

More willing to redistribute?

A hierarchical analysis for modelling country-level disparities in individual preferences for redistribution

Riccardo Massari, Maria Grazia Pittau, Roberto Zelli

Sapienza, Università di Roma

Osservatorio sulle disuguaglianze sociali. Workshop su
“*Metodi quantitativi per l’analisi delle condizioni di vita: nuove concettualizzazioni, stime statistiche e procedure operative*”
Facoltà di Economia “Marco Biagi”, Università di Modena
30 gennaio 2009

Main questions

- are Europeans more willing to redistribute than US citizens?
- which variables are good predictors of support for redistribution in Europe and which in US?
- can Europe be seen as a whole? are cross-country differences relevant? and within-country disparities?
- does the underlying process of individual preference formation differ across country and/or regions?
- to what extent do macro-variables (income inequality, poverty rate, ethnic fractionalization) shape European preference formation process regarding government redistribution?

Preferences for redistribution: theoretical background

Median voter hypothesis (Romer, 1975; Meltzer and Richards, 1981)
entirely driven by rational self-interest

- simple hypothesis: lump-sum redistribution and taxation to finance redistribution; linear tax rate
- if people seek to maximize their utility, their preferences for redistribution will be inversely ordered by income
- income of median voter (the decisive voter) is below the mean income (income distribution is skewed)
- the median voter wants to redistribute income perfectly, to close the gap between median income and mean income
- the higher the ratio of mean income over median income (the higher income inequality), the stronger median individual preference for redistribution.

Preferences for redistribution: theoretical perspectives

Extensions and refinements:

- more realistic tax schemes (Corneo and Grüner, 2001)
- extension beyond direct redistribution (cash transfers) to any public good that is equally benefitted by all citizens but disproportionately paid for by the rich (Perotti 1992)
- awareness of disincentive effects created by redistribution (e.g. lower labor supply) (Meltzer and Richards, 1981, p.920)
- awareness that welfare state expenditures also provides insurance against future income shocks (Saint Paul and Verdier, 1996)
- “tunnel effect” (Hirschman, 1973): people take into account also expectations about their future income (prospect of upward mobility hypothesis, POUM, Benabou and Ok, 2000)

However, the general conclusion remains intact

Growth models built on the median voter theorem

Three quite distinct logical steps:

- 1 higher inequality leads to a stronger preferences for redistribution among citizens
- 2 through the electoral process, it leads to more redistributive expenditure, which is financed through taxes
- 3 it creates market distortions and undermines incentive, hence reducing growth rates (different models: Perotti, 1992; Persson and Tabellini, 1992 and 1994; Alesina and Rodrick, 1994)

Preferences for redistribution: theoretical perspectives

Beyond self-interest?

- welfare state institution (Esping Andersen, 1990)
- personal beliefs: luck vs personal effort (Alesina and La Ferrara, 2005); beliefs can be endogenously determined by past own economic mobility experience (Piketty, 1995)
- altruism, but observed poverty may have an opposite effect (Alesina and La Ferrara, 2005)
- religion (Scheve and Stasavage, 2006)
- beggar-thy-(ethnically diverse)neighbour (Lutmer, 2001; Alesina and Glaeser, 2004)
- cultural and historical legacies (Weakliem et al., 2002)

Empirical strategy

- demand for redistribution is measured at the individual level (rather than in aggregated form)
- using as predictors of attitude towards redistribution variables both at individual and at country (regional) level
- examination of a range of country-level variables that we have theoretical reasons to believe influence the demand for redistribution
- focus on the role of income and inequality in shaping preferences between countries
- try to estimate the role of regions (NUTS)
- multilevel modelling (MLM) explicitly accounts for the hierarchical nature of our data

Individual-level data

- European Social Survey (ESS), initiated by the European Science Foundation (2002-2006): 23 countries; around 90,000 individuals in 3 waves
- *“The government should take measures to reduce differences in income levels”*
Answers from 1 (“Agree strongly”) to 5 (“Disagree strongly”)
- for U.S., General Social Survey (GSS) (1990-2006): 9 areas; around 9,000 individuals in 10 waves
- *“Some people think that the government in Washington ought to reduce the income differences between the rich and the poor, perhaps by raising the taxes of wealthy families or by giving income assistance to the poor. Others think that the government should not concern itself with reducing this income difference between the rich and the poor”*. The GSS answers range from 1 = “Should” to 7 = “Should not”
- dummy variable equal to 1 if one thinks that government should reduce difference and 0 otherwise. *REDISTR* takes value 1 if *GINCDIF* < 3 (ESS version) or *EQWLTH* < 4 (GSS version)

		Government should reduce differences in income levels				
		NO	4	3	2	YES
COUNTRY	Austria	3.03	11.27	16.47	39.44	29.80
	Belgium	2.99	14.25	13.34	43.99	25.43
	Switzerland	3.14	17.62	13.16	47.27	18.82
	Czech Republic	8.09	16.03	14.80	33.07	28.00
	Germany	3.36	18.51	16.93	43.33	17.86
	Denmark	8.29	31.37	19.68	31.04	9.62
	Estonia	0.86	6.59	12.69	47.93	31.93
	Spain	1.07	5.45	10.44	49.78	33.26
	Finland	2.55	9.09	14.14	39.16	35.06
	France	2.85	6.61	8.17	35.83	46.54
	Greece	0.64	1.92	5.32	41.15	50.97
	Hungary	1.10	3.60	8.53	38.24	48.53
	Ireland	1.29	11.78	12.75	55.67	18.51
	Italy	1.15	6.35	11.22	48.08	33.21
	Luxembourg	5.75	14.93	12.78	40.67	25.86
	Netherlands	3.05	21.92	15.81	45.14	14.09
	Norway	1.86	15.02	17.46	47.26	18.41
	Poland	1.62	8.90	8.15	48.08	33.24
	Portugal	0.70	3.25	9.07	47.83	39.15
	Sweden	1.48	11.91	17.90	51.33	17.38
Slovenia	1.12	5.51	9.11	46.38	37.89	
Slovakia	1.67	8.47	12.26	47.13	30.47	
United Kingdom	2.80	18.35	18.70	45.93	14.22	
YEAR	2002	2.82	13.76	11.59	46.66	25.17
	2004	2.60	11.72	14.10	43.08	28.50
	2006	2.37	12.03	14.92	42.74	27.94
TOTAL		2.61	12.50	13.50	44.19	27.21

Table: Attitude toward redistribution (U.S. data)

		Government should reduce differences in income levels						
		NO						YES
		7	6	5	4	3	2	1
REGION	East North Central	11.86	8.66	13.68	20.46	19.27	10.86	15.19
	East South Central	17.92	5.66	13.21	20.00	16.79	11.32	15.09
	Middle Atlantic	10.86	7.61	13.65	19.31	19.59	11.51	17.46
	Mountain	12.58	9.47	14.91	18.32	19.72	10.87	14.13
	New England	9.51	5.80	15.31	22.27	18.33	9.98	18.79
	Pacific	14.60	10.21	14.37	19.21	17.78	10.29	13.54
	South Atlantic	15.71	9.05	13.64	19.23	16.72	9.55	16.09
	West North Central	11.60	10.46	13.47	20.20	21.20	10.89	12.18
	West South Central	16.05	11.11	13.09	19.51	16.05	8.64	15.56
YEAR	1990	10.72	7.76	11.83	19.78	18.11	12.20	19.59
	1991	8.50	8.00	14.83	21.33	19.00	11.17	17.17
	1993	12.37	8.88	15.28	15.57	20.67	11.35	15.87
	1994	16.41	8.98	16.08	21.06	16.49	8.82	12.16
	1996	13.37	9.67	13.02	20.05	17.59	10.73	15.57
	1998	16.81	8.76	11.30	21.37	19.79	9.19	12.78
	2000	14.35	10.36	15.49	17.49	17.49	12.26	12.55
	2002	12.61	9.03	12.78	20.10	20.44	8.69	16.35
	2004	15.77	7.50	13.65	18.46	17.31	9.81	17.50
	2006	10.87	8.80	13.53	20.17	17.93	10.54	18.17
TOTAL		13.53	8.95	13.85	19.70	18.31	10.40	15.27

Baseline model

Let $P(Y_i = 1) = \pi_i$ the probability that individual i is favorable to redistribution

The baseline multilevel logit regression measuring attitude towards income redistribution of individual i resident in country j can be written as (for sake of simplicity only one individual predictor):

$$\pi_i = \text{logit}^{-1}(\alpha_{j[i]} + \beta x_i), \text{ for } i = 1, \dots, n \text{ and } j = 1, \dots, J, \quad (1)$$

with the additional assumption on the α_j 's:

$$\alpha_j \sim N(\mu_\alpha, \sigma_\alpha^2), \text{ for } j = 1, \dots, J, \quad (2)$$

where x is an individual-level predictor, as income, σ_α^2 is the unexplained within-countries variation and $j[i]$ indexes the country j where person i resides.

Varying-intercept and varying-slope model

$$\pi_i = \text{logit}^{-1}(\alpha_{j[i]} + \beta_{j[i]}x_i), \text{ for } i = 1, \dots, n, \quad (3)$$

modeling of the country-level intercepts α_j and slopes β_j as:

$$\begin{pmatrix} \alpha_j \\ \beta_j \end{pmatrix} \sim N \left(\begin{pmatrix} \mu_\alpha \\ \mu_\beta \end{pmatrix}, \begin{pmatrix} \sigma_\alpha^2 & \rho\sigma_\alpha\sigma_\beta \\ \rho\sigma_\alpha\sigma_\beta & \sigma_\beta^2 \end{pmatrix} \right), \text{ for } j = 1, \dots, J \quad (4)$$

where μ_α and μ_β are the means of the country intercepts and slopes respectively, σ_α and σ_β their standard deviations and ρ the between-countries correlation parameter.

Varying-intercept and varying-slope model with predictors

Adding group-level predictors to improve inference for the group coefficients α_j and the varying slopes β_j :

$$\alpha_j \sim \text{N}(\gamma_0^\alpha + U_j \gamma^\alpha, \sigma_\alpha^2), \text{ for } j = 1, \dots, J \quad (5)$$

$$\beta_j \sim \text{N}(\gamma_0^\beta + U_j \gamma^\beta, \sigma_\beta^2), \text{ } j = 1, \dots, J \quad (6)$$

where U is a matrix of country-level predictors, γ^α the vector of coefficients for the country-level regression (5) and γ^β the vector of coefficients for the country-level regression (6)

Advantages of multilevel modeling

- hierarchical structure of the data
- adjusting for clustering (in standard regression s.e. for regression coefficients of level 2-predictors are underestimated, resulting in confidence intervals too narrow → incorrect inferences)
- exploring the extent and nature of clustering and the effects of higher level characteristics on level 1 outcomes
- estimation based on the restricted maximum likelihood procedure (REML) in `lmer`

Individual-level predictors

- household income (midpoints of 11 categories. For the top category that does not have no upper limit, this value is extrapolated using a formula based on the Pareto curve. Total family income is expressed at 2000 prices, expressed in purchasing power parity terms. In order to control for family size, income has been converted to equivalent income using the LIS equivalence scale).
- gender, age, education [proxies for risk of income loss] Inglehart (1990); Alesina and La Ferrara (2001)
- marital status, children (dichotomous)
- employment status (self-employed vs not)
- personal beliefs: left-right position [endogeneity problems], feeling discriminated, past experience of unemployment
- religious attendance [religious beliefs as substitute for government social spending] Scheve and Stasavage (2006)
- education w.r.t. education of the father, job prestige w.r.t. that of the father [proxies of social mobility]

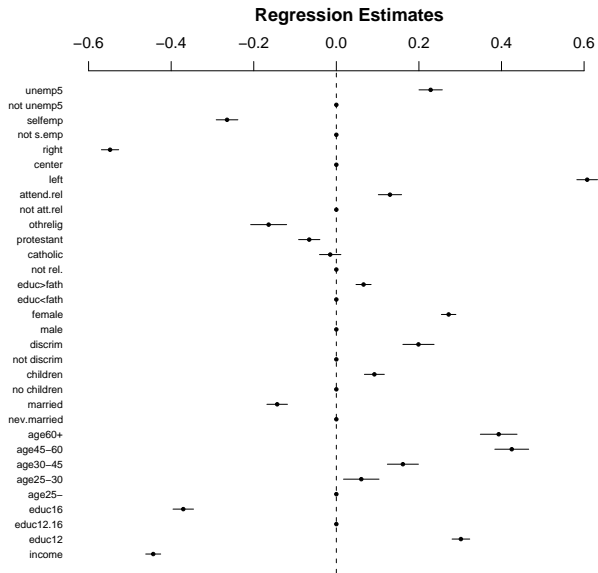
Country-level predictors

- Gini index [Brandolini and Smeeding, 2008] (source: LIS)
- Poverty rates (60 per cent median income) (source: Eurostat)
- Fractionalization index (ethnic, religious) - Alesina et al. (2003); Montalvo e Reynal-Querol (2005)
- controls for: GDP per capita in PPS, welfare state size (social transfers as a percentage of GDP) (source: Eurostat)

More willing to redistribute?

└ Empirical results: US vs Europe

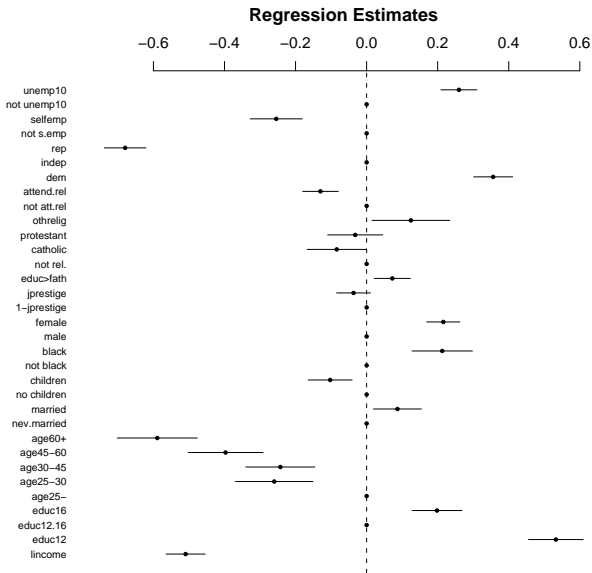
└ Multilevel logit regression (European data)



More willing to redistribute?

↳ Empirical results: US vs Europe

↳ Multilevel logit regression (US data)



U.S. vs Europe

- individual-level factors on support for redistribution
 - 1 richer people are more averse to redistribution (applying the “divide by 4 rule” a movement of one standard deviation along the income scale reduces the probability of support by at the most 13%)
[robustness checks for different measures of income]
 - 2 more educated people are more prone to redistribution in US but not in Europe
 - 3 being married or having children has small significant effect (but opposite in US wrt Europe)
 - 4 younger people are less averse to redistribution in US, while are more averse in Europe
 - 5 coefficients of the religious beliefs are not significant in US; difference between protestant and catholics in Europe
 - 6 attending regularly religious function reduces the probability of being supportive towards redistribution in US but not in Europe
 - 7 geographical differences appear more clearly in European data than in U.S. data after controlling for individual observable characteristics
- Intercepts have an estimated standard deviation $\hat{\sigma}_\alpha = 0.62$ (Europe) and $\hat{\sigma}_\alpha = 0.10$ (U.S.)

Cross-country variation in Europe: income

- income is negatively associated with support for redistribution (on average $\beta_j = -0.46$): strong variation among countries in the role of income predicting support for redistribution. Estimated (unexplained) standard deviation of β_j is $\hat{\sigma}_\beta = 0.22$
- coefficients that are more negative lend more support to the assumption that economic self-interest shapes preferences (Slovenia, Poland, Sweden, Finland, France, ..)
- coefficients close to zero indicate that individual income has little effect on support for redistribution (Portugal, Slovakia, Greece, Austria, Spain, Belgium, Norway, Italy,....) → more uniform attitudes across income groups toward redistribution

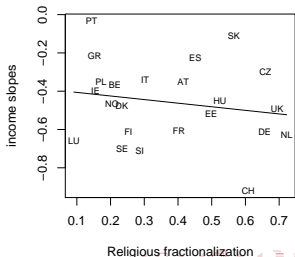
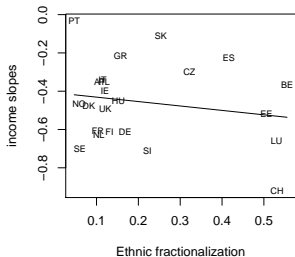
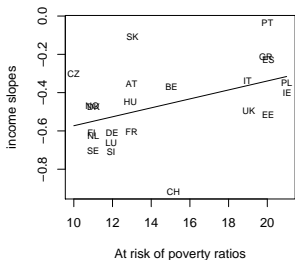
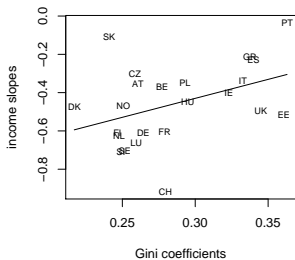
Cross-country variation in Europe: income

- which country-variables can reduce the unexplained variability of β_j ? inequality, poverty rates, GDP per capita
- unexplained variance reduces by around 23%
- in countries with high levels of income inequality, we expect even those with higher incomes to support redistribution (genuine altruism? interest of minimizing social conflicts? Alesina and Rodrick, 1994; Esteban and Ray, 2008)
- several robustness checks

More willing to redistribute?

Empirical results: cross-country variation in Europe

Effects of country-level variables on the income slope



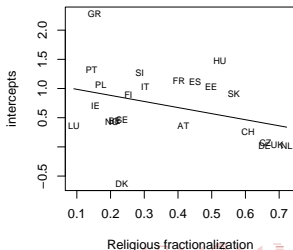
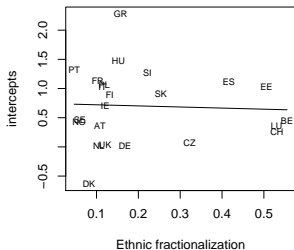
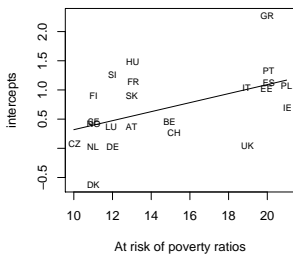
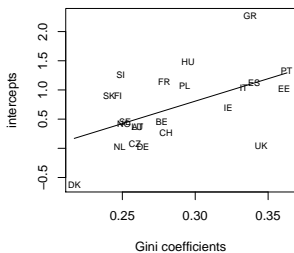
Cross-country variation in Europe: intercepts

- after controlling for individual characteristics and income varying-slope, still significant unexplained variation across-country remains (contextual effects)
- estimated (unexplained) standard deviation of α_j is $\hat{\sigma}_\alpha = 0.61$
- approximate measure of the clustering effect in GLM (using latent variable approach) is the variance partition coefficient (VPC) evaluated at the mean of the random coefficient predictor (income):

$$VPC_{ij} = \frac{\sigma_\alpha^2}{\sigma_\alpha^2 + \pi^2/3} \simeq 10.0\%$$

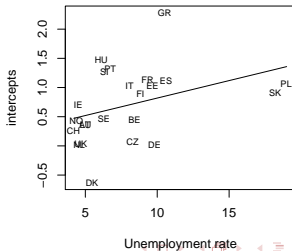
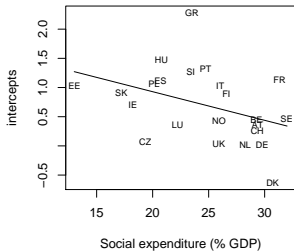
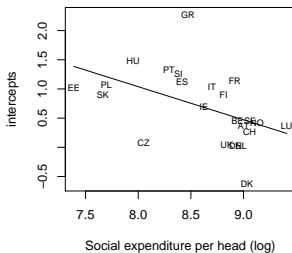
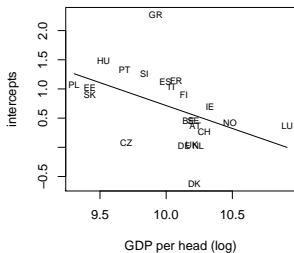
More willing to redistribute?

- Empirical results: cross-country variation in Europe
- Effects of country-level variables on the intercepts



More willing to redistribute?

- Empirical results: cross-country variation in Europe
 - Effects of country-level variables on the intercepts



Country-level factors associated to cross-country differences

- inequality: positively significant
- unexplained variance of α_j reduces by over 27%
- poverty rates: positively significant (23%)
- ethnic fractionalization: not significant (1%)
- religious fractionalization: negatively (slightly) significant (9%)
- welfare state size: negatively significant (14%)
- per capita GDP: negatively significant (19%)
- several robustness checks

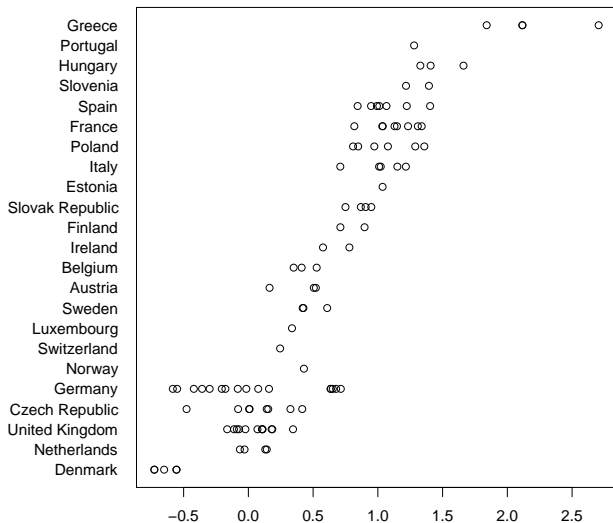
Regional perspective

- are there significant regional disparities in the European countries?
- recoding ESS regional codes into NUTS (NUTS1, NUTS2 for Ireland, Denmark, Czech Republic, Slovenia, Slovakia): 102 regions
- introducing a third-level in the MLM: level 2 \rightarrow region, level 3 \rightarrow country
- the variance partition coefficient (evaluated at the mean of the random coefficient predictor (income)): $VPC \simeq 12\%$
- the between-country variation accounts for 80% , while the between-region variation within countries accounts for 20%
- differences of β between regions within countries is relevant: it accounts for 42% of the variability of the slopes

More willing to redistribute?

Empirical results: Do regions matter?

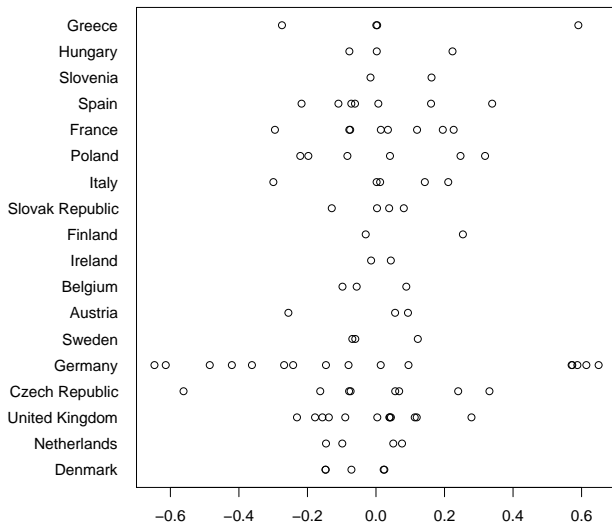
Regional variability of the intercepts: varying intercept three-level model



More willing to redistribute?

Empirical results: Do regions matter?

Regional variability within same countries of the intercepts: varying intercept three-level model



Further work

- more complex models: more varying-slope predictors
- ordered multilevel logit (so far no significant differences)
- try to disentangle effects of country-level predictors (inequality vs poverty)
- NUTS-level predictors (inequality? poverty?, small area estimation using EU-SILC data?)
- modelling time explicitly

