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Macro and micro determinants of well-being in European regions from a social capital perspective

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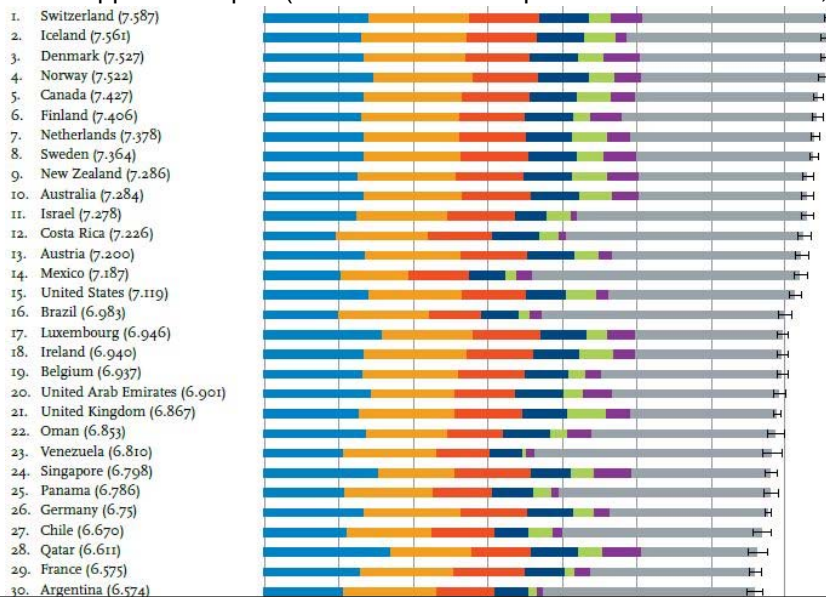
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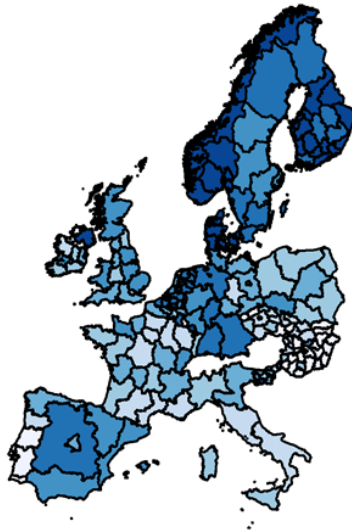
Motivation

World Happiness Report (Sustainable Development Solutions Network, 2015)



European subjective happiness: regional means

Happiness



Motivation

- The utility function represents happiness: **are the assumptions in Economics valid?**
- Income is only part of the explanation: **what's the role of social factors?**
- Social, economic and cultural factors are shaped by History: **what's the role of Geography?**
 - Happiness, income, social trust... are **spatially autocorrelated** in European regions
 - **Spatial path dependence, spatial traps** (Fazio & Lavecchia, 2013)

Goal

Is individual happiness affected by **spatially dependent contextual factors**?

- *Contextual factors:*

Economic and social or cultural aspects of the **individual's neighborhood** (region...) that affect her perceptions and behavior.

- Example: *Social capital*

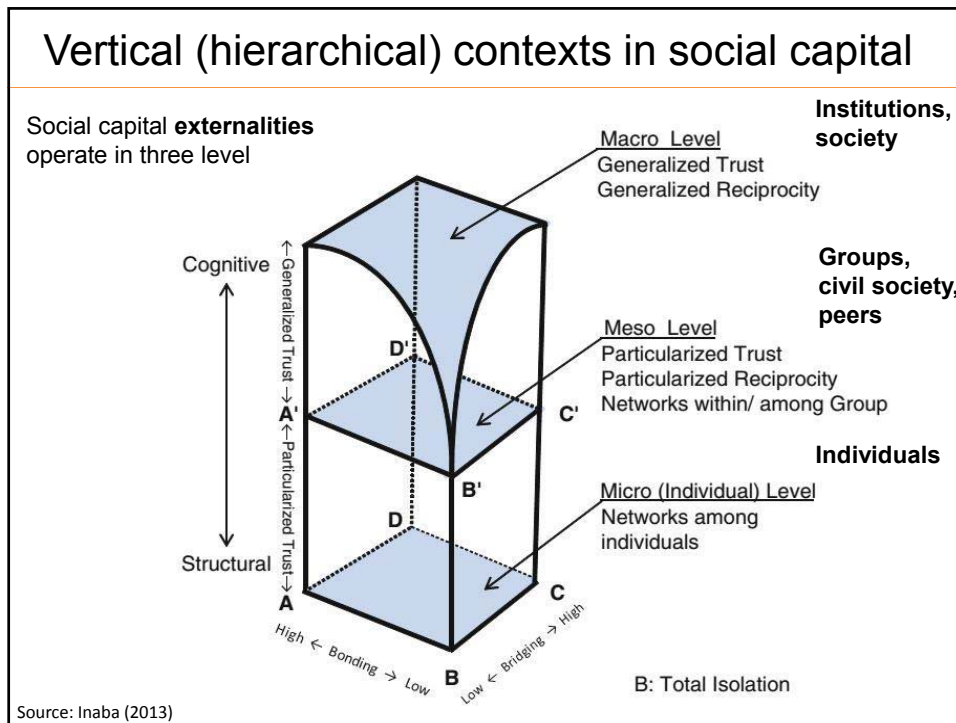
Trust, norms of reciprocity, and networks associated with **externality effects** which operate through perceptions and cognitions or in the minds of the actors (Inaba, 2013)

Two dimensions of “contexts”

1st) Horizontal vs vertical dependences (Dong & Harris, 2015)

Vertical (hierarchical) dependence:

MULTILEVEL MODELS



Two dimensions of “contexts”

1st) Horizontal vs vertical dependences
(Dong & Harris, 2015)

Horizontal dependence:

A SAR MODEL OF HAPPINESS?

Background: Approaches to individuals' wellbeing

- **Micro** level: within groups (probit models)
 - **Macro** level: between groups \Rightarrow spatial models (Stanca, 2010; Puntischer et al., 2014)
 - **Both micro and macro** (contextual) levels: multilevel (mixed) models
 - Traditional approach: **vertical dependence** (Pittau et al., 2010); Ballas & Tranmer, 2012); Aslam & Corrado, 2012;...)
 - + Spatial multilevel modelling: **horizontal dependence** (General literature: Elhorst & Zeilstra, 2007; Savitz & Raudenbush, 2009; Corrado & Fingleton, 2012); Dong & Harris, 2015)
- ↓
- = SAR and SEM multilevel models of well-being: Pierewan & Tampubolon (2014)

Two dimensions of "contexts": methodology

1st) Horizontal vs vertical dependences

A SAR MODEL OF HAPPINESS?

NO!!!

Pierewan & Tampubolon (2014): spatial externalities, not diffusion.

- LeSage (2014) \Rightarrow *local* spillover specification

↓

- We propose a **spatial lag of X (SLX) random effects multilevel model** of Europeans' well-being \Rightarrow **Spatial lags of contextual variables**

Two dimensions of “contexts”: methodology

2st) Different possible vertical hierarchies

- Identification of the proper geographical scale
- Multiple spatial contexts (Owen *et al.*, 2015),
- Spatially distributed omitted variables

WHAT IS THE RELEVANT CONTEXT?,
WHAT IS A “REGION”?



- We test our SLX model at several levels of regional aggregation

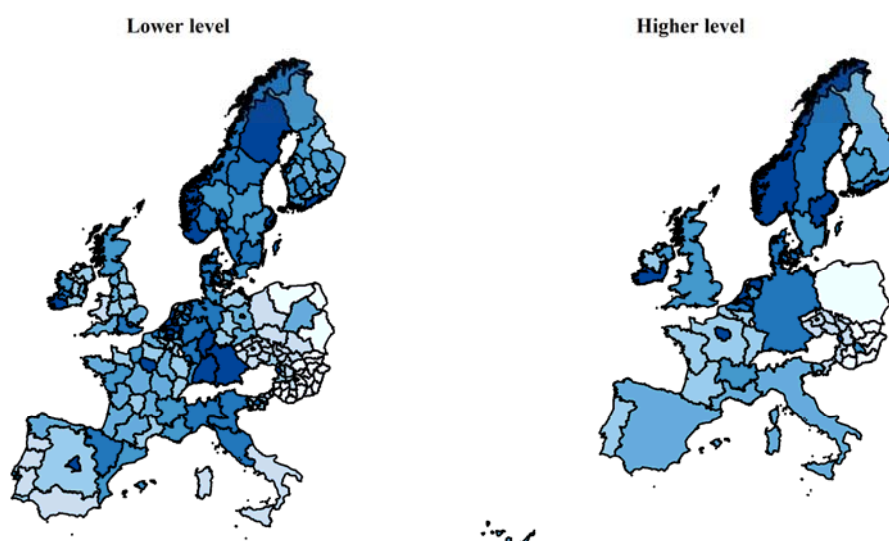
Data and dependent variables

- Data: European Social Survey (2012)
- Sample:
 - 31,117 individuals
 - 247 European regions
- Dependent variable: **Subjective well-being**
⇒ Two indicators:
 - **Happiness** (hedonic well-being): emotions of short duration, feeling-good
 - **Life satisfaction** (eudaimonic well-being): satisfaction resulting from living a good life

Explanatory variables

- **Individual:** trust on people and socio-demographic control variables (age, marital status, health, religious, gender, political, place of living, education, income)
- **Contextual:** regional mean of trust and GDP per capita.
 - Defined at a:
 - lower regional aggregation level
 - higher regional aggregation level

3 aggregation levels: *lower* & *higher* regions + countries



Estimation: Multicollinearity problems

A 2 levels case: i individuals, j regions, k countries

- X_{ijk} and \bar{X}_{jk} \Rightarrow Mundlack (1978)-Aslam & Corrado (2012):

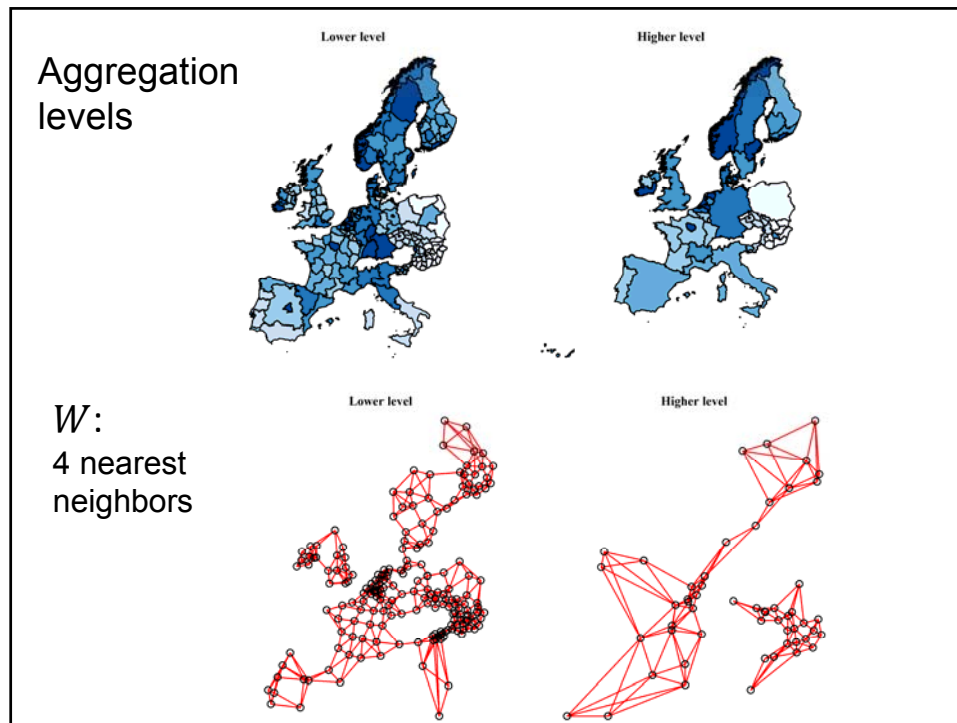
$$y_{ij} = \beta_{000} + \delta_{100}C_{ijk} + \beta_{100}(X_{ijk} - \bar{X}_{jk}) + \beta_{010}\bar{X}_{jk} + v_{00k} + u_{0jk} + e_{ijk}$$
- \bar{X}_{jk} and other Z_{jk} contextual variables \Rightarrow Difficulties in considering social capital together with economic factors.
- \bar{X}_{jk} , Z_{jk} and $W\bar{X}_{jk}$, WZ_{jk} \Rightarrow Corrado & Fingleton (2012) hierarchical model with horizontal dependence may present collinear group and out-group contextual factors.
- **regional (j) and national (k) variables**: country fixed effects, \bar{X}_{jk} , Z_{jk} , $W\bar{X}_{jk}$, WZ_{jk} and \bar{X}_k , Z_k , $W\bar{X}_k$, WZ_k

Two level SLX random effect multilevel model

$$y_{ij} = \beta_{00} + \delta_{10}C_{ij} + \beta_{10}(X_{ij} - \bar{X}_j) + \gamma_{01}^1\bar{X}_j + \gamma_{01}^2W\bar{X}_j + \delta_{01}^1Z_j + \delta_{01}^2WZ_j + u_{0j} + e_{ij}$$

- X : trust in others
- Z : Ln (GDP per capita) in PPS
- β_{00} : overall intercept
- δ_{10} , β_{10} : within group effects
- γ_{01}^1 , γ_{01}^2 , δ_{01}^1 , δ_{01}^2 : between-group effects
- W : standardized weights matrix to the 4 nearest neighbors
- u_{0j} and e_{ij} : group and individual random effects

'Contexts' (j subscript) evaluated at two levels of geographical aggregation to calculate contexts \Rightarrow Averages and spatial lags of averages for 'lower' and 'higher' level regions.



Results – Regional trust and GDPpc on Happiness

	(1)	(2)	(3)	(4)
Social Contextual Factors				
Low Regional Aggregation				
Trust ($X_{ij} - \bar{X}_j$)	0.1410*** (0.0053)		0.1412*** (0.0053)	
Trust (\bar{X}_j)	0.3347*** (0.0805)		0.2454*** (0.0678)	
W Trust ($W\bar{X}_j$)	0.4210*** (0.0871)		0.1301 (0.0782)	
High Regional Aggregation				
Trust ($X_{ij} - \bar{X}_j$)		0.1411*** (0.0053)		0.1413*** (0.0053)
Trust (\bar{X}_j)		0.7826*** (0.0948)		0.4124*** (0.0879)
W Trust ($W\bar{X}_j$)		-0.0213 (0.1057)		-0.1678 (0.1041)
Economic Contextual Factors				
Low Regional Aggregation				
Ln GDPpc			0.1741** (0.0541)	
W Ln GDPpc			0.3334*** (0.0665)	
High Regional Aggregation				
Ln GDPpc				0.3393*** (0.0597)
W Ln GDPpc				0.3475*** (0.0829)
Intercept	-0.5506*** (0.0652)	-0.5540*** (0.0655)	-5.6001*** (0.4931)	-7.4317*** (0.7002)
Random Parameters				
σ_u	0.0840	0.0838	0.0542	0.0526
σ_c	0.6232	0.6232	0.6233	0.6234
Log Likelihood	-38,360.5	-38,359.8	-38,319.9	-38,317.7
AIC	76,779.08	76,777.61	76,701.76	76,697.48
BIC	77,021.10	77,019.63	76,960.47	76,956.19

Conclusions

- Analysis of contextual effects on individual well-being:
 - using spatial lags of macro level variables (SLX multilevel)
 - at different aggregation levels
- Contextual factors of neighboring areas are significant to explain individual life satisfaction and happiness
 - Significance of out-region context also occurs at high aggregation levels and crossing national borders.
 - Thought the spatial lag of Trust is significant at a lower aggregation level, it becomes no significant if Ln GDPpc and its spatial lag are included
 - Possible **spatially autocorrelated latent variables** conditioning the spatial distribution of Europeans' well-being: culture

Ongoing research

- Interpretation and tests:
 - What does spatial dependence between contextual effects mean when talking about individual perceptions and behavior? \Rightarrow What is *WZ* proxying?: latent variables modelling
- Estimation issues:
 - Evaluating residual spatial autocorrelation at the regional level in multilevel models: Moran's I?
 - Standard errors of estimates, affected by residual spatial autocorrelation, clustered s. e.
 - Estimation of a spatial Durbin model (SLX+SEM): algorithm in R?

**COMMENTS VERY WELCOMED
THANK YOU**

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