Discussion Papers No. 670, December 2011
Statistics Norway, Research Department

Ragni Hege Kitterød, Marit Rønsen and Ane Seierstad

Working hours in dual-earner couples
Does one partner work less when the other works more?

Abstract:
In spite of increased labour market participation in recent decades, women in Norway still have high part-time rates and seldom work more than their partners. Given that an aging population implies a projected large labour demand in many Western countries, it is important to explore potential labour market reserves among women. Utilising the panel in the Norwegian part of the EU-SILC, we ask whether an increase in the mother's paid hours is associated with an increase or a decrease in the father's hours, or whether there is no relationship between changes in the partners' working hours at all. An increase from parttime to normal full time for the mother is not associated with a change in the father's hours, but an increase from full time to very long hours for the mother corresponds to an increase in the father's hours. A positive association between the parents' paid hours applies first and foremost to parents with school-aged children and to couples where both partners have either long or short education. When the mother has long education and the father has short, an increase in her paid hours is associated with a decrease in his.

Keywords: Dual-earners, gender equality, labour market, working hours

JEL classification: 21, J22, J23

Acknowledgements: This work was supported by the Norwegian Research Council and constitutes a part of the research project "Mobilising unutilised labour reserves: the role of part-time and extended employment interruptions" (185194/S20). We have benefitted from constructive comments from participants at a network meeting related to the project in November 2010 and from participants at the Nordic Demographic Symposium in Lund, June 2010

Address: Ragni Hege Kitterød, Statistics Norway, Research Department, E-mail: rhk@ssb.no

Marit Rønsen, Statistics Norway, Research Department, E-mail: mrr@ssb.no

Ane Seierstad, Statistics Norway, Department of IT and statistical methods, E-mail: sei@ssb.no

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ISSN 0809-733X
Print: Statistics Norway

Sammendrag

Til tross for økt yrkesdeltakelse de siste åra, jobber kvinner i Norge ofte deltid, og få jobber mer enn vanlig fulltid. De få som har lang arbeidstid, har oftest en partner som jobber minst like mye som dem selv, eller mer. Kvinner jobber dermed ofte mindre enn sin partner, og dette gjelder særlig blant par med barn i husholdningen. Gitt den sterke etterspørselen etter arbeidskraft i mange kvinnedominerte yrker, er det viktig å diskutere mulige kilder til arbeidskraftreserver blant kvinner. I dette paperet undersøker vi sammenhengen mellom endringer i partenes arbeidstid i to-inntektspar med barn i husholdningen. Vi spør om en økning i mors arbeidstid går sammen med en økning eller nedgang i fars arbeidstid, eller om det ikke er noen sammenheng mellom endringer i partenes arbeidstid i det hele tatt. Analysene er basert på paneldelen i den norske delen av EU-SILC (European Union Statistics on Income and Living Conditions). Hver person deltar i undersøkelsen åtte år på rad. Undersøkelsen gir informasjon om både respondentens og partners vanlige ukentlige arbeidstid.

Det er ingen sammenheng mellom en økning fra deltidsarbeid og til vanlig heltid for mor på den ene side og endringer i fars arbeidstid på den annen. Når mor øker fra vanlig fulltid og til lang ukentlig arbeidstid, er det imidlertid også en økning i fars arbeidstid. Dette gjelder også når far i utgangspunktet jobber minst 38 timer per uke. Slike par får da samlet sett veldig lang ukentlig arbeidstid.

En slik positiv sammenheng mellom endringer i foreldrenes arbeidstid gjelder først og fremst for par der begge parter har lang utdanning (utdanning på universitetsnivå) og for par der begge parter har kort utdanning (høyeste utdanning er videregående skole). Når mor har lang og far har kort utdanning, korresponderer en økning i mors arbeidstid med en reduksjon i fars. Når mor har kort utdanning og far har lang, er det ingen sammenheng mellom endringer i partenes arbeidstid. En økning i mors arbeidstid korresponderer da verken med en økning eller nedgang i fars arbeidstid.

Skiller vi mellom par med små og store barn, finner vi ingen sammenheng mellom partenes arbeidstidsendringer når yngste barn er 0-6 år, mens det er klare sammenhenger når yngste barn er 7-17 år, særlig når begge parter har lang utdanning, og særlig når mor begynner å jobbe veldig mye. Eksempelvis korresponderer en økning fra under 30 timer per uke og til 40-44 timer per uke for mor, med en økning på mer enn fire timer i fars arbeidstid. En økning til minst 45 timer per uke for mor, korresponderer med en økning på mer enn sju timer i fars arbeidstid.

Analysene viser altså både positive og negative sammenhenger mellom endringer i mors og fars arbeidstid, og også tilfelle der det ikke er noen sammenheng mellom foreldrenes arbeidstidsendringer. En negativ sammenheng er i samsvar med teorien om spesialisering og komparative fortrinn, mens en positiv sammenheng er i samsvar med teorien om sosial kapital. En manglende sammenheng er i samsvar med at både kvinner og menn nå er forventet å forsørge seg selv via arbeidsmarkedet, og at rettigheter i sosial- og trygdesystemet henger tett sammen med den enkeltes arbeidsmarkedsinnsats. Blant foreldre med små barn kan en manglende sammenheng også reflektere at en godt utbygd offentlig barneomsorg gjør det mulig for mor å jobbe mer uten at far jobber mindre.

Analysene i dette paperet viser ikke hvem av foreldrene som først endrer sin arbeidstid. Analyser av dette vil kunne gi en bedre forståelse av hvorfor foreldre tilpasser seg som de gjør, men ettersom vi bare har observasjoner en gang per år for hvert individ, kan det ha skjedd endringer i arbeidstiden også mellom datainnsamlingene. Videre kan en endring i den ene partens arbeidstid tenkes å være en tilpasning til en framtidig endring (økning eller reduksjon) hos partner. Dersom mor for eksempel signaliserer at hun ønsker å jobbe mer, kan far redusere sin arbeidstid for å muliggjøre dette i framtiden. Endringer i partenes arbeidstid kan også være resultat av at begge responderer på de samme ytre hendelsene. Arv av et større pengebeløp kan for eksempel gjøre det mulig for begge parter å jobbe mindre, mens det at besteforeldre bosetter seg i nærheten og kan hjelpe til med barna, kan gjøre det mulig for begge å jobbe mer. Uansett mener vi resultatet om at en økning i mors arbeidstid ofte går sammen med en økning i fars arbeidstid, er interessant fordi det viser at lengre arbeidstid for mor ikke med nødvendighet forutsetter en reduksjon for far.

1. Introduction

An aging population implies a projected great demand for labour in many Western countries, and potential sources of unutilised labour thus need to be discussed. In spite of a fairly high employment rate, women in Norway have one of the highest part-time rates in Europe. About four out of ten employed women work less than full time, and the percentage is even higher when there are children in the household. In addition, women rarely work long hours. Because of the large labour demand in the years to come, particularly in many female dominated occupations, it is important to explore the potential labour reserves among women in Norway. Besides, reduced hours for women may negatively impact their career and pension disbursements, and thus have adverse long-term effects at the individual level.

The Norwegian work-family policies facilitate the reconciliation of work and family for both women and men, and also aim at promoting an equal division of paid and unpaid work in families - a so-called dual-earner/dual-carer model (Ellingsæter and Leira, 2006). However, a significant proportion of women still spend considerably less time in the labour market than their partner (Kitterød and Rønsen, 2010). Men continue to have a strong identity as main breadwinners; they seldom work part time and often have long hours. Accordingly, a soft version of gender equality ("gender equality light") is the dominating pattern in Norway (Skrede, 2004), and it is an intriguing question whether and how this can be changed. Does an increase in women's working hours necessitate a reduction in men's hours, or is it possible for women to augment their hours without men reducing theirs? If men reduce their hours, the family's time crunch may be eased and the paid hours re-allocated from men to women. The couple's total labour supply may stay unaltered, however.

In this paper we investigate the interrelationship between changes in the partners' working hours in dual-earner couples with children in Norway. Particularly, we ask whether an increase in one parent's working hours is associated with a decrease or an increase in the other parent's working hours, or whether there is no association among the partners' working hours at all. While there is a rich research literature on changes in individual women and men's working hours over time (for instance Astone et al., 2010; Drobnic et al., 1999; Fevang et al., 2004; Gash, 2008; Kitterød et al., 2011; Nergaard, 2010; O'Reilly and Bothfeld, 2002; Sanchez and Thomson, 1997), there are fewer studies of the mutual accommodations of the partners' working hours in a couple, at least in the Nordic context. At the international level, studies indicate that men increase their housework somewhat in response to their partner's increased paid hours (Gershuny et al., 1994 and 2005), a process described by the authors as "lagged adaptation", and also that very long hours for the husband significantly increases women's

likelihood of quitting her job, whereas the wife's long hours does not increase the husband's likelihood of quitting (Cha, 2010). Studies that examine the association between changes in the partners' paid hours in social democratic countries where generous family policies ease the combination of paid work and children are few and far between. Pettersen (2007) is an exception, though, examining the relationship between changes in parents' working hours in dual-earner couples in Norway in 1997-2002. She found no signs of the mother adjusting her working hours to the father's hours, whereas an increase in the mother's hours of work corresponded to a very slight initial decrease in the father's working hours, and then a slight increase. However, the coefficients for the father's change were very small. In the present paper we undertake a similar analysis with more recent and slightly different data, and also a slightly different analytical model. Of particular importance is that while Pettersen's data provided information on paid working hours in a main job only, our data provide information on a possible secondary job as well. This means that we have more accurate information of people's working hours, particularly if they work very long hours.

Existing theories imply diverging predictions concerning how one partner adapts to the spouse's enhanced market work. Some foretell that the spouse will work more, others that the spouse will work less, and still others that the spouse's hours will be unaffected. The outcome of an increase in women's labour supply may vary depending on starting point. For instance, there may be less need for the partner to reduce his hours if his wife goes from short to long part-time hours, compared to a change from long part time to full time or from full time to long hours. Hence, we look at the associations between changes in the partners' working hours for various initial hours among woman's hours. We also explore whether there are diverging patterns between parents with different educational attainments and parents with young and older children.

Our empirical analysis draws on panel data from EU-SILC 2003-2009. Both partners' working hours are captured in this survey, and the panel structure allows us to examine changes for individuals as well as for their partners. We look at dual-earner couples with children under the age of 18 living in the household. Both formally married and cohabiting couples are included in the analyses.

2. Theoretical considerations – what relationship can we expect?

It is unclear from existing theories and research what association we may expect between changes in partners' working hours. According to Becker's theory on comparative advantages and specialisation (Becker, 1991), we would expect an increase in one of the partner's paid working hours to be associated with decreased hours for the spouse. The key assumption in this theory is that the individual

members of the family pool their resources and strive at maximising the joint utility of the family. In deciding how to allocate their time between market work and domestic duties, the partners have to agree on who should specialize in market work and who should specialize in family work, and the spouses are predicted to specialize in the fields in which they have a comparative advantage. It is expected that the employment status and working hours of individuals are negatively related to the wage rate and employment of their spouse. According to this theory, we would assume that increased working hours for one partner is associated with reduced hours for the spouse.

Also more practical considerations concerning the time schedules and domestic needs of families may suggest specialisation and mutual adjustments between the partners' time inputs in the labour market. Long hours for both partners may entail stress and time pressure for the family (Jacobs and Gerson, 1998 and 2001; Abrahamsen and Storvik, 2002). Hence, an increase in one partner's paid hours is likely to be met by a decrease in the spouse's hours, particularly if both partners already work full-time. However, an increase from part-time work to normal full hours for one of the partners may not necessitate a reduction in the spouse's hours. Verbarkel and de Graaf (2009) argue that there is probably a natural maximum of working hours that a couple can handle, and hence expect a negative relationship between one partner's labour market resources and the other partner's time input in the labour market. This assumption is supported in their study of Dutch couples' labour market careers. It is pretty obvious that there is an upper limit for a couple's combined working hours (see for instance Halrynjo and Lyng, 2009; Cha, 2010), but this limit is not absolute and probably varies between different countries and different groups within a country. For instance, couples with older children may find it easier to put in long hours than couples with young children, and highly educated people with flexible work schedules and interesting jobs may handle long hours more easily than those with less work hour flexibility and more routine jobs.

Unlike the theory on specialisation and comparative advantages, the social capital theory predicts a positive relationship between the partners' labour market resources. It is assumed that the partners may provide each other with skills, network resources and knowledge and thereby help and encourage each other to find good jobs and enhance their labour supply. According to this theory, having a resourceful partner would facilitate both men's and women's employment and careers. Verbarkel and de Graaf (2009) argue, however, that positive partner effects are dominant in predicting husbands' and wives' job level, but not their working hours. While there is a natural boundary for the couple's total working hours, there is no clear maximum for the partners' job levels (measured, for instance, by scores on a Socio Economic Index). We assume, though, that up to a certain limit, there may be a

positive association between the partners' working hours, too, because career-oriented partners may stimulate and encourage one another to put in large efforts in the labour market. Having a supportive partner and a social network where full-time work and long hours are regarded positively, may promote longer hours for both spouses. For instance, in her study based on in-depth interviews with Norwegian urban middle class dual-earner couples with an explicit aim of sharing both paid hours and domestic tasks, Aarseth (2007) finds a mutual and generous spousal support for the other partner's career and long working hours. It may also be the case that an increase in one partner's working hours decreases the utility of the spouse's free time, since the partner is not present. Thus, the spouse may decide to augment his/her paid working hours, too.

Another perspective that may have relevance for the couple's labour supply is the so-called doing-gender theory. According to this, both men and women continuously construct and reconstruct their gender identity in their daily lives (Berk, 1985; West and Zimmerman, 1987). For men this entails undertaking tasks that are regarded as typically masculine and avoiding activities with feminine connotations, for instance routine housework. The opposite is true for women. This strand of thought has received considerable support in studies of couples' division of family work (for instance Bittman et al., 2003), but is less utilised when it comes to the division of paid work. We argue, however, that it might have some relevance for the couple's allocation of paid hours as well. Several studies both in Norway and other countries suggest that paid work is an important factor in men's identity construction, and that strong breadwinner norms still prevail (for instance Brandth and Kvande, 2003; Cha, 2010). Although women increasingly contribute to the family's income in Norway, men are still the main providers in the majority of couples and are also expected to be so. Men's strong identity as main breadwinners combined with the central role that paid work plays for men's self esteem, suggest that most men would prefer to work longer hours than their partner. Even though they may be supportive of their wife's employment, they may be less likely to stimulate her to work more than they do themselves. This may suggest that men dislike their wives' long hours, and if the wife increases her hours so that they exceed his, he might enhance his own hours as well. As for women's labour market behaviour, the predictions from the doing gender theory is less clear, but a likely suggestion is that women would be careful not to surpass their partner's hours. This would be in line with the research contending that women continue to adapt their working hours to the needs of their families and that men's careers usually take priority over the career of their wives (for instance Andenæs, 1996; Maume, 2006; Cha, 2010; Halrynjo and Lyng, 2010).

The partners' may also change their working hours in the same direction as a response to common external events. For instance, a testamentary inheritance may allow both the mother and the father to work less, while the retirement of a grandparent may imply better access to private childcare and thus allow both partners to work more.

Whereas some theories predict a negative relationship between changes in the partners' working hours, and others predict a positive association, it can also be argued that the partners' working hours may be mutually independent. Accordingly, an increase in one partner's hours would not be met by neither an increase nor a decrease in the spouse's hours. Since women as well as men are increasingly expected to provide for themselves in Norway, and since entitlements in the national insurance and social security systems are strongly linked to individual earnings, there may be less reciprocal dependence between the partners' employment decisions. Moreover, good access to high quality and affordable public childcare and after-school programs may lessen the need for fathers to work less even if mothers work more. Domestic work can also be compressed when women work long hours (Berg, 1988; Bonke and Esping-Andersen, 2011; Gershuny and Sullivan, 1998). Hence, there is not necessarily a need for a man to substitute for the reduction in his spouse's domestic hours. A cross-sectional study of Norwegian fathers' housework and childcare found no clear association between the father's time spent on family work and the mother's paid working hours (Kitterød and Pettersen, 2006). Studies suggesting that men rarely restrict their working hours in response to family requirements point in the same direction (Presser, 1989; Andenæs, 1996; Maume, 2006), and the same is true for Pettersen's (2007) study showing only a very weak association between changes in mothers' and fathers' working hours in Norway. Moreover, the Norwegian labour market is strongly gender segregated with high percentages of women in the public sector and in education, health and social work, and men concentrated in the private sector, particularly in manufacturing and finance (OECD, 2000). Men's jobs are often characterised by "a long-hours culture" where overwork is expected and reduced hours discouraged (Abrahamsen, 2002). This may prevent men from reducing their hours even if they would prefer to do so because of family needs.

3. Data and analytical method

We utilise panel data from the Norwegian part of EU-SILC (European Union Statistics on Income and Living Conditions) in the empirical analysis. The survey has been conducted in Norway since 2003 and includes cross-sectional information as well as panel information. Topics such as housing, economy, child care, health and employment are covered every year. Information on income, property, education and place of work is linked to the survey data from various registers. In Norway, individual

people are sampled for the survey, but information is collected for all household members 16 years and older. Each individual is asked to participate in eight waves of the survey in order to ensure high-quality panel data. Data are collected from January/February to June, and every year one eighth of the sample is replaced by new respondents. The analysis in the present paper is based on a subsample of married/cohabiting respondents with at least one child (stepchild, biological or adopted child) below 18 years of age living in the household, and where both partners have employment as their main activity. Both partners were asked what they considered their main activity, with the following response alternatives: employment, studies, unemployment, disability pension, retirement, military services, housework and childcare, and other activities.

The survey has a personal part on the respondent's health and working conditions, and these questions can only be answered by the respondent him/herself. Then there is a part including questions on housing, economy and childcare, which may be answered by the respondent or another household member. Finally, all household members 16 years and older are asked about their employment and working conditions. This information may be provided by the respondent if the household members are not present and cannot be easily contacted. There are fewer questions on working conditions for the household members than for the respondent him/herself, though. For instance, household members are not asked if they have a leading position or not, but this is captured for the respondent.[1]

We start by presenting some descriptive statistics on working hours coupled with children in the household based on a pooled file of cross-sectional data for 2003-2009. Next, we take advantage of the data's panel structure and explore the association between changes in the two partners' working hours in a couple. We use an unbalanced panel, which means that we include all respondents, also those with non-response in one or more panel-waves. The response rate in the panel varies throughout our analysis period, exceeding 70 percent in 2003, 2004, 2005 and 2007, but dropping to 68.5 per cent in 2006, 64.3 percent in 2008, and 60.6 percent in 2009. We have run OLS models with fixed effects as well as random effects (mixed) models, but mostly report results from the fixed effects analyses in this paper. The dependent variable in the analysis is the father's weekly working hours, and the most important explanatory variable is the mother's weekly working hours. We explore whether there is an association between an increase or decrease in her hours and an increase or decrease in his hours.

[1] For documentation of EU-SILC, see http://epp.eurostat.ec.europa.eu/portal/page/portal/income_social_inclusion_living_conditions/quality/national_quality_reports

A fixed effects model uses each individual as his or her own control, and by doing so, it is able to control for all stable, unobserved variables, just as if these variables had been measured and included in the regression model (Allison, 2009). Hence, these models are able to control for variables that cannot be measured as well as variables that can be measured but are not included in the survey in question. However, the models do not produce any estimates for variables that do not change over time (for instance sex and ethnicity); only for time-varying variables. Moreover, fixed effects models produce very imprecise estimates for variables that have little variation over time for each individual, such as for instance the partner's educational attainment. In the fixed effects analyses, the unobserved variables are allowed to have any association whatever with the observed variables. A random effects model uses information both between and within individuals, and the unobserved variables are assumed to be uncorrelated with all the observed variables. Unlike the fixed effects model, it produces estimates for time-constant as well as time-varying variables.

4. Dependent and independent variables

Information on the respondents' working hours was captured by a question on how many hours they usually work per week in their main occupation as well as in a possible secondary occupation. They were asked to include overtime work as well as other extra hours worked at home. The same information was collected from the partner. In the variables on the parents' working hours we add hours from main and secondary occupations. We define the father's working hours as our dependent variable, and the mother's working hours as our principal independent variable, although our analyses do not reveal whether it is the father or the mother who first changes his or her working hours. This is of course a drawback when it comes to understanding the mechanisms behind the partners' adjustments. However, even if we did know which partner first changed his/her hours, we would not be able to conclude that the spouse's behaviour is a response to these changes. An alternative explanation would be, for instance, that if one spouse plan to reduce or increase his/her hours of work, the partner may change his/her hours in order to meet future changes from the spouse. It may also be the case that both partners change their working hours in response to a common external event, for instance a large testamentary inheritance that enables both partners to work less, or the provision of an expensive house, that requires both partners to work more. Moreover, as there is a time span of one year between the interviews in the panel, both partners may have changed their hours several times between the interviews. Hence, our analysis aim at revealing whether there is a positive or negative relationship between the parents' working hour changes, or whether there is no association at all, irrespective of which partner initially changes her/his hours.

We treat the father's working hours as a continuous variable, while the mother's working hours is included as a continuous variable in some models, and as a categorical variable in others, in order to explore the non-linear associations between changes in the partners' paid hours.

Since fixed effects models control for all time-invariant characteristics of the individuals, both observed and unobserved, we include only a few independent variables in these models in addition to the mother's working hours, and these are primarily considered as controls. We include dummies for the age of the youngest child in order to adjust for possible changes in the father's hours due to the child growing older or a younger child being born. We also include dummies for the father holding a leading position or not, and a dummy for self-employment versus being an employee. We expect that becoming a leader implies longer hours, and the same is true for entering into self-employment. Concerning leaders, we differentiate between those with responsibility for wages and promotions, and those without such responsibilities. We also control for the father's health (self-reported) and distinguish between those with a very good health, those with good health, those with neither good nor bad health, and those with bad health. Finally, we control for the year of study, with 2003 as the reference.

In the random effects model we also include both partners' educational attainment, the couple's civil status (married versus cohabiting) and whether the mother is self-employed or not.

5. Descriptive statistics

In spite of the considerable growth in women's employment and working hours during recent decades, there are still significant differences between women's and men's labour market behaviour in Norway. This is demonstrated in Table 1, which shows frequencies and averages for mothers' and fathers' working hours, based on pooled EU-SILC data from 2003 to 2009. The figures are based on all parents with children below 18 years of age, both employed and non-employed.[2] On the average, coupled mothers with at least one child under the age of 18 usually work 27.0 hours per week, whereas fathers work 40.5 hours per week. 17 per cent of the mothers are not employed, 23 percent work 1-29 hours per week, 47 percent work 30-39 hours per week, and pretty few work longer hours. Only 5 per cent work at least 45 hours per week. For fathers we observe a quite different pattern with only 5 per cent being non-employed, and as much as 32 percent working at least 45 hour per week.

[2] Parents with children under the age of 1 are omitted in these tables because a significant proportion has parental leave, particularly among the mothers. When answering the question on usual weekly working hours people probably refer to the situation prior to the leave period and this does not reflect their work load at the time of the interview. In the panel analysis, however, we include all parents. These are multivariate analyses where age of youngest child is included as a control variable.

Looking at couples where both partners have employment as their main activity, which constitute our sample in the panel-analyses below, the gender difference in working hours is more modest, but still significant (Table 2). For couples where both partners are mainly employed, we see that mothers on the average work 33.5 hours and fathers work 42.7 hours per week. Working less than 30 hours is pretty common for mothers, but definitely not for fathers, whereas the opposite is true for long hours.

Table 1. Weekly working hours among married/cohabiting mothers and fathers with children 1-17 years of age. All parents, irrespective of employment. Percent

	0 hours	1-29 hours	30-39 hours	40-4 hours	45 hours +	Average	N (Person-years)
Mothers	17	23	47	7	5	27.0	5283
Fathers	5	3	40	20	32	40.5	5283

Source: EU-SILC 2003-2009, cross-sectional data.

Table 2. Weekly working hours among married/cohabiting mothers and fathers who consider themselves mainly employed and have children 1-17 years of age. Percent

	1-29 hours	30-39 hours	40-44 hours	45 hours +	Average	N (Person-years)
Mothers	25	59	9	7	33.5	4016
Fathers	2	43	22	33	42.7	4016

Source: EU-SILC 2003-2009, cross-sectional data

Turning from the individual level to the couple level, we find that a significant proportion of women work less than their partner, while few work more. The exact proportions are of course sensitive to definitions, but if we decide that in order to work more than one's partner, a person needs to work at least five hours more, we find that 59 percent of the mothers work less than their partner, 5 percent work more, and 36 percent work as much as their partner (not shown). Similar results are found in analyses of other data as well (Kitterød and Rønsen, 2010).

The difference between mothers' and fathers' paid hours suggests that given the same number of working hours, mothers usually have less domestic support from their partner than fathers have. For instance, Table 3 shows that fathers with long working hours usually have a partner who works less, whereas this is not the case for mothers with long hours. Looking at mothers who work at least 45 hours per week (which constitute only 7 percent of mothers in couples where both partners have employment as their main activity), we find that two thirds of these have a partner who works equally much, and almost 20 percent have a partner who works 40-44 hours per week. Given women's significantly lower labour market input than men's we ask whether an increase in the mother's hours goes along with a decrease in her partner's hours, whether there is no relationship between the two spouses' labour market changes, or whether an increase in the mother's hours corresponds to an increase in her partner's hours.

Table 3. The partner's working hours among married/cohabiting mothers and fathers who consider themselves mainly employed and have children 1-17 years of age. Percent

	Partner's working hours					
	1-29 hours	30-39 hours	40-44 hours	45 hours +	All	N (Person-years)
Mother's working hours						
1-29 hours	2	44	20	34	100	1024
30-39 hours	2	49	21	29	100	2363
40-44 hours	1	20	39	40	100	359
45 hours +	1	16	19	64	100	270
Father's working hours						
1-29 hours	32	59	6	4	100	78
30-39 hours	26	67	4	2	100	1709
40-44 hours	23	56	16	6	100	890
45 hours +	26	51	11	13	100	1339

Source: EU-SILC 2003-2009, cross-sectional data

6. Increased hours for the mother – any changes for the father?

The panel structure of the data allows us to examine changes in the partners' working hours. Since parents in couples where both partners have employment as their main activity are included in the analyses, respondents will be excluded from the analysis if one of the partners changes his/her main activity during their participation in the panel. Only fairly stable dual-earner couples are studied, then, but these constitute the large majority of the couples in the panel.

Table 4 shows results from fixed effects regressions with the mother's working hours as a continuous variable, but based on different sample selections. In the first column (titled Both 1 hours +), all coupled parents where both partners are mainly employed are included in the analysis. We observe a positive relationship between the partners' working hours, in that one hour's increase by the mother is associated with 0.05 hours increase from the father. The estimate is clearly significant, but fairly low. An increase among fathers who initially work short hours would not be astonishing, but an increase among full-time working fathers might imply a heavy time-crunch for the family.

In the second column we show results from an analysis of couples where fathers who work less than 38 hours per week are excluded. Only some 386 observations are left out compared to the first column, which reflects the low percentage of part-time working fathers. Excluding part-time working fathers does not significantly alter the results. In column three we restrict the sample even further and look at couples where the mother works a maximum of 38 hours per week. We find no significant association between the partners' working hour changes in this analysis, implying that when the mother enhances her paid hours from part-time to normal full-time work at the most, this is not associated with neither an increase nor a decrease in the father's hours - at least there is no linear

relationship between the changes in the partners' hours of work. However, looking at couples where the mother works at least 38 hours per week (column four), we observe a strong positive association between changes in the two partners' hours. This means that when the mother augments her involvement in the labour market beyond normal full hours, this is associated with an increase rather than a decrease in the father's hours, even if he initially works at least 38 hours per week. The estimated effect is 0.31 hours, which means that one hour's increase in the mother's working time is associated with an increase of 18.6 minutes in the father's working time on average.

Table 4. Results from OLS fixed effects regression analysis of changes in weekly working hours among fathers in various groups of dual-earner couples with children 0-17 years of age. Mothers' working hours continuous

	Both 1 hour +	She one hour +, he 38 hours +	She 1-38 hours, he 38 hours +	She 38 hours +, he 38 hours +
Mother's working hours, continuous	0.05*	0.05**	-0.03	0.31***
Age of youngest child (ref: 0 years)				
1-2 years	-0.21	-0.25	-0.57	-0.75
3-6 years	-0.27	-0.02	-0.03	-0.70
7-10 years	-0.35	0.13	-0.08	-0.66
11-17 years	-0.20	0.61	0.21	0.65
Father leading position (ref: no)				
Yes, not responsible for promotions	1.02**	0.99**	0.86*	0.89
Yes, responsible for promotions	2.17***	1.80***	1.99**	0.86
Father self-employed (ref: no)				
Yes	1.56*	1.85**	2.85***	1.22
Father's health (ref: very good)				
Good	0.85**	0.88**	0.96**	0.09
Neither good nor bad	1.33*	1.48**	2.20***	0.60
Bad	0.60	1.63	0.80	0.16
Year (ref: 2003)				
2004	-0.09	-0.21	-0.24	-0.39
2005	-0.23	-0.40	-0.55	-0.88
2006	-0.26	-0.32	-0.24	-0.55
2007	-0.18	-0.32	-0.46	-0.18
2008	-0.06	-0.20	-0.35	-0.56
2009	-0.35	-0.80	-0.69	-1.06
R^2	0.69	0.72	0.71	0.79
Number of observations (person-years)	4380	3994	3311	2083
Number of individuals	1614	1535	1382	994
Average number of observations per Individual	2.7	2.6	2.4	2.1

*** Significant at 0.001 level; ** significant at 0.01 level; * significant at 0.05 level

In order to examine potential non-linear relationships between changes in the partner's hours, we have replicated the analyses with four dummies for the mother's working hours in stead of a continuous variable (Table 5). We differentiate between 1-19 hours (reference), 20-29 hours, 30-39 hours, 40-44 hours and 45 hours + per week. We find that it is above all an enhancement to very long hours for the mother that is associated with an increase in the father's hours, and the effect is pretty strong; 2.24

hours (or two hours and 14 minutes) when we look at all dual-earner couples, and almost the same (2.62 hours) when we exclude fathers working less than 38 hours per week. We find no association between changes in the partners' hours when we look at mothers working 1-38 hours per week, but when we look at mothers working at least 38 hours per week we observe a strong positive correlation between changes in the partners' working hours. When the mother expands her working time from normal full hours to 40-44 hours per week, the father's working time increases by 1.97 hours, and when she expands her hours beyond this, the father's working time increases by 3.69 hours, or more than three and a half hour per week.

In order to check the robustness of our results, we have run some random effects (mixed) models as well. Some additional controls are included in these models. We have based the analyses on the same subsamples as we used in the fixed-effects models, but we only show the results for the couples where both partners work at least 38 hours per week (Table 6). When we use the mother's working hours as a continuous variable, the estimated effect on the father's weekly hours is 0.38. Utilising dummies for the mother's working hours, we get an estimate of 2.06 when she increases from less than 40 hours to 40-44 hours per week, and an estimate of 4.74 when she increases to at least 45 hour per week. These estimates are slightly larger than the corresponding figures in Tables 4 and 5, but the random-effects models (both those that are shown in Table 6 and those that are not shown) corroborate the conclusions from the fixed-effects analyses. Like the fixed-effects models they demonstrate a positive association between the changes in the partners' working hours when the mother increases from 38 hours per week to long working time, but no association between alterations in the partners' hours when the mother augments her working time from short or long part-time and to a maximum of 38 hours per week.

We find significant associates between the father's working hours and some of, but not all, the control variables in the fixed-effects analysis. There is no clear relationship between the age of the youngest child and the father's hours of work, which is in line with Pettersen's (2007) results in her analysis of panel data for the time span 1996-2002. In a cross-sectional analysis of the Norwegian Labour Force Survey from 2005, Dommermuth and Kitterød (2009) found that fathers' actual working hours where slightly lower when they had children 0-1 years of age, than otherwise, which indicates a small reduction of hours when children are very young. Their contractual hours where not affected by the child's age, however. People's usual or normal working hours, which we look at in the present paper, are probably less sensitive to temporary changes due to child-care obligations than are actual hours of work.

Table 5. Results from OLS fixed effects regression analysis of changes in weekly working hours among fathers in various groups of dual-earner couples with children 0-17 years of age. Mothers' working hours categorical

	Both 1 hour +	She one hour +, he 38 hours +	She 1-38 hours, he 38 hours +	She 38 hours +, he 38 hours +
Mother's working hours (ref: 1-19 hours)				Ref: 38-39 hours
20-29 hours	-0.13	0.23	0.36	
30-39 hours	-0.81	-0.24	-0.03	
40-44 hours	0.49	0.92		1.97***
45 hours +	2.24**	2.62***		3.69***
Age of youngest child (ref: 0 years)				
1-2 years	-0.38	-0.42	-0.48	-0.70
3-6 years	-0.29	-0.09	-0.01	-0.74
7-10 years	-0.39	0.05	-0.06	-0.59
11-17 years	-0.29	0.49	0.23	0.70
Father leading position (ref: no)				
Yes, not responsible for promotions	1.02**	1.00**	0.86*	1.01
Yes, responsible for promotions	2.14***	1.76***	1.97***	0.81
Father self-employed (ref: no)				
Yes	1.57*	1.89**	2.81**	1.52
Father's health (ref: very good)				
Good	0.84**	0.86**	0.97**	0.15
Neither good nor bad	1.33*	1.50**	2.21***	0.62
Bad	0.74	1.68	0.81	0.37
Year (ref: 2003)				
2004	-0.06	-0.20	-0.24	-0.25
2005	-0.19	-0.37	-0.54	-0.76
2006	-0.19	-0.29	-0.27	-0.56
2007	-0.09	-0.27	-0.49	-0.24
2008	0.04	-0.11	-0.39	-0.65
2009	-0.21	-0.70	-0.74	-1.32
R^2	0.69	0.72	0.71	0.78
Number of observations (person-years)	4380	3994	3311	2083
Number of individuals	1614	1535	1382	994
Average number of observations per Individual	2.7	2.6	2.4	2.1

*** Significant at 0.001 level; ** significant at 0.01 level; * significant at 0.05 level

We see the expected positive relationship between the father becoming a leader and the father's working hours, particularly if he is responsible for promotions and salaries. There is also a positive association between the father becoming self-employed in stead of being an employee and the father's working hours. We do not, however, observe the expected negative correlation between a deteriorating health and the father's hours of work. On the contrary, it seems that the father increases his working hours if his health gets worse. It is important to remember, though, that only fathers reporting employment as their main activity are included in the analysis. Perhaps we get a selected group of fathers with health problems in our subsample, so that their health problems are of a sort that does not impede full-time work. Alternatively, worsening health conditions may require more substantial time inputs at work in order to get the job done, or the fathers' deteriorated health may be a consequence of

his long working hours, rather than causing them. Regarding year of study, we see few significant associations, meaning that there is little variation in fathers' working hours in the period, when a number of relevant characteristics are controlled for.

Table 6. Results from random effects analyses of variation in weekly working hours among fathers in various groups of dual-earner couples with children 0-17 years of age, where both the father and the mother works at least 38 hours per week. Mothers' working hours continuous and categorical

	Mother's hours continuous	Mother's hours categorical
Mother's working hours, continuous	0.38***	
Mother's working hours (ref: 38-39 hours)		
40-44 hours		2.06***
45 hours +		4.74***
Age of youngest child (ref: 0 years)		
1-2 years	-0.18	-0.16
3-6 years	-0.62	-0.65
7-10 years	-0.59	-0.57
11-17 years	-0.61	0.58
Civil status (ref: cohabiting)		
Married	-0.24	-0.23
Father leading position (ref: no)		
Yes, not responsible for promotions	0.78	0.78
Yes, responsible for promotions	2.79***	2.61***
Father self-employed (ref: no)		
Yes	6.23***	6.43***
Mother self-employed (ref: no)		
Yes	-0.19	0.20
Father's health (ref: very good)		
Good	-0.12	-0.12
Neither good nor bad	-0.24	-0.34
Bad	0.59	0.74
Father's education (ref: comprehensive)		
High school	0.02	0.10
University, 1-4 years	-0.39	-0.43
University, 5 years +	0.44	0.28
Mother's education (ref: comprehensive)		
High school	1.02	0.92
University, 1-4 years	-0.01	-0.09
University, 5 years +	-0.41	-0.65
Year (ref: 2003)		
2004	-0.34	-0.23
2005	-1.23*	-1.06*
2006	-0.98	-0.94
2007	-0.53	-0.54
2008	-0.76	-0.78
2009	-1.03	-1.21*
Number of observations (person-years)	2083	2083
Number of individuals	994	994
Average number of observations per individual	2.1	2.1

*** Significant at 0.001 level; ** significant at 0.01 level; * significant at 0.05 level; (*) significant at 0.10 level

Like the fixed effects models, the random effects models show strong associations between leadership and self employment on the one hand and the father's working hours on the other. Few of the other variables show a significant association with the father's working time, though. The estimated effects are generally larger in these models than in the fixed effects models.

7. Different patterns depending on the partners' educational attainment

One could argue that the association between the changes in the spouses' working hours may vary between groups of parents according to their educational level. The expected pattern, does, however, depend on which mechanism we assume to be at work. According to the social capital theory, we would anticipate that a positive relationship between the partners' working hours is most pronounced in highly educated couples since they are most likely to have interesting jobs and work-related networks and therefore stimulate each other's labour market involvement. The doing gender-theory does not entail any particular expectations regarding differences between educational groups, though, but it could be that fathers with low educational attainment are less supportive of their spouses' long hours than those with more education, since they tend to express less gender equal attitudes (Knudsen and Wærness, 1996). Following the theory on comparative advantages and specialisation, we would expect a negative association between the partners' working-hour changes in all groups. However, less specialization may be expected when the partners have equally much education, since their marginal productivities in domestic work and paid employment should be more similar.

In order to examine possible interactions between the partners' education and the association between their working-hour changes, we have run OLS-regression with fixed effects for couples with various educational attainments. We differentiate between those who have completed high-school or less on the one hand, and those with university education on the other. We look at couples where both partners fall in the first group, couples where he falls in the first and she in the second group, couples where he falls in the second and she in the first group, and couples where both partners fall in the second group. Couples where both partners report employment as their main activity are included in the analysis. We have run models with the mother's working hours as a continuous variable as well as models with a set of dummies for her working time. Because there are few observations in some of the analyses (particularly couples where he has high and she has low education), the reference category for the mother's working time is now set to 1-29 hours per week, rather than 1-19 hours, as in the previous analyses. The results are displayed in Table 7. The models include the same controls as those presented in Tables 4 and 5, but we now present estimates for the mother's working hours only.

Utilising the mother's working time as a continuous variable we find significant associations between changes in the partners' working hours only for couples where both partners have long education. The estimate implies that one hour's increase in the mother's working time corresponds to an increase of 0.12 hours, or about seven minutes, for the father. Using dummies for the mother's working hours produced a more nuanced picture, however. We see a positive relationship between an increase in the mother's and the father's working hours for couples where both partners have short education, as well as for couples where both partners have long education. The estimates have approximately the same magnitude. For those couples where the father has short education, while the mother has long, we observe a negative relationship between changes in the partners' paid hours. An increase from less than thirty hours per week to 30-39 hours per week for the mother is associated with a decrease of almost three hours per week for the father. There are no significant associations for further increases in the mother's hours, though. When he has long and she has short education, there are no significant correlations between the changes in the partners' hours.

Table 7. Results from OLS fixed effects regression analysis of changes in weekly working hours among fathers in dual-earner couples with children 0-17 years of age, with various educational attainments [1]

	Both high school	He high school, she university	He university, she high school	Both university
Mother's working hours, continuous	0.02	-0.02	0.04	0.12**
Mothers working hours, categorical				
(ref: 1-29 hours)				
30-39 hours	-0.67	-2.47**	-1.16	-0.13
40-44 hours	0.50	-1.48	-1.05	1.58
45 hours +	2.54*	1.17	0.21	2.66*
Number of observations (person-years)	1780	768	476	1175
Number of individuals	661	283	179	427
Average number of observations per Individual	2.7	2.7	2.7	2.8

[1] The following variables are included as controls: Age of youngest child, whether the father has a leading position or not, whether the father is self-employed or not, the father's health, and the year of study.

*** Significant at 0.001 level; ** significant at 0.01 level; * significant at 0.05 level

8. Different patters for parents with young and older children

Assuming that it is easier to handle long hours for couples with older rather than younger children, we have also run separate analyses for parents with children in different age groups, employing the same models as in the above analyses. We differentiate between those with a youngest child 0-6 years of age, and those with a youngest child 7-17 year of age. Results are presented in Table 8. We observe no associations between a change in the mother's and the father's working hours for parents with children 0-6 years of age, regardless of whether the mother's hours is treated as a continuous or a categorical variable. For those with a youngest child 7-17 years of age, however, there is a strong relationship

between an increase in the mother's and the father's working hours, but only when the mother expands her hours to at least 45 hours per week. This is met by an increase in almost four hours per week by the father. We do not know the mechanisms behind this pattern, but it may be the case that both parents want to get their careers moving when children have become less demanding and are less in need of intensive care. As older children usually stay up longer at night than younger children, parents may have the opportunity to spend several hours with their children in the afternoon even if they work long hours.

In order to explore possible interactions between the parents' educational attainments and the age of the youngest child, we have also run regressions for couples with children 7-17 years of age, depending on the parent's educational attainments. We observe a positive association between extensions in the partners' working hours for couples where both partners have either low or high education, particularly when the mother changes to very long hours (Table 9). When he has low and she has high education, an increase in her hours is met by a decrease in his. When he has long and she has short education, there are no significant associations between changes in the partners' hours. Due to the low number of observations in this group, however, only strong associations will be statistically significant. By and large, it seems that the associations demonstrated in table 7 apply first and foremost to parents with older children, and the relationships are stronger when parents with young children are excluded from the analysis. In particular, we want to draw attention to the strong positive correlation between changes in the parents' working hours in highly educated couples with older children. An increase to 40-44 hours per week for the mother is associated with an increase in more than four hour per week for the father, and an increase to at least 45 hours per week for the mother is associated with an increase in more than seven hours per week for the father.

Table 8. Results from OLS fixed effects regression analysis of changes in weekly working hours among fathers in dual-earner couples with children in different age groups[1]

	Youngest child 1-6 years	Youngest child 7-17 years
Mother's working hours, continuous	0.03	0.08**
Mothers working hours, categorical (ref: 1-29 hours)		
30-39 hours	-0.75	-0.54
40-44 hours	0.21	0.93
45 hours +	1.38	3.86***
Number of observations (person-years)	2218	2161
Number of individuals	914	872
Average number of observations perIndividual	2.4	2.5

[1] The following variables are included as controls: Age of youngest child, whether the father has a leading position or not, whether the father is self-employed or not, the father's health, and the year of study.

*** Significant at 0.001 level; ** significant at 0.01 level; * significant at 0.05 level

Table 9. Results from OLS fixed effects regression analysis of changes in weekly working hours among fathers in dual-earner couples with various educational attainments. Results for those with a youngest 7-17 years[1]

	Both high school	He high school, she university	He university, she high school	Both university
Mother's working hours, continuous	0.06	-0.07	-0.02	0.27***
Mothers working hours, categorical (ref: 1-29 hours)				
30-39 hours	-0.73	-2.91*	-2.22	1.95
40-44 hours	1.74	-3.83*	-1.58	4.24*
45 hours +	4.50**	-1.14	1.06	7.17***
Number of observations (person-years)	973	375	249	508
Number of individuals	401	149	101	194
Average number of observations per Individual	2.4	2.5	2.5	2.6

[1] The following variables are included as controls: Age of youngest child, whether the father has a leading position or not, whether the father is self-employed or not, the father's health, and the year of study.

*** Significant at 0.001 level; ** significant at 0.01 level; * significant at 0.05 level

9. Summary and discussion

In spite of mothers' enhanced labour market participation and working hours in Norway in recent decades, most coupled mothers still spend less time in the labour market than their partner. Mothers often work part time and rarely long hours, whereas the opposite pattern is common for fathers. Given the great projected demand for labour in many Western countries in the future it is important to explore potential sources of unutilised labour. Speculating whether mothers may possibly increase their labour supply, we investigate the interrelationship between the partners' paid working hours in dual-earners couples in Norway and ask whether an increase in one partners' working hours corresponds to an increase or decrease in the partner's working hours, or whether the there is no relationship between the partners' working hours changes at all. To our knowledge, this topic has so far been little explored in the Nordic context. More knowledge about the relationship between the partners' working hour changes is important in order to assess whether an increase in mother's hours is a realistic aim in Norway.

Existing theories involve different predictions regarding the association between changes in the partner's working hours. Wile the theory on specialisation and comparative advantages and also more practical considerations concerning the couples' times schedule may suggest that in increase in one partner's paid hours is associated with decreased hours from the spouse, the social-capital theory may predict a positive relationship between changes in the partners' paid hours. The doing-gender theory may imply that men prefer to have longer paid hours than their spouse, while women are careful not to surpass their partner's paid hours. The partners' working hours may also be mutually independent since all adults are

increasingly expected to provide for themselves via the labour market in Norway and entitlements in national insurance and social security system are strongly linked to individual earnings.

Although the divergent predictions cannot be strictly tested with our data, the empirical analyses suggest some support for each of them. Based on panel data from the Norwegian part of EU-SILC from 2003-2009 fixed effects as well as random effects models uncover both positive and negative associations between the mother's and the father's working hour changes in dual-earner couples, and in some cases there is no relationship between changes in the partners' paid hours at all. The pattern varies depending on the mother's initial working hours, and on the parents' educational attainment and the age of the youngest child. When the mother enhances her hours from part time to normal full time at the most, this is not related to neither an increase nor a decrease in the father's working hours. This suggests that the partner's decisions regarding their working hour changes may be mutually independent. However, when the mother augments her paid work from normal full time and to even longer hours, this is associated with an increase, rather than a decrease, in the father's hours, even if he initially works at least normal full time. This is in accordance with the social capital theory, which says that the partners may provide each other with help and network resources and thereby stimulate and encourage each other to put in considerable efforts at the labour market. We do not know which partner who initially decides to change his/her working hours, but if the father's enhancement is a response to an increase in the mother's paid hours this would be in accordance with the doing-gender theory. However, this is not the case if the increase in the mother's working hours is a response to an initial increase in the father's hours.

Looking at parents with different educational attainments, we find that an increase in the mother's paid hours is associated with an increase in the father's paid hours when both partners have either high or low educational attainments. This may agree with the theory on specialisation and comparative advantages since less specialisation is expected when the partners have equally much education. For couples where the father has short education while the mother has long, an increase in the mother's hours from less than 30 hours per week and to 30-39 hours per week is associated with a decrease in the father's paid hours. This may be consistent with the theory on specialisation and comparative advantages. However, an increase to even longer working hours for the mother is not related to a decrease in the father's hours. Moreover, when the father has long education and the mothers has short, an increase in the mother's working hours does not correspond to neither a decrease nor an increase in the father's hours.

Looking at parents with children at different ages, no association is observed between the mother's and the father's working hour changes when a youngest child is below 7 years of age, while a positive association

is found for parents with older children, first and foremost when the mother starts working very long hours (at least 45 hours per week). This may suggest that long hours for both parents are easier to handle as children grow older. The positive relationship between the parents' working hour changes is particularly strong when both partners are highly educated, but is also observed when both has less education.

Although our study yields several interesting results, is has certain limitations. First of all it is a drawback that the analyses do not tell whether it is the mother or the father who first increases her/his hours, or whether the partners concurrently augment their hours. Such information would make it easier to disentangle the mechanisms behind the observed associations. Data with more frequent observations of the partners' working hours would be helpful, but even then we would not be able to decide whether a change in one spouse's behaviour is a response to changes observed for the partner at an earlier point in time. It may well be the case that if one spouse plan to reduce or enhance her/his working hours, the partner may change his/her hours in advance in order to meet the future changes from the spouse. In order to be able to tell which partner actually adapts his/her paid hours to those of the spouse information on the reasons for the partners' working hours changes is needed. The partners' working hour changes may also be adaptations to external events. Future analyses should try to better disentangle the mechanisms behind the association or non-association between spouses' working hour changes. Moreover, a natural next step would be to explore further in what ways associations between partners' working hour changes vary between different groups depending on for instance the partners' occupations, wages and domestic duties.

In spite of certain weaknesses we believe that our study contributes with some new and interesting results regarding spouses' mutual adaptations in the labour market. In particular, we want to draw attention to the remarkable positive association between an increase in the mother's paid hours from full time and to very long hours on the one hand, and the enhancement of the father's hours on the other. The fact that this association holds even when the father initially works at least 38 hours per week, suggests that some couples are willing to put in considerable hours in the labour market. We believe that the preferences and time use arrangements of these couples should be looked at in more detail in future studies. Although they constitute a minority of couples with children in Norway, they may teach us more about the premises for combining long hours for both parents in a successful way. Our study does not tell whether parents are forced to work long hours for economic or other reasons, or choose long hours because they find their jobs interesting and stimulating. Future analysis should look more deeply into these questions and also try to disentangle how domestic duties are organised in couples that spend much time in paid labour.

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