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ABSTRACT

Flexible Working and Couples' Coordination of Time Schedules^{*}

Using previously unexploited data on time scheduling in the employment and household contexts, we investigate the effect of flexible working on couples' coordination of their daily work time schedules in the UK. We consider three distinct dimensions of flexible working: flexibility of daily start and finish times (flexitime), flexibility of work times over the year (annualised hours), and generalised control of working hours. We find that in couples with flexitime there is greater spouse synchronization in daily working times by nearly one hour. The effect is driven by couples with dependent children. However, we find the effect in couples with children of any age (under 16), suggesting it does not stem from the childcare requirements of young children. Robustness checks indicate that flexitime is not endogenous, suggesting that an expansion of flexitime would increase couples' work time coordination. There is less evidence that broader control over working hours increases daily synchronous working time and no evidence that annualised hours increase synchronous time on a daily basis. The weaker relationships with daily synchronous time for these two flexibility measures are consistent with their broader scope (control over amount of hours as well as timing) and longer time span.

JEL Classification: J12, J22, J32

Keywords: flexible work, time synchronization, time coordination

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1 Introduction

The ability to combine work with quality time together as a family is at the heart of the concept of work-life balance. The importance of time spent with others underlines the fact that work-life balance is not just about the total time available for out-of-work activities but is also about being able to coordinate time with others. This requires control over the timing of work hours which flexible work arrangements may be able to facilitate. How much more synchronization there might be if individuals had more control over their work hours and the timing of work is not well understood. To address this question we use previously unexploited data on time scheduling in the household and employment contexts to investigate for the first time in the UK the effect of flexible working on couples' coordination of their work schedules.

Our empirical strategy provides an estimate of the overall impact of flexible work on how couples synchronize their work schedules, and thus the potential time left for joint leisure. To that end we use the British Household Panel Survey (BHPS), which contains rich information about individuals and the households they belong to, including details of individuals' labour market experiences and use of flexible work (as measured by several indicators in the data). We exploit new data collected in 2003, when the BHPS introduced a novel set of questions about work timing which, to our knowledge, have never been used before. In this wave respondents were asked to report the times they usually started and finished work, which we use to construct the length of time per day that partners coincide at work as a measure of how they synchronize their work schedules.

We estimate a synchronous time equation augmented with flexibility under the assumption that workers are faced with a finite set of fixed hours schedules (Altonji and Paxson 1986, Dickens and Lundberg 1993). We find that when either member of a couple has the freedom to choose daily work times subject to a weekly total number of hours (flexitime) there is greater spouse synchronization in working times. The effect is driven by couples with dependent children: in particular, having flexitime allows nearly an hour more of spouse synchronization in working times. We find the effect in couples with children of any age (under 16), suggesting it does not stem from the childcare requirements of young children. Instead, it may relate to the broader constraints affecting families' choice of work schedules, for example their lower geographical mobility (Rabe 2011). When we consider a broader

measure of flexibility, such as control over working hours in general, we find less evidence that of a relationship with synchronous time (although there may be more synchronization when the male partner has working hours control). A third type of flexibility at work, annualised hours, which is not specifically related to daily adjustment of hours, does not lead to more daily synchronous time (and may lead to less).

This paper extends the economics literature in three important ways. First, it expands the emerging literature in labour economics on family friendly work practices, which include the provision of flexible working hours and annualized hours analyzed here. A growing body of research has investigated the impact of working time arrangements on outcomes such as firm performance, labour productivity and labour turnover (Dex et al 2001), job satisfaction and organisational commitment (Martinez Perez, 2009; Scandura and Lankau, 1997), and work-life balance (Hosking and Western, 2008; Hill et al, 2001). Rather than taking the perspective of firms or individual workers, we look within the household to see how flexible working may affect couples' scheduling decisions.

Second, we add to the literature documenting that synchronization of work schedules between partners is greater than would be expected from random pairings (Hamermesh (2002), Jenkins and Osberg (2005), and van Klaveren and van den Brink (2007), which is consistent with couples coordinating their time because they experience greater levels of enjoyment when they do things together (Sullivan, 1996). We show that flexible work is an important determinant of the ability of couples to synchronize. We further look at the importance of family structure in mediating the role of flexible work. Hallberg (2003) uses time-use data to confirm that spouses specifically synchronize leisure time. However, there is also evidence that couples with children de-synchronize their work schedules so that at least one parent is with the child (Hamermesh, 2000; Jenkins and Osberg, 2005; Scheffel, 2010), which usually means less time together with the spouse. Our findings suggest that flexible working increases coordination not because it alleviates childcare requirements of young children, but rather by loosening up broader constraints affecting families' choice of work schedules, for example their lower geographical mobility (Rabe 2011).

Third, we incorporate another dimension of time beyond the total time devoted to market work, i.e., the timing of market work, into the decisions taking place within the household. Only a few empirical studies have studied the timing of work, showing that it affects maternal

childcare time (Connelly and Kimmel, 2007 and Rapoport and Le Bourdais, 2008) and the housework division of labour (Presser, 1994). Only one study has modelled the individual choice to work or not at different times of the day (Hamermesh, 1999). This paper expands this recent literature by linking the timing of work and its coordination between spouses to the availability of flexible work.

The paper is organized as follows. Section 2 presents the theoretical framework on which the empirical analysis is based. Section 3 presents the British Household Panel Survey (BHPS) data and Section 4 introduces the empirical specification. Section 5 presents the main results and Section 6 concludes.

2 Theoretical framework

Models of household work coordination (e.g. Hamermesh 2002, Scheffel 2010) extend conventional labour supply models by distinguishing between the utility that each partner in a couple derives from leisure (or non-work) time alone and the utility they derive from joint leisure (non-work time). Couples choose their work times to maximise overall utility and the resulting amount of synchronous work time (h^*) depends on the partners' wage rates (w^m, w^f) as well as personal and household characteristics (X):¹

$$h^* = h^*(w^m, w^f; X) \quad (1)$$

The elements of X capture the couple's tastes for spending time together as well as other factors that may affect synchronous time, such as the presence of young children. As discussed below, couples with children may reduce their synchronous time so that one of them is at home with a child while the other works.² The partners' wages are associated with substitution and income effects, with the income effect expected to be positive, i.e. synchronous time is hypothesised to be a normal good (Hamermesh 2002). Versions of equation (2) have been estimated in several studies previously (e.g. Hamermesh 2002,

¹ We define synchronous (work) time as the length of time during which both partners are at work simultaneously (per day). An alternative measure would be "synchronous home time", the amount of time they can potentially spend together outside of work. The two are linked by the identity: synchronous home time = 24 hours – work duration(m) – work duration(f) + synchronous work time. As we control for work duration in our multivariate analysis, it effectively makes no difference which measure we use, i.e. conditional on work duration the determinants of synchronous home and synchronous work time are identical.

² For simplicity, in line with previous theoretical literature on time synchronization, we do not explicitly distinguish between the different uses of non-work time, e.g. leisure and child care. In our empirical work, we measure total non-work time and cannot disaggregate it into leisure, child care time etc.

Hallberg 2003, Jenkins and Osberg 2005). They have found results that are broadly consistent with the theory, thus children are associated with less synchronous time and there is some evidence (albeit mixed) that higher earners synchronize more.

An implicit assumption in these models (common to the broader labour supply literature) is that workers can choose from a wide range of different work schedules, either within the job or by moving (costlessly) between jobs. Observed work timings are then taken to reveal couples' preferences for coordination given their earnings and household structure. Indeed, in these models there is little reason to investigate the impact of flexible work because all workers are already fully flexible. However if the assumption of free choice of schedules does not hold, then observed work timings will likely understate couples' preference for synchronous time, and extensions of flexible work arrangements may have a significant impact on time coordination.³ There is evidence to suggest that there are significant constraints of this type in the labour market. For instance, large proportions of workers are not working their desired number of hours (Bryan, 2007; Böheim and Taylor, 2004), do not have access to flexible work (Nadeem and Metcalf, 2007) or would like more flexibility (Golden 2006, Hooker et al 2007).

To consider the likely impact of flexible work it is useful to think of a labour market with some constraints on hours that arise because employers have preferences over working time (perhaps because of the need to coordinate hours within work teams) and there are search or mobility frictions that prevent workers from costlessly changing jobs. Instead of a free choice of hours, we assume that workers are faced with a finite set of fixed hours schedules (Altonji and Paxson 1986, Dickens and Lundberg 1993). The set of available schedules implies a discrete set of possible synchronous work times. Suppose there are three levels of synchronous time $H = \{h_1, h_2, h_3\}$, such that $h_1 < h_2 < h_3$. A couple will choose $h \in H$ to yield the highest utility. However in general h will differ from their optimal synchronous time h^* . For example the couple may choose $h = h_3$ while $h^* > h_3$. In this context the addition of flexible work can act as a fine-tuning mechanism that brings synchronous time in line with (or at least closer to) preferences. In a fully flexible job, the couple could move up from h_3 to h^* . Thus,

³ Hamermesh (2002) augments one version of his empirical specification with industry controls in order to check robustness to potential demand-side constraints or "possible discrimination in the kinds of work environments available to women". He notes that such constraints are not included in the theoretical model and he does not report their coefficients. In our model we explicitly consider labour market constraints and our empirical specification includes a direct measure of (the relative absence of) constraints, i.e. flexible work.

the difference between the optimal synchronous time h^* and the chosen amount of synchronous time h will generally be a function of the degree of flexibility in the market. Rather than equation (1), observed synchronous time is described by:

$$h = g(h^*, flex) = \bar{h}(w^m, w^f, X, flex) \quad (2)$$

where *flex* indicates the degree flexibility available to couple. In Section 5 we estimate a linearised version of (2).

A key variable in X is the presence of children in the household. Previous work has shown that the presence of children leads couples to de-synchronize their time. In our framework children may determine synchronous time in two distinct ways. First, they may change the couple's priorities (their preferences). This could be because parents value time alone with their children or because it is more efficient to take turns with childcare. In both cases $h^*(.; child) < h^*(.; no\ child)$.

Second, in a frictional labour market children may restrict a couple's choice of work schedules because couples with children are probably less geographically mobile than those without and may also be more limited in their commuting times. In addition, the distribution of schedules may be thinner at those times which are most important for childcare, for example fewer jobs finish at 3pm than at 4:30pm or 5pm (4:30pm may be too late to collect children from school). If the choice set is reduced, such that for example $H = \{h_1, h_3\}$ rather than $\{h_1, h_2, h_3\}$, then flexible work potentially has a larger role to play in adjusting synchronous time. To allow for these distinct effects, in our empirical work we estimate separate specifications for couples with and without children as well as a pooled specification including children in X .

3 Data

We use the British Household Panel Survey (BHPS), which contains rich information about individuals and the households they belong to, including details of individuals' labour market experiences and use of flexible work. The BHPS began in 1991 with a random sample of about 5,000 private households, with additional samples of 1,500 households in each of

Scotland and Wales added in 1999, and a sample of 2,000 households in Northern Ireland added in 2001.⁴ The survey aimed to interview all adults (over 16 years old) from the original sample every year, as well as all other adult members of their current households (including newly formed households). Children in sample households become full sample members when they reach age 16, and in this way the panel is continually refreshed. In 2003, the BHPS introduced a novel set of questions about work timing which, to our knowledge, have never been exploited before. We look at couple households in which both partners work full time or in which the male partner works full time and the female part time (we do not analyse couples containing a part time man, since these make up only around 2% of working couples, or same-sex couples). We have 892 dual FT and 656 FT-PT couples with valid shift times.

The analysis focuses on how couples modify their schedule to maximize time with spouse. In particular, we are interested in the extent to which partners synchronize their working schedules to maximize joint time outside work on a typical weekday when both work. We construct the length of time per day that both partners are at work simultaneously, which in effect is directly related to the potential time that the couple can be together outside working hours. All else equal, this time is greater the more they synchronize their work schedules.

The measure of couples' synchronous time is derived from a special module to investigate work timing in wave 13 of the BHPS in 2003. In this wave employees were first asked whether they worked the same hours each day, rotating shifts, or no fixed pattern. Respondents working the same hours each day (*regular workers*) were asked for the times they usually started and finished work, while those on rotating shifts or with no fixed pattern (*irregular workers*) were asked for start and finish times on each day of the preceding week (all times reported to the nearest minute). Among the sample of dual earner couples, 58% both work regular hours, 34% contain one regular and one irregular worker and 8% both work irregular hours. Using the reported times, we calculate our measure of synchronous working time as the amount of time per day during which both spouses work simultaneously. For example, if one spouse works 9am-5pm and the other works 10am-6pm, synchronous working time is 7 hours (from 10am to 5pm). Because daily shift times vary for irregular workers, we calculate the mean over joint working days, i.e. those days on which both

⁴ All analyses are weighted to account for inclusion of the extension samples and for non-response.

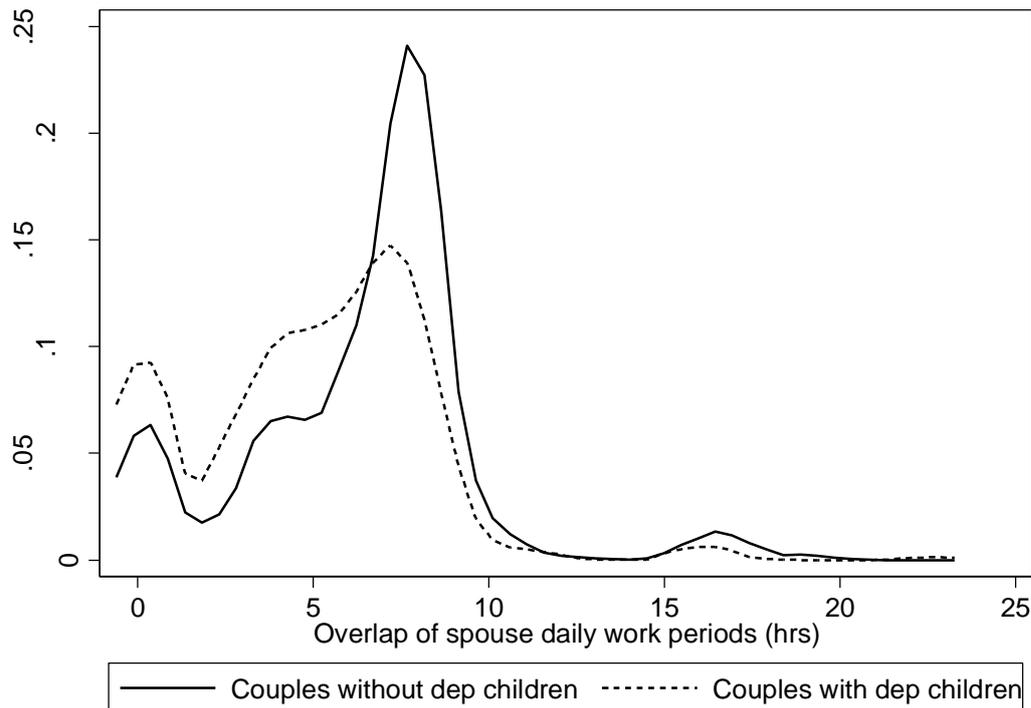
spouses do at least some market work (see the full wording for all questions and details of the calculation of synchronous time in Appendix Table A.1).

The resulting measure of work overlap is a quasi-continuous variable and is shown in Figure 1 as a kernel density plot, distinguishing between couples with and without dependent children.⁵ The amount of work overlap is less than 10 hours for almost all couples (the overall mean is 5.7 hours) with a notable spike at about 8 hours for couples without children (mainly consisting of spouses who both work standard FT hours) and a less pronounced spike at about 7 hours for couples with children. There are much smaller spikes for both groups at zero hours, corresponding to spouses who are never at work simultaneously. Unsurprisingly this arrangement is more common among couples with children (probably reflecting ‘tag-team’ arrangements to ensure that one parent is always available for childcare). Apart from these spikes in the data there appears to be wide variation in work overlap times across couples (the overall standard deviation is 3.3 hours).

Despite the variation in work overlap that we observe, because our measure covers only days when both spouses work, we may be underestimating the total ability of spouses to synchronize working times. For example, those working fewer hours (such as individuals in part time jobs) are already synchronizing by not working some days or working less in a given day. Thus it may be that individual part time workers still work a lot during the days they work and do not overlap a lot with the spouse. Nonetheless, they still synchronize fully during the days they do not work.

⁵ The work overlap variable contains 243 discrete values, the most common being zero hours (13%), 8 hours (11%) and 7.5 hours (6%). None of the other values exceeds a frequency of 5%.

Figure 1: Overlap of work schedules within couples



We construct three measures of flexible working, each corresponding to a different type or dimension of flexibility. Two of the measures are derived from a BHPS question asking respondents to report, from a show card list, which working hours arrangements they have (see the full question wording in Appendix Table A.2). The first measure is flexitime, which means choosing daily work times subject to being present during certain core hours each day (e.g. 10am-4pm).⁶ The second measure is annualised hours, meaning that employees must work a specified number of hours over the year but have some flexibility about when they work (possibly also subject to the level of demand by their employer). For the third measure we use a separate question asking respondents whether their work hours were decided by the employer, the respondent or both jointly (see wording in Appendix Table A.2). We define respondents who have at least some flexibility over working hours, or decide them jointly with their employer, or decide their hours themselves, as having control over working hours.

Panel A in Table 1 summarises the distribution of these flexible practices for all couples, and the panels B and C for couples without and with dependent children. Overall, the table shows there is a high degree of heterogeneity in flexible working, both across couples and between

⁶ <https://www.gov.uk/flexible-working/types-of-flexible-working>

partners within the same couple – such variation is crucial to establish whether it matters which partner has access to flexible work. In 14% of all couples the woman (only) works flexitime, in 11% the man (only) works flexitime, and in a further 5% of couples both partners work flexitime. Thus, 30% of couples are able to use flexitime to some extent, with the female partner having more access to flexitime than her spouse. Annualised hours are less common, affecting only 14% of couples, with men slightly more likely to use them (men work annualised hours in 9% of couples compared with women in 7% of couples). By contrast, in the majority of couples men and women report they have at least some control in setting their hours (55% of couples for men and 58% for women), and in 35% of the couples both partners report they have this flexibility. Panels B and C show that there are relatively minor differences in the flexibility measures between couples with and without dependent children. The main exception relates to working hours control. In 38% of couples without dependent children both partners have at least some control over their working hours, compared with 33% of couples with children. Further investigation (not reported) indicates that this difference is largely driven by higher levels of hours control among part-time workers, who are more likely to have children.⁷

Table 1: Flexible working practices within couples (%)

Within-couple prevalence of flexible working	Flexitime	Annualised hours	Working hours control
<i>Panel A: all couples (N=1533)</i>			
Neither partner	70.5	86.5	22.6
Woman only	14.2	4.3	22.8
Man only	10.7	6.6	19.4
Both partners	4.6	2.6	35.2
<i>Panel B: couples without dependent child(ren) (N=778)</i>			
Neither partner	72.2	86.3	25.8
Woman only	13.6	4.3	20.8
Man only	10.7	5.8	20.6
Both partners	3.5	3.6	32.7
<i>Panel C: couples with dependent child(ren) (N=755)</i>			
Neither partner	68.7	86.6	19.4
Woman only	14.9	4.3	24.7
Man only	10.8	7.5	18.2
Both partners	5.7	1.6	37.7

Note: estimates weighted to account for survey design and non-response.

⁷ Additional tabulations (not reported) of flexible working broken down by dual FT/FT-PT status are similar to those in Table 1 for couples with and without children respectively.

Next, Table 2 shows how couples' synchronous working varies by the different flexible working practices. The asterisks indicate estimates which are significantly different (at the 5% level) compared to couples without any flexible working. We see a positive and quite strong association between flexitime and synchronous work time, in particular for couples with children. The relationships appear less consistent relationships for the other two flexible work measures. For couples as a whole (panel A), those in which neither partner has flexitime have 5.4 hours of synchronous working time, increasing to 6.4 hours if the woman (only) has flexitime, 6.1 hours if the man (only) works flexitime, and 6.0 hours if both have flexitime. All differences except the last are statistically significant. We find similar patterns for flexitime among couples with and without children but the associations are only significant for couples with children. Panel C shows that these couples work synchronously for 4.7 hours when neither partner has flexitime, 5.8 hours when the woman has flexitime, 5.4 hours when the man works flexitime, and 5.8 hours if both partners do (all differences with respect to couples without flexitime are significant).

For annualised hours, the differences in synchronous time vary in sign and are only significant in one case (couples in which the woman works annualised hours synchronize less). Working hours control is typically associated with less synchronous time when it is available to only one partner (but these differences are not significant) and more synchronous time when both partners have some control over working time (this relationship holds whether or not couples have children).

The strong and consistent relationship between flexitime and work synchronization may reflect the fact that the synchronization measures refers to time within working days, which is typically the margin of adjustment for flexitime. By contrast, annualised hours are more likely to involve changes to hours per week or even weeks per year, and the measure of working hours control does not specifically refer to daily hours but to hours in general. However, it is not possible to draw more definite conclusions from these bivariate relationships because of the many confounding factors related to both flexible work and synchronization. In Section 5 we estimate a model of work time synchronization to allow for these additional factors.

Table 2: Synchronous working time (hours per day) within couples by flexible working practices

Within-couple prevalence of flexible working	Flexitime	Annualised hours	Working hours control
<i>Panel A: all couples (N=1533)</i>			
Neither partner	5.44	5.69	5.34
Woman only	6.44*	5.43	5.28
Man only	6.06*	5.54	5.41
Both partners	5.99	5.69	6.28*
<i>Panel B: couples without dependent child(ren) (N=778)</i>			
Neither partner	6.39	6.46	6.35
Woman only	6.78	7.11	6.19
Man only	6.55	6.53	6.22
Both partners	7.10	6.38	7.03*
<i>Panel C: couples with dependent child(ren) (N=755)</i>			
Neither partner	4.67	5.08	4.77
Woman only	5.76*	4.06*	4.59
Man only	5.44*	4.20	4.59
Both partners	5.83*	5.70	5.67*

Note: estimates weighted to account for survey design and non-response. *denotes estimate is significantly different at 5% level from estimate for couples where neither partner works flexibly (*t*-test).

4 Analysis and Estimation Methods

The multivariate analysis is based on a linearised version of the synchronous time equation (2):

$$y_c = \beta_0 + x_{1c}'\beta_1 + x_{2c}'\beta_2 + f_{1c}'\gamma_1 + f_{2c}'\gamma_2 + \varepsilon_c \quad (3)$$

where y_c is a measure of the amount of synchronous working time (in hours per day) experienced by couple c , x_{1c} and x_{2c} are vectors of characteristics associated with each spouse respectively, f_{1c} and f_{2c} are measures of flexible working by each spouse, and ε_c is a random error term. In line with previous studies of synchronous time use (Hamermesh, 2002; Hallberg, 2003; Jenkins and Osberg, 2005), vectors x_{1c} and x_{2c} contain explanatory variables for desired synchronous time such as spouses' age, education, wages and presence of dependent children. In extension specifications we also include industry and public/private sector dummies to control for demand-side constraints that may also be correlated with flexible work. The variables used in the analysis are summarised in Appendix Table A.3. Given the quasi-continuous nature of the synchronous time measure, we estimate (3) by OLS.

Similar to the above studies, we also control for (daily) hours of work in all specifications in order to separate the direct effects on synchronous time from indirect effects that may operate through the duration of work.⁸ Thus, by fixing the number of hours of work the effect of flexibility on synchronous working time reported here may be interpreted as a lower bound of the efforts made by couples to meet work-life balance issues, as the number of hours worked are decided on the basis of family needs.⁹

The key parameters to be estimated are γ_1 and γ_2 , which show how flexible working by each spouse affects the amount of synchronous time enjoyed by the couple.¹⁰ Comparing the relative magnitudes of γ_1 and γ_2 , we can test for differences across partners in the effects of flexible working on the couple's time together. Since previous evidence has found that the presence of children is an important determinant of couples' time synchronization (Jenkins and Osberg 2005), we estimate separate versions of equation for couples with and without children.

5 Results

Baseline specification

Table 3 shows the estimates of the impact of flexitime on couples' synchronous working time. Column 1 shows the results for all couples, while columns 2 and 3 show separate estimates for couples with no dependent children and couples with children. Before discussing the flexitime coefficients, we briefly summarise the other determinants of synchronous work time in light of previous research. First, we find a strong association between children and synchronous time (column 1). Couples with a child under 16 synchronize their work for almost one hour less per day than couples with no dependent children. This result confirms most previous studies (Hamermesh 2000, van Klaveren and

⁸ All else equal, longer work durations lead to more synchronous work time because there is more chance of spouses' work schedules overlapping.

⁹ Alternative specifications that analyse dual FT and FT-PT couples separately yields similar results, although precision is lost due to smaller sample sizes.

¹⁰ The models reported include all three flexible work measures. We obtain very similar results (available on request from the authors) if we estimate equations that include each flexible work measure separately.

van den Brink 2007, Jenkins and Osberg 2005) which find that children lead to reductions in couples' synchronous time.¹¹

Table 3: The impact of flexitime on couples' synchronous working time (hours per day), gender-specific effects

	All		No dependent children		With dependent children	
	(1)		(2)		(3)	
	Coeff	SE	Coeff	SE	Coeff	SE
Works flexitime (f)	0.513*	0.262	0.080	0.412	0.796**	0.296
Works flexitime (m)	0.116	0.237	-0.039	0.357	0.313	0.325
Annualised hours (f)	-0.490	0.381	-0.228	0.481	-1.033*	0.597
Annualised hours (m)	0.260	0.369	-0.045	0.397	0.504	0.653
Control over working hrs (f)	0.049	0.193	0.199	0.253	-0.027	0.282
Control over working hrs (m)	0.421**	0.200	0.545*	0.293	0.143	0.253
Children under 16 in hh	-0.950**	0.241				
Daily work duration (f)	0.575**	0.044	0.570**	0.069	0.559**	0.063
Age/10 (f)	1.312	1.198	-0.294	1.428	4.731**	2.016
(Age/10) ² (f)	-0.143	0.150	0.034	0.177	-0.570**	0.253
Degree (f)	1.269**	0.491	0.657	0.683	1.568**	0.705
Further education (f)	0.373	0.432	0.465	0.598	0.014	0.665
A level (f)	0.934**	0.449	0.820	0.616	0.669	0.694
O level or equiv (f)	0.765*	0.428	0.552	0.596	0.693	0.657
Other qual (f)	0.834	0.530	1.057	0.712	0.160	0.787
Log hourly wage (f)	0.104	0.179	0.586**	0.295	-0.140	0.228
Daily work duration (m)	0.319**	0.053	0.336**	0.081	0.305**	0.064
Age/10 (m)	-1.169	1.127	-0.835	1.406	-2.291	1.940
(Age/10) ² (m)	0.122	0.133	0.089	0.163	0.270	0.232
Degree (m)	0.773**	0.393	0.464	0.544	1.050*	0.625
Further education (m)	0.586*	0.329	0.409	0.415	0.974*	0.570
A level (m)	0.506	0.393	0.201	0.495	1.046	0.652
O level or equiv (m)	-0.115	0.361	-0.403	0.494	0.303	0.583
Other qual (m)	0.438	0.608	0.992	0.998	0.109	0.679
Log hourly wage (m)	0.342*	0.175	0.306	0.244	0.380	0.257
<i>N</i> (couples)	1523		772		751	
<i>R</i> ²	0.3		0.3		0.4	

Notes: OLS estimates at couple level, weighted for survey design and non-response. Models also include controls for region and missing qualification. * significant at 10% level, ** significant at 5% level.

Higher educated and higher earning couples tend to synchronize more. For example, among the all-couple sample the possession of a degree by either spouse is associated with more

¹¹ In contrast, Hallberg (2003) finds that children increase synchronous housework but reduce synchronous leisure, with no net effect on overall synchronous time.

synchronous time (1.2 hours per day when the graduate is a woman and 0.8 hours when the man holds a degree). Higher men's hourly wages are also associated with more synchronous time, although there is no significant effect of higher women's wages (except in couples without children). As noted by Hamermesh (2002), the wage coefficient may combine two effects: an income effect (since, holding hours constant, hourly wages reflect full earnings) and a price effect if wages are lower for work schedules that allow synchronization. Our results indicate that the income effect is at least as large as any price effect. Overall, higher income couples demand more synchronous time. The findings in previous studies are mixed, possibly because of the two opposing effects, but there is no evidence from these other studies that higher earners synchronize their work less.¹²

There is little evidence that synchronous work time changes with age, except that young mothers synchronize less (column 3). Hallberg (2003) found that younger households (as measured by the husband's age) synchronized less, although his sample included childless couples too. Finally, as expected longer work durations lead to more work synchronization, and women are more likely to increase their work hours during their partner's working time than are men (for couples as a whole, the coefficient on women's work hours is 0.57 compared with 0.33 for men).

Turning to the key flexible work coefficients, the flexitime estimates indicate that while the man's flexitime is not correlated with the couple's ability to synchronize working schedules, the woman's flexitime is associated with over half an hour more per day of synchronous working time (0.5 hours per day). The positive association between flexitime and synchronous working time is however not enough to compensate for the negative impact of children on synchronous time. As noted couples with children enjoy almost an hour less of synchronous working time than couples without children (the coefficient on children is -0.95 hours per week). Given the importance of children, Columns 2 and 3 of Table 4 separate the sample between couples with no dependent children and couples with dependent children. The results suggest that the effect of flexitime for all couples observed in Column 1 is driven by those couples with children: column 2 shows that for the sample with no dependent

¹² Hamermesh (2002) found robust evidence that higher earners synchronized more, but Hallberg (2003, p.199) reported that income did not affect synchronous time, while Jenkins and Osberg (2005) found that only the woman's (and not the man's) wage rate affected synchronous time (they controlled for the man's education but not the woman's – coefficients not reported). Like us, Jenkins and Osberg (2005) used the BHPS but they used a binary measure of synchronization based on discrete indicators of work schedule (morning, afternoon etc); continuous measures of work time were not available in their data (1991–99).

children having flexitime is not significantly correlated with more synchronous working time, while for couples with dependent children the amount of synchronous time is 0.9 hours per day greater if the woman works flexitime.

By contrast with the positive association of flexitime with synchronous time, there is no statistically significant relationship between working annualised hours and synchronous time except for couples with children: they synchronize for one hour per day less if the women works annualised hours, although this coefficient is only significant at the 10% level. Among couples overall, having control over working hours is associated with more synchronous time but, by contrast with the flexitime effect, the coefficient is only significant for the man. Couples in which the man has working time control synchronize by 0.4 hours more per day. When splitting the sample into couples with and without children, the precision of the estimates is reduced. The impact of working hours control (of the man) appears stronger among couples without children but even here it is only significant at 10%.

Given our focus on time coordination over the day, it is not surprising that (daily) flexitime has the strongest impact. In contrast, annualised hours may involve longer or shorter working weeks over the year (in the form of variation in total hours per week or number of weeks worked) rather than adjustment of daily hours within the day. Thus annualised hours may not be associated with more daily synchronous time in a given day.¹³ To the extent there is an effect from annual flexibility, it appears that it may be traded off against daily flexibility. The measure of working hours control potentially captures a broader notion of flexibility, including both the timing and amount of work (the question refers only to “the hours you work”). The data show that only 27% of those reporting working hours control also report flexitime, while almost 90% of those with flexitime also report working hours control. Thus control over working hours may involve flexibility over a different timescale to flexitime and thus any impacts may be reflected less strongly in our measure of daily synchronous time.

Couple-level effects

¹³ In addition the data indicate that flexitime and annualised hours are negatively correlated: nearly 10% of workers with no flexitime work annualised hours, compared to less than 2% of those with flexitime.

Although the flexible work coefficients differ between women and men in the baseline results, we cannot reject equality when we test formally for differences between them.¹⁴ Thus it appears not to matter which member of the couple has flexible work. For greater statistical efficiency we combine the gender-specific flexible work variables into a single couple-level variable (equal to one if either partner has flexible work and zero otherwise). Table 4 shows the new estimates (in columns 1, 3 and 5), which include the same controls as previously.

Table 4: The impact of flexible work on couples' synchronous working time, combined gender effects

	All		No dependent children		With dependent children	
	(1)	(2)	(3)	(4)	(5)	(6)
Works flexitime (m or f)	0.494** (0.217)	0.399* (0.223)	0.042 (0.308)	-0.098 (0.307)	0.969** (0.275)	0.851** (0.309)
Annualised hours (m or f)	-0.158 (0.281)	-0.132 (0.296)	-0.037 (0.364)	0.048 (0.376)	-0.388 (0.466)	-0.500 (0.456)
Control over wk hrs (m or f)	-0.016 (0.255)	0.047 (0.246)	0.318 (0.345)	0.334 (0.318)	-0.544 (0.393)	-0.463 (0.388)
Children under 16 in hh	-0.949** (0.242)	-0.818** (0.230)				
Industry/sector controls	No	Yes	No	Yes	No	Yes

Notes: OLS estimates at couple level, weighted for survey design and non-response. Standard errors in parentheses. Models include (for each spouse) daily work duration, age and age squared, highest educational qualification, log hourly wage, and region. Industry/sector controls consist of 15 dummy variables based on SIC92 divisions and a dummy variable for public vs private sector; industry/sector enters separately for each spouse. * significant at 10% level, ** significant at 5% level.

The results for flexitime are similar to the baseline specification: overall, couples with flexitime synchronize their work schedules by about half an hour per day more than those without flexitime, but this average effect hides a larger effect, of nearly one hour per day, among couples with children, and no effect among those without children (a formal test indicates that the difference is significant at the 5% level). As suggested in the Section 2, couples with children may be more restricted in their choice of work schedules if childcare requirements limit commuting times or children restrict geographical mobility. Thus flexitime may be particularly useful for these couples. We investigate the role of children in more detail below..

¹⁴ The only exception is the effect of annualised hours in couples with children, where the difference between men and women is significant at the 10% level (full results available from authors on request).

Consistent with the non-existent (or imprecise) effects from the baseline specification, couples who work annualised hours do not have more synchronous working time than those without. More surprisingly, we also do not find that couples with control over working hours synchronize more, despite the estimated positive effect of men's control over working time in the baseline specification. As we prefer the couple-level measure of working hours control on efficiency grounds, we conclude there is not robust evidence of a relationship between generalised hours control and synchronous time.

The size of the association of flexitime with synchronous time merits comment. Comparing a sample of real couples with pseudo, randomly-paired couples in Swedish data, Hallberg (2003) found that the real couples had 50 minutes more non-work time (leisure and housework) than the pseudo-couples. Our estimate, that flexitime is associated with about half a hour more synchronous time overall, and one hour among couples with children, is thus quite large. It suggests that flexitime may play an important role in relaxing constraints in the labour market.

Controlling for other demand-side constraints

To allow for other demand-side constraints that may affect hours synchronization and also be correlated with the availability of flexible work, we re-estimate the equations including dummy variables for one-digit industry and public/private sector (Table 4, columns 2, 4 and 6). The estimates change little, in particular, the flexitime coefficients decline only slightly and are still significant (although only at 10% in the sample of all couples), indicating that flexitime acts independently of other demand-side constraints in allowing couples to synchronize their schedules.

Investigating the role of children

There are several possible mechanisms for why flexible work only appears to affect the synchronous time of couples with children. The first is linked to childcare. Childcare may limit a couple's effective choice of work schedules if childcare requirements restrict the ability to commute or move to a job with more convenient hours. In addition the distribution of work schedules is likely to be thinner at times needed for childcare or for picking up children after school, e.g. mid-afternoon. Second, the presence of children *per se* may reduce

geographic mobility (irrespective of childcare) if couples are reluctant to move jobs because their children would have to move schools. In both cases, a lesser effective choice of work schedules implies that flexible work may be a more valuable fine-tuning mechanism for couples with children than for childless couples.

Since the BHPS contains information on commuting times and home moving (as well as work schedules) we can see whether these are plausible mechanisms. The data indicate little difference between the commuting times of those without children (the mean commute is 25 minutes one way) and with children (22 mins), suggesting that children do not unduly restrict potential commutes. However, couples with children of school age are much less likely to move house (7% moved since the previous wave) than those without children (12%). Thus it is plausible that school age children restrain geographical mobility (as found by Rabe 2011). Finally, the work schedule data confirm that many fewer jobs finish mid-afternoon rather than late afternoon: only 4% of job spells finish at 3pm, compared with 7% at 4pm, 10% at 4:30pm and 26% at 5pm, consistent with the idea that there is a thinner density of schedules at non-standard times.

Table 5: The impact of flexible work on couples' synchronous working time, by age of children

	All couples	Only with children under 5	Youngest children 5-11 years	Youngest children 12-15 years
	(1)	(2)	(3)	(4)
Works flexitime (m or f)	0.536** (0.219)	0.897** (0.442)	0.968* (0.495)	1.428** (0.450)
Annualised hours (m or f)	-0.158 (0.277)	-1.548** (0.736)	0.307 (0.511)	-0.680 (1.416)
Control over wk hrs (m or f)	-0.014 (0.251)	-0.680 (0.651)	-0.274 (0.529)	-0.968 (0.931)
Children under 5	-0.937** (0.272)			
Children 5-11 years	-0.744** (0.235)			
Children 12-15 years	-0.092 (0.248)			
<i>N</i> (couples)	1523	256	320	175

Notes: OLS estimates at couple level, weighted for survey design and non-response. Models include (for each spouse) daily work duration, age and age squared, highest educational qualification, log hourly wage, and region. * significant at 10% level, ** significant at 5% level.

In Table 5 we present estimates of the synchronous time model including controls for children of different ages, and also show estimates that stratify the sample by the age of the youngest child. Column (1) shows that the impact of children on synchronous time diminishes as they get older. Couples de-synchronize by almost an hour when they have pre-school children, but they do not de-synchronize at all (compared to childless couples) once their children reach 12 years old. Thus the direct effect of children on synchronous time appears to be through childcare requirements (which reduce as children get older). By contrast, we see in columns (2)–(4) that the impact of flexitime remains strong for children of all ages (the point estimate is in fact larger for teenage children, although the sample size is relatively small). This suggests that the impact of flexitime is not linked to childcare specifically, but to the presence of dependent children in the household. A possible explanation is that families with children are less mobile and so flexitime, rather than mobility, is used to adjust synchronous time.¹⁵

Endogeneity of flexible work: selection and reverse causality

The estimates presented thus far can only be interpreted causally if flexible work is exogenous in a synchronous time equation. This would not be true if people were systematically selected into flexible work for reasons that we do not control for. One possibility is that some occupations lead to more synchronization than others because they involve more standardised work schedules (e.g. daytime work rather than night shifts). If flexible work is more common in such occupations, this could give rise to a spurious estimated relationship between flexible work and synchronous time. As a robustness check, we add dummy variables for one-digit occupation to all the equations, reporting the estimates in Table 6. The key result holds that flexitime leads to more synchronous time in couples with children, although the point estimate is slightly smaller. Controlling for both industry/sector and occupation (column 6), couples working flexitime synchronize by 0.7 hours more per day than couples without flexitime. There is still no effect among couples without children while the average effect in the sample of all couples is somewhat reduced and no longer significant.

¹⁵ Mirroring the results in Table 3, we also see that annual hours working is associated with less synchronous time in couples with pre-school children. It is unclear exactly why, but the robustness checks in the following section indicate that annual hours may be endogenous. The other estimates are very similar when annual hours is excluded from the model.

Table 6: The impact of flexible work on couples' synchronous working time, controlling for occupation

	All		No dependent children		With dependent children	
	(1)	(2)	(3)	(4)	(5)	(6)
Works flexitime (m or f)	0.349 (0.216)	0.278 (0.226)	-0.001 (0.294)	-0.191 (0.295)	0.855** (0.282)	0.719** (0.307)
Annualised hours (m or f)	-0.137 (0.283)	-0.092 (0.294)	-0.135 (0.368)	0.091 (0.379)	-0.312 (0.447)	-0.464 (0.427)
Control over wk hrs (m or f)	-0.062 (0.245)	0.002 (0.235)	0.289 (0.317)	0.338 (0.296)	-0.613* (0.364)	-0.529 (0.363)
Children under 16 in hh	-0.850** (0.230)	-0.778** (0.222)				
Industry/sector controls	No	Yes	No	Yes	No	Yes

Notes: OLS estimates at couple level, weighted for survey design and non-response. Standard errors in parentheses. Models include (for each spouse) daily work duration, age and age squared, highest educational qualification, log hourly wage, region, and 8 occupation dummy variables based on SOC 1990 major groups. Industry/sector controls consist of 15 dummy variables based on SIC92 divisions and a dummy variable for public vs private sector; industry/sector enters separately for each spouse. * significant at 10% level, ** significant at 5% level.

A second potential source of endogeneity is that partners who want to spend time together may seek out flexible jobs. To endogenise flexible work we would ideally like to have instruments that predict flexible work but are not related to synchronous time. While some candidate instruments appear promising, unfortunately they do not fulfil all the required conditions – both theoretical and empirical.¹⁶ As an alternative to IV techniques, we therefore consider a more informal check of whether flexible work is likely to be endogenous. Using a measure of satisfaction with a respondent's partner, we investigate whether people who are more satisfied with their spouse (and so more likely to spend time together) seek more flexible work. We estimate the following probit model:

$$f_{it+1}^* = \beta_0 + \beta_1 f_{it} + \beta_2 s_{it} + x_{it}' \beta_3 + \varepsilon_{it} \quad (4)$$

$$f_{it+1} = 1 \text{ if } f_{it+1}^* > 0$$

$$f_{it+1} = 0 \text{ if } f_{it+1}^* \leq 0$$

¹⁶ We considered as potential instruments job characteristics from before the couple formed, based on the idea that these characteristics (i) predict access to flexible work but (ii) are not be related to the couple's desire for time together. Unfortunately, the second condition will not be satisfied in the likely event that a person's choice of job is related to their general taste for leisure. Moreover, using the BHPS marital/fertility histories, we can only trace detailed pre-partnership characteristics for 20% of sample or 300 couples (for the others, the start of partnership is censored in the marital history data or the partnership began before the panel started). We also considered parental background (occupation when the respondent was 14) as a predictor of access to flexible work. While this may be theoretically valid, in practice parental background does not predict flexible work at all.

where f_{it} is a dummy variable indicating that individual i has flexible work at time t (using the three separate measures in turn), s_{it} is individual i 's satisfaction with their partner, x_{it} is a vector of controls, and ε_{it} is a random error distributed as standard normal. The coefficient of interest is β_2 ; a positive value indicates that those who are more satisfied with their spouse are more likely to be in flexible work in the next period, holding constant their current flexible work status (and other controls). The finding of a significant estimate of β_2 would indicate that we have an endogeneity issue.

Table 7: Effect of relationship quality on transitions into and out of flexible work

Dependent variable	All (1)	No dependent children (2)	With dependent children (3)
Flexitime	0.019 (0.018)	0.031 (0.027)	0.007 (0.025)
<i>N</i>	16321	8391	7930
Annualised hours	0.052** (0.022)	0.056* (0.033)	0.046 (0.029)
<i>N</i>	16321	8391	7930
Control over working hours	0.020 (0.031)	0.025 (0.048)	0.035 (0.040)
<i>N</i>	2894	1462	1432

Notes: Probit model of whether have flexible work at $t+1$ as a function of characteristics at t . Reported coefficient is estimated parameter on satisfaction with spouse/partner (1-7), SE in parentheses. Other controls are flexitime and annual hours (at t), gender, age and age squared, highest educational qualification, log hourly wage, region, year, industry and public/private sector. Estimates weighted for survey design and non-response. * significant at 10% level, ** significant at 5% level.

The estimates of the probit equation are reported in Table 7. For two of the flexible work measures (flexitime and annualised hours), we are able to use all BHPS waves since wave 9, resulting in a large sample and therefore a high power to detect the effect of satisfaction on transitions into and out of flexible work. The results provide no indication that more satisfied couples seek to move to jobs with flexitime or control over working hours; but more satisfied couples are more likely to be in jobs with annualised hours in the next period. Thus the results suggest that flexitime and control over working hours are not endogenous but that annualised hours may be. As a robust check on our main results, we dropped annualised hours from equation (3) and its variants, and we obtain almost identical results for the other variables.

6 Conclusion

The ability to combine work with quality time together as a family is at the heart of the concept of work-life balance. We have shown that flexitime is associated with a half to one hour increase in daily synchronous time – a large figure given previous findings that the overall amount of synchronization among couples, irrespective of whether they have flexitime or not, is about an hour per day (Hallberg 2003). We find that the flexitime effect is driven by couples with children – indeed we find no impact of flexitime on the synchronous time of couples without children, suggesting they are able to find work schedules that meet their preferences for within-couple time coordination. Within couples with children, we find an equally large effect of flexitime on those with young children as those with teenagers. Thus flexitime seems to relax the scheduling constraints faced by families in general. Our robustness checks provided little evidence of endogeneity. Taken together, our findings suggest that an extension of flexitime would be a promising route toward more ‘family time’.

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Appendix A Synchronous Time Measures

Table A.1 gives the wording of the work timing questions used in the analysis, taken from wave 13 in the BHPS. The questions routing is as follows. First, respondents were asked about which type of schedule they worked. Second, depending on the type of work schedule, they were asked about the hours that they worked each day. Those working the same hours each day (whom we term *regular workers*) were asked for the times they usually started and finished work, for up to 3 separate daily periods (for example, morning, afternoon and evening). Respondents working rotating shifts or with no fixed pattern (*irregular workers*) were asked to report start and finish times on each day of the week just ended (one period per day), including the weekend.

The vast majority of regular workers, over 92%, reported just one daily period (for example, 8am to 5pm), 8% reported two periods and 1% reported three periods. One issue is that about half of those reporting multiple periods gave periods which overlapped (for example, 8am to 3pm and 9am to 4pm). Although these individuals reported (in the previous question) that they worked the same hours each day, their answers suggest that their shift times may in fact change. Owing to a lack of further information about how these shifts change day by day, we treat these responses as invalid and omit any couple containing such individuals (6% of couples).

Calculating our measure of synchronous time is a straightforward process for couples in which both partners work regular hours each day. For example, if one spouse works from 9am to 6pm and the other from 7am to 3pm, their synchronous work time is from 9am to 3pm, or 6 hours. For couples with two irregular workers, we match their schedules for each joint working day from Monday to Friday in turn, and then calculate the mean synchronous time over these days (assuming that the week reported represents a typical week). The matching process is more complicated for couples with one regular worker to and one irregular worker. We assume, in the absence of more information, that regular workers work Monday to Friday.¹⁷ We then match the regular shift to the irregular work times given by the

¹⁷ This is less realistic for those part-time workers who work fewer days per week rather than fewer hours per day. Data on irregular part-time workers suggests Wednesday to be the most popular working day, but only slightly (54% work on Wednesdays compared with 49% on Thursday and Friday, and 52% on Monday and Tuesday), and the differences are not statistically significant. Nevertheless, we may be understating the total amount of synchronization if a part-time regular worker chooses to work the same days as their irregular spouse.

spouse for each day in turn from Monday to Friday. Our final measure of synchronous time is the mean synchronous time calculated over the days that both spouses work. For example, suppose the spouse on regular hours works from 9am to 6pm, and the other spouse works on two days: 7am to 3pm on Monday, and 1pm to 9pm on Wednesday. Synchronous time is 6 hours for Monday (9am to 3pm) and 5 hours for Wednesday (1pm to 6pm), so synchronous time for a typical joint working day is 5.5 hours.

However, given that our focus is on time coordination within joint working days rather than across the week, this is not a serious shortcoming.

Table A.1 Questions about Work Timing in the BHPS Wave 13

Variable Name	Question	Answer
MJBWKPT	“Thinking about your (main) job, do you usually work the same hours each day, work rotating shifts or is there no fixed pattern?”	The same hours each day Rotating shifts No fixed pattern
MJBST*H, MJBST*M, MJBEN*H, MJBEN*M; * = 1-3 (for respondents working the same hours each a day)	“Would you please tell me at what times you usually start and finish work. If you have multiple spells of work in a day, for example, some hours in the morning and some in the evening, please tell me the start and finish time of each work period.”(Include lunch breaks within one work period)	Start time (hours, minutes) End time (hours, minutes) for up to 3 periods
Variables MLWST*H, MLWST*M, MLWEN*H, MLWEN*M, MLWDNW*; * = 1-7 (for respondents working rotating shifts or no fixed pattern)	“Thinking about the times you worked in the week ending last Sunday, can you tell me your start and finish times for each day starting on the previous Monday.”	Start time (hours, minutes) End time (hours, minutes) Didn’t work that day Don’t know for each day Monday– Sunday

Source: Wave 13 BHPS.

Table A.2 Questions about Flexible Work in the BHPS Wave 13

Variable Name	Question	Answer
MJBWKHRA, MJBWKHRB	“Some people have special working hours arrangements that vary daily or weekly. In your (main) job is your agreed working arrangement any of those listed on the card.”	Flexitime (flexible working hours); Annualised hours contract; Term time working; Job sharing; Nine-day fortnight; Four-and-a-half day week; Zero hours contract; None of these.
MJBPATW	“Thinking about the hours you work in your main job, which of the statements on this card best describes your situation?”	Your employer decides the hours you work; Your employer decides the hours you work but there is some flexibility; You and your employer jointly decide the hours you work; You decide the hours you work

Source: Wave 13 BHPS.

Table A.3 Means (standard deviations) of variables**(a) Male and female spouses**

Variable	Men	Women
Daily work duration (hrs)	9.04 (1.94)	7.13 (2.54)
Works flexitime	0.15	0.19
Annualised hours	0.09	0.07
Control over working hrs	0.54	0.58
Age (years)	41.56 (9.93)	39.66 (9.75)
Degree	0.17	0.19
Further education	0.40	0.36
A level	0.13	0.11
O level or equiv	0.15	0.18
Other qualification	0.06	0.09
No qualification	0.08	0.07
Qualification missing	0.02	0.01
Log hourly wage	2.50 (0.51)	2.21 (0.52)
Manager	0.22	0.11
Profesional	0.10	0.10
Technician	0.11	0.14
Clerical	0.08	0.27
Craft	0.19	0.01
Personal	0.06	0.15
Sales	0.04	0.09
Operative	0.13	0.03
Routine	0.05	0.07
Agriculture	0.00	0.00
Mining	0.01	0.00
Manufacturing	0.27	0.08
Utilities	0.02	0.01
Construction	0.07	0.01
Retail	0.12	0.14
Hotels	0.02	0.02
Communications	0.10	0.04
Finance	0.04	0.06
Property	0.11	0.10
Public administration	0.09	0.09
Education	0.05	0.18
Social work and health	0.04	0.22
Other industries	0.04	0.04
Private households	0.00	0.00
Extra-territorial organisations	0.01	0.01
Public sector	0.19	0.42

(b) Couples

Variable	
Daily synchronous working time (hrs)	5.67 (3.40)
Children under 16 in household	0.50
North-East	0.05
North-West	0.12
Yorkshire	0.09
East Midlands	0.09
West Midlands	0.08
East	0.09
South East	0.15
South West	0.09
Wales	0.04
Scotland	0.08
Northern Ireland	0.02

All estimates are weighted for survey design and non-response. Unweighted base is 1523 couples.