Spatial Dynamics of the Population in the Czech Republic, 1989-2007

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Outline

- What is spatial population dynamics?
- Research questions
- Definition of spatial categories
- Demographic and socio-economic spatial differentiation
- Dynamics of domestic residential migration
- Conclusions

What is spatial population dynamics?

Space

Values

Politics and Policies

Demog. reproduction (fertility, mortality), Migration

Time

Economy

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Societal context

- Socialist and capitalist political economies generated different spatial population dynamics and settlement structures
- Factors shaping spatial arrangement in capitalist societies:
  - » private ownership, retail price competition, decentralisation of governance
- Produced: urbanisation → suburbanisation → counter-urbanisation of residence and firms

Societal context

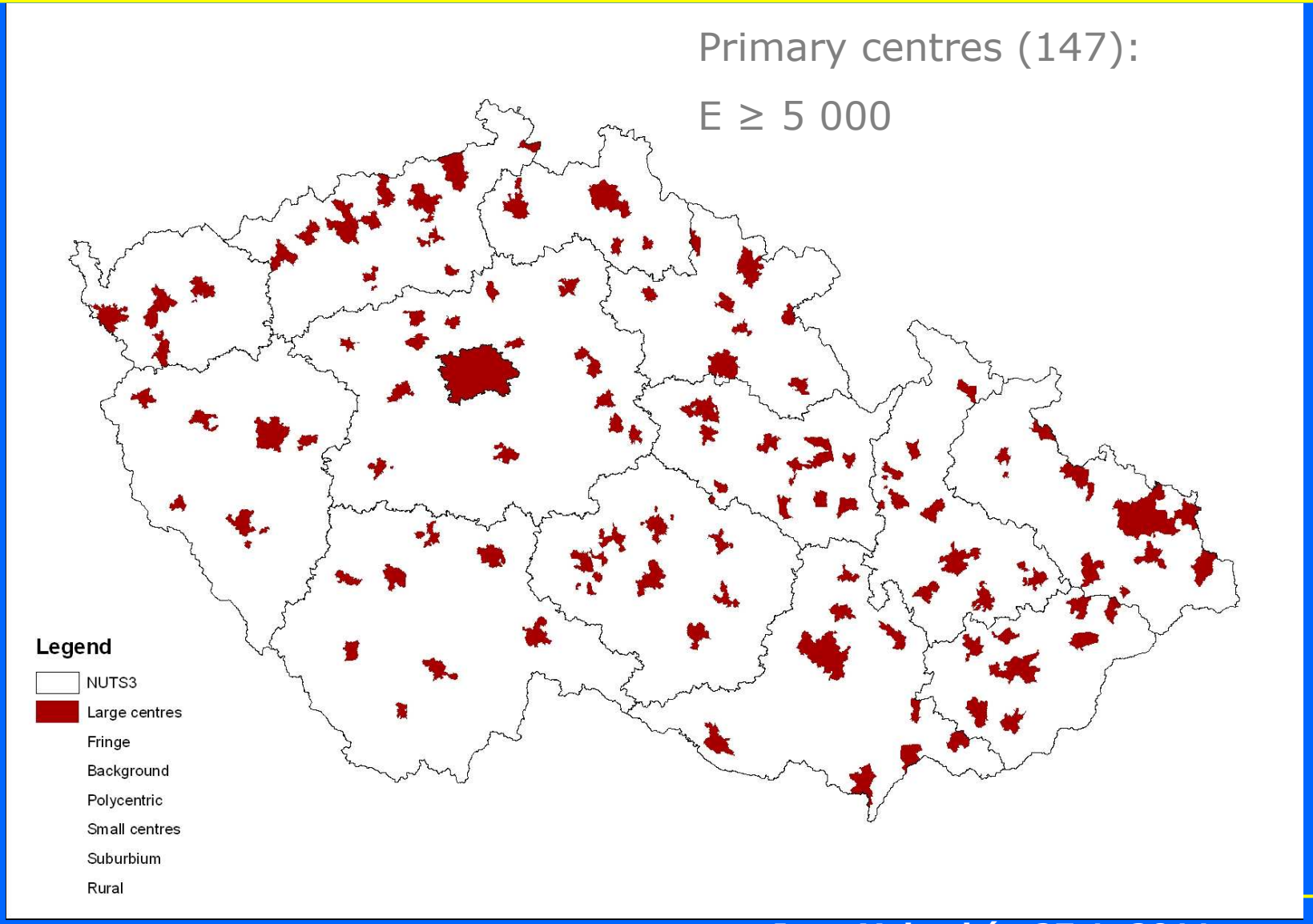
- Factors shaping spatial arrangement in socialist societies:
  - » collective ownership, centrally planned allocation of development funds, centralised decision-making
- Produced: under-urbanisation, housing shortage, work commuting, legally protected land (Andrusz et al. 1996)
- In the Czech R.: inter-regional equalization, stagnation of border regions with the West, monostructural character of industrial agglomerations (Illner, Andrle 1994)

Research questions

How has spatial population dynamics evolved in the Czech Republic?

- Are the population structures different through spatial categories?
- Who is moving where?
- What is the relative importance (intensity) of these flows?
- Do they influence population structure?
- Do they lead to the constitution of new inequalities along spatial dimensions, both core-periphery and urban-rural?

Urban-suburban-rural gradient residential categories



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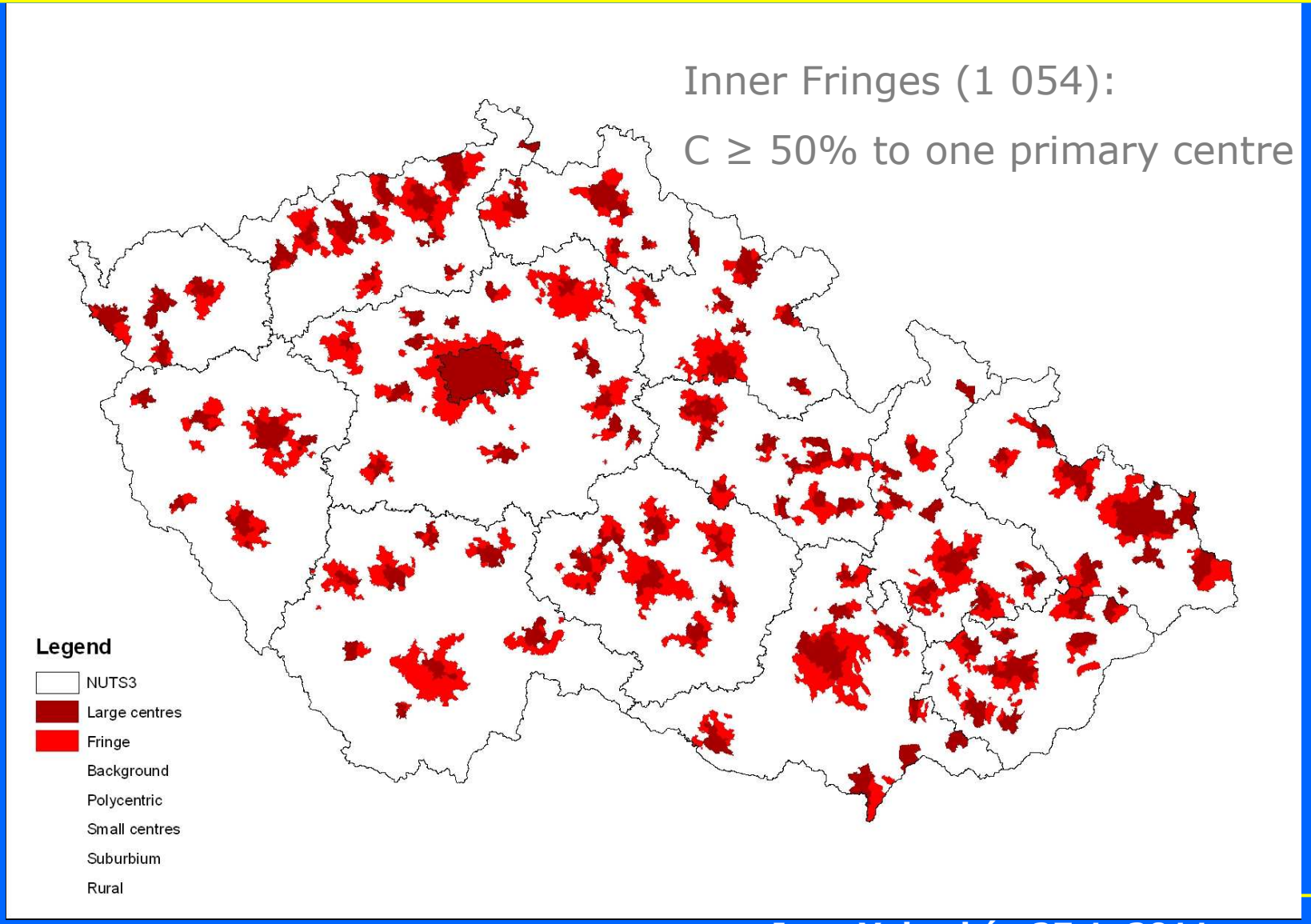

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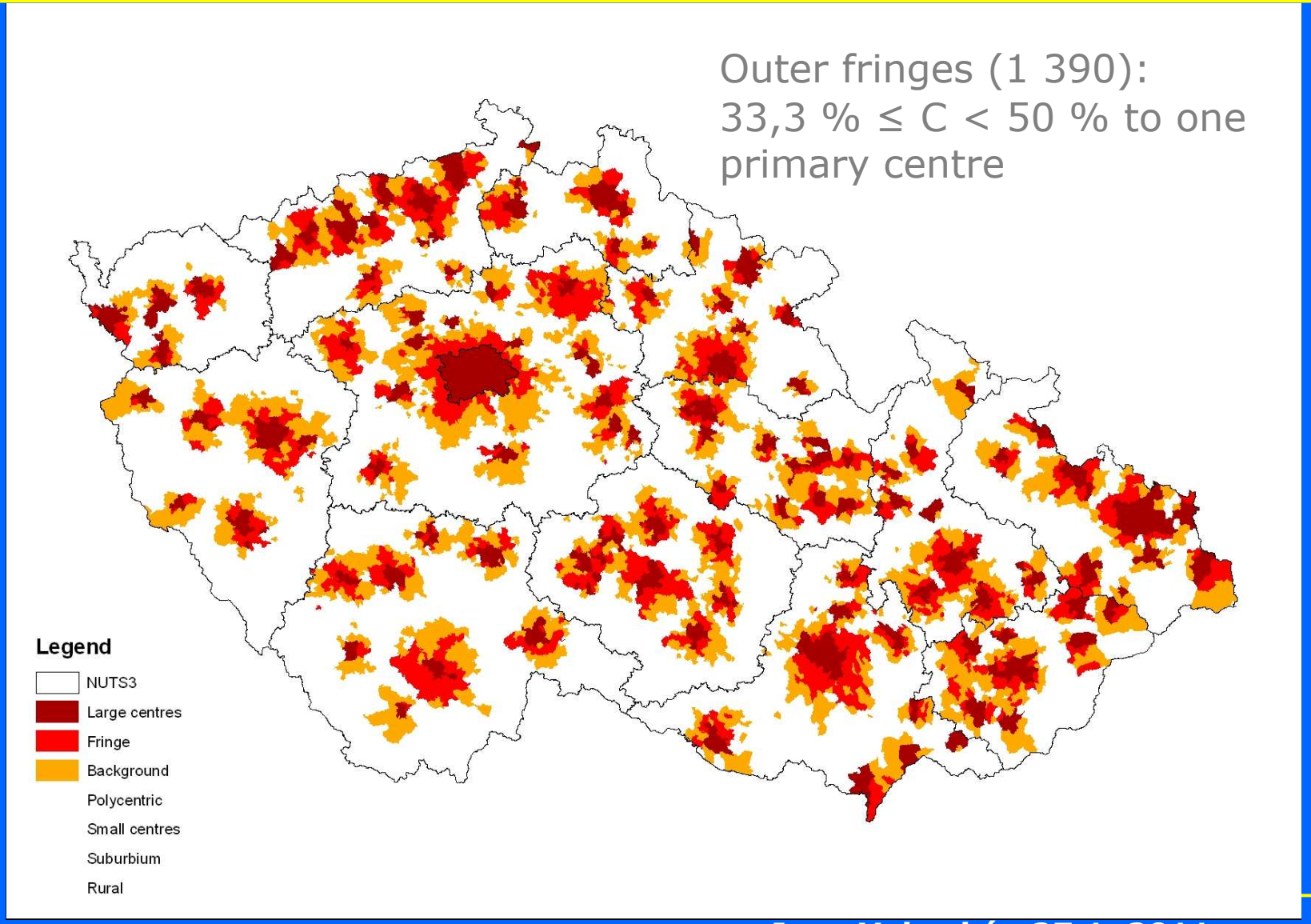

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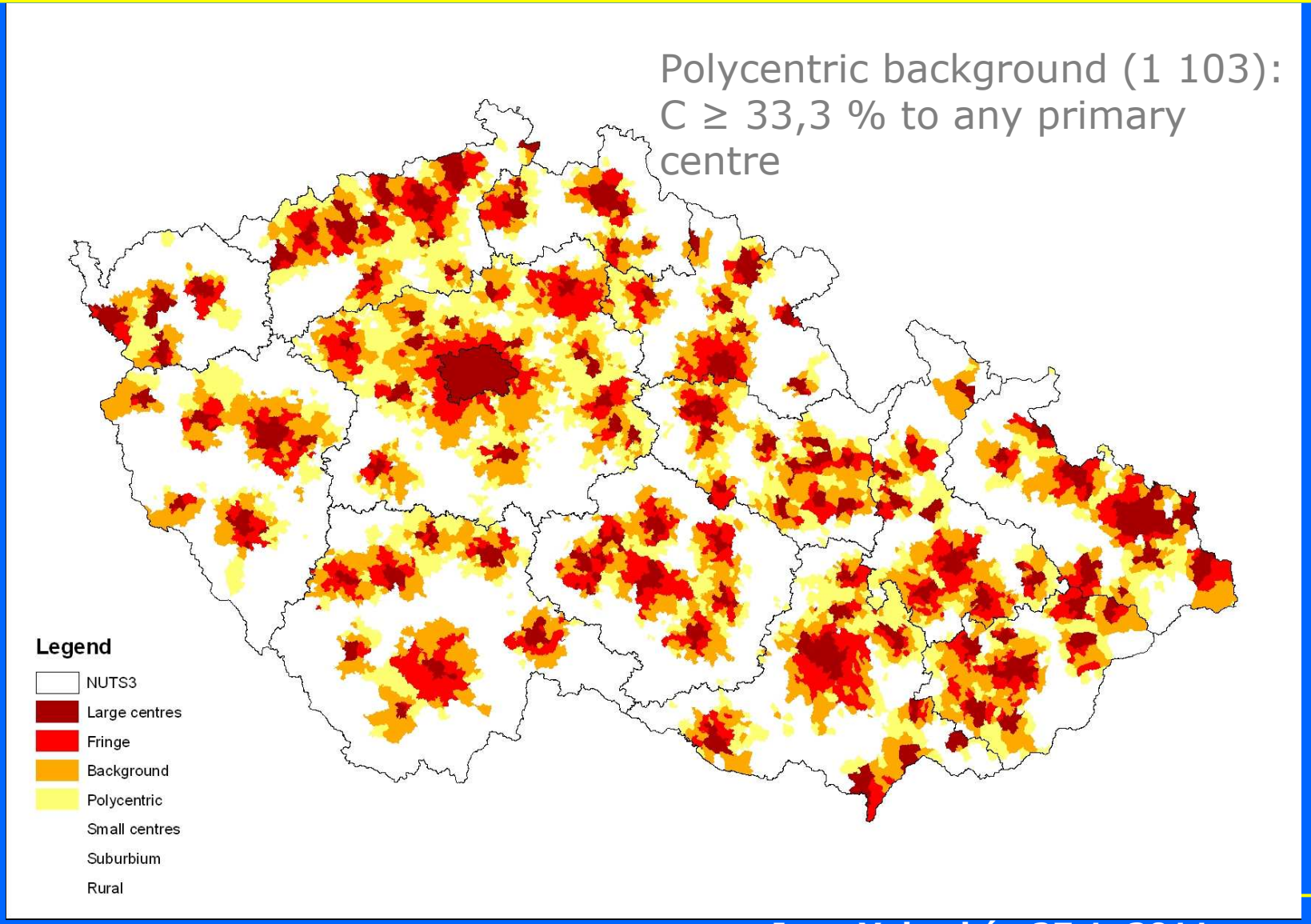

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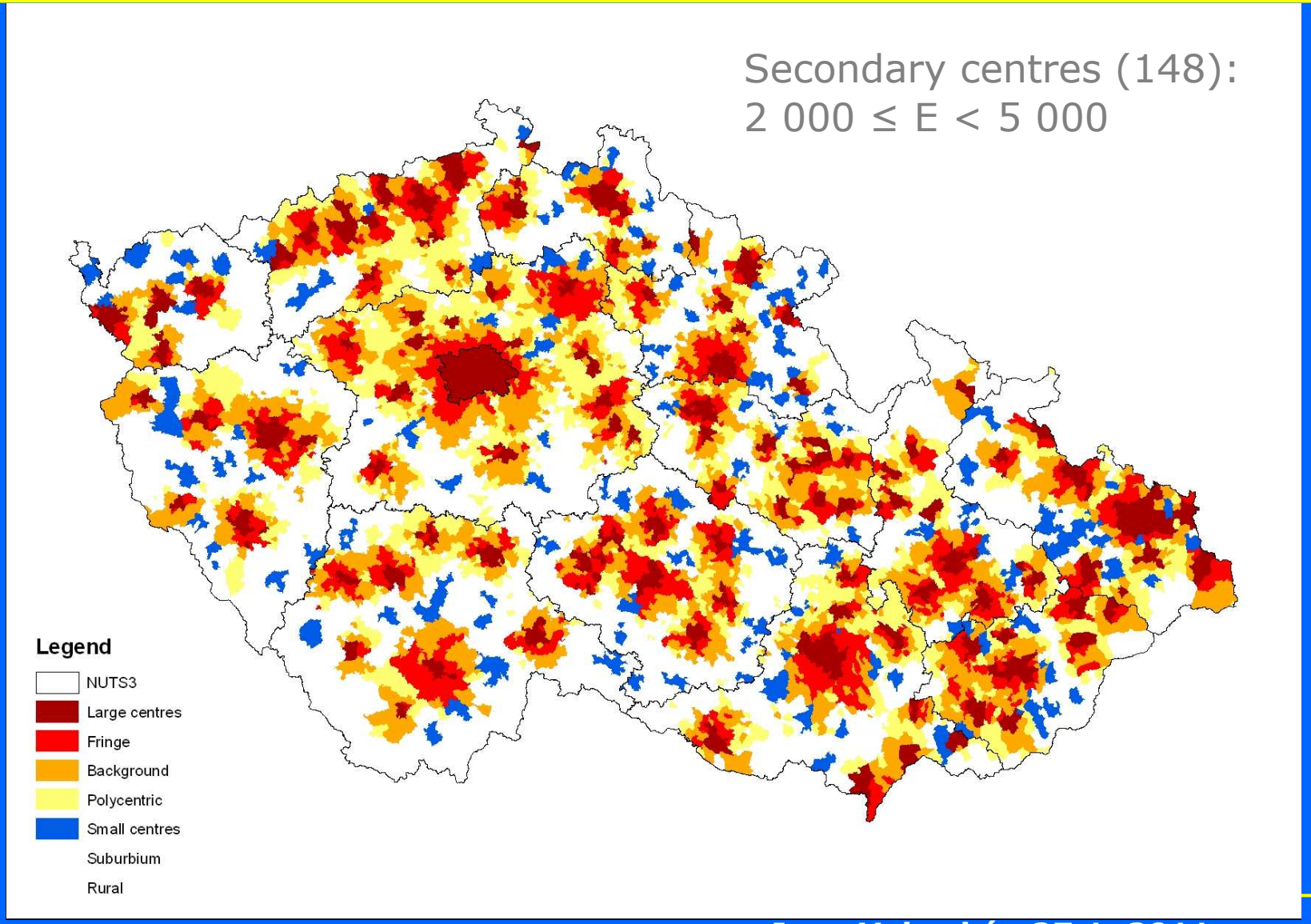

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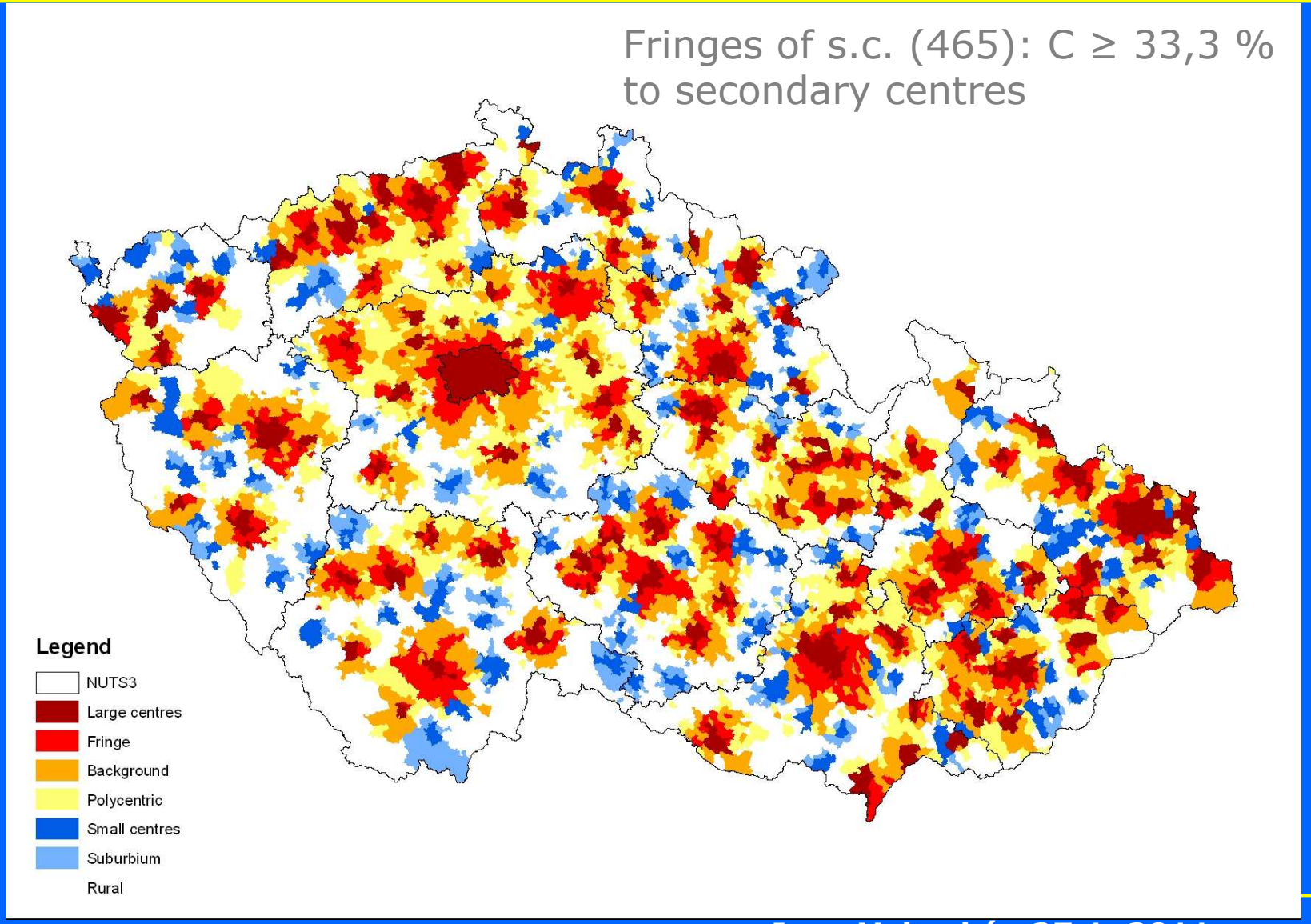

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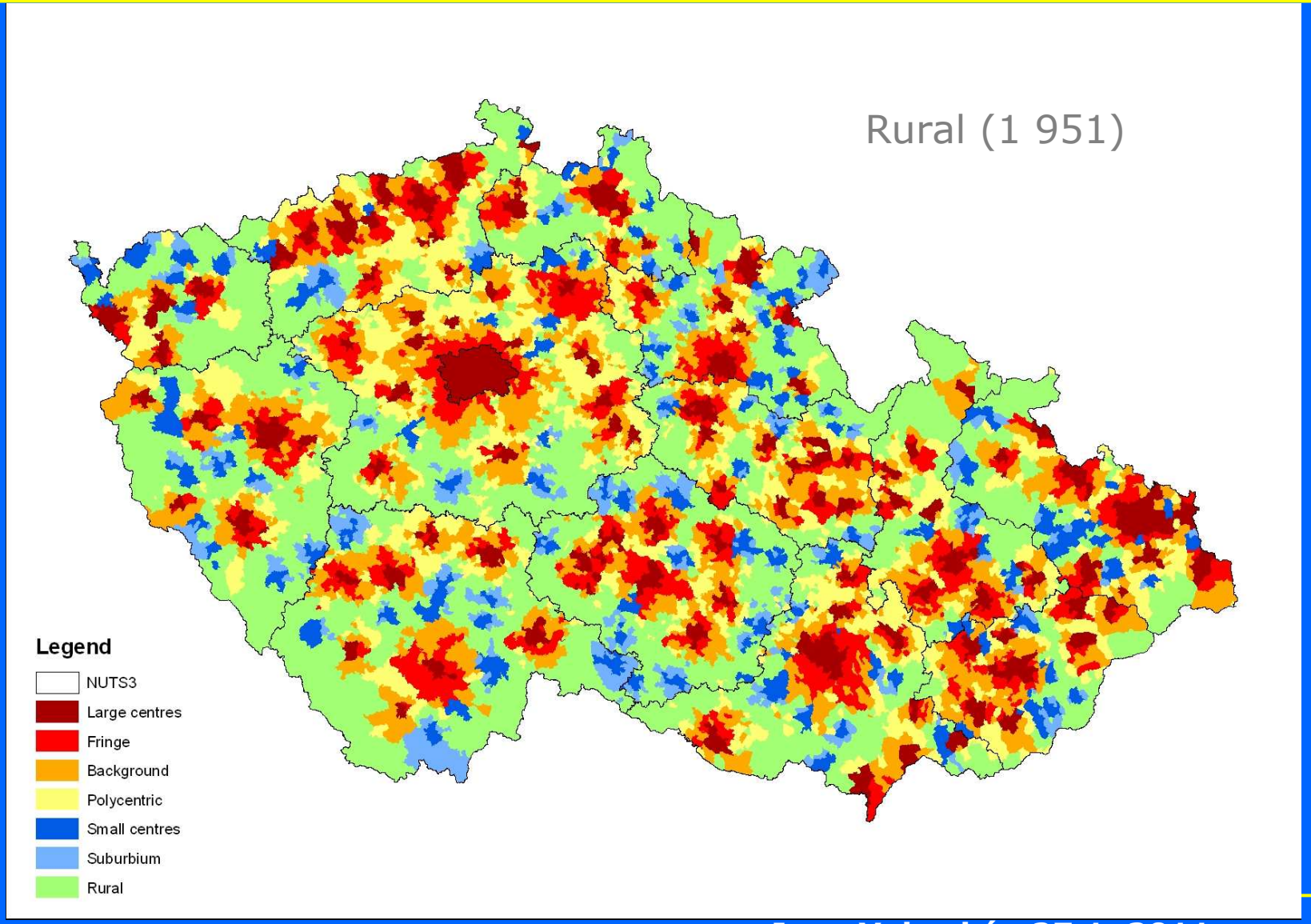

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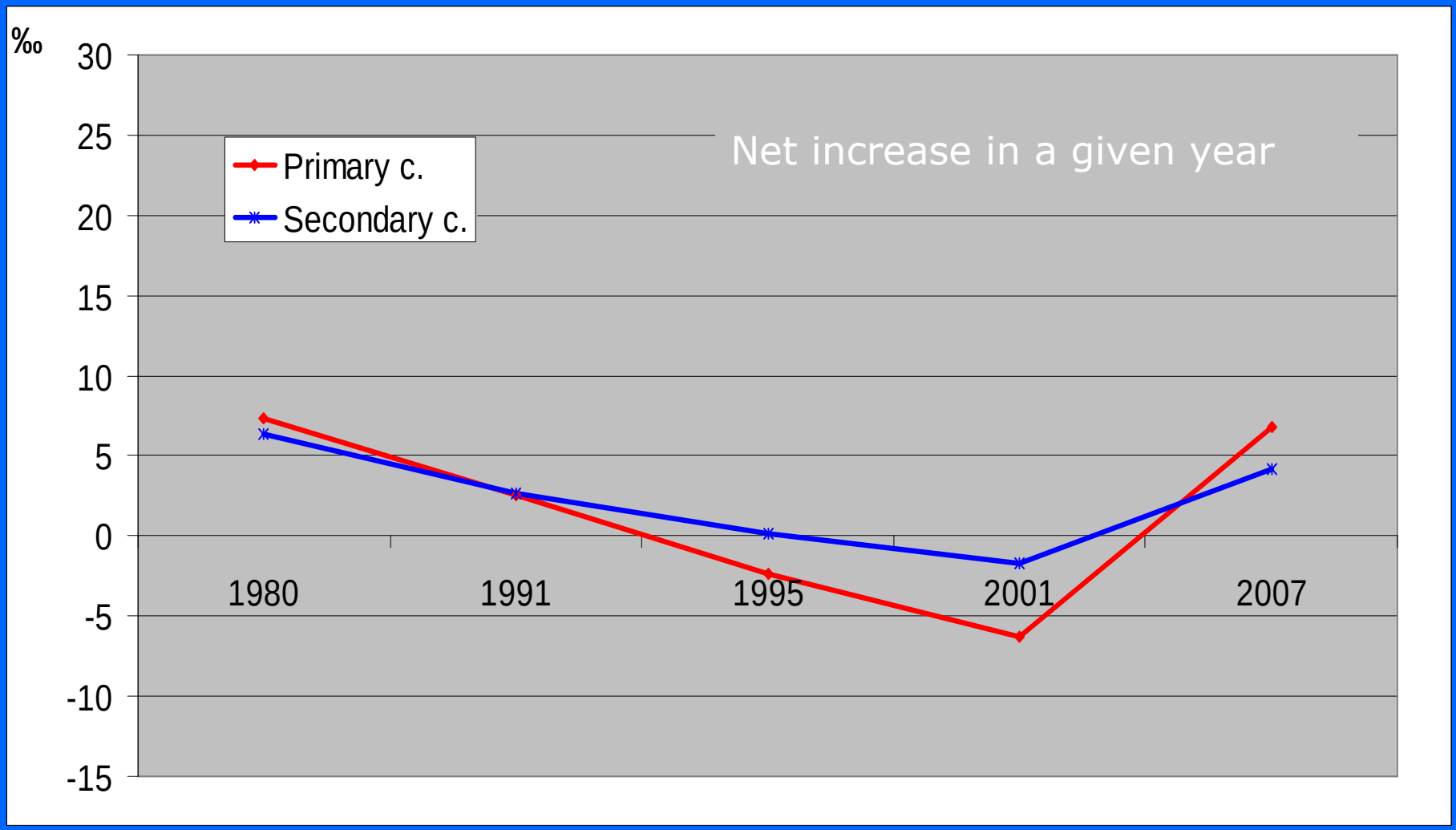
Evolution of population growth



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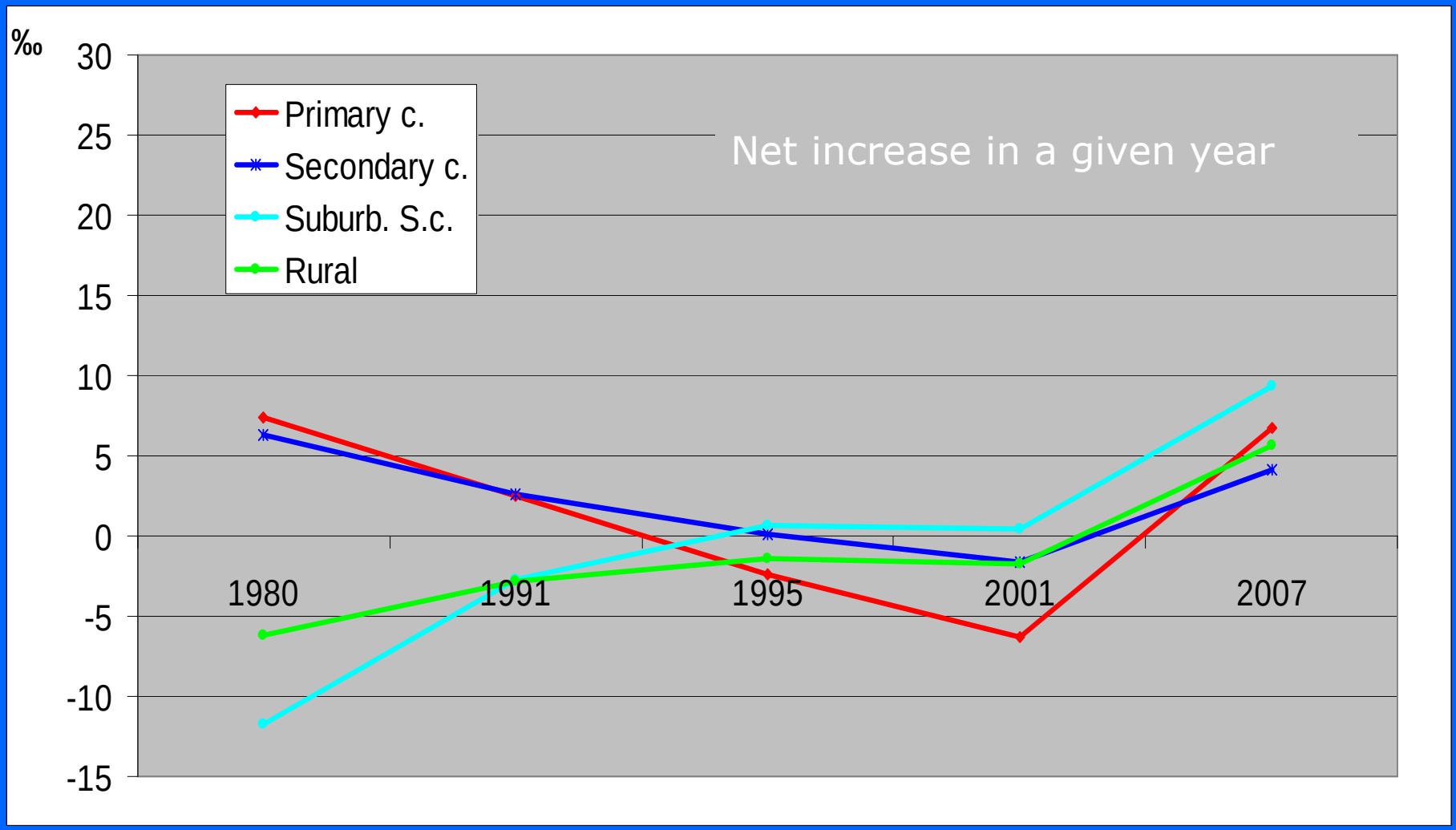

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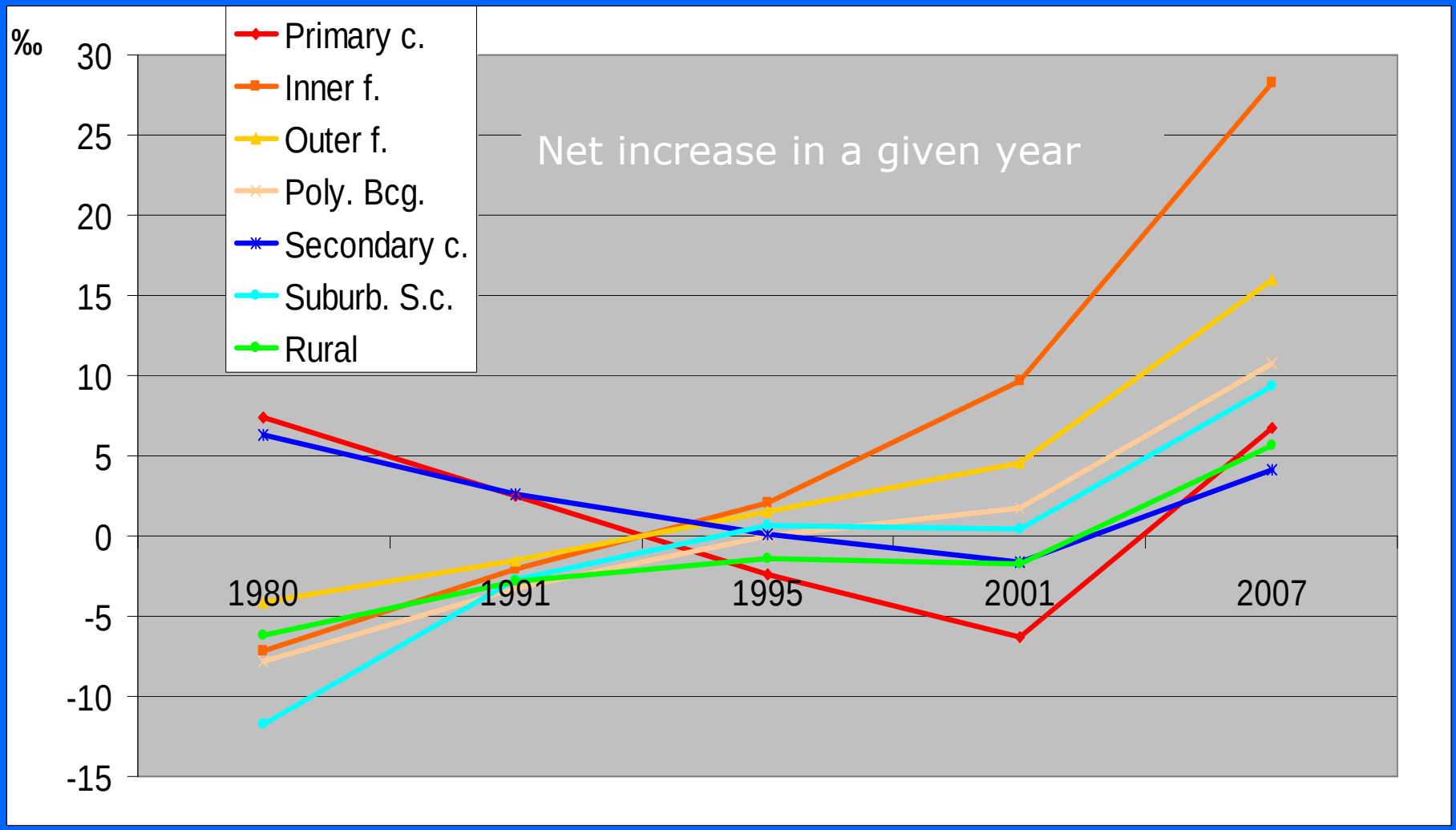

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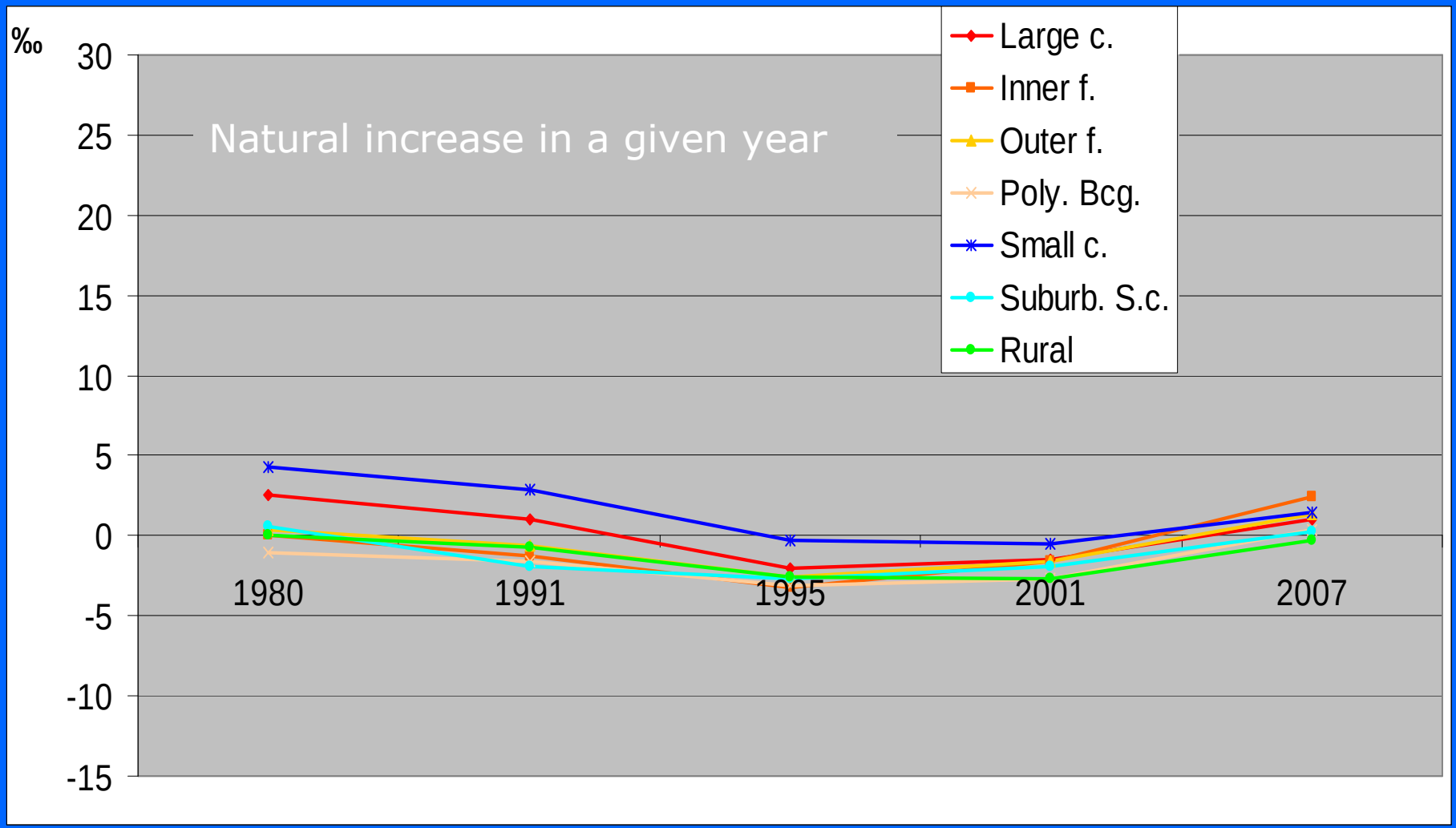

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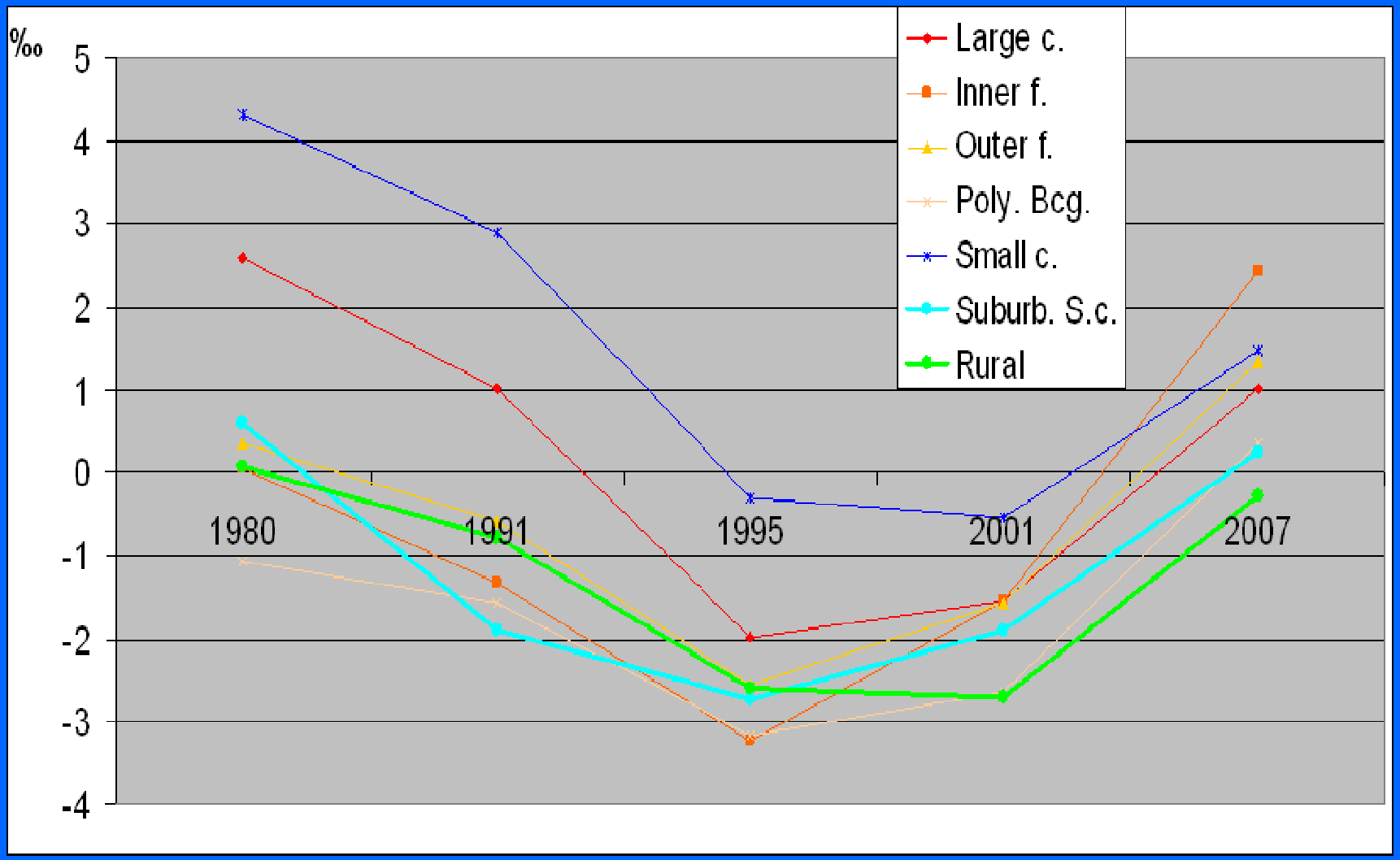


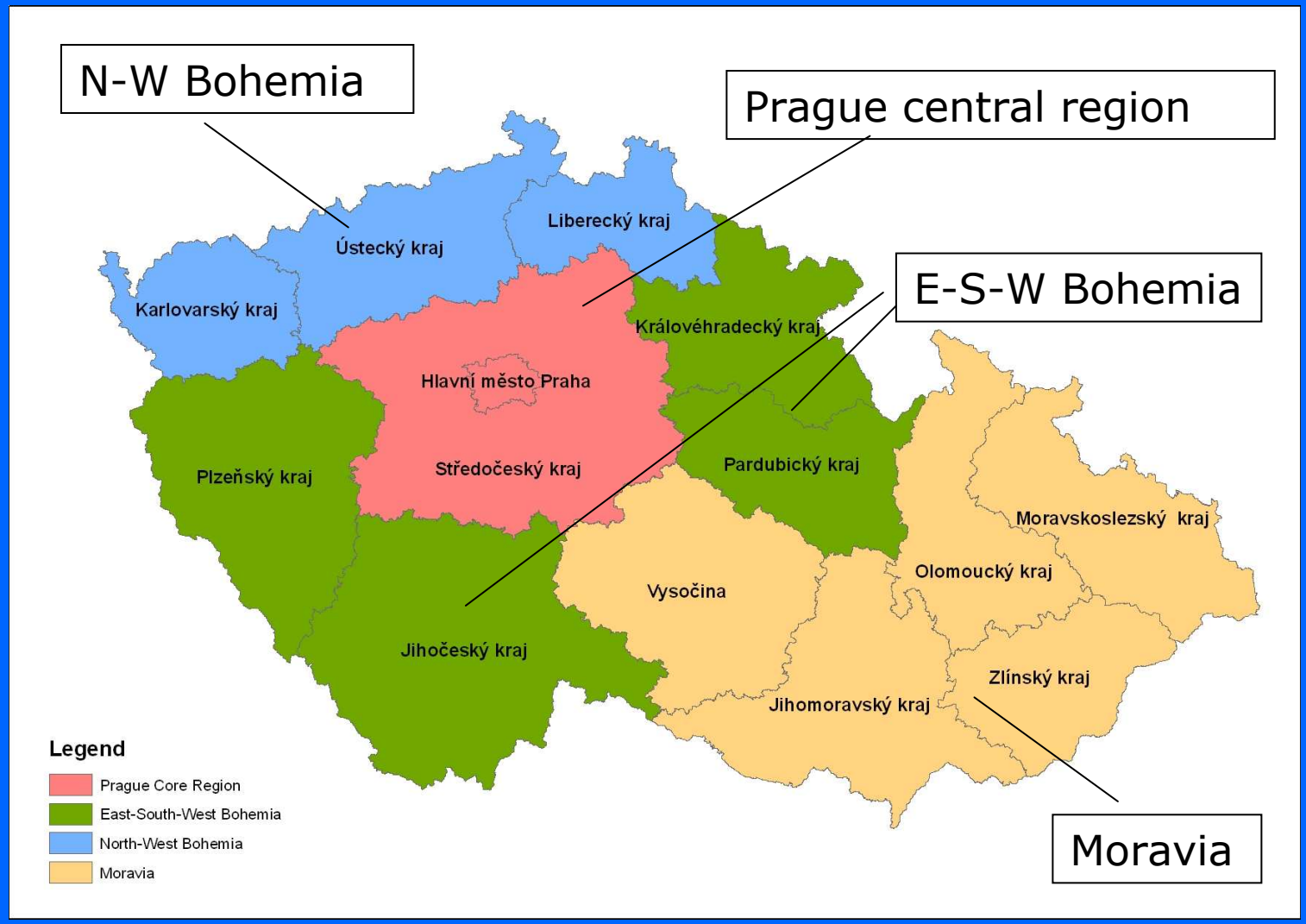
Demographic spatial differences

- Method: structural geographical analysis, special type of regression
  - The aim is to determine whether there are significant differences between urban-suburban-rural gradient categories of a given variable even after controlling for the structural effects (e.g. of age, education, and regional distribution)
- Completed fertility, families with children, one-parent families, proportion of divorced (Census 2001)
  - Clear division between urban and non-urban spatial categories

Socio-economic spatial differences

- Level of education, employment in service sector (Census 1991, 2001)
  - » Clear division between urban, suburban and rural spatial categories
- Unemployment, low income households
  - » Clear regional issue (14 NUTS 3 regions)

Central and peripheral regions



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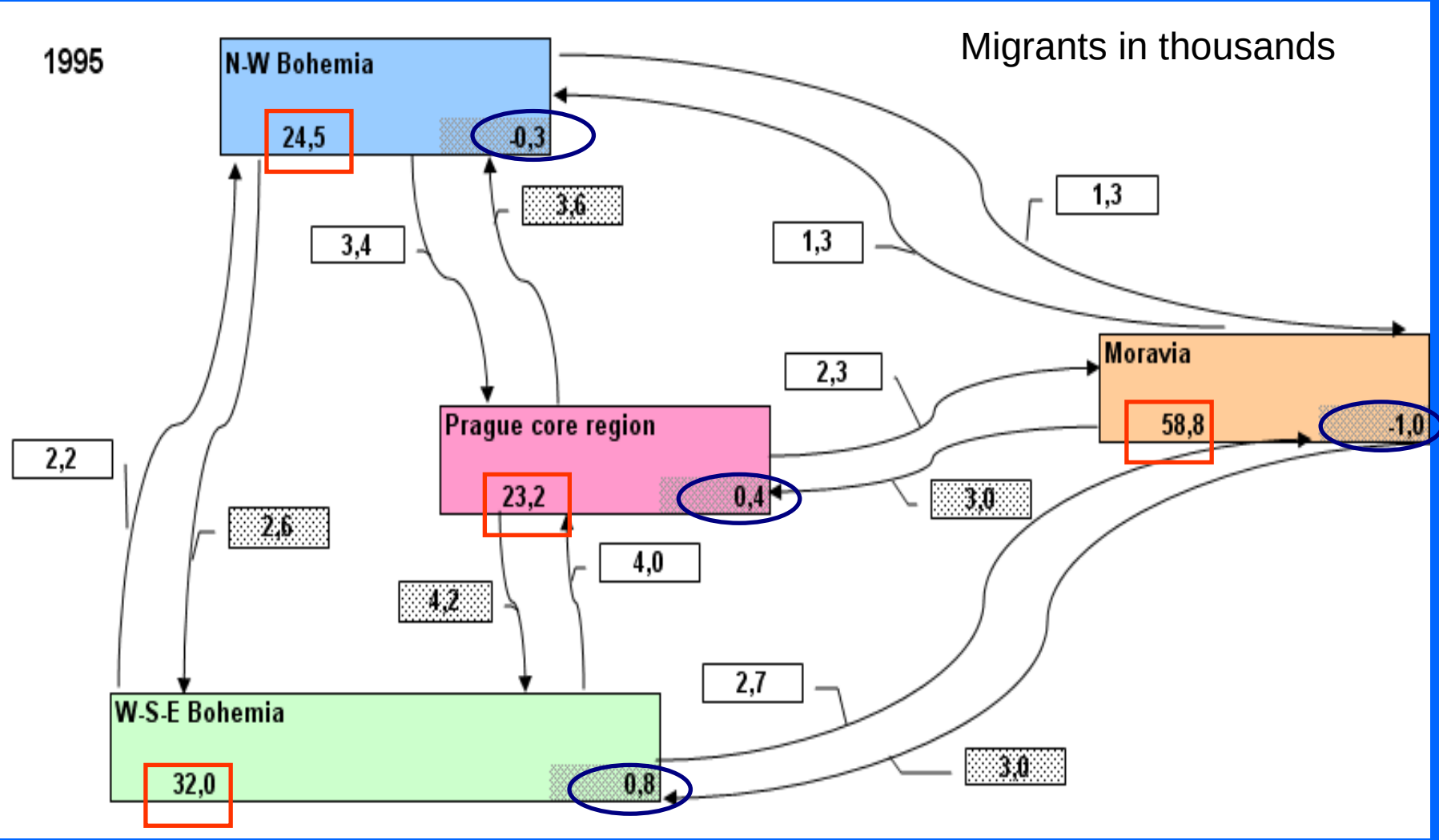
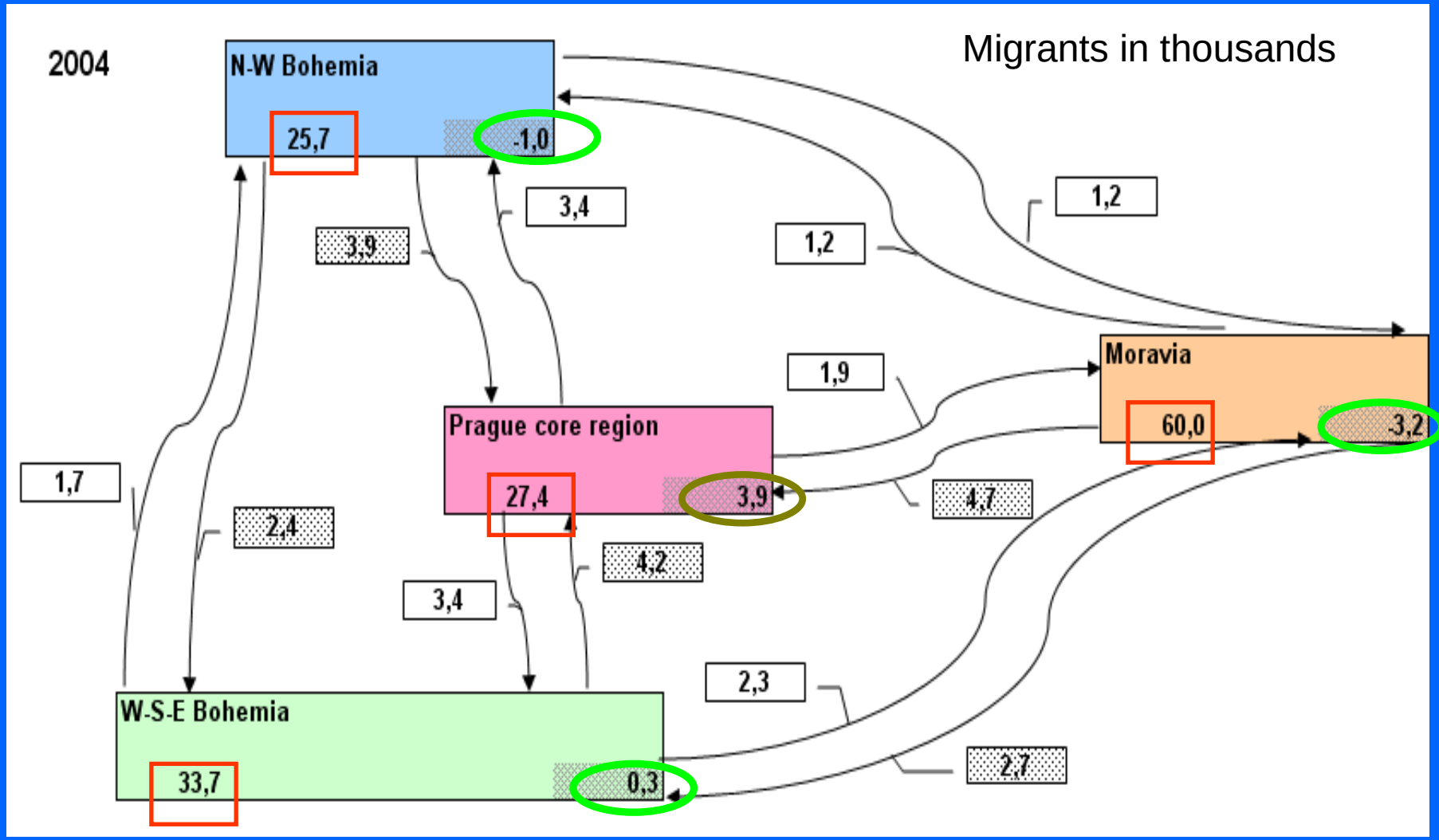
Dynamics of residential migration

- Less intensive than before 1989
- Most frequent among population aged 20-29
- More educated are more mobile and across longer distances
- Data set:
  - Individual data set on domestic residential migration
  - Municipality of origin, destination; gender; age; education
  - 1995 (171 959) and 2004 (179 946)

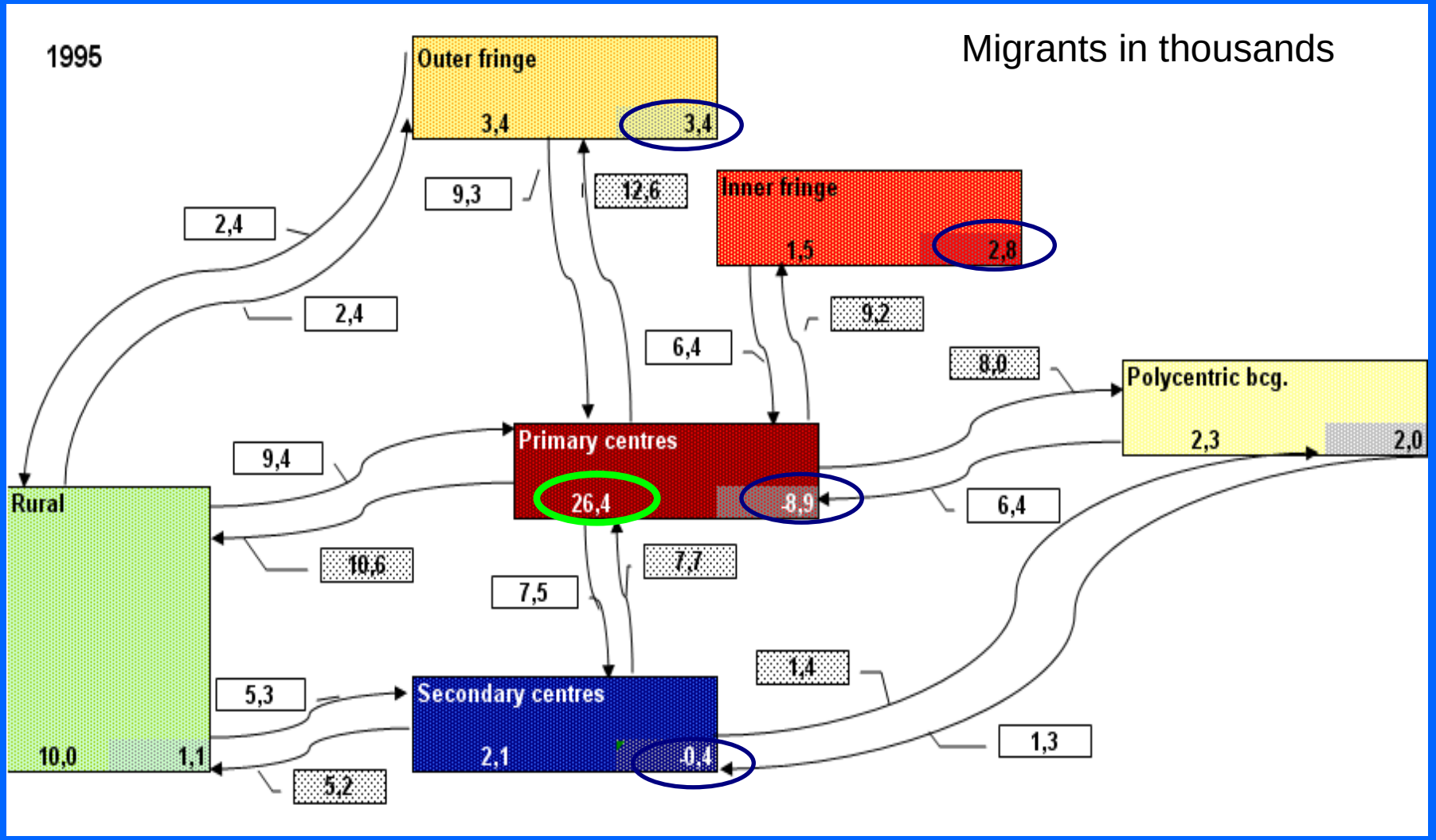
Where do people move? Regions 1995



Where do people move? Regions 2004



Where do people move? U-S-R Gradient 1995



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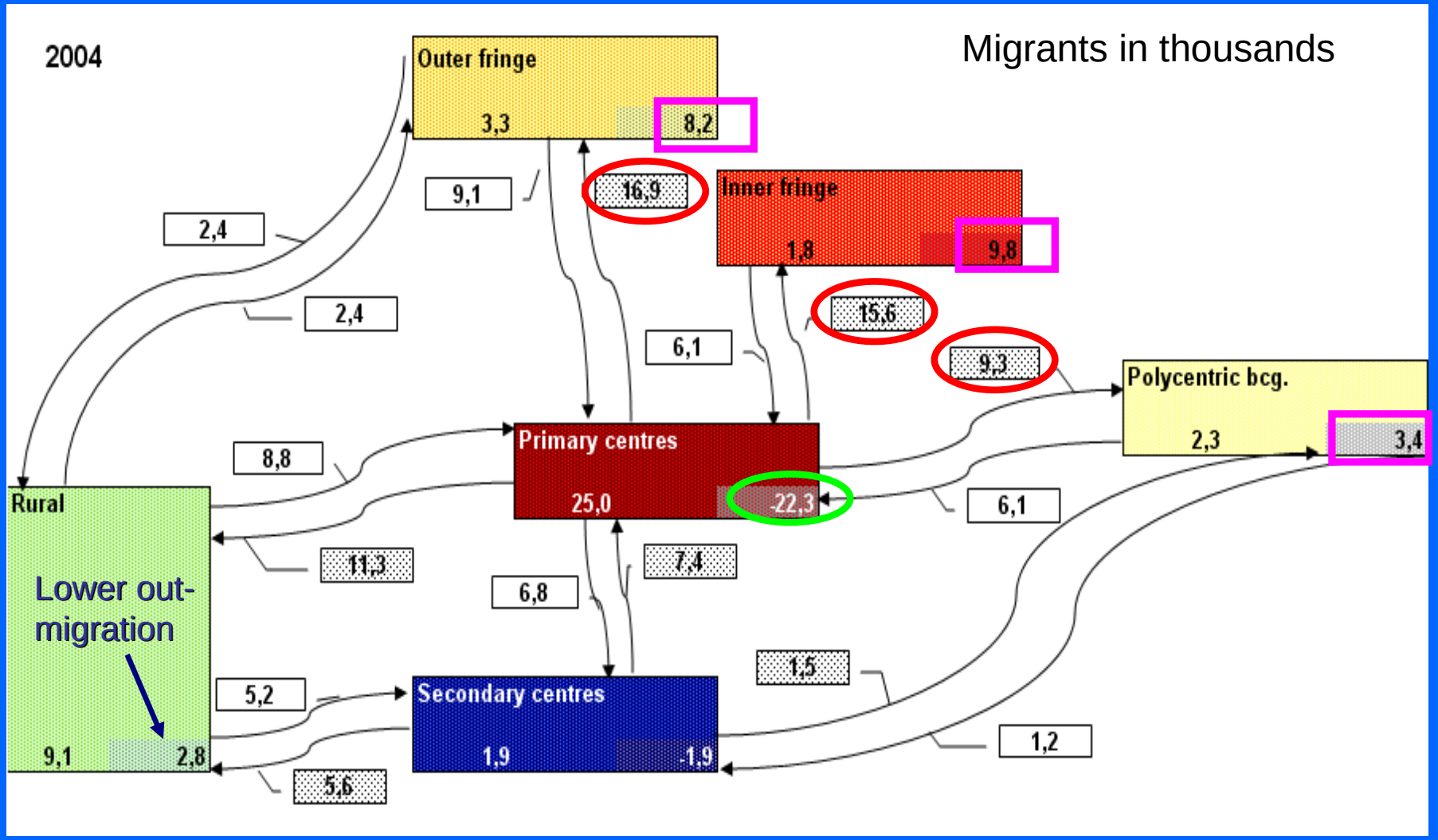


Who moves where?

- Further analysis solely on 2004 data
- What determines the destination of residential migration?
  - Characteristics of the locality of origin/ destination
  - Socio-demographic characteristics of migrants
- Method: Gravity regression modelling
  - Dependent variable: Gross migration from i to j, M_{ij}
  - Independent variables:
    - Gravitational control variables: Population mass (P_iP_j) and Distance (D_{ij}) : $M_{ij}= G\ P_iP_j/\ D_{ij}$

Residential migration analysis

- Independent variables (continued):
  - Characteristics of municipalities destination j/origin i:
    - Young-old ratio
    - Unemployment rate
    - Poverty
    - Blue collars
    - Proportion of built up area
    - Real estate price
  - Direction of migration i and j: 29 dummies
  - Demographic characteristics: 9 dummies combining age and education (eg. 20-29 with A-levels)

➲ 16 regression models: sets for total flows M_{ij} and for individual demographic group flows M_{ij}^{dmn}

Residential migration analysis : Results 1

- Inter-urban migration
  - » 20-29 higher level of education + 30-44 to Prg
- Migration towards urban centres
  - » 20-44 university educated to Prg. reg. primary c.
  - » 20-29 A-levels to Prg. reg. primary c.
  - » 20-44 low educated within NW Bohemia

Residential migration analysis : Results 2

- Suburbanisation from primary centres
  - In Prg. region: univ. educated of all ages, 30plus A-levels
  - NW Bohemia: lower educated 20-29 and 45plus and A-levels 30-44
- Suburban fringes as „buffer zones"
  - Fringes in Prague region - 20-44 university educated

Residential migration analysis: Results 3

- Role of municipal characteristics
  - Migration towards areas with smaller poverty, lower unemployment, with younger population and lower real estate prices
  - Introducing the directions of migration flows makes the municipal characteristics insignificant
  - Except for: 45plussers with non-university education
    - They move to localities with cheaper real estate than in their residence of origin.

Conclusions – International context

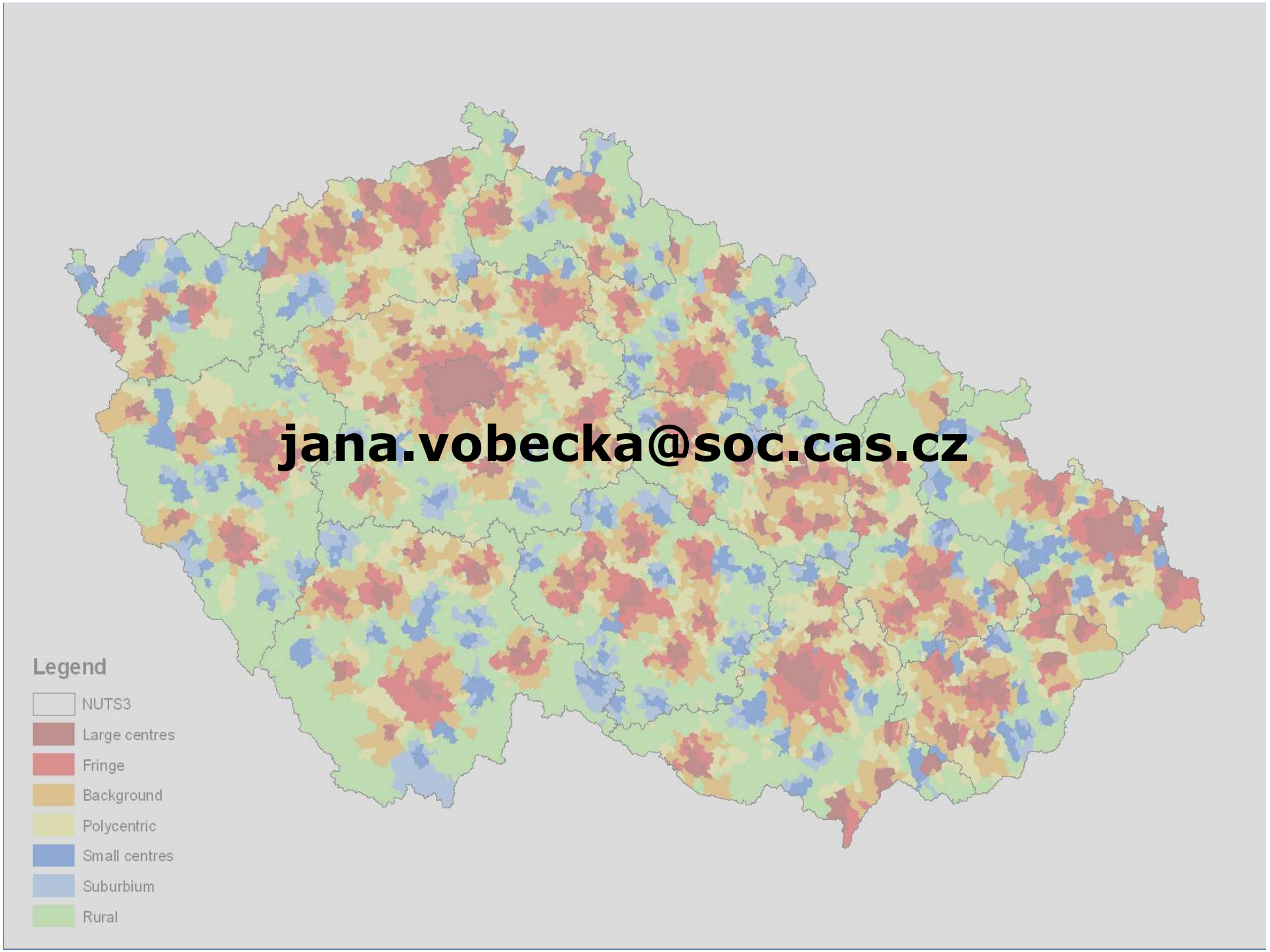
- Development of residential suburbanisation comparable to that of 1960´s, 70´s in Western Europe
- No counter-urbanisation, no-return migration
- CEE: slow down of residential migration during transformation
- CEE: back-to-land migration depends on deepness and pace of economic decline during the transformation in each country

Conclusions – Czech trends

- Spatial **population *not-very-dynamics*;** Czechs as **conservative commuters**
- Still, domestic migration is the main driver of spatial differences in population dynamics
- Suburbanisation new general trend, but with regional specificities
- Prague region's outstanding position in population dynamics strengthens over time
- The main determinant of the direction of residential migration is social position. Position in the life cycle has only secondary importance.

Conclusions – Czech futures

- Since the new patterns of domestic residential migration are recent and still relatively small they have *not* yet affected demographic structures very much
- Status-driven migration may lead to the establishment or deepening of already existing social inequalities along spatial dimensions, both in core-periphery region and urban-suburban-rural perspectives
- ***Vicious cycles, spatial traps***? Lower-educated and poor increasingly move to cheap property fringe regions where it is harder to find-keep good jobs, reinforcing poverty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Legend
NUTS3
Large centres
Fringe
Background
Polycentric
Small centres
Suburbium
Rural

Completed fertility rate - CFR

	CFR	Age effect	Education effect	Regional effect	Gradient effect
Primary c.	1 564	12	-27	-8	-98
Inner suburb. f.	1 780	-5	23	5	73
Inner suburb. f.	1 825	-10	32	6	114
Polycentric bcg.	1 852	-10	38	-2	141
Secondary c.	1 728	-22	10	21	34
Suburb. of s.c.	1 947	-17	52	16	212
Rural	1 894	-18	44	11	173
Czech Republic	1 684				

(All is significant at the 5 % or 1 % level.)

Shift and share analysis

- To be able to carry out our analysis, we need to have at least two quantitative variables and two qualitative variables. The quantitative variables serve to create the observed variable: growth rate, proportion or average. The qualitative variables serve to classify the population into sub-populations.

- $r_{ij} = r + (r_i - r) + (r_{ij} - r_i)$
- $r_j = r$ (national) + s_j (structural) + g_j (gradient effect)
  - with $s_j = \sum_i \frac{P_{ij1991}}{P_{j1991}}(r_i - r)$ and $g_j = \sum_i \frac{P_{ij1991}}{P_{j1991}}(r_{ij} - r_i)$
  - Estimable stochastic formulation

$$r_{ij} = \alpha + \beta_i + \gamma_j + \varepsilon_{ij}$$

Residential migration analysis

- Data reduction:
  - Reduction of spatial dimensions (reduction of small N)
  - Reduction in demographic characteristics (correspondence analysis)
  - Further reduction in the spatial dimensions of migration flows (cluster analysis)
  - Second correspondence analysis
    - reveal the association between geography of flows and demography of migrants

Gravity regression model

- logs on both sides of the equation :

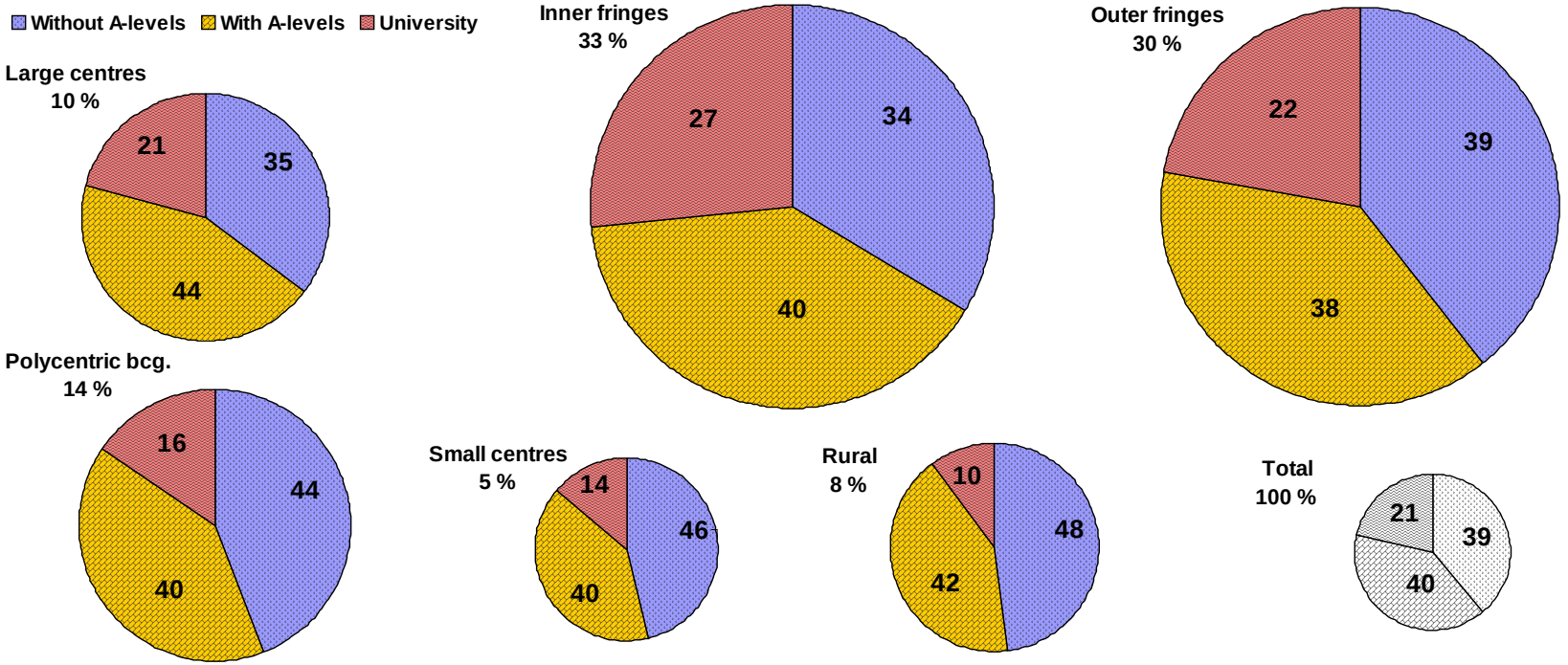
- $m_{ij} = a_0 + a_1(p_i \,.\, p_j) + a_2(d_{ij}) + a_3(price_{ij}) + a_4(kes_{ij}) + a_5(blue\_col_{ij}) + a_6(poverty_{ij}) + a_7(unemp_{ij}) + +a_8(young\_old_{ij}) + a_9(SPACEij) + u_{ij}$

- $m_{ij}^{d} = b_0 + b_1(p_i \,.\, p_j) + b_2(d_{ij}) + b_3(price_{ij}) + b_4(kes_{ij}) + b_5(blue\_col_{ij}) + b_6(poverty_{ij}) + b_7(unemp_{ij}) + +b_8(young\_old_{ij}) + b_9(DEMO) + b_{10}(SPACEij) + v_{ij}$

- $m_{ij}^{dmn} = b_0 + b_1(p_i \,.\, p_j) + b_2(d_{ij}) + b_3(price_{ij}) + b_4(kes_{ij}) + b_5(blue\_col_{ij}) + b_6(poverty_{ij}) + b_7(unemp_{ij}) + +b_8(young\_old_{ij}) + b_9(SPACE_{ij}) + v_{ij}$

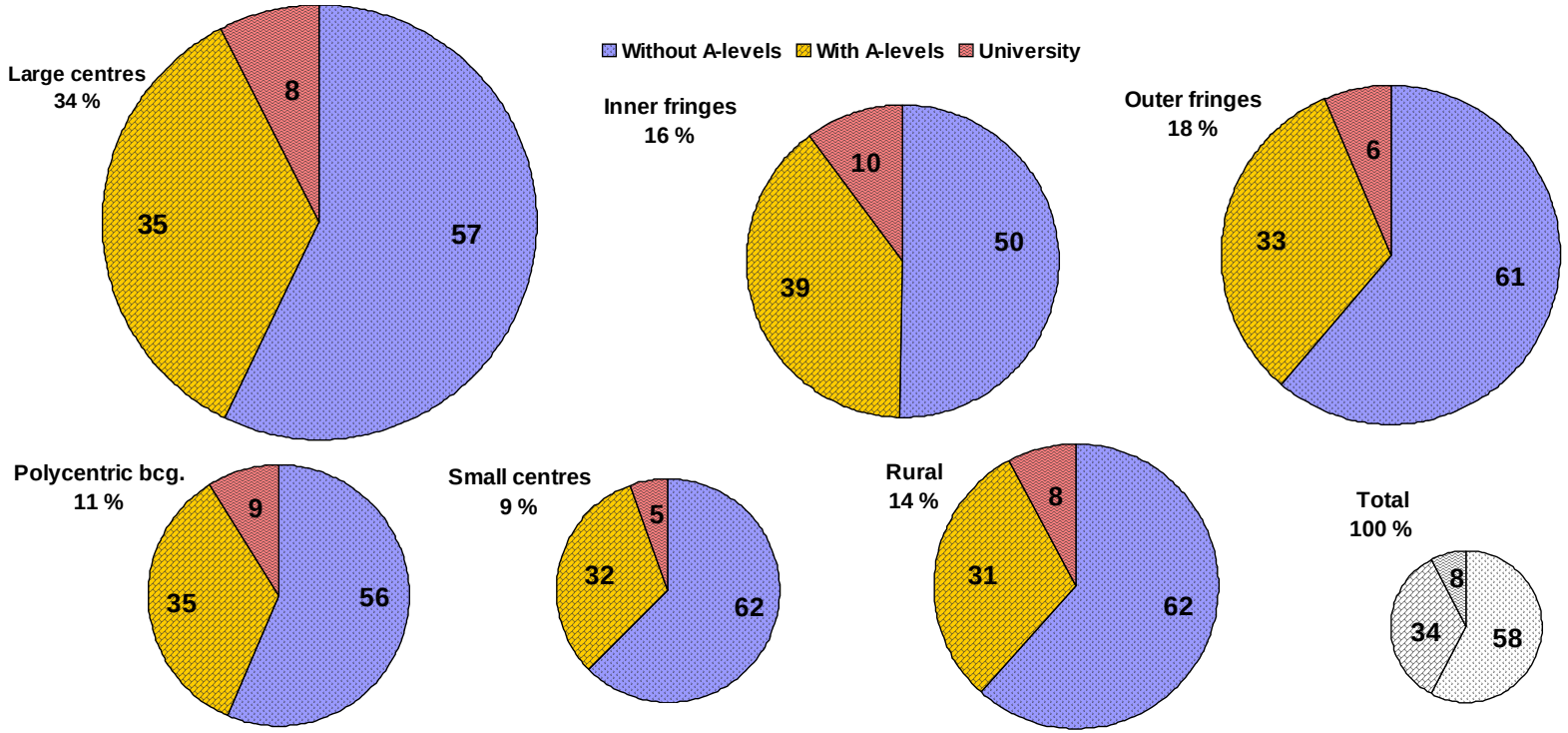
Conclusions

Residential migration from Prague city



Conclusions

Res. migration from primary c. of NW Bohemia

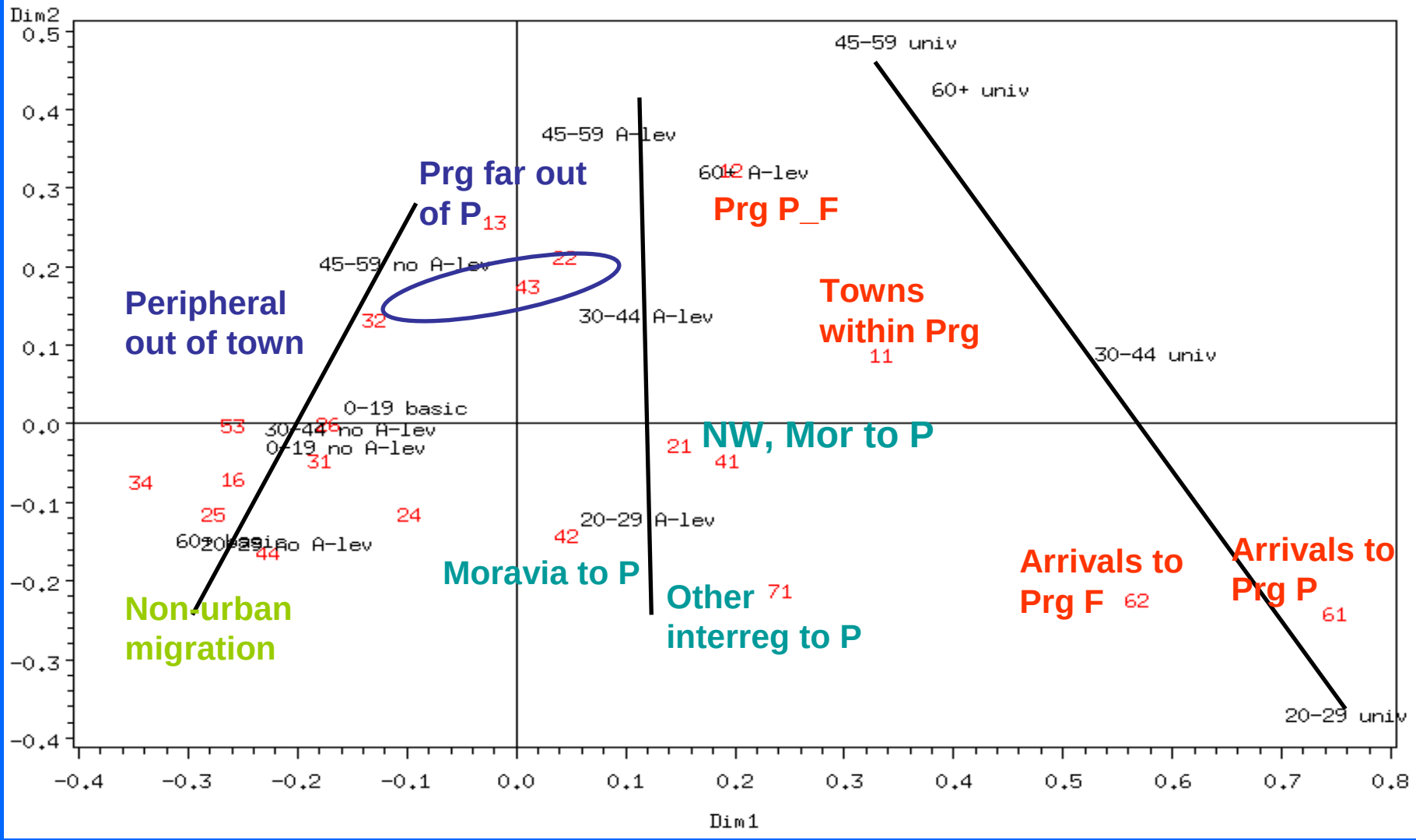


Further research?

- Why do people move to peripheral areas?
- What is demographic/ social future of suburban/rural areas?
- How do Prague profit from its human capital potential?
- Will ever happen deconcentration of economic activities and jobs?
- What is the future of secondary centres?

Who moves where?

Dim 1: Dim. of education (57 %); Dim 2: Dim. of young vs. old econ. actives (25%)



Who moves where?

Dim 1: Dim. of education (57 %); Dim 3: Econ. actives versus seniors (8 %)