

# Geographical rent – modelling social and economic development with spatial methods

Researcher and R user point of view

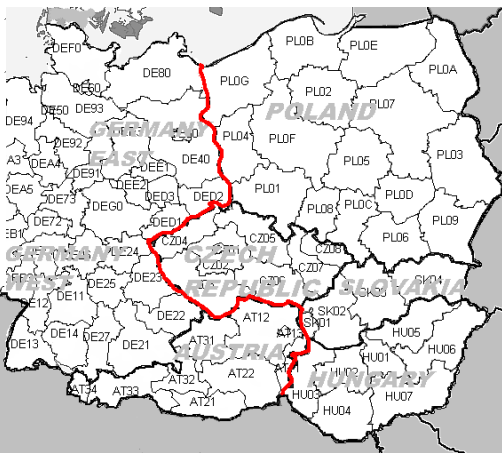
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Warsaw University

## Spatial economic analysis

Economic information

Geographical information

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	ID	KOD	REG	KWIAJ	border	stborder	stborder	region	wesieg	stluka	coordsx	cooridy	KW.1995	KW.1996
2	1.00	deu5	Amtsberg	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	488374.03	79899.20	83039.90	80991.70	
3	2.00	deu1	Koblenz	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-529886.06	-36205.07	29772.60	29660.90	
4	3.00	deu2	Köln	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-572022.14	27499.97	100205.40	100508.30	
5	4.00	deu3	Trier	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-585799.63	-67377.58	9701.40	9721.90	
6	5.00	deu9	Saarland	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-589107.07	-132287.64	23700.40	22795.60	
7	6.00	deu3	Wuppertal	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-486455.52	-126877.96	46027.00	44335.50	
8	7.00	deu11	Darmstadt	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-437431.30	-61317.70	117499.60	118763.40	
9	8.00	deu72	Gießen	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-439024.53	3369.19	21779.70	21792.10	
10	9.00	deu73	Kassel	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-380184.77	47813.95	28034.00	27875.90	
11	10.00	deu4	Detmold	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-431646.57	145435.77	46506.90	46610.50	
12	11.00	deu3	Münster	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-529225.48	149851.57	51378.70	49003.90	
13	12.00	deu1	Düsseldorf	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-650703.90	95586.72	137601.90	135426.50	
14	13.00	deu4	Wiesbaden	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-489398.26	259960.60	47936.20	48148.60	
15	14.00	deu3	Lüneburg	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-362311.54	284037.29	29269.80	29160.50	
16	15.00	deu10	Wuppertal	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-359759.76	294403.87	59709.80	59553.40	
17	16.00	plb0	Ponarskie	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	174094.04	423063.98	5938.90	6767.80	
18	17.00	plb0	mińsko-mazus	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	356489.08	410673.77	3106.70	3637.00	
19	18.00	plb2	wieliczka	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	214172.44	304098.95	5591.50	6195.50	
20	19.00	plb0	Wielkopolskie	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	141659.06	213169.80	8767.00	10404.50	
21	20.00	plb4	Podlasie	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	504184.94	389863.83	2591.50	2975.40	
22	21.00	plb2	wieliczka	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	402909.67	70715.19	2919.60	3226.60	
23	22.00	plb5	Lódzkie	5.00	0.00	0.00	0.00	PL.west.west.west	0.00	297498.97	150359.53	6640.40	7304.30	
24	23.00	deu8	Hamburg	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-347178.43	323753.91	66235.50	66323.80	
25	24.00	deu10	Brandenburg	2.00	1.00	1.00	1.00	% granicest granic	0.00	-116398.09	209839.33	39020.20	39050.20	
26	25.00	plb4	Lubuskie	5.00	1.00	1.00	1.00	% granicest granic	0.00	14406.13	187381.54	2690.10	2961.10	
27	26.00	deu2	Hannover	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-352609.55	196357.91	50968.30	50299.40	
28	27.00	deu6	Bremen	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-426968.68	274278.41	20602.70	20295.70	
29	28.00	deu2	Dresden	2.00	1.00	1.00	1.00	% granicest granic	0.00	-60877.06	69653.58	27090.80	27780.70	
30	29.00	deu11	Chemnitz	2.00	1.00	1.00	1.00	% granicest granic	0.00	-154202.31	11271.29	23976.30	24227.20	
31	30.00	deu3	Leipzig	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-160143.63	92656.89	18462.20	18278.10	
32	31.00	deu9	Thüringen	2.00	0.00	0.00	0.00	DE.west.west.west	0.00	-278692.50	31734.46	35467.50	36239.70	
33	32.00	deu14	Flämingen	2.00	1.00	1.00	1.00	% granicest granic	0.00	509194.67	674623.65	36262.90	36262.90	



## Researcher and R user point of view ...

### Tools:

- 1) GIS maps
- 2) Economic and social data
- 3) SPDEP package as a tool for modelling economic and social development on regional level in spatial approach

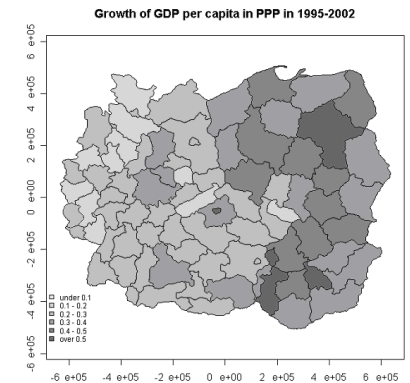
## Field of the research

Tools: Integration of GIS maps and economic data

Question: Looking for interactions in space...→ what can explain us differences in speed of development

Field of research

- 1) social and economic development
- 2) spatial interactions - do neighbours matter?
- 3) geographical rent - do borders matter?
- 4) do spatial and social proximity matters?



# Field of the research

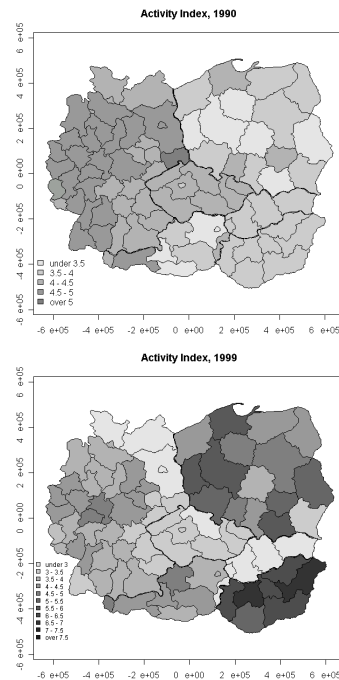
Tools: Spatial methods in SPDEP

Answer (trial): Perhaps there are some soft determinants

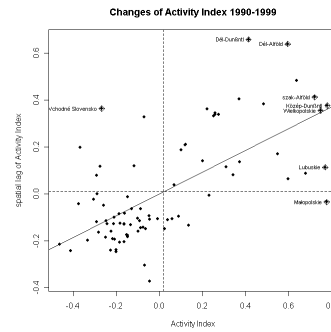
**Activity Index:** important (or not) work-related factors. The activity index presents the economic culture, lifestyle and workstyle, and mentality of a society. It shows professional priorities and attitude towards work, thus also reflecting socio-economic awareness.

→ Issues mixed in Activity Index (1=important, 0=not important)

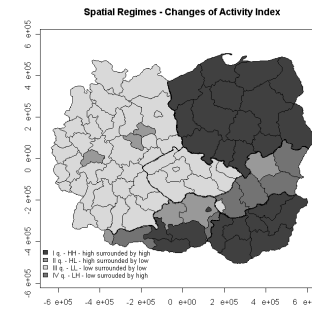
- Good co-workers
- Prestige of the profession
- Opportunity to show initiative
- Social utility of work
- Contacts with other people
- Opportunity to achieve something
- Responsible job
- Opportunity to use one's skills



# Activity Index vs. GDP

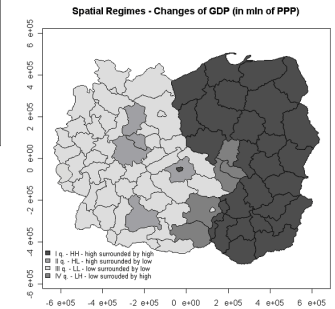


Moran Scatterplot regions vs their neighbours



Changes of GDP and Activity Index have similar pattern

Spatial regimes – points from Moran scatterplot on the map



## From Researcher and R user point of view...

### → Advantages of R

too many to list them.....☺

- almost perfect tool and packages (mainly SPDEP) for spatial economic analysis

## From Researcher and R user point of view...

### → Disadvantages of R

- 1) Graphics - still some problems with nice, advanced graphics for economic data (even not available in R Graph Gallery)
- 2) Descriptive statistics  
easy functions give poor results, other functions require many data transformations
- 3) Poor program marketing!!! - I do my best to promote it (book on spatial methods in R), but still it is not well-known program in economics ☹

**Thank You for attention!**