

**EXPENDITURE DECENTRALIZATION,
DOES IT MAKE US HAPPIER?
AN EMPIRICAL ANALYSIS USING
A PANEL OF COUNTRIES**

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TITLE. Expenditure decentralization, Does it make us happier? An empirical analysis using a panel of countries.

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ABSTRACT

In this paper we analyze whether fiscal decentralization of education, health, housing, social protection, recreation, culture and religion, public order and safety, and transportation has a significant effect on happiness. We specify a multilevel ordinal logit model with 1 intercept random and fixed effects. This hinges upon one ordinal endogenous variable and two types of exogenous factors: i), individual factors that represent the characteristics of individuals, and ii) aggregated factors, which reflect the level of decentralization in the above mentioned areas of government spending.

The database being used contains 89,584 observations of 30 countries.

The estimations reveal that the decentralization of recreation, culture and religion, housing, education and health are significant in explaining happiness. While decentralization of recreation, culture and religion, and health improve the level of individual satisfaction, a negative effect was found in relation to housing and education.

Keywords: Decentralization, happiness, subjective well-being, public policy.

Códigos JEL: H72, H77, D69, and C23

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1 INTRODUCTION

According to the economic analysis perspective, decentralization is justified because it improves the efficiency of the public sector management. On the one hand, decentralization favors the consumer, since the sub-national governments know and satisfy the preferences of the citizens better (Oates 1972). On the other hand, decentralization also improves the territorial productivity of public goods and services (Oates 2005; Lockwood 2009 and Weingast 2009).

On the theoretical level, it is argued that the gains in efficiency generated by decentralization can contribute to greater economic growth, although no conclusive empirical evidence in favor of this hypothesis exists (Martínez-Vázquez J. and McNab R. 2003). Nevertheless, there is a greater consensus about the significant effects of decentralization on public spending and its indirect contributions to public well-being (Letelier 2012). Still, there are numerous arguments that deny the potential positive effects of decentralization, among which are the weakness of local bureaucracy, the implicit risk in the excessive proximity between private and public interests, and the scale economy losses in the provision of public utilities,... (Prud'homme 1995). Though some studies have been carried out that analyze the relation between decentralization and happiness (Frey and Stutzer 2000 and 2002; Bjørnskov et al. 2008; Díaz-Mountain and Rodriguez-Pose 2012 and Voigt and Blume 2012), the influence of the decentralization of different functional areas of government has not yet been investigated.

Given that decentralization in general, and fiscal decentralization (FD) in particular, is a complex phenomenon whose impact differs according to the specific area of public management (Letelier and Saez 2013 2015), this paper states that its effect on subjective well-being depends on the specific area that is decentralized. As previously noted in the abstract, this effect is identified through a model one multilevel ordinal logit with I intercept random and fixed effects (Goldstein 2003; Rabe-Hesketh, Skrondal and Pickles 2005; Raudenbush and Bryk of 2002), the analysis object areas are education, health, housing, social protection, recreation, culture and religion, public order and safety, and transportation. The sample of data utilized includes 89,584 individual observations of 30 countries. From the estimations carried out, it is

inferred that decentralization in the areas of recreation, culture and religion, and health have a positive effect on happiness; where as decentralization of the functions of education and housing have a negative impact.

The remainder of this document is presented in the following structure: in section 2, we review the literature that links the theory of decentralization to happiness, epigraph 3 puts forth, the theoretical framework, the methodology utilized and the data employed, while in section 4, the results of the econometric estimations are analyzed. Conclusions are presented in section 5.

2 LITERATURE REVIEW

The theory of subjective well-being is a field of investigation whose origins go back to the 1970`s and 1980`s (Easterlin 1974; Scitovsky 1975; Kapteyn and they Go Praag 1976; Morawetz 1977; Ng 1978; Wansbeek and Kapteyn 1983; Martin and Lichter 1983; Sirgy et al. 1985; and Headey and Krause 1988). The goal of this theory is to explain life satisfaction through the lens of ordinal utility. The works of Praag, Frijters and Ferrer-i-Carbonell (2003) and Ferrer-i-Carbonell and Frijters (2004) have been very important in advancing the theory of subjective well-being in different spheres: personal health, family financial situation, working conditions, and leisure and free time, among others.

In terms of the economics of happiness, Frey and Stutzer (2000) differentiate three categories of exogenous factors that determine subjective well-being: i) personality and demographic factors (age, sex, marital status, level of education, ideology, religion, etc; ii) micro and macroeconomic factors (level of income, the unemployment, the inflation, etc); and iii) the institutional context (democratic state, federalism, decentralization of spending, etc). There are various studies analyzing the impact of the institutional context. Frey and Stutzer (2000 and 2002), Stutzer and Lalive (2004), Frey (2008) and Bjørnskov et al., (2008 and 2010) have analyzed the effect of some institutions on happiness. Radcliff (2001) investigated the role of government ideology and other characteristics of the Welfare State. Veenhoven (2000) showed that in affluent countries, political and individual liberty have a positive effect on happiness. Moreover, in less affluent countries economic institutions and courts have a greater influence. Bjørnskov et al., (2010) concluded that in more affluent countries, political institutions have more influence on personal

satisfaction. More recently, Voigt and Blume (2012) have found that a positive correlation exists between happiness and federalism.

Because the analysis of the effect of institutions on subjective well-being is still a new area of investigation, less is known about the link between decentralization and happiness. Frey and Stutzer (2000) carried out a pioneering study in which they analyzed the effects of decentralization on an interregional level in Switzerland. They concluded that institutional factors, such as government initiatives, referendums, and local autonomy, have a significant and positive effect on the satisfaction of the Swiss. Nevertheless, this effect is dependent upon the direct link that exists between the binomial democracy-voter preferences and subjective well-being. Similar studies were carried out by Díaz-Mountain and Rodriguez-Pose (2012), who extended their analysis to every European country and studied how different powers and resources of regional and local European governments improve the level of individual satisfaction. Bjørnskov et al., (2008), making use of a more extensive database that included 60000 individual observations of 66 countries, concluded that decentralization of spending does not have a significant impact on happiness. Sujarwoto and Tampubolon (2015) found that in Indonesia a developing country, fiscal decentralization if it increases happiness, but political decentralization is not significant.

From the standpoint of the probable impact of decentralization on the performance of the State, theoretical literature has made significant contributions. On the one hand, theoretical literature shows the positive effect of decentralization on efficiency and the quality of public spending (Oates 1972). On the other, there is an intense debate regarding the possibility of reaching greater degrees of decentralization in the context of the limited professionalization in the lower levels of government, the greater feasibility of corruption and capture of the elite brought about by the excessive proximity between the private and public interests, and, finally, the insufficient quality of democracy in developing countries (Prudhomme 1995, Inman and Rubinfeld 2000; Storper 2005). In terms of the first statement, it is inferred that the impact of decentralized management and financing is framed as a trade-off between the benefits of having more realistic information about the local context and the cost of a reduction in the operation scale (Letelier and Sáez-Lozano 2013). In

general, it is expected that those spending functions that require considerable coordination at the national level will be more efficiently carried out at the central or intermediate levels of government. On the contrary, the management and financing of those services recognized as being local public goods which seeing as they affect the quality of said goods require specific knowledge of their local context, should generally be considered the responsibility of local government. (Letelier and Sáez-Lozano 2013). Therefore, we can conclude that the impact of the functional decentralization on the quality of public goods and, by extension, its effect on happiness, depends on the specific functional area and/or public good object of analysis.

3 THEORETICAL FRAMEWORK, METHODOLOGY AND DATA

To analyze whether or not the decentralization of different spending functions influences happiness, we should begin by developing a theoretical framework and describing the methodology of explaining the happiness relation. We end this section with a presentation of the basic characteristics of the data used.

3.1 Theoretical Framework

Happiness S_{ij}^* is a continuous and latent variable that reflects the level of subjective well-being. S_{ij}^* is determined by two sets of explanatory variables: i) individual X_{ij} , that represents the characteristics of individuals i (level 1) in the country j (level 2), and grouped Z_j , in order to measure the degree of decentralization that public spending functions have undergone in each country j .

We define the following lineal relation between the endogenous and the explanatory variables as:

$$S_{ij}^* = \beta X_{ij} + \lambda Z_j + \varepsilon_{ij} \quad (1)$$

β and λ are the coefficients to be estimated, and ε_{ij} the error term.

Given that happiness is a unobservable variable, we define it through the level of individual satisfaction S_{ij} . The relation between S_{ij}^* and S_{ij} , for the m -category of S_{ij} , is:

$$S_{ij} = m \quad si \quad \kappa_{m-1} \leq S_{ij}^* < \kappa_m; \quad m = 1, 2, \dots, M \quad (2)$$

being $\kappa_{m-1} \dots \kappa_m$, the values threshold.

The accumulated probability of the m -category of S_{ij} , is:

$$\Pr(S_{ij} > m | X_{ij}, Z_j) \quad (3)$$

A priori, we assume that individuals i are nested in the countries j . Therefore, we assume that $VAR(\varepsilon_{ij})$ is different for each group j and that there is conditional independence among the observations. This assumption allows us to relax the condition of homoskedasticity. Additionally, we assume that the influence of the predictor variable is fixed in two levels of analysis and that a random term U_{0mj} exists, that collects the inter-group differences.

In expression (3), the model one is deduced multilevel ordinal logit with 1 intercept random and fixed effects¹ of m -category of S_{ij} ² (see the appendix):

$$\ln\left(\frac{\exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})}{1 - \exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})}\right) = \beta_{00j} + \sum_{l=1}^L \beta_{lmj} X_{lij} + \sum_{r=1}^R \lambda_{rmj} Z_{rj} + U_{0mj} + \varepsilon_{mij} \quad (4)$$

β_{00j} is the constant term, β_{lmj} represents the parameters that measure the effect of X_{ij} individual variables, λ_{rmj} associated coefficients to Z_{sj} variables, and U_{0mj} is the random effect of country.

From the review of the literature carried out in the previous section, it is inferred that the following hypothesis is feasible:

Hypothesis 1. *The effect of fiscal decentralization can differ according to the specific type of spending function. The net impact will depend on the differential between the benefits of more information that results from decentralization and the cost of a more reduced scale of operation.*

The previous hypothesis is based on the assumption that individuals are capable of identifying the magnitude of the net profit of decentralization, since there is an observable relation between the quality of the public good in

¹ There are three reasons for not specifying multilevel ordinal logit model with intercept and slope random of X_{ij} : i) the theory does not justify the effect of X_{ij} differs in each unit j due to unobservable factors; ii) differential effect of grouped j X_{ij} is explained by Z_j variables; and iii) the literature does not justify the inclusion of variables representing the interaction between X_{ij} and Z_j variables.

² Upon being the endogenous ordinal variable S_{ij} , we can specify ordinal logit or probit model. It given that we suppose fixed effects in the explanatory individual variable, we reject the option of ordinal probit model since produces inconsistent estimator.

question and its cost. The cost is implicit to the relative magnitude of local taxes.

Hypothesis 2. *Only the decentralization of expense functions, which citizens consider within the jurisdiction of sublevel governments, contributes to an increase of happiness. On the contrary, the decentralization of public goods (services), whose provision is perceived as cost efficient if provided by the central government, will result in a reduction in individual satisfaction.*

3.2 Methodology

To estimate the model (4) we apply the maximum likelihood method (ML), utilizing the adaptation of the quadrature of proposed Gauss by Rabe-Hesketh Skrondal and Pickles (2005). To maximize the likelihood function we employ the Newton-Raphson algorithm (see the appendix).

We also estimate two additional models: logit ordinal with 1 random intercept and fixed effects in the individual explanatory variable, and ordinal logit with 1 random intercept. In the appendix, the specification of both models is described.

3.3 The data

The database of this investigation has been built from the information supplied by three sources: the World Value Survey (WVS), the European Value Survey (EVS) and the Government Financial Statistics (GFS). The WVS is a world project of investigation that analyzes people's values and beliefs. It is a survey with representative national samples, in which a standardized questionnaire is utilized (<http://www.worldvaluessurvey.org/wvs.jsp>). The EVS is also a global research project used only in Europe and, just like the WVS, it provides detailed information on the ideas, beliefs, preferences, attitudes, values, and opinions of European citizens (<http://www.europeanvaluesstudy.eu/>). Until now, six waves of the WVS and EVS have been carried out: wave 1 (1981 - 1984), wave 2 (1989 - 1993), wave 3 (1994 - 1999), wave 4 (1999 - 2004), wave 5 (2005 - 2007) and wave 6 (2008 – 2010).

The GFS is a database prepared by the International Monetary Fund (IMF) that offers fiscal and budgetary information for 44 countries. It provides information on the decentralized spending in the areas of education, health, housing, social protection, recreation, culture and religion, public order and safety, and transportation.

Table 1. Variable, measurement and source

Variable	Definition	Measurement	Source
Endogenous			
S	Level of satisfaction	Nothing satisfaction Level (0), somewhat satisfied (1), quite satisfied (2) and very satisfied (3)	World Values Survey (WVS) / European Values Survey (EVS)
Explanatory: individual			
INCOME	Household income	Decile	World Values Survey (WVS) / European Values Survey (EVS)
GENDER	Gender	Dummy: men (1), and others (0)	World Values Survey (WVS) / European Values Survey (EVS)
AGE	Age	Years	World Values Survey (WVS) / European Values Survey (EVS)
MARRIED-COUPLE	Marital status: married or lives in couple	Dummy: married or they live in couple (1), and other states (0)	World Values Survey (WVS) / European Values Survey (EVS)
PRIMARY EDUCATION	Level of studies: primary education	Dummy: primary studies (1), and other levels studies (0)	World Values Survey (WVS) / European Values Survey (EVS)
SECONDARY EDUCATION	Level of studies: secondary education	Dummy: secondary studies (1), and other levels studies (0)	World Values Survey (WVS) / European Values Survey (EVS)
HIGHER EDUCATION	Level of studies: higher education	Dummy: higher education (1), and other levels studies (0)	World Values Survey (WVS) / European Values Survey (EVS)
CHILDREN	Children number	Children number: since 0 to 8 or more children	World Values Survey (WVS) / European Values Survey (EVS)

MUSLIM	Muslim religion	Dummy: Muslim (1), and other religion (0)	World Values Survey (WVS) / European Values Survey (EVS)
CATHOLIC	Catholic religion	Dummy: Catholic (1), and other religion (0)	World Values Survey (WVS) / European Values Survey (EVS)
PROTESTANT	Protestant religion	Dummy: Protestant (1), and other religion (0)	World Values Survey (WVS) / European Values Survey (EVS)
ORTHODOX	Orthodox religion	Dummy: Orthodox (1), and other religion (0)	World Values Survey (WVS) / European Values Survey (EVS)
JEWISH	Jewish religion	Dummy: Jewish (1), and other religion (0)	World Values Survey (WVS) / European Values Survey (EVS)
IDEOLOGY	Ideology	Discrete: left (0), and right (9)	World Values Survey (WVS) / European Values Survey (EVS)
UNEMPLOYED	Labor status	Dummy: unemployed (1), and others (0)	World Values Survey (WVS) / European Values Survey (EVS)

Explanatory: national (by countries)

FDDED	Fiscal decentralization education	Education expenditure of state and local government / local, state and central education expenditure	IMF Government Financial Statistics (GFS)
FDHE	Fiscal decentralization health	Health expenditure of state and local government / local, state and central health expenditure	IMF Government Financial Statistics (GFS)
FDHO	Fiscal decentralization housing	Housing expenditure of state and local government / local, state and central housing expenditure	IMF Government Financial Statistics (GFS)
FDSP	Fiscal decentralization social protection	Social protection expenditure of state and local government / local, state and central social protection expenditure	IMF Government Financial Statistics (GFS)
FDRCR	Fiscal	Recreation, culture and religion	IMF Government

	decentralization, recreation, culture and religion	expenditure of state and local government / local, state and central recreation, culture and religion expenditure	Financial Statistics (GFS)
FDPOS	Fiscal decentralization public order and safety	Public order and safety expenditure of state and local government / local, state and central public order and safety expenditure	IMF Government Financial Statistics (GFS)
FDRTRANS	Fiscal decentralization transportation	Transportation expenditure of state and local government / local, state and central transportation expenditure	IMF Government Financial Statistics (GFS)

By integrating the information from WVS, EVS and GFS, we have been able to accumulate 89584 observations with which, to analyze the effect of the decentralization spending of functions in 30 countries (table 2).

Table 2. Countries, times-series of the functions of expense decentralized and waves of the World Value Survey (WVS) / European Value Survey (EVS)

Country	Times-series of the expense decentralized	Source / Wave / Year
Albania	1995 – 1998	WVS / 3 / 1998
Argentina	1972 – 1999	WVS / 4 / 1999
Australia	1972 – 1995	WVS / 3 / 1995
Austria	1972 - 1990	EVS / 2 / 1990
Bulgaria	1988 - 2006	WVS / 5 / 2006
Canada	1979 - 2006	WVS / 5 / 2006
Chile	1974 - 1988	WVS / 2 / 1990
Croatia	1995 - 1999	EVS / 4 / 1999
Czech Republic	1993 - 1999	EVS / 4 / 1999
Denmark	1972 - 1999	EVS / 4 / 1999
Estonia	1991 - 1999	WVS / 4 / 1999

Table 2. Countries, times-series of the functions of expense decentralized and waves of the World Value Survey (WVS) / European Value Survey (EVS)

Country	Times-series of the expense decentralized	Source / Wave / Year
France	1978 - 1990	WVS / 2 / 1990
Germany	1974 - 1990	EVS / 2 / 1990
Hungary	1990 - 1999	EVS / 4 / 1999
Iceland	1972 - 1990	EVS / 2 / 1990
India	1974 - 2001	WVS / 4 / 2001
Iran, I. R.	1999 - 2007	WVS / 5 / 2007
Ireland	1982 - 1990	EVS / 2 / 1990
Latvia	1994 - 1999	EVS / 4 / 1999
Lithuania	1993 - 1999	EVS / 4 / 1999
Norway	1980 - 1996	WVS / 3 / 1996
Poland	1994 - 1999	EVS / 4 / 1999
Romania	1990 - 1999	EVS / 4 / 1999
Slovakia	1996 - 1999	EVS / 4 / 1999
Spain	1995 - 1997	EVS / 4 / 1999
Switzerland	1990 - 1996	WVS / 3 / 1996
The Netherlands	1991 - 1997	EVS / 4 / 1999
Uganda	1999 - 2001	WVS / 4 / 2001
United Kingdom	1979 - 1998	WVS / 3 / 1998
United States	1980 - 1999	WVS / 4 / 1999

As shown in table 2, the endogenous variable S_{ij} is ordinal and has four possible values: not at all satisfied (0), somewhat satisfied (1), quite satisfied (2) or very satisfied (3). We define the following relation between S_{ij}^* , and S_{ij} as:

$$S_{ij} = \begin{cases} 0 & si \quad S^* \leq \kappa_0 \\ 1 & si \quad \kappa_0 < S^* \leq \kappa_1 \\ 2 & si \quad \kappa_1 < S^* \leq \kappa_2 \\ 3 & si \quad S^* > \kappa_2 \end{cases} \quad (5)$$

Twenty two explanatory variables have been included in the multilevel ordinal logit with I intercept random and fixed effects model: the individual variables represent major personality characteristics and demographic factors: level of income (*INCOME*), sex (*SEX*), age (*AGE*), marital status (*MARRIED-COUPLE*), levels of primary (*PRIMARY EDUCATION*), secondary (*SECONDARY EDUCATION*) and higher (*HIGHER EDUCATION*) education, number of children (*CHILDREN*), Muslim (*MUSLIM*), Catholic (*CATHOLIC*), Protestant (*PROTESTANT*), Orthodox (*ORTHODOX*) and Jewish (*JEWISH*) religious confessions, individual ideology (*IDEOLOGY*) and labor situation of the unemployed (*UNEMPLOYED*). Seven grouped variables measure the level of FD in education (*FD*ED), health (*FD*H*E*), housing (*FD*H*O*), social protection (*FD*S*P*), recreation, culture and religion (*FD*R*C*R), public order and safety (*FD*P*O*S), and transportation (*FD*T*R*A*N*S).

AGE and *IDEOLOGY* are continuous variables. We have defined a quadratic function for age. *IDEOLOGY* reflects the car-position on a scale of 10 points: 0 is represented on the left and 9 on the right. *INCOME* and *CHILDREN* are discrete variables: *INCOME* reflects the segment (decile) in which the individual is located, while *CHILDREN* represents the number of children, with a reproof in the value equal to 8 children. The other explanatory variable of individual character is as follows: *SEX* (1 among the men, and 0 in the other cases), *MARRIED-COUPLE* (1 for these who are married or live with another, and 0 for those who do not in the others), *PRIMARY EDUCATION* (1 for these who have received a primary education, and 0 in the others), *SECONDARY EDUCATION* (1 for these who have done secondary studies, 0 in the others), *HIGHER EDUCATION* (1 for these who have done third level studies or higher, 0 in the others), *MUSLIM* (1 for Muslim, 0 in the others), *CATHOLIC* (1 for Catholic, 0 in the others), *PROTESTANT* (1 for Protestant, 0 in the others), *ORTHODOX* (1 for Orthodox, 0 in the others), *JEWISH* (1 for Jewish, 0 in the others), *UNEMPLOYED* (1 for unemployed, 0 in the others).

The data for the endogenous and individual explanatory variables were derived from the WVS and the EVS. The source is cited in the second column of Table 2, indicating the wave of information extracted and the year in which the study was carried out. For the majority of the countries we have selected the wave of the WVS and EVS whose year of execution coincides with the last period of the time series of the decentralized spending. In the cases of Chile, Spain and the Netherlands, we selected the wave that was carried out two years after the last data regarding the decentralization of spending was published, in order to having a longer time series. The seven grouped explanatory variables reflect the medium value of the time series of decentralized spending in education, health, housing, social protection, recreation, culture and religion, public order and safety, and transportation. The FD level of spending is measured as the relation between the spending carried out by subnational (state and local) governments, and the total spending at all three levels of government (central, state and local). Table 3 shows the descriptive statistics of the explanatory variable.

Table 3. Descriptive statistics

	Mean	Std. Dev.	Min.	Max.
<i>Individual Variables</i>				
INCOME	4.083653	2.524508	0	10
GENDER	.4950549	.4999783	0	1
AGE	44.08698	16.69112	14	100
MARRIED-COUPLE	.6699634	.4702286	0	1
PRIMARY EDUCATION	.0929854	.2904135	0	1
SECONDARY EDUCATION	.2027706	.4020653	0	1
HIGHER EDUCATION	.1514779	.3585161	0	1
CHILDREN	1.78418	1.5118	0	8
MUSLIM	.0355086	.1850624	0	1
CATHOLIC	.3732586	.4836727	0	1
PROTESTANT	.2093789	.4068676	0	1
ORTHODOX	.0607363	.2388473	0	1

Table 3. Descriptive statistics

	Mean	Std. Dev.	Min.	Max.
JEWISH	.0036056	.0599383	0	1
IDEOLOGY	4.408243	2.084069	0	9
UNEMPLOYED	.0574545	.2327102	0	1
<i>National Variables</i>				
FDED	.5683446	.3127372	0	.9462123
FDHE	.3612066	.2902539	0	.8821232
FDHO	.6785503	.2176554	.1640913	.9963085
FDSP	.1802081	.219165	.002983	1
FDRCR	.6702739	.21097	.2053692	1
FDPOS	.4020877	.3552743	0	1
FDTRANS	.4632165	.1912404	.0311248	.7827957

4 RESULTS

In Table 4 the estimations of multilevel ordinal logit with I random intercept model (model 1), multilevel ordinal logit with I random intercept and fixed effects model in the individual explanatory variable (model 2) and ordinal logit with I random intercept and fixed effects (model 3) are presented. The first part of the table shows the coefficients estimated for the fixed part, that is to say, of the grouped individual explanatory variable and the values threshold $\kappa_0, \kappa_1, \gamma, \kappa_2$. In the second section of the table is the variance of the random part. In the third part, various statistics of the three models are reviewed.

Table 4: Multilevel ordinal logit of happiness

	Model 1	Model 2	Model 3
Fixed Part			
<i>Individual Variables</i>			
INCOME		.072*** (23.77)	.067*** (20.80)

Table 4: Multilevel ordinal logit of happiness

	Model 1	Model 2	Model 3
GENDER		.116*** (8.53)	.117*** (8.04)
AGE		-.069*** (-27.02)	-.071*** (-26.54)
MARRIED-COUPLE		.001*** (24.29)	.001*** (23.72)
PRIMARY EDUCATION		.692*** (41.25)	.743*** (41.80)
SECONDARY EDUCATION		.125*** (5.00)	.127*** (4.80)
HIGHER EDUCATION		.316*** (16.96)	.332*** (16.63)
CHILDREN		.420*** (20.33)	.467*** (20.86)
MUSLIM		-.004 (-0.67)	-.001 (-0.23)
CATHOLIC		-.094 (-1.60)	-.137 (-1.92)
PROTESTANT		.084*** (4.37)	.083*** (4.08)
ORTHODOX		.143*** (6.23)	.148*** (6.23)
JEWISH		.029 (0.64)	.008 (0.18)
IDEOLOGY		-.320** (-2.83)	-.310** (-2.65)
UNEMPLOYED		.047*** (14.19)	.051*** (13.81)
INCOME		-.518***	-.583***

Table 4: Multilevel ordinal logit of happiness

	Model 1	Model 2	Model 3
GENDER		(-17.31)	(-18.18)
<i>National Variables</i>			
FDED			-1.270** (-3.02)
FDHE			.978* (2.29)
FDHO			-1.674*** (-3.55)
FDSP			.927 (0.82)
FDRCR			3.308*** (4.69)
FDPOS			.315 (0.63)
FDTRANS			.765 (1.07)
Constant	.817*** (0.071)	.855*** (10.74)	.430*** (7.12)
Fixed Part: Thresholds			
κ_1 : cut1 constant	-4.089*** (0.125)	-4.612*** (-32.44)	-3.669*** (-8.58)
κ_2 : cut2 constant	-1.759*** (0.123)	-2.213*** (-15.76)	-1.271** (-2.98)
κ_3 : Cut3 constant	1.264*** (0.123)	.914*** (6.52)	2.040*** (4.78)
Random Part: Variances and covariances			
Level 2 Variance (U_{0mj}) ⁽¹⁾	.6676852 (.11570094)	.31652341 (.00866424)	.18531846 (.0520741)
No. Obs. Level 1	89584	89584	79097

Table 4: Multilevel ordinal logit of happiness

	Model 1	Model 2	Model 3
No. Obs. Level 2	30	30	26
No. Iteration of Adaptive Quadrature (Newton-Raphson)	6	4	4
No. Integration Points	16	16	16
Wall Clock Time	00:00:40	0:49:09	01:52:12
Intraclass Correlation Coefficient (ICC):	.23738107	.12858689	.07952395
-2 Log Likelihood Restricted	172038.8	170706.58	143481.28
Akaike Information Criterion (AIC)	172046.798	164880.076	143535.278
Bayesian Information Criterion (BIC)	172084.410	165067.777	143785.796

⁽¹⁾ The standard error is in brackets

Notes: ***, **, and * indicate significance level at 1%, 5%, and 10%, respectively. Z value in brackets. “not at all happy” is the reference category.

The value of the intraclass correlation coefficient (ICC) of the model 1 shows that .2374 of the changeability of the subjective well-being is explained by the characteristics unrelated to country. Given the individual explanatory variable in the model 2, the variance of the random part diminishes by almost more than half; which explains why the ICC is reduced to .1286. If we compare the statisticians -2 log likelihood, Akaike information criterion (AIC) and Bayesian information criterion (BIC) of both models, we corroborate that Model 2 is appropriate for explaining level of individual satisfaction.

The incorporation of the national explanatory variable in Model 3 contributes to reduce the variance of the random part, if is compared with model 2, which explains why the statistical ICC diminishes. Given the statisticians -2 log likelihood, AIC and BIC show that Model 3 is most adequately explains happiness. In the same way, if we compare the coefficients of the individual explanatory variable from Models 2 and 3, we can confirm that they have the same sign and that the magnitude hardly differs. Therefore, Model 3 is the most adequate for explaining the effect of spending decentralization policies, given that it reflects the heterogeneousness of the countries.

The coefficients estimated for the grouped variables confirm Hypothesis 1. That is to say, the effect of decentralization differs in function of the policies, and is specific to each spending function. The spending parameters in education, health, housing and recreation, culture and religion are significant. The decentralization of spending functions in health and recreation, and culture and religion, make individuals happier, just as Hypothesis 2 predicts. On the contrary, the transfer of responsibility in the areas of in education and housing reduces citizens' satisfaction with these services.

Assuming that the benefit cost relation in the provision of local public goods is visible to individuals and that there is a direct relation between happiness and said relation, the previous results show that only in the cases of health and recreation, culture and religion, do the specific benefits of decentralization surpass the cost. Although the quality of public health assistance is at once multidimensional, the so-called "primary healthcare", in which the direct contact between the service providers and the beneficiaries acquires individual importance, it also requires a specific knowledge of the cultural and social context of the local community. These needs are adequately addressed in the realms of culture, leisure, and religion, in which it is expected that the demands of each community are different in terms of culture, local traditions, and other similar elements. In this context, a thorough knowledge of the local context and its specific demands can only be achieved through a decentralized management. The negative effects of decentralization on housing as well as education, concur with the fact that such functions of the State are clear indicators of important externalities among jurisdictions, and therefore require that the central government make a greater effort to coordinate these services. To the extent that individuals perceive that the effectiveness of these two policies is the responsibility of the central government, decentralization results in a reduction in individual satisfaction.

The previous results are in line with those obtained by Bjørnskov et al., (2008). The authors suggest that the effect of decentralization on subjective well-being can change in the context of specific public policies, and they show that this is exactly the case in the sphere of subnational spending, which admits the possibility that other forms of decentralization may also affect happiness selectively, depending on government function. The estimated coefficients of

the individual explanatory variable are significant, if we exclude the number of children and those of Orthodox and Muslim religion. The estimated parameters confirm the hypothesis of the base of happiness model, excluding age, although there is no general consensus with regard to the effect of this variable (Bjørnskov et al., 2008). As the economics of happiness theory predicted, individual income levels positively influence happiness. Another socioeconomic factor that determines the satisfaction level of the population is that of unemployment: those unemployed are less happy than those employed.

As opposed to previous analyses, these findings show that the decentralization of spending in recreation, culture and religion, housing, education and health are the exogenous factors that determine subjective well-being, though the sign of its effect is specific to each spending function. Also, the magnitude of its effect is greater if it is compared with the impact of the individual variables.

5 CONCLUSIONS

The main objective of this paper, as presented in the beginning, was to cover a prominent "gap" within the research into the economics of happiness: analysis of the influence of public spending decentralization in relation to subjective well-being. We specify one multilevel ordinal logit with 1 random intercept and fixed effects model for two reasons: i) happiness is a latent variable, which we measure through the level of satisfaction declared by individuals, and ii) there are two types of explanatory variables, the individuals, that represents individual characteristics, and grouped, which reflect the spending decentralization in education, health, housing, social protection, recreation, culture and religion, public order and safety, and transportation. The central hypothesis of this work is that decentralization, measured through FD, has a different effect on happiness depending on the nature of the State function through which it is analyzed.

This is the first study in this scientific environment which applies the multilevel analysis that permits us to quantify the influence of the explanatory variable on subjective well-being. On an empirical level, we contribute three significant findings: i) happiness is determined, chiefly, by spending decentralization in recreation, culture and religion, housing, education, and health; ii) the decentralization of the policies governing recreation, culture and religion, and health contributes to greater satisfaction in a country's citizens; and iii) the

transfer of spending responsibility in housing and education causes a decrease in subjective well-being. Of particular importance is the case of decentralization of policies regarding recreation, culture and religion, which is one of the exogenous factors that most heavily influences happiness.

In terms of future research, our results suggest that we should turn our efforts to study the feasibility of fiscal decentralization, examining the multiple dimensions of each specific area of spending. For example, education involves the administration of human resources, infrastructure maintenance and improvement, and the management of academic content and teaching methodologies. The same thing is true for health; an area in which the logistical aspects can easily be separated into other elements of public management. The various spending items included in the category of social protection require similar analysis. The availability of specific data at the national level would make repeating this exercise worthwhile, in order to further break down the information, which may, in turn, prove to be extremely useful in the development of good public policies.

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APPENDIX. Multilevel model: specification and estimation method.

In this appendix, the multilevel ordinal logit with I random intercept and fixed effects (section I), multilevel ordinal logit with I random intercept and fixed effects in individual explanatory variable (section II) and multilevel ordinal logit with I random intercept (section III) are given. Also described is the estimation method used for the three models in section IV.

I.- Multilevel ordinal logit model with I random intercept and fixed effects.

The accumulated probability of the m-category of S_{ij} is:

$$\Pr(S_{ij} > m | X_{ij}, Z_j) = \Pr(S_{ij}^* > \kappa_m | X_{ij}, Z_j) \quad (I.1)$$

Substituting (1) in (I.1), and operand:

$$\begin{aligned} \Pr(S_{ij} > m | X_{ij}, Z_j) &= \Pr(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij} > \kappa_m | X_{ij}, Z_j) \\ &= \Pr(-\varepsilon_{ij} \leq \beta X_{ij} + \lambda Z_j - \kappa_m | X_{ij}, Z_j) = F(\beta X_{ij} + \lambda Z_j - \kappa_m) \end{aligned} \quad (I.2)$$

$F(\cdot)$ the function of distribution accumulated. If $F(\cdot)$ is logistic accumulated distribution function, then:

$$\Pr(S_{ij} > m | X_{ij}, Z_j) = \frac{\exp(\beta X_{ij} + \lambda Z_j - \kappa_m)}{1 - \exp(\beta X_{ij} + \lambda Z_j - \kappa_m)} \quad (I.3)$$

The log-odds of the equation (I.3) is:

$$\ln \left(\frac{\exp(\beta X_{ij} + \lambda Z_j - \kappa_m)}{1 - \exp(\beta X_{ij} + \lambda Z_j - \kappa_m)} \right) = \beta_{0mj} + \sum_{l=1}^L \beta_{lmj} X_{lij} + \sum_{r=1}^R \lambda_{rmj} Z_{rj} - \kappa_m \quad (I.4)$$

β_{0mj} constant term, β_{lmj} parameters that measure the effect of the individual variable, λ_{rmj} associated coefficients to grouped variable.

Alternatively, the model (I.4) can be written in terms of S_{ij}^* :

$$\ln \left(\frac{\exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})}{1 - \exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})} \right) = \beta_{0mj} + \sum_{l=1}^L \beta_{lmj} X_{lij} + \sum_{r=1}^R \lambda_{rmj} Z_{rj} + \varepsilon_{mij} \quad (I.5)$$

Upon being nested i individuals inside j grouped, β_{0mj} can vary among j groups.

Therefore we can rewrite β_{0mj} thus:

$$\beta_{0mj} = \beta_{00j} + U_{0mj} \quad (I.6)$$

β_{00j} the constant term and U_{0mj} the random effect of j group.

If we substitute (I.6) in (1.5), we obtain the expression of the model one multilevel ordinal logit with 1 intercept random and fixed effects of the m -category of S_{ij} :

$$\ln \left(\frac{\exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})}{1 - \exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})} \right) = \beta_{00j} + \sum_{l=1}^L \beta_{lmj} X_{lij} + \sum_{r=1}^R \lambda_{rmj} Z_{rj} + U_{0mj} + \varepsilon_{mij} \quad (1.7)$$

Upon supposing that the effects of X_{ij} and U_{0mj} are fixed and random, respectively, the following is confirmed:

$$E(\varepsilon_{mij}) = 0, \text{Var}(\varepsilon_{mij}) = \sigma_{\varepsilon_{mij}}^2 \quad (I.8)$$

$$E(U_{0mj}) = 0, \text{Var}(U_{0mj}) = \sigma_{U_{0mj}}^2$$

$\sigma_{\varepsilon_{mij}}^2$ and $\sigma_{U_{0mj}}^2$ the variance components of the random and fixed effects, respectively.

II.- Multilevel ordinal logit model with 1 random intercept and fixed effects in individual explanatory variable.

If we suppose that explanatory variables Z_{rj} do not influence in S_{ij}^* , the model (I.7) is rewritten thus:

$$\ln \left(\frac{\exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})}{1 - \exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})} \right) = \beta_{00j} + \sum_{l=1}^L \beta_{lmj} X_{lij} + U_{0mj} + \varepsilon_{mij} \quad (I.9)$$

Just like in multilevel ordinal logit model with 1 random intercept and fixed effects, the following is confirmed:

$$E(\varepsilon_{mij}) = 0, \text{Var}(\varepsilon_{mij}) = \sigma_{\varepsilon_{mij}}^2, E(U_{0mj}) = 0 \text{ y } \text{Var}(U_{0mj}) = \sigma_{U_{0mj}}^2$$

III.- Multilevel ordinal logit model with 1 random intercept.

If we suppose that S_{ij}^* does not depend on the explanatory variable X_{ij} and Z_{rj} .

The model (I.7) is rewritten thus:

$$\ln \left(\frac{\exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})}{1 - \exp(\beta X_{ij} + \lambda Z_j + \varepsilon_{ij})} \right) = \beta_{00j} + U_{0mj} + \varepsilon_{mij} \quad (I.10)$$

Just like in the previous models, the following is confirmed:

$$E(\varepsilon_{mij}) = 0, \text{Var}(\varepsilon_{mij}) = \sigma_{\varepsilon_{mij}}^2, E(U_{0mj}) = 0 \text{ y } \text{Var}(U_{0mj}) = \sigma_{U_{0mj}}^2$$

IV.- Estimation method.

To estimate Model (1.4), (1.7) and (1.10) we utilize the method ML that involves important problems of calculation due to the multidimensional numerical integration, given the high one dimensionality of the likelihood function (Jaime-Castillo, A. M. Sáez-Lozano, J. L, forthcoming). There are two main approaches to deal with this issue in the literature: quasi-likelihood methods (PQL) and the approximation of the likelihood function by some numerical method of integration (MQL). While PQL methods are less computationally demanding, they do not directly involve likelihood, as they use a linear Taylor expansion of the inverse link function around current estimates of fixed and random effects. At the same time, PQL estimates are negatively biased if large variance components are present or the distribution of the response variable departs from normality. In our research we have used the Adaptive Gaussian Quadrature of Gauss approximation of the maximum likelihood, as proposed by Rabe-Hesketh Skrondal and Pickles (2005), which scales and translates the quadrature points taking into account the properties of the integrand. Newton-Raphson algorithm was subsequently used to maximize the likelihood function. Calculations have been done using the GLAMM routine.