

Odds and Persistence in European Countries Life Conditions⁽¹⁾

Difformità e Persistenze delle Condizioni di Vita nei Principali Paesi UE

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Riassunto: Sulla base delle informazioni disponibili per le prime quattro occasioni di indagine dell'*European Community Household Panel* (ECHP), in questo lavoro si intende individuare se, e in che misura, i cambiamenti nella composizione familiare (nascita di un figlio, divorzio, formazione di una famiglia, ecc.) e alcune caratteristiche familiari (livello di istruzione, composizione del reddito, ecc.) possono modificare la probabilità di essere o meno in una condizione di benessere. A tal fine nel lavoro viene proposta una "linea di benessere", in analogia con quanto viene fatto con la ben nota "linea di povertà" e viene specificato e stimato un modello a componenti di varianza per dati longitudinali. Tale modello ha permesso di evidenziare alcune interessanti peculiarità dei tre Paesi considerati (Italia, Francia e Spagna).

Keywords: well-being dynamics, countries comparisons, random effect models.

1. Introduction

The aim of this paper is the exploration of the European Community Household Panel (ECHP) data in order to study the dynamics of well-being conditions across countries. Aware of the problems concerning the collection of income data, especially with reference to high values and income composition (work, capital, transfers), a relative "well-being line" is proposed on the analogy of the relative poverty line. The well-being condition is defined on the basis of this line and it is modeled through a random effect logit model for longitudinal data.

In section 2 the data-set and both original and derived variables (especially those related to household changes) are presented. In section 3, after the specification and the evaluation of the model, some specific odds ratios have been calculated in order to assess some remarkable effects on well-being condition induced by household changes and characteristics, and the most significant differences across countries.

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2. Data and variables

The ECHP survey is a longitudinal survey conducted every year since 1994 on a sample of households living in the EU countries. The purpose of the survey is the study of households and individuals life conditions in a multidimensional, dynamic and comparative framework. The guidelines of the survey are established by Eurostat in order to assure the comparability of the results across countries (Dirven *et al.*, 2000).

In this work we use the information for the first four waves of Italy, France and Spain, since these are the largest EU countries for whom the complete ECHP dataset referring to waves 1 to 4 (1994 to 1997) has been disseminated up to this time.

The response variable is the household “well-being”, measured in terms of annual household income¹. At each wave, the annual income refers to the previous calendar year. With reference to Eurostat definition of poverty line - the threshold line is defined as 3/5 times the median - in this case the threshold is established in the upper tail of income distribution, and households whose equivalent income exceeds that threshold are considered to live in a “well-being” condition.

The threshold is put equal to 5/3 times the median equivalent income for each country, year by year. As equivalence scale, the OECD-modified scale is used. Every year, Purchasing Power Parities (PPPs) are used, so that incomes of the different countries are expressed in comparable units.

The well-being lines are steadily highest in France (Table 1); in 1997, the lines range from 13,553 in Spain (giving rise to 21.20 percent of households in a well-being condition) to 15,437 in Italy (16.51 percent) to 19,947 in France (15.29 percent)².

Table 1: Household sample sizes and well-being lines by country

Country	Average sample size across time	Well-being line, wave I	Well-being line, wave II	Well-being line, wave III	Well-being line, wave IV
Italy	6,865	14,760	15,041	15,330	15,437
France	6,609	18,206	19,176	19,589	19,947
Spain	6,339	12,447	12,294	12,541	13,553

Source: Elaborations from ECHP, wave I-IV

Our aim is to study how household changes and other covariates can influence the well-being condition across time and across countries. All these variables are presented in Table 2.

Because some covariates express a change from the previous wave, the starting time of this study is wave 2 – 1995. A non-balanced panel is considered, with households as units of analysis; if a household is not interviewed at wave t-1, changes in the covariates are evaluated with reference to wave t-2.

¹ Our unit of longitudinal analysis is the household, defined by a fixed household identification number across waves; changes in household composition are considered in the covariates.

² For example, in Italy, in 1997 the PPP is equal to 1,697 lire, so the line corresponds to 26,197,000 lire for a one-person household.

Table 2: *Covariates and their time reference*

Covariates	Time reference
Household typology (HTYP in six categories) ³	t-1
Change into single-parent household (SPARH 0/1)	from t-1 to t
Change into one-person household (ONEPH 0/1)	from t-1 to t
Birth of a child (BIRTH 0/1)	from t-1 to t
Marriage or new cohabitation (MARR 0/1)	from t-1 to t
Divorce, separation or death of the spouse (DIVOR 0/1)	from t-1 to t
Other change in household typology (OTHCH 0/1)	from t-1 to t
Single-family accomodation (ACCOM 0/1)	t
Household educational level (HEDLEV: low,medium,high)	t
Percent of income from non-work source (HNWORK)	t
Percent of income from self-employment (HSELF)	t

3. Model specification and estimation

Let WB_{it} be the well-being indicator at time t ($t = 1 \dots T_i$) for household i , $\mathbf{x}_{it}$ a vector of k time-varying and time invariant exogenous variables observed on household i at time t and $\boldsymbol{\varphi}_t$ a vector of time indicator variables. The well-being indicator function is assumed to be:

$$\text{logit Pr}(WB_{it} = 1 | U_i) = \beta_0 + U_i + \boldsymbol{\varphi}_t' \boldsymbol{\alpha} + \mathbf{x}_{it}' \boldsymbol{\beta} \quad (1)$$

where U_i represents a random household component distributed as $N(0, \sigma_u^2)$ and assumed to be independent of $\boldsymbol{\varphi}_t$ and $\mathbf{x}_{it}$; β_0 , $\boldsymbol{\alpha}$ and $\boldsymbol{\beta}$ are the usual unknown parameters. The specified model in (1) is a random intercept logistic model for binary data (Diggle *et al.*, 1995) and allows us to take into account the correlation across repeated measures nested in each household. In fact the household component U_i represents the effect of household unobserved (or unobservable) heterogeneity and this effect is assumed to persist throughout the period of observation. In order to compute marginal probabilities, numerical integration of equation (1) is needed (Hedeker and Gibbons, 1996), since the success probability depends on random effect U_i . The odds ratios derive from these probabilities.

The model specified in (1) has been estimated for the three countries mentioned above; random effects estimates and intracluster correlations are presented in Table 3. Using the likelihood ratio test, random effects are significantly different from zero and they suggest a strong effect of unobserved heterogeneity, in particular for France. The intracluster correlations measure the quote of total variance explained by the presence of random effects; their high values therefore seem to show that well-being condition tends to persist across time. Regarding the parameter estimation, the coefficients $\boldsymbol{\alpha}$ are not significantly different from zero for France and Spain, so it seems that there is no time effect for these countries; on the contrary, in Italy a significant positive trend is shown.

³ The six typologies are: one-person aged more than 65; other one-person; single-parent; couple without children; couple with children; others

The three estimated models show significant parameters for all the variables considered. To be noted that in Italy, and to a lesser extent in Spain, the most disadvantaged household typology is the older single, while in France it is the single-parent with children. This result seems to indicate a better functioning of social benefits system for retired and older people in France.

Table 3: *Random effects estimates and intracluster correlations by country*

Country	Repeated observations	Random effects (p-value)	Intracluster correlations
Italy	18,831	3.46070 (<.0001)	0.785
France	18,213	4.22894 (<.0001)	0.845
Spain	17,217	3.51256 (<.0001)	0.789

Source: Elaborations from ECHP, wave I-IV

In Table 4 odds ratios for some selected covariates are presented: these odds are referenced to a couple without children, with a low educational level, living in a dwelling, with all income from wages/salaries/social benefits, with no household changes across time. Considering the household changes, it is interesting to see that in all countries and in all times considered, both the birth of a child and the divorce/separation reduce the probability of the households to be in a well-being situation (odds ratios less than 1). As expected, high or medium educational level have the greatest positive impact on well-being situation. This effect seems to be more pronounced for high educational level in France and Spain. At last, households that have all income from self employment live in a better situation, especially in France, where the odds ratio is up to 4.

Table 4: *Odds Ratios by country by year*

Covariates	Italy			France			Spain		
	w. II	w. III	w. IV	w. II	w. III	w. IV	w. II	w. III	w. IV
BIRTH=1	0.444	0.443	0.445	0.309	0.308	0.309	0.615	0.615	0.615
DIVOR=1	0.730	0.728	0.733	0.509	0.509	0.509	n.s.	n.s.	n.s.
HSELF=100%	1.666	1.682	1.647	4.375	4.382	4.372	2.061	2.070	2.076
HEDLEV=medium	2.600	2.620	2.578	2.273	2.276	2.272	3.048	3.064	3.074
HEDLEV=high	4.785	4.828	4.729	9.735	9.755	9.727	9.512	9.579	9.622
ACCOM=1	1.180	1.184	1.175	1.152	1.151	1.152	0.614	0.614	0.614

Source: Elaborations from ECHP, wave I-IV

n.s.: not significant at 95%

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