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Essays in Environmental and Happiness Economics

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Preface

This dissertation consists of three chapters in the field of Environmental Economics and Happiness Economics. The first two chapters explore the willingness-to-pay for the landscape preservation for individuals with different attitudes. The last chapter examines the relationship between life satisfaction and the individual decision to migrate.

In the first chapter, we develop a latent class model for estimating willingness-to-pay (WTP) for public goods using simultaneously contingent valuation (CV) and attitudinal data to identify individuals with similar characteristics, such as WTP and protest attitudes. We find evidence that the answer to the CV question influences the responses to the attitudinal questions. In our case, this influence reflects rational behavior (budget constraint issues) and justification biases related to protest reasons, such as lack of trust in institutions or fairness issues with respect to the distribution of the burden of preservation. The results from our empirical application confirm the importance of accounting for those biases.

Frequently, survey based techniques rely on the neoclassical theory of preferences assuming that individuals behave rationally. However, the elicited preferences are also affected by individual attitudes. In order to capture the attitudes, follow up questions are typically included. These questions are measured in discrete scale ratings. The 5-point Likert scale (from "strongly disagree" to "strongly agree") is quite popular. Based on the responses to the attitudinal and SP questions, a latent class model can then be used to identify classes of individuals with similar attitudes, preferences and underlying WTP. However, even individuals with similar preferences and attitudes may interpret and use the same scale ratings (categories) differently. This phenomenon is known as scale usage heterogeneity.

In the second chapter, we develop a latent class model that takes into account scale usage heterogeneity within each class. In this way, individuals are classified into classes based on similarity of underlying attitudes and preferences. In addition, we explore how this heterogeneity is associated with socio-economic and preference variables. The findings of this chapter are as follows. First, we find evidence of the presence of scale usage heterogeneity in the answers of a set of attitudinal questions that varies across classes. Second, scale usage heterogeneity is associated with socio-economic and preference variables. Third, scale usage heterogeneity is not related to WTP. Finally, we also find evidence that respondents justify their response to the CV question when answering the attitudinal questions.

In the third chapter, we provide empirical evidence of the impact of life satisfaction on the individual intention to migrate. The impacts of individual characteristics and of country macroeconomic variables on the intention to migrate are analyzed jointly. We allow for life satisfaction to serve as a mediator between macroeconomic variables and the intention to migrate. Using the Eurobarometer Survey for 27 Central Eastern European (CEE) and Western European (non-CEE) countries, we find that people have a higher intention to migrate when dissatisfied with life. The socio-economic variables and macroeconomic conditions affect the intention to migrate indirectly through life satisfaction. The impact of life satisfaction on the intention to migrate for middle-aged individuals with past experience of migration, low level of education, and with a low or average income from urban areas is higher in CEE countries than in non-CEE countries.

Chapter 1

Protesting and Justifying: A Latent Class Model for Contingent Valuation with Attitudinal Data

coauthored with M. A. Cunha-e-Sá, L. Madureira, and L. C. Nunes

Abstract

This article develops a latent class model for estimating willingness-to-pay (WTP) for public goods using simultaneously contingent valuation (CV) and attitudinal data to identify individuals with similar characteristics, such as WTP and protest attitudes. We find evidence that the answer to the CV question influences the responses to the attitudinal questions. In our case, this influence reflects rational behavior (budget constraint issues) and justification biases related to protest reasons, such as lack of trust in institutions or fairness issues with respect to the distribution of the burden of preservation. The results from our empirical application confirm the importance of accounting for those biases.

Keywords: contingent valuation, attitudinal data, latent class model, protest responses, justification bias

JEL Classification: C35, C85, Q51

1.1. Introduction

Stated preference (SP) survey techniques, such as the Contingent Valuation (CV) approach, are widely used to elicit the economic value of public goods, such as land preservation, biodiversity, and other environmental amenities. Often, public agencies rely on those estimates to decide about the adoption of alternative policies. However, many CV studies have found that some respondents do not state their true value of the good in question (see Mitchell and Carson [33] and Carson and Groves [9]). For instance, in open-ended formats some respondents state very high bids (outliers) or zero willingness to pay (WTP), while in closed-ended formats some respondents may refuse to accept any bid for reasons that are related to a rejection of the valuation process. These are often called protest responses.[1]

There are many examples in the literature of different reasons for protest responses: scenario rejection, such as respondents' beliefs that the polluter should pay, lack of information, strategic acting, lack of trust in institutions, fairness issues, disagreement with the vehicle of payment or, as Mitchell and Carson [33] (pg. 166) state, any situation leading to respondents refusing to play the game economists want them to play (see, more recently, Meyerhoff and Liebe [32], and Olsen, Moerkbak, and Meyerhoff [36]).

The identification and treatment of protest responses have been the subject of a wide debate in the literature in the last two decades. In fact, in the presence of protest responses the use of standard SP methods is not able to elicit the true economic value that would allow for optimally providing the public good at stake, with a resulting cost to society. In order to identify protest responses, the researcher typically relies on the answers to a set of follow-up attitudinal questions, addressing different reasons for protesting. Examples are given by Soderqvist [42] (ethical

[1] The presence of protest responses has also been examined in other formats. For instance, in Meyerhoff and Liebe [18], the authors compare CV with Choice Experiments (CE). However, no clear pattern of differences between the two was found. Recent examples are Bonnichsen and Ladenburg [7], [8].

beliefs indicated by lexicographic preferences), Jakobsson and Dragun [14] (ethical beliefs indicated by fairness aspects), Morrison, Blamey and Bennett [47] (vehicle of payment), Strazzera, Genius, Scarpa and Hutchinson [43] (method of payment and fairness aspects), among others. Based on those answers, different criteria have been proposed in the literature. However, these criteria are often *ad hoc*. In fact, a protest response in one study could be identified as a valid one in another. This is illustrated in Dziegielewska and Mendelsohn [16]. After identifying protest responses, the standard approach consists of removing protest responses from the sample (see Mitchell and Carson [33], Whitehead, Groothuis, and Blomquist [45], and Jorgensen, Syme, Bishop and Nancarrow [21] for a thorough discussion).[2]

In many studies, the attitudinal questions were only presented to the respondents that were not willing to pay. However, Jorgensen and Syme [22] claim that protesting reflects an attitude toward paying for the good based on a set of attitudes that are mutually interdependent. This influences respondents' answers to the WTP question even among those that are willing to pay. Therefore, the attitudinal questions should be asked to all respondents (see also Carson, Mitchell, Hanemann, Kopp, Presser, and Ruud [14], and, more recently, Meyerhoff and Liebe [17], Dziegielewska and Mendelsohn [16], and Meyerhoff and Liebe [18]).

Recently, latent class models (LCM) have been used to endogenously identify classes of individuals with similar characteristics, such as preferences or attitudes, according to their responses to survey questions. Recent examples of empirical applications of LCM based on different types of data are given by Scarpa, Gilbride, Campbell and Hensher [41] on landscape preferences from choice experiments, Walker and Li [44] on household location decisions, and Scarpa and Thiene [39], Morey, Thacher,

[2] When protest responses are removed from the sample, a sample selection problem may occur if the group of protestors is significantly different from the remainder of the sample. Therefore, the estimators obtained from the reduced (non-protestors) sample may be biased. To deal with this problem, sample selection modeling has been used in the literature not only to detect selectivity bias but also to correct it, such as in Calia and Strazzera [11], Strazzera, Genius, Scarpa and Hutchinson [43], Martin-López, Montes and Benayas [25], and, more recently, in Brouwer and Martin-Ortega [10].

and Breffle [34], Morey, Thiene, Salvo and Signorello [35],, Bestard, Font, and Hicks [5], Scarpa and Beharry-Borg [40], and Breffle, Morey and Thacher [9] on recreational site choice. In the context of CV studies, and Meyerhoff, Bartczak, and Liebe [29] use a LCM to identify classes of protesters. The methodology followed only takes into account the responses to the attitudinal questions when estimating the latent classes. However, since the answers to the CV questions are directly affected by a respondent being a protestor or not, those answers could also be used to better infer about class membership, which is not the case in their paper.

In this paper, we contribute to this literature by considering a LCM that allows identifying different classes of individuals using simultaneously CV and attitudinal data capturing different reasons for protesting, thus extending the standard CV model. We also account for the presence of potential justification biases, that is, the possibility that for different reasons the response to the CV question affects the answers to the attitudinal questions. The justification bias effect was first suggested by Ben-Akiva *et al.* [4], in the context of an integrated choice and latent variable model, in order to capture systematic response biases in the respondents' answers to attitudinal questions. As an illustration, these authors mention the possibility that in a brand choice model respondents may exaggerate their response in reporting the perceived quality of the chosen brand. Justification bias has also been studied in other contexts. For instance, in transportation literature, Polydoropoulou, Gopinath, and Ben-Akiva [37] point out the possibility of justification bias when the respondents' answers in stated preferences' experiments are influenced by their actual choice. Also, in health and labor economics, Bound [7], Au, Crossley, and Schellhorn [1], among others, analyze the relationship between self-reported health evaluation and individual employment decision among different cohorts, finding that respondents that do not work state a given health problem as a more serious limitation than those that work. To the best of our knowledge our paper is the first to incorporate justification bias in the CV framework.

Our model is applied to a CV study regarding the preservation of the traditional landscape of the Douro Region, a conservation area in the north of Portugal, which has been classified by UNESCO as World Cultural Heritage since 2001, due to its unique natural and human environments. The estimation results obtained support the existence of four classes of respondents in the sample, which differ in terms of the estimated WTP and protest attitudes.

We find evidence that the answer to the CV question influences the responses to the attitudinal questions. In our case, this influence reflects budget constraint issues and justification biases related to protest reasons, such as lack of trust in institutions or fairness issues with respect to the distribution of the burden of preservation. In fact, it may be the case that a non-protester tries to justify his negative CV response by looking like a protestor when answering the attitudinal questions. In general, if this justification bias is ignored in the model, respondents are not adequately classified, biasing the estimate of the economic value of the public good with implications for policy purposes.

The remainder of the paper is organized as follows. In Section 1.2, the theoretical setup is developed. The data is described in Section 1.3, and the case study in Section 1.4. Section 1.5 presents and discusses the estimation results. Section 1.6 concludes the paper. Pictures, tables, and figures are shown in the Appendix (1.A).

1.2. The Model

We develop a model that is able to describe the responses to the CV question and to a set of attitudinal questions. The responses to these attitudinal questions contain useful information about underlying unobserved attitudes with respect to different elements in the survey setup such as budget constraint issues, or protesting related to mistrust with respect to the institutional environment, or fairness issues, among other reasons.

We assume that the population can be divided into a finite number of latent classes C that differ from each other in terms of their WTP and attitudes, which in turn affect the CV responses and the responses to the attitudinal questions. Therefore, although individual class membership is not directly observed, it can be inferred from the available data.

Figure 1.3 shows the general representation of our model. It is based on the integrated choice and latent variable model proposed by Ben-Akiva *et al.* [4], and Cameron and Trivedi [16] (pg. 516).[3] Observed variables appear in rectangles while unobserved variables, such as WTP and the latent class variable, appear in ovals. The dashed arrows from the latent class variable to the responses to the attitudinal questions represent the measurement equations describing how the probability distributions of the responses to the attitudinal questions vary across classes. Therefore, our approach assumes that the responses to the attitudinal questions are a manifestation of underlying latent preferences and attitudes, as in Ben-Akiva *et al.* [4], Provencher**,** Baerenklau, and Bishop [38] and Morey, Thacher and Breffle [34]. The solid lines represent the CV model, where the answer to the CV question depends on the bid value and the underlying WTP, which in turn depends on several socio-economic and demographic variables within each class. WTP also depends on underlying latent economic preferences that can be captured by a stochastic component. Class membership may also depend on explanatory variables.

Finally, the model allows for justification bias, represented by the dotted arrows that link the CV responses to the responses to the attitudinal questions. This corresponds exactly to what was proposed by Ben-Akiva *et al.* [4] (pg. 439). In their case the direction of causality goes from the actual choice to the stated responses, as the latter are obtained after the actual choices are made. Since in our application both the CV answer and the answers to the attitudinal questions were obtained

[3] Our approach is exactly the same as followed in the Structural Equation Modeling (SEM) approach where dependent variables in one equation appear as explanatory variables in another. See Bollen [14], among others.

during the interview, the direction of causality depends on the chronological order in which they were presented. In particular, in our survey the attitudinal questions always follow the CV question, implying that the direction of causality is as that given by the dashed arrows that go from the CV answer to the answers to the attitudinal questions in Figure 1.3.[4]

In the dichotomous choice CV question, respondents were asked whether they would be willing to pay randomly assigned fixed amounts in order to preserve the environmental good, or prefer not to pay, in which case environmental preservation would be kept at a lower level (status-quo). To explain the responses to this question we follow the random WTP approach as described in Bateman *et al.* [3], and Haab and McConnell [13].

The WTP for an individual n belonging to a class c is written as follows:

$$\mathbf{WTP}_n^c = \mathbf{V}(\mathbf{Z}_n, \boldsymbol{\vartheta}_n^c; \boldsymbol{\alpha}^c) \tag{1.1}$$

where $\mathbf{Z}_n$ is a $(k \times 1)$ vector of explanatory variables that reflect individual-specific socio-economic characteristics, $\boldsymbol{\vartheta}_n^c$ is a stochastic component capturing other unobservable individual heterogeneity, and $\boldsymbol{\alpha}^c$ is a vector of parameters specific to each class $c = 1, ..., C$. Assuming a log-linear model, we have that, conditional on the individual belonging to class c,

$$\ln(\mathbf{WTP}_n^c) = \boldsymbol{\alpha}^c \mathbf{Z}_n + \boldsymbol{\vartheta}_n^c. \tag{1.2}$$

In our application, we adopt the usual logit model and assume that $\boldsymbol{\vartheta}_n^c/\sigma^c$ follows a standard logistic distribution where σ^c is a scale parameter affecting the variance of the stochastic term in class c such that the cumulative distribution function of $z \equiv \boldsymbol{\vartheta}_n^c/\sigma^c$ is given by $\mathbf{F}(z) = e^z/(1 + e^z)$.

[4] It can be easily observed from Fig. 1 that our model is recursive (no reciprocal or feed-back loop relationships among the dependent variables), and, therefore, is identified. See Bollen [14].

It follows that an individual responds to the CV question with "Pay" or "Not Pay" if his WTP is "greater" or "not greater" than the proposed bid amount, respectively. Defining $u_n = 1$ when the response is "Pay", and $u_n = 0$ when it is "Not Pay", we have that:

$$u_n = \begin{cases} 1 & \text{if } \mathbf{WTP}_n^c > \text{Bid}_n \\ \\ 0 & \text{otherwise} \end{cases} \tag{1.3}$$

where Bid_n is the randomly proposed bid amount. Therefore, the probability that an individual n belonging to class c chooses to pay is given by:

$$\mathbf{P}(u_n = \mathbf{1}|\mathbf{Z}_n, \text{Bid}_n, c) = \mathbf{F}(\boldsymbol{\beta}_1^c \mathbf{Z}_n + \beta_2^c \ln(\text{Bid}_n)) \tag{1.4}$$

where $\boldsymbol{\beta}_1^c = \boldsymbol{\alpha}^c/\sigma^c$, and $\beta_2^c = -1/\sigma^c$. The median WTP for an individual in class c is given by $\text{Med}(\mathbf{WTP}_n^c) = \exp[(\boldsymbol{\beta}_1^c \mathbf{Z}_n)/(-\beta_2^c)]$.

The responses to the p attitudinal questions are denoted by a $(p \times 1)$ vector $\mathbf{I}_n = (\text{I}_{n1}, ..., \text{I}_{np})'$. These responses are categorically-ordered variables, given on a Likert scale, taking values from 1 to T, as follows. For any given response $j = 1, ..., p$, we have that

$$\mathbf{I}_{nj} = \begin{cases} T, \, if \quad \boldsymbol{\tau}_{j,T-1}^c < \text{I}_{nj}^* \\ T-1, \, if \quad \boldsymbol{\tau}_{j,T-2}^c < \text{I}_{nj}^* < \boldsymbol{\tau}_{j,T-1}^c \\ \qquad\qquad . \\ \qquad\qquad . \\ \qquad\qquad . \\ 2, \qquad if \quad \boldsymbol{\tau}_{j,1}^c < \text{I}_{nj}^* < \boldsymbol{\tau}_{j,2}^c \\ 1, \qquad if \quad \text{I}_{nj}^* < \boldsymbol{\tau}_{j,1}^c \end{cases} \tag{1.5}$$

where $\boldsymbol{\tau}_{j,k}^c$ represents the threshold of switching from category $(k-1)$ to category k when an individual belongs to class c, and $\mathbf{I}_{nj}^*$ represents in this case the corresponding answers to the attitudinal questions. We denote by $\boldsymbol{\tau}^c$ the vector of all $\boldsymbol{\tau}_{j,k}^c$, $j = 1, ..., p$, $k = 1, ..., T-1$.

The answers to the attitudinal questions are assumed to depend on the class c, the explanatory variables $\mathbf{Z}_n$, and the response to the CV question $\mathbf{u}_n$, capturing the justification bias, according to the measurement equation:

$$\mathbf{I}_n^* = \boldsymbol{\Theta}^c \mathbf{Z}_n + \boldsymbol{\Psi}^c u_n + \boldsymbol{\varepsilon}_n^c \tag{1.6}$$

where $\boldsymbol{\Theta}^c$ and $\boldsymbol{\Psi}^c$ are $(p \times k)$ and $(p \times 1)$ vectors of parameters, respectively, for class c, and $\boldsymbol{\varepsilon}_n^c$ is a $p \times 1$ vector of error terms that follows a logistic distribution with a diagonal variance–covariance matrix $\boldsymbol{\Sigma}_{\varepsilon}^c$, which may vary across classes.

In case the CV question has no impact on the answers to the attitudinal questions, that is, if there is no justification bias effect, then $\boldsymbol{\Psi}^c = 0$ in equation (1.6) . This hypothesis can be tested by checking the significance of the estimated vector of parameters $\boldsymbol{\Psi}^c$.[5]

From equations (1.5) and (1.6) we derive the probability of individual n responding $\mathbf{I}_n$ conditional on belonging to a particular class c, having characteristics $\mathbf{Z}_n$, and having responded u_n to the CV question, which is denoted as $\mathbf{g}(\mathbf{I}_n|\mathbf{Z}_n, u_n, c)$.

Finally, we also allow class membership to depend on explanatory variables:

$$\mathbf{P}(c_n = c|\mathbf{Z}_n) = \frac{e^{\delta^c + \gamma^c \mathbf{Z}_n}}{\sum_{c=1}^{C} e^{\delta^c + \gamma^c \mathbf{Z}_n}} \qquad \text{for } c = 1, ..., C. \tag{1.7}$$

As an identification condition we normalize the coefficients in (1.7) to zero in class C. Equation (1.7) represents the probability that individual n belongs to class c given his socio-economic characteristics. In addition, the conditional probability that individual n belongs to class c can also be computed using Bayes' rule. By using (1.4) and (1.7) we obtain the probability that an individual n belongs to class

[5] In the questionnaire used in our empirical application, as it is common in related studies, the attitudinal questions appear immediately after the CV question. If the order of the questions was reversed, the nature of the justification bias would also have to be changed and the model modified accordingly.

c conditional on $\mathbf{I_n}, \mathbf{u}_n$ and $\mathbf{Z}_n$, as follows

$$\begin{aligned}\mathbf{P}(\mathbf{c_n} &= \mathbf{c}|\mathbf{I_n}, \mathbf{u}_n, \mathbf{Z}_n, \text{Bid}_n; \boldsymbol{\theta}) = \\ &\frac{\mathbf{P}(c_n = c|\mathbf{Z}_n)\mathbf{P}(u_n = i|\mathbf{Z}_n, \text{Bid}_n, c)\mathbf{g}(\mathbf{I}_n|\mathbf{Z}_n, \mathbf{u}_n, c)}{\sum_{c=1}^{C} \mathbf{P}(c_n = c|\mathbf{Z}_n)\mathbf{P}(u_n = i|\mathbf{Z}_n, \text{Bid}_n, c)\mathbf{g}(\mathbf{I}_n|\mathbf{Z}_n, \mathbf{u}_n, c)}\end{aligned} \tag{1.8}$$

The joint probability of the responses to the CV and to the attitudinal questions, conditional only on the observable explanatory variables, is then given by

$$\mathbf{f}(\mathbf{I}_n, u_n|\mathbf{Z}_n, \text{Bid}_n) =$$

$$\sum_{c=1}^{C} \prod_{i=0,1} \mathbf{1}(u_n{=}i)\mathbf{P}(u_n = i|\mathbf{Z}_n, \text{Bid}_n, c)\mathbf{g}(\mathbf{I}_n|\mathbf{Z}_n, u_n, c)\mathbf{P}(c_n = c|\mathbf{Z}_n) \tag{1.9}$$

where $1(\cdot)$ denotes the indicator function. The maximum likelihood estimator of the parameters of this model are then obtained by

$$\max_{\theta} \mathbf{L}(\boldsymbol{\theta}) = \max_{\theta} \left(\prod_{n=1}^{N} \mathbf{f}(\mathbf{I}_n, u_n|\mathbf{Z}_n, \text{Bid}_n) \right) \tag{1.10}$$

where $\boldsymbol{\theta} = \{(\boldsymbol{\beta}_1^c, \boldsymbol{\beta}_{\mathbf{2}}^{\mathbf{c}}, \boldsymbol{\Theta}^{\mathbf{c}}, \boldsymbol{\Psi}^c, \boldsymbol{\Sigma}_{\varepsilon}^c, \boldsymbol{\tau}^{\mathbf{c}}, \delta^c, \boldsymbol{\gamma}^c), c = 1, 2, ..., C\}$ and N denotes the number of observations in the sample. The estimations were performed using the EM algorithm (see Dempster, Laird, and Rubin [12]).[6]

1.3. Case Study

Our empirical application is based on a survey conducted in The Alto Douro Wine Region, located to the east of the city of Oporto, in the north of Portugal. The cultural landscape of the Alto Douro represents an outstanding example of humankind's unique relationship with the natural environment. The "Demarcated Douro Region", defined and regulated since 1756, is one of the oldest of all the his-

[6] The code to implement the estimations is available from the authors upon request.

toric winemaking regions in the world, producing a world commodity, Port Wine, famous for its quality around the globe. The building of its landscape pattern by the wine producers over the last three centuries characterized by the land partition and cultural diversity was recognized as an exceptional testimony to a living cultural tradition, and the Alto Douro Wine Region became part of UNESCO's World Heritage cultural landscape in 2001.

In the last three decades, there has been an enormous pressure to transform the old vineyards into modern ones with the associated destruction of the typical landscape, due to the need of increasing productivity.[7] In this context, we investigate the possibility of using an annual payment collected in addition to the annual income tax to financially support the winegrowers in the region to prevent the destruction of the landscape.[8] However, the extent to which citizens trust public institutions responsible for the implementation of this project or accept the vehicle of payment are crucial issues in this context, and are not independent from the more general economic conditions that have characterized Portugal in the last decade.

For the period 1996-2004, Kaufmann, Kraay, and Mastruzzi [23] constructed aggregate measures of governance for 209 countries and territories, based on which an index on Government Effectiveness was obtained. For the case of Portugal, this index does not show an improvement in the country's relative position. On the contrary, from 2002 to 2004, it shows a negative trend.[9] In the last decade, the persistence of a large budget deficit has been responsible for a long period of slow growth, below the EU average, making convergence more difficult. Moreover, there is recent evidence that shows a great deal of persistence in indicators related to development, such as income, growth rates, and income inequality, as well as with respect to institutional indicators, which are also highly correlated with development achievements. Given the performance of the Portuguese economy in recent years,

[7] See pictures in the Appendix.

[8] This is a quasi-public good, because it is possible to exclude people from its use, by charging a price to use the resource or making the agent spend money or time to use the resource.

[9] See Kaufmann, Kraay, and Mastruzzi [23], pg. 123 and pg. 130.

a reversal of the observed trend is not expected.[10] Therefore, the circumstances described should have an impact on the attitudes regarding the provision of public goods, and, consequently, on how people answer CV surveys.

1.4. The Data

Information was collected in the summer of 2006 through face-to-face interviews of a random sample of visitors to the Alto-Douro Wine region.[11] Interviewers followed a worded script to avoid leading effects. The questionnaire included a CV question to measure the WTP for landscape preservation. The CV question format chosen was the referendum dichotomous choice. Each respondent was asked a CV question for an improvement in the level of preservation where the status-quo was the case of no preservation, and the bids varied randomly among the respondents. The payment mechanism that was proposed to respondents was an annual payment that would be collected in addition to the annual income tax. The money raised would go to a public institution that would compensate winegrowers for the incurred costs to keep the traditional landscape.

Moreover, eleven attitudinal questions were also included in the survey immediately following the CV question, and all respondents were asked to answer them (see Appendix). The choice of these questions was based on similar studies, and were previously tested in a pilot survey. The answers to those attitudinal questions contain useful information about underlying unobserved attitudes with respect to different elements in the survey setup, such as budget constraint issues (questions B1-B4), protesting related to the lack of trust in institutions that are responsible to implement the policy for preservation of the landscape (questions I1-I4), and, finally, fairness issues associated with the distribution of the burden of preservation

[10] Recent evidence shows that income per capita or its growth, as well as the achievements in the areas of health, education, infrastructure, etc., are highly correlated with measures of institutional quality, ranging between 0.65 and 0.78, as mentioned in Gradstein [17].

[11] In order to account for the fact that the data is collected on-site would require an extension of the econometric model which is beyond the scope of this paper.

(questions F1-F3).

The sample used in this article consists of 706 observations. Table 1.1 provides descriptive statistics for all the variables used in the estimations. In our survey, the answers to the attitudinal questions were given in a five level Likert scale (from 1-strongly disagree to 5-strongly agree). Since in the final sample some of the extreme levels had very few or even no observations, we decided to merge some of the levels: levels 4 and 5 in the Likert scale were merged in questions B2, B3 and F1, while in the remaining questions (B1, B4, I1-I4, F2-F3) levels 1 and 2 were merged instead. Table 2 presents the resulting frequency distribution of the answers to the attitudinal questions.

1.5. Estimation Results

In this section, we present and discuss the estimation results for the model described in Section 1.2. Although we have considered several explanatory variables, only gender, and an indicator of previous visits to the site were statistically significant. In order to select the number of classes we calculate six standard information criteria (AIC, BIC, ABIC, AIC3, AICC, and CAIC). In Tables 1.3 and 1.4 we present the results for the estimated models considering up to five classes, with and without justification bias. The number of classes is identified by the lowest information-criteria score. By inspection, we observe that for the model with justification the results indicate four classes, while for the model without some criteria point to four classes while others suggest five. However, the model with four classes allowing for justification bias is always better than any other model without justification bias according to all criteria.[12]

Estimation results for the models with four classes are shown in Table 1.5, where Model 1 does not allow for justification bias, and Model 1J takes it into account. This table is divided into four parts. The first corresponds to the CV equation (1.4),

[12] We also found that justification bias was significant independently of the number of classes.

and the second to the membership equation (1.7). The third presents the results for the justification bias effect given by the estimated vector of coefficients $\mathbf{\Psi}^c$ in equation (1.6) for Model 1J. Finally, in the last part, the estimated median WTP, the corresponding confidence intervals, and the estimated proportion of individuals in each class are presented.

For both models, the four classes differ with respect to both the estimated coefficients in the CV model, and the probability distributions of the responses to the attitudinal questions. Moreover, in Model 1J, there are also differences in the way the response to the CV question impacts the responses to the attitudinal questions, that is, the four classes differ in terms of justification bias. Regarding the CV part of the model, the estimated coefficients of ln(Bid) are significant in all classes in both models, except for class 4, and have the expected negative sign. For class 1, we find that those that have previously visited the site have a higher WTP.

We allow for the socio-economic characteristics to affect class membership. In particular, visit is significant in class 2, while gender is significant in class 1 in Model 1J. In Model 1 only gender is significant in class 1. These results suggest that women have a lower probability of belonging to class 1, while those that have previously visited the site have a higher probability of belonging to class 2.

1.5.1. Justification Bias

In our case, we consider eleven attitudinal questions. Some of them address protest reasons related to the lack of trust in institutions that are expected to implement the policy (questions I1-I4), fairness issues related to the distribution of the burden of preservation (questions F1-F3), while others capture concerns with budget constraint issues (questions B1-B4). In Model 1J the answer to the CV question is allowed to influence the response to the different attitudinal questions. Consequently, the estimated conditional probabilities of the answers to these different questions depend on whether the respondent answered Pay or Not Pay to the CV

question. These estimated conditional probabilities are presented in Table 1.6 for Model 1, and in Tables 1.7 for Not Pay, and Table 1.8 for Pay in Model 1J.

For each attitudinal question we can statistically test for the presence of the justification bias effect, by checking if the coefficient of the answer to the CV question is significant in the third part of Table 1.5. We observe that when the justification bias effect is significant, the corresponding estimates are in general negative, meaning that a positive answer to the CV question ("Pay") has a negative impact on the level of the Likert scale. Therefore, when a respondent answers negatively to the CV question, that person tries to justify that response by inflating his responses to those questions. For instance, it may be the case that a non-protester does not wish to look guilty in the eyes of other people for not affording to pay or not valuing the environment highly enough, and, subsequently, tries to justify his negative CV response by looking like a protestor when answering the attitudinal questions. As a consequence, in each class, we may conclude that the probability distribution of the responses to the attitudinal questions is shifted to the right in the case of "Not Pay" when compared to "Pay", as can be observed in Tables 5B and 5C. On the other hand, in each class, for those questions such that the estimates of the coefficients of the answers to the CV question are not significant, we may conclude that all the class members express a similar view with respect to those issues, regardless of their response to the CV question.

In order to better understand the differences between the four classes in Model 1J, we summarize the main findings in Table 1.9. This table is divided into three parts. In the first part we identify rational behavior by checking whether ln(Bid) is significant and whether the answer to the CV question influences the answers to the questions related to budget constraint issues (questions B1-B4). In the following part, we check for the presence of justification bias related to protest reasons, in particular, the lack of trust in institutions (questions I1-I4), and fairness issues (questions F1-F3). Finally, we characterize the classes according to the way respon-

dents answered to all the eleven questions. In particular, the results in Tables 1.7 and 1.8 are summarized by identifying for each group of questions the response level in the Likert scale with the highest probability.

In what concerns rational behavior, we observe that ln (Bid) is significant in all classes, except for class 4. Moreover, in classes 1 and 3 all the answers to the four questions associated with budget constraint issues are significantly affected by the answer to the CV question. From the third part of Table 4, the negative sign of the corresponding coefficients suggests that those that refused to pay the bid feel more strongly about budget constraint issues, as expected, suggesting that respondents in those three classes behave rationally from an economic perspective, that is, consistent with constrained utility maximization.

Regarding class 4, the results suggest that the respondents in this class do not relate the bid to the economic value of the good as ln(Bid) was found not significant, and yet they may value the good. In a different context, a class with similar characteristics was found in Herriges, Kling, Liu and Tobias [19], labelled "inconsequential group" ("if respondents do not believe the result of the survey might potentially influence an outcome they care about"), where the "Yes" response rate does not decrease with the bid values.[13]

In the case of justification bias related to protest reasons we observe that while in the case of institutions, two questions out of four are significant in class 3, and three out of four in class 4, none is significant in classes 1 and 2. Therefore, this suggests that in class 3 respondents have used institutions as an argument to justify their answer to the CV question. In contrast, in what concerns fairness issues, one question out of three is significant in all classes. Interestingly enough, fairness issues are present across all classes, suggesting that for the sampled population this is a

[13] As mentioned before, a type of protest responses are invalid highs, which in the context of dichotomous choice CV correspond to invalid yes. In our model this would correspond to a class with a high median WTP and with strong protest attitudes, that is, characterized by high probabilities of answering levels 4 or 5 in the Likert scale for the responses to the attitudinal questions capturing protest reasons. However, we do not find a class with similar characteristics in our estimated model with justification bias. We thank an anonymous referee for raising this issue.

rather sensitive issue.

From the last part of Table 1.9, and, in what concerns the questions related to institutions, we may conclude that among those who "Pay" the majority of respondents is indifferent in class 1, agrees in class 2, as well as in class 3, and is mostly indifferent in class 4. For those who did not Pay, while in class 1 a large number of indifferents is also observed, in class 2 respondents basically agree, and in class 3 the majority strongly agrees. In class 4 agreement is observed. So, more clear statements are observed as we move from class 1 to class 3. In class 3 we also observe that despite they value the good and state that preservation is their problem, the majority of respondents strongly agrees that money will be used for other purposes, that the payment will not insure the preservation of the landscape and that they already pay enough taxes for it. In contrast, in class 1 they are indifferent with respect to the statement that the payment will not insure the preservation of the landscape, and agree that they already pay enough taxes for this preservation. According to these results, we may classify class 1 respondents as low protestors, class 2 respondents as medium protestors and class 3 respondents as high protestors.

With respect to fairness, we find a similar pattern to the above one for those who pay, despite that we observe a smaller number of indifferents, and in class 3 respondents state more strongly their agreement. For those that do not pay, we observe that there are no respondents stating indifference. Hence, in classes 1 and 2 most of the respondents agree, while in class 3 strongly agree. In class 4, those that pay present a very disperse pattern while the majority that does not pay agrees. Thus, in classes 1, 2, and 3, we find that respondents that do not pay have in general a clearer position with respect to fairness issues, when compared to protest reasons concerning institutions. For instance, indifference is not present. As mentioned above, fairness is a rather sensitive issue for all the respondents.

When comparing Model 1 to 1J, we observe that class 1 in both models represents respondents that are mostly indifferent with respect to different protest issues. For

classes 1 and 2 the estimated conditional probabilities in Model 1 are in between those in Model 1J for "Not Pay" and "Pay". Also, the pattern found in class 4 in Model 1 matches that found in class 4 for "Pay" in Model 1J, and class 3 in Model 1 matches class 3 for "Not Pay" in Model 1J. This is the result of the rearrangement of respondents among classes, when taking account justification bias, as some respondents that were not willing to pay moved into class 4, while some others that were willing to pay moved into class 3 in Model 1J. Ultimately, the number of respondents in classes 2 and 4 have increased, and decreased in the others.

For policy purposes, we may use the estimated median WTP for class 1 in the model with justification bias (48.1 euros) as an estimate of the true economic value, as the results suggest that individuals in this class behave rationally and are mostly indifferent with respect to the majority of the attitudinal questions related to the different protest reasons. This estimated value is substantially higher than those obtained for the other classes (6.53 euros in class 2, and 10.3 euros in class 3), as well as the estimated value from the standard logit model (approximately 12.8 euros).[14] Mostly important, we observe that by accounting for the justification bias the obtained median WTP estimates are also different. In particular, median WTP for class 1 in Model 1 is 12 euros lower than that obtained for the same class in Model 1J. Notice also that this difference in WTP is significant, since the corresponding confidence intervals do not overlap. Therefore, the relevance of behavioral aspects, as captured by justification bias, should not be ignored.

1.6. Conclusion

In this article, we develop a latent class model for estimating WTP for public goods using simultaneously CV and attitudinal data capturing attitudes related to different

[14] This corresponds to the estimation of equation (1.4) in Section 1.2 when including gender, visits, employment condition, and age.

elements in the survey setup, such as budget constraint issues, protesting related to the lack of trust in public institutions or fairness issues. Moreover, we allow for the possibility of a justification bias, that is, the potential impact of the response to the CV question on the answers to the attitudinal questions. In fact, justification bias allows for a better characterization of the pattern of responses within each class, compared to the case without justification bias, by distinguishing those that pay from those that do not pay.

Based on a CV study conducted in The Alto Douro Wine Region, located in the north of Portugal, four classes of respondents are identified. We show that in our case omitting this justification bias would underestimate the true economic value for preserving the good as measured by the value of the estimated median WTP in class 1, that is, the one in which most respondents indicate indifference with respect to protest attitudes. Therefore, for policy purposes, psychological factors should not be disregarded in CV estimation.

Our methodology is flexible enough, and can be applied to other contexts involving different behavioral aspects or attitudes. Moreover, it can be extended to other stated preference elicitation formats, such as double-bounded CV and choice experiments. This is left for further research.

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1.A. Appendix

1.A.1. Attitudinal Questions

- Budget Constraint Issues (B1–B4):

  B1. The values are too high

  B2. I can't afford to pay anything right now

  B3. The landscape preservation is not my problem

  B4. I would rather pay more important things

- Institutions (I1–I4):

  I1. The landscape should be preserved with the current taxes

  I2. I think money will be used for other purposes

  I3. This payment will not insure the preservation of the landscape

  I4. I already pay enough taxes for this preservation

- Fairness Issues (F1–F3):

  F1. The residents of the region should pay for this preservation

  F2. The local authorities and tourist operators should pay for this preservation

  F3. It is not fair to ask me to pay

See Appendix Tables 1.1-1.9. See Appendix Figure 1.3.

1.A.2. Tables

Table 1.1: *Descriptive Statistics*

Variable	Mean	SD	Min	Max	Description
CV answer	0.32	0.47	0	1	Answer to the CV question (1=Pay, 0=Not Pay)
Bid	46.7	29.7	10	100	Bid for the CV question in Euros
Age	45.3	13.7	18	85	The age of the respondent
Emp	0.78	0.41	0	1	Employment Condition (1=Employed, 0=otherwise)
Visit	0.59	0.49	0	1	(1=If respondent has visited this place before, 0=otherwise)
Gender	0.47	0.25	0	1	(1=If respondent is a female, 0= respondent is a male)

Table 1.2: *Distribution of Answers to the Attitudinal Questions (%)*

Attitudinal Questions	Adjusted Scale			
	1	2	3	4
B1[a]	27.2	17.6	37.1	18.1
B2[b]	8.9	32.6	32.2	26.3
B3[b]	25.8	54.4	7.1	12.7
B4[a]	27.9	32	32.7	7.4
I1[a]	4.2	7.1	60.9	27.8
I2[a]	11.9	28.9	41.5	17.7
I3[a]	13	31.6	38.2	17.1
I4[a]	6.1	12.3	54.4	27.2
F1[b]	21.1	50.8	13.7	14.3
F2[a]	18.4	13.7	48.6	19.3
F3[a]	16.9	15.6	52.1	15.4

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

Table 1.3: *Model Selection Criteria for Model without Justification Bias*

Criteria	Number of Classes			
	2 classes	3 classes	4 classes	5 classes
LL	-9239	-8939	-8786	-8734
AIC	18628	18107	17865	17820
BIC	18970	18627	18531	18623
ABIC	18732	18265	18067	18064
AIC3	18703	18220	18010	17996
AICC	18646	18151	17941	17938
CAIC	18767	18317	18134	18145
# of parameters	75	114	146	176

Table 1.4: *Model Selection Criteria for Model with Justification Bias*

Criteria	Number of Classes			
	2 classes	3 classes	4 classes	5 classes
LL	-9023	-8840	-8653	-8605
AIC	18240	17968	17679	17705
BIC	18682	18625	18527	18831
ABIC	18347	18168	17936	18047
AIC3	18337	18112	17864	17951
AICC	18271	18042	17813	17972
CAIC	18419	18234	18022	18161
# of parameters	97	144	186	247

Table 1.5: *Estimation Results*

	Model 1 LCM without Justification Bias				Model 1 J LCM with Justification Bias			
	Class 1	Class 2	Class 3	Class 4	Class 1	Class 2	Class 3	Class 4
CV Equation (1.4)								
constant	1.285 (0.14)	0.283 (0.81)	1.711 (0.19)	2.557 (0.04)	1.395 (0.17)	1.073 (0.33)	2.980 (0.02)	0.663 (0.52)
visit	1.029 (0.01)	-0.323 (0.54)	1.011 (0.20)	-0.364 (0.45)	1.275 (0.01)	0.214 (0.71)	0.391 (0.61)	-0.264 (0.61)
ln(Bid)	-0.501 (0.03)	-0.544 (0.08)	-1.366 (0.00)	-0.452 (0.14)	-0.505 (0.07)	-0.655 (0.02)	-1.382 (0.01)	-0.287 (0.31)
Membership Equation (1.7)								
constant	1.333 (0.01)	0.042 (0.93)	0.655 (0.18)	-	0.716 (0.13)	-0.772 (0.23)	-0.712 (0.24)	-
visit	-0.121 (0.75)	0.413 (0.22)	0.094 (0.76)	-	-0.330 (0.286)	0.884 (0.02)	0.345 (0.31)	-
gender	-0.806 (0.02)	0.046 (0.86)	-0.399 (0.19)	-	-0.642 (0.03)	0.272 (0.31)	0.103 (0.72)	-
Estimated Ψ^c in Equation (1.6)								
"Justification Bias"								
B1			-		-2.373 (0.00)	-1.451 (0.01)	-1.620 (0.01)	-0.762 (0.11)
B2					-1.807 (0.06)	-0.069 (0.91)	-1.678 (0.00)	0.094 (0.81)
B3			-		-1.229 (0.01)	-0.654 (0.19)	-1.489 (0.00)	0.355 (0.44)
B4			-		-8.448 (0.01)	0.009 (0.99)	-2.123 (0.00)	-0.865 (0.03)
I1			-		-0.393 (0.43)	-0.081 (0.82)	-0.749 (0.30)	-0.490 (0.22)
I2			-		-0.475 (0.48)	-0.194 (0.77)	-1.106 (0.04)	-1.34 (0.00)
I3			-		-0.354 (0.51)	-0.801 (0.115)	-1.998 (0.01)	-1.608 (0.00)
I4			-		0.267 (0.60)	-0.934 (0.152)	-0.549 (0.55)	-2.273 (0.00)
F1			-		0.257 (0.54)	0.229 (0.63)	-0.622 (0.27)	0.091 (0.83)
F2			-		-0.084 (0.84)	-0.359 (0.44)	0.935 (0.04)	-0.126 (0.766)
F3			-		1.199 (0.05)	-2.135 (0.00)	-1.406 (0.11)	-2.929 (0.00)
Median(WTP) / S.E.	36.30 / 1.44	1.14 / 0.10	5.38 / 0.25	182 / 31.92	48.10 / 1.55	6.53 / 0.33	10.30 / 0.28	6.36 / 0.55
Confidence Interval of Median (WTP)	[35.77 , 41.43]	[0.93 , 1.34]	[4.89 , 5.86]	[119.82 , 244.94]	[45.90 , 52.00]	[5.89 , 7.18]	[9.70 , 10.80]	[5.26 , 7.43]
Number of observation per Class	173	211	182	140	142	236	137	191
Probability	0.24	0.3	0.26	0.2	0.2	0.33	0.2	0.27
Entropy			0.84				0.83	
Number of parameters			146				186	
Number of observations			706				706	

Notes:
In parentheses are p-values
WTP is in Euros
SE is a standard error/the standard errors for the median WTP are computed by using the delta method

Table 1.6: *Estimated Conditional Probabilities of Answers to the Attitudinal Questions in Model 1 (%)*

Attitudinal	Class 1				Class 2				Class 3				Class 4			
Questions	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
B1[a]	18	43	34	4	11	13	61	15	37	5	20	39	48	11	28	14
B2[b]	0	13	74	13	0	21	23	56	25	48	8	19	12	52	28	8
B3[b]	26	66	8	0	3	57	15	25	37	44	2	17	45	50	1	4
B4[a]	20	59	21	0	11	25	60	5	41	11	26	22	46	39	15	1
I1[a]	3	14	79	3	7	3	78	12	3	0	23	74	4	14	62	21
I2[a]	10	68	22	0	7	15	69	9	4	11	33	51	31	26	35	8
I3[a]	11	72	17	0	11	19	65	5	3	9	31	58	31	33	32	4
I4[a]	1	21	74	4	1	4	82	13	1	2	18	79	25	27	38	10
F1[b]	3	62	29	6	2	53	15	31	48	39	5	8	35	51	6	8
F2[a]	12	20	65	2	15	15	63	7	23	4	24	48	25	16	39	20
F3[a]	5	34	61	0	9	5	75	10	2	3	48	47	59	25	14	2

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

Table 1.7: *Estimated Conditional Probabilities of Answers to the Attitudinal Questions in Model 1J, Not Pay (%)*

Attitudinal	Class 1				Class 2				Class 3				Class 4			
Questions	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
B1[a]	3	31	54	11	12	11	65	13	31	3	22	44	32	13	27	27
B2[b]	0	3	81	16	0	22	20	58	18	51	4	27	15	51	31	4
B3[b]	14	74	12	0	3	54	15	27	25	47	3	26	51	47	1	1
B4[a]	0	56	44	0	17	24	56	3	37	9	29	26	31	36	23	10
I1[a]	2	14	80	3	7	4	79	11	0	0	11	89	4	7	60	29
I2[a]	7	70	23	0	8	17	66	8	3	7	29	60	15	22	42	22
I3[a]	9	69	23	0	10	21	63	5	1	2	20	77	12	30	45	13
I4[a]	1	23	74	2	2	5	78	15	0	0	6	94	6	14	56	24
F1[b]	4	65	27	4	1	54	17	28	49	39	5	8	38	50	5	7
F2[a]	13	19	67	2	15	16	63	6	27	4	21	48	20	12	41	27
F3[a]	7	45	48	0	6	7	76	11	4	2	41	53	13	20	48	19

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

Table 1.8: *Estimated Conditional Probabilities of Answers to the Attitudinal Questions in Model 1J, Pay (%)*

Attitudinal	Class 1				Class 2				Class 3				Class 4			
Questions	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
B1[a]	28	57	14	1	36	19	42	3	69	3	15	14	51	14	21	15
B2[b]	0	16	81	3	0	23	21	56	55	38	1	6	14	50	32	4
B3[b]	37	60	4	0	6	66	11	16	60	32	1	7	41	56	2	2
B4[a]	24	76	0	0	17	24	56	3	83	5	9	4	49	32	14	5
I1[a]	4	19	75	2	7	4	78	10	0	0	21	79	6	11	63	20
I2[a]	11	74	15	0	10	20	64	7	8	18	41	34	39	30	24	7
I3[a]	12	71	17	0	20	31	47	2	5	13	51	32	34	39	23	4
I4[a]	1	18	78	3	4	12	77	6	0	0	11	89	30	33	32	4
F1[b]	3	60	31	6	1	48	18	33	64	29	3	4	38	49	5	8
F2[a]	14	20	65	1	20	19	57	4	13	3	15	70	17	11	41	31
F3[a]	2	22	76	0	35	21	42	1	14	5	59	22	63	22	13	2

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

Table 1.9: *Summary of Estimation Results for Model 1J*

Classes	1	2	3	4
Rational Behavior:				
- Ln(Bid)-significant	Yes	Yes	Yes	No
- # of significant estimated Ψ′s related to budget constraint issues (B1-B4)	4	1 (B1)	4	1 (B4)
# of significant estimated Ψ′s related to :				
- Institutions (I1-I4)	0	0	2 (I2, I3)	3 (I2, I3, I4)
- Fairness (F1-F3)	1 (F3)	1 (F3)	1 (F2)	1 (F3)
Mode:				
- Budget Constraint (B1-B4)**:**				
- Pay	Indifferent	Agree	Strongly Disagree	Indifferent & Strongly Agree
- Not-Pay	Agree & Indifferent	Agree & Strongly Agree	Disagree & Strongly Disagree	Strongly Disagree
- Institutions (I1-I4)**:**				
- Pay	Indifferent	Agree	Agree	Indifferent
- Not-Pay	Indifferent	Agree	Strongly Agree	Agree
- Fairness (F1-F3)				
- Pay	Agree	Agree	Strongly Agree	Agree+
- Not-Pay	Agree*	Agree*	Strongly Agree*	Agree*

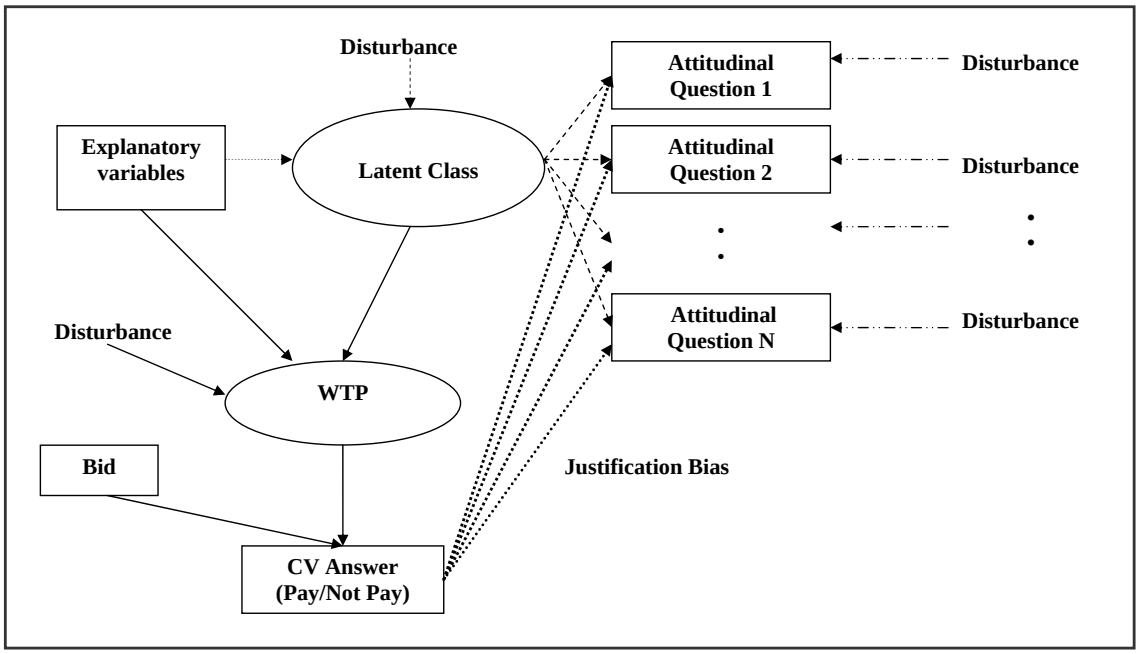
Notes:
*+ In addition, respondents always disagree when answering F1

1.A.3. Figures

Figure 1.1: *Traditional Landscape of Alto Douto*

Figure 1.2: *The New Vineyards*

Figure 1.3: *General Representation of the Joint CV and Latent Class Models*



Chapter 2

Protest Attitudes and Stated Preferences: Evidence on Scale Usage Heterogeneity

coauthored with M. A. Cunha-e-Sá, and L. C. Nunes

Abstract

We contribute to the stated preference literature by addressing scale usage heterogeneity regarding how individuals answer attitudinal questions capturing lack of trust in institutions and fairness issues. Using a latent class model, we conduct a contingent valuation study to elicit the willingness-to-pay to preserve a recreational site. We find evidence that respondents within the same class, that is, with similar preferences and attitudes, interpret the Likert scale differently when answering the attitudinal questions. We identify different patterns of scale usage heterogeneity within and across classes and associate them with individual characteristics. Our approach contributes to a better understanding of individual behavior in the presence of protest attitudes.

Keywords: Scale usage heterogeneity; Likert scale; protest attitudes; contingent valuation; latent class model.

JEL Classification Numbers: C35, Q51

2.1. Introduction

Survey based techniques, such as Contingent Valuation (CV) and Choice Modelling, have been widely used in many research fields, namely, economics, sociology, and political science, to elicit the willingness-to-pay (WTP) for non-market goods. These techniques rely on the neoclassical theory of preferences assuming that individuals behave rationally. However, elicited preferences are also affected by other individual factors.[1] Different individuals may have different WTPs, not only because they differ in terms of preferences, but also in their beliefs or attitudes. A typical situation is when respondents state zero values to open-ended questions or refuse to accept any CV bids, even though they may value the good in question.[2] This behavior is frequently attributed to protest attitudes associated with the lack of trust in institutions, fairness issues, strategic acting, or respondents' disagreement with some part of the survey.[3] As a result, the elicited WTP obtained from the use of standard SP techniques may not represent the "true" one if protest attitudes are ignored.

Latent Class Models (LCM) have been used in the literature to identify distinct groups of people with different preferences, beliefs, or attitudes, where the individual class membership is unknown or latent. In this context, recent valuation studies include a set of follow-up questions in their surveys, representing an important source of additional information regarding individual attitudes. In general, attitudinal questions involve a discrete rating scale, such as the Likert scale. In particular, the 5-point Likert scale (from "strongly disagree" to "strongly agree") is often used. However, even individuals with similar preferences and attitudes may interpret and use the same scale ratings (categories) differently. For instance, some people answer only in the middle of the scale, while others may use the lower or upper end on the

[1] For instance, Brown and Taylor [8] discuss gender differences regarding hypothetical bias. Another example is Botzen and van der Bergh [6] on individual risk attitudes related to climate change. For a general discussion see Bateman *et al.*[2].

[2] See Carson and Groves [10], Mitchell and Carson [19], among others.

[3] See Mitchell and Carson [19], Blamey [5], Meyerhoff and Liebe [17] and [18], Polomé [20], among others.

Likert scale. This phenomenon is known as scale usage heterogeneity and has been discussed in the context of consumer behavior literature by Rossi *et al.* [22], Wong *et al.* [23], and Jong *et al.* [15], among others.

This paper contributes to the CV literature by addressing scale use heterogeneity in the context of latent class analysis. We identify the factors that may explain why respondents use the scale differently, namely, by associating their answers with socioeconomic and preference variables.

The results are discussed in the context of a CV study regarding the preservation of a recreation site in the north of Portugal. After the standard CV question in the questionnaire, a set of attitudinal questions related to the budget issues and protest attitudes associated with the lack of trust in institutions and fairness issues is included.

The estimation results suggest three classes that differ with respect to the degree of protest attitudes as well as to the willingness-to-pay. We find evidence of the presence of scale usage heterogeneity, varying across classes, which is not related to WTP. Scale usage heterogeneity can also be associated with individual characteristics. For instance, respondents that visited the site more than once and belong to the classes that value the good use the upper end of the scale when answering the institutional attitudinal questions. Therefore, independently of being protestors or not, those that have visited the site more than once are more concerned with its preservation, and, hence, with the quality of the institutions that are responsible for it. Besides, among those that have higher protest attitudes, respondents that are employed and have visited the site more than once state the higher value when responding to institutional questions. Hence, these respondents are more critical with respect to the quality of institutions, suggesting that misuse of fiscal revenue is an especially sensitive issue for employed individuals. Finally, we find evidence of justification bias, that is, the response to the CV question affects the way people

answer attitudinal questions.[4]

The remainder of the paper is organized as follows. The next section presents the theoretical methodology. Section 2.3 describes the data. Then, Section 2.4 presents and discusses the estimation results, while Section 2.5 concludes the paper. Tables and Figures are presented in the Appendix.

2.2. The Model

In this section, we describe the proposed statistical methodology to estimate the underlying WTP for non-market-goods when using CV and attitudinal data. Our model is based on the LCM as described in McLachlan and Peel [16]. Individuals are assumed to belong to one of several classes that differ in terms of the underlying WTP as well as unobserved behavioral, psychological, or attitudinal aspects. Even though individual class membership is not directly observed by the researcher, it can be inferred from the responses to the attitudinal and CV questions.

An important feature of our model is that it takes into account possible individual scale usage heterogeneity in the responses to the attitudinal questions. This unobservable heterogeneity is captured by a latent variable, designated as subjective scaling variable.[5] As shown below, our model also allows to test for testing heterogeneity associated or not with the underlying WTP.

The general representation of the model is illustrated in Figure 2.1. Rectangles represent observed variables and ellipses represent unobserved variables, such as WTP, latent class, and subjective scaling. This approach is similar to that of Ben-Akiva *et al.* [3], Provencher *et al.* [21], Cunha-e-Sá *et al.* [11]. The only difference is that in this model we introduce the subjective scaling variable affecting the responses to the CV and the attitudinal questions. The solid lines represent the CV model,

[4] This bias is widely discussed in different economic fields, such as health, labor, transportation, and environment. See Au *et al.* [1], Bound [7], Ben-Akiva *et al.* [3], Cunha-e-Sá *et al.* [11], among others.

[5] See Bollen [14] for a discussion on latent variable models.

where the CV question depends on the bid and underlying WTP. The subjective scaling is allowed to be the class specific. This relationship is presented by the dotted line from the latent class variable to the scaling variable. In addition, we explore the correlation between explanatory variables and subjective scaling, which is highlighted by the dashed-dotted arrows from the explanatory variables to the subjective scaling variable. Following Cunha-e-Sá *et al.* [11], the dashed arrows from the CV response to the attitudinal questions represent justification bias.

In order to estimate the willingness-to-pay, we follow the random WTP approach as described in Bateman *et al.* [2], and Haab and McConnell [13]. The WTP for an individual n in class c can be written as follows:

$$\mathbf{WTP}_n^c = \mathbf{V}(\mathbf{Z}_n, \mathbf{S}_n^*, \boldsymbol{\vartheta}_n^c; \boldsymbol{\alpha}^c) \tag{2.1}$$

where $\mathbf{Z}_n$ is a $k \times 1$ vector of explanatory variables that reflects individual-specific socioeconomic characteristics, $\mathbf{S}_n^*$ is the subjective scaling variable, $\boldsymbol{\vartheta}_n^c$ is a stochastic component capturing other unobservable individual heterogeneity, and $\boldsymbol{\alpha}^c$ vectors of parameters for each class $c = 1, ..., C$. Assuming a log-linear model we have that, conditional on an individual n belonging to class c , $\ln(\mathbf{WTP}_n^c)$ can be written as follows:

$$\ln(\mathbf{WTP}_n^c) = \boldsymbol{\alpha}_1^c \mathbf{Z}_n + \boldsymbol{\alpha}_2^c \mathbf{S}_n^* + \boldsymbol{\vartheta}_n^c \tag{2.2}$$

In our application we adopt the usual logit model and assume that $\boldsymbol{\vartheta}_n^c/\sigma^c$ follows a logistic distribution where σ^c is a scale parameter affecting the variance of the stochastic term in class c such that the cumulative distribution function of $z \equiv \boldsymbol{\vartheta}_n^c/\sigma^c$ is given by $\mathbf{F}(\mathbf{z}) = e^{\mathbf{z}}/(1 + e^{\mathbf{z}})$.

In our application the dichotomous choice referendum was chosen as the format of the CV question. It follows that an individual responds to the CV question with "Pay" or "Not Pay" if his WTP is "larger" or "not larger" than the proposed bid amount, respectively. Defining $\mathbf{u}_n = 1$ when the response is "Pay", and $\mathbf{u}_n = 0$

when it is "Not Pay", we have that:

$$\mathbf{u}_n = \begin{cases} 1 & \text{if } \mathbf{WTP}_n^c > \text{Bid}_n \\ 0 & \text{otherwise} \end{cases} \tag{2.3}$$

where Bid_n is the randomly proposed bid amount. Thus, the probability that an individual n belonging to class c chooses to pay is given by:

$$\mathbf{P}_u(\mathbf{u}_n = \mathbf{1}|\mathbf{Z}_n, \mathbf{S}_n^*, \text{Bid}_n, c) = \mathbf{F}(\boldsymbol{\beta}_1^c \mathbf{Z}_n + \boldsymbol{\beta}_2^c \mathbf{S}_n^* + \boldsymbol{\beta}_3^c \ln(\text{Bid}_n)) \tag{2.4}$$

where $\beta_1^c = \boldsymbol{\alpha}_1^c/\sigma^c$, $\beta_2^c = \boldsymbol{\alpha}_2^c/\sigma^c$ and $\beta_3^c = -\mathbf{1}/\sigma^c$. The median WTP in class c is given by $\text{Med}(\mathbf{WTP}_n^c) = \exp\left\{-\frac{\boldsymbol{\beta}_1^c \mathbf{Z}_n + \boldsymbol{\beta}_2^c \mathbf{S}_n^*}{\beta_3^c}\right\}$.

The responses to the attitudinal questions are categorically ordered and are measured in a Likert scale taking values from 1 to T. These responses are denoted by a $(p \times 1)$ vector $\mathbf{I}_n = (\text{I}_{n1,...,}\text{I}_{nJ})'$. Each response j of an individual n can be represented as follows:

$$\mathbf{I}_{nj} = \begin{cases} \mathbf{T}_j \; if \;\; \boldsymbol{\tau}_{j,T_j-1}^c < \text{I}_{nj}^* \\ \mathbf{T}_j - 1 \; if \;\; \boldsymbol{\tau}_{j,T_j-2}^c < \text{I}_{nj}^* < \boldsymbol{\tau}_{j,T_j-1}^c \\ \qquad\qquad . \\ \qquad\qquad . \\ \qquad\qquad . \\ 2 \qquad if \;\; \boldsymbol{\tau}_{j,1}^c < \text{I}_{nj}^* < \boldsymbol{\tau}_{j,2}^c \\ 1 \qquad if \;\; \text{I}_{nj}^* < \boldsymbol{\tau}_{j,1}^c \end{cases} \tag{2.5}$$

where $\boldsymbol{\tau}_{j,k}^c$ represents the threshold of switching from category $k-1$ to category k when an individual belongs to class c, and $\mathbf{I}_{nj}^*$ represents the corresponding latent unobserved response. We denote by $\boldsymbol{\tau}$ the vector of all $\boldsymbol{\tau}_{j,k}^c$, $j = 1, ..., p, k = 1, ..., T-1$.

The responses to the attitudinal questions are denoted by a $p \times 1$ vector $\mathbf{I}_n^*$, and are assumed to depend on the class c, the response to the CV, $\mathbf{u}_n$, and the subjective

scaling $\mathbf{S}_n^*$ according to:

$$\mathbf{I}_n^* = \boldsymbol{\Theta}^c + \Psi^c \mathbf{u}_n + \Lambda^c \mathbf{S}_n^* + \boldsymbol{\varepsilon}_n^c \tag{2.6}$$

where $\boldsymbol{\Theta}^c$ and Ψ^c are $p \times 1$ vectors of parameters and Λ^c is a $p \times m$ vector of factor loadings for class c, respectively, and $\boldsymbol{\varepsilon}_n^c$ is a $p \times 1$ vector of measurement errors that follow a distribution $D(0, \Sigma_{\varepsilon}^c)$. In our application we use a logistic distribution.

If all the elements of the vector of factor loadings Λ^c are equal to zero in a given class c, then the model assumes that every individual in that class interprets the Likert scale similarly when responding to all the attitudinal questions. On the other hand, if some of the elements of Λ^c are statistically different from zero, it means that the individuals in that class interpret the Likert scale differently and, as a result, may provide different responses. Moreover, this model allows us to test if this scale usage heterogeneity in a given class is associated or not with different WTPs by checking the significance of $\boldsymbol{\beta}_2^c$ in equation (2.4). If $\boldsymbol{\beta}_2^c$ turns out not to be significant, it means that although the individuals in class c may provide different responses to some of the attitudinal questions, they may still be considered as homogeneous in terms of the underlying WTP distribution.

From equations (2.5) and (2.6) we derive the probability of individual n answering $\mathbf{I}_n$ conditional on belonging to a particular class c, having responded $\mathbf{u}_n$, and the subjective scaling $\mathbf{S}_n^*$, which is denoted as $\mathbf{g}_I(\mathbf{I}_n|\mathbf{u}_n, \mathbf{S}_n^*, c)$. The observed explanatory variables, $\mathbf{Z}_n$, may also affect the subjective scaling $\mathbf{S}_n^*$. Thus, the structural equation for this relationship is described by

$$\mathbf{S}_n^* = \boldsymbol{\Phi}^c \mathbf{Z}_n + \boldsymbol{\xi}_n^c \tag{2.7}$$

where $\boldsymbol{\Phi}^c$ is a $m \times l$ coefficient matrix, and $\xi_n^c \sim D(0, \Sigma_{\xi}^c)$ is a $m \times 1$ vector of $i.i.d.$ random variables for each class c.

The combination of equations (2.4) and (2.7) gives the probability that an indi-

vidual n belongs to class c conditional on responses to $\mathbf{I_n}, \mathbf{u}_n$, explanatory variables $\mathbf{Z}_n$, and subjective scaling $\mathbf{S}_n^*$ is:

$$\mathbf{P}(\mathbf{c_n} = \mathbf{c}|\mathbf{I_n}, \mathbf{u}_n, \mathbf{Z}_n, \mathbf{S}_n^*, \text{Bid}_n; \boldsymbol{\theta}) = \frac{\mathbf{P}(c_n = c)\mathbf{P}(u_n = i|\mathbf{Z}_n, \mathbf{S}_n^*, \text{Bid}_n, c)\mathbf{g}_I(\mathbf{I}_n|\mathbf{u}_n, \mathbf{S}_n^*, c)}{\sum_{c=1}^{C} \mathbf{P}(c_n = c) \times \mathbf{P}(u_n = i|\mathbf{Z}_n, \mathbf{S}_n^*, \text{Bid}_n, c)\mathbf{g}_I(\mathbf{I}_n|, \mathbf{u}_n, \mathbf{S}_n^*, c)} \tag{2.8}$$

The joint probability of the responses to the CV and attitudinal questions, conditional on the exogenous explanatory variables, $\mathbf{Z}_n$ and Bid_n is given by

$$\mathbf{f}(\mathbf{I_n}, \mathbf{u}_n|\mathbf{Z}_n, \text{Bid}_n, \boldsymbol{\theta}) = \sum_{c=1}^{C} \int_{S^*} \prod_{i=1,2} \mathbf{1}(\mathbf{u}_n = \mathbf{i})\mathbf{P}_u(\mathbf{u}_n = \mathbf{i}|\mathbf{Z}_n, \mathbf{S}_n^*; \boldsymbol{\beta}^c, \boldsymbol{\sigma}^c) \times \tag{2.9}$$

$$\times \mathbf{P}(c_n = c)\mathbf{g}_I(\mathbf{I}_n\ |\mathbf{u}_n, \mathbf{S}_n^*; \boldsymbol{\sigma}^c, \boldsymbol{\Lambda}^c, \boldsymbol{\Sigma}_\varepsilon^c)\mathbf{g}_{\boldsymbol{S}^*}(\mathbf{S}_n^*\ |\boldsymbol{\Phi}^c, \boldsymbol{\Psi}^c, \boldsymbol{\Sigma}_\xi^c)\mathbf{d}\mathbf{S}_n^*$$

where $\mathbf{1}(.)$ is the indicator function, $\mathbf{P}_u$ is the probability that an individual n pays ($\mathbf{u}_n = \mathbf{1}$) or does not pay ($\mathbf{u}_n = \mathbf{0}$), given by (2.4), $\mathbf{g}_I$ is the probability density function of the observed responses to attitudinal questions obtained by equations (2.5) and (2.6), $\mathbf{g}_{S^*}$ is the probability density function of the subjective scaling derived from equation (2.7), and

$$\boldsymbol{\theta} = \left\{(\boldsymbol{\beta}_1^c, \boldsymbol{\beta}_\mathbf{2}^\mathbf{c}, \boldsymbol{\beta}_\mathbf{3}^\mathbf{c}, \boldsymbol{\Lambda}^c, \boldsymbol{\Phi}^c, \boldsymbol{\Psi}^c, \boldsymbol{\Sigma}_\varepsilon^c, \boldsymbol{\Sigma}_{\boldsymbol{\varepsilon}}, \boldsymbol{\Sigma}_{\boldsymbol{\xi}}, \boldsymbol{\tau}^\mathbf{c}, \boldsymbol{\sigma}^c, \delta^c, \boldsymbol{\gamma}^c), c = 1, 2, ..., C\right\} \tag{2.10}$$

is a vector of the parameters of the model. The integration takes place over the subjective scaling $\mathbf{S}^*$.

Finally, the maximum likelihood estimator can be obtained by

$$\max_\theta \mathbf{L}(\boldsymbol{\theta}) = \max_\theta \left(\prod_{\mathbf{n=1}}^{\mathbf{N}} \mathbf{f}(\mathbf{I_n}, \mathbf{u_n}|\mathbf{Z_n}, \text{Bid}_\mathbf{n}, \boldsymbol{\theta}) \right) \tag{2.11}$$

where N denotes the number of individuals in the sample.

2.3. Case Study

The data for the empirical application were collected in the summer of 2006, in the Alto Douro Wine Region located in the north of Portugal, to the east of the city of Oporto, in the north of Portugal. The Alto Douro Wine Region became part of UNESCO's World Heritage cultural landscape in 2001. This landscape is comparable to the rice-growing terraces of Banaue in the Philippines. This site is one of the oldest historical winemaking regions in the world, where the famous Port Wine is produced. However, in the last three decades the old vineyards have undergone transformation in order to decrease costs and increase production efficiency. This transformation causes the destruction of the original landscape.

To preserve the unique landscape of this region, which is an important recreation site, the winegrowers have to be compensated for the incurred cost. To evaluate the benefits from the preservation of the traditional attributes of the vineyard landscape in the Douro Valley, an on-site face-to-face survey of a random sample of visitors to the site was conducted. The money raised would go to a public institution that would compensate winegrowers for the incurred costs of keeping the traditional landscape. The payment mechanism that was proposed to respondents was an annual payment that would be collected in addition to the annual income tax.

In order to evaluate the willingness-to-pay for the landscape preservation, the questionnaire included a CV question in the form of referendum dichotomous choice. Each respondent was asked a CV question about an improvement in the level of preservation. The status-quo is the case of no preservation, and the bids vary among the respondents. After the CV question the respondents were asked several attitudinal questions related to the budget constraint (B1-B4) associated with rational behavior, the quality of institutions (I1-I4), and fairness issues (F1-F3), represent-

ing protesting behavior (see Appendix for details). All attitudinal questions were measured on a 5-point Likert scale (from strongly disagree (1) to strongly agree (5)). As for some categories there were few responses, they were merged with the adjacent ones.

The sample used in this paper has 706 observations. Table 2.1 provides descriptive statistics for all the variables used in the estimations. In Table 2.2, the distribution of responses to the attitudinal questions with merged categories is presented. As can be seen from this table, many respondents answered 3 and 4 on a Likert scale, meaning that they agreed or strongly agreed with the corresponding statements.

2.4. Estimation Results

In order to identify the optimal number of classes for the model, we use five information criteria, namely AIC, BIC, ABIC, AICC, and CAIC. As seen in Table 2.3, the majority are in favor of the model with three classes. The results for this model are shown in Table 2.4. The first section of Table 2.4 corresponds to equation (2.6) where the factor loadings are presented. The next section corresponds to equation (2.7) where the relationship between the subjective scaling and socioeconomic and preference variables is explored. In the third section we present the results for the CV equation (2.4),and in the fourth the justification bias is presented. Finally, the last section shows the median WTP, the confidence interval for WTP, the number of parameters, probability of belonging to each class, and entropy.

We start by characterizing each class based on the corresponding estimated parameters. The estimation results of the CV equation (2.4) are presented in the third section of Table 2.4. The significant estimates of ln(Bid) in classes 1 and 2 suggest that individuals in these classes value the good. We note that the difference found in the estimated WTPs is not negligible, and can be attributed to the different protest

attitudes of individuals in those classes. In contrast to the other two classes, in class 3 ln(Bid) is not significant, suggesting that individuals in this class do not value the good.

Following Cunha-e-Sá *et al.* [11], we allow individuals to justify the response to the CV question when responding to the set of attitudinal questions. This behavior is known as justification bias. The estimated coefficients for the budget constraint issues and justification biases with respect to the lack of trust in institutions and fairness issues are presented in the second section of Table 2.4. The estimates on institutional (I2-I4) issues are significant in class 1. When individuals refuse to pay because the bid is above their WTP it may be the case that they try to justify their negative CV response by looking like a protestor. Also, the individuals in classes 1 and 2 use the budget constraint attitudinal questions to justify the "Not Pay" CV answer by inflating the responses to those questions, representing rational behavior. Therefore, we may conclude that justification biases with respect to institutions and fairness issues are a sensitive issue for those individuals.

The presence of justification implies that the probability distributions of the responses to some of the attitudinal questions are shifted to the right for the "Pay" answers compared to the "Not Pay" ones, as can be observed when comparing the results in Tables 2.5 to 2.6, respectively. In both tables we observe that the distributions of the responses to questions I1-I4 and F1-F3 for class 2 are shifted to the right relative to those in class 1, underlscoring the importance of the lack of trust in institutions and fairness issues for respondents in class 2. Therefore, we conclude that class 1 represents individuals with low protest attitudes (non-protestors), while class 2 represents those with high protest attitudes (protestors).

Regarding rational behavior captured by the responses to the questions (B1-B4) in Table 5A, we find that the modes of the distributions in classes 1 and 2 are mostly disagree and strongly disagree (B1, B3, and B4), respectively. Comparing these classes with respect to the institutional and fairness issues for "Pay" responses,

we find that the mode in class 1 is either indifferent (I2 and I3) or agree (I1 and I4), while in class 2 the mode is either agree (I2 and I3) or strongly agree (I1 and I4). Concerning the fairness issues, in class 1, the mode ranges from disagree to agree, while in class 2 the mode is between strongly disagree and strongly agree (F1, F3, and F2, respectively).

Based on these results, we conclude that individuals in class 1 have lower protest attitudes compared to individuals in class 2. Therefore, the calculated median WTP (34.12 Euros) in class 1 is expected to be closer to the "true" one. Nevertheless, the individuals in class 2 that have a higher protest attitude are also willing to pay some positive amount even though the estimated median WTP (8.29 Euros) is substantially lower than in class 1.

2.4.1. Scale Usage Heterogeneity

We now discuss the estimation results regarding scale usage heterogeity. We first test for its presence, second, explore its causes, and third examine how the subjective scaling and socioeconomic and preferences variables affect the responses to the attitudinal questions.

Since the estimated coefficients of the subjective scaling variable are significant (first section of Table 2.4), the presence of scale usage heterogeneity among respondents within each class is confirmed. For instance, in class 1, the factor loadings are significant only for the institutional issues (I2-I4), while in classes 2 and 3 the factor loadings are significant for budget constraint, institutional, and fairness issues (B2, I1-I4, and F3 in class 2 and B1, B3, and I4 in class 3). Given these results, we may conclude that the subjective scaling of individuals affects the responses to some attitudinal questions, and varies across classes.

Moreover, we test whether the individual subjective scaling can be directly associated with the economic valuation of the good, in particular, if it is significant in the CV question (third section of Table 2.4). As observed, the estimated coefficients

of this variable are not statistically significant in all classes. This means that the estimated WTP is representative of all individuals within each class, and is unrelated to the individual subjective scaling.

As stated by Rossi *et al.* [22], scale usage heterogeneity is a well documented phenomenon. However, its causes are not well understood. In our model we explore the association between the subjective scaling and individual characteristics, such as gender, employment status, and the previous visits to the site. The results are shown in the second section of Table 2.4. While the estimated coefficients on visit are positive and significant in classes 1 and 2, the estimated coefficient on gender is significant only in class 1. Regarding the employment status (emp), we find that the coefficients on this variable are significant in classes 2 and 3, positive and negative, respectively.

Since in non-protestor class, class 1, we find positive and significant factor loadings on the institutional issues (I2-I4), we may conclude that the individuals that previously visited the site use the higher values on the Likert scale to answer those questions. Also, when compared to males in this class, females use the lower values when responding to those questions.

In protestor class, that is, class 2, the significant positive factor loadings on I1-I4 and F3, and coefficients on visit and emp suggest that those that are employed and have previously visited the site state higher values when responding those attitudinal questions. Therefore, as taxes represent a high burden on salaries, misuse of tax revenues by public institutions is a highly sensitive issue, especially for employed citizens. At the same time, the factor loading on B2 is negative, meaning that employed respondents who previously visited the site provide lower values when responding to this attitudinal question, suggesting that they can afford to pay for the good.

These results also show that individuals in classes 1 and 2 that have previously visited the site use the upper end of the scale when responding the institutional

attitudinal questions. Therefore, independently of the degree of protesting, efficiency of institutions is an issue for those who show a preference for the valued good.

2.5. Conclusion

We contribute to the CV literature by addressing scale use heterogeneity in the context of LCM. Our approach enables us to better understand individual behavior when responding CV surveys that include attitudinal questions.

Our model is applied to a CV survey conducted in the Alto Douro Wine Region, Portugal, to elicit the WTP to maintain the traditional landscape in the presence of different sources of protest attitudes. We find evidence that respondents within the same class, that is, with similar preferences and attitudes, interpret the Likert scale differently when responding to the attitudinal questions. We show that grouping individuals into classes with respect to their protest attitudes as well as to the economic valuation of the good allows for identifying different patterns of scale usage heterogeneity within a given sample, thereby, highlighting the most sensitive issues for each particular group and across groups with different characteristics. This could not be captured without testing for the impact of the subjective scaling.

Finally, the methodology followed is flexible enough to be easily extended and applied to account for different behavioral and psychological attitudes. While in our application it is not possible to check how close the predicted WTP is to the actual unobserved one, it would be interesting to make this comparison in other contexts, such as when both revealed and stated preference data are available. This is left for future research.

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2.A. Appendix

2.A.1. Attitudinal Questions

- Budget Constraint Issues (B1–B4):

  B1. The values are too high

  B2. I can't afford to pay anything right now

  B3. The landscape preservation is not my problem

  B4. I would rather pay more important things

- Institutions (I1–I4):

  I1. The landscape should be preserved with the current taxes

  I2. I think money will be used for other purposes

  I3. This payment will not insure the preservation of the landscape

  I4. I already pay enough taxes for this preservation

- Fairness Issues (F1–F3):

  F1. The residents of the region should pay for this preservation

  F2. The local authorities and tourist operators should pay for this preservation

  F3. It is not fair to ask me to pay

Notes:
All attitudinal questions were measured on a 5-point Likert scale (from strongly disagree (1) till strongly agree (5)). However, for some categories there were a few responses, therefore, these categories were merged to the closest one. In Table 2.2 the responses to the attitudinal questions with merged categories are presented.

2.A.2. Tables

Table 2.1: *Descriptive Statistics*

Variable	Mean	SD	Min	Max	Description
CV answer	0.32	0.47	0	1	Answer to the CV question (1=Pay, 0=Not Pay)
Bid	46.7	29.7	10	100	Bid for the CV question in Euros
Age	45.3	13.7	18	85	The age of the respondent
Emp	0.78	0.41	0	1	Employment Condition (1=Employed, 0=otherwise)
Visit	0.59	0.49	0	1	(1=If respondent has visited this place before, 0=otherwise)
Gender	0.47	0.25	0	1	(1=If respondent is a female, 0= respondent is a male)

Table 2.2: *Distribution of Answers to the Attitudinal Questions (%)*

Attitudinal Questions	Adjusted Scale			
	1	2	3	4
B1[a]	27.2	17.6	37.1	18.1
B2[b]	8.9	32.6	32.2	26.3
B3[b]	25.8	54.4	7.1	12.7
B4[a]	27.9	32	32.7	7.4
I1[a]	4.2	7.1	60.9	27.8
I2[a]	11.9	28.9	41.5	17.7
I3[a]	13	31.6	38.2	17.1
I4[a]	6.1	12.3	54.4	27.2
F1[b]	21.1	50.8	13.7	14.3
F2[a]	18.4	13.7	48.6	19.3
F3[a]	16.9	15.6	52.1	15.4

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

Table 2.3: *Model Selection Criteria*

Criteria	Number of Classes		
	2 Classes	3 Classes	4 Classes
LL	-8801	-8614	-8507
AIC	17848	17593	17509
BIC	18409	18423	18636
ABIC	18019	17845	17851
AICC	17900	17720	17776
CAIC	18075	17928	17965
# of parameters	123	182	247

Table 2.4: *Estimation Results*

	Class 1	Class 2	Class 3
Factor Loadings in Equation (2.6)			
B1	0.137 (0.73)	-0.374 (0.11)	0.845 (0.00)
B2	0.752 (0.22)	-0.407 (0.03)	1.984 (0.11)
B3	0.332 (0.20)	0.412 (0.10)	1.586 (0.00)
B4	0.188 (0.54)	0.249 (0.39)	0.280 (0.27)
I1	0.023 (0.91)	0.929 (0.01)	-0.099 (0.60)
I2	2.141 (0.00)	1.105 (0.01)	-0.168 (0.66)
I3	1.242 (0.00)	2.416 (0.01)	0.046 (0.87)
I4	1.720 (0.04)	2.063 (0.02)	0.342 (0.06)
F1	0.227 (0.51)	0.112 (0.79)	1.473 (0.28)
F2	-0.010 (0.97)	0.143 (0.62)	0.162 (0.44)
F3	2.808 (0.29)	0.967 (0.02)	0.388 (0.18)
Measurment Equation (2.7)			
visit	0.892 (0.00)	0.667 (0.00)	-0.074 (0.72)
gender	-0.456 (0.09)	0.222 (0.29)	0.284 (0.36)
emp	0.375 (0.13)	0.821 (0.00)	-1.321 (0.00)
CV Equation (2.4)			
constant	2.730 (0.01)	2.712 (0.14)	0.016 (0.99)
factor	0.281 (0.46)	-0.486 (0.44)	-0.159 (0.70)
ln(Bid)	-0.784 (0.01)	-0.963 (0.00)	-0.290 (0.36)
Estimated Ψ^c in Equation (2.6)			
"Justification Bias"			
B1	-2.415 (0.09)	-1.438 (0.00)	-0.943 (0.39)
B2	-2.644 (0.30)	-1.091 (0.01)	0.487 (0.59)
B3	-1.854 (0.00)	-0.868 (0.01)	0.042 (0.95)
B4	-2.470 (0.43)	-1.364 (0.02)	-0.243 (0.81)
I1	-0.686 (0.19)	0.019 (0.98)	-0.455 (0.37)
I2	-4.321 (0.00)	-0.846 (0.24)	0.081 (0.86)
I3	-2.666 (0.03)	-1.774 (0.18)	-0.555 (0.14)
I4	-2.473 (0.03)	-1.243 (0.25)	-1.167 (0.01)
F1	-0.327 (0.65)	-0.887 (0.17)	0.721 (0.42)
F2	0.366 (0.53)	0.781 (0.17)	-0.740 (0.45)
F3	-3.171 (0.34)	-1.769 (0.02)	-2.078 (0.01)
Median(WTP) / S.E.	34.12 / 0.48	8.29 / 0.53	1.48 / 0.25
Confidence Interval of Median(WTP)	[33.16 , 35.07]	[7.25 , 9.23]	[0.99 , 1.97]
Number of Observations per Class	229	220	257
Probability	0.33	0.31	0.36
Entropy		0.78	
Number of Parameters		182	
Number of Observations		706	

Notes:
In parentheses are p-values
WTP is in Euros
SE is a standard error/the standard errors for the median WTP are computed by using the delta method

Table 2.5: *Estimated Conditional Probabilities of Answers to the Attitudinal Questions, Pay (%)*

Attitudinal	Class 1				Class 2				Class 3			
Questions	1	2	3	4	1	2	3	4	1	2	3	4
B1[a]	32	50	17	1	55	7	20	18	46	16	35	3
B2[b]	1	25	70	4	33	51	9	7	1	28	34	37
B3[b]	35	59	4	2	55	36	1	8	8	77	7	8
B4[a]	31	62	7	0	69	14	11	6	25	27	45	3
I1[a]	3	13	80	4	3	2	24	71	7	9	74	10
I2[a]	21	77	2	0	11	21	42	26	10	21	61	8
I3[a]	22	70	8	0	4	18	63	15	20	35	40	5
I4[a]	3	34	63	0	4	6	31	59	8	18	67	7
F1[b]	6	63	24	7	72	21	3	4	1	60	14	25
F2[a]	9	25	63	3	14	4	17	65	28	11	57	4
F3[a]	6	52	42	0	26	19	46	9	48	22	28	2

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

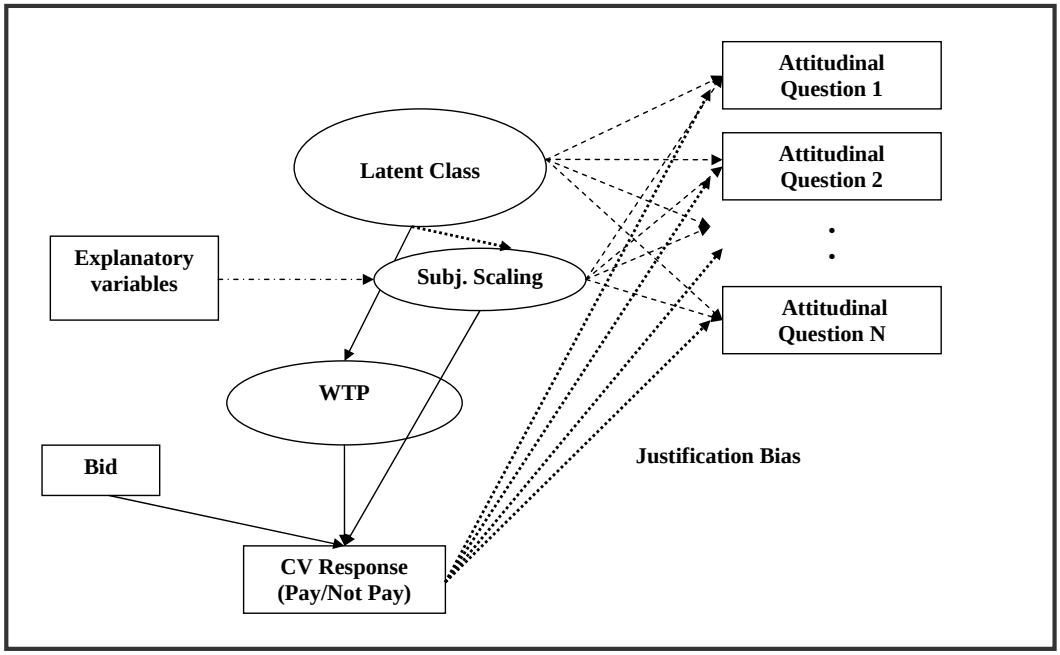
Table 2.6: *Estimated Conditional Probabilities of Answers to the Attitudinal Questions, Not Pay (%)*

Attitudinal	Class 1				Class 2				Class 3			
Questions	1	2	3	4	1	2	3	4	1	2	3	4
B1[a]	4	24	61	11	23	5	24	48	25	14	54	7
B2[b]	0	2	60	38	14	49	18	19	2	38	34	26
B3[b]	8	63	19	10	34	47	3	16	9	77	7	7
B4[a]	4	49	46	1	36	18	25	21	21	25	50	4
I1[a]	2	7	84	7	3	3	23	71	5	6	74	15
I2[a]	0	37	62	1	5	12	38	45	10	22	60	8
I3[a]	2	42	56	0	1	3	45	51	12	29	51	8
I4[a]	0	5	95	0	1	2	14	83	3	7	72	18
F1[b]	5	57	29	9	51	34	7	8	2	74	10	14
F2[a]	13	30	55	2	27	6	21	46	16	8	68	8
F3[a]	0	5	95	0	6	6	50	38	10	13	63	14

Notes:
a. Levels 1 and 2 in a Likert scale are measured in a level 1 in the table
b. Levels 4 and 5 in a Likert scale are measured in a level 4 in the table

2.A.3. Figures

Figure 2.1: *General Representation of the Model*



Chapter 3.

Life (Dis)satisfaction and the Decision to Migrate: Evidence from Central and Eastern Europe

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Abstract

This paper provides empirical evidence of the impact of life satisfaction on the individual intention to migrate. The impacts of individual characteristics and of country macroeconomic variables on the intention to migrate are analyzed jointly. We allow for life satisfaction to serve as a mediator between macroeconomic variables and the intention to migrate. Using the Eurobarometer Survey for 27 Central Eastern European (CEE) and Western European (non-CEE) countries, we find that people have a higher intention to migrate when dissatisfied with life. The socio-economic variables and macroeconomic conditions affect the intention to migrate indirectly through life satisfaction. The impact of life satisfaction on the intention to migrate for middle-aged individuals with past experience of migration, low level of education, and with a low or average income from urban areas is higher in CEE countries than in non-CEE countries.

Keywords: life satisfaction, migration, decision making

JEL Classification: I31, J61

3.1. Introduction

The factors driving the individual decision to migrate such as job and educational opportunities, expected income, relative deprivation, a better provision of social benefits and public goods, etc., have been widely explored in the literature.[1] However, non-pecuniary aspects also play a role in migration decisions (see Stark [54]). For instance, during conflict periods such as wars, terrorist attacks, and other regional instabilities, higher migration flows are observed regardless of any pecuniary aspects.[2] Also, the quality of institutions such as civil liberties, political rights, protection of property rights, corruption, and the level of institutionalized democracies (e.g., dictatorship) cause migration flows even when monetary benefits are sufficiently high in the country of origin.[3] As a result, these non-pecuniary aspects as well as tastes and culture, hidden reasons and motives such as a feeling of deserving a better life, and a feeling of fairness, affect the decision to migrate but may not be observed by a researcher. In this case a life satisfaction measure may be used as a proxy for both pecuniary and non-pecuniary aspects.[4] In fact, many surveys include questions regarding life satisfaction, where individuals evaluate the overall quality of their own life, providing the information that can be used for those purposes.

In the literature, only a few studies have investigated the relationship between life satisfaction and individual decisions and activities. Examples of such studies are Antecol & Cobb-Clark [4], Clark [17], Freeman [30], among others, who use job satisfaction as a predictor of future job quits. Lyubomirsky et al. [45] suggest that satisfied with life people are likely to be more successful and socially active, while Frey & Stutzer [32] argue that people who are satisfied with life are more likely to decide to get married. Guven et al. [37] examine the effect of the gap in happiness

[1] See Berger & Blomquist [5], Borjas[15], De Jong et al. [19], Dustmann [26], Gibson & McKenzie [33], Greenwood [35], Kennan & Walker [41], Stark [55], Stark & Bloom [56], Stark & Taylor [57], Stark & Wang [58], Tiebout [60], among others.

[2] See Bohra-Mishra & Massey [13], Dreher et al. [25], Morrison [47], Sirkeci [52], among others.

[3] See Bertocchi & Strozzi [6] and [7], among others.

[4] See Lyubomirsky et al. [46] and De Neve et al. [21].

between spouses on the probability to divorce. Besides the potential benefit of using the life satisfaction measure in the analysis, the major cost is potential endogeneity. For instance, in a recent paper, Guven [36], using the instrumental variable approach to overcome endogeneity, claims that people who are satisfied with life spend less and save more.

Our paper contributes to the existing literature on migration and life satisfaction, and opens the discussion about the ability of using subjective indicators to capture different factors affecting the migration decision. Using the Eurobarometer survey for 27 Central Eastern (CEE) and Western European (non-CEE) countries in the period of 2008, we examine the impact of life satisfaction on the individual intention to migrate (hereafter, migration decision).[5]

In our analysis, we distinguish three types of leaves: internal, temporary international, and permanent international leaves (hereafter, permanent and temporary migrations). Of particular interest is the impact of life satisfaction on individual permanent and temporary migration decisions. In order to explain the permanent and temporary migrations, we combine individual and country level variables that may affect the migration decision. Individual variables are represented by socio-economic characteristics such as age, income, education, and past experience of migration, while country level variables are unemployment, GDP per capita, inequality, and the quality of governance. Country level variables and socio-economic characteristics are allowed to affect the individual migration decision not only directly but also through life satisfaction. That is, differently from other studies, in this paper, life satisfaction plays the role of a mediator between country-wide economic and political conditions and the individual intention to migrate. The impacts of individual characteristics and of country macroeconomic variables on the decision

[5] Central and Eastern European countries in our sample are Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. Western European countries are Austria, Belgium, Cyprus (Republic), Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

to migrate are analyzed jointly.

The empirical findings indicate that people have a higher intention to migrate when dissatisfied with life. The results hold for all types of leaves: internal, temporary international, and permanent international. The socio-economic variables and macroeconomic conditions have an effect on the intention to migrate indirectly through life satisfaction. We also find differences in migration decisions between the CEE and Western Europe. The impact of life satisfaction on the intention to migrate for middle-aged individuals with past experience of migration, low level of education, and with a low or average income from urban areas is higher in CEE countries than in non-CEE countries. The empirical findings of this paper shed some light on how migration flows vary for different groups of individuals in those regions.

The rest of the paper is organized as follows. The next section briefly reviews the relevant literature. Then we present the empirical framework and robustness check, describe data, and discuss estimation results. The final section concludes.

3.2. Literature Review

The relationship between migration and life satisfaction has not yet been thoroughly examined in the economic literature. Existing studies at the individual level focus mostly on the life satisfaction of actual migrants and of their next generations. For instance, De Jong, Chamratrithirong, & Tran [20] study the life satisfaction of migrants in Thailand and argue that life satisfaction typically decreases after moving to a different place, while Easterlin & Zimmerman [29] argue that migrants from Eastern to Western Germany are relatively less satisfied than the locals living in the Western part. Safi [50] also suggests that immigrants in Europe and their generations are less satisfied than the natives.

At the country level, Blanchflower, Saleheen, & Shadforth [9] and Blanchflower

& Shadforth [10] analyze the migration flows from Central and Eastern Europe. The authors find that the higher number of immigrants in the UK is from those CEE countries that have a lower GDP per capita and a lower average life satisfaction. Such pattern invites us to attempt to disentangle the effects of country level variables and life satisfaction on the migration decision in CEE and non-CEE countries.

In labor economics, the use of job satisfaction anchored to labor mobility has received substantial attention. Most studies in this stream of literature argue that job dissatisfaction is a strong predictor of job quit intentions as well as actual quits (see Antecol & Cobb-Clark [4], Bockerman & Ilmakunnas [11], Clark [17], Freeman [30], Shields & Ward [51], Stevens [59], among others).

In a seminal study, Freeman [30] argues that the importance of satisfaction data for studying labor mobility is underestimated in the economic literature. The author suggests using individual satisfaction to evaluate the indirect effects of observed variables as well as a proxy for unobserved objective factors. For instance, job satisfaction may serve as an indicator of workplace quality. In line with this suggestion, Clark [17] points out that different job satisfaction domains, for instance, satisfaction with career opportunities, relations with supervisors, use of initiative, reflect unobservable job quality characteristics that can be used to measure the probability of job quits. Using data from BHPS, the author finds that dissatisfaction with payment, working hours, the type of work, job security, and the use of initiative are significant predictors of future actual job quits. Bockerman & Ilmakunnas [11] analyze Finnish data and argue that job dissatisfaction as a proxy for adverse working conditions induces quit intentions and actual job quits. The topic of job satisfaction and quits in different contexts is further explored by Antecol & Cobb-Clark [4] for military personnel, by Shields & Ward [51] for nurses, and by Stevens [59] for academics. All these studies underline the role of dissatisfaction in labor mobility and provide a rationale for studying the implications of dissatisfaction and migration intention.

In our paper, we examine the individual intention to migrate, not the actual migration decision. The psychological theories of reasoned action and planned behavior suggest that the individual intention predicts the actual decision and behavior.[6] As the predictions of these theories suggest, the better incorporation of individual (e.g., information, abilities, and emotions) and external (e.g., opportunity costs and external barriers for performing a behavior) factors into the model of hypothetical decisions reduces the gap between intended and actual behaviors (see Ajzen & Fishbein [2], Ajzen [1], and Hale & Householder [38]). Recently, in the context of a Prisoner's Dilemma game, Vlaev [61] argues that real and hypothetical decisions are different. However, a common critique to such findings is that they cannot be generalized to the whole population due to the use of students in the experiments. Also, the actual data may be too costly or rarely available to the researcher.

Data on individual intentions rather than actual labor mobility are also used in some economic studies (see Antecol & Cobb-Clark [4], Kristensen & Westergerd-Nielsen [42], Shields & Ward [51], among others). In the context of migration, empirical evidence in favor of a strong link between the intended and actual decision is provided by Gordon & Molho [34] and Boheim & Taylor [12]. Gordon & Molho [34] conclude that in the UK, a high share of people who intend to migrate actually moves within five years. Furthermore, Boheim & Taylor [12] argue that the actual probability to move for potential migrants is three times higher than for those who do not intend to move. Therefore, the analysis of the individual intention to migrate is important for understanding the actual migration decision-making process.

[6] See Ajzen & Fishbein [3] for an extensive review of the psychological literature on intentions and actual behavior; see Rabinovich & Webley [48] for the psychological factors affecting the realization of intentions into actual behavior.

3.3. Methodology

3.3.1. The Model

In this section we present the theoretical framework of the individual intention to migrate. An individual i is faced with a choice between the following alternatives: stay in the home country (1), move to another country permanently (2), move to another country temporarily (3), and move within home country (4). Following Dolan & Kahneman [24], we consider life satisfaction as a proxy to experienced utility. Using the additive random utility model for multiple alternatives as described by Cameron & Trivedi [16], the individual utility associated with the k^{th} alternative can be represented as follows:

$$U_{ik} = V_{ik}(\mathbf{x}_i, \mathbf{c}) + \varepsilon_{ik}, \ k = 1, ..., 4 \tag{3.1a}$$

$$V_{ik}(\mathbf{x}_i, \mathbf{c}) = \mathbf{x}_i' \boldsymbol{\beta}_\mathbf{k} + \mathbf{c}' \boldsymbol{\gamma}_\mathbf{k}, \tag{3.1b}$$

where U_{ik} represents the experienced utility of an individual i in a destination k. k represents four alternatives to migrate. $V_{ik}(x_i, c)$ represents the deterministic component of utility. In this study $V_{ik}(x_i, c)$ is measured by the life satisfaction score. ε_{ik} is the random component of utility that stands for individual unobserved characteristics. x_i are individual i characteristics such as income, level of education, employment and marital statuses, past experience of migration, age, and gender. c represents country characteristics, which may include the level of GDP, unemployment, income inequality. $\beta_\mathbf{k}$ and $\gamma_\mathbf{k}$ are the parameters of the model.

The individual decision to migrate is based on choosing the alternative with the highest utility. Even though there may be mental and material costs of the intention to migrate, without loss of generality, these costs are assumed to be zero.[7]

An individual i decides to migrate from the home country to the destination k if

[7] In a seminal study Sjaastad [53] distinguishes between monetary and non-monetary costs of migration. However, we do not have this information in our data.

the utility after moving to the destination is higher than the one from staying in the home country and from all other destinations, $U_{ik} \geqslant U_{ih}$,all $k \neq h$. The alternative h of staying in the home country is used as the reference alternative. Thus, the probability to migrate to the destination k is expressed as follows:

$$\begin{aligned} \Pr[MigrDecision_i &= k] = \Pr[U_{ik} \geqslant U_{ih}, \text{ all } k \neq h] = \\ &= \Pr[V_{ik}(\mathbf{x}_i, \mathbf{c}) + \varepsilon_{ik} \geqslant V_{ih}(\mathbf{x}_i, \mathbf{c}) + \varepsilon_{ih}, \text{ all } k \neq h] = \\ &= \Pr[\varepsilon_{ih} - \varepsilon_{ik} \leqslant V_{ik}(\mathbf{x}_i, \mathbf{c}) - V_{ih}(\mathbf{x}_i, \mathbf{c}), \text{ all } k \neq h] \end{aligned} \tag{3.2}$$

The errors ε_{ik} are assumed to be i.i.d. type 1 extreme value, with density function

$$f(\varepsilon_{ik}) = e^{-\varepsilon_{ik}} \exp(-e^{-\varepsilon_{ik}}), \ k = 1, .., 4. \tag{3.3}$$

Given equations (3.2) and (3.3), we result in a multinomial logit model

$$\Pr[MigrDecision_i = k] = \frac{e^{V_{ik}}}{e^{V_{i1}} + e^{V_{i2}} + e^{V_{i3}} + e^{V_{i4}}}. \tag{3.4}$$

Given equation (3.1b), the probability of the decision to migrate from the home country to the destination k depends negatively on the utility of living in the home country.[8] Since life satisfaction in the destination is not available, $V_{ik}(x_i, c)$, without loss of generality, we assume that it is constant for each destination.[9] This assumption can be relaxed in future research.

In our empirical specification, we follow a two-level regression analysis. This type of analysis allows us to relate and structure the characteristics of individuals and countries in one framework.[10] As can be observed from Figure 1 in the appendix,

[8] Alternatively, the difference $V_{ik}(\mathbf{x}_i, \mathbf{c}) - V_{ih}(\mathbf{x}_i, \mathbf{c})$ has to affect the individual decision to migrate positively.

[9] One way to relax this assumption is to use the average life satisfaction in the country of destination. However, the individuals in our sample point out several destinations.

[10] Alternatively, a two-level hierarchical model with random intercepts can be estimated as described by Raudenbush & Bryk [49]. However, due to the identification issue of the model, we estimate it sequentially. The results of both approaches are similar with only a difference in the

there are two levels, namely, between (country) and within (individual) levels. At the between level in the rectangle, country political and economic variables such as GDP per capita, unemployment, inequality and others are included. At the within level, individual variables appear in the rectangles such as individual socio-economic characteristics and the variable that represents the individual intention to migrate. The dashed-dotted arrow from life satisfaction to the intention to migrate hypothesizes the causal effect. Even though the variable of interest is the intention to migrate, not the actual decision, there may be the potential endogeneity issue related to simultaneity. This issue is discussed in the next section.

The econometric model can be expressed as follows: equations (3.5a) and (3.5b1-3.5b3) are attributed to the within level, while equations (3.6a1-3.6a2) and (3.6b1-3.6b3) represent the between level.

$$\Pr(MigrDecision_i = k) = F(\beta_{0k} + \beta_{1k} LifeSat2_i + \beta_{2k} LifeSat3_i + \\ + \beta_{3k} LifeSat4_i + \beta_{4k} Econd_i + \boldsymbol{\eta_k} \mathbf{x_i} + \theta_{k,\,s} + \varepsilon_{ik}) \tag{3.5a}$$

$$LifeSatJ_i^* = \mu_{0j} + \boldsymbol{\mu_j} \mathbf{x_i} + \lambda_{j,\,s} + \epsilon_{ij},\ j = 2, 3, 4 \tag{3.5b1-3.5b3}$$

$$\theta_{k,\,s} = \gamma_{0k} + \gamma_{1k} \mathbf{Politics} + \gamma_{2k} \mathbf{Economics} + \gamma_{3k} CEE + u_k \tag{3.6a1-3.6a2}$$

$$\lambda_{j,\,s} = \pi_{0j} + \pi_{1j} \mathbf{Politics} + \pi_{2j} \mathbf{Economics} + \pi_{3j} CEE + \zeta_j, \tag{3.6b1-3.6b3}$$

where the subscript i stands for individual. The variable $MigrDecision_i$ represents an individual decision to participate in the k^{th} alternative to leave, $k = 2, 3, 4$, that is permanent international (k=2), temporary international (k=3), and internal leaves (k=4). The intention to stay in the home country (k=1) is used as the reference alternative. $LifeSat$ is an individual's self-reported satisfaction with life in the home country; $Econd_i$ is a dummy variable, which is equal to one if the decision to migrate is driven by economic factors such as higher expected income, better working and

efficiency of estimators.

housing conditions and zero if the factors are non-economic, for instance, moving closer to family or friends, or expecting a better local environment, among others. Even though some individuals answered that they do not have the intention to migrate, they also provided the possible reason.[11] x_i includes individual socio-economic characteristics, namely, age, gender, marital status, children, income, level of education, employment status, living in an urban area, and past migration experience. $\theta_{k,\,s}$ and $\lambda_{j,\,s}$ are country fixed effects that account for the average country-specific life satisfaction and the propensity to migrate. *Politics* and *Economics* are the sets of country-level political and economic variables such as GDP per capita, the unemployment rate, and the Gini coefficient. Also, we introduce a dummy variable, CEE, that is equal to one if home country is in Central and Eastern Europe and zero otherwise. These variables correspond to c in the theoretical model. θ_k and λ_j are mean country-specific intercepts, while $\varepsilon_{ik}, \epsilon_{ik}, u_k$ and ζ_j are stochastic disturbances.

The responses to life satisfaction questions are categorically ordered and take values from one to four in a Likert scale. To evaluate the effects of each level of life satisfaction on individual migration decision separately, we separate $LifeSat_i$ into four dummy variables and use the lowest level of life satisfaction as a base category in our estimations.

$$LifeSatJ_i = 1, \text{ if } LifeSat_i = j \text{ and 0 otherwise, } j = 1, ..., 4$$

The reliability of subjective data is of potential concern. However, as summarized by Frey & Stutzer [31] from the economic, sociological, and psychological literature, life satisfaction data are valid, consistent and reliable measures of individual well-being. That is, people are able to evaluate own quality of life without systematic

[11] The exact question is "Regardless of whether you might move to another country or not, which of the following might encourage you to move to another country?"

errors. Moreover, life satisfaction is relatively stable over time.[12]

To analyze the determinants of the individual migration decision, the within level equations (3.5a) and (3.5b1-3.5b3) are estimated by using the maximum likelihood estimation (MLE). By estimating equation (3.5a) using a multinomial logit model, we examine the direct impact of life satisfaction and individual socio-economic characteristics on the probability to migrate abroad permanently, temporarily, or within a country against the reference category of no leave. To analyze the determinants of life satisfaction at each level, the equations (3.5b1-3.5b3) are estimated by logit.

The estimates of country dummy variables from equation (3.5a) are taken as dependent variables for equations (3.6a1-3.6a2). These estimates represent the country fixed effects. We assume that country level political and economic variables affect the decision to migrate abroad permanently and temporarily and have no effect on the decision to migrate internally. The decision to migrate internally is likely to be affected by regional level political and economic variables that are difficult to incorporate. Therefore, the mean country-specific intercept of the permanent migration decision and the temporary migration decision are included into the between level, while the intercept of internal migration is not.

The values for the dependent variables of equations (3.6b1-3.6b3) are the estimates of country dummies from equations (3.5b1-3.5b3). The dependent variables of these equations represent the average value of being satisfied in a particular country at the satisfaction levels 2, 3, and 4, respectively. The equations (3.6a1-3.6a2) and (3.6b1-3.6b3) are estimated by ordinary least squares and allow us to analyze the effects of country level political and economic variables directly on the permanent migration decision and on life satisfaction. Since equations (3.5a), (3.5b1-3.5b3) at within (the individual level) and (3.6a1-3.6a2), (3.6b1-3.6b3) at between (the macro level) levels are estimated sequentially, we bootstrap the standard errors and cluster them at the country level.

[12] See psychological and economic studies on the set point theory of life satisfasction (Clark et al. [18]; Di Tella et al. [22]; Diener et al. [23]; Lucas et al. [43] and [44], among others).

3.3.2. Robustness Check

The econometric model presented above may be subject to several potential caveats. First, even though the use of data on the individuals who intend to migrate instead of those who actually migrate helps to circumvent a positive selection bias, the simultaneity bias in the estimates of the effect of life satisfaction on the decision to migrate is still a potential concern. Some unobserved individual characteristics such as restlessness, perfectionism, or ambition, may make people both dissatisfied with life and be prone to migration. However, these concerns of a potential simultaneity bias are common for all cross-sectional studies on satisfaction and quitting behavior, for instance, Antecol & Cobb-Clark [4] and Bockerman & Ilmakunnas [11], among others.

Second, the small number of individuals for each type of migration in our sample may produce non-robust estimation results, both at individual and country levels. Finally, there may be the cross-country differences in the life satisfaction measure.

In order to respond to these potential concerns, we redefine the intention to migrate into a binary variable, which is equal to one if an individual intends to migrate permanently, temporarily, or internally, and zero otherwise. Thus, those who intend to migrate are treated in the estimation together regardless of the type of potential migration. To address the simultaneity issue, equations related to the intention to migrate and to four levels of life satisfaction are estimated simultaneously by using a multivariate probit. In addition, we estimate a SUR model with the intention to migrate and life satisfaction equations, where life satisfaction is treated as a continuous variable. In both models, the correlation of residuals between any level of life satisfaction and the intention to migrate is not statistically significant.[13] These results suggest that there is no endogeneity problem.

Since the life satisfaction variable is categorically ordered and measured in a

[13] The estimation results are available upon request.

Likert scale, this variable can be represented as follows:

$$LifeSat_i = \begin{cases} 4 & if \quad \tau_3 < LifeSat_i^* \\ 3 & if \quad \tau_2 < LifeSat_i^* < \tau_3 \\ 2 & if \quad \tau_1 < LifeSat_i^* < \tau_2 \\ 1 & if \quad LifeSat_{\mathbf{i}}^* < \tau_1 \end{cases} \tag{3.7}$$

where τ_j represents the threshold of switching from category $j-1$ to category j, for $j = \overline{1,4}$, and $LifeSat_i^*$ represents the corresponding unobserved life satisfaction.

In order to obtain the unobserved life satisfaction of individuals, we follow the latent variable approach described by Bollen [14]. The latent variable, $LifeSat^*$, is not observed but is inferred from the responses to the question regarding life satisfaction, according to the following measurement equation:

$$LifeSat_i^* = \boldsymbol{\mu}\mathbf{x}_i + \lambda_s + \Lambda\nu_i \tag{3.8}$$

where $LifeSat_i^*$ is a continuous latent life satisfaction variable, $x_{\mathbf{i}}$ are observed individual socio-economic characteristics, λ_s are country fixed effects, and Λ is a factor loading. ν_i is a measurement error that follows a logistic distribution.

The continuous representation of life satisfaction allows us to take into account the cross-country differences in life satisfaction. Also, it helps to avoid the equi-distance problem. That is, the difference between 1 and 2 in a Likert scale in life satisfaction may not have the same impact on the intention to migrate as the difference between 3 and 4. Then, we introduce the unobserved continuous life satisfaction into the migration equation as follows:

$$Pr(MigrDecision_i = 1) = F(\beta_0 + \beta_1 LifeSat_i^* + \beta_2 Econd_i + \boldsymbol{\eta}\mathbf{x}_i + \boldsymbol{\theta}\mathbf{CD} + \varepsilon_i) \tag{3.9}$$

where ε_i is the stochastic disturbance and follows a logistic distribution. The other coefficients and explanatory variables are interpreted in the same manner as in the

previous section. Then, equations from (3.7) to (3.9) are estimated simultaneously using the robust maximum likelihood. After estimating the individual level, we proceed to the country level estimation. This estimation is similar to the one described in previous section.

3.4. The Data

The primary data source for examining the model described above is the Eurobarometer survey in 2008. This is a cross-sectional survey based on nationally representative samples that include randomly selected respondents from 27 European countries, out of which 10 are Central and Eastern European countries.[14] There are about 1000 respondents per country. The survey contains questions on individual values and attitudes towards life, previous migration experience, the intentions to migrate in the future, and individual socio-economic characteristics. Since the survey has no questions on respondent's income, we use a proxy for income, namely, the judgement regarding the financial situation of the respondent's household. The question that we use is "How would you judge the financial situation of your household? Very good (4), rather good (3), rather bad (2), very bad (1)."

The question on life satisfaction that we use is "On the whole, are you very satisfied (4), fairly satisfied (3), not very satisfied (2) or not at all satisfied (1) with the life you lead?". The mean life satisfaction scores for two waves of the Eurobarometer survey are presented in Table 1 in the appendix. As observed, there are two columns that correspond to waves of April-May 2008 and October-November 2008. In our study, we use only the wave of October-November 2008, since this is the only wave that contains information on both life satisfaction and migration. The highest mean life satisfaction in our sample is in Denmark, while the lowest is in Bulgaria. People

[14] The list of countries in our sample is Austria, Belgium, Bulgaria, Cyprus (Republic), the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

from Central and Eastern Europe report lower levels of life satisfaction than people from Western European countries. This ranking is consistent with the similar ones from other databases, e.g. World Values Survey. One may be concerned that the period used for the analysis coincides with the economic crisis. However, as observed from Table 1, there are no major changes in the average life satisfaction before and during the crisis. Moreover, small changes in the average life satisfaction observed in some countries can be attributed to psychological aspects of individuals such as the fear of losing a job.

Survey questions about intended migration used in this research are presented in Figure 2 in the appendix. The following three questions are used to construct the variable of interest $MigrDecision_i$, namely "Do you intend to move in the next five years?"; "Do you intend to move within country or to another country?"; and "How long do you expect to stay abroad?" As mentioned above, we distinguish three types of leaves: permanent international, temporary international, and internal. If an individual responds that he/she intends to move in the next five years within country, we consider such a response as the intention to migrate internally. If an individual responds that he/she intends to move in the next five years to another country for a few weeks, few months, few years, or for more than a few years but not indefinitely, we consider such a response as the intention to migrate abroad temporarily. Finally, if an individual responds that he/she intends to move in the next five years to another country for the rest of his/her life, we consider such a response as the intention to migrate abroad permanently.

Descriptive statistics for the questions on life satisfaction and intended leaves are presented in Table 2 in the appendix. The number of intended migrants for all types of leaves is about 10 percent of our sample. Thus, for some countries, we may have only a few intended migrants. However, this should not change the main conclusions of our paper.

The country level data, namely, the real GDP per capita, unemployment rates,

and Gini coefficients are obtained from the Eurostat database. We also use the Worldwide Governance Indicators (see Kaufmann, Kraay, & Mastruzzi [40]). The correlation matrix for the macroeconomic variables is presented in Table 3.

3.5. Results and Discussion

3.5.1. Individual Level Effects

In this section we present and discuss the results for the decisions to migrate permanently, temporarily, and internally. To understand the migration decision at each level of life satisfaction, life satisfaction in our estimation is represented by three dummy variables, where the default group corresponds to individuals that indicate the lowest level of life satisfaction.

Individual level estimation results for the decision to migrate and life satisfaction are obtained by estimating equations (3.5a) and (3.5b1-3.5b3) and presented in Tables 4 and 5 in the appendix, respectively. In Table 4, the columns correspond to the particular intention to migrate, namely permanent, temporary, and internal. As observed, different levels of life satisfaction have strong negative impact on each type of the intention to migrate. This means that individuals with higher levels of life satisfaction have a lower intention to migrate. We also find that different levels of life satisfaction are jointly statistically significant for all types of migration intentions (for instance, in the equation for the intention to migrate permanently, the Lagrange multiplier test (LM)=41.11***).[15] Also, the impact of being at satisfaction level 2, "not very satisfied", is different from the impacts of satisfaction levels 3, "fairly satisfied", and 4, "very satisfied" (in the equation for the intention to migrate permanently, LM=32.48*** and LM=12.58***, respectively). These results suggest that it is important to consider life satisfaction at different levels.

In Table 4, we also observe that older, married, with a child, without past ex-

[15] ***, **, * stand for 1, 5, and 10 percent significance levels, respectively.

perience of migration, and employed individuals have a lower intention to migrate, while the self-employed, from an urban area, and those for whom the decision to migrate is driven by economic factors have a higher intention to migrate.

In Table 5, the results for the within level (individual) for each level of life satisfaction are presented. Life satisfaction is higher for married, with higher income and education, and employed or self-employed individuals and is U-shaped in age (see column "very satisfied"). These results support the findings from the existing happiness literature. The effects of all variables in Table 5 represent mediating relationships with the intentions to migrate. Interestingly enough, even though in our sample we do not find the effect of income on migration intentions (see Table 4), this effect is mediated by life satisfaction (see Table 5).[16] Thus, empirical findings suggest that even though the direct effect may not be observed, the relationship may be established through life satisfaction.

Since our dependent variable, the intention to migrate, is nominal, we have computed the average marginal effects for the explanatory variables from equation (3.5a).[17] These effects are presented in Table 6A. As observed from this table, an increase in life satisfaction may lead to the increase in the probability to stay in the country of residence. In particular, as compared to individuals with satisfaction level 1, "not at all satisfied", individuals with satisfaction level 3, "fairly satisfied", and 4, "very satisfied", are more likely to stay by 5.95% and 6.49%, respectively. The average marginal effects of life satisfaction on the intention to migrate for different groups of individuals are discussed in details in Section 5.3. However, since the countries in our sample have different levels of economic development, there may be important cross-country factors that may affect the individual decision to migrate. This issue is explored in the next section.

[16] We also estimated equation (3.5a) without the life satisfaction variable, but we do not find evidence that income affects the intention to migrate either.

[17] In our explanations, we multiply the calculated marginal effects by 100.

3.5.2. Country Level Effects

The migration literature has emphasized the influence of economic and political conditions on the individual migration decision.[18] In this paper, we also examine the relationship between the intention to migrate permanently and temporarily and various country characteristics. Differently from other studies, we use life satisfaction as a mediator between the macroeconomic variables and the intention to migrate. Due to high correlations between macroeconomic variables, we select only the logarithm of real GDP per capita, the unemployment rate, and the Gini coefficient as explanatory variables for equations (3.6a1-3.6a2) and (3.6b1-3.6b3) (see Table 3).

We are also interested in analyzing the country level differences in migration intentions between CEE and non-CEE countries. However, as can be observed from Table 3, there is a strong negative correlation between the logarithm of real GDP per capita and a dummy for CEE countries. Thus, we use these variables in different model specifications.

The results for the model with the logarithm of real GDP per capita and for the model with CEE are presented in Tables 7A and 7B, respectively. We have also estimated equations (3.6a1-3.6a2) with government effectiveness and other economic variables from Table 3. The results are robust to the choice of explanatory variables.[19]

In Tables 7A and 7B, the columns labeled as "INTERCEPT PERMANENT" and "INTERCEPT TEMPORARY" correspond to equations (3.6a1-3.6a2) for the intentions to migrate permanently and temporarily at the country level.[20] As observed from these columns, none of the macroeconomic variables are statistically significant.[21] Thus, we do not have evidence that the logarithm of real GDP per capita,

[18] See Bertocchi & Strozzi [6] and [7], Borjas [15], Dustmann, Fabbri, & Preston [27], Dustmann, Hatton, & Preston [28], Greenwood [35], Stark [55], Tiebout [60], among others.

[19] The results are available upon request.

[20] We assume that country level political and economic variables have no effect on the decisions to migrate internally.

[21] We also estimated equation (3.5a) without the life satisfaction variable, but we do not find evidence that macroeconomic variables affect the intention to migrate either.

the unemployment rate, the Gini coefficient, and CEE variable affect the intention migrate permanently or temporarily directly. However, we find that these macroeconomic variables affect life satisfaction (see the columns "INTERCEPT LIFE SATISFACTION=2, 3, and 4"). In particular, the fraction of individuals "not very satisfied" (satisfaction level 2) decreases if GDP per capita increases (or a country belongs to the non-CEE region) and increases if the inequality among individuals rises, while the fraction of "very satisfied" individuals (satisfaction level 4) increases with higher GDP per capita (or the non-CEE region), lower unemployment, and lower inequality among individuals. As a result, we may conclude that the intention to migrate is affected by these macroeconomic variables through life satisfaction.

As mentioned above, some macroeconomic variables are highly correlated. In our case, government effectiveness, control of corruption and GDP per capita have a similar effect on life satisfaction and can be used indifferently. This is especially relevant for explaining the differences in migration intentions between CEE and non-CEE countries since governance conditions in these two regions are substantially different. For instance, according to the Worldwide Governance Indicators (see Kaufmann et al.[40]), the gap between government effectiveness and the control of corruption in these two regions is large (0.68 vs. 1.40 for government effectiveness and 0.37 vs. 1.51 for the control of corruption). According to Kaufmann et al. [40], the government effectiveness indicator measures the perceptions over the quality of public services provision and policy implementation, while the control of corruption measures the perceptions over the use of public power for private interests and the extent of state capture. All the relationships between country level life satisfaction, macroeconomic and governance variables have an expected sign and underline the importance of the improvement of economic and political conditions for individual satisfaction with life. As a result of improvements in economic development and control of corruption and governance, individuals intend to migrate less.

To check the robustness of our results, we redefine the migration decision variable

into a binary variable and treat life satisfaction as a continuous latent variable. The individual level results are presented in Table 8. As observed from this table, the results from the modified equations support our previous findings. Also, findings are similar at the country level for unemployment and the Gini coefficients (see Tables 9A and 9B). However, we find that the logarithm of real GDP per capita affects both the intention to migrate and life satisfaction positively, while a CEE dummy affects them negatively. This finding can be explained by differences in institutional quality between CEE and non-CEE countries. For a given income at the individual level, people from CEE and non-CEE still have different opportunities to migrate. For instance, in 2008, nationals from CEE countries were still required to have a work permit to have a job in non-CEE and US labor markets. Overall, our findings highlight the importance of life satisfaction not only as a predictor of intentions to migrate, but also as a mediator between economic and political conditions and those intentions.

3.5.3. Migration Decisions in CEE and Non-CEE Countries

In this section we discuss the individual level differences in intentions to migrate permanently and temporarily from CEE and non-CEE countries.[22] We examine the impact of life satisfaction on the individual intention to migrate for different groups of individuals.

To highlight that life satisfaction and expected income have separate effects on the individual migration decision, we consider those individuals who had the experience of a long-term migration in the past but still intend to migrate, hereafter movers.[23] The average life satisfaction of these individuals in CEE countries is 2.39, while in non-CEE countries is 2.88. Individuals who did not migrate in the past and do not intend to migrate in the future, hereafter stayers, are used as a reference

[22] Since we study the impact of cross-country differences on the individual migration decision, we do not discuss the differences in decisions to migrate internally between individuals from CEE and non-CEE countries.

[23] We are grateful to David Blanchflower for this point.

category. The average life satisfaction of stayers in CEE and non-CEE countries is 2.63 and 3.04, respectively.

Comparing the average life satisfaction scores for movers and stayers, we find that movers have lower life satisfaction scores than stayers in the same region. Considering the responses of these individuals regarding the judgement of their households' current financial situation, we find that the average score for the financial situation for movers and stayers in CEE countries is very similar (2.42 vs 2.45). Therefore, we may conclude that movers in CEE countries met their income expectations by migrating, but they are still not satisfied with the quality of their own lives and, as a result, life dissatisfaction may drive them to migrate again. However, this effect is ambiguous in non-CEE countries. Even though the life satisfaction of movers from non-CEE is lower than the life satisfaction of stayers in this region (2.88 vs. 3.04), their judgement of their own financial situation is slightly different (2.68 for movers and 2.75 for stayers). Therefore, it might be the case that movers in non-CEE countries did not meet their income expectations and were not satisfied with the quality of their own lives. As a result, it is less clear whether the income or the life satisfaction effect dominates in the intention to migrate for individuals from the non-CEE region.

It should be noted that the results presented in this section are always in comparison with the reference group that represents "not at all satisfied" individuals. Comparing the average marginal effects for CEE and non-CEE countries in Table 6B, we observe that with an increase in life satisfaction the probability to migrate permanently and temporarily decreases more for individuals from non-CEE than from CEE. For instance, the probability of the intention to migrate permanently of "very satisfied" individuals is lower in comparison with that of "not at all satisfied" by 2.22% and 1.23% (by 1.73% and 2.16% in the case of temporary migration) in non-CEE and CEE countries, respectively. In other words, if the life satisfaction of individuals increases by the same amount in both regions, the individuals from CEE

intend to migrate more. This result is in line with the widely documented differences in social and economic conditions in East European compared to Western countries. Thus, policies regulating migration flows from CEE countries should not be taken independently from improvements to well-being in the region.

In Table 6B, we compute the average marginal effects of life satisfaction on the intention to migrate for each level of income, employment status, education, age, past experience of migration, and regional location of CEE and non-CEE individuals. As observed, if life satisfaction increases, non-CEE individuals intend to migrate less than CEE individuals at each level of income. For instance, the probability to migrate permanently for "very satisfied" individuals with income level 4 is lower by 2.49% and 1.42% (by 1.69% and 2.11% in the case of temporary migration) in non-CEE and CEE countries, respectively. The intuition behind this result is based on different income and employment prospects for people from CEE and non-CEE countries. According to data from the Eurostat, the average net nominal monthly earnings in non-CEE countries is about 1600EUR, while in CEE countries is 460EUR. At the same time, the average long-term unemployment rate is about 2% of the active population in non-CEE and 3% in CEE countries. Given huge wage differentials and higher unemployment rate in the CEE region, individuals from this region are more likely to migrate to find a job abroad.

The results are further compared between the individuals with and without past migration experience. In non-CEE countries, "very satisfied" individuals with past migration experience have lower intentions to migrate permanently than "not at all satisfied" by 5.16%, while in CEE countries, these individuals intend to migrate less by 3.22%. Thus, once an individual migrated and met his/her expectations regarding life satisfaction, he/she intends to migrate less.

We also find that as compared to "not at all satisfied", the "fairly satisfied" and "very satisfied" self-employed individuals from non-CEE countries have a lower intention to migrate permanently than those from CEE, by 3.67% and 3.94% and by

2.12% and 2.27% (by 2.43% and 2% and by 2.9% and 2.53% in the case of temporary migration), respectively. In fact, the average life satisfaction of self-employed individuals in CEE countries is 2.78, while in non-CEE countries is 3.05. This difference is likely to be due to the lower quality of institutions in the CEE region. According to the Worldwide Governance Indicators (see Kaufmann et al.[40]), CEE countries underperform non-CEE countries in regulatory quality and rule of law, which is measured by the perceptions of regulations that allow and promote private sector development, degree of enforcement of property rights, the quality of the police, and the courts (0.99 vs. 1.42 and 0.63 vs. 1.46, respectively). Therefore, the life satisfaction of self-employed individuals may convey information about the quality of the business environment in the country where they work.

A similar pattern is observed for the "fairly satisfied" and "very satisfied" employed individuals; the probability to migrate permanently is lower by 1.95% and 2.09% for the non-CEE individuals and by 1.07% and 1.14% for the CEE ones (by 2.09% and 1.76% and by 2.45% and 2.17% in the case of temporary migration). For the "fairly satisfied" and "very satisfied" individuals who are not employed, we find that the intention to migrate is lower in non-CEE countries than in CEE, by 2.08% and 2.21% and by 1.16% and 1.24% (by 2.01% and 1.67% and by 2.42% and 2.12% in the case of temporary migration), respectively.[24] These results suggest that individuals have lower intentions to migrate from regions where the social benefits are higher, which are consistent with the findings of previous literature (see Borjas [15]). For instance, according to data from the Eurostat, the average monthly unemployment benefit in non-CEE countries is about 370EUR, while in CEE countries, it is about 70EUR. Thus, the higher intentions to migrate from CEE of those who are not employed may reflect their dissatisfaction with the social security system. This point also finds support in the migration intention of individuals with different levels of education. We find that as compared to the "not at all satisfied" from the

[24]In Table 6B, those who are not employed are denoted as "Not Working". This group of individuals consists of the unemployed, retired, and housekeepers.

same region, the "very satisfied", individuals with less than 15 years of education in CEE countries have a lower intention to migrate by 1.04%, while in non-CEE countries this difference is 1.92%. Higher educated individuals at all levels of life satisfaction have lower intentions to migrate than the lower educated although they are still more likely to migrate from CEE countries.

Differences in the quality of the social security system and the quality of institutions may also be reflected in the migration intentions of individuals at different ages. In Table 6B, we also split the results for the individuals in five age groups: 20, 30, 40, 50, and 60 years old. We find that at all levels of life satisfaction migration intentions decrease with age. The highest difference between CEE and non-CEE countries in the intention to migrate permanently is observed for the age group of 30-year old. In CEE countries, where the quality of institutions and opportunities is lower, 30-year old "very satisfied" individuals intend to migrate by less 1.71%, while in non-CEE countries, "very satisfied" individuals of the same age group intend to migrate by less 3.10%.

Finally, we compare the average marginal effects of being a "not at all satisfied" individual with a "very satisfied" one from rural and urban areas in Table 6B. We observe that the probabilities of the intention to migrate permanently and temporarily from urban areas decrease by 1.38% and 2.49% in CEE countries and by 2.38% and 1.89% in non-CEE countries, respectively. Thus, dissatisfied individuals are likely to migrate more from urban areas in CEE, where they have more opportunities and better access to information to migrate abroad.

As our results suggest, the impact of life satisfaction on the intention to migrate for different groups of individuals in CEE is higher than in non-CEE countries. As discussed above, the life satisfaction measure may convey useful information regarding the quality of institutions and the business environment, the employment situation, and the development of a social security system in a region.

3.6. Conclusion

This paper provides empirical evidence of the impact of life satisfaction on the individual intention to migrate. The effects of both individual and country level factors on the intention to migrate are analyzed jointly. The empirical findings of this paper suggest that people dissatisfied with life have a higher intention to migrate. The individual socio-economic factors and macroeconomic conditions have an effect on the intention to migrate indirectly through life satisfaction. These empirical findings underline the importance of individual life satisfaction not only as a strong predictor of the individual migration decision, but also as a mediator between individual socio-economic variables and macroeconomic conditions and this decision.

Additionally, we analyze the differences in intentions to migrate permanently and temporarily for the Central Eastern European (CEE) countries and the Western European (non-CEE) countries. The impact of life satisfaction on the intention to migrate from CEE and non-CEE countries is examined for different groups of individuals. We find that at all levels of life satisfaction individuals with similar characteristics have higher intentions to migrate from CEE countries than from non-CEE countries. The low level of life satisfaction of individuals from CEE countries may be associated with the lower quality of institutions and business environment and with the development of the social security system in this region. Improvements in these conditions will result in an increase in individual life satisfaction and, thus, will lower individual migration intentions.

Our findings can be generalized to the migration decisions in regions with conflicts or natural disasters, with a low quality of institutions, and with economic crises. It may also be interesting to apply our model to study more in detail internal migration. This will be left for future research.

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3.A. Appendix

3.A.1. Tables

Table 3.1: *Sample Mean Life Satisfaction Scores*

Country	Wave Apr-May 2008 Rank	Wave Apr-May 2008 Mean Life Satisfaction	Wave Apr-May 2008 Std. Dev.	Wave Oct-Nov 2008 Rank	Wave Oct-Nov 2008 Mean Life Satisfaction	Wave Oct-Nov 2008 Std. Dev.
Denmark	1	3.614	0.577	1	3.616	0.580
Netherlands	2	3.450	0.604	2	3.495	0.564
Sweden	3	3.447	0.604	3	3.457	0.556
Luxembourg	4	3.393	0.638	4	3.304	0.695
Finland	5	3.272	0.608	5	3.275	0.570
Ireland	6	3.266	0.673	7	3.173	0.682
United Kingdom	7	3.201	0.695	6	3.193	0.692
Malta	8	3.144	0.687	11	3.030	0.762
Cyprus (Republic)	9	3.118	0.672	9	3.120	0.740
Belgium	10	3.111	0.724	8	3.125	0.690
Slovenia	11	3.094	0.638	10	3.046	0.710
Spain	12	3.016	0.615	12	2.966	0.624
Austria	13	2.997	0.620	13	2.965	0.639
Germany	14	2.923	0.724	14	2.955	0.715
France	15	2.904	0.736	16	2.890	0.730
Czech Republic	16	2.903	0.594	15	2.907	0.574
Estonia	17	2.808	0.659	18	2.796	0.621
Poland	18	2.800	0.732	17	2.804	0.668
Slovakia	19	2.681	0.711	19	2.728	0.721
Greece	20	2.671	0.745	23	2.480	0.751
Lithuania	21	2.638	0.802	20	2.627	0.782
Latvia	22	2.623	0.745	22	2.611	0.730
Italy	23	2.619	0.720	21	2.613	0.699
Romania	24	2.483	0.760	24	2.391	0.745
Portugal	25	2.462	0.732	25	2.361	0.744
Hungary	26	2.347	0.825	26	2.301	0.808
Bulgaria	27	2.218	0.862	27	2.170	0.793

Source: constructed by the authors using the Eurobarometer Survey.
Notes: Countries are ranked according to the mean life satisfaction score in the wave collected during April-May 2008. The wave collected during October-November 2008 is used for the estimations. The countries of Central and Eastern Europe are shaded.

Table 3.2: *The Number of Intended Leaves by Life Satisfaction*

		Life Satisfaction						
		1 (not at all satisfied)	2 (not very satisfied)	3 (fairly satisfied)	4 (very satisfied)	Total number of respondents	Percent	Cumul.
Intended Leave	0 (permanent international)	19	52	94	41	206	0.85	0.85
	1 (temporary international)	40	145	347	196	728	3.00	3.85
	2 (internal)	65	188	858	414	1 525	6.29	10.15
	3 (no leave)	1 189	4 286	11 927	4 371	21 773	89.85	100.00
	Total number of respondents	1 313	4 671	13 226	5 022	24 232		
	Percent	5.42	19.28	54.58	20.72			
	Cumul.	5.42	24.69	79.28	100.00			

Source: constructed by the authors using the Eurobarometer Survey.

Table 3.3: *The Correlation Matrix for Macroeconomic Variables*

	CEE	Log(Real GDP per Capita)	Unemployment Rate	Inflation Rate	Government Effectiveness	Regulatory Quality	Control of Corruption	Gini Coefficient
CEE	1.0000							
Log(Real GDP per Capita)	-0.8487	1.0000						
Unemployment Rate	0.0491	-0.2013	1.0000					
Inflation Rate	0.7088	-0.6932	0.0006	1.0000				
Government Effectiveness	-0.6348	0.8363	-0.3500	-0.5422	1.0000			
Regulatory Quality	-0.5798	0.7657	-0.3242	-0.4183	0.8889	1.0000		
Control of Corruption	-0.6989	0.8641	-0.3230	-0.5906	0.9489	0.8860	1.0000	
Gini Coefficient	0.1501	-0.4152	0.2509	0.5019	-0.5754	-0.4234	-0.4834	1.0000

Source: constructed by the authors using the Eurostat and WGI data from Kaufmann et al. [40].

Table 3.4: *Within Level Results for the Decision to Migrate*

Multinomial Logit Estimation	Intention to Migrate PERMANENTLY		Intention to Migrate TEMPORARILY		Intention to Migrate INTERNALLY	
Constant	-2.275 ***	(0.566)	-1.159 ***	(0.298)	0.176	(0.205)
Life Satisfaction =2 (Not Very Satisfied)	-0.571 *	(0.312)	-0.360 *	(0.189)	-0.450 ***	(0.110)
Life Satisfaction =3 (Fairly Satisfied)	-1.458 ***	(0.328)	-0.877 ***	(0.198)	-0.460 ***	(0.120)
Life Satisfaction =4 (Very Satisfied)	-1.661 ***	(0.447)	-0.772 ***	(0.203)	-0.598 ***	(0.151)
Married	-0.476 ***	(0.134)	-0.537 ***	(0.143)	-0.476 ***	(0.074)
Male	0.244	(0.183)	0.237 **	(0.093)	0.037	(0.074)
Age	-0.036 ***	(0.009)	-0.069 ***	(0.005)	-0.051 ***	(0.003)
Child	-0.240	(0.163)	-0.215 *	(0.115)	-0.160 **	(0.062)
Income	0.110	(0.110)	-0.009	(0.082)	0.006	(0.035)
Urban	0.468 ***	(0.165)	0.529 ***	(0.123)	0.234 ***	(0.067)
Education 15-19 Years	0.395 *	(0.206)	0.226	(0.223)	0.100	(0.088)
Education 20 or More Years	0.231	(0.310)	0.671 ***	(0.222)	0.253 **	(0.100)
Student	0.437	(0.412)	1.019 ***	(0.243)	-0.035	(0.147)
Econd	0.692 ***	(0.220)	0.412 ***	(0.124)	0.391 ***	(0.073)
Employed	-0.168	(0.175)	-0.044	(0.115)	-0.169 *	(0.101)
Self-employed	0.777 ***	(0.293)	0.362 **	(0.176)	-0.051	(0.158)
Past Migration Experience	1.436 ***	(0.191)	1.618 ***	(0.157)	0.408 ***	(0.129)
Country Dummies	Yes		Yes		Yes	
Pseudo R-Squared	0.208		0.208		0.208	
Number of Observations	24232		24232		24232	

Notes:
Standard errors clustered at the country level are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively. Life satisfaction =1 ("not at all satisfied") is used as the base category of life satisfaction; less than 15 years of education and no full time education are used as the base category for education level; those who do not work are used as the base category for employment status. Econd is a dummy equal to one if the intention to migrate abroad is driven by economic factors. For the individuals who intend to migrate internally, Econd stands for the factors in the case of a hypothetical migration abroad.

Table 3.5: *Within Level Results for Life Satisfaction*

Logit Estimation	LIFE SATISFACTION=2 (Not Very Satisfied)		LIFE SATISFACTION=3 (Fairly Satisfied)		LIFE SATISFACTION=4 (Very Satisfied)	
Constant	-0.157	(0.293)	-0.909 **	(0.374)	-3.641 ***	(0.281)
Married	-0.201 ***	(0.059)	-0.008	(0.054)	0.441 ***	(0.041)
Male	-0.013	(0.035)	-0.004	(0.035)	-0.079	(0.052)
Age	0.041 ***	(0.008)	-0.010	(0.006)	-0.052 ***	(0.010)
Age squared/1000	-0.396 ***	(0.088)	0.099	(0.065)	0.435 ***	(0.089)
Child	-0.073	(0.047)	-0.045	(0.040)	0.053	(0.049)
Income	-0.974 ***	(0.072)	0.443 ***	(0.131)	1.245 ***	(0.076)
Urban	0.031	(0.043)	0.069 *	(0.038)	-0.091 *	(0.046)
Education 15-19 Years	-0.063	(0.074)	0.134 ***	(0.049)	-0.027	(0.071)
Education 20 or More Years	-0.273 ***	(0.088)	0.074	(0.061)	0.264 ***	(0.073)
Student	-0.541 ***	(0.116)	0.129	(0.096)	0.499 ***	(0.095)
Employed	-0.038	(0.070)	0.193 ***	(0.048)	-0.104	(0.073)
Self-employed	-0.079	(0.080)	0.158 ***	(0.048)	0.041	(0.072)
Country Dummies	Yes		Yes		Yes	
Pseudo R-squared	0.187		0.051		0.249	
Number of Observations	24232		24232		24232	

Notes:
Standard errors clustered at a country level are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively. Less than 15 years of education and no full time education are used as the base category for education level,those who do not work are used as the base category for employment status.

Table 3.6A: *Average Marginal Effects for the Decision to Migrate*

Average Marginal Effects	The Effect on Probability to Migrate PERMANENTLY			The Effect on Probability to Migrate TEMPORARILY			The Effect on Probability to Migrate INTERNALLY			The Effect on Probability of NO LEAVE		
Life Satisfaction =2 (Not Very Satisfied)	-0.0086		(0.007)	-0.0088		(0.007)	-0.0232	***	(0.007)	0.0407	***	(0.011)
Life Satisfaction =3 (Fairly Satisfied)	-0.0173	**	(0.007)	-0.0221	***	(0.007)	-0.0202	**	(0.009)	0.0595	***	(0.011)
Life Satisfaction =4 (Very Satisfied)	-0.0185	**	(0.007)	-0.0189	***	(0.007)	-0.0275	***	(0.010)	0.0649	***	(0.013)
Married	-0.0031	***	(0.001)	-0.0111	***	(0.003)	-0.0224	***	(0.004)	0.0366	***	(0.005)
Male	0.0018		(0.001)	0.0058	**	(0.002)	0.0007		(0.004)	-0.0083	*	(0.005)
Age	-0.0002	***	(0.000)	-0.0015	***	(0.000)	-0.0024	***	(0.000)	0.0041	***	(0.000)
Child	-0.0016		(0.001)	-0.0046	*	(0.003)	-0.0072	**	(0.003)	0.0134	***	(0.005)
Income	0.0009		(0.001)	-0.0003		(0.002)	0.0003		(0.002)	-0.0008		(0.003)
Urban	0.0031	***	(0.001)	0.0115	***	(0.003)	0.0096	***	(0.003)	-0.0241	***	(0.004)
Education 15-19 Years	0.0030		(0.002)	0.0052		(0.006)	0.0039		(0.005)	-0.0121	*	(0.007)
Education 20 or More Years	0.0012		(0.003)	0.0176	***	(0.007)	0.0102	*	(0.005)	-0.0289	***	(0.008)
Student	0.0032		(0.004)	0.0328	***	(0.010)	-0.0071		(0.007)	-0.0289	**	(0.013)
Econd	0.0049	***	(0.002)	0.0083	***	(0.003)	0.0183	***	(0.004)	-0.0315	***	(0.005)
Employed	-0.0012		(0.001)	-0.0003		(0.003)	-0.0086	*	(0.005)	0.0100		(0.007)
Self-employed	0.0083	**	(0.004)	0.0098	*	(0.005)	-0.0053		(0.008)	-0.0128		(0.011)
Past Migration Experience	0.0160	***	(0.003)	0.0597	***	(0.009)	0.0102		(0.007)	-0.0859	***	(0.011)
Country Dummies	Yes			Yes			Yes			Yes		
Number of Observations	24232			24232			24232			24232		

Notes:
Standard errors calculated by the Delta method are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively. Econd is a dummy equal to one if the intention to migrate abroad is driven by economic factors. For the individuals who intend to migrate internally or do not intend to leave, Econd stands for the factors in the case of a hypothetical migration abroad.

Table 3.6A (cont.): *Average Marginal Effects for Life Satisfaction*

Average Marginal Effects, Logit	LIFE SATISFACTION=2 (Not Very Satisfied)			LIFE SATISFACTION=3 (Fairly Satisfied)			LIFE SATISFACTION=4 (Very Satisfied)		
Married	-0.0254	***	(0.007)	-0.0019		(0.013)	0.0532	***	(0.005)
Male	-0.0016		(0.004)	-0.0009		(0.008)	-0.0095		(0.006)
Age	0.0052	***	(0.001)	-0.0022		(0.001)	-0.0063	***	(0.001)
Age squared / 1000	-0.0498	***	(0.011)	0.0229		(0.015)	0.0529	***	(0.011)
Child	-0.0091		(0.006)	-0.0105		(0.009)	0.0065		(0.006)
Income	-0.1226	***	(0.007)	0.1023	***	(0.029)	0.1513	***	(0.008)
Urban	0.0039		(0.005)	0.0159	*	(0.009)	-0.0111	*	(0.006)
Education 15-19 Years	-0.0080		(0.009)	0.0309	***	(0.011)	-0.0033		(0.009)
Education 20 or More Years	-0.0335	***	(0.010)	0.0169		(0.014)	0.0329	***	(0.009)
Student	-0.0614	***	(0.012)	0.0295		(0.022)	0.0653	***	(0.014)
Employed	-0.0047		(0.009)	0.0446	***	(0.011)	-0.0126		(0.009)
Self-employed	-0.0098		(0.010)	0.0362	***	(0.011)	0.0051		(0.009)
Country Dummies	Yes			Yes			Yes		
Number of Observations	24232			24232			24232		

Notes:
Standard errors calculated by the Delta method are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively.

Table 3.6B: *Average Marginal Effects for CEE and Non-CEE Countries*

	The Effect on Probability to Migrate PERMANENTLY				The Effect on Probability to Migrate TEMPORARILY				The Effect on Probability to Migrate INTERNALLY				The Effect on Probability of NO LEAVE			
	CEE		non-CEE		CEE		non-CEE		CEE		non-CEE		CEE		non-CEE	
Average Marginal Effects by Satisfaction Level																
Life Satisfaction =2 (Not Very Satisfied)	-0.0060	(0.004)	-0.0101	(0.008)	-0.0107	(0.007)	-0.0077	(0.007)	-0.0137 ***	(0.004)	-0.0289***	(0.009)	0.0305 ***	(0.009)	0.0468 ***	(0.013)
Life Satisfaction =3 (Fairly Satisfied)	-0.0115 ***	(0.004)	-0.0207 **	(0.008)	-0.0245 ***	(0.007)	-0.0206 ***	(0.007)	-0.0124 **	(0.005)	-0.0248**	(0.011)	0.0484 ***	(0.009)	0.0662 ***	(0.012)
Life Satisfaction =4 (Very Satisfied)	-0.0123 ***	(0.005)	-0.0222 **	(0.009)	-0.0216 ***	(0.007)	-0.0173 **	(0.007)	-0.0164 ***	(0.005)	-0.0341***	(0.012)	0.0504 ***	(0.010)	0.0736 ***	(0.015)
Average Marginal Effects by Satisfaction and Income Levels																
Life Satisfaction =2																
Income Level =1	-0.0051	(0.003)	-0.0085	(0.006)	-0.0110	(0.007)	-0.0080	(0.007)	-0.0137 ***	(0.004)	-0.0291***	(0.009)	0.0298 ***	(0.009)	0.0456 ***	(0.011)
Income Level =2	-0.0057	(0.004)	-0.0094	(0.007)	-0.0108	(0.007)	-0.0078	(0.007)	-0.0137 ***	(0.004)	-0.0290***	(0.009)	0.0302 ***	(0.009)	0.0462 ***	(0.012)
Income Level =3	-0.0063	(0.005)	-0.0103	(0.008)	-0.0106	(0.007)	-0.0076	(0.007)	-0.0137 ***	(0.004)	-0.0289***	(0.009)	0.0307 ***	(0.010)	0.0469 ***	(0.013)
Income Level =4	-0.0070	(0.006)	-0.0113	(0.010)	-0.0105	(0.007)	-0.0075	(0.007)	-0.0138 ***	(0.004)	-0.0288***	(0.009)	0.0312 ***	(0.010)	0.0476 ***	(0.013)
Life Satisfaction =3																
Income Level =1	-0.0097 ***	(0.003)	-0.0174 ***	(0.006)	-0.0251 ***	(0.007)	-0.0214 ***	(0.007)	-0.0124 **	(0.005)	-0.0252**	(0.011)	0.0472 ***	(0.007)	0.0639 ***	(0.011)
Income Level =2	-0.0108 ***	(0.004)	-0.0191 ***	(0.007)	-0.0247 ***	(0.007)	-0.0210 ***	(0.007)	-0.0124 **	(0.005)	-0.0250**	(0.011)	0.0480 ***	(0.008)	0.0651 ***	(0.011)
Income Level =3	-0.0120 **	(0.005)	-0.0211 **	(0.009)	-0.0244 ***	(0.008)	-0.0206 ***	(0.007)	-0.0124 **	(0.005)	-0.0248**	(0.011)	0.0488 ***	(0.009)	0.0665 ***	(0.012)
Income Level =4	-0.0133 **	(0.006)	-0.0232 **	(0.011)	-0.0240 ***	(0.008)	-0.0202 **	(0.008)	-0.0124 **	(0.005)	-0.0245**	(0.011)	0.0497 ***	(0.011)	0.0679 ***	(0.014)
Life Satisfaction =4																
Income Level =1	-0.0104 ***	(0.003)	-0.0186 ***	(0.006)	-0.0221 ***	(0.007)	-0.0180 ***	(0.007)	-0.0164 ***	(0.005)	-0.0344***	(0.012)	0.0490 ***	(0.008)	0.0710 ***	(0.013)
Income Level =2	-0.0115 ***	(0.004)	-0.0205 ***	(0.008)	-0.0218 ***	(0.007)	-0.0177 **	(0.007)	-0.0165 ***	(0.005)	-0.0343***	(0.012)	0.0498 ***	(0.009)	0.0724 ***	(0.014)
Income Level =3	-0.0128 **	(0.005)	-0.0226 **	(0.009)	-0.0215 ***	(0.008)	-0.0173 **	(0.007)	-0.0165 ***	(0.005)	-0.0340***	(0.012)	0.0508 ***	(0.010)	0.0739 ***	(0.015)
Income Level =4	-0.0142 **	(0.007)	-0.0249 **	(0.012)	-0.0211 **	(0.008)	-0.0169 **	(0.008)	-0.0165 ***	(0.005)	-0.0338***	(0.012)	0.0518 ***	(0.012)	0.0755 ***	(0.016)
Average Marginal Effects by Satisfaction Level and Past Migration Experience																
Life Satisfaction =2																
No Past Migration Experience	-0.0056	(0.004)	-0.0089	(0.007)	-0.0100	(0.007)	-0.0068	(0.006)	-0.0139 ***	(0.004)	-0.0294***	(0.009)	0.0295 ***	(0.009)	0.0452 ***	(0.012)
Past Migration Experience	-0.0150	(0.012)	-0.0224	(0.018)	-0.0222	(0.016)	-0.0153	(0.015)	-0.0133 ***	(0.005)	-0.0263**	(0.010)	0.0505 ***	(0.020)	0.0641 ***	(0.021)
Life Satisfaction =3																
No Past Migration Experience	-0.0107 ***	(0.004)	-0.0179 **	(0.007)	-0.0225 ***	(0.007)	-0.0177 ***	(0.006)	-0.0128 **	(0.005)	-0.0262**	(0.011)	0.0460 ***	(0.008)	0.0618 ***	(0.011)
Past Migration Experience	-0.0297 **	(0.013)	-0.0477 **	(0.020)	-0.0541 ***	(0.017)	-0.0442 ***	(0.016)	-0.0095	(0.006)	-0.0158	(0.013)	0.0934 ***	(0.019)	0.1077 ***	(0.021)
Life Satisfaction =4																
No Past Migration Experience	-0.0114 ***	(0.004)	-0.0191 **	(0.008)	-0.0200 ***	(0.007)	-0.0151 **	(0.006)	-0.0167 ***	(0.005)	-0.0352***	(0.012)	0.0481 ***	(0.009)	0.0694 ***	(0.014)
Past Migration Experience	-0.0322 **	(0.014)	-0.0516 **	(0.022)	-0.0465 ***	(0.017)	-0.0359 **	(0.016)	-0.0146 **	(0.006)	-0.0269**	(0.013)	0.0933 ***	(0.021)	0.1143 ***	(0.024)
Average Marginal Effects by Satisfaction Level and Employment Status																
Life Satisfaction =2																
Not Working	-0.0061	(0.004)	-0.0101	(0.008)	-0.0105	(0.007)	-0.0073	(0.007)	-0.0148 ***	(0.004)	-0.0308***	(0.009)	0.0314 ***	(0.010)	0.0482 ***	(0.013)
Self-Employed	-0.0110	(0.008)	-0.0177	(0.014)	-0.0124	(0.009)	-0.0089	(0.008)	-0.0120 ***	(0.004)	-0.0250***	(0.009)	0.0354 ***	(0.013)	0.0516 ***	(0.016)
Employed	-0.0056	(0.004)	-0.0096	(0.008)	-0.0108	(0.007)	-0.0079	(0.007)	-0.0129 ***	(0.004)	-0.0277***	(0.009)	0.0293 ***	(0.009)	0.0451 ***	(0.012)
Life Satisfaction =3																
Not Working	-0.0116 **	(0.005)	-0.0208 **	(0.009)	-0.0242 ***	(0.007)	-0.0201 ***	(0.007)	-0.0135 ***	(0.005)	-0.0264**	(0.011)	0.0493 ***	(0.008)	0.0673 ***	(0.012)
Self-Employed	-0.0212 **	(0.009)	-0.0367 **	(0.016)	-0.0290 ***	(0.010)	-0.0243 **	(0.010)	-0.0103 **	(0.005)	-0.0194*	(0.011)	0.0604 ***	(0.014)	0.0803 ***	(0.018)
Employed	-0.0107 **	(0.004)	-0.0195 **	(0.008)	-0.0245 ***	(0.008)	-0.0209 ***	(0.008)	-0.0117 **	(0.005)	-0.0238**	(0.011)	0.0470 ***	(0.009)	0.0642 ***	(0.012)
Life Satisfaction =4																
Not Working	-0.0124 **	(0.005)	-0.0221 **	(0.009)	-0.0212 ***	(0.007)	-0.0167 **	(0.007)	-0.0178 ***	(0.006)	-0.0362***	(0.012)	0.0514 ***	(0.010)	0.0751 ***	(0.015)
Self-Employed	-0.0227 **	(0.009)	-0.0394 **	(0.016)	-0.0253 **	(0.010)	-0.0200 **	(0.007)	-0.0140 ***	(0.005)	-0.0281**	(0.012)	0.0620 ***	(0.014)	0.0875 ***	(0.020)
Employed	-0.0114 **	(0.004)	-0.0209 **	(0.009)	-0.0217 ***	(0.008)	-0.0176 **	(0.007)	-0.0155 ***	(0.005)	-0.0326***	(0.012)	0.0486 ***	(0.010)	0.0711 ***	(0.015)
Number of Observations	9089		15143		9089		15143		9089		15143		9089		15143	

Notes:
Standard errors calculated by the Delta method are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively. The "Not Working"group consists of the unemployed, retired, and housekeepers. Marginal effects for this group are computed using the "self-employed" and "employed" groups as the reference.

Table 3.6B (cont.): *Average Marginal Effects for CEE and Non-CEE Countries*

	The Effect on Probability to Migrate PERMANENTLY				The Effect on Probability to Migrate TEMPORARILY				The Effect on Probability to Migrate INTERNALLY				The Effect on Probability of NO LEAVE			
	CEE		non-CEE		CEE		non-CEE		CEE		non-CEE		CEE		non-CEE	
Average Marginal Effects by Satisfaction Level and Education																
Life Satisfaction =2																
Education Less Than 15 Years	-0.0052 (0.004)		-0.0090 (0.007)		-0.0080 (0.006)		-0.0056 (0.006)		-0.0126 *** (0.004)		-0.0274 *** (0.009)		0.0258 *** (0.008)		0.0421 *** (0.011)	
Still Studying	-0.0075 (0.004)		-0.0129 (0.012)		-0.0185 (0.012)		-0.0143 (0.012)		-0.0119 *** (0.004)		-0.0246 *** (0.009)		0.0379 ** (0.015)		0.0519 *** (0.017)	
Education 15-19 Years	-0.0070 (0.005)		-0.0120 (0.010)		-0.0112 (0.008)		-0.0080 (0.007)		-0.0139 *** (0.004)		-0.0290 *** (0.009)		0.0321 *** (0.009)		0.0490 *** (0.014)	
Education 20 or More Years	-0.0063 (0.005)		-0.0106 (0.009)		-0.0139 (0.009)		-0.0097 (0.008)		-0.0147 ** (0.005)		-0.0303 *** (0.009)		0.0351 *** (0.011)		0.0506 *** (0.014)	
Life Satisfaction =3																
Education Less Than 15 Years	-0.0097 ** (0.004)		-0.0179 ** (0.007)		-0.0193 *** (0.007)		-0.0161 ** (0.006)		-0.0115 ** (0.005)		-0.0240 ** (0.011)		0.0405 *** (0.008)		0.0579 *** (0.011)	
Still Studying	-0.0145 * (0.005)		-0.0265 * (0.015)		-0.0420 *** (0.014)		-0.0375 *** (0.015)		-0.0136 ** (0.005)		-0.0187 * (0.011)		0.0666 *** (0.016)		0.0828 *** (0.019)	
Education 15-19 Years	-0.0135 ** (0.006)		-0.0247 ** (0.011)		-0.0261 *** (0.009)		-0.0221 ** (0.009)		-0.0123 ** (0.005)		-0.0241 ** (0.011)		0.0518 *** (0.010)		0.0709 *** (0.013)	
Education 20 or More Years	-0.0123 ** (0.006)		-0.0220 ** (0.011)		-0.0329 *** (0.010)		-0.0267 *** (0.010)		-0.0127 ** (0.005)		-0.0248 ** (0.012)		0.0579 *** (0.011)		0.0735 *** (0.014)	
Life Satisfaction =4																
Education Less Than 15 Years	-0.0104 ** (0.004)		-0.0192 ** (0.008)		-0.0165 ** (0.007)		-0.0130 ** (0.006)		-0.0150 *** (0.005)		-0.0323 *** (0.012)		0.0419 *** (0.009)		0.0644 *** (0.013)	
Still Studying	-0.0156 * (0.006)		-0.0285 * (0.017)		-0.0371 *** (0.014)		-0.0316 ** (0.014)		-0.0177 ** (0.006)		-0.0277 ** (0.012)		0.0666 *** (0.017)		0.0879 *** (0.022)	
Education 15-19 Years	-0.0144 ** (0.006)		-0.0265 ** (0.012)		-0.0229 *** (0.008)		-0.0184 ** (0.008)		-0.0165 *** (0.006)		-0.0337 *** (0.012)		0.0538 *** (0.011)		0.0785 *** (0.016)	
Education 20 or More Years	-0.0132 ** (0.006)		-0.0236 ** (0.011)		-0.0287 *** (0.010)		-0.0223 ** (0.010)		-0.0174 *** (0.006)		-0.0350 ** (0.013)		0.0593 *** (0.012)		0.0809 *** (0.017)	
Average Marginal Effects by Satisfaction Level and Age Group																
Life Satisfaction =2																
Age=20	-0.0097 (0.007)		-0.0141 (0.012)		-0.0251 (0.017)		-0.0161 (0.016)		-0.0319 *** (0.010)		-0.0544 *** (0.018)		0.0667 *** (0.020)		0.0846 *** (0.021)	
Age=30	-0.0084 (0.006)		-0.0136 (0.011)		-0.0170 (0.011)		-0.0128 (0.011)		-0.0234 *** (0.007)		-0.0477 *** (0.015)		0.0489 *** (0.014)		0.0741 *** (0.019)	
Age=40	-0.0069 (0.005)		-0.0123 (0.009)		-0.0105 * (0.006)		-0.0093 (0.007)		-0.0161 *** (0.005)		-0.0383 *** (0.011)		0.0334 *** (0.010)		0.0599 *** (0.016)	
Age=50	-0.0053 (0.004)		-0.0104 (0.008)		-0.0061 * (0.004)		-0.0061 (0.004)		-0.0105 *** (0.003)		-0.0286 *** (0.008)		0.0219 *** (0.007)		0.0452 *** (0.012)	
Age=60	-0.0040 (0.003)		-0.0085 (0.007)		-0.0031 (0.002)		-0.0038 (0.003)		-0.0066 *** (0.002)		-0.0200 *** (0.006)		0.0140 *** (0.005)		0.0323 *** (0.010)	
Life Satisfaction =3																
Age=20	-0.0191 *** (0.007)		-0.0315 ** (0.013)		-0.0581 *** (0.017)		-0.0484 *** (0.017)		-0.0284 ** (0.012)		-0.0414 (0.023)		0.1056 *** (0.017)		0.1213 *** (0.018)	
Age=30	-0.0161 *** (0.006)		-0.0287 ** (0.011)		-0.0370 *** (0.011)		-0.0341 *** (0.012)		-0.0221 *** (0.008)		-0.0409 ** (0.018)		0.0753 *** (0.013)		0.1037 *** (0.017)	
Age=40	-0.0128 *** (0.005)		-0.0248 ** (0.010)		-0.0219 *** (0.006)		-0.0225 *** (0.008)		-0.0157 *** (0.005)		-0.0352 ** (0.013)		0.0504 *** (0.009)		0.0824 *** (0.015)	
Age=50	-0.0097 ** (0.004)		-0.0204 ** (0.008)		-0.0123 *** (0.004)		-0.0139 *** (0.005)		-0.0104 *** (0.003)		-0.0273 *** (0.010)		0.0325 *** (0.007)		0.0615 *** (0.013)	
Age=60	-0.0071 ** (0.003)		-0.0160 ** (0.007)		-0.0067 *** (0.002)		-0.0081 *** (0.003)		-0.0067 *** (0.002)		-0.0196 *** (0.007)		0.0205 *** (0.005)		0.0437 *** (0.010)	
Life Satisfaction =4																
Age=20	-0.0205 *** (0.008)		-0.034 ** (0.014)		-0.0512 *** (0.017)		-0.0397 ** (0.017)		-0.0383 *** (0.013)		-0.0620 ** (0.025)		0.1099 *** (0.020)		0.1355 *** (0.025)	
Age=30	-0.0171 *** (0.006)		-0.0310 ** (0.012)		-0.0331 *** (0.011)		-0.0289 ** (0.012)		-0.0286 *** (0.009)		-0.0565 *** (0.020)		0.0788 *** (0.015)		0.1162 *** (0.022)	
Age=40	-0.0136 *** (0.005)		-0.0264 ** (0.011)		-0.0198 *** (0.007)		-0.0195 ** (0.008)		-0.0198 *** (0.006)		-0.0465 *** (0.015)		0.0532 *** (0.017)		0.0925 *** (0.019)	
Age=50	-0.0103 ** (0.004)		-0.0218 ** (0.009)		-0.0112 *** (0.004)		-0.0123 ** (0.005)		-0.0129 *** (0.004)		-0.0351 *** (0.011)		0.0345 *** (0.007)		0.0690 *** (0.015)	
Age=60	-0.0076 ** (0.003)		-0.0170 ** (0.008)		-0.0061 *** (0.002)		-0.0073 ** (0.003)		-0.0082 *** (0.002)		-0.0247 *** (0.007)		0.0219 *** (0.005)		0.0490 *** (0.012)	
Average Marginal Effects by Satisfaction Level and Type of Community																
Life Satisfaction =2																
Rural	-0.0048 (0.004)		-0.0082 (0.007)		-0.0087 (0.006)		-0.0064 (0.005)		-0.0128 *** (0.004)		-0.0278 *** (0.009)		0.0262 *** (0.008)		0.0424 *** (0.011)	
Urban	-0.0067 (0.005)		-0.0112 (0.009)		-0.0117 (0.008)		-0.0084 (0.007)		-0.0143 *** (0.004)		-0.0297 *** (0.009)		0.0328 *** (0.010)		0.0494 *** (0.013)	
Life Satisfaction =3																
Rural	-0.0096 ** (0.004)		-0.0166 ** (0.007)		-0.0195 *** (0.006)		-0.0166 *** (0.006)		-0.0119 ** (0.005)		-0.0250 ** (0.010)		0.0405 *** (0.008)		0.0581 *** (0.012)	
Urban	-0.0129 *** (0.005)		-0.0230 ** (0.009)		-0.0270 *** (0.008)		-0.0227 *** (0.008)		-0.0128 ** (0.006)		-0.0251 ** (0.011)		0.0528 *** (0.009)		0.0708 *** (0.012)	
Life Satisfaction =4																
Rural	-0.0097 ** (0.004)		-0.0177 ** (0.008)		-0.0173 *** (0.006)		-0.0141 ** (0.006)		-0.0154 *** (0.005)		-0.0333 *** (0.012)		0.0425 *** (0.009)		0.0652 *** (0.014)	
Urban	-0.0138 *** (0.005)		-0.0249 ** (0.010)		-0.0238 *** (0.008)		-0.0189 ** (0.008)		-0.0171 *** (0.006)		-0.0347 *** (0.012)		0.0547 *** (0.010)		0.0785 *** (0.015)	
Number of Observations	9089		15143		9089		15143		9089		15143		9089		15143	

Notes:
Standard errors calculated by the Delta method are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively. Marginal effects for those with less than 15 years of education are computed using the "Education 15-19 years" and "Education 20 or more years" groups as the reference.

Table 3.7A: *Between Level Results for Life Satisfaction and the Decision to Migrate (with GDP)*

OLS estimation	INTERCEPT PERMANENT		INTERCEPT TEMPORARY		INTERCEPT LIFE SATISFACTION=2 (Not Very Satisfied)			INTERCEPT LIFE SATISFACTION=3 (Fairly Satisfied)		INTERCEPT LIFE SATISFACTION=4 (Very Satisfied)		
Constant	-7.446	(16.112)	-2.414	(2.009)	3.583	**	(1.654)	0.271	(1.855)	-5.289	**	(2.164)
Ln(Real GDP per capita)	1.299	(1.437)	0.178	(0.149)	-0.577	***	(0.118)	-0.045	(0.133)	0.751	***	(0.147)
Unemployment	-0.696	(0.778)	-0.023	(0.102)	0.066		(0.058)	0.106	(0.065)	-0.112	*	(0.069)
Gini	-0.103	(0.207)	0.023	(0.030)	0.060	**	(0.024)	-0.020	(0.028)	-0.057	**	(0.029)
Adj. R-squared	0.121		-0.081		0.649			0.096		0.672		
Number of Observations	27		27		27			27		27		

Notes:
The dependent variable is a mean country-specific intercept of the decision to migrate permanently or temporarily (life satisfaction) from the within level. Robust bootstrapped standard errors clustered at the country level are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively.

Table 3.7B: *Between Level Results for Life Satisfaction and the Decision to Migrate (with CEE)*

OLS estimation	INTERCEPT PERMANENT		INTERCEPT TEMPORARY		INTERCEPT LIFE SATISFACTION=2 (Not Very Satisfied)			INTERCEPT LIFE SATISFACTION=3 (Fairly Satisfied)			INTERCEPT LIFE SATISFACTION=4 (Very Satisfied)		
Constant	8.122	(5.825)	-0.300	(1.073)	-3.272	***	(0.808)	-0.258	(0.731)		3.625	***	(1.049)
CEE	-0.872	(1.671)	-0.205	(0.307)	0.745	***	(0.222)	0.130	(0.196)		-0.995	***	(0.275)
Unemployment	-0.751	(0.713)	-0.030	(0.094)	0.089		(0.065)	0.108	*	(0.056)	-0.143	**	(0.069)
Gini	-0.184	(0.233)	0.013	(0.032)	0.090	***	(0.025)	-0.019	(0.024)		-0.096	***	(0.036)
Adj. R-squared	0.079		-0.097		0.571			0.113			0.598		
Number of Observations	27		27		27			27			27		

Notes:
The dependent variable is a mean country-specific intercept of the decision to migrate permanently or temporarily (life satisfaction) from the within level. Robust bootstrapped standard errors clustered at the country level are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively.

Table 3.8: *Within Level Results for the Robustness Check*

Maximum Likelihood Estimation	Intention to Migrate				Life Satisfaction		
Constant	-0.134		(0.270)				
Life Satisfaction	-0.275	***	(0.083)				
Married	-0.365	***	(0.070)	Married	0.720	***	(0.081)
Male	0.085	*	(0.051)	Male	-0.166	***	(0.052)
Age	-0.058	***	(0.003)	Age	-0.085	***	(0.011)
				Age squared/1000	0.756	***	(0.102)
Child	-0.189	***	(0.058)	Child	0.030		(0.055)
Income	0.606	***	(0.190)	Income	2.450	***	(0.165)
Urban	0.294	***	(0.055)	Urban	-0.133	***	(0.046)
Education 15-19 Years	0.151	*	(0.092)	Education 15-19 Years	0.154	**	(0.064)
Education 20 or More Years	0.439	***	(0.106)	Education 20 or More Years	0.569	***	(0.080)
Student	0.624	***	(0.167)	Student	1.150	***	(0154)
Econd	0.419	***	(0.052)				
Employed	-0.163	**	(0.069)	Employed	0.111	*	(0.060)
Self-employed	0.152		(0.107)	Self-employed	0.248	***	(0.093)
Past Migration Experience	0.928	***	(0.073)				
Country Dummies	Yes			Country Dummies	Yes		
Number of Observations	24232			Number of Observations	24232		

Notes:
Robust standard errors are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively. The migration intention is a binary variable. Life satisfaction is treated as a continuous latent variable. Less than 15 years of education and no full time education are used as the base category for the education level;those who do not work are used are used as the base category for employment status.

Table 3.9A: *Between Level Results for the Robustness Check (with GDP)*

OLS estimation	INTERCEPT MIGRATION			INTERCEPT LIFE SATISFACTION		
Constant	-7.642	***	(2.203)	-7.795	**	(3.009)
Ln(Real GDP per capita)	0.824	***	(0.149)	1.125	***	(0.203)
Unemployment	-0.082		(0.085)	-0.156		(0.121)
Gini	-0.016		(0.035)	-0.088	**	(0.043)
Adj. R-squared	0.480			0.701		
Number of Observations	27			27		

Notes:
The dependent variable is a mean country-specific intercept of the decision to migrate (life satisfaction) from the within level. Robust bootstrapped standard errors clustered at the country level are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively.

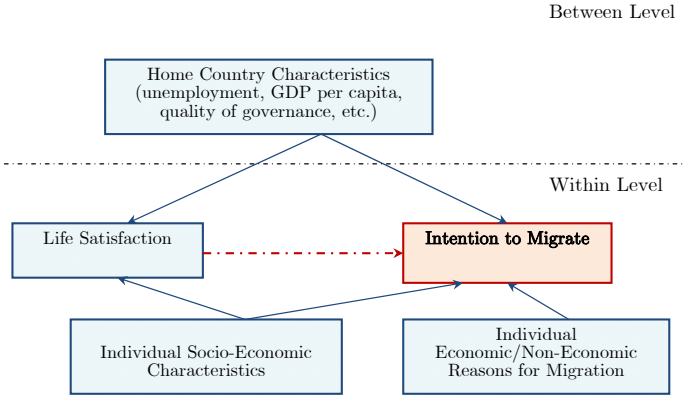
Table 3.9B: *Between Level Results for the Robustness Check (with CEE)*

OLS estimation	INTERCEPT MIGRATION			INTERCEPT LIFE SATISFACTION		
Constant	2.171	*	(1.231)	5.561	***	(1.330)
CEE	-0.963	***	(0.358)	-1.497	***	(0.343)
Unemployment	-0.116		(0.094)	-0.201	*	(0.115)
Gini	-0.060		(0.043)	-0.145	***	(0.041)
Adj. R-squared	0.327			0.625		
Number of Observations	27			27		

Notes:
The dependent variable is a mean country-specific intercept of the decision to migrate (life satisfaction) from the within level. Robust bootstrapped standard errors clustered at the country level are in parentheses. ***, **, * stand for 1, 5, and 10 % significance levels, respectively.

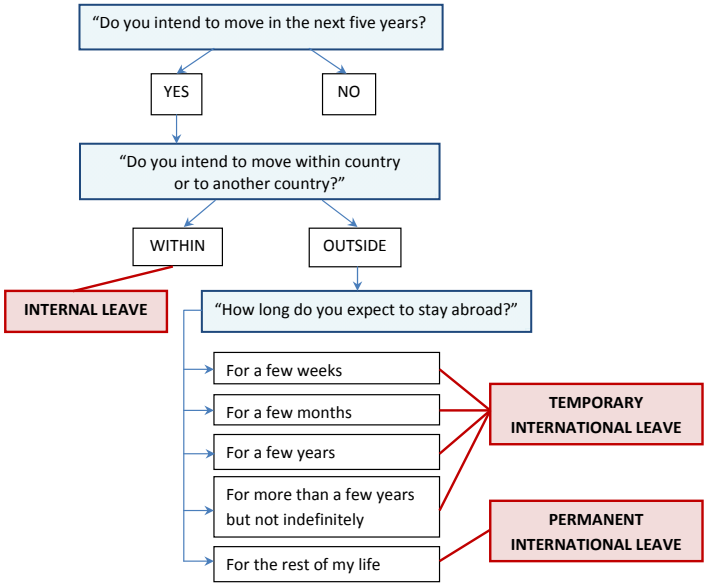
3.A.2. Figures

Figure 3.1: *Two-level Modeling of the Decision to Migrate*



Source: constructed by the authors.
Notes: Variables are included into boxes. Arrows originating from variables are hypothesized causal effects. Arrows originating from country economic and political variables correspond to equations 3.5a and 3.5b1-3.5b3 and indicate hypothesized direct effects on the migration intention and life satisfaction, respectively.

Figure 3.2: *Survey Questions about Intended Leaves*



Source: the Eurobarometer Survey.
Note: In our paper, the response "for more than a few years but not indefinitely" is considered as the intention to migrate temporarily. However, since a residence permit could be received after a few years in most countries, this response may also be attributed to permanent international leave. The estimation results are robust to such a modification.