His Gain, Her Pain?

The Motherhood Penalty and the Fatherhood Premium within Coresidential Couples

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Abstract. Prior research on the association between parenthood and wages has focused at the individual level, documenting a substantial motherhood wage penalty and a smaller fatherhood premium. However, the majority of births occur to coresidential couples, yet we know little about the within-couple association between the motherhood penalty and fatherhood premium. Specialization suggests that women who experience the largest motherhood penalty will tend to be partnered with fathers with the largest premium. However, it is also possible that some couples are better able to defray the wage costs of parenthood for both parents. We bring a dyad perspective to the study of the interaction between parenthood and wages, answering the following questions: 1) What is the average association between the motherhood penalty and the fatherhood premium within couples? 2) For which couples is the association strongest? 3) Which couples have the largest and smallest total wage penalties associated with parenthood?

Analyses of the costs and benefits of children from a labor-market perspective are typically performed at the individual level, documenting a substantial motherhood wage penalty (Budig and England 2001; Glauber 2007; Taniguchi 1999; Waldfogel 1997) and a smaller fatherhood wage premium (Glauber 2008; Hersch and Stratton 2000; Lundberg and Rose 2000, 2002). Analyses of this type are appropriate both for understanding the experiences of single parents and for answering questions relating to gender inequality in the costs of family responsibilities. However, most births are to married parents, and an even larger share to coresidential parents, married or unmarried. Furthermore, a leading theory to explain portions of both the motherhood penalty and fatherhood premium is that couples engage in a joint strategy of a specialized and gendered division of labor (Budig and England 2001; Glauber 2008). It is therefore puzzling that the couple dyad has received little attention in the study of the association between wages and parenthood.

In this paper, we propose to examine the association between the motherhood penalty and fatherhood premium within couples. Do mothers with the largest motherhood penalty tend to be partnered with fathers with the largest fatherhood premium? Such an outcome is consistent with the predictions of specialization theory (Becker 1981). Alternatively, are partners positively assortatively mated, with mothers with the smallest penalty partnered to fathers with the largest premium? The answers to these questions will shed light on whether variation in the motherhood penalty and fatherhood premium is primarily due to within-household specialization, or to some other factor. Furthermore, the results will elucidate whether the wage costs of parenthood are similar across couples, or whether some couples experience greater losses than others. Our results will examine which couples tend to have positively or negatively correlated wage

changes, as well as which couples appear to experience the largest joint wage penalties associated with parenthood.

Specialization

For partnered parents, labor market behavior is expected to follow from a joint decision-making process. The specialization model describes the work of household members as potentially including both labor market activity, which produces money that can be used to purchase other goods, and domestic production, which directly produces goods. In order to maximize household well-being, partners are expected to specialize in the domain in which they hold the comparative advantage (Becker 1981).

The arrival of children in the household greatly increases the demand for domestic production: The care of children is a time-intensive activity that can be at most partially transferred to child care professionals. Given the traditional gendered specialization within the household, partnered parenthood is expected to lead to increased household specialization by women in home production and men in paid employment. Empirically, much of the literature on the wage returns to parenthood is consistent with the predictions of specialization. The motherhood penalty is larger for married mothers than unmarried mothers (Budig and England 2001), while the fatherhood premium is larger for married than unmarried fathers (Glauber 2008). It is reasonable to suppose that some of these differences arise because partnership leads parents to adopt different work-family balances than they would in the absence of a co-parent. More directly, there is some evidence that the fatherhood premium for married men is smaller when their wives are employed full-time, year-round (Killewald forthcoming), again supporting

the hypothesis that household specialization is a determinant of within-gender variation in the wage costs or benefits of parenthood.

None of this is to suggest that within-household specialization decisions are neutral from the perspective of gender inequality: The partner who specializes in wage-earning is likely to benefit both from increased marital power and greater financial security in the event of divorce. To analyze outcomes at the couple level, then, is not to endorse these outcomes as egalitarian, but merely to recognize that properties of the dyad may contribute to within-sex variation in the motherhood penalty and fatherhood premium.

Assortative Mating

Although the specialization hypothesis is plausible, it is also possible that assortative mating will lead to a positive association between partners in their wage changes due to parenthood. For example, if individuals tend to partner with others who place a similar value on career advancement, mothers who experience the smallest wage penalties may be partnered to fathers who experience the largest gains.

This perspective also raises the possibility that the labor market costs of parenthood may be distributed unequally not only between genders, but across couples with different characteristics. Suggestive evidence for this perspective can be found in recent work by Michelle Budig and Melissa Hodges. They find that mothers at the top end of the wage distribution experience smaller motherhood penalties (Budig and Hodges 2010), while the fatherhood bonus is larger for men who are more educated, in professional or managerial occupations, and in jobs that emphasize cognitive skills – all traits associated with higher wages (Hodges and Budig 2010). Assortative mating on the basis of education and other wage-relevant traits may therefore

tend to generate a positive within-couple association between the wage changes associated with parenthood. Furthermore, this perspective suggests that couples who are more advantaged in the labor market will bear a lower total couple-level wage cost for parenthood.[1]

Data and Methods

Our analyses make use of data from the 1968-2009 waves of the Panel Study of Income Dynamics (PSID). Although the 1979 cohort of the National Longitudinal Survey of Youth (NLSY79) has been the primary dataset used for prior estimates of the motherhood penalty and fatherhood premium, a limitation of the NLSY79 is that the data collected on partners is not symmetric: considerably more information is available for the NLSY79 respondent than the partner. The PSID, by contrast, is a household-level survey, with symmetric information collected from both partners in a marriage or long-term cohabiting union. The PSID is therefore ideal for studying the within-couple associations between the motherhood penalty and the fatherhood premium.

Couples enter our sample in the first year in which they are both at least 18 years of age and are observed to be in a marriage or long-term cohabiting relationship, and they remain in the sample until they are no longer observed as a couple (either because of union dissolution or sample attrition), their oldest child reaches age 18, or either partner reaches age 60.

In general, the PSID collects far more detailed information about individuals who are the heads of their own household, or the wife/ "wife" of the household head. "Wives" are unmarried

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[1] There is less evidence that assortative mating by race will contribute to a positive within-couple correlation in the parenthood penalty. Glauber finds that married White women experience a larger motherhood penalty than married African American or Hispanic women (2007), while White married men experienced a larger fatherhood premium than other married men (2008).

women in long-term coresidential partnerships with household heads. By default, in opposite-sex partnerships the male member of the couple is considered the household head, regardless of which partner was the original sample member. When a couple is in their first year of cohabitation, however, the original sample member remains the household head, and the new partner does not have the same kind of detailed information collected that heads and wives/"wives" do. It is for this reason that we refer to our sample as consisting of spouses and those in "long-term" cohabiting unions: When we first observe a couple as a head-wife/"wife" pair with valid labor market information for both partners, the couple will either be married or have been in a cohabiting relationship for at least a year already.[2]

Our analysis proceeds in several stages. First, we estimate standard fixed-effects models of the motherhood penalty and the fatherhood premium, as shown in Equation 1.

$$\ln(w_{it}) = \gamma p_{it} + \mathbf{x}'_{it}\boldsymbol{\beta} + \alpha_i + \varepsilon_{it} \qquad (1)$$

In this model, p is the indicator for whether the individual is a parent in a given year, w is the individual's current hourly wage, $\mathbf{x}$ is a column vector of control variables, $\boldsymbol{\beta}$ is the column vector of coefficients, α is the individual fixed effect, and ε is the person-period effect. Individuals are indexed by i and periods by t. All analyses will be weighted with household weights, which are rescaled to average one in each year. In the fixed-effects models, we arbitrarily employ the weight for the first year in which the couple is observed.

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[2] Because of the relatively small number of long-term cohabiting parents in the PSID, it may not be possible to meaningfully test for variation between the experiences of cohabitors and married couples.

Wage. Consistent with the majority of prior research on the motherhood penalty and fatherhood premium, we measure the association between parenthood and individuals' hourly wages, rather than their annual earnings (Budig and England 2001; Glauber 2007, 2008; Hersch and Stratton 2000; Loughran and Zissimopoulos 2009; Taniguchi 1999; Waldfogel 1997). Not only does this make our analysis more directly comparable to the existing literature, but it also keeps the analytic focus on the returns that individuals receive for their labor in the labor market, rather than the time they spend in paid labor. In the PSID, hourly wages are not directly reported or constructed for all respondents. We construct a measure of average hourly wages by dividing the individual's annual labor income by her annual employment hours. As a result, this measure might be considered to represent the individual's "effective wage rate", after accounting for overtime pay, bonuses, commissions, and so on. Because the PSID asks in each survey wave about earnings and employment hours during the previous calendar year, we will tie labor market variables to the reports of parenthood and control variables in the prior year, although we do not make this adjustment in the current preliminary results. To avoid unduly influential outliers, we top-code at the 99th percentile of the wage distribution and bottom-code at the 1st percentile. All wage values are adjusted to 2008$.

Parenthood. To capture whether an individual is currently a parent, we constructed an indicator variable that is set equal to one if the individual reports that her first child was born in a year prior to the year of the current survey wave. Couples will be eligible for the sample if they satisfy the following conditions: 1) both members of the couple report the same year of birth for their first child; 2) the members of the couple are identified by the Family Identification Mapping System (FIMS) of the PSID as the co-parents of a child whose date of birth is

consistent with the reported year of birth in 1); 3) the couple is observed in the dataset as a couple at least once prior to the birth of their first child.

Control variables. Age is correlated with both entry into parenthood and wages. We control for a quadratic in the individual's age, interacted with her level of educational attainment. We allow for the interaction in order to account for the fact that the returns to experience vary by education (Heckman, Lochner, and Todd 2003). We additionally control for the year and the couple's current region of residence, as well as whether either member of the couple reports a health limitation that limits the amount or kind of work she can do.

We do not control for variables that are potentially endogenous to parenthood and are also correlated with wages, such as occupation, labor market experience, or employment hours. In other words, we estimate the *total effect* of parenthood on wages, rather than the residual portion that cannot be explained by the influence of parenthood on job traits, human capital, and other factors influencing wages. This is because our interest is in estimating the total association between partners' wage changes when they become parents. If partners' parenthood premiums are negatively correlated because they make changes to their occupation and employment hours in order to specialize, we do not want to "control out" this association. The exclusion of endogenous covariates is consistent with the arguments of Loughran and Zissimopoulos (2009) and Lundberg and Rose (2002)

The initial fixed-effects models do not make use of the couple-level aspect of the PSID data, but they allow us to compare our results with those obtained by other scholars using the NLSY79 data.

Second, we re-estimate the same models, with two adaptations. First, we use ordinary least squares (OLS) rather than the fixed-effects models. Second, we exclude the parenthood indicator from the model. This model can be represented as shown in Equation 2.

$$\ln(w_{it}) = \mathbf{x}'_{it}\boldsymbol{\beta} + u_{it} \qquad (2)$$

u_{it} is a composite error term, $u_{it} = \gamma_i p_{it} + \alpha_i + \varepsilon_{it}$.

Note the distinction between Equations 1 and 2: in Equation 2, we allow that γ, the wage penalty or premium associated with parenthood, may vary across individuals. We make no assumptions about the cause or pattern of this variation, but develop an empirical approach for estimating it. For each individual, we can then average her errors prior to and subsequent to parenthood.

$$\bar{u}_{ipre} = \alpha_i + \bar{\varepsilon}_{ipre}$$

$$\bar{u}_{ipost} = \gamma_i + \alpha_i + \bar{\varepsilon}_{ipost}$$

Differencing the average pre- and post-parenthood residuals at the individual level gives an unbiased estimate of the individual's unique parenthood premium or penalty.

$$\hat{\gamma}_i = \bar{u}_{ipost} - \bar{u}_{ipre}$$

$$E(\hat{\gamma}_i) = E\big(\bar{u}_{ipost} - \bar{u}_{ipre}\big) = E\left(\gamma_i + \alpha_i + \bar{\varepsilon}_{ipost} - \big(\alpha_i + \bar{\varepsilon}_{ipre}\big)\right) = \gamma_i + E(\bar{\varepsilon}_{ipost} - \bar{\varepsilon}_{ipre}) = \gamma_i$$

Although not our primary focus, the estimated $\hat{\gamma}_i$'s for men and women are informative about the distributions of the motherhood penalties and fatherhood premiums, a topic about which we know little. Although some prior work has documented variation in the association between wages and parenthood by education, race, and other markers of socioeconomic position (Amuedo-Dorantes and Kimmel 2005; Anderson, Binder, and Krause 2003; Budig and Hodges 2010; Hodges and Budig 2010; Glauber 2007, 2008), this work has focused on average subgroup differences, rather than exploring the full range of individual-level variation in the estimated penalty.[3] By making the wage changes associated with parenthood the outcome at the individual level rather than an average or subgroup-average coefficient, we are able to directly examine how much of the variation in the wage changes of parenthood can be explained by standard demographic predictors like race, education, and age at first birth, and how much remains unexplained.

At the couple level, our first analytic task is to estimate the direction and strength of the within-couple correlation in the wage changes associated with parenthood, which can be expressed as $corr(\hat{\gamma}_H, \hat{\gamma}_W)$, where the H and W subscripts indicate husbands and wives.

We then propose to model the within-couple association $\hat{\theta}_i = (\hat{\gamma}_H \hat{\gamma}_W)_i$ as a function of partner- and couple-level characteristics, using couple-level OLS, with robust standard errors to account for the estimated nature of the dependent variable (Lewis and Linzer 2005). Unsurprisingly, we predict that the within-couple association will be lower in couples who choose a specialized division of labor time post-parenthood. We also predict that the within-

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[3] The variance of the individual fixed effects will be an upwardly biased estimate of the population variance and requires adjustment (Bloom 2012).

couple association will be more positive within groups in which traditional gender specialization on employment hours is less common, such as African-Americans and college-educated spouses.

This model also allows us to estimate how $\bar{\theta}$, the average within-couple association, would change in various counterfactual scenarios. For example, we can predict $\hat{\theta}_i$ for couples in which the female partner never exits full-time employment and use this as an estimate of the association that would be observed in the population if there were no gendered division of labor during parenthood. In other words, we can generate a counterfactual estimate of $E(\hat{\gamma}_H \hat{\gamma}_W)$. This estimate can then be used to generate a counterfactual estimate of $corr(\hat{\gamma}_H, \hat{\gamma}_W)$, provided that the marginal distributions of $\hat{\gamma}_H$ and $\hat{\gamma}_W$ remain unchanged.

Lastly, we propose to again use couple-level OLS with robust standard errors to assess which couples gain the most (or lose the least) from parenthood, modeling $(\hat{\gamma}_H + \hat{\gamma}_W)_i$. We predict that couples who have traits associated with privileged labor market positions – particularly those who are more highly educated – will tend to suffer the smallest total wage losses.

In all analyses, our dependent variable is defined only for those for whom we are able to construct an annual hourly wage: those who have non-zero employment hours in the prior year. Omitting those without valid wage data is common in the parenthood wage literature (Glauber 2008; Loughran and Zissimopoulos 2009; Lundberg and Rose 2000, 2002). However, we might be concerned that selection into the labor force is correlated with the magnitude of the motherhood penalty or fatherhood premium and, furthermore, that it is correlated with the correlation in the parenthood penalty between parents, with couples with the strongest negative association being most likely to have a partner drop out of the labor market completely.

One possible method for adjusting for this selectivity is to apply a Heckman selection adjustment. However, in order to avoid identifying the model purely on the basis of parametric assumptions, this method requires a valid instrument: a variable that is correlated with the probability of employment, but not directly with hourly wages. It is difficult to find such an instrument. Instead, we propose to experiment with various imputation methods for missing wages to test the sensitivity of the results. For example, one imputation strategy would be to impute the minimum hourly wage for those not in the labor market, while another would be to impute the most recent reported wage. By using combinations of these methods for each spouse, we can test the robustness of the correlation estimated for the employed subsample.

Preliminary Results

In this section, we present the results from preliminary models. For these results, we have made several simplifications to the model and dataset. First, we have not incorporated the FIPS data to confirm that the couple members are the joint parents of a child born in the same year in which they each report that their first biological child was born. We have also not yet imposed the restraint that the couple be observed at least once prior to the birth of their first child, nor have we included controls for health status or implemented the survey weights.

Descriptive statistics are shown in Table 1. We observe 13,068 couples, for a total of 116,272 observations, or an average of almost nine observations per couple. Couples are in their mid- to late-thirties, on average. Men's average wages are $24.05/hour, compared to $16.58/hour for women.

The results from our fixed-effects models are shown in Table 3. On average, married women experience a motherhood penalty of about 6.6%, while married fathers experience wage gains of about 6.8%. These estimates are similar to those from the NLSY79, suggesting that the

PSID data is not unusual in this respect. On the face of it, these results might suggest almost perfect one-for-one tradeoffs in wages between partners who parent. Our within-couple correlations, however, tell a different story. We find that the within-couple correlation in the wage changes associated with parenthood is 0.19, suggesting that women with larger motherhood penalties tend to be partnered to men with smaller fatherhood premiums.

Conclusion

The association between parenthood and wages is a mature field: Many scholars have sought to estimate the magnitude of the motherhood penalty and fatherhood premium and to determine its causes and consequences. Yet this rich literature has been almost exclusively focused at the individual level, treating partner characteristics as covariates. Such an approach has value, but limits our ability to understand the association between wages and parenthood at the level of the couple dyad. In this paper, we contribute to the existing literature on parenthood and wages by estimating the within-couple association in wage changes. Our preliminary results suggest that, in contrast to the predictions of the specialization hypothesis, the wage changes that partners experience when they become parents are *positively* correlated. In future analyses, we will document which couples have more or less positive associations in their wage changes, as well as which couples appear to benefit most (or suffer the least) in the labor market when they become parents. In this way, we propose to bring a couple-level perspective to the study of the interaction between parenthood and the labor market.

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Table 1. Descriptives, PSID 1968-2009

	Men	Women
N	13,068	
Couple-year observations	116,272	
Hourly Wage	24.05	16.58
Age	38.23	35.84
Education		
Less than HS	24.5%	19.5%
High School graduate	35.1%	41.7%
Some college	20.3%	21.6%
BA or more	20.2%	17.3%
Region		
Northeast	16.1%	
North Central	24.6%	
South	42.8%	
West	16.0%	
Foreign	0.5%	

Table 2. Fixed Effects Coefficients Predicting Men's and Women's (ln) Hourly Wages: PSID, 1968-2009 [1]

	Men	Women
N [2]	11,648	9,624
Person-year observations	95,652	67,114
Parent (1 = yes)	0.068 ***	-0.066 ***

(1) All models include controls for education, age, their interaction, region, and year.