

09:2007 WORKING PAPER

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Working Paper 09:2007***

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PARENTAL INVESTMENTS IN CHILDREN: HOW BARGAINING AND EDUCATIONAL HOMOGAMY AFFECT TIME ALLOCATION*

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Abstract

This study examines parental time investment in their children, distinguishing between developmental and non-developmental care. Our analyses centre on three influential determinants: educational background, marital homogamy, and spouses' relative bargaining power. We find that the emphasis on quality care time is correlated with parents' education, and that marital homogamy reduces couple specialization, but only among the highly educated. In line with earlier research, we identify gendered parental behaviour. The presence of boys is an important condition for fathers' time dedication, but primarily among lower educated fathers. To the extent that parental stimulation is decisive for child outcomes, our findings suggest the persistence of important inequalities. This emerges through our special attention to behavioural differences across the educational distribution among households.

JEL: D13 J13 J16

Keywords: Intrahousehold Allocation, Child Care, Economics of Gender

INTRODUCTION

The link between the social conditions of childhood and later life chances has received intense scholarly attention in recent years. Research has focused both on the input and outcome side of the coin. Outcome research examines how variations in learning abilities, cognitive skills, school success and even adult achievements have their roots in the socioeconomic circumstances of childhood, in particular with regard to family income, parents' education, and the impact of maternal employment. The accumulated evidence suggests that family attributes matter far more than neighbourhoods or schools and, moreover, that early childhood intervention can be very effective, in particular for children from under-privileged backgrounds (Brooks-Gunn et.al., 1997; Carneiro and Heckman, 2003; Currie, 2001; Mayer, 1997; Karoly et.al, 2005) Input research has been more concerned with identifying what parents actually do when they invest in their children, be it in terms of expenditure on goods, or of parenting (Bianchi et.al., 2004;; Stafford and Yeung, 2005).

Input research has taken different routes. One tradition attacks the issue from an inter-generational perspective, examining how parental resources influence children's income and educational attainment (Solon, 1999; Corak, 2004; Shavit and Blossfeld, 1993). A second approach is to focus on child care time, such as Bianchi et.al. (2004), Lundberg et al. (2007b), and Stafford and Yeung (2005). Browning (1992) is a rare example of research on family spending on child consumption. Inter-generational inheritance is related to income effects, as emphasized in Solon (1999) and Corak (2004), but also to differences in parenting productivities and preferences for child quality that, in turn, derive from differences in education and human capital (Bianchi et al, 2004; Hill and Stafford, 1974; 1980; and Leibowitz, 1974; 1977).

It is well-established that mothers' education matters more than fathers' for child development. As women increasingly attain higher education this should be beneficial for child investments. A concomitant trend is rising marital homogamy in terms of human capital (Mare, 1991; Schwartz & Mare, 2005). Since homogamy is particularly accentuated at the top and bottom of the social pyramid, this should produce more variation (and possibly polarization) in the distribution of *families'* human capital and, as a consequence, greater inequalities of resources and investments.

Moreover, as wives' education and earnings increase relative to husbands', women will gain more autonomy which, in turn, should improve their bargaining power over family decision making and resource distribution (Bonke and Browning, 2003). Women's threat point is lowered when their economic dependence on the male partner diminishes. This implies a greater risk of divorce when her preferences are not adequately met. Employed women who face substantial opportunity costs of motherhood are especially likely to bargain for greater gender symmetry in household work and child care. There is, for example, evidence that career women's fertility choices depend on whether the husband can be expected to participate actively in child care (Esping-Andersen et al., 2007).

Our study is in the 'input research' tradition and centres on parents' time investments. As is common in such research, we distinguish between 'quality' and 'quantity' in time dedication. The intensity of time – measured in hours -- with children may be generally beneficial for their well-being, but is not necessarily a reliable indicator of investment in the sense of nurturing children's learning abilities and skills. Doing puzzles together for 15 minutes has arguably a greater cognitive stimulus effect than two hours spent together at the shopping mall. It is, accordingly, vital to distinguish developmental from non-developmental parenting time. In line with most studies, we highlight the importance of parents' (and especially mothers') education. Influenced by Lundberg et al.'s (1997) pioneering work, we also examine how mothers' relative bargaining power affects the

distribution and intensity of parental caring. In another study, Lundberg (2005) suggests that mothers bargain more effectively for child care symmetry when there is a male child, the reason being that fathers' have stronger preferences for boys. We take this insight one step further and argue that gendered preferences in bargaining are not similar across educational distributions.¹ Unlike earlier studies we also give prominence to the impact of marital homogamy. The reasoning stems from three considerations. One, as noted above, marital selection implies that human capital, or the lack thereof, becomes concentrated within families. Two, one would expect homogamous couples to embrace less specialization since their marginal productivities in either home or market production should converge. And, three, homogamy should imply that the spouses' preferences for time-allocation are more similar.

THEORETICAL PERSPECTIVE

Following Becker and Lewis (1973) and Becker (1991), research distinguishes between the desired number of children (quantity), and the skills, knowledge and socialization (quality, or developmental level) that parents wish their children to attain. Some parents may want to have many children at the expense of relatively low investments per child, while others may prefer fewer children with relatively higher per child investments. Given that quality is less income elastic than quantity, this might lead to a negative income elasticity of demand for quantity. The implication is that high income couples do not necessarily prefer fewer children than do those with low incomes, but they are more likely to prioritize child quality (Stafford and Yeung, 2005). In a non-unitary bargaining framework each parent will have a utility function that can be defined as:

¹ Focusing on paid work, Lundberg (2005: 352) shows that small children lead to more specialization among the low educated and less among the high educated.

$$U_p = U_p(N_p, Q_p, Z_p),$$

where p = father, mother; N is the # of children, Q is child quality or parental input received by each child, and Z represents non-child related consumption. We ignore for convenience utility obtained by spending time together with the child, i.e. process benefit. The production functions of Q and Z are

$$C = C(T^c, G^c)$$

and

$$Z_c = Z_c(T^z, G^z)$$

where $C = NQ$, and T^i and G^i ($i = C, Z_c$) are vectors of time and goods allocated to children and other goods.

Because production of childcare exhibits a very low elasticity of substitution between goods and time and may account for a large share of the family's full budget, childcare time can be greater for individuals with a high wage potential despite their higher time opportunity cost. Accordingly, caring time can be much greater per child (Stafford and Yeung, 2005). There is evidence that fathers give more dedication to sons than to daughters, either because fathers' input into childrearing has a greater impact on sons, or because they have stronger preferences for boys. The utility of any parent of having a "gendered" child can be formulated as

$$U_p = U_p(\gamma_i U_i(\theta_i Q), G^c),$$

where $U_p(U_i)$ is the utility function for one of the parents ($p=f, m$) given a boy or a girl ($i=b, g$) and G^c is goods exclusively destined for children. The production function of Q is

$$C = C(T_i^c, G_i^c).$$

Ignoring goods for children, if a parent's child care has a greater impact on sons than on daughters, i.e. when $\theta_b > \theta_g$, utility is derived from differences in productivity. If instead $\gamma_b > \gamma_g$, this would indicate that the utility comes from a preference for boys (Mammen, 2005). So far no empirical analysis has been able to disentangle the two effects.

Gendered child investments are likely to depend on the underlying spousal matching process. For parents who select each other in terms of giving similar importance to sons and daughters, gender egalitarian child investments can contribute to solidify the partnership (Stafford & Yeung, 2005). If the two partners' investment preferences are at odds, one would expect less marital stability or, alternatively, that the partners' input into child development becomes more skewed in terms of the distribution and/or aggregate amount of parents' care time. However, if childcare is seen as an intrinsically valuable activity (Hallberg & Klevmarken, 2003) and if gender roles depend on the partners' respective opportunity costs, then partner specialization may be much less important. In such a situation, partners may bargain for the opportunity to care for the children and, concomitantly, to avoid housework (Lundberg et al., 1997).

Finally, one cannot automatically assume that highly educated career parents minimize opportunity costs by devoting less time to child care. They can substitute by reducing housework, personal time, or leisure so that their career and earnings are not adversely affected. For women,

the child penalty can be reduced by postponing motherhood and by accelerating subsequent births (Hotz et.al., 1997).

FRAMEWORK AND HYPOTHESES

We analyze three major determinants of parental child investment: parents' human capital, marital homogamy, and bargaining power within the household. These should be correlated not only with the time devoted to child care, but also with the quality of the care, i.e. with the relative accent on developmental versus non-developmental care.

Human Capital

It is well established that parental care increases by level of education (Leibowitz, 1974, 1977; Hill and Stafford, 1974, 1980; Bianchi et.al., 2004; Lausten and Deding, 2006). This seems, at first glance, puzzling since the highly educated should face steeper time opportunity costs. Here we must remember that education embodies different kinds of attributes that are not necessarily related directly to human capital. Due to their education, parents may be more keenly concerned with investing in their children's life chances. They would therefore prioritize child quality and give special preference to developmental care. So as not to penalize market incomes, they can pursue this preference by diminishing time dedicated to other tasks, such as housework or leisure or, alternatively, they can postpone activities to weekends when the opportunity cost is lower. And to the extent that their human capital translates into higher income, they can of course substitute with purchased household help. One may, in contrast, assume that less educated parents give lower priority to developmental care over other activities such as leisure. Although their opportunity cost

of care should be smaller, the effect of paid work is difficult to determine since the need for income depends on their budget constraint. This leads us to hypothesize that *child care and especially developmental care increases with parents' education*. Additionally, we expect that *the higher is the level of parents' education, the more will they shift care to weekends*.

A second explanation of the puzzle is that more educated parents are (or believe they are) more talented and productive in child developmental activities. *Such skills decrease the substitution elasticity of other inputs such as nannies or external care*. Due to the higher earnings associated with human capital, the income elasticity of child care should exceed that for other housework (Leibowitz, 1974). If parents have gender preferences with regard to their children, such effects may be attenuated (see below). Still another possibility is that educated parents behave more altruistically. This implies that *highly educated parents may be more willing to reduce paid work and consumption in the interest of their children*. *If low educated parents are less altruistic, their preference would be to free time for leisure*.

Homogamy

The surge in higher education among women translates into more marital homogamy at the top. Simultaneously, one also sees the concentration of low education in couples (Fernandez et al., 2005; Schwartz & Mare, 2005)². Homogamy should produce greater similarity in terms of partners' tastes and preferences for time-allocation, and also in terms of their abilities in household production and child care³. Moreover, compared to heterogamous couples, homogamous couples will have fewer gains from specialization in home production or child care. Child care dedication

² Schwartz & Mare (2005) show that for during a cohort's life new marriages, marital dissolutions and educational upgrades after marriage also increases the odds of educational homogamy.

³ Nielsen & Svarer (2006) find that half of the sorting on education is caused by low search frictions in marriage markets and the other half to complementarities in household production.

should, accordingly, be more gender symmetric⁴⁵. This implies that fathers are likely to increase, and mothers decrease, their time dedicated to home production, most likely at the expense of, or to the benefit of, market work, respectively (Lundberg & Rose, 2002).

The hypothesis is therefore that educationally *homogamous parents specialize less in childcare*. They are therefore more likely to be similar in terms of their timing of child care and also in terms of their relative dedication to developmental and non-developmental care⁶.

Bargaining Power

It is well-established that women's bargaining power over the allocation of time and money increases with their labour market attachment and earnings (Browning et.al., 1994; Lundberg et.al., 1997; Attanasio and Lechene, 2002). The more that the husband's welfare depends on the wife's relative income, the more effective is the threat of divorce in case her time and consumption preferences remain unsatisfied (Cooke, 2006). The effect of bargaining power is, however, not straightforward with regard to the spouses' child dedication.

If child care is considered a superior good, the expectation is that *the mother's bargaining power will positively affect her child care time and, in particular, the time she spends on developmental care*. This positive effect should derive from a bargain where the father relieves her of ordinary housework and probably also of non-developmental child care time. But his contribution to developmental child care remains undetermined. If both parents have strong

⁴ However, the presence of children in American families increases specialization in household production as does the duration of the marriage, whereas only the latter occurs in Denmark (Stratton et al., 2007). We must therefore expect some specialization within Danish homogamous couples.

⁵ Bonke & Uldall-Poulsen (2007) also find that homogamous couples are more likely to pool their resources compared to hypergamous couples.

⁶ Bauer & Jacob (2006) hypothesize that heterogamous couples and especially highly educated ones, also have fewer children than homogamous couples, which implies some selection of children given their parental background.

preferences for child quality, then bargaining power should primarily determine the allocation of the most and least desirable household activities.⁷

Moreover, if fathers prefer boys, and if the mother is more likely to get custody after separation, the presence of a son will increase the value of the marriage for the father. Sons should accordingly produce a more stable marriage and an increase in the mother's bargaining power (Lundberg et al., 2007a). It is also possible that girls and boys have different developmental requirements so that fathers and mothers are more efficient in raising, respectively, sons and daughters. This should induce a gendered specialization in child rearing that is probably more accentuated in developmental than non-developmental care (Morgan et al., 1988).

Lundberg (2005), Lundberg et al. (2007b), Mammen (2005) and Yeung et al. (2001) report that fathers spend more time on, and are also more involved with, sons than daughters.⁸ This is consistent with both the preference and production function explanations and leads therefore to ambiguous interpretation. What these studies do not consider is the possibility that the masculine bias varies across types of men. Since there is evidence that highly educated men give greater importance to equality of opportunities (Bonke, 1994), they should accordingly also have a more positive assessment of the value and importance of girls' human capital. Consider also the qualitative differences involved in developmental and non-developmental care. The latter is more likely to be biased towards gender-biased activities (watching a football game with the boys and shopping with the girls), while the former is not (cognitive stimulation would be quite similar regardless of sex). We therefore hypothesize that *fathers in general will dedicate more care to sons than to daughters. But for highly educated fathers the gender bias should be appreciably smaller*

⁷ Research on developing countries indirectly supports this hypothesis. It has been shown that when women enjoy economic power, the children will benefit in terms of nutrition and health (Schmeer, 2005).

⁸ Lundberg (2005) provides evidence that child gender affects marital stability and fertility. Lundberg & Rose (2003) show that marriage is more likely when a son is born out of wedlock, and Lundberg & Rose (2002) suggest that fathers of boys increase their labour supply more than fathers of girls. The latter effect, however, has later been refuted by Lundberg et al. (2006), who find no evidence of increased market work by fathers of sons relative to fathers of daughters.

and possibly disappear, in particular regarding developmental care. As a logical extension, we hypothesize that *the presence of a son should produce a stronger positive marginal effect on low educated fathers' developmental care.*

MEASUREMENT AND DATA

As noted, we distinguish between developmental and non-developmental care. Stafford and Yeung (2005) defines developmental care as parental involvement in children's intellectual, physical and social development, while other kinds of care are categorized as non-developmental care.

Developmental care includes the following:

- Care giving activities: bathing, changing, and grooming, eating meals together
- Play and companionship activities: active and passive play and other types of leisure events
- Achievement-related activities: time spent studying, doing homework, reading, and other educational activities
- Social activities: visiting, household conversation, religious activities, and participation in other social events.

This framework is consistent with Bianchi et al (2006: chapter 4) who distinguish between routine (custodial) activities (feeding and dressing, medical care of children, other child care, and travel associated with child care activities), and interactive or enriching activities (helping or teaching children, talking or reading to them, and indoor or outdoor playtime).

For Zick et al. (2001) interactive activities "... signal parental time investments of greater quality" while Blair et. al. (1994) claim that "activities that involve intensive parent-child interaction (reading a book to a young child), activities that signal a parent's accessibility (e.g.

parental supervision of siblings' play), and activities that reflect a heightened sense of responsibility for the child (e.g. arranging for work-related child care) should all be included as potentially human capital enhancing for the child." In this article, developmental care is to be understood in the same way, although the data applied determine how this concept, together with the non-developmental care concept are to be operationalized in the analyses.

We use data from the most recent (2001) Danish Time-Use Survey (DTUS), which includes data for 2739 randomly chosen individuals. Besides collecting information on household characteristics and family composition as well as individual characteristics such as education, employment, earnings and demographic information, the survey had a time-diary component. The respondent (for cohabiting and married people also the partner) was asked to complete a weekday and weekend time-diary identifying the primary and secondary activities for each 10-minute interval over the two days, as well as who they were together with when doing the different activities, i.e. his/her partner, children, other people or alone. The number of diaries obtained was 1956. For our analytical purposes, we have 489 cohabiting and married spouses with children living at home. This is a rather small number of observations and our estimations are therefore likely to suffer from larger error terms. On the positive side, since we have direct information from both partners for the same day, our time use data are likely to be substantially more reliable than in most time use surveys, such as for example the recent American Time Use Survey, where only one representative of the household was interviewed.

The categories of child care are: Primary child care reported as the parent's main activity, secondary childcare reported as the parent's secondary activity, while the parent's main activity is not childcare, and tertiary childcare as time, where the child is present in the same room as the reporting parent. We follow very closely Stafford and Yeung's (2005) typology. Our developmental care variable includes helping or teaching children, talking or reading to them,

indoor or outdoor playtime⁹ and parents leisure activities (exclusive of time spent on radio, video and TV)¹⁰ where the child was present (the ‘with whom’ question). Non-developmental care includes feeding and dressing, baby or child care, medical care of children, other child care and travel associated with child care activities, and other activities where the child was present such as listening to radio and/or looking at TV.

Developmental and non-developmental care are measured as the aggregate number of intervals where it was performed multiplied by 10 minutes, i.e. the length of the intervals. The information refers to one weekday and one weekend day per respondent. To neutralize variation in caring during the week, weekday and weekend day information were then weighted together (weekdays multiplied by 5 and weekend days by 2 and the aggregated value divided by 7 to find an average day of the week), so an overall average of parent’s time spent on child care per day becomes the unit for analysis. We will, however, also distinguish between weekdays and weekends.

DESCRIPTIVE STATISTICS

Table 1 reports means and standard deviations for parents’ time spent on developmental and non-developmental child care, respectively. On average, mothers spend nearly one hour per day on developmental care and fathers about two thirds of an hour. For non-developmental care, mothers contribute 6.3 hours and fathers 4.7 hours per day. As expected, the highly educated parents devote more time to developmental care while the differences are minor with regard to non-developmental care. And, unsurprisingly, there is a clear across-the-board increase in caring on weekends.

⁹ The primary or secondary activities are 382 and 383 in the EUROSTAT classification (EUROSTAT, 2000)

¹⁰ The primary or secondary activities are 380, 381, 384, 389, 938 in the EUROSTAT classification (EUROSTAT, 2000)

Table 1 about here

The correlation between the spouses' non-developmental care is quite strong (0.7), whereas it is modest (0.3) for developmental care, and between developmental and non-developmental care (0.3). This implies that it is more usual for parents on any given day to participate jointly in non-developmental care than in developmental care. Of course, the total time spent on the former is so much greater, but this may also indicate that developmental care is a more specialized activity.

In line with the findings of Yeung et al. (2001), Mammen (2005) and Lundberg et al. (2007a) we find that child rearing is "doubly" gendered in the sense that not only does the mother spend more time with children, but also that the child's sex matters for how much care is given. In one-child families, a boy receives 1.36 hours of developmental care on an average weekday and a girl 1.54 hours. The father accounts for half of the boy's care but only for one third of the girl's care. In families with two children the father also dedicates more time when there is at least one boy. Mothers generally exhibit a mirror-image behaviour in the sense that her bias is towards girls. But when there is one of each sex her developmental care is reduced. But this difference is minor and statistically not significant. Table 2 provides an overview.

Table 2 about here

THE EMPIRICAL MODEL

Our analyses are based on Tobit time-use equations for the parents' joint time as well as their individual time spent on developmental and non-developmental child care. Tobit was chosen to take into account that during the two diary-days of information there are some parents who report zero caring, even though it is very likely that they did care on non-reported days. The assumption therefore is that there are no true zeroes but that they are all due to the conditions specific to the day of observation. If so, a censoring of the data is required. However, if the zeros we observe in our data were also zeros on any other possible (unobserved) day, OLS regression should produce robust estimation. Empirical research has adopted both views. Stafford and Yeung (2005) use Tobit while Lundberg et.al. (2007a) apply OLS regressions.

In our data, the number of zeros is modest and we have experimented with both estimators. It turns out that the differences are generally minor and that either estimator produces essentially the same substantive results.

To investigate the simultaneous distribution of time to child care, house work and paid work we applied a system of correlated Tobit-models (see e.g. Kalenkoski et al. 2005). But due to the relatively small sample, we have few degrees of freedom and most coefficients become insignificant.

The dependent variables are either developmental care DCARE or non-developmental care NDCARE in absolute numbers of hours. We have experimented with relative measures of the two partners' contributions. These gave similar results concerning the gendering of parent's investment in children. But considering that child quality is primarily related to the total amount of time spent on child care, we prefer the absolute specification. We analyze models for parents' combined time

dedication and separate models for fathers and mothers. Throughout we use F and M, respectively, to denote fathers and mothers.

The models take the following form:

$$\begin{aligned}
 & \text{— } \textit{education and homogamy} \text{ —} \\
 \text{DCARE/NDCARE} = & \alpha + \beta \text{ AGGEDU/FEDU/MEDU} + \delta \text{ HOMOGAMY} \\
 & \text{— } \textit{bargaining power} \text{ —} \\
 & + \eta \text{ MBARG} + \sigma \text{ BOY} \\
 & \text{— } \textit{labour market experience and home orientation} \text{ —} \\
 & + \theta \text{ MAGEBIRTH} + \upsilon \text{ FAGE/MAGE} \\
 & \text{— } \textit{time allocation} \text{ —} \\
 & + \rho \text{ FPWORK/MPWORK} \\
 & \text{— } \textit{controls} \text{ —} \\
 & + \text{NCHILD} + \text{CHILD06} + \text{CHILD715} + \text{MLEAVE} + \text{HELP} + \text{HINC} + \\
 & \varepsilon
 \end{aligned}$$

The educational level of the parents, MEDU (mother) and FEDU (father), is measured by the number of years of education associated with their ISCED level of educational attainment. The degree of homogamy (HOMOGAMY) is the numerical value of the differences in parent's years of education.

Ideally we would measure spouses' relative bargaining power by their relative wage-rates rather than income. Wage rates capture productivity while income is also influenced by actual labour supply. Unfortunately, the data includes only gross income information that we therefore use to calculate our bargaining strength variable, MBARG (the mother's individual gross income as a percentage of her and the husband's combined individual gross incomes). This is in fact the most

commonly adopted procedure in the literature (see e.g. Bonke & Browning, 2003). Following our earlier discussion, the presence of a son constitutes, indirectly, a potentially important element in the bargaining process to the extent that fathers' boy-preferences strengthen mothers' bargaining position. The variable is the presence of at least one boy living at home (BOY).

Table 3 about here

Besides education and age, which implicitly permit an estimate of Mincerian experience, we also include the age of the wife when she gave birth to her first child (MAGEBIRTH). It is well-established that women who face steep opportunity costs postpone motherhood (Hotz et.al., 1997). This variable should, in other words, help capture the mother's career dedication. Age is assumed to correlate with time investments in children due to two possible effects: one, older parents may have less energy to devote to their children; two, age may capture cohort effects. One should expect that older men will spend less time with children than younger ones, while the opposite might be the case for older women, who are likely to be more home-orientated than their younger sisters.

It is important to include parents' labour supply (PWORK) in the regressions to control for time-availability and the degree to which there are trade-offs between caring and market work. And by removing the labour supply effect of education, the latter will, more unambiguously, capture a parent's productivity in household production, preferences and cultural norms. However, we also ran estimations without the market work variable to investigate endogeneity between work and child care. The exclusion of market work does not affect any of the other coefficients significantly.

We finally include a set of control variables: number of children (NCHILD) and their distribution in the age range 0-6 (CHILD06) and 7-15 (CHILD715), whether the mother is on leave (FLEAVE), i.e. Danish maternity leave approximates the first year of the child's life, and purchased help (HELP). We finally control for the family's total disposable income (HINC), measured in Euros. Descriptive statistics of the variables included are shown in Table 3

ANALYSES

Our analyses follow a three step procedure. Beginning with Table 4 we pool parents' weekday and weekend caring time and present Tobit estimations for the couples jointly, as well as separately for fathers and mothers. Parents can employ substitution strategies by shifting time from, for example, busy weekdays to weekends. Such strategies ought to be especially important for parents that face major work-family tensions. In Table 5 we therefore include, as a second step, Tobit analyses separately for weekdays and weekends. In the third and final step, Table 6 examines two subsamples of, respectively, higher and lower educated parents so as to highlight the distinctive nature of bargaining and behaviour that occurs in the two groups.

In order to interpret our results, we should remember that virtually all Danish pre-schoolers, from age one, are enrolled in external child care – usually on a full-time, full-week basis. Put differently, Danish parents face far less dramatic work-family tensions than is the case in most countries. Still, of course, small children require generally more parental time and this is confirmed in our data. Our estimation also controls for whether the mother is on maternity-parental leave which, in Denmark, usually spans the greatest part of the child's first year.

Turning to the main foci of our analyses, Table 4 shows that education is relevant for developmental, but not for non-developmental, care. This is consistent with most previous research, as discussed earlier, but with some caveats since the education effect is clearly much stronger among fathers; indeed, it is not significant among mothers. Since we control for labour supply and household income, education is, so to speak, partially cleansed of its human capital effect and comes closer to measuring parental preferences for child quality and their potential productivity in child stimulus. As we saw in Table 1, higher educated parents (especially fathers) commit significantly more time to children than do the low educated.

In line with our hypothesis, we see that educational homogamy contributes significantly to less spousal specialization, essentially by increasing fathers' time dedication across both kinds of care. We also note that homogamy does not diminish maternal caring time in any significant way which, again, suggests that homogamy captures preferences rather than bargaining power. In any case, homogamy clearly results in less parental specialization. Educational homogamy is most pronounced at the top and bottom of society, but it is likely to express itself very differently at the two extremes. In general educational homogamy should produce greater preference similarities at the top than at the bottom. If higher education implies greater concern for child quality, the doubling of strong parental human capital that occurs at the 'top' should matter. Similarly, if low education is associated with more traditional gender norms, homogamy at the 'bottom' might not influence spousal specialization. The analyses that we present in Table 6 below explicitly address this possibility.

We notice in Table 4 that bargaining between the partners does not seem to have any appreciable effect on either joint or individual time dedication, except that it allows mothers to reduce their non-developmental caring time.¹¹ Additionally, the presence of a boy does not appear

¹¹ Estimations applying a categorical bargaining variable, i.e. the woman's share of income below 25%, 25-49% and 50% and above as in Stafford and Yeung (2004), gave similar results.

to motivate much additional fatherly care – which seems to contradict the findings of Lundberg et.al. (2007a). Later (again in Table 6) we shall see that both actually matter when we draw a sharper distinction between low and high educated parents. Mother’s age at first birth, which can represent her career dedication has, as we expected, positive (but not significant) effects on fathers’ caring time. The mother’s age at first birth may be an implicit indicator of her bargaining power. One surprising result, however, is that its effect is positive and significant for mothers’ non-developmental care time.

The models we test in Table 4 include a number of standard controls related to parents’ age, number and age of children, whether the mother is on leave, labour supply, the use of paid help in the home (essentially for cleaning), and household income. These variables all behave as expected. Both fathers’ and mothers’ caring time rises when there are more and, especially, young children and, almost by definition, caring time increases when the mother is on leave. Vice versa, paid work reduces caring time systematically. We also note that both parents’ caring time diminishes with their age, although interpretation of this is wrought with ambiguity. One interesting and noteworthy finding is that outside help increases parental child dedication. This indicates that parents buy themselves free time for children by externalizing household chores. One is also struck by the surprisingly strong *positive* effect of mother’s leave on father’s caring time.¹² Here we should, of course, remember that the same variable indicates that the child is less than one year old.

The time constraints and tradeoffs are far more serious during weekdays than weekends, at least for employed parents facing major opportunity costs. From our data we calculate that fathers’ average weekday working hours are 7.7, and mothers’ 5.4. In other words, also mothers approach full-time employment as the norm. During weekdays, a parent may respond by reducing market

¹² From our OLS regressions we estimate that mother’s leave doubles fathers’ caring hours in both types of care.

work (and/or leisure) or, alternatively, by shifting child care to weekends. Table 5 addresses these issues.

As we can see, for developmental care the shifting strategy seems to dominate among the highly educated. The education coefficient for fathers' weekend developmental care is strong and significant. It therefore seems evident that parents with substantial opportunity costs seek to concentrate their child investments on days when the shadow price is minimal.

Table 4 about here

Table 5 about here

This effect is, however, partially offset among homogamous couples. We note that homogamy produces a positive effect on *weekday* paternal time for both types of care. Via our OLS regressions we estimate that homogamy produces a 43% increase in fathers' weekday developmental care. We also note that homogamy produces a reduction in mothers' weekday developmental care. In line with our earlier reasoning, homogamy therefore seems to cultivate less spousal specialization also on days when the trade-offs are arguably most intense.

There also seems to be less shifting when the family has outside help, but in this case it mainly produces more non-developmental caring. The logic here is, almost certainly, that the couple can substitute household chores for more time with the children even on non-developmental care.

The outside-help effect on weekdays is quite substantial: for fathers it produces a 13% increase in non-developmental care time, and for mothers an 11% increase. Help with housework affects also weekend behaviour, but more modestly so, permitting the mother additional time for developmental care.

From our data we have calculated that mothers and fathers' paid work during weekends amounts to, respectively, 0.7 and 1.4 hours on average. These are of course averages and we must assume that some parents have longer weekend work commitments. Nonetheless, where such time constraints exist we see that parents clearly give priority to developmental care (which is not affected by paid work) and thus sacrifice on non-developmental time (where the effect is negative and statistically significant).

We noted above that there are potentially important interaction effects related to parents' education. Rather than test for this by introducing an interaction term in our models, we prefer to identify the distinctive behavioural patterns by estimating separate models for families with high and low educated fathers and mothers, respectively. High education, to recall, is any kind of completed tertiary level education. See Table 1 and 6.

Previous research has found that parental gender-specific preferences and productivities affect their child caring activities. Yeung et al (2001) show that boys spend significantly more time with fathers in play and companionship activities on weekdays than do girls, and Lundberg et al (2007a) argue more generally that spousal bargaining over child caring is partially shaped by the presence of a boy. In effect, mothers can more easily persuade fathers to chip in if there is a son involved.

In our earlier models, we found no significant boy or, for that matter, bargaining effects on fathers' or mothers' time dedication, which seems to contradict Lundberg et.al. (2007a). This may in part be attributed to our inclusion of marital homogamy. If parents share similar preferences regarding child quality this should also extend to the sex of the children. As we argued, one should

however also expect that the gender bias is far less pronounced among highly educated fathers, regardless of homogamy.

Table 6 brings this out quite clearly. Indeed, the education-specific models suggest the presence of orthogonalities. We firstly see that the positive effect of marital homogamy on child investments is pronounced among highly educated men. Homogamy has no bearing on highly educated women's developmental time, but it does increase their non-developmental care. Among the low educated, homogamy has no important effect whatsoever. This finding has interesting ramifications for our understanding of couples' preferences and household specialization. It may be that highly educated parents are more likely to converge around similar preferences because their educational experience *per se* is more similar. Alternatively, the fact that homogamous low educated couples do not diminish specialization may be attributable to the presence of more traditional gender norms – a plausible interpretation considering the gender-biased behaviour among low educated fathers.

We failed to find any clear 'boy-effect' in our previous analyses but when, as in Table 6, we estimate separately for the high and low educated, the effect does appear. What is noteworthy is that the gender bias is significant only among low educated fathers. Moreover, it is limited to their developmental time. We also notice that bargaining, for the first time, begins to matter, but only for low educated women's non-developmental time. The pattern that emerges is that low educated women use their bargaining position to reduce their non-developmental time and that low educated men are more motivated to give developmental care for boys. Using our OLS regression estimations, the bargaining effect is noteworthy in the sense that it permits her to reduce non-developmental caring time by 24%; similarly, the 'boy-effect' boosts low educated fathers' developmental care by 30%.

Table 6 about here

CONCLUSIONS

Research on parental time investment in their children has, as Lundberg (2005) points out, been largely confined to US data. This study uses the recent (2001) Danish Time Use Survey and serves thereby the double purpose of testing basic theoretical propositions regarding parenting and of extending research to other advanced countries. In several respects, we follow closely the theoretical framework represented in earlier research, in particular regarding our stress on the importance of education and the role of household bargaining. But we break new ground on two important counts. We highlight, first of all, how marital homogamy can reduce gender specialization in the household. Secondly, and perhaps of greatest significance, we stress how parental education, homogamy and bargaining are interactive. This emerges most clearly when we compare parental behaviour at the two ends of the education distribution.

Denmark constitutes a very promising counter-point to the US. Both countries boast high levels of employment among mothers which, of course, implies that reconciling work and family life is commonly difficult and fraught with trade-offs. Yet, in Denmark virtually all families have access to high quality and affordable child care, maternity and parental leaves are generous as is also income support in favour of children. This means that the typical family's budget constraints

are eased considerably. Under such comparably more favourable conditions core dilemmas regarding parenting should be less accentuated.

A major drawback of the Danish data is the small number of observations and the associated large standard errors. This makes econometric identification more difficult. In spite of these shortcomings our study yields, we believe, rather substantial and strong results. One great advantage is that the Danish study collected time use information from both partners which should ensure greater reliability.

Our findings are consistent with previous studies to the extent that education is positively associated with parental investment in child quality. The key lies in time dedicated to developmental care. The effect of education is especially positive among fathers. Like other studies, we cannot say whether this is attributable to preferences or to productivities. We also find, as one would predict, an evident shifting strategy to the extent that parents with larger opportunity costs, i.e. the highly educated, concentrate their child caring efforts during weekends.

A major novelty in our study emerges from the effects of homogamy. Homogamous parents, if highly educated, embrace less gender specialization and this appears to be distinct from any possible bargaining effect. Homogamy is associated with a stronger paternal dedication to developmental care but does *not* produce any reduction in maternal care. Again, it is clearly impossible to identify whether this stems from similarities in preferences or in productivities. Of particular interest is our finding that homogamy counteracts the choice of highly educated parents to shift care to weekends. We interpret this to mean that homogamy provides an additional impulse in favour of prioritizing child quality.

Our study also leads us to qualify the thesis that gendered parental preferences determine fathers' child dedication. When analyzed across the entire sample, the 'boy-effect' fails to emerge. This leads us to what is arguably the central finding of our analyses. When we break the sample into

high and low educated fathers and mothers, respectively, we find clear evidence that parenting behaviour is quite orthogonal. As is well-known, less educated parents devote less time in general to developmental caring. We find, in addition, that this interacts crucially with homogamy and bargaining. Firstly, the gendered ‘boy-effect’ exists only among low educated men, which suggests that the presence of a boy is only a bargaining chip in low educated families. Secondly, the homogamy effect appears limited to highly educated couples – where it clearly spurs additional parental caring. Considering the importance of gendered preferences among the less educated, we interpret the lack of any homogamy effect among the latter as an expression of more traditional gender norms regarding partner specialization and family life more generally.

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Table 1. Parent's time spent on developmental and non-developmental childcare

	Developmental care	Non-developmental care	N:
<i>All Days</i>	Mean (Std.Dev.)	Mean (Std.Dev.)	
Both parents	1.661 (1.443)	10.975 (8.569)	489
- mother	.995 (.948)	6.305 (5.134)	489
- father	.665 (.820)	4.669 (4.141)	489
<i>Education:</i>			
Highly educated ¹			
- mothers	1.048 (.893)	6.417 (5.061)	189
- fathers	.754 (.850)	4.571 (4.460)	166
Low educated ²			
- mothers	.962 (.981)	6.234 (5.187)	300
- fathers	.620 (.801)	4.721 (3.973)	323
<i>Weekdays</i>			
Both parents	1.577 (1.589)	9.682 (8.689)	489
-mother	.966 (1.091)	5.786 (5.371)	489
-father	.610 (.926)	3.896 (4.245)	489
<i>Weekend</i>			
Both parents	1.868 (2.030)	14.205 (10.680)	489
-mother	1.068 (1.313)	7.601 (5.957)	489
-father	.800 (1.189)	6.603 (5.694)	489

¹Tertiary level education

²Below tertiary level education

Table 2. The distribution of developmental child care for boys and girls

	N:	Father	Mother	Both parents
1 child family				
1 boy	103	.597	.770	1.367
1 girl	93	.538	1.010	1.547
2 children family				
- 2 Girls	45	.574	1.114	1.687
- 2 Boys	59	.691	1.102	1.793
- 1 Girl and 1 boy	96	.714	.869	1.583

Table 3. Descriptive statistics for the analysis

	Means	St.Dev.	Min	Max
AGGEDU	27.722	3.940	24	36
FEDU	13.787	2.344	12	18
MEDU	13.935	2.191	12	18
HOMOGAMY	1.342	1.811	0	6
MBARG	.435	.148	0	.937
BOY	.697	.460	0	1
MAGEBIRTH	27.731	4.342	17	44
FAGE	40.804	8.384	22	65
MAGE	38.460	7.552	20	57
NCHILD	1.620	.936	0	6
FLEAVE	.065	.248	0	1
CHILD06	.395	.489	0	1
CHILD715	.526	.500	0	1
PWORK	4.948	2.878	0	13.512
FPWORK	4.031	2.754	0	13.789
MPWORK	5.885	2.687	0	13.541
HELP	0.462	0.499	0	1
HINC (100 EURO)	3676.643	1202.072	800	11066.67

Table 4. Fathers', Mothers' and Joint Developmental and Non-developmental Child Care. Tobit Estimates

	DCARE			NDCARE		
	Both parents Coef. (Std. Err.)	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)	Both parents Coef. (Std. Err.)	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)
EDUCATION	.061*** (.019)	.053** (.024)	.031 (.023)	.139 (.093)	.093 (.0827)	.060 (.097)
HOMOGAMY	.023 (.036)	.070** (.027)	-.028 (.025)	.300* (.177)	.192** (.095)	.162 (.106)
MOTHER BARGAINING BOY	.121 (.433)	.069 (.330)	-.146 (.302)	-2.658 (2.121)	-.925 (1.155)	-2.305* (1.260)
MOTHER AGEBIRTH FAGE/ FAGE/MAGE NCHILD	.127 (.144)	.206* (.110)	-.051 (.101)	-.139 (.707)	.168 (.384)	-.238 (.425)
MOTHER AGEBIRTH FAGE/ FAGE/MAGE NCHILD	-.003 (.017)	.020 (.013)	.004 (.014)	.095 (.0857)	.047 (.046)	.152*** (.057)
MOTHER AGEBIRTH FAGE/ FAGE/MAGE NCHILD	-.025** (.012)	-.011 (.009)	-.035*** (.011)	-.259*** (.057)	-.105*** (.031)	-.244*** (.047)
MOTHER AGEBIRTH FAGE/ FAGE/MAGE NCHILD	.327*** (.098)	.195*** (.075)	.220*** (.068)	.471 (.484)	.348 (.263)	.290 (.287)
MLEAVE	1.578*** (.346)	.813*** (.250)	.677** (.272)	17.069*** (1.705)	6.300*** (.906)	8.435*** (1.149)
CHILD06	.414** (.188)	.339** (.142)	-.019 (.145)	3.823*** (.924)	1.304*** (.501)	1.670*** (.610)
CHILD715	.079 (.179)	.062 (.137)	.068 (.125)	1.547* (.879)	.329 (.4787)	1.404*** (.524)
PAID WORK	-.077*** (.025)	-.085*** (.019)	-.048*** (.018)	-.240** (.120)	-.330*** (.066)	-.338*** (.076)
HELP	.190 (.135)	.116 (.103)	.130 (.093)	1.305** (.662)	.650* (.360)	.649*** (.393)
HINC	-.000** (.000)	-.000* (.000)	-.000 (.000)	-.0004 (.000)	-.000 (.000)	-.000 (.000)
Cons	.818 (.769)	-.617 (.571)	1.871*** (.525)	12.939*** (3.782)	6.249*** (1.993)	9.926*** (2.21)
Log likelihood	-647.95	-473.95	-503.41	-1287.719	-1033.33	-1072.43
LR chi2(..)	145.97	113.10	115.87	251.19	175.73	272.93
Prob>chi2	0.000	0.000	0.000	0.0000	0.0000	0.0000
Pseudo R2	0.1012	0.107	0.103	0.0889	0.0784	0.1129
Censored n	27	112	43	13	21	18
Non-censored n	379	294	363	393	385	388

Table 5. The Distribution of Care between Weekdays and Weekends. Tobit Estimates.

	Weekday		Weekend	
	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)
Developmental care				
EDUCATION	.0446 (.034)	.049 (.032)	.113*** (.043)	.053 (.0412)
HOMOGAMY	.099** (.040)	-.040 (.035)	.036 (.050)	-.004 (.0456)
MOTHER BARGAINING BOY	.0227 (.477)	-.251 (.424)	.321 (.606)	.102 (.540)
MOTHER AGEBIRTH PAID WORK	.254 (.160)	.005 (.142)	.352* (.203)	-.111 (.182)
MOTHER AGEBIRTH PAID WORK	.036* (.0189)	.004 (.019)	.025 (.024)	.0248 (.025)
HELP	-.110**** (.020)	-.048**** (.018)	-.023 (.029)	-.048 (.037)
HELP	.212 (.147)	.058 (.130)	.175 (.187)	.357** (.168)
EHINC	-.000 (.000)	-.000 (.000)	-.000* (.000)	-.000 (.000)
cons	-1.126 (0.815)	1.763** (.731)	-1.884* (1.027)	1.411 (.945)
Log likelihood	-490.50	-569.13	-545.10	-626.24
Non-developmental care				
EDUCATION	.126 (.095)	.023 (.104)	.0416 (.130)	.144 (.135)
HOMOGAMY	.227** (.109)	.123 (.114)	.177 (.150)	.301** (.148)
MOTHER BARGAINING BOY	-.175 (1.320)	-1.752 (1.345)	-3.028* (1.828)	-3.543** (1.759)
MOTHER AGEBIRTH PAID WORK	.041 (.439)	-.174 (.455)	.464 (.608)	-.508 (.596)
MOTHER AGEBIRTH PAID WORK	.068 (.052)	.161*** (.061)	.048 (.072)	.220*** (.080)
HELP	-.330**** (.057)	-.317**** (.059)	-.389**** (.090)	-.369**** (.121)
HELP	.966** (.409)	1.143*** (.419)	-.186 (.571)	-.586 (.548)
EHINC	-.000* (.000)	-.000 (.000)	-.000 (.0003)	-.000 (.0002)
cons	5.043** (2.274)	9.195**** (2.367)	8.807*** (3.107)	10.797**** (3.084)
Log likelihood	-1015.06	-1079.12	-1151.76	-1166.60

Other independent variable included in the analyses, see table 4.

Note: ****p<.001, ***p<.01, **p<.05, *p<.1

Table 6. The Distribution of Care among Highly Educated and Lower Educated women and men. Tobit Estimates

	LOWER EDUCATED ²		HIGHER EDUCATED ¹	
	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)
Developmental care				
HOMOGAMY	.006 (.043)	-.058 (.037)	.128**** (.038)	-.006 (.038)
MOTHER BARGAINING BOY	.421 (.444)	.116 (.391)	-.319 (.492)	-.327 (.495)
MOTHER AGEBIRTH PAID WORK	.337** (.156)	.080 (.134)	.113 (.153)	-.242 (.153)
MOTHER AGEBIRTH PAID WORK	.011 (.017)	-.003 (.017)	.050** (.019)	.012 (.023)
MOTHER AGEBIRTH PAID WORK	-.069*** (.026)	-.064*** (.024)	-.092**** (.027)	-.021 (.026)
HELP	.170 (.141)	.124 (.123)	.010 (.143)	-.120 (.145)
EHINC	-.000** (.000)	-.000 (.000)	-.000 (.0001)	-.000 (.000)
Cons	.177 (.793)	2.390**** (.658)	-.032 (.754)	2.185*** (.766)
Log likelihood	-285.37	-302.70	-178.62	-196.78
Non-developmental care				
HOMOGAMY	.065 (.137)	.085 (.150)	.186 (.148)	.340** (.165)
MOTHER BARGAINING BOY	.2521 (1.446)	-2.755* (1.596)	-2.692 (1.911)	-.627 (2.117)
MOTHER AGEBIRTH PAID WORK	.0432 (.501)	-.560 (.549)	.568 (.595)	.030 (.662)
MOTHER AGEBIRTH PAID WORK	.020 (.056)	.162** (.068)	.119 (.076)	.123 (.098)
MOTHER AGEBIRTH PAID WORK	-.308**** (.086)	-.384**** (.098)	-.376**** (.103)	-.286** (.117)
HELP	.0518 (.462)	.091 (.504)	1.347** (.562)	1.406** (.625)
EHINC	-.0004* (.0002)	-.000 (.000)	.0001 (.000)	-.000 (.000)
Cons	9.448**** (2.547)	10.036**** (2.718)	4.576 (2.954)	11.756**** (3.296)
Log likelihood	-610.14	-641.70	-415.37	-425.00

¹Tertiary level education ²Below tertiary level education

Other independent variable included in the analyses, see table 4.

Note: ****p<.001, ***p<.01, **p<.05, *p<.1