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# Anything to Keep You Happy?

by

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## Abstract

Whilst there is an abundant supply of theoretical and empirical contributions in cooperative bargaining models on the transfer of material resources within couples and the labour supply patterns of individuals in couples, this literature has so far not been interested in measuring empirically the utilities of partners. Conversely the literature on hedonic wellbeing has recently moved on to assess couple's happiness and the extent to which individuals in couples influence each other's happiness without making reference to the problem of allocation of resources. The latter is however important to both the individual and couple happiness, and in the limit determine whether couples stay together. Here we address the role of the allocation of resources, particularly in the form of time use time and the effect it has on the joint and individual utilities in the couple.

**Keywords:** happiness, utility transfers, time use, care

**JEL Codes:** D13, I31

## 1. Background

The couple has been modelled in economics as either a unit maximising a joint utility function relying on the altruism of the breadwinner (Becker, 1974), or more recently as two separate individuals engaged in the production of both private (individual consumption) and public goods (which include children, shared meals etc) and bargaining over the distribution of gains.

In bargaining models (Manser and Brown, 1980; McElroy and Horney, 1981) partners compare their utility from participating in the couple with that of remaining single or getting divorced, which constitutes the 'threat point'. Thus the distribution of resources within the couple reflects the outside options of the two partners. The 'separate spheres' bargaining model of Lundberg and Pollak (1993) proposes an alternative threat point in the form of a non cooperative equilibrium that is not Pareto optimal but may prevail due to the presence of transaction costs (high divorce costs).

The theory of public goods shows that in non cooperative equilibria contributions to joint production are suboptimal, however in the case of couples gender norms intervene by increasing specialisation and reducing coordination costs. Thus couples with high transaction costs or low expected gains from cooperation are expected to stay together in a separate spheres fashion: each 'does their own thing' defined on the basis of gender norms.

In a more recent contribution, Pollak (2005) argues that the source of bargaining power is the productivity of each partner in both paid and unpaid work: this is what determines the utility at the 'threat point' in both divorce and separate spheres bargaining models. As argued by Folbre (2001) and Agarwal (1997), gender norms however affect both the bargaining process and the extent to which agents care about each other's utility and about the children's of course also affects their bargaining power. Extra household bargaining also matters as the household exists within the context of markets and states that are themselves determining women and men's roles and opportunities. In the context of the United States for example, Albanesi and Olivetti (2009) show that gender earnings and time use differentials persist over time even without differences in productivity or in preferences across genders. In the UK, we found that the very concept of utility is construed differently by women and by men (Della Giusta et al, 2009), and it is also possible that gender socialisation may mean that in a couple the utility of the woman is affected by that of the man more than the opposite (Agarwal, 1997).

However constructed, the extent to which partners' utilities are positive should indicate the nature of rewards from participating in the couple, once controlling for selection determined by personality (assortative mating) and shared social background (correlated effects of social interaction). Positive correlations may thus be taken as an indication of the state of the couple and, in the limit, it should be impossible to observe couples with persistently negative correlations in utility over time as this should lead to break-up. Powdthawee (2009) finds evidence of this in a sample of couples drawn from the British Household Panel Survey: spillover effects between partners' life satisfactions exist, and the probability of couple break up is negatively associated with life satisfaction (both individual and the average in the couple). A first aim of our paper is to assess the determinants of overall couples' satisfaction in a sample of 6,864 British couples observed over 12 years in the British Household Panel Survey.

Rather than in spillovers, we are however interested in testing for evidence of transfers of utility between partners: after all if each individual's utility is influenced by that of their partner then this increases the incentives to behave cooperatively and increase contributions. In particular, we are interested in contributions to joint production that derive from changes in the allocation of time from paid to unpaid work. Is the gap in utilities affected by the time use of each partner?

The relationship between paid labour supply and the utilities of partners in a couple has been at the centre of Chiappori's work on collective labour supply (Chiappori, 1992). In his model collective leisure and consumption are privately consumed within the household and household decisions are represented by a two-step process in which individuals first share their total nonlabor income according to some sharing rule which represents the intra-household decision process (and can be thought of as emerging from a non specified bargaining process) and then maximise their own utilities subject to separate budget constraints<sup>1</sup>. Our paper addresses the relationship between the supply of both paid and unpaid labour and the utilities of partners in a couple. Given that social norms pertaining to the gender division of labour likely determine both the activities partners specialise at and the utility they gain from them (Della Giusta et al, 2009), we also control for the individual gender attitudes of both partners in the empirical analysis.

We introduce an index of time use specialisation to better account for the effect of the extent of multi-tasking on both individual and couple's happiness which has been widely discussed in the feminist literature but not, to our knowledge, formally incorporated into either theoretical or empirical work. The rationale is that although women and men may well overall work similar hours, at least across developed non-Catholic countries (Burda et al., 2007), there is ample evidence that women perform the majority of 'home production' unpaid work (overall on average 53 per cent more time than men) (Antonopoulos, 2008). Time spent on housework has been connected to lower wages, particularly for women, and explains a substantial share of the gender wage gap (for a comprehensive review of the evidence, see Hersch, 2009). Mattingly and Bianchi (2003) show the different quantity and quality of time available to men and women in the US indicating that men tend to have more uninterrupted time and this gap is exacerbated by marriage and children. MacDonald et al (2005) show that the intensity and the combination of hours of market and non market work and the conflicting demands and role overloads they can create have consistently been found to be related to stress and poor health for women. Their analysis shows that women's greater hours of unpaid work contribute to women experiencing more stress than men, and of that work, hours spent on eldercare and housework are more stressful than those spent on childcare. This is supported by the evidence on expenditure patterns by gender indicating that women's earnings are associated with household spending on dining out, housecleaning services, and paid childcare (Cohen, 1998; Brandon, 1999; Phipps and Burton, 1998) and systematically negatively associated with their housework hours, independent of their partners' earnings and their shares of couples' total

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<sup>1</sup> Chiappori et al (1998) extend the model to describe the effect of the marriage market on intra-household utility distribution (postulated by Becker, 1991), which introduces a further bargaining dimension external to the couple

earnings (Gupta, 2006; and Gupta and Ash (2008). Gender norms and expectations combined with the characteristics of the paid labour market (pay and career gaps) exacerbate these effects: Kalenksoski et al (2008) using data from the 2000 UK Time Use Panel Survey find that whilst women's time allocation between childcare and market work is responsive to partner and well as own wages, men's responds only to their own wage

In what follows we firstly estimate couple's overall life satisfaction and discuss the effect of time use and a range of controls on both the happiness of the man and woman and the gap between the two. We then move on to estimating a GMM model (as in Powdthawee, 2009) with the aim of assessing the extent to which individuals in the couple are affected by their partner's life satisfaction. We conclude with policy implications and directions for future research.

## 2. Our model

Firstly we are interested in couple level satisfaction, both combined and differences in couple satisfaction. We estimate an average ( $LS^1$ ) and difference ( $LS^2$ ) across the couples combined life satisfaction:

$$LS_{it}^1 = \frac{LS_{it}^M + LS_{it}^F}{2} = \alpha^1 + \beta^{C1} X_{it}^C + \beta^{M1} X_{it}^M + \beta^{F1} X_{it}^F + \mu_{it}^1 + \nu_{it}^1 \quad (1)$$

$$LS_{it}^2 = \frac{LS_{it}^M - LS_{it}^F}{2} = \alpha^2 + \beta^{C2} X_{it}^C + \beta^{M2} X_{it}^M + \beta^{F2} X_{it}^F + \mu_{it}^2 + \nu_{it}^2 \quad (2)$$

where  $i$  represents the individual (or couple) and  $t$  the time period.  $X_{it}^C$  is a vector of characteristics common to both couple members and  $X_{it}^M, X_{it}^F$  are vectors of individual characteristics of the man and woman respectively.  $\mu_i$  is a fixed effect that capture time invariant unobserved effects and  $\nu_{it}$  the random error term. We also run models of individual life satisfaction for males and females using the same explanatory variables to see if the factors affect individual life satisfaction differently. In order to remove the time invariant unobserved factors we employ a fixed effects approach.

Secondly we are interested in the effect of partner life satisfaction on individual life satisfaction, taking into account the individual's allocation of time use. The link between one's own satisfaction and their partner's life satisfaction may be as a result of assortative mating (Becker, 1974) or having the same shared social environment, rather than any spill over or utility transfers, and therefore partner's life satisfaction may be endogenous to the model. Any effects of assortive mating may be reduced through a fixed effects approach which will remove any unobserved time invariant factors. However their shared environment is likely to vary across time and therefore be correlated with the unobserved fixed effect. Therefore we employ a General Methods of Moments (GMM) approach (as first devised by Arellano and Bond (1991)) which instruments endogenous variables with past values of the variables, which assumes these lagged values are correlated with the current value of the variable but not the current error term. We model life satisfaction for males (M) and females (F) separately as follows:

$$LS_{it}^M = \alpha^M + \beta^M LS_{it-1}^M + \beta^{Mf} LS_{it}^F + \beta^M X_{it}^M + \mu_i^M + \nu_{it}^M \quad (3)$$

$$LS_{it}^F = \alpha^F + \beta^F LS_{it-1}^F + \beta^{Fm} LS_{it}^M + \beta^F X_{it}^F + \mu_i^F + \nu_{it}^F \quad (4)$$

Both models include partners current life satisfaction ( $LS_{it}$ ) and their own lagged life satisfaction ( $LS_{it-1}^F$ ). Own lagged life satisfaction is included in the model since we assume it is correlated with current own life satisfaction but not the partners so can provide an instrument for the dependent variable.  $X_{it}$  is a vector of individual characteristics assumed to affect life satisfaction,  $\mu_i$  is a fixed effect that capture time invariant unobserved effects and  $\nu_{it}$  the random error term. We employ a system GMM approach which exploits extra information from the levels (as opposed to the differences) of the variables; however, we collapse our instruments to use only one lag of the variables to prevent having too many instruments (see Roodman, 2009). We are also treat the majority of our explanatory variables as endogenous (see section 4). as well as own and partner life satisfaction, and hence use the second lags of these variables as instruments.

### **3. Data**

We utilise data from the British Household Panel Survey (BHPS), a longitudinal study of around 5,500 households and over 10,000 individuals which began in 1991 and collects social and economic data at both the individual and household level. The BHPS collects data on original sample members and subsequently any new household members, as well as following original sample members to any new households. The BHPS provides information on both life satisfaction and time use, as well as many socio-economic and attitudinal variables. Since life satisfaction was first asked in 1996 we utilise BHPS data over the period 1996-2007 and match couples with at least two years of consecutive full interview. We have 6,864 couples in our dataset with an average of 7 years worth of data, with a minimum of 2 years and a maximum of 12 years. We are interested in couples time use, therefore we exclude couples where one or both of the couples are retired since there is no decision of how many hours to work.

#### ***Dependent Variable***

Our main dependent variable is life satisfaction with respondents of the BHPS ask ‘How satisfied or dissatisfied are you with your life overall?’, and answers provided along a seven point scale with 1 being not satisfied at all and 7 being completely satisfied. However, this question was not asked in the 2001 wave, so we exclude this year from our analysis. Although life satisfaction is measured on an ordinal scale we treat it as a continuous variable in order to allow for fixed effects (to control for unobserved heterogeneity). Ferrer-i-Carbonell and Frijters, (2004) showed that whether the dependent variable is treated as continuous or an ordered variable makes little difference to results but controlling for fixed effects is important. As mentioned in section 2 we analyse a number of dependant variables based on this variable including the average life satisfaction of the couple, the difference in life satisfaction between both members of the couple (following De Henau and Himmelweit (2007), who analysed satisfaction with income) and the separate life satisfaction of the male and female partner in the couple. The difference in life satisfaction variable measures the extent to which the male partner is more or less satisfied than the female partner The larger this variable, the further the partners are from each other and the more likely that they have to make an effort to change behaviours (change hours of paid or unpaid work in economic terms or other changes in behaviour) to bring their life satisfaction back in line. The ideal outcome from the point of view of the couple is that average life satisfaction increases and the difference in life satisfaction decreases (A positive effect of a variable suggests the difference in life satisfaction widens in favour of the man, whilst a negative suggests there is a change in favour of the woman).

#### ***Explanatory Variables***

Explanatory variables include variables both at the couple level and the individual level. Couple level variables include log of annual household income (adjusted for the number of adults) and number of children of various ages (0-2, 3-4, 5-11, 12-15).

As always, we control for a number of individual level characteristics including age, employment status (whether employed, unemployed, long term sick/disabled or in family care) hours worked, house work, whether one partner cares for the other, caring for other individuals (outside and inside the household). Hours worked include usual hours (including self employment), overtime hours and any hours from an occasional or second job. Rather than use actual hours of housework we decided to use the share of housework, since housework hours may be reflective of the number of children, number of people in the house, size of the house, attitudes to hygiene etc and we felt that the share of the housework maybe more important to an individual's life satisfaction than the number of hours. The share of housework hours were calculated by summing couples reported housework hours and then calculating each couple members share of this total amount. In the couple level regressions we include the share of the housework performed by women but include the individuals own in the second set of regressions that include partners life satisfaction (i.e. the effect of increasing their own share on their own life satisfaction).

As a measure of changes in time use specialisation we include the change from the previous period of an index of time use specialisation calculated by:

$$\sqrt{(P1^2+P2^2+P3^2)},$$

where P1 is the percentage of time in the labour market, P2 the percentage of time caring and P3 the percentage of time doing housework. This is analogous to an index of industry specialisation and simply measures the extent to which an individual concentrates their use of time over few activities (which may be paid or unpaid).

We also included health status (excellent, good, fair, poor/very poor) since past studies have shown this to be an important determinant of life satisfaction (Kahneman et al 1999).

Individuals in the BHPS are asked a set of questions on attitudes to family life, which are asked in alternate waves. People are asked to state their opinion on a scale of 1 (strongly agree) to 5 (strongly disagree) with the following questions:

- A -Pre-school child suffers if mother works
- B - Family suffers if mother works full-time
- C - Women and family happier if she works
- D - Husband and wife should both contribute to the household income
- E – Full time job makes women independent
- F – Husband should earn wife stay at home

In order to get an overall attitude we simply took an average across the six questions (we reverse coded questions A, B and F), therefore a higher score would reflect views more in line with traditional gender roles. Past studies (e.g. Berrington et al., 2008, Schober, 2009) have taken a similar approach, using factor analysis to demonstrate that the responses to these questions represent an underlying attitude. These studies have used these questions to help model female labour market participation and the division of labour within couples. We would expect that there is a positive relationship between these attitudes and male happiness and a negative effect on female happiness. If this is true, we might expect this variable not to have an effect on average couple life satisfaction but to increase the difference between in life satisfaction between the two partners in

favour of men. Since the questions are only every other wave we filled in the missing years with the previous year's response (and the next year's response if we did not have information in the previous year), hence assuming that attitudes are slow to change and are unlikely to alter much in a few years.

#### 4. Results

We start with the couple regressions defined by equations 1 and 2 in section 2 , to further our understanding of the factors that effect overall and differences in life satisfaction within a couple. We estimate each model using a fixed effects approach (to control for unobserved time variant). In particular we are interested in the division of labour, and therefore, as mentioned earlier, we exclude cases where both members of the couple are retired. Table 1 presents the results for each of our 4 dependent variables - average couple life satisfaction, difference in life satisfaction and life satisfaction of male partner and life satisfaction of female partner. Descriptive statistics of the variables used in the regression can be found in Table A1 in the appendix.

**Table 1: Fixed Effects Couple Level Life Satisfaction regressions**

	Average couple life satisfaction	Average difference in couple life satisfaction	Male	Female
<b>Couple level variables</b>				
Log annual household income per capita)	0.024*	0.01	0.029*	0.016
	[0.013]	[0.023]	[0.016]	[0.017]
No of children age 0-2	0.025	-0.026	0.014	0.037*
	[0.016]	[0.029]	[0.021]	[0.022]
No of children aged 3-4	-0.039**	0.042	-0.017	-0.058***
	[0.015]	[0.027]	[0.020]	[0.021]
No of children aged 5-11	0.005	0.015	0.01	-0.001
	[0.010]	[0.018]	[0.013]	[0.014]
No of children aged 12-15	-0.006	0.014	-0.002	-0.011
	[0.012]	[0.021]	[0.015]	[0.016]
<b>Age</b>				
Age - man	-0.032*	0.038	-0.016	-0.033
	[0.019]	[0.034]	[0.024]	[0.024]
Age - woman	-0.015***	0.0001	-0.014**	-0.030***
	[0.005]	[0.009]	[0.007]	[0.008]
<b>Employment status (ref: employed)</b>				
Unemployed - man	-0.151***	-0.271***	-0.297***	-0.034
	[0.038]	[0.068]	[0.049]	[0.052]
Unemployed - woman	-0.115***	0.229***	0.004	-0.217***
	[0.039]	[0.070]	[0.050]	[0.054]
long term sick/disabled - man	-0.370***	-0.562***	-0.612***	-0.107
	[0.052]	[0.094]	[0.067]	[0.071]

long term sick/disabled - woman	-0.173***	0.249***	-0.062	-0.298***
	[0.044]	[0.080]	[0.057]	[0.061]
Family care - man	-0.074	-0.260*	-0.201**	0.041
	[0.079]	[0.141]	[0.102]	[0.110]
Family care - woman	-0.069***	0.111***	-0.014	-0.119***
	[0.023]	[0.042]	[0.030]	[0.032]
<b>Hours worked</b>				
Man	0.001	-0.003**	0.0005	0.002**
	[0.001]	[0.001]	[0.001]	[0.001]
Woman	-0.001**	0.002	0.0005	-0.002***
	[0.001]	[0.001]	[0.001]	[0.001]
<b>Caring</b>				
Man caring for woman	-0.112**	0.236***	-0.009	-0.223***
	[0.045]	[0.080]	[0.057]	[0.061]
Woman caring for man	-0.100**	-0.134	-0.188***	-0.033
	[0.046]	[0.083]	[0.059]	[0.063]
Carer - not spouse/partner - man	-0.015	0.018	-0.008	-0.023
	[0.019]	[0.035]	[0.025]	[0.027]
Carer - not spouse/partner - woman	0.0004	0.048	0.025	-0.024
	[0.017]	[0.030]	[0.022]	[0.023]
<b>Division of housework -woman's percentage</b>				
	-0.025	-0.081	-0.059	0.047
	[0.036]	[0.064]	[0.046]	[0.049]
<b>Time use specialisation index</b>				
Man index	0.061	0.324***	0.229***	-0.116
	[0.063]	[0.113]	[0.081]	[0.087]
Female index	-0.062	0.188*	0.031	-0.153**
	[0.054]	[0.096]	[0.069]	[0.074]
<b>Health status (ref: good health)</b>				
Excellent health - man	0.044***	0.080***	0.084***	0.003
	[0.013]	[0.023]	[0.017]	[0.018]
Excellent health woman	0.091***	-0.147***	0.019	0.155***
	[0.013]	[0.024]	[0.017]	[0.018]
Fair health - man	-0.085***	-0.171***	-0.171***	-0.009
	[0.014]	[0.024]	[0.018]	[0.019]
Fair health woman	-0.108***	0.185***	-0.016	-0.194***
	[0.013]	[0.023]	[0.017]	[0.018]
Poor health - man	-0.228***	-0.365***	-0.417***	-0.048
	[0.023]	[0.042]	[0.030]	[0.032]
Poor health woman	-0.265***	0.431***	-0.051*	-0.473***
	[0.021]	[0.037]	[0.027]	[0.029]
<b>Attitudes to family life (scale of 1-5)</b>				
Male	-0.031**	-0.039	-0.052***	-0.013
	[0.013]	[0.024]	[0.017]	[0.018]
Female	0.0005	0.019	0.014	-0.016



	[0.013]	[0.024]	[0.017]	[0.018]
Constant	6.733*** [0.574]	-0.256 [1.024]	6.587*** [0.742]	6.600*** [0.739]
Observations	24334	24334	24493	24497
Number of pid	5228	5228	5240	5264
R-squared	0.04	0.02	0.03	0.03
r-squared within	0.04	0.02	0.03	0.03
r-squared between	0.02	0.03	0.04	0.01
r-squared overall	0.02	0.03	0.04	0.02

Standard errors in brackets  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
 Includes wave dummies

The log of household income (adjusted for the number of adults in the household) increases average couple life satisfaction (shared component) and individual male, but only at the 10% level, and has no effect on the difference in life satisfaction or female life satisfaction. When household income is high, both partners are better off and the average life satisfaction increases. However the difference in life satisfaction is not affected. The lack of effect on the difference in life satisfaction suggests that the utility of partners is neutral with respect to household income: the tide raises all boats and therefore there is no difference in their movement. If differences in utility are important to couple stability as postulated in the marriage literature and found in Powdthawee (2009), higher household income is not going to affect couple stability.

Generally having children has no effect on life satisfaction except having children aged 3-4 which negatively effects average life satisfaction and in particular female life satisfaction. This may be because children for babies (0-2 years), the honeymoon effect prevails and this maintains the life satisfaction levels of both partners. For slightly older children (aged 3-4 years), however, this effect has worn off. In addition, they impose tight constraints on what parents can do as they still need detailed care, do not attend school and therefore need all day long care. This causes problems in terms of balancing work and child care. The age of the man has no effect but as the age increases for women this decreases average life satisfaction, as well as individual male and female life satisfaction.

Unemployment of either partner reduces couple life satisfaction and widens the gap in favour of the other partner i.e. male unemployment decreases the gap in favour of woman and female unemployment increases the gap therefore in favour of men. Being unemployed has a negative effect on life satisfaction on the individuals but not their partners (since we are controlling for other factors such as income) which could be a result of loss of self esteem to the individual. If either the man or women is long term sick or disabled this again decreases average life satisfaction and decreases the gap between partners, but only affects individual life satisfaction and not partners. Being in family care and not working has a negative effect on individual life satisfaction and reduces the gap between partners. Only if the woman is in family care does this negatively affect average life satisfaction. These findings suggest the overall couples are happier when both partners are working and individually happier when working. These results support the view that the distribution of resources is fairer when outside options are relatively high for both partners (as they are when both partners are healthy and employed). They might also arise because both them have higher levels of self-esteem and feel needed within the partnership.

For those who are working, total hours worked have an influence on life satisfaction but the effect differs for women's and men's hours: couples' average life satisfaction decreases as women's hours

worked increase (but not men's hours), the gap increases in favour of the woman if men's hours increase but is unaffected by women's hours. Men are not affected by either their hours worked or the women's, once unemployment and their time specialisation are accounted for, whilst women are affected by both their own and men's hours worked. In line with findings on gender and time use, this suggests that women are unlikely to be able to shift much of their unpaid hours to men if they work longer hours whilst they are very likely to have to take up more when men's hours increase.

The coefficients of the time specialisation index show this further: men's life satisfaction is increased by their time allocation and this widens the gap in their favour. Women's life satisfaction is decreased by their own time use specialisation and this widens the gap in favour of men.

A positive change in the index of time use specialisation indicates that the individual has become more specialised in their time use. An increase in specialisation for men increases the gap between male and female satisfaction and increases the man's satisfaction but has no effect on the woman's. In contrast an increase in specialisation for the woman decreases their life satisfaction.

In terms of caring if either partner is cared for by the other this reduces their own life satisfaction, average couple life satisfaction and increases the difference between male and females life satisfaction if the man is caring for the woman.. However caring for their partner has no effect on individual life satisfaction. Caring for someone other than their partner has no influence on life satisfaction (however we have not controlled for the number of hours of caring since it is difficult to separate this from caring for ones partner when caring is for more than one person).

Health is an important factor in life satisfaction with better health increasing life satisfaction and worse health decreasing. Only poor partner health has an effect on individual life satisfaction.

Attitudes to family life with a high value reflect attitudes more in line with traditional gender roles, and the results indicate that when men have more traditional views experience this reduces both average couple life satisfaction and their own . This could reflect that their views make men more constrained in terms of the work and life choices.

### **The effect of partner's life satisfaction**

The above has analysed the effect of a variety of controls on the life satisfaction of partners in a couple. It is clear, however, that one partner's life satisfaction is affected by the level of life satisfaction of their partner. We are all happier when those around us are happy. To test for this, we included the life satisfaction of the partner into the individual's life satisfaction equation. We estimate this model using a general methods of moment (GMM) approach, as outlined in equations 3 and 4 to allow for the correlated effects of assortive mating and the effect of sharing the same environment and therefore the endogeneity of partner life satisfaction. In line with Powdthawee (2009), we model each individual's life satisfaction separately with various controls, but we also include the number of hours worked by the individual and their partner and the share of housework done in the couple. Means and standard deviations of the variables used in the regressions are provided in Table A2 in the appendix.

As mentioned in section 2 we utilise a method that includes both partner life satisfaction and lagged life satisfaction and treats both of them as endogenous (i.e. we instrument these with their second lag rather than their first lag). Following Powdthawee (2009) we treat only age and the wave dummies (which we do not report) as strictly exogenous and assume all the other control variables are endogenous (therefore again using their second lags as instruments) and collapse the endogenous variables (use only the second lag and no further lags) to prevent the inclusion of too many instruments. Both models pass the tests of no second-order autocorrelation but only the male model passes the Hansen test of over identification (although this test becomes weaker as the

number of instruments increases,).

Generally there is an upward bias in OLS results and a downward bias in fixed effects results, so the GMM results if well specified tend to be in between the two estimates. Therefore, we have reported both the OLS and fixed effects results as a comparison (both which do not include a lagged dependent variable).

**Table 2: Individual Models of Life Satisfaction with The Inclusion of Partner Satisfaction**

	OLS		Fixed Effects		GMM	
	Male	Female	Male	Female	Male	Female
Lag own life satisfaction					0.032*	0.070***
					[0.017]	[0.017]
Life satisfaction partner	0.194***	0.219***	0.102***	0.118***	0.164***	0.263***
	[0.009]	[0.010]	[0.006]	[0.007]	[0.060]	[0.077]
Age	-0.040***	-0.039***	-0.030***	-0.041***	-0.049***	-0.045***
	[0.007]	[0.008]	[0.010]	[0.010]	[0.011]	[0.011]
Age squared/10	0.006***	0.005***	0.003***	0.004***	0.007***	0.006***
	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Log annual household income per capita)	0.054***	0.080***	0.035**	0.028*	-0.017	-0.007
	[0.018]	[0.020]	[0.016]	[0.017]	[0.091]	[0.087]
No of children age 0-2	0.028	0.051*	0.011	0.036*	0.111*	0.054
	[0.023]	[0.026]	[0.020]	[0.022]	[0.065]	[0.069]
No of children aged 3-4	0.011	-0.038	-0.001	-0.045**	0.029	0.018
	[0.022]	[0.024]	[0.019]	[0.021]	[0.042]	[0.044]
No of children aged 5-11	-0.017	-0.047***	0.022*	0.01	0.054*	0.021
	[0.014]	[0.015]	[0.013]	[0.014]	[0.032]	[0.032]
No of children aged 12-15	-0.072***	-0.076***	0.007	0.006	-0.051	0.074**
	[0.019]	[0.020]	[0.015]	[0.016]	[0.034]	[0.036]
<b>Employment status (ref: employed)</b>						
Unemployed	-0.359***	-0.446***	-0.300***	-0.214***	-0.815**	-0.227
	[0.069]	[0.076]	[0.047]	[0.053]	[0.329]	[0.483]
Long term sick/disabled	-0.465***	-0.309***	-0.623***	-0.302***	-0.847***	-0.461
	[0.085]	[0.090]	[0.065]	[0.060]	[0.316]	[0.319]
Family care	-0.331**	-0.113***	-0.225**	-0.116***	-0.517	-0.159
	[0.136]	[0.040]	[0.098]	[0.031]	[0.813]	[0.161]
Total hours worked	-0.002**	-0.004***	-0.001	-0.002**	0.007	-0.007
	[0.001]	[0.001]	[0.001]	[0.001]	[0.006]	[0.004]
Total hours worked spouse/partner	-0.0004	0.001*	-0.0001	0.002***	-0.002	0.001
	[0.001]	[0.001]	[0.001]	[0.001]	[0.003]	[0.005]
Percentage share of housework	0.233**	-0.129	0.230***	-0.191***	0.469	-0.666
	[0.100]	[0.095]	[0.078]	[0.072]	[0.289]	[0.463]
Index of time use specialisation	0.233**	-0.129	0.230***	-0.191***	0.469	-0.666
	[0.100]	[0.095]	[0.078]	[0.072]	[0.289]	[0.463]

Cares for spouse/partner	0.02 [0.071]	0.009 [0.079]	-0.003 [0.055]	-0.036 [0.061]	0.325 [0.401]	-0.049 [0.412]
Cared for by spouse/partner	-0.489*** [0.098]	-0.175* [0.097]	-0.193*** [0.057]	-0.203*** [0.058]	-0.609 [0.403]	-0.494 [0.486]
<b>Health status (ref: good health)</b>						
Excellent	0.303*** [0.018]	0.348*** [0.021]	0.085*** [0.016]	0.154*** [0.018]	0.026 [0.161]	0.177 [0.187]
Fair	-0.367*** [0.024]	-0.403*** [0.024]	-0.172*** [0.017]	-0.192*** [0.018]	-0.592*** [0.158]	-0.439** [0.172]
Poor	-0.806*** [0.045]	-0.868*** [0.044]	-0.415*** [0.029]	-0.468*** [0.028]	-0.709*** [0.229]	-0.700*** [0.232]
<b>Attitudes to family life (scale of 1-5)</b>	-0.070*** [0.019]	-0.029 [0.021]	-0.044*** [0.016]	-0.014 [0.018]	0.004 [0.050]	-0.031 [0.054]
Constant	4.747*** [0.223]	4.233*** [0.229]	5.240*** [0.269]	5.316*** [0.276]	4.727*** [0.897]	4.843*** [0.882]
Observations	25321	25336	25321	25336	20668	20687
R-squared	0.2	0.18	0.04	0.05	.	.
Number of pid			5303	5349	5067	5106
Number of instruments					237	237
<b>GMM tests</b>						
serial 1st order					0.00	0.00
serial 2nd order					0.709	0.332
Hansen					0.324	0.028

Robust standard errors in brackets

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Includes wave dummies

The GMM coefficients of lagged own life satisfaction are significant (only at the 10% level in the case of the male regressions) unlike the Powdthawee (2009) estimates, as well as being larger. This result indicates that there is an element of inertia (or possibly the influence of personality which changes very slowly) in determining life satisfaction. The effect of partners life satisfaction, after controlling for other factors such as time use, is smaller than the Powdthawee (2009) and larger for females estimates i.e. an increase in life satisfaction of the woman by 1 increases male satisfaction by 16 percentage points, whilst an increase in male satisfaction increases female life satisfaction by 26 percentage points. Our results clearly indicate that for each individual, their partner's life satisfaction is very important in determining their own life satisfaction. In general, in all 3 models, this effect is larger for women i.e. women are more strongly influenced by their partner's life satisfaction. This effect shows up more strongly in the GMM for women and points to the possibility that women, possibly due to their internalisation of caring roles, are more affected by their partner's happiness than men (for a discussion see also Della Giusta, Kambhampati and Jewell, 2009).

Life satisfaction decreases with age but at a decreasing rate. This U shaped relationship is a common finding in the life satisfaction literature (Kahnemann et al 1999, Kahnemann and Krueger, 2006). The effect of having children is not consistent across the models with women less happy as

the age of their children rises, and men less satisfied in the presence of 12-15 year old children. These effects disappear once we control for fixed effects with men happier in the presence of 5-11 year olds in both the fixed effect and GMM model.

Except for women in the GMM model being unemployed (compared to be employed) reduces life satisfaction. Being long term sick or disabled reduces satisfaction and staying at home to look after the family reduces satisfaction but not in the GMM model. Both men and women are negatively affected if they are cared for by their spouse but this effect disappears in the GMM models. Generally better health has a positive effect on life satisfaction. Males who have more traditional division of labour views are less satisfied.

Any effect of hours worked are removed in the GMM model, with women less satisfied as their hours increase but happier as their partners hours increase, in both the OLS and Fixed Effects models. Men who become more specialised are happier but this disappears in the GMM model, whilst women become less satisfied as they specialise more in the fixed effects model.

We thus find that couples happiness and happiness gaps are affected by time use and time specialisation, but individual happiness -once we account for assortative matching, shared background and the partner's happiness- is not. Couple happiness and happiness gaps are however important indicators of the health of the relationship, thus a focus on these variables rather than individual happiness is necessary if we are to properly understand some of the trade-offs in utility terms that result from couples' bargaining over their time use.

## **Conclusions**

The paper's main contribution consists in showing that time use matters to a couple's happiness, and in particular the amounts of working hours and the extent of specialisation in paid and unpaid activities all affect both the average level of happiness in the couple and the extent of the happiness gap between partners, an important indicator of the health of the relationship. Whilst we confirm that an individual's happiness is affected by that of their partner (as found by Powdthawee, 2009), we observe that this is not necessarily symmetric across women and men and per se it is not a sufficient indicator of the underlying factors that lead to couple happiness and happiness gaps between partners.

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## Appendix

Table A1 – Mean and Standard Deviation of Explanatory Variables in Couple Level Regressions

Variable	Mean	Sd
Average life satisfaction	5.23	0.93
Difference in life satisfaction	-0.04	1.42
Age - man	42.76	10.73
Age - woman	40.66	10.54
Log annual household income per capita)	9.52	0.60
No of children age 0-2	0.12	0.34
No of children aged 3-4	0.12	0.34
No of children aged 5-11	0.43	0.73
No of children aged 12-15	0.23	0.51
Total hours worked - male	41.12	17.35
Total hours worked - female	24.14	17.57
Unemployed - man	0.03	0.18
Unemployed - woman	0.02	0.14
long term sick/disabled - man	0.05	0.22
long term sick/disabled - woman	0.04	0.19
Family care - man	0.01	0.08
Family care - woman	0.18	0.38
Man caring for woman	0.03	0.17
Woman caring for man	0.03	0.17
Carer - not spouse/partner - man	0.10	0.31
Carer - not spouse/partner - woman	0.15	0.36
House work share - woman	0.74	0.21
Excellent health - man	0.27	0.44
Excellent health woman	0.24	0.42
Fair health - man	0.19	0.39
Fair health woman	0.21	0.40
Poor health - man	0.08	0.27
Poor health woman	0.09	0.29
Attitudes to Family Life - male	2.87	0.58
Attitudes to Family Life - male	2.78	0.61
N	24,334	

Table A2 – Mean and Standard Deviation of Explanatory Variables in Partner Life Satisfaction Regressions

Variable	Female		Male	
	Mean	Sd	Mean	Sd
Life satisfaction	5.21	1.14	5.24	1.21
Age	42.81	10.75	40.69	10.56
Log annual household income per capita)	9.51	0.60	9.51	0.60
No of children age 0-2	0.12	0.34	0.12	0.34
No of children aged 3-4	0.12	0.34	0.12	0.34

No of children aged 5-11	0.42	0.73	0.42	0.73
No of children aged 12-15	0.23	0.51	0.23	0.51
Total hours worked	41.09	17.43	24.12	17.59
Unemployed	0.04	0.18	0.02	0.14
Long term sick/disabled	0.05	0.22	0.04	0.20
Family Care	0.01	0.08	0.18	0.38
Care for spouse	0.03	0.17	0.03	0.17
Carer fpor by spouse	0.03	0.17	0.03	0.17
Housework share	0.26	0.21	0.74	0.21
Excellent health	0.26	0.44	0.24	0.42
Fair health	0.19	0.39	0.20	0.40
Poor health	0.08	0.27	0.09	0.29
Attitudes to Family Life	2.87	0.59	2.78	0.61
N	25,321		25,336	

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