Tanulmányok

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The potential effects of the "melting" of state borders on the border areas of Hungary

The effect of borders can have important impact on the possibilities of spatial development. Many theoretical, methodological and empirical questions can arise about the investigation of this phenomenon and about the interpretation of it. In this domain of interests the issues of integration processes and their relation to borders (and border effects) have significant role. In this study, focusing primarily on border areas, many important and popular methods of analysing the effect of economic integration are presented. One of the most spectacular methods – the potential model – is investigated in detail in order to analyse the theoretical cross-border effect of the most important economic centres on the border areas of Hungary.

Keywords: border effects, integration, spatial development, potential model.
JEL code: R11, C10.

Introduction

Hungary is situated in East Central Europe and specific among the European countries, as there are seven neighbouring countries along its borders. Hungary is bordered by Austria on the west, by Slovakia on the north, by Ukraine on the north-east, by Romania on the east and south-east, by Serbia, Croatia and Slovenia on the south. The neighbouring countries – except for Austria – are post-socialist states struggling with the same transformation problems after the political changes in 1989-1990, when communism collapsed. Hungary is situated in the lower central parts of the Carpathian Basin, therefore most of the state borders are not natural barriers – put aside the river Danube on the north-west and the rivers on the south-west.

Presently Austria, Hungary, Slovakia, Slovenia are members of the European Union, since 2007 Romania has also been a member of the community and Croatia is a candidate state. Accordingly, most part of the Hungarian state borders are internal border of the European Union (after the end of 2007 – besides Austria – Hungary, Slovakia and Slovenia became members of the Schengen Agreement, so the traffic at border crossing points might have become freer).

The development level of the infrastructure that creates the background of the cross-border co-operations is characterised by significant regional disparities as a result of different natural, political, social and economic conditions.

In order to describe the situation of the border areas of Hungary, it is necessary to illustrate the changes of the spatial pattern of the country. The most important dimensions are the followings:

- Since the evolvement of the modernization of Hungary – since the middle of the 19th century – the role of Budapest has become a determinant factor in the spatial pattern. After the political transition the dichotomy between Budapest and the countryside became to more significant.
- Macroregional disparity has appeared between the western and the eastern part of Hungary, which can be modelled like a West-East slope.
- Partly as a result of the development policy of the communist era that focused on the towns and the major settlements, the urban-rural dichotomy according to the hierarchy and size of the settlements has become a characteristic feature of the Hungarian spatial pattern (*Nemes Nagy* 1994).

There are significant disparities between the development level of the western and eastern border area, as a result of the effects of the communist era and the new processes after the political transition.

The first aim of the current study is to illustrate and calculate the economic effect of the neighbouring participants of the economy on the border area of Hungary. In our opinion, this pattern can represent the area of possible and viable economic interactions between Hungarian and neighbouring territories. The second one is to demonstrate the transition of the border areas since the political changes and explore the different characteristics of the sections of the Hungarian state border.

The effect of borders on the spatial development

In general, borders are perceived as features acting as a constraint rather than an incentive upon the operation of spatial systems (*Reichman* 1993). Borders often appear as barriers having important effect on the regional development (*Van Geenhuizen* et al. 1996). It is easy to understand how borders can have a place of high priority in the integration process by looking back upon the theory of *August Lösch* (1962) on regional systems of market areas, which points out the role of the borders as barriers. The economic landscape that Lösch sketched out is divided by borders. Borders always have a distortive effect on possible functional (market, employment, etc.) networks, even if they are not completely impermeable (*Niebuhr-Stiller* 2002). Taxes introduced at the state borders could be compared to the elongation of distances in an economic sense (*Lösch* 1962).

Consequently, the presence of borders can generally have a negative effect on spatial relations, as they block potential connections and reduce the productivity of the economic sector in many ways. For this reason, economic entities strive to settle more distant from the border, near to the inner centres, where they can extend their market area. Thus border regions themselves suffer a great handicap in the field of economic activities and that of the accessibility of goods, and in many instances they can be viewed as deserts (*Lösch* 1962).

As a result of this, decrease and discontinuity can be observed in the number and intensity of activities (*Van Houtum* 2000). An increase in the expenditures might occur due to the higher risk for investments in the case of border areas in insecure political situation (*Hansen* 1977, *Ratti* 1993).

Certain border areas – including Eastern-Hungary – can be described as peripheries not only from geographical point of view, but from economic aspect as well (*Nemes Nagy* 1996, *Lőcsei-Szalkai* 2008). Border regions are frequently described as underdeveloped areas and can often be affirmed empirically (*Petrakos-Topaloglou* 2006), especially in Central and Eastern Europe (*Erkut-Özgen* 2003). The Eastern border area of the post-socialist countries in Eastern-Central-Europe forms almost a continuous backward area that can be regarded as a 'wall' (*Gorzelak* 1996). The peripheral situation strengthened after the WW II. because of the appearance of new state borders and the protectionism, import substituting industrial developments, lack of connections between new states (*Kovács* 1990, *Süli-Zakar* 1992).

The characteristics of borders have dominant effect on the neighbouring territory though the border area also has influence on the features of the border itself (*Hansen* 1977). However, typically not just the formation of present borders effected the less favourable situation of these regions, as the settlement structure and many characteristics of the economic and social activities had grown much earlier (*Hardi* 2001). Borders of the countries in Central and Eastern Europe have been changed many times in the course of the past centuries, and have broken again and again the natural run of development (*Hajdú* 2005).

The different economic characteristics of border areas result in a diverse income pattern compared to the non-border territories. Obviously, the income pattern of the border area itself is not homogenous. As a result of the concentrated flows and the employment effect, higher level

of income can be detected in the surroundings of border crossings related to the other parts of the border area (*Kozma* 2006, *Pénzes* 2006).

The different characteristics of border areas tend to generate higher level of income inequalities compared to the non-border areas according to James Peach's theory about the income inequalities of the US-Mexican border (*Peach* 1997). However, significant part of the incomes appears in the grey or black economy in the case of border areas (*Jakobi-Kiss* 2003).

The 'melting' of national borders can help to re-establish former spatial relations, as their barrier function decreases; in this manner their contact zone-role can become stronger (*Erkut-Özgen* 2003). Besides, opening national borders also help social cohesion by increasing the mobility of people or creating the possibility of that. Consequently, border regions may be put in a state of flux by their changing economic role through the reallocation of activities and opportunities (*Topaloglou* et al. 2005).

As a result of the integration process, border areas might become contact zones where the open border generates connections between the two sides of the border (this is the third approach – besides barrier and filter approach – according to *Ratti* 1993). An open border area might attract investments that profit from the different characteristics of the other side of the state border (differences in wages, taxes, restrictions, consumption customs etc.). A certain development level is necessary to induce economic interactions, however a considerable gap between the development levels of the neighbouring territories can also be an obstacle in the cross-border co-operations (*Van der Velde-Wever* 2005).

Effects of integration and the integration of borders

Fundamentally, an integration process should be a win-win game (*Breuss* 2001). But, as a matter of fact, gains and losses are not balanced in many cases; some pay most of the costs of the enlargement and others have the benefits of it. This can vary over not just different countries, but also over different regions of a state. In this framework border regions are one of the most important types of areas.

Nevertheless, the effects of integration on border regions are hard to judge unanimously. Some authors claim (for example *Huber* 2004) that the influence of the enlargement of the European Union in the past twenty years was mainly neutral on borderlands with a few positive and with a few negative consequences. Whereas, the latest great integration step of the EU – the Eastern Enlargement – seemed as an important and very effective act with respect to the border regions.

In this process, those border areas, which are near to a prospering market or an economic centre of a neighbouring country can take advantage of the integration. The increase in cross-border trade, the change in wage rates, the growth of employment related to gain in labour supply affect mainly newly joined and less developed countries (*Niebuhr* 2004, *Pfaffermayr* et al. 2004). Whereas, the border regions of neighbouring countries have often suffered a decline in wages and increase in unemployment as a consequence of that. This evidence was also investigated through the impacts of German re-unification (*Buettner-Rincke* 2007).

The situation of the border regions as it was mentioned above is an important aspect of judging them, since they can gain above average benefits by it (*Niebuhr* 2004, 2005). Border areas with favoured location make profit of their attractiveness and better accessibility conditions in many respects, relative to other non-border regions and along the external borders of the integration areas. While borders are 'melting' in the EU internal space, they are 'freezing' in the external spaces (*Topaloglou* et al. 2005). Consequently, these areas are facing many problems, possible serious difficulties due to their low economic performance and unfavourable access to European markets (*Niebuhr* 2004).

The success of the integration of border areas is influenced by not just the 'destruction' of the borders themselves, but by the real possibilities of a single person, firm or investment to cross a border (*Kozma* 2006). Common language or common currency has a stimulating effect on this and the lack of these advantageous elements can raise many difficulties in the flow of cross-border migration and co-operation. Moreover, it can also be an 'invisible' barrier when the differences in development are too considerable between the neighbouring countries: if the purchasing power of an area lags behind the others remarkably cannot take advantage of the opportunity of the 'melting' borders as required.

Techniques to measure integration benefits and border effects

The methods of describing the impact of an integration process cover a wide spectre of techniques of spatial analysis. Benefits can be measured simply by statistical enumeration or typifying regions through their characteristics, supported by factor and cluster analysis (*Topaloglou* et al. 2005). Measuring the change of economic specialisation and spatial concentration relating to integration can also be useful to reveal the benefits (*Wieser* 2004). Multivariate regression models are also often used in the investigation of possible integration effects (*Buettner-Rincke* 2007, *Huber* 2004), and in the exploration of special impacts of border regions on the border situation can easily be built in them as a determinant factor (*Niebuhr* 2004, 2005).

Several spatial econometric models of macroeconomics – for example the spatial computable general equilibrium (SCGE) model (*Bröcker* 1998) or OEF World Macroeconomic Model (*Breuss* 2001) – can be found among the techniques of measuring the integration benefits and border effects. Besides, core-periphery models of New Economic Geography also have their role in exploring how an integration process affects border regions (*Niebuhr* 2005). Completed by other techniques, for example, regression analysis (*Buettner-Rincke* 2007, *Niebuhr* 2004), these applications can give a properly complex explanation of the phenomenon.

However, beside the great variety of measurements to describe the integration benefits and impacts especially on border regions, the most frequent methods of investigations, are rooted in gravity-based approaches. Based on a formal-logical analogy with the Newton law of gravitation, gravitation models are often used to estimate the measure of trade or migration (labour and employment) flows. For these types of flows, physical borders and other barriers (tariffs, currency and language) are strict impediments and it is hard to cross them. Nevertheless, these elements are used to build in the models to denote border effects (*McCallum* 1995). The possible benefits of integration on borders can be revealed by simulating the reduction of border effects (*Brown-Anderson* 2002), modelling unimpeded trade and migration flows and an advantaged market access.

Potential model applications and their use in the investigation of borders and integration

The potential model developed by John Quincy Stewart for geographical application (*Stewart* 1941) is one of the key methods of measuring spatial interaction. In potential model applications, similarly to gravity models, the strength of interaction is taken into account by the masses (economic power, number of inhabitants) and distances of spatial bodies (in most of the cases settlements, regions, countries). In contradiction to the former one, the potential model does not concentrate on single forces effecting an entity, but on the sum of them. Namely, it shows how the entirety of a system affects one of its elements (*Tagai* 2007).

To describe the complex situation of a system built up by spatial relations it is useful to investigate all the influential factors. The most important thing is to reveal the internal conditions of a system, how large impulses overtake a given point. It is expressed in the term of internal potential and it is used to be measured according to the next formula:

$$(1)\ P_{in}(A_i) = \sum_{j=1}^{n} \frac{M_j}{d_{ij}^b}; \qquad (2)\ P_{self}(A_i) = \frac{M_i}{d_{ii}^b}; \qquad (3)\ P_{ex}(A_i) = \sum_{k=1}^{n} \frac{M_k}{d_{ik}^b}$$

($P_{in}(A_i)$: internal potential of „i" point; M_j: the weight of „j" point within the investigated area; d_{ij}: distance between „i" and „j" points; (2) $P_{self}(A_i)$: self potential of „i" point; M_i: the own weight of „i" point; d_{ii}: the distance assigned to „i" point; (3) $P_{ex}(A_i)$: external potential of „i" point; M_k: the weight of „k" point locating outside the investigated area; d_{ik}: distance between „i" and „k" points; (1-2-3) b: index based on experience, in this investigation equals with 2)

Besides, as the elements of the system have their effect on themselves, self potentials in many instances need to be regarded (2). Internal and self potentials reveal the inner structure of an investigated system as it would be completely closed without any external connections (3). Generally, it would conduce to a misleading result, as closed (economic) systems are hard to find in the world. Thus, external effects of a defined area outside the investigated system can also be taken into account, through external potential. By summing up the elements, total potentials can be supplied.

One of the original meaning of term 'potential' is the measure of proximity of people or economic goods to a given point (*Stewart* 1948). The proximity of a place indicates the accessibility of people to the given system. As the probability of the occurrence of social interactions is greater in the more accessible places, accessibility can be interpreted as a measure of the intensity of possible contact or social intensity (*Pooler* 1987).

The intensity of possible contacts can change in several ways. It can occur that the weight of a social or economic mass is the changing element of a system (*Frost-Spence* 1995). Similarly, accessibility conditions can also be developed (*Smith-Gibb* 1993, *Tóth* 2005). When an improvement in potential values cannot be attached directly to accessibility or mass function, but it is related to the reduction of impediments (tariffs, borders) among the parts of the system, then integration benefits can be estimated (*Clark* et al. 1969, *Keeble* et al. 1982).

Without barriers, border regions become more permeable and can be the main beneficiaries of the gains related to an integration process, on the basis of the principles of the model, as they are closer to foreign economic centres than the internal parts of the country (*Niebuhr* 2004, 2005). The roles of distance, market size and agglomeration economies in the process of cross-border interaction, which are built in the potential model, constitute a complex framework, which shows how the release of different barriers generates benefits not just for the border region but for the whole system, too (*Petrakos-Topaloglou* 2006, *Pfaffermayr* et al. 2004). By the combination of the model with other techniques and applications this image can be shaded onward (*Topaloglou* et al. 2005, *Niebuhr* 2004, 2005).

Methods of the analysis

In order to measure the contribution of the substantial local economies along the Hungarian state border to the economic potential of the border area, it is essential to find an indicator that

- represents the extent of the local economies (settlements or municipalities),
- is calculated by the same (or at least similar) methods of data collection in several countries,
- is measured at the same time period.

Under these constrains the number of persons in employment by the locality of place of work was chosen in the investigation (in fact this definition might be simplified as the number of local places of work). The data collection is based on the census of Hungary and those of the neighbouring countries in 2001 and 2002. In the case of several countries only the data about the number of persons in employment by the locality of residence are available. However, this

indicator does not make allowance for commuting, but it is appropriate to represent the economic weight of the localities.

In order to create a detailed model about the border area, the lowest territorial level – that can be researched with statistics available in the censuses – is the base of the analysis. According to the different administrational categories of data collection in the countries, settlements or municipalities (the LAU2 or former NUTS5 level in the methodology of the European Union) are regarded in the study. Nevertheless, it was necessary to narrow the number of localities. It is assumed that the larger centres might illustrate appropriately the economical potential of a given area. Those localities are involved in the investigation that have higher value than the Hungarian average number of persons in employment by the locality of place of work in the light of the censuses in 2001 and 2002. The mentioned threshold value is 1117 employed persons by localities.

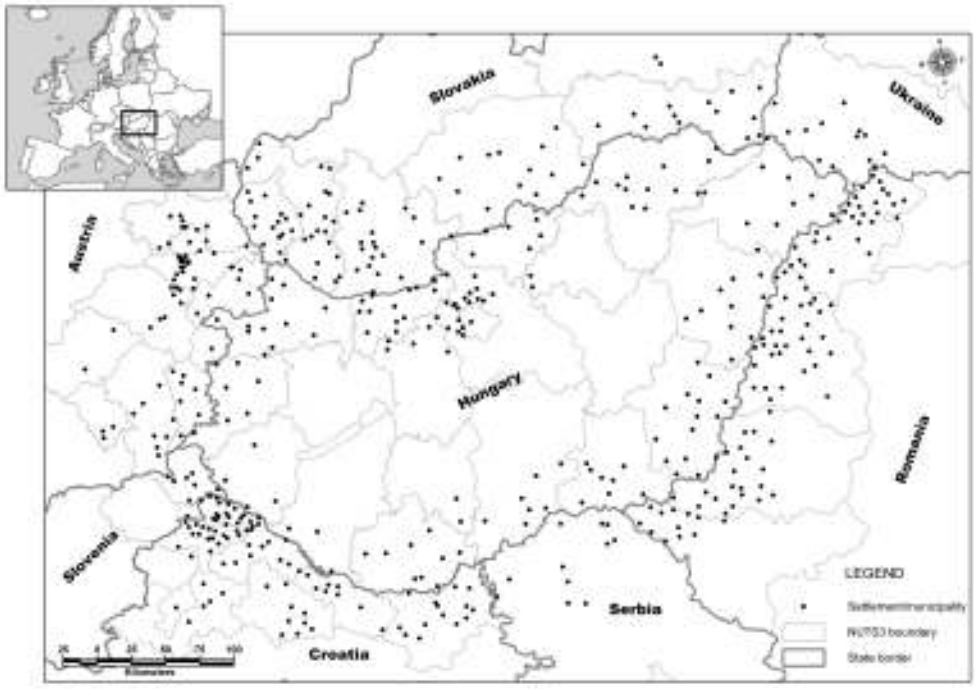

Figure 1. The settlements and municipalities involved in the investigation.
Source: Own drawing

The primary aim of the current study is to analyse the border areas in Hungary, so a specific zone was allocated. The zone is based on the accessibility of the non-stop road border crossing points. It has also been assumed, that only a narrow belt is affected directly by the economic centres located beyond the state border. In the current study, this distance was limited in 60-65 minutes far from the non-stop road border crossing points situated along the Hungarian state border. Distances were calculated by road accessibility and were expressed in minutes. The localities involved in the investigation were allocated with the help of a route planner (Marco Polo EuroRoute 2005) and a mapping software (ArcView GIS version 3.3). (*Figure 1*)

After narrowing the size and decreasing the territorial extent – 145 Hungarian and 367 surrounding localities were involved in the subsequent analysis. 67 Austrian, 83 Slovakian, 12 Ukrainian, 98 Romanian, 11 Serbian, 88 Croatian and 8 Slovenian localities were reckoned with. The number of localities is particularly affected by the physical geography, the history and the economic characteristics of a given area.

Results of the application of the potential model

The core question of the study is how the potential effect of the external economic centres can be modelled in the case of the settlements of the Hungarian border area. In order to illustrate the value of the influence the potential model was applied for the concerned zone.

The formula and the most important attributions of the potential model have already been detailed previously. Only the internal and external potential was regarded in the calculation from the three components of the model, as the value of the self potential is unimportant from the aspect of the analysed problem. In the case of both regarded components of the calculation the points of potential fields are composed by the localities. The weight of points was expressed by the number of persons in employment by the locality of place of work or the number of persons in employment by the locality of residence. Finally, the distances between the localities were calculated by road accession in minutes (as it has been detailed formerly). The following maps illustrating the potential field were created with the help of interpolation method (by the GoldenSoftware Surfer software) that simplifies and models the real pattern.

The internal potential was calculated by all the Hungarian localities – not only in the border area – that have higher number of persons in employment by the locality of place of work than the average value. Altogether 297 settlements were involved in this part of the analysis, disregarding the administrative status. The results can be summarised as the value of internal potential depends on the distance from Budapest (the number of persons in employment is approximately tenfold higher in the capital than in the second largest town, Debrecen). The highest internal potential values occur at the western 'gate' settlements (edge cities) of Budapest, close to the turn-off motorways. However, a continuous zone of low internal potential appears on the north, east, south and west parts of the country along the state border (except North-Western Hungary) as a result of the calculation. The effect of the largest regional centres in Hungary – Miskolc, Debrecen, Szeged, Pécs – cannot modify significantly this kind of peripheral situation (*Figure 2.*).

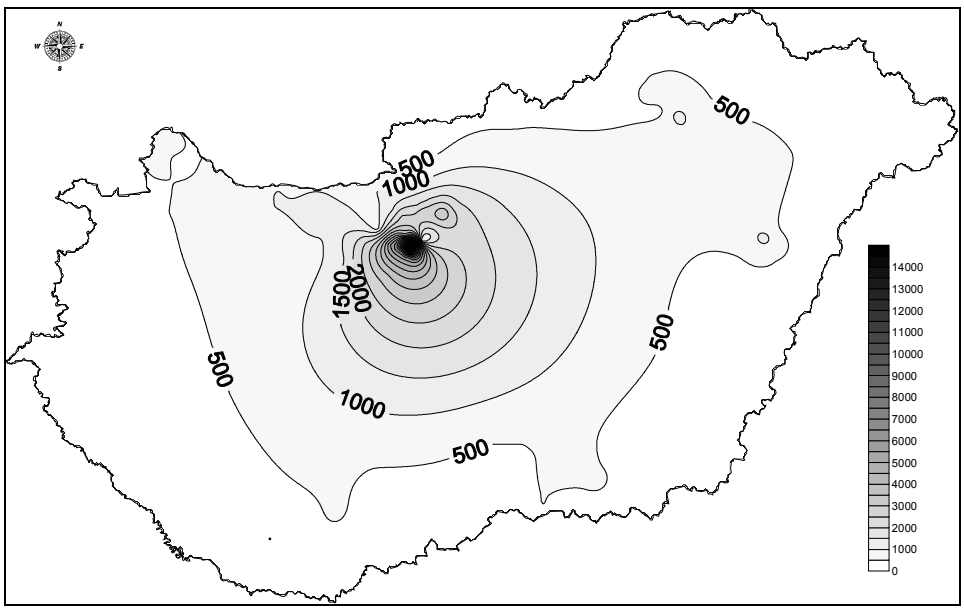

Figure 2. The pattern of internal potential.
Source: Own calculation (KSH data)

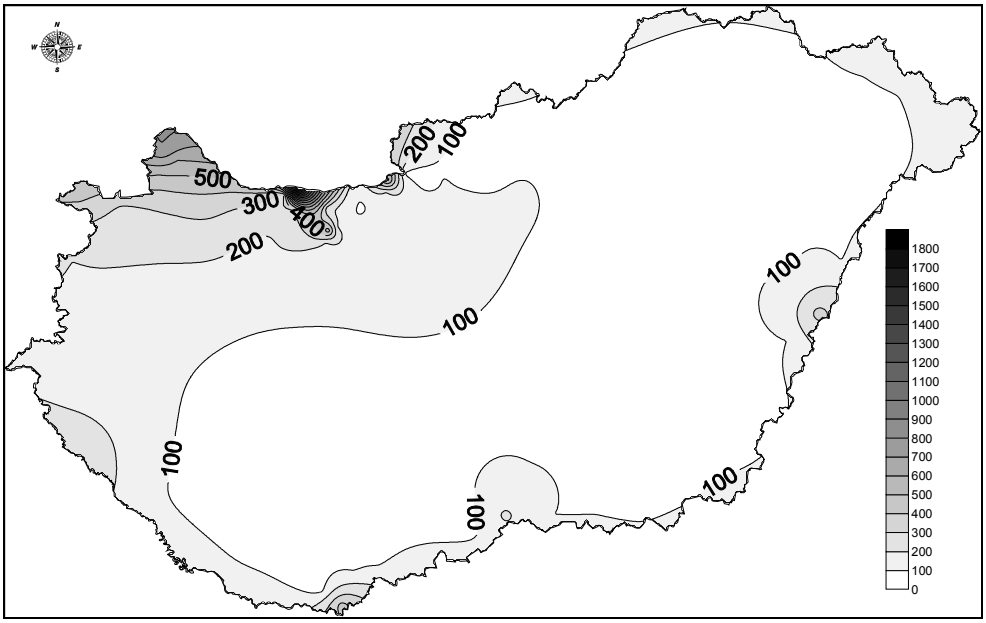

Figure 3. The pattern of external potential.
Source: Own calculation (data of national statistic agencies)

The external potential was calculated for the settlements of the Hungarian border area by the weight or effect of the main localities on the other side of the state border (the method of selection can be seen formerly). The pattern obviously shows a completely different distribution of the values (*Figure 3.*). The represented effect appears in the centre of Hungary far away from the border area due to the interpolation. In spite of this, the external effect is basically confined to the Hungarian border area. The highest values of external potential and the most extended influence occurs in the north-western part of the country, from where the accessibility of Bratislava and Vienna is quite good thanks to the developed motorway network. The maximum value appears in the surroundings of the border crossing place Komárom, which is located near the river Danube and the Slovakian Komárno situated on the other side of the river. The top value emerges as a result of the closeness of these twin cities. The external effect on potential is weaker in the case of the other sections of the Hungarian state border, although the effect of Zagreb and Osijek can be detected along the Hungarian-Croatian border. Similarly, the influence of Subotica near the Hungarian-Serbian border and the effect of Oradea along the Hungarian-Romanian border appear visually.

The sum of the internal and external potential shows a similar pattern to the internal potential, as the values of the internal potential are significantly higher than the latter ones. The external effects only in the case of North-west Hungary modify the potential field significantly. In other parts of the border area the external effect is not continuous and the influence appears only in the form of patches. This phenomenon strengthens the preconception that the North-west Hungary profits principally from the unifying economic space.

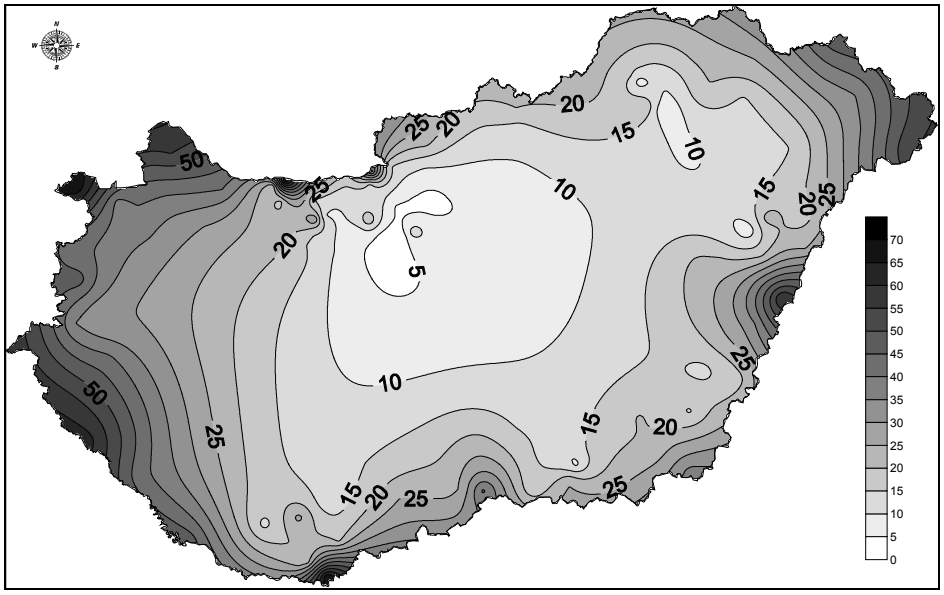

Figure 4. The contribution of external potential to the summarized potential value (without self potential), in percentage.
Source: Own calculation (data of KSH and national statistical agencies)

The contribution of external potential to the summarized potential value (the ratio of external potential) represents a particular spatial pattern (*Figure 4.*). The relative value of the external potential shows an even trend, as also the Hungarian-Ukrainian border area can be emphasized besides the formerly mentioned influences in the light of the percentage of external potential. This tendency can be attributed to the low contribution of the internal potential, because these regions are the farthest from Budapest. Therefore, the importance of external potential is rather relative than absolute. These results are fitted into the context of the extended Central-European economic pattern (*Nemes Nagy-Tagai* 2009).

Development level of settlements in the border area

The second part of the study aims to investigate the level and changes of development of the settlements that are located in a given border area. In order to denote the development in numbers a complex indicator was created by the Bennett method. This complex indicator was calculated for two years – 1990, the year of political-economic transition considered as the starting date and 2005. Unfortunately, some of the main indicators were not measured in 1990 and there are data available only in the censuses about the employment by localities.

The complex indicator includes the following components from the mentioned years:

- taxable personal income per permanent population (1990, 2005)
- number of taxpayers per 1000 inhabitants (1990, 2005)
- number of dwellings built in the percentage of the dwellings (1991, 2005)
- number of persons in employment by the locality of place of work in the percentage of inhabitants (1990, 2001 - census)
- gross value added of enterprises by locality per inhabitants (1992, 2005)
- export revenue of enterprises by locality per inhabitants (1992, 2005)
- number of passenger cars per 1000 inhabitants (1992, 2005)

- number of international tourist nights at public accommodation establishments per 1000 inhabitants (1990, 2005)
- number of enterprises per 1000 inhabitants (1992, 2005)
- own revenues of local governments per inhabitants (1993, 2005)

The maximum value of this complex indicator is 100 theoretically – it means that the settlement have the maximum values of all indicators among the studied group of localities.

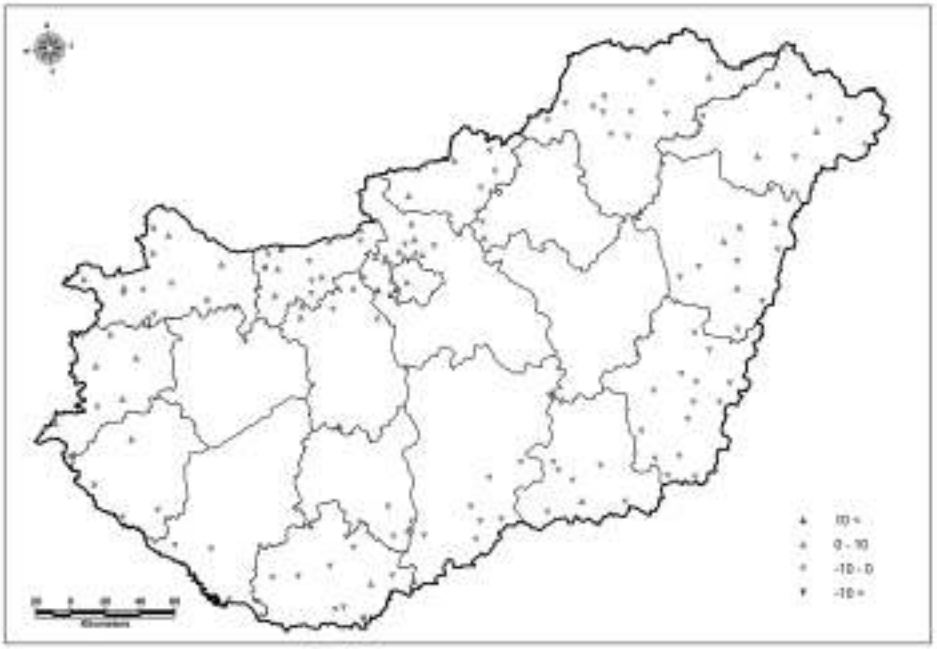

Figure 5. Changes in the development level of the localities between 1990 and 2005 (10 < - significant increase, 0-10 – moderate increase, -10-0 – moderate decrease, -10 > - significant decrease).
Source: Own calculation (TEiR databases)

There were already major disparities concerning the development of the settlements at the time of the political transition. It can be stated that settlements are located in the agglomeration of Budapest and along the borders of the western part of Hungary have been developed in the light of the weighted average (by the number of inhabitants) of the development index. The values are extremely high in the case of three settlements – Bábolna (it has been the most important centre of the extensive agricultural production), Bük and Harkány (the two internationally well-known thermal spas).

Some of the localities faced remarkable changes in the level of development between 1990 and 2005. (*Figure 5*) After creating groups from the given settlements by the sections of state border it is stated that the development level of the localities in the agglomeration of Budapest and along the north-western and western state borders has increased generally (*Nemes Nagy* 1996). The positions of the settlements located near the eastern border have stagnated or decreased. Naturally, there are exceptions in the eastern section of the border – the average value of the localities near the Hungarian-Ukrainian border has become better. The Hungarian-

Croatian border area showed depression during the examined time period by the calculated complex development indicator (*Figure 6.*).

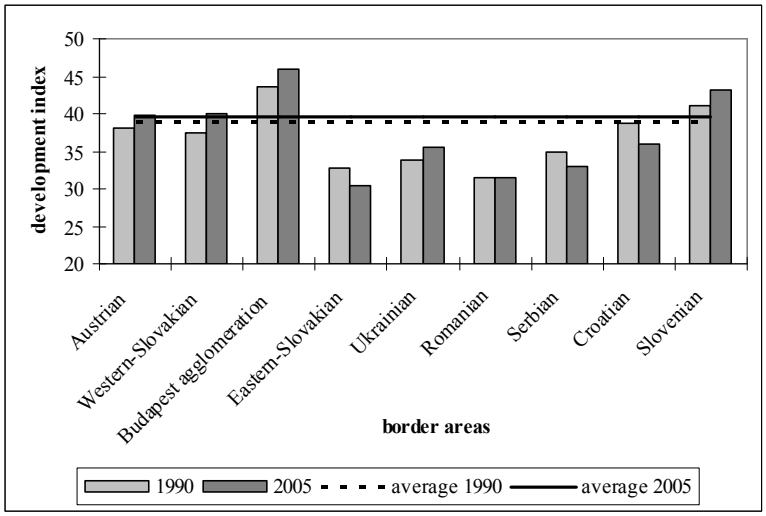

Figure 6. The average development level of the border areas in 1990 and 2005.
Source: Own calculation

The development pattern of the localities in the group of border areas has been modified since the political transition. The position of Budapest agglomeration has become more dominant compared to the average development level of the border areas. The Hungarian-Slovenian, Hungarian-Austrian and Hungarian-Western-Slovakian border areas indicate a higher development level than the average of 2005. The Ukrainian part of the eastern border area produced a relatively moderate increase, at the same time the Hungarian-Romanian border area stagnated (but it might decrease without the value of Debrecen) or declined compared to the development level in the early 1990's. (However, centres along the Ukrainian border area can be regarded as developed towns especially comparing to the smaller settlements of the given territory. This is the primary cause of the appearance of significant spatial inequalities in this part of the border zone (*Pénzes* 2007). The development level of the whole border area would be different.) The development of Budapest agglomeration is indicated by the settlements along the turn-off motorways (Budaörs, Törökbálint, Biatorbágy), which show extremely high increase. Only Bük has been able to hold its position among the 'top settlements'. The majority of settlements with decreasing development level is clearly seen along the eastern part of the state border.

The correlation between the development of settlements in the Budapest agglomeration and the potential values of the given area is relevant. The maximum values of the internal and total potential are located in the surroundings of Budapest. The values of internal potential are lower in the periphery (from a geographical point of view) therefore the role of external potential becomes more important in the pattern of the potential field. However, the emergence of the potential effects of the external economies also depends on the vitality of the economy on the other side of the border and the openness of a given state border. The localities in the north-western part of the country are in a favourable position from both aspects. There are settlements with relatively high external potential contribution on the eastern part of Hungary, but dynamism and development had emerged only in unique places. Current investigations also point out that those settlements that formerly had high development have been able to increase their development level.

Conclusions

In the current study, the theoretical effect of the 'melting' state borders on the economy of the border areas of Hungary was estimated with the help of the potential analysis adopted from physical methods. The results of the calculations strengthen the main conclusions of the references that are collected in the paragraph titled as "Effects of integration and the integration of borders".

On the one hand, the internal potential values are determined by the distance from Budapest and the border areas are represented as peripheries in the theoretical case of the closed boundaries (that was almost a real phenomenon during the socialist era). On the other hand, added potential values appear with the vanishing of the separating function of the borders and the unhindered success of the external effects. The features of the external effects depend on the economic character and development of the other side of the border. Due to the closeness of Vienna and Bratislava, the benefit of the north-western part of the Hungarian border area is clearly seen. The favourable situation of the given area can also explain the revaluation and development after the political transition. Finally, the example of the settlements from the Hungarian-Ukrainian section of the state border illustrates that the weak external effects might have significant contribution to the total potential values in case of a border area located far away from Budapest. Unfortunately, the external potential effects on the eastern and southern peripheries are mainly theoretical, but the influence of the foreign direct investments and the increasing demand for skilled employees in Western-Romania has started to increase. However, the presented situation will be modified by the current financial and economic crisis, but the territorial effects cannot be investigated yet due to the delay of the statistical data.

This investigation pointed out the places of adjacent and significant economic effects in the case of the border areas of Hungary in a theoretical way. The detected areas can be assumed as the stage of cross-border co-operations, mainly with economic orientation. This hypothesis is acknowledged by the cross-border flow of commuters and employees in the case of the areas with the highest values of external potential. A comparison between the theoretical and real pattern of the cross-border co-operations and flows might be the core question of a subsequent analysis.

References

Breuss, F. (2001): *Macroeconomic Effects of EU Enlargement for Old and New Members*. Vienna University of Economics and Business Administration, Research Institute for European Affairs, Vienna

Brown, W. M.-Anderson, W. P. (2002): Spatial markets and the potential for economic integration between Canadian and U.S. regions. *Papers in Regional Science* 81. pp. 99-120.

Bröcker, J. (1998): How would an EU-membership of the Visegrád-countries affect Europe's economic geography? *Annals of Regional Science* 32. pp. 91-114.

Buettner, T.-Rincke, J. (2007): Labour Market Effects of Economic Integration: The Impact of Re-Unification in German Border Regions. *German Economic Review* 8. pp. 536-560.

Clark, C.-Wilson, F.-Bradley, J. (1969): Industrial Location and Economic Potential in Western Europe. *Regional Studies* 3. pp. 197-212.

Erkut, G.-Özgen, C. (2003): *The Economic and Spatial Peripherality of Border Regions in South-eastern Europe*. The 43rd European Congress of the Regional Science Association, Jyväskylä, Finland, 27-30 August.

Frost, M. E.-Spence, N. A. (1995): The Rediscovery of Accessibility and Economic Potential: The Critical Issue of Self-potential. *Environment and Planning A* 27. pp. 1833-1848.

Gorzelak, G. (1996): *The Regional Dimension of Transformation in Central Europe.* Regional Policy and Development 10. Regional Studies Association, Jessica Kingsley Publishers, London.

Hajdú Z. (2005): *Magyarország közigazgatási földrajza*. Dialóg Campus Kiadó, Budapest-Pécs.

Hansen, N. (1977): Border Regions: a critique of spatial theory and a European case study. *Annals of Regional Science* 11. pp 1-14.

Hardi T. (2001): Néhány földrajzi elmélet alkalmazása a Kárpát-medence határtérségeire és határ menti együttműködéseire. In: *A földrajz eredményei az új évezred küszöbén*, Magyar Földrajzi Konferencia, Szeged 25-27 October. http://geography.hu/mfk2001/cikkek/Hardi.pdf (downloaded: 22 August, 2007.)

Huber, P. (2004): An Empirical Analysis of the Regional Effects of European Integration. *The Impact of Integration on Wages and Employment in Border Regions Regional Labour Market Adjustments in the Accession Candidate Countries*. Workpackage No. 6.

Jakobi Á.-Kiss J. P. (2003): A lakossági jövedelmek kistérségi becslése. In: *Kistérségi mozaik*. (szerk.: Nemes Nagy J.) Regionális Tudományi Tanulmányok 8, ELTE Regionális Földrajzi Tanszék – MTA-ELTE Regionális Tudományi Kutatócsoport, Budapest. pp. 55-86.

Keeble, D.-Owens, P. L.-Thompson, C. (1982): Regional Accessibility and Economic Potential in the European Community. *Regional Studies* 16. pp. 419-432.

Kovács Z. (1990): A határ menti területek központhálózatának átalakulása az első világháború utántól napjainkig. *Földrajzi Közlemények* 38. pp. 3-16.

Kozma, G. (2006): The use of cross-border co-operation and border location in place marketing. *Eurolimes* (Journal of the Institute for Euroregional Studies "Jean Monet" European Centre of Excellence) 2. pp. 74-80.

Lőcsei H.-Szalkai G. (2008): Helyzeti és fejlettségi centrum–periféria relációk a hazai kistérségekben. *Területi Statisztika* 48. pp. 305-314.

Lösch, A. (1962): *Die räumliche Ordnung der Wirtschaft*. Gustaw Fischer Verlag. Stuttgart.

McCallum, J. (1995): National Border Matter: Canada-US Regional Trade Patterns. *American Economic Review* 85. pp. 615-623.

Nemes Nagy, J. (1994): Regional disparities in Hungary during the period of transition to a market economy. *GeoJournal* 34. pp. 363-368.

Nemes Nagy J. (1996): Centrumok és perifériák a piacgazdasági átmenetben. *Földrajzi Közlemények* 44. pp. 31-48.

Nemes Nagy J.-Tagai G. (2009): Területi egyenlőtlenségek, térszerkezeti determinációk. *Területi Statisztika* 49. pp. 152-169.

Niebuhr, A. (2004): *Spatial Effects of European Integration: Do Border Regions Benefit Above Average?* HWWA Discussion Paper, 307.

Niebuhr, A. (2005): *The Impact of EU Enlargement on European Border Regions*. HWWA Discussion Paper, 330.

Niebuhr, A.-Stiller, S. (2002): *Integration Effects in Border Regions – A Survey of Economic Theory and Empirical Studies*. HWWA Discussion Paper, 179.

Peach, J. (1997): Income Distribution along the United States Border with Mexico: 1970-1990. *Journal of Borderlands Studies* 12. pp. 1-16.

Pénzes, J. (2006): Relations between personal incomes and distances from the state borders in the North Great Plain Region. In: *Regional Development in the Romanian-Hungarian*

Cross-border Space – From National to European Perspective. (eds: Horga, I.-Süli Zakar, I.) Kossuth Egyetemi Kiadó, Debrecen. pp. 337-344.

Pénzes J. (2007): A területi jövedelemegyenlőtlenségek alakulása az észak-alföldi régióban. *Területi Statisztika* 4. pp. 358-379.

Petrakos, G.-Topaloglou, L. (2006): *Economic Geography and European Integration: The Effects on the EU External Border Regions*. Department of Planning and Regional Development University of Thessaly, Discussion Paper Series. 12. pp. 153-174.

Pfaffermayr, M.-Huber, P.-Wolfmayr, Y. (2004): Market Potential and Border Effects in Europe. *The Impact of Integration on Wages and Employment in Border Regions Regional Labour Market Adjustments in the Accession Candidate Countries*. Workpackage No. 6.

Pooler, J. (1987): Measuring Geographical Accessibility: A Review of Current Approaches and Problems in the Use of Population Potentials. *Geoforum* 18. pp. 269-289.

Ratti, R. (1993): Spatial and economic effects of frontiers. In: *Theory and Practice of Transborder Cooperation*. (eds: Ratti, R.-Reichman, S.) Helbing and Lichtenhahn, Basel. pp. 23-49.

Reichman, S. (1993): Barriers and Strategic Planning: Spatial and Institutional Formulations. In: *Theory and Practice of Transborder Cooperation*. (eds: Ratti, R.-Reichman, S.) Helbing and Lichtenhahn, Basel. pp. 55-64.

Smith, D. M.-Gibb, R. (1993): The Regional Impact of the Channel Tunnel: a Return to Potential Analysis. *Geoforum* 24. pp. 183-192.

Stewart, J. Q. (1941): An Inverse Distance Variation for Certain Social Influences. *Science* 93. pp. 89-90.

Stewart, J. Q. (1948): Demographic Gravitation: Evidence and Application. *Sociometry* 11. pp. 31-58.

Süli-Zakar, I. (1992): A study of state borders as factors blocking socio-economic progress in North-Eastern Hungary. *Hungarian Geographical Review* 40. (International edition) pp. 53-64.

Tagai G. (2007): A potenciálmodell erényei és korlátai a társadalomkutatásban. *Tér és Társadalom* 21. pp. 145-158.

Topaloglou, L.-Kallioras, D.-Manetos, P.-Petrakos, G. (2005): A Border Regions Typology in the Enlarged European Union. *Journal of Borderlands Studies* 20. pp. 67-90.

Tóth G. (2005): A potenciálmodell alkalmazásának lehetőségei az autópálya-nyomvonalak területfejlesztési szempontú vizsgálatában. *Gazdaság és Statisztika* 17. pp. 3-18.

Van der Velde, M.-Wever, E. (2005): *Border and labour market*. 1. Romanian-Dutch Geography Seminar, 19-22 May, 2005. Bucarest http://www.itax.at/pdf/VdV_BLM.pdf (downloaded: 18 January, 2008.)

Van Geenhuizen, M.-Van der Knaap, B.-Nijkamp, P. (1996): Trans-border European networking: Shifts in Corporate Strategy? *European Planning Studies* 4. pp. 671-682.

Van Houtum, H. (2000): An overview of European Geographical Research on Borders and Border Regions. *Journal of Borderlands Studies* (Special Issue on European Perspectives on Borderlands) 15. pp. 57-85.

Wieser, R. (2004): *Specialization and Concentration of Europe: The Impact of EU Enlargement. Institute of Public Finance and Infrastructure Policy*. Vienna University of Technology, Working Paper No. 01/2004.