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Fertility in the Context of Mexican Migration to the US: A case for incorporating the pre-migration fertility of immigrants

Kate H. Choi

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A case for incorporating the pre-migration fertility of immigrants**

Kate H. Choi
Department of Sociology
University of Western Ontario

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Please direct correspondence to Kate H. Choi, Department of Sociology, University of Western Ontario, Canada. E-mail: hchoi228@uwo.ca, 519-661-2111 extension 85115. A previous version of this paper was presented in the annual meeting of the American Sociological Association held in August 2011 and the Notestein Seminar Series at the Office of Population Research in Princeton University in March 2012. The author thanks Robert D. Mare, Sara S. McLanahan, Jennifer Flashman, Erin R. Hamilton, Jenjira J. Yahirun, and Charles Westoff for their helpful comments and suggestions on this research.

**FERTILITY IN THE CONTEXT OF MEXICAN MIGRATION TO THE US:
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ABSTRACT

Background: The fertility behavior of Mexican immigrants remains poorly understood because data limitations have prevented researchers from accurately estimating their fertility levels and determining how their fertility changes within and across generations.

Objective: This paper pools birth histories from Mexico and the United States and applies an innovative methodological approach to (1) obtain more accurate fertility estimates; (2) gain better insights about how fertility changes within and across generations; and (3) examine the role of educational selectivity and assimilation in the high fertility of Mexican immigrants and subsequent changes in fertility within and across generations.

Results: My findings show that migration from Mexico to the United States is positively selective with respect to fertility. Migrants disrupt their fertility in anticipation of migration, but resume their pre-migration fertility and even compensate for the earlier fertility loss after they migrate. Fertility of Mexican immigrants decreases within and across generations, moving away from pre-migration fertility and converging towards the fertility of Whites. Education explains a considerable portion of this fertility decline within and across generations.

Comments: These findings highlight the importance of empirically observing the pre-migration fertility of immigrants.

1. INTRODUCTION

The Mexican American population grew from 20.6 million in 2000 to 31.8 million in 2010 (Passel et al. 2001). This increase accounted for 40 percent of the nation's overall population growth despite the fact that Mexican Americans comprised only 10 percent of the US population in 2000 (Passel et al., 2011). Two-thirds of this increase originated from births, highlighting the importance of Mexican American fertility for US population growth (Passel et al., 2011). Due to the increasing relevance of Mexican American fertility for population growth, the fertility of Mexican immigrants and their descendants has garnered substantial attention from popular media and scholarly work (Carter 2000; Frank and Heuveline 2005; Parrado 2011).

Despite these strong interests, Mexican immigrant fertility remains poorly understood. Scholars disagree about the levels of Mexican immigrant fertility and provide a wide range of estimates on their total fertility rates: 2.9 to 3.6 (Frank and Heuveline 2005: p. 82; Martin et al. 2009; Parrado 2011: Table 1). Scholars also offer mixed accounts about how immigrant fertility changes within and across generations. Some scholars argue that the fertility of Mexican immigrants steadily decreases (Ford 1990; Carter 2000; Parrado and Morgan 2008); whereas others argue that their fertility remains high (Frank and Heuveline 2005). In addition, scholars disagree about the role of educational selectivity in engendering the high levels of Mexican immigrant fertility and the extent to which educational assimilation explain fertility changes within and across generations.

Much of this disagreement arises due to data limitations. First, disagreements about levels of Mexican immigrant fertility arise due to the absence of reliable data that can accurately capture the number of Mexican immigrant women. Specifically, period estimates of fertility are computed by dividing the number of births recorded in vital statistics by the number of

immigrant women recorded in the census. Although vital statistics provide accurate counts of births, the census underestimates the number of Mexican immigrant women: a combination that will overstate levels of Mexican immigrant fertility (Hummer et al. 2007; Parrado 2011). Second, disagreements about changes in Mexican immigrant fertility arise due to the absence of information about pre-migration fertility. Without information about pre-migration fertility, researchers have reached conclusions about fertility assimilation by comparing the *observed* post-migration fertility to an *assumed* pre-migration level and they reach distinct conclusions about fertility changes depending on their assumptions about levels of pre-migration fertility. Finally, mixed accounts about the role of educational selectivity in engendering the high levels of Mexican immigrant fertility arise due to the absence of binational data, which prevents researchers from accurately estimating the degree of educational selectivity.

In this paper, I pool birth histories from Mexico and the United States to (1) obtain more accurate estimates of fertility among Mexican immigrants; (2) gain better insights about how the fertility of Mexican immigrants changes within and across generations; and (3) assess to what extent educational selectivity of migration flows accounts for the high fertility of Mexican immigrants and determine to what extent educational assimilation explains fertility change. To accomplish these goals, I first estimate the pre-migration fertility rates of immigrants. I then document the impact of migration on fertility timing, namely whether immigrants disrupt their fertility in anticipation of migration and compensate for the earlier disruption after migration. I then assess how the post-migration fertility of immigrants changes within and across generations, focusing on whether immigrant fertility moves away from pre-migration levels and converges with that of Whites. Finally, I examine the extent to which educational selectivity explains the

high fertility of immigrants and whether educational assimilation accounts for fertility changes within and across generations.

The methodology used in this paper provides more accurate estimates of immigrant fertility levels and precise accounts about how immigrant fertility changes within and across generations by using pooled birth histories from Mexico and the United States. Birth histories contain all the information necessary to compute fertility rates from one data source; and thus, the use of birth histories eliminates the bias that arises when we compute fertility rates from multiple data sources (Parrado 2011). The use of birth histories also allows for more accurate accounts of how immigrant fertility changes by comparing *observed* pre- and post-migration fertility. The insights garnered from this study will help us better understand how migration influences childbearing and the impact of Mexican immigrant fertility on the future population size and composition of the United States.

2. BACKGROUND

2.1 Divergent accounts about fertility change over time and across generations

Several explanations have been proposed to describe how immigrant fertility changes throughout the migration process. In this section, I review the four most commonly cited explanations about how the fertility of Mexican immigrants changes within and across generations: (1) classical assimilation; (2) racial stratification; (3) segmented assimilation; and (4) disruption and catch-up. The first three focus on the impact of migration on fertility levels. The fourth focuses on the impact of migration on fertility timing.

Classical Assimilation. This explanation, presented by the solid black line in Figure 1, argues that immigrants enter the host country subscribing to the fertility norms and engaging in the childbearing practices of the country of origin. Over prolonged durations of stay in the

destination country and across generations¹; immigrants adopt the fertility norms of the destination country and adapt fertility practices that optimize their family's chances for socioeconomic success in the host country (Alba and Nee 1997; Carter 2000). An assumption driving this explanation is that fertility rates in Mexico are considerably higher than those in the US and that Mexican immigrants enter the US subscribing to the pronatalist practices from Mexico. Thus, fertility will decrease as Mexican immigrants gain more exposure to US family norms encouraging smaller family sizes and experience a rise in the opportunity costs of childbearing with greater socioeconomic integration (Alba and Nee 1997; Carter 2000). Their fertility will eventually converge with that of Whites (Carter 2000).

Figure 1 goes here.

Racial Stratification. This explanation, presented by the grey line in Figure 1, argues that contemporary immigrants, including Mexican immigrants, are persistently disadvantaged because they experience racial discrimination as nonwhites (Frank and Heuveline 2005). The high fertility of Mexican immigrants will persist (and even increase) after migration because (1) their dim prospects for intra-generational mobility suppress the opportunity costs of childbearing, and (2) their children's limited prospects for upward mobility diminish the costs of childrearing by reducing incentives to invest in children (Frank and Heuveline 2005).

¹Although "assimilation" is usually viewed as an intergeneration process, this explanation acknowledges that assimilation occurs at varying rates for the different race/ethnic groups (Alba and Nee 2003: p. 38). Past studies have shown that immigrants rapidly adjust their fertility in response to the resources and constraints of their surroundings. Therefore, these models can also be applied to fertility changes occurring within a generation. Indeed, past studies have applied these models to describe intra-generational changes in fertility (Ford 1990; Carter 2000; Frank and Heuveline 2005).

Segmented Assimilation. This explanation, also presented by the grey line in Figure 1, argues that the direction, speed, and extent of immigrant assimilation depends on: (1) the amount of resources immigrants bring from the country of origin; (2) the social, economic, and political conditions in the country of origin that motivate migration; and (3) the social, economic, and political conditions they face in the destination country (Portes and Zhou 1993). According to this explanation, Mexican immigrants are destined for downward mobility because they migrate with limited human capital and encounter a context of reception that offers the low skilled few venues for upward mobility (Portes and Zhou 1993). The dim prospects for upward mobility reduce the real and opportunity costs of childbearing, and thus, their fertility remains high.

Disruption and Catch-up. This explanation, presented by the dashed lines in Figure 1, argues that immigrants disrupt their fertility in anticipation or due to the difficulties arising during the migration process (Carter 2000). However, once they migrate, immigrants resume their pre-migration fertility behavior and even compensate for the fertility loss incurred during the earlier disruption (Carter 2000). Disruption/catch-up hypothesis focuses on the effects of migration on fertility timing and do not render any predictions about changes in fertility levels; however, they are relevant for our understanding of group differences in fertility levels because *fertility disruption* may be perceived as “fertility decline” and *fertility catch-up* may be perceived as “fertility increases” in analyses using cross-sectional data (Parrado 2011).

In sum, the four explanations provide mixed accounts about how immigrant fertility changes within and across generations. *Classical assimilation* predicts that Mexican immigrants enter the US with high fertility levels, but it decreases within and across generations, eventually converging with the fertility of Whites. *Racial stratification* and *segmented assimilation* predict that Mexican immigrants enter the US with high levels of fertility and their fertility remains high

(and even increases) within and across generations, failing to converge with the fertility of Whites. *Disruption/catch-up* predicts a temporary decline in pre-migration fertility and a temporary rise in fertility after migration².

2.2 Previous empirical findings

Past studies provide mixed accounts about how immigrant fertility changes within and across generations. In this section, I review studies of immigrant fertility changes within and across generations. When doing so, I focus on fertility changes within a generation because the literature about intra-generational changes in immigrant fertility is sparse³ and this study seeks to make the most contribution on this topic.

2.2.1 Fertility changes within a generation

Using data from the 1970 and 1980 US Census, Ford (1990) compares the fertility of immigrants with varying durations of stay in the US. Her findings for Mexican immigrants, presented by the solid black line in Figure 2, show a pattern of a post-migration rise in fertility followed by a steady decline in fertility over time. The assumption driving her study is that Mexicans in Mexico, including immigrants prior to migration, have considerably higher fertility than US-born groups. On the basis of this assumption, she interprets the lower fertility levels prior to the post-migration rise in fertility as evidence of fertility disruption. She also interprets the post-migration rise in fertility as evidence of fertility catch-up and the subsequent fertility decline as evidence of fertility assimilation. Although this study makes an important contribution to the literature by being the first study to examine intra-generational changes in fertility, it has a

² This disruption/catch-up perspective does not make predictions about changes in levels of fertility; and thus, the predictions of this perspective are summarized in Figure 1 within the context of the other three explanations described above.

³To the best of my knowledge, only three studies of intra-generational changes in fertility exist.

key methodological limitation that may bias its conclusions: the absence of information about pre-migration fertility. Because this information is missing, Ford (1990) does not know whether the pattern of rise in fertility represents (1) fertility catch-up or (2) a rise in fertility due to the circumstance in receiving communities. She also does not know whether the subsequent decline in fertility is (1) fertility assimilation or (2) a return to pre-migration fertility practices.

Figure 2 goes here.

Carter (2000) uses birth histories from the 1995 NSFG to document how the fertility of Mexican immigrants changes within a generation. Her findings, presented by the grey lines in Figure 2, show unusually lower levels of fertility prior to migration, which is viewed as evidence of either (1) the negative selectivity of migration in terms of fertility or (2) a pre-migration disruption in fertility. This is followed by a post-migration rise in fertility, which is interpreted as evidence of fertility catch-up, and a subsequent decline in fertility, which is interpreted as fertility assimilation (Carter 2000: Table 2). This study advances the literature by obtaining more precise estimates of fertility through the use of birth histories and making efforts to incorporate pre-migration fertility when reaching conclusions about changes in immigrant fertility over time. The key limitation is that Mexican Americans are treated as the reference group although prior work offers inconclusive evidence about whether or not Mexican Americans experience fertility assimilation across generations (Bean et al. 2000; Rindfuss and Sweet 1977). Another limitation is that the study draws conclusions about migrant selectivity by comparing the pre- and post-migration fertility of immigrants when they should reach these conclusions by comparing pre-migration fertility with that of non-migrants. A third limitation is that the pre-migration period is grouped into one category, which prevents her from deciphering whether the low pre-migration fertility is due to (1) disruption or (2) selection.

Frank and Heuveline (2005) use six cross-sectional datasets from Mexico and the United States to document changes in Mexican immigrant fertility. Their findings, presented by the long dashed lines in Figure 2, reveal that the fertility rates of Mexican immigrants in the United States are higher than the national fertility rates in Mexico. This finding is interpreted as evidence of fertility increase, which arises because Mexican immigrants experience significant barriers to upward mobility as nonwhites and their opportunity costs associated with childbearing decrease as a result of their limited prospects for upward mobility. This study advances the literature on fertility assimilation by incorporating the fertility of the country of origin. A limitation of this study, as acknowledged by Frank and Heuveline (2005, p. 97), is that they use the national fertility rate in Mexico as a proxy for the pre-migration fertility of immigrants. This approach biases their accounts of fertility assimilation inasmuch as Mexican migration to the United States is selective in terms of fertility.

Taken together, the three studies find evidence of a post-migration rise in fertility followed by a steady decline in fertility. Yet, they offer distinct accounts about how Mexican immigrant fertility changes over time because they make distinct assumptions about the pre-migration fertility of Mexican immigrants. Ford and Carter⁴ assumes that pre-migration fertility is high; and thus, they interpret the lower levels of fertility (prior to the rise in fertility) as evidence of disruption; the post-migration rise in fertility as evidence of catch-up; and the subsequent decline as evidence of assimilation. Frank and Heuveline (2005) assume that pre-

⁴ Carter (2000) initially acknowledges the possibility of negative selectivity, but most of her results are interpreted under the assumption that the pre-migration fertility of immigrants is higher than post-migration fertility. For example, although the post-migration fertility of immigrants who lived in the US for 15+ years is higher than their pre-migration fertility, she interprets it as evidence of fertility assimilation.

migration fertility is low (i.e., the national fertility rates in Mexico); and thus, they view the higher fertility of recent immigrants as evidence of fertility increases arising due to discrimination and the subsequent decline as evidence of a partial return to pre-migration fertility. Instead of relying on assumptions about pre-migration fertility levels, I estimate pre-migration fertility levels and determine how fertility changes within and across generations.

2.2.2 Fertility changes across generations

Past studies of intergenerational changes in fertility also provide mixed accounts about how the fertility of Mexican immigrants changes across generations. The predominant view is that Mexican immigrant fertility decreases between the first and second generation, but there is a reversal in fertility decline between the second and third generation (e.g., Bean et al. 2000; Frank and Heuveline 2005; Rindfuss and Sweet 1977; Swicegood and Morgan 2002). Recent studies, however, argue that the reversal in fertility decline between the second and third generation is the artifact of methodological limitations, namely the use of synthetic immigrant generations (i.e., immigrants with distinct generational status belonging to the same age group in a single year). Such a comparison will yield incorrect assessments about fertility changes across generations by treating the fertility of the current second generation as a proxy for the fertility of the parents of the current third generation despite large fertility differentials between these two groups (Parrado and Morgan 2008; Smith and Brown 2011). In fact, fertility comparisons across biological generations show a pattern of a steady decline in fertility (Parrado and Morgan 2008; Smith and Brown 2011).

2.3 Methodological Limitations and Fertility Changes Within and Across Generations

Consensus about the fertility levels of Mexican immigrants and the pattern of fertility change over time is missing because two data limitations prevent us from ascertaining the

fertility levels of Mexican immigrants as well as the pattern of fertility change over time. First, existing data sources cannot fully capture the size of the immigrant population, which affects our ability to obtain accurate estimates of immigrant fertility. More specifically, the most commonly used fertility estimate is the total fertility rate (TFR), which is the average number of children a woman has if she lives through the end of her reproductive years and follows the fertility schedule dictated by the prevailing age-specific rates in the population (Preston et al. 2001, p. 95; Parrado 2011). Age-specific fertility rates (ASFR) can be calculated by dividing the number of births occurring to women of a given age range by the number of person-years lived by women in that age range (Preston et al. 2001). TFR cumulates ASFR throughout a woman's reproductive years. Formally, TFRs can be represented as follows:

$$TFR = \sum ASFR = \sum_{x=15}^{40} \frac{{}_nB_x}{{}_nN_x}$$

where ${}_nB_x$ is the number of births to women between the ages x and $x+n$; and ${}_nN_x$ is the numbers of person-years provided by women between the ages of x and $x+n$. This estimate is computed using two data sources: the vital statistics reports the counts of births and census data reports the counts of women⁵ (Parrado 2011). Vital statistics data provide accurate reports of the count of births because nearly all births are recorded in vital statistic records (Hummer et al.

⁵ Vital statistics and census data are cross-sectional data corresponding to a 1-year period; and thus, a sampled respondent in these datasets contributes 1 person-year. Because of this feature, I use the count and person-years interchangeably when describing fertility rates obtained using cross-sectional data. This, however, is not the case when fertility rates are computed using birth history data where women contribute multiple person-years. When fertility rates are computed using birth history data (the approach employed in this paper), the denominator is the number of person-years in the corresponding person-age category.

2007; Parrado 2011). Census data, however, underreports the counts of Mexican immigrant women because they are a highly mobile and largely undocumented population, whose legal status gives them incentives to avoid government agencies including the Census Bureau (Passel 2009; Warren and Passel 1987). Accurate counts of births, coupled with underestimates of the count of immigrant women, bias upwards the fertility rates for Mexican immigrant women. The magnitude of the bias will likely be greater among recent migrants and the foreign-born because immigrants with longer durations of stay are more likely to have encountered opportunities to obtain legal status (e.g., amnesty, employer sponsored visa, etc.) and the US-born become citizens at birth. Therefore, the fertility of recent immigrants will be inflated to a larger extent than that of immigrants with longer durations of stay in the US; the fertility of foreign-born will be inflated to a greater extent than that of the US-born; and the degree of fertility change within and across generation may also be overstated.

The other limitation is the absence of information regarding the pre-migration fertility of Mexican immigrants. To decipher whether immigrants experience fertility assimilation, we must observe whether the fertility of immigrants is moving away from the fertility practices of the sending communities and moving towards the mainstream fertility practices in the destination country. In the absence of information about the pre-migration fertility of immigrants, most past studies assume that the pre-migration fertility of Mexican immigrants and Mexicans in Mexico is considerably higher than that of US-born groups. Based on this assumption, they treat fertility decrease over prolonged durations of stay in the United States as evidence of fertility assimilation. The accuracy of this conclusion will depend on the accuracy of their assumptions about the levels of pre-migration fertility. Yet this assumption has become increasingly untrue over the past 30 years as Mexico experienced a rapid fertility decline (Frank and Heuveline

2005). The same argument can also be made with respect to “fertility disruption/catch-up”. Prior work treats a temporary post-migration rise in fertility as evidence of fertility catch-up following an (unobserved) disruption in fertility prior to migration. Yet this interpretation only holds if immigrants in fact disrupt their fertility prior to migration.

The empirical analyses in this paper make efforts to bridge these methodological gaps through the use of birth histories. The birth histories capture the births occurring to sampled women and avoid the bias resulting from the use of multiple datasets (Parrado 2011). The birth histories, combined with information about the year of arrival to the US, allow me to observe the pre-migration fertility of immigrants and compare it with post-migration fertility.

2.4 Divergent account about the relationship between education and immigrant fertility

Theoretical and empirical work attributes the high fertility of Mexican immigrants to their considerably lower levels of education relative to other US groups and argues that the fertility of Mexican immigrants will decrease following improvements in education (Bean and Swicegood 1982; Parrado 2011). Although scholars agree that education plays an important role for Mexican immigrant fertility, they disagree about (1) the mechanisms giving rise to the low levels of education and consequently high fertility of Mexican immigrants and (2) the extent to which educational assimilation explains the fertility changes within and across generations. The disagreements arise largely because scholars disagree about the extent to which migration is selective in terms of education and the degree of educational changes over time.

Past work offers mixed accounts about the role of educational selectivity in engendering the low fertility levels of Mexican immigrants. Some researchers argue that Mexican immigrants have higher fertility than the US-born because they are a negatively selected group in terms of education, and education is inversely correlated with fertility. Specifically, they draw attention to

the fact that Mexican immigrants enter the United States to fill shortages in the secondary labor market (Piore 1979; Telles and Ortiz 2008). Such labor demands disproportionately attract immigrants with unfavorable socioeconomic characteristics, including lower levels of education (Parrado 2011). The disproportionate selection of immigrants with lower levels of education also implies that immigrants will have higher fertility because their opportunity costs associated with childbearing will be low. Other studies, however, argue that the higher fertility of Mexican immigrants simply reflect Mexico-US differences in education. That is, due to cross-national differences in aggregate levels of education, Mexican immigrant women will have lower levels of education and higher levels of fertility than US-born groups, even if they complete the average schooling in Mexico. Empirical studies also provide mixed accounts about the educational selectivity in immigration flows, which further obfuscates conclusions about the impact of educational selectivity in giving rise to the high fertility of Mexican immigrants. Some studies find support for negative selectivity of migration (Ibarraran and Lubotzky 2007), whereas others find the opposite (Chiquar and Hanson 2005; Feliciano 2005).

Researchers also disagree about the extent to which educational improvements explain fertility changes within and across generations. This disagreement arises in large part because past work disagrees about the degree of educational assimilation that Mexican immigrants experience within and across generations. Researchers have traditionally held the view that Mexican immigrants have a persistent educational disadvantage over Whites because they experience limited educational mobility beyond the second generation (Blau and Kahn 2007; Grogger and Trejo 2002). A recent study by Smith (2004), however, argues that the traditionally held view is an artifact of methodological limitations, namely the reliance on educational comparisons across synthetic immigration generations (i.e., immigrants with distinct generational

status belonging to the same age group in a single year). Such a comparison will yield incorrect assessments about intergenerational changes in education by treating the education of the current second generation as proxies for the education of the parents of the third generations despite pronounced educational differences across these groups (Smith 2004). Indeed, educational comparisons across biological generations reveal that the education of Mexican Americans increases between the second and third generation, converging with that of Whites (Smith 2004).

Diverging accounts about magnitude of educational selectivity and educational assimilation make it difficult for us to ascertain the role educational selectivity and assimilation plays in generating the high fertility levels of Mexican immigrants and giving rise to fertility changes within and across generations. The use of bi-national data offers a unique opportunity to assess whether Mexican migration to the United States is negatively selected in terms of education by comparing the educational characteristics of non-migrants in Mexico and Mexican immigrants in the United States. More accurate estimates of educational selectivity improves our ability to assess whether Mexican immigrants have high fertility levels because they are negatively selected in terms of education and education is negatively correlated with completed levels of fertility. The inclusion of pre-migration fertility levels improves our ability to estimate the extent to which fertility decreases over time and across generations, which allows for a more accurate estimation of the extent to which educational assimilation accounts for fertility changes over time and across generations.

3. DATA AND METHOD

3.1 Data

The present analysis pools three nationally representative datasets from Mexico and the United States: (1) the Mexican Family Life Survey (MxFLS) and (2) the 2002 National Survey

of Family Growth (NSFG) and (3) the 2006-2010 Continuous NSFG. The birth history from MxFLS is used to capture the fertility experiences for non-migrants in Mexico. Pooled birth histories from the NSFG are used to capture the fertility experiences for Whites, Mexican Americans, and Mexican immigrants before, during, and after migration.

MxFLS is a nationally representative survey of households in Mexico that collected socio-demographic information for 17,154 men and 18,523 women residing in 8,400 households in 150 communities in 2002. A follow-up interview was conducted in 2005. For a subsample of women between the ages 15 and 49, the survey also collected complete birth histories. Although the MxFLS has a longitudinal design, the present analysis relies only on data from Wave 1.⁶

The NSFG is a series of nationally representative, cross-sectional surveys, which are designed to produce reliable estimates of fertility trends for US men and women between the ages of 15 and 44. Because a single year of the NSFG does not include sufficiently large numbers of Mexican immigrants to disaggregate their fertility experiences by age and stages of migration, I pool data from the 2002 NSFG (7,643 women) and the continuous 2006-10 NSFG (12,279 women)⁷.

⁶ I do not use the birth histories from the second wave of MxFLS because the attrition across the two waves is selective with respect to fertility and education. At Wave 1, female attritors report having fewer children and attaining higher levels of education than their peers who also responded to Wave 2 data (Velasquez et al. 2010: Table 3).

⁷The NSFGs are designed with the goal of describing fertility trends in the United States; therefore, the sampling designs of the 2002 and 2006-2010 NSFGs are mostly comparable (see Groves et al. 2009). Yet, few differences arise due to the timing of data collection. The most relevant difference for this study lies in the composition of Mexican immigrants. Compared to the 2002 NSFG, the 2006-2010 NSFG includes a higher proportion of immigrants who migrated post 9/11. Compared to earlier migrants, recent migrants are more likely to migrate permanently

The MxFLS and the NSFGs⁸ are well-suited for the present analysis for several reasons. First, both studies collected detailed retrospective histories of birth. Second, they asked information about women's migration experiences: NSFG asked respondent to report the "year they came to stay in the US" and MxFLS asked respondents to report if they ever migrated into the US. Combined, this information allows me to document how immigrant fertility changes across the various stages of migration. Finally, the studies collected information on key determinants of fertility, including year of birth, educational attainment, and marital histories.

3.2 Sample

My analytic sample is restricted to Whites, Mexican Americans, foreign-born Mexicans, and non-migrants in Mexico born between 1958 and 1987 (18,453 or 48% deleted). I focus on women because MxFLS only collected birth histories from women. I limited my sample to those born between 1958 and 1987 because this is the birth cohort for whom birth histories are available in both the MxFLS and pooled NSFG. Additionally, I excluded Mexican immigrants who did not report "the year they came to stay in the US" because I cannot describe how their

into the United States because circular migration and crossing the border has become a dangerous endeavor. Individuals who migrate permanently are more likely to engage in practices that are more conducive to their socioeconomic integration than temporary migrants. Therefore, I ran sensitivity tests that control for year of migration in consideration of these differences. The general results stay the same.

⁸The birth histories in the MxFLS and the pooled NSFGs are mostly comparable. An exception to this is that MxFLS collected birth histories on all women in the household, but the NSFG randomly selected one woman. To determine whether this sampling difference affects the results, I randomly selected an eligible woman in a MXFLS household and re-ran the analyses. The general results stayed the same: migration is positively selective with respect to fertility. Nonetheless, I stratify my multivariate results by data source to net out any potential biases arising from sampling differences between the NSFGs and MxFLS.

fertility changes before and after migration (19 cases or 0.05% deleted). I also excluded female return migrants in Mexico because there are far too few return migrants to produce reliable life table estimates of fertility specific to age and stage of migration (60 cases or 0.2% deleted). I also limited my sample to women who had valid birth and marriage histories and to women who initiated marriage and births at age 15⁹ (992 cases or 2.6% deleted). Finally, I excluded women who did not report their schooling (24 cases or 0.06% deleted). These restrictions yield a sample of 18,897 women (9,132 Whites, 1,082 Mexican Americans, 1,086 Mexican immigrants, and 7,597 non-migrants in Mexico).

3.3 Measures

3.3.1 Dependent variable

Number of children born is a time-varying covariate measuring the number of children born during the person-age interval.

3.3.2 Independent variables

Race, ethnicity, and generational status is a time-fixed covariate classifying women's reproductive histories into five categories depending on women's self-reports of race, ethnicity, and generational status. These categories are (1) non-migrants in Mexico; (2) Mexican immigrants; (3) Mexican Americans; (4) Whites. *Non-migrants in Mexico* are Mexican-born women who have never migrated into the US until the date of interview¹⁰. Mexican immigrants

⁹ It is common practice in demography, including in the computation of total fertility rates, to assume that reproductive ages commence at age 15 (Preston et al. 2001). Therefore, I assume that the risk of marriage and childbirth starts at age 15. Nonetheless, I conducted robustness checks with the risk of childbearing starting at age 12. The results remain virtually unchanged.

¹⁰ Mexican-born women are classified into Mexican immigrants and non-migrants in Mexico depending on their place of residence at the date of interview. This means that the population of

are foreign-born Mexican women who are residing in the United States at the date of interview. *Mexican Americans* are US-born women who self-identify as Mexican. *Whites* are US-born Non-Hispanic (NH) women who self-identify as Whites.

Race, ethnicity, generational status, and stage of migration is a time-varying covariate that further disaggregates the birth histories of Mexican immigrants (living in the US and Mexico) into 5 distinct stages of migration. Literature on intra-generational changes in fertility identifies five stages of migration: (1) a baseline pre-migration stage when fertility is unaffected by migration; (2) a pre-migration stage immediately before migration when immigrants disrupt their fertility in anticipation of difficulties of migration; (3) a post-migration stage immediately after migration when immigrants disrupt their fertility due to the insecurities and difficulties associated with a cross-national move; (4) a post-migration stage when immigrants compensate for the earlier disruption in fertility¹¹; and (5) a post-migration stage when immigrants are better integrated socioeconomically to the destination country. To construct stages, I compute the years since/after migration, which is the difference between mean year in the person-age category of interest and year of arrival in the United States. A negative (positive) value denotes the number of years before (after) migration. I classify each person-age category file into the stages of migration described above. The birth histories of Mexican immigrants are divided into

non-migrants will include future immigrants who migrate after 2002. This will understate differences between non-migrants and Mexican immigrants.

¹¹ If fertility disruption occurs in the period immediately preceding migration but not immediately after migration, then fertility catch-up could occur in the period immediately following migration and the remaining two post-migration stages will describe periods when immigrant women are integrated into the US at varying degrees.

five stages that are roughly four years in length¹² because doing so ensures that the number of women at risk of giving birth in each age category is at least 15, which is the minimum number of cases required to obtain reliable life table estimates (Andersson and Philipov 2002).¹³ The stages are: (1) ≥ 4 years before migration; (2) < 4 years before migration; (3) < 4 years after migration; (4) 4 to 7 years after migration; and (5) ≥ 8 years after migration. Table A1 presents the number of person-age categories in each group.

Table A1 goes here.

Age interval is a time-varying covariate classifying each respondent into five age categories: ≤ 19 ; 20 to 24; 25 to 29; 30 to 34; and 35 to 44¹⁴.

Completed years of education is a time-fixed¹⁵ covariate distinguishing between respondents with ≤ 9 , 10 to 11, 12, and ≥ 13 or more years of schooling.

The multivariate analysis also introduces some socio-demographic controls previously identified as important determinants of fertility differentials by race, ethnicity, and stage of migration (or by race, ethnicity, and generational status). Mexico has undergone a demographic transition and there are large fertility variations among Mexican women in different birth cohorts (Frank and Heuveline 2005). I therefore control for *birth cohort* (1958-1967; 1968-1977; 1978-1987). High levels of Mexican immigrant fertility are attributable to their high marriage rates,

¹² I also computed using distinct cut-off points in the construction of stages of migration: 5, 7, and 10 year intervals. Most results stay the same with the only exception being that “catch-up” effects are more pronounced in smaller intervals.

¹³ As a robustness check, I merged the 1995 NSFG to rule out the possibility that the observed patterns of fertility are due to small sample sizes. The general results remain unchanged.

¹⁴ I combine “35 to 39” and “40 to 44” to ensure a sufficiently large sample sizes.

¹⁵ The 2002 and 2006-2010 NSFG did not collect educational histories. Thus, I use completed years of schooling (time-fixed variable). “Less than 10 years” is the lowest educational category.

which arise because female Mexican immigrants enter the US to reunite with their migrant husbands and US immigration policy favors married over single women under the family reunification principle (Raley and Sweeney 2009). I therefore introduce controls for *marital status* (married vs. unmarried throughout person-age category), which is a time-varying covariate¹⁶. Non-migrants in Mexico in consensual unions are classified as being married because these unions have served as surrogate marriages in Mexico (Martin Castro 2002).

It is noteworthy that my analyses do not include period controls. This is because age, period (i.e., year of childbirth); and cohort (i.e., year of mother's birth) perfectly specify one another and I run into the classic Age-Period-Cohort problem: Year of childbirth = Year of mother's birth + Mother's age at childbirth. I ran robustness checks that excluded year at mother's birth and included year at child's birth and the results remain virtually unchanged.

4. METHODS

My analysis has two parts. In the first part, I describe changes in immigrant fertility, focusing on (1) how selective migration is with respect to fertility; (2) whether migrants disrupt their fertility in anticipation of (or due to) the difficulty associated with the migration process; (3) whether migrants resume and even compensate for the earlier disruption in fertility once they migrate; (4) whether the fertility of immigrants decreases over time and across generations. In

¹⁶ Some researchers attribute the higher fertility of Mexican immigrants over US-born groups to their higher marriage rates (Parrado 2011). In this paper, I do not measure the extent to which marital composition accounts for fertility differentials within and across generations because the 2002 NSFG is missing dissolution dates for over one-third of all marriages that subsequently dissolved (Kennedy and Bumpass 2008). Given that Mexican immigrants are less likely than other groups to experience union dissolution, the bias will understate the extent to which differences in marital composition explain fertility differences by race, ethnicity, generational status, and stage of migration (or by race, ethnicity, and generational status).

the second part, I study to what extent educational selectivity accounts for the high fertility of Mexican immigrants and to what extent educational assimilation explains the fertility changes within and across generations.

To conduct these analyses, I take the information from the retrospective histories of birth and reorganize them into person-age category files, which start when the respondent is in the “15 to 19” age category and end in the age category at interview or in the “35 to 44” age category (whichever comes faster). This yields 62,725 person-age category files. Once constructed, I use these files to compute descriptive life-table estimates that document fertility differences by race, ethnicity, generational status and stage of migration. I also estimate standard errors in accordance to Chiang’s (1984) formula for the computation of standard errors for life table estimates.

Formally, it is represented as follows:

$$S_{nF_x} = \sqrt{\frac{1}{nB_x} \cdot ({}_nF_x)^2 \cdot (1 - {}_nF_x)}$$

where ${}_nB_x$ is the number of births and ${}_nF_x$ is the age-specific fertility rates.

Next, I use poisson regression¹⁷ models to predict age-specific fertility rates. I do this by using STATA’s poisson regression command with the exposure option: the poisson command predicts the *number of children born in person-age category (i.e., the numerator in age-specific fertility rates)* and the exposure option then takes the predicted number of children born in each category and divides it by the *number of person-years in each person-age category (i.e., the*

¹⁷ I made efforts to use negative binomial regression for the present analyses as they are better equipped to account for the over-dispersion in the counts of births. I am unable to do so because the models fail to converge with the addition of time-varying controls (i.e., marital status). I compared the poisson and negative binomial regression results for models that do not include marital status. There are virtually no differences in the results.

denominator in age-specific fertility rates). I employ two additive poisson regression models to determine (1) how immigrant fertility changes within and across generations, net of socio-demographic controls and (2) to what extent educational selectivity accounts for the high fertility levels of immigrants and educational assimilation explains fertility changes within and across generations. Specifically, the first model includes covariates for race, ethnicity, generational status, and stage of migration; age; the interaction between age and race, ethnicity, generational status, and stage of migration; birth cohort; and marital status. The second model adds controls for education to the existing model. All analyses are weighted using final, post-stratified weights. The multivariate analyses are stratified by data sources to net out any potential biases that arise due to the varying sampling design between the MxFLS and the pooled NSFG. I also account for the clustering of person-age categories within individuals. The results section presents predicted age-specific and cumulative fertility rates, which are computed based on the coefficients and population means.¹⁸

The methodological approach employed in this paper is very similar to event history models with repeated events, which do not censor the sampled respondent following the occurrence of an event to capture recurrence (Box-Steffensmeier and Zorn 2002). The only difference between the employed methodological approach and the event history models with repeated events lies in that this method predicts counts of children born during the person-age

¹⁸ I report predicted age-specific and cumulative fertility rates (instead of coefficients) because of two reasons. First, each model includes 35 interaction terms between age and race, ethnicity, generational status, and stage of migration. Therefore, it is difficult to keep track of the distinct coefficients and make group comparisons. Second, the coefficients do not immediately yield cumulative and total fertility rates, which are the most commonly reported fertility rates.

interval and repeated event history models predict the instantaneous hazard that an event will occur during the person-year (or person-months).

This method capitalizes on the advantage of both event history analyses and period estimates of fertility. The main advantage of event history models lies in that they document how the timing and levels of fertility vary across race, ethnic, and generation status groups (or across stages of migration). Their disadvantage is that their outcome – the instantaneous hazard of giving birth to a child– is not easily translatable to the number of children born to women in a certain group, which is needed to project their contribution to future population size and composition. Period estimates of fertility have the advantage that it predicts the number of children born to women in a certain group, which is needed to project their contribution to future population size and composition. Yet, period estimates of fertility predict the number of children born to a hypothetical cohort of women who are subject throughout their reproductive lives to the age-specific fertility rates at a cross-sectional period (Preston et al. 2001). Therefore, their disadvantage is that (1) the actual fertility behavior of women likely differs from those of the hypothetical group of women and (2) it is hard to disentangle whether fertility changes represent shifts in the fertility timing or fertility levels (Parrado 2011). The method proposed in this paper allows us to estimate total fertility rates (i.e., the number of children women contribute to future populations) using observations about women’s actual fertility behavior throughout their reproductive lives. It also helps us get a better handle on whether changes in immigrant fertility represent a shift in fertility timing (“tempo effect”) or levels of fertility (“quantum effect”) using information about dates of childbirth and year of arrival to the US. Finally, it allows us to compute life table estimates using multivariate analysis and assess the role of educational

selectivity in engendering the high fertility of Mexican immigrants and determine to what extent educational assimilation gives rise to a fertility decline over time.

In the results section, I describe variations in total fertility rates by race, ethnicity, and generational status. I then document variations in women's cumulative fertility rates by age 34 depending on her race, ethnicity, generational status, and stage of migration. The cumulative fertility rates at age 34 can be interpreted as the number of children women have by age 34¹⁹, holding constant the stage of the migration. In real life, the population of immigrant women contributes children to the five stages of migration – before, during, and after migration. Yet, to establish how fertility practices change across stages of migration, I pose the question: what would immigrant women's cumulative fertility be if stage of migration is held constant? The only difference between this approach and multivariate analysis is that it makes more explicit *ceteris paribus* (i.e., holding everything constant).

5. RESULTS

5.1. Fertility levels of Mexican Immigrants

I begin by reporting the age-specific and total fertility rates of Mexican immigrants (without distinctions about the place of childbirth²⁰) and comparing them with those of other groups. Table 1 presents the results. These fertility rates are estimated using birth history data, which have the advantage that they directly observe the births occurring to the sampled women

¹⁹ My decision to report cumulative fertility by age 34 instead of total fertility rates is driven by the age restriction in the NSFG data: 15-44. Because of the age restriction, I do not have enough immigrant women ages 35 to 44, for whom four or more years have to elapse before migration takes place to obtain reliable estimates of age-specific fertility.

²⁰ If analyses are restricted to US births, the total fertility rate of Mexican immigrants is 2.86.

and avoid the biases resulting from both: the undercounts of women and the reliance on a distinct source of data for each component of the fertility rates. This approach yields total fertility rates that are lower than previously reported period estimates of fertility: 2.7 vs. 2.9 to 3.6. This finding suggests that the effects of Mexican immigrant births on future population size and growth will not be as large as projected by past work using period estimates of fertility.

Table 1 goes here.

I now turn my attention to how the fertility of Mexican immigrants compare with that of other groups. Consistent with Frank and Heuveline (2005), I find that Mexican immigrants have higher fertility than non-migrants in Mexico. The total fertility rates of Mexican immigrants are approximately 40 percent [$100 \times (2.73 - 1.97) / 1.97 = 40$] higher than those of non-migrants in Mexico. This finding suggests that we can no longer assume that fertility levels in Mexico will be considerably higher than those in the United States or that Mexican immigrants have higher fertility than other groups because they continue the pronatalist practices from Mexico. Like much of the prior work, I also find that Mexican immigrants have higher fertility than US-born groups. For instance, the total fertility rates of Mexican immigrants are approximately 30 percent [$100 \times (2.73 - 2.13) / 2.13 = 30$] higher than those of Mexican Americans.

5.2 Fertility of Mexican immigrants changes within and across generations

Researchers also provide mixed accounts about how the fertility of Mexican immigrants changes within and across generations. Some researchers argue that the fertility of Mexican immigrants decreases within and across generations; whereas others argue that it remains high. The empirical analyses in this section test these competing hypotheses using pooled birth history data from Mexico and the United States. Table 2 displays the age-specific and cumulative fertility rates by race, ethnicity, generational status, and stage of migration.

Table 2 goes here.

The first step is to determine the pre-migration levels of Mexican immigrant fertility and to decipher how selective migration is in terms of fertility. This analysis will ascertain whether studies can rely on national fertility rates as proxies for pre-migration levels of fertility or whether they must empirically observe the pre-migration fertility of immigrants to reach accurate conclusions about fertility changes within and across generations. To accomplish this goal, I compare the fertility of Mexican immigrants at the baseline stage of migration (i.e., four or more years prior to migration) and the fertility of non-migrants in Mexico. My results show that Mexican migration to the United States is positively selective with respect to fertility. By age 34, the cumulative fertility of immigrants four or more years prior to migration is 2.72, which is 51 percent [$100 \cdot (2.72 - 1.80) / 1.80 \approx 51$] higher than the fertility of non-migrants in Mexico. This finding is not surprising, given that Mexican immigrants have traditionally originated from rural communities where women average more children than their urban counterparts (Marcelli and Cornelius 2001). The positive migrant selectivity in terms of fertility means that national fertility rates, which are used by Frank and Heuveline (2005), understate the pre-migration fertility rates of Mexican immigrants. Underestimates of pre-migration fertility transmit the impression that immigrant fertility is increasing after migration and make it unclear whether the subsequent decline in fertility represents a return to pre-migration levels or fertility assimilation. This finding highlights the need to empirically observe the pre-migration fertility of immigrants.

Next, I examine how immigrant fertility changes during migration, paying special attention to fertility disruption prior to migration and fertility catch up after migration. My results show that immigrant women disrupt their fertility in the period immediately preceding migration. By age 34, the cumulative fertility of immigrants in the period immediately before migration is

27 percent [$100 \cdot (1.98 - 2.72) / 2.72 \approx 27$] lower than the baseline stage: four or more years before migration. This fertility disruption likely arises because (1) Mexican immigrants regulate their fertility because they do not wish to cross the border while pregnant or with infants, or (2) because Mexican immigrant women experience temporary spousal separation following their husband's migration (Carter 2000). I also find evidence in support of fertility catch-up. In the period immediately following migration, immigrant women accelerate their fertility to compensate for some, but not all, of the fertility loss they incurred during the earlier period. Specifically, immigrant women compensate for about a third [$100 \cdot (2.96 - 2.72) / (2.72 - 1.98) \approx 32$] of the fertility loss they experienced earlier. These findings are somewhat different from those of past studies. I find that fertility catch-up occurs within four years of migration, as compared with Ford (1990) who finds that fertility-catch up occurs once six to ten years have elapsed after migration. This difference is attributable to two factors: (1) the two studies capture different periods and (2) Ford uses census data while I use birth histories which are better equipped to tease out tempo and quantum effects. It also differs from Carter (2000) who finds evidence that the fertility catch-up occurs between 2 to 7 years of migration. Differences between my results and Carter's likely arises because I include the immigrant fertility experiences after 9/11, which increased the difficulty of border crossing; gave immigrant women greater incentives to postpone fertility until after migration; and consequently generated a need to rapidly compensate for the earlier disruption.

Third, I investigate how the post-migration fertility of immigrant women changes within an immigrant woman's life course and across generations. Immigrant fertility decreases steadily with prolonged duration of stay in the United States, falling below their pre-migration fertility levels and converging towards the fertility of Whites. By age 34, the cumulative fertility of

immigrants who have resided in the US for 8 or more years is 16 percent [$100 \times (2.29 - 2.72) / 2.72 \approx -16$] lower than the pre-migration fertility of immigrants four or more years prior to migration. The fertility of Mexican immigrants also decreases steadily across generations, moving away from pre-migration fertility levels and converging with that of Whites. By age 34, the cumulative fertility of Mexican Americans is 18 percent [$100 \times (1.87 - 2.29) / 2.29 \approx -18$] lower than that of Mexican immigrants who have resided in the US for 8 or more years, but still 23 percent [$100 \times (1.44 - 1.87) / 1.87 \approx -23$] higher than that of Whites. Although the fertility of immigrants decreases over time and across generation, it has not converged fully with that of Whites. Nonetheless, this pattern of change, consistent with the findings of Ford (1990) and Carter (2000), supports the classical assimilation hypothesis that immigrant fertility will decrease moving away from pre-migration fertility and converging with the fertility of Whites.

Taken together, my findings suggest that migration is positively selective with respect to fertility, which illustrates the importance of empirically observing the pre-migration fertility of Mexican immigrants. Mexican immigrants disrupt their fertility in the period immediately before migration, but they resume and even compensate for the earlier disruption in fertility once they migrate. This pattern of change is consistent with the fertility disruption/catch-up hypothesis. However, overall Mexican immigrant fertility decreases within and across generations, moving away from their pre-migration fertility and converging towards that of Whites.

5.3 Education, fertility levels, and fertility changes over time and across generations

This section addresses the third puzzle surrounding the fertility of Mexican immigrants, namely the role of educational selectivity in engendering the high fertility of immigrants and the extent to which educational assimilation accounts for fertility change within and across

generations.²¹ My results, presented in Table 3, show that Mexican migration to the United States is positively selected in terms of education. Just over half of Mexican immigrants have fewer than 10 years of education, as compared with nearly 70 percent of non-migrants in Mexico²². They also provide evidence of educational assimilation over time and across generations. Nearly 40 percent of immigrants who have lived in the US for 8 or more years have at least completed 12 years of schooling, as compared with a third of Mexican immigrants who have resided in the US for shorter durations. Seventy-six percent of Mexican Americans have at least completed 12 years of schooling, as compared with only a quarter of Mexican immigrants. Even so, Mexican Americans continue to have an educational disadvantage over Whites.

Table 3 goes here.

Next, I examine whether educational selectivity gives rise to the high fertility of Mexican immigrants. Table 4 presents the predicted age-specific and cumulative fertility rates, disaggregated by race, ethnicity, generational status, and stage of migration. These estimates are obtained from two additive poisson regression models: Panel A presents estimates obtained from a model without controls for education, and Panel B presents estimates obtained from a model with controls for education. I focus on the results from Panel B because Panel A yields estimates

²¹ I do not report how education affects the fertility changes that occur during the migration process (i.e., fertility disruption and fertility catch-up) because disruption/catch-up deals with fertility a short period of time where the educational characteristics of immigrants changes little.

²² Levels are consistent with the literature and national average. Santibanez et al. (2005) estimate that the total completed years of schooling for Mexican adults (15+ years of age) is 7.9 years. Two-thirds of Mexican women between 15 and 44 years of age had less than 10 years of schooling (Author's calculation using the 2000 Mexican Census).

similar to the descriptive results. My findings detract from the view that the high fertility of Mexican immigrants is attributable to the negative educational selectivity in the migration flow from Mexico to the United States. In fact, there is evidence to the contrary. The positive educational selectivity in the migration flow from Mexico to the United States suppresses some of the fertility differentials between non-migrants in Mexico and Mexican immigrants. Net of education, the cumulative fertility of immigrants four or more years prior to migration is 51 percent [$100 \cdot (1.71 - 1.13) / 1.13 \approx 51$] higher than that of non-migrants, as compared with 48 percent [$100 \cdot (2.04 - 1.38) / 1.38 \approx 48$] in the absence of educational controls. This finding is unsurprising, given the fact that fertility is negatively associated with education and migration is positively selective in terms of education. Interestingly, non-migrants in Mexico simultaneously have lower levels of education and lower levels of fertility. This paradox likely emerges because non-migrants in Mexico are more likely to reside in urban areas than Mexican immigrants (Marcelli and Cornelius 2001). Urban residence may introduce constraints to high fertility (e.g., crowding, higher cost of childrearing) and reduce the fertility of all educational groups, but especially that of individuals with lower levels of education. If it was not for the positive educational selectivity in the immigration flow from Mexico to the United States, the fertility of Mexican immigrants would be even higher.

Table 4 goes here.

Finally, I investigate the extent to which educational assimilation accounts for fertility changes within and across generations. I first assess the extent to which education explains the fertility changes within a generation by comparing the effect of education on the fertility changes which occur between the baseline stage of migration (i.e., 4 or more years prior to migration) and the very end stage of migration (i.e., 8 or more years after migration). By age 34, the cumulative

fertility of immigrants in the very end stage of migration is 8 percent [$100*(1.59-1.71)/1.71 \approx -8$] lower than that of immigrants in the very beginning stage of migration, net of controls for education. This compares with the 16 percent [$100*(1.71-2.04)/2.04 \approx -16$] differential in fertility obtained in the absence of controls for education. Stated differently, variations in educational composition account for half [$(-8)/(-16) \approx 0.5$] of fertility changes occurring within an immigrant woman's life course. Educational improvements across generations also account for a considerable portion of fertility changes across generations. Net of controls for education, the cumulative fertility of Mexican immigrants who resided in the US for 8+ years is 6 percent [$100*(1.74-1.83)/1.83 \approx -6$] lower than that of Mexican Americans by age 34. This compares with cumulative fertility rates that are 7 percent [$100*(1.88-1.75)/1.75 \approx +7$] higher than that of Mexican Americans. That is, Mexican Americans would have higher fertility than Mexican immigrants who have resided in the US for 8+ years, if there were educational parity between the two groups.

I also investigated to what extent educational disparities between Whites and Mexican Americans give rise to the fertility differentials between them. In particular, I wish to test whether the fertility of Mexican Americans will converge with that of Whites if the educational gap between Mexican Americans and Whites disappears. Net of controls for education, the cumulative fertility of Mexican Americans at age 34 is 32 percent [$(1.63-1.23)/1.23 = 32$] higher than that of Whites, as compared with 46 percent [$(1.56-1.07)/1.07 = 46$] in the absence of controls for education. Stated differently, educational gap between Mexican Americans and Whites accounts for about 30 percent [$100*(46-32)/46 \approx 30$] of the fertility differentials between these two groups. The educational disadvantage of Mexican Americans is an important reason why Mexican Americans have higher fertility than Whites, but factors other than education are

also contributing to the fertility differentials between them. My findings, however, may understate the degree of educational assimilation experienced by Mexican immigrants and their descendants as well as the extent to which educational assimilation explain the fertility changes within and across generations. Due to data limitations, I am unable to measure educational improvements using educational histories, and like most studies, I am forced to rely on synthetic immigrant generations to capture intergenerational changes.

Taken together, my findings detract from the view that Mexican immigrants have higher fertility levels due to the negative educational selectivity of Mexican migration to the US. To the contrary, Mexican immigrants appear to be a positively selected group in terms of education who also happen to have higher fertility rates. I argue that this pattern arises because they originate from rural areas where there are fewer constraints to childbearing and childrearing, especially among those with lower levels of education. Improvements in education explain a considerable portion of the fertility decline within and across generations. The fertility of Mexican Americans fails to converge with that of White partly due to the educational disparities between Mexican Americans and Whites. Yet, even if Mexican Americans are to attain educational parity with Whites, it does not appear that their fertility will converge with those of Whites.

6. SUMMARY AND CONCLUSIONS

The goals of this study were to (1) obtain more accurate estimates of fertility; (2) document how the fertility of immigrants changes within and across generations; and (3) decipher the extent to which educational selectivity generates the high fertility of Mexican immigrants and the extent to which educational assimilation explains fertility changes within and across generations. To do so, I pool birth histories from Mexico and the US and take a

retrospective look at how Mexican immigrant fertility changes within and across generations. My analyses yield several notable findings.

A comparison of the fertility behavior of immigrants four or more years prior to migration with that of non-migrants in Mexico reveals that Mexican migration to the United States is positively selected with respect to fertility. This selectivity, which likely arises because immigrants have traditionally originated from rural areas in Mexico, reveals that national average fertility rates may inadequately represent the fertility of immigrants prior to migration and highlights the importance of observing the pre-migration fertility of immigrants.

My findings also show that migration influences fertility timing. Mexican immigrants disrupt their fertility shortly before they migrate, but they resume their pre-migration fertility behavior and even compensate for a portion of the earlier fertility loss once they migrate. This finding is consistent with fertility disruption/catch-up hypothesis.

Mexican immigrant fertility decreases over time and across generations, moving away from their pre-migration fertility levels and moving towards the fertility of Whites. These findings are consistent with the classical assimilation hypothesis and past findings by Ford (1990) and Carter (2000). Nonetheless, it should be noted that the fertility of Mexican immigrants and their descendants fails to converge fully with that of Whites.

Fourth, my findings reveal that the high fertility of Mexican immigrants is not attributable to the negative educational selectivity of migration. In fact, the opposite is true. The fertility of Mexican immigrants would be higher if it were not for the positive educational selectivity of the migration flow from Mexico to the United States. Interestingly, Mexican immigrants have both higher levels of education and fertility than non-migrants in Mexico. I speculate that this is because non-migrants in Mexico are more likely to originate from urban

areas than Mexican immigrants and urban residence introduces constraints (e.g., high costs of childbearing and crowding) to women's fertility, especially those with lower levels of education.

Fifth, I find that White-Mexican differences in education account for a considerable portion of the fertility differentials between Mexican-origin women and Whites. Yet, it appears that factors other than education also contribute towards the fertility differentials between them and Whites; and thus, the fertility of Mexican origin women would not converge with those of Whites if they are to achieve educational parity with them.

This study is not without limitations. First, I unable to include some controls which have been identified by prior work as determinants of women's fertility, including women's employment, women's school enrollment, and husband's characteristics because they were not collected in all three data sources. Second, the NSFGs did not collect migration histories for Mexican immigrants. Instead, it only includes information about the "year they entered to stay in the US." Solely relying on this information to construct measures of "duration of stay in the U.S." overstates the magnitude of exposure to the US by ignoring the time "circular migrants" may have spent in Mexico and understates the extent of fertility assimilation experienced by circular migrants from Mexico (Ford 1990) . Third, Mexican-born women are classified into non-migrants and immigrants depending on their country of residence at the time of survey; and thus, the population of non-migrants in Mexico may include individuals who will migrate into the US after 2002. This implies that the fertility differentials between non-migrants in Mexico and Mexican immigrants may be understated. Fourth, the NSFG distinguishes between first and second/third generation Mexican Americans, but it does not distinguish between second and third generation immigrants, which limits my ability to observe how immigrant fertility changes between the second and third generation. Fifth, because NSFG is a repeated cross-sectional

dataset, I am forced to rely on synthetic immigrant generations. Although this practice is the modal approach in the literature, the use of synthetic immigrant generations may understate estimates of fertility changes across generations. Finally, because the 2002 and 2006-2010 NSFG did not include educational histories, I may underestimate the extent to which educational assimilation accounts for fertility changes over time. This research, however, makes an important contribution to our understanding of fertility assimilation by proposing a methodological approach that partly overcomes the biases found in traditional approaches, namely (1) the bias accompanying the combination of accurate counts of births with undercounts of Mexican immigrant women and (2) the bias resulting from the absence of information about pre-migration fertility.

In sum, my findings highlight the importance of incorporating the pre-migration fertility of immigrants when studying their fertility. Given the positive selectivity of migration with respect to fertility and the drastic fertility decline in Mexico, we can no longer use the national average as proxy for pre-migration fertility nor can we assume that the fertility of immigrants is considerably higher than that of US-born groups. Future studies also need to measure the pre-migration fertility of immigrants and compare it with their post-migration fertility in order to obtain accurate accounts of fertility assimilation. Finally, my fertility estimates for Mexican immigrants are lower than period estimates of fertility: 2.7 vs. 2.9 to 3.6. These findings, coupled with the observation that the fertility of Mexican immigrants decreases over time and across generations, suggest that the effects of Mexican immigrant births on future population will not be as large as projected by past work that uses period estimates of fertility and that argues that Mexican immigrants do not experience fertility assimilation.

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8. TABLES

Table 1. Differences in Age-Specific and Total Fertility Rates by Race, Ethnicity, and Generational Status

	Non-migrants in Mexico			Mexican Immigrants			Mexican Americans			Whites		
	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.
15-19	0.17	0.17	0.005	0.28	0.28	0.013	0.26	0.26	0.013	0.10	0.10	0.003
20-24	0.63	0.81	0.006	0.79	1.07	0.013	0.62	0.88	0.016	0.38	0.48	0.005
25-29	0.61	1.42	0.007	0.81	1.87	0.014	0.57	1.45	0.019	0.49	0.97	0.006
30-34	0.38	1.80	0.009	0.55	2.42	0.020	0.42	1.87	0.023	0.47	1.44	0.007
35-44	0.17	1.97	0.009	0.31	2.73	0.024	0.26	2.13	0.027	0.27	1.71	0.008

Notes: Age-specific fertility rates are weighted. ASFR denotes age-specific fertility. Σ ASFR denotes “cumulative fertility rates up to that age”.
S.E. denotes standard errors.

Table 2. Differences in Age-Specific and Total Fertility Rates by Race, Ethnicity, and Stages of Migration

	Non-migrants in Mexico			Before migration (Baseline)			Stages during migration					
				Pre-migration, ≥ 4 years			Pre-migration, <4 years			Post-migration, <4 years		
	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.
15-19	0.17	0.17	0.01	0.25	0.25	0.02	0.30	0.30	0.03	0.34	0.34	0.04
20-24	0.63	0.81	0.01	0.75	1.00	0.03	0.62	0.92	0.03	0.98	1.31	0.02
25-29	0.61	1.42	0.01	0.83	1.83	0.05	0.59	1.52	0.05	0.95	2.26	0.03
30-34	0.38	1.80	0.01	0.90	2.72	0.11	0.47	1.98	0.07	0.70	2.96	0.06
35-44	0.17	1.97	0.01				0.09	2.07	0.10	0.31	3.26	0.10
	Stages after migration											
	Post-migration, 4-7 years			Post-migration, ≥ 8 years			Mexican Americans			Whites		
	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.	ASFR	Σ ASFR	SE.
15-19	0.26	0.26	0.06	0.25	0.25	0.04	0.26	0.26	0.013	0.10	0.10	0.00
20-24	0.97	1.23	0.02	0.73	0.98	0.03	0.62	0.88	0.016	0.38	0.48	0.01
25-29	0.87	2.10	0.02	0.77	1.76	0.02	0.57	1.45	0.019	0.48	0.96	0.01
30-34	0.61	2.72	0.04	0.53	2.29	0.03	0.42	1.87	0.023	0.47	1.44	0.01
35-44	0.53	3.24	0.07	0.29	2.58	0.03	0.26	2.13	0.027	0.27	1.71	0.01

Notes: Age-specific fertility rates are weighted. ASFR denotes age-specific fertility. Σ ASFR denotes “cumulative fertility rates up to that age”. S.E. denotes standard errors. The fertility rates for women between the ages of 35 and 44, four or more years before migration, are not computed because of small sample sizes (fewer than 15 individuals).

Table 3. Differences in Educational Composition by Race, Ethnicity, Generational Status, and Duration of Stay in the US

Education	Non-migrants in Mexico (7,597)	Mexican immigrants, < 4 years (139)	Mexican immigrants, 4-7 years (192)	Mexican immigrants, ≥ 8 years (755)	Mexican immigrants, All (1,086)	US-born Mexican Americans (1,082)	Whites (9,132)	Total (18,897)
A. Completed year of schooling (Row %)								
≤ 9 years	67	57	58	49	52	8	4	45
10 to 11 years	10	10	7	13	11	16	8	9
12 years	9	13	24	18	18	26	20	14
≥ 13 years	14	20	11	20	19	50	67	32
Total	100	100	100	100	100	100	100	100

Notes: Percentages are weighted. Number of observations is not weighted. We do not have any pre-migrants at the time of the survey.

Table 4. Predicted Age-Specific and Total Fertility Rates by Race, Ethnicity, Generational Status, and Stage of Migration

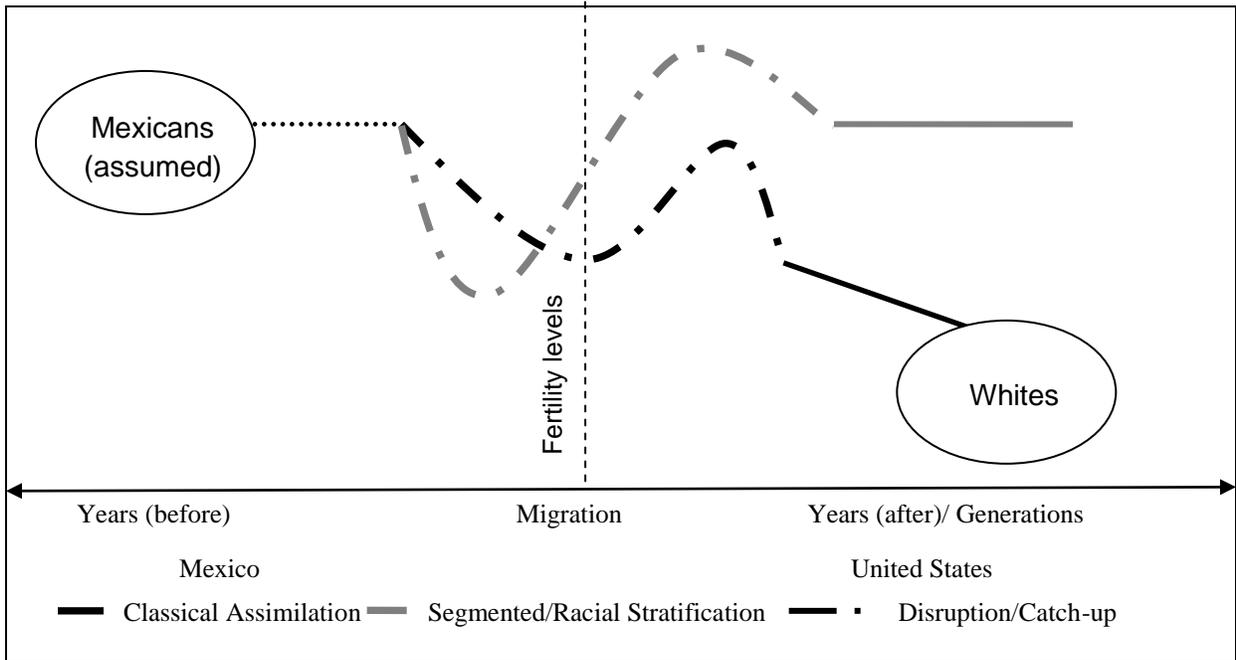
	Non-migrants in Mexico		Pre-migration, ≥ 4 years		Pre-migration, < 4 years		Post- migration, <4years		Post- migration, 4-7 years		Post- migration, ≥ 8 years		Mexican Americans		Whites	
	ASFR	∑ASFR	ASFR	∑ASFR	ASFR	∑ASFR	ASFR	∑ASFR	ASFR	∑ASFR	ASFR	∑ASFR	ASFR	∑ASFR	ASFR	∑ASFR
A. Without education																
15-19	0.18	0.18	0.29	0.29	0.27	0.27	0.42	0.42	0.29	0.29	0.31	0.31	0.34	0.34	0.14	0.14
20-24	0.50	0.68	0.59	0.88	0.44	0.72	0.69	1.11	0.67	0.96	0.59	0.90	0.52	0.86	0.31	0.45
25-29	0.43	1.11	0.58	1.46	0.41	1.13	0.60	1.71	0.57	1.54	0.50	1.40	0.41	1.28	0.32	0.77
30-34	0.27	1.38	0.58	2.04	0.29	1.42	0.46	2.16	0.36	1.89	0.32	1.71	0.28	1.56	0.3	1.07
35-44	0.12	1.50	-	-	0.04	1.46	0.20	2.36	0.29	2.18	0.17	1.88	0.18	1.75	0.17	1.25
B. With education																
15-19	0.15	0.15	0.24	0.24	0.22	0.22	0.35	0.35	0.26	0.26	0.30	0.30	0.35	0.35	0.15	0.15
20-24	0.41	0.56	0.49	0.73	0.37	0.59	0.58	0.94	0.56	0.94	0.56	0.86	0.54	0.89	0.35	0.51
25-29	0.35	0.91	0.51	1.24	0.34	0.93	0.50	1.44	0.49	1.43	0.45	1.31	0.44	1.33	0.37	0.88
30-34	0.22	1.13	0.47	1.71	0.27	1.20	0.39	1.82	0.39	1.82	0.28	1.59	0.30	1.63	0.35	1.23
35-44	0.10	1.23	-	-	0.03	1.24	0.17	2.00	0.17	2.00	0.15	1.74	0.20	1.83	0.20	1.43

Notes:

- (1) Predicted age-specific and total fertility rates are computed using poisson regression models. The coefficients of the poisson regression models are available upon request.
- (2) ASFR denotes age-specific fertility. ∑ASFR denotes “cumulative fertility rates up to that age”. S.E. denotes standard errors.
- (3) All models control for birth cohort and marital status.
- (4) All analyses are weighted.
- (5) Using svy commands, I account for clustering of person-age files within women.

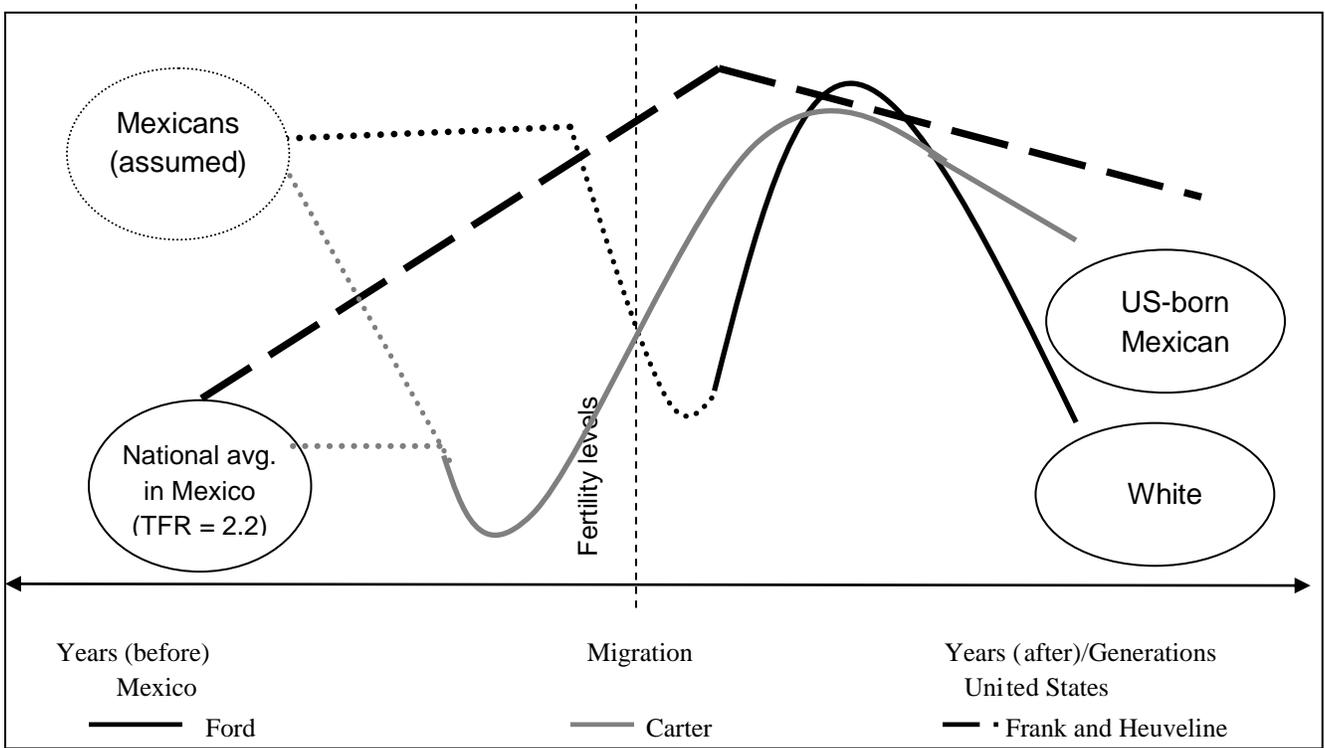
9. FIGURES

Figure 1. Predicted pattern of fertility change within and across generations



Notes: Disruption/Catch-up describes impact of migration on fertility timing and not levels of fertility; and thus, we present their predicted trajectories within the context of the other explanations. Dotted lines represent assumed pre-migration levels of fertility.

Figure 2. Summary of key findings from studies of fertility changes within a generation



Notes: Solid lines represent the observed fertility estimates. Dotted lines represent the assumed levels of fertility.

10. APPENDIX

Table A1. Number of Person-Age Categories by Race, Ethnicity, Generational Status, and Stage of Migration

	Age categories					Total
	<20	20-24	25-29	30-34	35-44	
A. Race, Ethnicity, and Stage of Migration						
Non-migrants in Mexico	7,597	5,745	4,306	3,101	1,930	22,679
Pre-migration \geq 4	532	219	80	15	0	846
Pre-migration <4	239	206	102	42	16	605
Post-migration <4	124	210	150	67	25	576
Post-migration 4-7	71	198	215	115	50	649
Post-migration \geq 8	120	217	362	386	290	1,375
Mexican American	1,082	981	727	467	249	3,506
White	9,132	8,422	6,726	4,961	3,248	32,489
Total	18,897	16,198	12,668	9,154	5,808	62,725
B. Race, Ethnicity, and Generational Status						
Non-migrants in Mexico	7,597	5,745	4,306	3,101	1,930	22,679
Mexican immigrants	1,086	1,050	909	625	381	4,051
Mexican Americans	1,082	981	727	467	249	3,506
Whites	9,132	8,422	6,726	4,961	3,248	32,489
Total	18,897	16,198	12,668	9,154	5,808	62,725

Notes: Number of cases is not weighted.