

# Regional distribution of immigrants in Hungary - An analytical approach

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## Abstract

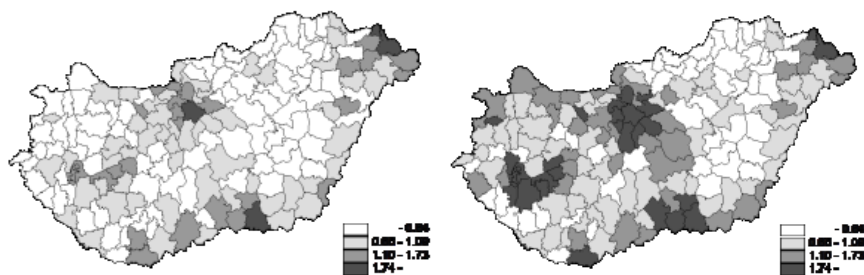
The study examines the regional peculiarities of immigration in Hungary. We reveal the reasons for immigration and the national differences thereof. We analyse the relations between the share of migrants and the road availability with the help of a road analysis method. The purpose of this study is to analyse the territorial characteristics of those who migrate to our country. We aim to explore the causes of immigration and the national differences of that. With the help of a path analysis we will analyse how the proportion of migrants and public road access relate to each other. So, on one hand the aim of this article is to map the regional situation of Hungary and other hand to give some examples about applications for analysis in migration.

**Keywords:** immigrants, regional distribution, path analysis, potential method.

## Introduction

The overwhelming share of the foreigners in Hungary is in Budapest and its surroundings while a smaller proportion of them reside in smaller areas near the borders as well as in the surrounding areas of Lake Balaton (Figure 1).

**Figure 1:** Regional distribution of the foreigners<sup>1</sup>, 2001-2008



Previously, location theories suggested that the border regions as traditionally backward areas, first of all, because borders hampered international trade flows which were threatened by possible military invasions (Anderson-O'Dowd, 1999). National borders have a negative effect on a regional economy, because these artificially cut up spatially connected regions and increase transaction costs. Different taxes, languages, cultures and business practices

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<sup>1</sup> Foreigners meant a foreign citizen having a residence permit, an immigration permit or a settlement permit who stayed in Hungary on 1 January of the given year.

hamper the cross border trade – these are a basis for potential political and social instability at border regions – which hinder domestic and foreign producers to settle down in these regions (Hansen, 1977). In a short time after the fall of the “Iron Curtain” and Hungary became a member country of EU, more or less all borders became permeable. One of the consequences of East to West flow was that foreigners settled in sending border area (Rédei, 2002). In the following period, the West to East flows became marginal (Illes and Kincses, 2007).

Such a structural change, as a result of a greater international integration (Papademitriou, 2006; Salt, 2001) – with the help of eliminating trade barriers and international borders (Van Geenhuizen *et al.*, 2001) – represents a new growth perspective in border regions (Contessi, 2001; Traistaru *et al.*, 2002). This is so, in the first place, due to the fact that geographical accessibility to large potential markets was improved in 1993 in Europe with the establishment of a single market and after the establishment of NAFTA in North America (Krugman and Venables, 1996; Krugman, 1998).

### **Applying a path analysis to examine the territorial distribution of foreign population groups**

In our present analysis at the most significant foreign population groups that live in Hungary (from Romania, Serbia, Slovakia, EU15 and the Ukraine) the causes of their territorial distribution will be analysed. As it was seen, the literature stresses living standards and differences in payments but the location of settlements is prioritized, too, and this geographic factor will be examined in a little bit more detailed way.

With the help of a path analysis, between 2001 and 2008, the average proportion of foreigners by micro regions is to be examined by factors. In our analysis, we aimed at identifying connections between public road access at micro regions and the proportion of immigrants.

Zero order linear correlations of independent and dependent variables are broken down into two parts in the path models. One part is the effect that our independent variables directly have on a dependent variable; the other part is the effect that is produced by independent variables through other intermediate variables (Székelyi-Barna, 2008). To our best knowledge, this method has not been applied for migratory survey.

Variables used in our analysis are as follows:

#### *Accessibility*

At micro regional centres, distance on public road from the “corresponding” border crossing in minutes

At micro regional centres, distance on public road from Budapest in minutes

*Economic situation*

Personal cars per thousand residents as an average, 2000-2007

Shops and stores that sell food per thousand residents as an average, 2000-2007

Earning per taxpayer as an average, 2000-2007

Active enterprises per thousand residents as an average, 2000-2006

*Social situation*

Natural increase/decrease per thousand residents, 2000-2007

Migration balance per thousand residents, 2000-2007

Indicted cases per thousand residents as an average, 2001-2007

Ratio of those with secondary and higher qualifications to the resident population, %, 2001

*Territorial distribution of migrants*

Ratio of migrants from a given country to the resident population, 2000

These are considered as independent variables that may explain the proportion of foreigners with a given citizenship, which constitute the dependent variable. In connection with the territorial distribution of migrants therefore four groups of variables were put together overall. Over our examinations, there were more indicators in the single groups of variables, which were excluded from our system as a result of preliminary calculations.

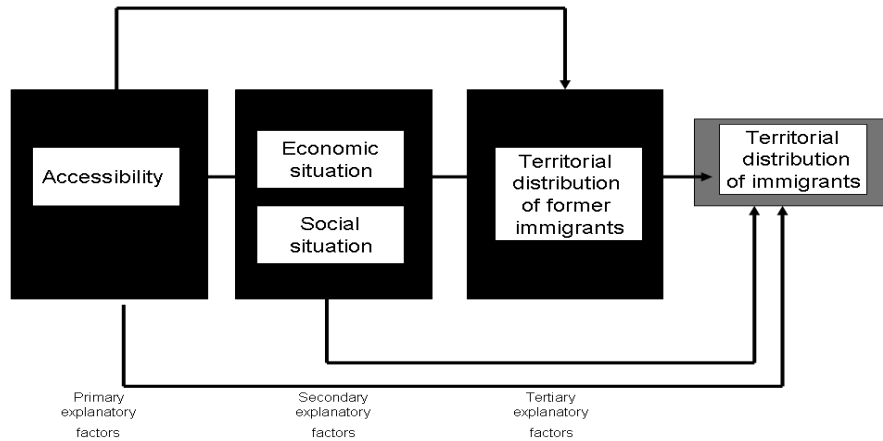
We assume that the primary explanatory factors (accessibility) influence differences in secondary factor (economic situation, social situation), which in turn have an influence on tertiary factors (territorial distribution of migrants in earlier times). We also presume that the primary and secondary explanatory factors have an influence on the proportion of migrants not only in an indirect but in an independent way (the arrows are to illustrate this causal relationship).

As a starting stage for the path analysis, with a simple multivariate regression, along with all independent variables, based on micro regional data, we tried to explain the proportion of foreigners by citizenship. Our results are summarized by table 1. It has verified, on the one hand, we may point out that our variables involved in the analysis jointly explain with an  $R^2$  value of between 0.83 and 0.99 the proportion of the population with a proper citizenship in the resident population, on the other hand, significant differences may be found by citizenship in the weight of the explanatory factors. To sum up, we may make it clear that the proportion of earlier migrants by micro region has the most significant explanatory force in all cases.

**Table 1:** Regression results

Dependent variable	Denomination	EU15	Serbia	Romania	Slovakia	Ukraine
$\beta_1$	Distance from border crossing	-0.212	-0.014	0.006	-0.123	-0.022
$\beta_2$	Distance from Budapest	0.034	0.008	-0.065	0.016	0.016
$\beta_3$	Personal cars	-0.058	0.039	0.170	0.100	0.023
$\beta_4$	Shops and stores	0.077	-0.017	-0.023	0.044	0.027
$\beta_5$	Earning	-0.413	0.006	0.051	0.032	0.053
$\beta_6$	Active enterprises	-0.096	-0.016	-0.138	-0.182	0.025
$\beta_7$	Natural increase /decrease	0.006	0.001	0.038	-0.014	-0.001
$\beta_8$	Migration balance	0.150	0.007	0.044	-0.031	0.004
$\beta_9$	Indicted cases	-0.016	-0.003	-0.015	0.086	-0.018
$\beta_{10}$	Qualification	0.215	-0.022	-0.059	0.095	-0.016
$\beta_{11}$	Ratio of migrants, 2000	0.838	0.983	0.863	0.817	0.971
R <sup>2</sup>		0.83	0.99	0.92	0.82	0.96

**Figure 2:** Causality relations of the groups of explanatory variables



With the help of a path analysis, however, only with the geographic location of micro regions (distance from the corresponding border and Budapest) we try to explain the proportion of foreigners and show the importance of the geographic location. The location may have a direct and, through other variables, an indirect influence, which will also be quantified by us. As we have two independent primary variables so the betas<sup>2</sup> of binary linear regressions are broken down into indirect and direct parts by this procedure in an additive way. The schematic system of our path analysis is illustrated by figure 2.

<sup>2</sup> These betas are not eligible for longtime forecasting, because the current situation is shown by them.

As a next step the relations will be analysed among accessibility and the ratios of migrant groups to a resident population at micro regional level, in the beginning irrespective of their indirect or direct role.

**Table 2:** Binary regression results between availabilities and migrants' proportions

Proportions of citizens in the population	Time to access the nearest border crossing point, 2008	Time to access Budapest, 2008
EU15		
$\beta$	<b>-0.509</b>	<b>0.141</b>
R <sup>2</sup>	<b>0.221</b>	
Romania		
$\beta$	<b>-0.193</b>	<b>-0.488</b>
R <sup>2</sup>	<b>0.259</b>	
Serbia		
$\beta$	<b>-0.575</b>	<b>0.203</b>
R <sup>2</sup>	<b>0.284</b>	
Slovakia		
$\beta$	<b>-0.516</b>	<b>0.076</b>
R <sup>2</sup>	<b>0.236</b>	
Ukraine		
$\beta$	<b>-0.489</b>	<b>0.228</b>
R <sup>2</sup>	<b>0.303</b>	

Table 2 is to illustrate steepness at a “simple” binary regression;  $R$  is to measure closeness at this stochastic relationship.  $R^2$  is to show in percentages how the geographic location explains the dispersion of micro-regional distribution at foreigners with a given citizenship. So we can quantify that the geographic location explains in itself in 22-30% the micro regional variances at foreigners with a given citizenship that is why the geographic location plays a significant role when the foreigners choose a domicile in Hungary. To be fair, it has to be noted, based on table 1, that at the foreigners it plays an even larger role in an informed decision to choose a domicile. They will settle down with a high probability in those micro regions where their compatriots already live in greater numbers, who will help them in the process of migration.

In table 2, the nearest corresponding border<sup>3</sup> when analysing the countries of EU15 is the Austrian border, while in other cases the borders corresponding to citizenships. If in a regression the steepness at these variables is negative that means that when moving away from the border (or from Budapest), on average, the analysed group with a foreign citizenship accounts for a decreasing proportion, if positive then for an increasing proportion. As it can be seen at data of table 2 – with the exception of those who migrated from Ro-

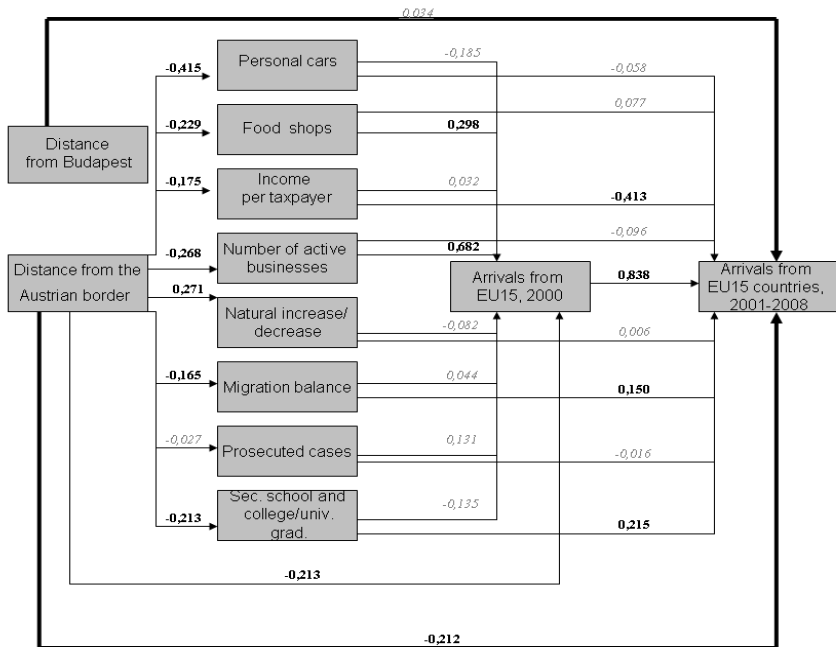
<sup>3</sup> From 2008 Hungary joined the Schengen Area, so the importance of the borders turned into less or more significant, but the distance from the border still has a key role in the spatial structure.

mania – in all cases the distance measured from border crossings is more significant than the distance measured from Budapest, which is shown by the difference between standardized betas. That is in addition to the central character of the capital city, borders play a significant role in the geography of migration.

In the further part of the path analysis the beta value was broken down into direct and indirect paths. To do this, in the first place, we analysed that out of primary characters (accessibility) which and how influence the secondary ones (economic situation, social situation). To begin with the distances measured from the border:

The distance measured from the Austrian border – except indicted cases – produces a significant effect on all analysed secondary factors (in case of figures 3-7 non-significant values are marked with grey). Signs in most cases are negative that is why there is higher development, better provision and school attainment, etc. nearer to the border. There is only one positive sign at natural increase/decrease, which is in conjunction with the present demographic processes in our country. The closest relationship may be seen between car ownership and the distance from the Austrian border (Figure 3).

**Figure 3:** The role of distance from the Austrian border in explaining the ratio of immigrants from EU-15 countries in 2001-2008 to total population



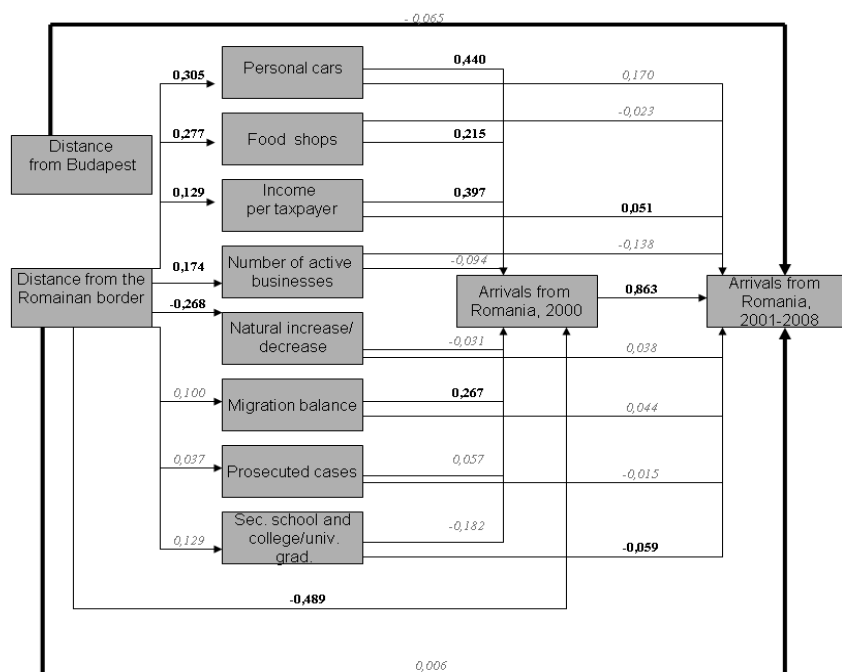
The distance measured from the Romanian border is insignificant in connection with the migration balance, criminal offences and school attainment, concerning other secondary indicators it exerts a different influence as we may

have seen before. Against the distance measured from the Austrian border, here the signs are mainly positive, in parallels with the socio-economic situation. The distance measured from the border is in the closest correlation with the car density. However, natural increase shows a decrease when moving away from the border.

The distance measured from the Serbian border produces a significant effect on only three secondary indicators. When moving away from the border there is an improvement in provision with food shops, in income per taxpayer and in natural increase.

The distance measured from the Slovakian border exerts a significant influence on car ownership, income per taxpayer, enterprise density and natural increase. When moving away from this border there is an increase in car as well as in enterprise density and a decrease in productivity and natural increase.

**Figure 4:** The role of distance from the Romanian border in explaining the ratio of immigrants from Romania in 2001-2008 to total population



At last the distance measured from the Ukrainian border exerts a significant influence on three secondary variables too. When moving away from the border there is an increase in car and enterprise density as well as a decrease in natural increase. The distance measured from the border is the closest at this last indicator. Distances measured from the Serbian, Slovakian and Ukrainian borders were in the closest correlation with the natural increase.

Closeness among primary and secondary indicators may be analysed with the help of a determination coefficient, i.e. how accessibility indicators explain difference from the average at socio-economic indicators. It may be pointed out that the inequality indicators first of all explain dispersion at the migration balance, car ownership and productivity (accessibility interprets more than a third of dispersion in case of all three of them). In spite of this, the weighted determination coefficient for criminal offences is only 5%, the lowest at the analysed indicators.

After analysing how the primary and secondary explanatory factors relate each other we should focus our attention on how these variables impact the tertiary variables.

In 2000, the ratio of arrivals from EU15 countries to the resident population was directly and significantly influenced by the distance measured from the Austrian border as well as the effect of this may be felt through specific data of food shops and the business density. Of these three paths the direct one is the strongest. In this case the sign is negative, i.e. considering 2000 there was also a decrease in arrivals of EU15 countries when moving away from the border.

In one respect, in 2000, the distance measured from the Romanian border produced a direct and significant effect on the ratio of those who came from Romania as well as its effect may be felt through the provision with cars and food shops and the productivity. Of the analysed paths the direct impact of the distance measured from the border is the strongest and has a negative sign, i.e. there was also a decrease in the ratio of arrivals from Romania in 2000 along with an increase in distance.

In 2000, there was a significant correlation between arrivals from Romania and the distance measured from the Romanian border, an impact was also felt through car and food shop provision as well as productivity. At the analysed paths the distance from the border has the strongest direct effect with a negative sign, i.e. already in 2000, there was a decrease in the ratio of arrivals from Romania along with an increase in distance.

In 2000, at the ratio of arrivals from Yugoslavia only the distance measured from the Serbian border has a significant effect; there is no significant correlation thorough the secondary factors. There is a decrease in the share of migrants along with an increase in the distance measured from the border.

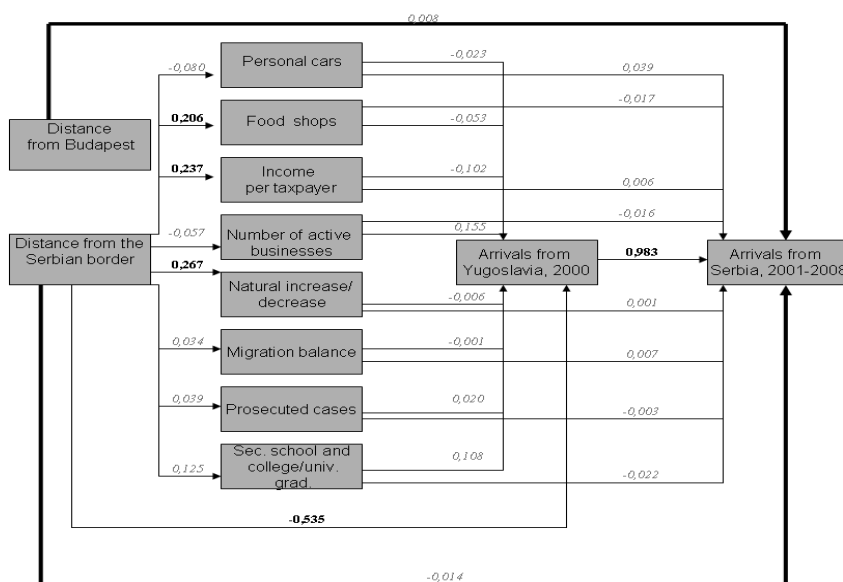
In 2000, on the one hand, the distance measured from the border had a direct effect on the ratio of those who came from Slovakia; on the other hand, it also had an indirect effect through the natural increase/decrease. Of the two indicated paths the direct one is the stronger and it has a negative sign, i.e. there is a decrease in the share of immigrants along with an increase in distance.

At last, in 2000, there was a direct, significant correlation between the distance measured from the Ukrainian border and the ratio of migrants from the Ukraine to the resident population (here is the strongest direct impact taking



into account all border sections), as well as an impact can be indirectly felt through car and business density as well as natural increase/decrease.

**Figure 5:** The role of distance from the Serbian border in explaining the ratio of immigrants from Serbia in 2001-2008 to total population

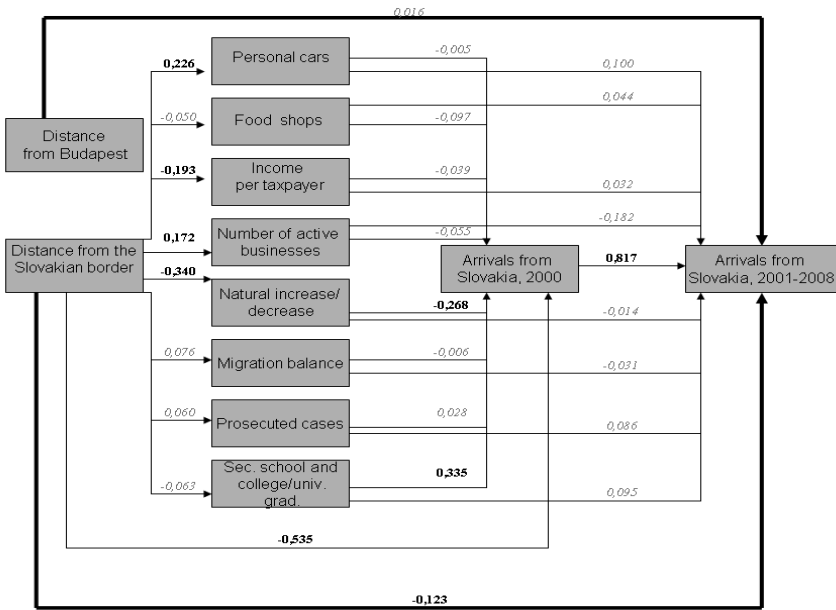


When observing how tertiary variables impact dependent variables it can be pointed out that this is significant in all cases and shows the strongest standardized beta-coefficient - i.e., based on our model- the territorial distribution of earlier migrants influences the most the share of migrants. The highest standardized beta-coefficient can be observed at immigrants from Serbia.

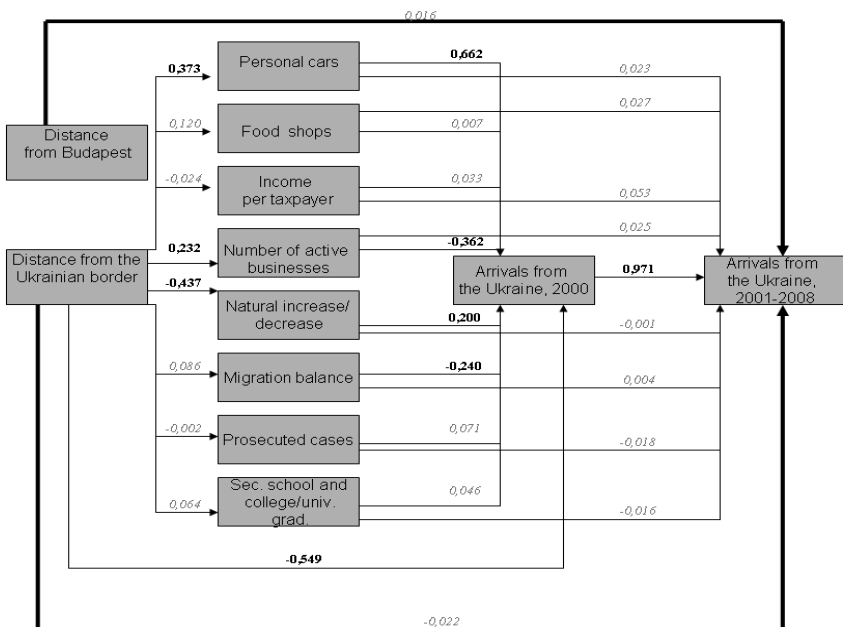
Considering the model as a whole, in 2001 and 2008, there was a significant correlation between the distance from the border and the average share of immigrants from the EU15 and Serbia. It is not true at the distance measured from Budapest, which is not significant in any case when considering its direct impacts. Of course it does not mean that there is no correlation between the distance measured from Budapest and the ratio of immigrants to the resident population. That has effects not in a direct way but rather through different socio-economic factors. So this part of our path analysis is not detailed separately in our article, but because of our later results this calculations are also shown by figures 3-7.

After identifying what “path strengths” are in our model we start to identify how the accessibility impacts the territorial distribution of migrants. The question to ask is accessibility indicators directly or, through other factors, indirectly impact the ratio of immigrants by citizenship.

**Figure 6:** The role of distance from the Slovak border in explaining the ratio of immigrants from Slovakia in 2001-2008 to total population



**Figure 7:** The role of distance from the Ukrainian border in explaining the ratio of immigrants from Ukraine in 2001-2008 to total population



On the one hand indirect paths may go over the primary, secondary and tertiary variables, at this time all ways have to be added together from the onset to the dependent variable, while the proper path sections have to be multiplied together, i.e. (irrespective of significances).

Total paths were calculated for the analysed citizenships and for both accessibility indicators. Our results are presented in table 3.

In general it can be pointed out that in all cases accessibility indicators has no direct impact but first of all an indirect one described by socio-economic indicators.

**Table 3:** The role of direct and indirect paths in explaining the share of immigrants in total population (standardised B coefficients)

Share of citizens in the population	Access time for the nearest corresponding border crossing, 2008	Access time for Budapest, 2008
EU15		
indirect	-0,297	0,106
direct	-0,212	0,034
<b>total</b>	<b>-0,509</b>	<b>0,141</b>
R <sup>2</sup>	<b>0,221</b>	
Romania		
indirect	-0,199	-0,424
direct	0,006	-0,065
<b>total</b>	<b>-0,193</b>	<b>-0,488</b>
R <sup>2</sup>	<b>0,259</b>	
Serbia		
indirect	-0,562	0,195
direct	-0,014	0,008
<b>total</b>	<b>-0,575</b>	<b>0,203</b>
R <sup>2</sup>	<b>0,284</b>	
Slovakia		
indirect	-0,393	0,060
direct	-0,123	0,016
<b>total</b>	<b>-0,516</b>	<b>0,076</b>
R <sup>2</sup>	<b>0,236</b>	
Ukraine		
indirect	-0,467	0,212
direct	-0,022	0,016
<b>total</b>	<b>-0,489</b>	<b>0,228</b>
R <sup>2</sup>	<b>0,303</b>	

## Conclusion

Budapest and its surrounding area accounts for a dominant part of the foreigners, while a smaller proportion of them live in micro regions along the

border as well as in the surroundings of Lake Balaton. Budapest and Pest County are unambiguously attractive destinations for those foreigners who stay in Hungary from the neighbouring countries, along with this they prefer those micro regions which are nearer to the country corresponding to their citizenship, mainly in the vicinity of the Romanian, Ukrainian and the Serbian border.

During the path analysis our variables involved in the analysis jointly explain in a decisive way the ratio of the population with a proper citizenship to the resident population. On the other hand, however, significant differences can be pointed out by nationality in the weight of the explanatory variables. One of the most important findings of our analysis is that for the average proportion of foreigners between 2001 and 2008, the strongest explanatory force was in all cases the ratio of those immigrants who came earlier -i.e. the new immigrants follow the existing structure in their distribution. In case of all citizenship groups, accessibility indicators have no direct effect but an indirect one, which is first of all described by socio-economic indicators.

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