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The Effects of Sons and Daughters On Men's Labor Supply and Wages*

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ABSTRACT

In this paper we estimate the effects of children and the differential effects of sons and daughters on men's labor supply and hourly wage rates. The responses to fatherhood of two cohorts of men from the PSID sample are examined separately, and we use fixed effects estimation to control for unobserved heterogeneity. We find that fatherhood significantly increases the hourly wage rates and annual hours of work for men from both cohorts. Most notably, men's labor supply and wage rates increase more in response to the births of sons than to the births of daughters. (JEL: J23, J16, J22, J24)

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I. Introduction

The impact of fatherhood on men's labor market outcomes has received little attention from economists, in contrast to the central role played by children in studies of women's labor supply. However, there is good reason to think that parenthood does affect men's labor supply and hourly earnings. Though child care has traditionally been viewed as the wives' responsibility, children place demands on the time and financial resources of the entire household. If the labor market decisions of husbands and wives are interdependent, we would expect parenthood to affect men's wages and labor supply. Since women's roles in the labor market and the family have changed dramatically in recent decades, we would also expect to see a shift in the relationship between children and men's labor market behavior.

In this paper, we estimate the effect of children on men's labor supply and hourly wages using data from the Panel Study of Income Dynamics (PSID). Our fixed effects estimates indicate that, on average, a child increases a man's wage rate by 4.2 percent and his annual hours of work by 38 hours per year. However, the effects of children are highly non-linear and non-monotonic, with significant positive incremental effects limited to the first two children. Comparison of OLS and fixed effects estimates suggest that there is substantial heterogeneity bias in conventional cross-section estimates of the effect of fatherhood on men's outcomes. We compare the behavior of two cohorts--men born in and before 1950, and men born after 1950--and find that the relationship between children and men's labor supply and wages has shifted over time.

Our most notable results relate to the effects of child gender on men's labor market outcomes. Sons increase men's annual hours of work and wage rates significantly more than do daughters. Fathers of both cohorts respond differently to sons and daughters, though the gender effects are more pronounced in the hours worked of the late cohort and the hourly wage rates of

the early cohort. We find little evidence of an effect of child gender on the labor market outcomes of mothers, and are unable to explain our results in terms of differences in the expected pecuniary returns to boys and girls in the United States. Our results are consistent with a model in which the gender composition of a couple's offspring affects the returns to marriage, and this has implications for future research.

Section II presents the background for our analysis in terms of the theoretical underpinnings and the related empirical literature. Section III describes the data. Section IV outlines the empirical specification and econometric issues. The results are presented in Section V, and Section VI discusses the finding on gender differences. Section VII is concludes.

II. Background

Theory

Why would children affect men's labor market outcomes? There is substantial evidence that motherhood reduces women's labor supply and wages.[1] The fall in mothers' labor supply is attributed to the increased value of women's home time after having a child (Becker [1985]), and the decline in wage rates to a fall in market productivity due to reduced time and effort on the job.[2] Given the evidence that husbands' and wives' labor market outcomes are interdependent,[3] we would expect this reallocation of mothers' time to be accompanied by some labor market response among fathers.

We would expect parenthood to have *two* effects on the value of parents' time in the household. First, consistent with Becker's work, there is the *specialization effect* due to the

[1] For example, Mroz [1987], Korenman and Neumark [1992], Neumark and Korenman [1994], Lundberg and Rose [1998]. For summaries of the literature, see Browning [1992] and Waldfogel [1998].

[2] Alternative explanations include discrimination against mothers, and a wage penalty that compensates for more flexible work arrangements.

[3] Lundberg [1988] finds evidence of interdependence in husbands' and wives' labor supplies in households

increased value of wives' time relative to that of husbands. This generally takes the form of wives' increasing their focus on home production while husbands concentrate more on the labor market. The magnitude of the specialization effect depends on husbands' and wives market wages and relative productivities in the household.

Second, in Lundberg and Rose [1999] we introduce an additional effect which we term the *home-* (relative to market-) *intensity effect.* This results from the increased value of *both* parents' time as inputs to child care after a child is born. This effect leads to an increase in total household resources devoted to the home in response to parenthood.

In our framework, the predicted effects of children on women's outcomes are unambiguous: both the specialization and the home-intensity effects on labor supply are negative. However, for men they are ambiguous. We would expect the specialization effect to be negative, but the home-intensity effect to be positive. The greater the extent to which fathers share in parenting responsibilities, the more likely it is that the home-intensity effect will dominate the specialization effect, leading to a fall in hours worked after the birth of a child.[4]

The effects of children on fathers' labor market outcomes are likely to vary by parity level and by cohort. We expect the potential gains from specialization to decline with parity, as the decreases in mothers' labor supply are largest for the first two children. This implies that the effects of children on men's wages may be non-linear or even non-monotonic, and we allow for this in our empirical analysis.

The level of marital specialization appears to have declined for more recent cohorts of couples, as women's and men's productivities have become more similar. However, this does not necessarily imply that the *change* in specialization associated with the birth of a child has fallen. If, for more recent cohorts, households are substantially less specialized immediately following

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with young children.

marriage, there may be a larger *increase* following the birth of the first child. Similarly, decreases in the level of home-intensity associated with an expansion of the market for substitutes for parental time in home production, do not necessarily imply that the change in home-intensity in response to the birth of a child is negative. Therefore the sign, and magnitude, of the cohort differences in the effects of children on men's outcomes is an empirical question.

Literature

Most research on the relationship between household roles and men's labor market outcomes has focused on the effect of marriage on wages. Married men earn more than single men with the same education and experience, but it has not been clear whether marriage makes men more productive, or more productive men select into marriage. Korenman and Neumark [1991] estimate this marriage premium using fixed effects and find that married men earn approximately 6 percent more than single men and that the premium accrues gradually over the course of the marriage. Their analyses of data from one firm's records on reviews, wages, and personal characteristics of professionals and managers indicate that the effect of marriage arises through promotions rather than through a premium for married men within a job category. Taken together, their findings suggest that much of the marriage premium can be attributed to increased productivity of married men, perhaps due to returns to specialization within the household. Gray [1997] finds that the marriage wage premium has fallen over time and attributes this to declining specialization of husbands and wives.

There have been only a few attempts to measure the effect of parenthood on men's labor supply and wages. Pencavel [1986] finds that young children are associated with longer work hours for men in the 1980 U.S. Census, and Waldfogel [1998] reports that the wages of young men in 1980 and 1991 NLS samples are higher if they have two or more children. However, both

[4] Similarly, the effect of children on men's wages is ambiguous *a priori*.

of these studies use cross-section data and do not correct for endogeneity. To the extent that fathering children is endogenous with respect to labor market outcomes or correlated with unobservables in the wage or labor supply equations, the estimated effects of fatherhood will be subject to bias.

Angrist and Evans [1998] use instrumental variables to estimate the effect of the birth of a third child on the labor supply of men and women, and find no significant effect of this birth on men's labor supply. In Lundberg and Rose [2000a] we estimate age-hours and age-wage profiles for husbands and wives with and without children under fixed effects. However, if the effects of children on men's outcomes are non-monotonic, or even non-linear, with respect to parity, the results of these two studies will not be generalizable to other parities.

III. Data

We examine the effects of both marital status and parenthood on work hours and wages, using a sample of men drawn from the Panel Study of Income Dynamics (PSID). Our sample spans the entire period over which data were available to us from the PSID: 1968 through 1992. The dependent variables are annual hours of work and the (log of the) real hourly wage rate. The wage rate was computed as total annual labor income divided by annual hours of work, and deflated to 1983 dollars using the Consumer Price Index.

Marital status was measured as a dummy variable indicating whether the individual reported having been married in a particular year.[5] Fertility measures were constructed from the

[5] We construct marital status and fertility variables using the Marriage History file and the Childbirth and Adoption History file, which contain retrospective fertility and marriage information beginning in 1985 and updated in each subsequent survey. Alternative indicators of marital status based on questions asked in each year can be constructed from PSID data. We have used the retrospective data for two reasons. First, for some of our analysis we use data on length of current marriage, and this variable can only be constructed with the retrospective data. Therefore, our measure of marital status will be consistent with the data on length of marriage. Second, the retrospective data asks about marriages per se, and the alternative

fertility histories and include all children ever born, whether currently living with the father or not.[6] In addition to the total number of offspring, we calculated the number of children by gender, whether the man had at least one son or daughter, and whether the man had a first child that was a son or a daughter.

Additional regressors used as controls in all empirical models were age, education, and year of the observation, all of which are entered as a series of dummy variables to allow for non-linearities. In some analyses, we control for the length of the marriage using values calculated from the marital history.

Our raw PSID sample consisted of 26809 observations on 2304 white male heads of household who were born in 1943 or later, and for whom fertility and marital histories exist.[7] Observations were deleted for the following reasons: the man was under age 18 or over age 60 (5 observations), education was missing (30 observations), the marriage history indicates that the man was in two marriages simultaneously (44 observations), the man had a child but did not report its gender (77 observations), hours worked was missing (448 observations). The final sample consisted of 26205 observations on 2243 individuals.

To examine changes in household responses to children over time, we divided the sample into two cohorts - men born in or before 1950 and men born after 1950. Means and standard deviations of the variables used in the analysis are reported in Table 1.

Table 2 reports the frequency distribution of children by parity for each cohort. Approximately 89 percent of the men in the early cohort and 66 percent of the men in the later cohort have had at least one child. This difference may be due to both cohort effects and age

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measures at times categorize cohabitors as married. For a more detailed discussion of the issues involved in choosing marriage variables, see Lillard and Waite [1990].

[6] We used children (reported to have been) fathered rather than children living with their father, since coresidence may be endogenous.

[7] Rendell et al [1999] find evidence of significant underreporting of children for non-whites but not for

effects, as the average age is 34 for the early cohort and 28 for the later cohort. Very few men have more than four children (about 2 percent for the early cohort and 1 percent for the later cohort). Therefore, in our empirical analysis, we focus on the effects of the first few children, and include a separate dummy variable for observations with more than four children.

Table 3 reports frequency counts for number of children by gender. We note that fewer men report having any daughters than any sons in the early cohort (216 have no daughters and 195 have no sons). This is in contrast to what would be expected biologically, given that about 105 boys are born for every 100 girls, and about equal numbers of boys and girls survive until age 5 in the U.S.

Undercounting can be detected by comparing the total number of boys relative to girls born. For the early cohort, men report having about 110 boys for every girl (649 boys and 590 girls, in total), and for the later cohort, the numbers are approximately equal (1112 boys and 1102 girls). The apparent overreporting of sons relative to daughters by the early cohort is quite striking, since it is generally believed that bias in favor of male children is relatively mild in the U.S. and other developed countries.[8] We suspect that this preponderance of sons is due to systematic recall bias: men in the early cohort are more likely to recall the birth of a child if it is a son relative to a daughter, particularly if the birth is nonmarital or from a prior marriage.[9]

IV. Empirical Specification and Econometric Issues

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whites in the PSID retrospective data.

[8] This is in contrast to parts of Asia, where pro-male bias is believed to be more acute (Behrman [1997]). In particular, in parts of India, pro-male bias leads to excess mortality of female children relative to males, and mother's reports of births of sons relative to daughters are particularly high (Rose [1999]). Both of these factors lead to an econometric concern for the "endogeneity of gender" that is discussed in Section IV.

[9] However, women's reports of the numbers of sons born relative to daughters do not appear to be biased. In Lundberg and Rose [2000b] we use data from the women's marital and fertility histories to estimate a hazard model of the likelihood a woman marries, subsequent to a non-marital birth, and find that women who have sons marry sooner than women who have daughters. This is consistent with the hypothesis that fathers underreport daughters because they are less likely to have contact with daughters born non-

We undertake two parallel analyses. We estimate identical sets of wage and reduced-form labor supply equations. Because the equations describing the two outcomes contain identical sets of regressors, and we do not need to test cross-equation restrictions, the equations can be estimated separately.

The base specification is:

$$Y_{it} = a + b_{MAR} MARR_{it} + \sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Year} b_{Year} D_{Year_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (1)$$

where the subscript "i" indicates individual and "t' indicates time. *Y* is the outcome of interest (the log of the real hourly wage rate, or annual hours of work), *MARR* is a dummy variable indicating whether the individual is married, D_{Age} is a series of dummy variables for each year of age of the individual, D_{Year} is a series of dummy variables representing the year of the observation, and D_{Educ} is a series of dummy variables indicating the number of years of education.[10]

Since both age and education are included as regressors, an estimate of Mincerian experience is implicitly included in these estimates. We do not include actual experience, or controls for occupation or industry, as these variables are endogenous in the theoretical framework underlying our estimating equations. In these respects our estimates of the effect of the marriage are not comparable with those reported in Korenman and Neumark [1991] and Gray [1997], and our estimates of the male "family gap" are not analogous to those in Waldfogel [1998].

We introduce children into the analysis in two ways. In a linear specification, we include the variable *NKID04*, which is the number of children if the man has four children or less and zero otherwise, and a dummy variable for five or more children (*DKID5*); i.e.:

$$Y_{it} = a + b_{MARR} MARR_{it} + + b_{NKID04} NKID04_{it} + b_{DKID5} DKID5_{it}$$

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maritally.

$$+\sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Year} b_{Year} D_{Year_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (2)$$

In a non-linear specification we include instead a series of dummy variables *DKID1* though *DKID4* indicating whether the man has exactly that number of children; i.e.,

$$Y_{it} = a + b_{MARR} MARR_{it} + \sum_{NKID=1}^{NKID=4} b_{NNKID} D_{NKID_{it}} + b_{DKID5} DKID5_{it}$$

$$+\sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Year} b_{Year} D_{Year_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (3)$$

We only examine the effects for the first four children because there are so few observations for men with five or more children (See Table 2).[11]

These models are estimated two ways. First, we estimate OLS[12] equations to obtain estimates that are more comparable to what would be found in a conventional cross-section analysis. OLS estimation of these models may yield substantially biased coefficients due to heterogeneity – i.e., a man's fertility may be correlated with unobservables in the estimating equations. There are essentially three approaches for dealing with this problem. The first is using an instrumental variables procedure, such as two-stage least squares. However, this procedure would require data on some variable that is correlated with the measures of fertility, but uncorrelated with the error terms. It is in practice very difficult to find such an instrument. For instance, Angrist and Evans [1998] use the sex composition of the first two children in a family to instrument for whether a third child is born. This is appropriate given the evidence that parents' preference for balanced families leads them to be more likely to have a third child if the first two

[10] The few observations with 17 or more years of education are grouped together.

[11] We estimated the effects of children without separating out the highest parities and found that the coefficients for these parities were unstable, imprecisely estimated, and implausibly large, but that including them did not have much impact on the coefficients for lower parities. These results are reported in Appendix Tables A.1.1 and A.1.2.

[12] With huberized standard errors in order to allow for the fact that we have repeated observations by individual (Huber [1967]).

children are the same sex. However, since this approach can only be used to examine the effect of the third child on outcomes, it will not be useful for our problem.

The other two approaches involve some form of fixed effects. Under sibling fixed effects, data on brothers would be used. Here, the subscript "i" would refer to family, and "t" would refer to brother, and the intercept α would be allowed to vary by family. This approach assumes that the portion of the unobservables that is correlated with the regressors is constant within family. Biases would arise if, say, more attractive brothers tend to have more favorable labor market outcomes, and be more likely to marry or father children.

The third approach is individual fixed effects. In this case, α varies by individual, and as discussed above, the subscript "i" refers to individual and "t" refers to time.[13] This approach is commonly used in this literature; for instance, Korenman and Neumark [1992] and Waldfogel [1997] on the effect of children on women's wages, and Korenman and Neumark's [1991] on the marriage premium. This is the strategy we follow.

Individual fixed effects estimates may still exhibit endogeneity or omitted variable bias, for two reasons. First, timing of marriage and parenthood may be caused by, or correlated with, actual or expected shocks to the outcome. For instance, men may time marriage or childbirth at a time when they expect to receive a promotion and a raise. Second, men with higher *growth rates* of wages may be more likely to get married or have more children. Because hours tend to be more stable over time than wages, we believe this is less likely to be a problem in the hours equations.

[13] In our specification, it is necessary to eliminate the year dummies from the fixed effects specification because they are perfectly collinear with the fixed effects and the age dummies.

The Effects of Sons vs. Daughters

In order to estimate the effects of sons relative to daughters on wages and hours work we estimate several variants of Equations (2) and (3) under fixed effects.

First, we examine the differential effect of the number of boys and girls. We measure the number of boys and girls as *NBOY03* and *NGIRL03*, which refer to the number of boys and girls if there are less than three. Observations in which there are more than three boys or girls are dummied out with the variable *GIRBOYG3*. The first specification of the model used to estimate gender-specific effects, then, is:

$$Y_{it} = a_i + b_{MARR} MARR_{it} + b_{NBOY} NBOY03_{it} + b_{NGIRL} NGIRL03_{it}$$
$$+ b_{GIRBOYG3} GIRBOYG3_{it} + \sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (4)$$

Second, we note that Morgan, Lye, and Condron's [1988] finding on the effect of sons relative to daughters on marital survival probabilities pertained to whether there was *at least* one son or at least one daughter, and Butcher and Case's [1993] finding on the effect of brothers on girls' education relates to the presence of at least one brother. Therefore, in the second specification we include the variables *IFBOY* and *IFGIRL* indicating whether the man has at least one son or daughter; i.e.,

$$Y_{it} = a_i + b_{MARR} MARR_{it} + b_{IFBOY} IFBOY_{it} + b_{IFGIRL} IFGIRL_{it}$$
$$+ \sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (5)$$

Third, we include the dummy variables *FIRBOY* and *FIRGIR* indicating that the man has had at least one child and the first child was a boy or girl, respectively; i.e.,

$$Y_{it} = a_i + b_{MARR} MARR_{it} + b_{FIRBOY} FIRBOY_{it} + b_{FIRGIRL} FIRGIRL_{it}$$
$$+ \sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (6)$$

Finally, in the non-linear specification, we include two sets of dummy variables corresponding the gender specific parities; i.e.,

$$Y_{it} = a_i + b_{MARR} MARR_{it} + \sum_{NBOY=1}^{NBOY=3} b_{NBOY} D_{NBOY_{it}} + \sum_{NGIRL=1}^{NGIRL=3} b_{NGIRL} D_{NGIRL_{it}}$$

$$+ b_{GIRBOYG3} GIRBOYG3_{it} + \sum_{Age} b_{Age} D_{Age_{it}} + \sum_{Educ} b_{Educ} D_{Educ_{it}} + u_{it} \qquad (7)$$

All of these equations are estimated under individual fixed effects. To the extent that the gender composition of a man's offspring is random, the issues of endogeneity and heterogeneity with respect to actual or expected shocks to hours or wages are not of concern.

However, the sex ratios reported in Section III suggest that births of girls are underreported for the cohort of men born before 1950. This means that gender is potentially endogenous; i.e., the probability that a son is reported to have been born, or survive, relative to a daughter, may be correlated with unobservables in regressions of the effects of a child's gender on individual or household level outcomes. If the underreporting is systematic with respect to *shocks* to earnings or hours, then the difference in the effects of sons and daughters will be biased. This seems unlikely. Alternatively, if men in the early cohort who have high growth rates of hours or wages are more likely to under-report daughters, then the effects of sons vs. daughters will be biased upward. This possibility cannot be eliminated, but we do note that it's unlikely to be an issue with the hours equations, or for the later cohort.[14]

IV. Results

[14] For further discussion of the econometric implications of endogenous gender, see Rose [2000].

The Effects of Children on Wages and Hours (Tables 4 and 5)

Table 4 presents the results regarding the effects of marriage and children on hourly wage rates. Table 4a reports results for the entire sample, and Table 4b reports the results by cohorts. Columns (1) through (3) contain the OLS estimates, and columns (4) through (6) contain the fixed effects estimates. Columns (1) and (4) present the base specifications without children, columns (2) and (5) are the linear child specifications and columns (3) and (6) are the non-linear specifications. The estimated incremental effect of each child, and the standard error of the incremental effect, are reported in the shaded regions of column (3) and (6).

The fixed effects results for the base specification reported in column (4) indicate that married men earn approximately 6.2 percent more than single men, holding constant age, education, race, and year of observation. Adding *NKID04* and *DKID5* into the regression in column (5) reduces the estimate of the marriage premium slightly to 5.7 percent. The coefficient on *NKID4* is .042 and statistically significant. This means that each additional child is associated with an increase in wages of approximately 4.2 percent. The coefficient on the dummy variable *DKID5* is also positive and significant. The results in column (6) indicate that the relationship between number of children and hourly wages is highly non-linear. The first child increases wages by 7.1 percent (t=5.9), the second by an additional 6.0 percent (t=5.5), and the incremental effects of the third and fourth child are small and insignificant.

The OLS results in columns (1)-(3) indicate a somewhat larger marriage premium (10 percent rather than 6 percent) and a substantially smaller effect of children (1.7 percent per child rather than 4.2 percent). The fall in the marriage coefficient when we move from OLS to fixed effect estimates indicates that one reason that married men earn more than single men is positive selection: men with higher levels of the unobservables affecting wages are more likely to get married. This positive selection effect in terms of marriage is consistent with the findings of

Korenman and Neumark [1991] and Gray [1997]. However, the implied selection into fatherhood is *negative*. The estimated effects of children are higher under fixed effects relative to OLS in both the linear specification in column (5) and for each parity in the non-linear specification in column (6). This means that, although fatherhood itself *increases* wages, having children is associated with *lower* levels of unobservables in the wage equation.

The effect of heterogeneity can be seen graphically in Figure 1a, which plots the OLS coefficients (solid line) and the fixed effects coefficients (dashed line) against the number of children. A diamond sign (◊) indicates that the respective coefficient is significantly different from zero (at the 10 percent level). A square ( ) indicates that the coefficient is significantly different from the coefficient for the previous parity.

Figure 1 shows that, for each parity, the fixed effects coefficient is greater than the respective OLS coefficient. The difference at parity 4 is particularly striking: the OLS estimates suggest that having a fourth child relative to a third reduces wages substantially, but the fixed effect estimate indicates that this drop is due entirely to heterogeneity.

The analyses reported in Table 4a are repeated by cohort and presented in Table 4b. For both cohorts, we find positive marriage premia and evidence of positive selection into marriage. We find, as does Gray, that the marriage premium has fallen over time: our fixed effects estimates indicate that it has been reduced by half. For both cohorts, there is evidence that fatherhood increases wages and that negative selection into fatherhood is present. In the linear specification for the early cohort, the selection effect apparently nearly outweighs the true effect and the estimated OLS relationship between the number of children and wages is small and insignificant.

The effects of children on men's wages appear to have changed over time. The incremental effects of the first two children are about half as large for the later cohort (5.7

percent vs. 9.7 percent for the first child, and 4.2 percent vs. 8.4 percent for the second child.) The incremental effect of the third child is significantly negative for the early cohort, and positive but not highly significant for the later cohort. For the early cohort, the effects of children are highly non-linear and non-monotonic; for the later cohort the effects are monotonic and approximately linear (see Figures 1b and 1c).

The analysis of the determinants of wages reported in Table 4 is repeated for total hours of work in Table 5. The formats of the tables and figures are identical. The results for the entire sample reported in Table 5a indicate that men work more hours per year after marriage, in addition to earning more per hour. The OLS estimates indicate that married men work approximately 201 hours per year more than single men; the comparable fixed effects estimate is 115 hours per year. In hours as well as hourly wages, there is evidence of positive selection into marriage, as the fixed effects estimates are approximately half the magnitudes of the OLS estimates for the entire sample, and for each cohort individually. Comparing the estimates for the two cohorts indicates that the marriage "premium" in terms of hours of work has *increased* somewhat over time.

Having children significantly increases men's annual hours of work. For the sample as a whole, the linear OLS estimate of the effect of children is 46 hours per year per child and the comparable fixed effects estimate is 38 hours per child. The non-linear fixed effects estimates reported in column (6) indicate that men work approximately 82 hours per year more (t=5.5) after the birth of the first child and 26 hours per year more (t=1.9) after the second child. The incremental effects of subsequent children are not statistically significant, nor is the effect of having more than 4 children.

Interpretation of the non-linear estimates by cohort is facilitated by examining Figures 2b and 2c. For the early cohort, the fixed effects coefficients are less than the OLS coefficients for

each parity, and they indicate a step-function relationship between children and men's labor supply. The effect of the first child is positive and significant, but the effects of subsequent children are all small. For the later cohort, however, the effects of each child on hours of work are positive and significant.

In summary, men work more hours and earn more per hour after becoming fathers, although the incremental effects of children are non-linear. For the early cohort the relationship is non-monotonic. The first two children increase wages, but subsequent children reduce them. For hours of work, the relationship is a step function, with the first child leading to higher labor supply, and no effect of children at higher parities. In terms of the framework in Lundberg and Rose [1999] and discussed in Section II, the specialization effect outweighs the market intensity effect for the first one or two children, but the market intensity effect dominates or cancels out the specialization effect for higher parities. For the late cohort, in contrast, the positive effect of the first four children on hours and wages is approximately linear.

The Effects of Boys vs. Girls on Wages and Hours (Tables 6 and 7)

The results for the gender-specific effects on hourly wage rates and hours worked (Equations 4 – 7) are reported in Tables 6 and 7, respectively. In each, the results for the entire sample are reported in column (1), for men born in or before 1950 in column (2), and for men born subsequent to 1950 in column (3). The differential effects of sons vs. daughters are reported in the shaded portions of the tables.

For the sample as a whole, the gender of the man's offspring does not significantly affect his wage rate. However, when we disaggregate by cohort, more striking patterns emerge.

For men in the early cohort, we find significantly higher wages for fathers of sons relative to daughters in most of the specifications. Each son raises wages by approximately 3 percent more than each daughter, and this difference is significant (t=1.9). Men with at least one son earn

2.9 percent more than men with at least one daughter, although this effect is not significant. However, men whose first child was a son earn approximately 5.3 percent more per hour than men whose first child was a daughter and this is statistically significant (t=1.8). The non-linear specification at the bottom of column (2) indicates that for each gender-specific parity men earn more after having sons relative to daughters, but these results are statistically significant only for the third boy or girl. There are no significant gender-specific effects on wages for men born after 1950.

The gender-specific effects on men's hours of work reported in Table 7 are striking. For the full sample, we find that men work significantly more if they have at least one son vs. at least one daughter (53 hours per year, t=2.5) or if their first child was a boy rather than a girl (65 hours per year, t=2.7). In the non-linear estimates we again find hours are significantly higher if the first child is a boy rather than a girl (63 hours per year, t=3.0), but find no significant effects for subsequent children.

We find some significant effects of child gender on labor supply for both cohorts, though only the effects for the later cohort are substantial and pervasive. For the early cohort, the only significant difference is in the effect of the first child in the nonlinear specification: 60 hours more if the first child is a son relative to a daughter. For men born after 1950, we find statistically and quantitatively significant positive effects of sons relative to daughters in every specification. The linear specification indicates that each son increases his father's labor supply by 40 hours per year more than (or about 2.5 times as much as) each daughter (t=2.2). Having at least one son leads to about 73 more hours of work per year than having at least one daughter (t=2.7), and having a son as a first child leads to an increase in labor supply of about 69 hours per year more than a daughter (t=2.2). Thus the incremental effect of having a son rather than a daughter amounts to

more than 3 percent of total male labor supply. In the non-linear specification, we find increases in labor supply for each of the gender-specific parities.

In summary, having sons vs. daughters leads to higher hourly wages and higher labor supply for fathers. The labor supply effect is particularly striking, as we find significant effects for both the early and late cohorts and for a variety of specifications of the gender composition of a man's offspring.

V. Discussion: Why Do Men's Outcomes Depend on Children's Gender?

Our results indicate that men work more and/or harder after having sons relative to daughters. Furthermore, when we estimated the same specifications reported in Tables 6 and 7 for women as well as men,[15] we found virtually no evidence that children's gender affects women's hourly wages and no evidence of an effect on labor supply.

What economic factors could explain these findings? First, we consider how having sons relative to daughters might shift parents' constraints. If the returns to educating sons are greater than the returns to educating daughters, parents may work more if they have sons relative to daughters in order to finance their education. While there is limited evidence to suggest that parents spend more on sons' education than on daughters' education, the magnitudes would be too small to explain the difference in wages and labor supply of parents of boys relative to girls (Taubman [1990]).

Parents' lifetime constraint sets may also differ by child gender if they expect more old age support from daughters relative to sons. It is often observed that women are more likely to care for elderly parents than are men, perhaps because the opportunity cost of women's time at the age at which parents need care is lower than the opportunity cost of men's time. However,

[15] These results are available from the authors upon request.

McGarry [1998] finds that men are less likely to care for elderly parents only if they have sisters, and that men with only male siblings are no less likely to care for parents than are women from female-only families. This implies that the labor supply effects of "at least one son" vs. "at least one daughter" would not be due to anticipated differences in old-age support.

Moreover, if the effects of children's gender are due only to pecuniary factors such as differential costs or old-age support from sons and daughters, we would expect to find some effects on women's outcomes, as well. This would be particularly true for an old-age support motive, as women are more likely to outlive their husbands and require care in old-age.

One additional way that children's may affect parents' constraints is through demonstration effects. Fathers or families may believe it is more important to model the traditional male role in society for sons than for daughters.

The alternative to a constraint explanation for fathers' responses to child gender is a preference explanation. If men prefer sons to daughters or value the time spent with sons more highly, then the value of marriage (or at least co-residence) with the child's mother will be higher for fathers of sons. Morgan *et al* [1988] find that the birth of a son relative to a daughter increases the likelihood that a marriage will survive by approximately 7 percentage points using data from the U.S. Census.[16] Reduced probability of marital dissolution will increase the returns to marriage-specific investments, and we would expect this to lead to greater specialization within the marriage. This is consistent with our finding that husbands work more in the labor market after a son is born relative to a daughter, but not with our finding of no differential increase in home production by mothers of sons.

[16] Their findings are supported by those of Mott [1994] and Katzev et al [1994], who use data from the NLSY and National Survey of Families and Households, respectively. Teachman and Schollaert [1989] find that women are likely to have a second child sooner when the first child is a son rather than a daughter, but this is attributed entirely to the reduced likelihood of marital dissolution due to the birth of the son.

We can also analyze the effects of child gender in the context of a bargaining model with a divorce threat point in which husbands and wives each allocate their resources to the production of household public goods and to private goods. If men prefer sons and divorce causes a reduction in the child services that fathers receive, they will contribute more to household public goods and less to their private consumption of leisure in a marriage with sons. Our labor supply results are consistent with this story, but the bargaining framework implies that child gender should affect the intrahousehold distribution of goods and time more generally. Yeung *et al* [1999] (and others) find that boys spend more time with fathers than do girls. This suggests that the increased in work intensity of men with sons is *not* at the expense of their contribution to the child-care component of household production, and is also consistent with the bargaining model.[17]

The theoretical models underlying the last two explanations are only relevant for two-parent families. We therefore have re-run the analyses for married and unmarried men, separately. These results are summarized in Table 8. We find that the boy vs. girl effects are larger, and generally more significant for married men. However, for unmarried men we find that the coefficients on the "boys" variables tend to be *smaller* than the coefficients on the "girls" variables. This suggests to us that selection bias is an issue when analyzing the data by fathers' marital status. In particular, since parents of boys are less likely to divorce than parents of girls, if

[17] The dependence of other family outcomes, including divorce, on the gender of children suggests a couple of ways in which the relationship between children's gender and labor supply and wages might be spurious. First, Korenman and Neumark [1991] show that the marriage premium increases with the duration of the marriage. If having sons relative to daughters increases the duration of a marriage, the gender effects may be proxying the effects of marriage duration. In Appendix Tables A.2.1 and A.2.2 we report the results of the analyses reported in Tables 6 and 7 when length of marriage, and its square, are included in the regressions. The findings on the gender effects change little. Second, Teachman and Schollaert's finding that having a son as a first child speeds the transition to having a second child would suggest that the effect of a first boy on labor market outcomes may be due to the fact that families with first sons are, on average, larger than families with first daughters. However, we found that including total number of children in the specifications including *FIRBOY/FIRGIRL* and *IFBOY/IFGIRL* did not affect the magnitude or significance of the results (Appendix Tables A.3.1 and A.3.2).

men with less favorable unobservables are more likely to divorce, then divorced fathers of boys are a more "negatively selected" pool than divorced fathers of girls.

VI. Conclusion

In this paper we have estimated the effects of children, both total and by gender, on men's labor supply and hourly wages. We find that fatherhood results in significantly higher wages and labor supply. We find that the relationship between children and labor market outcomes for fathers has changed; men born after 1950 have larger labor supply responses to children than do men from earlier cohorts. Also, the child effects are non-linear, with positive incremental effects on men's hours and wages limited to the first two children.

Most strikingly, we find that men's outcomes respond differently to the births of sons rather than daughters. For the earlier cohort, there is some evidence that both wages and hours are higher after having sons relative to daughters; for the later cohort, there are very strong and highly significant effects of sons vs. daughters on hours worked.

There are several implications of our findings. First, although the role of children is typically ignored in studies of male labor supply and wage determination, fatherhood has quantitatively and statistically significant effects on both outcomes. Second, since we observe increases in both hourly wages and annual hours of work for fathers, increased specialization of husbands and wives in response to parenthood is the dominant pattern for both early and late cohorts. Third, the increase in men's hourly wage rates suggests that additional research into the source of this "fatherhood premium" and its relationship to human capital investments, job changes, or promotions is warranted.

Finally, the increased commitment to the labor market that men demonstrate after having sons relative to daughters provides surprising evidence of the significance of child gender for

families in the United States. Since we did *not* find evidence of gender effects on mother's labor supply, it appears that the "first round" effects on household outcomes arise through the behavior of fathers, not mothers.[18] In conjunction with other research on the effects of child gender on divorce and father's time with children, our results suggest that sons increase the value of marriage and family life for men.

[18] This echoes the findings in the child development literature summarized by Maccoby [1998] that mothers' behavior towards sons and daughters tends to be more similar than that of fathers.

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Table 1: Means (Standard Deviations) of Key Variables

	Early Cohort (Born 1950 or Earlier)	Late Cohort (Born After 1950)
Log (Real Hourly Wage)	2.36* (0.61)	2.14** (0.63)
Annual Hours Worked	2248.07 (703.15)	2168.85 (717.41)
Years of Education	13.93 (2.42)	13.24 (2.08)
Age	34.18 (6.69)	28.44 (5.03)
Married?	0.895	0.806
Length of Marriage	9.07 (7.29)	4.85 (4.79)
Length of Marriage (If Married)	10.13 (6.97)	6.01 (4.64)
Number of Children	1.63 (1.17)	1.15 (1.15)
Number of Sons	0.87 (0.90)	0.58 (0.78)
Number of Daughters	0.76 (0.86)	0.57 (0.78)
After First Child Born (Son)	0.43	0.32
After First Child Born (Daughter)	0.36	0.30
If at Least One Son	0.58	0.43
If at Least One Daughter	0.53	0.41
Number of Observations	11248	14957

*Based on 11090 observations
**Based on 14665 observations

Table 2
Frequency Distribution: Number of Children
Number of Observations
(Percent of Sample)

	By Individual*Time		By Individual (Maximum Number per Individual)	
	Born 1950 or Earlier	Born After 1950	Born 1950 or Earlier	Born After 1950
No Children	2342 (20.82)	5749 (38.44)	70 (11.65)	560 (34.10)
One Child	2501 (22.24)	3548 (23.72)	86 (14.31)	317 (19.31)
Two Children	4062 (36.11)	3823 (25.56)	259 (43.09)	488 (29.72)
Three Children	1761 (15.66)	1398 (9.35)	129 (21.46)	207 (12.61)
Four Children	455 (4.05)	339 (2.27)	42 (6.99)	53 (3.23)
Five Children	109 (0.97)	82 (0.55)	12 (2.00)	15 (0.91)
Six Children	11 (0.10)	17 (0.11)	1 (0.17)	1 (0.06)
Seven Children	7 (0.06)	1 (0.01)	2 (0.33)	1 (0.06)
Total	11248 (100)	14957 (100)	601 (100)	1642 (100)

Table 3
Frequency Distribution of Sons and Daughters
Number of Observations
(Percent of Sample)

By Observation

	Born 1950 or Earlier	Born After 1950		Born 1950 or Earlier	Born After 1950
No Sons	4763 (42.35)	8533 (57.05)	No Daughters	5266 (46.82)	8756 (58.54)
One Son	3789 (33.69)	4460 (29.82)	One Daughter	3797 (33.76)	4241 (28.35)
Two Sons	2131 (18.95)	1671 (11.17)	Two Daughters	1819 (16.17)	1620 (10.83)
Three Sons	522 (4.64)	244 (1.63)	Three Daughters	311 (2.76)	312 (2.09)
Four Sons	43 (0.38)	45 (0.30)	Four Daughters	45 (0.40)	28 (0.19)
Five Sons	0	4 (0.03)	Five Daughters	9 (0.08)	0
Six Sons	0	0	Six Daughters	1 (0.01)	0
Total	11248 (100)	14957 (100)	Total	11248 (100)	14957 (100)

By Individual

	Born 1950 or Earlier	Born After 1950		Born 1950 or Earlier	Born After 1950
No Sons	195 (32)	867 (53)	No Daughters	216 (36)	878 (53)
One Son	216 (36)	495 (30)	One Daughter	226 (38)	484 (29)
Two Sons	142 (24)	232 (14)	Two Daughters	123 (20)	228 (14)
Three Sons	43 (7)	40 (2)	Three Daughters	29 (5)	46 (3)
Four Sons	5 (1)	7 (0)	Four Daughters	5 (1)	6 (.4)
Five Sons	0	1 (0)	Five Daughters	1 (0)	0 (0)
Six Sons	0	0	Six Daughters	1 (0)	0 (0)
Total	601 (100)	1642 (100)	Total	601 (100)	1642 (100)

Table 4a: The Effect of Marriage and Children on (Log Real Hourly) Wage
(Entire Sample)
(Additional regressors include: dummy variables for: year of observation, years of education, age)
(Standard errors in parentheses)
(N = 25755)

	(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Married	0.10 (0.023)	0.086 (0.023)	0.078 (0.023)	0.061 (0.013)	0.057 (0.013)	0.050 (0.013)
Number of Children (0 if None or > 4)		0.017 (0.010)			0.042 (0.006)	
(Exactly) One Child			0.020 (0.021)			0.071 (0.012)
(Exactly) Two Children			0.070 (0.026)			0.131 (0.014)
(Exactly) Three Children			0.073 (0.033)			0.125 (0.019)
(Exactly) Four Children			-0.04 (0.065)			0.114 (0.028)
More than 4 Children		-0.157 (0.138)	-0.141 (0.137)		0.088 (0.050)	0.087 (0.050)
Two Children - One Child			*0.05 (0.022)*			*0.060 (0.011)*
Three Children - Two Children			*0.003 (0.03)*			*-0.006 (0.015)*
Four Children - Three Children			*-0.113 (0.062)*			*-0.011 (0.025)*
R-squared	0.16	0.17	0.17	0.59	0.59	0.59

Table 4b: The Effect of Marriage and Children on (Log Real Hourly) Wage
(By Cohort)

(Additional regressors include: dummy variables for: year of observation, years of education, age)
(Standard errors in parentheses)

Cohort (N)		(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Born 1950 or Earlier (11090)	Married	0.153 (0.049)	0.146 (0.047)	0.134 (0.047)	0.084 (0.020)	0.076 (0.020)	0.067 (0.020)
	Number of Children (0 if None or > 4)		0.008 (0.018)			0.043 (0.008)	
	(Exactly) One Child			0.019 (0.043)			0.097 (0.019)
	(Exactly) Two Children			0.076 (0.048)			0.181 (0.021)
	(Exactly) Three Children			0.064 (0.057)			0.136 (0.029)
	(Exactly) Four Children			-0.105 (-0.102)			0.085 (0.040)
	More than 4 Children		0.040 (0.136)	0.072 (0.137)		0.127 (0.068)	0.137 (0.068)
	Two Children - One Child			*0.057 (0.036)*			*0.084 (0.016)*
	Three Children – Two Children			*-0.012 (0.045)*			*-0.045 (0.020)*
	Four Children - Three Children			*-0.169 (0.091)*			*-0.051 (0.032)*
	R-squared	0.13	0.13	0.13	0.55	0.56	0.56
Born After 1950 (14665)	Married	0.070 (0.025)	0.048 (0.025)	0.044 (0.026)	0.048 (0.016)	0.045 (0.016)	0.042 (0.017)
	Number of Children (0 if None or > 4)		0.028 (0.011)			0.044 (0.008)	
	(Exactly) One Child			0.030 (0.023)			0.057 (0.015)
	(Exactly) Two Children			0.075 (0.029)			0.099 (0.018)
	(Exactly) Three Children			0.089 (0.040)			0.127 (0.026)
	(Exactly) Four Children			0.057 (0.073)			0.173 (0.041)
	More than 4 Children		-0.438 (0.189)	-0.431 (0.188)		0.050 (0.073)	0.052 (0.073)
	Two Children - One Child			*0.045 (0.025)*			*0.042 (0.014)*
	Three Children – Two Children			*0.014 (0.035)*			*0.028 (0.019)*
	Four Children - Three Children			*-0.032 (0.073)*			*0.046 (0.036)*
	R-squared	0.16	0.16	0.16	0.60	0.60	0.60

Table 5a: The Effect of Marriage and Children on Annual Hours Worked
(Entire Sample)
(Additional regressors include: dummy variables for: year of observation, years of education, age)
(Standard errors in parentheses)
(N = 26205)

	(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Married	200.679 (24.560)	160.945 (24.645)	148.516 (24.892)	115.325 (16.327)	111.264 (16.335)	103.686 (16.470)
Number of Children (0 if None or > 4)		45.86 (10.245)			38.416 (7.266)	
(Exactly) One Child			68.297 (22.983)			82.023 (14.849)
(Exactly) Two Children			138.562 (25.595)			108.165 (17.729)
(Exactly) Three Children			138.922 (34.375)			113.230 (24.544)
(Exactly) Four Children			126.268 (66.625)			152.212 (36.551)
More than 4 Children		-57.497 (133.137)	-34.916 (132.643)		38.074 (62.147)	49.624 (62.319)
Two Children - One Child			*70.265 (24.215)*			*26.142 (13.554)*
Three Children – Two Children			*0.360 (30)*			*5.065 (17.907)*
Four Children - Three Children			*-12.654 (63.27)*			*38.982 (31.111)*
R-squared	0.04	0.04	0.04	0.45	0.45	0.45

Table 5b: The Effect of Marriage and Children on Annual Hours Worked
(By Cohort)
(Additional regressors include: dummy variables for: year of observation, years of education, age)
(Standard errors in parentheses)

Cohort (N)		(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Born 1950 or Earlier (11248)	Married	173.946 (38.702)	132.761 (39.310)	110.868 (39.260)	89.157 (26.179)	84.924 (26.249)	75.778 (26.351)
	Number of Children		45.183 (16.578)			25.850 (10.955)	
	One Child			111.941 (39.98)			102.453 (24.218)
	Two Children			174.566 (41.668)			102.874 (27.633)
	Three Children			137.205 (52.801)			100.369 (37.350)
	Four Children			184.275 (102.62)			91.639 (51.857)
	More than 4 Children		19.678 (186.82)	70.617 (185.85)		8.746 (86.607)	32.131 (86.864)
	Two Children - One Child			*62.625 (39.141)*			*0.421 (21.2)*
	Three Children – Two Children			*-37.361 (45.644)*			*-2.505 (25.05)*
	Four Children - Three Children			*47.07 (98.148)*			*-8.73 (43.65)*
	R-squared	0.03	0.03	0.04	0.41	0.42	0.42
Born After 1950 (14957)	Married	219.089 (31.169)	179.695 (30.968)	175.617 (31.743)	132.115 (21.002)	128.610 (20.991)	124.346 (21.247)
	Number of Children		46.971 (12.842)			52.556 (9.776)	
	One Child			41.381 (27.63)			72.455 (18.821)
	Two Children			120.189 (31.699)			121.436 (23.201)
	Three Children			157.128 (45.437)			138.084 (32.851)
	Four Children			78.916 (78.028)			240.877 (52.599)
	More than 4 Children		-184.61 (205.32)	-177.16 (205.05)		73.246 (90.024)	82.482 (90.374)
	Two Children - One Child			*78.808 (29.431*			*48.981 (17.732)*
	Three Children – Two Children			*36.939 (39.603)*			*16.648 (24.284)*
	Four Children - Three Children			*-78.212 (77.065)*			*102.793 (46.109)*
	R-squared	0.04	0.05	0.05	0.48	0.48	0.48

Table 6: The Effect of Sons vs. Daughters on (Log Real Hourly) Wage

(Additional regressors include: dummy variables for: marital status, years of education, age)
(Fixed effects estimates, standard errors in parentheses)

Equation Number		(1) Full Sample	(2) Born 1950 or Earlier	(3) Born After 1950
(4)	Number of Boys (0 if None, or > 3)	0.037 (0.008)	0.048 (0.011)	0.027 (0.010)
	Number of Girls (0 if None, or > 3)	0.030 (0.008)	0.018 (0.011)	0.044 (0.010)
	Number of Boys - Number of Girls	*0.007* *(0011)*	*0.030* *(0.016)*	*-0.017* *(0.014)*
	If More Than 3 Boys or More Than 3 Girls	-.035 (.051)	.091 (.072)	-.175 (.073)
(5)	If at Least One Boy (0 if No Sons Yet)	0.051 (0.011)	0.084 (0.018)	0.030 (0.015)
	If at Least One (0 if No Daughter Yet)	0.056 (0.011)	0.055 (0.018)	0.059 (0.015)
	If at Least One Boy - If at Least One Girl	*-0.005* *(0.016)*	*0.029* *(0.026)*	*-0.029* *(0.022)*
(6)	After First Child, Boy (0 if No Child, or First Child Girl)	0.091 (0.014)	0.151 (0.023)	0.052 (0.018)
	After First Child, Girl (0 if No Child, or First Child Boy)	0.080 (0.015)	0.098 (0.024)	0.074 (0.019)
	After First Child Boy - After First Child Girl	*0.011* *(0.019)*	*0.053* *(0.030)*	*-0.022* *(0.024)*
(7)	(Exactly) One Boy	0.050 (0.011)	0.075 (0.018)	0.033 (0.015)
	(Exactly) One Girl	0.050 (0.012)	0.053 (0.018)	0.052 (0.015)
	One Boy – One Girl	*-.0002* *(0.011)*	*0.022* *(0.027)*	*-0.019* *(0.022)*
	(Exactly) Two Boys	0.10 (0.017)	0.120 (0.025)	0.085 (0.023)
	(Exactly) Two Girls	0.088 (0.017)	0.075 (0.026)	0.105 (0.023)
	Two Boys – Two Girls	*0.012* *(0.022)*	*0.045* *(0.035)*	*-0.02* *(0.032)*
	(Exactly) Three Boys	0.115 (0.030)	0.103 (0.040)	0.136 (0.045)
	(Exactly) Three Girls	0.024 (0.030)	-0.039 (0.043)	0.111 (0.042)
	Three Boys – Three Girls	*0.091* *(0.040)*	*0.142* *(0.056)*	*0.025* *(0.059)*
	If More Than 3 Boys or More Than 3 Girls	.031 (.052)	.146 (.073)	-.10 (.074)

Table 7: The Effect of Sons vs. Daughters on Annual Hours Worked

(Additional regressors include: dummy variables for: marital status, years of education, age)
(Fixed effects estimates; standard errors in parentheses)

Equation Number		(1) Full Sample	(2) Born 1950 or Earlier	(3) Born After 1950
(4)	Number of Boys (0 if None, or > 3)	36.477 (9.663)	4.101 (14.513)	66.013 (12.997)
	Number of Girls (0 if None, or > 3)	25.063 (9.773)	30.121 (14.691)	26.010 (13.148)
	Number of Boys - Number of Girls	*11.414* *(13.452)*	*-26.02* *(20.380)*	*40.003* *(18.016)*
	If More Than 3 Boys or More Than 3 Girls	-41.658 (64.389)	-93.327 (91.693)	12.815 (91.304)
(5)	If at Least One Boy (0 if No Sons Yet)	81.451 (14.76)	67.973 (23.360)	95.462 (18.928)
	If at Least One (0 if No Daughter Yet)	28.570 (14.704)	43.127 (23.360)	22.140 (18.975)
	If at Least One Boy - If at Least One Girl	*52.881* *(21.481)*	*24.846* *(34.791)*	*73.322* *(27.383)*
(6)	After First Child, Boy (0 if No Child, or First Child Girl)	118.405 (18.543)	129.375 (29.975)	111.754 (23.599)
	After First Child, Girl (0 if No Child, or First Child Boy)	53.650 (19.193)	75.206 (31.078)	42.832 (24.429)
	After First Child Boy - After First Child Girl	*64.755* *(24.354)*	*54.169* *(39.402)*	*68.922* *(31.009)*
(7)	(Exactly) One Boy	85.591 (14.806)	85.125 (23.832)	93.356 (18.991)
	(Exactly) One Girl	22.517 (14.851)	25.020 (23.760)	25.172 (19.123)
	One Boy – One Girl	*63.074* *(21.634)*	*60.105* *(35.114)*	*68.184* *(27.562)*
	(Exactly) Two Boys	81.582 (21.414)	52.194 (31.985)	114.162 (29.168)
	(Exactly) Two Girls	54.743 (22.042)	67.999 (33.196)	51.885 (29.612)
	Two Boys – Two Girls	*26.839* *(29.460)*	*-15.805* *(45.625)*	*62.277* *(39.466)*
	(Exactly) Three Boys	99.830 (37.997)	21.480 (52.158)	206.652 (57.288)
	(Exactly) Three Girls	65.839 (38.530)	65.223 (56.197)	89.574 (53.255)
	Three Boys – Three Girls	*33.991* *(51.243)*	*-43.743* *(71.913)*	*117.078* *(74.952)*
	If More Than 3 Boys or More Than 3 Girls	21.163 (65.424)	-82.059 (92.80)	136.443 (93.361)

Table 8: The Effects of Sons vs. Daughters on Wages and Hours
Married Men vs. Unmarried Men
(Additional regressors include: dummy variables for years of education, age)
(Fixed effects estimates; standard errors in parentheses)

			Married			Not Married		
Dependent Variable	Eq. No.	Difference in Coefficients	Full Sample	Early Cohort	Late Cohort	Full Sample	Early Cohort	Late Cohort
Log Real Wage Rate	(4)	Number of Boy – Number of Girls	.021 (.011)	.025 (.016)	.012 (.015)	-.22 (.071)	-.064 (.129)	-.335 (.089)
	(5)	If At Least One Boy – If At Least One Girl	.024 (.018)	.040 (.028)	.012 (.021)	-.024 (.097)	-.143 (.174)	-.362 (.12)
	(6)	After First Child Boy – After First Child Girl	.062 (.021)	.062 (.033)	.054 (.026)	-.25 (.091)	-.066 (.16)	-.40 (.115)
	(7)	One Boy – One Girl	.030 (.017)	.042 (.028)	.019 (.023)	-.180 (.101)	-.124 (.185)	-.224 (.125)
		Two Boys – Two Girls	.049 (.024)	.050 (.035)	.042 (.032)	-.734 (.17)	-.388 (.412)	-.722 (.21)
		Three Boys – Three Girls	.129 (.041)	.139 (.056)	.095 (.060)	-.420 (.35)	-.180 (.619	-1.17 (.58)
		Sample Size (N)	21803	9927	11876	3952	1163	2789
Annual Hours of Work	(4)	Number of Boy – Number of Girls	17.7 (13.9)	-8.71 (21.1)	39.1 (18.5)	33.3 (97.5)	96.3 (165)	7.09 (129)
	(5)	If At Least One Boy – If At Least One Girl	58.1 (22.2)	42.6 (36.1)	72.5 (28.1)	103.05 (134)	238.4 (221)	58.6 (172)
	(6)	After First Child Boy – After First Child Girl	63.3 (26.2)	70.4 (42.5)	57.1 (33.2)	71.2 (127)	258.6 (205)	-36.9 (167)
	(7)	One Boy – One Girl	64.8 (22.2)	69.9 (36.3)	65.5 (28.2)	139.2 (140)	456 (236)	45.4 (181)
		Two Boys – Two Girls	37.1 (30.3)	15.3 (46.3)	56.4 (40.3)	23.55 (228)	-45 (531)	-66.5 (301)
		Three Boys – Three Girls	47.5 (51.9)	-8.42 (84.4)	125.9 (74.5)	204.2 (484)	929 (802)	400 (799)
		Sample Size (N)	22140	10072	12068	4065	1176	2889

Appendix Table A.1.1: The Effect of Children on (Log Real Hourly) Wage

(Additional regressors include: dummy variables for: year of observation, years of education, age, if married)
(Standard errors in parentheses)

Cohort (N)		(1) OLS	(2) OLS	(3) FE	(4) FE
All (25755)	Number of Children	0.01 (0.01)		0.037 (0.005)	
	One Child		0.020 (0.021)		0.071 (0.012)
	Two Children		0.070 (0.026)		0.131 (0.014)
	Three Children		0.073 (0.033)		0.126 (0.019)
	Four Children		-0.040 (0.065)		0.114 (0.028)
	Five Children		-0.071 (0.125)		0.167 (0.053)
	Six Children		-0.484 (0.511)		-0.221 (0.109)
	Seven Children		-0.685 (0.375)		-0.434 (0.197)
Early (11090)	Number of Children	0.007 (0.017)		0.037 (0.008)	
	One Child		0.019 (0.043)		0.097 (0.019)
	Two Children		0.076 (0.048)		0.182 (0.021)
	Three Children		0.064 (0.057)		0.138 (0.029)
	Four Children		-0.105 (0.102)		0.088 (0.040)
	Five Children		0.123 (0.138)		0.196 (0.073)
	Six Children		0.014 (0.227)		0.048 (0.157)
	Seven Children		-0.687 (0.379)		-0.374 (0.198)
Late (14665)	Number of Children	0.014 (0.013)		0.039 (0.008)	
	One Child		0.030 (0.024)		0.057 (0.015)
	Two Children		0.074 (0.029)		0.098 (0.018)
	Three Children		0.088 (0.040)		0.127 (0.026)
	Four Children		0.056 (0.073)		0.167 (0.041)
	Five Children		-0.354 (0.136)		0.151 (0.079)
	Six Children		-0.798 (0.710)		-0.40 (0.152)
	Seven Children		0.0 (0.0)		0.0 (0.0)

Appendix Table A.1.2: The Effect of Children on Annual Hours Worked

(Additional regressors include: dummy variables for: year of observation, years of education, age, if married)
(Standard errors in parentheses)

Cohort (N)		(1) OLS	(2) OLS	(3) FE	(4) FE
All (26205)	Number of Children	37.321 (10.557)		32.869 (7.055)	
	One Child		68.431 (22.983)		82.014 (14.849)
	Two Children		138.784 (25.596)		108.044 (17.729)
	Three Children		139.198 (34.375)		113.505 (24.545)
	Four Children		126.569 (66.627)		151.424 (36.558)
	Five Children		-28.354 (131.40)		96.996 (66.782)
	Six Children		-241.498 (391.595)		-168.659 (140.288)
	Seven Children		542.48 (443.952)		-111.059 (225.275)
Early (11248)	Number of Children	39.084 (16.405)		21.429 (10.486)	
	One Child		111.625 (39.975)		102.335 (24.223)
	Two Children		174.402 (41.648)		102.776 (27.637)
	Three Children		136.768 (52.799)		99.997 (37.364)
	Four Children		184.436 (102.632)		90.991 (51.881)
	Five Children		-11.553 (184.471)		21.903 (93.366)
	Six Children		320.331 (345.975)		30.671 (206.745)
	Seven Children		927.751 (108.740)		141.281 (247.532)
Late (14957)	Number of Children	35.494 (13.709)		46.496 (9.606)	
	One Child		41.198 (27.631)		71.735 (18.815)
	Two Children		119.703 (31.685)		120.177 (23.195)
	Three Children		156.065 (45.410)		136.872 (32.841)
	Four Children		78.182 (78.217)		233.055 (52.635)
	Five Children		-80.628 (216.475)		179.564 (96.554)
	Six Children		-565.50 (449.038)		-361.981 (194.292)
	Seven Children		-1903.692 (119.201)		-1514.531 (582.496)

Appendix Table A.2.1: The Effect of Sons vs. Daughters on (Log Real Hourly) Wage

(Additional regressors include: dummy variables for years of education, age, if married)

(Fixed effects estimates, standard errors in parentheses)

Cohort		(1) FE	(2) FE	(3) FE	(4) FE
All (25755)	Length of Marriage	0.012 (0.002)	0.012 (0.002)	0.012 (0.002)	0.010 (0.002)
	(Length of Marriage)^2	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
	Number of Boys - Number of Girls	*0.008 (0.011)*			
	If at Least One Boy - If at Least One Girl		*-0.004 (0.016)*		
	After First Child Boy - After First Child Girl			*0.011 (0.018)*	
	One Boy – One Girl				*0.001 (.017)*
	Two Boys – Two Girls				*0.011 (0.022)*
	Three Boys – Three Girls				*0.096 (0.040)*
Early (11090)	Length of Marriage	0.013 (0.003)	0.013 (0.003)	0.012 (0.003)	0.013 (0.003)
	(Length of Marriage)^{2a}	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
	Number of Boys - Number of Girls	*0.032 (0.016)*			
	If at Least One Boy - If at Least One Girl		*0.032 (0.026)*		
	After First Child Boy - After First Child Girl			*0.054 (0.030)*	
	One Boy – One Girl				*0.024 (0.027)*
	Two Boys – Two Girls				*0.043 (0.034)*
	Three Boys – Three Girls				*0.152 (0.055)*
Late (14665)	Length of Marriage	0.016 (0.004)	0.017 (0.004)	0.018 (0.004)	0.014 (0.004)
	(Length of Marriage)^2	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)	-0.001 (0.000)
	Number of Boys - Number of Girls	*-0.016 (0.014)*			
	If at Least One Boy - If at Least One Girl		*-0.028 (0.021)*		
	After First Child Boy - After First Child Girl			*-0.023 (0.024)*	
`	*One Boy – One Girl*				*-0.019 (0.022)*
	Two Boys – Two Girls				*-0.014 (0.029)*
	Three Boys – Three Girls				*0.024 (0.058)*

Appendix Table A.2.2: The Effect of Sons vs. Daughters on Annual Hours of Work

(Additional regressors include: dummy variables for years of education, age, if married)
(Fixed effects estimates, standard errors in parentheses)

Cohort		(1) FE	(2) FE	(3) FE	(4) FE
All (26205)	Length of Marriage	3.222	2.999	3.209	2.558
		(2.627)	(2.581)	(2.545)	(2.642)
	(Length of Marriage)^2	-0.173	-0.149	-0.143	-0.137
		(0.111)	(0.111)	(0.110)	(0.112)
	Number of Boys - Number of Girls	*11.552*			
		(13.521)			
	If at Least One Boy - If at Least One Girl		*53.047*		
			(21.478)		
	After First Child Boy - After First Child Girl			*64.489*	
				(24.375)	
	One Boy – One Girl				*63.257*
					(21.633)
	Two Boys – Two Girls				*26.465*
					(29.589)
	Three Boys – Three Girls				*35.048*
					(51.695)
Early (11248)	Length of Marriage	4.873	3.492	3.267	3.772
		(3.414)	(3.350)	(3.312)	(3.424)
	(Length of Marriage)^2	-0.239	-0.183	-0.167	-0.192
		(0.131)	(0.130)	(0.129)	(0.132)
	Number of Boys - Number of Girls	*-25.261*			
		(20.192)			
	If at Least One Boy - If at Least One Girl		*25.821*		
			(34.817)		
	After First Child Boy - After First Child Girl			*54.91*	
				(39.423)	
	One Boy – One Girl				*60.885*
					(35.094)
	Two Boys – Two Girls				*-16.404*
					(45.497)
	Three Boys – Three Girls				*-40.125*
					(72.067)
Late (14957)	Length of Marriage	3.049	4.372	4.847	2.912
		(4.721)	(4.666)	(4.629)	(4.768)
	(Length of Marriage)^2	-0.125	-0.145	-0.124	-0.112
		(0.260)	(0.261)	(0.262)	(0.263)
	Number of Boys - Number of Girls	*39.793*			
		(18.032)			
	If at Least One Boy - If at Least One Girl		*73.107*		
			(27.379)		
	After First Child Boy - After First Child Girl			*67.831*	
				(30.993)	
	One Boy – One Girl				*68.214*
					(27.574)
	Two Boys – Two Girls				*61.8*
					(39.483)
	Three Boys – Three Girls				*116.277*
					(74.901)

Appendix Table A.3.1: The Effect of Sons vs. Daughters on (Log Real Hourly) Wage Controlling for Number of Children

(Additional regressors include: dummy variables for years of education, age)
(Fixed effects estimates, standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Cohort	All	All	Early	Early	Late	Late
If at Least One Boy	0.006		0.040		-0.017	
	(0.015)		(0.023)		(0.020)	
If at Least One Girl	0.010		0.013		0.012	
	(0.015)		(0.023)		(0.020)	
If at Least One Boy - If at Least One Girl	*-0.004*		*0.027*		*-0.029*	
	(0.015)		*(0.026)*		*(0.021)*	
After First Child, Boy		0.049		0.109		0.012
		(0.017)		(0.027)		(0.022)
After First Child, Girl		0.039		0.057		0.033
		(0.017)		(0.028)		(0.022)
After First Child Boy - After First Child Girl		*0.010*		*0.052*		*-0.021*
		(0.018)		*(0.030)*		*(0.025)*
Number of Children, if < 4 Children (else = 0)	0.045	0.035	0.043	0.031	0.047	0.037
	(0.010)	(0.008)	(0.014)	(0.012)	(0.013)	(0.010)
If 4 or More Children	0.090	0.070	0.038	0.015	0.158	0.134
	(0.035)	(0.029)	(0.050)	(0.042)	(0.049)	(0.042)

Appendix Table A.3.2: The Effect of Sons vs. Daughters on Annual Hours of Work Controlling for Number of Children

(Additional regressors include: dummy variables for years of education, age)
(Fixed effects estimates, standard errors in parentheses)

	(1)	(2)	(3)	(4)	(5)	(6)
Cohort	All	All	Early	Early	Late	Late
If at Least One Boy	59.814		68.037		52.631	
	(19.352)		(30.355)		(25.239)	
If at Least One Girl	6.587		44.995		-18.887	
	(19.445)		(30.517)		(25.346)	
If at Least One Boy - If at Least One Girl	*53.227*		*23.042*		*71.518*	
	(21.481)		*(34.737)*		*(27.426)*	
After First Child, Boy		97.319		130.709		72.037
		(21.985)		(35.780)		(27.928)
After First Child, Girl		33.150		75.677		1.341
		(22.438)		(35.966)		(28.805)
After First Child Boy - After First Child Girl		*65.169*		*55.032*		*70.696*
		(24.738)		*(39.793)*		*(30.972)*
Number of Children, if < 4 Children (else = 0)	21.157	18.322	0.150	-1.345	41.204	38.392
	(12.277)	(9.861)	(18.430)	(15.088)	(16.510)	(13.132)
If 4 or More Children	65.082	70.246	-37.378	-24.622	174.377	181.949
	(44.785)	(37.803)	(65.279)	(54.466)	(62.602)	(53.748)