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# How do German Couples spend their Time? A Panel-Data Analysis\*

By Miriam Beblo\*\*

## Summary

*To investigate whether the division of housework between German couples can be explained by factors identified in the competing theoretical approaches to intrafamily time allocation, a three-regression model is estimated with data from the German Socio-Economic Panel. A mixed specification is applied that accounts for both fixed and random individual-specific effects. The empirical results reveal that, allowing for variables identified by the traditional theory, gender-specific household activity is also influenced by the age difference between spouses, which serves as an indicator for a strategic advantage in family decision making.*

## 1. Introduction

How do German couples spend their time? In particular, what determines the amount of housework time provided by each partner? The intrafamily time allocation decisions of German couples are analyzed in this paper to answer these questions. The empirical results presented here are directly comparable with those of a study of families in the United States conducted by Hersch and Stratton (1994), which used gender-specific household activity data from the Panel Study of Income Dynamics (PSID). Hersch and Stratton examined the time use, in particular the time devoted to household tasks, of more than 6,000 white American couples during the years 1979 to 1987. They restricted their sample to dual-earning married couples between the ages of 20 and 64.

To explore the division of housework in Germany, similar data from the German Socio-Economic Panel (GSOEP) covering the years from 1985 to 1994 are analyzed here.<sup>1</sup> As an individual household microdata panel, the GSOEP is roughly comparable with the PSID in both scope and design. The GSOEP is an even richer data source for the analysis of individual time use, having more detailed questions at the individual level. (The PSID only provides answers from the husband on his own time use and that of his wife.) In addition to investigating German families' time allocation decisions, the present study extends the work of Hersch and Stratton in two respects. First, a non-cooperative bargaining hypothesis is derived and tested. Second, the panel structure of the data is exploited by controlling for individual-specific effects in the estimations.

The paper begins with a descriptive analysis of the time use of working couples in the GSOEP as it relates to various household characteristics. In the third section, two competing theoretical approaches to intrafamily time allocation are presented: the traditional time allocation theory and a

noncooperative bargaining model. The latter approach incorporates the existence of dominance as a strategic advantage in family decision making.

To investigate whether the division of housework can be explained by factors identified in the competing approaches, a three-regression model is estimated using the GSOEP sample pooled over time. One regression is run for time contributed to housework by each of the partners and another for the husband's share of housework time. Next, the estimation is extended to control for unobserved individual-specific characteristics using a mixed specification that accounts for both fixed and random effects. The paper concludes with a summary of the empirical findings and the implications for the modeling of intrafamily time allocation.

## 2. The Time Use of Working Couples

The empirical results in this paper are based on time use data from the West German subsample of the GSOEP, encompassing ten waves over the time period from 1985 to 1994 (with the exception of the year 1990).<sup>2</sup> The analysis is restricted to married couples in which both spouses have paid jobs. It is further limited to adults aged 20 to 60 to minimize the influence of changes in work patterns due to retirement. The final sample includes 1,595 couples with 5,183 observations.

The time use data are based on the following question that husbands and wives were each asked separately: "What does your typical (work-)day look like? How many hours do you spend on the following activities: occupation (including multiple jobs and commuting time); housework and shopping; child care; repairs to the house or the car and garden work; other time uses (among these education, TV, hobbies)?"

Table 1 summarizes the respondents' answers broken down by various household characteristics.<sup>3</sup> The division of housework in Germany looks very similar to what has

\* This is the short version of a discussion paper (Beblo 1998) entitled "Intrafamily Time Allocation: A Panel-Econometric Analysis of the Division of Housework Time among German Couples." For estimation results not reported here please refer to that paper.

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<sup>1</sup> For a detailed description of the GSOEP see Wagner et al. (1993).

<sup>2</sup> Time use questions in wave G of the GSOEP differed from other years, so no data from that year have been used.

<sup>3</sup> The sample is restricted to individuals who did not report more than 24 hours per activity. Double counting of multiple activities may still occur, as seems obvious, for example when running errands and caring for the children at the same time. Actual double counting, however, appears to be of subordinate importance, as can be seen with the summed means of Table 1 (11.99 hours total for the average man and 13.08 hours for the average woman). These numbers still allow for a residual amount of time for other uses, most importantly leisure and personal care.

Table 1

## Average Time Use of Working Spouses

	Hours Spent Per Day		Male Share
	Husband	Wife	
<b>All Respondents (n = 5,183)</b>			
Job	9.50	7.58	0.56
Housework	0.85	3.35	0.20
Child care	0.65	1.59	0.29
Repairs, garden	0.99	0.56	0.64
<b>Couples without Children (n = 2,691)</b>			
Job	9.57	8.12	0.54
Housework	0.81	3.03	0.21
Child care	0.05	0.12	0.29
Repairs, garden	1.03	0.59	0.64
<b>Couples with Children (n = 2,492)</b>			
Job	9.43	7.00	0.57
Housework	0.90	3.70	0.20
Child care	1.30	3.18	0.29
Repairs, garden	0.96	0.53	0.64
<b>Wife Working Full-time (n = 3,533)</b>			
Job	9.46	8.79	0.52
Housework	0.87	2.87	0.23
Child care	0.60	1.16	0.34
Repairs, garden	0.95	0.45	0.68
Source: GSOEP, waves B-K (excluding wave G).			

been found for the United States. In both countries, wives spend much more time on housework. On average, German men perform 20 percent of a family's total housework and about 30 percent of its child care. Secondly, family work hours overall and the difference between male and female hours increase with the presence of children in the household. The difference in hours decreases slightly when the wife holds a full-time job.<sup>4</sup>

When the wife has full-time employment her average job-working time is still 40 minutes less than her husband's, whereas her housework is three times greater than his and her child care time is double. Despite having full-time employment, this indicates not only a greater overall time burden for the wife (i.e., less leisure time) but also specialization of men and women according to traditional gender-specific responsibilities.

Whereas the presence of children results in a visible effect on the daily time pattern of the wife, it has only a marginal impact on the time use of the husband. His time use only changes with regard to child care time, not with regard to the accompanying greater workload in the

household. Again, in spite of increasing female employment and the dissolving gender-specific division of paid work, family work still remains the responsibility of the woman. Overall male time use stays relatively constant, seemingly independent of household characteristics. It is the women's time use that forms the flexible factor in adjusting to the varying demands of family work.<sup>5</sup>

### 3. Theoretical Approaches to Intrafamily Time Allocation

Various economic approaches have attempted to explain the individual choice of time use and the division of labor

<sup>4</sup> Please note that all averages reported here refer to the pooled sample of 5,183 observations. Due to the unbalanced panel design, some couples appear more often than others. This has to be kept in mind when generalizing the results.

<sup>5</sup> For a comparison of these findings with the time use data gathered by the German Federal Statistical Office in 1991/92 (Statistisches Bundesamt 1995) please refer to Beblo (1998).

within households. The first approach to modeling time allocation decisions was made by Becker (1965) in his pioneering contribution to the "New Home Economics." This approach was later extended by Gronau (1973, 1977). Within this framework both spouses specialize according to their comparative advantages in the competing time uses. Thus, higher male wage rates or poorer promotion prospects of women automatically lead to the well-known gender-specific division of work. Furthermore, the mere ability of women to bear children as well as the complementarity between the bearing and rearing of children establishes a female comparative advantage in household activities, according to Becker (1981, 21f). In this context the division of labor within families is seen as biologically determined. Since in this unitary model the household is treated as a single decision-making unit, different preferences of husband and wife, in particular the existence of dominance or power within the household, are ignored.

Modeling intrafamily decision making as a bargaining game provides an alternative approach that explains the gender-specific division of labor by means of a dominance argument. In this paper I focus on the noncooperative bargaining model of Bolin (1996, 1997), which explains the unequal division of family work as the outcome of a Stackelberg game between the spouses.<sup>6</sup> In this model husband and wife both maximize the consumption of two goods, a private good that is paid for by individual labor income and a public family good that is generated by household production. Even if the product "housework and child care" is only provided by one spouse, as a public good it will be consumed by the other partner as well. As a Stackelberg leader, the dominating first mover can decide on his time allocation first. In particular he fixes his provision of the family good and, thus, sets the restrictions for the time use decision of his partner.<sup>7</sup>

Dominance or power as a strategic advantage may arise due to an age difference between the spouses. In the typical case with the husband older than his wife (three years on average in the sample) he has a head start in deciding about his labor force participation. In terms of intrafamily time allocation he acts, whereas his wife can only react, given his time use and his contribution to household production. Apart from any specialization due to comparative advantages, dominance within a family also leads to a specialization in paid labor of the dominating spouse since this is the only source of income and, thus, for private consumption. The dominated spouse will then produce the family good. This noncooperative setting offers the advantage of allowing us to distinguish the empirical results drawn from the game theoretic approach from those of the traditional model. This is accomplished by using the age difference between husband and wife as a proxy for dominance within the household, that is, as an indicator variable for a strategic advantage in family decision making.

#### 4. The Division of Housework Time: Estimation Results

To investigate whether the division of housework can be explained by factors identified in the competing theoretical approaches, a three-regression model is estimated (as in Hersch and Stratton 1994): one regression for time contributed to housework by each of the partners and one regression for the husband's share of housework time. First, the linear relationship between the husband's share of total housework time and various individual and household variables is estimated to reflect the actual intrafamily time allocation decision. In the second and third regressions, the respective amounts of housework time of husband and wife are the dependent variables. This procedure allows us to view the impact of the household variables on the husband's share as the combination of the impact on his time use and his wife's separately.

Which factors are identified as important by the competing theoretical approaches? According to Becker's comparative advantage theory, the husband's contribution to the household's total labor income and his educational level (measuring his success in the paid labor market) should show a negative effect on his housework share as well as the absolute amount of his housework. Conversely, these variables are predicted to have a positive impact on the wife's housework. Because of the substitutability of home-produced goods with purchased market goods, total household income is supposed to be negatively correlated with the housework time of both spouses, while more hours contributed to an occupation might be accompanied by less own family work but more for the partner. Additionally, in the presence of children we expect the mother to specialize in housework, and thus expand her family work hours, and the father to pull back.

Two age-based variables are used to account for cohort effects as well as the dominance effect. The average of the husband's and wife's ages provides a control for changes in attitudes and social norms regarding the household division of labor and gender roles. To capture the dominance effect, the age difference between husband and wife is included to serve as an indicator for a first-mover advantage

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<sup>6</sup> Fleck (1996) applies a similar model to explain the labor force participation of women in Honduras. The unequal division of housework time might also be interpreted as the outcome of a cooperative bargaining game (see, for example, Manser and Brown 1980; McElroy and Horney 1981; Chiappori 1988; Lundberg and Pollak 1993; Ott 1992) with asymmetric bargaining weights assigned to the household members. These bargaining weights would then be determined by the spouse's relative power or, as Katz (1997) argues, their respective "voices" in the decision-making process.

<sup>7</sup> Konrad and Lommerud (1995) also model the family decision as a noncooperative game in which both spouses decide on the supply of a family public good. Treating husband and wife as equals, however, they use a Cournot game with simultaneous decision making.

in intrafamily time allocation decisions. The larger the age difference between the spouses the smaller the amount of housework expected by the first mover (husband) and the higher the contribution expected by the follower (wife). In the comparative advantage model, on the contrary, this variable is not expected to have any influence once the partners' efficiency in the paid labor market is controlled for.

### Pooled Sample

Table 2 shows the estimates from the least squares regression on the pooled (unbalanced) observations. The first two columns indicate that the higher the husband's share of labor income and the more hours spent on his job, the lower his contribution to household production, whether measured as a fraction of total housework hours or as the number of hours. As expected, this is accompanied by an increase in the female's household activity in column 3. The second row shows that as total household income rises, both spouses devote fewer hours to housework and child care. The husband's relative share, however, still decreases. At high income levels, while partners' work in the home decreases overall, the basic family activities are increasingly the wife's responsibility.

Each additional year of schooling, whether the husband's or wife's, significantly increases the man's share of household work: by 0.4 percent or 0.8 percent, respectively. While additional education reduces the wife's housework

time, her husband takes over more family activities. This observation is consistent with both the specialization and the dominance arguments. The male education results might be interpreted as an indication of assortive matching on the marriage market. That is, men with a higher educational level tend to marry women with a high level of human capital and, thus, specialization advantages within the household are reduced. An alternative explanation would be that of attitudinal differences toward a gender-based division of work in the family depending on the educational background in the household.

The presence of children in the household (as captured in a dummy variable for children aged 16 and under living in the household) decreases the male share by 2 percent. This is because mothers expand their household activities when a child is to be cared for.

The higher the age average of the spouses, the lower the male share and hours of household activity and the higher the wife's hours. Thus, the German data suggest, even more than the results of Hersch and Stratton, that in younger couples men assume an increasing share of the family work. This is consistent with changing attitudes over time and a gradual turning away from traditional gender roles.<sup>8</sup>

<sup>8</sup> Nonetheless these small coefficients suggest that Hersch's and Stratton's vision of diminishing gender differences in work histories and housework time paired with greater equity in the allocation of housework is not exactly around the corner.

Table 2

OLS Coefficient Estimates of the Pooled Sample

	Husband's Share of Housework Time		Hours Housework Time, Husband		Hours Housework Time, Wife	
	Coefficient	Standard Deviation	Coefficient	Standard Deviation	Coefficient	Standard Deviation
Husband's share of wage income	-0.110**	0.02	-0.37**	0.12	1.73**	0.21
Household income/1000	-0.003**	0.001	-0.029**	0.006	-0.05**	0.01
Hours paid work, husband	-0.017**	0.001	-0.082**	0.007	0.03**	0.01
Hours paid work, wife	0.011**	0.001	0.02**	0.01	-0.20**	0.01
Education, husband	0.004**	0.001	0.009	0.007	-0.04**	0.01
Education, wife	0.008**	0.001	0.013*	0.008	-0.06**	0.01
Child dummy	-0.023**	0.006	0.08**	0.03	0.49**	0.05
Age average	-0.0027**	0.0003	-0.005**	0.002	0.028**	0.003
Age difference	-0.0023**	0.0006	-0.010**	0.003	0.004	0.006
Constant	0.35**	0.03	1.80**	0.16	3.45**	0.27
Adjusted R <sup>2</sup>	0.10		0.04		0.23	

\* indicates significance at 10 percent. — \*\* indicates significance at 5 percent.

Data source: GSOEP, waves B-K (excluding wave G).

The inclusion of the age difference between spouses as an indicator for dominance, on the other hand, reveals a statistically significant inverse relation with the husband's contribution to housework. This is consistent with the prediction from the noncooperative model: the larger the age difference between husband and wife the higher their home chores gap, *ceteris paribus*. Each additional year between the husband's and the wife's ages reduces male housework time by 40 seconds (starting from an average of 51 minutes) whereas the impact on female hours is not statistically significant.<sup>9</sup>

In spite of all the differences between the American and German studies — different time periods as well as country-specific differences in culture, political background, and labor markets — to a large extent the GSOEP data show the same patterns as in the PSID. (For a summary comparison of the American and the German estimation results refer to Beblo 1998.)

### Individual-Specific Effects

Up to now the analysis has been solely based on the pooled panel data set. Yet, individual preferences or characteristics and household structures might well make a difference in a person's use of time. In fact, the failure of an F-test for the equality of all individual effects (Judge et al.

1988) leads to the conclusion that the individual heterogeneity of the sample needs to be taken into account in order to obtain efficient estimation results. Extending the approach of Hersch and Stratton, we can allow for these unobservable individual-specific aspects of family work by controlling for fixed or random individual effects.

In a fixed effects specification, dummy variables for every single respondent are introduced to take into account omitted time-invariant characteristics that may be correlated with some of the included variables. In a random effects specification, on the contrary, individual-specific factors are regarded as independent random variables uncorrelated with the included variables. The fixed effects approach is appropriate here since we have no reason to believe the individual effects are uncorrelated with the other regressors. For example, the health of the spouses may influence their ability to perform market work and their preferences for housework.<sup>10</sup>

<sup>9</sup> Though this is a rather small effect, including the dominance indicator leads to a slightly better fit of the model; raising the adjusted R<sup>2</sup> from 10.0 percent to 10.2 percent for the husband's share equation.

<sup>10</sup> This claim is supported by the rejection of the null hypothesis of the Hausman test for the equality of the fixed affect estimator and the generalized least square estimator (Judge et al. 1988).

Table 3

### "Mixed Effects" Regression

	Husband's Share of Housework Time		Hours Housework Time, Husband		Hours Housework Time, Wife	
	Coefficient	Standard Deviation	Coefficient	Standard Deviation	Coefficient	Standard Deviation
<b>Step 1: Fixed effects</b>						
Husband's share of wage income	-0.14**	0.04	-0.36*	0.22	2.11**	0.36
Household income/1000	-0.003**	0.001	-0.02**	0.01	-0.03**	0.01
Hours paid work, husband	-0.007**	0.002	-0.03**	0.01	0.025	0.016
Hours paid work, wife	0.004**	0.002	-0.006	0.009	-0.14**	0.02
Child dummy	0.01	0.01	0.12**	0.06	0.30**	0.09
Age average	0.05**	0.02	0.09	0.08	-0.10	0.14
Adjusted R <sup>2</sup>	0.41		0.31		0.47	
<b>Step 2: Random effects</b>						
Education, husband	-0.0002	0.0003	0.0016**	0.0005	-0.003**	0.001
Education, wife	-0.0002	0.0003	-0.0027**	0.0005	0.0005	0.0015
Age difference	-0.00018	0.00013	-0.0001	0.0002	0.0023**	0.0007
Constant	0.004	0.003	0.007	0.005	0.018	0.015
Adjusted R <sup>2</sup>	0.0002		0.005		0.003	
* indicates significance at 10 percent. — ** indicates significance at 5 percent.						
Data source: GSOEP, waves B-K (excluding wave G).						

A fixed effects estimator requires within-group variation of all variables, however. Since education and birth years do not vary in time, at least not in the observed sample of already employed adults, the corresponding variables cannot be included in the fixed effects regression. In this case only a reduced regression equation with time-variant variables can be estimated. Due to the theoretical relevance of the variables education and age difference, a mixed specification that allows for both time-varying and time-constant individual factors appears to best fit the data. Following a procedure proposed by Hsiao (1989, 50 ff.), in a first step, OLS estimation is applied to a fixed effects specification with time-variant variables only. Coefficient estimates for the time-constant variables are then obtained by regressing the individual-specific time average of the first step's residuals on all time-invariant variables assuming random individual-specific effects.

As the estimation results of this two-step procedure, presented in Table 3, show, the age difference still has a statistically significant effect on the division of housework, at least with respect to the wife's housework time.<sup>11</sup> Economically speaking, the larger the age gap between the spouses and, thus, the more pronounced the first-mover advantage of the husband, the greater is the home chores gap predicted by the dominance argument.

The estimates of the mixed specification do not differ substantially in sign and magnitude from those of the pooled model.<sup>12</sup> However, the mixed specification is more appealing because it incorporates both the better fit of the fixed effects specification, by allowing for individual dummy variables, and the greater analytical potential of the random effects specification by also including time-invariant variables.

## 5. Concluding Remarks

We may summarize the empirical results as follows: if there is anything like a constant in intrafamily time allocation, then it appears to be the amount of time husbands devote to household production and work in the labor

market. Regardless of household characteristics, men perform about 20 percent of a family's total housework and 30 percent of its child care activity. A flexible adjustment to differing family circumstances is exclusively provided by the wife's time use, in particular, her leisure time. Noncooperative bargaining approaches, namely the dominance models of Bolin and Fleck, relaxes the assumption of unitary preferences in the comparative advantage model and adds another potential explanation for the gender-specific division of household work.

Econometrically, we find results that match with the United States literature and are largely consistent with the comparative advantage model: housework hours decrease with family income and with variables that reflect efficiency in the paid labor market. In addition, the age difference between spouses is also found to be significant in some cases. This may be interpreted as an indicator for a strategic advantage in family decision making in favor of the older spouse, even after controlling for the fact that husbands spend less time on household activities as a consequence of higher relative wage earnings and more hours dedicated to the labor market. This finding supports the dominance argument that the home chores gap between husband and wife increases with their age difference. The result holds even when allowing for both fixed and random individual-specific effects within a mixed specification framework.

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<sup>11</sup> At this point it should be noted that if the individual-specific effect is correlated with the time-constant variables the OLS estimates will be inconsistent and a more elaborate procedure suggested by Hausman and Taylor (1981) must be applied. For this reason the T-statistic might not provide reliable values to be able to reject the null hypothesis of no relationship between the regressors and the respective housework hours. The signs of the coefficient estimates for age difference, however, are consistent with the findings of the pooled regression and the dominance hypothesis.

<sup>12</sup> There are two exceptions. The presence of a child now has no significant effect on the husband's share of family activity, whereas in the pooled OLS case, there was a negative effect. The coefficient on the age average also changes sign when individual-specific effects are included.

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