

Sons, Daughters, Wives, and the Labour Market Outcomes of West German Men

Hyung-Jai Choi
Jutta M. Joesch
Shelly Lundberg*

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Abstract: 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 individual fixed effects models that control for correlation in time-invariant unobservables that affect both family and work outcomes, though the inclusion of length of marriage reduces the effects of children. Child gender also matters – a first son increases fathers’ work hours by 100 hours per year more than a first daughter, and positive effects of sons on work hours and earnings are particularly strong for men with higher levels of education. There is evidence of son “preference” in the probability that a German man is observed to be coresiding with a son – men are more likely to remain in the same household with a male child than a female child.

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* Hyung-Jai Choi is Associate Fellow at the Korea Labor Institute. Jutta M. Joesch is Principal Research Scientist at Battelle Centers for Public Health Research and Evaluation, Seattle, WA. Shelly Lundberg is Castor Professor of Economics and Director, Center for Studies in Demography and Ecology at the University of Washington, Adjunct Professor of Economics at the University of Bergen, and Research Fellow, IZA, Bonn. Lundberg gratefully acknowledges research support from NIH/NICHHD (R01 HD042785) and the Castor Professorship.

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. 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, but only a few studies examine the effects of family status on men's labor supply.¹ 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. We find substantial positive "marriage premia" in work hours and earnings, as well as evidence that fathers of sons, particularly well-educated fathers, increase their work hours more than do fathers of 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

¹ These include two studies that focus on the effects of child gender on father's labor supply (Lundberg and Rose, 2002; Lundberg, 2005c).

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 in the U.S. (Lundberg, 2005b). 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. Like Lang (2005), we do not find significantly different effects of sons and daughters on men’s earnings in the full sample, but in a subsample of men with more than 11 years of education, sons increase both the hours worked and earnings of their fathers. 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.

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 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.

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 man'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, and therefore their

² The impact of marriage on work hours in a collective household model is presented formally in Lundberg (2005a).

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 work 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 (e.g.

³ There may also be indirect spillover effects of a wife's human capital on her husband's productivity (Benham, 1974; Jepsen, 2005; 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 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. 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 fathers' 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 a father's time with a male child is more productive than his time with a female child, 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. Thus, what is

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 (2005b).

usually termed son “preference” may arise from preferences per se or from the parameters of child production functions.

In Germany, as in most developed countries, there is little overt evidence of son preference based on direct reports or fertility behavior. Hank and Kohler (2000) examine gender preferences for children using both the reports of parents in the German Social Survey concerning the desired gender of first and additional children, and the influence of the gender of previous children on both intended and actual parity progression. They find a strong stated preference for at least one child of each gender, 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 gender preference is apparent at higher parities.

Studies examining the effects of sons and daughters on the labor supply on the labor supply of fathers have been based on U.S. data and 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 (2005c), 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 with childcare.

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).⁶ The SOEP is a panel survey that has been collecting representative micro-data in

⁶ For confidentiality reasons, the English public use version of the SOEP is a 95% sample of the complete SOEP. Five percent of the original wave 1 households were excluded from the sample randomly (Kroh & Spiess, 2005).

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. Interviews mostly are conducted face-to-face. All persons in a household who are at least 16 years old are interviewed. Each year, GSOEP attempts to re-interview original sample members, with the exception of those who have left the country. When children in a sample household reach 16 years, they are added to the sample, as are individuals who join households in the sample (Wagner, Burkhauser, & Behringer, 1993).

3.1. Sample

From 1984 to 1989, the SOEP was comprised of samples A and B. Additional samples were added in 1990, 1994/95, 1998, 2000, and 2002. 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. Because the relationships between employment and family status may differ for guestworkers⁷ and to maximize the time period for analysis, we restrict our study to data from sample A. In 1984, sample A consisted of 4,528 households. In 2001, 50% of the individuals interviewed in 1984 were re-interviewed successfully (Kroh & Spieß, 2005).

We extracted data from 1984 through 2001 for males born in 1950 or later, who were at least 18 years old when interviewed and who were the head of the household. Selecting household heads was necessary to identify the man’s own children, as the SOEP does not include a fertility history for men. Prior to eliminating cases with incomplete information, we have 15,382 observations from 1,645 male household heads between the ages of 18 and 60 years. After excluding observations with incomplete information on marital status, education level, and work hours, we are left with 15,143 observations from 1,629 male household heads. At each interview, SOEP inquires about employment and earnings in the prior year. In the process of matching demographic

⁷ Dustmann (2003) finds that the return migration decisions of German guestworkers, particularly Turkish migrants, depend upon whether they have sons or daughters.

characteristics with earnings and work hours from the same year, we lose an additional observation from each respondent, resulting in the final sample size of 13,514 observations from 1,478 male household heads.

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) estimated with robust standard errors. 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 be correlated with the unobservable determinants of the other. 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).⁸ 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

⁸ 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.

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. 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 the decisions of American parents 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 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

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. This index is based on the official German Verbraucherpreisindex and Index der Einzelhandelspreise.

Marital Status

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. The cross-national equivalent file does not include information to distinguish legal marriage from cohabitation. Thus, we use the terms "married" and "living with a partner" interchangeably. Korenman and Neumark (1991)

find that the male marriage premium in wages increases gradually as a result of faster wage growth for married men. We examine this relationship for work hours and earnings by including a measure of current marriage length in years.

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 less than 16 years old, and were the own children of the household head. However, we cannot distinguish between a man's biological children, adopted children, or step-children. In our equations, we include separate dummy variables for one, two and 3 or more children (the latter category includes 9.2 percent of the sample). This less restrictive specification of parity was superior to a linear child effect.

Child Gender

In families with more than one child, there are many possible ways to represent child gender. Following Lundberg and Rose (2002), we focus on two approaches. One, we construct dummy variables indicating whether there is at least one son and at least one daughter in the man's household. Two, we estimate 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 these 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. As an alternative, we use information on children who were ever in the man's household. In our first measure, based on current coresidence, 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. Estimates based on this measure will be problematic if the child's presence or gender is endogenous with respect to unobservable characteristics of the man. In the second approach, 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 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. A school-leaving degree corresponds to 9 to 12 years of education in Germany. Since a 12-year degree is a qualification for college attendance, we split the sample into two subsamples with 11 years or less and with 12 years or more when examining the interaction between education and child effects in section 4.2.

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.⁹ 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, a man was 27.4 years old when his first child was born.¹⁰ Average work hours for the men

⁹ 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.

¹⁰ 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.

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 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 person-year observations.¹¹ 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 impact of marital status and children on the annual work hours and earnings of West German men born in 1950 or later. Tables 2 and 3 show that married men work more and earn more than unmarried men, and this effect is increasing in the length of the current marriage. Men with minor children present in their household work and earn more than childless men, though, in fixed effects models, the inclusion of marriage length substantially weakens the effect of children. The estimates in Table 4 allow the effects of sons and daughters on work hours and earnings to differ, for the whole sample and for subsamples with 11 or less, and 12 or more years of education. For the high-education group, a son has a substantially larger impact on his father's work hours and earnings than does a daughter. In contrast, child gender effects in the low-education group are inconclusive.

4.1. Marriage and Children

The first four columns in Table 2 contain coefficients from OLS regressions of annual work hours on indicators of marital status, marriage length in years, 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

¹¹ In March 2004, 86.3% of 15 to 65-year old West German men with children were employed (Statistisches Bundesamt Deutschland, 2005). The corresponding figure for 1996 is 86.6%.

indicators or marriage length are added to the model. 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. 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 remains. However, the FE marriage coefficients are only about half as large as the OLS coefficients, suggesting that men are positively selected into marriage. The impact of marriage length on work hours is stronger in the individual FE specifications and, when based on within variation alone, renders the effects of fewer than 3 children insignificant.

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 (though the latter depends upon the exclusion of marriage length). 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. Child effects are also similar, though 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 due 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 FE 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.

Marriage length is also significantly positive, though not when included with number of children. Much of the difference between the earnings of married and unmarried men, and of fathers and non-fathers, is due to differences in the probability of employment.¹²

In the fixed effects models presented in the last four 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. Marriage length has a significant positive effect on earnings, and reduces the significance of fewer than 3 children when they are both included in the FE specification. These results are not directly comparable to those in Lundberg and Rose (2002), who used the log of the real hourly wage for workers 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.¹³

4.2. Sons vs. Daughters

Tables 4a-4c show the separate impacts of sons and daughters on the annual work hours and earnings of their fathers. In the first column of each table, 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.

As noted, 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. 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" is equal to one in all years after the man's first son appeared in his household, even if the child is no longer co-resident with the father. Unlike a fertility history, this use of child co-residence

¹² Separate estimates for the probability of employment and earnings conditional on employment indicate that marriage is associated with only 13 to 16 percent higher earnings conditional on employment, and the effects of children on earnings of the employed are insignificant.

¹³ In results not reported here, we estimate the effects of marriage, marriage length, and children on the log of the hourly wage for the sample of working German men. We find that married men's wages are 9 percent higher than the wages of single men (compared to 6 percent in Lundberg and Rose), but the effects of children on German men's wages are substantially smaller in fixed-effect estimates than in American data (and are significant only for two or more children).

history will not eliminate all potential bias, because it cannot address fathers' self-selection into initial co-residence with sons versus daughters.¹⁴

Table 4a reports the coefficients for the full sample and shows that the effects of sons and daughters are not, with one exception, significantly different. In all specifications, boys have effects on their fathers' work hours that are positive, but in only one case is this effect significantly different from zero or from the effect of girls. 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. The impact of both sons and daughters on log real earnings are small and insignificant.

Table 4b reports the same results for the subsample of men with more than 11 years of education. The effect of sons on both work hours and earnings is always significantly positive after controlling for selection, and the effects of daughters are always insignificant. The difference in work hours between "at least one boy" and "at least one girl" is a significant 90 hours per year, and the difference between first sons and first daughters is similar in magnitude and very close to statistical significance. There are also significant child gender differences in effects on annual earnings, with boys having positive effects and girls very small and often negative effects on earnings in both selection-corrected and uncorrected specifications. These results for the high-education sample provide considerable support for the hypothesis that the birth of a son has a greater positive impact on the market work effort and income of his father than does the birth of a daughter.

The results for the less-educated subsample of men are less consistent. The effect of a first son on work hours is once again significantly more positive than the effect of a first daughter, but this difference results from a large negative impact of a daughter rather than a positive effect of a son in the "ever-in-household" specification. The fact that the impact of a daughter ever in the man's household is substantially more negative than a

¹⁴ It also requires that there be no bias in the reporting of sons and daughters.

daughter currently in his household suggests that there is positive selection (in terms of work hours) of men into co-residence with their daughters. For annual earnings, there is a significant negative difference between the effects of sons and daughters in the “at least one” specification, but essentially no difference in the “first” specification.

The education pattern of these results – a pronounced positive relative effect of sons on the work hours of only the highly-educated sample – is very different from the effects found by Lundberg (2005c) on the work hours of American men in the NLSY79 sample, in which highly-educated fathers of very young sons work less than fathers of young daughters.¹⁵ This discrepancy could be due to the difference in the child age range in our samples (under 3 vs. under 16) or to the different labor market and child care environments in the two countries.

4.3. Child Gender and Attrition

The differences between the results in the two columns of Tables 4a-4c suggest that there is a relationship between the unobserved characteristics of men who separate from their children and the gender of those children. When comparing the effects of sons and daughters using information on children currently in the household, we tend to find smaller son premiums than when we use information on children ever in the man’s household. This indicates that men who decide to stay with their daughters have higher work hours, relative to men who stay with sons, than do men who ever have daughters – in other words, men who stay with daughters are positively selected, compared to men who stay with sons.

In Table 5, we investigate the attrition process 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 are treated as censored when the child reaches age 16, the father leaves the SOEP sample, or the end of the sample period is reached. Most of the other child “disappearances” are due to the father establishing a separate household after separating or divorcing from the child’s mother.

¹⁵ Lundberg and Rose do not examine the influence of paternal education on child gender effects.

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 is neither necessary nor sufficient for differences in the selection on unobservables of fathers coresident with boys and girls, but it does indicate that the household dissolution process is not independent of child gender.

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 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. Including marriage length in the fixed-effect specifications substantially reduces the effect of children on work hours. 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 fathers' work hours is a highly significant 100 hours per year. The positive effects of sons on work hours and earnings are particularly strong for men with higher levels of education.

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.

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
Length of marriage in years	6.96	7.06	0	31
Length of marriage in years ^b	10.44	6.20	1	31
Number of children	0.99	1.10	0	6
Number of sons ^c	0.52	0.74	0	4
Number of daughters ^c	0.47	0.72	0	5
After first child (son) ^c	0.28	0.45	0	1
After first child (son) ^d	0.31	0.46	0	1
After first child (daughter) ^c	0.26	0.44	0	1
After first child (daughter) ^d	0.29	0.45	0	1
At least one son ^c	0.39	0.49	0	1
At least one son ^d	0.42	0.49	0	1
At least one daughter ^c	0.36	0.48	0	1
At least one daughter ^d	0.40	0.49	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 9,008 observations with marriage length greater than zero.

^c Based on children currently in household.

^d Based on children ever in household.

Table 2
Men's annual work hours: Marriage, children and marriage length

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	FE	FE	FE	FE
Married	254.95 (32.85)	191.340 (40.535)	193.87 (39.39)	156.368 (44.012)	134.12 (22.73)	79.487 (24.998)	103.71 (25.37)	68.254 (26.521)
Length of current marriage		7.474 (3.486)		5.808 (3.619)		11.434 (2.555)		10.247 (2.763)
Exactly one child			94.47 (35.79)	84.311 (36.294)			55.63 (22.66)	36.930 (23.216)
Exactly two children			63.57 (40.46)	40.976 (41.811)			52.12 (27.18)	13.776 (29.081)
3 or more children			158.63 (59.28)	131.686 (61.032)			146.03 (40.33)	90.286 (42.840)
R-squared	0.10	0.10	0.10	0.10	0.06	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. The FE analyses allow for serial correlation.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, the respondent's years of education, and age.

Table 3
Men's log real annual earnings: Marriage, children and marriage length

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	OLS	OLS	OLS	FE	FE	FE	FE
Married	0.724 (0.087)	0.585 (0.105)	0.615 (0.107)	0.521 (0.117)	0.363 (0.064)	0.247 (0.068)	0.301 (0.070)	0.224 (0.072)
Length of current marriage		0.016 (0.009)		0.015 (0.009)		0.024 (0.007)		0.022 (0.008)
Exactly one child			0.186 (0.091)	0.161 (0.092)			0.120 (0.058)	0.080 (0.059)
Exactly two children			0.116 (0.100)	0.060 (0.103)			0.100 (0.071)	0.019 (0.075)
3 or more children			0.230 (0.125)	0.163 (0.127)			0.315 (0.095)	0.197 (0.100)
R-squared	0.13	0.13	0.13	0.13	0.07	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. The FE analyses allow for serial correlation.
Bold figures indicate statistical significance at 0.1.
Additional regressors include dummy variables for year of observation, respondent's years of education and age.
Sample includes non-workers (zero earnings are set to sample minimum earnings).

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

	Children currently in household	Children ever in household
Annual Work Hours (N = 13,514)		
If at least one boy (0 if no son yet)	35.47 (23.00)	29.54 (25.15)
If at least one girl (0 if no daughter yet)	22.49 (22.49)	-2.84 (25.39)
<i>If at least one boy - if at least one girl</i>	12.98 {0.689}	32.38 {0.375}
After first child, boy (0 if no child or 1 st child girl)	38.57 (26.54)	61.61 (31.72)
After first child, girl (0 if no child or 1 st child boy)	-7.59 (23.74)	-45.72 (32.10)
<i>After first child boy - after first child girl</i>	46.16 {0.127}	107.33 {0.008}
Log Real Earnings (N = 13,278)		
If at least one boy (0 if no son yet)	0.038 (0.058)	-0.015 (0.064)
If at least one girl (0 if no daughter yet)	0.085 (0.057)	0.075 (0.064)
<i>If at least one boy - if at least one girl</i>	-0.047 {0.579}	-0.090 {0.335}
After first child, boy (0 if no child or 1 st child girl)	0.072 (0.069)	0.129 (0.082)
After first child, girl (0 if no child or 1 st child boy)	-0.006 (0.059)	-0.009 (0.081)
<i>After first child boy - after first child girl</i>	0.078 {0.323}	0.138 {0.184}

Notes:

Numbers in () and { } are Huber-White robust standard errors and p-values, respectively.

Bold figures indicate statistical significance at 0.1.

Additional regressors include marital status and marriage length, year of observation, and respondent's years of education and age.

Table 4b
The effect of sons vs. daughters on work hours and earnings (Fixed Effects)
More than 11 years of education

	Children currently in household	Children ever in household
Annual Work Hours (N = 6,702)		
If at least one boy (0 if no son yet)	51.21 (31.14)	52.10 (32.48)
If at least one girl (0 if no daughter yet)	-22.61 (32.01)	-37.94 (34.40)
<i>If at least one boy - if at least one girl</i>	73.82 {0.103}	90.04 {0.067}
After first child, boy (0 if no child or 1 st child girl)	55.76 (36.50)	73.51 (41.59)
After first child, girl (0 if no child or 1 st child boy)	3.25 (35.35)	-15.04 (45.28)
<i>After first child boy - after first child girl</i>	52.51 {0.242}	88.55 {0.106}
Log Real Earnings (N = 6,586)		
If at least one boy (0 if no son yet)	0.140 (0.080)	0.166 (0.084)
If at least one girl (0 if no daughter yet)	-0.074 (0.079)	-0.059 (0.085)
<i>If at least one boy - if at least one girl</i>	0.214 {0.068}	0.225 {0.073}
After first child, boy (0 if no child or 1 st child girl)	0.139 (0.099)	0.207 (0.110)
After first child, girl (0 if no child or 1 st child boy)	-0.047 (0.086)	0.008 (0.118)
<i>After first child boy - after first child girl</i>	0.186 {0.120}	0.199 {0.169}

Notes:

Numbers in () and { } are Huber-White robust standard errors and p-values, respectively.

Bold figures indicate statistical significance at 0.1.

Additional regressors include marital status and marriage length, year of observation, and respondent's years of education and age.

Table 4c
The effect of sons vs. daughters on work hours and earnings (Fixed Effects)
11 or fewer years of education

	Children currently in household	Children ever in household
Annual Work Hours (N = 6,812)		
If at least one boy (0 if no son yet)	12.78 (33.18)	13.04 (38.43)
If at least one girl (0 if no daughter yet)	38.25 (31.67)	22.94 (37.56)
<i>If at least one boy - if at least one girl</i>	25.47 {0.575}	-9.90 {0.854}
After first child, boy (0 if no child or 1 st child girl)	29.47 (37.08)	36.41 (49.25)
After first child, girl (0 if no child or 1 st child boy)	-22.15 (31.88)	-83.49 (44.68)
<i>After first child boy - after first child girl</i>	51.62 {0.195}	119.90 {0.047}
Log Real Earnings (N = 6,692)		
If at least one boy (0 if no son yet)	-0.082 (0.081)	-0.170 (0.096)
If at least one girl (0 if no daughter yet)	0.112 (0.082)	0.153 (0.092)
<i>If at least one boy - if at least one girl</i>	-0.194 {0.092}	-0.323 {0.016}
After first child, boy (0 if no child or 1 st child girl)	0.018 (0.092)	-0.015 (0.120)
After first child, girl (0 if no child or 1 st child boy)	-0.007 (0.080)	-0.042 (0.104)
<i>After first child boy - after first child girl</i>	0.025 {0.799}	0.027 {0.856}

Notes:

Numbers in () and { } are Huber-White robust standard errors and p-values, respectively.

Bold figures indicate statistical significance at 0.1.

Additional regressors include marital status and marriage length, 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 > χ^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.

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/OOBM9A,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).
- Jepsen, L.K., 2005. The relationship between wife's education and husband's earnings: evidence from 1960 to 2000. *Review of Economics of the Household* 3 (2), 197-214.
- Kohler, H.-P., Behrman, J.R., Skytthe, A., 2005. Partner + children = happiness? The effect of fertility and partnerships on subjective well-being. *Population and Development Review* 31 (3), 407-445.
- Korenman, S., Neumark, D., 1991. Does marriage really make men more productive? *Journal of Human Resources* 26, 282-307.

- Kroh M., Spieß M., 2005. Documentation of Sample Sizes and Panel Attrition in the German Socio Economic Panel (SOEP) 1984 – 2004. Data-Documentation 6, DIW Berlin.
- 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., 2005a. Men and islands: dealing with the family in empirical labor economics. *Labour Economics* 12 (4), 591-612.
- Lundberg, S., 2005b. Sons, daughters, and parental behavior. *Oxford Review of Economic Policy*. 21 (3), 340-356.
- Lundberg, S., 2005c. 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, 2005. Leben und Arbeiten in Deutschland, Ergebnisse des Mikrozensus 2004, Tabellenanhang zur Pressebroschüre. Accessed 08/13/2005 at: http://www.destatis.de/presse/deutsch/pk/2005/Tabellenanhang_MZ2004.pdf

- 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.
- Wagner, G.G., Burkhauser, R.V., Behringer, F., 1993. The English language public use file of the German Socio-Economic Panel. *The Journal of Human Resources* 28 (2), 429-433.
- Waite, L. J., Gallagher, M., 2000. *The Case for Marriage: Why Married People are Happier, Healthier, and Better Off Financially*. Doubleday, New York, NY.
- Waldfoegel, 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.