Differentials in Fertility Patterns: The Divergence of Childbearing and the Convergence of Childlessness in the United States, 1980s-2000s.

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Abstract

Fertility trends reveal an increased prevalence of childlessness in the recent decades; yet, little research has studied its socioeconomic and demographic correlates or compared them to patterns of childbearing. Using data from the Integrated Fertility Survey Series (IFSS) and the National Survey of Family Growth (NSFG), we analyze changes in the associations between childlessness and key socio-demographic factors from the 1980s to the late 2000s and compared them to patterns of childbearing. Previous studies reveal a bifurcating pattern in childbearing behaviors as highly educated, wealthier, and white women increasingly delay childbearing and usually have children within marriage; while low-educated, low-income, and disadvantaged racial/ethnic minority women bear children at relatively young ages and more often outside marriage. Contrary to this pattern, we found convergence in childlessness by marital status, education and, race/ethnicity; however, we found a growing divergence by economic well-being. This study reveals that different patterns of stratification shape motherhood and childlessness.

The level of childlessness in the U.S. has substantially increased in the recent decades from a low 10% in the 1970s to 19% in 2010 (Kirmeyer and Hamilton 2011; U.S. Census Bureau 2011a). However, despite the growing prevalence of childlessness, childless women have received little attention from scholars as research on fertility and social inequality has conventionally focused on women with children. Relatively few recent studies have analyzed changes over time in the key correlates of childlessness (Abma and Martinez 2006; Hayford 2013; Heaton, Jacobson, and Holland 1999; Livingston and Cohn 2010); however, most studies have focused on marital status, education, and race/ethnicity, but have left out income from their analyses. Moreover, to our knowledge, none of these studies has compared the patterns in childlessness to those of childbearing. We build on prior research by, first, examining the association between childlessness and key socioeconomic and demographic factors, including income; second, analyzing how these associations have changed in recent times, from the 1980s

to the late 2000s; and third, comparing patterns of stratification for childlessness to the well-documented patterns observed for childbearing.

Research on fertility has found a bifurcating pattern of childbearing behaviors as low-educated, low-income women, and disadvantaged ethnic minorities are having nonmarital births at higher rates and at relatively young ages; while white, college educated, and higher-income women are increasingly delaying childbearing and having children within marriage (Ellwood and Jencks 2004; McLanahan 2009). Given the recent growth in socioeconomic inequality, which disproportionately increases the opportunity cost of childbearing for more advantaged women, we would have expected that the likelihood to remain childless would have increased more for advantaged women; however, contrary to this expectation, we found that childlessness has increased faster for more disadvantaged groups. Rather than a bifurcating pattern as observed for childbearing, our results show instead a convergence from the 1980s to the late 2000s in key socio demographic characteristics of childless women. We find that the differences in the levels of childlessness by marital status have narrowed, the differentials across racial/ethnic groups are small and have remained relatively stable, and the gap between low and highly educated women has been reduced. These findings reveal that although women from diverse marital statuses, educational levels, and race/ethnicity have become more different in their timing and marital context of childbearing, they have become more similar in their probabilities of remaining childless past age 40. However, we did find a growing disparity among childless women by economic well-being, measured by family income as a percentage of the poverty threshold, as those with higher incomes are departing from the norm by remaining childless beyond age 40 at higher rates than less affluent women.

We argue that marital status, education, and race/ethnicity are receding in power to predict childlessness. Although being single never-married is still the major predictor for

remaining childless, its predictive power has decreased from the 1980s to the late 2000s. Contrary to the patterns observed for childbearing; the associations between childlessness, on the one hand, and education and race/ethnicity, on the other hand, have become weaker. Nonetheless, economic factors may be gaining importance, as our findings reveal that income has emerged as a major stratifying factor among those who remain childless. Since fertility outcomes affect women's life chances and their opportunities for social mobility (Kahn, García-Manglano, and Bianchi 2014), understanding these trends can shed light on how fertility patterns are shaped by and reproduce social inequality.

Background

The growth in childlessness during the recent decades is not a new phenomenon since comparable high levels of childlessness were also observed during the depression era. The rates of childlessness have followed a U-shaped pattern that has mirrored historical economic circumstances (Kirmeyer and Hamilton 2011; Rowland 2007). The highest level of childlessness in the U.S. was observed among women born in the early 1900s who began their reproductive cycles during the Great Depression. Among this cohort, the percentage of women remaining childless by age 49 reached record high of 20%. Women born during the 1930s reached reproductive age during the baby boom period, when childbearing became nearly universal and childlessness reached a record low of 10%. Since then, women began increasingly postponing childbearing while some are eschewing parenthood altogether, increasing once more the rates of childlessness (Dykstra 2009; Kirmeyer and Hamilton 2011; Rowland 2007). According to the U.S. Current Population Survey (CPS), childlessness among women aged 40-44, who have virtually ended their reproductive cycles, reached 19% in 2010 (U.S. Census Bureau 2011a).

The increase in childlessness since the 1970s has occurred amid a time of drastic social change affecting family life, including the rise in women's education and labor force

participation, the diffusion of effective contraception, delays in marriage, high rates of divorce and remarriage, and a greater emphasis on individualism and self-development (Casper and Bianchi 2002; Cherlin 2004; Koropeckyj-Cox and Pendell 2007; Lesthaeghe 1995). As the historical trends reveal, the prevalence of childlessness is affected by the macro-economic circumstances extant during women's reproductive careers, as well as by changes in norms and cultural values. It has now become more acceptable for individuals to eschew long-term commitments such as marriage and children. Parenthood is increasingly seen as a voluntary choice and as a means for self-realization (Kirmeyer and Hamilton 2011; Koropeckyj-Cox and Pendell 2007; Lesthaeghe 1995).

Socio-demographic and individual characteristics also shape childlessness and help explain sub-groups differences. Marital status, education, and race/ethnicity are major stratifying factors of fertility outcomes and, thus, group-differences by these variables have often been analyzed in research on childbearing and childlessness (Smock and Greenland 2010). Income is also strongly associated with fertility outcomes, but since it is highly correlated with education and family background characteristics, it is often left out of most studies (see Bloom and Trussell 1984; Hayford 2013; Livingston and Cohn 2010; Lundquist, Budig, and Curtis 2009; Martin 2000). We build up on previous research by analyzing key correlates of childlessness in two recent periods; in 1980s and the late 2000s, and by showing that income as a percentage of the poverty line has emerged as a central factor in differentiating childless women. In the next sections we summarize previous findings on the differences in fertility outcomes by these major stratifying factors, then we present our analysis of the trends of childlessness and compared them to those observed for childbearing. Finally, we discuss these trends and their implications for the social stratification of women.

Fertility Patterns and Marital Status

Marital status is a major predictor of fertility; however, the association between marital status and fertility has weakened in the recent decades as the social norms mandating that childbearing occur within marriage have waned. At the same time, the previous stigma attached to single motherhood has eroded (Casper and Bianchi 2002; Ellwood and Jencks 2004). Since the 1970s, fertility within marriage has decreased while nonmarital childbearing increased. As a consequence, unmarried women have become more similar to the married in their likelihood of becoming mothers. Single parenthood and cohabitation have gained acceptance as alternative contexts for childbearing (Kennedy and Bumpass 2008). Nonmarital births have become an important element of fertility in the U.S. In 1960, only 5.3% of all births were to unmarried women, and by 2010 this percentage was 40.8% and about half of all nonmarital births occurred to cohabiting women (Ellwood and Jencks 2004; Martin, Hamilton, Ventura, Osterman, Wilson, and Mathews 2012). This trend suggests a decoupling of marriage and childbearing, especially among disadvantaged ethnic minorities, low-educated, and low-income women (Cherlin 2004; Edin and Kefalas 2005; Hayford, Guzzo, and Smock 2012; McLanahan 2009; Musick 2002).

Childlessness, which has traditionally been in the realm of the unmarried, has become more of a conscious choice and has increased among the married (Abma and Martinez 2006; Rowland 2007). Part of the growth in childlessness is the result of the postponement of childbearing due to delays in marriage and the relatively high levels of divorce as many women still consider marriage a prerequisite for childbearing (Dykstra 2009; Hagestad and Call 2007; Quesnel-Vallée and Morgan 2004; Rowland 2007). As individuals set higher standards for marriage (e.g. financial stability, assets and savings, high relationship quality, etc.), marriage has acquired a symbolic meaning of achievement and has become more selective of individuals' socioeconomic characteristics (Cherlin 2004). The deteriorating economic standing of low-

income men has further contributed to the low marriage rates among disadvantage populations. Women who remain single or get divorced spend a higher proportion of their reproductive lives at risk of a nonmarital pregnancy, and many of them remain childless for longer periods (Heaton et al. 1999). These changes have turned marital status into a stratifying factor among women, shaping their reproductive behaviors (Gibson-Davis, Edin, and McLanahan 2005).

Trends in Fertility and Childlessness by Educational Attainment

Women's education has substantially increased since the 1970s. Since 2004, women have been graduating from college at higher rates than men (Buchmann and DiPrete 2006). Education is one of the major dimensions of social stratification affecting not only most socioeconomic outcomes, but also fertility behaviors. However, the directionality of the relationship between education and fertility is not always clear; childbearing can affect educational attainment, and both can be affected by common factors and selectivity (Marini 1984; Stange 2011). Yet, higher education is positively correlated with delays in fertility, low achieved fertility, and higher levels of childlessness (Bloom and Trussell 1984; Musick, England, Edgington, and Kangas 2009; Stanche 2011).

Previous research has shown that the relationship between education and childbearing has grown stronger over time (Bloom and Trussell 1984; McLanahan 2004). While highly educated women are increasingly delaying childbearing until their late 20s or early 30s; low educated women bear children at younger ages at higher rates. Low educated women also account for a higher proportion of nonmarital births. These trends have given rise to a growing bifurcation in the timing and partnership context of childbearing by educational attainment (Ellwood and Jencks 2004; McLanahan 2004).

Conversely, college educated women are more likely to remain childless, in part, because they tend to postpone childbearing to attend college, and later on, to get established in a career.

Although higher education is also associated with better information on birth control and access to more efficient contraceptive methods, the opportunity cost of childbearing is often cited as one of the main reasons for the high rates of childlessness among college educated women (Musick et al. 2009). Giving the intense time demands of a newborn, having a child during early adulthood threatens women's chances of completing their expected level of education and obtaining a career. Because sterility increases with age, delaying childbearing past age 30 increases the likelihood of becoming permanently childless (Kirmeyer and Hamilton 2011; McQuillan, Greil, White, and Jacob 2003; Quesnel-Vallée and Morgan 2004).

The stakes of higher education have substantially increased in the recent decades. Since the mid 1970s, the earnings for college graduates have substantially risen, while the earnings for those with a high school diploma or less either have decreased or remained stagnant, widening the disparities in the returns to education (Autor, Katz, and Kearney 2008; Western, Bloome, and Percheski 2008). Occupational status and employment rates also became stronger correlated with college education. These changes would imply that the opportunity cost to childbearing has grown faster for the highly educated, and thus, we should expect a higher increase in the levels of childlessness among college educated women. However, contrary to this expectation, and to what early research has showed (Bloom and Trussell 1984), childlessness has instead increased faster among women with lower education in the recent times (Livingston and Cohn 2010). This trend has weakened the relationship between college education and childlessness. In this study, we analyze how this association has changed from the 1980s to the late 2000s controlling for other socioeconomic and demographic factors.

Fertility and Childlessness by Race/Ethnicity

Fertility behaviors in the U.S. also vary by race/ethnicity. Disadvantaged ethnic minorities, such as African Americans and Hispanics, exhibit greater rates of early and nonmarital

childbearing than whites, and this relationship has grown stronger in the recent decades. In part, due to their relatively low prospects for marriage, African Americans and Hispanics have become more likely to have nonmarital births at younger ages, while whites are postponing childbearing at higher rates (Ellwood and Jencks 2004; Landale, Schoen, and Daniels 2010; McLanahan 2009). These trends have increased the racial/ethnic gap in the timing and marital context of childbearing. During 2006-2010, the average age at first birth was 24.1 for non-Hispanic whites, compared with 20.9 for African Americans, and 21.2 for Hispanics (Martinez, Daniels and Chandra 2012). Moreover, 29% of all births to Non-Hispanic whites were nonmarital births in 2010, compared with 72.5% for non-Hispanic blacks, 53.3% for Hispanics, and only 17% among Asians and Pacific Islanders (Martinez et al. 2012).

The levels of childlessness also differ by race/ethnicity. Childlessness has traditionally been seen as a white phenomenon driven by white's higher rates of voluntary childlessness. Childlessness among African American women was considered to be the result of sterility due to health problems, implying that it was mostly involuntary. Nonetheless, involuntary childlessness was greatly reduced after World War II, and the rates of infertility between whites and blacks became similar (Boyd 1989; Lundquist et al. 2009). More recently, childlessness among African Americans has been linked to their low marriage rates, as African American women face a smaller pool of "marriageable men" (Lundquist et al. 2009; Wilson and Neckerman 1987). Some scholars have suggested that given the relatively low status of African American men, African American professional women often choose to stay single and childless as a strategy to achieve or retain middle class status (Marsh, Darity, Cohen, Casper, and Salters 2007). Recent studies suggest that the factors driving childlessness, including the intention to remain childless, are now very similar among whites and African Americans (Boyd 1989; Lundquist et al. 2009; Marsh et al. 2007).

Overall, since the 1970s the levels of childlessness by race/ethnicity began to converge, driven by an increase in childlessness among ethnic minorities. In the late 2000s, the levels of childlessness by race/ethnicity for women ages 40-44 ranged from 20% for whites, 17% for African Americans and Hispanics, and 16% for Asians (Livingston and Cohn 2010). As we show in this study, contrary to the growing disparities in the patterns of childbearing by race/ethnicity, we did not find substantial changes in the trends of childlessness by race/ethnicity from the 1980s to the late 2000s.

Fertility Behaviors and Income Inequality

Previous research has shown that low-income women begin childbearing at young ages and often with an unmarried partner, while their better-off counterparts more often delay childbearing (Edin and Kefalas 2005; McLanahan 2009). The relatively higher rate of early childbearing among low-income women has been explained by the few alternative roles to motherhood and high value that low-income women attach to children. Conversely, the high economic opportunity costs to motherhood for more affluent women constitute an incentive to delay or eschew childbearing (Becker 1981; Edin and Kefalas 2005; Morgan 2003). Part of the high opportunity costs to motherhood stem from institutional barriers to combine work and parenthood, such as limited paid maternity leave, the lack of flexible work schedules, and the insufficient affordable childcare (Bianchi, Casper, and King 2006; Stone 2007). As a result, women often exit the labor force when they become mothers, and when they rejoin the labor force, they pay a penalty in the form of lower earnings and limited possibilities for promotion and career advancement (Budig and England 2001; Budig and Hodges 2010; Stone 2007).

Although income is highly associated with fertility outcomes, it is usually left out of most analyses because of its high correlation with other socioeconomic variables such as education and family background characteristics. Research on intergenerational mobility has

shown that parents transmit economic advantages to their children that often shape children's socioeconomic status and reproductive behaviors in adulthood (Landale et al. 2010; Mare 2011). Higher education also leads to better job opportunities and an increased probability of attracting an educated partner, both of which further rises the potentiality for higher income (Arum, Roksa, and Budig 2008; Musick, Brand, and Davis 2012; Schwartz and Mare 2012). Because of these correlations, most studies control for individual's education and family background characteristics as proxies for socioeconomic status, but tend to leave income out of the equation. We expand current research on childlessness by incorporating an analysis of the association between childlessness and family income relative to the poverty threshold, a measure of economic well-being, while controlling for other factors.

In sum, we build up on the prior literature by analyzing the associations between childlessness and key socio-demographic factors in the 1980s and in more recent years, 2006-2010, and evaluating how these associations have changed over this period. We also investigate the extent to which income, which has been greatly under studied, is independently associated with childlessness once education, family background characteristics, and other factors are parceled out. Finally, we compare the relatively more converging trends in the stratification of childless women to the divergent trends found in the stratification of mothers. We conclude by drawing some potential implications for future socioeconomic inequality among women.

Data, Methods, and Measurements

Data

We use data from the National Survey of Family Growth (NSFG). The NSFG is a nationally representative probability design survey that collects cross-sectional data for women ages 15 to 44 living in households in the U.S. The NSFG collects data on reproductive behaviors, health,

transitions in family formation, demographic characteristics, and socioeconomic background. The NSFG has been conducted repeatedly since the 1960s, using similar questions on relevant variables for fertility behaviors, and thus, it is suitable for the analysis of trends over time. Since we analyze childlessness, we restrict our sample to women ages 40-44 who have practically ended their reproductive cycles. Although some women in this age range may still become mothers, the probability of having a first birth past age 40 is relatively low (Abma and Martinez 2012; Martin et al. 2012), thus, this method is close to analyzing permanent childlessness.

Childless women were included in the NSFG in 1982 for the first time. Accordingly, we take the 1980s period as the baseline for comparison by combining the 1982 with the 1988 panel to increase the sample size. The 1982 and 1988 waves were obtained from the Integrated Fertility Survey Series (IFSS), which contains harmonized data from all waves of the NSFG from inception until 2002. Although women in the 1988 wave were more likely to be childless than those in the 1982 wave, the difference was small, and pooling both waves did not affect the main results. We tested for changes in our 1982-1988 results by introducing a dummy variable for 1988, however doing this did not affect the main results obtained from the pooled sample. Thus, for the rest of the analysis we use the combined 1982-1988 sample. The 2006-2010 wave, a continuous survey conducted during 2006-2010, was obtained directly from the National Center for Health Statistics website. Our sample size for women ages 40-44 in the pooled 1982-1988 wave is 1,981 women, and for the 2006-2010 wave the sample size is 1,685.

Methods and Measurements

Because childlessness is often a process resulting from successive decisions to postpone parenthood, changing over the life course (Hagestad and Call 2007; Rindfuss, Morgan, and Swicegood 1984), we use survival analysis to model childlessness by age 40, evaluating the risk or probability of remaining childless at each year after age 12, conditional upon not having had

a child before that age. All women in our sample are age 40-44 at the time of survey, they enter the risk set at age 12, and are considered at risk of having a first birth until they either had a child or until the date of interview if censored. Thus, we excluded women who had their first birth before age 12. Because we cannot model a nonevent (e.g. not having had a child), we model instead the risk of having a first birth, and take the survival function from this model to obtain the conditional probability of remaining childless. For this purpose, we fit a semi-parametric Cox model on the risk or hazard of having a first birth at each month a woman is at risk, then we multiply the coefficients of this model by -1 and take their exponential to predict the risk or hazard of remaining childless (Cleves, Gould, Gutierrez and Marchenko 2010). Since Cox regression assumes a constant (proportional) hazard over time, we tested for non proportionality of the hazard using a link test, however, none of these tests was significant, indicating that our models do not violate the proportionality assumption (Cleves et al. 2010). All analyses account for survey design and sample weights. We use adjusted weights that average to 1. Using these models we evaluate the association between childlessness and key stratifying variables: marital status, education, race/ethnicity, and income, while controlling for other factors. The results are expressed in hazard ratios, which are analogous to odds ratios from logistic regression. Although the NSFG provides event history data, it is not longitudinal and, thus, the timing of some events, such as educational trajectories, is not available. Given these limitations, we evaluate associations and not causal effects.

The dependent variable in our models is dichotomous, taking the value of 1 if a woman had a child and 0 if she remains childless. The main independent variables are marital status, education, race/ethnicity, and income, and we also include other control variables. Previous studies on childlessness have measured marital status as a dichotomous variable, comparing ever married to never married women (Hayford 2013; Livingston and Cohn 2010). However,

given the increased salience of cohabitation for fertility outcomes, we separate cohabiting from never married unpartnered women, thus, we measure marital status in three categories: ever married (referent category), never married and never cohabited, and ever cohabited but never married. Education is measured in four categories identifying those with less than high school, high school (referent), some college, and college education. Race/ethnicity consists of mutually exclusive dummy variables for non-Hispanic whites (referent group), from now on simply "whites"; non-Hispanic African Americans, from now on "African Americans", Hispanics, and other race/ethnicity.

Measuring economic well-being poses some challenges for research. First, the real value of income changes over time, making it difficult to compare nominal values across periods. This inconvenience is usually resolved by adjusting nominal values for inflation or taking the natural logarithm of income. However, a major difficulty arises when we want to measure earnings for women given that many women leave the labor market or disinvest in their careers once they get married or have children (Budig and Hodges 2010; Kahn et al. 2014; Stone 2007), and, thus, their individual earnings may not reflect their economic well-being. If we consider family income instead, married women have the advantage of having a husband who is likely to be employed, and thus, they have two sources of earnings contributing to their family income; while most single unpartnered women have a single source of earnings. Due to these inconveniences, we measure economic well-being by family income as a percentage of the poverty line, given that this measure takes into consideration the number of people who depend on the family income. This measure is a relative income-to-needs ratio that, despite its drawbacks, is officially recognized and adjusts for household size. It also overcomes the issue of changes in real value, since the poverty threshold is continuously adjusted for inflation. We divide this variable into 5 categories corresponding to below poverty or <100% of the poverty

threshold, 100-199%, 200-299%, 300-399%, and 400% or more above the poverty line. In the 1982 wave, this variable had missing values, thus we imputed the values using a multivariate single imputation and tried to replicate a similar distribution to the adjacent 1976 and 1988 waves; however we made the first interval 15% of the distribution because it corresponds to the official poverty rate in 1982 (U.S. Census Bureau 1984). We were unable to use multiple imputation due to methodological challenges; however, to test whether the results would change with other specifications of economic well-being, we tried alternative measures using family income in quartiles and quintiles, and obtained similar results for the 1982-1988 period. The 2006-2010 wave did not present missing values for income relative to the poverty line, thus no values were imputed.

We control for three family background characteristics used as proxies for family of origin socioeconomic background (Lundquist et al. 2009). Mother's education was measured by a dummy that takes the value of 1 for women whose mothers had some college education or a college degree, and 0 otherwise. Mother's work status takes the value 1 for respondents whose mothers worked at least part time while the respondent was growing up, and 0 otherwise. Family structure is indicated by a dummy that takes the value of 1 for respondents who lived with both biological or adoptive parents at age 14.

Fertility problems are assessed by a dummy that takes the value of 1 for women reporting having physical difficulties to have a baby, either themselves or their partners, or having received medical help to get pregnant or prevent a miscarriage, or being infertile by nonsurgical means, either themselves or their partners.

We also control for religiosity and urbanicity, both of which have been found to condition fertility outcomes. As a proxy for religiosity we used a dummy for attendance to religious services that takes the value of 1 for those who never attend religious services, and 0 for

those who attend religious services. We tried other measures of religiosity such as the religious denomination in which the respondent was raised; however, as other studies have also shown, no significant differences by this variable between mothers and childless women were found (Abma and Martinez 2006). Finally, we control for rural/urban residency with a dummy that takes the value of 1 if the respondent lived in a rural area and 0 if they lived in a city or metropolitan area.

Results

[Insert Table 1 here]

Table 1 shows descriptive statistics for women aged 40-44 from the NFSG 1982-1988 and 2006-2010 panels. In 1982-1988, 10.5% of women aged 40-44 were childless; this percentage increased to 15.6% in 2006-2010. As we observe, childless women's socio-demographic characteristics substantially differ from those of mothers in both time periods. Childless women are significantly more likely to be never married, college educated, and white compared with mothers. Childless women are also significantly less likely to be poor and more likely to have family incomes of 400% or more above the poverty line. In terms of family background characteristics, in the 1980s childless women were more likely to have had a mother with at least some college education, and to have lived with both parents while growing up; however by the late 2000s, none of these family background characteristics significantly differed between mothers and childless women. In both periods, a higher percentage of childless women than mothers also reported having experienced fertility problems by themselves or their partners, suggesting that some of them were involuntarily childless. Attendance to religious services did not significantly differ between mothers and childless women in the 1980s, however by the late 2000s, childless women were more likely to never attend religious services, probably as a result of the increasing secularization process characteristic of the Second Demographic Transition

(Lesthaeghe 1995). Finally, in both periods women from urban areas were more likely to be childless that those from rural areas.

[Insert Table 2 here]

Table 2 presents the results of the Cox regression predicting the risk or hazard of being childless by age 40 in 1982-1988 and 2006-2010 waves, controlling for other variables. The results shows that, net of other factors, the associations between marital status and childlessness declined during this time. In the 1982-1988, never married single women had an 11.2 times greater risk or hazard of being childless by age 40 than ever married women, net of other factors. By 2006-2010, the hazard ratio was substantially reduced to 5.6, indicating that ever married and never married women have become more alike in their chances of remaining childless. These results are illustrated in Figure 1A. Figures 1 and 2 plot a comparison by selected stratifying variables of the estimated survival curves based on the Cox models reported in table 2, holding all other variables to their mean. The y-axis indicates the estimated proportion of women remaining childless as they age. The x-axis includes a reference line at age 40 for comparison purposes.

[Insert Figure 1 here]

We tested for significant changes over time by estimating a pooled model for the two periods (1982-1988 and 2006-2010) fully interacted with period. According to this test, the reduction in the hazard ratio over time for never-married single women relative to ever-married women was statistically significant. The magnitude of this reduction can be appraised by the vertical distances between the survival curves at age 40 (the reference line) for each period. This change can be partly explained by the decrease in marital fertility and the increase in nonmarital births (Hayford 2013). As Figure 1A indicates, childlessness is still more prevalent among never-

married single women, but the differences by marital status are smaller than they were in the 1980s.

As discussed in the background section, since the 1960s cohabitation began emerging as an alternative family context for childbearing (Brown 2004; Ellwood and Jencks 2004; Kennedy and Bumpass 2008; Musick and Bumpass 2012). As cohabitation was endorsed as a milieu for childbearing, cohabiting women's probability of entering motherhood increased, and thus, their likelihood of remaining childless decreased. As Figure 1A shows, net of other factors, cohabiting women behave more similarly to ever-married than to never-married single women. According to our model, although the coefficient changes directions, the change in the coefficient for cohabiting relative to ever married women from the 1980s to the 2000s was not statistically significant.

Overall, comparing both periods reveals a converging pattern, suggesting that marital status is no longer as strong of a stratifying factor for childlessness as it was in the 1980s. This convergence is at odds with previous research on childbearing behaviors showing instead an increased stratification of mothers by marital status. As these studies have found, never married and cohabiting women exhibit higher rates of early childbearing than married women, especially among disadvantaged women, and these differences have grown in the recent decades (Ellwood and Jencks 2004; McLanahan 2009).

By educational attainment, the results show that over this period, while women's education increased, the differences in the risk of remaining childlessness after age 40 between the college educated and those with lower education decreased. These results are illustrated in Figure 1B. We found some small significant differences at lower levels of education. In general, lower levels of education were associated with a lower risk of remaining childless by age 40; however, the changes in the hazard ratios over time were not statistically significant. At the

upper end of the educational distribution, however, we observe a major reduction in the hazard ratio. Holding constant other factors, the risk of remaining childless for college educated women relative to high school graduates decreased from 2.03 to 1.54, and this decline was significant over time. This result is evidenced by comparing the reduction in the vertical distance between the survival curves for these two groups at the reference line in Figure 1B. Given the growth in the returns to education, especially to college education, we would have expected college graduates to be even more likely to be childless than high school graduates; however, counter to this expectation, the difference was instead reduced. Again, contrary to the divergent patterns in childbearing behaviors by education, we did not find a greater stratification of childlessness by educational attainment; instead, the results suggest a converging pattern.

As previous studies have done (Hayford 2013; Lundquist et al. 2009), we tested for interactions between marital status and educational attainment (analysis not shown). However, only a few of these interactions were significant. For example, in the 1980s, the interaction between being *single* and having *some college education* was significant, indicating that although single women were more likely to remain childless than ever married women, they were even more so if they had some college education. The magnitude of this interaction was smaller but still significant in the late 2000s. However, the interaction between being *single* and having a *college* degree was not significant in either period. Most of the other interactions were not significant in any of the two periods. In sum, despite the few significant interactions found between education and marital status, the main effects of marital status and education were not substantially altered with the introduction of these interactions, and the major findings of our analysis remained unchanged. Thus, we present the more parsimonious model shown in Table 2.

By race/ethnicity, the results show that African Americans had a lower risk of remaining childless by age 40 than whites. In the 1980s blacks had a 29% (100%*[1-.742]=28.6%) lower risk than whites; and although the difference slightly grew to 35% by the late 2000s (100%*[1-.650]=35.0%), the change was fairly small. Hispanics were not significantly different from whites in their odds of remaining childless in any of the two periods, controlling for other factors. Because the "other" category is composed of different racial groups, we do not interpret this hazard ratio. Nonetheless, Figure 1C shows that the prevalence of childlessness net of other factors has increased for most racial/ethnic groups from the 1980s to the late 2000s. Although it has increased more for whites, the racial/ethnic differences are not substantial nor have become substantially divergent.

We focus now our attention to the differences by economic well-being. Most previous studies of childlessness have focused on differences by marital status, educational attainment, and race/ethnicity (Hayford 2013; Livingston and Cohn 2010; Lundquist et al. 2009), but have not directly analyzed differences by economic well-being. This approach has been justified by the fact that income and earnings are highly correlated with educational attainment and family background characteristics. We expand previous research by incorporating a measure of economic well-being and evaluating its association with childlessness independently of educational attainment and other socio demographic factors.

As explained in the measurements section, we use an income-to-needs variable measured by family income relative to the poverty threshold. To test whether this variable was independently associated with childlessness, we ran the models including education and the other covariates, but excluding income[1], then we ran a full model including income. To our surprise, incorporating income to the 1980s model did not substantially change the coefficients

[1] Analysis not shown but available upon request.

for education, marital status, race/ethnicity, or any of the other variables, suggesting that a part of income was not correlated to the other variables and was independently associated with childlessness in this period. In the 2006-2010 sample, adding income to the model had a very low impact on most of the coefficients, but it did decrease the coefficient for college education, reducing the hazard ratio from 1.97 to 1.54. This finding suggests that college education was more strongly correlated with income in the late 2000s than in the 1980s.

The results show that a part of economic well-being is positively associated with childlessness independent of education, family background, and other factors; thus, we consider important to incorporate a measure of economic well-being in the analysis of the stratification of childless women. Overall, net of other factors, women with family incomes below the poverty threshold are less likely to be childless by age 40 relative to more affluent women. In the 1980s, only two of the differences by income categories were significant, but the differences were small; women with family incomes of 400% or more above the poverty line had a 20% greater risk of remaining childless by age 40, net of other factors. By the late 2000s, an income gradient emerged as observed by comparing the 1980s to the 2000s period in Figure 2. Holding constant other factors, increases in family income above 200% of the poverty line were associated with a significantly higher risk of remaining childless by age 40. More importantly, women in the highest income bracket, those with family incomes 400% or more above the poverty line, became drastically different from those in the lower income categories. These women have nearly 3 times greater risk of remaining childless than poor women, and this change over time was statistically significant. Compared to previous research, this result is congruent with the increasing bifurcation in the timing and marital context for childbearing. We argue that a new dimension in the stratification of childless women seems to be emerging in which education and

other factors are taking a back stage, while differences by economic well-being are gaining importance in differentiating those who ultimately remain childless.

[Insert Figure 2 here]

The mechanisms that have lead to this change are not addressed in this study; however it is possible that as education has expanded, college education has become less selective of individual socio-economic characteristics (Musick et al. 2012). Because college educated women are now more heterogeneous in their socioeconomic and demographic backgrounds, education may not be as meaningful as it used to be as a stratifying factor for childless women. The differences in childlessness by economic well-being as measured in this study, on the contrary, increased over these two periods, especially at the top end of the distribution, providing evidence that income has become a more significant correlate of childbearing behaviors.

It is important to note that the 2006-2010 period includes a time of economic downturn. To evaluate whether the economic recession that ensued in 2007 is related to this finding, we introduced a dummy variable for 2008-2009, the period right after the recession hit. However, not only was this variable not significant, but also none of the other coefficients substantially changed after we controlled for this period effect, not even the coefficients for income exhibited significant changes. This result indicates that the findings presented for 2006-2010 are not altered by controlling for the recession period.

In sum, the results do not show an increasing bifurcation in the stratification of childless women by marital status, education, or race/ethnicity. Instead, as seen in Figure 1, we found evidence of a converging pattern in the likelihood of remaining childless across women of different marital and partnership statuses, and educational attainment. The differences found by race/ethnicity were relatively small. It is worth noting that marital status is still the major factors associated with the odds of remaining childless passed age 40, as never married single

women continue to be significantly more likely to remain childlessness despite the growth in nonmarital fertility, as Hayford (2013) puts it "marriage still matters"; however, its significance for childlessness has declined. Overall, the results are at odds with the trends in childbearing patterns, which indicate a growing bifurcation in the timing and marital context of childbearing by marital status, race/ethnicity, and education (Ellwood and Jencks 2004; McLanaham 2009).

Nonetheless, similar to the trends in childbearing, Figure 2 shows evidence of a growing divide among childless women by economic well-being, as women with the highest income brackets are remaining childless beyond age 40 at higher rates, diverging from less affluent women. Since sterility increases rapidly at this age, most of these women are expected to become permanently childless. This study contributes to current research in childlessness by comparing changes in the levels of childlessness from 1982-1988 to the more recent years, 2006-2010, incorporating an analysis of economic well-being and showing its importance as an emerging dimension in the stratification of childless women.

Discussion

Childlessness levels have significantly increased during the recent decades, however, few studies have analyzed changes in the factors associated with childlessness over time, nor have compared these trends to those of childbearing. In this study we analyze some of the major stratifiers of childlessness behaviors, evaluating their changes from the 1980s to the late 2000s, and comparing these trends to the trends in childbearing. As previous studies have found, childbearing patterns have become bifurcated since the 1970s. Disadvantaged ethnic minorities, low educated, and low income women are more likely to have early and nonmarital births; while whites; college educated, and well-off women are postponing childbearing and, more often, having children within marriage. Childless women used to be greatly differentiated by these same factors as whites, college educated and never-married single women were

considerably more likely to remain childless than non whites, low educated and married women. However, although significant differences remain, the gap among childless women by these socio-demographic characteristics has significantly been reduced over time, indicating a convergence in the trends of childlessness by marital status, education, and race/ethnicity. Nonetheless, we found greater disparities by economic well-being, which has often been left unanalyzed in previous research in childlessness. Although women in most income strata have become more likely to remain childless by age 40, more affluent women are remaining childless at higher rates than low-income women, differentiating themselves from their less affluent counterparts. These findings evidence the growing importance of economic well-being as a dimension of the stratification of childless women, and urges scholars to consider this dimension in addition to educational attainment, family background characteristics, and other variables that are more frequently included in the research of childlessness.

The greater disparities by economic well-being may be a consequence of the rise in income inequality in the recent decades, especially at the higher end of the income distribution that may have increased the economic opportunity cost of childbearing for more affluent women. This finding suggests that the opportunity costs of childbearing may not be completely captured by education, but by income differences as well. The convergence in the levels of childlessness by education suggests that as education has expanded, it has become a less differentiating factor of women's likelihood of remaining childless. This could be partly explained by the increased heterogeneity among college goers and by the fact that higher education can exert offsetting effects, by raising the opportunity cost of childbearing, while at the same time, increasing the likelihood of finding a marriageable partner with whom to bear children (Schwartz and Mare 2012). Some scholars have argued that these opposing forces may

explain the weaker relationship between education and childlessness in more recent times (Heaton et al. 1999; Martin 2000).

The convergence by marital status provides evidence of the decoupling of marriage and childbearing, not only are single women more likely to enter motherhood than in the past, but also married women are more likely to remain childless, indicating that childbearing has lost some of its centrality within marriage (Hayford et al. 2012). For some women being childless may be an involuntarily outcome resulting from continuous postponement of childbearing (Abma and Martinez 2006). Since age-related infertility increase rapidly with age, fertility problems may be contributing to the rise of childlessness for women who postpone childbearing beyond age 40 (McQuillan et al. 2003). For other women, opportunity costs as well as the rise in individualism and self-development may have reduced their willingness to undertake long-term commitments, such as marriage and childbearing, making childlessness a more suitable option (Lesthaeghe 1995; Cherlin 2004). These women may have voluntarily chosen to remain childless even as they get married.

The growing similarities found by education and the small disparities by race/ethnicity suggest a declining significance of education and race in the odds of remaining childless. As some scholars have suggested, it is possible that women of different educational and racial/ethnic backgrounds may now be more similarly pressed by the increasing time demands of work and the practical difficulties of combining work and family (Martin 2000).

If motherhood affects women's life chances for social mobility, remaining childless may, as Marsh and colleagues (2007) have claimed, constitute for some women an avenue to achieve or maintain middle-class status. In this sense, childlessness may represent an equalizing mechanism among women from different marital, educational, and racial/ethnic backgrounds. However, the growing divergence in the timing and marital context of childbearing, by

education attainment and racial/ethnic backgrounds, works in the opposite direction, stratifying mothers and their families by these same characteristics. Given the limited socioeconomic resources for disadvantaged families, the increasing gap in the prevalence of early and nonmarital childbearing implies that disadvantaged women and their children will become more likely to face a myriad of challenges for social mobility (Brown 2004; McLanahan 2009). To the extent that unmarried and disadvantaged women are increasingly the ones having children at young ages, while married and advantaged women delay childbearing or remain childless, inequality among women and the future generations of Americans is expected to grow. It is still an empirical question as to whether the converging trend toward childlessness has helped to equalize opportunities for social mobility for women with different socio-demographic characteristics.

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Tables and Graphs

Table 1. Characteristics of Women ages 40 to 44.
Weighted Percent Distribution: NSFG 1982-1988 & 2006-2008.

	1982-1988				2006-2010			
Variables	**All**	**Mothers**	**Childless**		**All**	**Mothers**	**Childless**	
	100%	89.5%	10.5%		100%	84.4%	15.6%	
Marital status								
Never married	5.0%	1.5%	35.0%	***	5.0%	2.1%	20.4%	***
Ever married	88.6%	91.7%	61.6%	***	87.3%	91.0%	67.1%	***
Ever cohabited	6.4%	6.8%	3.4%		7.7%	6.9%	12.4%	*
Education								
Less than high school	19.2%	19.6%	15.0%	***	14.1%	15.1%	8.4%	*
High school	41.9%	42.6%	35.7%		29.4%	30.8%	22.2%	*
Some college	23.4%	23.4%	23.3%		26.4%	26.2%	27.6%	
College	15.6%	14.3%	25.9%	***	30.1%	27.9%	41.8%	**
Race/ethnicity								
White	79.7%	79.0%	85.8%	***	64.5%	63.0%	72.7%	*
African American	11.1%	11.4%	8.3%	***	13.9%	13.8%	14.2%	
Hispanic	6.3%	6.9%	1.6%	***	14.1%	15.5%	6.6%	**
Other	2.9%	2.7%	4.2%		7.5%	7.6%	6.5%	
Income as % of poverty level								
Below poverty	10.4%	10.8%	6.7%	***	17.0%	19.0%	6.0%	***
100-199% above poverty	14.3%	14.4%	13.2%		19.6%	21.0%	11.8%	**
200-299% above poverty	16.8%	16.1%	22.6%	***	18.9%	19.9%	14.0%	
300-399% above poverty	16.6%	17.7%	7.7%	***	22.3%	24.3%	11.6%	***
400%+ above poverty	41.8%	40.9%	49.9%	***	22.3%	15.9%	56.6%	***
Family background								
Mother has some college educ.	13.2%	12.2%	21.8%	***	30.5%	29.4%	36.3%	
Mother worked	44.3%	44.7%	40.5%		62.6%	61.7%	67.4%	
Lived with both parents at 14	77.9%	77.0%	85.1%	**	66.5%	67.4%	61.9%	
Fertility Issues								
Reports fertility problems	25.6%	24.5%	35.6%	**	26.1%	23.6%	39.4%	***
Attendance to religious services								
Never attends relig. sevices	8.6%	8.4%	10.6%		20.0%	17.8%	32.0%	**
Urbanicity								
Lived in urban area	78.8%	77.6%	88.9%	***	77.9%	75.8%	89.5%	***
Unweighted sample size	1981				1685			

T-tests for differences in means between mothers and childless women: * p < .05 ** p < .01 ***p < .001

Table 2. Estimated Coefficients and Hazard Ratios based on Cox Regression on Childlesless NSFG 1982-1988 & 2006-2008, Women ages 40 to 44.

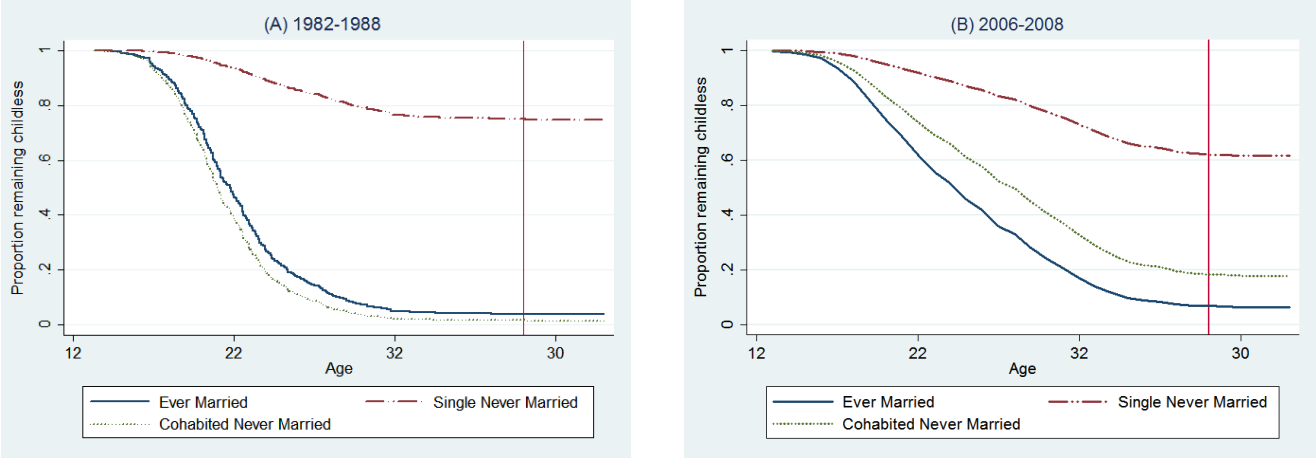
	1982-1988			2006-2010			Sign. Diff
			Haz. Ratio			Haz. Ratio	Across
Independent Variables	**β**	**S.E.**	**Exp$^{-\beta}$**	**β**	**S.E.**	**Exp$^{-\beta}$**	**Periods?[1]**
Marital status							
Ever married (ref.)	---	---	---	---	---	---	
Never married	-2.417	0.186	11.208 ***	-1.726	0.300	5.620 ***	Yes
Ever cohabited	0.236	0.114	0.790 *	-0.460	0.167	1.585 **	No
Education							
High school dropout	0.209	0.042	0.811 ***	0.330	0.143	0.719 *	No
High school (ref.)	---	---	---	---	---	---	
Some college	-0.222	0.034	1.249 ***	-0.152	0.101	1.165	No
College	-0.709	0.072	2.032 ***	-0.435	0.088	1.545 ***	Yes
Race/ethnicity							
White (ref.)	---	---	---	---	---	---	
African American	0.337	0.109	0.714 **	0.430	0.137	0.650 **	Yes
Hispanic	-0.039	0.136	1.040	0.241	0.127	0.785	Yes
Other	-0.352	0.096	1.423 ***	0.458	0.109	0.633 ***	Yes
Income as % of poverty level							
Below poverty	---	---	---	---	---	---	
100-199% above poverty	-0.120	0.027	1.128 ***	-0.177	0.115	1.193	No
200-299% above poverty	-0.235	0.134	1.265	-0.310	0.133	1.364 *	No
300-399% above poverty	-0.014	0.061	1.015	-0.460	0.126	1.584 ***	No
400%+ above poverty	-0.186	0.053	1.204 ***	-1.047	0.157	2.848 ***	Yes
Family background							
Mother has some college educ.	-0.039	0.029	1.039	0.013	0.079	0.987	No
Mother worked	0.101	0.036	0.904 **	-0.028	0.071	1.029	No
Lived with both parents at 14	-0.184	0.016	1.201 ***	-0.074	0.092	1.077	No
Fertility Issues							
Reports fertility problems	-0.503	0.014	1.653 ***	-0.509	0.082	1.664 ***	No
Attendance to religious services							
Never attends relig. sevices	0.069	0.031	0.933 *	-0.127	0.114	1.136	Yes
Urbanicity							
Lived in urban area	-0.305	0.044	1.357 ***	-0.437	0.079	1.548 ***	Yes
Unweighted sample size	1980			1685			

* p < .05 ** p < .01 ***p < .001

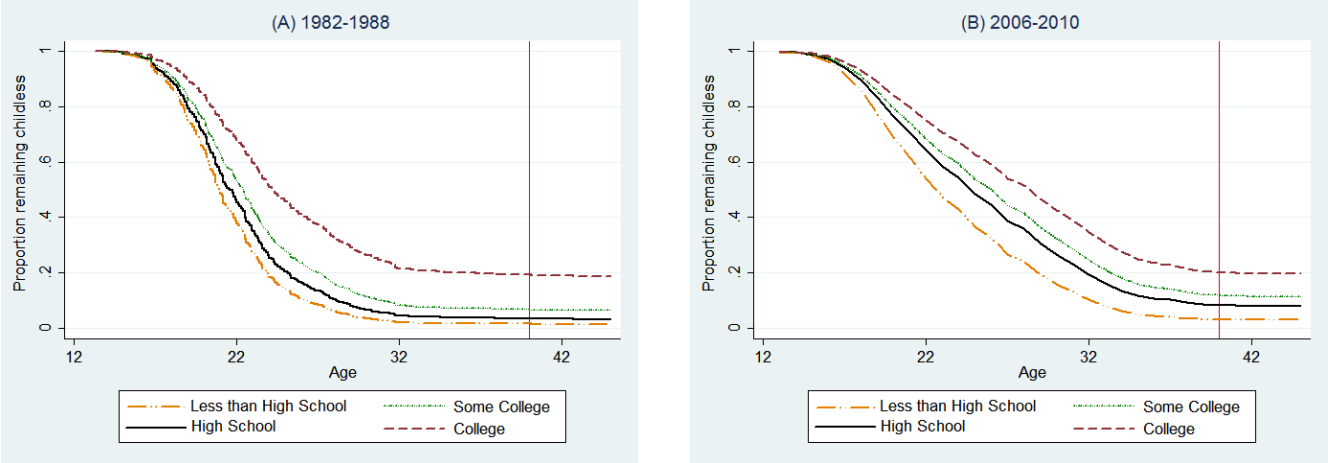
[1]Tests of significance were estimated from a pooled model testing period interactions.

Figure 1. Survival Estimates based on Cox Regression

A. Marital Status



B. Educational Attainment



C. Race/Ethnicity

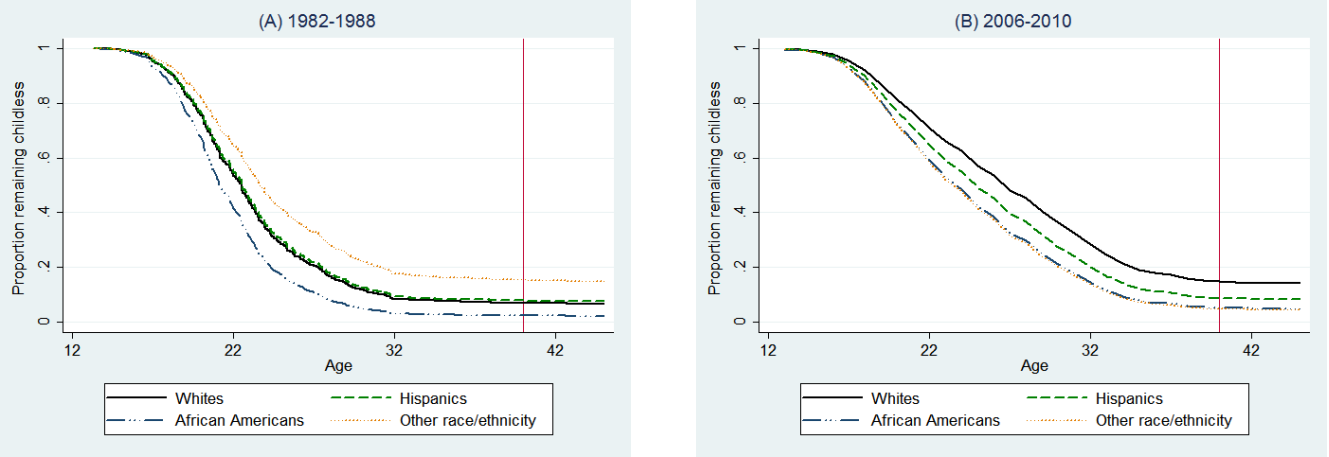


Figure 2. Survival Estimates based on Cox Regression by Income/ Poverty