QUALITY OF LIFE AND SUBJECTIVE WELFARE IN EUROPE: AN ECONOMETRIC ANALYSIS

SOMARRIBA, Noelia* PENA, Bernardo

Abstract: For more than three decades psychologists, sociologists and economists have used an ample rank of statistical and econometric techniques to analyze the answers to the questions of subjective well-being, of the all of these techniques the regression analysis it has been the most important tool.

In this paper, we combine the subjective perceptions and the objective conditions and we make attempt to development a satisfaction model with the purpose of analyzing: the quality of life of the Europeans by means of European Quality of Life Survey and if our results were coherent with the obtained ones by other authors in this type of models.

JEL: I39 – Other; D6 - Welfare Economics

Key words: QUALITY OF LIFE, SUBJECTIVE WELFARE, SATISFACTION MODEL, EUROPEAN UNION, ORDERED PROBIT MODEL

1. Introduccion

The analysis of the quality of life of the individuals is a subject of great importance in the design, application and evaluation of the social and economic policies. In a scene like the European Union, immersed in a deep transformation and with profound cultural, economic and social inequalities, the analysis of the quality of life and the well-being of the inhabitants plays a very important role. It is a tool for reduce the disparities in the living conditions and in the material resources of the inhabitants of the different European countries.

Traditionally, the economists are broached the investigation of concepts like the quality of life and the well-being by means of the use of objective indicators, for example the income. It is in the last thirty years when a great number of authors make analysis of the well-being incorporating components of subjective type, for example the happiness or the satisfaction with life. These authors consider that the well-being not only depends on objective conditions and that are influenced by the appreciations that the own individuals have on their quality of life, making reference to concepts like the subjective welfare.

For more than three decades psychologists, sociologists and economists have used an ample rank of statistical and econometric techniques to analyze the answers to the questions of subjective well-being, of the all of these techniques the regression analysis it has been the most important tool.

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^{*} Noelia Somarriba Arechavala, <u>nsomarri@eco.uva.es</u>, University of Valladolid (Spain), Department of Applied Economy. Jesus Bernardo Pena Trapero <u>bernardo.pena@uah.es</u>, University of Alcala de Henares (Madrid, Spain), Department of Economic Statistic, Economic Structure and International Economic Organization

In this paper, we combine the subjective perceptions and the objective conditions with the purpose of analyzing the quality of life of the Europeans by means of European Quality of Life Survey. This survey will constitute a fundamental instrument in the analysis of the attitudes and beliefs of the European inhabitants.

In our empirical analysis we will use the econometric analysis; this technique allows us to study the determinants of the subjective well-being of the individuals. We make attempt to development a satisfaction model; in this model we will assume that the satisfaction with life is a proxy of the quality of life and the satisfaction depends on objective and subjective variables.

In the first part, we will explain the main characteristics of our source of information, the European Quality of Life Survey.

Secondly, we will make a brief description of the used methodology in the estimation of our econometric model. Afterwards, we will estimate our model and we will comment the main obtained results.

Finally, we will finish our work with a section with the main conclusions that derive from this work and the bibliography employed in its elaboration.

2. European quality of life survey (EQLS) and selection of variables

The surveys constitute, without a doubt some, one of the most valuable and used instruments in the investigation of Social Sciences. In our paper, we will use the European Survey of Quality of Life, for several reasons: it enables an accurate picture of the social situation in the enlarged Community to be drawn and it includes objective and subjective elements.

Some of the most important characteristics of this survey are:

- Year of elaboration: EQLS that was carried out in 2003.
- It covers 28 countries: the EU Members States before May 2004 (EU15); the acceding countries which became Member States in May 2004 (NMS) and the three candidate countries: Bulgaria, Romania and Turkey.
- Units of observation: individuals
- Population: people of 18 year or more and resident adults in the countries object of study [N=26000].
- Type of interview: The interviews are face to face.
- The survey examines a range of issues, such as employment, income, education, housing, family, health, work-life balance, life satisfaction and perceived quality of society.
- The weight procedure of the variables is agreed with diverse factors like: age, sex and region. In addition certain weights are created to adapt the sample size from each country to the proportion of population recognized in groupings of countries of the UE for example EU15, EU25...

In this paper, we are assuming the approach of "having, loving and being" for the selection of the variables of our model. This approach was introduced into quality of life research by Allardt (1975) in the Scandinavian Welfare Survey, and it belongs to the so-called Scandinavian approach of quality of life.

Allardt invented his famous "having, loving and being" to give a more complete description of the human condition:

- "Having" has to do with the material conditions of human development and existence. This dimension is closer to the resource approach and it refers to material living conditions.
- "Loving" is related with the necessity to be related to other people and to form social identities. This dimension is related to the family, friends and neighbours.
- "Being" refers to the necessity of integrating ourselves in the society and living in harmony with Nature.

Many scholars and researchers have used this approach in their investigations because it is simple and intuitive, it reflects a complete vision of the quality of life and it incorporates subjective information.

On the basis of this exposition we propose the following selection of variables:

Table 1 Selection of variables

<u>HAVING</u>	<u>LOVING</u>	<u>BEING</u>		
Satisfaction with the job [SWORK]	• Satisfaction with the	• Activity in a		
Status socio-economic [STATUS]	family [SFAMILY]	charitable organisation		
• Satisfaction with the house	• Trust in people	[VOLUNT]		
[SHOUSE]	[TRUST]	 Absence green and 		
• Problems with the accommodation:	• Satisfaction with	recreative zones		
shortage of space [SPACE]	social life [SSOCLIF]	[GREENZ]		
Satisfaction with one's education	• Number of children	• Air		
[SEDU]	[CHILDREN]	pollution[POLUC]		
Age of ended education [AGEEDU]	Marital Status			
Level of education [LEVEDU]	[MARITALS]			
Satisfaction with the standard of				
living [SSTANDA]				
Income [INCOME]				
Difficulties in making ends meet				
[DIFFIC]				
• Satisfaction with one's health*				
[SHELATH]				
Chronic illness [LIMIT]				
CHARACTERISTICS SOCIO-ECONOMIC: Sex, Age				

In the labour scope we have selected two variables: the labour situation of the individual (Economic Status), and the satisfaction of the individual with its work, this last variable could catch aspects related to the conditions of work.

Another aspect that seems to us interesting is the characteristics of the house or accommodation of the individuals. In order to consider these characteristics we have selected two variables: one problem with the accommodation, the shortage of space and the satisfaction with the accommodation.

In relation to the education, we have selected the following variables: the formal years of education through the age of ended of the educational process, the satisfaction with the owner education and finally, the obtained educative level.

With the objective to catch the economic resources of the individual we have selected the income according to the scale of the OECD, the facility that shows the individual to make ends meet and the satisfaction with its standard from life.

In the dimension health, two variables are proposed: the chronic illness, variable like disease symptom of disease and/or incapacity and the variable satisfaction with the own health of the individual.

Inside the component "loving" we have included five indicators of familiar and social type: the marital status, next to the number of children, also we have incorporated subjective variables as satisfaction with the family, satisfaction with the social life and trust in the people.

Considering that the component "being" talks about the necessities of: integration in the society by the individual and living in harmony with the nature, we have selected two variables in relation to the environment and one variable that reflects if the individual participates in voluntary associations or in charity.

In order to reflect the environment we have selected two variables: the first variable is denominated air pollution, and second is the access to the green or recreational zones. This last variable has relation to the leisure time.

Finally two variables of demographic type have been selected, sex and age, variables that traditionally are included in this type of models.

3. Methodogy

In the satisfaction models usually variables as satisfaction with the life in general and the happiness are identified with the well-known like subjective well-being that we will denote by SWB. In this case we have chosen the answer to the question on satisfaction with the life in general. This variable presents/displays a high correlation with the variable satisfaction and a similar distribution¹.

Psychologists and sociologists have used the answers to the questions on happiness and satisfaction like tool for the analysis of the well-being during decades.

Diverse formulations of these questions of subjective character exist, being one of the most well-known the one of Cantril (1965). In the case of the European Survey of Quality of Life the questions about satisfaction and happiness are formulated of the following form:

Taking all things together on a scale of 1 to 10, how happy would you say you are? Here 1 means you are very unhappy and 10 means you are very happy.

All things considered, how satisfied would you say you are with your life these days? Please tell me on a scale of 1 to 10, where 1 means very dissatisfied and 10 means very satisfied.

The answers to these questions are considered like variables proxy of the quality of life. In literature on the subject, a great methodology debate exists about if the variables type satisfaction must be investigated assuming an ordinal or cardinal approach, existing faced positions to this respect.

Traditionally, the psychologists have worked the satisfaction questions considered the answer of cardinal type, for example the difference between happiness and/or satisfaction between the 4 and the 5 is the same one that between the 8 and the 9. Within this approach it would be possible to mention authors like for example Wilson (1967), Kahneman et al.. (1999). Nevertheless, in economic science it is assumed that the answers type satisfaction are only ordinal comparable.

In the last decade, an ample literature has arisen in which analyses of the subjective well-being are made assuming that the variables type satisfaction are of ordinal type, Oswald (1997), Clark (1997,1999,2000), Ferrer-i-Carbonell and Praag (2002, 2003), among other.

If we assumed that the satisfaction is ordinal comparable the model will adopt a latent form, of the following form:

$$GS^* = X\beta + \varepsilon$$

Where GS^* is the latent variable, GS is the observed variable of satisfaction, X is a set of explanatory variables and \mathcal{E} is the error term, depending on the distribution observed for the error term we will use an ordered logit or probit models. These models that will be solved by the procedures of maximum likehood estimation or logistic regression.

The model probit ordered is the employed by most of the economists, for example: Blanchflower and Oswald (2000), Clark and Oswald (1994), Frey and Stutzer (1999,2000). Descriptions of this type of model can be consulted in Liao (1994) and Maddala (1983).

Given the model, $GS_t^* = \sum_{k=1}^k \beta_k x_k + \varepsilon$ it follows a symmetrical distribution with average zero, like the normal distribution, it is verified:

$$GS_{i} = 1 \text{ if } GS_{i}^{*} \leq \mu_{1} (=0)$$

$$= 2 \text{ if } \mu_{1} < GS_{i}^{*} \leq \mu_{2}$$

$$= 3 \text{ if } \mu_{2} < GS_{i}^{*} \leq \mu_{3},$$

$$.$$

$$.$$

$$.$$

$$= j \text{ if } \mu_{j-1} < GS_{i}^{*}$$

where GS_i is observed, j is the number of ordered categories and where μ_s are unknown parameters that separate the adjacent categories for the estimation of βs .

In general, we have:

$$\operatorname{Prob}\left(GS_{i}=j\right)=F\left(\mu_{j}-\sum_{k=1}^{k}\beta_{k}x_{k}\right)-F\left(\mu_{j-1}-\sum_{k=1}^{k}\beta_{k}x_{k}\right)$$

This last expression gives us the general form of observed probability when GS falls in category j, and μs and βs are estimated by means of ordered probit or logit models.

With the objective that all the probabilities are positive it must satisfy:

$$0 < \mu_2 < \mu_3 < \dots < \mu_{i-1}$$

Ferrer-i-Carbonell and Frijetrs (2002) analyze that to assume cardinality or ordinality doesn't affect the results significantly, in this sense the coefficients change in the same direction and magnitude.

After that we will calculate our estimations under both assumptions and will comment the main results.

4. The determinants of the subjective welfare.

The next table shows the result to apply an ordered probit model to our data, assuming an ordinal approach. The dependent variable in this model is satisfaction with the life. If instead of the variable satisfaction in the life we utilize as variable dependent the variable happiness the results are similar.

With asterisk are indicated those variables that are significant. Also it has been estimated the model by means of square minimums to verify if there are significant differences in the sign and magnitude of the parameters when assuming ordinality or cardinality.

When we estimated the model by square minimums assuming a cardinal approach, one of the variables stops being significant, the variable marital status. And the variable satisfaction with the education see altered its sign. The results of this other model are in the last columns of table 2.

In our ordered probit model we can observe that variables of demographic type as age and sex are significant in our model. In the studies about satisfaction, the differences by sex are habitually small. The women traditionally present lower satisfaction values than the men. However, there are studies and investigation whose results can be contradictory. For example van Praag et al. (2002) find that in the case of Germany the women are more in general satisfied than the men, whereas in other studies, for example Clark and Oswald (1994) obtain that the men are more satisfied than the women.

In our case, we obtain that gender is a significant variable in the explanation of the general satisfaction in the life and that the women are more satisfied than the men, although the degree of correlation between gender and the SWB is reduced.

In relation to the age, traditionally, the majority of the studies say that the increase of the age reduces to the happiness or satisfaction, nevertheless recent studies have raised that is not a universal truth.

Table 2. Ordered probit model and OLS model

VARIABLE		PROBABILITY	_		Coeficient	Probability	7
CONSTANT	1.11158135	0	*	CONSTANT	4.08702339	0	*
SEX	0.03322157	0.0112	*	SEX	0.07987583	0.0021	*
AGE	0.00282332	0	*	AGE	0.00606578	0	*
STATUS	0.19248124	0	*	STATUS	0.39420817	0	*
SJOB	0.00057406	0	*	SWORK	0.00123922	0	*
LIMIT	0.000864934	0.1584		LIMIT	0.000960968	0.4321	
SHEALTH	0.00032202	0	*	SHEALTH	0.0005937	0	*
LEVEDU	0.16122992	0	*	LEVEDU	0.35558242	0	*
SEDU	-0.0000180869	0.9687		SEDU	0.000474053	0.603	
AGEEDU	-0.00019059	0	*	AGEEDU	-0.00043364	0	*
POLUC	.0000395010	0.6214		POLUC	0.000640778	0.6884	
GREENZ	0.00025846	0.0032	*	GREENZ	0.00054223	0.0019	*
INCOME	0.000748281	0	*	INCOME	0.00015461	0	*
DIFFIC	-0.00016692	0.0222	*	DIFFIC	-0.00041161	0.0046	*
SSTANDA	.000429250	0.7265		SSTANDA	0.000454763	0.8526	
SPACE	-0.00016245	0.2895		SPACE	-0.00019246	0.5277	Ī
SHOUSE	0.00014221	0.3285		SHOUSE	0.00030317	0.2978	
MARITALS	0.00013419	0.0824	*	MARITALS	0.00021009	0.1731	
CHILDREN	000996841	0.0862	*	CHILDREN	-0.0002033	0.0779	*
SFAMILY	0.00026419	0.0001	*	SFAMILY	0.00048893	0.0003	*
VOLUNT	0.3001861	0	*	VOLUNT	0.57180627	0	*
TRUST	.000953817	0.0145	*	TRUST	0.00018406	0.0179	*
SSOCLIF	0.00049191	0	*	SSOCLIF	0.00103113	0	*

Note: [Prob[ChiSqd>value]=0];

Many studies find a negative correlation between age and well-being between 40 years 30 and after the satisfaction increases with the age increase, it is knows like the relation of the "U" inverted, for example Clark and Oswald (1994).

In our case, the obtained result must be analyzed with precaution because when we work with transverse data we cannot analyze certain effects that are essential in this type of studies.

The relation between happiness and/or satisfaction of the individual and its relation with the labor aspects have generated an ample literature.

In our estimation the variable that makes reference to labor status of the individual is a significant variable within the model, like the variable satisfaction in the work that presents a positive relation with the general satisfaction in the life.

Habitually, in this type the relation between "to have work" and subjective well-being presents a positive relation, whereas to be unemployed takes a negative character [Clark and Oswald (1994), Frey and Stutzer (1999)].

In our sample we can observe like those individuals that are unemployed show lower levels of satisfaction than those that they are employed.

In relation to the health, we have including the satisfaction of the individual with its health, question of subjective type, so as one variable about the existent of limitations, that it indicates if the individual have some incapacity or disease that does not allow carrying out its daily life.

While the first of the variables are significant, second it is not. This result is coherent with the work of Argyle (1999), in this investigation Argyle obtains that the correlations between subjective well-being and the measures of health are greater with subjective evaluations that with objective evaluations².

In general, the effect of the education in the general satisfaction and/or happiness of the individual is ambiguous in the diverse studies, without a clear relation. Some authors find relations positive as for example Frey and Stutzer (2000) or Praag et al. (2002), whereas in other cases the results show that the relation is negative, for example Clark and Oswald (1994).

In our estimation the satisfaction of the individuals about their education is not significant, but the educative level and the age of ended of their educational process are significant variables, being the coefficient of this last is negative.

In our model, so and as we had commented there are including two variables, that tries to catch the environment of the individual: the air pollution and if the individuals have access to green and recreational zones. The first variable surprising it is not significant, but the second is significant.

The relation between income and subjective well-being is one of the main topics that are discussed in the literature of subjective well-being. While some authors find a reduced correlation and with a positive character, for example Blanchflower and Oswald (2000), Ferrer-i Carbonell and Frijetrs (2002), others find a negative relation for example Clark (2000) or non significant like for example Clark and Oswald (1994).

In the analysis of this type of relations between income and well-being, it is shown that the correlations are higher in the poor countries that in the rich countries, which seems to confirm the idea that increases of the income produce increases of the well-being until certain level and from this point those increases are not substantial.

In our sample, so and as it was to hope, the correlations are not elevated. We can observe it is the correlations take higher values for those countries with a smaller level income, mainly Mediterranean countries and the countries of the East.

The variable income is a significant variable although with a reduced value of the coefficient. While the variable that reflect if the individual has difficulty in making ends meet is significant, not being the variable satisfaction with the standard of life.

The set of variables that had been introduced with the objective to reflect the conditions of accommodation of the individual are not significant.

In the family component all variables are significant in the explanation of the well-being of the individuals, presenting the variable number of children a negative coefficient, quite habitual result in this type of models. Previous studies have established that habitually to have partner or to be married contributes positively to the satisfaction in the life [Argyle (1999), Clark and Oswald (1994)], whereas to have children, normally presents a negative relation with the variable satisfaction in the life [Frey and Stuzter (1999)].

Variables of social type like: trust in others, the satisfaction with the social life and to participate and/or to contribute in voluntary, they are significant and they affect the satisfaction with the life positively, like it was to hope.

With these brief commentaries, we have wanted to reflect those factors, that at sight of our estimation, they affect to the denominated subjective well-being or quality of life in Europe, as well as to analyze if our results were coherent with the obtained ones by other authors in this type of models.

5. Conclusions

The analysis of the quality of life has great importance due to their implications in political, economic and social matter. Although had existed different approaches at the time of approaching to the investigation of this concept, at the present time, it seems to exist certain consensus in that a suitable definition of quality of life must include objective and subjective information.

In relation to the determinants of quality of life at European level, we can draw the following conclusions:

Variables as the age and sex are significant in our model. It is observed a small difference in favor of the women and a positive relation between age and subjective well-being.

In the labor scope, as the labor situation of the individual as their level of labor satisfaction are significant in the explanation of the quality of life, being the relation of both variables with satisfaction positive.

In the component health, from the two variable introduced the variable limitation is not significant, being significant the variable satisfaction with the health. Also it is observed like the correlation between satisfaction in the life is greater for the subjective variables that the objective variables.

In the component education, the satisfaction with the education is not significant; being significant the educative level and the age of ended the educational process.

The variable income, traditionally it has had a paper of great importance in the explanation of the life satisfaction, although now it plays a secondary paper in the presence of variables of subjective character plays. Habitually the rent presents higher correlations with the satisfaction with the life in those less developed countries, losing intensity this relation when the country increases its level of development. This fact is

seen with clarity in Europe where countries of the east and the Mediterranean type show higher levels of correlation.

Of the other two variables introduced in the model, the variable satisfaction with the standard of life is not significant; being significant if the individual has difficulty in making ends meet.

The variables of the component accommodation are not significant in the explanation of the subjective well-being, just like the variable pollution, of environmental type.

In the family area, as much the marital status as having children plays an important role in the explanation of the subjective well-being. Nevertheless both variables affect the well-being of different form. To have partner affects positively, while to have children negatively, habitual result in literature on the subjective well-being.

Variables like access to recreational and green zones, social satisfaction, volunteer and trust in the others, variables of social type that would be fitted in loving and the being component are significant in the explanation of the life satisfaction.

Notes

- (1) The correlation coefficient between the variables satisfaction with the life and happiness is of r = 0.65
- (2) Coefficients of correlation between satisfaction in general and the variables LIMIT and HEALTH, result that goes in the direction of the finding of Argyle.

	LIMIT	SHEALTH
SLIFE	0.15	0.38

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ANNEX

Variable Description

VARIABLE		NAME	description
SEX		SEX	1 men; 2 woman
AGE		AGE	[18-99]
STATUS	SOCIO-	STATUS	1. employeed
ECONOMIC			2. unemployed and other

JOB SATISFACTION *	SJOB	scale [0-9]
CHRONIC ILLNESS	LIMIT	do you have any long-standing illness of
		disability that limits your activities in any
		way? 1=yes; 2=no
HEALTH	SHEALTH	scale [0-9]
SATISFACTION*	SHEHEIH	seare [0 7]
AGE OF ENDED	AGEEDU	numeric
EDUCATION	MOLLED	nameric
LEVEL OF EDUCATION	LEVEDU	0. none and 3.university
EDUCATION	SEDU	scale [0-9]
SATISFACTION*	BLDC	scare [0 7]
AIR POLLUTION	POLUC	please think about the area where you live
AIRTOLLOTTON	TOLOC	now. do you have reasons or no reason (4)
		at all to complain about each of the
		following problems? air pollution
ABSENCE GREEN AND	GREENZ	please think about the area where you live
RECREATIVE ZONES	GREENZ	now. do you have reasons or no reason (4)
RECREATIVE ZONES		at all to complain about each of the
		following problems? absence green and recreative zones
INCOME	INICOME	
INCOME DIFFICULTIES IN	INCOME DIFFIC	household's total net income
	DIFFIC	1. very easily a 6 great difficulty. scale
MAKING ENDS MEET	CCTANDA	1 . [0, 0]
SATISFACTION WITH	SSTANDA	scale [0-9]
THE STANDAR OF		
LIVING*	GD + GE	1 2
PROBLEMS WITH THE	SPACE	1=yes; 2= no
ACCOMMODATION:		
SHORTAGE OF SPACE	GHOHGE	1 10 01
SATISFACTION WITH	SHOUSE	scale [0-9]
THE HOUSE*	CHIL DDEN	
NUMBER OF CHILDREN	CHILDREN	numeric
MARITAL STATUS. ARE	MARITALS	1=yes; 2= no
YOU MARRIED OF		
LIVING WITH PARTNER	GEAR STATE	1.50.03
SATISFACTION WITH	SFAMILIY	scale [0-9]
THE FAMILY*	11011777	1 2
ACTIVITY IN A	VOLUNT:	1=yes; 2= no
CHARITABLE		
ORGANISATION		
TRUST IN PEOPLE	TRUST	scale [0-9]
SOCIAL LIFE	SSOCLIF	scale [0-9]
SATISFACTION*		

With asterisk are indicated those variables that area a scale of 0 to 9, where 0 means you are very dissatisfied and 9 means you are very satisfied. The variable trust in people is a scale of 0 to 9, where 0 means you can't be too careful and 9 means that most people can be trusted. And finally, the variable happiness is a scale of 0 to 9. Here 0 means you are very unhappy and 9 means you are very happy.

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