The Effect of Marriage on the Wages of Americans: Gender and Generational Differences

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Abstract

A substantial body of literature on the wage effects of marriage finds that married American men earn anywhere from 10% to 40% higher wages than unmarried men on average, while married American women earn up to 7% less than unmarried women, even after controlling for traits such as background, education, and number of children. Because this literature focuses heavily on men born in a single time period, we study both men and women in two different generational cohorts of Americans (Baby Boomers and Millennials) from the National Longitudinal Surveys of Youth to examine how the wage effects of marriage differ between genders and across time. Using a fixed effects approach, we find that Millennial women—but not Baby Boomer women—experience an increase in wages after marriage, and we replicate the finding from the literature that men experience an increase in wages after marriage as well. However, after controlling for wage trajectory-based selection into marriage by using a modified fixed effects approach that allows wage trajectories to vary by individual, we find that the wage effects of marriage are no longer statistically significant for any group in our data, suggesting that the wage differences between married and unmarried individuals found in previous studies are primarily a result of selection.

JEL classification: C33; D13; J12; J13; J22; J30

Keywords: Labor; Marriage; Gender; Baby Boomer; Millennial; Selection

Introduction

At first glance, the average married man in the United States seems to earn much higher wages than the average single man, even after controlling for traits such as work experience, educational attainment, and number of children (Korenman & Neumark, 1991; Killewald & Gough, 2013; Cheng, 2016). Known as the "marital wage premium", or MWP, this wage gap has been estimated to range from 10% to 40%, the upper end of which is comparable to the gross wage gap between Americans with and without a 4-year college degree.[1] On the other hand, women seem to experience a wage penalty for getting married, or a negative MWP, that may be as large as a 7% decrease in wages after controlling for observable traits (Cheng, 2016; Loughran & Zissimopoulos, 2009). Similar gendered wage effects have been found in other countries, such as Norway (Peterson, 2014), Germany (Adda, 2017), and Russia (Ashwin, 2014).

What accounts for the gendered wage differences between married and unmarried individuals? For men, wage-based selection into marriage produces a large portion of the wage difference between married and unmarried men. That is, men who already have high wages are more likely to get married (Killewald & Lundberg, 2017; Ludwig & Brüderl, 2018). Married men also tend to spend less time on household work after marriage (Gupta, 1999) and may invest more in labor market skills, as predicted by Gary Becker's theory of household specialization. Other hypotheses propose treatment effects from marriage, whereby married men may be "domesticated" by marriage and become more responsible and hard-working (Cheng, 2016).

For women, having and raising children accounts for a large part of the wage difference between married and unmarried women (Budig & England, 2001; Kuziemko et al., 2018), and some studies have shown that occupational selection after having children or from the

[1] See http://www.pewsocialtrends.org/2014/02/11/the-rising-cost-of-not-going-to-college/.

anticipation of having children further contributes to the negative MWP for women (Adda, 2017). As with men, household specialization may explain some of the MWP, since married American women historically have spent more time on household work and raising children than unmarried women (Gupta, 1999; Hersch & Stratton, 1994), which may also contribute to employer discrimination if employers subjectively believe that married women are less economically productive[2] (Fu, 2017).

We examine the gender differences in MWP to contribute to the existing literature, which tends to focus only on men. In doing so, we also compare MWPs for men and women across two generational cohorts of Americans—Baby Boomers and Millennials—to observe how MWPs change with evolving gender norms and behaviors related to work and family life in the United States. Trends such as increased labor market participation for women, declining marriage and birth rates, and shrinking gender differences between time spent doing paid work versus housework and child care (see Appendix A, Figures A1–A6 for graphs and descriptions of these trends) plausibly reflect changing work- and family-related behavior.

[2] Marriage bars—explicit corporate policies prohibiting married women from being hired and firing single women when they married—existed in the United States until the 1950s. For more information, see Goldin, C. (1988).

Literature Review

We contribute to the MWP literature in three ways. Previous studies usually controlled for selection into marriage based on wage level and other individual traits (Korenman & Neumark, 1991; Killewald & Gough, 2013) often by using fixed effects. However, few studies also account for selection into marriage based on future wage trajectory (Ludwig & Brüderl, 2018), which may differ between individuals with the same wage level and may also affect marriage timing. Therefore, we fill this gap by controlling for individual wage trajectories, in addition to wage level, to fully account for wage-related selection into marriage.

MWP research also tends to focus only on men (see de Linde Leonard & Stanley, 2015 for a meta-analysis on male MWP), while analyses for women often focus on the effects of having children rather than the effect of marriage in general (Budig & England, 2001; Adda, 2017). This difference in research focus may reflect social norms and the beliefs of researchers about the roles of men and women in families and workplaces. In this paper, we analyze both men and women in order to uncover not only their MWP's but also causes of gender differences in MWP's.

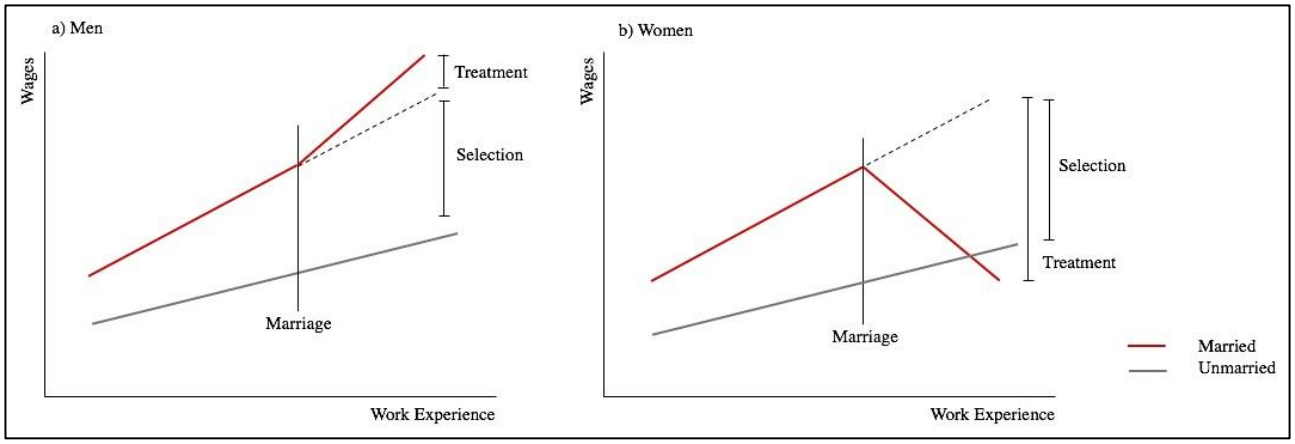
Finally, MWP studies tend to survey individuals born and living around the same time period. This is useful in controlling for time period-specific effects but cannot capture societal changes occurring across generations that can influence the gender differences in MWPs. To examine how different generations of American men and women experience the MWP, we use data on two generational cohorts of Americans from the National Longitudinal Surveys of Youth. The National Longitudinal Survey of Youth 1979 (NLSY79) cohort, whose participants have been surveyed annually from 1979, tracks Americans born in the 1960s, while the National Longitudinal Survey of Youth 1997 (NLYS97) cohort, whose participants have been surveyed

annually from 1997, tracks Americans born in the 1980s. By comparing these two cohorts, we examine whether the contributions of marriage, children, and other factors to individuals' wages have changed over generations.

Theoretical Framework

Many factors determine individual wages, including common human capital measures such as educational attainment and job tenure—that is, continuous employment with the same employer. The MWP literature often uses cumulative work experience, measured in units of time, to track how an individual's wages grow over his or her life. Using cumulative work experience as an independent variable, we hypothesize that the average wage trajectories for married and unmarried individuals will appear as follows (Figure 1):

Figure 1. Hypothesis for Selection and Treatment Effects Due to Marriage on Wages.



a) Hypothetical wage trajectories of the average married man and unmarried man, given positive wage-related selection into marriage and a positive MWP, and b) hypothetical wage trajectories of the average married and unmarried woman, given positive wage-related selection into marriage and a negative MWP. Note that wage slopes may differ between married and unmarried individuals even before married individuals marry.

A major concern for MWP analyses is selection into marriage based on wages or traits that affect wages, such as dependability or height. These factors create a selection bias if married individuals have high wages or potential wages before they even marry. In Figure 1, this selection is represented by married individuals starting off with both a higher wage level and steeper wage slope—representing returns to additional work experience—than unmarried individuals. The literature has consistently found that men with high incomes select into

marriage (Korenman & Neumark, 1991; Ludwig & Brüderl, 2018). There is also evidence of positive assortative mating in the United States for education and income—that is, individuals tend to marry those with similar education and income levels to themselves (Greenwood et al., 2014). We therefore expect women with high incomes to similarly select into marriage.

Selection may not account for all gender differences in the MWP. Some researchers point to Gary Becker's theory of household specialization to explain the gender differences. That is, the increased time spent on average by married men in the labor market and increased time spent on average by married women on childcare and household work (Hersch & Stratton, 1994; Lachance-Grzela & Bouchard, 2010) may translate to more human capital investment and higher wages for married men and opposite results for married women. Other researchers propose that employer favoritism of married men and discrimination against married women also contribute to gendered MWPs (Correll, Benard, & Paik, 2007; Hersch & Stratton, 2000). Our analysis will not separately identify all of these potential explanations but instead aggregate them into a general effect of marriage on wages.

Importantly, many gender differences in the workplace and family may be shrinking over time, as reflected in the previously mentioned trends surrounding work and family in the United States. We expect younger cohorts of Americans (NLSY97) to experience less specialization and discrimination or favoritism on average than older cohorts of Americans (NLSY79), as more American women take on economic roles in their families and more American men take on homemaking roles (Appendix A, Figure A6). We would then expect to see a decrease in the MWP for Millennial men and increase in the MWP for Millennial women compared to the MWPs for Baby Boomers. Alternatively, consistently declining marriage rates (Appendix A, Figure A1) may increase selection into marriage for individuals who prioritize family over labor

market work. Then, Millennials in general may experience a change in MWP in the negative direction because the individuals who choose to marry may on average be less career-driven than their counterparts who never marry.

Finally, many time-invariant individual traits such as race, age at first marriage, and family background also impact wages. To focus our analysis, we will use individual fixed effects to control for these traits.

Empirical Specification

We use a fixed effects model to account for selection into marriage based on wages and individual traits that influence both wages and marriage.

$$\ln Wages_{it} = \alpha_{0i} + \alpha_{1i} Exp_{it} + \alpha_{2i} Exp^2_{it} + \beta_0 Married_{it} + \beta_1 X_{it} + \delta_i + Year_t + \varepsilon_{it} \quad (1)$$

Here, the natural logarithm of real hourly wages ($Wages_{it}$) for individual i in year t is a function of cumulative work experience (Exp_{it}), whether that person is married ($Married_{it}$, a dummy that equals 1 if that individual is married in year t, and 0 otherwise), and a vector of other time-varying control variables (X_{it}). Any time-invariant individual traits are captured by an individual-specific fixed effect δ_i. Year-specific fixed effects $Year_t$ capture general wage variations over time, and ε_{it} represents the error term. Wage differences between married and unmarried individuals that are not captured by human capital- or children-related controls will impact β_0, which represents the MWP. Importantly, we allow the estimators for returns to additional labor market experience (α_{0i}, α_{1i}, and α_{2i}) to vary by individual to account for selection into marriage based on wage level and wage trajectory.

Ludwig and Brüderl (2018) describe the procedure to estimate this model, which they call fixed effects with individual slopes, as follows (modified to align with our variables)[3]:

(1) For each person i, estimate the individual wage trajectory by an OLS regression of ln W_{it} on a constant and labor market experience Exp_{it}.

(2) Get the residuals. These are the de-trended wages of individual i.

(3) Repeat steps (1) and (2) for the covariate(s).

(4) Pool the resulting data and estimate an OLS regression.

[3] For a more detailed description of this model, see:
Brüderl, Josef & Ludwig, Volker. (2015). Fixed-effects panel regression. Sage Handbook of Regression Analysis and Causal Inference. 336-338.

This type of estimation requires observations per individual equal to one plus the number of individual slope parameters and the individual intercept. Because our model includes both a linear and squared term for work experience in addition to an individual intercept, we require at least four observations per individual in our data. We compare results from this model to results from a conventional fixed effects model that does not allow work experience to vary by individual—that is, α_{0i}, α_{1i}, and α_{2i}, become sample-wide estimates rather than individual-specific ones—but is otherwise identical.

Measurements and Control Variables

Wages

Following the literature, our dependent variable is the natural logarithm of the real hourly wages of survey participants' primary job. Unlike total earnings, hourly wages are not directly dependent on total work hours and therefore offers a more accurate measure of the economic returns for an individual's time (Killewald & Gough, 2013). Wages are adjusted to 2006 prices.

Work Experience and Human Capital

Because the National Longitudinal Surveys of Youth record each participant's weekly labor force participation status since his or her first survey date as a teenager, we are able to count the total number of weeks an individual has ever been employed up to the current survey week to measure cumulative work experience, from which we also create a squared term. Tenure with the current employer is similarly calculated by counting the number of weeks an individual has spent with his or her current employer, resetting to zero whenever an individual changes

jobs. We also include individuals' educational attainment and dummies for school enrollment status and job characteristics.

Marriage and Children

We use a time-varying dummy to indicate whether an individual is married in each survey year, as previously discussed. We record the number of biological children living with an individual as well as the age of the individual's youngest child during each survey period.

Individual Time-Invariant Traits

Individual characteristics that are time-invariant during the survey period such as race, age at first marriage, and family background, are accounted for in the individual fixed effect.

Data

We use two datasets from a collection of longitudinal surveys created by the United States Department of Labor. The National Longitudinal Survey of Youth 1979 (NLSY79) follows a sample of 12,686 Americans born from 1957-1964, whom we refer to as Baby Boomers, and the National Longitudinal Survey of Youth 1997 (NLSY97) follows a sample of around 8,984 Americans born from 1980-1984, whom we refer to as Millennials. Both surveys ask participants a comprehensive set of questions about their families, education, work experience, and many other personal details. Table 1 shows summary statistics for NLSY79 and NLSY97 by gender and generation.

Sample Restrictions

To avoid capturing wage effects from divorce or multiple marriages, we focus our analysis on first marriages. We restrict our sample to observations made before and during survey participants' first marriages and also exclude years during which individuals were married but separated from their partner. Because the nature of our fixed effects model requires within-person comparisons of wages between each individual's unmarried and married states, we restrict our sample to individuals who have at least one wage observation before marriage and at least one wage observation after marriage. As previously discussed, we also require at least 4 observations per person in order to estimate our model, and so we further restrict our sample in this way.

Following the literature (Ludwig & Brüderl, 2018; Killewald & Gough, 2013), we further exclude wage observations for years during which individuals were self-employed, dropping at most 6% of total observations per sample group. To avoid over-representing individuals who

have been married for long periods of time, we exclude person-years after 15 years of marriage under the assumption that most of the MWP effects will have occurred within those 15 years of marriage.

After restricting our samples, the remaining NLSY79 sample contains 3,868 men with 40,701 person-years and 3,730 women with 34,806 person-years. The remaining NLSY97 sample contains 4,421 men with 37,794 person-years and 4,216 women with 37,364 person-years.

Data Limitations

Our sample restrictions prevent us from examining all individuals in our data, such as those who have never married or those with missing data for the relevant variables. Also, because the ages of individuals in the NLSY97 Millennial population range from 31 to 35 in 2015, the most recent survey year available, some Millennials who will marry in the future have yet to enter their first marriage. Still, 45% of men and 54% of women in our Millennial samples have married at least once, compared to 71% of men and 77% of women in our Baby Boomer samples, suggesting that we can still observe most of the first marriages of our Millennials. Though we are unable to predict how many more Millennials will enter their first marriage after the 2015 survey, our results apply to Millennials who married by their early 30s.

Table 1. NLSY79 & NLSY97 Sample Statistics.

Summary Statistics for Samples

Survey Name (Generation)	NLSY79 (Baby Boomers)		NLSY97 (Millennials)	
Survey Years Used	1979–2014		1997–2015	
Age Range at Latest Survey Year	50–57		31–35	
	Men	Women	Men	Women
Unique Individuals	6,403	6,283	4,599	4,385
Original Number of Observations	166,478	163,358	75,991	71,316
Educational Attainment				
Less Than High School	0.11	0.10	0.26	0.18
High School Completed	0.46	0.42	0.24	0.20
Some College (<4 Years)	0.21	0.25	0.25	0.27
4 Years of College or More	0.22	0.22	0.25	0.36
Age at First Marriage				
Never Married (Yet)	0.29	0.23	0.55	0.46
Before 25	0.39	0.52	0.13	0.17
25–30	0.21	0.16	0.19	0.18
31–35	0.07	0.05	0.06	0.05
After 35	0.05	0.04	-	-
Median Age at First Marriage	24	22	26	25
Number of Biological Children				
0	0.32	0.22	0.29	0.20
1	0.19	0.19	0.25	0.20
2	0.26	0.31	0.28	0.33
3+	0.22	0.28	0.18	0.27

Notes: Averages and proportions are reported from the latest survey year for each generational cohort (2014 for Baby Boomers, 2015 for Millennials). Statistics for the age at first marriage for the Millennial samples are biased downward because no individuals in that sample are older than 35 as of 2015, the latest survey year. Proportions are rounded to the nearest hundredths place and therefore may not sum to 1.00.

Results

Conventional Fixed Effects Model

Table 2 shows results for a conventional fixed effects model that accounts for selection into marriage based on fixed, individual traits but not selection based on wage trajectory. Because our dependent variable is the natural logarithm of an individual's real hourly wages, each estimate β represents an $(e^{\beta} - 1) \times 100$ percent change in real hourly wages. Both samples of men experience a positive and significant MWP—a wage increase of 5.6% for Baby Boomer men and 12.6% for Millennial men. The MWP for Baby Boomer women is not statistically significant, while Millennial women experience a positive and significant MWP (7.1%). We expected the MWP for women to be larger for Millennials than for Baby Boomers, but we had not expected the same to be true for men.

For women, the negative and statistically significant wage effect of having children does not change across generations (–3% per child), contrary to our hypothesis that the negative effect of children would be smaller in magnitude for Millennial women than Baby Boomer women. On the other hand, while Baby Boomer men experience no significant wage effect from having children, Millennial men experience a positive wage effect of 2% per child, again contrary to our hypothesis that Millennial men might experience a negative wage effect from having children.

Table 2. Results for the Effect of Marriage and Other Controls on Hourly Wages, Using Conventional Fixed Effects.

Conventional Fixed Effects	(1) Baby Boomer Men	(2) Baby Boomer Women	(3) Millennial Men	(4) Millennial Women
Marriage Dummy	0.0545***	0.0107	0.119***	0.0690***
	(0.00631)	(0.00684)	(0.00957)	(0.00789)
Cumulative Work Experience	0.0764***	0.0712***	0.0547***	0.0516***
(Years)	(0.00350)	(0.00354)	(0.00392)	(0.00378)
Cumulative Work Experience^2	-0.00123***	-0.00127***	0.000809***	0.000840***
(Years)	(9.77e-05)	(0.000107)	(0.000150)	(0.000149)
Tenure with Current Employer	0.0106***	0.0134***	0.00944***	0.0119***
(Years)	(0.000816)	(0.000970)	(0.00148)	(0.00142)
Educational Attainment	0.0709***	0.0776***	0.0431***	0.0529***
(Years)	(0.00253)	(0.00275)	(0.00218)	(0.00197)
Currently Enrolled in School	-0.194***	-0.115***	-0.145***	-0.107***
(Dummy)	(0.00711)	(0.00699)	(0.00701)	(0.00586)
Number of Biological Children	0.00412	-0.0296***	0.0202***	-0.0298***
	(0.00332)	(0.00416)	(0.00512)	(0.00432)
Age of Youngest Child	-0.000560***	-0.000848***	-	-
(Years)	(9.15e-05)	(9.99e-05)		
Public Sector Job (vs. Private)	-0.0187**	0.0373***	-	-
(Dummy)	(0.00789)	(0.00755)		
Urban Job (vs. Rural)	0.0554***	0.0393***	0.0335***	0.0124
(Dummy)	(0.00778)	(0.00905)	(0.00860)	(0.00776)
Constant	1.460***	1.146***	1.513***	1.387***
	(0.0320)	(0.0351)	(0.0266)	(0.0251)
Observations	38,330	32,413	37,794	37,364
Unique Individuals	3,330	3,065	4,421	4,216
Avg. Observations per Indiv.	11.5	10.6	8.5	8.9
R-squared (Within)	0.387	0.338	0.313	0.323

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable is the natural logarithm of real hourly wages for an individual in a given year. The variable Marriage Dummy represents the MWP, and it equals 1 if the individual is married in a given year and 0 otherwise. Dummies for each survey year are not included in the table (1979–2014 for Baby Boomers, 1997–2015 for Millennials). For Millennials, we do not include the age of their youngest child or whether they worked in a public sector job due to a large number of missing observations in the data.

Fixed Effects with Individual Wage Slopes Model

Table 3 shows results when we allow work experience to vary by individual to control for wage trajectory-based selection into marriage. Once individual wage trajectories are accounted for, the MWP is no longer statistically significant in any of our samples.

As in our conventional fixed effects model, the wage effect from having children in this model is negative and statistically significant for women (–3.8% for female Baby Boomers and –2.7% for female Millennials), and that effect is not statistically different between Baby Boomer and Millennial women ($|Z| = 0.87$, $p = 0.38$). Neither generation of men experience statistically significant wage effects from having children.

Verifying Our Empirical Approach

Allowing work experience to vary by individual drastically reduced the statistical significance not only of the MWP estimate but also of other estimates that were previously significant in the conventional fixed effects model (Table 2), such as the estimates for job tenure for Millennials and educational attainment[4]. To verify that our empirical approach does not inherently reduce the significance of all estimates, we run a supplemental analysis on our samples and allow number of children or job tenure instead of work experience to vary by individual. The results for this analysis show statistically significant MWPs for Millennials and Baby Boomer men (Appendix B, Tables B1 and B2) and do not differ meaningfully from the results in our conventional fixed effects model, which verifies that allowing some estimates to vary by individual does not inherently reduce the significance of other estimates in our model. This result also supports our choice to allow work experience—rather than other variables such

[4] See Appendix C for additional discussion on the non-significant results for educational attainment.

Table 3. Results for the Effect of Marriage and Other Controls on Hourly Wages, Using Fixed Effects with Individual Slopes for Cumulative Work Experience.

Fixed Effects, Individual Slopes	(1) Baby Boomer Men	(2) Baby Boomer Women	(3) Millennial Men	(4) Millennial Women
Marriage Dummy	0.00703	-0.00314	0.0210	0.00647
	(0.00887)	(0.00949)	(0.0150)	(0.0142)
Tenure with Current Employer	0.00720***	0.0115***	0.00361	0.00392
(Years)	(0.00168)	(0.00162)	(0.00277)	(0.00241)
Educational Attainment	0.0110	0.00902	-0.00255	0.0188***
(Years)	(0.00737)	(0.00777)	(0.00645)	(0.00540)
Currently Enrolled in School	-0.123***	-0.0848***	-0.0946***	-0.0786***
(Dummy)	(0.0101)	(0.00921)	(0.00932)	(0.00763)
Number of Biological Children	-0.0148*	-0.0375***	0.01000	-0.0266***
	(0.00836)	(0.00911)	(0.00963)	(0.00861)
Age of Youngest Child	3.01e-06	8.30e-06	-	-
(Years)	(0.000219)	(0.000219)		
Public Sector Job (vs. Private)	-0.0253*	0.0534***	-	-
(Dummy)	(0.0147)	(0.0113)		
Urban Job (vs. Rural)	0.0446***	0.0213	0.0445***	0.00975
(Dummy)	(0.0117)	(0.0148)	(0.0128)	(0.0106)
Observations	38,324	32,401	36,384	36,180
Unique Individuals	3,328	3,061	3,747	3,664
Avg. Observations per Indiv.	11.5	10.6	9.7	9.9
R-squared (Within)	0.0252	0.0187	0.0195	0.0146

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable is the natural logarithm of real hourly wages for an individual in a given year. The variable Marriage Dummy represents the MWP, and it equals 1 if the individual is married in a given year and 0 otherwise. Because we allow work experience to vary by individual, the model does not include sample-wide estimates for them. Dummies for each survey year are not included in the table (1979–2014 for Baby Boomers, 1997–2015 for Millennials). We do not include Age of Youngest Child or the Public Sector Job dummy for Millennials due to a large number of missing observations in the data.

as number of children or job tenure—to vary by individual, because accounting for individual deviations in work experience meaningfully affected and reduced all MWPs (Table 3), while accounting for individual deviations in other control variables does not meaningfully affect the MWPs or any other estimates.

Robustness Checks

Because the decision to have children may be endogenous to wages (Adda, 2017; Cheng, 2016), we repeat our analyses without including children-related variables. Our results do not differ meaningfully (Appendix B, Table B3). We also repeat our analyses without including years during which an individual was enrolled in school, in case enrollment in school affects labor market and family behavior beyond a simple decrease in wages. Again, our results do not differ meaningfully. As previously discussed, the age range for the Millennials in our sample is 31 to 35 in their latest survey year, meaning there may be individuals who will marry in the future but have yet to get married. To check if excluding individuals who marry after their early 30s changes the MWP, we reexamine the MWP for Baby Boomers, first excluding observations made after age 35 and then excluding observations made after age 31, the two bounds of the Millennials' age range. Our results do not differ meaningfully (Appendix B, Table B4).

Limitations

Labor Force Participation After Marriage

Because we cannot observe the wages of individuals who are not employed, our analysis does not account for individuals who drop out of the labor force immediately after getting married. If individuals who would experience a negative marital wage effect are more likely to

drop out of the labor force after marriage, then our estimates for the MWP will be biased upwards.

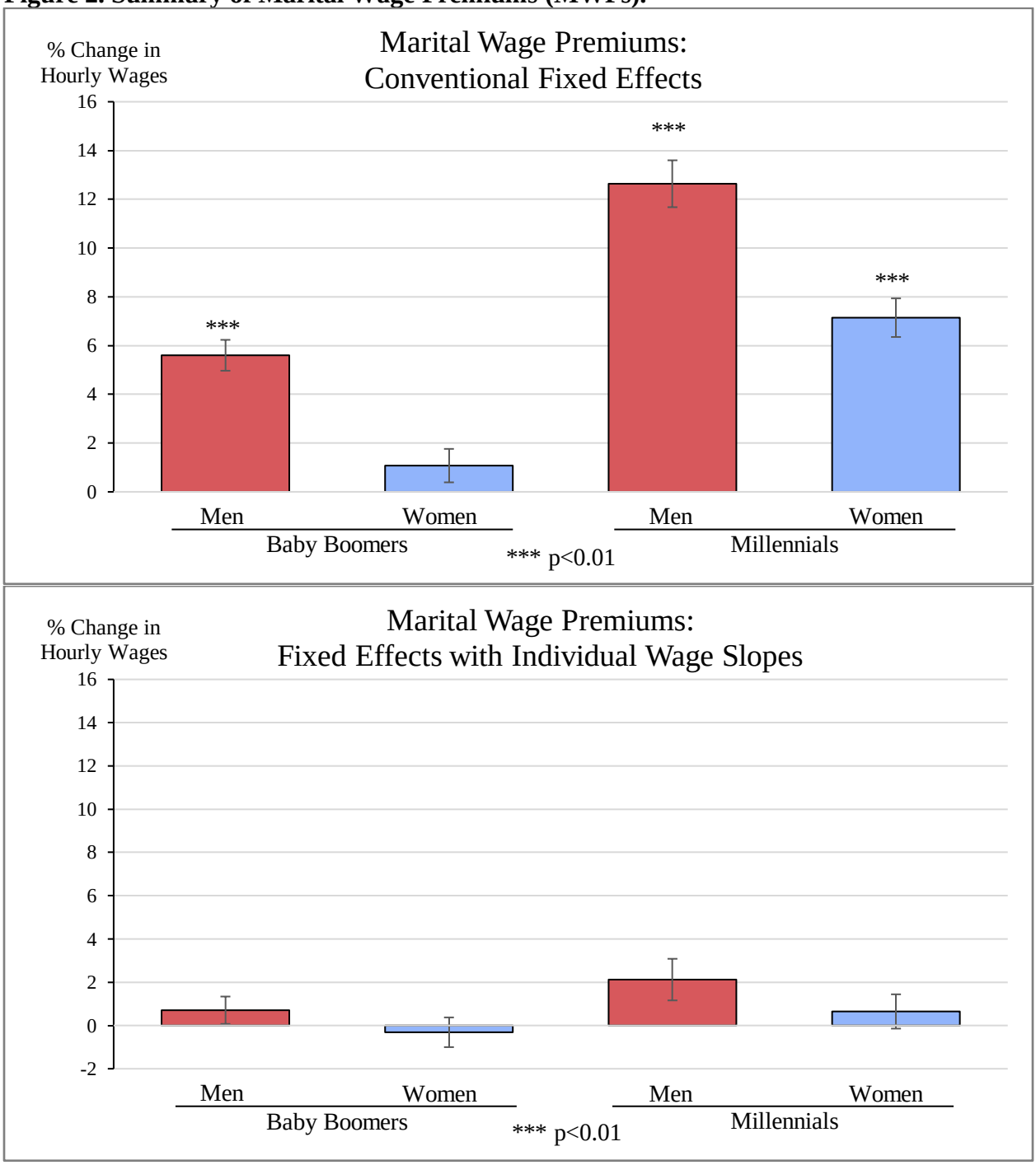
Spouse Employment

Plausibly, whether or not an individual's spouse works and how much that spouse earns has an effect on an individual's labor market decisions. However, spousal employment is extremely endogenous and difficult to control for, as labor market decisions such as the decision to work can be influenced not only by current employment and wages, but also expectations for the future employment and future wages of all members of a family. Additionally, the effect of a spouse's labor market participation on an individual's labor market experience may also vary by factors such as individuals' gender beliefs and race (Glauber, 2008), considerations which merit further research.

Hourly Wages vs. Hours Worked

Because we use real hourly wages as our dependent variable in order to measure economic returns to an individual's time, our analysis does not address the effect of marriage on how much time is spent working, which may also vary by gender (Hotz, 2018).

Figure 2. Summary of Marital Wage Premiums (MWPs).



Notes: This figure summarizes the MWPs for men and women in the Baby Boomer and Millennial generations. (Top) The estimates from the conventional fixed effects model are calculated from Table 2. (Bottom) The estimates from the fixed effects with individual wage slopes model are calculated from Table 3, and none of the estimates are statistically significant. In general, percentage wage changes (y-axis) are calculated from the relevant tables such that each estimate β represents an $(e^{\beta} - 1) \times 100$ percent wage change.

Conclusion

The results from our conventional fixed effects model replicate previous literature finding a positive MWP for men. Interestingly, we find that the MWP is positive and statistically significant for Millennial women, and also larger and more positive for Millennials in general than for Baby Boomers. However, after controlling for wage trajectory-based selection into marriage, all MWPs are no longer significant, contrary to the findings in much of the literature. Taken at face value, our results suggest that the MWP phenomenon is primarily produced by selection into marriage based on wages and/or individual traits that improve wages rather than a causal treatment effect of marriage such as household specialization.

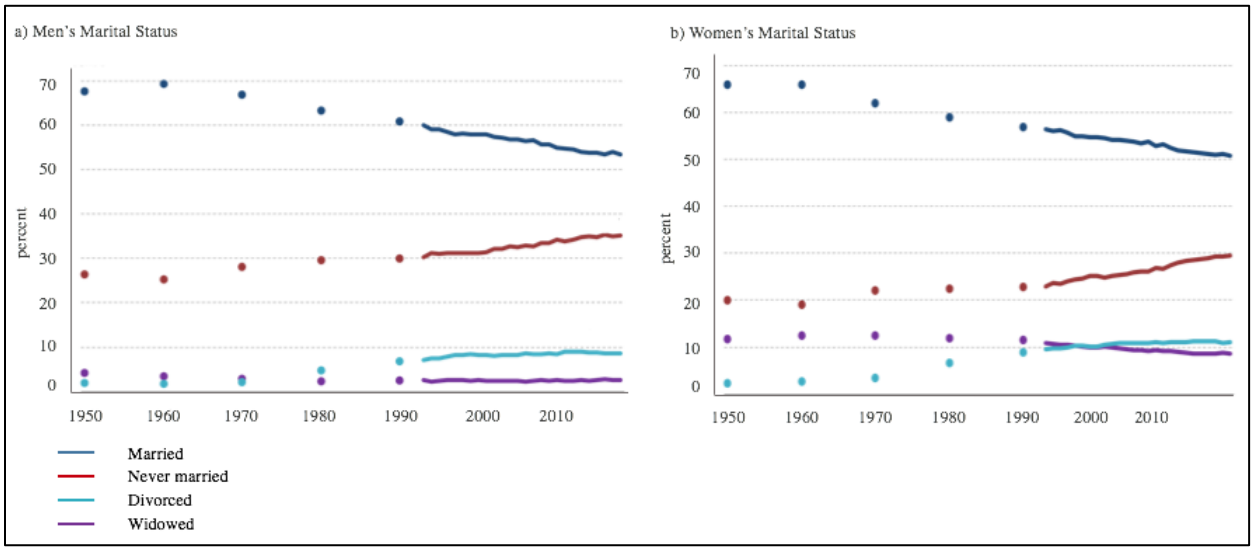
Because we found larger MWPs for Millennials than for Baby Boomers in our conventional fixed effects model, and because Millennials marry at lower rates than Baby Boomers, our results also suggest that the selection into marriage based on wages or wage-related traits is stronger for Millennials than for Baby Boomers. That is, although fewer Millennials every marry, Millennials who do marry tend to have higher wage trajectories than those who do not. Supporting this interpretation, other literature has identified trends in the United States towards increased selection into marriage based on high educational attainment (Lundberg, Pollak, & Stearns, 2016), which is positively related to wages.

We do not observe any statistically significant change in the wage effects of having children between the Baby Boomer and Millennial generations, but having children may be producing multiple wage effects that oppose each other and cancel out to make the overall effect appear not to be significant. For example, high-earning Millennial women may face high opportunity costs for having children (Adda, 2017) but may also be more likely to have a partner who is willing to spend additional time on childcare (Appendix A, Figure A6).

Many avenues for further research remain. The endogeneity issues of spousal income and spousal labor force participation in MWP models need to be addressed creatively while considering that labor market decisions are made with expectations for the future in mind. Future studies might also move away from the MWP and instead examine the effect of marriage on other labor market decisions and outcomes such as time spent working or total earnings. How evolving social norms influence labor market and family decisions over time is also worth examining further. In the end, our paper highlights the interconnectedness of labor and marriage markets, and our results demonstrate the importance of carefully considering selection biases.

Appendix A

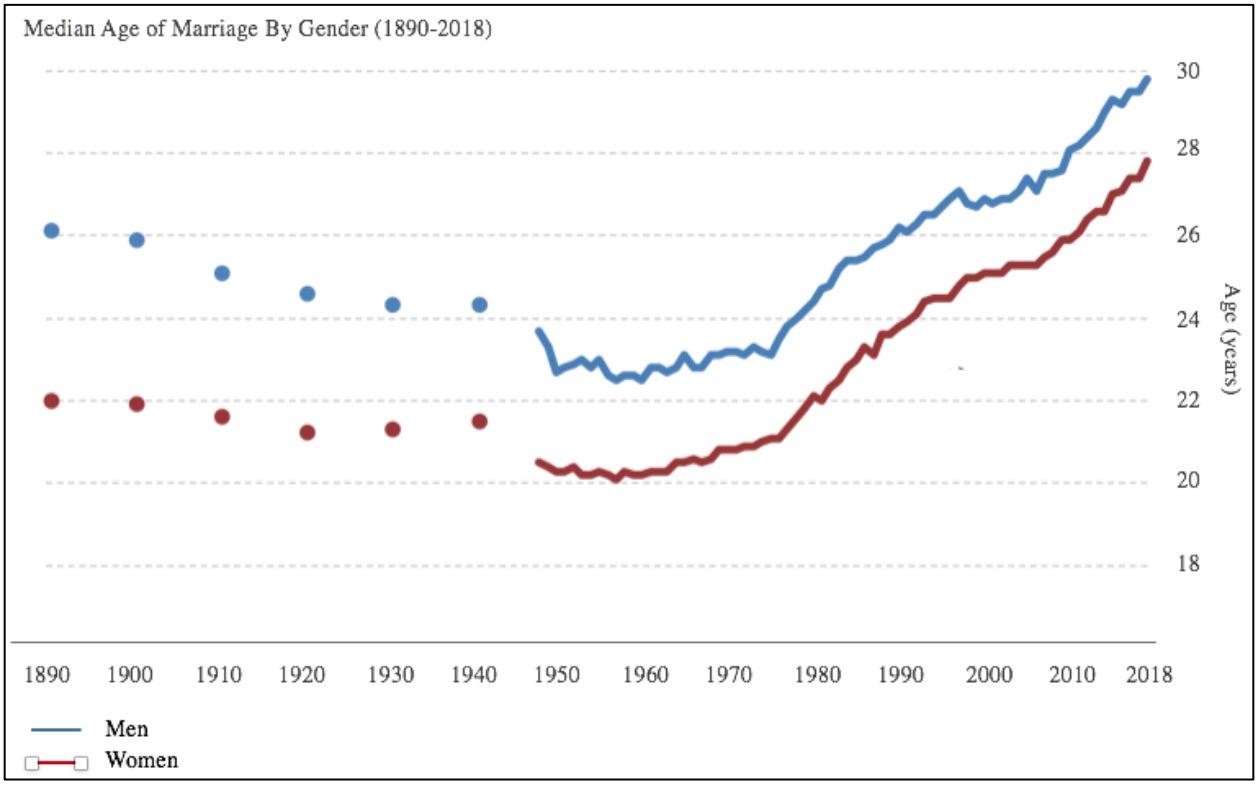
Figure A1. Declining Marriage Rates in the United States Since the 1960s.



Source: United States Census Bureau, https://www.census.gov/data/tables/time-series/demo/families/marital.html?fbclid=IwAR02V5NtQywZhNJOyDw29SqTe3ENQw-W-NE51ceAiWu10XECFfZOPKGXDbI

Since the 1960s, the proportion of Americans who are married in a particular year has been steadily decreasing, and the proportion of never-married and divorced Americans has increased. As marriage becomes less common over time, selection may influence who decides to marry.

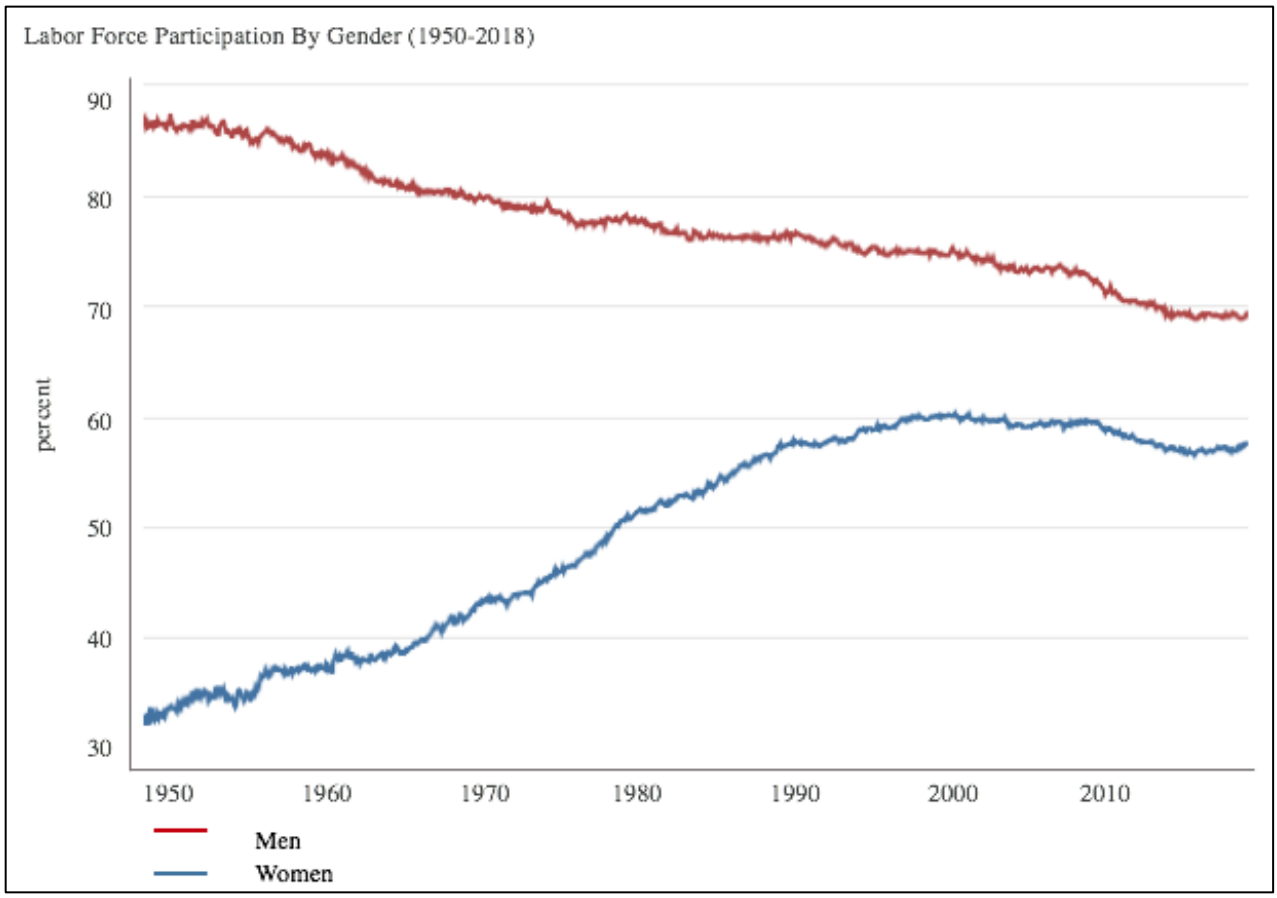
Figure A2. Increasing Median Age at First Marriage in the United States by Gender.



Source: United States Census Bureau, https://www.census.gov/data/tables/time-series/demo/families/marital.html

The age at first marriage for American men and women has steadily increased since the 1960s, reflecting large-scale changes in norms and behaviors surrounding marriage.

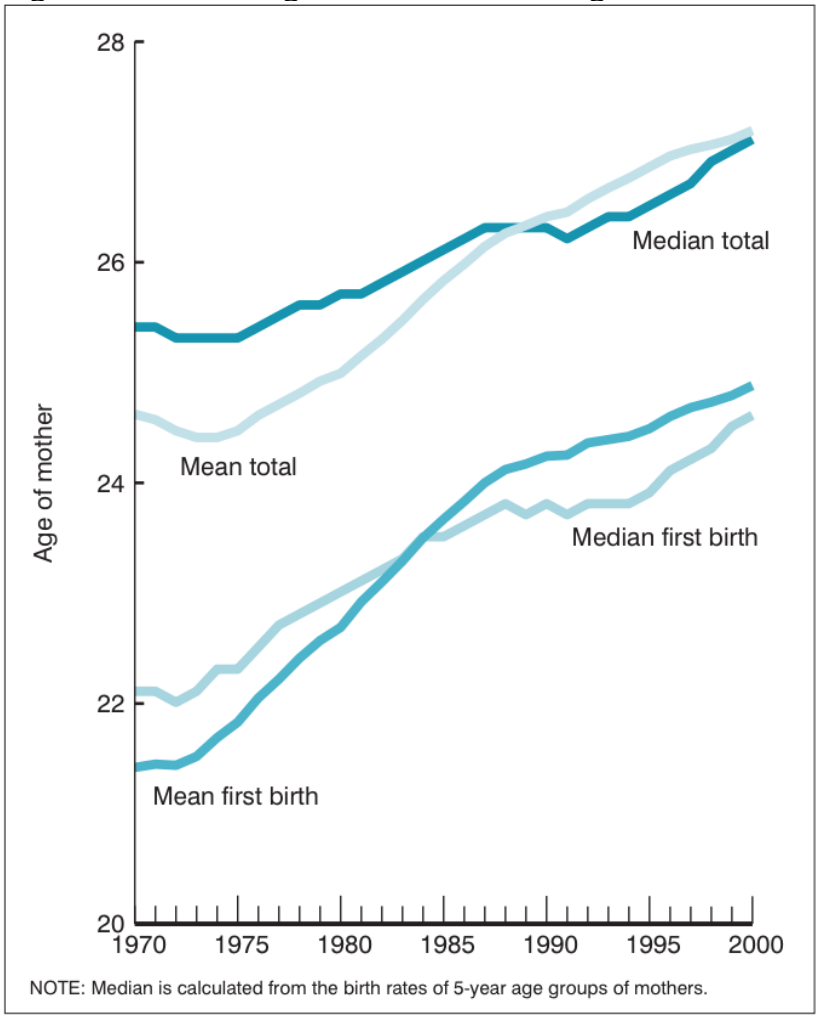
Figure A3. Labor Force Participation in the United States by Gender.



Source: Federal Reserve Bank of St. Louis

The labor force participation rates for American men and American women has been steadily converging since the 1950s.

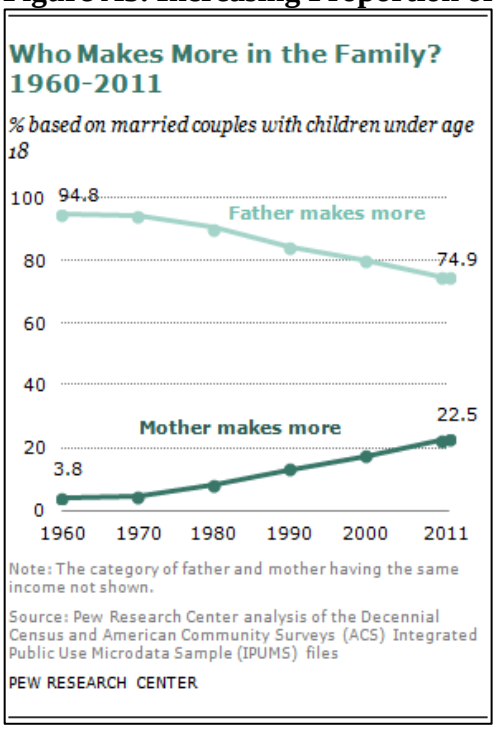
Figure A4. Increasing Median and Mean Age at First Childbirth for American Mothers.



Source: Mathews TJ, Hamilton BE. Mean age of mother, 1970–2000. National vital statistics reports; vol 51 no 1. Hyattsville, Maryland: National Center for Health Statistics. 2002.

The mean and median age at which American mothers have their first child has steadily increased since the 1970s. The mean and median age at which American mothers have *any* child (marked as "Mean total" and "Median total" on the figure) has also been increasing.

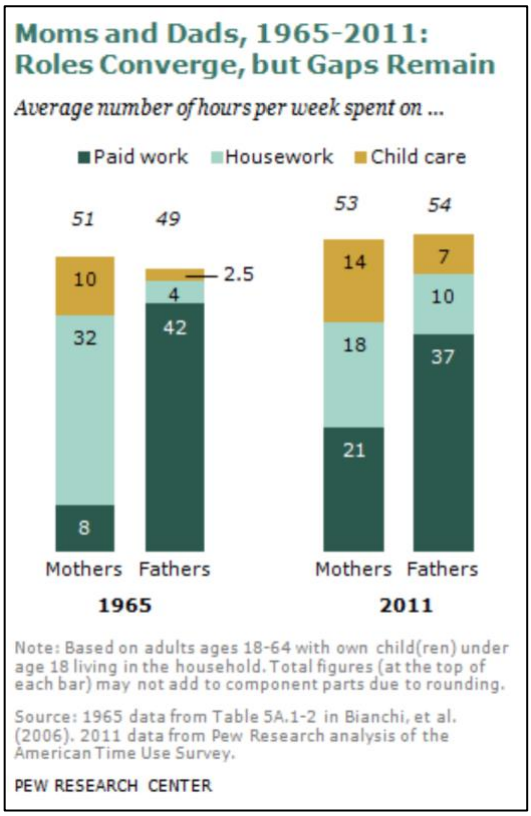
Figure A5. Increasing Proportion of Families with Mothers Earning More Than Fathers.



Source: Pew Research Center, http://www.pewsocialtrends.org/2013/05/29/chapter-3-married-mothers-who-out-earn-their-husbands/

For two-person households with a father, mother, and children under the age of 18, the proportion of households in which the mother earns the most in the family has steadily increased since the 1960s.

Figure A6. Gender Differences in Time Spent on Child Care, Housework, and Paid Work Decrease from 1975 to 2011.



Source: Pew Research Center, https://www.pewsocialtrends.org/2013/03/14/modern-parenthood-roles-of-moms-and-dads-converge-as-they-balance-work-and-family/

Gender differences in time spent on child care, housework, and paid work has declined in the United States during the last half-century, with mothers spending more time on paid work and fathers spending more time on child care and housework in 2011 compared to 1965.

Appendix B

Table B1. Allowing Individual Slopes for Number of Children and Job Tenure Instead of Work Experience (Baby Boomers).

NLSY79	(1)	(2)	(3)	(4)
Baby Boomers	Men: Individual Slopes for Number of Children	Men: Individual Slopes for Job Tenure	Women: Individual Slopes for Number of Children	Women: Individual Slopes for Job Tenure
Variables				
Marriage Dummy	0.0468***	0.0523***	0.00957	0.00329
	(0.00865)	(0.00853)	(0.00891)	(0.00901)
Cumulative Work Experience	0.0820***	0.0756***	0.0815***	0.0664***
(Years)	(0.00696)	(0.00659)	(0.00733)	(0.00622)
Cumulative Work Experience^2	-0.00136***	-0.00122***	-0.00163***	-0.00109***
(Years)	(0.000195)	(0.000207)	(0.000206)	(0.000212)
Tenure with Current Employer	0.00911***	-	0.0103***	-
(Years)	(0.00138)		(0.00160)	
Educational Attainment (Years)	0.0611***	0.0641***	0.0700***	0.0704***
	(0.00481)	(0.00468)	(0.00495)	(0.00485)
Currently Enrolled in School	-0.170***	-0.181***	-0.102***	-0.105***
	(0.0105)	(0.0107)	(0.00900)	(0.00896)
Number of Biological Children	-	-0.00623	-	-0.0417***
		(0.00602)		(0.00713)
Age of Youngest Child	-0.000414***	-0.000476***	-0.000817***	-0.000929***
	(0.000149)	(0.000167)	(0.000166)	(0.000172)
Public Sector Job (vs. Private)	-0.0257*	-0.0138	0.0382***	0.0385***
	(0.0138)	(0.0135)	(0.0105)	(0.0105)
Urban Job (vs. Rural)	0.0494***	0.0544***	0.0334**	0.0387***
	(0.0116)	(0.0114)	(0.0139)	(0.0139)
Observations	38,330	38,330	32,413	32,413
Number of id	3,330	3,330	3,065	3,065

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable is the natural logarithm of real hourly wages. The variable Marriage Dummy represents the MWP, and it equals 1 if the individual is married in a given year and 0 otherwise. The model does not include sample-wide estimates for variables allowed to vary by individual (number of children for columns 1 & 3, and tenure for columns 2 & 4). Dummies for survey years are not shown.

Table B2. Allowing Individual Slopes for Number of Children and Job Tenure Instead of Work Experience (Millennials).

NLSY97 Millennials Variables	(1) Men Individual Slopes for Number of Children	(2) Men Individual Slopes for Job Tenure	(3) Women Individual Slopes for Number of Children	(4) Women Individual Slopes for Job Tenure
Marriage Dummy	0.101***	0.115***	0.0564***	0.0604***
	(0.0126)	(0.0128)	(0.0118)	(0.0112)
Cumulative Work Experience (Years)	0.0524***	0.0567***	0.0598***	0.0468***
	(0.00593)	(0.00608)	(0.00612)	(0.00580)
Cumulative Work Experience^2 (Years)	-0.000755***	-0.000704***	-0.00107***	-0.000503*
	(0.000245)	(0.000272)	(0.000253)	(0.000277)
Tenure with Current Employer (Years)	0.00872***	-	0.00879***	-
	(0.00205)		(0.00203)	
Educational Attainment (Years)	0.0397***	0.0440***	0.0482***	0.0526***
	(0.00328)	(0.00345)	(0.00328)	(0.00311)
Currently Enrolled in School	-0.137***	-0.131***	-0.104***	-0.0961***
	(0.00836)	(0.00857)	(0.00726)	(0.00735)
Number of Biological Children	-	0.0202***	-	-0.0347***
		(0.00736)		(0.00615)
Urban Job (vs. Rural)	0.0351***	0.0341***	0.0124	0.0116
	(0.0114)	(0.0109)	(0.0103)	(0.0101)
Observations	37,164	37,164	36,840	36,840
Number of id	4,007	4,007	3,884	3,884

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable is the natural logarithm of real hourly wages. The variable Marriage Dummy represents the MWP, and it equals 1 if the individual is married in a given year and 0 otherwise. The model does not include sample-wide estimates for variables allowed to vary by individual (number of children for columns 1 & 3, and tenure for columns 2 & 4). Dummies for survey years are not shown.

Table B3. Conventional Fixed Effects Results Without Children-Related Controls.

VARIABLES	(1) Baby Boomer Men	(2) Baby Boomer Women	(3) Millennial Men	(4) Millennial Women
Marriage Dummy	0.0583***	0.0120*	0.131***	0.0589***
	(0.00625)	(0.00680)	(0.00908)	(0.00776)
Cumulative Work Experience (Years)	0.0773***	0.0794***	0.0548***	0.0546***
	(0.00350)	(0.00344)	(0.00392)	(0.00375)
Cumulative Work Experience^2 (Years)	-0.00124***	-0.00131***	-0.000796***	-0.000858***
	(9.77e-05)	(0.000107)	(0.000149)	(0.000149)
Tenure with Current Employer (Years)	0.0105***	0.0128***	0.00950***	0.0114***
	(0.000816)	(0.000970)	(0.00147)	(0.00142)
Educational Attainment (Years)	0.0727***	0.0848***	0.0419***	0.0561***
	(0.00250)	(0.00268)	(0.00216)	(0.00191)
Currently Enrolled in School	-0.196***	-0.115***	-0.145***	-0.108***
	(0.00711)	(0.00699)	(0.00701)	(0.00586)
Public Sector Job (vs. Private)	-0.0190**	0.0382***	-	-
	(0.00789)	(0.00757)		
Urban Job (vs. Rural)	0.0562***	0.0394***	0.0322***	0.0135*
	(0.00778)	(0.00906)	(0.00859)	(0.00776)
Constant	1.442***	1.068***	1.523***	1.361***
	(0.0317)	(0.0345)	(0.0265)	(0.0248)
Observations	38,330	32,413	37,853	37,398
R-squared	0.386	0.335	0.313	0.322
Number of id	3,330	3,065	4,421	4,217

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable is the natural logarithm of real hourly wages. The variable Marriage Dummy represents the MWP, and it equals 1 if the individual is married in a given year and 0 otherwise. Dummies for survey years are not shown.

Table B4. Conventional Fixed Effects Results For Baby Boomers in the Same Age Range as Millennial Samples (31 to 35).

Conventional Fixed Effects	(1) Men, 35 and younger	(2) Men, 31 and younger	(3) Women, 35 and younger	(4) Women, 31 and younger
Marriage Dummy	0.0563***	0.0580***	0.0107	0.00372
	(0.00656)	(0.00713)	(0.00705)	(0.00757)
Cumulative Work Experience	0.0797***	0.0763***	0.0809***	0.0816***
(Years)	(0.00434)	(0.00528)	(0.00459)	(0.00569)
Cumulative Work Experience^2	-0.00171***	-0.00181***	-0.00216***	-0.00240***
(Years)	(0.000162)	(0.000241)	(0.000186)	(0.000274)
Tenure with Current Employer	0.0117***	0.0117***	0.0148***	0.0147***
(Years)	(0.00107)	(0.00138)	(0.00124)	(0.00157)
Educational Attainment	0.0659***	0.0601***	0.0727***	0.0679***
(Years)	(0.00269)	(0.00294)	(0.00291)	(0.00318)
Currently Enrolled in School	-0.182***	-0.170***	-0.114***	-0.107***
(Dummy)	(0.00724)	(0.00763)	(0.00711)	(0.00754)
Number of Biological Children	-0.00542	-0.0131***	-0.0362***	-0.0479***
	(0.00378)	(0.00456)	(0.00468)	(0.00558)
Age of Youngest Child	-0.000455***	-0.000351**	-0.00105***	-0.00103***
(Years)	(0.000124)	(0.000170)	(0.000131)	(0.000170)
Public Sector Job (vs. Private)	-0.0158*	-0.0104	0.0408***	0.0404***
(Dummy)	(0.00829)	(0.00900)	(0.00799)	(0.00871)
Urban Job (vs. Rural)	0.0576***	0.0629***	0.0320***	0.0317***
(Dummy)	(0.00898)	(0.0100)	(0.0102)	(0.0112)
Constant	1.499***	1.541***	1.198***	1.242***
	(0.0335)	(0.0360)	(0.0368)	(0.0396)
Observations	34,174	29,149	29,628	25,888
Unique Individuals	3,330	3,327	3,064	3,060
R-squared (Within)	0.354	0.335	0.320	0.306

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The dependent variable is the natural logarithm of real hourly wages for an individual in a given year, and the variable Marriage Dummy represents the MWP. Dummies for each survey year are not included in the table (1979–2014). The ages restrictions used reflect the age range of the Millennial sample in the latest survey year (ages 31 to 35 in 2015). The number of observations is lower than in our original analysis which had 38,330 observations for Baby Boomer men and 32,413 observations for Baby Boomer women.

Appendix C

In our fixed effects model allowing work experience to vary by individual, the estimates for educational attainment are not statistically significant for Baby Boomers and Millennial men (Table 3). This may reflect data limitation, if severe heterogeneity in the quality of education received by individuals in our data—which we cannot observe—introduces a large amount of noise to our educational attainment term. Alternatively, the individual traits that affect wages and other human capital measures may heavily determine educational attainment. Then, after accounting for such traits, no statistically significant returns to additional education remain, except for Millennial women who on average experience a 1.9% wage increase for each additional year of education.

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