DEMOGRAPHIC RESEARCH INSTITUTE BUDAPEST

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THE RELATIONSHIP BETWEEN SPATIAL FOCUSING AND MIGRATION INTENSITY IN HUNGARY

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Objectives

- Explorative analysis of the concentration (spatial focusing) of internal migrational streams between Hungarian regions (county/megye).
- We pursued to include all available county level interaction matrices in Hungary.
- Full set consists of 55 (20 by 20) matrices,
- Yearly data from 1957 to 2012.
- The second aim was to examine the relationship between spatial concentration and the intensitiy of flows.

The concept of focusing

- According to Plane and Mulligan spatial focusing refers to:
- *„ …the inequality that exists in the relative volumes of a set of origin-destination-specific migration flows.* ***A high degree of spatial focusing means that most in-migrants are moving selectively to only a few destinations while most out-migrants are leaving only a few origins. A low degree of spatial focusing means that migrants are moving among all possible origins and destinations in relatively equal numbers***” (Plane-Mulligan 1996, 1-2)

Measuring the spatial focusing

- Limited number of indices can be used to measure the focusing of a migration system.
- Plane – Mulligan (1998) proposed the application of the Gini index.
- The Gini index has several favourable properties.
- Rogers and Raymer (1998) applied a less computation-intensive coefficient of variation (CV, ACV).

Total Gini

- Total Gini coefficient is based on comparing every inter-regional flow to every other inter-regional flow, in a 20 by 20 (county-level, NUTS III) matrix the number of connectivities are 144 400.

$$^{T}G(t) = \frac{\sum_{i=1}^{n}\sum_{\substack{j=1 \\ j\neq i}}^{n}\sum_{g=1}^{n}\sum_{\substack{h=1 \\ h\neq g}}^{n}\left|m_{ij} - m_{gh}\right|}{2\left[n(n-1)\right]^{2}\left(\sum_{i=1}^{n}\sum_{\substack{j=1 \\ j\neq i}}^{n} m_{ij}\right)/\left[n(n-1)\right]}$$

Out-migration, in-migration, exchange Gini

- Out-migration (based on row differences)

$$G_i^O = \frac{\sum_i \sum_{j \neq i} \sum_{h \neq i,j} \left| m_{ij} - m_{ih} \right|}{2n(n-1)T}$$

- In-migration (based on column differences):

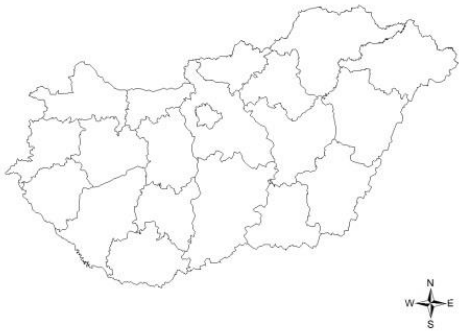
$$G_j^I = \frac{\sum_i \sum_{j \neq i} \sum_{h \neq i,j} \left| m_{ij} - m_{gj} \right|}{2n(n-1)T}$$

- Gini exchanges

$${}^{\tau}G_{RC,CR}(t) = \frac{\sum_i \sum_{j \neq i} \left| m_{ij} - m_{ji} \right|}{2n(n-1)T}$$

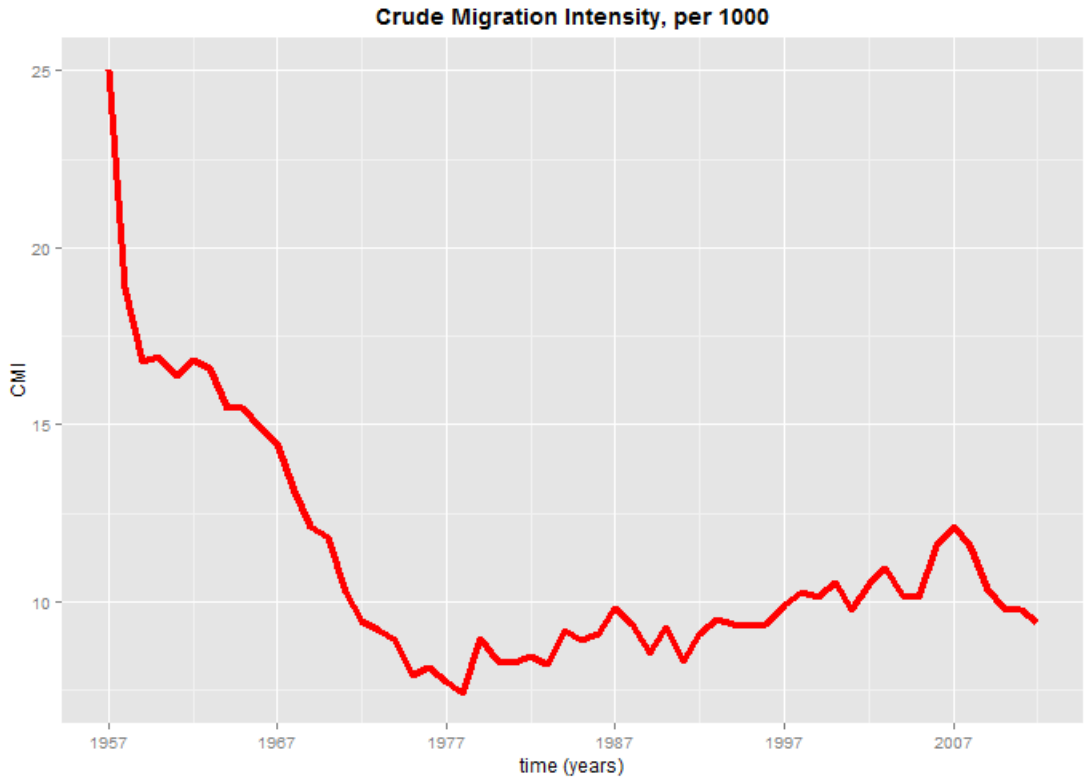
Data, spatial scale

- The origin-destination specific flow matrices of permanent internal migration are available from 1957 annually.
- During the period the examined administrativ units (county borders) have not changed.
- More detailed data, concerning sex and age, are only available since 1984 unfortunately.
- We do not have yearly time series according to education attainment.
- The calculations were carried out using the R package “migration.indices” developed by Daróczi-Bálint, 2013.



Results of the spatial focusing at county-level between 1957-2012

Intensity of county-level internal migrations between 1957-2012



Theoretical background

- Plane and Rogerson (1991): *„When large generations reach their young adult years, age-specific mobility rates decrease. The direction of flows, however, becomes more focused upon favoured destination regions, that is; the demographic efficiency of migration increases”.*
- Rogers and Hemez-Descryve (1993): *„It is not evident that the above described migration propensities were accompanied by greater geographical focus in long-distance migration. Different indices suggest different conclusion.”*

Our hypotheses

- Focusing affects migration intensity, since focusing embodies some sort of positive or negative social phenomenon which facilitates/mitigates migration.
- Decomposibility of focusing helps us to shed light on which component of focusing influences migration or influences it more:
- 1) If the rows/out-migration is decisive in migration intensity, then movements are typically coordinated by crisis-type mechanisms (e.g. out-migration from economically disadvantaged areas).
- 2) If the migration is determined by the focusing of in-migration; a sort of “gold fever” type flow is determinant.

Method: Vector Autoregressive Model, VAR(p)

- The VAR(p)-process consists of a set of K endogenous variables $y_{1t}, \dots, y_{kt}, \dots, y_{Kt}$ for $k = 1, \dots, K$.
- The VAR(p) process is defined as (Pfaff, 2008):
  - $y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + C D_t + u_t$
- where A_1 are $(K \times K)$ coefficient matrix for $i = 1, \dots, p$ and u_t is K dimensional white noise process with time-invariant positive definite matrix $E(u_t u'_t) = \sum_u$. The matrix C is the coefficient matrix of potentially deterministic regressors $(K \times K)$, and D_t is an $(M \times 1)$ column vector of the deterministic regressors (constant, trend).
- All variables are endogenous and explained by their own past values and the past values of the other variables.
- The model does not differentiate variables; therefore, no causal relationships are implied.
- In special cases, the symmetrical position of variables can be changed, and one variable can be assigned as response variable (dependent variable) while the others are regarded as explanatory variables.
- This still does not imply real causality, only a predictive one.
- Predictive causality means that the variables which are treated as explanatory contain relevant information with regard to forecasting the target variable.
- Most important characteristic of VAR(p)-process is its stability.

VAR(1) models

Vector autoregressive models, VAR(1)

Variables	Model 1. (with first diff.)	Model 2. (with first diff.)	Model 3. Residual after removing Analytic trend components
	Total Gini	Gini Row +Col	Gini Row + Col
Gini total.l1	-0.037 (0.108)		
Intensity.l1	0.135 (0.093)	0.129 (0.094)	0.674 (0.086)
Gini.r.l1 (out-migration)		0.754 (1.934)	138.360 (193.596)
Gini.c.l1 (in-migration)		-2.436 (2.394)	84.541 (316.394)
constant	-0.418 (0.219)	-0.378 (0.224)	-0.341 (0.252)
trend	0.010 (0.060)	0.009 (0.007)	0.007 (0.007)
R^2	0.08	0.08	0.53
F	2.51 (n.s)	2.16 (n.s)	16.3***
N =	54	54	55

†p<0.1, *p<0.05, **p<0.01, ***p<0.001

Conclusions

- We found no relationship between the intensity of migration and the focusing of migration flows with the methods applied here.
- The intensity of migration was independent from the components of focusing, as well.
- It is possible that the effect exists for specific age-groups.
- Less than half of the period examined here was influenced by market mechanisms. In the socialist era directed by central planning, the processes of free labour market had an insignificant role.
- It is possible that in a free market economy a significant relationship can be detected between focusing and the level of migration, but fitting this model for the Hungarian data is almost impossible because of the limited amount of data available.

Thank you!