

**ON THE IMPACT OF THE EUROPEAN UNION IN CITIZENS'  
PERCEPTION OF QUALITY OF LIFE**

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Working Paper no. 8/2017

MAY 2017

**u n i m i** UNIVERSITÀ DEGLI STUDI DI MILANO



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# On the impact of the European Union in citizens' perception of quality of life

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May 4, 2017

## Abstract

In the 2000s many important events have affected the EU political and economic stage: the adoption of the Euro currency, the enlargement occurred in three waves, the big economic crisis in 2008 and the Brexit referendum in 2016, just to cite a few. It is common opinion that these shocks have contributed to deeply change the average citizens' attitude towards the EU and have had a strong impact on citizens' quality of life. The present work aims at analyzing the relationship between the EU and EU citizens' perceived quality of life. This analysis is carried out in two-steps via firstly a nonlinear principal component analysis to extract underlying components of perceived quality of life related to the EU, and secondly using multilevel modeling to take into account country effects influencing the overall quality of life. Specific attention is given to national differences and the connection with the general citizens' perception of quality of life.

**Keywords**– Quality of Life, European Union, Nonlinear Principal Component Analysis, Multilevel Models, Synthetic Indicators

**JEL Classification**– I31, O52, C38

## 1 Introduction and Motivation

In the last fifteen years many events have changed the nature of the the European Union: the initial enthusiasm leading to the adoption of the Euro currency in 2002, the big enlargement in 2004 (10 countries entering the EU) and other two enlargements in 2007 (with Romania and Bulgaria) and 2013 (with Croatia) was followed by a big economic crisis in 2008 and the *Brexit* referendum in 2016. It is common opinion that these shocks have contributed to profoundly change for the worst the average opinion of citizens about the EU, usually taken as the 'scapegoat' for all the latest social and political problems, and something that has had a strong impact on citizens' quality of life, in a way or another.

Recent studies have addressed this issue. Most of them refer to actions or decisions of the EU concerning some aspects of the quality of life. They span from the analysis of specific dimensions of this concept, to overall analyses on the policies to be adopted to improve it, to statistical indicators to measure

it, but generally few references to citizens' perception of the EU's impact on the quality of their lives are given. In our view it is also interesting to know how EU citizens regard the EU as an entity affecting their life and if this perception is positive or negative, and what are the causes determining positive or negative attitudes. In the sociological literature, two factors among others can promote citizens' attitudes about the EU: (i) an 'instrumental' or 'utilitarian' factor stating that EU citizens form attitudes toward the EU that are consistent with their personal economic interests and job status [15]; (ii) a 'non-economic culturalistic' factor stating that personal political resources (*cognitive mobilization*) are key determinants of abstract concepts such as the opinion about the European integration. Individuals having a higher degree of cultural resources and political ability should have a more positive opinion than citizens with a lower degree of cognitive mobilization; in this sense, for example, the more educated groups might be also more aware of European-level politics [20] and have a more positive feeling.

Based on this reasoning, Manzi et al. [24] recently discussed the hidden attachment of EU citizens to EU institutions, arguing that even if on the surface people could appear very unsatisfied with the EU, in reality they still are 'truly European' and continue to trust the EU. The authors arrive to this conclusion by detecting some of the 'components' forming the attachment to the EU. For their analysis the authors used 2013 EB survey data and performed a two-step analysis: the first step was aimed at detecting hidden individual traits of attachment/satisfaction with the EU, whereas the second step took into consideration individual and contextual variables, which can affect the feeling about the EU.

Following their approach in this paper we aim to address the problem of analyzing the quality of life in a perceptive view, using data from the EB survey series, and taking into consideration variables in it focusing on the relationship between the EU and the quality of life.

The paper is organized as follows. In Section 2 a reference framework is given. In Section 3 data and methodology used are described. Results are presented in Section 4, whereas Section 5 concludes the paper.

## 2 Reference framework

### 2.1 Sociological framework

The relationship between citizens and EU has been addressed in the literature from different theoretical perspectives, regardless of the specific issue here in question (the feeling of belonging, opinions on the EU policies etc.). Schematically we can divide the different approaches in two models: the economic-utilitarian models and non-economic models.

The utilitarian-economic or instrumental theory interprets the pro-European sentiments of public opinion on the basis of a rational calculation that the citizens would operate evaluating European integration economic consequences for both themselves and the social groups to which they belong, their nation included [15]. The results of the studies conducted on the basis of this approach show how, for example, citizens who benefit directly from EU aid gets a high support for Europe. Other authors have also considered aggregated economic factors, considering the constraints arising from the performance of the national economy: the orientation towards European integration is high where national economic conditions (inflation, unemployment, GNP growth,

etc.) are favorable [9].

On the other hand, the theory of cognitive mobilization considers non-economic factors such as the increase in the level of education among citizens or the information exposure. Consequently, a greater knowledge of Europe and its mechanisms would favor pro-European feelings [20]. More recently, the identity paradigm, where the national and sub-national identities sometimes takes on the role of key predictor of public opinion orientations toward the EU, has aroused increasing attention [6] [19]. Other authors have focused on citizens' political motivation as a cognitive shortcut and an indicator of trust in the national system. In particular, institutional trust would have a positive impact on pro-European citizens' attitudes because national institutions are used as cognitive shortcuts: those who trust their political system is likely to develop feelings of closeness, if not of trust towards Europe [1]. However, the sign of the relationship can also be negative, i.e. who shows feelings of distrust in the national political system can develop strong pro-European sentiments because Europe is seen as a possible rescue [27]. Finally, for some authors also the quality of governance would intervene in the relationship between trust in national institutions and Europeanism [4]. In politics that work better, the relationship is negative because the national system would act as a filter.

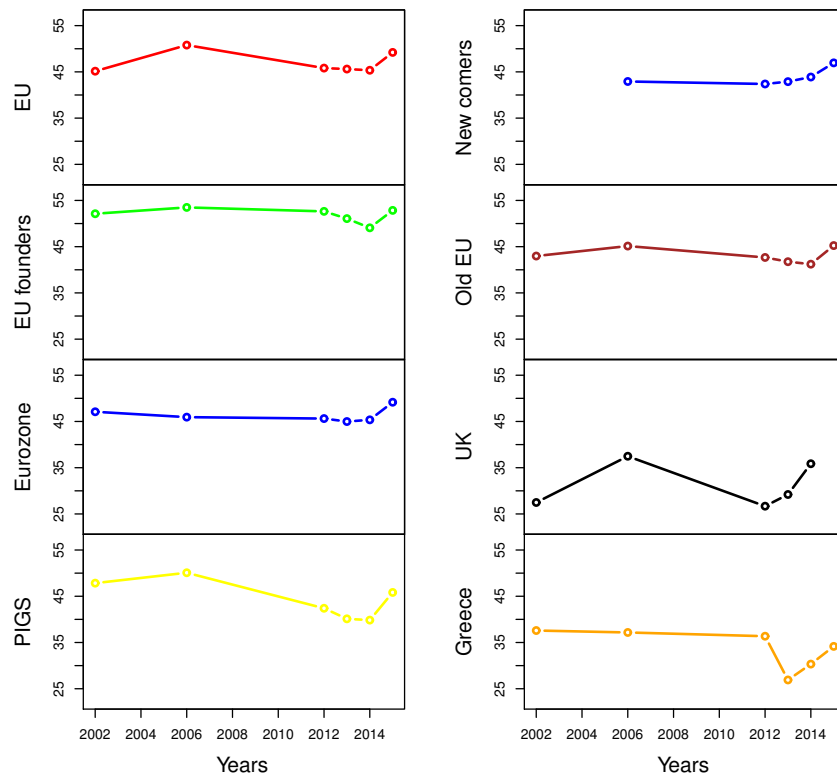
Trust in the EU institutions is strictly related to the feeling about the influence of these institutions on the quality of life perceived by citizens. How to explain citizens' tendencies in Europe, in particular on policies for the quality of life? For a long time in the theoretical and empirical literature the *permissive consensus* model has prevailed [23]. The support from EU member states' citizens for the European integration project tended to be higher in the very first phase of the European Community and has remained stable all over the next few years because the topic "Europe" was politically insignificant [20] and poorly known at that time, and its debate and related decisions were delegated to the political elites. The consequence of this was that the rather large majority of the Europeans simply had no opinions about the actions of their governments on the issue "Europe" or uncritically supported their action when it came to promoting integration [18]. Over time things are slightly changed: disputes arising with the enlargement of the EU borders and the heavy financial and economic crisis that has hit Europe in 2008 have led to new interpretations on the actual tendencies in public opinion with regard to the EU.

## 2.2 The EB survey and the European citizens' opinion

Since 1974, the Eurobarometer (EB) survey series (subdivided in "Standard", "Special" and "Flash" series) is one of the main tools the European Union (EU) institutions use to monitor the opinion of the European citizens on the EU. An interactive graphical tool based on the EB surveys has recently been implemented by the European Commission in order to give policy makers a quick overview of the public opinion on the EU and its institutions [8]. Figure 1 illustrates the EU citizens' attachment rate to the EU for all the EU countries and some subgroups of EU countries along more than a decade, from 2002 to 2015.

This attachment rate is based on the average percentage of positive answers ('Very or fairly attached to the EU') to the question 'Please tell me how attached you feel to the European Union' contained in the Standard EB questionnaire. It shows a peak in 2006 before the economic crisis (for the EU as a

Figure 1: Average percentages of positive answers ('Very or fairly attached to the EU') with respect to attachment to the EU - Various EU country groups - 2002-2015 (Source: EB and 'http://ec.europa.eu')



whole, and specifically for the United Kingdom), an almost constant decrease until 2013-2014 (especially for the so-called PIGS countries), and some signs of recovery in the last years. The EU countries which formed the European single market in 1957 (the 'EU founders' - Belgium, France, Germany, Italy, Luxembourg and the Netherlands) have always had higher approval rates than the other EU countries, whereas the UK has always had lower rates than the other countries. Note that the 'new comers' (countries joining the EU from 2004 onwards) and countries in the 'old EU' (countries in the EU before 2004) have had similar rates during the period. Contrary to what one can expect, Greeks' attachment rate has dropped significantly in 2013 (and not immediately after the 2008 crisis) but has experienced a speedy recovery in 2014 and 2015. In any case, Figure 1 reveals a more complex scenario for the EU attachment.

### 2.3 Quality of life within the EU

Much has been written about the quality of life in the EU. For example, Wiziak-Bialowolska [29] leads an in-depth analysis on the quality of life of Europeans living in cities using data from Flash EB 466, or [12], which is an extensive report on fact and views about the quality of life in the EU. Goswami et al. [17] present an overview of the current state-of-art of children and youth well-being in the EU, highlighting the increasing need for a comparative longitudinal survey. Ivaldi et al. [21] look for a multidimensional well-being

index for EU member states, revealing six blocks of member states, from the highest rated group formed by Denmark, Sweden, Finland and the Netherlands to the lowest rated group, formed by Greece, Romania and Bulgaria. Child poverty in the EU has been extensively analyzed by Chzhen et al. [7] for the case of Finland, Romania and the United Kingdom. The EC has published many reports on quality of life (see, for example, [10]).

As for data sources, Eurostat and EB databases are the most used data sources for the construction of synthetic indicators of wellness [3]. Another important source to evaluate the quality of life in EU countries is the European quality of life survey, conducted by Eurofound every 4-5 years since 2003. OECD, UN and WHO database are also frequently considered.

There is also another stream of literature regarding EU decisions that might have directly affected the quality of life of European citizens. Since 2008 when the economic crisis spread in the eurozone so-called PIIGS countries (Portugal, Italy, Ireland, Greece and Spain), the austerity measures adopted by the European Commission (EC), the European Central Bank (EBC) and the International Monetary Fund (IMF), i.e., the so-called "Troika", have deeply affected the everyday life of citizens of these countries, bringing them to a period of increasing social suffering, insecurity, poverty and deprivation [22]. In a systematic review, stemming from 2009 to 2013, Simou and Koutsogeorgou [28] have studied the effect of the economic crisis on the Greek health system focusing on the deterioration of public health with increasing rates of mental health, suicides and epidemics, which have followed the introduction of measures imposed by the Troika focused only on the reduction of public health expenditure. Betti [5], using the Eurofound survey, and applying a fuzzy set approach in a longitudinal setting, found that there was no significant change in the overall quality of life index in EU between 2007 and 2012. Improvements in the indicator resulted also for Bulgaria, Croatia and Germany, whereas Malta and Greece registered the higher decrease.

However, what we want to analyze in this work is not the effect of actions and decisions taken by the European Union on certain aspects of the quality of life, but rather how those actions or decisions are perceived by European citizens as factors influencing or determining the quality of their lives. In other words, we do not focus on specific actions but more in general we aim at stating if the EU plays a positive or negative role in the quality of life as perceived by European citizens, and asses it. Moreover, we are interested in detecting the possible determinants of this evaluation.

## 3 Data and statistical tools

### 3.1 Data used for the analysis, problems and data setting

Data for this analysis are taken from the Standard EB survey 80.1 [11]. EB is among the most used data source for analyses on European public opinion. However, even if the EC outlines that "the fundamental structure of the survey aims at performing it with repetition at regular intervals of certain questions (i) always worded in the same way, (ii) using the same reliable methodology and (iii) in all the European Union Member States", the aforementioned principles about wording, same methodology and survey areas have been sometimes violated, as noted by Nissen [26]. We also have met in our analysis some drawbacks like, for example: a huge percentage of "don't know"

Table 1: Variables selected for the analysis: EU affecting citizens' life

Question code	Question wording	Totally agree	Tend to agree	Tend to disagree	Totally disagree
QA13.1	The EU is creating the conditions for more jobs in Europe	1	2	3	4
QA13.2	The EU is responsible for austerity in Europe	1	2	3	4
QA13.3	The EU makes doing business easier in Europe	1	2	3	4
QA13.4	The EU generates too much red tape	1	2	3	4
QA13.5	The EU will emerge fairer from the crisis	1	2	3	4
QA13.6	The EU is making the financial sector pay its fair share	1	2	3	4
QA13.7	The EU makes the cost of living cheaper in Europe	1	2	3	4
QA13.8	The EU makes the quality of life better in Europe	1	2	3	4
QA13.9	The EU helps tackle global threats and challenges	1	2	3	4
QA13.10	The EU helps protect its citizens	1	2	3	4
QA13.11	The EU needs a clearer message	1	2	3	4

responses, hinting at some weakness of the questionnaire, a huge percentage of missing values, especially for some countries, and a lack of 'scale coherence' for certain questions. Nevertheless, these data are relevant because extended to the European countries, and, after an accurate cleaning work, are a good basis for the analysis.

Given the object of our study and the available questions in the questionnaire, the analysis was conducted considering questions forming the QA13 section under the title "Please tell me to what extent you agree or disagree with each of the following statements" on the impact of the EU in the everyday citizen's life (see Table 1).

In searching the determinants of the improvement/worsening of the quality of life, these questions can be considered as proxies of it determined by citizens' sentiment of belonging to the EU. They are not observed variables but recorded through their perceptions. We have then selected a second group of variables, yet of perception, related to individual feelings of respondents, then used as "control" or "ecological" variables in the model with which we will try to account for the improvement/worsening of the quality of life due to the EU, as perceived by the respondents. Questions selected were the QA1 question "On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?" and the QA3a section under the title "What are your expectations for the next twelve months: will the next twelve months be better, worse or the same, when it comes to...?" regarding personal expectations about the life in general and the economic and labour situation (see Table 2).

With reference to the former set of variables (those listed in Table 1), it can be noted that item QA13.8 might be considered in some ways a synthesis of the remaining items. The same can be said about item QA1 with reference to the remaining variables listed in Table 2. Recently an interesting work [2] has been published on a survey experiment about the effects on evaluation of a perceived quality of life generated by the awareness of fundamental domains of this latent variable ("unpacking effect"): a raising awareness about the domains of this variable seems to increase the reliability and validity of the self-reported evaluation. For that assessment of the quality of life, we hence adopted all the questions rather than only synthetic variables. Moreover, the latent variables so obtained, being continuous rather than discrete variables,

Table 2: Variables selected for the analysis: expectations from the EU

Question code	Question wording	Very satisfied	Fairly satisfied	Not very satisfied	Not at all satisfied
QA1	On the whole are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?	1	2	3	4
Question code	Question wording	Better	Worse	Same	
QA3a.1	Your life in general	1	2	3	
QA3a.2	The economic situation in our country	1	2	3	
QA3a.3	The financial situation of your household	1	2	3	
QA3a.4	The employment situation in our country	1	2	3	
QA3a.5	Your personal job situation	1	2	3	
QA3a.6	The economic situation in the EU	1	2	3	

allow us for a more detailed individual recording.

Before proceeding with the analysis, the following actions on cleansing the data set have been done:

- Data were selected for EU member countries only<sup>1</sup>.
- Records containing at least one 'Don't know' responses among the variables selected for the analysis were dropped.
- Records containing at least one missing value among the variables selected for the analysis were dropped.
- Some of the selected variables were recoded to avoid the 'scale coherence' problem outlined before.

After this data cleansing a final sample of 15,281 records resulted.

### 3.2 Variables and methods used for the analysis

As said, this analysis is aimed at assessing the improvement/worsening of the quality of life due to the EU as perceived by the European citizens. According to our viewpoint, this perception is based not only on how they think the EU actions affect both their quality of life and that of the social groups they belong to, but on their general attitude toward the life as well. Besides, some individual factors such as, for example, the job status and contextual factors such as the countries they belong to can affect their perception.

For this reason, our statistical analysis is based on two steps (see Ferrari et al. 2011). The first step refers to the search of hidden variables which are suitable to describe citizens' perception of the EU influence on the quality of their life or express their individual and/or contextual expectations. The second one looks at finding a statistical model to detect which variables can be suitable to better explain the variability of their perception. At the first step, for constructing the latent variables from responses to questions, we resort to Nonlinear Principal Component Analysis (NPCA).

As known, NPCA belongs to the so-called "Gifi system of descriptive multivariate analysis" ([16]; [25]). Being a part of the more general homogeneity

<sup>1</sup>Data for non-member states are also present in EB datasets. These states are those which have already opened formal membership negotiations like Turkey or are potential membership candidates like the Republic of Macedonia, or are in the European Economic Area (EAA) like Norway.



analysis, it aims at reducing dimensionality of a set of variables without loss of information in terms of variability explained. In this sense it works like the classical Principal Component Analysis (PCA), but unlike PCA, it tries to find nonlinear patterns in the data, assuming that Likert-scaled categorical answers in a questionnaire are intrinsically not equidistant, and consequently the detected relationships are not linear. An output of the NPCA procedure is therefore the *quantifications* of the categories of the original variables, i.e. the conversion of categorical into numerical values, to get optimal scaling of the data. This transformation is performed in such a way that as much as possible of the variance in the quantified variables is accounted for. NPCA is therefore useful when nonlinearity between variables and among the Likert scale categories is assumed.

More formally, when  $m$  ordinal variables are observed on  $n$  objects, NPCA works as follows. Let  $\mathbf{c}_j$  be an  $k_j$ -dimensional vector containing the ordinal categories of variable  $j$ ,  $j = 1, \dots, m$ ,  $\mathbf{H}$  be an  $n \times m$  matrix with the observations of the  $m$  variables on the  $n$  objects (its  $j$ -th column is denoted by  $\mathbf{h}_j$ ),  $\mathbf{G}_j$  an  $n \times k_j$  indicator matrix such that  $\mathbf{G}_j \mathbf{c}_j = \mathbf{h}_j$ . NPCA aims at finding the matrix  $\mathbf{X}$  minimizing the following loss function:

$$\begin{aligned} \sigma^2(\mathbf{X}; \mathbf{q}_1, \mathbf{q}_2, \dots, \mathbf{q}_m; \beta_1, \beta_2, \dots, \beta_m) \\ = \frac{1}{m} \sum_{j=1}^m \text{tr} [(\mathbf{X} - \mathbf{G}_j \mathbf{q}_j \beta_j)^T (\mathbf{x} - \mathbf{G}_j \mathbf{q}_j \beta_j)], \end{aligned} \quad (1)$$

where  $\mathbf{q}_j$  is the  $k_j$ -dimensional vector that contains optimal category quantifications and  $\beta_j$  is a vector of component loadings for the variable  $j$ . In order to avoid trivial solutions, the loss function (1) is subject to the following restrictions:

$$\mathbf{X}^T \mathbf{X} = n\mathbf{I},$$

and

$$\mathbf{u}_n^T \mathbf{X} = n\mathbf{0},$$

where  $\mathbf{u}_n^T$  is an  $n$ -dimensional vector of ones and  $\mathbf{I}$  is the identity matrix. The optimal solution is derived by means of an iterative algorithm called *Alternating Least Squares* [16].

As in PCA, component loadings express the relationship between the original variables and the new components and are used to interpret them, whereas the quantifications are the quantitative values to be attributed to the original categories of the variables. We use the NPCA scores to form the response variable and some predictors in the multilevel model as specified below.

An NPCA on the variables presented in Table 1 is performed to construct the variable ("EU influence on life") which is then used as response in the multilevel model in the second step. A three-component NPCA is used to construct three of the predictors of the multilevel model by considering the variables in Table 2. In detail, by looking at the component loadings of each of the three components, we have inferred that QA1 is the only original variable strongly correlated with the new first component, and therefore we identify it as the predictor "Life satisfaction", questions QA3a.1, QA3a.3 and QA3a.5 are strongly correlated with the second component, and therefore this is identified as the predictor "Personal expectations", and question QA3a.2, QA3a.4 and QA3a.6 are strongly correlated with the third component, identified as the predictor "Collective expectations". Country NPCA average scores are also used to set the country indicators on the EU impact on quality of life presented in Table 4.

The second step of our analysis is focused on detecting individual and contextual variables which affect the perception of quality and choosing a suitable model. A natural choice for the model in this framework is multilevel analysis (MA). Multilevel models are ideal to model nested or hierarchical data, i.e. observations at a first level (in our case respondents in the EB survey) are clustered in an second-level entity (in our case respondents' countries).

Basic multilevel analysis is based on two simple models: the random-intercept model and the random-slopes model. The most basic multilevel model allows for predicting the response variable from only an intercept that varies randomly for each group (in our case, each country). Therefore the model will be the following [14]:

$$y_{ij} = \beta_{0j} + \epsilon_{ij}, \quad (2)$$

where  $y_{ij}$  is the response variable value for individual observation  $i$  in group  $j$ ,  $\beta_{0j}$  is the intercept for group  $j$  with:

$$\beta_{0j} = \gamma_{00} + u_{0j}, \quad (3)$$

where  $\gamma_{00}$  is the second-level intercept, and  $\epsilon_{ij}$  and  $u_{0j}$  are respectively the first and second level error terms.

By substituting  $\beta_{0j}$  in (2) with its expression in (3) we obtain the *null multilevel model*:

$$y_{ij} = \gamma_{00} + u_{0j} + \epsilon_{ij}.$$

We will refer to this model as  $M0$  later in this paper. The importance of the null multilevel model lies in that it provides information about how variation in the response variable is partitioned between the within group variance (i.e. among individual observations) and the between-group variance (i.e. between groups of individual observations).

We can also add a new predictor at the individual level, obtaining the following model, called the *random-intercept model*:

$$y_{ij} = \gamma_{00} + u_{0j} + \gamma_{10}x_{ij} + \epsilon_{ij}. \quad (4)$$

Of course, this form can be extended by adding more than one predictor. We will refer model (4) as  $M1$  and  $M2$  later in this paper, allowing for different sets of predictors,  $M1$  presenting only socioeconomic individual predictors, and  $M2$  presenting socioeconomic and NPCA-constructed individual predictors. Stemming on model (4) we can account for a second-level predictor  $z_j$  and for its interaction with a first level predictor  $x_{ij}$ , forming the full structure of a two-level model with random intercept and first and second-level predictors. We will refer to this type of model as  $M3$  and  $M3'$  later in this paper.

Moreover, we can allow the coefficient of  $x_{ij}$  to be  $\gamma_{10} + u_{1j}$ , where  $\gamma_{10}$  is the average relationship of  $x$  with  $y$  across cluster, and  $u_{1j}$  is the cluster-specific variation of the relationship between the two variables. This model, called the *random-slopes model*, is:

$$y_{ij} = \gamma_{00} + u_{0j} + \gamma_{10}x_{ij} + u_{1j}x_{ij} + \epsilon_{ij}. \quad (5)$$

Finally, stemming on model (5) we can account for a second-level predictor  $z_j$  and for its interaction with a first level predictor  $x_{ij}$ , forming the full structure of a two-level model with random intercept and slopes and first and second-level predictors:

$$y_{ij} = \gamma_{00} + \gamma_{10}x_{ij} + \gamma_{01}z_j + \gamma_{1001}x_{ij}z_j + u_{0j} + u_{1j}x_{ij} + \epsilon_{ij}. \quad (6)$$

In addition to the choice of the model, in the second step we need to select the individual and contextual predictors. The choice of the predictors to be inserted in the models was performed first independently by each author, then after a thorough discussion, and finally through technical selection, using stepwise techniques. Individual predictors are those obtained in the NPCA procedure described above, i.e., NPCA-constructed individual predictors:

- Personal expectations about quality of life;
- Life satisfaction;
- Collective expectations about quality of life;

and socioeconomic predictors taken from the set of the original questions in the EB questionnaire:

- Age education;
- Age: 30-54 years (reference: Age: 15-29 years);
- Age: 55 years or more (reference: Age: 15-29 years);
- Job: medium status (reference: Job: low status);
- Job: high status (reference: Job: low status);
- Community: big town (reference: rural area).

Finally, contextual predictors (chosen after an accurate predictor selection analysis) refer to some 2013 country socioeconomic characteristics. They are: Euroscepticism (measured as the percentage of seats gained by eurosceptic parties at the 2013 EU elections), pro-capita GDP, unemployment rate, percentage of at-risk-of-poverty people, percentage of at-risk-of-poverty workers, percentage of early leavers from the education system and deprivation rate. We did not account for an interaction term between any first and any second level predictor.

## 4 Results

### 4.1 Country synthetic indicator for the EU impact on quality of life

We consider the NPCA in the form expressed by (1) to extract a one-dimensional synthetic indicator for the perception of the impact of the EU on the quality of life of European citizens, using the variables listed in Table 1 [13]. We call this indicator EUIMPACT. NPCA is performed on all the 11 variables listed in Table 1, and on the same variables but without question QA13.8. The variance accounted for by the extracted component is about 40%, whereas Cronbach's  $\alpha$  is 0.831. Component loadings of the NPCA are showed in Table 3 (a) and (b). It can be noted that in (a) question QA13.8 has the highest loading value. This confirms that the constructed latent variable represents the impact of the EU on the quality of life; so, for the motivation expressed in Section 3.1, we drop it and use the remaining variables in an NPCA with only ten variables. Moreover, it can be noted that loadings concerning variables in Table 3 (a) and (b) are very close, and therefore from now on we will consider only EUIMPACT formed by an NPCA with ten variables.

The only variable having an opposite sign with respect to the rest of the variables is question (QA13.4) regarding 'too much red tape' generated by the EU, which coherently has an opposite sign with respect to other variables.

Table 3: NPCA analysis: variables selected and component loadings

Variable	Loadings (11 vars.) (a)	Loadings (10 vars.) (b)
The EU is creating the conditions for more jobs in Europe (QA13.1)	0.743	0.746
The EU is responsible for austerity in Europe (QA13.2)	0.352	0.379
The EU makes doing business easier in Europe (QA13.3)	0.667	0.676
The EU generates too much red tape (QA13.4)	-0.354	-0.361
The EU will emerge fairer from the crisis (QA13.5)	0.714	0.721
The EU is making the financial sector pay its fair share (QA13.6)	0.640	0.654
The EU makes the cost of living cheaper in Europe (QA13.7)	0.678	0.663
The EU makes the quality of life better in Europe (QA13.8)	0.782	-
The EU helps tackle global threats and challenges (QA13.9)	0.747	0.748
The EU helps protect its citizens (QA13.10)	0.774	0.772
The EU needs a clearer message (QA13.11)	0.332	0.352

The highest values are for those for questions QA13.10 ('The EU helps protect its citizens'), QA13.5 ('The EU will emerge fairer from the crisis') and QA13.1 ('The EU is creating the conditions for more jobs in Europe'): this might mean that the dimensions 'security situation', 'economic situation' and 'job situations' are the most relevant for the feelings of EU citizens on the EU impact, and that the EU is seen as an entity which should play a 'protective role' towards its citizens. Table 4 reports the country average scores for EUIMPACT with all the 11 variables listed in Table 1 (column a) and with the same variables but without question QA13.8 (column b). As it can be seen, differences are negligible and the overall ranking is the same, apart from the ranks of Portugal and Slovakia. According to the values of the component loadings, positive values of the country average scores indicate that citizens are feeling that the EU's impact is negative on the quality of life, whereas negative values indicate a positive effect. Therefore, increasing values of the indicator correspond to a perceived increasingly negative EU's impact on the quality of life. In the table body the horizontal line separates countries with a positive attitude toward the EU from countries with a negative attitude. A strong negative attitude is reported for Mediterranean countries and the United Kingdom, a weak negative attitude for central European countries (Slovenia, Austria, Germany) and for Portugal and the Netherlands. A strong positive attitude is reported for newer EU member countries and for Scandinavian countries, whereas a weak positive attitude is reported for central European countries (Luxembourg and Hungary) and for Belgium, Ireland and Slovakia. Note that Greece is the strongest county in asserting that the EU is negatively affecting the quality of life, whereas Poland is on the opposite, i.e. is the strongest country in asserting that the EU is positively affecting the quality of life. All in all the 'protective role' of the EU is stronger for the newcomers. There is also a polarization North-Eastern countries versus South-Western countries with some exceptions. This can be seen with a visual representation of the EU countries using colors in grayscale values proportional to the values of the synthetic indicator (Figure 2): the grayscale has a clear increasing pattern from North-Eastern to South-Western EU countries .

We also use this indicator as the response variable in the multilevel model whose results are presented in the next subsection, under the name EUIMPACT.

Table 4: Country average scores of the EU impact on quality of life (EUIMPACT)

Country	Average EUIMPACT (11 var.) (a)	Average EUIMPACT (10 var.) (b)
Poland	-0.5010	-0.5017
Malta	-0.4476	-0.4440
Lithuania	-0.4267	-0.4333
Romania	-0.2967	-0.3137
Bulgaria	-0.2686	-0.2686
Estonia	-0.2316	-0.2299
Croatia	-0.2290	-0.2235
Finland	-0.1996	-0.2029
Denmark	-0.1905	-0.1992
Sweden	-0.1713	-0.1704
Latvia	-0.1345	-0.1345
Czech Republic	-0.1116	-0.0985
Belgium	-0.1094	-0.1087
Luxembourg	-0.0996	-0.1030
Hungary	-0.0709	-0.0768
Ireland	-0.0331	-0.0311
Slovakia	-0.0132	0.0146
Portugal	0.0144	0.0100
Germany	0.0230	0.0230
Netherlands	0.0374	0.0396
Austria	0.2218	0.2306
Slovenia	0.2990	0.3022
United Kingdom	0.3140	0.3101
Spain	0.3830	0.3890
France	0.4030	0.4056
Italy	0.4399	0.4466
Cyprus	0.5362	0.5362
Greece	0.5384	0.5401

## 4.2 ML model

The results of the considered models, with the chosen response and predictors outlined in section 3.2, are presented in Table 5.

Five models have been chosen to give an idea of the improvement of the two-step analysis we present here, each of them with a different subset of predictors.

- Model  $M0$ : it is the null model with an intercept only (results not presented in Table 5);
- Model  $M1$ : it presents only socioeconomic individual predictors;
- Model  $M2$ : it presents socioeconomic and NPCA-constructed individual predictors;
- Model  $M3$ : it is the complete model and presents individual and contextual predictors.
- Model  $M3'$ : it is model  $M3$  with only contextual significant predictors.

Second-level residuals are presented in Figure 3.

The individual socioeconomic predictors are all clearly significant in all the three models with predictors except for "Job: high status" in model  $M1$  and "Community: small-medium town" (in models  $M1$ ,  $M2$  and  $M3-M3'$ ). The "Age education" coefficient has always a negative sign indicating a positive effect of education on EUIMPACT. Similarly, the coefficients of "Job: medium status" and "Job: high status" have always negative signs indicating again a positive effect on EUIMPACT with respect to the reference category "Job: low status". Negative effects are those coming from age and from being part of a community living in urban rather than in rural areas. With regard to perception predictors, it can be noted the dichotomy between personal and collective expectations: as far as personal expectations arise EUIMPACT increases, whereas as far as collective expectations arise EUIMPACT decreases, revealing different personal and collective psychologic attitudes on the evaluation of the impact of the EU on the quality of life. The only significant contextual predictors are related to the job market: both the unemployment

Figure 2: Representation of EU countries colored according to greyscale color values proportional to values of the synthetic indicator



rate and the rate of at-risk-of-poverty workers have positive regression coefficients revealing that citizens in countries with high unemployment and risk of poverty rates believe that the EU has a negative impact on the quality of life.

However, the multilevel analysis reveal some unexpected results in terms of comparisons between countries. In Figure 3 second level residuals and their confidence intervals are shown for Model  $M0$ - $M3$ . While residuals for model  $M0$  show a clear pattern from countries hit by the crisis to North-Eastern European countries, residuals for model  $M3$ , which takes into account contextual variability, show a more indefinite patterns with closer confidence intervals. This is enforced in Figure 4 where in plot (b) a closer greyscale is shown among countries.

Only four countries do not cross the 0 line: the UK, Slovenia and Austria having negative evaluation, and Poland having a positive evaluation. It can be noted that the UK has the highest value of the residuals, meaning that by considering contextual variables it has the highest negative opinion about the impact of the EU on the quality of life.

It is also interesting to know how these results can be compared to the feeling emerging from the analysis performed directly on the answers to the questionnaire questions presented in Figure 1 and discussed in Section 2.2. In particular, it can be underlined that when the perception is cleared from the determinants included in the model, the feeling of citizens in the Mediterranean area is no longer negative (see, for example, the peculiar case of Greece), whereas citizens from the UK keep their negative attitude.

Table 5: Comparison of models (Dependent variable: EUIMPACT - SE in parentheses - Significance: \* < 0.10; \*\* < 0.05; \*\*\* < 0.01).

Independent Variables	M1	M2	M3	M3'
Intercept	0.101*** (0.049)	-0.111** (0.045)	-0.047 (0.225)	-0.180 (0.076)
<b>Socio-economic predictors:</b>				
Age education	-0.008*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)	-0.006*** (0.002)
Age: 30-54 years	0.201*** (0.023)	0.148*** (0.022)	0.148*** (0.022)	0.148*** (0.022)
Age: 55 years or more	0.209*** (0.023)	0.120*** (0.023)	0.120*** (0.023)	0.121*** (0.023)
Job: medium status	-0.146*** (0.020)	-0.136*** (0.019)	-0.135*** (0.019)	-0.135*** (0.019)
Job: high status	-0.033 (0.023)	-0.046** (0.022)	-0.046** (0.022)	-0.045** (0.022)
Community: small-medium town	0.023 (0.019)	0.025 (0.018)	0.025 (0.018)	0.025 (0.018)
Community: big town	0.039* (0.020)	0.046** (0.020)	0.046** (0.020)	0.046** (0.022)
<b>Perception predictors:</b>				
Personal expectations		0.164*** (0.008)	0.164*** (0.008)	0.164*** (0.008)
Life satisfaction		0.192*** (0.008)	0.192*** (0.008)	0.192*** (0.008)
Collective expectations		-0.059*** (0.008)	-0.059*** (0.008)	-0.060*** (0.008)
<b>Contextual predictors:</b>				
EUROSCEPTICISM			0.001 (0.001)	
PRO-CAPITA GDP			0.000 (0.000)	
UNEMPLOYMENT RATE			0.027*** (0.007)	0.024*** (0.005)
AT-RISK-OF-POVERTY			-0.022 (0.018)	
AT-RISK-OF-POVERTY (WKS)			0.019* (0.018)	-0.004 (0.006)
EARLY LEAVERS			0.007 (0.007)	
DEPRIVATION RATE			-0.002 (0.016)	
<b>Random effects:</b>				
First-level variance:	0.916 (0.010)	0.854 (0.010)	0.854 (0.010)	0.854 (0.010)
Second-level variance:	0.158 (0.021)	0.140 (0.018)	0.123 (0.016)	0.126 (0.015)
<b>Deviance:</b>	42141.8	41062.6	41055.2	41057.1

## 5 Conclusions

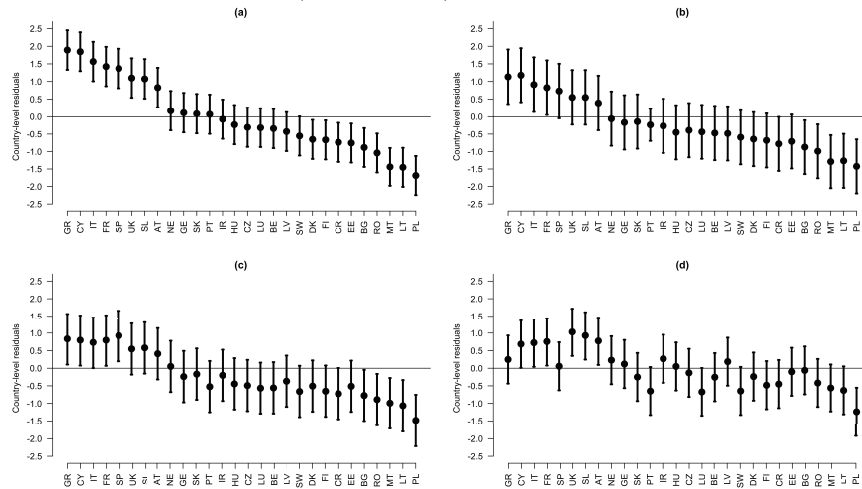
Many events have affected the EU political and economic stage and contributed to changing the average opinion of citizens about the EU and its impact on their quality of life.

In the public opinion literature, some factors can promote citizens' views about the EU, for example: (i) an 'instrumental' or 'utilitarian' factor stating that EU citizens form attitudes toward the EU that are consistent with their personal economic interests; (ii) a 'culturalistic' factor stating that the individual's capacity to receive and interpret messages relating to a remote political community (such as that of the EU) must be regarded as a cognitive mobilization .

In this paper we have focused on the role of the EU in improving/worsening the quality of life of the EU citizens, just as they perceive it, and the factors determining it.

We have analyzed this in two steps using firstly the Nonlinear Principal Component Analysis to extract underlying components of perceived quality of life related to the EU and other unobservable factors that can affect it, and secondly on the Multilevel Model to take into account individual and country effects influencing the overall quality of life. Specific attention is given to national differences and the connection with the general citizens' perception of quality of life. We mean that the impact of these factors is negative if they are

Figure 3: Comparison between models in terms of second level residuals (dependent variable: EUIMPACT). (a) M0: null model (intercept only); (b) M1: only socio-economic predictors; (c) M2: only socioeconomic and perception predictors; (d) M3: complete model with country (contextual) predictors



positively associated with the response variable of our model, and conversely positive if they are negatively associated with the response variable which, therefore, expresses a feeling about the EU negatively affecting the quality of life.

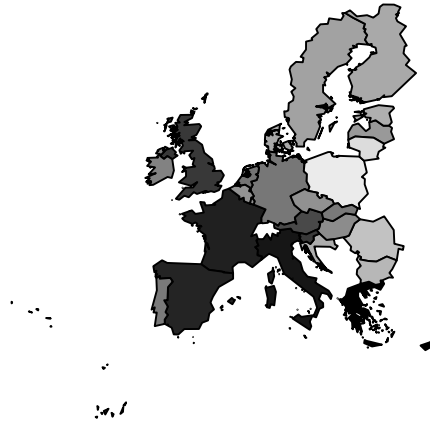
Results from this two-step analysis show that the impact of the EU on the quality of life perceived by European citizens is felt negatively in Mediterranean countries, i.e. Italy, Greece, Spain, Slovenia and Cyprus, and in the UK, whereas it is felt positively in Scandinavian countries and in Poland, Malta and Lithuania, that are all newer EU member states. Among individual determinants of this perception, education (positively), age (negatively), job status (positively), personal expectations (negatively), general life satisfaction (negatively) and collective expectations (positively) seem to have a significant impact, whereas among contextual variables, the unemployment rate of the own country (negatively) and the percentage of at-risk-of poverty workers (negatively), i.e. social deprivation indicators, play a relevant role.

Utilitarian-economic and instrumental models for Europeism presented in this work show how a sociotropic utilitarianism prevails when considering the specific case of a direct benefit which has an impact on the quality of life: in this specific framework citizens are able to reckon the consequences of this impact not only in indirect terms for themselves, but also with a different logic based on the awareness that belonging to Europe can favor in wider terms and through multiple mechanisms the national economic and social environment.



Figure 4: Representation of EU countries colored according to greyscale color values proportional to values of the second level residuals. (a)  $M0$ ; (b)  $M3$

(a)



(b)



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