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# Parental Investments in Children: How Educational Homogamy and Bargaining Affect Time Allocation \*

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## NOTE

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# Parental Investments in Children: How Bargaining and Homogamy Affect Time Allocation \*

*This study examines parental time investment in their children. To explain variations in both developmental and non-developmental care we focus on educational background, marital homogamy, and spouses' relative bargaining power. We find that the emphasis on developmental 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.*

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## 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 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).

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) 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.<sup>1</sup>

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 AND HYPHOTESES

Following Becker and Lewis (1973) and Becker (1991), research distinguishes between the desired number of children (quantity), and the skills (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:

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

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<sup>1</sup> 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.

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 low elasticity of substitution between goods and time and may account for a large share of the family's 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).

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

### *Human Capital*

There is substantial evidence that parental care increases by level of education (Leibowitz, 1974, 1977; Hill and Stafford, 1974, 1980; Bianchi et.al., 2004; Sayer et.al., 2004; and 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 can also embody attributes that are not necessarily related directly to human capital, such as a greater concern for the children's life chances (Sayer et.al., 2004). If so, child quality will be given particular priority in parenting. So as not to penalize market incomes, parents 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 is that more educated parents are (or believe to be) more talented and productive in nurturing children's skills. *Such talents 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).

### *Homogamy*

The surge in higher education among women is associated with declining hypergamy and more marital homogamy at the top (Rose, 2004). Simultaneously, one also sees the concentration of low education in couples (Fernandez et al., 2005; Schwartz & Mare, 2005)<sup>2</sup>. Homogamy should produce greater similarity in terms of partners' tastes and preferences for time-allocation (Oppenheimer, 1997), and also in terms of their abilities in household production and child care<sup>3</sup>. Moreover, compared to heterogamous couples, homogamous couples will have fewer gains from specialization in home production or child care. Child care dedication should, accordingly, be more

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<sup>2</sup> Schwartz & Mare (2005) show that new marriages, marital dissolutions and educational upgrades after marriage also increase the odds of educational homogamy.

<sup>3</sup> 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.

gender symmetric<sup>45</sup>. 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*. This entails greater similarity in spousal time use and in their relative dedication to developmental and non-developmental care<sup>6</sup>.

### *Bargaining Power*

The distribution of bargaining power between spouses is usually identified by their relative earnings power or contribution to household income (Sorensen and McLanahan, 1987; Browning et.al. 1994). It has been applied extensively in research on the division of housework, in particular with the aim of elucidating the preserverance of traditional gender norms (Brines, 1994; Shelton and John, 1996; Bianchi et.al., 2000; Bittman et.al., 2003; Cooke, 2004; Evertsson and Neramo, 2004). The effect of bargaining power on spouses' dedication to child care is less straightforward.

Although caring for one's children can be considered a superior good, not all tasks are necessarily given the same preference by the parents. Thus, active play, stimulation and interaction are believed to be more attractive than routine and ordinary child caring - two facets captured in our distinction between developmental and non-developmental care – and we should expect that parents will give preference to the former. This leads us to predict that *the mother's bargaining power will*

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<sup>4</sup> 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.

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

<sup>6</sup> Bauer & Jacob (2006) hypothesize that heterogamous couples and especially highly educated ones, also have fewer children than homogamous couples, which implies some selection on parental background.



*allow her to dedicate relatively more time to developmental as compared to non-developmental care, while the father's distribution of child care remains undetermined.*

Spousal bargaining power may be influenced by the sex of the children. 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 to the father. Sons should accordingly produce a more stable marriage (Dahl & Moretti, 2004) and reinforce the mother's bargaining power (Lundberg et al., 2007a). However, gendered specialization in child rearing may also reflect differences in boys' and girls' developmental requirements which imply that fathers and mothers are more efficient in nurturing, respectively, sons and daughters. If this is the case, a gendered specialization in child rearing should be more accentuated in developmental than in non-developmental care (Morgan et al., 1988).

We know from empirical studies that fathers spend more time on, and are also more involved with, sons than daughters (Lundberg, 2005; Lundberg et al., 2007b; Mammen, 2005; and Yeung et al. (2001).<sup>7</sup> Yet, these studies do not consider the possibility that the masculine bias varies across types of men. Since the importance attached to equality of opportunities increases by level of education (Bonke, 1994), higher educated fathers should accordingly have a more positive assessment of the value of girls' human capital. 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 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.*

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<sup>7</sup> Lundberg (2005) provides evidence that child gender influences 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. (2007), who find no evidence of increased market work by fathers of sons relative to fathers of daughters.

## MEASUREMENT, DATA AND EMPIRICAL MODEL

### *Measurement*

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

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 the two types of care can be empirically operationalized.

We follow Stafford and Yeung's (2005) typology. Our developmental care variable includes helping or teaching children, talking or reading to them, indoor or outdoor playtime<sup>8</sup> and parents leisure activities (exclusive of time spent on radio, video and TV)<sup>9</sup> 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 across 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.

Finally, since we analyze mothers' and fathers' child care separately, we do not distinguish between joint parental and individual parental child care.

### *Data*

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

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<sup>8</sup> The primary or secondary activities are 382 and 383 in the EUROSTAT classification (EUROSTAT, 2000)

<sup>9</sup> The primary or secondary activities are 380, 381, 384, 389, 938 in the EUROSTAT classification (EUROSTAT, 2000)

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 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 diary 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 filling out a diary.

### *The empirical model*

We estimate 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: those we observe 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:

$$\begin{aligned}
 & \text{— } \textit{education and homogamy} \quad \text{—} \\
 \text{DCARE/NDCARE} = & \alpha + \beta \text{ AGGEDUC/FEDUC/MEDUC} + \delta \text{ HOMOGAMY} \\
 & \text{— } \textit{bargaining power} \quad \text{—} \\
 & + \eta \text{ MRELINCOME} + \sigma \text{ BOY} \\
 & \text{— } \textit{labour market experience and home orientation} \quad \text{—} \\
 & + \theta \text{ MAGEBIRTH} + \upsilon \text{ FAGE/MAGE} \\
 & \text{— } \textit{time allocation} \quad \text{—} \\
 & + \rho \text{ FPAIDWORK/MPAIDWORK} \\
 & \text{— } \textit{controls} \quad \text{—} \\
 & + \text{NCHILD} + \text{CHILD06} + \text{CHILD715} + \text{MLEAVE} + \text{PAIDHELP} + \\
 & \text{HHINCOME} + \varepsilon
 \end{aligned}$$

The educational level of the parents, AGGEDUC (mother and father), MEDUC (mother) and FEDUC (father), is measured by the number of years of education associated with their ISCED

level of educational attainment. The degree of homogamy (HOMOLOGY) is the numerical value of the differences in parent's years of education (father's education minus mother's education).

Ideally we would measure spouses' relative bargaining power by their relative wage-rates rather than income (Pollak, 2005). 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, MRELINCOME (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). In order to identify the possible impact of gendered child preferences, we include a dummy variable for the presence of at least one boy living at home (BOY).

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Table 1 about here  
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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, FAGE (father) and MAGE (mother) 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.

To control for time-availability, and the degree to which there are trade-offs between caring and market work, we include parents' labour supply (FPAIDWORK and MPAIDWORK), measured as the number of hours worked during the actual day. This also allows us to remove the labour supply effects associated with education. This means that education will, more unambiguously, capture a parent's, preferences, cultural norms, and productivity in household production. We also ran estimations without the labour supply variables in order to investigate endogeneity between work and child care, but their exclusion 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 (MLEAVE),<sup>10</sup>, and purchased help (PAIDHELP). We finally control for the family's total disposable income (HHINCOME), measured in Euros. Descriptive statistics of the variables included are shown in Table 1

## DESCRIPTIVE STATISTICS

Table 2 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.

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<sup>10</sup> Danish maternity leave approximates the first year of the child's life

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Table 2 about here  
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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 to care jointly in non-developmental 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 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. Fathers account for half of the care of boys but only for one third in the case of girls. 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 3 provides an overview.

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Table 3 about here  
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## ANALYSES

Our analyses follow a three step procedure. We first pool weekday and weekend caring time. Table 4 presents 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 who 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, we examine, in Table 6, two sub-samples of, respectively, higher and lower educated parents so as to highlight the distinctive nature of bargaining and behaviour that occurs in the two groups.

When interpreting the results, one must 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 estimations also control for whether the mother is on maternity-parental leave.

From table 4 we see 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. This contradicts the findings of Sayer et.al. (2004) who, in a four-country comparison, show that the education effect is far stronger among mothers than fathers. 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. The Sayer et.al.(2004) study controls for

labour supply but not for income. 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, educational homogamy contributes significantly to reduce 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. 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 (measured by their relative incomes) has no appreciable effect on either joint or individual time dedication, except that it allows mothers to reduce their non-developmental caring time.<sup>11</sup> Additionally, the presence of a boy does not appear 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, a positive (but not significant) effect on fathers' caring 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

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<sup>11</sup> Since the bargaining effect may be non-linear, we also estimated with 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). This gave similar results.

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 is positively correlated with caring time. 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.<sup>12</sup> 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 work (and/or leisure) or, alternatively, by shifting care to weekends. See table 5.

As we can see, for developmental care there exists a clear shifting strategy among the highly educated. The education coefficient for fathers' weekend developmental care is strong and significant. This suggests that parents with substantial opportunity costs seek to concentrate their child investments on days when the shadow price is minimal.

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Table 4 about here  
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<sup>12</sup> From our OLS regressions we estimate that mother's leave doubles fathers' caring hours in both types of care.

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Table 5 about here  
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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 OLS regressions (not shown) 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. As we anticipated, homogamy 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 is also associated with 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 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.

Our analyses have, so far, 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. And, as we argued, one should 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. The latter interpretation is very much in line with similar research on the division of housework (Shelton and John, 1996).

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 utilize their bargaining power to reduce their non-developmental time, and that low educated men are more likely to augment their caring time for boys. Using, as before, our OLS regression estimations, the mother’s bargaining power is noteworthy since it is associated with a 24 percent reduction in her non-developmental caring time; similarly, the presence of a boy boosts low educated fathers’ developmental care by 30 percent.

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Table 6 about here  
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## CONCLUSIONS

Research on parental time investment in their children has, with few exceptions such as Sayer et.al. (2004), 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 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 parenting. 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 maternal employment 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. But in contrast to other studies, such as Sayer et.al. (2004), we find that the effect of education is stronger among fathers than mothers. 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 novelty in our study emerges from our attention to 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. Homogamy among the highly educated is almost certainly associated with less traditional gender norms. 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, also when the trade-offs are more severe.

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 a bargaining chip only 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. *Descriptive statistics for the analysis*

		Means	St. Dev.	Min	Max
AGGEDUC	# of years of mother's and father's education	27.722	3.940	24	36
MEDUC	# years of mother's education	13.787	2.344	12	18
FEDUC	# years of father's education	13.935	2.191	12	18
HOMOGAMY	# years of father's education minus years of mother's education	1.342	1.811	0	6
MRELINCOME	Mother's income as a proportion of mother's and father's income	.435	.148	0	.937
BOYMAGEBIRTH	Boys present in the family	.697	.460	17	1
MAGE	Mother's age when giving birth first time	27.731	4.342		44
NCHILD	Age of mother	40.804	8.384	22	65
MLEAVE	Age of father	38.460	7.552	20	57
CHILD06	# of children	1.620	.936	0	6
CHILD715	Mother on maternal leave	.065	.248	0	1
PAIDWORK	Child aged 0-6	.395	.489	0	1
MPAIDWORK	Child aged 7-15	.526	.500	0	1
FPAIDWORK	# of hours of paid work	4.948	2.878	0	13.512
PAIDHELP	# of hours of mother's paid work	4.031	2.754	0	13.789
HHINCOME (100 EURO)	# of hours of father's paid work	5.885	2.687	0	13.541
	Paid help	0.462	0.499	0	1
	Household income	3676.643	1202.072	800	11066.67

Table 2. Parent's time spent on developmental and non-developmental childcare. Hours per day

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

<sup>1</sup>Tertiary level education

<sup>2</sup>Below tertiary level education

Table 3. *The distribution of developmental child care for boys and girls. Hours per day*

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

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

	DCARE		NDCARE	
	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)	Father Coef. (Std. Err.)	Mother Coef. (Std. Err.)
MEDUC/FEDUC	.053** (.024)	.031 (.023)	.093 (.0827)	.060 (.097)
HOMOGAMY	.070** (.027)	-.028 (.025)	.192** (.095)	.162 (.106)
MRELINCOME	.069 (.330)	-.146 (.302)	-.925 (1.155)	-2.305* (1.260)
BOY	.206* (.110)	-.051 (.101)	.168 (.384)	-.238 (.425)
MOTHER AGEBIRTH	.020 (.013)	.004 (.014)	.047 (.046)	.152*** (.057)
FAGE/ FAGE/MAGE	-.011 (.009)	-.035*** (.011)	-.105*** (.031)	-.244*** (.047)
NCHILD	.195*** (.075)	.220*** (.068)	.348 (.263)	.290 (.287)
MLEAVE	.813*** (.250)	.677** (.272)	6.300*** (.906)	8.435*** (1.149)
CHILD06	.339** (.142)	-.019 (.145)	1.304*** (.501)	1.670*** (.610)
CHILD715	.062 (.137)	.068 (.125)	.329 (.4787)	1.404*** (.524)
MPAIDWORK/FPAIDWORK	-.085*** (.019)	-.048*** (.018)	-.330*** (.066)	-.338*** (.076)
PAIDHELP	.116 (.103)	.130 (.093)	.650* (.360)	.649*** (.393)
HHINCOME	-.000* (.000)	-.000 (.000)	-.000 (.000)	-.000 (.000)
Cons	-.617 (.571)	1.871*** (.525)	6.249*** (1.993)	9.926*** (2.21)
Log likelihood	-473.95	-503.41	-1033.33	-1072.43
LR chi2(..)	113.10	115.87	175.73	272.93
Prob>chi2	0.000	0.000	0.0000	0.0000
Pseudo R2	0.107	0.103	0.0784	0.1129
Censored n	112	43	21	18
Non-censored n	294	363	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.)
<b>Developmental care</b>				
MEDUC/FEDUC	.0446 (.034)	.049 (.032)	.113*** (.043)	.053 (.0412)
HOMOGAMY	.099** (.040)	-.040 (.035)	.036 (.050)	-.004 (.0456)
MRELINCOME	.0227 (.477)	-.251 (.424)	.321 (.606)	.102 (.540)
BOY	.254 (.160)	.005 (.142)	.352* (.203)	-.111 (.182)
MOTHER	.036* (.0189)	.004 (.019)	.025 (.024)	.0248 (.025)
AGEBIRTH	-.110*** (.020)	-.048*** (.018)	-.023 (.029)	-.048 (.037)
MPAIDWORK/FPAIDWORK	.212 (.147)	.058 (.130)	.175 (.187)	.357** (.168)
HHINCOME	-.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
<b>Non-developmental care</b>				
EDUCATION	.126 (.095)	.023 (.104)	.0416 (.130)	.144 (.135)
HOMOGAMY	.227** (.109)	.123 (.114)	.177 (.150)	.301** (.148)
MRELINCOME	-.175 (1.320)	-1.752 (1.345)	-3.028* (1.828)	-3.543** (1.759)
BOY	.041 (.439)	-.174 (.455)	.464 (.608)	-.508 (.596)
MOTHER	.068 (.052)	.161*** (.061)	.048 (.072)	.220*** (.080)
AGEBIRTH	-.330*** (.057)	-.317*** (.059)	-.389*** (.090)	-.369*** (.121)
PAID WORK	.966** (.409)	1.143*** (.419)	-.186 (.571)	-.586 (.548)
HELP	-.000* (.000)	-.000 (.000)	-.000 (.0003)	-.000 (.0002)
HHINCOME	5.043** (2.274)	9.195**** (2.367)	8.807*** (3.107)	10.797**** (3.084)
cons	-1015.06	-1079.12	-1151.76	-1166.60
Log likelihood				

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 <sup>2</sup>		HIGHER EDUCATED <sup>1</sup>	
	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)
MRELINCOME	.421 (.444)	.116 (.391)	-.319 (.492)	-.327 (.495)
BOY	.337** (.156)	.080 (.134)	.113 (.153)	-.242 (.153)
MOTHER AGEBIRTH	.011 (.017)	-.003 (.017)	.050** (.019)	.012 (.023)
MPAIDWORK/FPAIDWORK	-.069*** (.026)	-.064*** (.024)	-.092**** (.027)	-.021 (.026)
PAIDHELP	.170 (.141)	.124 (.123)	.010 (.143)	-.120 (.145)
HHINCOME	-.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)
MRELINCOME	.2521 (1.446)	-2.755* (1.596)	-2.692 (1.911)	-.627 (2.117)
BOY	.0432 (.501)	-.560 (.549)	.568 (.595)	.030 (.662)
MOTHER AGEBIRTH	.020 (.056)	.162** (.068)	.119 (.076)	.123 (.098)
MPAIDWORK/FPAIDWORK	-.308**** (.086)	-.384**** (.098)	-.376**** (.103)	-.286** (.117)
PAIDHELP	.0518 (.462)	.091 (.504)	1.347** (.562)	1.406** (.625)
HHINCOME	-.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

<sup>1</sup>Tertiary level education      <sup>2</sup>Below tertiary level education

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

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