The impact of changes in maternal age on the wellbeing of children

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ABSTRACT

The primary objective of this paper is to examine how recent changes in maternal age at first birth have impacted the health and wellbeing of children, accounting for changes in other factors associated with both age at first birth and wellbeing. An additional objective is to determine whether these relationships vary for children from different race/ethnic and socioeconomic backgrounds. We propose to use individual and contextual data from the 1995 and 2002 National Survey of Family Growth (NSFG) to explore this question. These data allow us to examine differences in health and wellbeing for two birth cohorts (1988-1992: high teenage fertility and 1998-2002: relatively lower teenage fertility). Specifically we will look at birth cohort differences in birthweight, birth intendedness, and breastfeeding for children. We will control for a variety of individual and contextual level characteristics which may also have changed over this time period.

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Background and Hypotheses

Increased teenage sexual activity and teenage nonmarital childbearing in the 1970's and 1980's resulted in teenage childbearing again becoming a critical issue on the national public policy agenda in the 1990's (Furstenberg 2003). Research documenting the strong association between teenage childbearing and poor outcomes for these teenagers and their children amplified this concern (Moore and Sugland 1999; The National Campaign to Prevent Teen Pregnancy 2002; Terry-Human, Manlove, and Moore 2005). In 1996, in an attempt to reduce teenage childbearing, Congress authorized money to support State-wide abstinence education programs funded through the Department of Health and Human Services. At roughly the same time, the National Campaign to Prevent Teen Pregnancy was organized with a goal to reduce teenage childbearing by 30% by 2006, declaring that "one of the surest ways to improve overall child well-being is to reduce the proportion of children born to teen mothers." This is expected to be the case because teenagers who did not have a birth are ultimately more likely to finish school, find gainful employment, and marry compared to women who did not delay a birth (Amato 2005; McLanahan and Sandefur 1994; Lichter and Graefe 2001). This means they will be in more stable unions and have more resources when they do have children later in the lifecourse. Additionally, even if they do not marry, older women are expected to have more resources (e.g. experience, maturity) with which to negotiate single motherhood.

There has been success in achieving a delay in childbearing as reflected in the fairly steady decline in teenage birth rates since the early 1990's. In 2002, the teenage birth rate was 43 (per 1,000), a decline of 30 percent from the rate of 62 in 1991; this decline was particularly pronounced among younger and Black teenaged women (Martin et al. 2005). While much of the focus has been on teenage birth rates, birth rates have changed for other groups of women too. Though the decline was greatest among teenagers, women in their twenties experienced intermittent declines in birth rates over this time (decline of 12% for women aged 20-24 and 4% for women aged 25-29), while women in their thirties experienced increases (20% for women aged 30-34). Similar age related changes are seen in rates of first births (Martin et al. 2005). Taken together, these changes mean that the average age of first birth has increased over time.

These changes lead to our first hypothesis:

H1: Delays in age at birth over the past 15 years should have increased the wellbeing of children over this period of time because, on average, children today are being born to older mothers than they were 15 years ago (a lesser proportion of births are occurring to teenage women).

However, there are reasons to expect that improvements in wellbeing may not be uniform across all groups of children. Research has consistently found that non-teenage women in disadvantaged populations are actually in worse reproductive health than reproductively mature younger women, and as a result have higher rates of infant mortality and a worse distribution of birth outcomes than do white women (Geronimus 1986; 1987; 1996). This research suggests that age does not hold the same meaning for all people; that certain groups age more rapidly than others including a more rapid decline in reproductive health. This more rapid aging, or "weathering", occurs in response to a lifetime of socioeconomic disadvantage and race/ethnic discrimination faced by many minority groups. Delaying the age at birth alone is unlikely to improve birth outcomes in these populations and, in fact, may worsen them.

This possibility is not limited to biological characteristics such as birth outcomes. There is a substantial body of qualitative research which suggests that early childbearing may be an adaptive strategy among some groups of minority and lower socioeconomic status women. For example, younger mothers are more likely than older mothers to live with other adults, adults such as parents who are able to assist with childcare and help out when assistance is needed. In this manner they have what researchers call private safety nets as opposed to public safety nets (Edin and Lein 1997; Harknett 2006). The presence of these safety nets among low income women is associated with higher levels of human capital, fewer depressive symptoms, and increased self-efficacy (Harknett, 2006). These women were also actually able to work more and were less reliant on welfare.

The above discussion leads to our second hypothesis:

H2: Minority and lower socioeconomic status women and children may gain less than others from delays in the age at childbearing.

Significance

As mentioned above, much research (but very importantly, not all) which has examined the impact of teenage fertility on the wellbeing of women and children has come to the conclusion that less teenage fertility would improve the wellbeing of women and children at the individual (the teenagers and their eventual children will be better off) and population level (all children and all teenagers will be better off due to change in distribution of births). This research often focuses on comparisons made across cohorts within one time period or between cohorts without adjusting for period differences.

For example, some research compares births to older mothers with births to younger mothers within a particular time period. However, this comparison does not take into account the possibility that other factors impacting wellbeing may have also changed over time, so that when the delayers do eventually have a birth they are facing a different set of circumstances. An important example of this is the recent change in nonmarital fertility rates and ratios. While teenage childbearing has declined since 1991, there has been an increase in out-of-wedlock childbearing among women over the age of 19 (Martin et al. 2005; Abma et al. 2004). This has contributed, in part, to the increased proportion of births that occur to unmarried women. By 2003, roughly 42% of first births occurred to unmarried women though again there is much variation in this by race/ethnicity – roughly 22% of births to White women, 70% to Black

women, and 45% to US born Mexican origin women are nonmarital. Nonmarital fertility is also associated with a host of negative outcomes for women and children. It is possible that increases in nonmarital fertility may offset some of the gain made from delaying the age at birth.

In another example, claims are made that children are better off as a result of the recent declines in teenage childbearing. A report issues by the Committee on Ways and Means Democrats argues that given poverty rates of teen mothers now, if we had teen birth rates of 10 years ago, 460,000 more children under the age of 6 would be in poverty than actually are in 2002 (Committee on Ways and Means Democrats, 2004). However, these claims do not adjust for any of the other characteristics that have changed over this time period that may be associated with poverty and maternal age and are likely to overstate the importance of maternal age.

Surprisingly little research has compared different cohorts of women and children across different time periods (for an exception, see work by Hofferth and colleagues 2001 and 2002). This historical element is important given the recent changes in fertility behavior and in other social factors such as contraceptive availability and use, education, labor markets, and marriage markets which have impacted the lifecourse trajectories of women and the wellbeing of children. A better understanding of the true nature of the relationship between age at birth and children's wellbeing over time is necessary to construct meaningful policy interventions.

Whether teenage childbearing is a primary cause of disadvantage for women and their children or is itself a consequence of preceding disadvantage remains hotly debated. To the extent it is a cause, interventions that delay childbearing are clearly beneficial. These include programs that promote abstinence and/or contraceptive use, as well as those that help build the human capital of teenagers. Currently, the emphasis is on the former type of program. However if it is a consequence, as some research tends to suggest, then delaying teenage childbearing may only delay the negative outcomes generally associated with a teen birth. If this is the case, then interventions need to focus equally on the development of human capital early in the lifecourse of women at risk of either a teenage or nonmarital birth.

Analytic Plan

While there are multiple ways to examine the impact of changes in maternal age at birth on the wellbeing of children, this paper proposes to explicitly evaluate the claim that "one of the surest ways to improve overall child well-being is to reduce the proportion of children born to teen mothers." More specifically, we will attempt to test the two hypotheses (listed above) derived from this claim and from theory suggesting why there may be variations in the relationships between maternal age and children's wellbeing.

The analysis in this paper will be very straightforward. Regression techniques will be used to look at temporal differences in the wellbeing of children (measured at birth). This can be thought of as comparing the wellbeing of two cohorts of births or, alternatively, the wellbeing of two populations of births in different periods of time.

- First, differences in a variety of measures of children's wellbeing across two time periods (1988-1992: period of high teenage fertility, 1998-2002: relatively lower teenage fertility) will be documented.

- Second, we will determine whether any of the difference between birth cohorts is due to differences in the distribution of maternal age at birth.
- Third, we will evaluate to what extent the effect of maternal age at birth (if there is one) is due to individual differences in marriage and employment (expected mechanisms), net of other individual and contextual level characteristics.
- Lastly, race/ethnic and socioeconomic interactions and/or specific models will be examined to determine if these relationships vary across populations.

Data

For the analyses we will use two waves of the National Survey of Family Growth (NSFG), a nationally representative individual level survey of American women aged 15-44 conducted by the National Center for Health Statistics (NCHS). We will use the 1995 NSFG which interviewed 10,847 women and the 2002 NSFG which interviewed 7,643 women. The NSFG is particularly suited to our research as it is designed to gather retrospective data related to fertility, family formation, and contraception. In particular, it gathers health and wellbeing information on each birth for every woman and collects detailed information on the family background and sociodemographic characteristics of each woman. This allows us to look at patterns of childbearing across cohorts and over time. Additionally, the NSFG files can be linked to contextual data files (NSFG-CDF) which combine census data and other sources aggregated at the county, census tract, and block group level measured in 1990 and 2000 – which allow us to control for contextual measures such as unemployment rates, rates of school attendance and completion, as well as marriage markets.

Sample

In this paper we compare the wellbeing of two cohorts of births and determine to what extent differences in maternal age at birth are important. It is important to note that we focus on first births because we are interested in the impact of delayed fertility. If we included all births, we would be including later births born to women who may have had a first teenaged birth in a previous period. Research has documented that age at first birth is the important factor to consider. To conduct the analyses we construct two (almost) complete cohorts of first births using the 1995 and 2002 NSFG.

Using the 1995 NSFG pregnancy files we select a cohort of first live singleton births born between 1988 and 1992 – the years characterized by high levels of teenage fertility. At the time of interview, in 1995, a woman could be as old as age 44. Therefore, the oldest she could be in 1988 is 37. Thus, the sample is restricted to all births occurring to women age 37 and younger. Although this eliminates the oldest of first time mothers, they make up less than 1% of the first births. Ultimately, from this survey we have a final sample of 1,610 first live singleton births that occurred to women less than 38 years of age and between 1988 and 1992. The 2002 NSFG is used to create a similar sample of first births that occurred to women less than age 38 between the years 1998 and 2002 – a time of relatively lower teenage fertility and higher fertility among older women. From this survey we have a final sample of 1,023 first live singleton births. Each data set when weighted is nationally representative. Weights in each data set are normalized and the samples are merged giving us a working sample of 2,633 births.

Variables

Dependent variables:

In the analysis we use three different measures to evaluate period differences in the health/wellbeing of children. Because the second cohort includes very recent births we are limited by how far out over time we can follow the children. Additionally, the NSFG only collects retrospective data on each child at the time of birth or and shortly thereafter. The three measures are:

1. Birth weight: Low birthweight is a proximate determinant of infant mortality, one of the best indicators of a group's wellbeing (Hummer et al. 1999; Gortmaker and Wise 1997; Eberstein 1989). Based on previous research, we create a dummy variable which takes on a value of 1 if the birthweight was less than 2500 grams.
2. Birth intendedness: Pregnancies classified as unwanted or mistimed are associated with overall worse measures of child wellbeing later on (Hummer, Hack, and Raley 2004; Santelli, Rochat, and Hatfield-Timajchy et al. 2003).The NSFG has a constructed measure based on a series of questions that determines (retrospectively) whether each birth occurred too early, on time, later than wanted, or was not wanted. We create two binary dependent variables to indicate whether the birth was considered on time (=1) and whether the birth was unwanted (=1).
3. Breastfeeding: A substantial body of research has documented the health benefits to children of being breastfed. Additionally, the American Academy of Pediatrics has suggested that women try to breastfeed for a minimum of six months to maximize the health benefits. We create one binary dependent variable indicating whether a child was breastfed at all (=1) and one categorical measures indicating: no breastfeeding, 3-6 months of feeding, greater than 6 months.

Independent Variables:

We have two primary independent variables of interest: maternal age at first birth and period of time. We create a categorical variable to measure maternal age at first birth with the following categories: 15-17, 18-19, 20-24, 25-29, and 30+. In the regression analysis, age 25-29 is the reference category. Period is identified by a dummy variable which takes on a value of 1 if the birth occurred between 1998 and 2002 and a value of 0 if it occurred between 1988 and 1992.

Control/Mediating Variables:

Individual Level

- marital/cohabitation status at birth: married, no longer married, never married. At this point cohabitation status is not determined at each birth in the 1995 survey, though it is in the 2002 survey. However, we can determine cohabitation status for each woman at each birth in the 1995 survey from her marital history information on the individual level file. For the final analysis this will be done allowing us to examine differences in cohabitation across these two time periods.
- employment: whether woman worked at all during pregnancy (=1). Will be constructed.
- race/ethnicity: White, Black, Hispanic
- parent's highest level of education: less than high school, high school graduate, some college, college degree +. This is education of mother's parent.
- family structure while growing up: lived with two biological parents at age 14 (=1)

- religion while growing up: fundamentalist protestant, mainstream protestant, catholic, other/none

Contextual Variables: At this point these variables are not included in the analysis. Researchers need special permission to access the CDF and can only use this data through a remote access system. I have already submitted a proposal to use the contextual data for both the 1995 and 2002 surveys and have received permission to use these data. This analysis will be done over the next few months and will be completed prior to the PAA meetings. The variables we propose to include at this point are the following:

- Socioeconomic Status
  - Median household income
- Marriage Markets: availability of marriageable men to women in a county.
  - Sex ratio
- Economic Opportunity: Quantity and quality of employment options.
  - Full time employment rate
  - % jobs – high quality
  - % jobs – low quality
- Educational Opportunity
  - % adults with college degree
  - Proportion of youth enrolled in school
- Residential Stability
  - % of households living in same residence last 5 years
- Race/ethnic concentration
- Family Planning
  a. Abortion provider
  b. Family planning clinics

Descriptive Results

Table 1 presents the mean age at first singleton birth, based on births to women aged 15-37, in the two periods of interest by race/ethnicity. All results are weighted in order to compensate for survey design and to make them comparable to national estimates. For comparison, Table 1a presents the mean age at first birth (not singleton and to women of all ages) from the vital statistics across the same period of time.

Table 1: Mean Age at First Live Birth, by Race/Ethnicity - 1995 and 2002 NSFG

	1988-1992	1998-2002
Overall	24.1	24.7
White	24.8	25.9
Black	21.6	22.0
Hispanic	22.1	22.1

Table 1a: Mean Age at First Live Birth, by Race/Ethnicity - Vital Statistics

	1990	1995	2000	2002
White	25.0	25.4	25.9	26.2
Black	21.7	21.9	22.3	22.7
Mexican	21.9	21.9	22.2	23.1(Hispanic)

In our sample, we see that the mean age of the mother at first birth for the earlier birth cohort (those born between 1988-1992) was 24.1 years compared to 24.7 years for the second birth cohort. This confirms expectations that the age at first birth has increased over the time period of interest. Additionally we see that the increase in age at first birth was greatest for White women, followed by Black women, with Hispanic women experiencing virtually no change. We should note that the lack of change in the Hispanic population may reflect a relatively larger proportion of births occurring to foreign born women, given recent increases in the proportion of immigrants in the US. The final analysis will include a measures indicating whether each mother was born in the US. Luckily, the estimates from the NSFG do not appear to differ (too substantially) from Vital Statistics records. The Vital Statistics verify that the greatest gains in mean age at first birth occurred among White women followed by Black women, with Mexican (roughly 65% of Hispanic population) having the smallest gain. It is interesting to note that the greatest gain in mean age at first birth occurs among white women given that Black teenagers have experienced the greatest declines in teenage pregnancy rates. This reflects the fact that the increases in fertility among women over thirty are not nearly as great for Black women as they are for White women.

Table 2 presents the descriptive statistics on the dependent variables of interest for this paper by period of birth.

Table 2: Percent Distribution on Primary Dependent Variables, Births to All Women: 1995 and 2002 NSFG

	Birth Intendedness			Birthweight	Breast Feed	Duration of Breastfeeding			
	Unwanted Birth	On Time Birth	Too Soon, Mistimed	Low Birthweight	At all	None	0-3 months	3-6 months	greater than 6 months
Period									
1988-1992	3.6	59.0	26.6	7.4	57.2	42.9	25.6	18.0	13.5
1998-2002	8.4	52.6	28.2	9.1	69.3	30.7	21.0	24.6	23.7
1988-1992 (N=1,595)									
15-17	8.6	21.5	67.8	12.5	25.1	74.9	13.7	4.6	6.8
18-19	7.9	46.4	41.1	8.3	37.2	62.8	22.1	8.2	6.9
20-24	2.0	58.8	32.9	5.9	53.5	46.5	27.3	16.3	9.9
25-29	3.3	71.8	11.2	6.5	68.8	31.2	29.3	22.2	17.4
30+	1.2	68.6	6.4	8.5	77.5	22.5	25.2	29.2	23.1
1998-2002 (N=1,018)									
15-17	21.5	11.5	65.5	11.2	47.0	53.0	22.8	25.6	8.6
18-19	14.6	23.0	60.2	15.9	55.0	45.0	28.6	20.5	15.9
20-24	11.6	47.3	34.4	9.6	67.8	32.2	26.0	21.2	20.7
25-29	4.7	69.2	12.7	6.3	75.5	24.5	20.1	25.8	29.6
30+	0.2	72.4	6.5	7.1	80.5	19.5	16.0	33.3	31.2

Note: Sample is comprised of all singleton first births born to women up through age 37. All results are weighted.

The top two rows show birth cohort differences across a variety of health and wellbeing outcomes; the bottom portion of the table looks at these differences by maternal age at birth. Focusing first on the top portion of the table, we see that there have been improvements in some outcomes and declines in others. The proportion of the babies who were breastfed at all has increased substantially over this period of time; in 1988-1992 roughly 57% of babies were breastfed compared to almost 70% by 1998-2002. We can also see that the greatest gains were among those breastfed for longer than 6 months. Given the strong relationship between maternal

age and breastfeeding, the change over time is consistent with expectations that increases in maternal age at birth will contribute to increased rates of breastfeeding. However, birth cohort differences in birthweight and birth intendedness are not in the expected direction. The proportion of births that are low birthweight has *increased* by roughly 1.5%. Additionally, the proportion of births classified as unwanted has more than doubled, from 3.6% to 8.4%, while the proportion of births classified as occurring on time decreased by 6.5%. The bulk of this difference is due to differences between women in their teenage years and early 20s. Although these differences are not in the expected direction, it is still possible that increased in maternal age operates to increase wellbeing and that changes in other factors outweigh any gains that increased maternal age may provide. The next step of the analysis is to explore this possibility.

Next Steps

A combination of logistic and multinomial regression analyses will be used to determine whether any of the birth cohort differences in health and wellbeing are due to differences in maternal age. We will determine whether these relationships operate through the increased likelihood of marriage and employment expected to come with delays in childbearing. Additionally, we will examine whether these relationships hold controlling for other individual and contextual level differences in the mothers of the two cohorts. These analyses will be conducted using SAS and those that include contextual measures will be run remotely using the ANDRE system in place and the National Center for Health Statistics.

Table 3 presents descriptive statistics on characteristics of the mothers at the time of birth by birth cohort.

Table 3: Distribution of Mediating/Control Individual Level Variables, by Period

	Period	
	1988-1992	1998-2002
Relationship Status at Birth		
Married	67.1	58.4
Never Married	29.9	38.4
Formerly Married	3.1	3.3
Race/Ethnicity		
White	68.3	63.0
Black	13.5	13.1
Hispanic	13.6	18.1
Other	4.7	5.7
Parent's Highest Level of Education		
Less than high school	17.1	14.9
high school graduate/ged	44.2	30.1
some college	16.0	28.2
at least a college degree	22.5	26.8
Family Structure		
Lived with two biological parents at 14	58.8	61.5
Religion while growing up		
Mainstream Protestant	22.1	26.2
Fundamentalist Protestant	28.7	23.3
Catholic	36.8	35.4
Other	12.5	15.1

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