Seven Decades of Nonmarital Childbearing in the United States

Robert D. Plotnick

Daniel J. Evans School of Public Affairs and

Center for Studies in Demography and Ecology

University of Washington

Phone: 206-685-2055

Fax: 206-684-9044

E-mail: plotnick@u.washington.edu

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Abstract

This study investigates nonmarital childbearing during 1920 – 1993, a time span that encompasses the enormous increase in American nonmarital fertility. The study examines nonmarital fertility across time periods and across and within birth cohorts, and estimates discrete hazard models of nonmarital childbearing. The results suggest both continuity and change in the social forces related to nonmarital fertility. Continuity because the significant associations between nonmarital childbearing and personal characteristics in models spanning 70+ years resemble those from models based on data from the last three decades. Change because change in the nature of these associations, which reflect how personal characteristics are translated into the likelihood of nonmarital childbearing in response to shifts in preferences, norms, and incentives, accounts for essentially all the increase in nonmarital fertility between the pre- and post-1950 periods.

Key words: nonmarital childbearing, nonmarital fertility, historical change

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I. Introduction

According to U.S. Vital Statistics data, the nonmarital fertility rate increased from 7.1 in 1940 to 46.9 in 1994 – more than a six-fold increase.[1] The rise was uninterrupted except for a few years in the 1970s. In recent years the rate has leveled off in the mid-40 range. This steady rise contrasts with the dramatic swings in the overall fertility rate during these decades.

The increase in the nonmarital fertility rate, combined with decreasing fertility rates among married women since the 1950s and with more recent declines in rates of marriage, has produced a steady rise in the nonmarital birth ratio. During the 1940s it was about 3.5 percent. By 1960 it had crept up to slightly more than 5 percent. By the 1990s it had jumped to the 32-33 percent range (Ventura & Bachrach 2000).

The rise in nonmarital childbearing since 1940, and especially since 1970, has been widely discussed, and has motivated many cross-section and panel data studies. Descriptive analyses based on relevant time trends (e.g. rates of sexual activity, contraceptive use, marriage and abortion) have provided insight and plausible explanations for changes in nonmarital childbearing over time (Ventura & Bachrach 2000, Sawhill 2001, Wu, Bumpass & Musick 2001). Statistical decomposition methods have shed light on factors driving the nonmarital birth ratio (Smith, Morgan & Koropeckyj-Cox 1996) and on some important dynamics of nonmarital childbearing (Hoffman & Foster 1997).

Many studies use cross section and panel data spanning the 1960s to 1990s and multivariate statistical methods to address the antecedents of teenage nonmarital childbearing in the U.S. This body of work demonstrates that differences in incentives and individual characteristics are statistically associated with differences in the likelihood that women have nonmarital births. (See Kirby 2001 for a comprehensive review.) Studies of the antecedents of nonmarital childbearing among women beyond the teenage years and of nonmarital childbearing beyond the first nonmarital birth are much less common (Wu & Martin 2002).

From findings based on cross-section and panel data that typically span no more than 10 to 20 years, it is difficult to infer the major long term changes in incentives, in women's characteristics and in other factors that helped drive the long term rise in nonmarital fertility. Because microdata on outcomes and explanatory variables before the late 1960s are rare and have not been exploited, multivariate analysis of the longer historical record has been absent. Consequently, the sources of the rise in nonmarital fertility are not well understood.

This study complements earlier research by using the Panel Survey of Income Dynamics (PSID) to analyze nonmarital childbearing during 1920 – 1993, a time span of 74 years that encompasses the enormous increase in nonmarital fertility. The PSID data allow new analyses of the long term rise in nonmarital childbearing and some of the social factors that may have contributed to it. At the descriptive level this study examines nonmarital fertility across and within birth cohorts as well as across time periods. Such data can usefully supplement the published data, which are generally organized by time period, usually a year, and age range. We examine the proportion of women within a cohort who have ever had a nonmarital child (see Hoffman & Foster 1997 for a related analysis) and the distribution of nonmarital births by the age of the mother. We estimate multivariate reduced-form models of the likelihood that a woman has a nonmarital birth, draw on a simple conceptual framework to interpret the results, and examine the stability of the empirical relationships over time.

Research using relatively recent data consistently finds associations between a number of personal and family background characteristics and the likelihood of having a nonmarital birth (Kirby 2001). This study confirms that those relationships hold over a much longer time period, but shows that the nature of those relationships has changed. This second result allows us to decompose the rise in nonmarital childbearing into a component that reflects the change in the relationships, and one that reflects the change in characteristics of unmarried women between earlier and later decades.

II. Data

The PSID sample initially consisted of women whose marriage and childbirth histories were available in the 1985-1993 Marriage History file and the 1985-1993 Childbirth and Adoption History file. From the information in these files we construct all periods when a woman faces the risk of having a nonmarital birth. For each woman, the first risk period starts, by assumption, at age 15. (Births to girls younger than 15 are very uncommon.) It ends either with her first marriage or a nonmarital birth, or is censored if neither occurs before the last year she appears in the data set or by age 45, whichever comes first. If it ends with marriage and the marriage dissolves before age 45, a second risk period begins. This risk period may end via a second marriage, a nonmarital birth, or censoring. We proceed in parallel fashion for the period following the end of a second or higher order marriage. If a risk period ends with a nonmarital birth, we assume a postpartum infertility period of two months.[2] Then, if the woman is still unmarried, another risk period begins. To add personal and family background variables, we merge risk period data with information from the main PSID 1968-1993 family and individual files. Each risk period is divided into risk years, the unit of analysis in the multivariate models.

Because the data are sparse for the early years of the twentieth century, we restrict analyses to risk periods beginning in 1920 or later and to women born in 1900 or later.[3] Because the focus is on American nonmarital fertility, we drop immigrants whose childbearing years passed before they lived in the U.S. The analysis sample has 15,019 risk periods that include 127,907 risk years for 12,391 women. Of this total, 21,393 risk years occur after a first nonmarital birth. The sample records 5,543 nonmarital births to 3,089 women.

III. Descriptive Findings for Seven Decades of Nonmarital Childbearing

The first two columns of table 1 present the nonmarital birth rate observed in the PSID and parallel data from Vital Statistics, available from 1940 to 1993. The PSID data track the national data fairly well, except for the final four years. In the 1930s the nonmarital fertility rate derived from PSID data was 5.0 percent, or half its value for the 1940s. The rate for the 1920s exceeds that for the 1930s, a pattern consistent with the difference in overall fertility rates between the two decades (National Center for Health Statistics 1994).

The patterns for whites in columns 3 and 4 are similar to those of the corresponding aggregate rates, but at lower levels. The white PSID rates are substantially lower than those from Vital Statistics in three of the five time periods. PSID data show that black nonmarital fertility doubled during the 1950s and remained roughly at that higher level for the next 3.5 decades. Recent PSID nonmarital birth rates for blacks also fall below those from Vital Statistics, but to a much lesser degree than for whites.

Table 2 presents data on nonmarital birth rates for ten-year birth cohorts rather than time periods. Here the numerator is the number of nonmarital births occurring to women in the cohort and the denominator is the number of risk years (years when unmarried) experienced by members of the cohort from age 15 to 45 or, for the more recent cohorts, from age 15 to the latest age we can observe.[4] By 1993 we can observe completed nonmarital fertility for cohorts through 1940-49. Figures for the three youngest cohorts likely overstate the completed nonmarital fertility rates because fertility declines as women reach their 30s and 40s.

The rate tends to rise for later cohorts, but not uniformly. The dip for the 1910-19 cohort may be reflecting the general decline in fertility during the Depression years of the 1930s, when many in this cohort were in their prime childbearing ages. The markedly lower rate for the 1940-49 cohort relative to the 1930-39 cohort is unexpected and not easily detected with published data. Changes in nonmarital birth rates across cohorts of white and black women are similar to changes in the overall rates, but at markedly different levels.

Data organized by cohort show how women born in the same time period experienced nonmarital childbearing over their reproductive years. Such data provide an adult-centered perspective. Data organized by time period provide a child-centered perspective because they show characteristics of mothers when the children are born. It can be equivalently viewed as a cohort analysis, with the cohort being the children born nonmaritally within a specific time period. Both perspectives are useful, depending on the question at hand.

Figure 1 presents nonmarital birth rates for five-year age groups broken down by birth cohort. The first set of bars, for example, shows how teenage nonmarital fertility changed from the oldest cohort (1900-09) to the youngest (1970-79). Evident from the first two sets of bars is the near-steady increase in nonmarital fertility among teenagers and adult women in their early twenties. For both age groups the increases were especially sharp for the 1930-39 cohort. For the age 25-29 group, nonmarital fertility rose precipitously for the 1920-29 cohort, and again for the 1930-39 cohort, then moderated. Nonmarital fertility among 30-34 year olds steadily increased among early cohorts, then moderated. Because there are no data for ages 25-34 for the 1970-79 cohort, we do not know if its rates exceeded those for the

1950-59 and 1960-69 cohorts (like they did for the two youngest age groups). Consistent with the data in table 2, the 1940-49 cohort's rates fall well below the general trend for all four age groups.

Interestingly, nonmarital fertility for the two oldest age ranges was not larger for the younger cohorts. If anything, it declined.

How widespread was nonmarital childbearing among women in different cohorts? Figure 2 shows the percentage of women in a cohort who ever had a nonmarital birth between ages 15 and 45. The numerator is the number of women in the cohort who had at least one nonmarital birth. Each woman having such a birth is counted once regardless of how many nonmarital births she has. The denominator is the total number of women in the cohort.[5]

The changes across cohorts are similar to the changes in the cohort rates in table 2. Among women born in 1900-09, 3.1 percent experienced at least one nonmarital birth. This dropped to 2.1 percent for the 1910-19 cohort, rose for the next two cohorts to almost 7 percent, then declined to 5.1 percent for the 1940-49 cohort.

The corresponding values for more recent cohorts will be much higher. For the 1950-59 cohort, we only track fertility through age 34-43. Though their nonmarital fertility is observed incompletely, 9.4 percent of the women in this cohort had already experienced at least one nonmarital birth. For the 1960-69 (1970-79) cohort, with 10 (20) fewer years of observed fertility, 11.9 (10.0) percent had already experienced nonmarital childbearing. The patterns are similar for white and black women.

Figure 3 shows for nonmarital mothers the age distribution of when they experienced their first nonmarital birth. In the oldest cohort 74 percent of first nonmarital births occurred at age 25 or younger. This dropped to 64 percent for the next cohort and remained in the low to mid 60 range through the 1950-59 cohort.[6] The offsetting increase mostly took place in the 26-30 age range, except for the anomalous 1910-19 cohort, where it took place in the 31-35 age range. Thus, an upward shift in the age of first nonmarital birth to the late 20's happened in mid-century. Women age 31-45 accounted for 18 percent of first nonmarital births in the 1900-09 cohort. This percentage jumped sharply for the next two cohorts, but then returned to its earlier level.

Figure 4 shifts the unit of observation from nonmarital mothers to nonmarital births. It shows the distribution of all such births by the age of the mother at the time of each birth, by cohort. For the two oldest cohorts, 61 to 63 percent of nonmarital children were born to mothers age 25 or under. This share dropped to 50 percent for the 1920-29 cohort. It then rebounded to the 63-68 percent range for the next three cohorts. So, like figure 3, we find a sharp decrease in the share of births to women age 25 or younger for the 1920-29 cohort. But unlike figure 3, we do not see a permanent shift away from early nonmarital childbearing. As in figure 3, we find a large increase in the share of nonmarital births to women in their late 20's starting with the 1920-29 cohort. A substantial decline in the share of nonmarital births took place in the 31-45 age range, starting with the 1930-39 cohort.

Table 3 presents corresponding data by time period. This way of organizing the data yields a rather different impression of the trend in the distribution of nonmarital births by age of the mother. Here we observe an <u>increase</u> in share of births to the two youngest age groups, then a return to the earlier level. In contrast to figure 4, the share for women in their late 20's does not exhibit a clear trend. The share of nonmarital births to women age 31-45 declined from 14.1 percent in the 1950s to 5.7 percent in the 1970s, then rebounded.

IV. Multivariate Models: Conceptual Framework, Independent Variables, and Findings

At a general level one may conceptualize the factors behind the long term rise in nonmarital fertility as falling into three categories: incentives, social norms and individual preferences and values, and personal characteristics. **Incentives** (or constraints) related to childbearing and marriage decisions may have changed in ways that increasingly encouraged nonmarital fertility. Changes in women's earnings relative to men's, in the real value of women's earnings, in income support and tax policies, in the availability and costs of child care and abortion (and in the legality of the latter), and in the costs and efficacy of contraceptives might be examples.

Holding incentives constant, **social norms** and **individual preferences and values** ("tastes") about the acceptability and desirability of unwed parenthood may have gradually changed so that such behavior is less stigmatized and more widely regarded as an acceptable alternative to both childlessness and parenting within marriage. For example, if men increasingly believe that women can and should control their fertility via contraception and abortion, they may become less willing to marry partners they impregnate (Akerlof, Yellen & Katz 1996). If the normative climate is more accepting of nonmarital motherhood, women may be more willing to choose this status, other things equal (Butler 2002). There is strong evidence of such changes in norms and preferences (Pagnini & Rindfuss 1993).

Net of these factors, **women's characteristics** may have changed in ways that led to more nonmarital fertility. For example, being raised in a single mother family is associated with higher nonmarital fertility (Kirby 2001). More women have been raised in such families over time, so if family structure has had a constant effect on nonmarital fertility, then the nonmarital fertility rate would rise, other things equal.

Individual characteristics are often regarded as proxies for, or determinants of, unobservable individual preferences and values. Under this interpretation, changes in women's characteristics may have led to changes in the distribution of preferences and values in ways that led to more nonmarital fertility.

Independent variables. The analysis requires a set of explanatory variables available for all women in the sample and over seven decades. This limits the number of feasible variables for several reasons. The PSID has data on state of residence and other location variables starting in 1968. Because many risk years precede 1968, location variables as well as other contextual variables that might be appended using location variables can not be included. Also, many individual characteristics related to nonmarital childbearing behavior are arguably not exogenous, particularly when one tracks behavior starting at age 15. For example, years of completed schooling and work experience are likely to be jointly determined with early nonmarital (and marital) childbearing (Klepinger, Lundberg & Plotnick 1999, Ribar 1999). Such variables do not belong in a reduced-form model. In addition, only a few family background measures are available for many women in the sample.

The parsimonious set of explanatory variables includes seven personal and family background characteristics: father's and mother's education, religion, race/ethnicity, number of siblings, mother's marital status at the time of the respondent's birth, and age when the respondent became a permanent resident of the U.S. The first five have been widely used in studies of nonmarital childbearing. We also considered the birth order of the respondent and a dummy if the respondent's birth weight was low. Because neither was significant in models that included the other characteristics, the final results omit them.

Prior research (Kirby 2001) shows that greater parental education and having a religious affiliation (relative to none) are strongly associated with lower chances of nonmarital childbearing. Blacks are most likely to have nonmarital births, followed by Hispanics. Living in a family lacking both biological parents, having a larger number of siblings, and having a mother who experienced a teenage birth are each associated with higher chances of nonmarital childbearing.

We code parental education as dummy variables: high school graduate, some college, and college graduate and above. The dummy variables for religion are coded as Protestant, Catholic, Baptist, and Jewish/other. We code race/ethnicity as black, non-black Hispanic, and other. Mother's marital status at the time of the respondent's birth is represented by dummies for never married, widowed, divorced and separated. The omitted categories are, respectively, less than high school, no religion, non-Hispanic white, and married. To minimize loss of observations, we include missing value dummies for the education, sibling and mother's marital status variables.

One might expect that, among immigrants, the younger a woman was when she moved to the U.S., the more likely American norms and values about marriage and parenthood have influenced her. Because most immigrants came from societies with stronger norms against such behavior, one might hypothesize that the age when a respondent became a permanent resident will be inversely related to the chances of becoming an unwed mother. The models include this variable as a rough proxy for acculturation to American norms and values. It equals zero for native born women and ranges from 1 to 45 for immigrants.

The models include dummies for birth cohort and time period. Birth cohorts are defined by five-year periods, starting with 1900-04 and ending with 1970-74.[7] Time periods are defined in ten-year spans, starting with 1920-29 and ending with 1980-89. We observe behavior during 1990-93 and so define these years as another time period. The omitted dummies are for the 1900-04 cohort and the 1920-29 decade. Because cohort and period variables are in the regressions, we exclude age at the start of each risk year.[8]

Discrete time logit hazard models of whether a woman had a nonmarital birth within a risk year provide the multivariate results (Allison, 1984). Because there are multiple observations on the same woman, significance tests use Huber-White standard errors.

Findings. When one compares the mean of each independent variable for women who had a nonmarital birth to the mean for those who did not, the significant differences generally accord with expectations based on earlier research. Women with nonmarital births are less likely to have mothers who were married at the time of the respondent's birth, come from families with more siblings, have parents with less education, and are more likely to report no religion and to be black or Hispanic (table available upon request).

Table 4 contains findings from discrete time logit hazard models of the likelihood of having a nonmarital birth during a risk year. In the model for the full sample, though few cohort dummy variables are significant, they show a plausible pattern – a steady increase in the likelihood of nonmarital childbearing for women in the 1955-59 and later cohorts. All period dummy variables, save one, are insignificant at the 5 percent level. One other is marginally significant.

The conceptual framework suggests an interpretation of the coefficients on the birth cohort and time period dummies. Suppose norms and personal preferences and values have become more supportive of nonmarital childbearing and that such changes have gradually permeated society across all cohorts. Then in more recent periods nonmarital fertility for all age groups of women would exceed that in earlier periods. If this mechanism has largely been driving the observed rise in nonmarital fertility, one would expect to find period effects characterized by a positive trend in the coefficients on the period dummies. One would also expect to find a positive trend if incentives changed in ways that increasingly encouraged nonmarital childbearing, because changes in such incentives generally apply broadly, rather than to specific cohorts.

Alternatively, if changes in norms and personal preferences and values tended to occur mainly among adolescents and young adults, then more recent cohorts would have higher nonmarital fertility, other things equal. This mechanism would gradually increase the aggregate rate of nonmarital fertility as younger cohorts move through their childbearing years. In this case one would expect cohort effects characterized by a positive trend in the coefficients on birth cohort dummies. Results for the full sample are consistent with this expectation.

Published Vital Statistics for the annual rate of nonmarital fertility (e.g. Ventura & Bachrach 2000) are consistent with increasing period effects, increasing cohort effects, or both. The findings suggest that cohort effects have predominated.

The findings for the personal and family background variables resemble those typically reported in the literature. Black women are much more likely to become unwed mothers. Hispanic and other non-white women also have higher odds than non-Hispanic whites. Mother's and father's education are strongly and inversely associated with their daughter's likelihood of nonmarital childbearing. Women whose mothers were unmarried, separated or widowed when they were born are more likely to have a nonmarital birth. The effect of widowhood is marginally significant. Having more siblings and being raised as a

Catholic or Baptist are also positively associated with the likelihood of nonmarital childbearing. The finding on being Catholic runs counter to most other studies. Women raised Jewish or in some other faith were less likely to become unwed mothers. Contrary to expectation, the age when a respondent became a permanent resident is positively associated with the odds of nonmarital childbearing.

Coefficients on personal and family characteristics do not admit to a simple interpretation about the effects of preferences, norms and incentives. Such characteristics may be thought of as proxies for individual preferences and values. For example, being raised by a never-married mother may increase a daughter's willingness to be an unwed parent. They may also reflect subgroup norms. The coefficient on "black" may partly reflect black community norms about the acceptability of nonmarital childbearing. And the same characteristics are likely to be related to economic incentives. For example, the opportunity costs of unwed parenthood may be lower for blacks because of discrimination that limits their labor market prospects and for women with poorly educated parents because of intergenerational transmission of economic status (Chadwick & Solon 2002).

Columns 2 and 3 of table 4 contain separate estimates for blacks and for non-Hispanic whites. (The Hispanic sample is too small for separate estimation.) Findings for the individual background variables generally are similar for whites and blacks and to those from the full sample. Parental education again is inversely associated with a daughter's likelihood of nonmarital childbearing. The relationships are stronger and more consistent for whites. Mother's marital status at time of birth and number of siblings show the same relationships with nonmarital childbearing as in column 1. Here, too, the relationships are stronger and more consistent for whites. Being Baptist has a weak positive relationship with black women's likelihood of nonmarital childbearing. For whites, women raised Jewish or in some other faith were less likely to become unwed mothers. The age when a respondent became a permanent resident is positively associated with white women's likelihood of nonmarital childbearing and unrelated to black women's.

The pattern of period and cohort effects differs substantially between blacks and whites. For blacks, as for the full sample, period effects are not present and cohort effects show a significant, steady increase, but starting slightly earlier with the 1950-54 cohort. In contrast, cohort effects for whites are all insignificant while the period effects show a sharp rise in the likelihood of nonmarital childbearing starting during 1960-69. In line with earlier reasoning, these results suggest that changes in norms, personal preferences and values about nonmarital childbearing for blacks tended to occur among adolescents and young adults starting with women born in the early 1950s, while for whites such changes gradually diffused across all cohorts starting in the 1960s.

First nonmarital births: To focus on factors associated with initiation of nonmarital childbearing, we estimate the model using samples that exclude all risk years after the first nonmarital birth. Because the excluded risk years account for only 17 percent of the total, one would expect results similar to those in table 4. That is what we find for the background characteristics, except for the following. For the model estimated on all women, the positive effects of Catholic, Baptist and age of permanent residence become insignificant. For blacks, Baptist becomes significant at the 5 percent level. For whites, being born to a widow shows a strong positive relationship with nonmarital childbearing, and being raised Catholic, Protestant and Baptist all show a negative relationship.

The cohort effects hardly change when we use the restricted samples. But the period effects do for the race-specific models. For blacks, the restricted sample shows significant and unexpected negative period effects for 1980-89 and 1990-93. For whites, the strong period effects found with the full set of risk years completely disappear with the restricted set, except for a marginally significant positive coefficient for 1990-93.

V. Decomposing the Long-Term Increase in Nonmarital Fertility

The conceptual framework views changes in preferences, norms, incentives or women's characteristics as the drivers of changes in nonmarital fertility. If preferences, norms, and incentives have systematically changed over time, the coefficients on the individual background variables are likely to have changed as well. For example, suppose norms about the acceptability of nonmarital childbearing have become more similar in white and black communities in recent decades. Then the positive coefficient on the dummy variable for being black would tend to decline over time. Similarly, because black women's earnings opportunities have become more similar to white women's (Cain 1986, Altonji & Blank 1999) the opportunity costs of becoming an unwed mother in terms of foregone earnings would have become more similar. Such a change would also tend to reduce the coefficient on the dummy variable for being black.

As a third example, consider how the coefficients on the dummy variables for mother's marital status at the time of birth might change over time. Suppose daughters of never-married women have always felt nonmarital childbearing to be more acceptable than daughters of mothers were married at the time of birth. As the acceptability of nonmarital childbearing has risen in the general population, one might expect a decline in the relative effect of being the daughter of a never-married mother. Lasat, to the extent that the acceptability of nonmarital childbearing has risen throughout society, one would expect an increase in the constant term.

Women's characteristics have changed over time as well. As noted earlier, being raised in a single mother family or by poorly educated parents is associated with higher nonmarital fertility. Holding constant the relationship between these characteristics and nonmarital childbearing, the increase in recent decades in the proportion of women raised in single mother families would have contributed to the increase in nonmarital childbearing, while the secular increase in adult education would have exerted downward pressure.

If the regression coefficients or women's characteristics (or both) have changed over time, one can better understand the long-term increase in nonmarital childbearing using the Blinder-Oaxaca decomposition (Blinder 1973, Oaxaca 1973). This technique has been widely used to analyze race and sex discrimination in the labor market (e.g. Altonji & Blank 1999, O'Neill & Polachek 1993). It can be applied more generally to decompose the difference in an average outcome between any two groups, such as in Sastry & Hussey's (2003) study of racial and ethnic differences in birth weight. To apply it in the context of this study, consider two cohorts, early (E) and late (L). In a linear hazard model, the mean probability that a woman in the early cohort has a nonmarital birth in a year, P_E, is:

(1) $$\mathbf{P_E = X_E ß_E,}$$

where X_E is the vector of the mean characteristics of women in cohort E, and $ß_E$ is the vector of coefficients from a hazard regression on the members of cohort E. Similarly, for the late cohort $P_L = X_L ß_L$. Vectors X_E and X_L include the same variables. The change in the mean probability is:

(2) $$\mathbf{P_L - P_E = (X_L ß_L - X_E ß_E)}$$

Adding and subtracting $X_L ß_E$ and rearranging terms gives:

(3) $$P_L - P_E = ß_E(X_L - X_E) + X_L(ß_L - ß_E)$$

The decomposition divides the change in the mean probability into two components. The first shows the portion of the change accounted for by differences in the cohorts' mean characteristics, evaluated using cohort E's coefficients. The second shows the portion accounted for by differences in the coefficients from regressions on the late and early cohorts, evaluated at the mean characteristics of cohort L. The change in coefficients, which captures the change in how personal characteristics are translated into the expected chances of nonmarital childbearing, empirically reflects underlying changes in norms, preferences and incentives. Adding and subtracting $X_E ß_L$ yields a similar decomposition.[9]

To implement the decomposition, we divide the sample into an "early" cohort – those born before 1950, and a "late" cohort – those born in 1950 or later. The regressions include the same individual background variables as in the full model. They exclude time period and cohort dummies in order to have identical specifications for the two cohorts. With period and cohort variables excluded, we are able to include age at the start of each risk year as an additional explanatory variable. Age is commonly associated with nonmarital childbearing (Kirby 2001).[10] For ease of interpretation, we present results based on linear probability hazard regressions.

The predicted mean probability of having a nonmarital birth in a year for the early cohort is .0338 when computed using the early regression. The predicted mean for the late cohort is .0468, computed using the late regression. The change is +.0130. When the mean characteristics of cohort L are inserted into the early regression, the predicted probability is .0336. Thus, the shift in demographic composition exerted a small negative effect on the rate of nonmarital childbearing that accounts for – 1.5 percent [(.0336 - .0338) / .0130] of the total change. Change in coefficients, which captures the change in how personal characteristics are translated into the expected chances of nonmarital childbearing, accounts for all of the observed increase in the mean. The results, however, provide no insight into how much of the change in coefficients reflects changes in incentives versus changes in preferences and norms.

The alternative decomposition yields even more striking results. When the mean characteristics of cohort E are inserted into the late regression, the predicted probability is .0502. This suggests that shifts in demographic composition accounted for – 28 percent of the observed change, and the change in coefficients accounted for 128 percent. Put otherwise, the rate of nonmarital childbearing would have been even higher in recent decades without the demographic shifts that partly counteracted changes in the coefficients.

Replicating the analysis on models of first nonmarital births yields a slightly different impression. With the first decomposition, demographic change accounts for 20 percent of the increase in the probability of having a first nonmarital birth in a year. With the alternative decomposition, demographic change accounts for – 2 percent. Shifts in the coefficients again account for essentially all of the observed increase. [11]

To further investigate the relative importance of changes in demographics and coefficients, we redefine the late cohort as women born 1960 or later. Women born in 1960 turned 15 in 1975, right around the time when nonmarital fertility began two decades of rapid increase. This variation strongly confirms that the main driver of the rise in nonmarital fertility has been changes in preferences, norms and incentives, holding constant demographic characteristics. With the first decomposition, demographic change accounts for – 8 percent of the increase in the probability of having a first nonmarital birth in a year. With the alternative, demographic change accounts for – 129 (!) percent.

We also conduct parallel analyses using cross-section regressions. The dependent variable is whether a woman ever had a nonmarital birth before age 20, or whether she ever had such a birth before age 30. The samples are women born before 1950, and women born in 1950 or later who were 19 (29) or older by 1993. The regressions include all time-invariant characteristics in the hazard-based decomposition regressions.

Compared to decompositions based on hazard models, the results suggest demographic change probably helped increase nonmarital fertility, rather than offset changes in the coefficients. For the model of teen nonmarital fertility, demographic change accounts for + 23 or + 6 percent of the increase, depending on the decomposition. For the under 30 model, demographic change accounts for + 35 or – 3 percent of the increase. Nonetheless, shifts in the coefficients account for the lion's share of the observed increase. [12]

Last, in view of the large differences between white and black women in nonmarital fertility, we repeated the first decomposition separately for the two groups. For white women we again find demographic change exerted downward pressure on the rate of nonmarital fertility. Depending on the decomposition used, it accounts for – 35 percent or – 158 percent of the increase in the probability of having a first nonmarital birth in a year. Shifts in the coefficients drove the rate upward, accounting for 135 or 258 percent of the increase.

For black women the difference between P_L and P_E is very small. This means the share of the change apportioned to each factor can swing wildly in response to small absolute changes in the two components on the right hand side of equation (3). In fact, this is what happens with the estimated regressions, so a stable estimate of the share accounted for by each component eludes us.

VI. Conclusion

This study complements earlier research by examining nonmarital childbearing over the 1920-1993 period, a time span that encompasses the enormous increase in this behavior. The results suggest both continuity and change over these decades in the social forces related to the rate of nonmarital fertility in the U. S. Continuity because the significant associations between nonmarital childbearing and personal and family background characteristics in models spanning 70+ years are much like those from models based on data from the last three decades. Change because change in the nature of these associations, which reflect how personal characteristics are translated into the likelihood of nonmarital childbearing in response to shifts in preferences, norms, and incentives, accounts for essentially all of the observed increase in nonmarital fertility between the pre- and post-1950 periods.

The hypothesis that shifts in preferences, norms and incentives have been far more closely associated with the rise in American nonmarital fertility than demographic change would probably command broad assent among close observers of this behavior. The decompositions presented in this study provide a firmer basis for such a conclusion.

The estimates and decompositions provide new clues about the nature of the long term record of nonmarital fertility, but have several important limitations. Because the set of exogenous variables is small, the models are sparsely specified. Sparseness restricts the hypotheses that can be examined, prevents the analysis from shedding light on how much of the historical increase reflects changes in incentives versus changes in preferences and norms, and generally limits the depth of insight one can derive. Given that richer data for these decades are unlikely to ever be available, our understanding of the factors that helped drive the rise in twentieth century nonmarital fertility in the United States will remain limited.

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Average Nonmarital Birth Rate by Decade (Births per 1000 Unmarried Women per Year)

	All women		White women		Black women	
Years	**PSID**	**Vital Statistics**	**PSID**	**Vital Statistics**	**PSID**	**Vital Statistics**
1920-29	9.7	na	7.7	na	33.4	na
1930-39	5.0	na	3.7	na	19.5	na
1940-49	10.0	9.8	5.5	na	47.4	na
1950-59	21.5	18.4	8.5	8.5	95.6	na
1960-69	20.7	23.2	8.8	11.0	79.8	na
1970-79	29.0	25.3	13.3	13.0	76.8	86.2
1980-89	29.5	33.5	14.6	22.5	72.0	80.9
1990-93	31.5	44.9	14.4	34.7	71.9	87.6

Source: Tabulations from the PSID (weighted) and Vital Statistics data

For the PSID column the numerator is the number of nonmarital births occurring during the time period. The denominator is the number of risk years observed during the time period among all unmarried women. The Vital Statistics data are weighted averages of published annual rates, with the number of unmarried women in each year as the weight, except for 1940-1949 when such information was unavailable. For that decade the table shows the simple average of the published rates.

na = Not available

Table 2

Nonmarital Birth Rate in PSID Data, by Birth Cohort (Births per 1000 Unmarried Women per Year)

Birth Cohort	**All Women**	**White Women**	**Black Women**
1900-09	9.2	7.0	37.6
1910-19	6.2	5.3	22.1
1920-29	12.7	8.4	47.3
1930-39	23.4	8.4	94.9
1940-49	16.6	6.7	57.0
1950-59	28.7	12.1	71.9
1960-69	34.8	18.5	86.1
1970-79	34.0	13.3	102.0

Source: Tabulations from the PSID (weighted).

Table 3

Distribution of Nonmarital Births by Age of Mother at Time of Birth, by Time Period

	Time Period [a]				
	1950-59	**1960-69**	**1970-79**	**1980-89**	**1990-93**
Percentage of all nonmarital births, by age of mother at time of birth					
Less than 20 years	29.6	45.0	37.5	30.0	29.8
21-25 years	37.6	31.8	42.3	35.4	33.1
26-30 years	18.7	10.5	14.5	23.3	19.3
31-35 years	9.9	7.2	3.8	7.9	14.5
36-40 years	3.1	4.0	0.9	2.8	2.3
41-45 years	1.2	1.5	1.0	0.6	1.0
25 years or younger	67.1	76.8	79.8	65.4	62.9
31-45 years	14.1	12.7	5.7	11.2	17.8

Source: Tabulations from the PSID (weighted).

a. The data do not provide complete nonmarital birth information for the older age ranges for decades earlier than the 1950s.

Table 4

Discrete Time Logit Hazard Models of the Likelihood of Having a Nonmarital Birth

	Full Sample	**White Women**	**Black Women**
Birth cohort:			
1905-09	0.456	0.646	0.195
	(1.11)	(0.94)	(0.41)
1910-14	0.034	0.279	-0.478
	(0.08)	(0.37)	(0.96)
1915-19	0.239	0.048	0.122
	(0.55)	(0.06)	(0.24)
1920-24	0.535	-0.165	0.688
	(1.28)	(0.21)	(1.46)
1925-29	0.576	0.275	0.680
	(1.36)	(0.35)	(1.44)
1930-34	0.647	0.039	0.817#
	(1.55)	(0.05)	(1.74)
1935-39	0.497	0.198	0.552
	(1.19)	(0.26)	(1.17)
1940-44	0.287	-0.603	0.620
	(0.69)	(0.79)	(1.32)
1945-49	0.473	-0.223	0.752
	(1.14)	(0.29)	(1.60)
1950-54	0.616	0.013	0.870#
	(1.50)	(0.02)	(1.87)
1955-59	0.903	0.184	1.208**
	(2.19)*	(0.24)	(2.59)
1960-64	1.117	0.407	1.422**
	(2.70)**	(0.54)	(3.04)
1965-69	1.270	0.603	1.551**
	(3.06)**	(0.80)	(3.30)
1970-74	1.355	0.446	1.731**
	(3.25)**	(0.59)	(3.66)
Risk period:			
1930-39	-0.395	-0.303	-0.357
	(1.27)	(0.64)	(0.82)
1940-49	-0.119	0.033	-0.225
	(0.34)	(0.05)	(0.56)
1950-59	0.660	1.003	0.522
	(1.99)*	(1.59)	(1.28)
1960-69	0.608	1.381*	0.166
	(1.79)#	(2.13)	(0.40)
1970-79	0.343	1.361*	-0.337
	(1.01)	(2.10)	(0.81)
1980-89	0.209	1.568*	-0.642
	(0.61)	(2.42)	(1.54)

1990-93	0.200	1.723**	-0.779#
	(0.58)	(2.64)	(1.86)
Siblings	0.044	0.070**	0.042**
	(5.15)**	(2.93)	(4.30)
Never Married	0.322	0.743**	0.271**
	(4.64)**	(3.33)	(3.59)
Widow	0.369	1.377#	0.292
	(1.80)#	(1.94)	(1.32)
Divorced	0.060	-0.324	0.024
	(0.35)	(0.73)	(0.13)
Separated	0.502	1.096**	0.488**
	(4.18)**	(2.70)	(3.80)
Dad-High school grad	-0.317	-0.359**	-0.208**
	(5.77)**	(3.51)	(2.98)
Dad-Some college	-0.406	-0.740**	-0.151
	(3.83)**	(3.74)	(1.15)
Dad-College grad	-0.449	-0.500**	-0.194
	(4.43)**	(2.60)	(1.52)
Mom-High school grad	-0.334	-0.588**	-0.181**
	(6.88)**	(5.90)	(3.09)
Mom-Some college	-0.408	-0.962**	-0.243*
	(4.80)**	(4.91)	(2.39)
Mom-College grad	-0.520	-1.096**	-0.236*
	(5.58)**	(4.77)	(2.26)
Protestant	-0.006	-0.191	-0.015
	(0.09)	(1.53)	(0.17)
Catholic	0.165	-0.018	-0.067
	(2.31)*	(0.15)	(0.60)
Baptist	0.150	-0.148	0.147#
	(2.32)*	(1.00)	(1.91)
Jewish/other	-1.661	-1.650**	-0.778
	(3.80)**	(3.25)	(1.03)
Black	1.207		
	(23.46)**		
Hispanic	0.564		
	(7.84)**		
Other race	0.646		
	(4.19)**		
Age of residency	0.008	0.015**	-0.003
	(2.61)**	(3.47)	(0.23)
Constant	-5.144	-5.471**	-3.492**
	(14.31)**	(8.85)	(8.11)
Observations	127,907	69,314	45,769

Robust z statistics in parentheses
significant at 10%, * significant at 5%; ** significant at 1%
Regressions also include missing value dummies for siblings, mother's marital status, and mother's and father's education. Results available upon request.

Figure 1
Nonmarital Birth Rate by Cohort and Age Groups

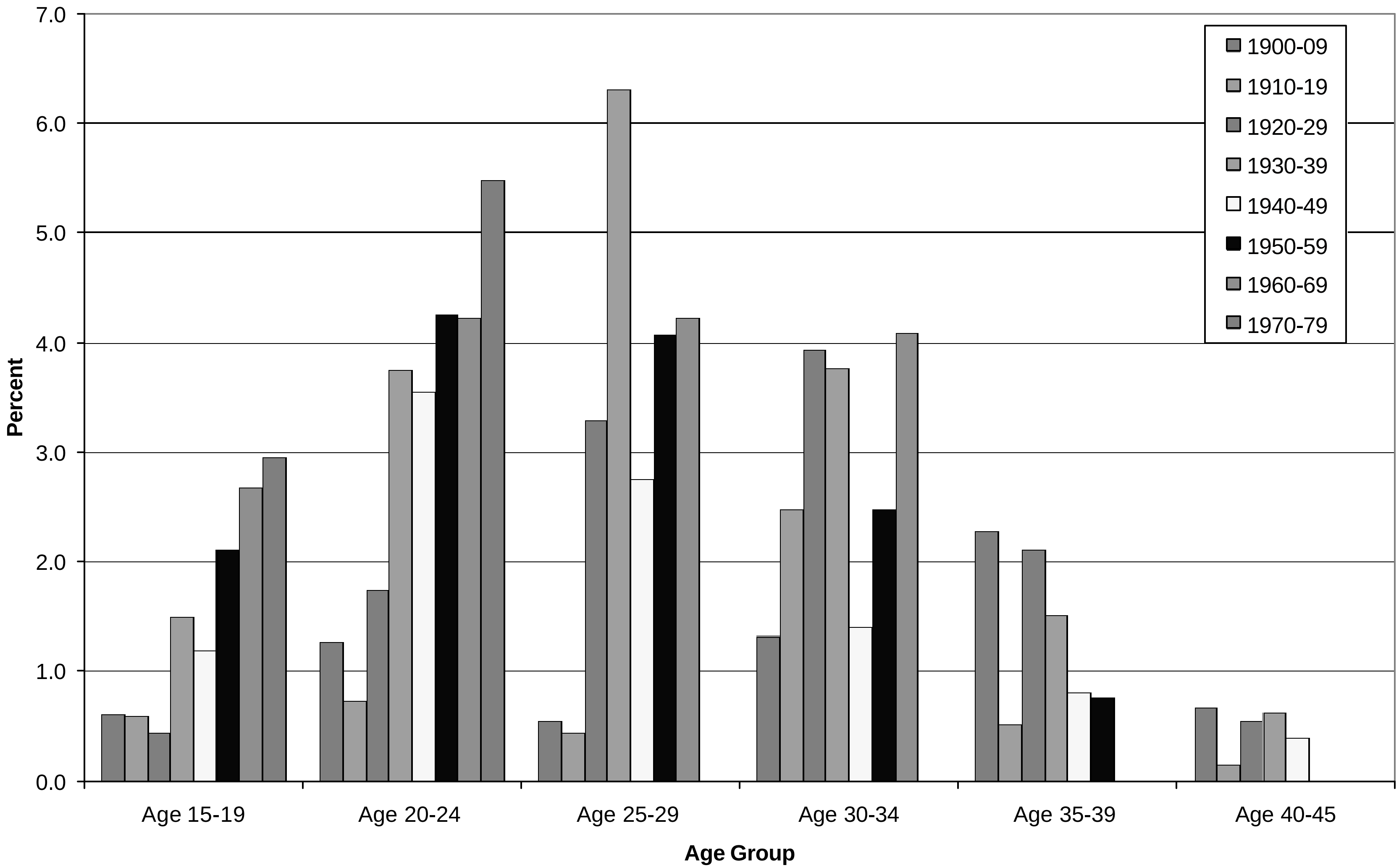


Figure 2
Percentage of Women Ever Experiencing a Nonmarital Birth, by Birth Cohort

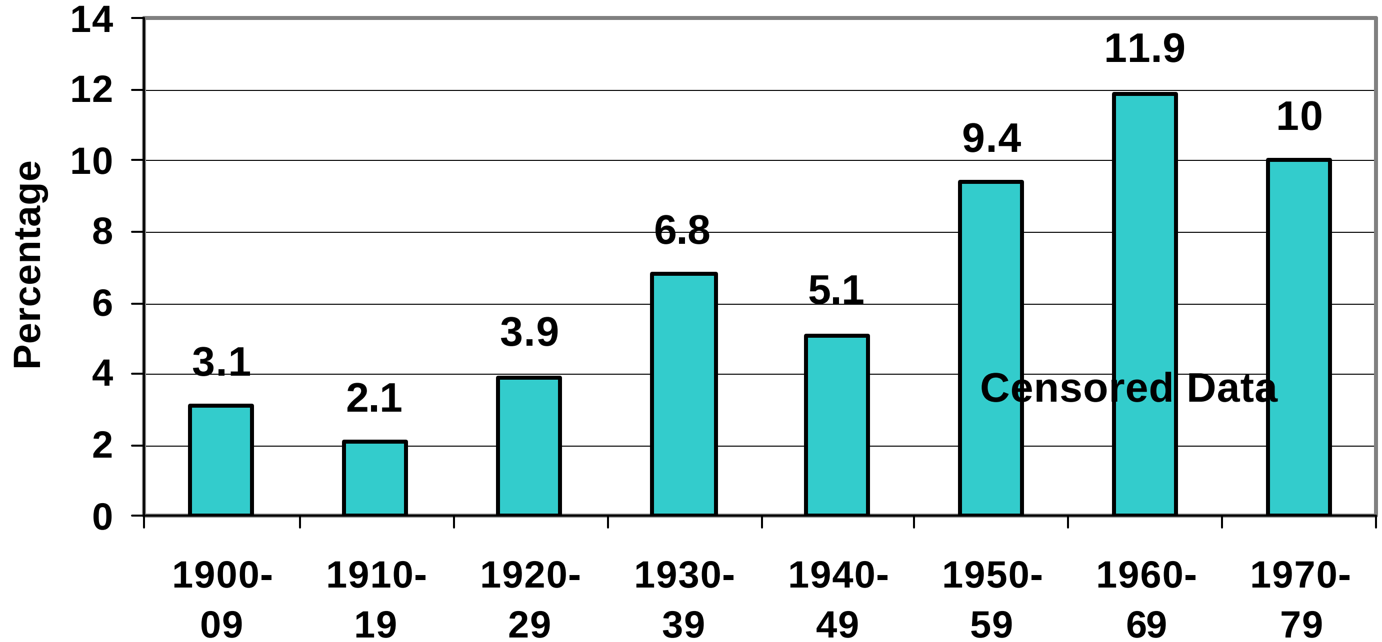


Figure 3
Age Distribution of First Nonmarital Births, By Cohort

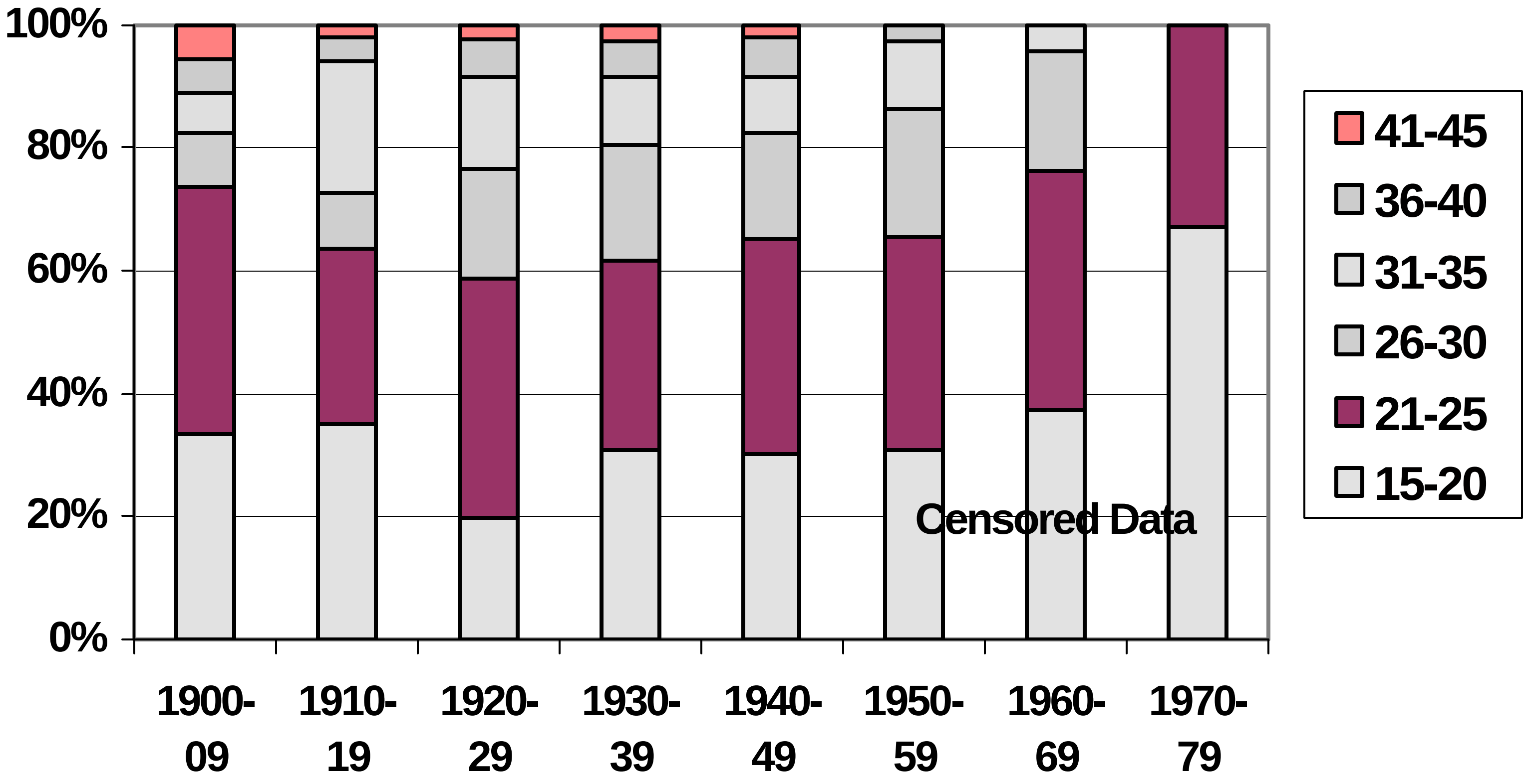
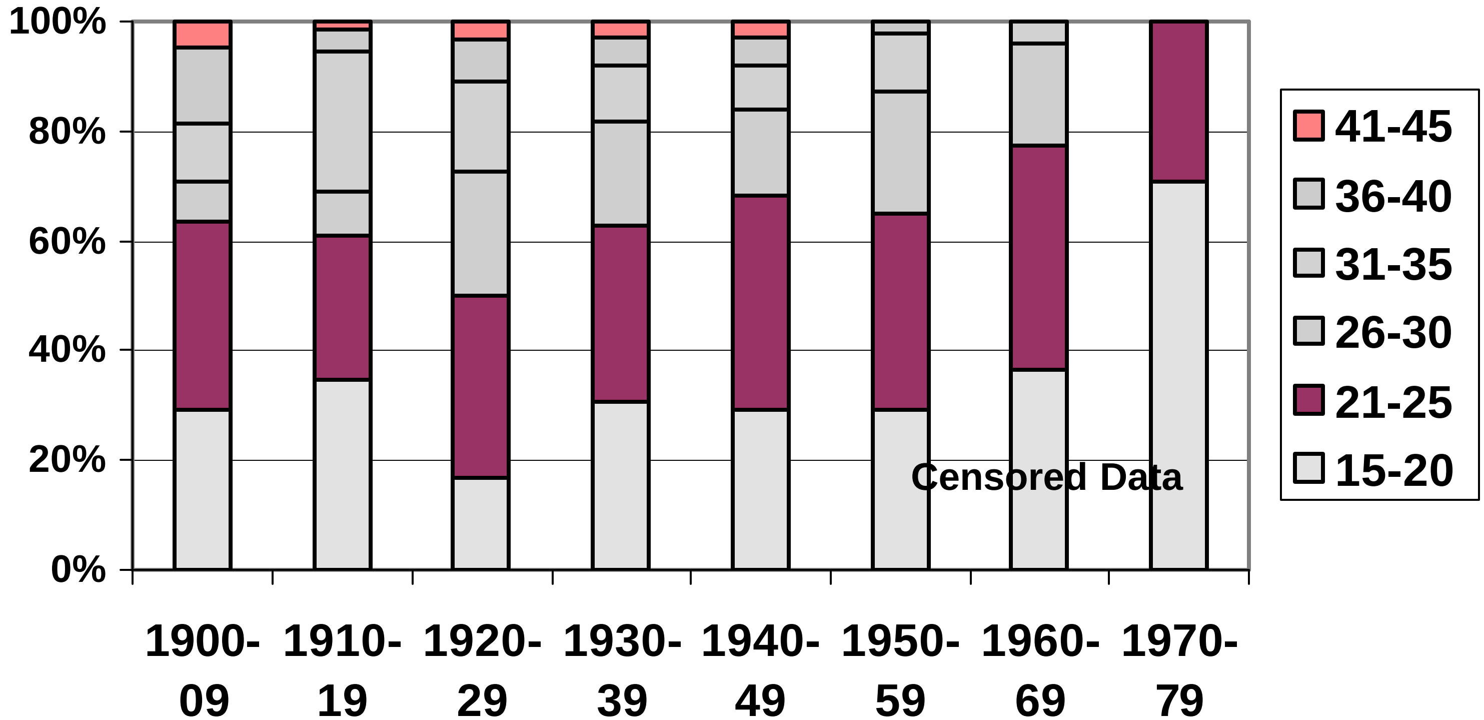


Figure 4
Distribution of Nonmarital Births by Age of Mother at Time of Birth, by Cohort



[1] The earliest year with reliable data on the national nonmarital fertility rate is 1940. Bachu (1999) reports data for the 1930s, but only for women age 15-29.

[2] We assume two months because there are many cases in the PSID with a birth interval of only 11 or 12 months.

[3] For early cohorts, there is significant loss of potential members of the analysis sample because of mortality. If mortality rates for women with nonmarital births do not differ from the rates of other women, the findings will not be biased by sample loss due to mortality.

[4] The numerator of any given cohort's nonmarital fertility rate in year t is the number of nonmarital births occurring in year t to unmarried women in the cohort. The denominator is the number of unmarried women in the cohort in year t. The denominator changes as unmarried women in the cohort marry or die, and married women divorce or become widowed. Hence, to obtain a multi-year rate analogous to the annual one, we proceed as described in the text.

[5] This percentage is not analogous to the nonmarital fertility rates in tables 1 and 2. The numerator in the rates counts each nonmarital birth (rather than each woman with one or more nonmarital births) and the denominator uses risk years among unmarried women.

[6] In figures 3 and 4 the percentages for the 1950-59 cohort are slight overestimates because they are based on data that exclude all nonmarital fertility in the 41-45 age range and some in the 36-40 range. Data for the two youngest cohorts are too incomplete to use for inter-cohort comparisons in either figure. For the 1940-49 cohort we observe fertility for all ages and all women except at age 45 for women born in 1949. The missing data have a negligible effect on the amount of nonmarital fertility during age 41-45 for that cohort, and, hence, on the overall rate.

[7] Women born in 1975-78 would be between age 15 and 18 during the last time period. Because we observe such a small portion of their fertility history, we omit them from the regressions.

[8] Given the study's focus on long run changes in nonmarital fertility, the relationships of period and cohort to such changes are of greater interest than the relationship of age. Given the need to exclude one of these three variables, we dropped age.

[9] One term captures the share of change accounted for differences in the mean characteristics, evaluated using cohort **L**'s coefficients. The other captures the share of the change accounted for by differences in the coefficients from late and early regressions, evaluated at the mean characteristics of cohort **E**.

[10] Footnote 8 explains why it was excluded from earlier regressions.

[11] We also use logit hazard regressions to compute the mean logarithm of the odds of having a nonmarital birth, which is a linear function of the independent variables. This approach shows that demographic shifts account for –21 to –26 percent of the total change for all nonmarital births, and for +0.9 to +17.8 percent for first nonmarital births. Consistent with the linear probability results, shifts in the coefficients account for essentially all of the observed increase.

[12] Mach (2002) uses the two youth cohorts of the NLS to compare factors related to teen nonmarital childbearing in the 1970s and in the 1990s. She reports that changes in demographic characteristics and abortion and welfare policy, and that changes the coefficients on such variables both account for some of cohort difference in nonmarital childbearing. Her study does not decompose the difference into the two components discussed here.