The Quantity and Quality of Child Care Provision in Australian Households

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Charlene M. Kalenkoski
Ohio University
Department of Economics
Bentley Annex 351
Athens, OH 45701
(740) 593-2022 (phone)
(740) 593-0181 (fax)

Gigi Foster
University of South Australia
School of Commerce
Elton Mayo building, North Terrace
Adelaide, South Australia 5001
+618-8302-0821 (phone)
+618-8302-7001 (fax)

Abstract:

Using data from the 1992 and 1997 Australian Time Use Surveys, we explore the patterns of child care time spent by parents in Australia and estimate censored regression models of the quantity and quality of the time that parents spend in child care and the time parents spend in market work. Our results show that mothers and fathers differ remarkably in the determinants and levels of the quality of time they spend with children. We also find that how the quality of time spent caring for children is conceptualized affects the conclusions we draw about the determinants of parental child care time.

Introduction

In the past twenty years there has been a renewed interest in time-use research by economists. This has partly been a function of the growth in the availability of time use data since the mid-1980's. One area of interest to applied researchers is the amount of time that parents spend caring for their children, as this time is thought to be an important investment in children's well-being. Differences in the amount and fashion of this investment across households may account, in part, for the heterogeneity in future outcomes observed across those children. For instance, Datcher-Loury (1988) shows that an increase in child care time by highly educated mothers raises children's eventual years of schooling (although this is not true for less-educated mothers). Muller (1995) provides evidence that unsupervised time after school reduces a child's performance on eighth-grade math achievement tests. Amato and Rivera (1999) show that fathers' involvement reduces behavior problems in children. Time diary data make possible the detailed exploration of patterns of child care time in the home, providing us with the opportunity to enhance our understanding not only of children's experiences and behavioral patterns, but of the potential origins of teen and adult inequality.

In the absence of direct measures of child quality, most economic studies of parental child care time using time-diary data have focused on the total quantity of child care time spent by parents. However, if each hour spent by a parent with his/her child is not equally productive, then models of child quality production which do not capture this fact may be misleading to the extent that the heterogeneity of the quality of time spent is correlated with parental observables. Some previous research has dealt with this fact to some extent by separately modeling total time spent in child care as a primary activity

and total time spent in child care as a secondary activity (child care performed when another, non-child care activity is being peformed as the primary activity). However, while readily available in time-diary data sets, there is no *a priori* reason to believe that this is the only or the best way of capturing the quality dimension of parental time inputs to child production. Sociologists suggest that children's social capital may develop as a reflection of norms experienced and observed in the home (Coleman 1988). The developmental psychology literature offers a number of alternative theories (see Shaw and Bell (1993) for a review) regarding how parents' behavior may affect children's later emotional functionality, most of which suggest that it is not only aggregate time parents spend with children that nurtures a child's healthy development. Because previous time-diary research has not focused on the quality of parents' child care time, we do not have much guidance as to how the quality of parental child care time should be measured. However, the sociological and psychological considerations discussed here motivate our use in this paper of three measures of the quality of parental child care time that can be constructed using our data: the *proportions* of a parent's total child care time in which child care is the primary activity, in which child care is the sole task being performed by the parent, and in which the parent is the sole caregiver present during the activity.

In this paper, we exploit detailed Australian time-diary data from 1992 and 1997 to explore the individual-level and household-level determinants of the quantity of a parent's child care time, the quality of that time, and the time the parent spends in market work. Given well-known gender differences in the amount of time mothers and fathers spend in child care we provide estimates separately for mothers and fathers. To account for the time constraint faced by every individual, we specify correlations in the error

terms across the three outcomes (quantity of child care time, quality of child care time, and market work time)..

Our results show that, as expected, there are different patterns in and determinants of the amount and quality of time mothers and fathers spend in child care and the amount of time they spend in market work. They also show that the decision about whether to perform child care as a sole caregiver appears to be related differently to market work and the quantity of child care than our other two measures of child care quality, both of which focus on the priority of child care relative to other activities.

Existing Literature

There are several existing studies of parental child care time that use time-diary data. These papers typically focus on describing the associations of time spent with or for children with demographic and other variables such as gender, household structure, and work-related characteristics. Some look at changes over time, focusing on how women's increased labor force participation has influenced patterns of care in the home. Most focus on the total amount of child care time spent or on the tradeoff between time spent caring for children and time spent working. Most also rely on data from the United States and Europe. Economic studies typically motivate their analyses with Becker's (1965) household production model. In this model, the household chooses time spent in market and household work to maximize its utility over household-produced commodities such as child quality that are produced with household members' time and goods and services purchased in the market. Only a few papers model variance in what may be considered the quality of time spent with children.

Kooreman and Kapteyn (1987) use U.S. data on couples from a University of Michigan survey conducted in 1975-1976 to estimate a model of the allocation of time among different uses. They find a strong effect of the presence of young children on women's child care time that decreases with the age of the children in the household. They also find that the presence of young children reduces women's time spent on entertainment and social activities. However, they find that men's time use in general is unaffected by the presence of children.

Nock and Kingston (1988) use time-diary data from the 1981 Study of Time Use (STU) to examine the tradeoff American parents make between market work and time with their children. They find that parents in single-earner families spend a substantially greater amount of time with children than parents in dual-earner families due to dual-earner families spending more time working in the market, but that the difference is mostly in non-child-oriented activities, such as homemaking. It is thus what may be perceived as lower quality child care that is sacrificed by dual-earner parents.

Bianchi (2000) shows that mothers' time with children in the U.S. has not decreased even as women's labor force participation has increased. She separately investigates three measures of child care time: time spent in child care as a primary activity, time spent in child care as a secondary activity, and time spent with children present. She finds that, regardless of the measure used, mothers spent as much time in 1998 with their children as they did in 1965, if not more, and that if one adjusts for family size, mothers in 1998 may be spending more time per child than mothers in the 1960s.

Sandberg and Hofferth (2001, 2005) use the 1981 and 1997 waves of the Panel Study of Income Dynamics, Child Development Supplement (PSID-CDS) to examine

changes in the total amount of time children in the U.S. spend with their parents given the increase in women's labor force participation and the rise of single-parent families over this period. They find that children's time with parents did not decrease over the period as expected given these demographic changes; rather, it substantially increased.

Hallberg and Klevmarken (2003) use data from the 1984 and 1993 waves of the Swedish household panel study, Household Market and Nonmarket Activities (HUS), to analyze the tradeoff between parents' time with children and time spent in market work, taking into consideration child care provided outside of the home and the process benefits, or utility, derived by parents from both activities. They find that economic incentives affect child care mainly through market work, and also that a change in the fathers' hours of work has a greater influence on parents' time with their children than a change in the mothers' hours of work. They also find that parents prefer joint activities with their children and that outside child care is not a substitute for parents' own time with children.

Kalenkoski, Ribar, and Stratton (2005) use time diary data from the United Kingdom Time Use Survey (UKTUS) to investigate how parents' time spent in child care differs with their marital status and other characteristics. They focus on three uses of time: child care as a primary activity, child care as a secondary activity, and market work. They find that single, non-cohabiting parents of both genders spend more time in child care and less time in market work than married parents, and that there is no statistically significant difference in the time use of married and cohabiting parents. They also find that, for both men and women, minutes spent in child care increase with the number of young children. Finally, they also show that the number of children aged 12-17 in the

household is negatively associated with primary child care, suggesting that these older siblings may be acting as caregiver substitutes for the parents.

Kalenkoski, Ribar, and Stratton (2006) use both the UKTUS data and data from the 2003 and 2004 American Time Use Surveys (ATUS) to estimate the effect of family structure on the time parents spend on child care as a primary activity, passive child care (defined as any time spent with a child when doing some non-child care activity as the primary activity), and market work. They find that, in the U.S. and the U.K., single parents spend more time in both primary and passive child care than married or cohabiting parents. However, while in the U.K. single parents work less than married or cohabiting parents, in the U.S. single parents work more than their married or cohabiting counterparts.

Kimmel and Connelly (2007) also use data from the 2003 and 2004 ATUS to analyze the effect of wages on mothers' child care time. They find a positive effect of both mothers' wages and fathers' earnings on mothers' primary child care time.

Folbre et al. (2005) note three problems with this literature. First, there is a focus on explicit activities that ignores passive care (including time the child is sleeping). Second, there is a focus on parents as the only potential caregivers, ignoring siblings and grandparents. Finally, there is a lack of attention to overlaps of time between parents and children. They propose three different measures of passive care, a measure of active care, and a measure of "care density" defined as the ratio of adults to children under 13 participating in a given activity. They also consider secondary child care as a measure of multi-tasking. Using the 1997 PSID-CDS, they conclude that the upward trend in average hours of care by parents may be misleading, and suggest that new measures and

the investigation of the time spent by other caregivers in the household are needed to paint the complete picture of American child care time expenditures.

Given the small numbers of older siblings and grandparents living in households with children available in our Australian data, we are unable to investigate the time they spend in child care. However, in the spirit of beginning to address Folbre et al.'s (2005) concerns regarding the measurement of child care time we do explicitly model the quality of adults' time with children, utilizing different measures of quality that consider multi-tasking, primary versus passive child care, and whether one or both parents are present during a child care activity. We investigate the determinants of the quality of parental child care time separately by parental gender, accounting for the fact that the quality of a parent's child care time is determined jointly with the quantity of such time and the time that the parent spends in market work. Second, we use two samples of recent Australian time-diary data which have not to our knowledge been used to explore the determinants of the quantity and quality of parental child care time. Finally, we show that our results vary depending on the measure of quality used and thus why it is important to carefully conceptualize and measure child care quality.

Data and empirical approach

The data we use are drawn from the 1992 and 1997 Australian Time Use Surveys. Each survey contains two consecutive days' worth of time-diary data on all adults in a random sample of Australian households. Given the consecutive nature of the two diary days, we treat them together as one 48 hour (2880 minute) reporting period. Our analysis data set therefore includes one observation per individual on an array of household-specific and person-specific variables, including the individual's number of minutes and

quality of time spent in child care, and the number of minutes spent working in the market.

Our sample selection criteria are as follows. First, the few individuals who reported time use only for one day are excluded. Second, only households with children, and in which neither primary adult (the householder or the spouse of the householder) is studying full-time, part-time, or by correspondence, are included. Finally, while we model time use only for primary householders and their spouses or partners, we also include information on other resident relatives of the household head 15 years of age or older (most of whom are under the age of 25) via a dummy variable indicating whether an "other adult" of this sort was present in the household.

Table 1 provides sample sizes separately for 1992 and 1997, and for the two years combined. Before sample restrictions, the total number of adults represented in the two Time Use Surveys is roughly 28,000. In our analysis sample of parents there are over 3,400 fathers and 4,300 mothers, for a total of 7,728 observations.

TABLE 1 ABOUT HERE

To create our child care quantity variable, the total child care minutes spent by a given parent in the 48-hour window of observation, we sum the number of minutes during which that person reported being engaged in any of an array of child care tasks – whether in a primary, secondary, or tertiary capacity – being careful not to double-count time in the same activity. [1] In practice, single-counting was achieved through a strict dominance in our calculations of any activity reported as occurring in primary time over

[1] Our measures of childcare time explicitly exclude any time during which the reporting individual (the mother or father) was engaged in sleeping or napping. "Default care" of a sleeping child, if reported by respondents, is therefore counted only if the parent/guardian was awake while the child slept.

the same activity reported occurring in secondary time, and likewise for secondary and tertiary time. The child care tasks we include in this measure are the following: minding child(ren), taking care of sick child(ren), teaching child(ren), playing with child(ren), performing physical care of child(ren), traveling in association with child care or with child(ren), and child care not further defined.

Our initial quality measure is the fraction of this child care time that is reported by the parent to have been performed as a "primary activity." This measure captures that portion of child care time during which the parent believed – by his or her own report – that involvement with a child was the most important thing s/he was doing, reflecting the extent to which children were at the forefront of the parent's own mind during that time. This measure is constructed by summing for each person all of the minutes s/he spent in the activities listed above and reported as primary activity time and then computing the ratio of this amount to the total amount of time spent on these activities. We then construct two alternative measures of quality which differ only in their numerator. The first is the fraction of child care time where child care was reported as the sole task being performed – that is, time during which the parent reported being engaged in no other activities except child care (so no multi-tasking was occurring). We utilize this measure because multi-tasking may reduce the quality of a parent's child care time. The second alternative measure of quality is the fraction of child care time spent by the parent during which s/he reported being the *sole caregiver* – that is, when his or her spouse or partner was not present. This measure is intended to capture the degree to which children spend one-on-one time with a parent. While such care may lead to greater bonding with one parent, time spent with the attention of both parents may also be positive for a child.

Therefore, *a priori* we cannot say whether a higher or lower value of this variable relates to better quality child care.

Finally, the number of minutes spent on market work by a given person is calculated by summing all minutes spent (whether reported as primary, secondary, or tertiary) on the following work-related tasks over the 48-hour period of observation: work for pay, work brought home, job search, travel for work, overtime, unpaid work for a family business, work-related communication, and labor force activities not further defined.

Explanatory variables included in our analyses include indicators for whether or not the respondent is single; speaks a language other than English in the home; is Australian; is in a certain age range; lives in a non-metropolitan urban area or a rural area; works in a particular industry or occupational group; provided no occupation or industry information; and has attained various levels of education. We also observe for each person whether the household contains disabled children or adults; whether there are other adults in the household besides the respondent and a spouse or partner; the number and youngest age of dependent children living in the household; the number of people in different age ranges living in the household; the number of women in the household; household structure; whether anyone in the household reported that childcare was difficult to find; the number of weekend days included in the 48-hour diary period; and survey year (1992 or 1997). Each of these variables is discussed and supported conceptually below.

In the standard household production model, the time allocated to producing household commodities depends on the needs of the household, the household's

resources, and relative market versus household productivity. The variables proxying for household child care needs include those that represent the number and ages of household children and whether or not there are any disabled children in the household. Younger children, disabled children, and a greater number of children all lead, *ceteris paribus*, to a greater household need for child care. Variables controlling for the household's time resources include the indicators for single status, the availability of other adults in the household, and whether a disabled adult is present in the household. Additional able-bodied adults in the household provide it with a greater time resource. In addition, households with two adults instead of one have greater opportunities for specialization and may enjoy economies of scale (Becker 1985). Finally, since wage data are not available, market productivity is captured by the educational attainment and age category dummies. Estimates are provided separately by gender because cultural norms, previous research, and our descriptive statistics suggest a greater and different role for women in the child-rearing process.

Table 2 displays descriptive statistics for the outcome measures and all of the explanatory variables used in our regressions by gender, with the exception of quarter, year, industry, and occupation dummy variables. They show that the Australian context is broadly similar to that of the United States and the United Kingdom. As in Kalenkoski, Ribar, and Stratton (2005, 2006), women in Australia are found to spend more time on child care and less time on market work than men. There are also very few Australian single fathers but a not insignificant number of single mothers living in households with children.

TABLE 2 ABOUT HERE

Model

We estimate reduced form censored regression (tobit) models of the determinants of the quantity and quality of the time that mothers and fathers spend in child care as well as the amount of time they spend in market work. We first estimate uncorrelated models separately by gender and use of time. Then, we estimate correlated tobit models in which we allow the three different uses of time to be correlated for each person. We do this to account for the forty-eight hour time constraint faced by each individual respondent that causes time spent in one activity to take away time available for another activity (though we do not have a clear theoretical prediction regarding whether child care quality is a substitute or a complement with respect to quantity of care or work hours). It will also account for any other person-specific unobserved factor that affects the person's time allocation decision, such as a strong disposition toward child rearing or market work.

The models to be estimated are specified as follows:

$$Q_P^* = \alpha'_{QP} H + \beta'_{QP} X_P + e_{QP} \quad (1)$$

$$L_P^* = \alpha'_{LP} H + \beta'_{LP} X_P + e_{LP} \quad (2)$$

$$W_P^* = \alpha'_{WP} H + \beta'_{WP} X_P + e_{WP}. \quad (3)$$

where Q^*_P, L^*_P, and W^*_P are latent variables referring to the quantity of child care time, the quality of child care time, and the amount of time spent in market work desired by household member P (where P = m if mother, and P = f if father); H is a vector of household characteristics, X_P is a vector of person-specific characteristics; e_{QP}, e_{LP}, and e_{WP} are the error terms; and α'_{QP}, β'_{QP}, α'_{LP}, β'_{LP}, α'_{WP}, and β'_{WP} are the

parameters to be estimated. We observe the latent variables if they are positive but we observe zero if they are zero or negative.

For the correlated models, the error terms of the time use equations for a particular person are assumed to be jointly normally distributed with the following unrestricted covariance structure:

$$\begin{bmatrix} \varepsilon_{QP} \\ \varepsilon_{LP} \\ \varepsilon_{WP} \end{bmatrix} \sim N\left(\begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \sigma_Q^2 & \rho_{QL}\sigma_Q\sigma_L & \rho_{QW}\sigma_Q\sigma_W \\ \rho_{QL}\sigma_Q\sigma_L & \sigma_L^2 & \rho_{LW}\sigma_L\sigma_W \\ \rho_{QW}\sigma_Q\sigma_W & \rho_{LW}\sigma_L\sigma_W & \sigma_W^2 \end{bmatrix} \right) \quad (4)$$

Results

The first question we ask is whether there are any correlations in these data – and if so, in what directions – among the quantity of time spent with children, the quality of that time, and time spent in market work. Table 3 displays raw correlations among all of these variables, as well as the correlations of selected education and household structure variables with time use outcomes, separately by gender for our analysis sample of 7,728 adults. Unsurprisingly, market work is negatively correlated with total time spent with children for both genders, which is likely to reflect time constraints. Perhaps more interesting is the pattern of correlations between quantity and quality of child care time spent for the two genders. If parents increased their time to primary childcare in a constant proportion as total childcare time rose, then child care quality as we measure it here would stay constant with respect to quantity of childcare time. This seems to be the case for men as we find no relationship between the quality and quantity of child care time for men. However, if instead parents disproportionately decreased their quality time

as quantity of hours rose, we would expect a negative correlation, which is what we find for women. From Table 3 it also appears that poorly-educated adults spend less time in child care and less time in market work compared to better-educated adults, although quality of care as measured as the fraction of child care time that is primary is not correlated with education. The finding that more educated individuals spend more time in both child care and market work has been documented elsewhere. For example, Kalenkoski, Ribar, and Stratton (2005, 2006) find positive relationships between education and both primary and secondary child care and market work in the U.S. and the U.K., even after controlling for many other variables. The correlations in Table 3 also show that while quantity of child care time is not associated with the presence of four or more children in the household, quality of child care time is negatively associated with this variable – perhaps reflecting parents' increasing need to multi-task across different activities as the number of children in the household grows. Having a disabled child present in the household is positively associated with both total time spent on child care, and the percentage of that time that is reported to be primary. Having a very young child in the household is positively associated with both quantity and quality for both men and women. Finally, correlations of the children variables with work time are in the expected directions for women: more, younger, and more disabled children decrease work time.

TABLE 3 ABOUT HERE

Table 4 presents our uncorrelated tobit estimates. Three tobits corresponding to the three outcome variables of interest are estimated for men, and another three tobits are estimated for women, and the error terms are assumed to be uncorrelated across all six

tobit models. The three outcome variables analyzed in this table are total time spent in childcare activities, total time spent in market work, and the quality of childcare time as measured by the fraction of total time spent in child care activities in which child care was reported to be the primary activity (our first-choice quality variable).

Our results for total child care time exhibit some patterns found in studies using data from other countries. As the youngest child in the household ages, both men and women reduce their time spent on child care tasks. In addition, more highly educated men and women spend more time in child care.

Other coefficients of note include the significant positive association of the "child care difficult to find" variable with child care time spent by parents of both genders. Both sexes experience a decline in the time they spend with their children as they (and therefore their children) age, and both spend less time in child care activities when another person aged 15 or older is present in the household, indicating that additional family members share the child care burden faced by households in a way that allows parents to substitute away from care themselves. Finally, women spend more time in child care and less time in work as the number of children in their household increases (particularly as it rises above 2). However, while men also spend more time in child care the more children are present, they work more instead of less when they live with two or three dependent children instead of one. The results also show that men, but not women, spend more time with children on weekends and that single parents of both genders spend more time with children, perhaps to make up for some time that would have been spent by the absent parent. Finally, women in rural areas spend more time with children

than women in metropolitan areas, but rural status does not affect the time spent on child care by men.

Our results for the quality of child care time spent by parents of both genders are presented in the final columns of Table 4. Both men and women respond to having others 15 and over in the household by decreasing the fraction of their child care time that is spent as the primary activity and both genders decrease their quality of time as they age. Single mothers spend a higher proportion of their child care time in a primary capacity than partnered mothers, despite the tighter time constraint faced by single parents. This result also appears to be true for men, although the estimated coefficient is not statistically significant, perhaps because of the small number of single fathers in our sample.

Two sets of coefficients in the quality equation are particularly intriguing as they indicate significant responses in the opposite directions for the two genders. The first is the response to high school completion, which is negative and significant for men but positive and significant for women. The second pair of coefficient estimates that differs across the genders in this equation is the estimated response to having the youngest child in the household be of age 10 to 14 as opposed to less than 1. The coefficient for men is negative while the coefficient for women is positive. This might be due to the differing identities of mothers and fathers as children age.

Table 5 provides estimates for the models in which the error terms of the tobits for men are allowed to be correlated with one another, and the error terms of the tobits for women are allowed to be correlated with one another, but no across-gender correlation is allowed. This is done to allow for the time constraint faced by each person in which

time spent in one activity takes away time available for another activity. It also accounts for unobserved person-specific characteristics such as a caregiving nature or overall level of motivation that may affect all of a person's uses of time.

The uncorrelated and correlated tobit coefficient estimates are not very different, as one would expect, given that allowing the errors to be correlated should only affect the standard errors of the estimates. However, allowing for errors to be correlated across outcomes for a given person does provide some interesting insights. For men, the estimated correlation between the unobserved determinants of the quantity and quality of their child care time at the bottom of Table 5, ρ_{QL}, shows that the unobserved components of the quality and quantity equations seem to be reflecting a similar characteristic (perhaps caregiving nature), as the errors in these equations are positively correlated. For women, however, the correlation between the unobserved components estimated in the quantity and quality equations is negative, perhaps reflecting a binding time constraint. For both men and women, the correlation between the unobserved components of quantity of child care time and market work time is negative, again perhaps reflecting time constraints. While for men the error terms in the quality and market work equations are also negatively related, for women they are unrelated.

Tables 6 and 7 provide correlated tobit estimates with alternative quality variables. In Table 6, quality is defined as the fraction of child care time in which child care is the sole task (i.e., the person reported doing nothing else but child care). This table shows that men increase the percentage of child care time performed as their sole task the greater the number of children they have, while only the third child appears to have such an effect for women. Both men and women spend a smaller fraction of time in

child care as the sole task on the weekends. Geography matters for both women and men. The greater the number of women in the household, the larger the percentage of mothers' child care time in which child care is the sole task, perhaps because mothers can focus on child care while other female household members focus on other tasks such as housework, but this is not the case for men. Having other adults present in the household decreases child care quality for both men and women. If child care is difficult to find, men (but not women) spend more of their child care time as sole task. Mothers spend more of their child care time as the sole activity the older their children are, but age of children does not affect this measure of quality for men – which is consistent with results reported above using our first measure of child care quality. When a non-English language is spoken inside the home, both men and women spend more of their time in child care as the sole activity. Another gender difference with respect to this quality measure has to do with parental age: age of the mother negatively affects the fraction of time she spends in child care as a sole activity, but age of father does not affect this measure of quality. Education has no effect for men or women. Perhaps surprisingly (given the likelihood of increased pressure to multi-task due to time constraints), single mothers spend more of their child care time as the sole task, although again this may have to do with making up time that would otherwise have been spent by the absent parent.

The signs on the estimates of the error correlations are the same as those for the fraction primary quality variable with one exception: for women, the errors from the quality of child care and market work equations are positively related. This may reflect that women with greater effectiveness and/or greater motivation at work also are more motivated and effective in terms of providing high-quality time with their child(ren).

Table 7 provides tobit estimates when child quality is measured as the percentage of child care time in which the respondent is the sole caregiver. Weekends reduce this measure of quality for both men and women. Geography again matters for both men and women. The more women there are in the household, the greater the share of time spent as sole caregiver for women, again perhaps because it allows mothers to specialize in child care while other women perform other household tasks. Older children are associated with an increase in the percentage of child care time spent with only one parent. When a non-English language is spoken in the home, women spend less time as sole caregivers. Both older mothers and older fathers spend less time as sole caregivers. There is slight evidence that more education of certain types leads to more sole caregiving for both men and women. Finally, Australian women and both single men and women spend more time as sole caregivers.

Unlike the case with our first two quality variables, the errors in the quantity and quality of child care equations in Table 7 are positively related for both men and women, and the correlations between quality and market work errors are negative for both men and women.

Finally, to give some sense of magnitude, Table 8 provides estimates of marginal effects for some of the more important explanatory variables in our original model, where child care quality is measured as the fraction of child care time spent as the primary activity. This table shows that, apart from age-related variables, the most powerful contributors to child care time and quality are the presence of others in the household and the marital status of the parent. Others' presence is associated with fewer total child care minutes spent by parents – a reduction of roughly 140 minutes by fathers and almost 230

minutes by mothers – as well as a decrease by roughly 13 basis points in the fraction of those child care minutes that parents spend in a primary capacity. Single parents spend more of their time in child care – men by 113 minutes, and women by 66 minutes – and more of that time is quality time. These patterns lead us to believe that there is a threshold amount of total child care time, and of the quality of child care time, that a child requires, and that adults and older teenagers share this responsibility with parents when they are present in the household. Children living in families with more than one adult are likely to experience the care of adults who are, individually, less intensive caregivers (both in quantity and quality) than single parents or dual parents in nuclear families, but whether those children's ultimate outcomes benefit or suffer from this phenomenon cannot be determined using time use data.

Conclusion

In this paper, we estimated correlated tobit models of the quantity and quality of child care time and the amount of market work time spent by Australian parents in 1992 and 1997 using data from two Australian time-diary studies. We estimated these models separately by gender and found differences of interest with respect to all of the time-use measures. A particularly interesting result we found was that mothers' child care time reported as the primary or sole task increased the older the youngest child in the household, compared to no effect or a negative effect for men, suggesting separate identities for mothers and fathers as children age. Another interesting result we found is that single parenthood had positive effects on the quantity and quality of child care time

of both mothers and fathers, suggesting that single parents may make up for time that would have been spent by the other parent, if present.

We also found that the correlations between the unobserved determinants in the child care quantity, quality, and market work equations differ when quality is measured as the fraction of child care performed as the sole caregiver, compared to when it is measured as the fraction of child care that is performed as a primary activity or the fraction performed as the sole task. This implies that these different aspects of parents' child care decisions are related differently to their work and child care quantity decisions.

Our paper has suggested three ways of measuring the quality of child care time spent by parents, which we argue is potentially an important determinant of children's outcomes. Our results indicate that which measure of quality is chosen matters significantly to results and interpretation. We hope that this work will motivate other time-use researchers concerned with the effect of parental child care time on children's outcomes to accommodate measures of time quality in their models.

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Table 1: Sample Sizes

	year = 1992	year = 1997	Combined years
Fathers (includes step-fathers and guardians)	1872	1548	3420
Mothers (includes step-mothers and guardians)	2376	1932	4308
TOTAL adults	4248	3480	7728

Table 2: Descriptive Statistics for the 1992-1997 Combined Sample

Outcomes (means and standard deviations across persons)	**Fathers**	**Mothers**
Total minutes spent in selected child care activities	234.51	587.13
	(293.38)	(516.85)
Total minutes spent in market work-related activities	743.62	249.46
	(529.04)	(382.43)
Total minutes spent in child care as a primary activity	85.17	241.25
	(121.59)	(242.46)
Fraction of child care minutes spent in child care as a primary activity	0.36	0.43
	(0.38)	(0.32)
Fraction of child care minutes spent in child care as a sole activity	0.23	0.29
	(0.31)	(0.28)
Fraction of child care minutes spent in child care as a sole carer	0.15	0.45
	(0.27)	(0.36)
Person-level Explanatory Variables (proportions of persons)	**Fathers**	**Mothers**
Married or co-habiting^	0.99	0.85
Single	0.01	0.15
Australian	0.71	0.75
Speaks language other than English at home	0.10	0.09
Age 15-25^	0.01	0.05
Age 25-35	0.28	0.36
Age 35-45	0.45	0.43
Age 45-55	0.20	0.14
Age 55+	0.06	0.02
Did not complete high school^	0.28	0.44
High school terminating	0.10	0.12
Other post-high school educational qualification	0.01	0.02
Certificate or diploma	0.14	0.22
Vocational/trade qualification	0.33	0.11
Bachelor's degree or higher	0.15	0.09
No industry or occupation information	0.11	0.42
Household-level Explanatory Variables	**Fathers**	**Mothers**
Count of women in the household	1.19	1.24
	(.55)	(.54)
Count of persons aged 15-24 in the household	0.47	0.46
	(.77)	(.77)
Count of persons aged 25-34 in the household	0.66	0.61
	(.82)	(.79)
Count of persons aged 35-44 in the household	0.88	0.79
	(.84)	(.81)
Count of persons aged 45-54 in the household	0.35	0.30
	(.66)	(.61)
Count of persons aged 55 or older in the household	0.10	0.10
	(.37)	(.37)
Number of weekend days included in survey	0.56	0.56
Metropolitan area^	0.57	0.56
Non-metropolitan urban area	0.29	0.31
Rural area	0.14	0.13
1 if anyone in the household reports difficulty in finding child care	0.21	0.23
Household has one dependent child^	0.30	0.31
Household has two dependent children	0.39	0.39
Household has three dependent children	0.20	0.19
Household has four or more dependent children	0.11	0.10
Age of youngest child in household is less than 2 years^	0.23	0.21
Age of youngest child in household is 2 to 4 years	0.21	0.21
Age of youngest child in household is 5 to 9 years	0.24	0.23
Age of youngest child in household is greater than 9 years	0.24	0.23
Household type: One married/de facto couple with children 0 -14 only	0.65	0.56
Household type: One married/de facto couple with children 0 - 14 and 15+	0.20	0.16
Household type: One person with children 0 - 14 only	0.01	0.09
Household type: One person with children 0 - 14 and 15+	0.00	0.03
Household type: All other households^	0.07	0.09
Indicator for other adults (age 15+) in the household	0.29	0.28
Year = 1992	0.55	0.55
Year = 1997	0.45	0.45
Number of Observations	3420	4308

Notes: The maximum number of minutes is spent for each person on any activity is 2,880, which is the total number of minutes in a 48-hour period. Variables with carrots (^) form part of the left-out category in ensuing regression models.

Table 3: Raw Correlations (total N=7728)

Panel A: Fathers (N = 3420)	**Total child care minutes**	**Total market work minutes**	**Fraction primary minutes**
Total child care minutes	1.00	-0.30 ***	-0.00
Total market work minutes	-0.30 ***	1.00	-0.01
Total primary child care minutes	0.62 ***	-0.22 ***	0.47 ***
Fraction primary child care	-0.00	-0.01	1.00
Did not complete high school	-0.09 ***	-0.11 ***	0.00
Bachelor's degree or higher	0.12 ***	0.01	0.01
Four or more dependent children in the household	0.02	-0.03	-0.04 **
Disabled child present in the household	0.07 ***	-0.02	0.05 ***
Youngest child in the household under 2 years old	0.21 ***	0.01	0.15 ***
Panel B: Mothers (N = 4308)	**Total child care minutes**	**Total market work minutes**	**Fraction primary minutes**
Total child care minutes	1.00	-0.34 ***	-0.06 ***
Total market work minutes	-0.34 ***	1.00	-0.03 **
Total primary child care minutes	0.72 ***	-0.31 ***	0.39 ***
Fraction primary child care	-0.06 ***	-0.03 **	1.00
Did not complete high school	-0.13 ***	-0.09 ***	0.01
Bachelor's degree or higher	0.06 ***	0.13 ***	-0.03 **
Four or more dependent children in the household	0.01	-0.05 ***	-0.07 ***
Disabled child present in the household	0.09 ***	-0.07 ***	0.03 **
Youngest child in the household under 2 years old	0.46 ***	-0.15 ***	0.14 ***

Notes: Correlations significant at the 1% level are tripled-starred; those significant at the 5% level are doubled-starred; and those significant at the 10% level are single-starred.

Table 4: Uncorrelated Tobit Estimates - Quality Measured as Percent Primary

	Minutes of Child Care Time (Child Care Quantity)		Minutes of Market Work		Percent of Child Care Time That Is Primary (Child Care Quality)	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	**Mothers**
Intercept	185.6532 **	330.2163 ***	1050.537 ***	683.7491 ***	0.3356 ***	0.4685 ***
	(75.7146)	(76.8627)	(111.2321)	(112.6342)	(0.1188)	(0.0617)
Two dependent children	32.3026 **	31.4654 *	78.9936 ***	34.4317	0.0513 **	-0.0172
	(14.2648)	(16.3970)	(21.1537)	(24.7393)	(0.0224)	(0.0131)
Three dependent children	33.6754 *	110.8213 ***	88.6048 ***	-59.4385 *	0.0143	0.0194
	(17.3380)	(20.1022)	(25.7018)	(30.8374)	(0.0274)	(0.0160)
Four dependent children	106.5367 ***	113.3488 ***	18.0093	-94.6626 **	0.1007 ***	-0.025
	(22.1286)	(25.6386)	(32.6262)	(40.7994)	(0.0351)	(0.0206)
Number of weekend days included	73.0965 ***	7.4957	-401.6450 ***	-276.924 ***	-0.0595 ***	-0.0695 ***
	(7.8918)	(9.1469)	(12.0837)	(14.9619)	(0.0125)	(0.0073)
Non-metropolitan urban area	13.4948	-29.3020 *	-42.4663 **	-8.5599	-0.0617 ***	-0.0477 ***
	(13.5339)	(15.3593)	(20.0354)	(23.4564)	(0.0214)	(0.0123)
Rural area	-4.9064	53.725 **	-29.0651	-50.7151	-0.0602 **	-0.0485 ***
	(18.3736)	(21.4267)	(27.1523)	(32.5326)	(0.0291)	(0.0172)
Count of women in the household	-29.1547 *	28.7633	-0.3549	12.3239	-0.0072	0.0158
	(17.6722)	(19.2247)	(23.7439)	(26.4938)	(0.0281)	(0.0154)
Indicator for disabled child present in the household	-21.1763	24.6392	-31.7993	-13.2091	-0.0013	-0.0016
	(17.5365)	(19.8045)	(26.7059)	(31.9824)	(0.0275)	(0.0158)
Indicator for disabled person present in the household	20.1105	-25.0396	-32.4901	-75.2319 ***	0.0084	0.0011
	(15.1462)	(17.5489)	(22.6622)	(27.2679)	(0.0238)	(0.0140)
Indicator for other adults (age 15+) in the household	-225.9530 ***	-276.666 ***	-6.9237	94.8869	-0.2036 ***	-0.1635 ***
	(37.3090)	(41.4008)	(52.8205)	(58.9290)	(0.0586)	(0.0331)
Indicator for "child care reported to be difficult to find"	48.0147 ***	96.76 ***	-22.2927	-92.2732 ***	0.0361 *	0.0078
	(13.9248)	(16.2625)	(21.2124)	(26.9912)	(0.0219)	(0.0130)
Youngest child in household is of age 2 to 4	-0.1706	-99.1016 ***	-4.6623	105.9642 ***	0.0164	-0.0129
	(16.3200)	(19.2694)	(24.7066)	(31.5480)	(0.0256)	(0.0154)
Youngest child in household is of age 5 to 9	-33.4838 *	-294.3610 ***	35.4837	123.2664 ***	-0.0315	0.0405 **
	(17.7271)	(20.5842)	(26.6153)	(32.1967)	(0.0280)	(0.0164)
Youngest child in household is of age 10 to 14	-137.8790 ***	-452.2270 ***	43.4722	162.3239 ***	-0.0738 **	0.0787 ***
	(20.7832)	(23.9707)	(30.3247)	(36.3327)	(0.0328)	(0.0191)
Indicator for non-English language spoken in home	-96.2732 ***	-121.6190 ***	-8.7859	76.1021 *	0.088 **	0.0697 ***
	(22.6225)	(26.9730)	(33.4492)	(41.7054)	(0.0353)	(0.0215)
Person reporting is of age 25-35	-192.736 ***	-221.5390 ***	111.0001	-53.3086	-0.3709 ***	-0.2039 ***
	(61.7114)	(44.1868)	(94.2376)	(74.9064)	(0.0966)	(0.0354)
Person reporting is of age 35-45	-302.5140 ***	-243.2430 ***	107.2854	-54.0242	-0.3998 ***	-0.2816 ***
	(64.3435)	(47.0609)	(98.0114)	(77.9177)	(0.1009)	(0.0376)
Person reporting is of age 45-55	-238.195 ***	-354.597 ***	-34.7308	-16.9626	-0.3401 ***	-0.3332 ***
	(69.8406)	(54.9106)	(105.1710)	(85.8292)	(0.1101)	(0.0439)
Person reporting is 55 or older	-417.012 ***	-558.159 ***	-109.371	-94.8046	-0.4914 ***	-0.5133 ***
	(80.3419)	(76.1613)	(120.9134)	(122.1456)	(0.1253)	(0.0617)
Person reporting completed high school only	52.7969 **	104.8832 ***	-22.213	9.3447	-0.0682 **	0.0312 *
	(21.3103)	(21.7904)	(31.8453)	(34.0171)	(0.0337)	(0.0174)
Person reporting has other post-school qualification	36.6459	62.6672	160.9812 *	-110.852	-0.1242	-0.0772 **
	(59.0709)	(48.3354)	(86.0884)	(87.2054)	(0.0955)	(0.0389)
Person reporting holds certificate or diploma	54.1521 ***	113.4767 ***	70.5113 **	36.2331	0.0267	0.0101
	(19.7716)	(18.1448)	(28.8577)	(26.9054)	(0.0311)	(0.0146)
Person reporting has a vocational or trade qualification	24.1618	88.7707 ***	44.2808 *	35.7727	-0.0226	-0.0062
	(15.9411)	(23.1639)	(23.4636)	(35.2772)	(0.0251)	(0.0186)
Person reporting holds a bachelor's degree or higher	102.5498 ***	229.4351 ***	-6.1395	75.4811 **	0.0135	0.0053
	(21.2618)	(27.0140)	(31.2908)	(37.9218)	(0.0333)	(0.0216)
Person reporting is Australian	-27.1046 *	5.7823	-13.3823	-64.4667 **	-0.0011	0.0076
	(14.591)	(17.6936)	(21.4811)	(26.0875)	(0.0230)	(0.0141)
Person reporting is single	147.0376 *	87.2238 **	72.7678	81.6324	0.1828	0.0958 ***
	(81.645)	(40.8254)	(111.8707)	(56.4061)	(0.1270)	(0.0327)
N	3420	4308	3420	4308	3420	4308
Log likelihood	-19058.63361	-28722.68039	-21358.23141	-14726.27664	-2396.12937	-1683.464777

Notes: Coefficient estimates, not marginal effects, are reported in this table. Excluded dummy categories are one dependent child in the household; metropolitan area; youngest child in household is under 2 years old; person reporting is of age 15 to 25; person reporting is legally married or de facto married; and person reporting did not complete high school. Variables which are controlled in the regressions but whose estimated coefficients are not reported are occupation (3 categories) and industry (6 categories), and a dummy for no occupation or industry reported; household type (five categories); quarter and year effects (eight categories); and the count of the total number of women and the total number of persons in the household in each of six age ranges. Estimated coefficients significant at the 1% level are triple-starred; those significant at the 5% level are double-starred, and those significant at the 10% level are single-starred.

Table 5: Correlated Tobit estimates - Quality Measured as Percent Primary

	Minutes of Child Care Time (Child Care Quantity)		Minutes of Market Work		Percent of Child Care Time That Is Primary (Child Care Quality)	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	**Mothers**
Intercept	182.2055 **	339.1510 ***	1044.3655 ***	633.1334 ***	0.3251 ***	0.4730 ***
	(87.1129)	(82.0247)	(133.1880)	(116.5021)	(0.1149)	(0.0643)
Two dependent children	36.2204 **	31.3002 *	79.4454 ***	35.4792	0.0528	-0.0168
	(15.8367)	(17.1774)	(23.1722)	(25.8973)	(0.0242)	(0.0132)
Three dependent children	37.2870 *	111.2371 ***	87.0136 ***	-57.4306 *	0.0176	0.0191
	(19.7523)	(21.4016)	(27.4414)	(31.7458)	(0.0291)	(0.0169)
Four dependent children	112.3367 ***	113.8705 ***	7.7736	-81.9234 *	0.1025 ***	-0.0245
	(22.9166)	(27.0501)	(32.4953)	(42.2871)	(0.0388)	(0.0229)
Number of weekend days included	74.2248 ***	8.2180	-397.4572 ***	-268.3432 ***	-0.0617 ***	-0.0690 ***
	(8.4844)	(9.1193)	(12.7327)	(14.6935)	(0.0139)	(0.0076)
Non-metropolitan urban area	10.8271	-29.0246 *	-45.3355 **	-3.4098	-0.0645 ***	-0.0474 ***
	(15.1739)	(16.2109)	(21.5313)	(24.1835)	(0.0238)	(0.0133)
Rural area	-5.9331	54.9022 **	-24.2933	-44.8888	-0.0603 *	-0.0481 **
	(20.8903)	(21.7775)	(30.1879)	(33.4984)	(0.0321)	(0.0188)
Count of women in the household	-32.9388	27.7137	-0.4591	8.3497	-0.0063	0.0149
	(22.2791)	(23.9778)\	(26.7130)	(28.0163)	(0.0255)	(0.0140)
Indicator for disabled child present in the household	-22.2829	24.0772	-32.4089	-16.1094	-0.0024	-0.0018
	(19.4172)	(20.3702)	(29.5958)	(33.2491)	(0.0301)	(0.0187)
Indicator for disabled person present in the household	22.0450	-23.8009	-33.4739	-50.2285 *	0.0098	0.0010
	(16.2760)	(18.0578)	(24.4197)	(28.9463)	(0.0253)	(0.0143)
Indicator for other adults (age 15+) in the household	-222.9664 ***	-275.7231 ***	-8.6050	114.9744 *	-0.2097 ***	-0.1605 ***
	(43.0972)	(47.7578)	(57.9027)	(65.4765)	(0.0575)	90.0325)
Indicator for “child care reported to be difficult to find”	49.7082 ***	96.4191 ***	-25.9482	-92.3251 ***	0.0376	0.0076
	(15.2359)	(16.1316)	(23.0540)	(27.5153)	(0.0251)	(0.0148)
Youngest child in household is of age 2 to 4	2.0355	-101.3622 ***	-1.8141	116.3881 ***	0.0203	-0.0140
	(17.9389)	(18.3304)	(26.6846)	(31.3283)	(0.0308)	(0.0191)
Youngest child in household is of age 5 to 9	-31.4506	-296.8832 ***	37.3617	133.3343 ***	-0.0261	0.0389 **
	(19.0176)	(21.4493)	(28.4266)	(34.9047)	(0.0318)	(0.0186)
Youngest child in household is of age 10 to 14	-136.5247 ***	-454.6190 ***	45.9823	164.8505 ***	-0.0696 **	0.0766 ***
	(23.3638)	(26.6333)	(31.8696)	(38.0648)	(0.0343)	(0.0194)
Indicator for non-English language spoken in home	-99.4324 ***	-120.1763 ***	-5.6832	100.9418 **	0.0896 **	0.0690 ***
	(27.5326)	(28.5426)	(34.5271)	(43.4452)	(0.0355)	(0.0203)
Person reporting is of age 25-35	-199.8311 ***	-215.3310 ***	109.9741	-70.8383	-0.3813 ***	-0.2006 ***
	(64.9153)	(47.4057)	(116.6214)	(74.5251)	(0.0985)	(0.0383)
Person reporting is of age 35-45	-314.0257 ***	-238.1230 ***	109.2227	-63.7292	-0.4126 ***	-0.2772 ***
	(69.3308)	(52.7839)	(121.5396)	(80.5051)	(0.1033)	(0.0405)
Person reporting is of age 45-55	-246.3497 ***	-341.2782 ***	-31.7940	-17.5460	-0.3523 ***	-0.3275 ***
	(76.4518)	(64.0800)	(129.3267)	(91.1967)	(0.1122)	(0.0464)
Person reporting is 55 or older	-429.0668 ***	-555.4823 ***	-114.8870	-115.1653	-0.5062 ***	-0.5054 ***
	(95.6522)	(77.5972)	(146.2502)	(131.3620)	(0.1360)	(0.0600)
Person reporting completed high school only	54.6242 **	102.9557 ***	-20.4725	-11.2634	-0.0708 *	0.0306
	(21.1388)	(23.3789)	(32.6318)	(34.4600)	(0.0364)	(0.0199)
Person reporting has other post-school qualification	43.7710	65.5108	163.7174	-153.4273	-0.1226	-0.0767 **
	(98.8642)	(56.9508)	(127.8208)	(95.8656)	(0.0966)	(0.0386)
Person reporting holds certificate or diploma	55.1181 **	111.9967 ***	72.3420 **	26.2162	0.0275	0.0100
	(22.7040)	(18.6494)	(30.1696)	(27.9495)	(0.0327)	(0.0153)
Person reporting has a vocational or trade qualification	28.6660	88.3440 ***	45.5227 *	16.3855	-0.0234	-0.0062
	(17.9120)	(24.2875)	(24.6546)	(35.6734)	(0.0268)	(0.0200)
Person reporting holds a bachelor’s degree or higher	107.5900 ***	228.6274 ***	-4.0330	50.9218	0.0146	0.0051
	(23.4159)	(27.2906)	(33.4676)	(39.1862)	(0.0382)	(0.0236)
Person reporting is Australian	-29.5138 *	6.0262	-11.7240	-64.3466 **	-0.0023	0.0074
	(15.9560)	(18.8580)	(22.7495)	(27.2273)	(0.0251)	(0.0148)
Person reporting is single	154.4067 *	79.1838 *	77.4092	83.5260	0.1854	0.0937 ***

	(85.4133)	(41.5976)	(170.1982)	(61.7518)	(0.1437)	(0.0334)
	σ_Q		σ_W		σ_L	
	314.8269 ***	412.3346 ***	464.2912 ***	502.0408 ***	0.4916 ***	0.3299 ***
	(4.5003)	(5.4100)	(6.1427)	(10.7140)	(0.0127)	(0.0054)
	ρ_{QW}		ρ_{QL}		ρ_{WL}	
	-0.3275 ***	-0.3495 ***	0.2038 ***	-0.0981 ***	-0.0622 ***	0.0082
	(0.0194)	(0.0192)	(0.0270)	(0.0189)	(0.0216)	(0.0217)
N	3420	4308	3420	4308	3420	4308
Log likelihood = -87577.3577						

Notes: Coefficient estimates, not marginal effects, are reported in this table. Correlations are allowed across outcomes but not across gender. Excluded dummy categories are one dependent child in the household; metropolitan area; youngest child in household is under 2 years old; person reporting is of age 15 to 25; person reporting is legally married or de facto married; and person reporting did not complete high school. Variables which are controlled in the regressions but whose estimated coefficients are not reported are occupation (3 categories) and industry (6 categories), and a dummy for no occupation or industry reported; household type (five categories); quarter and year effects (eight categories); and the count of the total number of women and the total number of persons in the household in each of six age ranges. Estimated coefficients significant at the 1% level are triple-starred; those significant at the 5% level are double-starred, and those significant at the 10% level are single-starred.

Table 6: Correlated Tobit Estimation - Quality Measured as Percent Sole Task

	Minutes of Child Care Time (Child Care Quantity)		Minutes of Market Work		Percent of Child Care Time Spent as Sole Task (Child Care Quality)	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	**Mothers**
Intercept	187.5951 **	337.7368 ***	1044.3293 ***	635.7638 ***	-0.1298	0.3237 ***
	(84.5329)	(80.7606)	(136.8882)	(117.6300)	(0.1206)	(0.0582)
Two dependent children	35.5077 **	31.1869 *	79.5033 ***	36.0037	0.0612 ***	-0.0073
	(15.6120)	(17.1857)	(23.2058)	(25.9024)	(0.0227)	(0.0118)
Three dependent children	36.5754 *	111.3455 ***	87.0726 ***	-57.0206 *	0.0425	0.0294 *
	(19.5971)	(21.4293)	(27.4832)	(31.7961)	(0.0276)	(0.0151)
Four dependent children	110.3664 ***	114.1454 ***	8.0071	-82.0127 *	0.1040 ***	-0.0091
	(22.4390)	(27.1235)	(32.4196)	(42.2941)	(0.0365)	(0.0206)
Number of weekend days included	73.8504 ***	8.1528	-397.3961 ***	-268.0693 ***	-0.0473 ***	-0.0558 ***
	(8.4453)	(9.0804)	(12.7681)	(14.6199)	(0.0133)	(0.0071)
Non-metropolitan urban area	10.8642	-29.0207 *	-45.3221 **	-3.2763	-0.0693 ***	-0.0311 **
	(15.1019)	(16.2837)	(21.5318)	(24.2153)	(0.0226)	(0.0121)
Rural area	-5.9398	54.9963 **	-24.3153	-44.4073	-0.0291	-0.0297 *
	(20.6783)	(21.8815)	(30.1879)	(33.4845)	(0.0297)	(0.0172)
Count of women in the household	-32.7133	28.0611	-0.5247	8.5503	-0.0058	0.0231 *
	(21.6533)	(23.2594)	(26.6185)	(28.2586)	(0.0254)	(0.0127)
Indicator for disabled child present in the household	-22.0437	24.0966	-32.3273	-16.3261	-0.0075	-0.0062
	(19.0837)	(20.2647)	(29.6061)	(33.2877)	(0.0276)	(0.0160)
Indicator for disabled person present in the household	21.9236	-23.7993	-33.5271	-49.8485 *	-0.0042	-0.0001
	(16.1456)	(18.1379)	(24.3948)	(29.0624)	(0.0246)	-0.0130
Indicator for other adults (age 15+) in the household	-217.9612 ***	-276.9548 ***	-8.4863	113.1221 *	-0.3136 ***	-0.1280 ***
	(41.2450)	(46.1127)	(57.7985)	(65.3016)	(0.0555)	(0.0291)
Indicator for "child care reported to be difficult to find"	49.3570 ***	96.5294 ***	-25.9635	-93.2273 ***	0.0517 **	0.0151
	(15.0002)	(16.1294)	(23.0431)	(27.6684)	(0.0227)	(0.0128)
Youngest child in household is of age 2 to 4	1.5192	-100.9315 ***	-1.7873	114.2733 ***	0.0431	0.0119
	(17.6768)	(18.1486)	(26.7007)	(31.3035)	(0.0281)	(0.0167)
Youngest child in household is of age 5 to 9	-32.1704 *	-296.2 ***	37.3340	132.3760 ***	-0.0048	0.0477 ***
	(18.6783)	921.2506)	(28.3404)	(34.8942)	(0.0295)	(0.0164)
Youngest child in household is of age 10 to 14	-135.7660 ***	-454.1315 ***	45.9490	164.2686 ***	-0.0475	0.0344 *
	(22.9773)	926.4127)	(31.7798)	(37.9250)	(0.0328)	(0.0175)
Indicator for non-English language spoken in home	-98.7300 ***	-120.3759 ***	-5.6789	100.6550 **	0.1313 ***	0.0825 ***
	(27.0761)	(28.4897)	(34.5489)	(43.3573)	(0.0332)	(0.0177)
Person reporting is of age 25-35	-199.9434 ***	-216.9541 ***	109.9981	-71.1189	-0.1118	-0.1830 ***
	(63.4468)	(45.6712)	(121.9707)	(75.0547)	(0.0994)	(0.0363)
Person reporting is of age 35-45	-313.4488 ***	-239.9248 ***	109.2441	80.8621	-0.0965	-0.2393 ***
	(67.9232)	(50.8947)	(127.1418)	(-64.6415)	(0.1042)	(0.0377)
Person reporting is of age 45-55	-246.9797 ***	-344.1568 ***	-31.7519	-18.1373	-0.0260	-0.3105 ***
	(74.9528)	(62.0700)	(134.7156)	(91.6300)	(0.1122)	(0.0423)
Person reporting is 55 or older	-427.7873 ***	-558.4906 ***	-115.1787	-114.2056	-0.1481	-0.4399 ***
	(90.9461)	(75.3490)	(151.3259)	(128.5781)	(0.1290)	(0.0611)
Person reporting completed high school only	53.6827 **	103.3633 ***	-20.2980	-12.3617	-0.0035	0.0143
	(20.9627)	(23.1903)	(32.7152)	(34.4535)	(0.0349)	(0.0175)
Person reporting has other post-school qualification	42.1722	65.703	163.8455	-151.6253	0.0305	-0.0507
	(98.1521)	(57.1791)	(124.6466)	(96.2610)	(0.0891)	(0.0349)
Person reporting holds certificate or diploma	54.5353 **	112.4073 ***	72.3065 **	25.5649	0.0474	0.0056
	(22.5265)	(18.7202)	(30.0741)	(27.9674)	(0.0313)	(0.0141)
Person reporting has a vocational or trade qualification	28.1262	88.6987 ***	45.5586 *	16.1328	0.0034	-0.0043
	(17.7743)	(24.2494)	(24.5517)	(35.5652)	(0.0250)	(0.01713)
Person reporting holds a bachelor's degree or higher	106.4674 ***	229.248 ***	-4.0329	50.4904	0.0478	-0.0072
	(23.0115)	(27.3801)	(33.5774)	(39.2585)	(0.0363)	(0.0218)

Person reporting is Australian	-28.8835 *	6.2414	-11.8007	-64.0008 **	-0.0145	0.0016
	(15.7602)	(18.9399)	(22.7599)	(27.2992)	(0.0236)	(0.0133)
Person reporting is single	154.3231 *	79.8329 *	77.3044	83.8521	0.0598	0.0777 ***
	(91.4866)	(40.7008)	(176.0516)	(61.6776)	(0.1628)	(0.0295)
	σ_Q		σ_W		σ_L	
	312.4269 ***	413.0988 ***	464.2815 ***	502.2221 ***	0.4441 ***	0.2899 ***
	94.1662)	(5.3586)	(6.1329)	(10.6955)	(0.0102)	(0.0040)
	ρ_{QW}		ρ_{QL}		ρ_{WL}	
	-0.3274 ***	-0.3501 ***	0.1913 ***	-0.0954 ***	-0.0670 ***	0.0363 *
	(0.0194)	(0.0191)	(0.0307)	(0.0199)	(0.0235)	(0.0218)
N	3420	4308	3420	4308	3420	4308
Log likelihood = -86801.4920						

Notes: Coefficient estimates, not marginal effects, are reported in this table. Correlations are allowed across outcomes but not across gender. Excluded dummy categories are one dependent child in the household; metropolitan area; youngest child in household is under 2 years old; person reporting is of age 15 to 25; person reporting is legally married or de facto married; and person reporting did not complete high school. Variables which are controlled in the regressions but whose estimated coefficients are not reported are occupation (3 categories) and industry (6 categories), and a dummy for no occupation or industry reported; household type (five categories); quarter and year effects (eight categories); and the count of the total number of women and the total number of persons in the household in each of six age ranges. Estimated coefficients significant at the 1% level are triple-starred; those significant at the 5% level are double-starred, and those significant at the 10% level are single-starred.

Table 7: Correlated Tobit Estimation - Quality Measured as Percent Sole Caregiver

	Minutes of Child Care Time (Quantity of Child Care)		Minutes of Market Work		Percent of Child Care Time Spent as Sole Caregiver (Quality of Child Care)	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	**Mothers**
Intercept	186.4478 **	327.6715 ***	1044.9573 ***	634.1348 ***	-0.0843	0.1307 *
	(82.0881)	(81.0271)	(134.7303)	(116.0930)	(0.1471)	(0.0706)
Two dependent children	35.8431 **	30.4562 *	79.3915 ***	35.1012	0.0417	-0.0045
	(15.6341)	(17.5295)	(23.0127)	(25.7813)	(0.0317)	(0.0147)
Three dependent children	36.1718 *	112.6723 ***	86.7682 ***	-56.6221	0.0859 **	0.0504 ***
	(19.6097)	(21.8136)	(27.6213)	(31.5428)	(0.0375)	(0.0182)
Four dependent children	110.7061 ***	118.3582 ***	8.4277	-82.7657	0.1870 ***	-0.0156
	(22.5260)	(27.6289)	(32.9268)	(42.3217)	(0.0505)	(0.0230)
Number of weekend days included	74.1790 ***	7.8215	-397.4338 ***	-267.8528 ***	-0.0417 **	-0.1057 ***
	(8.4300)	(99.2618)	(12.7181)	(14.6680)	(0.0184)	(0.0085)
Non-metropolitan urban area	10.7473	-29.3845 *	-45.3221	-2.9591	-0.0214	-0.0345 **
	(15.0476)	(16.5818)	(21.5318)	(24.1085)	(0.0307)	(0.0140)
Rural area	-5.9799	56.1543 **	-24.7840	-44.6137	-0.0984 **	-0.0415 **
	(20.8795)	(22.3000)	(30.2958)	(33.5075)	(0.0412)	(0.0201)
Count of women in the household	-32.4444	27.7900	-0.5846	6.8300	-0.0416	0.0889 ***
	(20.3072)	(22.3129)	(26.2999)	(27.8616)	(0.0395)	(0.0150)
Indicator for disabled child present in the household	-21.9126	24.5178	-32.3048	-16.4500	-0.0094	0.0320
	(18.9944)	(20.9260)	(29.9634)	(33.4497)	(0.0392)	(0.0214)
Indicator for disabled person present in the household	21.8817	-24.2839	-33.5723	-49.3499	0.0171	-0.0127
	(16.2396)	(18.5477)	(24.2057)	(29.2449)	(0.0336)	(0.0155)
Indicator for other adults (age 15+) in the household	-222.8321 ***	-288.8124 ***	-8.5699	112.5113	-0.1044	-0.0269
	(40.1611)	(45.7947)	(57.2412)	(64.9236)	(0.0793)	(0.0317)
Indicator for “child care reported to be difficult to find”	49.4860 ***	97.4618 ***	-25.6340	-92.1735 ***	0.0007	-0.0189
	(15.0020)	(16.5188)	(23.0332)	(27.4600)	(0.0322)	(0.0158)
Youngest child in household is of age 2 to 4	1.0280	-97.3333 ***	-1.6329	116.0393	0.1989 ***	0.0944 ***
	(17.7490)	(18.8970)	(26.5435)	(31.1525)	(0.0382)	(0.0195)
Youngest child in household is of age 5 to 9	-32.5327 *	-290.9146 ***	37.2869	133.6690 ***	0.1845 ***	0.0864 ***
	(18.8505)	(21.8378)	(28.2929)	(34.6315)	(0.0410)	(0.0200)
Youngest child in household is of age 10 to 14	-138.1114 ***	-451.2960 ***	45.6632	164.4378 ***	0.2290 ***	0.1211 ***
	(23.2334)	(26.7607)	(31.5544)	(37.8577)	(0.0455)	(0.0206)
Indicator for non-English language spoken in home	-98.8851 ***	-120.6912 ***	-6.2691	98.1213	0.0492	-0.0509 **
	(26.8487)	(29.0060)	(34.6539)	(42.9767)	(0.0503)	(0.02439)
Person reporting is of age 25-35	-197.7921 ***	-231.1685 ***	108.3767	-72.8478	-0.4952	-0.1911 ***
	(61.8828)	(47.2164)	(117.1635)	(74.7136)	(0.1363_	(0.0391)
Person reporting is of age 35-45	-310.6903 ***	-257.1401 ***	107.3332	-66.1685	-0.5623 ***	-0.2589 ***
	(66.6872)	(52.6777)	(122.1091)	(80.6212)	(0.1389)	(0.0436)
Person reporting is of age 45-55	-244.8416 ***	-370.5802 ***	-32.7558	-20.2344	-0.3907 **	-0.3216 ***
	(73.6843)	(63.9248)	(129.1872)	(90.1995)	(0.1534)	(0.0483)
Person reporting is 55 or older	-423.3587 ***	-576.4174 ***	-115.6347	-116.2656	-0.6095 ***	-0.4510 ***
	(88.2762)	(75.8673)	(146.9087)	(127.8975)	(0.2022)	(0.0726)
Person reporting completed high school only	54.0491 **	107.0843 ***	-20.2892	-11.7996	-0.0373	0.0766 ***
	(21.0552)	(23.8973)	(32.8571)	(34.5221)	(0.0501)	(0.0197)
Person reporting has other post-school qualification	42.2953	67.0697	163.6661	-155.3156	0.0015	-0.0229
	(96.0225)	(58.5878)	(126.0618)	(95.1300)	(0.1267)	(0.0506)
Person reporting holds certificate or diploma	54.4044 **	115.8022 ***	71.8677	27.0880	0.0237	0.0330 **
	(22.4433)	(19.0876)	(30.0168)	(27.6743)	(0.0442)	(0.0166)
Person reporting has a vocational or trade qualification	27.4193	91.9879 ***	45.4950	18.3946	0.0967 ***	0.0042
	(17.8297)	(24.8926)	(24.6319)	(35.7040)	(0.0362)	(0.0222)
Person reporting holds a bachelor’s degree or higher	106.4269 ***	235.2856 ***	-4.0675	53.2632	0.0680	-0.0014
	(23.0585)	(28.1568)	(33.8353)	(38.9130)	(0.0509)	(0.0265)
Person reporting is Australian	-29.6066 *	8.9282	-11.9684	-63.6710	0.0023	0.0504 ***
	(15.6864)	(19.2978)	(22.7435)	(27.2914)	(0.0330)	(0.0163)

Person reporting is single	143.9478	72.0656 *	76.8023	76.2807	0.4815 **	0.3868 ***
	(98.1867)	(42.5480)	(174.5278)	(61.0691)	(0.1868)	(0.0307)
	σ_Q		σ_W		σ_L	
	312.4279 ***	420.2188 ***	464.0290 ***	500.7495 ***	0.5647 ***	0.3532 ***
	(4.1768)	(5.4172)	(6.1974)	(10.6345)	(0.0188)	(0.0054)
	ρ_{QW}		ρ_{QL}		ρ_{WL}	
	-0.3255 ***	-0.3440 ***	0.3948 ***	0.2864 ***	-0.1679 ***	-0.1401 ***
	(0.0194)	(0.0195)	(0.0246)	(0.0165)	(0.02417)	(0.0207)
N	3420	4308	3420	4308	3420	4308
Log likelihood = -87335.6097						

Notes: Coefficient estimates, not marginal effects, are reported in this table. Correlations are allowed across outcomes but not across gender. Excluded dummy categories are one dependent child in the household; metropolitan area; youngest child in household is under 2 years old; person reporting is of age 15 to 25; person reporting is legally married or de facto married; and person reporting did not complete high school. Variables which are controlled in the regressions but whose estimated coefficients are not reported are occupation (3 categories) and industry (6 categories), and a dummy for no occupation or industry reported; household type (five categories); quarter and year effects (eight categories); and the count of the total number of women and the total number of persons in the household in each of six age ranges. Estimated coefficients significant at the 1% level are triple-starred; those significant at the 5% level are double-starred, and those significant at the 10% level are single-starred.

Table 8: Marginal Effects of Key Variables

	Minutes of Child Care Time (Child Care Quantity)		Minutes of Market Work		Percent of Child Care Time That Is Primary (Child Care Quality)	
	Fathers	**Mothers**	**Fathers**	**Mothers**	**Fathers**	**Mothers**
Two dependent children	23.82 **	25.49 *	67.20 ***	15.92	0.0347	-0.0143
Three dependent children	24.54 *	92.44 ***	73.70 ***	-24.58 *	0.0114	0.0164
Four dependent children	77.64 ***	94.69 ***	6.49	-34.61 *	0.0690 ***	-0.0207
Number of weekend days included	49.60 ***	6.79	-348.25 ***	-120.07 ***	-0.0411 ***	-0.0590 ***
Non-metropolitan urban area	7.29	-23.83 *	-38.38 **	-1.50	-0.0426 ***	-0.0402 ***
Rural area	-3.95	46.03 **	-20.64	-19.38	-0.0399 *	-0.0408 **
Indicator for disabled child present in the household	-14.78	19.99	-27.37	-7.02	-0.0016	-0.0015
Indicator for disabled person present in the household	14.92	-19.59	-28.30	-21.68 *	0.0065	0.0008
Indicator for other adults (age 15+) in the household	-139.78 ***	-226.16 ***	-7.30	51.69 *	-0.1329 ***	-0.1338 ***
Indicator for “child care reported to be difficult to find”	34.03 ***	81.07 ***	-21.95	-39.33 ***	0.0252	0.0065
Youngest child in household is of age 2 to 4	1.45	-90.41 ***	-1.52	49.03 ***	0.0139	-0.0116
Youngest child in household is of age 5 to 9	-21.93	-255.21 ***	31.68	56.68 ***	-0.0174	0.0330 **
Youngest child in household is of age 10 to 14	-88.46 ***	-375.89 ***	39.05	71.25 ***	-0.0455 **	0.0658 ***
Indicator for non-English language spoken in home	-63.04 ***	-96.75 ***	-4.82	46.18 **	0.0613 **	0.0597 ***
Person reporting is of age 25-35	-161.02 ***	-190.89 ***	93.05	-31.79	-0.2948 ***	-0.1850 ***
Person reporting is of age 35-45	-239.11 ***	-210.10 ***	92.40	-28.70	-0.3154 ***	-0.2510 ***
Person reporting is of age 45-55	-194.24 ***	-294.14 ***	-26.16	-8.08	-0.2751 ***	-0.2923 ***
Person reporting is 55 or older	-305.12 ***	-450.74 ***	-92.79	-50.55	-0.3733 ***	-0.4227 ***
Person reporting holds a bachelor’s degree or higher	73.71 ***	193.24 ***	-3.40	22.70	0.0099	0.0044
Person reporting is Australian	-19.96 *	4.98	-9.95	-28.70 **	-0.0014	0.0063
Person reporting is single	113.29 *	66.23 *	66.51	37.77	0.1328	0.0812 ***

Note: Marginal effects are all calculated in comparison to the excluded category of each dummy variable array. Those significant at the 1% level are triple-starred; those significant at the 5% level are double-starred, and those significant at the 10% level are single-starred.