

## Modelling interdependences between spouses by estimating income satisfaction

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### *Abstract*

This paper models interdependences between spouses. To that end, it estimates income satisfaction in a collective family model framework using a sample of seven EU countries. The IV Hausman-Taylor estimator has been selected in the majority of countries, and it appears that those of Southern Europe (Greece, Portugal and Spain) are the only countries where both husbands' and wives' income satisfaction are significantly and positively affected by their spouses' wages and non-wage incomes, thus indicating a particular way of life characterized by mutual cooperation and income sharing between spouses.

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## 1. Introduction

On the basis that current research suggests that reported subjective well-being is a satisfactory empirical approximation of individual utility, that can be applied in socio-economic research (Easterlin, 2002), the two areas of general or life satisfaction that have mainly been the subject of economic analysis are those which study the positive relationship between this satisfaction and income (Easterlin, 2001; Blanchflower and Oswald, 2001), and that analyses the negative consequences on well-being of unemployment (Winkelmann and Winkelmann, 1998; Di Tella et al., 2001).

In addition to the study of this general or life satisfaction, one aspect of individual satisfaction that has been the subject of extensive analysis in the literature is income satisfaction. The evidence has shown that age, education or individual income appear to have significantly positive impacts on the income satisfaction of both spouses (Ferrer-i-Carbonell and Van Praag, 2003; Schwarze, 2003). In this literature, the family, in the form of a marital status variable, has traditionally been considered as a positive influence on the satisfaction level of its members (Clark and Oswald, 1994, 2002).

Despite the clear relevance of this evidence, income satisfaction has usually been studied without reflecting that the family is composed of interdependent spouses. Thus, the intuitive interrelations which can be assumed in reported satisfaction levels among members of the same family are overlooked. The following question then arises: how does one analyse the effects of one spouse's level of satisfaction on that of the other in an integrated framework? Attempting to answer this question, we model the interdependences of individual preferences within the household by assuming the collective approach, in which one spouse's satisfaction not only depends on his/her own determinants, but also on the other spouse's variables (Chiappori, 1988, 1992). This makes it possible to derive stochastic formulations estimated for seven representative EU countries, using the panel structure of the eight waves of the European Community Household Panel-ECHP (1994-2001).

## 2. The data and the model

Families from the ECHP (1994-2001) have been selected in which both spouses are aged between 16 and 65.<sup>1</sup> Individuals both with and without children have been included in these households. Those families lacking the required information have been excluded, resulting in a total sample ranging from 33,764 households in Spain to 6,236 households in Finland. The ECHP enquires into the income satisfaction level of individuals by asking: "How satisfied are you with your present financial situation?". Each of these responses takes values from 1 to 6, moving from not satisfied at all (1) to completely satisfied (6).

Our dependent variables are husband and wife income satisfaction (*HusbSatisf*, *WifeSatisf*), whereas the exogenous variables include a number of individual characteristics and, secondly, several economic variables. These include the age of the spouses (*HusbAge*, *WifeAge*), the age difference between them (*AgeDifference*), the education level (*HusbPrimEduc*, *HusbSeconEduc*, *HusbHighEduc*, *WifePrimEduc*, *WifeSeconEduc*, *WifeHighEduc*), as well as two other variables which refer to the presence of children in the household: a dummy variable indicating if there is a child under 12 in the family (*Children<12*), and another indicating the number of children under 16 (*Children<16*). As regards the variables of the economic situation of the

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<sup>1</sup> The ECHP is an extensive, sample-based panel survey in which the same households and individuals are interviewed annually. The data come from a standardised questionnaire and are designed to be cross-nationally comparable (Peracchi, 2002).

household, these include the wages of both spouses (*HusbWage*, *WifeWage*), as well as the annual non-wage incomes (*HusbNon-WageInc*, *WifeNon-WageInc*), the wife's participation in the family income (*WifeParticipation*) and, finally, the study includes a variable indicating whether the individual is self-employed or a wage-earner (*HusbSelf-Employed*, *WifeSelf-Employed*, *HusbWage-Earner*, *WifeWage-Earner*).

The model adopts the family collective approach, based on the assumption that intra-household decisions are Pareto-efficient, considering that the household consists of two working-age individuals,  $A = \text{husband}$  and  $B = \text{wife}$ , whose rational preferences could be represented by indirect utility functions defined on their own vectors of wages and non-labour incomes, as well as on the other member's vector. It should also be noted that the panel data structure of the ECHP permits the application of techniques to control for unobservable heterogeneity. On these theoretical and empirical bases, the stochastic formulation underlying the observed subjective well-being responses takes the form of linear functions:

$$v_{it}^I = \mu^I + \beta_1^A w_{it}^A + \beta_2^B w_{it}^B + \beta_3^A y_{it}^A + \beta_4^B y_{it}^B + \delta z_{it} + \alpha_i^I + e_{it}^I$$

(1)

where the parameters  $\beta$  and  $\delta$  are the coefficients of the variables;  $\mu$  and  $\alpha$  are constant terms, with  $\mu$  being the average population and  $\alpha$  the individual deviation with respect to this average; and, finally,  $e$  are the error terms, with null mean and constant variance.<sup>2</sup> These equations are estimated independently for both spouses, in such a way that  $N$  is the number of families in the sample.

The estimation of family members' satisfaction requires that individual unobservable utility be measured, with a common approach having been to use ordinal well-being variables. One concern is that some people look at life either pessimistically or optimistically, even though there is "really" no difference in their level of well-being, with this potential bias being largely overcome by controlling for individual effects (Clark and Oswald, 2002; Ferrer-i-Carbonell and Frijters, 2004). Moreover, as individuals' behaviour is orientated towards achieving higher satisfaction levels, the chosen variables will be endogenous, with a standard solution to this bias being to use instrumental variables (Schwarze, 2004).

Taking into account these stochastic circumstances, we develop an estimation strategy consisting of four consecutive estimations, namely pool, fixed effects, random effects, and efficient generalized instrumental variables as proposed by Hausman and Taylor (1981). After estimating the four alternative specifications, some appropriate tests allow us to select the best formulation. An LM test indicates if a panel or a pool estimation is preferred. If a panel estimation is selected, then a choice must be made among the three alternative specifications, with two Hausman tests allowing the best panel estimation to be selected. The first Hausman test (Hausman-1) is the standard to distinguish between the random and fixed effects estimators, whereas the second (Hausman-2) tests the Hausman-Taylor against the fixed effects model.<sup>3</sup>

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<sup>2</sup> Given the ordinal nature of the dependent variable on individual satisfaction, an appropriate regression model would be an ordered probit. However, whilst random-effects ordered probit model is available in standard statistical software packages (Ferrer-i-Carbonell and Van Praag, 2003; Schwarze, 2004; Winkelmann, 2005; Schwarze and Winkelmann, 2005), the fixed-effects ordered probit estimator is not. This is the reason why the present paper uses as approximations both random-effects and fixed-effects regression models, which are perfectly comparable by using habitual tests (Ferrer-i-Carbonell and Frijters, 2004; Graham et al., 2004).

<sup>3</sup> The 8.0 version of Stata includes the Hausman-Taylor procedure and is used to obtain the estimates presented in this paper

### 3. Empirical results

Starting with the test results, Table 1 shows that, for the majority of cases, the Hausman-Taylor estimation is the selected method. The same Table shows that the effect of age is significantly positive in the majority of countries. Moreover, when the age difference between spouses is greater, female income satisfaction rises in Spain and the United Kingdom. The effects of the presence of children vary across countries, and also depending on age. If the child is younger than 12, the effect is positive for males, but negative in Denmark, France and Italy for females. As the number of children under 16 living at home rises, satisfaction falls in Greece, Spain and the United Kingdom for both male and female sub-samples. The education variables show that income satisfaction significantly increases when husbands and wives achieve higher education qualifications.

(Table 1)

With respect to the economic variables, increases in the individual's wage has a highly significant positive impact on both male and female satisfaction for all sample EU countries. Male satisfaction also positively depends on female wages in Denmark, Finland, France, Greece, Italy, Portugal and Spain. Moreover, for all sample countries, the wife's income satisfaction increases as the husband's wage increases.

With respect to non-wage incomes, the positive cross-effect on female satisfaction appears in Finland, France, Greece, Italy, Portugal and Spain, whereas the normality hypothesis is satisfied in Greece, Portugal and Spain. Moreover, the husband's variable has a positive effect on male income satisfaction in Denmark, France, Greece, Portugal and Spain. This positive effect also appears from the wife's non-wage income in Denmark, Greece, Portugal and Spain.

Moreover, increases in the wife's share of family income raises the husband's income satisfaction in Spain, but lowers it in Greece and Portugal. An increase in the wife's share of family income is seen to raise female income satisfaction in Italy and Spain. The self-employment variable has a significantly negative impact on the male variable in Greece, and on the female variable in Finland, France and Greece.

In summary, strong evidence has been adduced in support of the interrelations between spouses, with asymmetric behaviour being identified between husbands and wives. Specifically, the Southern European countries (Greece, Portugal and Spain) are the only sample members where both spouses could be interpreted as "altruistic", in the sense that both male and female satisfaction variables are significantly and positively affected by the spouses' wage and non-wage income. This result indicates a pattern of family life characterized by mutual and strong cooperation and income sharing between the spouses. Thus, these countries are clear examples where cooperative models of family behaviour are fully justified to represent the interrelations between spouses.

An understanding of individual satisfaction derived from income within the family could be particularly useful for policy-makers in evaluating socio-economic policies. Our conclusions will assist in the drafting of policies aimed at increasing spouses' satisfaction levels. In addition to policies focused on improving the education level of individuals, as well as their incomes, our finding that wives in particular exhibit altruistic behaviour has a bearing on policies directed towards increasing male incomes and thus having a greater impact on the family as a whole.

## References

- Blanchflower, D.G. and Oswald, A.J. (2001) "Well-Being Over Time in Britain and the USA" NBER, Working Paper 7487.
- Chiappori, P-A. (1988) "Rational Household Labor Supply" *Econometrica* **56**, 63-89.
- Chiappori, P-A. (1992) "Collective Labour Supply and Welfare" *Journal of Political Economy* **100**, 437-467.
- Clark, A.E. and Oswald, A.J. (2002) "A Simple Statistical Method for Measuring How Life Events Affect Happiness" *International Journal of Epidemiology* **31**, 1139-1144.
- Di Tella, R., MacCulloch, R.J. and Oswald, A.J. (2001) "Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness" *American Economic Review* **91**, 335-341.
- Easterlin, R.A. (2001) "Income and Happiness: Towards a Unified Theory" *Economic Journal* **111**, 465-484.
- Easterlin, R.A. (2002) *Happiness in Economics*. Cheltenham, Edward Elgar.
- Ferrer-i-Carbonell, A. and Firjters, P. (2004) "How Important is Methodology for the Estimates of the determinant of Happiness?" *Economic Journal* **114**, 641-659.
- Ferrer-i-Carbonell, A. and Van Praag, B. (2003) "Income Satisfaction Inequality and its Causes" IZA, Working Paper 854.
- Graham, C., Eggers A. and Sukhtankar, S. (2004) "Does Happiness Pay? An Exploration based on Panel Data from Russia" *Journal of Economic Behaviour and Organization* **55**, 319-342.
- Hausman, J.A. and Taylor, W.E. (1981) "Panel Data and Unobservable Individual Effects" *Econometrica* **49**, 1377-1398.
- Peracchi, F. (2002) "The European Community Household Panel: A Review" *Empirical Economics* **27**, 63-90.
- Schwarze, J. (2003) "Using Panel Data on Income Satisfaction to Estimate Equivalence Scale Elasticity" *Review of Income and Wealth* **49**, 359-372.
- Schwarze, J. (2004) "Living Conditions of Children and Parental Well-Being: Evidence From German Data on Life Satisfaction" IZA, Discussion Paper 1200.
- Schwarze, J. and Winkelmann, R. (2005) "What Can Happiness Research Tell Us About Altruism? Evidence From the German Socio-Economic Panel" IZA, Discussion Paper 1487.
- Winkelmann, R. (2005) "Subjective Well-Being and the Family: Results From an Ordered Probit Model with Multiple Random Effects" *Empirical Economics* **30**, 749-761.
- Winkelmann, L. and Winkelmann, R. (1998) "Why Are the Unemployed So Unhappy? Evidence From Panel Data" *Economica* **65**, 1-15.

**Table 1. Income satisfaction**

Variables	Denmark		Finland		France		Greece		Portugal		Spain		United Kingdom	
	Male	Female	Male	Male	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Constant	4.614** (6.42)	4.449** (14.36)	1.426** (2.87)	1.928** (3.79)	2.110** (11.20)	3.690** (11.33)	2.059** (15.61)	2.614** (41.69)	2.683** (48.02)	2.377** (33.10)	0.974** (7.28)	1.639** (15.35)	3.391** (9.50)	2.478** (9.28)
HusbAge	0.009** (3.73)	0.011** (3.90)	0.023** (5.11)	0.021** (4.53)	0.027** (16.83)	0.001 (0.15)	0.004** (3.42)	0.003** (2.31)	0.003** (3.43)	0.004** (4.07)	0.027** (19.57)	0.018** (12.44)	0.006** (2.18)	0.015** (5.02)
Age Difference	-0.008 (-0.66)	0.004 (0.42)	0.001 (0.10)	0.018* (1.68)	-0.018** (-3.51)		-0.019* (-1.91)			0.005 (1.01)	-0.003 (-0.57)	0.015** (2.36)	-0.015** (-2.12)	0.012** (2.44)
Children < 12	-0.059** (-2.00)	-0.102** (-3.24)	-0.050 (-1.02)	-0.074 (-1.48)	-0.052** (-2.53)	-0.066* (-1.77)	0.057** (2.54)	0.055** (2.42)	-0.019 (-1.06)	0.003 (0.19)	0.098** (4.49)	0.056** (2.46)	0.063** (2.29)	-0.044 (-1.46)
Children < 16	-0.124** (-6.10)	-0.077** (-3.54)	-0.000 (-0.01)	0.002 (0.05)	0.061** (4.22)	-0.011 (-0.22)	-0.060** (-3.95)	-0.063** (-4.17)	-0.002 (-0.17)	-0.009 (-0.71)	-0.102** (-6.59)	-0.055** (-3.40)	-0.087** (-3.17)	-0.090** (-3.10)
HusbSeconEduc	-2.033 (-1.57)	1.528** (3.22)	1.410** (2.00)	2.054** (3.69)	-1.591** (-2.68)		-0.259 (-0.48)			6.372** (8.01)	1.240 (1.48)	4.693** (10.41)	-3.138** (-3.32)	2.513** (9.16)
HusbHighEduc	1.104 (1.02)	-2.281** (-4.15)	2.968** (3.41)	1.131* (1.73)	2.595** (7.36)		6.500** (6.26)			-1.457** (-2.14)	3.868** (8.68)	-1.915** (-2.33)	2.555** (6.47)	-1.011 (-1.46)
WifeHighEduc	-0.781 (-0.95)	-0.811 (-1.52)	-1.213 (-1.59)	-0.627 (-1.11)	1.240** (2.97)		-4.467** (-4.48)			-0.204 (-0.24)	-1.787** (-4.61)	-1.261** (-3.54)	-0.510 (-1.43)	-0.135 (-0.48)
HusbWage	0.108** (12.87)	0.056** (6.31)	0.102** (2.81)	0.078** (2.06)	0.039** (8.30)	0.062** (3.14)	0.068** (18.11)	0.040** (11.52)	0.057** (17.51)	0.029** (9.13)	0.077** (20.71)	0.061** (16.06)	0.103** (6.02)	0.108** (5.98)
WifeWage	0.020** (2.64)	0.078** (9.67)	0.070** (2.59)	0.067** (2.38)	0.012** (2.30)	0.083** (4.45)	0.027** (6.21)	0.034** (7.12)	0.015** (4.10)	0.039** (10.93)	0.024** (5.07)	0.033** (6.69)	-0.002 (-0.14)	0.050** (2.82)
HusbNon-WageInc	0.438* (1.67)	-0.262 (-0.94)	0.398 (1.49)	0.495* (1.80)	0.481** (2.47)	-1.395 (-1.12)	0.091** (12.07)	0.070** (9.20)	0.060** (5.83)	0.041** (4.00)	0.065** (6.72)	0.057** (5.55)	3.720 (1.27)	3.677 (1.25)
WifeNon-WageInc	1.104** (3.29)	0.664* (1.86)	0.010 (0.02)	-0.296 (-0.65)	-0.386 (-1.15)	1.433 (0.51)	0.071** (4.60)	0.048** (3.11)	0.073** (3.48)	0.079** (3.81)	0.104** (3.22)	0.081** (2.38)	3.257 (0.67)	0.324 (0.06)
WifeParticipation	-0.013 (-0.14)	-0.097 (-0.95)	-0.209 (-0.95)	0.013 (0.06)	-0.045 (-0.81)	-0.022 (-0.18)	-0.171** (-3.42)	0.068 (1.35)	-0.084** (-2.12)	0.030 (0.75)	0.117** (2.12)	0.246** (4.24)	0.006 (0.08)	0.051 (0.55)
HusbSelf-Employed	-0.274** (-5.05)	0.031 (0.44)	-0.024 (-0.42)	-0.299** (-3.94)	0.015 (0.34)	-0.023 (-0.17)	-0.045* (-1.74)	-0.114** (-3.22)	0.016 (0.82)	0.005 (0.23)	0.078** (2.57)	-0.062 (-1.50)	0.065 (1.46)	0.004 (0.06)
LM	4,923.67 (0.0000)	4,317.63 (0.0000)	1,774.92 (0.0000)	1,638.12 (0.0000)	17,036.62 (0.0000)	1,787.88 (0.0000)	6,133.27 (0.0000)	6,286.51 (0.0000)	13,890.03 (0.0000)	16,166.02 (0.0000)	7,825.20 (0.0000)	8,706.36 (0.0000)	2,928.44 (0.0000)	2,534.99 (0.0000)
Hausman 1	129.59 (0.0000)	124.69 (0.0000)	62.89 (0.0000)	59.27 (0.0000)	619.40 (0.0000)	186.34 (0.0000)	653.27 (0.0000)	613.39 (0.0000)	499.27 (0.0000)	359.04 (0.0000)	753.30 (0.0000)	603.36 (0.0000)	314.91 (0.0000)	230.08 (0.0000)
Hausman 2	7.58 (0.577)	9.32 (0.4082)	2.90 (0.9683)	1.99 (0.9916)	0.76 (0.9998)	17.81 (0.0374)	16.55 (0.0562)	29.53 (0.0005)	17.16 (0.0463)	12.33 (0.1955)	12.98 (0.1636)	1.58 (0.9965)	4.97 (0.8367)	2.24 (0.9871)
Selected estimation	HT	HT	HT	HT	HT	FE	HT	FE	FE	HT	HT	HT	HT	HT
Number of observations	12,083		6,236		31,083		27,817		28,803		33,764		14,612	

Asymptotic t-statistics in parentheses, \*\*\* indicates significance at the 1% level, \*\* indicates significance at the 5% level, \* indicates significance at the 10% level