Work and Family:
Marriage, Children, Child Gender and the Work Hours and Earnings of West German Men

Hyung-Jai Choi
Jutta M. Joesch
Shelly Lundberg

September 2005

I Z A

Work and Family: Marriage, Children, Child Gender and the Work Hours and Earnings of West German Men

Hyung-Jai Choi
University of Washington

Jutta M. Joesch
Battelle Centers for Public Health Research and Evaluation

Shelly Lundberg
*University of Washington
and IZA Bonn*

ABSTRACT

Work and Family: Marriage, Children, Child Gender and the Work Hours and Earnings of West German Men[*]

We find a strong association between family status and labor market outcomes for recent cohorts of West German men in the German Socio-Economic Panel. Living with a partner and living with a child both have substantial positive effects on earnings and work hours. These effects persist in fixed effects models that control for correlation in time-invariant unobservables that affect both family and work outcomes. Child gender also matters—a first son increases fathers' work hours by 100 hours per year more than a first daughter. There is evidence of son "preference" in the probability that a German man is observed to be coresiding with a son or a daughter. Men are more likely to remain in the same household with a male child than a female child and girls are underrepresented in the raw data. Controlling for selective attrition in our labor supply model reveals that men who remain with female children are strongly positively selected (in terms of their work hours) relative to men who remain with male children.

JEL Classification: J22, J12, J13, J16

Keywords: child gender, fatherhood, labor supply, family

Corresponding author:

Shelly Lundberg
Department of Economics
Box 353330
University of Washington
Seattle, WA 98195-3330
USA
Email: lundberg@u.washington.edu

1. Introduction

Interactions between a woman's employment and earnings and her marital status and parenthood have been a central theme in economic analyses of female labor market outcomes. A woman's roles as wife and mother clearly impinge on her role as a worker—influencing both the cost of time devoted to market work and the value of income generated by that work. Fertility and marriage decisions depend, in turn, on the earnings opportunities of a woman and on those of her partner or potential partner. The interdependence of work and family decisions for men have received less attention, but this is changing as fertility rates fall, marriages occur later in life and end more frequently, and gender roles become more equal in developed countries. As men's family status becomes more variable and more transitory, the co-determination of partnership and parenting with employment and earnings becomes a more interesting empirical issue (Lundberg, 2005a). A longstanding literature on the "marriage premium" in men's wages has explored one dimension of this simultaneity. However, only a few studies examine the effects of fatherhood or family on men's labor supply (Lundberg and Rose, 2002; Lundberg, 2005b). In this paper we use longitudinal data to estimate the relationship between the work hours and earnings of recent cohorts of West German men and their family situation—whether they are living with a partner, how many children they have, and whether they have sons or daughters.

Since the 1970s, the former West Germany has experienced demographic changes and changes in the economic roles of men and women that are similar to those in most of the developed world—declining fertility, delayed marriage, and increases in women's employment. While employment, and particularly full-time employment, of German mothers with young children has lagged behind that in many other countries, the overall employment rates of women have been rising (Bundeszentrale für Politische Bildung, 2004a). For men, the average age at first marriage has increased from 25.3 years in the mid 1970s to 32 years in 2003 (Statistisches Bundesamt Deutschland, 2005; 2001), and the average number of births per woman aged 15 to 45 has decreased from 2.2 in 1970 to 1.4 in 2000 (Bundeszentrale für Politische Bildung, 2004b). These trends indicate a substantial change in the lifetime family responsibilities of young German men—more of

their "prime-age" years will be spent without a spouse or dependent child, and many of them will share the income-earning role with their partner.

Is the labor market behavior of West German men affected by their family status? We use longitudinal data from the German Socio-Economic Panel Study to estimate individual fixed effects models of earnings and annual work hours for men. We find that living with a partner is associated with substantially higher earnings and work hours for male household heads born in 1950 or later, as is the presence of children in a man's household. A comparison of models with and without fixed effects suggests positive selection of men into marriage. Although our estimates control for correlations between time-invariant unobservables that may affect family status and employment, we cannot rule out reverse causality because a man's co-residence decisions may be affected by shocks to his labor market prospects.

Child gender at birth, however, may reasonably be considered to be exogenous with respect to labor market outcomes, and a number of recent studies have found that sons and daughters have different effects on parental behavior (Lundberg, in press). When we distinguish between the effects of sons and daughters on a man's earnings and work hours, two interesting results emerge. First, a first son appears to have a significantly more positive effect on the father's work hours than does a first daughter. This finding is consistent with the results of Lundberg and Rose (2002), who found positive effects of sons on the labor supply of American men. However, like Lang (2005), we do not find significantly different effects of sons and daughters on men's earnings. Second, the presence of boys versus girls in a man's household is endogenous with respect to his labor supply behavior. Girls are significantly more likely to "disappear" from the man's household, and when we replace indicators of co-resident boys and girls with variables that reflect children ever reported to have been in the man's household (thus reducing the effects of paternal self-selection), the positive relative effect of boys on men's labor supply is increased.

3

2. Work-Family Interactions for Men

2.1. "Returns" to Marriage

A man's marital status is strongly correlated with his labor market outcomes: married men earn more, work harder, and are more stable employees than unmarried men (Akerlof, 1998; Schoeni, 1995). Married men are also less likely to participate in illegal and unhealthy activities that inhibit long-term labor market success, such as abusing drugs and alcohol (Akerlof, 1998; Waite and Gallagher, 2000). Cross-sectional correlations between marital status and these outcomes are often interpreted as causal "effects" of marriage, but social scientists understand that the OLS coefficient on a "married" dummy variable in an earnings equation is likely to be a biased estimate of such an effect. This bias is due to both selection and endogeneity: the unobserved attributes of men who marry are different from those who do not, and current marital status reflects choices that may depend on earnings opportunities and that are made simultaneously with decisions about work hours.[1]

Why should marriage increase men's work effort and earnings? The standard explanation of the marriage effect emphasizes the direct impact of a wife on her husband's behavior and productivity. A woman, it is argued, improves her spouse's health and productivity by monitoring and controlling his behavior, including reducing his participation in risky activities. Akerlof (1998), on the other hand, argues that changes in behavior coincident with marriage result from a change in the individual's own utility function: marriage is the cue for the adoption of a new, more responsible and domestic, identity. In both cases, the change in men's labor market outcomes with marriage is due to a change in the household's collective preferences, somehow defined. An alternative explanation for the marriage effect focuses on constraints, and is based on the Beckerian view of marriage as an opportunity for two individuals to pool resources and to reap the benefits of specialization and exchange. Given gender differences in the returns to market and home work, increased specialization generally takes the form of an increase in men's work hours and a decrease in women's.[2] Married men's productivity,

---

[1] These issues are discussed in detail in Ribar (2004) and Lundberg (2005a).
[2] The impact of marriage on work hours in a collective household model is presented formally in Lundberg

4

and therefore their hourly wages and earnings, increase because they devote additional time and energy to market work, relieved of household responsibilities by their wives.[3]

Identifying the true effects of marriage on men's work hours and wages is a difficult task. Both supply and demand factors in the marriage market will lead more productive and hard-working men to sort into marriage. Men who are articulate and responsible will be more attractive to employers, and also more attractive to potential spouses. Men who are hard working and stable employees may also find marriage more congenial than single life (perhaps because they are risk-averse, or conventional). Therefore, married men will have unobserved characteristics that are positively correlated with earnings and work hours, and these unobservables will impart an upward bias to the coefficient on marriage.

To the extent that these characteristics are constant over time, the causal impact of marriage can be identified with a fixed effects model using individual panel data, that is, by observing changes in a man's earnings or hours when his marital status changes. Fixed effects estimates of the so-called "marriage premium" in men's wage rates and earnings are surveyed in Ribar (2004). All studies he cites find a positive and significant effect of marriage on men's hourly wage. The interpretation of the fixed effects coefficient on marriage as the true effect of marriage, however, rests on the assumption that changes in marital status can be taken as exogenous with respect to the unobservable determinants of wages or work hours. If family status and work effort are determined simultaneously in response to changing labor market conditions and other constraints, then the fixed effects coefficient may be biased as well.

2.2. Son Preference and Parental Responses to Child Gender

Estimating the causal impact of children on the labor market outcomes of their parents presents methodological issues similar to those affecting the "marriage premium" literature. The presence of children, particularly young children, has a strong negative association with the work hours and earnings of mothers (Waldfogel, 1998), and a weak positive or no significant association with the work hours and earnings of fathers (eg.

_____

(2005a).

[3] Some researchers argue that there are also direct spillover effects of a wife's human capital on her husband's productivity (Benham, 1974; Jepson, in press; Mamun, 2004).

Pencavel, 1986; Blomquist and Hansson-Brusewitz, 1990; van Soest et al., 1990)[4] However, issues of selection into parenthood and the endogeneity of fertility or fertility timing make a causal interpretation of these correlations unwise (Browning, 1992).

Theoretically, the average impact of a child on her father's work hours is ambiguous. Children place additional demands on household time and money, and their effects on their mother's and father's labor supply depends on the parents' relative market returns to their time and on the prices and substitutability of purchased inputs and parental time in child "production". With a gender gap in market wages, we expect that when an additional child is born, her mother will be less likely to work in the market, while her father will increase his work hours.

Several recent studies by economists, building on a substantial literature in sociology and developmental psychology, have found that the gender of children has wide-ranging and significant impacts on parental behavior in the United States. The birth of a son, rather than a daughter, is associated with greater marital stability, a higher probability of marriage following a nonmarital birth, and changes in parental time allocation.[5]

At present, it is not clear why the birth of a son, rather than a daughter, affects parental behavior in countries where son preference is not believed to be prevalent, such as the U. S. The estimated impacts of sons and daughters on family structure are consistent with a positive effect of sons on marital surplus—either because fathers prefer sons, making divorce or separation more costly, or because paternal time is believed to be more productive in generating high-quality sons. These mechanisms will both increase relationship stability, but can be expected to have different effects on father's work time. If sons increase the expected duration of marriage, then parents may have a greater incentive to engage in traditional gender specialization and the father's work hours will increase. Conversely, if sons increase marital surplus because a father's time with a male child is more productive than his time with a female child, then a man's work hours could decrease relatively more following the birth of a son instead of a daughter, because the marginal value of his childcare time increases.

---

[4] However, Carlin and Flood (1997) find a negative effect of children on the work hours of Swedish fathers when they use time diary data rather than survey data to measure hours.
[5] These studies are surveyed in Lundberg (in press).

6

Studies examining the effects of sons and daughters on the labor supply of U.S. fathers have yielded inconsistent results. Lundberg and Rose (2002), using the Panel Study of Income Dynamics, find that sons have a substantially larger positive effect on men's work hours than do daughters. Lundberg (2005b), however, finds that child gender effects on the work hours of new parents vary by education level. Highly educated fathers of sons in the National Longitudinal Survey of Youth, 1979 work less than fathers of daughters, while less educated fathers of sons work more. The former result is replicated in the 2003 American Time Use Survey—fathers of young sons with more than a college degree work less than fathers of young daughters. They also spend more time in childcare.

In Germany, as in most developed countries, there is little overt evidence of son preference. Hank and Kohler (2000) examine sex preferences for children using both the reports of parents in the German Social Survey concerning the desired sex of first and additional children, and the influence of the sex of previous children on both intended and actual parity progression. They find a strong stated preference for at least one child of each sex, though education is correlated with a preference for daughters, and the young were more likely to prefer sons. The actual behavior of German parents is consistent with some son preference, however. Parents with a first-born son are significantly less likely to have a second child than parents of a first-born daughter, though no sex preference is apparent at higher parities.

3. Data and Methods

The data used in this paper are from the German Socio-Economic Panel Study (SOEP) cross-national equivalent file available through Cornell University (Lillard, 2004). The SOEP is a panel survey that has been collecting representative micro-data in Germany since 1984 to measure stability and change in living conditions. A set of core questions is asked every year, including questions on household composition, labor market and occupational dynamics, and earnings.

3.1. Sample

Until 1990, the SOEP was comprised of two samples. Sample A consists of persons residing in private households in the former West Germany and whose household head does not belong to the main foreigner groups of "guestworkers". Sample B covers persons in private households whose household head is from Greece, Italy, Spain, Turkey or the former Yugoslavia. In later years, additional samples were added to the SOEP. Because the relationships between employment and family status may differ for guestworkers,[6] and to maximize the time period for analysis, we based our study on data from sample A.

We extracted data from 1984 through 2001 for males who were born in 1950 or later, were at least 18 years old when interviewed, and who were the head of the household. Selecting men who were household heads was necessary to identify a man's children, as the SOEP does not include a fertility history for men. Excluded from the sample are individuals who gave incomplete information on marital status, work hours, and years of education. This leaves us with 13,514 observations from 1,478 men between the ages of 18 and 50.

3.2. Estimation Approach

We estimate work hours and earnings equations in two ways: once with Ordinary Least Squares (OLS) and standard errors corrected for the correlation of multiple observations from the same individual; and a second time with individual fixed effects regression (FE). Annual work hours and the log of real annual earnings are specified as a linear function of the man's marital status, the number of children, child gender, and his age, years of education, and the survey year.

As noted above, OLS coefficients are not likely to represent unbiased indicators of the causal effect of marriage or children on men's work hours and earnings. The observable characteristics of men explain only a small proportion of the variance in both family and labor market outcomes, and the unobservable determinants of one are likely to

---

[6] Dustmann (2003) finds that the return migration decisions of German guestworkers, particularly Turkish migrants, depend upon whether they have sons or daughters.

be correlated with the unobservable determinants of the other. Married men, in particular, tend to work harder, get paid more, and tend to be more stable employees than unmarried men. Some of this correlation reflects the fact that men who are hard workers are also more likely to marry, rather than a causal effect of marriage on employment.

Individual fixed effects models will control for time-invariant unobservables that affect both family and labor market outcomes, and this has been the approach of choice in the "marriage premium" literature (Korenman and Neumark, 1991; Ribar, 2004).[7] However, coefficients from individual fixed effects models cannot be interpreted as causal effects of marriage and children on labor market outcomes, as there is the possibility of reciprocity between these events. For instance, job loss may result in divorce, or marriage and childbearing may be timed to coincide with improved employment prospects (Black et al., 2003; Charles & Stephens, 2004; Falaris, 1987). Of particular relevance to our analysis is the possibility that child gender may not be exogenous in our sample. According to Norberg (2004), sex-selective abortion and biological factors are empirically unimportant enough to consider child gender at birth random. However, the gender of a child conditional on the father's presence in the household is not likely to be random. Mott (1994) and Dahl and Moretti (2004) find that in the U.S., daughters are less likely than sons to be living with their father. Thus, determinants of child co-residence and employment may be correlated.

Since the SOEP does not include a fertility history for men, information on men's children is available only when children live in the same household as the father. If a child does not live with the father during the years he is interviewed, the SOEP does not have any information about this child. This data limitation introduces the possibility that the gender of the children who live in the same household as their father is endogenous with respect to the determinants of work hours and earnings. There is some evidence that American parents' decisions to marry and divorce may depend upon child gender (Morgan et al., 1988; Lundberg and Rose, 2003; Dahl and Moretti, 2004). While there is no evidence that divorce in Germany differs on average between the parents of sons and

---

[7] Alternative approaches include instrumental variables and family fixed effects. Unfortunately, there are no good candidates for valid instruments for marriage and children in an employment/earnings equation. A family fixed effects model would require observations on brothers (ideally identical twins) and by the age of marriage it seems unlikely that individual differences correlated with family and employment outcomes have not emerged.

daughters (Diekmann and Schmidheiny, 2004), it may still be the case that a father's unobservable propensities to live with his sons versus his daughters (e.g., son preference) may be correlated with unobservables in his earnings or work hours equations. To partially control for potential self-selection in the sample of co-resident fathers, we use the longitudinal data in the SOEP to construct indicators of whether children ever lived in the father's household. Next, we describe our measures in more detail.

3.3. Measures

Measures of Work Hours and Earnings

The SOEP Cross-National Equivalent File includes a measure of annual work hours based on information on employment status during each month of the survey year and the average number of hours worked per week (Lillard, 2004). Earnings are measured as the log of annual earnings from all jobs in 1999 DM, adjusted for inflation with the price index provided by the SOEP. The index is based on the official German Verbraucherpreisindex and Index der Einzelhandelspreise.

Measure of Marital Status

A man's marital status is represented with a dummy variable that takes on a value of one if the respondent is either legally married or living with a partner at the time of the interview, and zero otherwise. Thus no distinction is made between legal marriage and cohabitation, and we use the terms "married" and "living with a partner" interchangeably.

Measures of the Number of Children

Our count of the number of children is based on information for the children who lived in the household at the time of the interview, were at most 16 years old, and were the children of the household head. However, we cannot distinguish between the men's biological children, adopted children, or step-children, as a fertility history is not available for men in the SOEP.

For comparability of our results with results from the U.S., we chose measures of children and child gender following Lundberg and Rose (2002). We estimate two

different specifications with measures of the number of children. One specification includes a measure that takes on a value of 0, 1, or 2, depending on whether a man has no, one, or two children in the household. In addition, a dummy variable indicates whether the man has three or more children in the household (9.2% of the sample). In the second specification, we allow for parity-specific effects, including separate variables for exactly one, exactly two, and three or more children.

Measures of Child Gender

We examine differential effects of sons and daughters on work hours and earnings in two ways. One, we estimate the effect of the presence of a son relative to a daughter with dummy variables that indicate whether there is at least one son and at least one daughter in the man's household. Two, we focus on the effect of having a son relative to a daughter as the first child with dummy variables that indicate whether the first child is a boy or a girl.

To address the potential self-selection of co-resident fathers, we construct the child gender variables in two ways. In the first approach, we include children who are children of the household head and live with him at the time of the interview. In this approach, the son/daughter variables can change over time, as children join or leave the household due to, for instance, changes in the man's marital status, a child's birth, or children moving out to live on their own.

This first approach only represents "co-residential effects" rather than the "true" effect of a child obtained by comparing labor market outcomes before and after a child is born. This approach is problematic, if the child's presence or gender is endogenous with respect to unobservable characteristics of the man. To address this problem, we use a second approach in which the fertility variables are "fixed", regardless of whether a child is still present in the man's household. For instance, the variable that indicates whether there is at least one boy in the man's household is set to one for all years after a boy was reported to live in the man's household for the first time, even if the child is no longer in the man's household at a later date. Likewise, the dummy variable that indicates the gender of the first child is constructed to indicate a boy for all years after the child who

11

was first reported in the man's household was a boy, regardless of whether the boy remains in the household in subsequent years.

Control Variables

In addition to measures of marital status, and the number and gender of children, each model specification includes measures of the respondent's age and education level, and of the survey year. Age and survey year are represented with a series of dummy variables. The four education level dummy variables represent whether a respondent has 10 years of education or less, 11 years, 12 or 13 years, or more than 13 years of education.

3.4. Sample Descriptives

Table 1 provides descriptive statistics for the data used in the analysis. The mean level of education in this sample is 12 years and the average age is 34 years. Of the 1,478 men in the sample, 72 percent were ever married or living with a partner at least once in their lives.[8] On average, they were 26.1 years old when they got married or started living with a partner for the first time.

There is, on average, one child per household. However, the average number is 1.8 when children are present in the household. Fifty-six percent of the men had at least one child living in their household while they participated in the SOEP. On average, the men were 27.4 years old when his first child is born.[9] The ratio of sons to daughters currently in their father's household is 1.094, higher than the German sex ratio for children under 15 (1.06). This underrepresentation of daughters is consistent across the different child gender measures.

Average work hours for the men in the sample are 2,062 hours per year. Since annual hours are calculated by multiplying reported hours worked per week by the number of months worked and by 4.33, the average number of weeks per month, this

---

[8] The SOEP provides a marital history file, which records each marriage spell, including marital status transitions starting in 1984. A complete marital history for an individual can be constructed by combining data from this marital history file with retrospective marital history information collected in 1985.

[9] With no information on fertility history for men, we calculated a man's age when he had his first child by subtracting his birth year from that of the child who was reported first in the man's household during the sample period.

measure does not account for vacations and other time off and will overstate actual hours worked during the year. Positive earnings are reported in 85 percent of the survey years. Average real annual earnings are DM 68,077 in the sample. This compares to average earnings of DM 68,489 in 1997 for full-time employees in production industries in the former West Germany (Statistisches Bundesamt Deutschland 1998).

4. Results

Tables 2 through 4 present the main results of our analysis—least squares and fixed effects estimates of the effects of marital status and children on the annual work hours and earnings of West German men. Tables 2 and 3 show that married men work more and earn more than unmarried men, and that men with minor children present in their household work and earn more than childless men. The estimates in Table 4 allow the effects of sons and daughters to differ, and show that a first son has a substantially larger impact on his father's work hours than does a first daughter. We provide next a more detailed description of these results.

4.1. Marriage and Children

The first three columns in Table 2 contain coefficients from OLS regressions of annual work hours on indicators of marital status and number of children, as well as controls for age, education, and calendar year. Marriage alone is associated with annual work hours that are 12 percent (255 hours/year) higher than average annual work hours in the sample. This figure falls to 9 percent when child indicators are added to the model. The coefficient on a linear term for number of children is not significant, but the presence of a single child appears to increase fathers' work hours by more than 2 weeks of full time work compared to men with no children, and men with three or more children work even more.

As noted, these OLS coefficients are likely to be biased indicators of the causal impacts of marriage and children. The last three columns of Table 2 show that, in a fixed effects specification, the strong positive association between marriage and work hours

13

remains, although the fixed effects marriage coefficients are only about half as large as the OLS coefficients. This decrease in magnitude indicates that men are positively selected into marriage. The effects of children in the fixed effects model are somewhat more precisely estimated—the linear effect of number of children (about 25 hours per child) is now significant—and the effect of one child on her father's work hours, though smaller than in the OLS estimates, is still a substantial 56 hours per year.

Both the magnitude and the general pattern of these results are very similar to the fixed effects estimates of Lundberg and Rose (2002), who found, using 1968 to 1992 data from the Panel Study of Income Dynamics (PSID), that marriage increased the annual work hours of American men born after 1950 by 124 hours, and the first child by 72 hours. This compares to our estimates from a similar specification of 104 hours per year for marriage and 56 hours for the first child. There is clear evidence of positive sorting into marriage in both the American and German data: in both cases, the OLS coefficient on marriage is substantially larger than the fixed effects coefficient. Also similar across the data sets is the relative insensitivity of the child coefficients to specification. However, the impact of a first child falls when we employ fixed effects in the German data, but rises in the American data. This could be due to differential selection into parenthood by men in the two countries, or to the positive selection that is likely to result from the child measures used in the German analysis (i.e. children in the man's household vs. children ever born).

Table 3 reports the results of similar OLS and fixed effects models with the log of annual earnings as the dependent variable. This specification includes non-workers--zero earnings are replaced with the sample minimum—and so the effects of marriage and children include both changes in employment (the probability of positive earnings) and in earnings conditional on employment. In the OLS models, marriage is associated with a very large (80 percent or more) increment in annual earnings, while the first child appears to increase earnings by nearly 20 percent and three or more children by about 23 percent. Much of the difference in the earnings of married and unmarried men, and of fathers and non-fathers, is due to differences in the probability of employment.[10]

---

[10] Separate estimates for the probability of employment and earnings conditional on employment are included in the appendix. Appendix Table A-1 shows that marriage is associated with only 13 to 16

14

In the fixed effects models presented in the last three columns of Table 3, the marriage effect on earnings remains significant, but much smaller at 30 to 36 percent, and the effect of a first child is also reduced to 12 percent. An increase in the number of children to 3 or more, however, is associated with substantially higher earnings. These results are not directly comparable to those in Lundberg and Rose (2002), who used the log of the real hourly wage as a dependent variable instead of earnings. They did find, however, that both marriage and children had positive and significant impacts on wages for PSID men.[11] We find proportional effects of marriage on the earnings of West German workers that are about twice as large as effects on the hourly earnings of American men, but find significant child effects only for hours and employment, not earnings conditional on work.

4.2. Sons vs. Daughters

Table 4 shows the separate impacts of sons and daughters on the annual work hours and earnings of their fathers. In the first column, we use information on children currently in the household to construct two fixed effects specifications: one that includes dummy variables indicating whether there is at least one boy or at least one girl in the household, and one that includes dummy variables indicating that the man's first child is in the household and the gender of that child. In both specifications, boys and girls have positive, but not significantly different, effects on their fathers' work hours. The effects of both boys and girls on log real earnings are almost always small and insignificant.

Since men's decisions about divorce and co-residence may depend upon whether they have sons or daughters, self-selection may be biasing the results in column 1. For example, men who choose to remain living with their daughters may have unobservable characteristics affecting their work hours that differ on average from those of men who choose to live with sons. In column 2, we redefine the child variables so that they refer to children ever in the man's household, that is, the dummy variable for "after first child, boy" will be equal to one in all years after the man's first son appeared in his household,

percent higher earnings conditional on employment, and the effects of children are insignificant.
[11] We use earnings instead of the wage rate to avoid the division bias likely to result from constructing hourly wages by dividing earnings by hours.

even if the child is no longer co-resident with the father. This use of child co-residence history (unlike a fertility history) will not eliminate all potential bias, because it cannot eliminate the effects of father self-selection into initial co-residence with sons versus daughters.

These results show, not surprisingly, that the effects of ever living with a child are generally smaller than the effects of currently living with a child. There is some indication that men who live with daughters are positively selected—the positive effects of daughters on fathers' work hours fall substantially more than the effects of boys in the "ever lived with" specification. The impact of a first daughter on father's work hours after controlling for selection is negative (though not significant) and is significantly smaller than the effect of a first son. The absolute difference between the son and daughter effects is 107 hours per year, compared to an equivalent gap of about 70 hours in Lundberg and Rose (2002). The difference between the effects of "at least one son" and "at least one daughter" is positive and increases when selection is controlled for, but it is not statistically significant. These results provide considerable support for the hypothesis that the birth of a son has a greater positive impact on the market work effort of his father than does the birth of a daughter.

4.3. Child Gender and Attrition

The difference between the results in the two columns of Table 4 suggest that there is a relationship between the unobserved characteristics of men who separate from their children and the gender of those children. In Table 5, we investigate this directly by estimating a Cox proportional hazards model of the duration from a first child's appearance in her father's household to the child's disappearance from the household. Observations in which the child reaches age 16, the father leaves the SOEP sample, or the end of the sample period is reached are treated as censored; most of the other child "disappearances" are due to the father establishing a separate household after separating or divorcing from the child's mother.

The father's marital status during the year in which the first child appears and his education level are strongly associated with his probability of attrition—married and more educated fathers are, not surprisingly, less likely to leave. Child gender also has a large and significant effect: if the first child is a boy, the probability of his father leaving the household is 25 percent less than if the first child is a girl. This very substantial difference in attrition rates explains the apparent shortage of daughters in the raw data.

5. Conclusions

The earnings and work hours of West German men born in 1950 or later have a strong positive association with coresidence with a partner and with children. Using fixed effects to control for the fact that hard-working and productive men are more likely to marry and have children, we find that marriage and children continue to have substantial positive effects, though they are reduced in magnitude. Marriage increases a man's work hours by about 100 hours per year and his earnings (unconditional on employment) by more than 30 percent; a child in his household increases a man's work hours by 56 hours per year and his earnings by 12 percent. We also find that child gender matters, at least for work hours—after controlling for selection, we find that only male children have positive significant effects. The difference between the effects of a first son and first daughter on father's work hours is a highly significant 100 hours per year.

We also find evidence of son "preference" in the probability that a German man is observed to be coresiding with a son or a daughter. Female children are underrepresented in the raw data, and a Cox proportional hazards model of a child's "disappearance" from a man's household shows that men are substantially more likely to remain in the same household with a male than a female child. A comparison of labor supply models that base child measures on either children currently in a man's household or children ever in a man's household indicates that men who remain with female children are strongly positively self-selected (in terms of their work hours) relative to men who remain with male children.

References

Akerlof, G.A., 1998. Men without children. The Economic Journal 108, 287-309.

Benham, L., 1974. Benefits of women's education within marriage. Journal of Political Economy 82 (2), S57-S71.

Black, D., McKinnish, T., Sanders, S. 2003. Does the availability of high-wage jobs for low-skilled men affect welfare expenditures? Evidence from shocks to the steel and coal industries. Journal of Public Economics 87, 1921-1942.

Blomquist, N., Hansson-Brusewitz, U., 1990. The effect of taxes on male and female labor supply in Sweden. The Journal of Human Resources 25, 317-357.

Browning, M., 1992. Children and household economic behavior. Journal of Economic Literature 30, 1434-1475.

Bundeszentrale für Politische Bildung 2004a. Erwerbstätigkeit nach Geschlecht in West-Deutschland. Accessed 07/31/2005 at: http://www.bpb.de/files/APZ9F9.pdf

Bundeszentrale für Politische Bildung 2004b. Entwicklung der Geburtenziffer. Accessed 07/31/2005 at: http://www.bpb.de/wissen/0OBM9A,0,Entwicklung_der_Geburtenziffer.html.

Carlin, P.S., Flood L., 1997. Do children affect the labor supply of Swedish men? Time diary vs. survey data. Labour Economics 4 (2), 167-83.

Charles, K.K., Stephens Jr., M., 2004. Job displacement, disability, and divorce. Journal of Labor Economics 22, 489-522.

Dahl, G., Moretti, E. The demand for sons: evidence from divorce, fertility, and shotgun marriage, NBER Working Paper 10281, 2004.

Diekmann, A., Schmidheiny, K., 2004. Do parents of girls have a higher risk of divorce? An eighteen-country study. Journal of Marriage and the Family 66 (3), 651-660.

Dustmann, C., 2003. Children and return migration, Journal of Population Economics 16 (4), 815-830.

Falaris, E.M., 1987. An empirical study of the timing and spacing of childbearing. Southern Economic Journal 54 (2), 287-300.

Hank, K., Kohler, H.-P., 2000. Gender preferences for children in Europe: empirical results from 17 FFS countries. Demographic Research 2 (1).

Jepson, L.K., in press. The relationship between a wife's education and her husband's earnings: evidence from 1960-2000. Review of Economics of the Household.

Kohler, H.-P., Behrman. J.R., Skytthe, A., in press. Partner + children = happiness? The effect of fertility and partnerships on subjective well-being. Population and Development Review.

Korenman, S., Neumark, D., 1991. Does marriage really make men more productive? Journal of Human Resources 26, 282-307.

Lang, G., 2005. The difference between wages and wage potentials: earnings disadvantages of immigrants in Germany. Journal of Economic Inequality 3, 21-42.

Lillard, D. R. (with assistance of Phillip Giles and Markus M. Grabka). 2004. Codebook for the Cross-National Equivalent File 1980-2002. BHPS-GSOEP-PSID-SLID. Mimeo, Department of Policy Analysis and Management, Cornell University.

Lundberg, S., in press. Sons, daughters, and parental behavior. Oxford Review of Economic Policy.

Lundberg, S., 2005a. Men and islands: dealing with the family in empirical labor economics. Labour Economics 12 (4), 591-612.

Lundberg, S., 2005b. The division of labor by new parents: does child gender matter? Working Paper, Department of Economics, University of Washington, Seattle, WA.

Lundberg, S., Rose, E., 2003. Child gender and the transition to marriage. Demography 40 (2), 333-350.

Lundberg, S., Rose, E., 2002. The effects of sons and daughters on men's labor supply and wages. Review of Economics and Statistics 84, 251-268.

Mamun, A., 2004. Is there a cohabitation premium in men's earnings? University of Washington Center for Research on Families Working Paper 2004-02.

Morgan, S. P., Lye, D., Condran, G., 1988. Sons, daughters and the risk of marital disruption. American Journal of Sociology 94 (1), 110-129.

Mott, F.L., 1994. Sons, daughters and fathers' absence: differentials in father-leaving probabilities and in-home environments. Journal of Family Issues 15 (1), 97-128.

Norberg, K., 2004. Partnership status and the human sex ratio at birth. Proceedings of the Royal Society, London.

Pencavel, J., 1986. Labor supply of men: a survey. In: O. Ashenfelter and R. Layard (Eds.), Handbook of Labor Economics, Vol. 1. North-Holland, New York, NY, pp. 3-102.

Ribar, D., 2004. What do social scientists know about the benefits of marriage? A review of quantitative methodologies. IZA Discussion Paper No. 998, January 2004.

Schoeni, R. F. 1995. Marital status and earnings in developed countries. Journal of Population Economics 8 (4), 351-359.

Statistisches Bundesamt Deutschland, 2005. Durchschnittliches Heiratsalter Lediger. Accessed 07/31/2005 at: http://www.destatis.de/basis/d/bevoe/bevoetab1.htm.

Statistisches Bundesamt Deutschland, 2001. Heiratsalter immer höher. Accessed 07/31/2005 at: http://www.destatis.de/presse/deutsch/pm2001/zdw03.htm.

Statistisches Bundesamt Deutschland, 1998. Bruttojahresverdienste vollzeitbeschäftigter Arbeitnehmer 1997. Accessed August 2005 at: http://www.destatis.de/presse/deutsch/pm1998/p2270042.htm

Van Soest, A., Woittiez, I., Kapteyn, A., 1990. Labor supply, income taxes, and hours restrictions in the Netherlands. The Journal of Human Resources 25, 517-558.

Waite, L. J., Gallagher, M., 2000. The Case for Marriage: Why Married People are Happier, Healthier, and Better Off Financially. Doubleday, New York, NY.

Waldfogel, J., 1998. The family gap for young women in the United States and Britain: can maternity leave make a difference? Journal of Labor Economics 16 (3), 505-545.

Table 1
Descriptive statistics

	Mean	S.D.	Minimum	Maximum
Real earnings in DM[a]	68,077	37,466	27	1,397,558
Log of real earnings[a]	11.01	0.55	3.30	14.15
Annual work hours	2,062	806	0	5,196
Education in years	12.09	2.61	7	18
Age	33.88	6.23	18	50
Married	0.67	0.47	0	1
Number of children	0.99	1.10	0	6
Number of sons[b]	0.52	0.74	0	4
Number of daughters[b]	0.47	0.72	0	5
After first child (son)[b]	0.28	0.45	0	1
After first child (son)[c]	0.31	0.46	0	1
After first child (daughter)[b]	0.26	0.44	0	1
After first child (daughter)[c]	0.29	0.45	0	1
At least one son[1]	0.39	0.49	0	1
At least one daughter[1]	0.36	0.48	0	1
Number of observations	13,514			

[a] Based on 12,228 observations with positive earnings. Earnings are expressed in 1999 DM.
[b] Based on children currently in household.
[c] Based on children ever in household.

Table 2
Marriage, children and annual work hours

	(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Married	**254.95** (**32.85**)	**217.34** (**37.40**)	**193.87** (**39.39**)	**134.12** (**19.66**)	**114.01** (**21.57**)	**103.71** (**22.39**)
Number of children (0 if none or > 2)		28.43 (20.14)			25.23 (13.24)	
Exactly one child			**94.47** (**35.79**)			**55.63** (**22.14**)
Exactly two children			63.57 (40.46)			**52.12** (**26.49**)
3 or more children		**132.98** (**57.89**)	**158.63** (**59.28**)		**136.60** (**37.94**)	**146.03(3 8.33**)
Two children – one child			*-30.90* *{0.325}*			*-3.51* *{0.869}*
Three or more children – two children			**95.06** ***{0.066}***			**93.91** ***{0.004}***
R-squared	0.10	0.10	0.10	0.06	0.06	0.06
Number of observations	13,514					

Note:
Numbers in ( ) and { } are Huber-White robust standard errors and p-values, respectively.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, and respondent's years of education and age.

Table 3
Marriage, children and log real earnings

	(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Married	**0.724** **(0.087)**	**0.663** **(0.100)**	**0.615** **(0.107)**	**0.363** **(0.053)**	**0.325** **(0.057)**	**0.301** **(0.060)**
Number of children (0 if none or > 2)		0.051 (0.049)			0.048 (0.035)	
Exactly one child			**0.186** **(0.091)**			**0.120** **(0.059)**
Exactly two children			0.116 (0.100)			0.100 (0.070)
3 or more children		0.178 (0.119)	**0.230** **(0.125)**		**0.293** **(0.101)**	**0.315** **(0.102)**
Two children – one child			-0.070 {0.321}			-0.020 {0.725}
Three or more children – two children			0.114 {0.231}			**0.215** **{0.013}**
R-squared	0.13	0.13	0.13	0.07	0.07	0.07
Number of observations	13,278					

Note:
Numbers in ( ) and { } are Huber-White robust standard errors and p-values, respectively.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, and respondent's years of education and age.
Includes non-workers (zero earnings set to sample minimum earnings).

Table 4
The effect of sons vs. daughters on work hours and earnings (Fixed Effects)

	Children currently in household	Children ever in household
	Annual Work Hours (N = 13,514)	
If at least one boy (0 if no son yet)	**56.102** **(21.944)**	32.868 (24.214)
If at least one girl (0 if no daughter yet)	**43.751** **(21.463)**	-1.836 (24.555)
If at least one boy - if at least one girl	*12.351* *{0.701}*	*34.704* *{0.332}*
After first child, boy (0 if no child or 1st child girl)	**57.097** **(25.823)**	**62.407** **(30.445)**
After first child, girl (0 if no child or 1st child boy)	9.707 (24.283)	-44.97 (31.095)
After first child boy - after first child girl	*47.390* *{0.120}*	**107.377** **{0.006}**
	Log Real Earnings (N = 13,278)	
If at least one boy (0 if no son yet)	0.082 (0.058)	0.011 (0.064)
If at least one girl (0 if no daughter yet)	**0.130** **(0.057)**	0.076 (0.065)
If at least one boy - if at least one girl	*-0.048* *{0.574}*	*-0.065* *{0.491}*
After first child, boy (0 if no child or 1st child girl)	0.111 (0.069)	0.130 (0.081)
After first child, girl (0 if no child or 1st child boy)	0.029 (0.064)	-0.008 (0.082)
After first child boy - after first child girl	*0.082* *{0.313}*	*0.138* *{0.181}*

Note:
Numbers in ( ) and { } are Huber-White robust standard errors and p-values, respectively.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, and respondent's years of education and age.

Table 5
Cox proportional hazard model for attrition of men from first child

	Hazard Ratio
First child boy	**0.736**
	(0.121)
Married	**0.448**
	(0.168)
Age	0.995
	(0.025)
Education level 11 years	0.743
	(0.173)
Education level 12 or 13 years	**0.635**
	(0.167)
Education level more than 13 years	**0.275**
	(0.096)
Number of observations	708
Log Likelihood	-891.8
LR $\chi^2(6)$	28.96
Prob $> \chi^2$	0.000

Note:
Numbers in ( ) are standard errors.
Bold figures indicate statistical significance at 0.1.
10 years or less is the excluded education category.

Table A-1
Marriage, children and log real earnings (excluding zero earning)

	(1) OLS	(2) OLS	(3) OLS	(4) FE	(5) FE	(6) FE
Married	**0.158**	**0.132**	**0.128**	**0.112**	**0.100**	**0.108**
	(0.022)	**(0.023)**	**(0.024)**	**(0.012)**	**(0.013)**	**(0.013)**
Number of children (0 if none or > 2)		0.022 (0.015)			**0.015** **(0.008)**	
Exactly one child			0.034 (0.023)			-0.007 (0.013)
Exactly two children			0.046 (0.030)			**0.029** **(0.016)**
3 or more children		0.059 (0.042)	0.064 (0.042)		**0.069** **(0.022)**	**0.061** **(0.023)**
Two children – one child			*0.012* *{0.614}*			*0.036* *{0.004}*
Three or more children – two children			*0.018* *{0.644}*			*0.032* *{0.094}*
R-squared	0.19	0.19	0.19	0.21	0.21	0.21
Number of observations	12,228					

Note:
Numbers in ( ) and { } are Huber-White robust standard errors and p-values, respectively.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, and respondent's years of education and age.

Table A-2
Marriage, children and employment (Dependent Variable: Employment = 1 if worked any positive hours)

	(1) Linear Probability	(2) Linear Probability	(3) Linear Probability	(4) FE Linear Prob.	(5) FE Linear Prob.	(6) FE Linear Prob.
Married	**0.074** **(0.010)**	**0.070** **(0.012)**	**0.064** **(0.013)**	**0.033** **(0.007)**	**0.031** **(0.008)**	**0.027** **(0.008)**
Number of children (0 if none or > 2)		0.003 (0.006)			0.003 (0.005)	
Exactly one child			**0.020** **(0.011)**			**0.015** **(0.008)**
Exactly two children			0.009 (0.012)			0.006 (0.009)
3 or more children		0.014 (0.013)	0.020 (0.014)		**0.026** **(0.013)**	**0.030** **(0.013)**
Two children – one child			*-0.011* *{0.169}*			*-0.009* *{0.239}*
Three or more children – two children			*0.011* *{0.242}*			*0.024* *{0.037}*
R-squared	0.09	0.09	0.09	0.04	0.04	0.04
Number of observations	13,514					

Note:
Numbers in ( ) and { } are Huber-White robust standard errors and p-values, respectively.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, and respondent's years of education and age.