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Spatial inequalities in development:

Determining evolutionary patterns and their relevance for three eastern EU countries

Mihail Eva, Alexandru Ioan Cuza University of Iasi
Ema Corodescu-Roșca, Alexandru Ioan Cuza University of Iasi & University of Tours
Bogdan Constantin Ibănescu, Alexandru Ioan Cuza University of Iasi
Alexandra Cehan, Alexandru Ioan Cuza University of Iasi

“If you want to have a sense about the future, don’t look at the GDP, look at the distribution.”

George Friedman

Introduction

- Interpersonal inequalities are increasing after 1980, thus contradicting the neoclassical assumptions

- 2008 financial crisis has differently affected different sectors of society and economy

- One important dimension of (interpersonal) inequalities are **regional inequalities**

- Regional inequalities explain around one third of interpersonal inequalities existing in society (Kanbur & Venables, 2005, Lesseman, 2013).

- Regional inequalities are highly relevant for political stability when they are associated with cultural, linguistic or historical divisions :
  ex. Northern Italy
  ex. Catalonia

- One third of the EU budged dedicated to regional policy in order to, *inter alia*, reduce regional inequalities

Introduction

How do regional inequalities evolve throughout the time?

Introduction

Inequalities throughout the time - theoretical background

Existing literature converges around four main models:

The neoclassical convergence model

The divergence and structural models

The inverted-U model

The product cycle model

Research questions

Q1. What are the evolutionary patterns of spatial inequalities in PL, HU and RO?

Q2. Can we speak about a spatial pattern of inequalities?

Q3. Do spatial patterns overlay with historical lines of divergence?

Research questions and methodology

Q1. What are the evolutionary patterns of spatial inequalities in PL, HU and RO?

Method: sigma convergence indicators (weighted coefficient of variation, Gini, Atkinson and Theil) employed at infranational scale for the recent decades.

Q2. Can we speak about a spatial pattern of inequalities?

Method: inferential statistics (spatial autocorrelation indexes introduced by Anselin, 1995, Ord & Getis, 1995) were employed at infranational scale.

Q3. Do spatial patterns overlay with historical lines of divergence?

Method: geo-historical / spatial analysis.

Research questions and Methodology

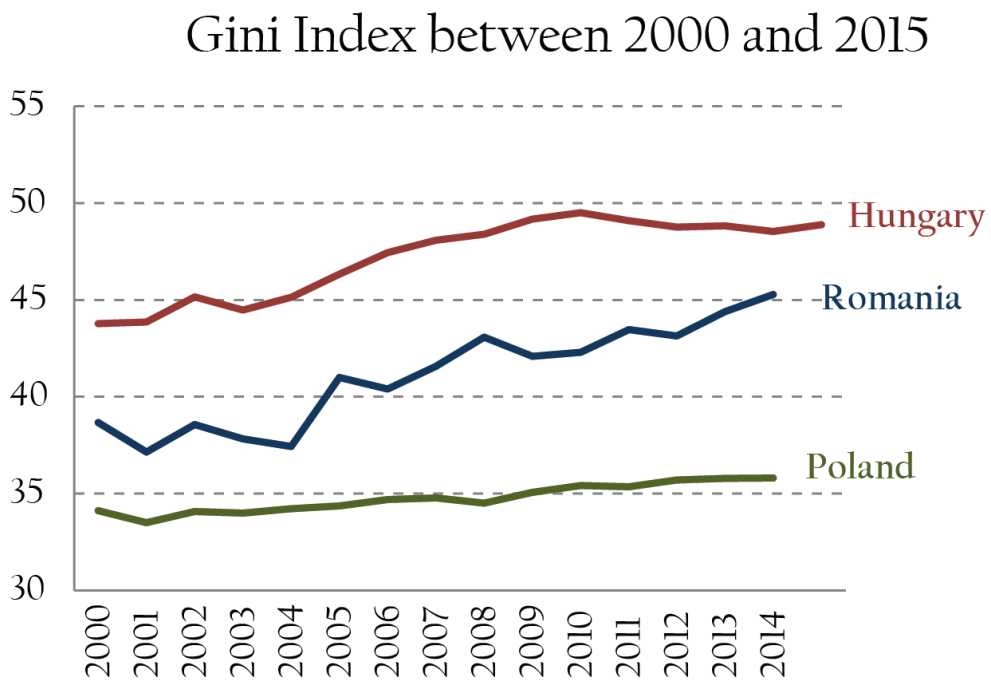
Convergence indicators for answering Q1

	Variation interval	Description
Gini Index	0 – 1	The extent to which a distribution deviates from a perfectly equal distribution It is not easily decomposable and additive It is more sensitive to the income of the middle classes than to that of the extremes
Robin Hood Index	0 - 1	The proportion of all income which would have to be redistributed to achieve a state of perfect equality
Atkinson Index	0 – 1	Measures inequality by taking into consideration a subjective parameter called „inequality aversion”
Theil’s Index	0 – ∞	-An entropic "distance" the population is away from the egalitarian state of everyone having the same income -Researchers can assign different values to an “α” parameter (the lower the values of “α” , the more sensitive Theil Index is to changes in the lower tail of the distribution). The most common values are 0 (Theil’s L), 1 (Theil’s T) and 2. -It is a fully decomposable index

Results and discussions

Increasing regional inequalities in all the three countries (but different patterns)

NUTS3 level



Results and discussions

Increasing regional inequalities in all the three countries (but different patterns)

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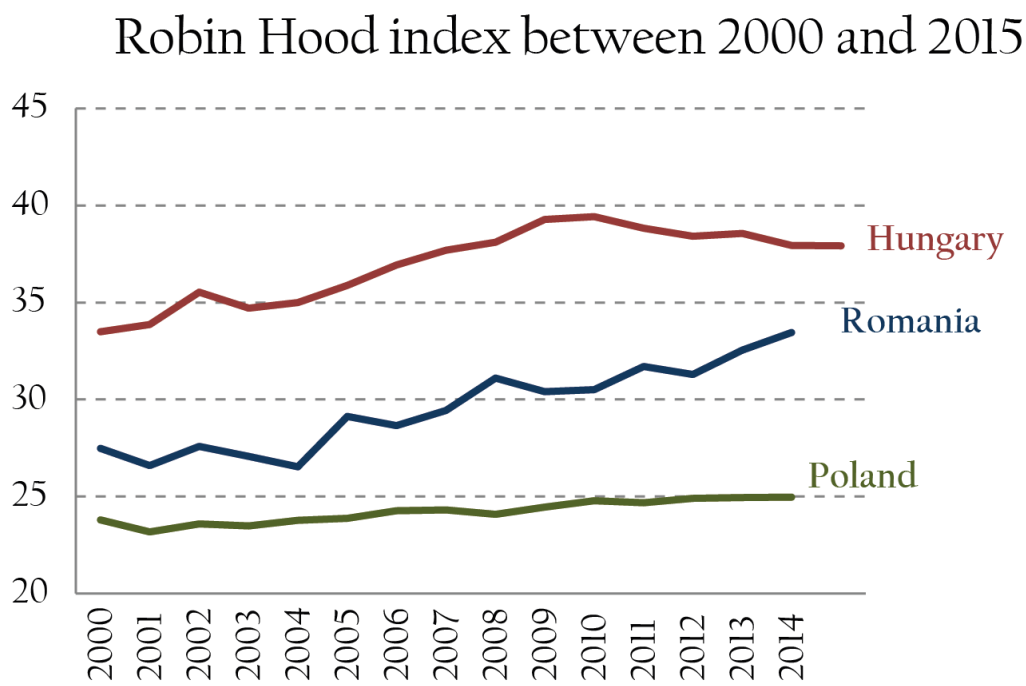

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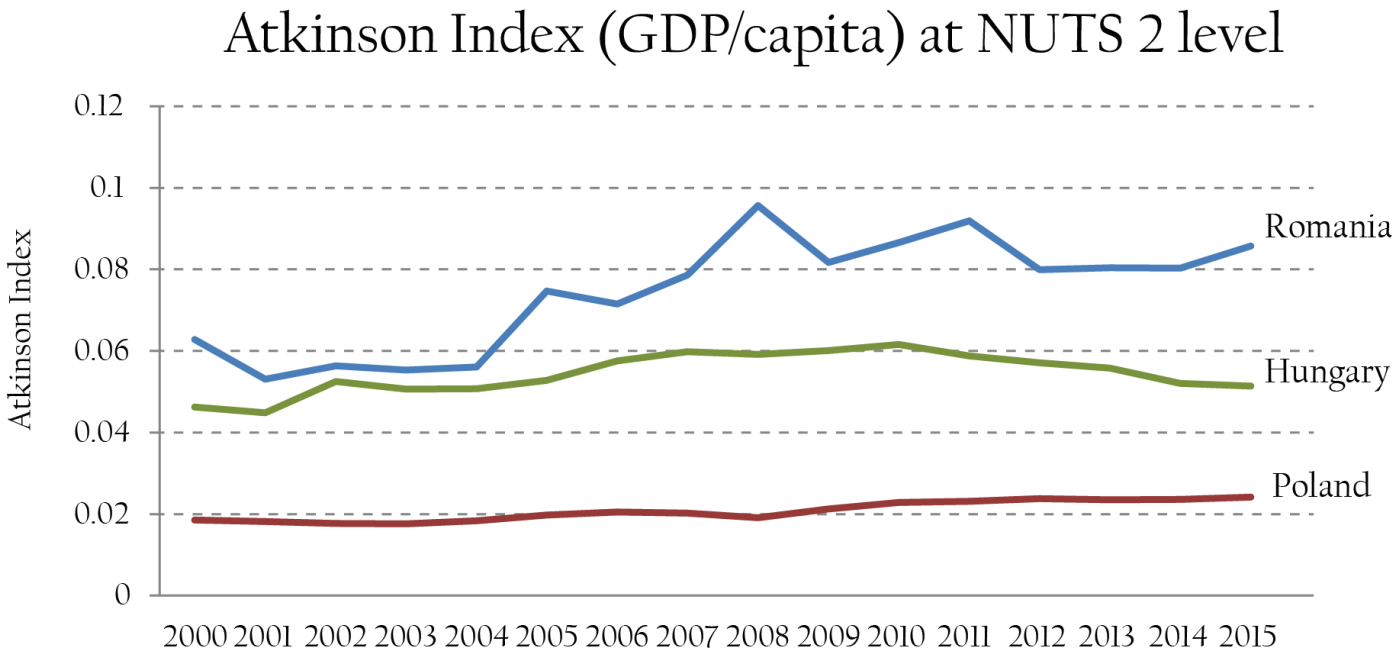

Results and discussions

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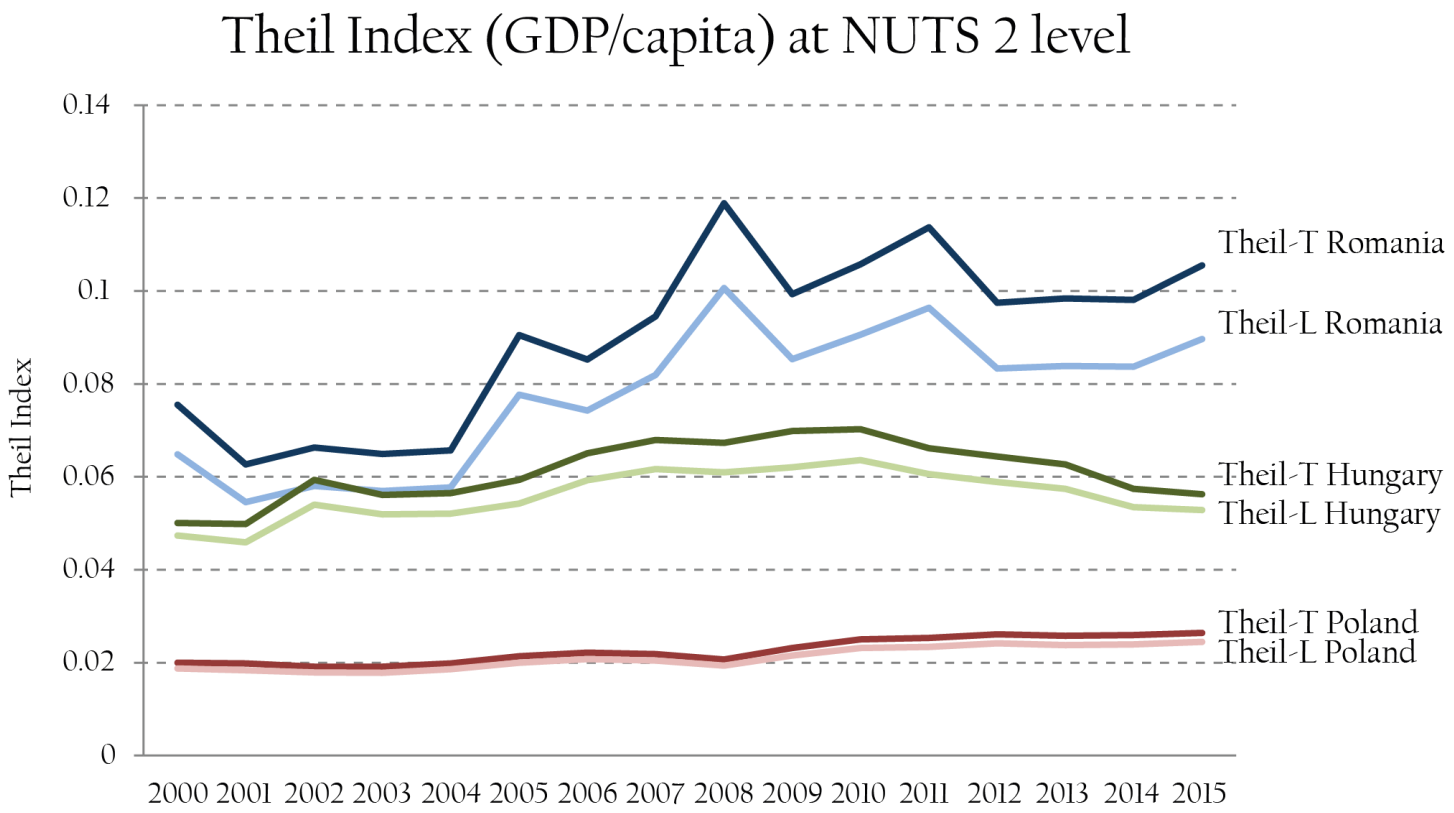


Results and discussions

Main findings concerning temporal patterns of inequalities

Poland

- A moderate increase in regional inequalities, especially after 2008

Romania

- A significant increase in regional inequalities in Romania throughout the entire period

Hungary

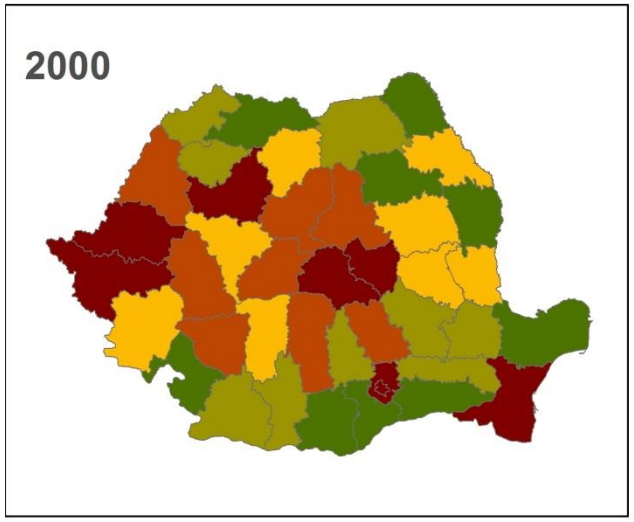
- An increase in Regional inequalities between 2000 and 2010, followed by a moderate convergence process between 2010 and 2015

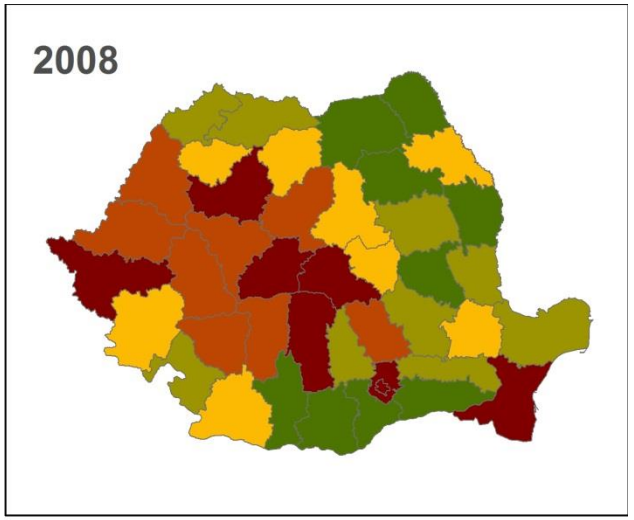
Results and discussions

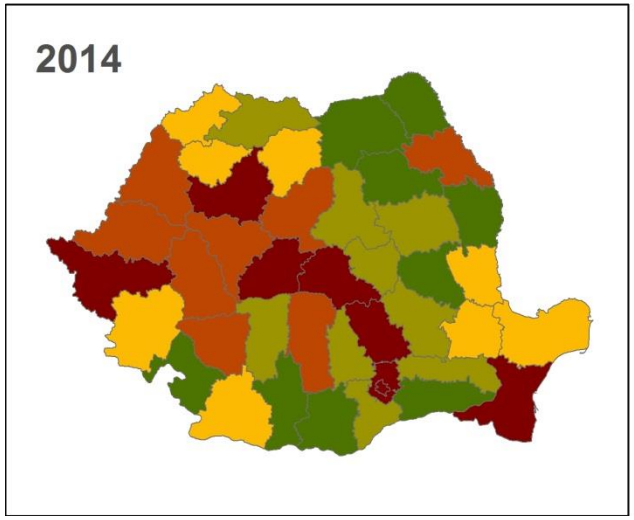
Are counties/regions spatially clustered according to their level of development?

Results and discussions

Counties ranked by GDP/inh.







Legend for GDP/inh.

- Counties ranked 1-8
- Counties ranked 9 -16
- Counties ranked 17-24
- Counties ranked 25-32
- Counties ranked 33-41

Results and discussions

Spatial autocorrelation indexes for answering Q2 (Moran's I)

The Moran's I statistic for spatial autocorrelation is given as:

$$I = \frac{n}{S_0} \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j} z_i z_j}{\sum_{i=1}^{n} z_i^2}$$

where z_i is the deviation of an attribute for feature i from its mean $(x_i - \bar{X})$, $w_{i,j}$ is the spatial weight between feature i and j, n is equal to the total number of features, and S_0 is the aggregate of all the spatial weights:

$$S_0 = \sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j}$$

The z_I-score for the statistic is computed as:

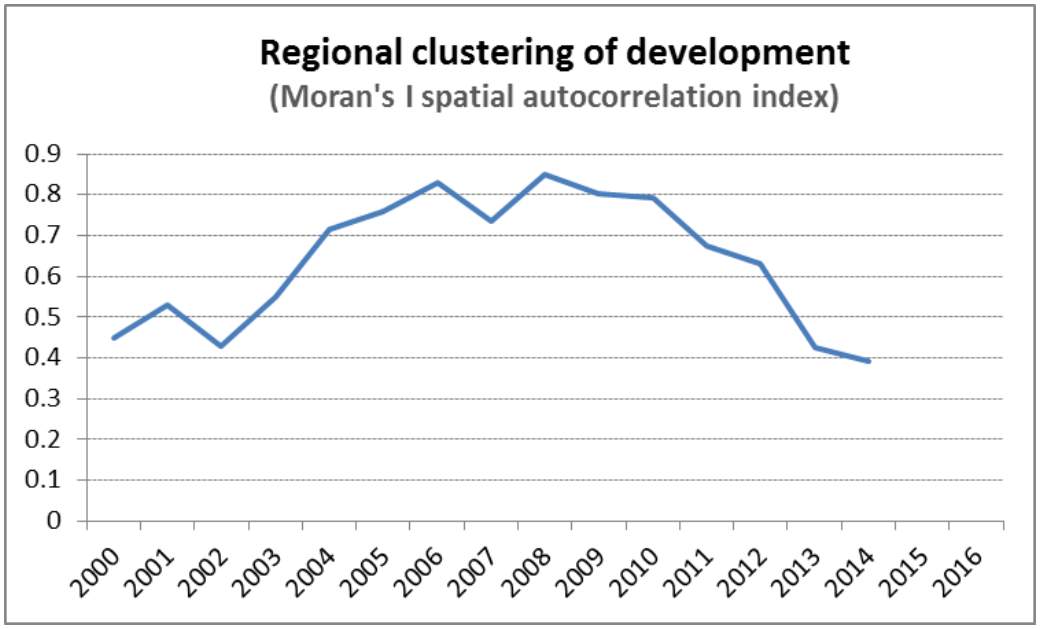
$$z_I = \frac{I - \mathrm{E}[I]}{\sqrt{\mathrm{V}[I]}}$$

where:

$$\begin{aligned} \mathrm{E}[I] &= -1/(n-1) \\ \mathrm{V}[I] &= \mathrm{E}[I^2] - \mathrm{E}[I]^2 \end{aligned}$$

Results and discussions

Spatial autocorrelation indexes for answering Q2

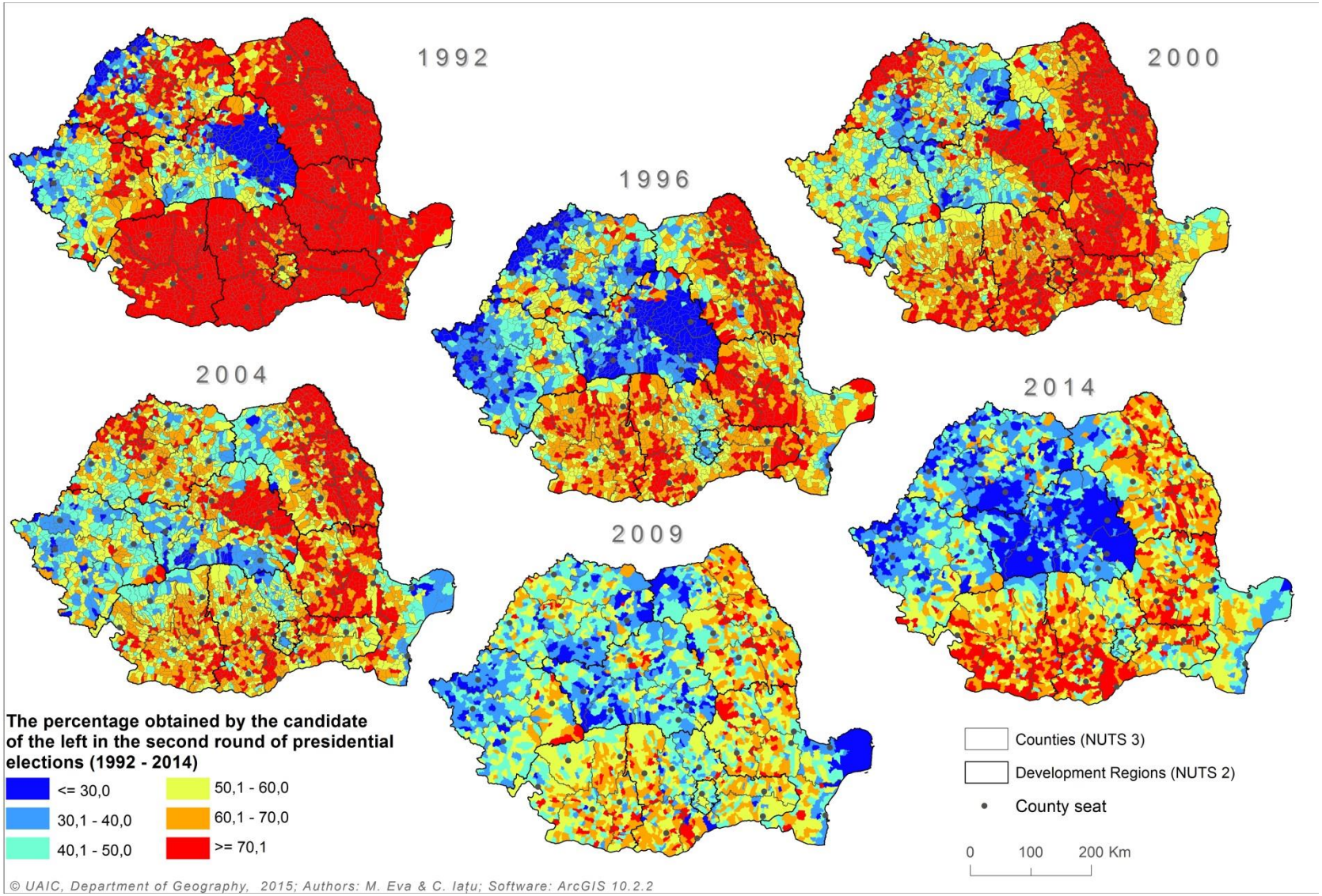


- Significant increase of spatial clustering of development from 2000 to 2009 (county level perspective)
- Significant decrease of spatial clustering of development after 2009 (county level perspective)

Does spatial clustering of development (or the spatial pattern of inequalities) have any relevance?

High degree of clustering of regional inequalities throughout the entire period (→ risk for regional tensions of various sorts)

Results and discussions



Conclusions

Empirical evidences concerning evolution of spatial inequalities:

Poland
- A moderate increase in regional inequalities, especially after 2008

Romania
- A significant increase in regional inequalities in Romania throughout the entire period

Hungary
- An increase in Regional inequalities between 2000 and 2010, followed by a moderate convergence between 2010 and 2015

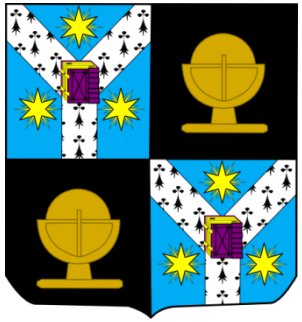
Empirical evidences concerning the evolution of spatial pattern of inequalities:

Romania
- High degree of clustering of regional inequalities throughout the entire period (→ risk for regional tensions of various sorts)

- Significant increase of spatial clustering of development inequalities from 2000 to 2008 (county level analysis)

- Significant decrease of spatial clustering of development inequalities after 2008 (county level analysis)

Thank you for your attention!



Alexandru Ioan Cuza University of Iași
Faculty of Geography and Geology
Department of Geography
Romania, 700505 - RO,
Iași, Bulevardul Carol I nr. 20 A
mihail.i.eva@gmail.ro