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Leaving for Good: How Does Development Make a Difference in Migration?

Tamás Domokos
and
László J. Kulcsár

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Abstract*

Probably the most widely used category for describing differences among places in development and the quality of life is the urban-rural distinction. Although the settlement morphology of Eastern Europe has turned to predominantly urban in the last couple of decades, in many cases this urbanization did not diminish the differences in life quality among the settlements. The exposure to competition during post-socialism has found the places in very different starting positions.

The quality of life is usually described a function of economic development. However, if we conceptualize development in a more complex way than just economic performance, we can unfold a new map of spatial inequalities. The most common social reaction to these inequalities is migration. Our question is to what extent do post-socialist migration patterns follow the inequalities in different development spheres such as economic, social and human development.

Our study examines the various indicators of life quality of 405 settlements in a dynamically developing region in Hungary. We explore the correlation and interdependence of different life quality components with regards to migration statistics in the region. We follow a macro-level approach, using aggregated statistics to build a regression model explaining the impact of various indicators on migration rates as our dependent variable. We also will differentiate various clusters of settlements in the region by their common dimensions of life quality and migration. We examine how these clusters created by the regression model will fit into traditional territorial categories of sociology (rural-urban dimension, statistical micro-regions, town and agglomeration).

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1. Conceptual and technical background

The statement that there is a relationship between migration and development is relatively uncontested. Seemingly this is a very simple argument, claiming that interregional development differences cause push and pull factors: more developed regions attract inmigration, while less developed regions suffer from outmigration. In the neoclassical economic argument this phenomenon with the different wages and job opportunities goes toward labor equilibrium. The problem arises if we do not reduce this difficult and complex causational relationship, especially the concept of development to economic development, but pay attention to other factors also that can contribute to migration.

In most cases migration contributes to development. But because of the selectivity of migration this contribution applies only to the destination. It is easy to see that the selective outmigration of the younger, more innovative, better-educated members of the community (or the society) is detrimental to development at the origin. These problems at the origin can start a downward spiral, further reducing the retention capacity of the place.

In many cases net migration figures are seen as signs of the level of development. In many of these cases the causal relationship between development and migration is like a black box, and a relatively easy assumption is made that better net migration means more development, whatever the underlying factors and motives may be. This is a dangerous assumption, as in some cases, especially in transforming societies spatial mobility does not always occur according to this: displacement can better describe the processes as people do not have full leverage on choosing a place to live.

This limitation includes the lack of migration as well. But the decision for not moving is not only economic, claiming the lack of resources, but also psychological when people not used to any kind of mobility simply decide to stay where they are. This is the case in post-socialist Hungary, our study country where the population is relatively immobile, having only about 2 percent who change residence annually.

In this paper we examine the 407 municipalities of the Central Transdanubian region of Hungary. Hungary has seven planning regions, created in 1996 according to the territorial development system (the so-called NUTS system) of the European Union. These regions in Hungary were created on the traditional county system: the Central Transdanubian region includes three counties, Fejér, Veszprém and Komárom-Esztergom. Planning regions do not have administrative functions or elected bodies, they serve only territorial planning and statistical purposes, but in the long run it might change and they can be the middle level administrative units instead of the counties.

Our investigation will focus on the various economic and social indicators of the municipalities that can affect migration. Migration will be our dependent variable and in the analysis we will use in-, out-, gross and net migration rates. Our aim is to build a model that explain the variance in migration in the Central Transdanubian region, presenting the municipal indicators in a different classification system as it is now in the Hungarian statistical system. For this, we will use the 2002 edition of the TSTAR database of the Central Statistical Office that contains numerous municipality level indicators for the Hungarian settlements, including official classifications (more on this later).[1]

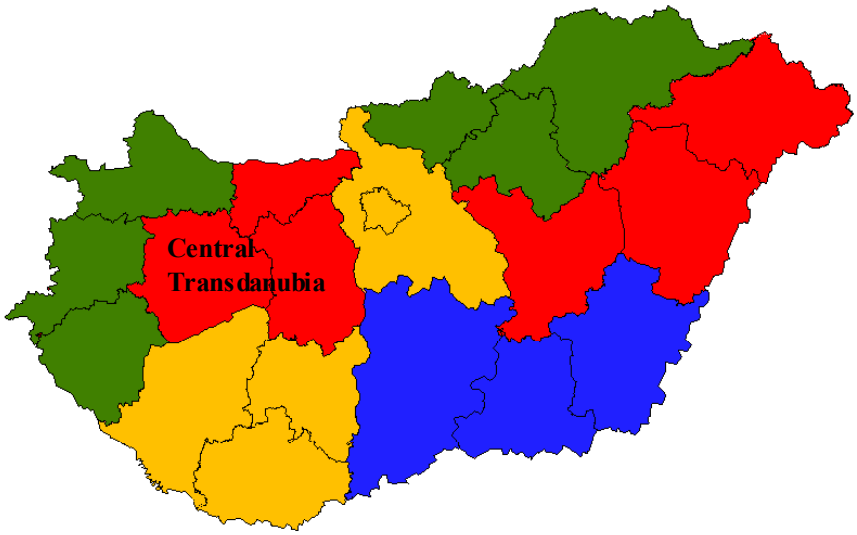
[1] The TSTAR is an integrated database containing settlement level socioeconomic variables. The basic variables are created by the mandatory registration system of the municipalities that had to report statistical data regularly for the Central Statistical Office.

Migration in Hungary is administered by residential registries. All citizens, even those who live abroad, are supposed to have one permanent address and the registration is accurate enough to model migration patterns. There are two types: permanent and temporary migration. In this study we only use the permanent migration numbers as this refers to the permanent change of residence.

2. Central Transdanubia: an introduction

Central Transdanubia (Figure 1.) is usually considered as a developed part of the country. It covers about 11,000 square kilometers with a population of 1,126 thousand that is about 11 percent of the total population of the country. The population density is 100 persons per square kilometer, lower than the EU-15[2], but higher than the Eastern European average. The GDP per capita in the region was $5800 in 2001, which is the 49% of the EU-15 average – it counts as developed in Hungary.

Figure 1. Planning Regions in Hungary



Central Transdanubia has a long history of development. It was the heart of Pannonia, the Roman province and some of the current roads are still on the same line as it was at that time. The city of Alba Regia, now called Székesfehérvár was the first capital of the medieval Hungarian Kingdom. The Ottoman occupation broke this natural development but after the resettlement of the region in the 18th century and the industrial development in the 19th century resulted in rapid development again. With the state socialism this development was derailed again, and while some cities were favored by the forced industrialization, the traditional economic structure of Central Transdanubia has changed and the settlement structure was altered. The post-socialist transformation has found the region struggling with these spatial inequalities, and the market competition has deepened these development differences. The two leading industries in the region now are manufacturing and tourism, but their distribution is uneven, thus we can find settlements that are rapidly developing and also those that are declining, creating inner peripheries in the region.

[2] The EU-15 refers to the original 15 countries of the European Union before the 2004 enlargement.

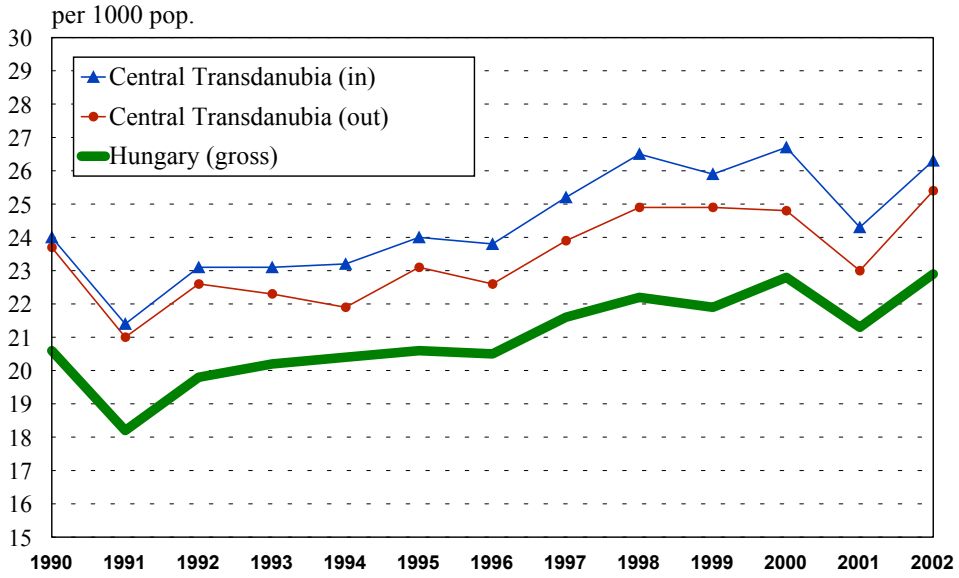
Table 1. shows selected population statistics of Hungary and Central Transdanubia. From this we can see that the birth rates were higher in Central Transdanubia in the first half of the 1990s, but after 1995 they are actually worse than the national average. The death rates, however, are significantly better, due to the younger age structure of the region's population. About 60 percent of the population is under 40 and the gender balance is not uneven. The relative economic development of Central Transdanubia can be seen for the migration statistics also: the region has a positive migration balance, especially remarkable in 2000 when the manufacturing industry was in its peak.

Table 1. Population statistics of Hungary and Central Transdanubia

	Hungary		**Central Transdanubia**		
	Birth rate	Death rate	Birth rate	Death rate	Net migration
1990	12.1	14	12.7	12.6	-0.3
1995	10.8	14.1	10.9	12.6	0.8
2000	9.7	13.5	9.2	12.1	3.2
2002	9.5	13.1	9.3	12.2	0.4

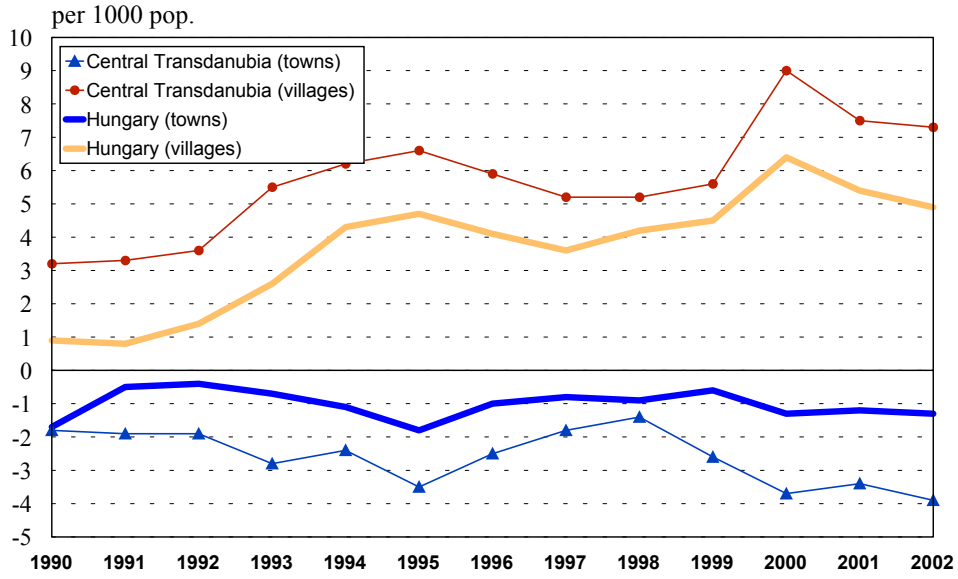
If we take a closer look at the migration patterns of the region, we can see that it differs from the national pattern (Figure 2.). Both in- and outmigration rates are higher in Central Transdanubia, which means that the region has experienced a larger spatial mobility during the post-socialist transformation. Moreover, it could gain population from these movements also, the inmigration was higher than the outmigration throughout the 1990s. But this population gain went almost exclusively to the villages as both the large urban centers and the small towns experienced negative migration in the 1990s, similar to the national experience, (Figure 3.).

Figure 2. Migration rates 1990-2002



Source: Central Statistical Office

Figure 3. Net migration rates 1990-2002[3]



Source: Central Statistical Office

As a summary we can say that the region is one of the best in terms of development and demographic composition in Hungary. What is more important, the intensity of migration is larger than the national average, offering a good opportunity to study the impact of various socioeconomic indicators on spatial mobility.

3. The explanatory model of development and migration

In this part of the paper first we examine those variables that are common explanatory indicators in the Hungarian statistical system. Besides the usual geographic (county) and administrative (settlement type) classification, we use four of the independent variables that are commonly used in the Central Statistical Office.

1. General development: the CSO classifies micro-regions[4] into five categories according to their socioeconomic development, based on 19 indicators, including various employment, infrastructure and demography related indicators. These five categories are: Lagging behind, Catching-up, Stagnant, Progressing and Dynamically progressing. In our analysis only four categories were used as in the Central Transdanubian region there wasn't any micro-region that was classified as "lagging behind".
2. Recreation area: Recreational areas were originally determined in 1986 by the Council of Ministers and later specified in the National Regional Development Concept in 1998. These areas are typically ones with natural amenities, national parks and protected areas. There is a special regulation for the settlements around Lake Balaton, the primary tourist area in Hungary. The designation is made at the micro-region level.

[3] The Hungarian towns do not include Budapest as the capital has a very distinct migration pattern.
[4] Micro-regions are the NUTS IV. level units in the EU territorial structure. In Hungary they have no administrative responsibilities, serving only statistical and planning purposes (like the NUTS II. level regions).

3. Agricultural characteristic: This indicator is calculated by using the sectoral distribution of economic activities, especially the proportion of agricultural employment and enterprises.
4. Rurality: this indicator uses the OECD definition of rurality: areas where the population density is lower than 120 people per square kilometer. This is also calculated at the micro-region level, in other words, those settlements are rural that are in micro-regions that are classified as rural.

Table 2. shows the population statistics of the Central Transdanubian municipalities by these indicators. From this we can see the relative incompatibility of the demographic patterns with the four classification variables. In the case of the general development variable, only the population over 60 seems to work in the right direction, having a younger age structure in the more progressing groups. The other three binomial variables do not seem to support the conventional logic in demographic development.

Table 2. Population statistics of the municipalities in the Central Transdanubian region, 2002

			Per thousand population							
Variable	**Attributes**	**N**	**Pop. under 18**	**Popula-tion 60+**	**Live births**	**Deaths**	**Mar-riages**	**Divor-ces**	**Nat. incr.**	**Pop. density (per km^2)**
County	Fejer	108	204,5	187,3	9,3	11,4	6,5	4,3	-2,1	99,0
	Komarom-Esztergom	74	201,1	193,6	9,4	13,0	7,8	4,5	-3,6	140,4
	Veszprem	225	196,9	196,8	9,0	12,1	4,7	4,4	-3,1	81,3
Settlement classification	County rank city[a]	4	186,2	187,5	8,9	10,6	5,8	5,1	-1,7	651,6
	Other town	22	196,1	187,9	9,2	12,0	6,3	4,5	-2,8	201,8
	Village	381	212,6	197,8	9,4	13,0	6,5	3,9	-3,6	55,2
General development	Catching-up	157	204,4	198,3	9,5	13,3	5,3	4,4	-3,7	72,4
	Stagnant	43	227,3	193,5	10,4	13,7	7,9	3,8	-3,3	50,4
	Progressing	105	199,8	193,3	9,1	11,9	7,8	4,3	-2,8	135,1
	Dynamically progressing	102	194,9	186,8	9,0	11,2	5,1	4,6	-2,2	125,0
Recreation area	Yes	74	192,9	195,2	8,8	12,1	5,8	4,6	-3,3	172,3
	No	333	206,3	190,3	9,5	12,1	6,5	4,3	-2,6	78,3
Agricultural characteristic	Yes	35	210,7	192,7	9,5	13,5	4,8	4,2	-3,9	64,4
	No	372	200,2	192,2	9,2	12,0	6,4	4,4	-2,8	104,9
Rurality	Rural	148	213,1	196,1	9,5	12,8	5,4	4,2	-3,2	58,3
	Non-rural	259	197,8	191,3	9,1	11,9	6,5	4,4	-2,8	123,1
	Average	**407**	**201,0**	**192,3**	**9,2**	**12,1**	**6,3**	**4,4**	**-2,9**	**100,0**

[a] County rank cities are large urban centers, having administrative responsibilities similar to counties. County rank is given to a city if it reaches the population of 50,000 or if it is a center of a county.

The picture is even more confusing if we look at the migration statistics (Table 3.). The aforementioned rural migration gain can be see through the administrative classification, but the agricultural characteristic and the rurality variables do not indicate such clearly this population redistribution. It is not clear why recreation areas lose migrants, and the general development classification does not support the conventional logic in the relationship between migration and development.

Table 3. Migration statistics of the municipalities in the Central Transdanubian region, 2002

			Internal migration per 1000 population			
Variable	**Attributes**	**N**	**Inmigration**	**Outmigration**	**Net migration**	**Gross migration**
County	Fejer	108	47,6	47,7	-0,1	95,3
	Komarom-Esztergom	74	41,3	40,2	1,1	81,5
	Veszprem	225	51,2	50,8	0,4	102,0
Settlement classification	County rank city	4	41,2	48,3	-7,1	89,5
	Other town	22	42,7	44,8	-2,1	87,5
	Village	381	53,2	46,9	6,3	100,0
General development	Catching-up	157	42,9	43,8	-0,9	86,6
	Stagnant	43	41,9	40,1	1,8	82,0
	Progressing	105	47,2	47,2	0,0	94,4
	Dynamically progressing	102	50,8	49,4	1,4	100,1
Recreation area	Yes	74	45,3	47,6	-2,4	92,9
	No	333	48,2	46,0	2,2	94,1
Agricultural characteristic	Yes	35	41,2	41,3	-0,1	82,6
	No	372	47,5	47,1	0,4	94,6
Rurality	Rural	148	49,8	48,5	1,2	98,3
	Non-rural	259	46,3	46,1	0,2	92,4
	Average	**407**	**47,0**	**46,6**	**0,4**	**93,7**

We can see it from Table 3. that the settlement classification has a strong impact on migration. This, however, is interrelated with the population size, as the larger population in practice means a higher level in the classification system.[5] The one-way ANOVA analysis showed that the settlement classification has explained 86% variance from the gross migration and 36% from the net migration (Table 4.). It became also clear that independent variables, such as rurality and agricultural characteristic has no explaining power, while the recreational area variable has shown limited influence.

Table 4. One-way ANOVA: the impact of official classification variables on migration

	Gross migration		**Net migration**		**Inmigration**		**Outmigration**	
	F	R^2	F	R^2	F	R^2	F	R^2
Settlement classification	1295,24**	,86	114,96**	,36	1182,54**	,85	1251,23**	,86
Rurality	4,80*	,01	,02	,00	5,45*	,01	4,20*	,01
Agricultural characteristic	,19	,00	,00	,00	,23	,00	,15	,00
Recreational area	16,58**	,04	2,88	,01	17,27**	,04	15,72**	,04
General development	3,07*	,02	,15	,00	3,68*	,02	2,54	,01

*p<.05 **p<.001

Leaving out the settlement classification variable, the official variables were put in one model that explains only limited proportion of the variance even after the logarithmic transformation: 16% from the gross migration and from the inmigration, 15% from the outmigration and 7% from the net migration (Table 5.).

[5] Cramer's V was 0.89 in this case.

Table 5. The official/original explanatory model (multivariate ANOVA)

	Gross migration		Net migration		Inmigration		Outmigration	
	F	Beta	F	Beta	F	Beta	F	Beta
Rurality	7,172*	,152	2,697	,071	7,104*	,140	6,418*	,157
Agricultural characteristic	4,620*	,145	,070	,030	3,754	,136	5,526*	,154
General development	12,396**	,229	4,755*	,150	14,224**	,253	9,951**	,201
Recreational area	27,253**	,252	10,535*	,165	22,953**	,231	29,722**	,264
Model R^2	. 162		.066		.163		.154	

*p<.05 **p<.001

Since these official variables were not satisfactory in explaining migration, we have created our own explanatory model. In the first step we divided the TSTAR variables into four groups: demography, human infrastructure, local service environment and economic activities environment.[6] Then we conducted a cluster analysis in each group, defining 3 or 4 clusters in each dimensions.[7] These four cluster structures could capture the diversity of the quality of life better, thus, in our opinion, could serve as a better explanatory model of migration.

Table 6. shows the demography cluster definitions. As we can see from even the cluster names, but also from the F statistics, population density and ageing were the two dominant indicators in the cluster analysis. The high-density settlements are the large urban centers in the region and some other smaller settlements, typically in recreational areas. All of them belong to progressing micro-regions. The low density, old settlements are villages, the population of 64 percent of them are under 500 inhabitants, mostly in Veszprem county. According to the general development variable, 34 percent is in progressing micro-regions, which is surprising at first, but reflects well the inner heterogeneity of even the progressing micro-regions, thus the limited applicability of the indicator at the settlement level.

Table 6. Demography cluster definitions

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	F
	low density, young	low density, stable	low density, old	high density, stable	
Population density, persons per sq.km	-,08084	-,06394	-,40945	5,37788	273,196**
Ageing index	1,12841	-,16977	-1,41340	-,07431	265,985**
60+ year-olds per 1000 inhabitant	-,78798	-,02263	1,58212	-,43663	164,419**
0-17 year-olds per 1000 inhabitant	,92192	-,08481	-1,29173	-,48551	130,258**
Natural increase per 1000 inhabitant	,58647	,02795	-1,20803	,25282	61,816**
Deaths per 1000 inhabitant	-,32346	-,18041	1,31970	-,42507	61,032**
Live births per 1000 inhabitant	,60916	-,15962	-,49609	-,14225	24,277**
Divorces per 1000 inhabitant	,21192	-,04992	-,30994	,74060	5,635*
	N=111	N=226	N=61	N=9	

*p<.05 **p<.001

[6] The selection of the variables we have used was arbitrary as no previous research has been done on this subject. We have tried to select as wide range of socioeconomic indicators as we could, taking into consideration the local characteristics, and also avoiding the application of such variables that had only limited variation in the examined settlements.

[7] Tables 6-9 display the averages of the standardized variables and not the nominal values of the indicators.

Human infrastructure includes local health and other social services, including those institutions that focus on knowledge transfer, such as schools and libraries. The cluster definitions are mainly based on the level of provided services (Table 7.). In those clusters where are service shortages, we can find many settlements that have small population (typically under 2000), are in Veszprem County and are not designated as recreational areas. Somewhat surprisingly the general development variable does not have a significant interaction with the provided services.

Table 7. Human infrastructure cluster definitions

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	F
	Moderate service shortages	Full service provision	Elderly focused services	Service shortages even at the basic level	
Beds in institutions providing long-term or temporary accommodation per 1000 inhabitants	-,18419	-,07045	6,55277	-,08756	245,161**
Knowledge based institution index[a]	-,02602	,58850	-,27264	-1,34146	212,362**
Health service index[b]	-,79186	,69575	-,59124	-,90400	193,670**
Adult patients at consultation per 1000 inhabitant	-,80254	,67121	,68019	-,91737	187,716**
Teachers in kindergartens and daycares per 1000 children	,53430	,37813	,04699	-1,35739	176,667**
Kindergarten and daycare places per 1000 inhabitants	,74897	,26415	,08937	-1,28007	155,510**
Adult inhabitants per general health practitioners	-,77534	,63772	,48105	-,84995	144,789**
Places of homes for the elderly per 1000 60+ year-old inhabitants	-,19557	-,02521	5,51030	-,11798	114,499**
Teachers in primary schools per 1000 students	,29683	,39533	,03018	-1,18923	103,337**
Child-aged patients at consultation per 1000 inhabitants	-,38659	,31898	-,38659	-,38659	18,949**
Public medical care card holders per 1000 inhabitants[c]	-,14475	-,09614	2,63338	,18582	18,305**
Children per pediatricians	-,36350	,29993	-,36350	-,36350	16,484**
Number of special child welfare supports provided by local governments per 1000 inhabitants	,11105	-,17206	,66048	,26516	5,843**
NGOs per 1000 inhabitants	-,09968	-,11955	,42441	,34091	5,559*
Inhabitants per hospital beds in use	-,19330	,15952	-,19441	-,19329	4,286*
Teachers in secondary schools per 1000 students	-,03962	,12428	-,24427	-,24427	3,261*
	N=83	N=223	N=6	N=95	

*p<.05 **p<.001

[a] Index measuring the presence of various knowledge based institutions: library, cinema, schools, internet points, kindergartens.
[b] Index measuring the available basic health services: family doctors, pediatricians, hospitals, pharmacies.
[c] Public medical care cards are issued by the local governments for those who have difficulties obtaining medication, the eligibility is based on income.

The local service environment group contains the indicators of basic services, among those the tourism related indicators were the most important in creating the clusters (Table 8.). Most of the settlements were put into the low service cluster, but it is interesting that not the large urban centers were in the high service cluster, but those settlements that are in recreational areas around Lake Balaton. This is not surprising as we referred the importance of tourism related indicators in the cluster definitions.

Table 8. Local service environment cluster definitions

	Cluster 1	Cluster 2	Cluster 3	F
	Low	Medium	High	
Bed-places at public accommodation establishments per 1000 inhabitants	-,18230	,16427	5,59710	535,344**
Catering units per 1000 inhabitant	-,24513	,59618	4,85759	341,786**
Tourist nights at public accommodation establishment per 1000 inhabitants	-,14942	,04554	5,22127	333,832**
Number of retail trade units per 1000 inhabitants	-,24695	,75505	3,79519	171,607**
Private telephone main lines per 1000 inhabitant	-,22976	,74670	3,21685	113,977**
Number of cars per 1000 inhabitant	-,27607	1,18592	1,81208	112,244**
Local shop index[a]	-,22318	1,09906	,46712	62,476**
Dwellings built per 1000 inhabitants	-,19382	,75170	1,84756	49,133**
NGOs per 1000 inhabitants	-,19036	,75712	1,68068	45,182**
Rate of dwellings equipped with public sewerage	-,14656	,66414	,71612	22,088**
Rate of dwellings equipped with public water conduit	-,03817	,18176	,12417	1,372
	N=334	N=64	N=9	

*p<.05 **p<.001

[a] Index showing the presence of various types of local shops.

Table 9. shows our fourth cluster definitions. The economic activities environment is primarily determined by the inactive, but registered enterprises. In clusters 1 and 2 the dominance of small business is notable, but while in cluster 2 they are relatively stable over time, in cluster 1 a high turnover could be observed. Cluster 3 represents a balanced economic structure among small and large business representatives, while cluster 4 is the most problematic from this viewpoint: settlements here are struggling with a large pool of unemployed and other population that is entitled to local governmental support for the everyday life. The general development indicator does not work here either, as dynamically progressing settlements can be found in all clusters.

Table 9. Economic activities environment cluster definitions

	Cluster 1	Cluster 2	Cluster 3	Cluster 4	F
	small business cluster with high turnover	stable small business cluster	healthy economy cluster	unhealthy economy cluster	
Proportion of registered enterprises that are not active	2,50614	-,29564	-,01027	-,23306	299,914**
Number of registered sole proprietors per 1000 inhabitants	2,40996	-,29088	,14947	-,28246	243,904**
Number of supports for dwelling maintenance provided by local governments per 1000 inhabitants	,00914	-,20945	3,21002	-,28893	222,507**
Number of registered corporations and unincorporated enterprises per 1000 inhabitants	2,34601	-,28752	,31810	-,37089	220,734**
Number of special child welfare supports provided by local governments per 1000 inhabitants	-,13317	-,19731	-,16272	2,65247	135,157**
Number of other supports provided by local governments to person in need per 1000 inhabitants	,01520	-,22861	,32249	2,38682	99,525**
Number of active enterprises per 1000 inhabitants	-1,89907	,23617	,07315	-,02167	89,257**
Proportion of registered unemployed over 180 days within all unemployed	-1,03566	,13751	,12928	-,19034	18,979**
Number of corporations and unincorporated enterprises employing 1-9 persons per 1000 inhabitants	,47210	-,00087	,21014	-,86818	10,827**
Number of persons receiving unemployment benefits from local governments per 1000 inhabitants[a]	-,18845	-,01874	-,16956	,64367	4,578*
Number of persons receiving regular social support from local governments per 1000 inhabitants	-,43995	,07743	-,25657	-,03876	3,810*
Number of registered unemployed per 1000 active-aged inhabitants	-,20545	,04349	-,49603	,21626	3,118*
	N=40	N=317	N=23	N=27	

*p<.05 **p<.001

[a] Registered unemployed in Hungary are first within the central registration, but after this eligibility is expired, long-term unemployed can receive benefits from local governments.

If we examine the interrelation between the original categorical variables and our new clusters, we can see interesting results (Table 10.). The widely used rurality and agricultural characteristic variables were completely independent from all our four life quality clusters. There are significant relations, however, if we look at the settlement classification, recreational area, general development, population and micro-regions. The importance of micro-regions can be derived from the fact that most original categories are calculated at micro-region level.

Our demography clusters are closely related to the settlement classification and not surprisingly the size of population – we have to remember that population density was the main indicator here. The human infrastructure clusters are related to the population size (no surprise here as the various human services are more abundant in larger municipalities) and the geographic position of the settlement (county, micro-region). Interestingly, settlement classification does not have an important role here. Both the local service environment and the economic activities environment are closely related to the recreational area designation. This is not surprising either, as there is a strong impact of tourism on the local service environment clusters and also, we can assume that the enterprises in the economic activities environment are mainly organized around tourism also.

Table 10. Interrelation between the original categories and the new clusters (Cramer's V)

	Demography	Human infrastructure	Local service environment	Economic activities environment
Settlement classification	.468**	.168*	.351**	.351**
Rurality	.116	.031	.082	.045
Agricultural characteristic	.095	.144*	.078	.138
Recreational area	.221**	.195*	.608**	.491**
County	.343**	.309**	.112	.230**
Population	.444**	.471**	.344**	.334**
General development	.153*	.134*	.265**	.200**
Micro-region	.317**	.351**	.465**	.452**

*p<.05 **p<.001

Now we can examine how these new clusters work as explanatory variables in relation with migration as a dependent variable (Table 11.).[8] First of all we can see that all four clusters had significant explanatory power at the 1% level in all the four dependent migration variables. The gross migration is explained best with the human infrastructure cluster and least with the economic activities cluster that challenges the conventional logic of the relationship between migration and development. In the case of net migration, the demography cluster was the most important, but the local service environment cluster had the largest beta coefficient. The inmigration was determined by the economic activities cluster, while the outmigration was determined by the human infrastructure cluster, but the beta coefficient was the highest at the human infrastructure cluster in both cases.

Table 11. Explanatory model using the new clusters (multivariate ANOVA)

	Gross migration		**Net migration**		**Inmigration**		**Outmigration**	
Clusters	F	Beta	F	Beta	F	Beta	F	Beta
Demography	95,487**	,240	26,149**	,239	80,213**	,238	96,604**	,234
Human infrastructure	132,762**	,574	14,200**	,255	61,926**	,552	136,670**	,586
Local service environment	45,344**	,296	12,982**	,312	80,213**	,288	45,293**	,289
Economic activities environment	11,438**	,181	7,526**	,237	111,667**	,178	10,755**	,175
Model R^2	. 676		.304		.637		.680	

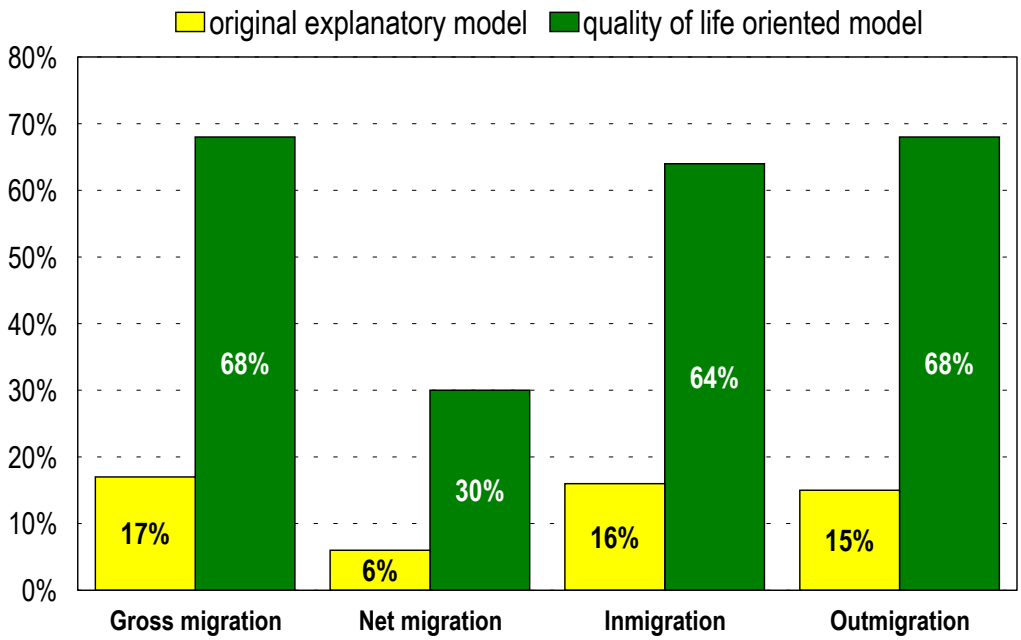
*p<.05 **p<.001

[8] The dependent variables went under logarithmic transformation.

Since the interaction effect is not significant, we can use R^2 to present the explanatory power of the full model.[9] Our new clusters have explained 68 percent of the variance in the gross migration and 30 percent variance from the net migration (Figure 4.). Compared to the original/official model, it can be seen that the migration patterns can be better explained by complex indicators that take into account the various aspects of life quality.

Also it is important to note that our life quality indicators explained better the outmigration than the inmigration. This means that the push factor is more sensitive to the level of life quality, which is not surprising as the potential migrants have better information about the origin, while in many cases they have only vague assumptions about the situation at the destination.

Figure 4. The explanatory power of original and new models



Our next step was to run a regression analysis for all four clusters to identify those variables that have significant explanatory power within the cluster. After this we selected these variables and built them into one model explaining gross migration (Table 12.). This model explained 35 percent of the variance in gross migration, but only 9 percent in net migration. We have put the emphasis on the gross migration as a Hungarian migration peculiarity that a large number of gross migration results in a relatively small number of net migration. In this analysis we are more interested in the population change or circulation captured by gross migration than the actual population increase or decrease expressed in net migration.

[9] There are actually four models for the four independent variables.

Table 12. Regression model of gross migration by the indicators determining the clusters

	Economic activities environment		**Demography**		**Human infrastruc-ture**		**Local service environment**		**Complex model**	
	t	St. Beta	t	St. Beta	t	St .Beta	t	St. Beta	**t**	**St. Beta**
Number of persons receiving unemployment benefits from local governments per 1000 inhabitants	-2,18*	-.11							**-1,752**	**-,073**
Number of persons receiving regular social support from local governments per 1000 inhabitants	2,69*	.20							**3,219***	**,143**
Number of other supports provided by local governments to person in need per 1000 inhabitants	2,03*	.12							**1,102**	**,046**
Live births per 1000 inhabitant			-4,928**	-,340					**-4,068****	**-,245**
Deaths per 1000 inhabitant			4,301**	,453					**3,478***	**,321**
Divorces per 1000 inhabitant			2,143*	,104					**3,381***	**,141**
Natural increase per 1000 inhabitant			4,331**	,472					**2,729***	**,264**
Ageing index			2,155*	,331					**2,014***	**,271**
60+ year-olds per 1000 inhabitant			2,532*	,279					**1,399**	**,139**
0-17 year-olds per 1000 inhabitant			-2,514*	-,246					**-1,685**	**-,150**
Catering units per 1000 inhabitant					5,985**	,541			**6,326****	**,425**
Tourist nights at public accommodation establishment per 1000 inhabitants					-2,962*	-,188			**-2,333***	**-,143**
Dwellings built per 1000 inhabitants					4,586**	,230			**4,664****	**,219**
Local shop index					-3,015*	-,175			**-,608**	**-,040**
Knowledge based institution index							-2,37*	-,27	**-2,264***	**-,158**
Teachers in secondary schools per 1000 students							2,55*	,14	**1,840**	**,087**
Model Adjusted R^2	. 019		.012		.053		.264		.35	

*p<.05 **p<.001

Comparing the standardized regression coefficients we can find several interesting patterns. The economic activities environment cluster was interestingly not determined by the enterprise-type indicators, but rather the benefit-type ones. Yet their contribution to the complex model was not very large. The indicators in the demography cluster had larger regression coefficients and the natural increase indicators were significant at the 1 percent level also, still its adjusted R^2 was relatively low. In the human infrastructure cluster the catering units were the single most important indicator and this can be seen in the regression analysis also. The most interesting, however, is the local service environment cluster that had only two determinant indicators, significant only at the 5 percent level, yet their contribution

to the model R^2 was the largest if we investigated them separately. The last column in Table 12. shows the model in which all the determinant indicators are there. In this model the various demographic indicators (natural increase, ageing and especially the death rates) and the aforementioned catering indicator have the largest standardized regression coefficient.

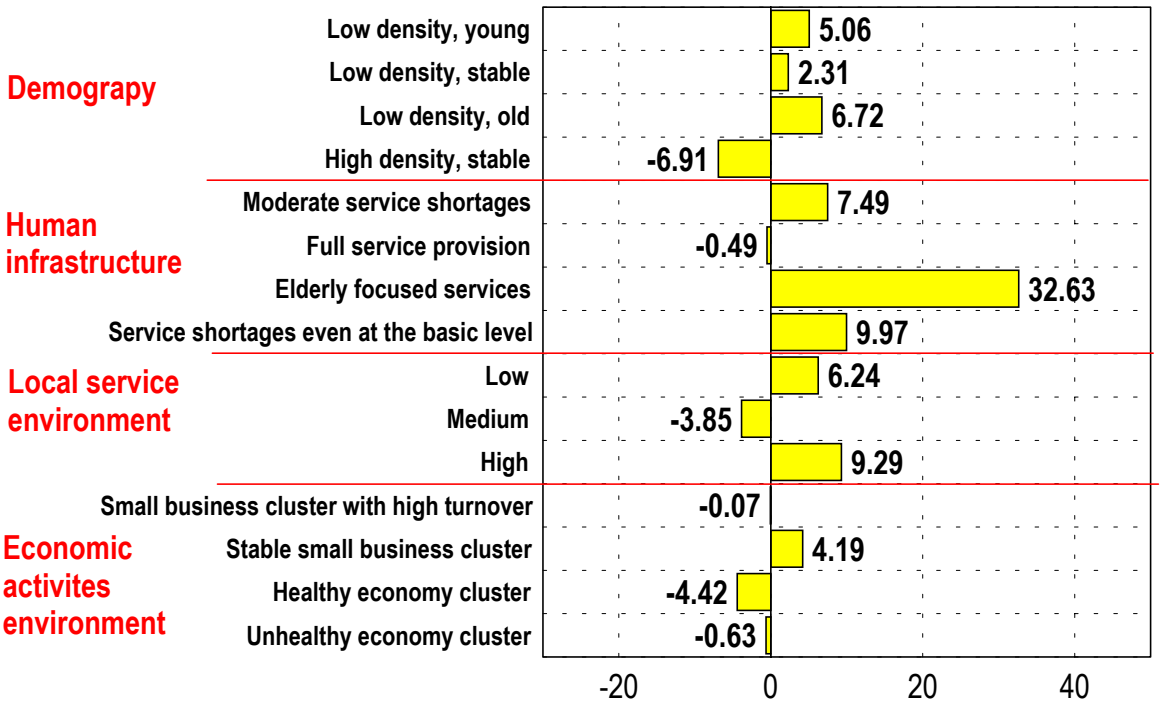
The final part of our analysis is to examine how are migration rates influenced by our cluster classifications (Table 13.). High-density settlements experienced negative net migration (corresponding with the rural migration gain). Low-density settlements with old populations have positive net migration but large population circulation. Corresponding with this, population circulation is large in settlements that have service shortages even at the basic level – these are probably the same municipalities. The largest positive net migration was measured in settlements with elderly focused services (Figure 5.), though it is not clear to what extent can this sign the start of retirement migration in Hungary.

Settlements with good local service environment experienced high gross migration and positive net migration. But on the other end of the scale we can see settlements with low level of services also experiencing positive net migration. This could refer the dual nature of migration in Hungary: migration occurs at both ends of development, though obviously attracting a very different composition of migrants. The economic activities clusters have also surprises, the settlements in the healthy economy cluster have experienced negative net migration. The high turnover/small business cluster refers to those enterprises that are created not mainly from entrepreneurship but as an everyday livelihood strategy through tax evasion.

Table 13. Migration rates by cluster membership

			Internal migration per 1000 population			
	Clusters	**N**	**Inmigration**	**Outmigration**	**Net migration**	**Gross migration**
Demography	low density, young	111	50,91	45,88	5,06	96,76
	low density, stable	126	47,61	45,29	2,31	92,90
	low density, old	61	60,68	53,96	6,72	114,64
	high density, stable	9	41,90	48,80	-6,91	90,70
Human infrastructure	Moderate service shortages	83	52,37	44,89	7,49	97,26
	Full service provision	223	46,13	46,62	-0,49	92,75
	Elderly focused services	6	70,73	38,10	32,63	108,84
	Service shortages even at the basic level	95	62,34	52,57	9,97	114,70
Local service environment	Low	334	50,57	44,34	6,24	94,91
	Medium	64	43,93	47,80	-3,85	91,72
	High	9	93,04	83,75	9,29	176,79
Economic activities environment	small business cluster with high turnover	40	72,77	72,93	-0,07	145,61
	stable small business cluster	317	47,93	43,74	4,19	91,67
	healthy economy cluster	23	42,32	46,74	-4,42	89,06
	unhealthy economy cluster	27	49,56	50,19	-0,63	99,75
	Average	**407**	**47,0**	**46,6**	**0,4**	**93,7**

Figure 5.
Net migration rate per 1000 population by cluster membership



4. Conclusions

From the analysis above we can derive the following conclusions. First of all, the relationship between migration and development is very complex, thus it can be described by complex indicator sets only. However, it is not enough just to enter some life quality indicators as an elaboration compared to the explanatory models based on economic development, the life quality indicators have to be extensive also. As we could see, entering a wide range of indicators, increases the explanatory power of our model.

Following this line, we can say that the categorical variables used by the Central Statistical Office and the academic community in Hungary do not necessary useful when we want to explain migration behavior. These variables were created either by complex calculations, like the general development indicator, or were created to comply with various international institutions' requirements, like the rurality index invented by the OECD. However, their usefulness in explaining migration is very limited. It was especially noteworthy to see the problems with the rurality index.

Part of the problem is that categorical variables created at micro-region level are insufficient in explaining settlement level variances. This is a shortcoming of the Hungarian statistical structure that is lagging behind the territorial development changes in Hungary. There are obviously some limitations, as for example GDP calculations cannot be done under a certain size of geographic unit. Nevertheless, these indicators have been failed to explain differences at the community level, although we know that in many cases migration decision-making is occurring in correspondence with community level indicators.

Another conclusion of the analysis was that outmigration can be slightly better explained than inmigration. This refers back to the push/pull debate. We have found that push factors are more sensitive to the level of life quality, corresponding with the better information about the origin. This does not mean of course that pull factors are not important in migration decision making, as the model's explanatory power was large in that case also.

We have found that however large the explained variance in our model, certain indicators of life quality are missing. The most obvious and important among these are indicators about the natural environment. Currently in Hungary there is no possibility to match environmental data with municipality level demographic and economic indicators. It seems clear that a particular migration stream, the increasing suburbanization is largely driven by natural amenities or at least a search for a less degraded environment around the large urban centers. This is a very important further research direction, hopefully the statistical data will allow such analysis in the near future. This can be related to a validity test with a large survey for example that can reveal the factors in migration decision-making, and also could help to uncover new explanatory variables that might have been overlooked in the analysis.

Another important research direction is the analysis of gross migration. In Hungary a relatively large gross migration causes a relatively small net migration differences. Places that are seemingly not changing if we look at the net migration rates, can experience significant change in the population composition. This phenomenon is understudied and hasn't been picked up by policy considerations either. Policy makers in most cases check only the net migration rates and could be misguided by that. We think that a further elaboration of this aspect of our analysis can have a significant contribution to both migration and life quality studies.