Women's Reproductive Patterns And Adult Mortality: A Life Course Approach

(Working Draft)

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ABSTRACT

Increasingly, researchers are applying a life course approach to the study of health and mortality, examining how early life and young adult circumstances set into motion a range of events with long-term implications for well-being throughout life. Among women, fertility is a central element of the life course that shapes opportunities, attitudes, decisions, behaviors, and health. As part of a larger project using the National Longitudinal Survey of Mature Women to investigate the relationship between reproductive patterns and later life well-being, this paper uses Cox proportional hazards regression to (1) estimate the effects of age at first birth, premarital childbearing, and number of children among mothers on the risk of post-reproductive mortality over a 20 year follow-up period; and (2) investigate the influence of early life and adult social and economic circumstances. The results indicate that these factors account for the relationship between parity and premarital childbearing. Age at first birth is best modeled as a quadratic with a positive effect until about age 25 and a negative effect beyond that point. Findings for age at first birth are attenuated by early life and adult social and economic circumstances but remain a significant predictor of mortality with controls for those factors.

INTRODUCTION

Driven largely by contemporary trends in the timing of childbearing and family size, researchers have begun asking questions about the long-term consequences of women's reproductive patterns. Increased rates of teenage childbearing during the 1970s and 1980s, more recent increases in delayed childbearing (i.e., after about age 30), and increasing childlessness have primarily gained attention in this area of research. Giving birth at a young age, particularly among white women, is often associated with a disorderly life course trajectory and both immediate and long-term health consequences. On the other hand, postponed childbearing may allow a woman to attain her desired level of education, marry and establish a stable relationship and home environment, and improve financial security. However, delaying parenthood for too long may be detrimental for a woman's health or even result in childlessness. Aside from the consequences of timing, there may be important implications associated with having children. For example, children may bring a positive sense of fulfillment or increase social ties, or they may be the source of strain on resources and time.

Studies on the links between women's fertility and later life health and mortality provide a limited picture of the ways in which these two variables relate. This is due in large part to methodological limitations. For example, there is little consistency in the availability of measures and the operationalization of fertility. The timing of childbearing and number of children may not be examined concomitantly. Furthermore, some studies on the number of children have included women who are still in childbearing years, among who fertility may not be completed. This could bias conclusions about the effect of number of children on health beyond the reproductive years. Finally, many of these studies lack statistical controls for potential confounding and selection factors. Thus, while there is some evidence for a

relationship, less is known about the influence of social conditions on the relationship between women's fertility and adult mortality.

In addition, related research often relies on cross sectional data to examine processes that are longitudinal and accumulative. There is also wide within this body of research in the populations studied. Much of our current understanding of the fertility-adult mortality relationship comes from research on historical and non-representative samples (e.g., 19th Century Mormons and British royalty). While such samples are invaluable for answering questions about the biological costs of reproduction from the standpoint of evolutionary theories, more research is needed to explore the role of social and economic circumstances in linking particular reproductive patterns to later well-being. This paper seeks to overcome some of these limitations by exploring the relationship between reproductive patterns and post-reproductive mortality, controlling for key social and economic correlates, among mothers of a contemporary US cohort.

BACKGROUND

Existing research on the relationship between fertility and adult mortality generally suggest significant differences by age at birth and parity with a conspicuous lack of attention given to premarital childbearing. Some studies seek to establish the presence of an overall correlation between mortality risk and age at birth, while others distinguish between first and last births and/or focus on differences in the relative age at birth (i.e., early and late births). Results vary according to the populations studied, methods employed, and covariates included in the models. Evidence for the parity-mortality relationship is less ambiguous than research on age at

birth. Overall, this body of research points to likely patterns in the relationship between reproductive patterns and adult mortality, as well as the need for further research.

Research on historical cohorts of women and age at birth produces contradictory conclusions about the relationship of this measure of fertility and longevity. For example, a study employing historical data on British aristocracy finds that age at first birth and longevity are positively associated and women who died early had the lowest age at first childbirth (Westendorp and Kirkwood 1998). Bivariate correlations from a relatively homogenous population of women born in Massachusetts around the turn of the 20th century demonstrate a significantly higher percentage of centenarians who gave birth after age 40 than 73 year olds who gave birth after age 40 (Perls et al. 1997). Mueller (2004), on the other hand, finds no significant differences with age at first birth and life span, even with controls for genetic, environmental, and social conditions during early life built into the sample.

Other studies using historical data using hazards models further cloud the picture. For example, using data on British royalty, Doblhammer and Oeppen (2003) simultaneously estimate mortality using proportional hazards models and fertility using ordered probit models. The results of their analysis show marginally significant effects of teenage births and no significant effects of late (after age 40) births. The use of hazards models with historical data from Utah also generates mixed support for the relationship between age at birth and mortality (Smith, Mineau, and Bean 2003). The authors of this study find no evidence that late age at *first birth* influences longevity, but a *late age* at last birth is associated with greater post-reproductive longevity among women, after adjusting for age at first birth and parity.

Looking at more recent cohorts of women, however, findings are less ambiguous. Overall, it appears that early childbearing is associated with increased mortality risks, while

delayed childbearing is linked to longer life. In terms of early childbearing, Mirowsky (2005) finds the highest risk of mortality among adult women (aged 18-95) in the United States who had their first births young (nearest puberty). A study of women in Austria and England and Wales, who survived beyond the childbearing years, also suggests a negative association between early first births and mortality, with higher rates of mortality among women who had first births before age 20 compared to those who began childbearing after that age (Doblhammer 2000). Despite the differences in sampling (i.e., limiting to post-reproductive ages or not) and in geographic context, these studies implicate a negative association between early childbearing and mortality[1].

Evidence for a beneficial effect of delayed childbearing is found cross-culturally among contemporary cohorts. The lowest mortality risk is found among American women who had their first births after 30, with no upper limit on the benefits of delay for mortality (Mirowsky 2005). A reduction in the relative risk of mortality associated with a birth after age 40 is found by Doblhammer (2000) in studying women in Austria and England and Wales. In addition to these two studies, the results of research on married women aged 25+ at 1970 Norwegian census indicate that late first and last births are associated with low mortality risks (Lund, Arnesen, and Borgan 1990). Finally, in their study of elderly Chinese, another group of researchers finds that women with at least 2 or more births after the ages of 35 and 40 have lower mortality risks than those who do not and they are more likely to be healthy survivors to old ages (Yi and Vaupel

[1] This relationship may not apply to non-White women. In a recent study on African American women over the age of 55 in Chicago, Astone, Ensminger, and Juon (2002) report that those who were 25+ at first birth had higher mortality rates than first birth before 25. This effect was stronger among older women. This effect appears controlling for education, poverty status of household earlier in life, health status (measured as the presence of chronic condition), and current age. This study raises the question of the generalizability of findings from research that do not look at non-White women. Indeed, Geronimus' (1994) "weathering hypothesis" suggests that African American women who give birth at later ages may be at a greater risk of poor health and mortality. It is hypothesized that, due to racism and the greater social disadvantage experienced by African American, these women experience a worsening of health over their reproductive years (Geronimus 2003). Thus, weathering may translate into a younger optimal age of childbearing for these women compared to their white counterparts. In other words, given the disadvantage associated with the structural niches occupied by African American women, it is reasonable for this group to have children when they are younger and healthier.

2004). Thus, much less variation exists in findings when examining the relationship between age at birth and mortality risk among contemporary cohorts of women.

Inquiries into the relationship between parity and mortality are numerous and produce a number of interesting results. In their 1973 study on social differentials in mortality in the United States, Kitagawa and Hauser demonstrated a clear J-shaped pattern in mortality ratios by parity. They find that women who bear five or more children appear to have higher mortality risks than those who bear 2-4 children, even after including control variables for socioeconomic status. Much research since then supports this idea: having a large number of children can be detrimental for mothers' well-being.

Some studies have elaborated the relationship between parity and mortality in various ways. For example, some research tells us that this pattern generally holds when examining mortality risk from many causes (Beral 1985; Green, Beral, and Moser 1988) and in all age groups (Lund et al. 1990). Concerning the upper limit on the positive effects of having children, Mueller (2004) finds that the tradeoff between total number of children and life span applies only after the sixth birth. Also, studies have examined how the relationship between parity and mortality change as women age. Looking at breakdowns by age, Austrian data suggest that the mortality disadvantage among women with higher parities with increases in age (Doblhammer 2000). In the same analysis of English and Welsh populations, however, the excess mortality of high-parity women decreases from age 75 onwards, and is even lower than that of mothers with one or two children after age 80. Another study examined correlations between parity and longevity using historical data on British Aristocracy and found that parity increased with the age of death and eventually stabilized after age 60 and decreased again in women who died after 80 years of age (Westendorp and Kirkwood 1998). Overall, a good deal of research supports the

idea that mothers of high parities fare worse than those with fewer children. Further research is needed, however, to determine the robustness of such findings in the face of controls for social and economic factors across the life course.

DATA AND METHODS

Data and Sample

The analyses use data from the National Longitudinal Survey of Mature Women (NLS-MW). Multistage probability sampling was used to draw a representative sample of 5,393 civilian, non-institutionalized women aged 30-44 years in 1967, with an oversample of Black women (see Center for Human Resource Research 2003 for more detailed information). Of those women, 94 percent participated in the baseline (1967) interview (n=5,083). Since then, the cohort of Mature Women have been interviewed a total of 20 times through 2003 when 2,237 of the original respondents were surveyed. Attrition due to non-response, respondent institutionalization, or failure to locate the respondent was 37.8 percent; however, including deaths, the attrition rate was 66 percent.

Although the NLS-MW was not explicitly designed to study the links between reproductive patterns and adult mortality, it is very well suited for the task. The initial purpose of the NLS-MW was to study the labor market experiences and ways in which this cohort of women balanced work and family roles, thus leading to the collection of data on several key data elements. In particular, the NLS-MW gathered data on the timing of women's childbearing and family size, marriages, a wide range of socioeconomic status measures, and early life social circumstances that may be predictive of these other factors. In the later waves of the study, the scope of data collection was broadened to include more regular and varied questions on health.

Finally, the NLS-MW is one of the most extensive, long-running data collection efforts carried out with a cohort of Americans, providing a unique opportunity to study women at various life course stages with a sizeable sample to sustain multivariate analyses.

Measures

Post-reproductive mortality is the dependent variable of interest, coded 1 when the respondent died, 0 otherwise. Month and year of death were obtained from Social Security Administration (SSA) state death reports (Center for Human Resource Research 2003). The current study is limited to deaths occurring between 1982, when the women were ages 45-59, and 2001 when the last deaths were verified with state death reports—yielding a 20-year follow-up period. This focus on post-reproductive mortality removes potential biases introduced by maternal mortality and allows for the estimate of the effect of reproductive patterns once reproduction is complete.

Reproductive Patterns are measured with a series of time-invariant covariates. The NLS-MW asked women about the children born to them through 1982, when the women were ages 45-59. By these ages, we expect that most women have completed their childbearing. Women were asked about up to 16 children born to them. This direct method for collecting data on biological children is arguably superior to surveys in which age at birth is calculated from indirect measures, such as birthdates of household members. Reported birthdates of adopted and step children are not used in these analyses. Although parenthood generally may affect women's health over the life course, limiting the analyses to biological children only should capture some biological effects of childbearing. Specifically, I examine the following measures of fertility:

Age at first birth is specified as a quadratic. Tests of the difference between two models indicate significant improvement in model fit when adding age at first birth squared.

Pre-Marital childbearer is a dichotomous indicator of whether the first child was born before the age at first marriage. This does not indicate whether a woman ever had a child out of wedlock, but rather is limited to the first born child. Women with no children and those who were married before the birth of their first child are coded 0 as the reference group.

Number of children is measured using a series of dummy variables. Women with 3-4 children and 5 or more children are compared with mothers of 1-2 children.

Early life social circumstances are implicated in the study of fertility and later well-being. Young people from low socioeconomic status families are at a greater risk for teenage pregnancy and childbearing. These same characteristics of young women's early life circumstances are believed to have an effect on adult mortality risk. A growing body of research applying the life course approach to the study of health and mortality rather strongly suggests that childhood conditions matter (for example, see Hayward and Gorman 2004; Hertzman et al. 2001; Preston et al. 1998). Factors such as family structure and SES, among others, may function in various ways to shape health over the long-term. For example, Preston and colleagues (1998) posit that early life social conditions and mortality risks in adulthood may be indirectly linked through what they refer to as "correlated environments." That is, individuals growing up privileged are likely to maintain privilege throughout life, potentially translating into better health in later life. Because early life social conditions have been shown to influence both fertility and health in later life, controls for such factors are needed in research on the relationship between reproductive patterns and mortality.

Measures of early life social circumstances come from retrospective data collected in the baseline survey (1967) on the respondent's circumstances at age 15 years. Specifically, I use data on *family structure*, *type of residence*, and *mother's education*. Family structure is measured with dichotomous indicators of whether an individual lived in a single parent family, a step parent family, or some other family arrangement, with two biological parent families as the reference group. Type of residence is coded as 1) city with 25,000 or more people, 2) small town or suburb, and 3) rural—farm or nonfarm, which are used to construct dummy indicators with "city" as the reference category. Mother's education is measured using a series of dummy variables, including one for missing or unknown data.

Educational attainment may affect fertility, as it competes, in a sense, with childbearing behavior for women's time and attention (Barber 2001). Because of the difficulties often associated with attending school and having children, one may be delayed or forgone for the other. For example, having a baby as a teenager typically impedes educational attainment (McElroy 1996; Waite and Moore 1978). In terms of older age at first birth, it appears that postponed childbearing is most prominent among women with at least high school educations (Heck et al. 1997). In addition to the causal role that education may play in age at birth, education is also an independent and relatively strong predictor of health throughout the life course. In general, those with higher educational attainment are healthier than their less educated counterparts, and this advantage may increase with age (Ross and Wu 1996). Educational attainment not only affects health through socioeconomic, psychosocial, and behavioral mechanisms, it also appears that education has a direct, positive impact on health (Ross and Wu 1995).

Educational attainment is included in analyses as a time-invariant covariate measured at baseline as highest grade completed, centered at 12 years. Preliminary analyses (not included) examined the possibility of using 1) a time-varying measure, or 2) including a dummy indicator of change in educational attainment since baseline. However, there were not enough instances of change found in this sample. That is, few women returned to school after the baseline 1967 survey. In a life course framework, educational attainment may be considered a measure of early life that leads to the completion of schooling. However, studies often view educational attainment as a measure of adult socioeconomic achievement or status. Therefore, the current paper includes educational attainment in both contexts.

Adult social and economic characteristics are the most commonly examined predictors of mortality. A number of these characteristics also have implications for women's reproductive patterns. For example, reproductive patterns may be associated in specific ways with social disadvantages, particularly in cultures where children no longer represent sources of labor and/or income. That is, a large number of children can be a drag on financial resources and women's time, which might otherwise be spent working for pay, in job training, or at educational pursuits to improve social status. Moreover, social disadvantage resulting from age at birth may also influence the relationship between this fertility characteristic and health related outcomes. Having children late in the reproductive cycle may be unplanned and associated with high parity, as was often the case in earlier cohorts (Mansfield and McCool 1989), and young age at first birth is also likely to be associated with a wide range of negative outcomes, including lower educational attainment (Waite and Moore 1978) and worse financial status (Moore et al. 1993).

Like education, labor force participation may affect fertility and mortality independently. Women who are employed may be less likely to have children or they may delay childbearing to

later ages as they establish their careers, resulting in late age at first birth and lower parities. Women having children early and/or having many children may be penalized for their absence from the labor force at a time when their childless counterparts are building experience and tenure. Additionally, participating in the paid labor force may have varying consequences for women's health and subsequent mortality. For example, women may benefit from paid employment as a result of having greater resources, more positive psychosocial resources, and greater social integration, among other things (Moen et al. 1992; Sorensen and Verbrugge 1987; Thoits 1986). On the other hand, combining paid and domestic labor can have negative effects on well-being (Blane, Berney, and Montgomery 2001).

Marriage is yet another important predictor of both mortality and reproductive patterns. Marriage, particularly among older cohorts of women among whom non-marital fertility was rare, is important as it may govern exposure to fertility. Furthermore, women who stay married, having continuous exposure to fertility, may be more likely to be of high parity. In addition to its relationship with fertility, being married and avoiding numerous marital transitions can have a positive impact on health throughout the life course. Marriage may positively affect health, independent of its relationship to fertility, through its influence on behaviors, social integration, and socioeconomic factors. On the other hand, early marriage is found to be associated with poor health and disability among women, net of the effects of age and socioeconomic factors (Grundy and Holt 2000). Furthermore, particular marital trajectories (e.g., married →divorced → remarried → widowed) can have negative health consequences (Barrett 2000).

In this study, adult social and economic characteristics are measured across the life course. More specifically, time-invariant covariates measure characteristics at baseline (1967) and the same characteristics are measured later as time-varying covariates drawing on data

collected between 1982 and 2001 (the mortality follow-up period). The use of baseline characteristics provides controls for respondent's adult life prior to the end of reproduction, while the time-varying covariates represent the more proximal circumstances of women's lives that predict their risk of mortality. In particular respondent's *family income* (in logged 1983 dollars), *employment status* (working for pay=1, not employed=0), and *marital status*. Marital status is measured using a series of dummy variables representing never married, widowed, and divorced or separated, with currently married as the reference category.

Adult health is controlled in these analyses by the inclusion of a series of dummy variables for self-rated health. During the baseline survey, women were "Would you rate your health, compared with other women about your age, as excellent, good, fair, or poor?" Responses to this question were used to construct a series of dummy variables, with poor as the reference category. These dummy variables serve to control for health status prior to the end of the reproductive period that may influence later life circumstances and mortality risk.

Methods

I use a series of nested Cox proportional hazards regression models to estimate the risk of mortality over the 20-year follow-up period. As with many statistical modeling techniques, unobserved heterogeneity is problematic in discrete-time hazard models. Although the problem of unobserved heterogeneity compromises interpretations of statistical results, correcting for it is beyond the scope of this research[2]. Moreover, the extent of this limitation in analyses of mortality may be less severe. As Singer and Willett (2003) state, "Fortunately, the effect of unobserved heterogeneity is itself consistent: it always leads to hazard functions that appear to

[2] Accounting for unobserved heterogeneity in hazards models is rare, as it requires additional assumptions and/or data such as repeated events data on individuals (Singer and Willett 2003), which is obviously not available in the analysis of mortality.

decline over time. As a result, if you find sample hazard functions that *increase over time*…you are probably safe" (p. 462). It is highly unlikely that the hazard of death decreases over time, so the effect of unobserved heterogeneity should lead to more conservative estimates of mortality risk.

RESULTS

Table 1 reports descriptive statistics for the covariates included in the analysis. In terms of the key variables of interest in multivariate models, we see that the average age at first birth for these mothers is 22 years, and less than 20 percent had their first child before marriage. With regard to parity, we find that most women had fewer than five children, with three to four children being the modal category (38 percent of the sample). Black women comprise about one-fourth of the sample, and these women average about 11 years of education.

TABLE 1 HERE

Table 2 displays baseline hazard ratios for measures of reproductive patterns predicting mortality with age held constant across six models. In Model 1, we see significant effects of age at first birth that demonstrate a positive effect of delaying childbearing to a point before increasing a woman's risk of death. This relationship holds across all models, indicating that other measures of fertility do not account for the effect of the timing of childbearing. Looking at Model 2, we see that pre-marital childbearing increases women's risk of mortality by almost 40 percent. However, this relationship is accounted for by age at first birth (Models 4 and 6). Overall, we see no significant effects of number of children.

TABLE 2 HERE

Controls for race, early life social and economic circumstances, and education attainment are added in Table 3 to examine the role of these factors in accounting for the effects of reproductive patterns on post-reproductive mortality. Model 2 shows that race attenuates the relationship between age at first birth and mortality, however significant effects of the timing of childbearing persist. The same is true in Model 3 where measures of family structure, mother's education, and type of residence at age 15 are added to the model. The inclusion of educational attainment combined with early life circumstances in Model 4 make the most significant differences in the relationship between mortality and age at first birth, though the initially positive and eventually negative effect is still implicated. A model (not shown here) controlling for educational attainment and not early life circumstances shows that this factor alone does not have the same effect on the age at first birth-mortality relationship that is seen in Model 4. Thus, further attention is needed to tease out this effect. As in Model 6 of Table 2, pre-marital childbearing and number of children are not significant predictors of post-reproductive mortality. That is, there is no evidence of a suppressed effect in these models.

TABLE 3 HERE

Measures of social and economic circumstances in the baseline (1967) interview, as well as a control for earlier adult health are added in Table 4. These measures are intended to capture the circumstances of women's lives during prime adult years (ages 30-44). In spite of controls for this stage of the life course, we find that age at first birth remains a significant predictor of post-reproductive mortality. Again, the combination of educational attainment and early life circumstances most notably attenuate the effect of age at first birth.

TABLE 4 HERE

Model 3 in Table 5 includes many key factors included in models of adult mortality. Here, we find higher risk of mortality among women who have lost their spouses (due to divorce, separation, or spousal death) and a negative association between being employed in the paid labor force and death. In all, however, these more proximal circumstances do little to the observed relationship between reproductive patterns and health. Using the final model, which includes all covariates examined, we find that the curvilinear effect of age at first birth tips around age 25, at which point delayed childbearing begins to have a negative effect on post-reproductive mortality risk.

DISCUSSION

Consistent with past research generally, I find significant differences in the risk of mortality by age at first birth among mothers. This finding is robust in that the pattern of relationship maintains significance with controls for a number of theoretically important factors across the life course. However, my findings are inconsistent with recent research in this vein. Specifically, Mirowsky (2005) finds the lowest mortality risk among women who had their first births after 30, with no upper limit on the benefits of delay for mortality. The results of the present study indicate that delaying childbearing is beneficial only to around age 25, after which each additional year of delay results in a small (3 percent) though significant increase in mortality risk. Methodological differences between these studies may explain this disparity. For example, his study includes women still in their childbearing years, while the present study examines post-reproductive mortality. Further investigation is needed to determine the reasons for differential findings.

Contrary to much past research, the current analyses demonstrate that parity does not significantly distinguish mothers in terms of post-reproductive mortality risk. This suggests that the number of children that a woman has does not have a long-term impact on mortality risk. In addition, while premarital childbearing demonstrated significant negative effects in on its own, no significant differences between women who had their first child before marriage and those who did not are found across all other models. This suggests that pre-marital childbearing is not important outside of the timing of childbearing.

The present study provides a relatively comprehensive assessment of the relationship between reproductive patterns and post-reproductive mortality by examining theoretically important predictors of mortality at various stages of the life course. However, there is a notable absence of measures of post-reproductive health (e.g., self-rated health, a demonstrated strong predictor of mortality), health risk factors (e.g., smoking and Body Mass Index), and other social and economic correlates of mortality (e.g., assets). Future research will investigate the role of such factors.

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Table 1. Characteristics of NLS-MW Mothers: Means and Percentages (Adjusted for Clustering by Individual); *N* of Individuals=3,060

Variable	Mean or Percentage	Variable	Mean or Percentage
Reproductive Patterns		Demographic Characteristics	
Age at First Birth	22	Age	60.90
Pre-marital Childbearer	.18	Black	.26
Number of Children			
1-2 Children	.33	1967 SocioEconomic Circumstances	
3-4 Children	.38	Ln(Family income)	9.88
5+ Children	.29	Employment Status (Working for Pay)	.42
		Marital Status	
Early Life Circumstances		Married	.85
Family Structure, age 15		Never Married	.02
Two-Parent	.73	Divorced or Separated	.10
Single Parent	.14	Widowed	.03
Step Parent	.05		
Other	.08	Adult Health (Self-Rated), 1967	
Mother's Education		Excellent	.43
0-6 years	.15	Good	.42
7-8 years	.23	Fair	.11
High School	.25	Poor	.03
College or more	.07		
Missing or unknown	.30	Post-Reproductive Social and Economic Circumstances	
Type of Residence			
City	.31	Ln(Family income)	9.67
Suburb	.35	Employment Status (Working for Pay)	.42
Rural	.34	Marital Status	
		Married	.63
Educational Attainment	11.08	Never Married	.01
		Divorced or Separated	.15
		Widowed	.21

Table 2. Hazard Ratios of Reproductive Measures on Post-Reproductive Mortality, NLS-MW

	(1)	(2)	(3)	(4)	(5)	(6)
Age in Years	1.082**	1.078**	1.079**	1.080**	1.081**	1.080**
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Age at First Birth	0.755**			0.775**	0.769**	0.789**
	(0.050)			(0.054)	(0.052)	(0.056)
Age at First Birth^2	1.005**			1.005**	1.005**	1.005**
	(0.001)			(0.001)	(0.001)	(0.001)
Pre-Marital Childbearer (no=ref)		1.383*		1.203		1.201
		(0.174)		(0.163)		(0.163)
3-4 Children (1-2 = ref)			0.952		0.974	0.983
			(0.124)		(0.130)	(0.132)
5+ Children			1.258+		1.176	1.182
			(0.163)		(0.165)	(0.166)
Observations	50335	50335	50335	50335	50335	50335
Log Likelihood	-2749.89	-2755.00	-2755.49	-2749.02	-2748.77	-2747.91

Robust standard errors in parentheses
+p<.10 *p<.05 **p<.01

Table 3. Hazard Ratios of Reproductive Measures on Early Life Socioeconomic Circumstances and Educational Attainment, NLS-MW

	1	2	3	4
Age in Years	1.080**	1.082**	1.084**	1.082**
	(0.013)	(0.013)	(0.014)	(0.014)
Age at First Birth	0.789**	0.838*	0.849*	0.866+
	(0.056)	(0.062)	(0.065)	(0.067)
Age at First Birth^2	1.005**	1.004*	1.003*	1.003*
	(0.001)	(0.001)	(0.001)	(0.002)
Pre-Marital Childbearer (no=ref)	1.201	1.034	1.010	0.999
	(0.163)	(0.143)	(0.140)	(0.138)
3-4 Children (1-2 = ref)	0.983	1.014	1.012	1.014
	(0.132)	(0.136)	(0.136)	(0.136)
5+ Children	1.182	1.067	1.093	1.077
	(0.166)	(0.152)	(0.156)	(0.154)
Race (Black=1, White=0)		1.780**	1.699**	1.673**
		(0.220)	(0.217)	(0.216)
Family structure at age 15--Single Parent (Two parent=ref)			0.995	0.999
			(0.173)	(0.174)
Family structure at age 15--Step Parent			1.233	1.220
			(0.294)	(0.291)
Family structure at age 15--Other			1.288	1.263
			(0.243)	(0.239)
Mother's Education at age 15-- 7-8 years (0-6=ref)			0.973	1.009
			(0.179)	(0.188)
Mother's Education at age 15-- High school			1.118	1.181
			(0.200)	(0.217)
Mother's Education at age 15-- College			0.978	1.075
			(0.268)	(0.300)
Mother's Education at age 15-- Missing or Unknown			1.213	1.219
			(0.215)	(0.216)
Residence at age 15--Rural (City=ref)			0.695**	0.665**
			(0.090)	(0.090)
Residence at age 15--Suburban			0.763*	0.752*
			(0.099)	(0.098)
(Education-12)				0.969
				(0.021)
Observations	50335	50335	50335	50335
Log Likelihood	-2747.91	-2737.21	-2728.79	-2727.90

Robust standard errors in parentheses
+p<.10 *p<.05 **p<.01

Table 4. Hazard Ratios of Reproductive Measures on Baseline Socioeconomic Circumstances, Adult Health, Educational Attainment and Early Life Socioeconomic Circumstances, NLS-MW

	1	2	3	4	5
Age in Years	1.082**	1.083**	1.079**	1.085**	1.081**
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
Age at First Birth	0.838*	0.849*	0.840*	0.864+	0.855*
	(0.062)	(0.065)	(0.064)	(0.068)	(0.067)
Age at First Birth^2	1.004*	1.003*	1.004*	1.003*	1.003*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Pre-Marital Childbearer (no=ref)	1.034	1.008	0.997	0.984	0.977
	(0.143)	(0.142)	(0.142)	(0.138)	(0.138)
3-4 Children (1-2 = ref)	1.014	1.008	1.015	1.004	1.012
	(0.136)	(0.138)	(0.140)	(0.138)	(0.140)
5+ Children	1.067	1.037	1.032	1.057	1.055
	(0.152)	(0.152)	(0.154)	(0.155)	(0.157)
Race (Black=1, White=0)	1.780**	1.692**	1.646**	1.625**	1.577**
	(0.220)	(0.234)	(0.229)	(0.227)	(0.221)
ln(net family income), 1967		0.972	0.984	0.957	0.967
		(0.041)	(0.044)	(0.037)	(0.041)
Employment status, 1967 (Not employed=ref)		0.899	0.946	0.920	0.971
		(0.104)	(0.108)	(0.106)	(0.111)
Marital status, 1967--Never Married (Married=ref)		1.119	1.081	1.030	0.971
		(0.381)	(0.375)	(0.357)	(0.344)
Marital status, 1967--Divorced or Separated		1.300	1.293	1.202	1.198
		(0.211)	(0.210)	(0.199)	(0.198)
Marital status, 1967--Widowed		0.819	0.756	0.830	0.763
		(0.263)	(0.245)	(0.269)	(0.249)
(Education-12)		0.985	1.003	0.975	0.993
		(0.020)	(0.021)	(0.021)	(0.022)
Self-Rated Health, 1967--Excellent (Poor=ref)			0.540**		0.510**
			(0.120)		(0.114)
Self-Rated Health, 1967--Good			0.591*		0.576**
			(0.125)		(0.123)
Self-Rated Health, 1967--Fair			0.911		0.904
			(0.208)		(0.206)
Family structure at age 15--Single Parent (Two parent=ref)				0.999	0.967
				(0.175)	(0.170)
Family structure at age 15--Step Parent				1.232	1.280
				(0.296)	(0.308)
Family structure at age 15--Other				1.263	1.261
				(0.241)	(0.241)
Mother's Education at age 15-- 7-8 years (0-6=ref)				1.003	1.022
				(0.188)	(0.192)
Mother's Education at age 15-- High school				1.174	1.219
				(0.217)	(0.226)
Mother's Education at age 15--College				1.040	1.091
				(0.293)	(0.308)
Mother's Education at age 15--Missing or Unknown				1.197	1.243
				(0.211)	(0.221)
Residence at age 15--Rural (City=ref)				0.674**	0.659**
				(0.092)	(0.089)
Residence at age 15--Suburban				0.759*	0.747*
				(0.100)	(0.098)
Observations	50335	50335	50335	50335	50335
Log Likelihood	-2737.21	-2734.54	-2727.13	-2726.32	-2717.85

Robust standard errors in parentheses
+p<.10 *p<.05 **p<.01

Table 5. Hazard Ratios of Reproductive Measures on Baseline and Current Socioeconomic Circumstances, Adult Health, Educational Attainment and Early Life Socioeconomic Circumstances, NLS-MW

	1	2	3	4	5	6
Age in Years	1.082**	1.054**	1.055**	1.055**	1.053**	1.056**
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)
Age at First Birth	0.838*	0.859*	0.858*	0.858*	0.849*	0.862+
	(0.062)	(0.066)	(0.067)	(0.066)	(0.065)	(0.068)
Age at First Birth^2	1.004*	1.003*	1.003*	1.003*	1.003*	1.003*
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Pre-Marital Childbearer (no=ref)	1.034	1.004	1.004	0.983	0.976	0.957
	(0.143)	(0.138)	(0.138)	(0.138)	(0.138)	(0.136)
3-4 Children (1-2 = ref)	1.014	1.049	1.048	1.048	1.051	1.052
	(0.136)	(0.141)	(0.141)	(0.144)	(0.145)	(0.145)
5+ Children	1.067	1.043	1.044	1.049	1.047	1.069
	(0.152)	(0.149)	(0.150)	(0.155)	(0.156)	(0.159)
Race (Black=1, White=0)	1.780**	1.565**	1.569**	1.560**	1.537**	1.479**
	(0.220)	(0.204)	(0.208)	(0.221)	(0.218)	(0.212)
ln(net family income), Time varying		0.957	0.956	0.957	0.960	0.956
		(0.031)	(0.031)	(0.031)	(0.032)	(0.031)
Employment status, Time varying		0.379**	0.379**	0.379**	0.391**	0.397**
		(0.057)	(0.057)	(0.058)	(0.060)	(0.061)
Marital status, Time varying--Never Married (Married=ref)		1.418	1.421	1.504	1.478	1.407
		(0.553)	(0.556)	(0.900)	(0.884)	(0.869)
Marital status, Time varying--Widowed		1.354*	1.355*	1.361*	1.340*	1.354*
		(0.181)	(0.182)	(0.183)	(0.180)	(0.183)
Marital status, Time varying--Divorced or Separated		1.411*	1.411*	1.327+	1.324+	1.294
		(0.226)	(0.226)	(0.219)	(0.216)	(0.213)
(Education-12)			1.002	1.004	1.018	1.008
			(0.020)	(0.020)	(0.021)	(0.022)
ln(net family income), 1967				0.988	0.999	0.983
				(0.042)	(0.045)	(0.041)
Employment status, 1967 (Not employed=ref)				1.008	1.051	1.072
				(0.117)	(0.122)	(0.125)
Marital status, 1967--Never Married (Married=ref)				0.927	0.903	0.838
				(0.476)	(0.468)	(0.449)
Marital status, 1967--Divorced or Separated				1.179	1.174	1.096
				(0.198)	(0.198)	(0.187)
Marital status, 1967—Widowed				0.753	0.706	0.711
				(0.241)	(0.228)	(0.231)
Self-Rated Health, 1967--Excellent (Poor=ref)					0.598*	0.567**
					(0.130)	(0.123)
Self-Rated Health, 1967—Good					0.633*	0.615*
					(0.131)	(0.128)
Self-Rated Health, 1967—Fair					0.918	0.908
					(0.205)	(0.202)
Family structure at age 15--Single Parent (Two parent=ref)						0.985
						(0.172)
Family structure at age 15--Step Parent						1.289
						(0.315)
Family structure at age 15—Other						1.247
						(0.237)
Mother's Education at age 15-- 7-8 years (0-6=ref)						1.051
						(0.197)
Mother's Education at age 15-- High school						1.271
						(0.235)
Mother's Education at age 15-- College						1.113
						(0.312)
Mother's Education at age 15-- Missing or Unknown						1.249
						(0.221)
Residence at age 15--Rural (City=ref)						0.676**
						(0.091)
Residence at age 15--Suburban						0.752*
						(0.099)
Observations	50335	50335	50335	50335	50335	50335
Log Likelihood	-2737.21	-2707.49	-2707.49	-2706.43	-2701.17	-2692.41

Robust standard errors in parentheses
+p<.10 *p<.05 **p<.01