

## Parental Child Care in Single-Parent, Cohabiting, and Married-Couple Families: Time-Diary Evidence from the United Kingdom

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### Article:

The time that parents spend caring for their children is a topic of intense interest among researchers, policymakers, and parents themselves. Parental inputs of time are enormously valuable investments in children’s well-being and development. However, the declining prevalence of two-parent, married-couple families and the steady influx of mothers into the labor market are generally believed to have placed these investments at risk.

We use time-diary data from the United Kingdom 2000 Time Use Study (UKTUS) to investigate how parents’ time spent in child care differs with their marital status and other characteristics. Unlike previous economic studies, which have analyzed alternative child-care activities but only among two-parent families (e.g., Peter Kooreman and Arie Kapteyn, 1987; Daniel Hallberg and Anders Klevmarcken, 2003), we examine differences among married, cohabiting, and single-parent families. The household production model indicates that single-parent households may differ from married and cohabiting households either because there are fewer time resources or because there are fewer opportunities for economies of scale or specialization in household activities (Gary Becker, 1985). If marital relationships are more stable than cohabiting relationships, the type of union may matter.

Time-allocation decisions will also be influenced by market opportunities, gender, and perceived need. The household production model predicts that differences in market opportunities will affect child-care outcomes. Accordingly our analyses incorporate schooling measures, local unemployment rates, and regional indicators. While the gender gap in time use has narrowed over time, women still devote more time to child care and less time to paid work than men. Differences in opportunities as well as initial differences in skills, attitudes, custom, or bargaining power could affect how specialization plays out across gender. Accordingly, we distinguish between men and women. Finally, information on the age and health status of family members is incorporated to capture needs.

### *I. Data*

The UKTUS is a national household-based study with questionnaire and time-diary components. The questionnaires asked about household characteristics including income and family composition and individual characteristics including education, employment, earnings, and demographic information. Each household member was asked to complete a weekday and weekend time diary identifying his/her primary and secondary activities for each 10-minute interval over the two days. The UKTUS obtained 20,981 time diaries from 11,664 people living in 6,414 households. We focus on the time use reported by parents of children under age 18 and exclude parents who lived in complex households (with multiple sets of parents or unrelated children), were enrolled in school, were of retirement age, or provided incomplete questionnaire or diary information. These exclusions reduced the final analysis sample to 5,134 diaries for 2,715 adults living in 1,639 households.

We focus on three uses of time: primary child care, secondary child care, and market work. Child-care activities include physical care, teaching, playing, talking, escorting, and transporting children living in one's own household (childcare for others is excluded). Our primary child-care time measure is constructed by summing up all minutes spent on child-care activi-

TABLE 1—AVERAGE ACTIVITY TIMES BY LIVING ARRANGEMENTS AND GENDER

Variable	Living arrangements		
	Married	Cohabiting	Single
<b>Women</b>			
Minutes in primary child-care activities	91.1	118.9	90.9
Minutes in secondary child-care activities	60.2	69.8	64.2
Minutes in market work activities	129.3	114.3	95.1
Number of diaries	2,030	300	614
<b>Men</b>			
Minutes in primary child-care activities	41.9	49.2	34.9
Minutes in secondary child-care activities	29.3	26.5	70.7
Minutes in market work activities	262.1	262.3	182.8
Number of diaries	1,852	277	61

ties as a primary activity. Our measure of secondary child-care time is constructed similarly by summing up all minutes spent on childcare activities as a secondary activity when the primary activity was not also child care. Market work activities are specified to include first and second jobs, travel related to work (not commuting time), and lunch and coffee breaks.

Table 1 reports the average time use and sample sizes separately for men and women who are married, cohabiting, and single. On average, women spend over twice as much time in primary child-care activities and only half as much time in market work activities as men. Cohabiting women report more time in primary and secondary childcare activities than either married or single women, while single men report less primary time but more secondary time in child care than either married or cohabiting fathers.

## II. Econometric Specification

For each household, we model the total minutes that a parent devotes to primary child-care activities, secondary child-care activities, and market work activities on a given day using gender-specific Tobit specifications. Let  $g$  ( $= f, m$ ) denote the gender of the parent and  $d$  ( $= 1, 2$ ) denote the day (to simplify notation, we omit subscripts identifying households).

The parent's latent, or desired, total time spent in primary child-care activities,  $\text{PrimCC}_{g,d}^*$ , is specified as a linear function of the parent's living arrangements,  $\mathbf{L}$ ; other observed characteristics of the household, person, and day,  $\mathbf{X}_{g,d}$ ; a person-specific unobserved variable,  $\mu_g$ ; and a person- and day-specific unobserved component,  $\varepsilon_{p,g,d}$ , such that

$$(1) \quad \text{PrimCC}_{g,d}^* = \boldsymbol{\gamma}'_{p,g} \mathbf{L} + \boldsymbol{\beta}'_{p,g} \mathbf{X}_{g,d} + \mu_g + \varepsilon_{p,g,d}.$$

We only observe the parent's latent child-care time if it is positive; otherwise, child-care time is censored at zero.

The parent's latent or desired minutes spent in secondary child-care activities and work activities are similarly specified as

$$(2) \text{ SecCC}_{g,d}^* = \boldsymbol{\gamma}'_{S,g} \mathbf{L} + \boldsymbol{\beta}'_{S,g} \mathbf{X}_{g,d} + \lambda_{S,g} \mu_g + \varepsilon_{S,g,d}$$

$$(3) \text{ MktWork}_{g,d}^* = \boldsymbol{\gamma}'_{M,g} \mathbf{L} + \boldsymbol{\beta}'_{M,g} \mathbf{X}_{g,d} + \lambda_{M,g} \mu_g + \varepsilon_{M,g,d}$$

Latent or desired minutes devoted to secondary child-care activities and market work are each observed only if they are positive and are censored at zero otherwise.

For each parent on each day, the idiosyncratic errors are distributed as follows:

$$(4) \begin{bmatrix} \varepsilon_{P,g,d} \\ \varepsilon_{S,g,d} \\ \varepsilon_{M,g,d} \end{bmatrix} \sim N \left( \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_{P,g}^2 & \rho_{PS,g} \sigma_{P,g} \sigma_{S,g} & \rho_{PM,g} \sigma_{P,g} \sigma_{M,g} \\ \rho_{PS,g} \sigma_{P,g} \sigma_{S,g} & \sigma_{S,g}^2 & \rho_{SM,g} \sigma_{S,g} \sigma_{M,g} \\ \rho_{PM,g} \sigma_{P,g} \sigma_{M,g} & \rho_{SM,g} \sigma_{S,g} \sigma_{M,g} & \sigma_{M,g}^2 \end{bmatrix} \right)$$

The idiosyncratic errors are otherwise uncorrelated across days for a given parent and across parents within a given household. The person-specific random effects are

$$(5) \begin{bmatrix} \mu_f \\ \mu_m \end{bmatrix} \sim N \left( \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_{\mu,f}^2 & \rho_{\mu} \sigma_{\mu,f} \sigma_{\mu,m} \\ \rho_{\mu} \sigma_{\mu,f} \sigma_{\mu,m} & \sigma_{\mu,m}^2 \end{bmatrix} \right)$$

The coefficients  $\lambda_{S,g}$  and  $\lambda_{M,g}$  in equations (2) and (3) represent factor loadings on the person-specific random effects. The random effects and idiosyncratic errors are assumed to be distributed independently of one another. With these assumptions, the model is a system of correlated Tobit models with a flexible, yet estimable covariance structure. We obtain estimates of the model parameters using a maximum-likelihood procedure in the aML software package.

### III. Results

Results from the correlated Tobit models of time use are reported in Table 2. The first part of the table lists estimated coefficients and standard errors from Tobit models of the time that women spend in primary child care, secondary child care, and market work, while the second part lists the corresponding estimates for men. Each model includes observed controls for the parent's living arrangements; the number of children in different age ranges; the presence of disabled children; the number of other adults; the receipt of nonlabor income; the parent's education, age, and physical limitations; the local unemployment rate; the region of residence; whether the residence is located in a rural area; whether the time use refers to a weekend day; and the season of the report. Because of space limitations, results for some coefficients are suppressed (complete results are available from the authors upon request). The models also include the random effects, correlation coefficients, and factor loadings described in the previous section; specification tests indicated that these controls were jointly significant.

Estimation reveals that single, non-cohabiting women and men spend more time in child care and less time in market work than their married counterparts. Note that the coefficients in Table 2 show the relationship between the explanatory variables and latent, rather than actual, time use. Calculations of the marginal effects indicate that single women spend 19 minutes more in child care and 32 minutes less in market work than married

women, while single men spend 63 minutes more in child care (almost all in secondary activities) and 72 minutes less in market work than married men. Thus, the model-based estimates of the differences in child-care time between single and married parents are substantially larger than the unadjusted

TABLE 2—ESTIMATION RESULTS FROM CORRELATED TOBIT MODELS OF CHILD CARE AND MARKET WORK

Variable	Primary child care	Secondary child care	Market work
<i>Results for Women:</i>			
Cohabiting	-7.8 (7.9)	16.2 (14.6)	-0.4 (35.0)
Single	10.7 <sup>†</sup> (6.1)	24.1* (10.0)	-96.2** (24.9)
Number of children aged 0-1	148.4** (6.0)	81.9** (11.2)	-238.1** (36.0)
Number of children aged 2-3	59.9** (6.5)	95.3** (11.0)	-143.1** (29.7)
Number of children aged 4-6	44.3** (5.2)	59.7** (8.6)	-73.8** (22.9)
Number of children aged 7-11	18.4** (3.8)	40.7** (6.4)	-51.2** (15.1)
Number of children aged 12-17	-17.1** (3.7)	-1.8 (6.2)	-13.4 (16.0)
Any disabled children	62.7 <sup>†</sup> (15.3)	98.0** (22.6)	-100.5 (65.6)
Number of other adults	-15.0** (4.5)	-6.6 (9.5)	-31.3 (21.1)
Any nonlabor income	14.4 <sup>†</sup> (5.7)	8.1 (10.5)	-6.1 (25.0)
Person has a health limitation	2.9 (8.6)	-15.8 (14.7)	-96.2** (30.6)
Weekend	-41.8** (4.2)	-2.1 (7.4)	-387.8** (32.5)
Advanced degree	27.6** (8.4)	56.8** (14.9)	106.8** (35.7)
Local unemployment rate	-0.1 (0.7)	-1.3 (1.3)	-10.7** (3.1)
$\sigma_{P,f}, \sigma_{S,f}, \sigma_{M,f}$	83.0** (1.8)	132.2** (3.0)	389.7** (17.8)
$\rho_{PS,f}, \rho_{PM,f}, \rho_{SM,f}$	0.003 (0.03)	-0.14** (0.04)	-0.04 (0.04)
$\sigma_{\mu,f}, \lambda_{S,f}, \lambda_{M,f}$	52.0** (2.5)	1.8** (0.1)	-1.5** (0.3)
<i>Results for Men:</i>			
Cohabiting	-13.2 (9.0)	-12.6 (19.4)	-4.2 (29.2)
Single	19.9 (20.7)	126.6** (29.2)	-132.7** (51.5)
Number of children aged 0-1	74.6** (7.5)	55.6** (16.7)	-42.2 (29.4)
Number of children aged 2-3	55.9** (7.3)	80.3** (15.6)	-23.5 (26.3)
Number of children aged 4-6	33.8** (6.0)	37.4** (11.2)	-25.2 (20.3)
Number of children aged 7-11	12.4** (4.4)	37.2** (8.6)	-27.1 <sup>†</sup> (15.2)
Number of children aged 12-17	-12.2** (4.5)	-5.1 (9.2)	-18.7 (15.5)
Any disabled children	5.2 (28.0)	17.5 (40.8)	-42.9 (67.0)
Number of other adults	-14.9** (7.6)	-47.7** (18.3)	-7.2 (20.1)

TABLE 2—Continued.

Variable	Primary child care	Secondary child care	Market work
<i>Results for Men: (continued)</i>			
Any nonlabor income	7.4 (7.0)	13.3 (14.4)	-18.4 (24.7)
Person has a health limitation	19.1 <sup>†</sup> (10.9)	36.0 <sup>†</sup> (19.8)	-317.1** (34.3)
Weekend	6.1 (5.7)	38.5** (10.2)	-511.3** (31.2)
Advanced degree	18.3 <sup>†</sup> (10.6)	22.6 (19.4)	-49.0 (35.3)
Local unemployment rate	-1.8** (0.9)	-3.6** (2.0)	0.8 (2.8)
$\sigma_{P,m}$ , $\sigma_{S,m}$ , $\sigma_{M,m}$	90.8** (2.7)	138.6** (5.1)	359.1** (12.7)
$\rho_{PS,m}$ , $\rho_{PM,m}$ , $\rho_{SM,m}$	0.15** (0.05)	-0.25** (0.04)	-0.20** (0.05)
$\sigma_{\mu,m}$ , $\lambda_{S,m}$ , $\lambda_{M,m}$	43.7** (4.6)	2.1** (0.3)	-1.3** (0.4)
$\rho_{\mu}$		0.34** (0.07)	

*Notes:* Models are estimated using data from the UKTUS and include controls for age, age squared, other levels of schooling, rural residence, season of year, region of residence, and an intercept. Standard errors appear in parentheses.

<sup>†</sup> Statistically significant at the 10-percent level.

\* Statistically significant at the 5-percent level.

\*\* Statistically significant at the 1-percent level.

differences from Table 1, while the differences in work time are slightly attenuated. The coefficients on the cohabiting dummy variable in the child-care and market-work time models are not individually or jointly statistically significant for women or men. Thus, the finding from the descriptive analysis of a large difference in child-care time between married and cohabiting women is not borne out in estimates that adjust for personal and household characteristics.

The number of children aged 11 and younger is a statistically and substantively important determinant of time use for men and women. For both genders, minutes spent in child care increase with the number of young children. The number of children aged 12–17 is negatively associated with primary child care, a result that is consistent with older children both needing less care and acting as caregivers themselves. Having more adults in the household also lowers women's and men's primary child-care time and men's secondary child-care time. Hence, other adults also appear to serve as substitute caregivers. The numbers of older children and other adults are not significantly associated with market work for men or women.

Having a disabled child increases the primary and secondary child-care time spent by women but not by men. However, the presence of a disabled child has no effect on market work for either gender. The estimates indicate that parents with health limitations work less than other parents. Interestingly, men with health limitations spend more time on both primary and secondary child-care activities, while women with health limitations do not.

As expected, women and men spend less time in market work on weekends. Women devote less time to primary child-care time on weekends, while men spend more time in secondary child care on weekends, suggesting a substitution between men and women as to when and how they assume child-care responsibilities. The correlation coefficients on the unobserved terms further indicate that men and women who spend more primary time in child care spend significantly less time in market work, suggesting substitution across types of activities. Finally, the intrahousehold individual random effects are positively correlated.

Labor-market opportunities are also important determinants of time use. Highly educated women devote more time to market work and child care than less educated women. For men, an advanced degree is negatively associated with market work and positively associated with child care. Higher unemployment rates result in fewer hours of market work spent by women and fewer hours of child care by men.

Lastly, receipt of household nonlabor income increases primary child-care time spent by women, suggesting that better household financial resources allow families to substitute mothers' time for purchased care in the production of child well-being.

#### *IV. Conclusion*

Our analysis of data from the United Kingdom indicates that married and cohabiting parents are very similar with respect to the time they spend in child care and market work but that single parents spend more time in child care and less time in market work than other parents. The results also suggest that the effects of family structure and other variables on time spent in child care and market work are usually similar in direction, though often substantially different in magnitude, for men and women.

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