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Understanding Generational Differences in Early Fertility: Proximate and Social Determinants

Objective: *This study investigated: (1) differences by generational status in the risk of early childbearing; (2) to what extent observed differences reflected timing of sexual onset versus postonset proximate determinants like contraceptive use; and (3) the influence of individual-, family-, and neighborhood-level social factors.*
Background: *Although U.S. rates of early fertility have declined, they remain high relative to other high-income countries, and disparities by population group persist. The share of the youth population with immigrant parents has expanded greatly, yet relatively little is known about generational variations in early fertility.*
Method: *This study used Wave 1–4 data from the National Longitudinal Study of Adolescent to Adult Health (N=8,777 women). To distinguish between the sexual onset and fertility processes, a sequential hazard framework modelled: 1) the transition to sexual activity, and 2) the transition to first birth among women who had initiated sexual activity.*
Results: *Foreign-born and second-generation young women initiated both sexual activity and childbearing later than those with U.S.-born parents. Sequential hazard models revealed the importance of later sexual onset in explaining delayed fertility among the foreign-born, and of family attributes for their later sexual onset. Postonset behaviors were essential to the delayed childbearing observed among the second generation.*
Conclusion: *Important differences by generational status exist in both the proximate determinants and the social factors underlying children of immigrants' lower risk of early fertility.*

Despite a dramatic drop during the past 2 decades, U.S. rates of early fertility remain high relative to other high-income countries (Martin, Hamilton, Osterman, Driscoll, & Mathews, 2017; United Nations Population Division, 2017), and within the United States, large between-group differences persist (Sweeney & Raley, 2014). In 2015, the birth rates of non-Hispanic Black and Hispanic youth aged 15 to 19 years were roughly twice that of non-Hispanic Whites; similar trends were observable among 20- to 24-year-olds (Martin et al., 2017). Births to women in their teens and early 20s are linked with worse health and social outcomes for mothers and offspring than births to older women, even after accounting for factors that predispose women to early motherhood (Chen, Wen, Fleming, Yang, & Walker, 2008; Diaz & Fiel, 2016; Kane, Morgan, Harris, & Guilkey, 2013).

Children of immigrants are the fastest growing segment of the U.S. population (Tienda & Haskins, 2011) and can thus be expected to increasingly shape U.S. fertility trends. Yet to date relatively little research attention has been given to variation by migration background in early fertility despite a large literature describing

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and explaining racial variations in early childbearing (e.g., Sweeney & Raley, 2014) and much research on the cumulative fertility of immigrant women (e.g., Bean, Swicegood, & Berg, 2000; Parrado & Morgan, 2008). According to recent estimates, roughly one in four U.S. children aged younger than 18 years were foreign born or of the second generation (U.S. born to at least one foreign-born parent) in 2015, up from 13% in 1990 (Migration Policy Institute, 2017); this share is projected to rise to one-third by 2050 (Passel, 2011).

Whether foreign-born and second-generation women are at lower or higher risk of early fertility relative to those with U.S.-born parents is not straightforward to anticipate based on existing research. Accumulating evidence that children of immigrants initiate sexual activity later on average than offspring of the U.S. born (e.g., Harris, 1999; McDonald, Manlove, & Ikramullah, 2009) might suggest a tendency also toward later fertility. Nonetheless, other research suggests that once sexually active, Hispanic immigrant young women may use contraception less consistently, and abortion less frequently, than their U.S.-born counterparts (Aneshensel, Becerra, Fielder, & Schuler, 1990; Manlove, Steward-Streng, Peterson, Scott, & Wildsmith, 2013). Work directly investigating differences in early fertility by generational status has yielded results in the direction of both higher and lower risk for children of immigrants (e.g., Aneshensel et al., 1990; Glick, Ruf, White, & Goldscheider, 2006; Manlove et al., 2013; Rumbaut, 2008).

Analyzing data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), a nationally representative longitudinal study of students in Grades 7 to 12, this study asks three overarching research questions. First, it asks whether and how children of immigrants differ from those with U.S.-born parents in their risk of early childbearing. Second, grounded in a proximate determinants framework (Bongaarts, 1978, 2015; Davis & Blake, 1956), it asks to what extent observed generational differences in early fertility reflect variation in timing of sexual onset versus postonset behaviors such as contraceptive use or abortion. Third, it investigates the social factors underlying observed generational differences in both timing of sexual onset and postonset fertility, as previous studies have generally stopped short of identifying mechanisms for observed differentials. I consider factors spanning the individual, family, and neighborhood levels, heeding calls by others to consider the multiple environments in which young people's lives are enacted (Browning, Leventhal, & Brooks-Gunn, 2004; Leventhal & Brooks-Gunn, 2000).

Background

Generational Differences in Fertility

A sizeable body of literature has examined childbearing patterns across immigrant generations, focusing primarily on women's cumulative fertility. Consistent with social mobility and classical immigrant assimilation perspectives (Alba & Nee, 1997), there is increasing consensus that cumulative fertility declines with time in the United States and across immigrant generations, at least among Hispanic women (Choi, 2014; Parrado, 2011; Parrado & Morgan, 2008).

Yet work attending to age-specific fertility rates has revealed more complex generational patterns among women in their teens and early 20s. Frank and Heuveline (2005) observed higher fertility rates among third-generation Mexican-origin women younger than age 24 relative to earlier generations, suggesting—consistent with a segmented assimilation perspective (Portes & Rumbaut, 2001)—that barriers to upward mobility among youth from racial/ethnic minority groups may lead to decreases in the opportunity costs of early fertility. Choi (2004) found that the fertility rates of 15- to 19-year-old Mexican immigrants and U.S.-born Mexican Americans were very similar, whereas older age groups displayed the pattern of decreasing fertility across generations. Studies concentrated exclusively on generational differences in teenage fertility have produced mixed results; some have observed lower risk of teen fertility among children of immigrants relative to offspring of the U.S. born (Glick et al., 2006; Guarini, Marks, Patton, & García Coll, 2013; Rumbaut, 2008), and others have found the opposite (Aneshensel et al., 1990; Manlove et al., 2013).

Proximate Determinants of Fertility

Research on immigrant fertility has rarely attended to the underpinnings of observed generational differences. In unpacking fertility trends, a common demographic approach distinguishes proximate determinants, a small set

of biological and behavioral factors that directly determine fertility, from more distal factors (Bongaarts, 1978, 2015; Davis & Blake, 1956). Proximate determinants include sexual activity (timing of sexual onset and sexual frequency), contraceptive use, and whether a pregnancy is carried to term (Bongaarts, 2015). Social factors must operate through at least one of these proximate determinants to influence fertility.

Attending to the proximate determinants is arguably particularly important when considering generational differentials in early fertility given the increased relevance of sexual onset timing for younger age groups and the potentially countervailing influences of onset timing and family planning. As noted previously, a growing body of research has observed that foreign-born and second-generation youth initiate sexual activity later than children of the U.S. born (Goldberg, Tienda, & Adserá, 2017; Harris, 1999; McDonald et al., 2009). Research has also found that foreign-born Hispanic youth have fewer sexual partners than U.S.-born youth (Guarini et al., 2013). Landale and Hauan (1996) concluded that the higher risk of premarital childbearing they observed among first- and second-generation Puerto Rican migrants to the U.S. mainland, relative to nonmigrants in Puerto Rico, was due primarily to increasingly earlier sexual onset across generations. Nonetheless, there is also evidence that once sexually active, Hispanic (Wu & Martin, 2015) and Hispanic immigrant (Aneshensel et al., 1990; Manlove et al., 2013) young women are less likely than are other young women to use contraception and to terminate unwanted pregnancies.

Contextual Determinants of Sexual Onset and Fertility Timing

Family environment. Beyond the proximate determinants, family traits are often implicated for general health advantages observed among immigrant youth (Perreira & Ornelas, 2011), and indeed immigrant families possess a number of characteristics that might be expected to delay both sexual activity and fertility. Children of immigrants coreside with two biological parents more often than children with U.S.-born parents (Landale, Thomas, & Van Hook, 2011); living with two biological parents is also associated with later sexual onset and fertility (Browning et al., 2004; Wu & Thomson, 2001). Family cohesion has also been linked with both sexual onset timing (Miller, Benson, & Galbraith, 2001) and immigrant status (Santelli, Abraido-Lanza, & Melnikas, 2009). In addition, although foreign-born parents are on average less educated than U.S.-born parents, their expectations for their children's education are often high (Feliciano & Lanuza, 2015), which may also reduce early childbearing risks (Glick et al., 2006).

Nevertheless, discrepancies in acculturative status between parents and youth can increase family conflict and decrease family cohesion, particularly for second-generation youth (Portes & Rumbaut, 2001; Sluzki, 1979). In addition, immigrant youth, particularly girls, often face close parental monitoring (Espiritu, 2001; Suárez-Orozco & Qin, 2006); although beneficial to a point, some research suggests that excessive or coercive parental control may actually elicit risk behavior (Miller et al., 2001). Finally, although children of immigrants more often have married parents than children of the U.S. born, they also may experience migration-related separations from parents (e.g., due to staged migration or deportation; Landale et al., 2011), which have been linked with earlier sexual onset (Goldberg et al., 2017).

Neighborhood environment. Previous research has highlighted the importance of neighborhood factors in explaining racial differences in sexual activity and early fertility (e.g., Browning et al., 2004; South & Baumer, 2000), but their influence on generational differences is less well understood. Immigrants tend to be more residentially segregated than nonimmigrants (Iceland & Scopilliti, 2008). A growing literature links residence in immigrant enclaves with positive health outcomes, particularly for those who are foreign born (Eschbach, Ostir, Patel, Markides, & Goodwin, 2004; Osypuk, Diez Roux, Hadley, & Kandula, 2009). Youth in enclaves may delay sexual activity and fertility because strong social networks can ease access to information, reinforce norms on acceptable behavior, and foster informal social control (Denner, Kirby, Coyle, & Brindis, 2001). Enclaves can also insulate youth from discrimination (Portes & Rumbaut, 2001).

Nonetheless, immigrants also often live in neighborhoods with high levels of poverty (Osypuk, Galea, McArdle, & Acevedo-Garcia, 2009; Pong & Hao, 2007), and neighborhood poverty is linked with both early sexual onset and early fertility (Browning et al., 2004; South

& Baumer, 2000). Moreover, for the second generation, residence in enclaves may reflect blocked economic and social opportunities (Osypuk, Bates, & Acevedo-Garcia, 2010; Portes & Rumbaut, 2001).

Individual-level intervening factors. Family and neighborhood attributes may influence the proximate determinants of early fertility through individual-level processes. For example, family and neighborhood factors may influence youths' school attachment and educational expectations (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993; Crowder & South, 2003; Duncan, 1994), which in turn are associated with the timing of sexual onset and fertility postonset (Glick et al., 2006; Resnick et al., 1997). Traits of families and neighborhoods may also influence youth proclivity to engage generally in risk behaviors (Leventhal & Brooks-Gunn, 2000), and correlations between sexual behavior and risk behaviors such as substance use and delinquency are well established (Browning et al., 2004; Osgood, 1988). Thus, individual-level processes may serve to link contextual factors with sexual and fertility transitions.

Data and Methods

To examine generational differentials and underlying proximate and social determinants, I used longitudinal data from Waves 1 to 4 of Add Health, a nationally representative study following a cohort of youth who were in Grades 7 to 12 from 1994 to 1995. Add Health used a school-based, cluster-sampling design to generate a stratified, random sample of 80 high schools and their corresponding feeder schools. Adolescents were selected from school rosters for in-home interviews; Cuban, Puerto Rican, and Chinese youth were oversampled, as were Black youth with highly educated parents. A total of 20,745 adolescents completed in-home interviews in 1994 and 1995; of these, 14,738 were reinterviewed in 1996, 15,170 in 2001 and 2002, and 15,701 in 2008. In addition to Add Health's in-home interview data, I also used 1990 census data linked by Add Health to respondents' Wave 1 addresses. Overall, Add Health's large nationally representative sample of youth, longitudinal measurement of sexual activity and childbearing, detailed measures of potential individual and family predictors of sexual onset and fertility timing, and linked neighborhood-level data all rendered it uniquely well suited for examining the research questions of interest.

Of the 10,430 women interviewed at Wave 1, I restricted the analyses to 9,634 with valid sampling weights. I focused on women because the burden of early fertility falls more heavily on mothers than fathers (Kane et al., 2013) and because young men's reports of fertility and sexual onset timing tend to be less reliable (Sweeney & Raley, 2014; Upchurch, Lillard, Aneshensel, & Li, 2002). I excluded 12 women missing data on birth timing and 845 with missing covariate data, yielding a final analytic sample of 8,777. Separate analyses using multiple imputation suggested biases from excluding cases missing data were negligible. I did not exclude women reporting sexual onset or fertility before Wave 1 to avoid biasing the sample toward those with later transitions; however, robustness checks to excluding both indicated very similar results to those presented.

Measures

First birth timing. I measured the month and year of first birth using fertility histories collected from respondents at each study wave. To minimize forward telescoping (the tendency to perceive distant events as more recent than they are), I used the first birth timing provided in the earliest wave in which a participant reported having given birth (Harden, Mendle, Hill, Turkheimer, & Emery, 2008). Of the women, 33% experienced a first birth before age 24, and 21% before age 21 (not shown).

Sexual onset timing. I measured timing of first heterosexual intercourse via reports at each study wave. As with first birth, I used information from the earliest wave the participant endorsed having initiated sexual activity. Timing of first sex was reported as month and year in Waves 1 and 2 and age in Waves 3 and 4. Approximately one half of respondents in the analytic sample reported sexual onset by Wave 2. For the other half, I imputed sexual onset month using the distribution of sexual onset months reported by women of similar ages in the 2002 wave of the National Survey of Family Growth (NSFG) (National Center for Health Statistics, 2002). In my models I controlled for whether onset month was imputed. The results

were robust to other imputation methods, such as imputing the mid-point between birthdays.

Generational status. I categorized respondents as (a) foreign born, (b) second generation (U.S. born to at least one foreign-born parent), or (c) third-plus generation (U.S. born to U.S.-born parents). The third group was the most heterogeneous, encompassing grandchildren of immigrants and those whose ancestors immigrated several generations ago. The majority of women in the analytic sample (77%) were of the third-plus generation. A total of 14% were of the second generation, and 9% were foreign born.

Family context. Family structure is a six-category variable capturing coresidence at Wave 1 with both biological parents (reference category); two adults, one or both of whom are stepparents, foster parents, or adoptive parents; only a mother; only a father; and other family structure. Family relationship quality assesses the extent to which respondents felt at Wave 1 that their parents cared about them, people in their family understood them, their family paid attention to them, and they had fun together with their family. Responses were coded on a 5-point scale with higher values indicating higher quality ($\alpha = .77$); the scale score is the mean of the items multiplied by 4. Parental monitoring is a summed six-item scale ($\alpha = .57$) based on Wave 1 questions asking whether respondents made their own decisions about (a) what time to be home on weekends, (b) who to hang around with, (c) what clothes to wear, (d) how much television to watch, (e) what time to go to bed on weeknights, and (f) what food to eat. Parent educational expectations uses a Wave 1 question on perceptions, from 1 to 5, of how disappointed respondents' parents would be if they did not graduate from college; a selection of 5 for mothers or fathers was considered high college expectations. Finally, I measured non-English language use in the home at Wave 1.

Neighborhood context. I performed principal components analysis on selected tract-level neighborhood measures, and two factors emerged. The first, labeled *immigrant concentration*, was defined by two variables: the proportion foreign born and the proportion aged 5 years and older who did not speak English well or did not speak English at all. The second, *concentrated poverty*, was defined by the following four variables: (a) the proportion of persons with 1989 income below the poverty level, (b) the proportion of households with public assistance income, (c) tract-level unemployment, and (d) the proportion of female-headed households with no husband present and children aged younger than 18 years. Both measures used continuous factor scores; immigrant concentration ranged from −1.59 to 5.95, and concentrated poverty from −1.32 to 9.08. I tested for nonlinearities (Browning et al., 2004), but found no evidence of them.

Individual-level intervening variables. The school attachment scale uses Wave 1 reports of how often respondents had trouble getting along with teachers, paying attention in school, getting homework done, and getting along with other students. The scale score is the mean of the items, multiplied by 4 ($\alpha = .69$); higher scores indicated greater attachment. College expectations measures how likely respondents thought it was at Wave 1 that they would attend college, from 1 to 5; selections of 5 were considered high. Finally, the measure of nonsexual risk behavior uses Wave 1 self-reports of the frequency of shoplifting, serious fighting, getting drunk, and binge drinking in the past 12 months. Following Cavanagh (2004), I converted each of the items to binary variables and summed them ($\alpha = .58$).

Sociodemographic controls. I measured race/ethnicity as non-Hispanic White (reference), non-Hispanic Black, non-Hispanic Asian, non-Hispanic other, Mexican, and other Hispanic. Small cell sizes precluded finer categorization. Marital status is a time-varying dichotomous indicator based on Wave 1 to 4 reports of the month and year of marital transitions. Parental education used respondent Wave 1 reports of the highest level of education completed by a resident parent: less than high school, high school diploma or GED, more than high school (reference), or missing. Finally, I included a continuous measure of age in years at Wave 1 to account for possibilities of both higher recall bias and higher likelihood of sexual onset before Wave 1 among respondents who were older at baseline.

Analytic Strategy

To distinguish between the sexual onset and fertility processes, I used a sequential hazard framework developed by Wu and Martin (2009, 2015) that modeled the following two transitions underlying fertility: (a) a process in which some women become sexually active and (b) a process in which women who have initiated sexual activity are at risk of a first birth. If T_1 represents timing of first sex, then the transition $0 \rightarrow T_1$ denotes sexual onset. $T_1 \rightarrow T_2$ denotes the progression to a first birth among women who have initiated sexual activity. Most studies ignore the $0 \rightarrow T_1$ transition when modeling the transition to first birth, assuming implicitly that a woman is at risk of childbearing before and after she becomes sexually active (Wu & Martin, 2015).

I used piecewise exponential survival models, a flexible class of semiparametric survival models that assume that the baseline hazard is constant in well-chosen intervals. I first modeled sexual onset, considering respondents at risk of first sexual intercourse from the month of their 10th birthday to the month before sexual onset, study attrition, or their 24th birthday, whichever came first. I then modeled the postonset process, considering respondents at risk of first birth only after sexual onset. Those not initiating sexual activity before age 24 or study attrition were excluded from the second model. In both models, right-censoring was assumed to be noninformative; that is, the censoring time was independent of the event time that would have otherwise been observed, given any covariates in the analysis (Leung, Elashoff, & Afifi, 1997). Following Wu and Martin (2009, 2015), I incorporated a piecewise constant specification for months since first sex (0–7, 7–14, 14–36, 36+) in the second model, and a linear specification of age at onset as a right-hand covariate.

To further quantify the extent to which generational variation reflected differences in sexual onset timing versus postonset factors, I first predicted the median age at sexual onset for each generational group with the results from the $0 \rightarrow T_1$ model. I then used the $T_1 \rightarrow T_2$ model to calculate the predicted probability of having a first birth by ages 21 and 24 for each group, conditional on that group's predicted median age at sexual onset. Finally, I recalculated these predicted probabilities, this time using a common age at onset across the three groups.

Initial $0 \rightarrow T_1$ and $T_1 \rightarrow T_2$ models examined associations between generational status and the hazard of first sex or first birth, independent of controls. Subsequent models added the sets of variables corresponding to family-, neighborhood-, and individual-level intervening factors. I used seemingly unrelated estimation (*suest* in Stata [StataCorp, College Station, TX, USA]) to compare hazard ratios across models. I weighted the analyses and adjusted standard errors for school-level clustering using Stata's *svy* commands.

Results

Characteristics of Immigrant Young Women

Table 1 provides descriptive statistics for the independent variables by generational status. At the family level, foreign-born and second-generation young women reported significantly higher levels of parental monitoring at Wave 1 than those with U.S.-born parents and a far greater share reported a non-English language in the home. College expectations were highest among families of the foreign born. A significantly larger share of the second generation, but not of the foreign born, resided with two biological parents when compared with the third-plus generation. The second generation reported significantly lower quality family ties than the foreign born.

At the neighborhood level, children of immigrants lived in Wave 1 neighborhoods with significantly higher immigrant concentrations when compared with the third-plus generation. However, the differences in neighborhood concentrated poverty were not statistically significant across groups.

At the individual level, foreign-born young women reported significantly stronger Wave 1 school attachment than the other groups and less nonsexual risk behavior. The second generation reported the most nonsexual risk behavior, and the third-plus generation the highest college expectations.

Bivariate Relationships Between Generational Status and Sexual Onset and First Birth

Figure 1 displays smoothed monthly hazard estimates of sexual onset through age 24. Through roughly age 21, there was a clear generational gradient, with the highest hazards of sexual onset

Table 1. *Descriptive Statistics of Independent Variables by Generational Status*

Characteristic	Total	Foreign born	Second generation	Third-plus generation
Family context at Wave 1				
Family structure				
2 biological parents[b]	54.92	57.13	62.55	53.83
2 parents[b]	17.05	15.80	12.46	17.70
Single mother	22.03	18.59	19.92	22.56
Single father	2.37	3.04	1.94	2.36
Other	3.63	5.43	3.14	3.54
Quality of family relationship (mean)[c]	15.98 (2.83)	16.16 (3.57)	15.74 (3.33)	15.99 (2.71)
Parental monitoring (mean)[a,b]	1.67 (1.35)	1.96 (1.76)	1.85 (1.64)	1.62 (1.27)
High parental college expectations[a,c]	55.58	64.42	57.80	54.60
Language other than English usually spoken in home [a,b,c]	7.84	62.69	32.09	0.52
Neighborhood context at Wave 1				
Immigrant concentration (mean)[a,b,c]	-0.21 (0.76)	0.90 (1.85)	0.37 (1.50)	-0.37 (0.34)
Concentrated poverty (mean)	-0.01 (1.02)	0.07 (0.99)	-0.03 (1.16)	-0.02 (1.00)
Individual-level covariates at Wave 1				
School attachment (mean)[a,c]	12.16 (2.84)	12.79 (3.30)	12.34 (3.23)	12.09 (2.73)
High college expectations[a,b]	60.83	55.28	54.25	62.07
Nonsexual risk behavior (mean)[a,b,c]	1.14 (1.18)	0.87 (1.28)	1.30 (1.46)	1.15 (1.13)
Sociodemographic controls				
Age at first interview (mean)[a,c]	15.29 (1.80)	15.74 (2.17)	15.26 (2.20)	15.26 (1.71)
Parental education at Wave 1				
Less than high school[a,b,c]	13.45	34.85	25.82	10.25
High school diploma or GED[a,b,c]	31.42	16.96	23.25	33.57
More than high school[b]	54.52	46.11	49.37	55.81
Missing parental education[a,b]	0.61	2.07	1.56	0.38
Race/ethnicity				
Non-Hispanic White[a,b,c]	67.25	13.56	32.99	75.66
Non-Hispanic Black[a,b]	15.95	4.94	7.20	17.89
Non-Hispanic Asian[a,b,c]	3.47	27.48	12.10	0.50
Non-Hispanic other race[a,b]	1.51	4.24	3.00	1.11
Mexican[a,b]	6.96	25.20	25.11	3.33
Other Hispanic[a,b]	4.87	24.58	19.60	1.52
Married before age 24	28.71	24.84	26.77	29.26
n respondents	8,777	800	1,225	6,752

Source. National Longitudinal Study of Adolescent to Adult Health.

Note. Percentages given unless otherwise noted. Means and percentages were weighted to adjust for sample design. Standard deviations are in parentheses below means.

[a]Significant difference between foreign born and third-plus generation ($p < .05$). [b]Significant difference between second generation and third-plus generation ($p < .05$). [c]Significant difference between foreign born and second generation ($p < .05$).

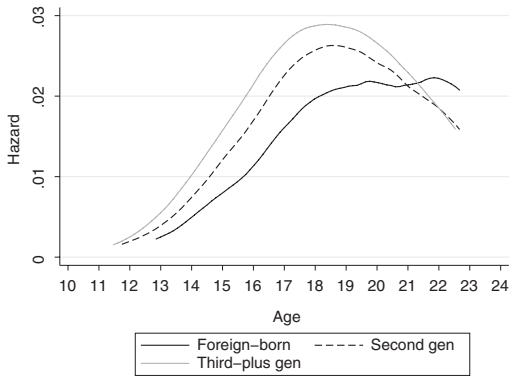
among the third-plus generation, followed by the second generation and then the foreign born.

Figures 2 and 3 present hazard estimates of first birth through age 24. Figure 2 ignores sexual onset timing, whereas Figure 3 begins exposure in the month of sexual debut. Figure 2 indicates that the third-plus generation had the highest hazards of first birth across all ages in the exposure period. By contrast, in Figure 3, differences between sexually experienced foreign-born and third-plus-generation young women were negligible throughout adolescence. Sexually experienced second-generation women had the lowest hazard of first birth across most ages.

Multivariate Analyses

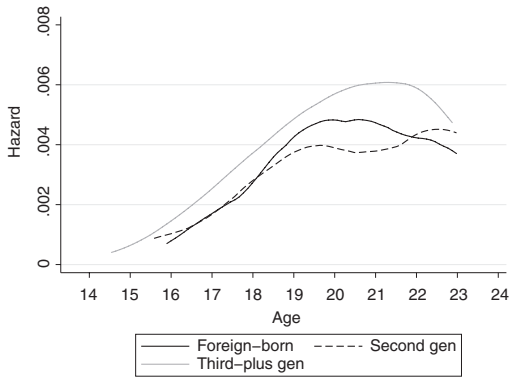
Proximate determinants. Table 2 presents estimated hazard ratios from survival models incorporating the sociodemographic controls. A hazard ratio greater than 1 indicated that the variable increased the risk of sexual onset or

Figure 1. Hazard of Sexual Onset Age 10 Through Age 24 by Generational Status.



Note. gen = generation.

Figure 2. Hazard of First Birth Through Age 24, by Generational Status, Ignoring Timing of Sexual Onset.

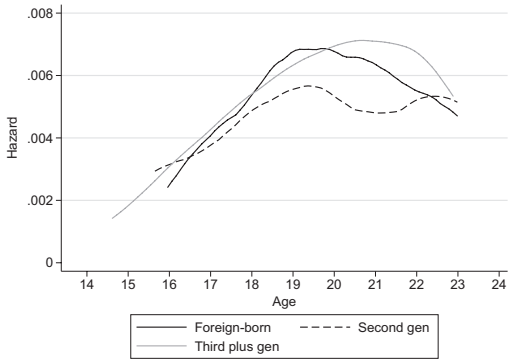


Note. gen = generation.

first birth—or equivalently, lowered the average age at first sex or first birth. The first column presents results from a conventional model predicting first birth while ignoring sexual onset timing ($0 \rightarrow T_2$). Estimates indicated a 39% lower risk of first birth for the second generation relative to the third-plus generation, and a 36% lower risk for the foreign born.

The second and third models of Table 2 display results from the sequential hazard models for the transitions to first intercourse ($0 \rightarrow T_1$) and first birth conditional on sexual onset ($T_1 \rightarrow T_2$), respectively. Foreign-born and

Figure 3. Hazard of First Birth Through Age 24, by Generational Status, Beginning Exposure Period in Month of Sexual Onset.



Note. gen = generation.

second-generation women initiated sexual activity later than the third-plus generation, with the contrast particularly large for the foreign born. The Sequential 2 model shows that among those who had initiated sexual activity, risk of fertility did not, however, differ significantly between the foreign born and third-plus generation. It is important to note that, nonetheless, first birth risks were not on average higher postonset for the foreign born, as might be expected if immigrant women adopted fewer fertility control measures than the third-plus generation. For the second generation, a significantly lower risk of first birth persisted in the Sequential 2 model, suggesting that their lower fertility risk observed in the first model reflected both later sexual onset as well as higher levels of fertility control once sexually active.

Results for the sexual onset variables included in the Sequential 2 model indicated that the risks of first birth were low in the first 7 months following onset, consistent with standard gestational durations. Later onset was marginally significantly associated with delayed fertility.

Panel A in Table 3 presents predictions of median age at sexual onset by generational status, derived from Table 2's Sequential 1 model with other covariates set at their means. The predicted median age at first sex was 199 months (16.6 years) for the third-plus generation, 203 months (16.9 years) for the second generation, and 209 months (17.4 years) for the foreign born.

Panel B in Table 3 presents predicted probabilities of first birth by age 21, derived from

Table 2. *Hazard Ratios From Piecewise Exponential Survival Models Predicting First Birth, With Sociodemographic Controls: "Conventional" Model Ignores Sexual Onset Timing, and Sequential Models Encompass the Transitions to First Intercourse ($0 \rightarrow T_1$)* and *First Birth Postsexual Onset ($T_1 \rightarrow T_2$)*

	Conventional: $0 \rightarrow T_2$		Sequential 1: $0 \rightarrow T_1$		Sequential 2: $T_1 \rightarrow T_2$	
Variables	HR	95% CI	HR	95% CI	HR	95% CI
Immigrant generation (ref.: third-plus generation)						
Foreign born	0.64*	[0.45, 0.92]	0.69***	[0.57, 0.83]	0.80	[0.57, 1.11]
Second generation	0.61***	[0.47, 0.79]	0.84*	[0.74, 0.96]	0.67**	[0.51, 0.86]
Sociodemographic controls						
Age at Wave 1	0.95**	[0.92, 0.98]	0.90***	[0.87, 0.93]	0.94**	[0.91, 0.97]
Parental education (ref.: > high school)						
Less than high school	2.14***	[1.80, 2.55]	1.41***	[1.26, 1.58]	1.84***	[1.53, 2.21]
High school diploma or GED	1.80***	[1.58, 2.05]	1.34***	[1.23, 1.45]	1.56***	[1.38, 1.78]
Race/ethnicity (ref.: non-Hispanic White)						
Non-Hispanic Black	2.19***	[1.82, 2.62]	1.28***	[1.16, 1.41]	1.84***	[1.56, 2.17]
Non-Hispanic Asian	0.87	[0.53, 1.45]	0.85	[0.69, 1.04]	0.97	[0.58, 1.62]
Non-Hispanic other race	1.15	[0.66, 2.00]	1.00	[0.73, 1.36]	1.15	[0.69, 1.91]
Mexican	1.48*	[1.09, 2.02]	0.85†	[0.73, 1.00]	1.66***	[1.29, 2.14]
Other Hispanic	1.31*	[1.02, 1.67]	0.96	[0.81, 1.15]	1.31*	[1.03, 1.68]
Married	6.68***	[5.70, 7.84]	7.78***	[5.75, 10.51]	5.30***	[4.56, 6.17]
Sexual onset						
Age (in months) at onset					1.00†	[0.99, 1.00]
Duration following onset (ref.: 15–36 mo)						
0–7					0.46***	[0.33, 0.64]
8–14					0.99	[0.79, 1.23]
37+					1.07	[0.90, 1.27]

Source. National Longitudinal Study of Adolescent to Adult Health.

Note. Exposure period spanned ages 10 to 24. All models also included dummy variables for age and a flag for missing parental education. The sequential models also included a flag for whether sexual onset month was imputed. Analyses were adjusted for sample design. ref. = reference.

† p < .1; * p < .05; ** p < .01; *** p < .001.

Table 2's Sequential 2 model. Conditional on their median age at sexual onset, about 18% of third-plus-generation young women were predicted to give birth by age 21 compared to 12% of the second generation and foreign born. The second column in Panel B presents a counterfactual: What would the predictions be if all three groups had the median age at sexual onset of the third-plus generation? The last two rows of the second column show that when age at onset was equalized, the predicted difference between the third-plus generation and foreign born decreased from 6.6 percentage points to 3.4 percentage points, almost a 50% decline. The predicted difference between the third-plus and second generations decreased from 6.5 percentage points to 5.7 percentage points. These results further support the idea that sexual onset timing explained more of the delayed fertility observed among the foreign born than it did for the second generation. Panel C changes the age cut-off for the predicted probabilities to age 24; although the probabilities of first birth were higher for all groups, generational trends were similar to Panel B.

Social determinants. Tables 4 and 5 investigate contextual explanations for generational differences in the $0 \rightarrow T_1$ and $T_1 \rightarrow T_2$ transitions, respectively. In Table 4, Model 1 repeats the results presented in Table 2's Sequential

Table 3. *Predicted Median Age at Sexual Onset and Predicted Probability of First Birth by Age 21 and Age 24 by Generational Status*

A: Predicted median age at first sexual intercourse (in months)	
Third-plus generation	199
Second generation	203
Foreign born	209

B: Predicted probability of first birth by age 21 (%)	Conditional on median age at onset for group	Conditional on onset at 199 months
Third-plus generation	18.23	18.23
Second generation	11.72	12.54
Foreign born	11.59	14.83
Predicted difference between groups (percentage points)		
Third-Plus Generation – Second Generation	6.51	5.69
Third-Plus Generation – Foreign Born	6.64	3.40

C: Predicted probability of first birth by age 24 (%)	Conditional on median age at onset for group	Conditional on onset at 199 months
Third-plus generation	31.51	31.51
Second generation	21.42	22.27
Foreign born	22.89	26.07
Predicted difference between groups (percentage points)		
Third-Plus Generation – Second Generation	10.09	9.24
Third-Plus Generation – Foreign Born	8.62	5.44

Source. National Longitudinal Study of Adolescent to Adult Health.

Note. Predictions were calculated using estimates from the Sequential 1 (A) and Sequential 2 (B and C) models in Table 2. All other covariates were held at their respective means.

1 model. The subsequent models add family- and neighborhood-level measures as well as the individual-level intervening variables.

Model 2 of Table 4 reveals that Wave 1 family attributes of children of immigrants were, on balance, protective against early sexual activity. When family traits were included, the gaps in sexual onset risk between both groups and the third-plus generation decreased, and separate *suest* tests indicated that the increases in hazard ratios between models were statistically significant. The increase in the foreign-born hazard ratio was particularly sizeable. Higher quality family ties, greater parental monitoring, and use of a non-English language in the home all delayed sexual onset. Residence in family structures other than two biological parents accelerated sexual debut.

In Model 3, neighborhood-level attributes also significantly attenuated the links between generational status and onset timing, but the increase in hazard ratios was not as sizeable as in Model 2. Higher neighborhood immigrant concentration delayed sexual activity. Concentrated neighborhood poverty accelerated sexual onset. Nonetheless, in Model 4, which added the family variables, immigrant concentration was no longer significantly associated with risk of onset.

In Model 5, nonsexual risk behavior correlated with higher risk of sexual onset and greater school attachment with lower risk. High college expectations were not independently associated with onset timing. However, adding these individual-level variables did not significantly change the hazard ratios for the foreign born or second generation, suggesting that these factors played a minimal role in linking the contextual factors with sexual behavior.

Table 5 displays hazard ratios from the analyses predicting first birth conditional on sexual onset; Model 1 repeats Table 2's Sequential 2 model. In Model 2, family traits explained virtually none of the generational differences

Table 4. *Hazard Ratios From Piecewise Exponential Survival Models Predicting Sexual Onset ($0 \rightarrow T_1$ Transition)*

	Model 1		Model 2		Model 3		Model 4		Model 5	
Variables	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Immigrant generation (ref.: third-plus generation)										
Foreign born	0.69***	[0.57, 0.83]	0.82†	[0.66, 1.02]	0.73**	[0.61, 0.88]	0.85	[0.69, 1.06]	0.92	[0.74, 1.14]
Second generation	0.84*	[0.74, 0.96]	0.91	[0.80, 1.05]	0.87*	[0.76, 0.99]	0.93	[0.81, 1.06]	0.91	[0.79, 1.04]
Family context (Wave 1)										
Family structure (ref.: two biological parents)										
Two parents			1.43***	[1.29, 1.59]			1.43***	[1.29, 1.58]	1.37***	[1.24, 1.52]
Single mother			1.32***	[1.21, 1.43]			1.30***	[1.19, 1.41]	1.28***	[1.17, 1.39]
Single father			1.60***	[1.33, 1.93]			1.59***	[1.32, 1.92]	1.51***	[1.26, 1.82]
Other			1.48***	[1.22, 1.79]			1.45***	[1.20, 1.76]	1.36**	[1.13, 1.65]
Quality of family relationship			0.93***	[0.92, 0.94]			0.93***	[0.92, 0.95]	0.97***	[0.95, 0.98]
Parental monitoring			0.94***	[0.92, 0.97]			0.94***	[0.91, 0.97]	0.96**	[0.93, 0.99]
High parental college expectations			1.01	[0.95, 1.09]			1.02	[0.95, 1.09]	1.03	[0.96, 1.10]
Non-English language in home			0.65***	[0.55, 0.77]			0.66***	[0.55, 0.78]	0.71***	[0.60, 0.83]
Neighborhood context (Wave 1)										
Immigrant concentration					0.93*	[0.87, 0.98]	0.96	[0.91, 1.01]	0.95†	[0.90, 1.01]
Concentrated poverty					1.07**	[1.03, 1.12]	1.06**	[1.02, 1.11]	1.07**	[1.03, 1.12]
Individual-level covariates (Wave 1)										
School attachment									0.98*	[0.97, 1.00]
High college expectations									0.99	[0.91, 1.07]
Nonsexual risk behavior									1.35***	[1.30, 1.40]
Sociodemographic controls										
Age at Wave 1	0.90***	[0.87, 0.93]	0.87***	[0.84, 0.89]	0.90***	[0.87, 0.93]	0.87***	[0.84, 0.89]	0.86***	[0.83, 0.88]
Parental education (ref.: > high school)										
Less than high school	1.41***	[1.26, 1.58]	1.38***	[1.24, 1.54]	1.35***	[1.20, 1.52]	1.33***	[1.19, 1.49]	1.30***	[1.16, 1.45]
High school diploma or GED	1.34***	[1.23, 1.45]	1.29***	[1.19, 1.40]	1.31***	[1.21, 1.41]	1.27***	[1.17, 1.37]	1.26***	[1.16, 1.37]

Table 4. *Continued*

Variables	Model 1 HR	Model 1 95% CI	Model 2 HR	Model 2 95% CI	Model 3 HR	Model 3 95% CI	Model 4 HR	Model 4 95% CI	Model 5 HR	Model 5 95% CI
Race/ethnicity (ref.: Non-Hispanic White)										
Non-Hispanic Black	1.28***	[1.16, 1.41]	1.23***	[1.13, 1.34]	1.16**	[1.04, 1.29]	1.14**	[1.03, 1.25]	1.16**	[1.05, 1.28]
Non-Hispanic Asian	0.85	[0.69, 1.04]	0.92	[0.76, 1.10]	0.85	[0.69, 1.05]	0.92	[0.76, 1.11]	0.90	[0.73, 1.09]
Non-Hispanic other race	1.00	[0.73, 1.36]	1.04	[0.80, 1.35]	0.96	[0.69, 1.32]	1.00	[0.76, 1.32]	0.98	[0.75, 1.29]
Mexican	0.85†	[0.73, 1.00]	1.00	[0.85, 1.17]	0.88	[0.74, 1.03]	1.00	[0.85, 1.18]	0.89	[0.76, 1.04]
Other Hispanic	0.96	[0.81, 1.15]	1.07	[0.92, 1.25]	1.02	[0.83, 1.26]	1.10	[0.92, 1.31]	1.00	[0.83, 1.19]
Married	7.78***	[5.75, 10.51]	8.29***	[6.32, 10.88]	7.57***	[5.55, 10.34]	8.13	[6.18, 10.68]	8.82***	[6.71, 11.59]

Source. National Longitudinal Study of Adolescent to Adult Health.

Note. Exposure period spanned ages 10 to 24. All models also included dummy variables for age as well as flags for whether sexual onset month was imputed and parent's education was missing. Analyses were adjusted for sample design. ref. = reference.

$^{\dagger}p < .1$; $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

observed in Model 1. Neighborhood traits (Model 3) explained more of the generational differences in fertility than did family traits, and the changes in hazard ratios between Models 1 and 3 were statistically significant. Because Table 1 showed little variation in neighborhood poverty by generational status, differences in immigrant concentration likely drove this result. In Models 4 and 5, a sizeable difference in postonset fertility risk between second-generation and third-plus-generation young women persisted.

Robustness Checks

In separate analyses, I conducted three robustness checks. First, because a growing literature identifies differences among the foreign born between those who migrate as young children and those who migrate later in childhood (e.g., Bleakley & Chin, 2010; Rumbaut, 2004), I examined variation by age at migration (Appendix Table 1). Although the number of women who migrated in adolescence was small, I found that those who migrated at age 10 or older had the latest sexual onset, consistent with other research (e.g., Goldberg et al., 2017). I found no significant differences by age at migration in the timing of first birth postonset. A further test of within-generation heterogeneity investigated differences between second-generation youth with two foreign-born parents and their counterparts with one foreign-born parent (Rumbaut, 2004). I found that youth with two foreign-born parents had lower risk of sexual onset relative to the third-plus generation, whereas those with only one foreign-born parent did not significantly differ from the third-plus generation (Appendix Table 1). I found no statistically significant difference in the risk of first birth postonset between the two second-generation groups, however.

Second, because Add Health is a sample of youth appearing on school rosters, the results could be biased by selectivity in high school dropout and, among adolescent migrants, in postmigration enrollment in American high schools (Oropesa & Landale, 2009). Udry and Chantala (2003) estimated biases from omitting high school dropouts and concluded that their absence did not significantly bias estimates for the total population. In ancillary analyses limiting the sample to respondents in Grades 7 to 9 at

Table 5. *Hazard Ratios From Piecewise Exponential Survival Models Predicting First Birth After Sexual Onset ($T_1 \rightarrow T_2$ Transition)*

	Model 1		Model 2		Model 3		Model 4		Model 5	
Variables	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Immigrant generation (ref.: third-plus generation)										
Foreign born	0.80	[0.57, 1.11]	0.80	[0.55, 1.15]	0.92	[0.67, 1.26]	0.89	[0.62, 1.27]	0.87	[0.60, 1.26]
Second generation	0.67**	[0.51, 0.86]	0.69**	[0.52, 0.91]	0.72*	[0.55, 0.93]	0.72*	[0.55, 0.95]	0.72*	[0.55, 0.96]
Family context (Wave 1)										
Family structure (ref.: two biological parents)										
Two parents			1.33***	[1.15, 1.53]			1.32***	[1.15, 1.52]	1.32***	[1.15, 1.52]
Single mother			1.35***	[1.18, 1.55]			1.33***	[1.15, 1.52]	1.32***	[1.15, 1.51]
Single father			1.23	[0.94, 1.00]			1.23	[0.94, 1.62]	1.25	[0.95, 1.64]
Other			1.58***	[1.23, 2.03]			1.58***	[1.23, 2.04]	1.59***	[1.24, 2.03]
Quality of family relationship			0.98*	[0.96, 1.00]			0.98*	[0.96, 1.00]	0.98†	[0.96, 1.00]
Parental monitoring			1.04†	[1.00, 1.09]			1.04	[0.99, 1.09]	1.04	[0.99, 1.08]
High parental college expectations			0.89*	[0.81, 0.98]			0.90*	[0.81, 0.99]	0.93	[0.84, 1.03]
Non-English language in home			1.09	[0.83, 1.43]			1.21	[0.91, 1.60]	1.22	[0.91, 1.62]
Neighborhood context (Wave 1)										
Immigrant concentration					0.85**	[0.77, 0.94]	0.84***	[0.76, 0.92]	0.84***	[0.77, 0.92]
Concentrated poverty					1.17***	[1.09, 1.25]	1.15***	[1.08, 1.23]	1.15***	[1.08, 1.23]
Individual-level covariates (Wave 1)										
School attachment									0.99	[0.97, 1.01]
High college expectations									0.86	[0.77, 0.96]
Non-sexual risk behavior									0.99	[0.94, 1.03]
Sexual onset										
Age (in months) at onset	1.00†	[0.99, 1.00]	1.00	[0.99, 1.00]	1.00†	[0.99, 1.00]	1.00	[0.99, 1.00]	1.00	[0.99, 1.00]
Duration following onset (ref.: 15–36 mo)										
0–7	0.46***	[0.33, 0.64]	0.46***	[0.33, 0.64]	0.46***	[0.33, 0.63]	0.46***	[0.33, 0.64]	0.46***	[0.33, 0.64]
8–14	0.99	[0.79, 1.23]	0.99	[0.79, 1.23]	0.98	[0.79, 1.23]	0.99	[0.79, 1.23]	0.99	[0.79, 1.23]
37+	1.07	[0.90, 1.27]	1.07	[0.90, 1.27]	1.08	[0.91, 1.28]	1.07	[0.91, 1.27]	1.07	[0.91, 1.27]
Sociodemographic controls										
Age at Wave 1	0.94**	[0.91, 0.97]	0.95**	[0.91, 0.98]	0.94**	[0.91, 0.98]	0.95**	[0.91, 0.98]	0.95**	[0.92, 0.99]
Parental education (ref.: > high school)										
Less than high school	1.84***	[1.53, 2.21]	1.65***	[1.37, 2.00]	1.67***	[1.38, 2.02]	1.51***	[1.24, 1.83]	1.45***	[1.19, 1.76]
High school diploma or GED	1.56***	[1.38, 1.78]	1.51***	[1.32, 1.71]	1.51***	[1.33, 1.72]	1.46***	[1.28, 1.66]	1.43***	[1.25, 1.63]

Table 5. *Continued*

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Race/ethnicity (ref.: Non-Hispanic White)										
Non-Hispanic Black	1.84***	[1.56, 2.17]	1.74***	[1.47, 2.06]	1.50***	[1.23, 1.83]	1.45***	[1.19, 1.76]	1.45***	[1.19, 1.77]
Non-Hispanic Asian	0.97	[0.58, 1.62]	0.95	[0.55, 1.64]	0.96	[0.55, 1.69]	0.94	[0.52, 1.69]	0.95	[0.53, 1.71]
Non-Hispanic other race	1.15	[0.69, 1.91]	1.10	[0.66, 1.84]	1.09	[0.66, 1.80]	1.04	[0.62, 1.73]	1.07	[0.64, 1.76]
Mexican	1.66***	[1.29, 2.14]	1.61***	[1.25, 2.07]	1.76***	[1.40, 2.23]	1.68***	[1.32, 2.13]	1.66***	[1.30, 2.12]
Other Hispanic	1.31*	[1.03, 1.68]	1.28†	[0.98, 1.65]	1.53**	[1.18, 1.99]	1.48**	[1.13, 1.94]	1.46**	[1.11, 1.92]
Married	5.30***	[4.56, 6.17]	5.26***	[4.52, 6.12]	5.21	[4.51, 6.04]	5.17***	[4.46, 5.98]	5.09	[4.39, 5.90]

Note. Exposure period spanned ages 10 to 24. Models also included dummy variables for age and flags for whether sexual onset month was imputed and parent's education were missing. Analyses were adjusted for sample design. ref. = reference.

†$p < .1$; *$p < .05$; **$p < .01$; ***$p < .001$.

Wave 1 (grades with presumably lower dropout rates and higher postmigration enrollment), I found virtually identical generational differences in sexual onset timing to the Table 2 results (Appendix Table 2). For fertility postonset, the difference between the second and third-plus generations was 15% smaller than in Table 2 and no longer statistically significant, suggesting that selectivity in who persisted in school may slightly inflate the second generation's advantage. The findings for the foreign born were virtually identical to the results for the full sample. I also compared the timing of first birth and sexual onset in the full analytic Add Health sample to findings from a household-based survey, the NSFG (results available upon request). The median age at first birth for the Add Health analytic sample was roughly 25. Using 1998 to 2010 NSFG data, Finer and Philbin (2014) estimated median ages at first birth ranging from 25 to 27 for similar birth cohorts. Median age at sexual onset was approximately 17 in the Add Health and NSFG samples.

Finally, because previous research indicates that the relationship between generational status and sexual onset timing may vary by race/ethnicity (Spence & Brewster, 2010), I examined the robustness of the results to incorporating interactions between race/ethnicity and immigrant generation (Appendix Table 3). Associations between foreign-born status and risk of sexual onset were less strong for non-Hispanic Whites and Blacks than for the other racial/ethnic groups. However, there was little evidence of variation by race/ethnicity in associations between generational status and the risk of fertility postonset; none of the interaction terms was significantly different from 1.0, nor were they jointly significant.

Discussion

Despite important gains in prevention, U.S. rates of early fertility continue to exceed those of other industrialized countries, and major differences by population group persist. This study contributes to existing literature by investigating differences in early childbearing between children of immigrants and children of U.S.-born parents in a large, diverse sample, and exploring a host of potential proximate and contextual mechanisms. Although prior research has investigated the contours and origins of racial disparities in early fertility (e.g., Sweeney & Raley,

2014), variation by generational status has been less well understood. Given expansions in the share of the youth population with immigrant parents, understanding whether and why such differentials exist is vital to designing adequate policy responses and foreseeing future trends.

Overall, I found that foreign-born and second-generation young women began childbearing at later ages than their counterparts with U.S.-born parents. Although cumulative fertility across all ages and parities has been shown to decline across generations (e.g., Choi, 2014; Parrado, 2011), these results are consistent with several other studies that have found that early fertility in particular actually increases across generations (e.g., Frank & Heuveline, 2005; Rumbaut, 2008). Using a sequential hazard framework that modeled separately the sexual onset and fertility transitions (Wu & Martin, 2009, 2015), I examined to what extent the delayed fertility observed among the foreign born and second generation reflected discrepancies in the timing of sexual onset as opposed to postonset behaviors. Echoing prior research (e.g., Goldberg et al., 2017; Harris, 1999), I found that children of immigrants initiated sexual activity later than the third-plus generation, with a clear gradient by generational status. However, sexually active foreign-born women did not differ significantly from the third-plus generation in their risk of early fertility. By contrast, sexual onset timing explained little of the lower risk of fertility observed for second-generation women, underscoring the centrality of fertility control behaviors postonset for this group.

Family characteristics explained much of the delayed sexual onset observed among children of immigrants, particularly the foreign born. Although parents of the foreign born were less educated on average than were those of the third-plus generation, parental monitoring was higher, family relationships were closer, and attachment to origin country norms was strong; on balance, these family attributes were associated with delayed sexual activity. Nonetheless, once sexually active, neighborhood traits, particularly immigrant concentration, were more important than family traits in explaining the lower risk of fertility observed among children of immigrants.

Family and neighborhood characteristics were less protective for the second generation than for the foreign born, which squared with bivariate findings that although a greater share of the second generation lived with both biological parents, a smaller share spoke a language other than English in the home and their family relationship quality was lower. The second generation also resided in neighborhoods with lower concentrations of immigrants than the foreign born. In general, that the second generation in this sample experienced later fertility than the third-plus generation net of all of the family-, neighborhood-, and individual-level measures suggests protection by other unmeasured factors. Peer, school, and partner traits might be productively examined in future research as well as access to reproductive health services.

This study has several data-related limitations. First, although a strength of longitudinal data such as Add Health is the ability to follow one cohort across the life course, a limitation is the inability to capture intergenerational change per se, as would be possible with data linking multiple biological generations (Parrado & Morgan, 2008). Rather, I investigated differences between children of immigrants and children of U.S.-born parents within a single cohort. Furthermore, the study's sample size did not support in-depth investigation of variations within the three generational status groupings by country of origin or age at migration, although the results from several robustness checks were noted. The limited neighborhood-level measures available also precluded distinguishing the concentration of immigrants from particular national origin groups to account for variations in sexual onset and fertility timing between origin countries.

A final limitation is the ability to distinguish only between sexual onset timing and all other fertility control behaviors. It is possible that the particular behaviors adopted by sexually active children of immigrants differ from those adopted by children with U.S.-born parents. Future research should distinguish between the other proximate determinants (e.g., contraceptive use, sexual frequency, and abortion), ideally with diary or calendar data that can track behaviors over time at short intervals (Barber, Kusunoki, & Gatny, 2011; Goldberg & Tienda, 2017).

These limitations notwithstanding, the study results underscore the importance of attending to generational status in research and policy work related to early fertility. As the proportion of youth who are children of immigrants continues to expand (Passel, 2011), the behaviors of children of immigrants can be expected to increasingly influence population trends in

early childbearing. Notably, if the lower risk of early fertility observed among children of immigrants in this sample were to persist in later birth cohorts, this would suggest potential further population-level declines in early fertility. The study findings also highlight the continuing importance of attending to proximate determinants of fertility, focusing attention on the following two separate transitions: a sexual onset process and a process in which some sexually active women proceed to a first birth. The results indicated that immigrant advantages were not uniformly experienced with respect to both processes. Finally, that family and neighborhood factors exerted different influences on the sexual and fertility behaviors of immigrant youth reinforces the importance of enacting policies and programs at multiple levels and supports contextual theories of youth behavior.

Note

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix Table 1. *Hazard Ratios from Piecewise Exponential Survival Models Predicting First Birth, Disaggregating the First and Second Generation Categories: Sequential Models Encompass the Transitions to First Intercourse ($0 \rightarrow T_1$) and First Birth Post-Sexual Onset ($T_1 \rightarrow T_2$)*

Appendix Table 2. *Hazard Ratios from Piecewise Exponential Survival Models Predicting First Birth, Limited to Youth in Grades 7-9 at Wave 1: Sequential Models Encompass the Transitions to First Intercourse ($0 \rightarrow T_1$) and First Birth Post-Sexual Onset ($T_1 \rightarrow T_2$)*

Appendix Table 3. *Hazard Ratios from Piecewise Exponential Survival Models Predicting First Birth, Incorporating Interactions Between Race/Ethnicity and Immigrant Generation: Sequential Models Encompass the Transitions to First Intercourse ($0 \rightarrow T_1$) and First Birth Post-Sexual Onset ($T_1 \rightarrow T_2$)*

References

Alba, R., & Nee, V. (1997). Rethinking assimilation theory for a new era of immigration. *International Migration Review, 31*, 826–874. https://doi.org/10.2307/2547416

Aneshensel, C. S., Becerra, R. M., Fielder, E. P., & Schuler, R. H. (1990). Onset of fertility-related events during adolescence: A prospective comparison of Mexican American and non-Hispanic White females. *American Journal of Public Health, 80*, 959–963. https://doi.org/10.2105/AJPH.80.8.959

Barber, J. S., Kusunoki, Y., & Gatny, H. H. (2011). Design and implementation of an online weekly journal to study unintended pregnancies. *Vienna Yearbook of Population Research, 9*, 327–334. https://doi.org/10.1553/populationyearbook2011s327

Bean, F. D., Swicegood, C. G., & Berg, R. (2000). Mexican-origin fertility: New patterns and interpretations. *Social Science Quarterly, 81*, 404–420.

Bleakley, H., & Chin, A. (2010). Age at arrival, English proficiency, and social assimilation among US immigrants. *American Economic Journal: Applied Economics, 2*, 165–192. https://doi.org/10.1257/app.2.1.165

Bongaarts, J. (1978). A framework for analyzing the proximate determinants of fertility. *Population and Development Review, 4*, 105–132. https://doi.org/10.2307/1972149

Bongaarts, J. (2015). Modeling the fertility impact of the proximate determinants: Time for a tune-up. *Demographic Research, 33*, 535–560. https://doi.org/10.4054/DemRes.2015.33.19

Brooks-Gunn, J., Duncan, G. J., Klebanov, P. K., & Sealand, N. (1993). Do neighborhoods influence child and adolescent development? *American Journal of Sociology, 99*, 353–395.

Browning, C. R., Leventhal, T., & Brooks-Gunn, J. (2004). Neighborhood context and racial differences in early adolescent sexual activity. *Demography, 41*, 697–720.

Cavanagh, S. E. (2004). The sexual debut of girls in early adolescence: The intersection of race, pubertal timing, and friendship group characteristics. *Journal of Research on Adolescence, 14*, 285–312. https://doi.org/10.1111/j.1532-7795.2004.00076.x

Chen, X., Wen, S. W., Fleming, N., Yang, Q., & Walker, M. C. (2008). Increased risks of neonatal and postneonatal mortality associated with teenage pregnancy had different explanations. *Journal of Clinical Epidemiology, 61*, 688–694. https://doi.org/10.1016/j.jclinepi.2007.08.009

Choi, K. H. (2014). Fertility in the context of Mexican migration to the United States: A case for incorporating the pre-migration fertility of immigrants. *Demographic Research, 30*, 703–738. https://doi.org/10.4054/DemRes.2014.30.24

Crowder, K., & South, S. J. (2003). Neighborhood distress and school dropout: The variable significance of community context. *Social Science*

Research, 32(4), 659–698. https://doi.org/10.1016/S0049-089X(03)00035-8

Davis, K., & Blake, J. (1956). Social structure and fertility: An analytic framework. *Economic Development and Cultural Change, 4*(3), 211–235.

Denner, J., Kirby, D., Coyle, K., & Brindis, C. (2001). The protective role of social capital and cultural norms in Latino communities: A study of adolescent births. *Hispanic Journal of Behavioral Sciences, 23*, 3–21. https://doi.org/10.1177/0739986301231001

Diaz, C. J., & Fiel, J. E. (2016). The effect(s) of teen pregnancy: Reconciling theory, methods and findings. *Demography, 53*, 85–116. https://doi.org/10.1007/s13524-015-0446-6

Duncan, G. J. (1994). Families and neighbors as sources of disadvantage in the schooling decisions of White and Black adolescents. *American Journal of Education, 103*, 20–53.

Eschbach, K., Ostir, G. V., Patel, K. V., Markides, K. S., & Goodwin, J. S. (2004). Neighborhood context and mortality among older Mexican Americans: Is there a barrio advantage? *American Journal of Public Health, 94*, 1807–1812. https://doi.org/10.2105/AJPH.94.10.1807

Espiritu, Y. L. (2001). "We don't sleep around like White girls do": Family, culture, and gender in Filipina American lives. *Signs, 26*, 415–440.

Feliciano, C., & Lanuza, Y. (2015). The immigrant advantage in adolescent educational expectations. *International Migration Review, 50*: 758–792. https://doi.org/10.1111/imre.12183

Finer, L. B., & Philbin, J. M. (2014). Trends in ages at key reproductive transitions in the United States, 1951-2010. *Women's Health, 24*, e271–e279. https://doi.org/10.1016/j.whi.2014.02.002

Frank, R., & Heuveline, P. (2005). A crossover in Mexican and Mexican-American fertility rates: Evidence and explanations for an emerging paradox. *Demographic Research, 12,* 77–104. https://doi.org/10.4054/DemRes.2005.12.4

Glick, J. E., Ruf, S. D., White, M. J., & Goldscheider, F. K. (2006). Educational engagement and early family formation: Differences by ethnicity and generation. *Social Forces, 84*, 1391–1415.

Goldberg, R. E., & Tienda, M. (2017). Adolescent romantic relationships in the digital age. *Emerging Trends in the Social and Behavioral Sciences*, 1–17. https://doi.org/10.1002/9781118900772.etrds0426

Goldberg, R. E., Tienda, M., & Adserá, A. (2017). Age at migration, family instability, and timing of sexual onset. *Social Science Research, 63*, 292–307. https://doi.org/10.1016/j.ssresearch.2016.09.021

Guarini, T. E., Marks, A. K., Patton, F., & García Coll, C. (2013). The immigrant paradox in pregnancy: Explaining the first-generation advantage for Latina adolescents. *Research on Adolescence, 25*, 14–19. https://doi.org/10.1111/jora.12096

Harden, K. P., Mendle, J., Hill, J. E., Turkheimer, E., & Emery, R. E. (2008). Rethinking timing of first sex and delinquency. *Journal of Youth and Adolescence, 37*, 373–385. https://doi.org/10.1007/s10964-007-9228-9

Harris, K. M. (1999). The health status and risk behaviors of adolescents in immigrant families. In D. J. Hernandez (Ed.), *Children of immigrants: Health, adjustment, and public assistance* (pp. 286–347). Washington, DC: National Academies Press.

Iceland, J., & Scopilliti, M. (2008). Immigrant residential segregation in U.S. metropolitan areas, 1990-2000. *Demography, 45*, 79–94.

Kane, J. B., Morgan, S. P., Harris, K. M., & Guilkey, D. K. (2013). The educational consequences of teen childbearing. *Demography, 50*, 2129–2150. https://doi.org/10.1007/s13524-013-0238-9

Landale, N. S., & Hauan, S. M. (1996). Migration and premarital childbearing among Puerto Rican women. *Demography, 33*, 429–442. https://doi.org/10.2307/2061778

Landale, N. S., Thomas, K. J. A., & Van Hook, J. (2011). The living arrangements of children of immigrants. *The Future of Children, 21*, 43–70. https://doi.org/10.1111/j.1747-7379.2002.tb00087.x

Leung, K., Elashoff, R. M., & Afifi, A. A. (1997). Censoring issues in survival analysis. *Annual Review of Public Health, 18,* 83–104. https://doi.org/10.1146/annurev.publhealth.18.1.83

Leventhal, T., & Brooks-Gunn, J. (2000). The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin, 126*, 309–337.

Manlove, J., Steward-Streng, N., Peterson, K., Scott, M., & Wildsmith, E. (2013). Racial and ethnic differences in the transition to a teenage birth in the United States. *Perspectives on Sexual and Reproductive Health, 45*, 89–100. https://doi.org/10.1363/4508913

Martin, J. A., Hamilton, B. E., Osterman, M. J. K., Driscoll, A. K., & Mathews, T. J. (2017). Births: Final data for 2015. *National Vital Statistics Reports, 66*, 1.

McDonald, J. A., Manlove, J., & Ikramullah, E. N. (2009). Immigration measures and reproductive health among Hispanic youth: Findings from the National Longitudinal Survey of Youth, 1997-2003. *Journal of Adolescent Health, 44*, 14–24. https://doi.org/10.1016/j.jadohealth.2008.08.001

Migration Policy Institute. (2017). *Children in U.S. immigrant families*. Retrieved from http://www.migrationpolicy.org/programs/data-hub/charts/children-immigrant-families

Miller, B. C., Benson, B., & Galbraith, K. A. (2001). Family relationships and adolescent pregnancy

risk: A research synthesis. *Developmental Review, 21*, 1–38. https://doi.org/10.1006/drev.2000.0513

National Center for Health Statistics. (2002). National Survey of Family Growth, 2002. Public-use data file and documentation. Retrieved from https://www.cdc.gov/nchs/nsfg/nsfg_cycle6.htm

Oropesa, R. S., & Landale, N. S. (2009). Why do immigrant youths who never enroll in U.S. schools matter? School enrollment among Mexicans and non-Hispanic Whites. *Sociology of Education, 82*, 240–266. https://doi.org/10.1177/003804070908200303

Osgood, D. W. (1988). The generality of deviance in late adolescence and early adulthood. *American Sociological Review, 53*, 81–93. https://doi.org/10.2307/2095734

Osypuk, T. L., Bates, L. M., & Acevedo-Garcia, D. (2010). Another Mexican birthweight paradox? The role of residential enclaves and neighborhood poverty in the birthweight of Mexican-origin infants. *Social Science & Medicine, 70*, 550–560. https://doi.org/10.1016/j.socscimed.2009.10.034

Osypuk, T. L., Diez Roux, A. V., Hadley, C., & Kandula, N. R. (2009a). Are immigrant enclaves healthy places to live? The Multi-Ethnic Study of Atherosclerosis. *Social Science & Medicine, 69*, 110–120. https://doi.org/10.1016/j.socscimed.2009.04.010

Osypuk, T. L., Galea, S., McArdle, N., & Acevedo-Garcia, D. (2009b). Quantifying separate and unequal: Racial-ethnic distributions of neighborhood poverty in metropolitan America. *Urban Affairs Review, 45*, 25–65. https://doi.org/10.1177/1078087408331119

Parrado, E. A. (2011). How high is Hispanic/Mexican fertility in the United States? Immigration and tempo considerations. *Demography, 48*, 1059–1080. https://doi.org/10.1007/s13524-011-0045-0.

Parrado, E. A., & Morgan, S. P. (2008). Intergenerational fertility among Hispanic women: New evidence of immigrant assimilation. *Demography, 45*, 651–671. https://doi.org/10.1353/dem.0.0023

Passel, J. S. (2011). Demography of immigrant youth: Past, present, and future. *Future of Children, 21*, 19–41. https://doi.org/10.2307/41229010

Perreira, K. M., & Ornelas, I. J. (2011). The physical and psychological well-being of immigrant children. *Future of Children, 21*, 195–218.

Pong, S., & Hao, L. (2007). Neighborhood and school factors in the school performance of immigrants' children. *International Migration Review, 41*, 206–241. https://doi.org/10.1111/j.1747-7379.2007.00062.x

Portes, A., & Rumbaut, R. (2001). *Legacies: The story of the immigrant second generation*. Berkeley: University of California Press.

Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., … Udry, J. R. (1997). Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association, 278*, 823–832. https://doi.org/10.1001/jama.1997.03550100049038

Rumbaut, R. G. (2004). Ages, life stages, and generational cohorts: Decomposing the immigrant first and second generations in the United States. *International Migration Review, 38*, 1160–1205. https://doi.org/10.1111/j.1747-7379.2004.tb00232.x

Rumbaut, R. G. (2008). The coming of the second generation: Immigration and ethnic mobility in Southern California. *The Annals of the American Academy of Political and Social Science, 620*, 196–236.

Santelli, J. S., Abraido-Lanza, A. F., & Melnikas, A. J. (2009). Editorial: Migration, acculturation, and sexual and reproductive health of Latino adolescents. *Journal of Adolescent Health, 44*, 3–4. https://doi.org/10.1016/j.jadohealth.2008.10.135

Sluzki, C. E. (1979). Migration and family conflict. *Family Process, 18*, 379–390.

South, S. J., & Baumer, E. P. (2000). Deciphering community and race effects on adolescent premarital childbearing. *Social Forces, 78*, 1379–1408. https://doi.org/10.1093/sf/78.4.1379

Spence, N. J., & Brewster, K. L. (2010). Adolescents' sexual initiation: The interaction of race/ethnicity and immigrant status. *Population Research and Policy Review, 29*, 339–362. https://doi.org/10.1007/s11113-009-9147-4

Súarez-Orozco, C., & Qin, D. B. (2006). Gendered perspectives in psychology: Immigrant origin youth. *International Migration Review, 40*, 165–198. https://doi.org/10.1111/j.1747-7379.2006.00007.x

Sweeney, M. M., & Raley, R. K. (2014). Race, ethnicity, and the changing context of childbearing in the United States. *Annual Review of Sociology, 40*, 539–558. https://doi.org/10.1146/annurev-soc-071913-043342

Tienda, M., & Haskins, R. (2011). Immigrant children: Introducing the issue. *The Future of Children, 21*, 3–18.

Udry, J. R., & Chantala, K. (2003). Missing school dropouts in surveys does not bias risk estimates. *Social Science Research, 32*, 294–311. https://doi.org/10.1016/S0049-089X(02)00060-1

United Nations Population Division. (2017). *Adolescent fertility rate (births per 1,000 women ages 15-19)*. Retrieved from http://data.worldbank.org/indicator/SP.ADO.TFRT

Upchurch, D. M., Lillard, L. A., Aneshensel, C. S., & Li, N. F. (2002). Inconsistencies in reporting the occurrence and timing of first intercourse among adolescents. *The Journal of Sex*

Research, 39, 197–206. https://doi.org/10.1080/00224490209552142

Wu, L. L., & Martin, S. P. (2009). Effects of exposure on prevalence and cumulative relative risk: Direct and indirect effects in a recursive hazard model. *Sociological Methodology, 39*, 185–232. https://doi.org/10.1111/j.1467-9531.2009.01212.x

Wu, L. L., & Martin, S. P. (2015). Premarital first births: The influence of the timing of sexual onset versus post-onset risks in the United States. *Population Studies, 69*(3), 281–297. https://doi.org/10.1080/00324728.2015.1100318.

Wu, L. L., & Thomson, E. (2001). Race differences in family experience and early sexual initiation: Dynamic models of family structure and family change. *Journal of Marriage and Family, 63*, 682–696. https://doi.org/10.1111/j.1741-3737.2001.00682.x