

Estimating the Impact of Marriage on Women's Wages

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Abstract

The wage premium or penalty for married women has been relatively ignored, both theoretically and empirically, despite extensive literature on the marriage premium for men and the motherhood penalty. Marriage may increase women's wages if it increases their motivation or if they are able to draw on their husbands' social and human capital. Alternatively, marriage may lead women to devote more time to home production and less to market work, or reduce their willingness to move for job opportunities, lowering their wages. Using data from NLSY79, our work estimates the marriage premium or penalty for women, allowing it to vary across the life course. Using a distributed fixed effects model that treats wage growth, rather than wage levels, as the outcome, we attempt to account for selectivity into marriage and into the labor force, as well as for the potential endogeneity of wage changes with marital status transitions.

Introduction

An active line of research has documented the existence of a motherhood penalty for women in terms of wages (Anderson, Binder and Krause 2003; Beblo, Bender and Wolf 2009; Budig and England 2001; Ellwood, Wilde, and Batchelder 2009; Glauber 2007; Loughran and Zissimopoulos 2007; Lundberg and Rose 2000; Simonsen and Skipper 2008), while far less attention has been paid to the relationship between marriage and women's wages. This topic has been so neglected that there is not even a consensus about the *sign* of the relationship, if any, much less the magnitude. Given the interest in the relationship between a particular family status transition – transitions to parenthood – and women's wages, it is puzzling that another form of family status transition – those into and out of marriage – has received so little attention. At the same time, research in economics has been active in documenting the wage premium for married men (Ahituv and Lerman 2007; Chun and Lee 2001; Gray 1997; Hersch and Stratton 2000; Loh 1996; Loughran and Zissimopoulos 2007), but little attention has been given to the marriage premium for women. The motherhood penalty and men's marriage premium strands of

literature each provide insight into the possible implications of marriage for women's wages, but are incomplete: married women resemble mothers in terms of gender, but not the family status transition that they experience, while married men resemble married women in family status transition, but differ by gender. Our work draws upon the theoretical traditions of these two existing literatures to propose hypotheses for the relationship between marriage and women's wages. We attempt to fill the empirical and theoretical gap by undertaking an examination of the relationship between women's marriage transitions and their wages. Furthermore, we make use of methodological advancements that have been used primarily (though sparsely) within the economics literature to make estimates of the marriage penalty or premium experienced by women that improve upon standard fixed effects estimates.

Assessments of the wage penalty or premium for women associated with transitions into and out of marriage have implications for understanding the intersection between work and family, as well as for sex stratification. Even if lower wages of married women (compared to unmarried women) are offset by higher wages for their husbands (compared to unmarried men), the marriage penalty for women may not be benign if married women's earnings disadvantage undermines their bargaining position in the home, or if divorcing women experience greater financial distress due to lower wages during marriage. Finally, the wage penalty or premium for married women has implications for stratification by other demographic characteristics as well. For example, if married women experience a wage premium, then white women's greater time spent in marriage, on average, may contribute to their earnings advantage as compared to African-American women.

Existing sociological work in this area has recognized the problems inherent in estimating the cost of marriage or parenthood for individuals by directly comparing the wages of the married and unmarried, or of parents and the childless, as selection into family statuses may be correlated with other, unmeasured traits that are correlated with wages. While conditioning on covariates may reduce this concern to some extent, the typical solution to this problem has been to use fixed effects models, allowing researchers to estimate the effect

of family status transitions that exist net of both time-varying observed covariates and time-invariant unobserved covariates. Estimates of the wage penalty or premium associated with family status changes typically find that fixed effects models attenuate the effects found in OLS models (Budig and England 2001; Glauber 2007; Gray 1997; Korenman and Neumark 1992). These models estimate, essentially, the difference *for an individual* between her pre-marriage/pre-parenthood wages and her post-marriage/post-parenthood wages.

While these models are a good first step in avoiding the problems of unobserved differences, more remains to be done. In particular, we argue that the sociological literature has lagged behind the economics literature in considering the potential bias that may arise if fertility and marriage transitions are endogenous with wages, as well as bias caused by selectivity into the labor force on the basis of the magnitude of the family status change penalty or premium. The economics literature, by contrast, in addition to focusing disproportionately on the marriage premium for men, has paid relatively less attention than sociologists to potential subgroup heterogeneity in the relationship between family status transitions and wages. In our work, we bring together the methodological advances of the economics literature and the attention to heterogeneous effects of the sociological literature, as well as shining light on the relatively ignored marriage penalty or premium for women. In addition, we examine an aspect of heterogeneity that has been mostly overlooked in both disciplines: that of changing premia/penalties across the life course, rather than assuming a constant penalty that begins as soon as a family status transition occurs and endures forever.

In the next section, we discuss the potential sources of an observed relationship between women's marital statuses and their wages, drawing on the existing literature on the motherhood wage penalty and male marriage premium. Next, we discuss our analytic plan in more detail and highlight our methodological improvements over existing sociological work. We close with a conclusion and discussion of the implications of our research.

Theoretical Framework

Explanations for any gross relationship between women's wages and their marital status can be grouped into three types. First, it is possible that women who marry are different in some way from those who do not, and that these differences are correlated with women's wages, or with their wage growth. This is a selection-based argument, and suggests no causal relationship between family status and women's wages. The generally attenuated estimates of the marriage premium for men and of the motherhood wage penalty in fixed effects as opposed to OLS estimates generally support the theory of selectivity in family status transitions (Budig and England 2001; Glauber 2007; Gray 1997; Korenman and Neumark 1992). However, it is unclear whether such a relationship would occur for marriage for women and, if so, in what direction the bias would lie. If selection into marriage for women occurs along the same lines as selection into marriage for men, it is possible that married women possess characteristics unobserved by the researcher that make them valuable to both employers and potential marriage partners. However, the relationship between women's earnings and their entry into marriage is weaker than it is for men (Smock and Manning 1997; Sweeney 2002), which suggests that a selection argument may be less relevant for women than it is for men. On the other hand, if selection into marriage for women operates similarly to selection into motherhood, women who transition to marriage and to motherhood may have lower-than-average wages, even prior to the transition. Women who have low wages may be particularly motivated to marry in order to achieve the financial benefits of marriage. As both the extent and direction of selection effects for women into marriage are unknown, it is important that estimates of the causal relationship between marriage and women's wages address the potential for selection effects.

Second, it is possible that marital status transitions alter women's wages by altering their productivity. The dominant theoretical framework in the literature on the wage premium for married men has been that men benefit from an opportunity for increased specialization at marriage, with marriage reducing their domestic burden and providing an opportunity for increased productivity in market work (Becker 1985; Hersch and

Stratton 2000). The analogous prediction for women is that marriage should increase women's specialization in non-market work, reducing their productivity in market work and leading to a decline in wages. Given that women experience an increase in housework hours when they enter into coresidential heterosexual partnerships, including marriage (Baxter, Hewitt, and Haynes 2008), if specialization is responsible for married men's wage premium, we might expect that it also leads to a wage penalty for wives. The evidence for the specialization hypothesis in accounting for married men's wage premium, however, is mixed (Chun and Lee 2001; Gray 1997; Hersch and Stratton 2000; Loh 1996), and so it is unclear whether a similar mechanism will be at work for women.

Marriage may alter individuals' productivity through mechanisms other than specialization. Married men may be more motivated to work hard, perhaps with the goal of supporting their wives financially. If this is the case, it is unclear whether women's wages would be expected to rise at the time of marriage for similar reasons. Enduring norms about gender roles may make it less likely that women will feel that adequate performance of the "wife" role necessitates increased earnings. In fact, men's historic responsibility for breadwinning and the economies of scale provided by marriage may give married women more flexibility to take jobs that have lower financial rewards, but higher non-financial rewards. In this case, marriage would be expected to lead to lower wages for women. Yet another mechanism suggests that marriage may increase men's wages through providing them access to their wives' human and social capital (Loh 1996). Such an explanation suggests that women should also be able to leverage their husbands' social and human capital to receive increased wages. In terms of productivity changes for married women, it is not clear whether the specialization effects or the motivation and social network effects will dominate: for women specialization offsets the other two, while for married men all three mechanisms operate in favor of the marriage wage premium. Under each of these mechanisms, however, the relationship between marriage and wages is "fair" – it represents only the response of employers to productivity changes, not discrimination.

Lastly, a relationship between wages and marriage may occur due to discrimination practiced against women of a particular marital status. Existing research suggests that employers may discriminate against mothers if they perceive them as less productive or if they anticipate that mothers are less likely to remain in the labor force (Budig and England 2001; Correll, Benard and Paik 2007). Given the generally normative character of marriage, it is unclear whether we would expect employers to discriminate on the basis of women's marital status and, if so, in which direction. If employers perceive married women as more responsible, they may discriminate in their favor. On the other hand, if they view marriage as a precursor to child-bearing, they may discriminate against married women as "potential mothers." Alternatively, employers may be neutral to women's marital status.

While our work does not aim to document the precise mechanism by which a wage penalty or premium for married women arises, our models attempt to address selection concerns in order to make estimates of the causal relationship between marriage and wages for women. Both the reduced-form estimates of the relationship between marriage and wages and the effects net of changes in labor supply and job characteristics are of interest. Assuming that selection concerns have been adequately addressed, gross effects express the financial cost or benefit experienced, on average, by those who change their marital status, without taking into account the behavioral changes induced by marital status transitions. Net effects capture residual effects that remain after controlling for observed changes in behavior, and may represent either unobserved behavioral responses or discrimination in the workplace. Unfortunately, neither productivity nor discrimination are easily measured, so it is not easy to distinguish to what extent residual differences between the wages of unmarried women and married women that cannot be explained by other factors are due to discrimination. However, residual differences in wages by marital status that remain after controlling for observed changes in behavior represent a plausible upper bound on the degree of within-job wage discrimination on the basis of women's marital status.

Methodological Contributions

Our work makes four methodological improvements over traditional sociological work in this area. First, we address unobserved differences among women that may exist not only in their wage levels, but also in their wage trajectories. If the hazard of entry into marriage and returns to experience are positively correlated, for example, then the standard fixed effects model will overstate the positive effect of marriage on wages. To relax this assumption, we follow the methodology of Loughran and Zissimopoulos (2007) and first take the difference between women's wages in two consecutive years, and then use a fixed effects model on the difference. This allows a test of whether wage *growth* is different for women in the years before and after marital status transitions.

Second, we consider the possibility that marital transitions are not exogenous. A recent increase in wages may make women either more or less likely to marry in the near future, depending on whether marriage is seen as an opportunity for economies of scale and risk-pooling, or a social status only to be entered into once sufficient financial resources have been accumulated (Edin and Kefalas 2007; Smock, Manning, and Porter 2005). If transitions to marriage tend to follow negative wage shocks, a marriage penalty could appear in fixed effects models that compare pre- and post-transition averages, even if no such effect exists: if the lower wages persist after the transition, it will appear that marriage is associated with wage decreases, even if the decrease occurred prior to the transition. While we do not know of any existing evaluations of the exogeneity of marriage transitions for women, Dougherty (2006) suggests that the wage premium experienced by married men is due not to an increase in wages at the point of marriage, but to a rise that begins several years before marriage. Thus, endogeneity is at least a potential concern, but is typically ignored in sociological studies of the relationship between family status variables and individuals' wages.

Third, we use a distributed effect modeling strategy not only to assess the endogeneity of marriage transitions, but to assess whether the relationship between marriage transitions and wages changes over time. The unwillingness of married women to move for their own job opportunities, and their potential to experience a decline in wages if they are “ tied movers” (Bielby and Bielby 1992; Frank 1978) may lead to increasing costs of marriage for women as marital duration increases and the cost of foregone job opportunities becomes larger. We know of only one existing article that discusses the possibility for changes over the life course in the returns to marriage for women: Loughran and Zissimopoulos (2007) argue that women experience both an instantaneous decline in wages at the time of marriage and also slower wage growth, leading to an accumulating marriage penalty. Even this work is limited, however, as it constrains the marriage penalty for women to consist of a combination of a one-time reduction in the level and a one-time reduction in the growth rate, rather than allowing for a more flexible relationship across the duration of the marriage. Modeling the costs and benefits of marriage transitions not as constants, nor as following a constrained parametric form over time, but instead in a flexible, semi-parametric way, allows an analysis of changes in these costs and benefits over time. If marriage changes affect wages through a one-time shift in wage levels, which is essentially the assumption of standard fixed effects models, then we expect to see that the individual’s wage growth differs from her person-specific average in the year of the transition, but then returns to the person-specific average in all subsequent years. However, we may also see that marriage transitions continue to affect wage growth in years following the transition to marriage.

Finally, we consider the potential bias that is introduced by selective entry into the labor market. If selection into the labor force following marital status changes is positively correlated with the size of the marriage premium (or, equivalently, negatively correlated with the magnitude of the penalty), then the estimates of the premium/penalty will be biased upward. While we know of no existing work addressing this concern with respect to the marriage premium for women, evidence for the sensitivity of the estimates of the motherhood penalty to the selectivity of women into the labor force following birth has been mixed. Korenman

and Neumark (1992) find that the lowered wages associated with motherhood result in significant reductions in labor force attachment, suggesting that selection concerns may be non-trivial in estimating the wage penalty for motherhood. Amuedo-Dorantes and Kimmel (2005) find that there is no penalty for motherhood once selection into labor force participation is controlled for, while Glauber (2007) finds little difference in the estimated motherhood penalty with or without selection corrections. Accounting for the possibility that labor force participation is selective on the basis of the magnitude of family status penalties is important if we are to interpret the results of changing estimated effects over time. We employ selection correction models to address this source of bias.

Data and Methods

We use data from women in the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79). The NLSY79 has been the dataset of choice for many researchers interested in assessing the wage effects of family status transitions (Amuedo-Dorantes and Kimmel 2005; Avellar and Smock 2003; Budig and England 2001; Dougherty 2006; Glauber 2007; Glauber 2008; Loughran and Zissimopoulos 2007), and is particularly appropriate to this question because of its focus on the experiences of young adults. Initiated in 1979 as a sample of 12,686 men and women ages 14-22, NLSY79 surveyed respondents annually through 1994 (when respondents were ages 29-37), and biannually thereafter. NLSY79 therefore provides a large sample of young people experiencing marriage transitions. By the year of the last publicly-available wave, 2006, the respondents are ages 41-49, which means that most transitions to first marriage have occurred.

For our sample, we exclude the military subsample, which was not reinterviewed after 1984, and the poor non-black, non-Hispanic subsample, which was not interviewed after 1990. We also exclude individuals who experienced a first marriage prior to age 21, because our modeling strategy requires that we observe

individuals' wages for several years prior to experience of a marital status transition. We further exclude observations with missing data for either the dependent variable or the covariates, although we do not exclude individuals who are missing wage data because they are not in the labor force.

The dependent variable is the first difference of log of wages in subsequent years. In these models, coefficients can be interpreted as the predicted change in wage growth associated with a one-unit change in the independent variable. Our key independent variables are a series of dummy variables that capture the number of years before or after the marriage that the given observation occurs. Our baseline is three or more years prior to the marital status transition. Dummy variables are then created for 2 years and 1 year prior to the marriage (*pre2* and *pre1*), the year of the marriage (*marriage*), 1-2 years after the marriage (*post1*), 3-5 years after the marriage (*post3*), 6-9 years after the marriage (*post6*), and 10 or more years after the marriage (*post10*). The divisions are necessarily somewhat arbitrary and we intend to experiment with the specification of the terms, balancing the desire for a flexible specification with the benefit of more precise estimates that come with coarser divisions.

Our models of the gross effect of marital status transitions on wages include only the key independent variables mentioned above and adjustments for *potential* experience (*exper*), to reflect the traditional age profile of wage growth, without considering the effect of marital status changes on *actual* experience. Potential experience is measured as the differences between the individual's age and his or her imputed age at entry into the labor force¹. Since the log of wage *levels* are almost universally assumed to follow a quadratic with age, following Mincer (1974), wage *growth* can be modeled approximately with a linear term, and should be expected to decline with age.

¹ The imputed age at entry into the labor force is set to 16 for those with less than a high school degree, 18 for those with a high school degree and no college education, 20 for those with some college education, 22 for those with a college degree and no graduate degree, and 25 for those with a graduate degree

We additionally use a modified Heckman selection model, extended for panel data by Wooldridge (1995), in order to correct for the selectivity of women into the labor force. We construct eight models of the first-stage probability of participation in the labor market, one for each of the periods identified in the wage equation. We include a rich set of covariates in the first-stage model, including the woman's age and education, whether she reported in 1979 that she would like to be employed at age 35, the state-and-year-specific unemployment rate, the presence and ages of children in the household, and the wage and education of her husband in the years in which she is married. Because the model is identified only on the basis of parametric assumptions without an exclusion restriction, we make use of two family background characteristics – the woman's mother's education and whether the woman's mother was in the labor force in 1978 and 1979. Family background variables have been identified as appropriate exclusion restrictions in previous studies (Griliches 1979; Korenman and Neumark 1992). We also consider variation in state-specific income tax rates that alter the incentive for paid labor as a potential exclusion restriction. In each year, we generate the inverse Mills ratios (IMRs) for each individual, using the appropriate period-specific model ($\lambda_t(Z_{it}\gamma_{it})$). Since every outcome is the difference of wages in two years, we enter the IMR terms for both years in the model, to account for selectivity in both periods.

$$\begin{aligned} \ln(W_{it+1}) - \ln(W_{it}) \\ = \alpha_i + \beta_1 \text{exper}_{it} + \beta_2 \text{pre2}_{it} + \beta_3 \text{pre1}_{it} + \beta_4 \text{marriage}_{it} + \beta_5 \text{post1}_{it} + \beta_6 \text{post3}_{it} \\ + \beta_7 \text{post6}_{it} + \beta_8 \text{post10}_{it} + \beta_9 \lambda_t(Z_{it}\gamma_{it}) + \beta_{10} \lambda_{t+1}(Z_{it+1}\gamma_{it+1}) + \varepsilon_{it} \end{aligned}$$

In our net effect models, we include a variety of covariates that may be associated with marital status transitions and with wages, in order to estimate a residual effect of marital status transitions that cannot be explained by behavioral changes. For these models, we add controls for the number of years that the individual has spent out of the labor force and the number of years she has spent working part-time, as well as for the individual's occupation, job tenure at the current job, and, for married individuals, the predicted work hours of

her spouse². We further control for fertility transitions, using a flexible specification identical to that used for marriage, in order to separate the motherhood effect from the marriage effect. We also add a similar set of indicators for divorce status. While our work focuses on the premium or penalty associated with marriage, our model estimates the motherhood penalty as well and also provides evidence on the wages of divorced women as compared to the never-married.

Subgroup Analyses

We consider that marriage and parenthood transitions may interact in their effect on wages, and that differences in the relationship between family status transitions and wages may exist across a variety of demographic subgroups, particularly education and race. Existing evidence suggests that the motherhood penalty may be larger for white women than for African-American and Hispanic women (Glauber 2007). Given that white couples, on average, have a greater degree of specialization between spouses (Orbuch and Eyster 1997), we would anticipate that marriage, too, would be less favorable to white women's wages. In order to assess racial differences in the relationship between marital status transitions and wages in our models, we estimate separate models for whites, African-Americans, and Hispanics, and compare the results. Similarly, the marriage penalty may vary by education level. College-educated women typically perform less housework than less-educated women (Baxter et al. 2008; Sanchez and Thomson 1997; Pittman and Blanchard 1996), so they are less likely to suffer from the burden of domestic production. Even if college-educated women's lost wages are larger in absolute terms, they may be the same or smaller than those of less-educated women in percentage terms³. We re-estimate our models separately for three education groups: individuals with less than a high

² We control for predicted rather than observed spousal work hours, to avoid the potential endogeneity between spouses' labor force hours and wages (Chun and Lee 2001).

³ There is some evidence that the motherhood penalty varies by education, although there is no consensus on whether the motherhood penalty is larger for women with high or low education (Amuedo-Dorantes and Kimmel 2005; Anderson et al. 2003; Ellwood et al. 2009).

school education, those with a high school degree but no college degree, and those with at least a bachelor's degree.

Analyzing heterogeneity in the marriage penalty/premium according to parenthood status is more complicated. Loughran and Zissimopoulos (2007), whose main models resemble our own in several key respects, do not consider the possibility of an interaction between transitions in marriage and parenthood status. Glauber (2007; 2008) considers heterogeneity of the parenthood penalty/premium according to marital status, but not the converse of the question. For simplicity, we begin by stratifying the analysis of the marriage premium according to whether the woman is already a mother at the time of her marriage.

Conclusions

Understanding the costs and benefits associated with family status transitions is at the heart of the work-family intersection. Work to date on this topic has disproportionately focused on the motherhood wage penalty, while the marriage penalty or premium for women remains underexplored. A priori, it is unclear whether married women will benefit from marriage through increased human and social capital and increased motivation for productivity, or whether they will be disadvantaged by increased specialization in home production or discrimination by employers. Methodologically, while pockets of scholarship, particularly in economics, consider endogeneity and selection into the labor force, these methods have neither been widely adopted in sociology, nor in tandem with one another, and methodologically sophisticated work has tended to abstract from considerations that the wage premium or penalty associated with family status transitions may vary dramatically across demographic subgroups. Finally, by considering the possibility that the wage penalty associated with marriage may change over the life course, we gain greater insight into the mechanism by which family status changes affect wages, and whether these effects are equally pronounced at all points in the life course.

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