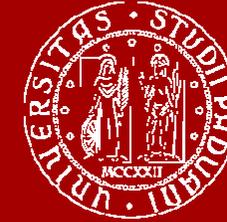
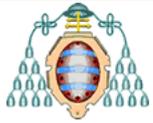


# Dealing with Complexity in Society: From Plurality of Data to Synthetic Indicators



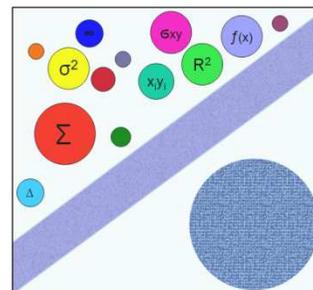
UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



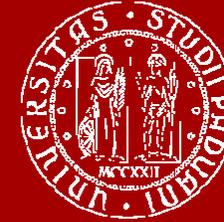
Universidad de Oviedo  
La Universidad de Asturias

## COMBINING DIMENSIONS OF QUALITY OF LIFE IN SPANISH MUNICIPALITIES

Eduardo González, Ana Cárcaba, Juan Ventura  
University of Oviedo (Spain)



September 17<sup>th</sup> and 18<sup>th</sup>, 2015



## OUTLINE

1. Motivation and Objectives
2. Data and Variables and Methods
3. Results
4. Concluding remarks



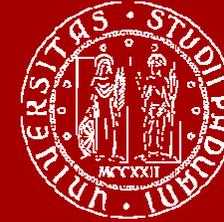
## Motivation

### **There's more to life than income**

QoL and Happiness central role in social progress (Stiglitz, Sen, Fitoussi 2009; OECD, EU, etc.)

### **Unit of analysis typically countries**

Within country comparisons? Cities? Only a few works in Spain



## Objectives

### Index and rank

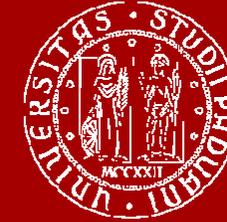
Composite QoL indicator for the largest municipalities

### Weight information

Using constrained DEA

### Show geographic patterns

Is QoL distributed as unevenly as GDP? (or even more)



## Data

### Sample

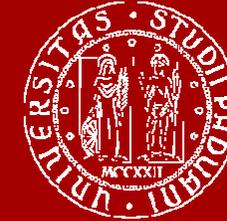
Spanish municipalities over 20000 population

393 municipalities

### Indicators of QoL

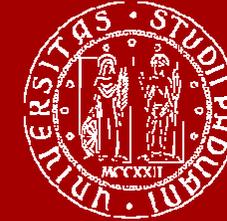
15 indicators (Sources: INE, La Caixa, Official records)

Some indicators constructed from microdata



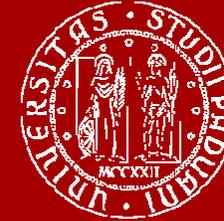
## Variables

	QoL dimensions	Stiglitz et al (2009)	Sponsorship group	OECD
1	Material Living Conditions	Economic insecurity	Material living conditions	Income, Housing
2	Health	Health	Health	Health
3	Education	Education	Education	Education
4	Environment	Env conditions	Nat & living env	Environment
5	Economic & physical safety	Personal insecurity	Economic and physical safety	Safety, Jobs
6	Governance & Political voice	Political voice & governance	Governance, basic rights	Civic engagement
7	Social interaction	S. connections	Leis & Soc interact	Community
8	Leisure & Pers act	Personal activities	Productive or main activity	Work-Life balance



## Variables

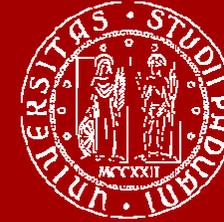
QoL dimension	Indicators
Material Living Conditions	Average Socio-economic Condition (ASC) Quality of Dwellings (QD)
Health	Excess Mortality (EM) Avoidable Mortality (AM)
Education	Overall Level of Education (OLE) Population with a University Degree (UD)
Environment	Particulate Matter (PM <sub>10</sub> ) Ozone (O <sub>3</sub> )
Economic & Physical Safety	Unemployment Rate (UR) Crime rate (CRI)
Governance & Polit. voice	(Governance) Participation in Municipal Elections (PME)
Social interaction	Pop. participating in Volunteering Activities (VA) Cultural and Social Centers (CSC)
Leisure & Personal Activ.	Commercial Market Share (CMS) Commuting Time (CT)



## Methods

### DEA-Data Envelopment

- Hashimoto and Ishikawa (1993)- 47 Japan prefectures
- Despotis (2005)- 174 countries
- Marshall and Shortle (2005)- Counties in the Mid Atlantic States USA
- Murias, Martínez, Miguel (2006)- 52 Spanish provinces
- González et al. (2011)- Spanish municipalities in 2001
- Morais and Camanho (2011)- Urban Audit (Europe)
- Many other studies in recent years (Mariano et al. 2015)



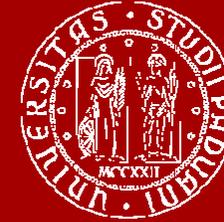
## DEA

$$\max \frac{\sum_{s=1}^S u_s y_{0s}}{\sum_{m=1}^M v_m x_{0m}}$$

*s.a* :

$$\frac{\sum_{s=1}^S u_s y_{js}}{\sum_{m=1}^M v_m x_{jm}} \leq 1 \quad , \quad j = 1, \dots, N$$

$$u_s, v_m \geq 0 \quad , \quad s = 1, \dots, S; \quad m = 1, \dots, M$$



## Cherchye transformation

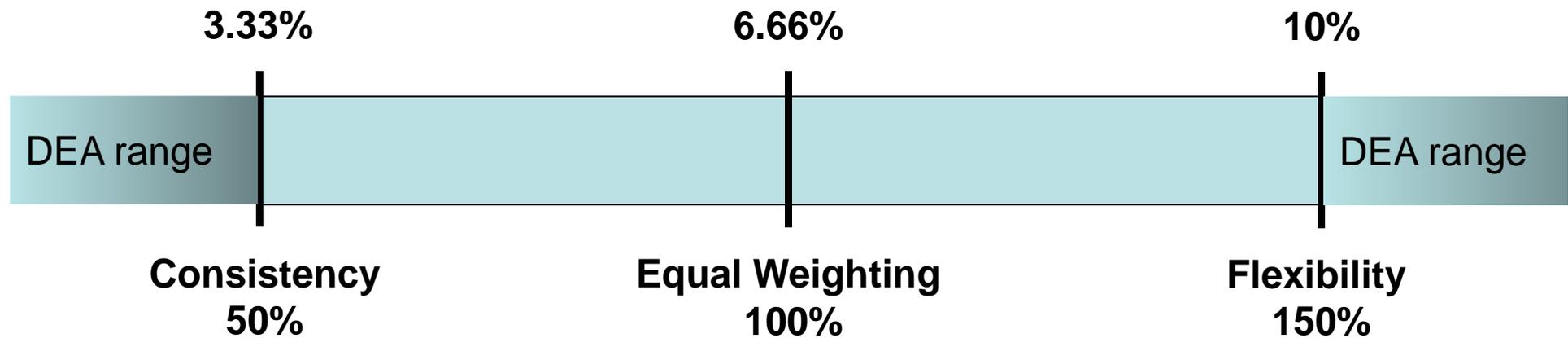
$$\max \sum_{s=1}^S u_s y_{is}$$

*s.a.* :

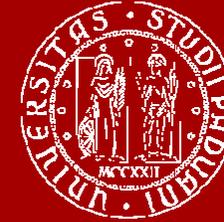
$$\sum_{s=1}^S u_s y_{js} \leq 1 \quad , \quad \forall j$$

$$u_s \geq 0 \quad , \quad \forall s$$

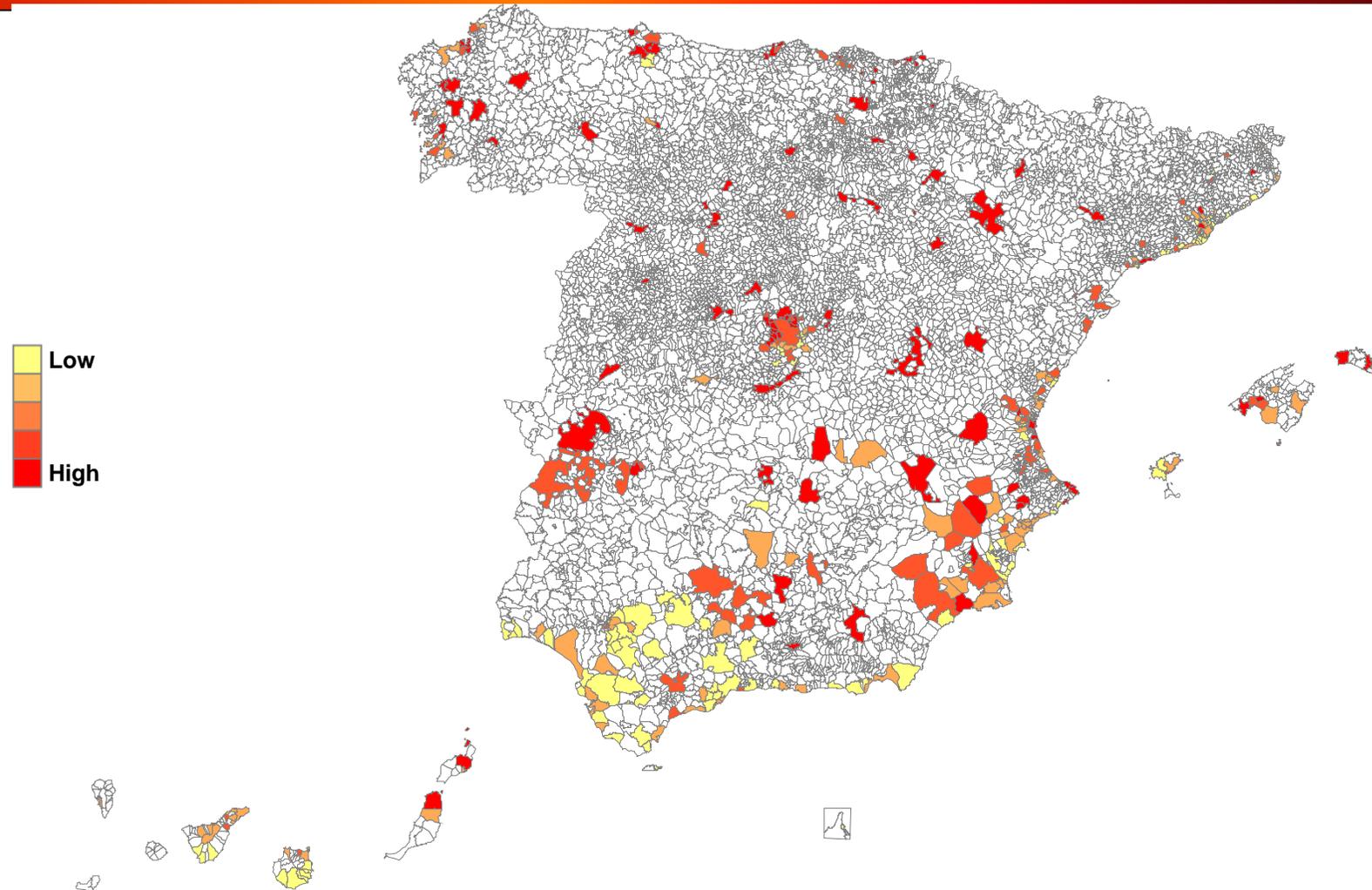
## Weight constraints

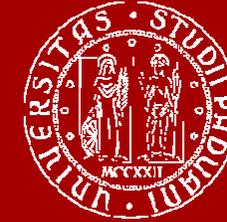


$$0.333 \leq \frac{u_k}{\sum_{s=1}^{15} u_s} \leq 0.10 \quad , \quad \forall k$$

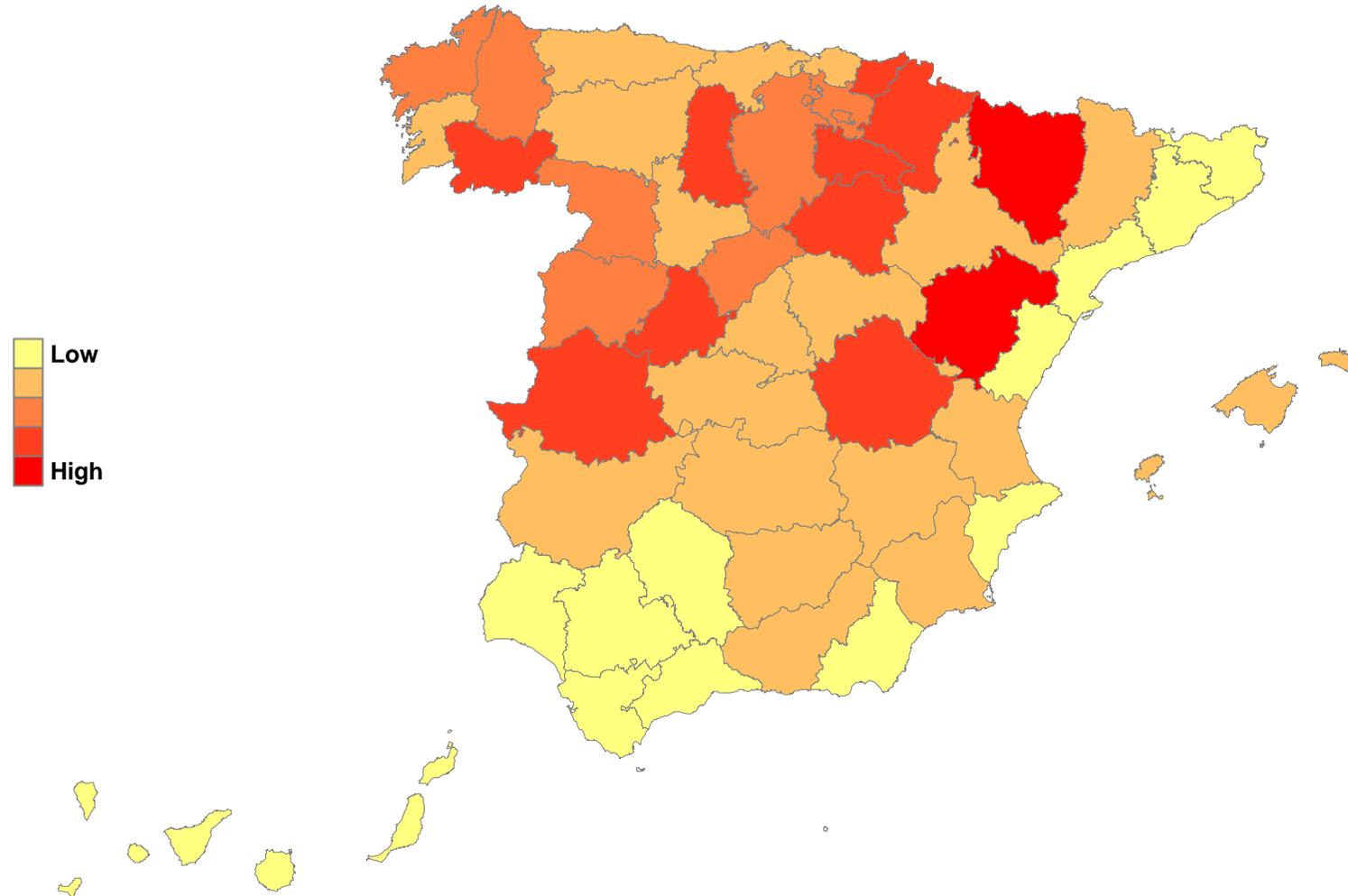


## Results

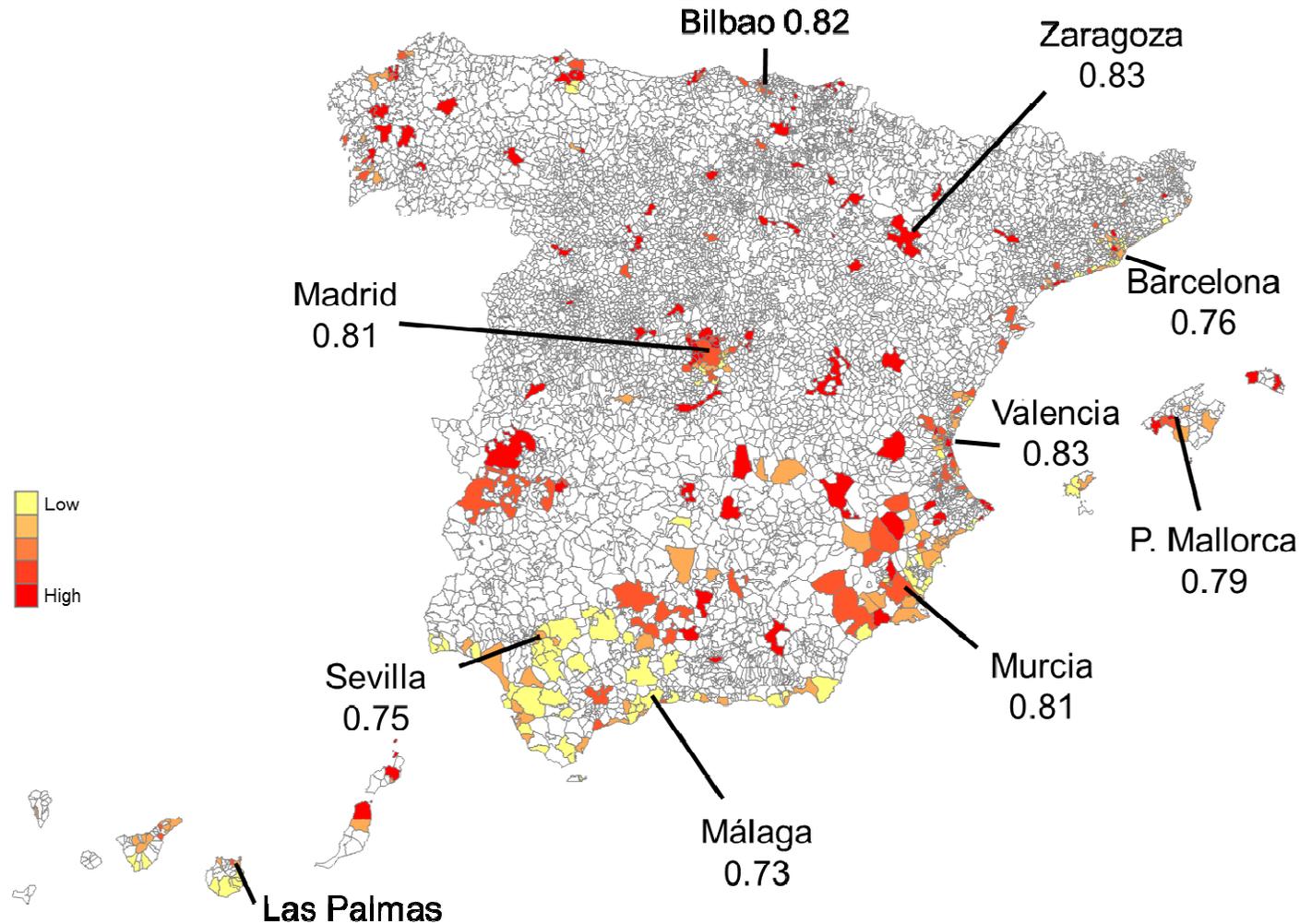


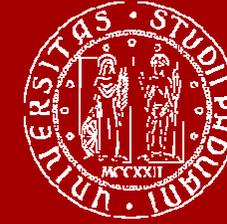


## Results

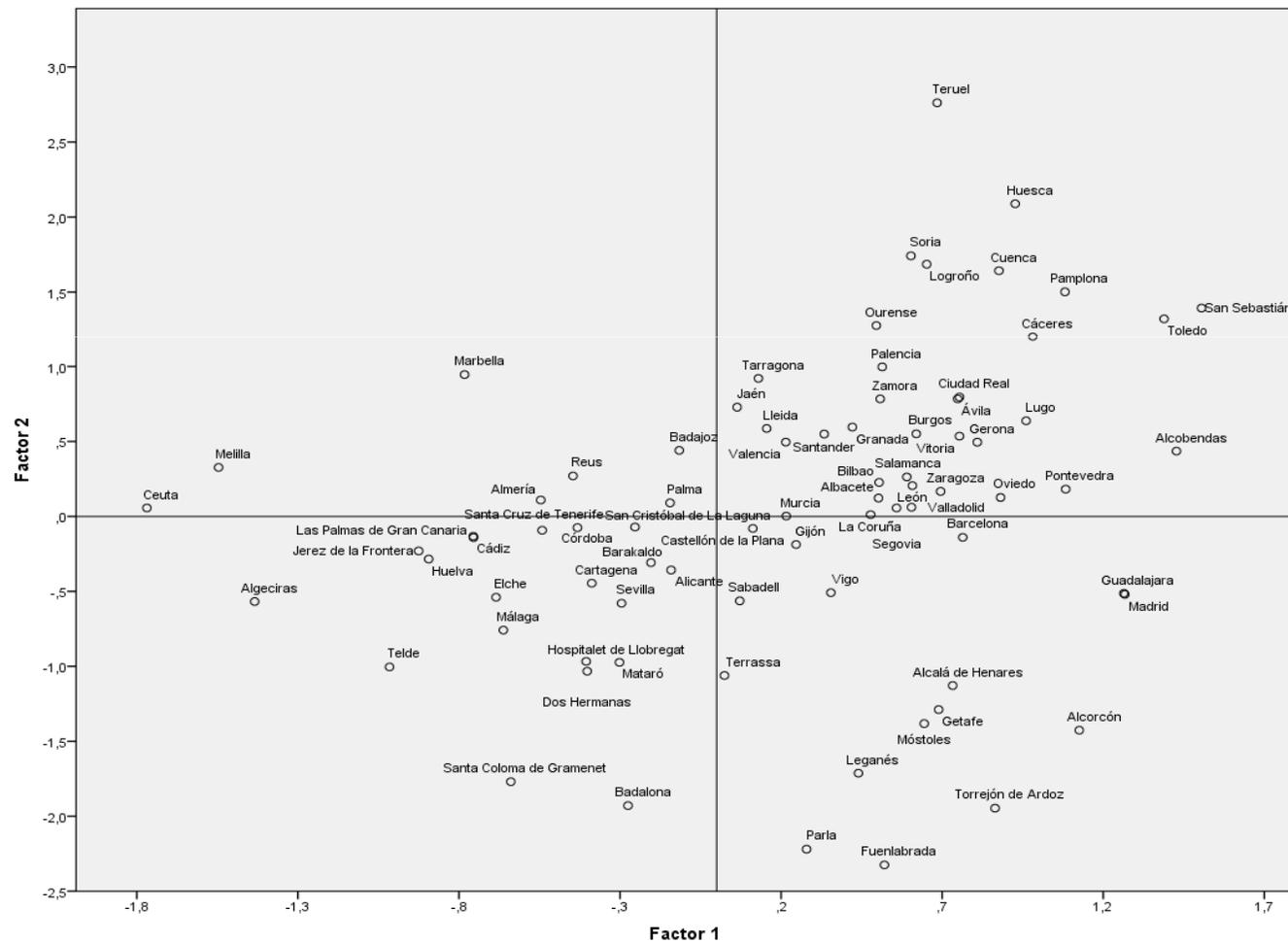


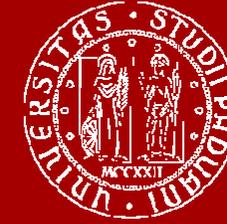
## Results



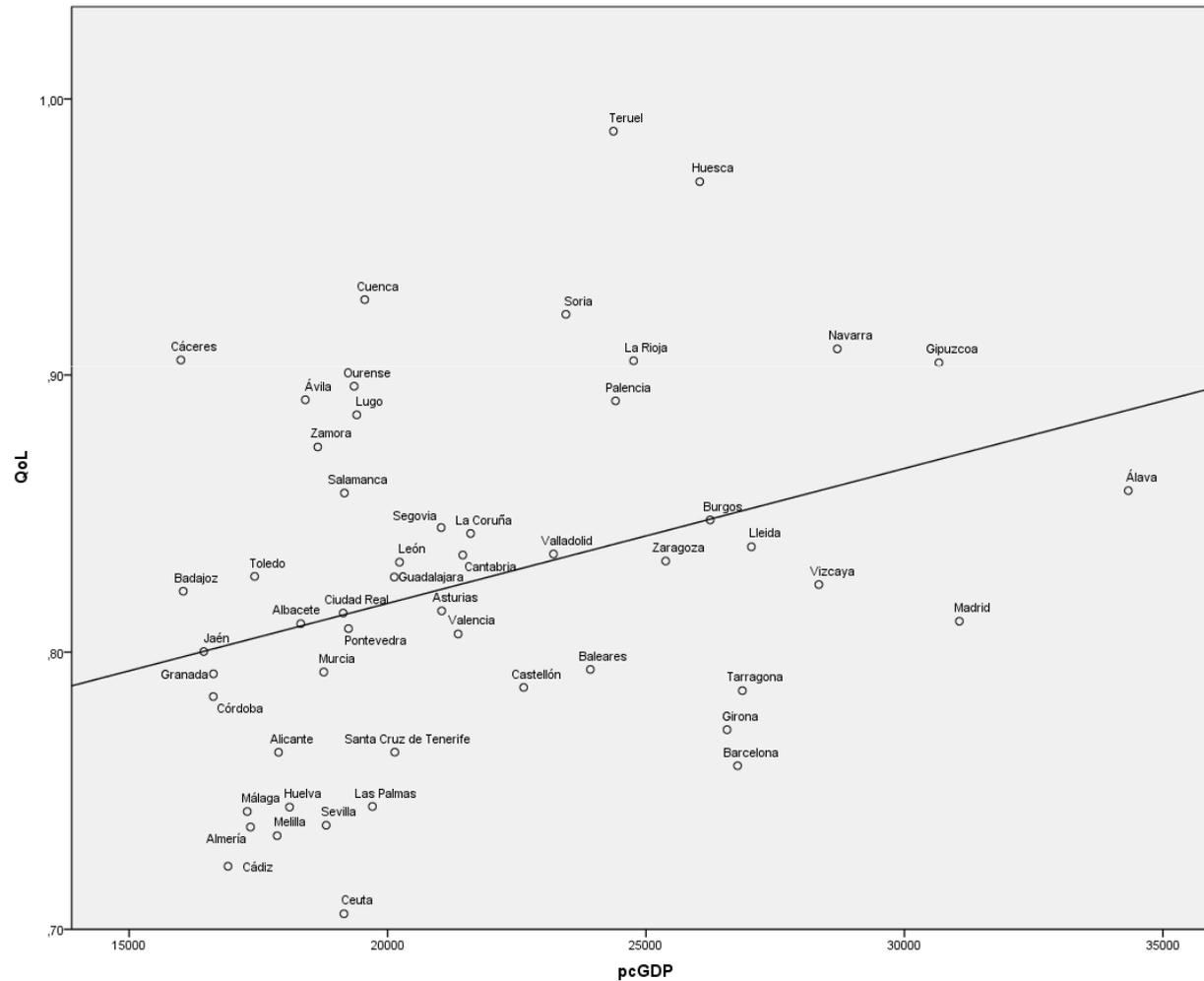


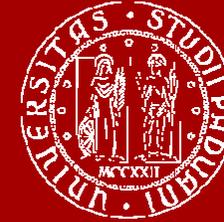
## Results





## Results





## Conclusions

### GEOGRAPHIC PATTERN

Southern and Mediterranean municipalities score consistently lower than Central-Northern ones. Decreasing trend in Mediterranean area

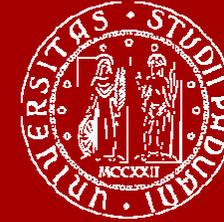
### BEST PERFORMERS

Medium and small sized municipalities (mostly provincial capitals: Teruel, Santiago, San Sebastián, Pamplona, Logroño, etc.)

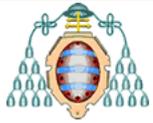
### RELATIONSHIP WITH GDP

Significant but not determinant

# Dealing with Complexity in Society: From Plurality of Data to Synthetic Indicators



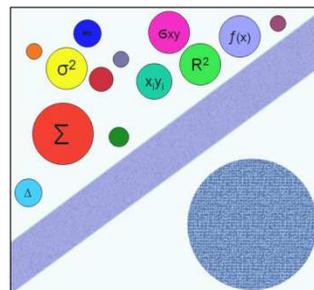
UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



Universidad de Oviedo  
La Universidad de Asturias

THANK YOU VERY MUCH

[efidalgo@uniovi.es](mailto:efidalgo@uniovi.es)



September 17<sup>th</sup> and 18<sup>th</sup>, 2015

18