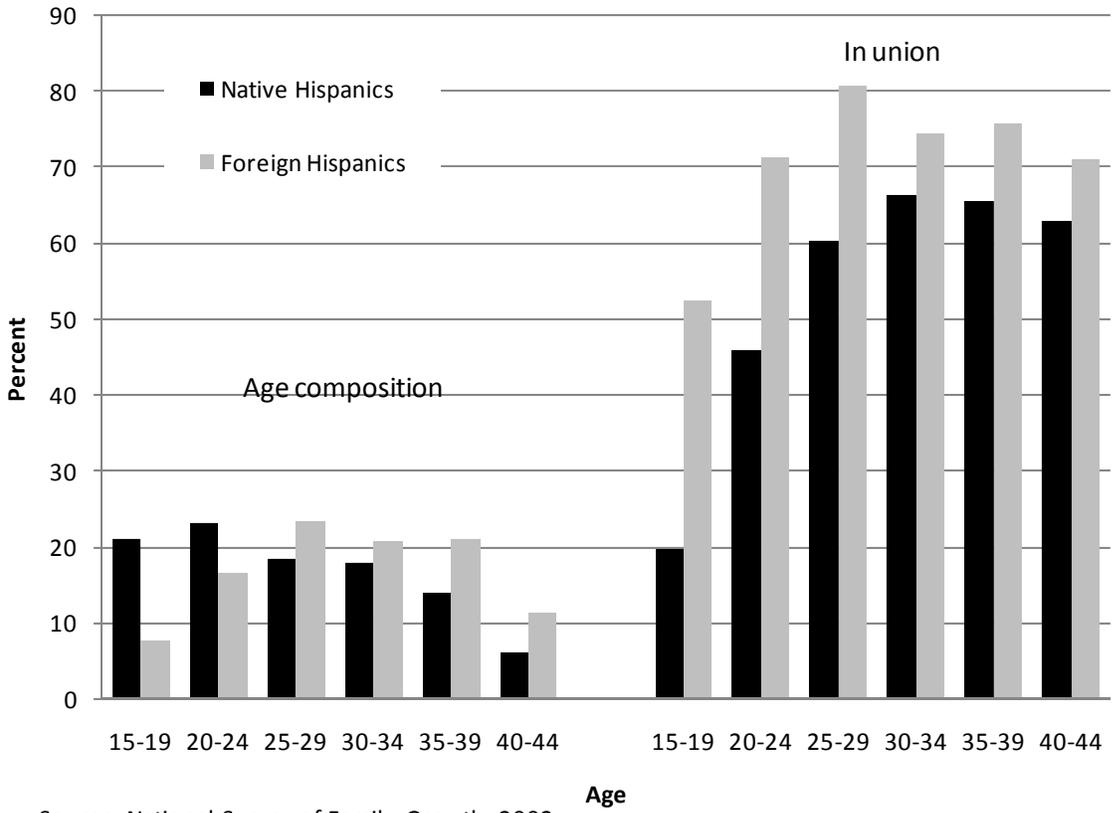


**Figure 2: Vital Statistics Estimates of Total Fertility Rate for Hispanics/Mexicans in U.S. by Nativity**



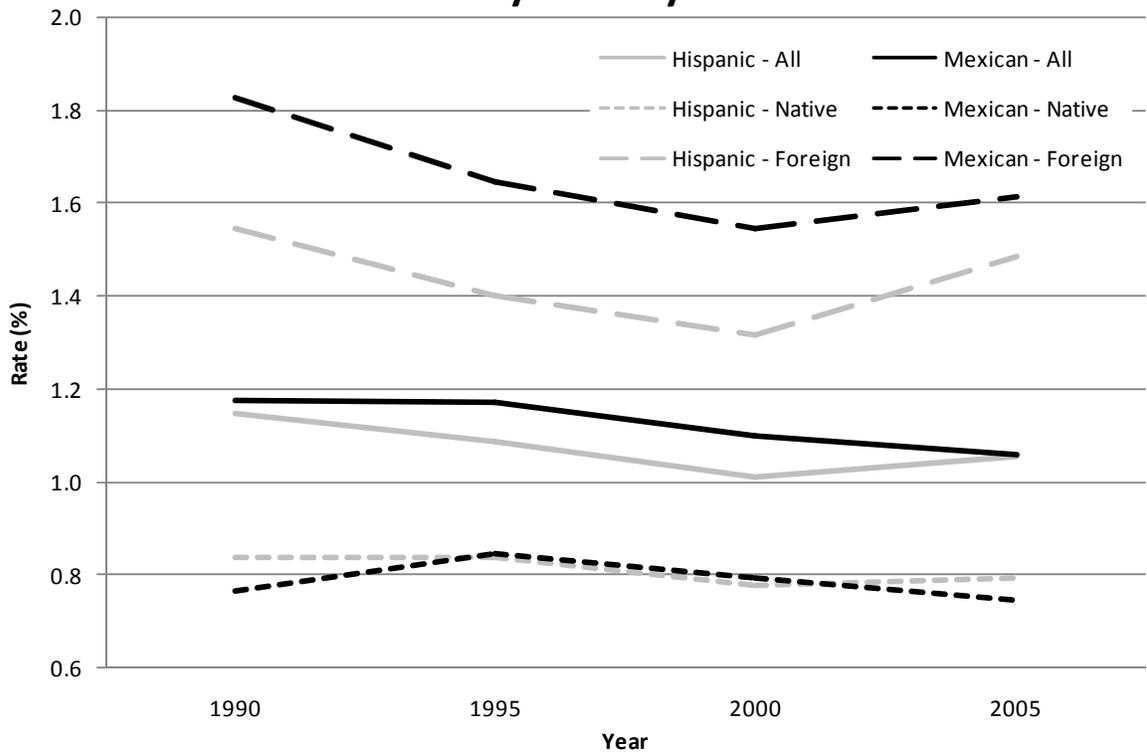
Source: Birth data obtained from vital statistics ([http://www.cdc.gov/nchs/data\\_access/Vitalstatsonline.htm](http://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm)). Population estimates obtained from the 1990 and 2000 Censuses and the 2005 American Community Survey.

**Figure 3: Age and Marital Composition of the Hispanic Population by Nativity**



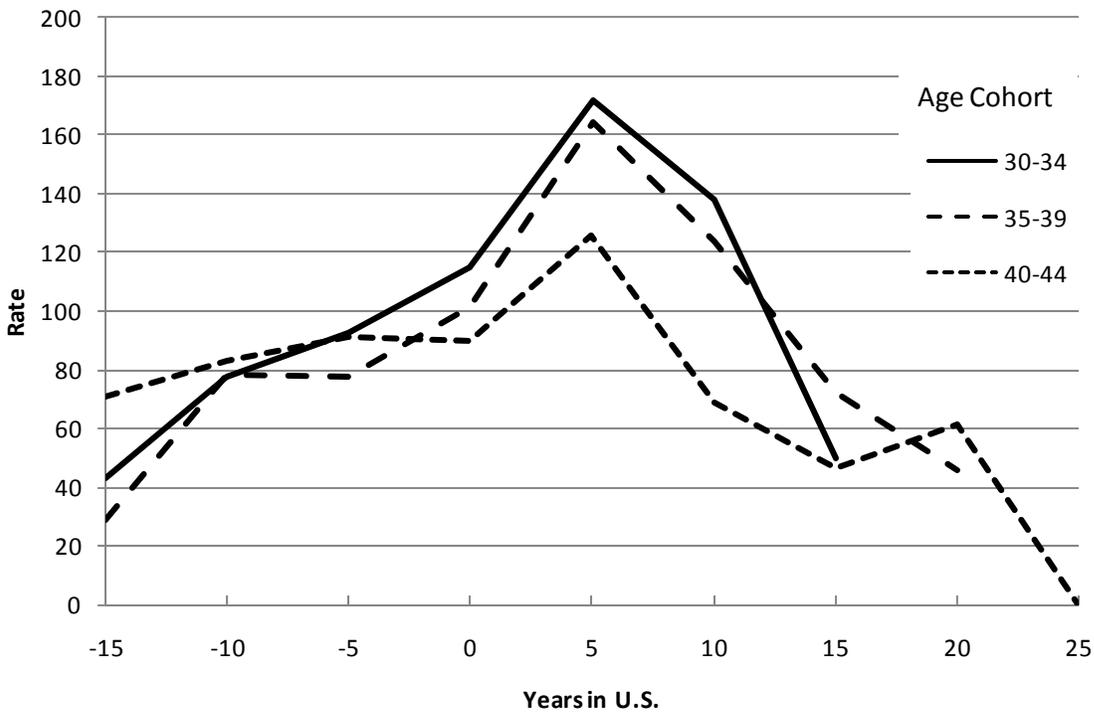
Source: National Survey of Family Growth, 2002

**Figure 4: First Birth Rate Hispanics/Mexicans in U.S. by Nativity**



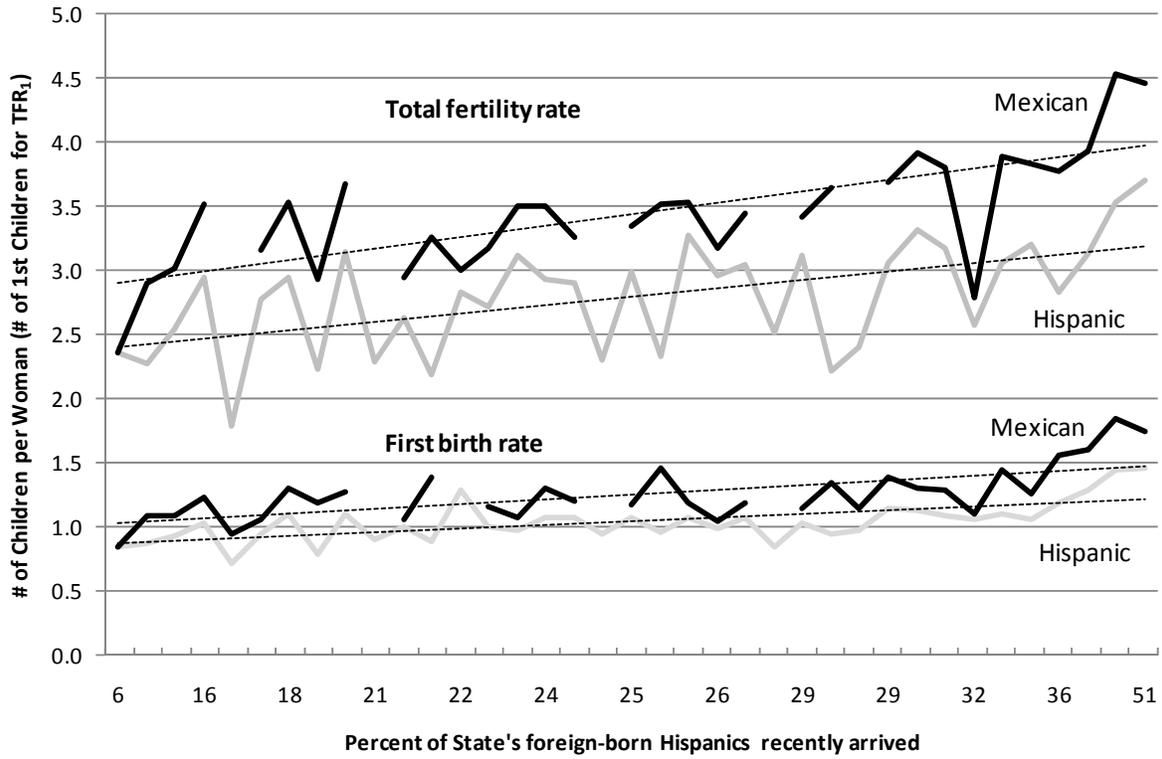
Source: Birth data obtained from vital statistics ([http://www.cdc.gov/nchs/data\\_access/Vitalstatsonline.htm](http://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm)). Population estimates obtained from the 1990 and 2000 Censuses and the 2005 American Community Survey.

**Figure 5: Fertility rates for Hispanic women before and after migration by age cohort**



Source: National Survey of Family Growth, 2002

**Figure 6: Vital Statistics Estimates of Total and First Birth Rates by State in 2000**



Source: Sutton, PD and Mathews TJ. 2006. *Birth and fertility rates by Hispanic origin subgroups: United States, 1990 and 2000*. Vital Health Statistics 21(57) Hyattsville, MD: National Center for Health Statistics.

**Figure 7: CFR to Hispanic Women (35-39 and 40-44) and Reported TFRs**

