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Evolution of the Marriage Earnings Gap for Women[†]

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Married men earn 10 percent to 40 percent more than single men.[1] In contrast, researchers have found that married women who work earn significantly less than unmarried women who work with similar human capital characteristics, and this is particularly true for those with children.[2] Two factors are thought to contribute to these patterns: (i) selection, by which we mean that characteristics that are related to earnings differ between those who are married and those who are not, and (ii) specialization, in which one spouse invests more heavily in skills rewarded in the labor market while the other spouse takes a primary role in home production.

How have earnings differentials associated with marriage evolved over time? Stevenson and Wolfers (2007) hypothesize that the returns to marriage based on production complementarities have diminished over time. The introduction of technology in household production, such as washing machines, microwave ovens, and vacuum cleaners, has reduced incentives to marry based on household specialization (Greenwood and Guner 2009). While the returns to specialization may have declined, the benefits of marriage based on consumption and leisure complementarities may have increased due to increased longevity and leisure (Aguiar and Hurst 2007). Based on these developments, we would expect to find that marriage gaps have narrowed over time. Additionally, selection into marriage may have become more positive in terms of earnings potential for women. Among older cohorts, college educated women were the least likely to marry. Among recent birth cohorts, college educated women are the most likely to marry (Isen and Stevenson 2010; Goldstein and Kenny 2001; Juhn and McCue 2015).

In this paper we use recently available panel data to examine the evolution of the earnings gap associated with marriage for women. Our basic empirical strategy is to estimate earnings gaps associated with marriage using OLS and fixed-effect models. OLS estimates combine the effects of changes in earnings associated with a change in marital status (specialization) with any persistent preexisting differences in mean earnings between those who are married and those who are not (selection effects). When we include fixed effects, the coefficient on marriage isolates changes in earnings associated with a change in marital status. The difference between the two estimates then provides us with the net effect of selection into marriage.

I. Data

The data we use is Survey of Income and Program Participation (SIPP) panels matched to Social Security Administration earnings records from 1954–2011. These data have many advantages for our purposes: they provide detailed earnings histories that allow us to estimate both cross-sectional and fixed-effect models of the marriage gap; the samples of individuals from the pooled SIPP panels are considerably larger than those available from other long panels such as the PSID or the National Longitudinal Study

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[1]For example, Korenman and Neumark (1991); Antonovics and Town (2004).

[2]Waldfogel (1997, 1998).

of Youth 1979 (NLSY79); and the earnings data span a period long enough to allow us to meaningfully compare across birth cohorts. To the best of our knowledge, our paper is the first to compare cross-sectional and fixed-effect models for birth cohorts spanning four decades.

Our sample of individuals is drawn from respondents in the 1984, 1990–1993, 1996, 2001, 2004, and 2008 SIPP panels who provided the information needed to validate matches to Social Security Administration (SSA) earnings records.[3] Individuals had to be at least 15 years old at the time of their second SIPP interview to be eligible for inclusion in the matched data.[4] For matched individuals, we use annual earnings for 1954–2011 based on annual summaries of earnings on jobs recorded in SSA's Master Earnings File. The primary source of the earnings information is W-2 records, but self-employment earnings are also included. We include employees' contributions to deferred compensation plans as part of our earnings measure.[5] We examine earnings differences conditional on having nonzero Social Security earnings. Since we do not observe hours in our data, we cannot separately examine the relative contributions of wages and hours. Marital histories, educational attainment, and women's fertility histories are based on data collected in the SIPP.

[3] The results presented here are based on confidential data from Version 6.0 of the SIPP Gold Standard File. External researchers can access related data through the public-use SIPP Synthetic Beta (SSB) files, and Census will validate results obtained from the SSB on the internal, confidential version of these data (the Completed Gold Standard Files). For more information, please visit http://www.census.gov/programs-surveys/sipp/methodology/sipp-synthetic-beta-data-product.html. The US Census Bureau also supports external researchers use of some of these data through the Research Data Center network (www.census.gov/ces/rdcresearch).

[4] The SIPP is a series of short panel surveys in which respondents are surveyed every four months to collect detailed information on household members' income, employment, and program participation over the previous months. The surveys also periodically collect detailed information on the demographic characteristics and relationships of household members. Panels have ranged in length from about two to four years. More detail on the SIPP is available at http://www.census.gov/hhes/www/sippdesc.html. Since our sample pools data from several SIPP panel samples, we do not use SIPP survey weights in our analysis, so the results cannot be assumed to be nationally representative.

[5] For the years prior to 1978, earnings measures are truncated at the maximum earnings subject to FICA taxes. The cap affects a very small share of women in our sample.

We use these data to look at cohorts born between 1936 and 1975, following their earnings over years in which we have earnings data, and the individual had 1 to 35 years of potential experience. To determine marital status at a point in time, we use the marital history information collected in the relevant SIPP panel with some additional updates from changes in later waves of that panel. This largely gives us the information we need for years leading up to or during the SIPP panel, but not for the years after the panel is over. For this reason, we drop any earnings records from years after the individual is last observed in the panel. Since our focus here is on marital status, we further restrict the sample to women who are interviewed at age 35 or older, so that at a minimum we know marital status through age 35 for everyone in the sample.

II. Results

We estimate OLS and fixed-effect models of the following form:

$$(1)\quad \ln Y_{it} = \beta X_{it} + \gamma M_{it} + \pi K_{it} + \delta_c + \varepsilon_{it},$$

$$\varepsilon_{it} = \alpha_i + \nu_{it},$$

where i indexes an individual, X are observable characteristics such as age, education, race, ethnicity, M is the married dummy, K are indicators for the presence and age of children, and δ_c refers to birth cohort effects.

Table 1 presents the results. In column 1 we report the coefficient on the "married" dummy without controlling for children while in column 2 we control for the number of children and whether any of those children are under age six. In column 3 we interact both married and children dummies with birth cohort to estimate the evolution of marriage and child effects on earnings. Finally, in column 4, we additionally interact the married and children variables with each other and with birth cohort dummies, thereby allowing the impact of children on earnings to differ between married and single women, and for that interaction effect to vary across cohorts.

We find a substantial negative earnings differential for married women in the first specification for both OLS and fixed-effect estimates. The larger absolute size of the fixed-effect estimate

Table 1—log Earnings Regressions, Women

Controls	OLS coefficient estimates				Fixed-effect coefficient estimates			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Married	−0.256***	−0.118***	−0.266***	−0.237***	−0.292***	−0.197***	−0.312***	−0.277***
Married × Cohort 1946–1955			0.116***	0.115***			0.101***	0.117***
Married × Cohort 1956–1965			0.245***	0.203***			0.166***	0.179***
Married × Cohort 1966–1975			0.331***	0.314***			0.277***	0.330***
Number of children < 18		−0.177***	−0.149***	−0.133***		−0.167***	−0.145***	−0.128***
Number of children × Cohort 1946–1955			−0.025***	−0.024**			−0.022***	−0.012**
Number of children × Cohort 1956–1965			−0.048***	−0.067***			−0.046***	−0.039***
Number of children × Cohort 1966–1975			−0.054***	−0.061***			−0.029***	−0.010***
Child < 6 yrs old		−0.167***	−0.257***	−0.223***		−0.250***	−0.344***	−0.271***
Child <6 × Cohort 1946–1955			0.076***	0.054*			0.073***	0.077***
Child <6 × Cohort 1956–1965			0.126***	0.053*			0.139***	0.098***
Child <6 × Cohort 1966–1975			0.138***	0.067*			0.160***	0.133***
Married × number of children				−0.024***				−0.025***
Married × number of children × Cohort 1946–1955				−0.003				−0.014***
Married × number of children × Cohort 1956–1965				0.029**				−0.013**
Married × number of children × Cohort 1966–1975				0.007				−0.039***
Married × Child < 6				−0.041				−0.088***
Married × Child < 6 × Cohort 1946–1955				0.027				−0.009
Married × Child < 6 × Cohort 1956–1965				0.093**				0.047**
Married × Child < 6 × Cohort 1966–1975				0.096**				0.026

Notes: $N = 1{,}696{,}700$ (to nearest 100). Dependent variable is log annual earnings from SSA records. Regressions also include controls for year, education, dummies indicating if race is African American, and indicating if ethnicity is Hispanic, main effects for birth cohort, and a quartic in age.

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

implies that, for this set of cohorts overall, positive selection into marriage offsets a modest share of the differential. When we add controls for children in column 2, the marriage effect is reduced substantially. In the OLS regression, the marriage earnings differential falls by more than half, from −0.256 to −0.118. In the fixed-effect regression, the coefficient falls by about one-third from −0.292 to −0.197.

In column 3 we add interactions between the married and children variables and ten-year birth cohort dummies to examine changes in these earnings differentials across these cohorts of women. In both the OLS and fixed-effect regressions, the earnings differential associated with marriage becomes less negative across birth cohorts. The decline in the earnings differential in fixed-effect estimates suggests a much reduced role for specialization. Comparing the OLS and fixed-effect estimates, we find a larger increase between the earliest and the most recent birth cohorts in the OLS estimate (.331) than in the fixed-effect estimates (.277). This implies that selection into marriage based on potential earnings became increasingly positive across these cohorts—i.e., women with higher potential earnings became more likely to marry. In contrast, the coefficients on the children/cohort interaction terms do not show a notable decline in the earnings differentials associated with children. The differential associated with young children has declined across cohorts but the differential associated with school-aged children has actually increased.

In the final specification in (4), we also include three-way interactions that allow the earnings differentials associated with children to differ between married and single women, and for that to vary across cohorts as well. The three-way interactions make it much more difficult to interpret individual coefficients, so we present a series of earnings differentials in Figures 1 and 2 that describe the patterns of interest: Figure 1 is based on the OLS results, and Figure 2 is based on our fixed-effect estimates. Each estimate in the figures gives an earnings differential for a particular group based on specification (4) relative to single, childless women in the same

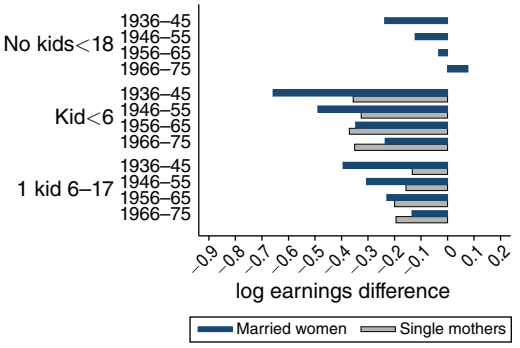

Figure 1. Earnings Relative to Single, Childless Women (*OLS estimates*)

Notes: The estimates are based on the fully interacted model reported in Table 1 (column 4, OLS). Each bar corresponds to the earnings differential for the specified group relative to single, childless women in the same cohort. We report implied differentials for two child scenarios—having one school aged child, and having one pre-school aged child.

Source: Authors' estimates based on linked SIPP-SSA estimates

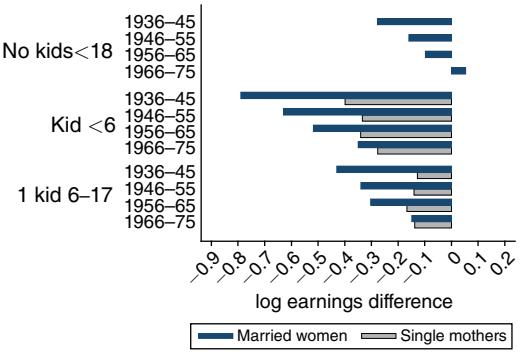

Figure 2. Earnings Relative to Single, Childless Women (*FE estimates*)

Notes: The estimates are based on the fully interacted model reported in Table 1 (column 4, FE). Each bar corresponds to the earnings differential for the specified group relative to single, childless women in the same cohort. We report implied differentials for two child scenarios—having one school aged child, and having one pre-school aged child.

cohort. As a way of illustrating how changes across cohorts in the marriage differential differ between women with children and those without, we include implied differentials for two different scenarios—having one school-aged child, and having one pre-school aged child.

The more heavily shaded bars in the graphs represent differentials for married women, while the lighter bars give those for single women. The top panel gives the marriage differential for women without children, and in both figures this differential is positive for the most recent cohort. In other words, among the most recent birth cohort of women who remain childless, marriage actually increases earnings relative to single women without children.[6] The second and third panels give estimated differentials for married and single women with one pre-school aged child and one school-aged child, respectively.

The marriage differential in these figures, conditional on children, is given by the difference between the married and single bars. Both the OLS and fixed-effect estimates imply that the gap in earnings between married and single women with children has also declined. The OLS results suggest that married women with children now earn more than single women with children, but comparison with the fixed-effect results suggests that this is due to married women with children being increasingly positively selected relative to single women with children.

While our findings imply that marriage is no longer associated with lower earnings among women in the most recent cohort (with the exception of married women with young children who are still slightly behind their single counterparts), what is notable is that the motherhood gap remains substantial. Even among the most recent birth cohort, married women with pre-school age children have approximately 35 percent lower earnings compared to married women without children while married women with school-aged children have approximately 15 percent lower earnings.[7]

[6] The fact that this is also true for the fixed-effect estimates suggests that this is not due to selection on earnings levels. One possibility is that women are increasingly likely to marry upon finishing school so that we observe their earnings rise along with change in marital status. In Juhn and McCue (2015), we show that this result is entirely driven by women with a college degree.

[7] Our focus in this paper is earnings gaps, conditional on working. In Juhn and McCue (2015), we also investigate

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participation differentials where participation is defined as having nonzero earnings. Married mothers with young children are less likely to participate in the labor market than single mothers with young children and the differential shows no clear pattern of decline across cohorts.