Choosing between his time and her time?

Market work and housework of Danish couples

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Abstract

When adding up market work and non-market work, Danish men and women work about the same number of hours per day. While men do the major share of the market work, women do the major share of the non-market work. In this paper, we investigate the interaction between the different time use activities for Danish working couples. The analysis is based on the Danish Time Use Survey from 2001, which contains detailed time use information for both spouses. We analyse the time used by each spouse on market work and non-market work, taking the endogeneity of time regressors into account. Non-market work consists of both ordinary housework and childcare. We analyse whether these two activities are structurally different by estimating them separately and find strong evidence in favour of this hypothesis.
Results show that substitution between time use activities is found both for individuals and between spouses. This is especially the case for market work and housework, while childcare is different. Thus, when considering labour supply the total workload must be taken into account. Furthermore, the interdependence between the spouses' working hours suggests that bargaining is taking place in the household.

JEL-code: D13, J22

Keywords: Labour supply, family and work, time allocation

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1. Introduction

During the last decades, Danish women have increased their market working hours dramatically, while men's market working hours have decreased (Lausten and Sjørup, 2003). According to market working hours, the gap between Danish men and women are thus closing, although it remains positive. However, several analyses have shown that men and women are still far from equal concerning wages and career opportunities (Datta Gupta and Rothstein, 2001, and Lausten, 2001). A suggested explanation for this inequality is that women are main responsible for the non-market work. Looking at the combined workload of both market work and non-market work, Danish men and women work about the same (Lausten and Sjørup, 2003), where the difference in market work hours is almost exactly offset by the difference in non-market work hours. Hence, equality in the labour market cannot be separated from equality within families.

The purpose of this paper is to study the allocation of working time in Danish couples using data from the Danish Time Use Survey 2001. When looking at working time, we look at the total workload i.e. both work in the market and in the home. The substitution between different time use activities is of special interest. We estimate a model including three different types of interaction effects. The first interaction effect is the "own-time" substitution: For each individual there is the possibility of substitution between market work and non-market work. Because time is a limited resource, a negative trade-off between market work and non-market work is a natural consequence of the traditional Becker time-allocation model (Becker, 1965).

The second substitution effect that we consider could be called the "cross-spouse" substitution, i.e. substitution between for instance his market work and her market work or between his non-market work and her non-market work. Depending on whether this substitution is positive or negative, different theoretical explanations could be offered: A negative "cross-spouse" substitution could indicate that comparative advantage is playing a role in the intrahousehold division of labour. Following the comparative advantage explanation, the spouse with the lowest relative market wage should do the major share of the domestic chores (Becker, 1994; Fafchamps and Quisumbing, 2003). Consequently, if spouses

have divided tasks between each other we expect a negative correlation between the spouses' market work and between the spouses' non-market work and housework.

If the "cross-spouse" correlation on the other hand is positive, the explanation can be of a very different sort. According to the theory of assortative mating, people tend to marry someone who is similar in characteristics such as educational background (Becker, 1973 and 1974; Ermisch and Francesconi, 2002). But if couples are "alike" for instance with regard to their preferences for market work or household work, then we expect a positive "cross-spouse" correlation.

The third substitution effect that we consider is the "cross-time" substitution. "Cross-time" indicates that the spouses react to changes in the partner's working time in one time use activity by changing working time for another time use activity. Thus, we look at the relation between for instance his market work and her non-market work or vice versa. An often-used model for the intrahousehold allocation of time is the collective bargaining model with sharing rules (Chiappori, 1997). In this model, spouses bargain about the division of labour tasks such that the spouse with the highest bargaining power gets a lower share of household work. Often relative wages are used as an indicator of bargaining power, and because men typically have higher wages this is then the explanation for the fact that women do more housework (e.g. Bittman et al, 2003). In this time use framework, we expect bargaining to appear as substitution between spouses across different time use activities, i.e. "cross-time" substitution.

Finally, it should be mentioned that another possible explanation for the intrahousehold allocation of time is the gendering of working tasks. Norms and attitudes of men and women can be such that gender it itself affects the distribution of work; more specifically gendering implies that women do the major share of the household tasks while men do the major share of market work (Bittman et al, 2003; Álvarez and Miles, 2003). In the case of gendering, we do not expect much substitution between spouses' working hours, because these are primarily determined by factors outside the household.

Apart from studying the interaction between market work and non-market work, defined as all work taking place within the household, an important contribution of the paper is to analyse whether there are structural differences between housework as a time use activity on the one side and childcare on the other side. Where many analyses combine housework and childcare, we distinguish between the two and analyse whether this is important for the results.

Not much previous work has combined labour supply outside and inside the household. Hochschild has characterised the relationship between working time and family time as "the time bind", i.e. the phenomenon that working schedules are gradually characterising all parts of life, especially when both parents are working (Hochschild, 1997). Hessing (1994) analyses how women organise their lives to accomplish their many tasks. Presser (1994) shows that variations in employment schedules are significant determinants of a husband's share in traditional female household tasks. Glick (1999) shows that a woman's time in the labour market and in home production activities are affected by her human capital, household income and demographics, and community factors; analysing data from an urban area of a developing country. The effect of housework on wages earned in the market has been studied by Hersch and Stratton (2002) and Bonke, Datta Gupta and Smith (2003).

The paper is organised as follows. The econometric framework is introduced in section 2. Data are discussed in section 3, and results from the empirical analysis on market and non-market work are presented in section 4. In section 5, non-market work is split into housework and childcare, and finally, concluding remarks are found in section 6.

2. Econometric framework

We investigate hours worked for women and men in couples. Total hours worked for an individual is equal to hours worked in the market (market work) plus hours worked in the home (non-market work). A special concern is the work concerned with children in the household. In traditional time use analyses, childcare is included in the non-market work and in the first part of the analysis we take this traditional approach. However, many will argue that time spent caring for children is not only work but also creating utility in itself. Thus, in

the second part of the analysis we divide non-market work into the two components: housework and childcare.

In the econometric analysis, we estimate the level of time used on the different activities. We allow time used on different activities to be interdependent, both for the individual but also between spouses. The more a person works outside the house, the less time is left for housework. And the more housework a person has to do, the less time is left for market work. Furthermore, spouses can divide tasks, such that one is primarily responsible for market work and the other one for non-market work. Not only hours, but also timing of work activities may be important (Presser, 1994). However, in this analysis only actual working hours are taken into account.

A special feature of the time activities is that they are truncated distributions – we do not observe negative hours. Therefore a tobit specification is applied. Consider the estimation of time used on market work and non-market work. Let H_m^m and H_m^w be market hours for the man and the woman, respectively, and H_{nm}^m and H_{nm}^w be the non-market hours. Defining H_m^{m*}, H_m^{w*}, H_{nm}^{m*} and H_{nm}^{w*} as the latent variables corresponding to H_m^m, H_m^w, H_{nm}^m and H_{nm}^w the model is as follows (where x_m^m, x_m^w, x_{nm}^m and x_{nm}^w are vectors of exogenous variables and γ and β are parameters)

$$
\begin{aligned}
H_m^{m*} &= \gamma_1^2 H_m^w + \gamma_1^3 H_{nm}^m + \gamma_1^4 H_{nm}^w + \beta_1 x_m^m + u_1 \\
H_m^{f*} &= \gamma_2^1 H_m^m + \gamma_2^3 H_{nm}^m + \gamma_2^4 H_{nm}^w + \beta_2 x_m^w + u_2 \\
H_{nm}^{m*} &= \gamma_3^1 H_m^m + \gamma_3^2 H_m^w + \gamma_3^4 H_{nm}^w + \beta_3 x_{nm}^m + u_3 \\
H_{nm}^{f*} &= \gamma_4^1 H_m^m + \gamma_4^2 H_m^w + \gamma_3^3 H_{nm}^m + \beta_4 x_{nm}^w + u_4
\end{aligned}
\tag{1}
$$

and

$$
\begin{aligned}
H_m^m &= H_m^{m*} \quad if \quad H_m^{m*} > 0 \\
&= 0 \quad if \quad H_m^{m*} \le 0
\end{aligned}
$$

$$
\begin{aligned}
H_m^w &= H_m^{w*} \quad if \quad H_m^{w*} > 0 \\
&= 0 \quad if \quad H_m^{w*} \le 0
\end{aligned}
$$

(2)

$$
\begin{aligned}
H_{nm}^m &= H_{nm}^{m*} \quad if \quad H_{nm}^{m*} > 0 \\
&= 0 \quad if \quad H_{nm}^{m*} \le 0
\end{aligned}
$$

$$
\begin{aligned}
H_{nm}^w &= H_{nm}^{w*} \quad if \quad H_{nm}^{w*} > 0 \\
&= 0 \quad if \quad H_{nm}^{w*} \le 0
\end{aligned}
$$

In the estimation of (1) and (2), we apply Amemiya's Generalised Least Squares (AGLS) for tobit models with endogenous regressors (Amemiya, 1974 and 1979). With the AGLS estimator, the endogenous regressors are treated as linear functions of the instruments and the exogenous variables, while correcting for the truncated distribution of the dependent variable. In essence, the AGLS is thus a variant of the traditional GLS estimator. For details of AGLS, see Maddala (1983).

In the second part of the analysis, we divide the non-market work into housework and childcare. The implication for the time use model is straightforward: the non-market work equations in (1) and (2) are replaced by two equations, one for housework and one for childcare, and likewise the number of endogenous regressors in the equations increase. The estimation method, however, remains unchanged. All estimations are done using STATA8.

3. Data: the Danish Time Use Survey 2001

To analyse the interaction between market work and non-market work, we use the Danish Time Use Survey from 2001. The design of the survey follows the guidelines developed by an expert group in Eurostat (2000). Two diaries – one for a weekday and one for a weekend day – and a preceding questionnaire was given to approximately 4.700 representative Danish households. In households with a married or cohabiting couple, data were collected for both spouses.

The interviewees completed the time use diaries by stating main and secondary activity for each 10-minute interval of the day, where the activity took place, and the presence of other persons. The questionnaire includes information about income, socio-demographic variables, family background, educational background, relation to the labour marked etc. Furthermore, the data have been merged with register information from Statistics Denmark, adding for instance educational background for the spouses.

The sample is restricted to 827 couple households (married or cohabiting), where both spouses completed the time diaries and where both spouses are working. The couples are aged 18-74 and are thus not restricted to the usual working ages. However, because we want to analyse the relationship between market work and non-market work, both spouses must be working. In addition, in the analysis only the weekday diary is used, the day where the majority of market work is taking place. Sample means of the variables used in the analyses are given in Table 3.1 to 3.4. The individual-specific variables have means for men and women separately, whereas the couple-specific variables are joint variables.

Our definitions of time use for the different activities - market work, non-market work, housework, and childcare - are:

Time used on market work is defined as time spent performing a job, either at the job or at home, time spent travelling to and from work, and time spent on own education.

Time used on non-market work is defined as time spent in or around the house doing

- Housework (preparing food, dish washing, cleaning, laundry-work, gardening, handcrafting, caring for pets, or shopping) or
- Childcare (active child caring such as feeding/bathing the child, educating the child, reading for, talking to, and playing with the child, or accompanying the child to child-related activities).

Consequently, time spent sleeping and time spent on leisure activities are not considered in this analysis. Furthermore, secondary activities are not included.

Table 3.1 Weekday time use in Danish couples

	Women		Men	
	Mean	Std. Dev.	Mean	Std. Dev.
Total time-use for work	9.936	*(2.809)*	10.211	*(2.666)*
Market work	6.241	*(3.503)*	7.870	*(3.223)*
Non-market work	3.695	*(2.483)*	2.340	*(2.096)*
- House work	2.844	*(1.987)*	1.874	*(1.794)*
- Child care	0.851	*(1.395)*	0.466	*(0.961)*

In Table 3.1, we find the time use averages for the women and the men in the sample. In 2001, men and women in Danish couples spent about the same amount of hours working, approximately 10 hours per weekday. Dividing this into market work and non-market work, women spent 6 hours on market work and 4 hours on non-market work, whereas men spent 8 hours on market work and 2 hours on non-market work. Thus, the data indicates a substantial division of labour between spouses.

Dividing the non-market work into housework and childcare, we find that women on average spend 2.8 hours on housework and 0.9 hours on childcare. Men on the other hand spend 1.9 hours on housework and 0.5 hours on childcare. Hence, Danish men spend approximately two thirds of the time Danish women spend on housework and about half the time on childcare. Note, that this is an average of the sample as a whole, whether or not the couples have children.

Table 3.2 Share of zeroes

	Women	Men
Market work share	17.17%	8.22%
Non-market share	1.45%	7.26%
- Housework share	1.81%	8.22%
- Childcare share	52.84%	65.05%

On the day of the time-use diary, not all individuals spend time on all time-use activities. Although all individuals are working, they may not do so on this particular day. Therefore, a tobit specification is used in the estimations. The share of zeroes for each time-use activity is found in Table 3.2. This share is relatively low for female non-market work and housework,

while it is relatively large for both male and female childcare - reflecting that many couples have no children.

Descriptive statistics on the individual-specific variables are found in Table 3.3. The average age in the sample is 40 years for the women and 43 years for the men. Education is classified in 6 categories following the traditional classification of the Danish educational system. There are some differences between men and women's educations: especially, more men than women have a vocational education, while more women than men have a medium further education (including teachers and nurses).

Table 3.3 Individual-specific variables

	Women		Men	
	Mean	Std. Dev.	Mean	Std. Dev.
Age	40.239	*(10.498)*	42.549	*(10.976)*
Basic education	0.170	*(0.376)*	0.170	*(0.376)*
High School	0.089	*(0.286)*	0.068	*(0.251)*
Vocational education	0.362	*(0.481)*	0.429	*(0.495)*
Short further education	0.052	*(0.222)*	0.059	*(0.236)*
Medium further education	0.225	*(0.418)*	0.154	*(0.361)*
Long further education	0.102	*(0.302)*	0.120	*(0.325)*
Level of responsibility at work:				
1-10 subordinates	0.132	*(0.338)*	0.196	*(0.397)*
11-20 subordinates	0.030	*(0.171)*	0.059	*(0.236)*
21-50 subordinates	0.012	*(0.109)*	0.044	*(0.204)*
51+ subordinates	0.006	*(0.078)*	0.025	*(0.157)*
Flexibility through working hours:				
Can vary working hours	0.198	*(0.399)*	0.376	*(0.485)*
More than 1 hours of transportation	0.259	*(0.438)*	0.334	*(0.472)*

Relatively large gender differences are found in the job variables. About 18% of the women and 32% of the men have manager responsibilities at work with a differing number of subordinates. In all categories, however, men outweigh women. Men have the opportunity to vary their daily working hours as they wish on a larger scale than women (38% vs. 20%). And

finally, men more often have more than 1-hour transportation to their workplace than women, 33% of the men compared to 26% of the women.

Table 3.4 Couple-specific variables

Couple-specific variables:	Mean	Std. Dev.
Housing conditions:		
Single family house	0.739	*(0.440)*
Apartment	0.215	*(0.411)*
Other kind of residence	0.046	*(0.210)*
Number of rooms	4.855	*(4.931)*
Area of living:		
Copenhagen	0.328	*(0.470)*
Urban area	0.336	*(0.473)*
Rural area	0.336	*(0.473)*
Pct. Having children	0.511	*(0.500)*
Average number of children:		
0-18 year olds	0.924	*(1.060)*
0-2 year olds	0.149	*(0.395)*
3-6 year olds	0.191	*(0.445)*
7-17 year olds	0.584	*(0.877)*
Number of couples	827	

In Table 3.4, the couple-specific variables are found. These variables are used, not to find differences within the couples, but to find differences between couples. Time use is expected to differ between couples with different housing conditions or living in different areas. Number of children also influences the non-market time use. Roughly speaking, the sample is split evenly on the Copenhagen area, urban areas, and rural areas; three quarters of the sample lives in single-family houses; and half of the sample has children.

4. Market work and non-market work

The results presented in Table 4.1 are from the estimation of time spent on market work and non-market work, while the next section focuses on estimations on time spent on market work, housework and childcare. Going through the results, we follow the outline of the introduction on "own-time" substitution, "cross-spouse" substitution, and "cross-time" substitution.

In the first two columns, the estimated coefficients for the market work equations for men and women are found, and in the last two columns the corresponding estimated coefficients for the non-market work equations are found. In all the columns, three types of variables are included. First the endogenous variables, second the individual specific variables, and third the couple-specific variables. Thus, for instance in the estimation of male market work; female market work, male non-market work, and female non-market work are all endogenous variables. The instruments used for the endogenous variables are all variables in the model not included in the specific equation.

Generally, we find that the "own-time" substitution between time use activities is very important. Other things equal, the husband and wife decreases his/her market work hours the more he/she works at home, and likewise he/she decreases his/her non-market work the more he/she works in the market. The data thus indicates a substitution effect between market work and non-market work both for men and for women.

This "own-time" substitution between market and non-market activities is clearly expected as they are subject to the same time budget constraint. The typical utility maximising problem includes the maximisation of utility from leisure as well as maximisation of utility from goods either produced in the market or at home. Given a desired level of leisure for an individual, increasing market work implies that less time is available for non-market work, and the other way around. This empirical finding is thus consistent with the predictions from the simple time allocation model (Becker, 1965).

Table 4.1 Market work and non-market work

	Market work		Non-market work	
	Women	Men	Women	Men
Intercept	-2.389	4.735***	1.130	2.011*
Endogenous variables:				
Female market work		0.293*	-0.252**	0.064
Male market work	0.808***		0.314***	-0.387***
Female non-market work	-1.479***	0.503*		0.249
Male non-market work	1.319**	-0.992***	0.345	
Individual-specific variables:				
Age	0.207*	0.061	-0.002	0.076
Age squared/100	-0.245*	-0.076	0.022	-0.099
High School	0.632	-0.535	-0.471	-0.077
Vocational education	-0.142	-0.065	-0.298	-0.083
Short further education	-0.328	-0.081	-0.421	0.026
Medium further education	-0.422	-0.346	-0.164	0.055
Long further education	-0.179	0.202	-0.365	0.433*
1-10 subordinates	0.568	0.151		
11-20 subordinates	0.376	0.525		
21-50 subordinates	2.439*	0.774		
51+ subordinates	1.578	0.195		
Can vary working hours	0.574**	0.658**		
More than 1 hour of transportation	0.668**	-0.222		
Couple-specific variables:				
Single-family house			0.219	0.426**
Other residence			0.552	0.646*
Number of rooms			0.014	0.010
Living in Copenhagen	-0.370	0.285	-0.163	0.126
Living in rural area	-0.129	0.419	0.006	-0.081
Number of 0-2 year olds			1.614***	0.428
Number of 3-6 year olds			0.753***	0.399
Number of 7-17 year olds			0.393***	0.157

Note: *** Indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level.

The second interaction effect, the "cross-spouse" substitution, is substitution between spouses within the same time use activity. For market work we find a strong positive correlation between husband and wife: either they both tend to work more, or they both tend to work less. The positively correlated working hours indicate that spouses are "alike", i.e. the assortative mating explanation. Also in the non-market equation, a positive but insignificant correlation is found. The assortative mating pattern thus appears to be stronger regarding "market work values" than regarding "home-values" such as preferences for the home standard or childcare.

However, not only the "own-time" and "cross-spouse" substitutions are present. The "cross-time" substitution between the spouses is also observed. We find that both men and women increase their market work if their spouse works more at home. An explanation for this could be that the more one of the spouses work inside the home, the more the other spouse is free to work in the market. We also find the opposite effect for women: the more the husband works in the market, the more she works at home (the causality going both ways). Male non-market work, however, does not depend on female market work. Thus, we find that both spouses react to the behaviour of the other spouse (except for male non-market work). This interaction between the spouses through the "cross-time" substitution of time supports the hypothesis of bargaining taking place. Thus, the working-time allocation does not appear to be an individual decision but rather to be determined through continuous bargaining between the spouses. In this analysis, we do not attempt to identify sharing rules (Chiappori, 1997); instead we document the constant interplay between spouses.

Turning to the other explanatory variables, in general there are not many significant coefficients, a natural consequence of the small sample. Considering market work, age as well as age squared has a significant impact for women but not for men. For women, market work hours are a u-shaped function of age increasing up to the age of app. 42 years and decreasing afterwards, whereas men's market work hours do not depend on age.

Neither education nor subordinates at work (except for one single case) matter for market work hours. Contrary to findings in other countries, in Denmark working hours do not seem to depend on education (e.g. Eberharter, 2001, for non-poor German families and Euwals and

Soest, 1999, for the Netherlands). Four dummy variables indicate responsibility for various numbers of subordinates at work. Except for women having 21-50 subordinates, these are insignificant for both men and women. Although both groups of variables (education and subordinates at work) undoubtedly matter for the wages of the individual, actual working hours are thus different.

An ongoing debate discusses whether increased flexibility in the labour market is primarily to the benefit of the employers or to the employees. The results here indicate that the ability to vary working hours makes both men and women work more in the market. This finding is in line with other studies showing how increased flexibility at work makes workers work more (Czonka, 1999; Hochschild, 1997).

Transportation to and from work is included in the definition of market work time and thus we expect a positive sign for the dummy indicating more than 1 hour of transportation to work. As seen in Table 4.1, a positive sign is found for women, indicating that the longer the commuting time is, the longer is the total working time. However, the coefficient is insignificant for men. The long commuting distance does not seem to have any effect on male working hours, suggesting a trade-off between working hours and commuting.

Turning to the couple-specific effects on the non-market work equations, we find that children are important for women while type of residence is important for men. For women, children increase non-market work significantly, and the younger the children the more non-market work increases. This result reflects that the extent of child-related work declines when the children grow older. However, there is no significant effect of children on male non-market work. Thus, although Danish fathers do take part in the childrearing (Lausten and Sjørup, 2003), this does not show up in the estimation of their non-market work. The reason may be that they cut down on non-child related work, causing the net-effect to be zero. We return to the issue of childcare versus housework in section 5.

Living in a single-family house as opposed to an apartment has a positive effect on males' non-market work, but no effect on females' non-market work, and so does living in another type of residence. An explanation for this result could be that living in a single-family house

(or other type of residence than single-family house or apartment) typically implies having a garden and thus relatively more outside work. The result thus suggest a traditional division of labour within the households, where men are main (more) responsible for the work outside.

5. Market work, house work and childcare

Dividing the non-market work into housework time and childcare implies that three sets of equations are estimated: one set for market work (men and women), one set for housework (men and women), and one set for childcare (men and women). In doing this, we split the couple-specific variables such that the housing variables are included in the housework equations, while the number of children is included in the childcare equations.

The results for the three time use equations are presented in Table 5.1. Looking at the interaction effects, some interesting results are found. Regarding the market work equations, column 1 and 2, the same "cross-spouse" interactions between the spouses' market work as in the previous section are found. The more the wife works in the market, the more the husband works; and the more the husband works in the market, the more the wife works. If we substitute housework for non-market work, the "own-time" substitution, the relation between own housework and own market work also remains unchanged, such that more housework by the man reduces male market work; and more housework by the woman reduces female market work. The "cross-time" substitution, i.e. the effect of female housework on male market work, and the effect of male housework on female market work also remains significantly positive. Thus, the more one spouse works at home, the more the other works in the market. Furthermore, the remaining insignificant "cross-time" substitution, i.e. the missing effect from female market work on male housework, is still missing.

The results concerning childcare are very different, however. Thus, we find no significant substitution in column 1 or 2 from childcare to market work, neither from own childcare ("own-time" substitution) nor from spouse's childcare ("cross-time" substitution). Consequently, there is no evident interaction between childcare and market work for neither man nor woman, although the "cross-time" substitution between housework and market work is definitely present. This suggests that housework and childcare indeed are two very different

time use activities, when it comes to the intrahousehold allocation of time. In other words, childcare seems to be left out of the bargaining taking place about market work and housework.

The difference between childcare and housework is also evident from the interactions terms in column 3-6. Thus, we find no substitution between childcare and housework, concerning all three kinds of substitutions ("own-time", "cross-spouse", and "cross-time" substitutions), implying that the childcare of neither man nor woman matters for the housework of neither man nor woman, or vice versa. On the other hand, the substitution between the spouses is stronger in the housework equations in Table 5.1 than in the non-market work equations in Table 4.1. There the "cross-spouse" substitutions between spouses' non-market work were insignificant, while here we find a positive significant effect from his housework to her housework.

Concerning the effect of market work on housework, the results are similar to the earlier findings of market work and non-market work. Thus, both spouses do less housework when they work more in the market, whereas the woman does more housework if her husband does more market work. The "cross-time" substitution from her market work to his housework, however, remains insignificant.

Finally, looking at the childcare equation there is very little interaction with the other time use activities. The only significant "cross-time" substitution is male market work that affects female childcare positively. Thus, women respond to male market work hours in their childcare determination, while the same is not true the other way around and neither for the housework.

Table 5.1 Market work, housework, and childcare

	Market work		Housework		Childcare	
	Woman	Man	Woman	Man	Woman	Man
Intercept	-2.793	5.276***	-0.285	1.904*	-8.644***	-8.466***
Endogenous variables:						
Female market work		0.402**	-0.243**	0.141	0.067	-0.183
Male market work	0.796***		0.299**	-0.323***	0.264*	0.168
Female housework	-1.969**	0.838*		0.383	-0.230	-0.555
Male housework	1.774**	-1.331***	0.756*		0.479	0.578
Female childcare	-0.572	-0.157	0.283	-0.007		0.484
Male childcare	-0.169	0.353	-0.544	0.106	0.144	
Individual-specific variables:						
Age	0.243*	-0.004	0.031	0.018	0.257***	0.334***
Age squared/100	-0.261	-0.014	-0.004	-0.037	-0.329***	-0.372***
High School	0.816	-0.828	-0.076	-0.366	-0.668	0.667
Vocational education	-0.274	-0.150	-0.252	-0.135	-0.138	0.137
Short further education	-0.752	-0.071	-0.575	-0.007	-0.360	0.101
Medium further education	-0.452	-0.315	-0.173	0.029	0.061	0.055
Long further education	-0.608	-0.065	-0.578*	0.117	-0.339	0.518*
1-10 subordinates	0.772*	0.117				
11-20 subordinates	0.314	0.683				
21-50 subordinates	1.924	1.003				
51+ subordinates	1.292	0.267				
Can vary working hours	0.549*	0.623**				
More then 1 hour of transportation	0.501	-0.214				
Couple-specific variables:						
Single-family house			0.001	0.358*		
Other residence			0.256	0.571		
Number of rooms			0.007	0.012		
Living in Copenhagen	-0.475	0.370	-0.230	0.142	0.005	-0.018
Living in rural area	-0.297	0.587*	-0.123	0.055	-0.065	-0.388*
Number of 0-2 year olds					2.950***	0.809
Number of 3-6 year olds					1.470***	0.803
Number of 7-17 year olds					0.785***	0.387

Note: *** Indicates significance at 1% level, ** significance at 5% level, and * significance at 10% level.

Turning to the other explanatory variables, there are some differences between the results in Table 5.1 and the earlier results. For the market work equations, the differences are largest concerning the women. When looking at the three time use activities in Table 5.1, we thus find that commuting time is no longer significant along with age squared. In addition, the significant effect of subordinates at work has changed from 21-50 subordinates to 1-10 subordinates. For men, the only difference between the two specifications is that men living in rural areas have longer working hours than men living in urban areas, when looking at the three time use activities.

The difference between the market work equations in the two specifications (Table 4.1 and Table 5.1) is due to the interaction between the time use activities. Although market work is defined identically in the two specifications, the distinction between housework and childcare not only changes the results for those equations, but also alters the results for the market work equations to some extent.

Overall, the results concerning the endogenous variables in table 5.1 clearly emphasize the difference between housework and childcare. Where the interaction between the spouses is evident both for market work and for housework, the level of childcare is almost independent of the other two time use activities. This suggests that gendering plays a larger role than bargaining in the determination of childcare: Although men do some childcare, women do the larger share – and this is independent of her remaining workload.

The explanatory variables for the non-market work equation in Table 4.1 is split between the housework and the childcare equations, so that the child variables go into the childcare equations, while the residence variables go into the housework equations. This splits the significant results from Table 4.1 accordingly. Thus, type of residence (single-family house) matters for male housework, while number of children in different age groups matters for female childcare. In addition to this, some supplementary results are found. Having a long further education relative to basic education thus decreases female housework and increase male childcare. Living in a rural area decreases male childcare, while age and age squared matter for both male and female childcare.

Regarding housework, we thus find that men do more housework when the couple lives in a single-family house compared to living in an apartment, while women with long further educations do less housework than non-educated women. On the other hand, men with long further educations do more childcare than non-educated men. Thus, looking at the two time uses separately, education does have the expected impact on housework and childcare – a difference that did not show up as clearly in the non-market work equations.

Age is significant for both men and women in the childcare equations. This is natural, as children are not present in the youngest and the oldest couples. The effect of age on childcare is u-shaped for both men and women, with a peak at about 39 years for women and 45 years for men. Number of children increases the mothers' childcare with a decreasing magnitude for older children. As mentioned earlier, this is a natural consequence of smaller children demanding more care. On the other hand, it may be surprising that number of children does not have a significant effect on the fathers' childcare. The interpretation of this result must be, that – contrary to the mother – the amount of childcare supplied by the father is independent on the age of the children. In return, though, living area matters for fathers: fathers living in rural areas compared to fathers living in urban areas thus spent less time on childcare. The explanation for this could be that it is less accepted for fathers in rural areas to take care of the children.

6. Concluding remarks

In this paper, we have analysed the interrelations between time use activities for Danish couples. The time use activities that we consider are market work and non-market work, as well as dividing the latter into housework and childcare.

The sample includes 827 working couples where both spouses answered time diaries in a Danish time use survey from 2001. The time spent on the different time use activities are estimated taking the endogeneity between time uses and between spouses, as well as the truncation of the time use variables into account. Time use is thus estimated using AGLS (Amemiya's GLS).

The analyses present some interesting results regarding the interactions between the different time use activities as well as between the spouses. We find “own-time” substitution effects between market work and non-market work for both men and women. In addition, substitution is found between the spouses, through the “cross-spouse” substitution. This finding is consistent with the hypothesis of shared preferences and the theory of division of labour based on comparative advantages (Becker, 1994). Thus, interaction matters and estimations of market labour supply could be improved if other kinds of time use are taken into account. Furthermore there is evidence of assortative mating as the couples seems to either work much at the market or work little at the market. Interestingly, the same is not happening for the non-market work, as this “cross-spouse” substitution effect is insignificant.

When using three kinds of time use, the substitution effects both for the individuals and between spouses become more complex. In general, however, the analysis shows a marked difference between the two time use activities: housework and childcare. More or less, if housework is substituted for non-market work the interaction effects are unchanged. The main difference is that a positive “cross-spouse” substitution is found between his housework and her housework: if he does more housework so does she. The opposite effect is insignificant though: he will not do more housework, just because she does. Thus, the assortative mating effect is clearer when distinguishing between housework and childcare although this effect seems to be stronger concerning the “market work values” than for the “home-values”.

The analyses in this paper show that analysing housework and childcare together conceals important differences between the two. The two time-use activities are very different, especially as we find almost no interaction between childcare on the one hand and housework or market work on the other hand. Furthermore, the link between market work and housework is emphasised when not including childcare, as the interaction effects become more significant. The conclusion must thus be that there are structural differences between housework and childcare. Consequently, not differentiating between housework and childcare may cause misleading results.

The main conclusion from this paper is then that the interaction between spouses is very important when determining the allocation of time. Time appears to be a binding factor in

Danish couples, who use several kinds of substitutions in order to make time-ends meet, at least concerning housework and market work – but not childcare. Future research must explore other aspects of these results. However, the interdependency between spouses is important to acknowledge in future studies as well as policies targeted at labour supply issues.

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