Why Wait?

The Effect of Marriage and Childbearing on the Wages of Men and Women

David S. Loughran
Julie M. Zissimopoulos

ABSTRACT

We use data from the earlier and later cohorts of the NLSY to estimate the effect of marriage and childbearing on wages. Our estimates imply that marriage lowers female wages 2–4 percent in the year of marriage. Marriage also lowers the wage growth of men and women by about two and four percentage points, respectively. A first birth lowers female wages 2-3 percent, but has no effect on wage growth. Male wages are unaffected by childbearing. These findings suggest that early marriage and childbearing can lead to substantial decreases in lifetime earnings.

I. Introduction

Age-specific marital and birth rates have fallen sharply in the United States since the mid-1960s. The decline in these age-specific rates is attributable both to a delay in marriage and childbearing and to a reduction in the fraction of individuals who are ever likely to marry or have children. Among women aged 25-29, for example, the percentage of ever-married decreased from 85 to 62 percent between 1976 and 2004 and the percentage with one or more live births decreased from 69 to 56 percent.[1] The decline in marriage and childbearing is less pronounced at ages

1. Statistics on marital status are derived from the 1976 and 2004 March demographic supplements to the Current Population Survey (CPS). Statistics on live births come from published tables of the U.S. Census that employ the June fertility and marriage supplements to the CPS (see Table H1 available at http://www.census.gov/population/www/socdemo/fertility.html).

David S. Loughran is a senior economist and Julie M. Zissimopoulos is an economist at the RAND Corporation in Santa Monica, Calif. Both are also faculty members of the Frederick S. Pardee RAND Graduate School. *The authors gratefully acknowledge the financial support of the National Institute of Child Health and Development under grant 5 R03 HD 40853. The data used in this article can be obtained beginning October 2009 through September 2012 from David Loughran, RAND Corporation; Santa Monica, CA 90407; loughran@rand.org.*
[Submitted March 2007; accepted December 2007]
ISSN 022 166X E ISSN 1548 8004 8 2009 by the Board of Regents of the University of Wisconsin System

40–44, but still significant—the percentage of women ever married fell from 96 to 90 percent between 1976 and 2004 and the percentage of women with one or more live births fell from 90 to 81 percent.

A variety of hypotheses have been proposed to explain why men and women are more likely to postpone marriage and childbearing today, including increased access to convenient forms of contraception like the "pill" (Akerlof, Yellen, and Katz 1996; Goldin and Katz 2002), greater access to the labor market among women (Becker 1973; Van der Klaauw 1996; Blau, Kahn, and Waldfogel 2000), a decline in the number of marriageable men (Wilson 1987; Wood 1995; Brien 1997), rising male wage inequality (Loughran 2002; Gould and Paserman 2003) and the rise in federal welfare support for single mothers (Murray 1984; Moffitt 1992).

Another hypothesis for the delay in marriage and childbearing supposes that marriage and childbearing have adverse effects on wages and, hence, lifetime labor market earnings. As women have become more fully integrated into the labor force, and their potential contribution to household income has risen, the opportunity cost of marriage and childbearing in terms of foregone earnings has grown causing women to delay both. Childbearing leads, at the very least, to temporary absences from work, which can have a deleterious effect on wages, and, perhaps more significantly, to an increase in the demand for household production, which may come at the cost of market production. Marriage could independently lower wages if it is more difficult to optimize career development within marriage than outside of marriage. We are perhaps most likely to find support for these hypotheses when examining the labor market experiences of women, but it is not out of the question that the wages of men could be harmed by marriage and childbearing as well.

In this paper, we employ panel data on wages and marital and fertility histories from the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79) and the earlier cohorts of the NLSY—the 1966 Young Men (NLSYM) cohort and the 1968 Young Women (NLSYW) cohort—to estimate the effect of marriage and childbirth on wages. Our research is distinguished from earlier empirical research that employs similar panel data in several important ways. First, we examine the effects of marriage and childbearing on the wages of both men and women. Second, we report estimates from both cohorts of the NLSY. Much of the published longitudinal research on marriage and childbearing focuses on either men or on women and employs either the 1966/68 NLSY cohorts or the 1979 NLSY cohort.[2] Because these studies employ a variety of regression specifications, comparing published results across women and men and across birth cohorts is problematic. Third, we model the effect of both marriage and childbearing making it possible to draw inferences about the independent effects of these life events on wages over the life cycle.

Finally, unlike much of the earlier literature, we model the effect of marriage and childbearing on both wage levels and wage growth. This empirical approach is appropriate, we argue, since marriage and childbearing are as or more likely to affect the slope of the wage-experience profile as they are to induce a discrete shift in

2. Exceptions include Gray (1997), Waldfogel (1997b) and Waldfogel and Mayer (2000). Gray (1997) reports estimates from both cohorts, but only for men. Waldfogel and Mayer (2000) and Waldfogel (1997b) consider marriage and childbearing among other factors as explanations for the gender gap in pay utilizing a single year of data for each cohort (1980 in the NLSYW/NLSYM and 1994 in the NLSY79).

wages at all levels of experience. Our empirical approach also addresses the possibility that unobserved heterogeneity correlated with marriage and birth timing not only might affect wage levels, but wage growth as well.

Our estimates imply that marriage lowers female wages 2–4 percent in the year of marriage. Marriage has the additional effect of lowering the wage growth of both men and women by about two and four percentage points, respectively. A first birth lowers female wages 2-3 percent, but has no effect on subsequent wage growth. The wages of men are unaffected by childbearing. These findings are robust across the earlier and later cohorts of the NLSY and suggest that both men and women can benefit financially from delaying marriage and childbearing since even small decreases in wage growth at relatively young ages can lead to substantial decreases in lifetime earnings.

The remainder of this paper has the following structure. In Section II, we summarize hypotheses regarding the effect of marriage and childbearing on wages and the existing empirical literature that employs panel data to test these hypotheses. Section III develops our empirical specification and, in Section IV, we describe the data we use for this research and how we select our particular samples from the NLSY79, NLSYM, and NLSYW. Section V presents results and Section VI concludes.

II. Why Should Marriage and Childbearing Affect Wages?

Many studies have shown that women with children earn less than women without children and that married men earn more than unmarried men. For example, based on coefficient estimates derived from sex-specific regressions of log hourly wages on current marital status, number of children, experience, and experience squared using the NLSY79 sample described in Section IV, we find that the hourly wages of women with two or more children are 28 percent less than the hourly wages of women with no children and that the hourly wages of married men are 33 percent higher than the hourly wages of never married men. In this section we discuss how the empirical literature has interpreted the negative correlation between childbearing and the wages of women and the positive correlation between marriage and the wages of men and note that there is comparatively little focused empirical research on the effect of childbearing on the wages of men and the effect of marriage on the wages of women.

For women especially, pregnancy, delivery, and the immediate postpartum period are likely to lower labor market productivity and reduce labor supply, at least temporarily. Temporary absences from the work force necessary to bear and care for children cause general and firm-specific skills and rents to depreciate which leads to lower wages (Moffitt 1984; Blackburn, Bloom, and Neumark 1993; Hotz, Klerman, and Willis 1997; Angrist and Evans 1998; Lundberg and Rose 2000; Budig and England 2001; Anderson, Binder, and Krause 2003). Even if childbearing has no direct effect on productivity, temporary separation from work lowers work experience and tenure and may result in missed opportunities for professional development and promotion. Men and women who choose to work part-time following delivery also may experience declines in wages since part-time work typically pays a lower wage than does full-time work. Childbearing also might affect wages in the long run if the demands of caring for one's child permanently lowers productivity or if even short separations from work permanently limit future labor market opportunities.

While it seems quite plausible that childbearing might lower labor supply and wages, interpreting such correlations in the data is made difficult by the likelihood that men and women who have children are different from men and women who do not in ways that are potentially correlated with wages, but unobserved by the researcher. One approach to addressing the potential biases introduced by such unobserved heterogeneity is to control for individual-level fixed effects (Korenman and Neumark 1991; Waldfogel 1997, 1998; Taniguchi 1999; Lundberg and Rose 2002; Anderson, Binder, and Krause 2002, 2003; Amuedo-Dorantes and Kimmel 2005).[3] The literature employing fixed-effect models consistently finds a negative relationship between childbearing and female wages and a positive relationship between childbearing and male wages, although the magnitude of the effect varies substantially across studies and by whether the measured effect is for the first or subsequent children.[4]

As is well-known, fixed-effect estimates of the effect of childbearing on wages are still subject to bias if individual-level unobserved heterogeneity is not fixed over time[5] or if poor wage realizations lead to childbearing. The estimates of Angrist and Evans (1998) address both of these concerns by exploiting exogenous variation in the tendency to have a third child induced by the gender mix of the first two children. Their estimates suggest that a third child lowers female labor force participation by about 12 percentage points and female labor earnings by between 21 and 27 percent.[6] By these estimates, the labor force participation and labor earnings of men are unaffected by the birth of a third child. Miller (2007) uses shocks to fertility such as miscarriage and undesired childbearing (pregnancy while contracepting) to generate exogenous variation in the timing of motherhood and finds delaying childbearing increases both wage levels and growth.[7]

While the empirical literature on childbearing has largely focused on the negative impact of childbearing on the wages of women, the empirical literature on marriage

---

3. Geronimus and Korenman (1992) estimate the socioeconomic consequences of teenage childbearing by comparing the outcomes of sisters who had first births at different ages. These sibling fixed-effect models control for unobserved family background, but not individual-level heterogeneity.

4. The costs of childbearing may vary by skill level. A few studies, also employing fixed-effect methods, find marriage exacts either no wage penalty or actually increases wages among higher educated women (Taniguchi 1999; Amuedo-Dorantes and Kimmel 2005) while Ellwood, Wilde, and Batchelder (2004) find childbearing is more costly for more highly skilled women.

5. See, for example, Wooldridge (2002).

6. Whether these estimated effects would generalize to the effect of first and second children is unknown. Employing a similar strategy, Bronars and Grogger (1994) report that unwed mothers who first give birth to twins are more likely, in the short-run, to be unemployed, experience poverty, and receive welfare than are unwed mothers who first give birth to singletons.

7. Miller's identification strategy is undermined if miscarriages are correlated with unobserved health or if the likelihood of recognizing a miscarriage as such is correlated with unobserved determinants of labor market success. It also may be that the effectiveness of contraception (in terms of both diligence and quality of method) varies with the expected cost of childbearing. Hotz, McElroy, and Sanders (2005) also employ miscarriages to identify the effect of childbearing on labor market outcomes, but focus on teenage women.

has largely focused on the positive impact of marriage on the wages of men. There are several causal explanations for this male marriage premium. Marriage could motivate men to work harder (Becker 1981), marriage might allow men to specialize in market work(Korenman and Neumark 1991), or employers could favor married men over unmarried men (Hill 1979).

Alternatively, it could be that men with strong labor market potential make more desirable marriage partners than men with weak labor market potential. Consequently, it is not so much that marriage leads to higher wages, but that higher wages lead to marriage. In an effort to rule out this selection hypothesis, researchers have employed fixed-effect models (Korenman and Neumark 1991; Daniel 1995; Cornwell and Rupert 1997; Gray 1997; Lundberg and Rose 2000; Lundberg and Rose 2002; Krashinsky 2004; Ahituv and Lerman 2007). Using NLSY data between 1979 and 1993, Gray (1997) finds that male wages increase by about 2.1 percent for each year they are married. Korenman and Neumark (1991) report a similar estimate using data from the NLSYM. Krashinsky (2004), though, argues that married men could be on a steeper wage trajectory prior to marriage than are unmarried men, which could lead conventional fixed-effect models to overstate the impact of years married on wages. Krashinsky (2004) finds no evidence that marriage induces higher rates of wage growth for men.

Comparatively little attention has been paid to the effect of marriage on the wages of women. This gap in the literature is not entirely surprising, since age at first marriage is correlated with age at first birth, and childbirth perhaps has a more obvious role in determining female labor supply. However, the coupling of these events has weakened over time which opens up the possibility that marriage could act independently of childbearing in determining wages. Ellwood and Jencks (2002), for example, report that the percentage of women who had a first birth within 36 months of marriage declined from 75 to 50 percent between 1960 and 1990.

One reason why marriage could harm the wages of women (and men too) is that successful career development frequently requires some degree of mobility (Mincer 1986; Topel and Ward 1992; Keith and McWilliams 1999). It may take several tries to achieve the optimal employer-employee match and individuals who are geographically constrained may have fewer opportunities to achieve that match than will individuals who can search freely.[8] Marriage may limit mobility since privately optimal migration decisions can be collectively suboptimal (Mincer 1978; Gladden 1999; Keith and McWilliams 1999; Costa and Kahn 2000).

The empirical evidence on the effect of marriage on the wages of women is mixed. Using data from the NLSYW, Neumark and Korenman (1994) report that OLS estimates of the effect of marriage on white female wages are insignificantly different from zero, but positive in models that control for sibling fixed-effects. Using similar data, Anderson, Binder and Krause (2003) report that individual-level fixed-effect estimates imply female wages fall following marriage. We are unaware of any longitudinal studies of the effect of marriage on female wages that employ the NLSY79.

8. Topel and Ward (1992) find using longitudinal data between 1957 and 1972 that the typical young man will hold seven jobs in the first ten years of his working career, two-thirds of his career total. Whether that job churning has positive or negative repercussions for wages is unclear empirically since it is difficult to separate the effects of voluntary and involuntary job shopping (Neumark 2002, Light and McGarry 1998).

To summarize, most published empirical research employing panel data shows that married men earn considerably more than never married men and that women with children earn considerably less than women without children. Temporary absences from work due to childbearing are hypothesized to lower work experience and lead to human capital depreciation that lowers long-term wages. In practice, women are more likely to experience this childbearing effect than are men. Marriage, on the other hand, is hypothesized to motivate men to work harder and allow them to specialize in the labor market, thereby increasing wages. There is comparatively little empirical research on how childbearing affects the wages of men and how marriage affects the wages of women and what little evidence there is comes to mixed conclusions.

III. Empirical Specification

We begin by assuming that real log wages ($2004) are linearly related to current marital status, the presence of children, years married or divorced, and years with children:

$$\begin{aligned} \ln W_{it} &= \alpha + Married_{it}\beta_1 + YMarried_{it}\beta_2 + Divorced_{it}\beta_3 + YDivorced_{it}\beta_4 \\ &\quad + Child_{it}\beta_5 + YChild_{it}\beta_6 + Exp_{it}\alpha_i + Exp_{it}^2\beta_7 + Year_t\beta_8 + \eta_i + \epsilon_{it} \end{aligned} \tag{1}$$

where $\ln W_{it}$ is the real log hourly wage of individual i in year t, $Married_{it}$ is a dummy variable equal to one in years that an individual is married, $YMarried_{it}$ counts years married (equal to one in the year of marriage), $Divorced_{it}$ is a dummy variable equal to one in years that an individual is divorced, $YDivorced_{it}$ counts years divorced, $Child_{it}$ is a dummy variable equal to one in years that an individual has one or more children, $YChild_{it}$ counts years with children, $Year_t$ is a vector of year dummy variables, Exp_{it} is experience, Exp_{it}^2 is experience squared, and ϵ_{it} is an idiosyncratic error term.[9]

This specification assumes that marital status and childbearing can affect both the level of wages and its growth rate over time. So, for example, $\hat{\beta}_1 + \hat{\beta}_2$ is the estimated effect of marriage on wages in the year of marriage (an intercept effect), while $\hat{\beta}_2$ is the estimated effect of marriage on subsequent wage growth. The specification also allows the wage equation to have separate intercepts, η_i, and slopes in experience, α_i, for each individual.

If the choice of whether and when to marry, divorce, or have a child is correlated with either η_i or α_i, then the estimates of β_{1-6} will be biased. For example, individuals who have the potential to earn high wages may be more likely to delay marriage and childbearing because the opportunity cost of doing so is higher for them. Conversely, individuals with high potential wages might be more attractive to potential

9. Much of the earlier empirical research has included a larger set of covariates, such as occupation, industry, education, nonlabor income, age, and region. We chose a relatively parsimonious regression specification out of concern that many of these variables are endogenous. We note, however, that their omission has no substantive impact on the results we report below. This is not surprising since at the individual-level these covariates vary relatively little between survey waves in the NLSY.

partners in the marriage market and, therefore, on average, might marry and have children earlier.

By first differencing Equation 1 and assuming we observe individuals in our panel data set every year and that experience increases by one year every year, we obtain the following regression specification:

$$(2)\quad \Delta \ln W_{it} = \lambda + \Delta Married_{it}\beta_1 + Married_{it}\beta_2 + \Delta Divorced_{it}\beta_3 + Divorced_{it}\beta_4 + \Delta Child_{it}\beta_5 + Child_{it}\beta_6 + Exp_{it}\delta + \Delta Year_t\beta_8 + \alpha_i + \Delta\epsilon_{it}$$

where $\delta = 2\beta_7$. First differencing removes the individual intercept, η_i, but note that the individual-specific intercept, α_i, remains allowing for the possibility that wages grow over time at different rates for different individuals. If α_i is correlated with the choice of whether and when to marry and have children, then estimates of β_{1-6} will remain biased. For example, if individuals who marry early have higher wage growth than individuals who marry late, then $\hat{\beta}_{1-2}$ will be biased upward. Conversely, if individuals who marry early have lower wage growth than individuals who marry late, then $\hat{\beta}_{1-2}$ will be biased downward.[10]

Demeaning the specification in Equation 2 controls for the influence of this unobserved heterogeneity by removing the individual-specific intercept α_i:

$$(3)\quad \Delta \ln W_{it} - \Delta \ln W_i = (\Delta Married_{it} - \Delta Married_i)\beta_1 + (Married_{it} - Married_i)\beta_2 + (\Delta Divorced_{it} - \Delta Divorced_i)\beta_3 + (Divorced_{it} - Divorced_i)\beta_4 + (\Delta Child_{it} - \Delta Child_i)\beta_5 + (Child_{it} - Child_i)\beta_6 + (Exp_{it} - Exp_i)\delta + (Year_t - Year)\beta_8 + (\Delta\varepsilon_{it} - \Delta\varepsilon_i)$$

where, for example, $\Delta \ln W_{it} - \Delta \ln W_i$, is the difference between wage growth at time t and its within-person mean.[11]

In Section V, we report estimates derived from estimating variants of Equation 3. Since we do not necessarily observe individuals in our data annually, the first differences of $YMarried_{it}$ and $YChild_{it}$ cannot be interpreted as currently married or currently with child as in Equation 2. Likewise, the square of experience will not drop out of Equations 2 and 3.

We adjust our specification of Equations 2 and 3 as follows to account for gaps in our panel data. First, we include a term for the square of experience. Second, we divide first differences of log wages, experience, and the square of experience by the number of years between interviews. Thus, our measure of the difference in log

10. The published empirical literature on the effect of marriage and childbearing on wages typically specifies Equation 2 in terms of deviations from within-group means rather than in terms of first differences (Korenman and Neumark 1991; Daniel 1995; Gray 1997; Anderson, Binder, and Krause 2003; Lundberg and Rose 2002). However, the consistency of the fixed-effect parameter estimates still requires that unobserved heterogeneity be fixed over time.

11. We assume the error term in this specification is i.i.d., although we acknowledge that this specification still could generate biased estimates of β_{1-6} if contemporaneous shocks to wage growth affect marriage, divorce, and birth timing. For example, an unexpected shock to wage growth for a man might make him more attractive in the marriage market and induce him to marry earlier than he otherwise would.

wages approximates annual average wage growth between interviews. Finally, we employ the survey measure of current marital status to generate the variables $Married_{it}$ and $Divorced_{it}$ in Equation 2 rather than computing differences in years married and years divorced and dividing by years between interviews. We do the same for the variable $Child_{it}$ (where we specify this variable as two dummy variables for whether an individual has one or more children, $Child1_{it}$, or two or more children, $Child2+_{it}$).[12] The reason we do this is because dates of marriage, divorce, and childbearing cannot be determined as reliably for the older NLSY cohorts as for the NLSY79. So, if we were to employ measures of years married, divorced, and with children, this would introduce more measurement error for the earlier cohorts than for the later cohorts. Marital status and number of children, on the other hand, are measured with comparable levels of reliability in all three surveys.

As in the previously published empirical literature on this topic, we focus on wages rather than earnings as our outcome variable. We do this for two reasons. First, wages arguably focus the analysis on productivity effects rather than labor supply effects. Second, annual earnings are measured in the previous calendar year in the NLSY, which makes synchronizing earnings, marital, and childbearing histories problematic. It is important to note, though, that our wage growth regressions will suffer from sample selection bias since we only observe wages for those respondents who choose to work.[13] This is particularly problematic in the case of women. As we discuss in the following section, this potential sample selection bias complicates the interpretation of cross-cohort differences in parameter estimates.

IV. Data

We employ data from the 1966, 1968, and 1979 cohorts of the NLSY—the NLSYM, NLSYW, and NLSY79, respectively. We begin this section by discussing how we form our samples from these three surveys. We then discuss the implications of our most significant sample restriction, dropping observations with missing wages, and, in so doing, present estimates of the effect of marriage and childbearing on labor force participation.

A. Sample Restrictions

The NLSY79 began in 1979 with 12,686 men and women aged 14-22. With the exception of particular subsamples, these men and women were surveyed every year between 1979 and 1988 and biannually thereafter. By 2004, the surveyed sample was between 39 and 48 years old.

We employ a number of sample restrictions that we detail in Table 1. First, we drop the military and poor nonblack, non-Hispanic subsamples since the NLSY79

12. With this specification, $Child2+_{it}$ measures the incremental effect of having a second or higher birth order child.

13. We could attempt to address this sample selection problem by an ad-hoc imputation of missing wages or, more formally, by estimating a sample-selection model. But, in the absence of having a credible instrumental variable, we believe that the assumptions we would need to make in order to interpret these sample selection estimates are too strong as to be useful.

Table 1
Sample Restrictions: NLSY79

	Men		Women	
Sample	Responses	Observations	Responses	Observations
All respondents	6,403	134,463	6,283	131,943
Nonmilitary, nonpoor white	4,837	101,577	4,926	103,446
Interviewed	4,837	90,246	4,926	103,446
Age 18-41	4,824	79,963	4,912	94,674
Nonmissing marital status	4,824	79,954	4,912	83,106
Nonmissing fertility	4,776	79,157	4,881	83,106
Nonmissing hourly wage	4,738	65,959	4,799	62,297
Drop first observation	4,679	61,221	4,719	57,498
More than one observation remains	4,610	61,152	4,618	57,397

Source: NLSY79.

stopped surveying them after 1984 and 1990, respectively.[14] Our sample of NLSY79 respondents includes individuals for whom we could reliably identify whether they married or had children and, if so, the years in which they did so. To maintain an age distribution comparable to that in the NLSYW and NLSYM samples, we keep observations when sample members are ages 18–41. We then drop observations with missing data on wages. Finally, the first difference specification with fixed effects (Equation 3) causes us to drop the first observation for each sample member and then retain only those individuals with more than one remaining observation. Altogether, our sample restrictions leave us with 4,610 male and 4,618 female respondents with 61,152 and 57,397 individual-year observations, respectively.

We apply a comparable set of sample restrictions to the NLSYM and NLSYW (see Table 2). The NLSYM began in 1966 with 5,225 men aged 14-24. The NLSYW began in 1968 with 5,159 women aged 14-24. The NLSYM sample was surveyed annually between 1966 and 1971, and then in 1973, 1975, 1976, 1978, 1980, and 1981. The NLSYW sample was surveyed annually between 1968-1973, and then in 1975, 1977, 1978, 1980, 1982, 1983, 1985, 1988, and has been surveyed biannually since 1991. We drop observations for women aged 42 and above in the NLSYW in order to maintain an age distribution that is comparable to that of the NLSYM in their last survey wave (aged 28–41 in 1981).[15] After dropping observations with missing data on wages and dropping the first year of data for each respondent, our sample restrictions leave us with 4,445 male respondents from the NLSYM (30,484 individual-year observations) and 4,231 female respondents from the NLSYW (31,269

14. A small number of respondents in the military subsample were retained after 1984; we drop them from our sample nonetheless.
15. 1995 is the last survey wave of the NLSYW we use for this paper.

Table 2
Sample Restrictions: NLSYM and NLSYW

	NLSYM		NLSYW	
Sample	Responses	Observations	Responses	Observations
All respondents	5,225	62,700	5,159	113,498
Interviewed	5,223	48,306	5,159	86,256
Age 18-41	5,087	43,345	5,056	58,897
Nonmissing marital status	5,087	43,307	5,056	58,872
Nonmissing fertility	5,087	42,803	5,056	57,774
Nonmissing hourly wage	5,020	35,831	4,831	36,410
Drop first observation	4,772	30,811	4,541	31,579
More than one observation remains	4,445	30,484	4,231	31,269

Source: NLSYM and NLSYW.

individual-year observations). Tables 3 and 4 report the means and standard deviations of our regression variables from all three surveys.

B. Dropping Observations with Missing Wages

After imposing the first six sample restrictions in Table 1 and the first five sample restrictions in Table 2, dropping observations with missing wages eliminates 16 and 37 percent of the remaining male and female observations in the NLSYM and NLSYW, and 17 and 25 percent of the remaining male and female observations in the NLSY79.[16] These statistics suggest that it was more common for women to drop out of the labor force following marriage and birth in the earlier cohort than in the later cohort.

The regression results reported in Table 5 confirm this hypothesis. Table 5 reports the results of estimating Equation 2, where the dependent variable is a dummy variable for whether an individual has a missing wage, which we treat as a proxy for whether an individual is currently working (its mean and standard deviation is reported in Tables 3 and 4). We do not include experience in this regression since it is mechanically related to labor force participation.

In this table and those to follow, the sum of the coefficients on *Married* and *YMarried* is the intercept shift in the dependent variable attributable to marriage. *YMarried* is the effect of marriage on the rate of growth in the dependent variable following marriage. Thus, in this table and those to follow, we do not report the coefficient on *Married* alone, only its sum with *YMarried* and the corresponding standard error. The coefficients on divorce and children are reported in a parallel manner.

16. Note that this sample restriction does not result in a significant drop in the number of women in our sample since most women report a wage in at least one wave of their survey.

Table 3
Summary Statistics: NLSY79

Variable	Definition	Men		Women	
		Mean	Standard Deviation	Mean	Standard Deviation
ln(W)	Log hourly wage	2.54	0.63	2.34	0.61
Married	Currently married	0.44	0.50	0.48	0.50
Divorced	Currently divorced	0.11	0.31	0.16	0.37
Child1	One or more children	0.51	0.50	0.60	0.49
Child2	Two or more children	0.31	0.46	0.37	0.48
Exp	Experience	9.14	5.43	8.32	5.20
Exp^2	Experience squared	113.00	120.22	96.34	109.22
Working[a]	Nonmissing wage	0.85	0.36	0.76	0.42
Observations		61,152		57,397	

Source: NLSY79.
Note: a. Mean *Working* is computed from a larger sample that includes individuals with nonmissing wages (n = 74,362 and 78,204 for men and women, respectively). Samples are otherwise defined as in Table 1.

For men in the NLSY79 (Column 2), the regression results indicate that marriage decreases the probability of working by 1.3 percentage points, but has no effect on the rate of change in the probability of working. Childbearing has no statistically significant effect on a male's probability of working in the NLSY79. For men in the NLSYM, the results indicate that marriage increases the probability of working by about 1.7 percentage points. Divorce, on the other hand, decreases the probability of working by about three percentage points. A second or higher order child lowers the probability of working in the NLSYM by about two percentage points.

For women, we see that both marriage and childbearing have negative effects on the probability of working. In the NLSY79, the probability of working falls by 1.7 percentage points in the year of marriage and by another 1.6 percentage points every year thereafter. Relative to never being married, divorce lowers the probability of working by 1.3 percentage points per year divorced. In the NLSYW, marriage lowers the probability of working by 2.4 percentage points in the year of marriage and by another 3.7 percentage points for each year of marriage thereafter. Divorce increases the probability of working by 2.3 percentage points in the year of divorce, but the estimates imply that this effect diminishes over time.

The estimates of Table 5 indicate that having a first child lowers the probability of working by 9.4 percentage points among women in the NLSY79 and by 14.3 percentage points among women in the NLSYW. We estimate that a second child lowers the probability of working in the year of birth by an additional 7.7 and 5.5 percentage points in the NLSY79 and NLSYW, respectively. However, the negative effect of having a second child on the probability of working diminishes over time by 1.3 and 4.5 percentage points per year.

Table 4
Summary Statistics: NLSYM and NLSYW

		NLSYM		NLSYW	
Variable	Definition	Mean	Standard Deviation	Mean	Standard Deviation
ln(W)	Log hourly wage	2.76	0.48	2.41	0.49
Married	Currently married	0.62	0.49	0.59	0.49
Divorced	Currently divorced	0.09	0.29	0.17	0.38
Child1	One or more children	0.47	0.50	0.62	0.48
Child2	Two or more children	0.30	0.46	0.41	0.49
Exp	Experience	6.45	3.62	6.91	4.81
Exp^2	Experience squared	54.63	51.85	70.86	87.90
Working[a]	Nonmissing wage	0.84	0.37	0.68	0.47
Observations		30,484		31,269	

Source: NLSYM and NLSYW.
Note: a. Mean *Working* is computed from a larger sample that includes individuals with nonmissing wages (n = 37,487 and 52,591 for men and women, respectively). Samples are otherwise defined as in Table 2.

These results suggest that marriage and childbearing led to greater declines in labor force participation for women who married and had children in the 1960s and 1970s than for women who married and had children in the 1980s and 1990s. Looking at the final two rows of Table 5, the total effect of marriage and a first birth on the probability of working is −0.112 in the NLSY79 and −0.166 in the NLSYW. Moreover, over time, it would appear that these negative effects on the probability of working continue to grow in the NLSYW, but much less so in the NLSY79. By way of explanation, it could be that postmarriage and birth reservation wages were relatively high among women in the earlier cohort or that postmarriage and birth offered wages were relatively low. If so, this could mean that the estimated effect of marriage and childbearing on female wages is subject to relatively more sample selection bias in the earlier cohort. All else equal, this sample selection bias will drive our estimates of the effect of marriage and childbearing on wages toward zero, and relatively more so in the NLSYW than in the NLSY79.

V. Results

We present results in four sections. First, we report estimates of the effect of marriage and childbearing on the wages of men. The second section reports the same results for women. The third section explores whether the estimated negative effect of marriage on female wages truly reflects the effect of marriage alone or whether it reflects the effect of childbearing that, in many cases, follows shortly

Table 5
The Effect of Marriage and Childbearing on Labor Force Participation

	Men		Women	
	NLSY79	NLSYM	NLSY79	NLSYW
Married + YMarried	−0.013	0.017	−0.017	−0.024
	(0.006)[b]	(0.008)[b]	(0.007)[b]	(0.010)[b]
YMarried	−0.003	−0.002	−0.016	−0.037
	(0.003)	(0.007)	(0.004)[c]	(0.006)[c]
Divorced + YDivorced	−0.004	−0.029	0.002	0.023
	(0.009)	(0.010)[c]	(0.010)	(0.013)[a]
YDivorced	−0.006	0.002	−0.013	−0.029
	(0.005)	(0.01)	(0.005)[c]	(0.008)[c]
Child1 + YChild1	0.002	−0.0007	−0.094	−0.143
	(0.007)	(0.009)	(0.008)[c]	(0.009)[c]
YChild1	−0.001	0.00005	0.009	−0.004
	(0.004)	(0.009)	(0.004)[b]	(0.006)
Child2 + YChild2	−0.005	−0.020	−0.077	−0.055
	(0.008)	(0.009)[b]	(0.008)[c]	(0.009)[c]
YChild2	−0.001	−0.008	0.013	0.045
	(0.004)	(0.008)	(0.004)[c]	(0.006)[c]
Constant	0.059	0.016	0.081	0.061
	(0.008)[c]	(0.009)[a]	(0.008)[c]	(0.009)[c]
Observations	74,362	37,487	78,204	52,591
Married + YMarried + Child1 + YChild1	−0.011	0.016	−0.112	−0.166
	(0.009)	(0.010)	(0.010)[c]	(0.013)[c]
YMarried + YChild1	−0.005	−0.003	−0.008	−0.043
	(0.004)	(0.007)	(0.005)[a]	(0.007)[c]

Source: NLSY79, NLSYM, and NLSYW.
Notes: Dependent variable: *Working*. All regressions correspond to the specification in Equation 2, but omit experience, and include year dummy variables. *Married + YMarried* is the estimated effect of marriage on working in the year of marriage (an intercept effect). *YMarried* is the estimated effect of marriage on the rate of change in working. The corresponding terms for divorce and childbearing can be interpreted accordingly. See the text for further explanation. Samples are defined as in Tables 1 and 2, but include observations with missing wages. Standard errors are in parentheses.
a. Statistically significant at the 10 percent confidence level.
b. Statistically significant at the 5 percent confidence level.
c. Statistically significant at the 1 percent confidence level.

Table 6
The Effect of Marriage and Childbearing on Wages

	Men		Women	
	NLSY79	NLSYM	NLSY79	NLSYW
Married + YMarried	0.0003	0.009	−0.039	−0.019
	(0.010)	(0.008)	(0.011)[c]	(0.008)[b]
YMarried	−0.023	−0.021	−0.037	−0.037
	(0.009)[c]	(0.009)[b]	(0.009)[c]	(0.008)[c]
Divorced + YDivorced	−0.0006	0.033	−0.018	−0.005
	(0.015)	(0.009)	(0.014)	(0.010)
YDivorced	−0.026	−0.036	−0.031	−0.038
	(0.012)[b]	(0.012)[c]	(0.012)[c]	(0.010)[c]
Child1 + YChild1	−0.009	−0.004	−0.021	−0.027
	(0.011)	(0.007)	(0.012)[a]	(0.008)[c]
YChild1	−0.003	−0.012	−0.005	0.002
	(0.009)	(0.009)	(0.010)	(0.008)
Child2 + YChild2	−0.008	−0.0006	−0.003	0.007
	(0.012)	(0.008)	(0.012)	(0.008)
YChild2	−0.010	−0.001	−0.0004	0.005
	(0.009)	(0.008)	(0.009)	(0.008)
Exp	0.118	0.066	0.116	0.065
	(0.012)[c]	(0.012)[c]	(0.011)[c]	(0.008)[c]
Exp^2	−0.001	0.002	−0.001	−0.001
	(0.0006)[c]	(0.0009)[b]	(0.0006)[c]	(0.0004)c
Constant	−0.026	0.085	−0.045	0.079
	(0.025)	(0.011)c	(0.020)b	(0.010)[c]
Observations	61,152	30,484	57,397	31,269
Married + YMarried + Child1 +	−0.009	0.004	−0.060	−0.046
YChild1	(0.014)	(0.009)	(0.016)[c]	(0.011)[c]
YMarried + YChild1	−0.029	−0.035	−0.044	−0.036
	(0.011)[c]	(0.009)[c]	(0.012)[c]	(0.010)[c]

Source: NLSY79, NLSYM, and NLSYW.
Notes: Dependent variable: *ln(W)*. All regressions correspond to the specification in Equation 3 and include year dummy variables. *Married + YMarried* is the estimated effect of marriage on log wages in the year of marriage (an intercept effect). *YMarried* is the estimated effect of marriage on subsequent wage growth. The corresponding terms for divorce and childbearing can be interpreted accordingly. Samples are defined as in Tables 1 and 2. Standard errors are in parentheses.
a. Statistically significant at the 10 percent confidence level.
b. Statistically significant at the 5 percent confidence level.
c. Statistically significant at the 1 percent confidence level.

Table 7
The Effect of Marriage and Childbearing on Wages: Conventional Fixed Effects Estimates

	Men		Women	
	NLSY79	NLSYM	NLSY79	NLSYW
Married	0.111	0.108	0.055	0.069
	(0.007)[c]	(0.007)[c]	(0.008)[c]	(0.008)[c]
Divorced	0.032	0.072	0.075	0.091
	(0.010)[c]	(0.009)[c]	(0.010)[c]	(0.011)[c]
Child1	0.042	0.029	−0.028	−0.032
	(0.008)[c]	(0.007)[c]	(0.008)[c]	(0.008)[c]
Child2	−0.010	0.008	−0.065	−0.025
	(0.007)	(0.007)	(0.008)[c]	(0.008)[c]
Exp	0.109	0.094	0.094	0.078
	(0.003)[c]	(0.006)[c]	(0.003)[c]	(0.003)[c]
Exp^2	−0.001	−0.003	−0.001	0.0
	(0.00009)[c]	(0.0002)[c]	(0.00009)[c]	(0.0001)[c]
Constant	1.150	2.266	1.292	2.135
	(0.048)[c]	(0.010)[c]	(0.039)[c]	(0.010)[c]
Observations	61,152	30,484	57,397	31,269

Source: NLSY79, NLSYM, and NLSYW.
Notes: Dependent variable: *ln(W)*. All regressions correspond to the specification in Equation 2, but express variables in terms of deviations from their within-individual means. All regressions include year dummy variables. Samples are defined as in Tables 1 and 2. Standard errors are in parentheses.
a. Statistically significant at the 10 percent confidence level.
b. Statistically significant at the 5 percent confidence level.
c. Statistically significant at the 1 percent confidence level.

thereafter. The fourth and final section presents results disaggregated by educational attainment.

A. Results for Men

Our estimates indicate that marriage and childbearing do not exert an intercept shift in male wages in either the NLSY79 or NLSYM cohorts. In the second and third columns of Table 6, the sum of the estimated coefficients on *Married* and *YMarried* are small in magnitude and statistically indistinguishable from zero. The same is true of the sum of *Divorced* and *YDivorced*, *Child*1 and *YChild*1, and *Child*2 and *YChild*2. However, our estimates imply that male wages suffer from marriage in the long run. Male wages fall by 2.3 percent for each year of marriage in the NLSY79 and 2.1 percent for each year of marriage in the NLSYM. Thus, the estimates imply that male wage growth declines as a result of marriage. This negative effect on wage growth persists in divorce. Childbearing has no independent effect on male wage growth in either cohort.

Quite to the contrary, we show in Table 7 that parameter estimates generated from a conventional fixed-effect specification (where variables are expressed as deviations from within group means) imply marriage and childbearing have a strong positive effect on male wages. These estimates imply that marriage leads to about an 11 percent increase in the wages of men surveyed in both cohorts. Childbearing leads to a 3-4 percent increase in male wages according to these estimates. These results are consistent with those reported by Korenman and Neumark (1991) and Gray (1997) who use the NLSY and Lundberg and Rose (2002) who use the Panel Study of Income Dynamics (PSID).[17]

However, conventional fixed-effect estimates are likely to be biased since they assume there is no unobserved heterogeneity correlated with marriage and birth timing in the effect of experience on wages (for example, assuming $\alpha_i = \alpha$ in Equation 1). In the case of marriage, for example, the large positive difference between the conventional fixed-effect estimates and the estimates we report in Table 6 suggest that men who marry relatively early, conditional on their fixed characteristics, experience relatively higher wage growth both pre- and postmarriage than do men who marry relatively late or never marry at all. This inference is consistent with that suggested by Krashinsky (2004) in his study of marriage and male wages using the NLSY79.

B. Results for Women

For women, our results imply that both marriage and childbearing lower wages (fourth and fifth columns of Table 6). The estimates imply that female wages fall by about 4 percent in the year of marriage in the NLSY79 and by about 2 percent in the year of marriage in the NLSYW. In both samples, marriage has the additional effect of lowering wage growth by 3.7 percentage points. In the NLSYW, the estimates imply that wages recover in the year of divorce (the estimated net effect of divorce on wages is near zero relative to never married women), but in both the NLSYW and NLSY79, wages continue to grow more slowly after divorce relative to never married women.

A first birth lowers the wages of women by 2.1 percent in the NLSY79 (significant at the 10 percent confidence level) and by 2.7 percent in the NLSYW. A first child has no effect on female wage growth in either sample. The results also suggest that a second child has no incremental effect on female wages.

We have already shown that female labor force participation falls considerably upon marriage and childbearing and so it seems likely that the concurrent decline in work experience could be dampening the estimated negative effect of marriage and childbearing on wages we observe in Table 6. We examine this possibility by estimating Equation 3 without the quadratic in experience. These results are presented in Table 8.

17. The estimates of the effect of marriage on male wages reported in Table 7 are substantially higher than those reported in Table 2 of Korenman and Neumark (1991) and Table 3 of Gray (1997). We attribute these differences to differences in sample selection. Our samples include many more years of data than do either of the samples they employ. When we employ similar sample restrictions we obtain similar estimates. The effect of children on male wages reported by Lundberg and Rose (2002) are similar to our results for the cohort born after 1950. They find a 5.7 percent (4.2 percent) increase in men's wages for the first (second) child. They find substantially higher effects for the cohort born 1950 or before (9.7 percent and 8.4 percent for first and second children, respectively).

Table 8
The Effect of Marriage and Childbearing on Wages: Work Experience Omitted

	Men		Women	
	NLSY79	NLSYM	NLSY79	NLSYW
Married + YMarried	0.003	0.013	−0.041	0.019
	(0.010)	(0.008)[a]	(0.011)[c]	(0.008)[b]
YMarried	−0.021	−0.010	−0.039	−0.036
	(0.009)[b]	(0.008)	(0.009)[c]	(0.008)[c]
Divorced + YDivorced	0.0001	−0.002	−0.021	−0.004
	(0.015)	(0.009)	(0.014)	(0.010)
YDivorced	−0.025	−0.028	−0.029	−0.035
	(0.012)[b]	(0.012)[b]	(0.012)[b]	(0.010)[c]
Child1 + YChild1	−0.011	−0.005	−0.043	−0.035
	(0.011)	(0.007)	(0.012)[c]	(0.008)[c]
YChild1	−0.003	−0.011	−0.013	−0.001
	(0.009)	(0.009)	(0.010)	(0.008)
Child2 + YChild2	−0.009	−0.003	−0.023	0.002
	(0.012)	(0.008)	(0.012)[a]	(0.008)
YChild2	−0.014	−0.002	0.0	0.010
	(0.009)[a]	(0.008)	(0.009)[c]	(0.008)[c]
Constant	−0.0007	0.134	0.054	0.126
	(0.019)	(0.008)[c]	(0.017)[c]	(0.008)[c]
Observations	61,152	30,484	57,397	31,269
Married + YMarried + Child1 + YChild1	−0.008	0.008	−0.084	−0.054
	(0.014)	(0.009)	(0.016)[c]	(0.011)[c]
YMarried + YChild1	−0.026	−0.023	−0.053	−0.039
	(0.011)[b]	(0.009)[b]	(0.012)[c]	(0.010)[c]

Source: NLSY79, NLSYM, and NLSYW.
Notes: Dependent variable: *ln(W)*. All regressions correspond to the specification in Equation 3, but omit experience, and include year dummy variables. *Married + YMarried* is the estimated effect of marriage on log wages in the year of marriage (an intercept effect). *YMarried* is the estimated effect of marriage on subsequent wage growth. The corresponding terms for divorce and childbearing can be interpreted accordingly. Samples are defined as in Tables 1 and 2. Standard errors are in parentheses.
a. Statistically significant at the 10 percent confidence level.
b. Statistically significant at the 5 percent confidence level.
c. Statistically significant at the 1 percent confidence level.

In Table 8, marriage continues to exert a negative effect on male and female wage growth comparable to what we observe in Table 6 (although for men in the NLSYM, marriage is now estimated to increase wages in the year of marriage and has no statistically significant effect on wage growth). Without experience in the model, the

Table 9
The Effect of Marriage on Female Wages, by Fertility Outcome

	No Child				No Child by Age 40	
	NLSY79	NLSYW	Child w/in 3 Years	Expect Child w/in 3 Years	NLSY79	NLSYW
Married + YMarried	−0.017	0.012	0.003	0.047	0.006	−0.047
	(0.015)	(0.012)	(0.017)	(0.026)[a]	(0.032)	(0.028)[a]
YMarried	−0.027	−0.036	−0.016	−0.042	−0.015	−0.008
	(0.013)[b]	(0.013)[c]	(0.014)	(0.024)[a]	(0.023)	(0.024)
Divorced + YDivorced	−0.018	0.040	−0.005	0.027	−0.013	−0.021
	(0.024)	(0.020)[a]	(0.025)	(0.039)	(0.041)	(0.036)
YDivorced	−0.028	−0.035	−0.014	−0.043	−0.008	−0.025
	(0.021)	(0.021)[a]	(0.021)	(0.034)	(0.030)	(0.031)
Exp	0.117	0.0	0.129	0.101	0.091	−0.007
	(0.020)[c]	(0.017)	(0.022)[c]	(0.040)[b]	(0.032)[c]	(0.030)
Exp^2	−0.001	−0.0004	−0.001	0.0007	−0.0003	−0.0005
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)
Constant	−0.083	0.135	−0.104	−0.179	−0.128	0.030
	(0.054)	(0.016)[c]	(0.055)[a]	(0.107)[a]	(0.062)[b]	(0.035)
Observations	24,113	11,798	18,878	6,850	7,746	3,256

Source: NLSY79 and NLSYW.
Notes: Dependent variable: *ln(W)*. All regressions correspond to the specification in Equation 3, but omit children and include year dummy variables. *Married+YMarried* is the estimated effect of marriage on log wages in the year of marriage (an intercept effect). *YMarried* is the estimated effect of marriage on subsequent wage growth. The corresponding terms for divorce can be interpreted accordingly. Samples are restricted to women who currently have no children. In Column 4, the sample is restricted to NLSY79 women whose first birth occurs at least 3 years following their first marriage. In Column 5, the sample is restricted to NLSY79 women who at the time of first marriage did not expect to have a child for at least three years. In Columns 6 and 7, the samples are restricted to women who have no children by age 40. Samples are otherwise defined as in Tables 1 and 2. Standard errors are in parentheses.
a. Statistically significant at the 10 percent confidence level.
b. Statistically significant at the 5 percent confidence level.
c. Statistically significant at the 1 percent confidence level.

negative effect of having a first child on female wages in the year of birth is now 3-4 percent in both samples. There is no statistically significant effect of a first birth on female wage growth in either sample. In the NLSY79, a second or higher order birth child reduces wages by an additional 2 percent (statistically significant at the 10 percent confidence level). Together, the results of Tables 6 and 8 suggest that the negative effect of childbearing on female wages is at least partly due to decreases in work experience whereas the negative effect of marriage on female wages appears to be independent of experience.

Contrary to the results in Table 6, conventional fixed-effect estimates for women imply that marriage increases wages (fourth and fifth columns of Table 7). In the NLSY79 sample, fixed-effect estimates imply marriage raises female wages by 5.5 percent; marriage increases wages in the NLSYW sample by 6.9 percent. Children, on the other hand, lower wages. The fixed-effect estimates imply that a first child lowers the wages of women in the NLSY79 by 2.8 percent and a second child lowers their wages by another 6.5 percent. The corresponding wage declines for women in the NLSYW are 3.2 and 2.5 percent. Compared to the estimates of Table 6, the conventional fixed-effect specification results in upwardly biased estimates of the impact of marriage and downwardly biased estimates of the impact of higher order childbearing on female wages.

C. Is it Marriage or Childbearing that Lowers Females Wages?

For most women, marriage and childbearing occur closely in time. In our NLSY79 sample, for example, the median difference between age at first marriage and age at first birth is 16 months (a comparable estimate for the NLSYW is not readily computed). So, while the estimates reported in Table 6 suggest that marriage has a negative effect on the wages of women that is independent of the negative effect of childbearing, can we be certain that this marriage effect is truly independent?

In Table 9, we restrict the NLSY79 and NLSYW samples to women who currently do not have children. Thus, the effect of marriage in these samples is the effect of marriage on wage growth prior to childbearing. In Columns 2 and 3, the point estimates imply that marriage has no effect on female wages in the year of marriage. The estimates do imply, however, that marriage lowers female wage growth by 2.7 and 3.6 percentage points in the NLSY79 and NLSYW samples, respectively.

Still, it could be that women expect their careers to suffer when they have children and so, following marriage, invest less in those careers, resulting in lower wage growth even prior to childbearing. We cannot directly test this hypothesis with our data. We can, however, impose additional sample restrictions to focus on women who upon marriage do not intend to have children for several years. In Column 4 of Table 9 we restrict the NLSY79 sample to women who had their first child three or more years following their first marriage and in Column 5 to women, who at the time they married (or soon after), stated they did not "expect" to have a child for at least another three years. In these restricted samples we see that the effect of marriage on wage growth is smaller (−0.016) and statistically insignificant for women who have their first birth three or more years following marriage and of a comparable magnitude (−0.042) and statistically significant at the 10 percent confidence level for women who do not expect to have a child for at least another three years.

Finally, in both the NLSY79 and NLSYW, we can restrict our samples to women who did not have a child by age 40 (Columns 6 and 7). The effect of marriage on wage growth in these restricted samples is −0.015 and −0.008 in the NLSY79 and NLSYW, respectively. Neither estimate is statistically significant. In the NLSYW, the estimates imply that marriage has a negative effect on wages in the year of marriage (statistically significant at the 10 percent confidence level). Thus, while the estimates do indicate that female wage declines following marriage, but prior to

Table 10
The Effect of Marriage and Childbearing on Female Wages, by Educational Attainment: NLSY79

	Years of Education			
	<12	12	13-15	≥16
Married + YMarried	−0.083	−0.050	−0.061	0.010
	(0.060)	(0.019)[c]	(0.020)[c]	(0.021)
YMarried	−0.027	−0.033	−0.040	−0.030
	(0.049)	(0.015)[b]	(0.016)[b]	(0.017)
Divorced + YDivorced	−0.080	−0.036	−0.024	0.020
	(0.069)	(0.023)	(0.026)	(0.032)
YDivorced	−0.020	−0.044	−0.027	−0.001
	(0.057)	(0.019)[b]	(0.021)	(0.027)
Child1 + YChild1	0.064	−0.031	−0.019	−0.002
	(0.068)	(0.019)	(0.021)	(0.023)
YChild1	−0.016	0.014	−0.029	0.007
	(0.058)	(0.016)	(0.017)[a]	(0.020)
Child2 + YChild2	0.067	−0.011	0.010	−0.014
	(0.059)	(0.019)	(0.021)	(0.027)
YChild2	0.048	−0.005	0.002	0.003
	(0.049)	(0.015)	(0.016)	(0.021)
Exp	0.141	0.111	0.119	0.099
	(0.040)[c]	(0.016)[c]	(0.020)[c]	(0.026)[c]
Exp^2	−0.001	−0.0008	−0.001	−0.0008
	(0.002)	(0.0009)	(0.001)[b]	(0.001)
Constant	−0.027	−0.064	−0.027	−0.289
	(0.106)	(0.040)	(0.034)	(0.056)[c]
Observations	3,356	22,706	16,730	14,605
Married + YMarried + Child1 +	−0.019	−0.080	−0.081	0.008
YChild1	(0.084)	(0.025)[c]	(0.027)[c]	(0.031)
YMarried + YChild1	−0.045	−0.019	−0.072	−0.024
	(0.067)	(0.019)	(0.020)[c]	(0.023)

Source: NLSY79.
Notes: Dependent variable: *ln(W)*. All regressions correspond to the specification in Equation 3 and include year dummy variables. *Married* + *YMarried* is the estimated effect of marriage on log wages in the year of marriage (an intercept effect). *YMarried* is the estimated effect of marriage on subsequent wage growth. The corresponding terms for divorce and childbearing can be interpreted accordingly. Samples are defined as in Tables 1 and 2. Standard errors are in parentheses.
a. Statistically significant at the 10 percent confidence level.
b. Statistically significant at the 5 percent confidence level.
c. Statistically significant at the 1 percent confidence level.

birth, it might be that the estimated effect of marriage on female wage growth would be smaller were it not for the expectation of future childbearing.

D. Does the Effect of Marriage and Childbearing on Females Wages Vary by Educational Attainment?

In the empirical literature on childbearing and female labor supply it has been hypothesized that only women with potentially high returns to career development (for example, college graduates) would experience a significant wage penalty for having children and temporarily dropping out of the labor force (Taniguchi 1999; Anderson, Binder and Krause 2003). This also could be true in the case of marriage. If the negative effect of marriage on wage growth is in part due to constraints on mobility that marriage can impose, then we should expect women who experience high returns to mobility to suffer greater declines in wage growth following marriage than women who do not experience high returns to mobility.

Table 10 reports estimates for women in the NLSY79 by educational attainment (highest grade recorded in the survey– <12 years, 12 years, 13-15 years, and 16 or more years). Marriage has a negative effect on wages in the year of marriage for all but the most educated women (although the point estimate for women with less than 12 years of education is statistically insignificant). The estimates imply a negative and comparable effect of marriage on wage growth across all educational categories. Although the impact of having a first child on wages varies considerably across educational categories, we cannot reject the null hypothesis that these effects are equivalent.[18] Examining the second to last row of Table 10, the estimates imply that marriage and childbearing together have larger negative effects on the wages of women with between 12 and 15 years of education than for either women with less than 12 years of education or more than 15 years of education (the point estimates for the 12 and 13-15 years of education categories are statistically different from the point estimate for the 16 or more years of education category).

VI. Conclusions

In this paper we have presented evidence that marriage and childbearing lower the probability that women work and negatively affect the wages of women who do work. Our estimates imply that female wages fall 2-4 percent in the year of marriage. Marriage has the additional effect of lowering the wage growth of women by another two to four percentage points. A first birth lowers female wages 2-3 percent but has no effect on wage growth in subsequent years. These negative effects on the labor supply and wages of women are found in both the earlier and later cohorts of the NLSY. A simple comparison of point estimates across cohorts suggests that the negative effect of marriage and childbearing on female wages

18. To test this hypothesis, we estimate a common experience effect across all education groups, but allow the effect of marriage and childbearing to vary by education. This finding holds when we estimate these regressions without experience, as in Table 8.

has worsened over time (see the last two rows of Tables 6 and 8). With respect to the labor supply of women, it would appear that marriage and childbearing have a smaller negative effect on the probability of working now than in earlier times. Whether differences in estimated wage effects across cohorts reflect a worsening of the causal effect of marriage and childbearing on wages or a change in the type of women who continue to work after marriage and childbearing cannot be determined from these results alone.

Our estimates indicate that marriage and childbearing depress female wages for different reasons. Whereas childbearing has the effect of shifting the entire wage-experience profile downward, marriage decreases the slope of the wage-experience profile (prior to childbearing and at all levels of education). A model of household income maximization could explain these findings. Given the relative difficulty of optimizing two careers rather than just one and the likelihood that women will bear much of the burden of childbearing, married couples find it optimal to accommodate the careers of men more than the careers of women. This leads to lower wage growth for married women even before children are born. The arrival of children then causes many women to reduce their labor supply or drop out of the labor force altogether, which lowers experience, and further reduces wages.

But we should not forget that our estimates imply that marriage lowers the wage growth of men as well (by about two percentage points), a finding that stands in stark contrast to the earlier empirical literature on this topic. Thus, it might be that men too find it difficult to optimize their careers within marriage. Unlike women, the wages of men remain unaffected by childbearing once married, but marriage itself may pose constraints on career development that ultimately lower even their long-term wage growth. For both men and women, then, there could be significant financial gains to delaying marriage since small decreases in wage growth at relatively young ages could result in large decreases in lifetime earnings.

References

Ahituv, Avner, and Robert I. Lerman. 2007. "How Do Marital Status, Work Effort, and Wage Rates Interact?" *Demography* 44(3):623–47.

Akerlof, George, Janet Yellen, and M. Katz. 1996. "An Analysis of Out-of-Wedlock Childbearing in the United States." *Quarterly Journal of Economics* 111(2):277–317.

Amuedo-Dorantes, Catalina, and Jean Kimmel. 2005. "The Motherhood Wage Gap for Women in the United States: The Importance of College and Fertility Delay." *Review of Economics of the Household* 3:17–48.

Anderson, Deborah J., Melissa Binder, and Kate Krause. 2002. "The Motherhood Penalty: Which Mothers Pay and Why?" *American Economic Review Papers and Proceedings* 92(2):354–58.

__________. 2003. "The Motherhood Wage Penalty Revisited: Experience, Heterogeneity, Work Effort, and Work-Schedule Flexibility." *Industrial Labor Relations Review* 56(2):273–94.

Angrist, Joshua, and William Evans. 1998. "Children and Their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size." *The American Economic Review* 88(3):450–77.

Becker, Gary S. 1973. "A Theory of Marriage: Part I." *Journal of Political Economy* 81(4):813–46.

__________. 1981. *A Treatise on the Family.* Cambridge: Harvard University Press.

Blackburn, McKinley, David Bloom, and David Neumark. 1993. "Fertility Timing, Wages, and Human Capital." *Journal of Population Economics* 6(1):1–30.

Blau, Francine, L. Kahn, and Jane Waldfogel. 2000. "Understanding Young Women's Marriage Decisions: The Role of Labor and Marriage Market Conditions." NBER Working Paper 7510. Cambridge: National Bureau of Economic Research.

Brien, Michael. 1997. "Racial Differences in Marriage and the Role of Marriage Markets." *Journal of Human Resources* 32(4):741–78.

Bronars, Stephen G., and Jeff Grogger. 1994. "The Economic Consequences of Unwed Motherhood: Using Twin Births as a Natural Experiment." *American Economic Review* 84(5):1141–56.

Budig, Michelle J., and Paula England. 2001. "The Wage Penalty for Motherhood." *American Sociological Review* 66(2):204–25.

Costa, Dora L., and Matthew E. Kahn. 2000. "Power Couples: Changes in the Locational Choice of the College Educated, 1940-1990." *The Quarterly Journal of Economics* 115(4):1287–314.

Cornwell, Christopher, and Peter Rupert. 1997. "Unobservable Individual Effects, Marriage, and the Earnings of Young Men." *Economic Inquiry* 35:285–94.

Daniel, Kermit E. 1995. "The Marriage Premium." In *The New Economics of Human Behavior*, eds. M. Tommasi and K. Ierulli, 113–28. Cambridge: Cambridge University Press.

Ellwood, David T., and Christopher Jencks. 2002. "The Growing Difference in Family Structure: What Do We Know? Where Do We Look for Answers?" John F. Kennedy School of Government, Harvard University. Unpublished.

Ellwood, David, Ty Wilde, and Lily Batchelder. 2004. "The Mommy Track Divides: The Impact of Childbearing on Wages of Women of Differing Skill Levels." Working Paper, Russell Sage Foundation.

Geronimus, Arline T., and Sanders Korenman. 1992. "The Socioeconomic Consequences of Teen Childbearing Reconsidered." *Quarterly Journal of Economics* 107(4):1187–214.

Gladden, T. 1999. "Labor Market Effects of Family Ties and Migration." Evanston: Northwestern University, Department of Economics. Unpublished.

Goldin, Claudia, and Lawrence F. Katz. 2002. "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions." *Journal of Political Economy* 110(4): 730–70.

Gould, Eric, and Daniele Paserman. 2003. "Waiting for Mr. Right: Rising Inequality and Declining Marriage Rates." *Journal of Urban Economics* 53(2):257–81.

Gray, Jeffrey S. 1997. "The Fall in Men's Return to Marriage. Declining Productivity Effects or Changing Selection?" *Journal of Human Resources* 32(3):481–504.

Hill, Martha. 1979. "The Wage Effects of Marital Status and Children." *Journal of Human Resources* 14(4): 579–94.

Hotz, Joseph, Jacob Klerman, and Robert Willis. 1997. "The Economics of Fertility in Developed Countries." In *Handbook of Population and Family Economics*, eds. Mark Rosenzweig and Oded Stark, 275–347. Amsterdam: Elsevier.

Hotz, Joseph, V., Susan Williams McElroy, and Seth G. Sanders. 2005. "Teenage Childbearing and Its Life Cycle Consequences: Exploiting a Natural Experiment." *Journal of Human Resources* 40(3):683–715.

Keith, Kristen, and Abagail McWilliams. 1999. The Returns to Mobility and Job Search by Gender. *Industrial and Labor Relations Review* 52(3):460–77.

Korenman, Sanders, and David Neumark. 1991. Does Marriage Really Make Men More Productive? *The Journal of Human Resources* 26(2):282–307.
Krashinsky, Harry A. 2004. ‘‘Do Marital Status and Computer Usage Really Change the Wage Structure?’’ *Journal of Human Resources* 29(3):774–91.
Light, Audrey, and Kathleen McGarry. 1998. ‘‘Job Change Patterns and the Wages of Young Men.’’ *The Review of Economics and Statistics* 80(2):276–86.
Loughran, David S. 2002. ‘‘The Effect of Rising Male Wage Inequality on Female Age at First Marriage.’’ *Review of Economics and Statistics* 84(2):237–50.
Lundberg, Shelly, and Elaina Rose. 2000. ‘‘Parenthood and the Earnings of Married Men and Women.’’ *Labour Economics* 7(6):689–710.
__________. 2002. ‘‘The Effects of Sons and Daughters on Men’s Labor Supply and Wages.’’ *Review of Economics and Statistics* 84(2):251–68.
Lundberg, Shelly. 1985. ‘‘Tied Wage-Hours Offers and the Endogeneity of Wages.’’ The *Review of Economics and Statistics* 67(3):405–10.
Miller, Amalia. 2007. ‘‘The Effects of Motherhood Timing on Career Path.’’ Department of Economics, Stanford University. Unpublished.
Mincer, Jacob. 1978. ‘‘Family Migration Decisions.’’ *Journal of Political Economy* 86(5):749–73.
__________. 1986. ‘‘Wage Changes in Job Changes.’’ In *Research in Labor Economics*, ed. Ronald G. Ehrenberg, 171–97. Greenwich, Conn.: JAI Press, Inc.
Moffitt, Robert. 1984. ‘‘Optimal Life-Cycle Profiles of Fertility and Labor Supply.’’ In *Research in Population Economics*, eds. Paul T. Shultz and Kenneth I. Wolpin, 29–50. Greenwich, CT: JAI Press Inc.
__________. 1992. ‘‘Incentive Effects of the U.S. Welfare System: A Review.’’ *Journal of Economic Literature* 30(1): 1–61.
Murray, Charles. 1984. *Loosing Ground*. New York: Basic Books.
Neumark, David, and Sanders Korenman. 1994. ‘‘Sources of Bias in Women’s Wage Equations - Results Using Sibling Data.’’ *The Journal of Human Resources* 29(2):379–405.
Neumark, David. 2002. ‘‘Youth Labor Markets in the United States: Shopping Around vs. Staying Put.’’ *The Review of Economics and Statistics* 84(3):463–82.
Taniguchi, Hiromi. 1999. ‘‘The Timing of Childbearing and Women’s Wages.’’ *Journal of Marriage and the Family* 61:1008–19.
Topel, Robert H. and Michael P. Ward. 1992. ‘‘Job Mobility and the Careers of Young Men.’’ *The Quarterly Journal of Economics* 107(2):439–79.
Van Der Klaauw, Wilbert. 1996. ‘‘Female Labour Supply and Marital Status Decisions: A Life-Cycle Model.’’ *Review of Economic Studies* 63:199–235.
Waldfogel, Jane. 1997. ‘‘The Effect of Children on Women’s Wages.’’ *American Sociological Review.* 62(2):209–17.
__________. (1997b). ‘‘Working Mothers Then and Now: A Cross-Cohort Analysis of the Effects of Maternity Leave on Women’s Pay.’’ In *Gender and Family Issues in the Workplace*, ed. Ronald G. Ehrenberg, 92–126. New York: Russell Sage Foundation.
__________. 1998. ‘‘Understanding the ‘Family Gap’ in Pay for Women with Children.’’ *Journal of Economic Perspectives* 12(1):137–56.
Waldfogel, Jane, and Susan E. Mayer. 2000. ‘‘Gender Differences in the Low-Wage Labor Market.’’ In *Finding Jobs: Work and Welfare Reform*, ed. D. Card, 193–232. New York: Russell Sage Foundation.
Wilson, Julius. 1987. *The Truly Disadvantaged*. Chicago: University of Chicago Press.
Wood, Robert. 1995. ‘‘Marriage Rates and Marriageable Men: A Test of the Wilson Hypothesis.’’ *Journal of Human Resources* 30(1):163–93.
Wooldridge, Jeffrey M. 2002. *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT Press.