Impact of Regional Development Programs on Hungarian LAU1 Regions

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EAAE2017 Parma, Italy

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Motivation – Rural Development

- 75% of the territory of **OECD** countries is classified as **rural**, on average 25% of the total population live in these areas
- **growth** in agricultural productivity - **fall** in both agricultural employment and the weight of agriculture to national economies
- the **modern CAP** (AGENDA 2000) shifted the support system towards a more integrated rural development policy. Aims:
  - to promote a **viable and liveable rural environment** - rather than maximize agricultural output
  - creation or preservation of a number of important **values** such as landscape, traditions-customs, social structures and environmental protection.
- pre-condition: the existence of a sufficiently large **active rural population**
- **NMS** are more rural than **OMS**, with a more predominant income gap between rural and urban areas.

Motivation – Rural Development in Hungary

- Hungary: **93,000** km^2, approx. pop: of **9.8** million
- HU is in Central Europe, a **EU** member state since 2004
- the economic output of rural Hungary is 50% less than the national average, and 3x less than that of the predominantly urban output
- Within the EU, Hungary is one of the **biggest beneficiaries** of RDP payments – at least when per capita transfers are considered.
- 2007 – 2013 programming period: EUR **3.8** billion
- 2014 – 2020 programming period EUR **4.2** billion (of which EUR 740 million in the form of national co-funding) is foreseen.

Have these significant amounts of RDP funds that have been distributed had any measurable impact?

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Hungary in the European Union

Source: NuclearVacuum (File:Location European nation states.svg) [CC BY-SA 3.0 (http://creativecommons.org/licenses/by-sa/3.0)

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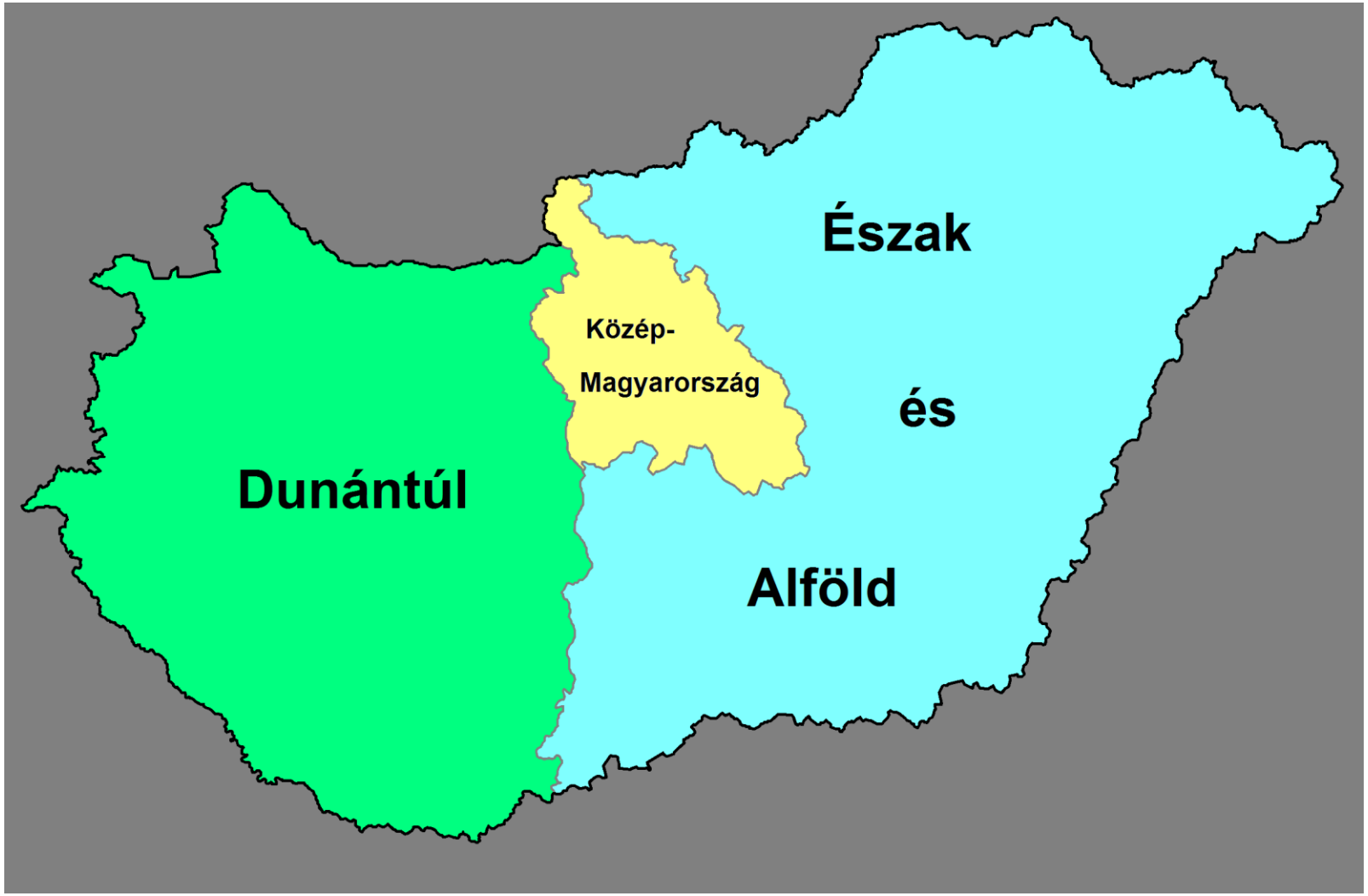
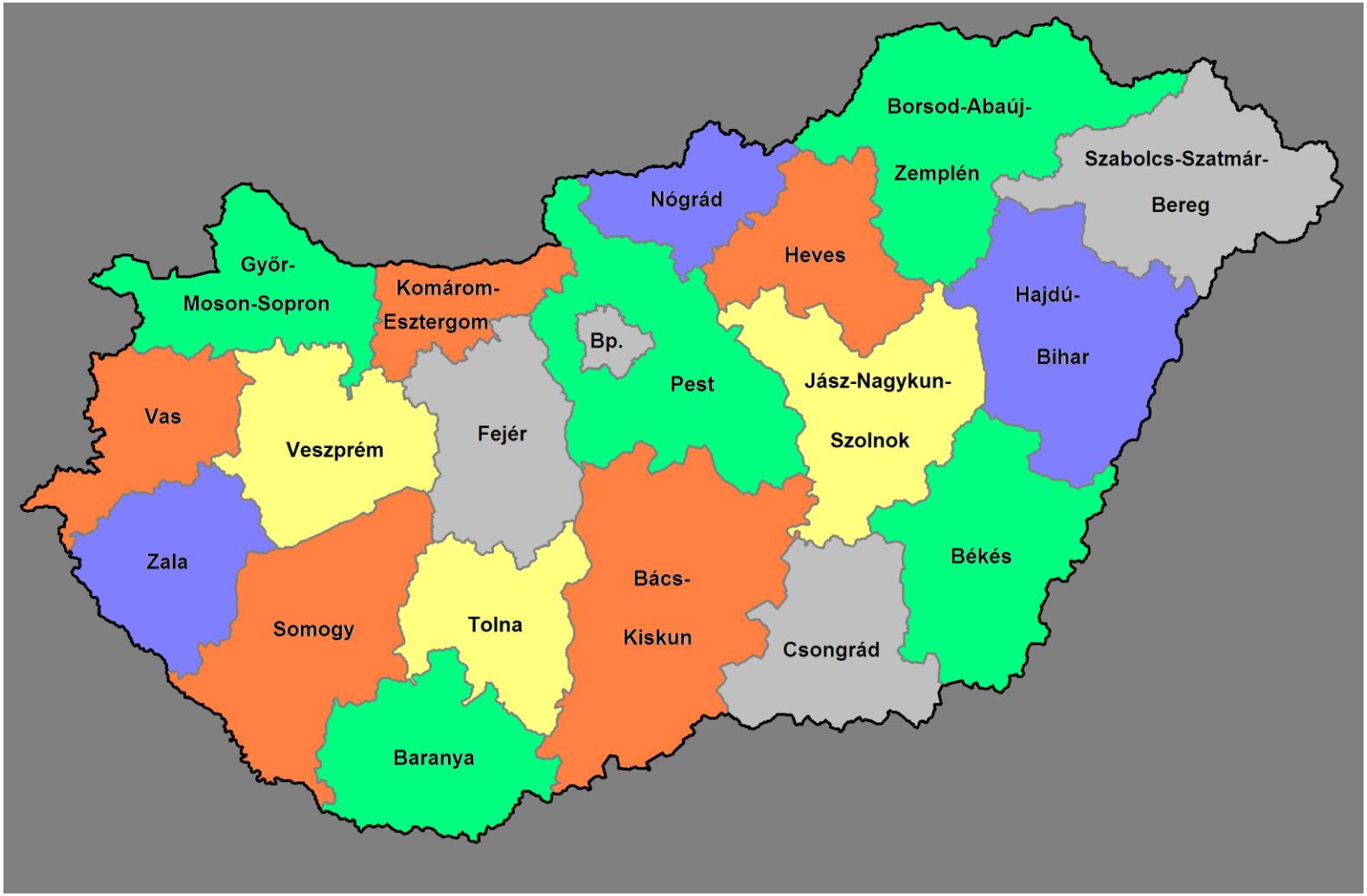
Hungary: NUTS 1 regions



Hungary: NUTS 2 regions

Hungary: NUTS 3 regions



RDP support data

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
T. Subsidy (th. HUF*)	1,044	780185.1 (**2977 th.**)	814366.4	-36435	7111930
Subsidy/cap (th. HUF)	1,044	19.707 (**75.21**)	17.077	-2.106	126.25
Subsidy/km² (th. HUF)	1,044	1386.61 (**5.29**)	1209.213	-95.581	13203.6

Nominal prices, 2008 – 2013 period, * **EUR 1= 304** (as of August 2017).

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RDP support data

Year	**T. Subsidy** (th. HUF*)	**Subsidy/cap** (th. HUF)	**Subsidy/km²** (th. HUF)
2008	415932.6	741.4727	10.42477
2009	**896959.9**	**1582.969**	**21.80959**
2010	**344121.3**	**611.1701**	**8.787789**
2011	916278.1	1632.067	23.27737
2012	1010492	1804.834	25.74464
2013	1097327	1947.158	28.20319

Nominal prices, * **EUR 1= HUF 304** (as of August 2017).

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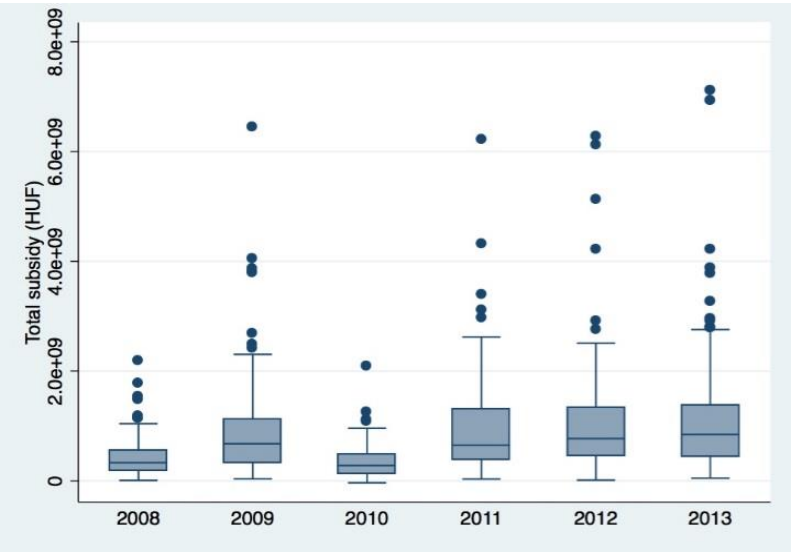
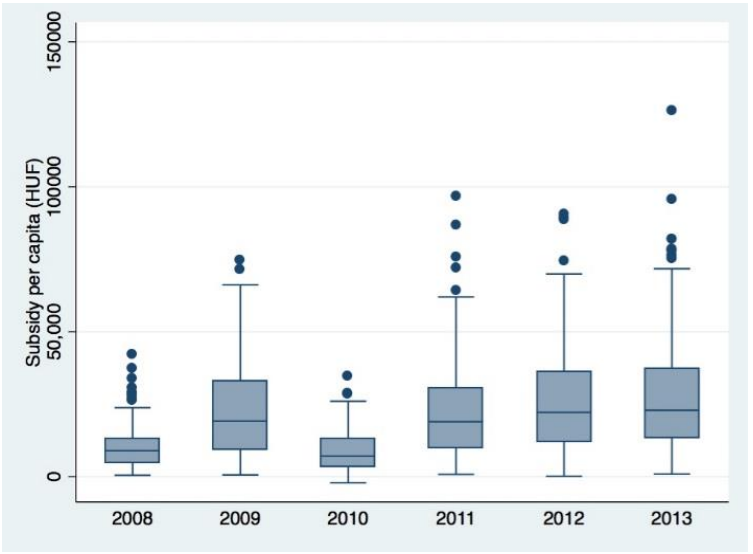
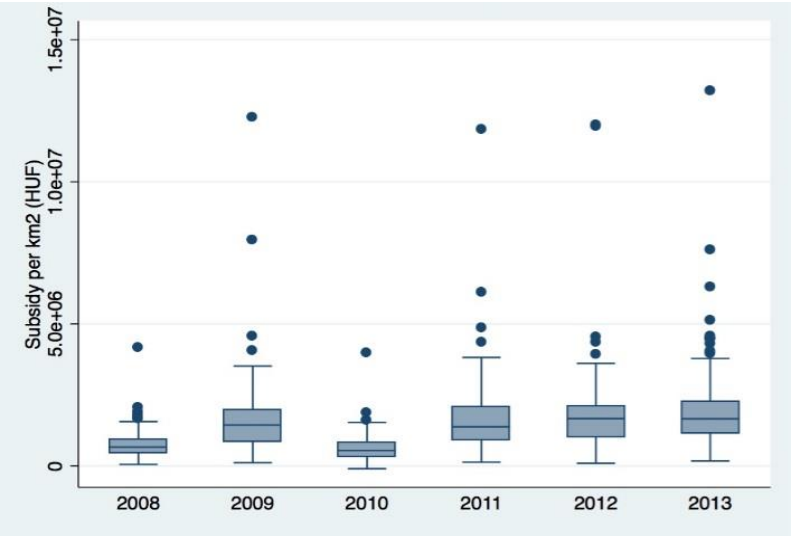
RD support data







On a Local Administrative Unit level (LAU1, formerly NUTS4) there are **174 small regions**, composed of **3,164** administratively independent settlements.

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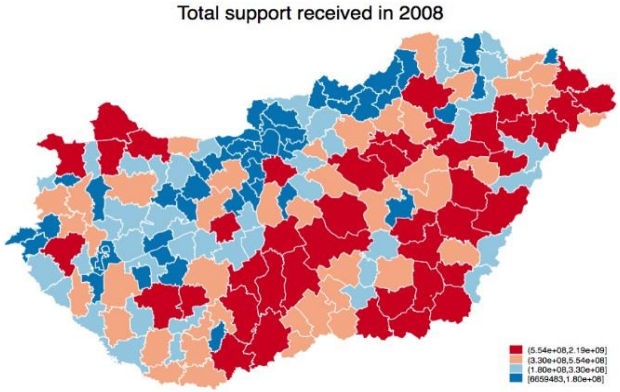
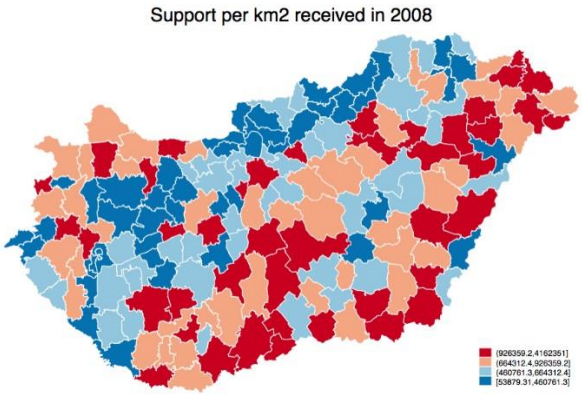
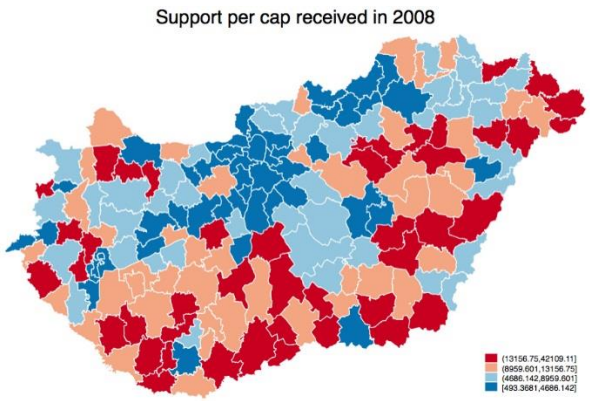
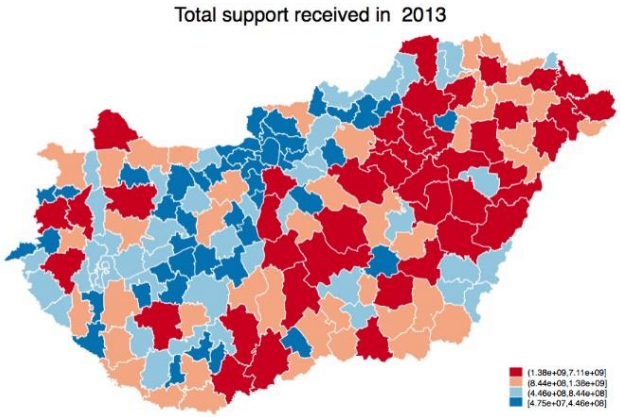
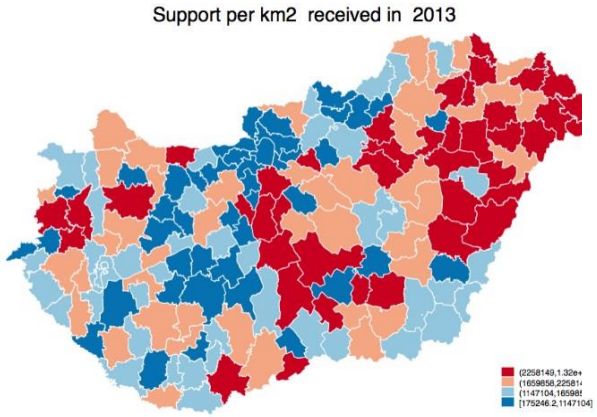
Total, /km2, /cap support in 2008 and 2013

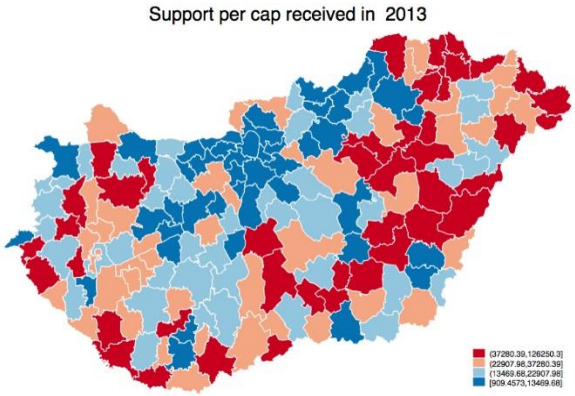












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Methodology – impact assessment

- Issues:
  - the problem of **partial indicators** – lack of causality
  - the problem of **counterfactual**
- Solution:
  - create an '**objective**' complex **Rural Development Index**:
    - Possibilities: PCA/Factor analysis or 'manual' index creation
  - complement it with '**subjective**' **Quality of Living** measures:

    net_migr = (inmigr – outmigr)

    rel_migr = (inmigr-outmigr)/pop

Methodology – impact assessment

For all 3,164 independent settlements:

-Group 1: Social and demographic conditions (e.g. mortality rate, birth rate, migration, nursery -kindergarten - schools, migration)
- **Group 2: Habitation and living conditions** (e.g. houses built as percentage of existing stock, number of cars/1000cap, taxes paid/cap)
- **Group 3: Local economy and employment** (e.g. businesses per 1000 habitants, various measures of unemployment)
- **Group 4: Infrastructure and environment** (e.g. houses connected to sewage system/total number of houses, natural gas, electricity, running water usage, local government services, distance in min to LAU1 centre).

(Each variable was scaled to 0-100, Groups are arithmetic average of scaled vars. (with – or + signs), ***RDI*** *is weighted sum of Groups.)*

Finally, data is aggregated to LAU1 level (from 3,164 to 174)

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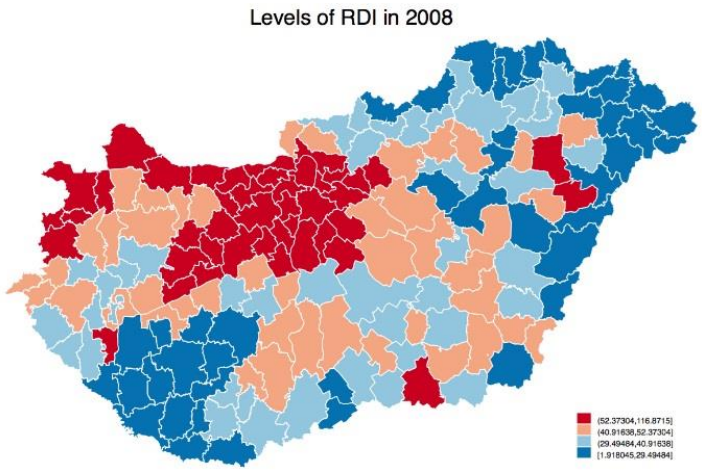
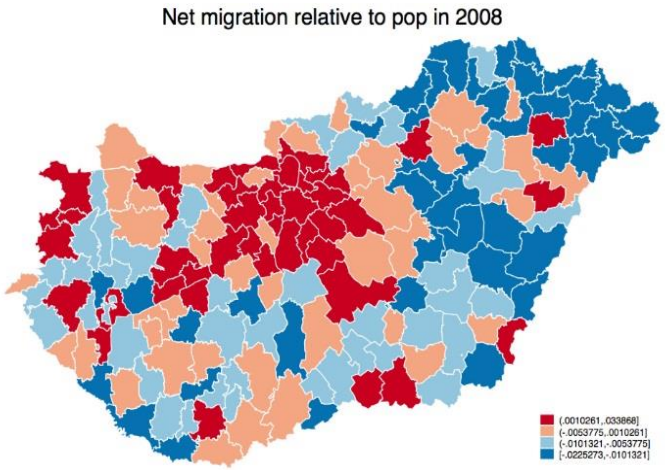
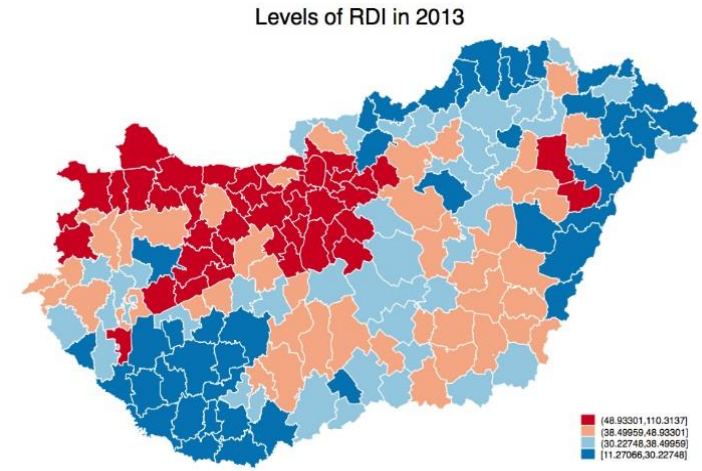
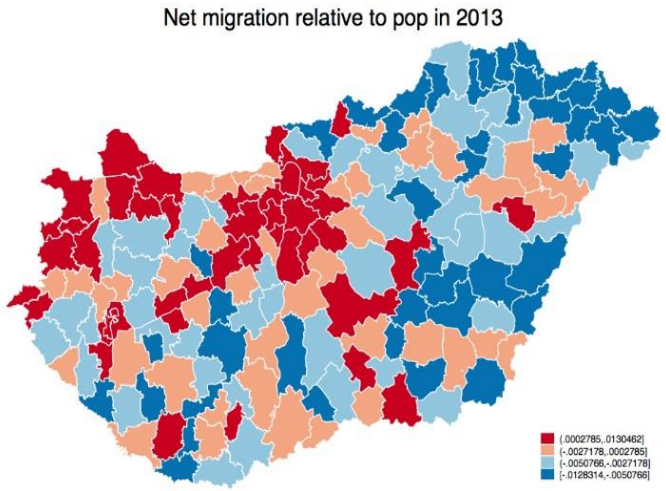
Objective (RDI) and subjective (QoL) levels









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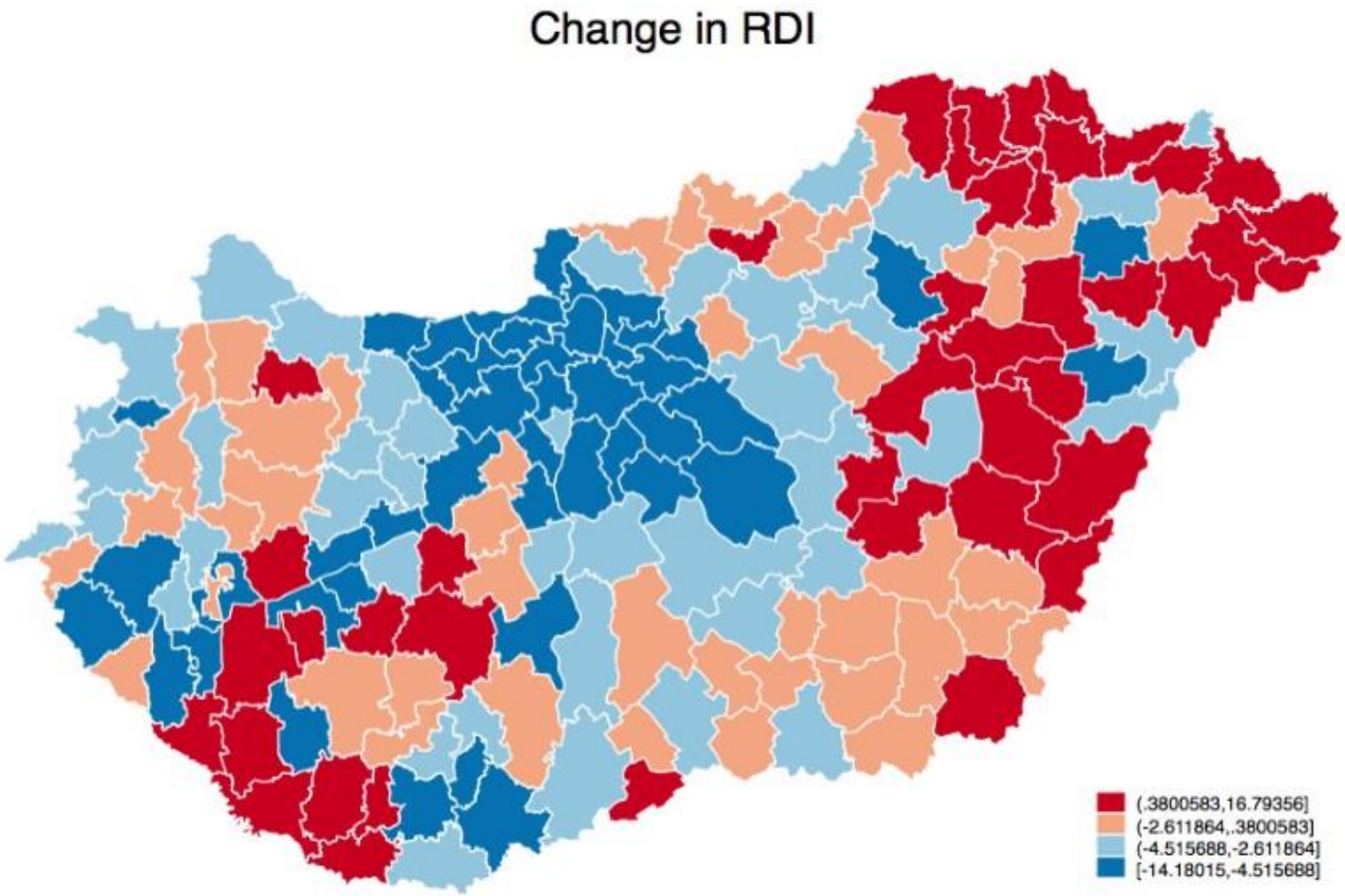
Change in the RDI between 2008 and 2013



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Methodology – PSM and def. of treated

- RDI and QoL indices allow the use of PSM and creation of counterfactual:
  - We predict the probability of a region being subsidised on the basis of observed covariates for both subsidised and non-subsidised regions
  - sub-regions are selected into treatment and non-treatment groups that have similar potential outcomes (***rdi***, ***relative*** **and** ***net migration*** scores)
- All sub-regions received some development support.
- A necessarily subjective **rule** had to be imposed to differentiate between treated and non-treated regions
- 2 definitions for treated: **support intensity** was higher than 2/3 of the yearly **median** (Msub) and **mean** subsidy (Asub)

Results - ATT

	MSub/tot	**MSub/cap**	**MSub/km2**
rdi	37.033	35.938	38.07
rel_migr	-0.003	-0.004	-0.003
net_migr	-92.521	-135.24	-84.212
	ASub/tot	**ASub/cap**	**ASub/km2**
rdi	37.224	35.243	38.188
rel_migr	-0.003	-0.004	-0.003
net_migr	-30.786	-139.47	-84.04

Results – Diff in Diff

	MSub/tot	MSub/cap	MSub/km2	ASub/tot	ASub/cap	ASub/km2
	Baseline: 2008, End: 2013					
rdi	-3.261	-0.289	-5.469	0.186	2.443	-2.888
rel_migr	-0.002	0.001	-0.002	0	0.001	-0.003
net_migr	-74.52	28.85	-120.71	39.29	15.96	-167.03*
	Baseline: 2008 - 2009, End: 2012 - 2013					
rdi	-0.631	0.671	-2.215	0.717	-0.723	-2.567
rel_migr	-0,02	0	-0.001	-0.001	0,001	-0.002
net_migr	-36.24	-23.11	-92.3	-38.42	39.43	-113.9*
	Baseline: 2008 - 2010, End: 2011 - 2013					
rdi	-3.741*	0.527	-1.696	1.217	2.145	-0.917
rel_migr	-0.002**	0.001	-0.002**	0	0.001	-0.001
net_migr	-54.786	43.183	-102.92**	-53.06	23.27	-88.75**

Conclusions and future research

- The main contribution to the literature of this paper is its assessment of (almost) an **entire programming period**
- focus on the overall effects of RDP at a **disaggregated** level
- use **three** development indicators, along with **six** definitions of subsidies.
- we find considerable variation in terms of the level of subs received by regions during the period under analysis.
- it is very difficult to identify **any impact** of European development subsidies, and not only because estimates are **sensitive** to the chosen support variables.
- very few estimations revealed significant impacts, these were **negative** instead of the expected positive.

Conclusions and future research

- Very few research (papers) to use as benchmark
- Exception Michalek (2012) - similar conclusion

Possible explanation of no impact

- **Methodological**:
  - issues with local variables and aggregation
- **Econometrics**:
  - use of continuous treatment variable
  - Use bounds approach (see Craig's paper)
- **Political:**
  - The most unfortunate and difficult to correct