

EFFECTS OF FDI INFLOWS ON REGIONAL LABOUR MARKET DIFFERENCES IN HUNGARY¹

Károly Fazekas²

Article received on November 25, 2003

Accepted on September 07, 2004

ABSTRACT. Post-transitional labour markets of the Central and East European countries have been characterised by marked regional differences. This paper will concentrate on the spatial pattern of job creation, determined by the allocation decisions of foreign and domestic investors. Regions with the highest employment rates may boast high doses of FDI inflows, while low employment regions have been suffering from the persistent lack of outside investments. The paper describes the regional distribution of foreign and domestic employment. The second section analyses the spatial distribution of FDI and domestic firms' employment, and points out the most important explanatory factors of their regional distribution. The third section discusses the time path of regional labour market differences in Hungary and measures the impact of foreign firms' net job creation on employment, in high and low employment regions. The last section concludes with some policy relevant messages.

JEL Classification: F02; F23; J40; R12.

Keywords: Local Labour Markets; FDI; Transitional Economies; Hungary.

RÉSUMÉ. Les marchés du travail dans les pays d'Europe centrale et orientale se caractérisent, après la transition, par des différences régionales accentuées. L'article se concentre sur la répartition spatiale de la création d'emplois, déterminée par les décisions d'investisseurs étrangers et nationaux. Les régions avec les taux d'emploi élevés peuvent se vanter de recevoir des flux importants d'IDE, alors que celles où le chômage est fort ont souffert d'un manque chronique d'investissements étrangers. S'appuyant sur des données microéconomiques, l'article analyse la distribution spatiale de l'IDE et de l'emploi et met en évidence les principaux facteurs explicatifs. Il étudie la dynamique des différences régionales de l'emploi en Hongrie, identifie les vainqueurs et les perdants de la transition et mesure l'impact de la création nette d'emplois des entreprises étrangères. Ces résultats conduisent à des recommandations de nature politique.

Classification *JEL* : F02 ; F23 ; J40 ; R12.

Mots-clefs : Marché du travail local ; IDE ; économies en transition ; Hongrie.

1. The first version of this paper was presented at the International Conference "Reinventing Regions in the Global Economy" organised by the Regional Studies Association. 12th-15th April 2003. Pisa Congress Centre. Pisa, Italy. The paper is prepared as a part of the National Research and Development Programme on "Knowledge-based Society and Labour Market in Hungary in the 21st Century" funded by the Ministry of Education of Hungary (Contract No: OM-00042/2002-5/180).

2. Károly FAZEKAS, Deputy Director, Institute of Economics, Hungarian Academy of Sciences, (fazekas@econ.core.hu).

■ INTRODUCTION

The aim of this paper is to investigate the impact of inflows of FDI on the growing labour market differences in Hungary during transition. Full employment, social equality, and balanced regional development had been the major explicit policy goals of the old regimes in Central and Eastern European countries (CEECs) for more than four decades. Transition to a market economy brought about dramatic changes in this field of "socialist achievements". Where full and life-time employment, scarcity of labour, and compressed income distribution used to be the standard, the situation is now the reverse in many respects. This system change in the CEECs has been accompanied by large scale redundancies, massive and frequently long-term unemployment, a high level of inactivity and growing income disparities. One of the most striking consequences of transition was the emergence of large regional gaps in terms of output, productivity, labour market activity, wage and income indicators (OECD, 1995; Boeri and Scarpetta, 1996; Keune, 1998; Huber and Wörgötter, 1999; Gács and Huber, 2003).

At the very beginning of the transition a rapid rise in regional labour market imbalances had to be addressed. This was an inevitable consequence of the high spatial concentration of industries hit by the collapse of the COMECON markets and was also a consequence of the fast decrease in agricultural employment in rural regions. The transitional crisis was over in a few years, yet there have been no signs of equalisation of regional differences. Despite an emerging inverse relationship between regional wage and unemployment levels, neither supply side nor demand side adjustment mechanisms proved to be sufficient in equilibrating regional disparities. Cross regional labour mobility has remained low while employers are still reluctant to relocate their activities towards high unemployment regions (Bornhorst and Commander, 2004).

In the case of Hungary indicators of regional labour market differences at the level of micro regions have been showing a steadily increasing trend in terms of the range of relative differences and increasing core-periphery division. Growing regional disparities were accompanied by two other important features: high rank stability on the one hand and polarisation of micro-regions on the other (Ábrahám and Kertesi, 1998; Fazekas, 1996, 2000; Nemes and Nagy, 2004).

Large scale dispersion, polarisation and rank stability of regions in terms of their labour market performance is not a unique feature of Hungary or other transitional economies. A series of empirical studies revealed that the variation in unemployment or employment rates between regions within countries was considerably greater than disparities between countries and there was a tendency of polarisation in Europe in the '90s. (Taylor and Bradley, 1997; Padoa Schioppa Kostoris, 1999; Overman and Puga, 1999, 2002). Dispersion and polarisation are driven by changes in the spatial distribution of the labour force (demographic trends, migration patterns, participation decisions) or changes in the spatial distribution of

employment³. Theoretical considerations of the *New Economic Geography* (Fujita, Krugman and Venables, 1999) and empirical studies (Overman and Puga, 1999; Padoa Schioppa Kostoris, 2002; Suedekum, 2004) revealed that the polarisation of local labour markets is mainly the result of employment changes as a consequence of agglomeration forces in economies.

The same tendencies apply to the Hungarian case as well. In the first three years following the collapse of the socialist economy (an important feature of which was full employment) approx. 1.5 million jobs (more than 30 percent of the total) disappeared. The high intensity of job destruction was accompanied by dynamic job creation in the following years of recovery (Kőrösi, 2003). Research results show invariably that while the intensity of job destruction portrays an equal regional distribution, the intensity of job creation follows an uneven spatial pattern (Nemes and Nagy, 2000). 2001)

There is no doubt that an important factor behind the changing location preferences of firms was the rapid expansion of the private sector, the massive inflow of foreign direct investments and the rapid increase of foreign firms' employment during the '90s. A sudden collapse of the socialist system offered an unprecedented opportunity for the CEECs to attract a huge amount of FDI in a short period of time. These countries had a number of industrial regions where relatively cheap and highly qualified labour was available. From the point of view of the host countries foreign investments are assumed to play a crucial role in economic restructuring (Barrell and Holland, 2000, 2001). Foreign capital can decisively promote the economic restructuring of local economies through the provision of capital, modern technologies and work organisation practices. Foreign capital is also a means of integration into the global economy and could provide positive spillovers of know-how for domestic firms in the region (Schoors and van der Tol, 2001; Sgard, 2001; Günther, 2002; Konings, 2000).

Hungary was quite successful in attracting FDI over the last ten years and several studies confirmed that FDI was the leading factor in the economic success of the recent years (Nemes and Nagy, 2000, 2001; Mickiewicz, 2000). In 2002, foreign investment enterprises (FIEs) included 8.1 percent of the total number of firms and 25 percent of the employees in the corporate sector. FIEs produced 46.8 percent of net sales, 43.3 percent of the value added and 83 percent of the net exports in the corporate sector (HCSO, 2004). The fast inflows of FDI had a great impact on the labour market. During the years of economic recovery (1993-2002) corporate sector employment increased by 22 percent, while more than two thirds of net job creation took place within the group of foreign enterprises.

The Core/Periphery concept used by the *New Economic Geography* models suggests that, in the presence of increasing returns, in the absence of congestion, of local externalities and of insufficient labour mobility, a stronger economic integration may widen regional gaps in

3. Elhorst (2003) provides an integrated overview of theoretical and empirical explanations used in applied literature on regional unemployment differentials.

terms of employment rates. Increasing flows of FDI are a crucial element of this process. Since the allocation preferences of the foreign firms differ from those of the domestic enterprises (Krugman, 1991 a, b, c) a massive increase of FDI in the world economy had a substantial impact on regional differences of the host countries and contributed to the regional polarisation process of recent years. The success of regions to attract FDI depends upon the competitive advantages of regions and is created and sustained by highly localised processes which are reinforced by the location capacity to attract resources from outside. Backward areas, not being attractive locations for foreign investors will suffer an increasing marginalisation (Iammarino and Santangelo, 2000).

In the second part of this paper, empirical evidence of the regional impact of FDI in Hungary is offered. We analyse the difference between the spatial distribution of foreign and domestic firms' employment over the last ten years and the most important explanatory factors of spatial concentration is identified. Then, the paper measures the impact of spatial concentration of foreign and domestic corporate employment in local labour markets. The final part concludes and gives a few policy relevant messages.

■ SPATIAL DISTRIBUTION OF FOREIGN AND DOMESTIC FIRMS' EMPLOYMENT IN HUNGARY

Data

The micro-regional distribution of the corporate sector will be analysed on the IE⁴-FDI micro-regional database of the IE-HAS⁵. The source of this data is the firm level Balance-sheet Corporate Database of the Hungarian Central Statistical Office (HCSO)⁶. This covers all incorporated firms and practically all firms employing more than five persons. In the IE-FDI micro regional database, a set of balance sheet data of all foreign and domestic enterprises⁷ was separately aggregated at NUTS⁸-4 level of regions. Data covers all years between 1993-2002. We will use NUTS-4 region level labour market data and a set of NUTS-4 region level background variables. Labour market data is aggregated from three settlement level data bases: (a) the Unemployment Register database of the National Employment Office, (b) the T-star database of the HCSO, (c) the Census database of the HCSO.

4. IE: Institute of Economics, Budapest.

5. HAS: Hungarian Academy of Sciences.

6. Balance-sheet Corporate Database does not provide relevant data on the spatial distribution of employment in the financial sector, therefore this sector was excluded from the micro regional data base.

7. Classification of foreign and domestic enterprises follows international standards: firms with more than 10 percent foreign share are regarded as foreign owned enterprises (FIEs). The average share of foreign capital in FIEs was 82.7 percent in 2000.

8. NUTS: Nomenclature of territorial units for statistics.

In the existing HCSO-FDI regional database, the firms are classified into regions according to the official location of the headquarters of the firms. This method, however, overestimates the spatial concentration of firms because premises located in different regions are taken into account as if they were located in the headquarters' region (Hamar, 1999). Since the balance sheets of the firms contain the settlement (location) code and the number of employees of each establishment of enterprises, this bias can be reduced by the re-distribution of firms' data between micro-regions in proportion to the branch's share in the total number of employees of the given firms⁹. Variables used in the following analysis are described in the APPENDIX 1.

Absolute spatial concentration of working age population, foreign and domestic firms' employment

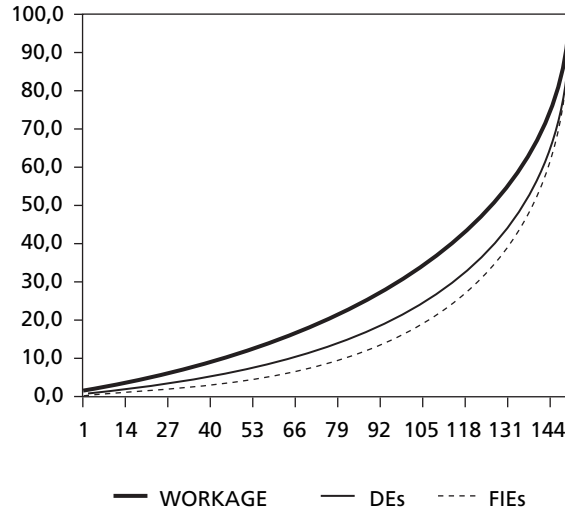
Studies on spatial distribution of FDI (Hamar, 1991; Fazekas, 2001) revealed that FDI inflows were highly concentrated in certain regions so it is not surprising that the concentration of FIE's jobs is much higher than the concentration of working age population and higher than the concentration of DE's¹⁰ employees (FIGURE 1). Nevertheless the difference between the concentration of FIE's and DE's jobs is not particularly high. The Gini coefficients of the working age population, DE's employees and FIE's employees were 0.50, 0.63 and 0.70 in 2002. 17.1 percent of the working age population, 23.0 percent of the domestic firms' employment and 23.5 percent of the foreign firms' employment were concentrated in one region: in the capital of the country. The top quartile of the micro regions (37 regions) having the highest shares covered 61.1 per cent of the working age population. 73.3 percent of the DE's jobs and 78.3 percent of FIE's jobs in 2002.

The time path of Gini coefficients shows that the difference between the degree of absolute spatial concentration of the FIE's and the DE's jobs has not changed and the degree of concentration has not decreased over recent years (FIGURE 2). However the difference between the shares of the top and bottom quartiles in the case of DE's employment decreased somewhat over the years. The share of the top quartiles increased from 70.4 percent to 73.3 percent while the share of the bottom quartiles decreased from 4.4 percent to 3.8 percent between 1993-2002.

9. We could not carry out this correction in the case of the financial sector hence firms operating in the financial sector were excluded from the micro regional database.

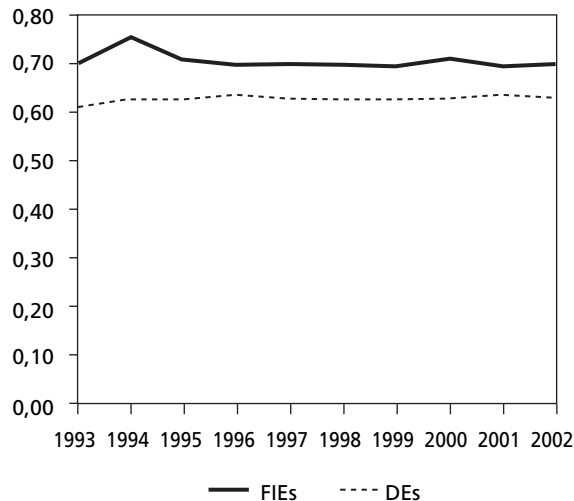
10. DE's: Domestic enterprises.

Figure 1 - Spatial concentration of working age population, FIEs and DEs employment in Hungary, in 2000 (Lorenz curves)



Note: Financial sector excluded.
 Source: Institute of Economics, FDI database.

Figure 2 - Time path of spatial concentration of FIEs and DEs employment, 1993-2002 (Gini coefficients)



Note: Financial sector excluded.
 Source: Institute of Economics, FDI database.

Relative spatial concentration of FIE's and DE's jobs

It is obvious that the corporate jobs are concentrated in regions where a relatively large pool of working age population is available. Using relative concentration indexes, we could measure the difference between the spatial distribution of FIE's or DE's jobs and the distribution of a benchmark variable (such as the working age population) through the following method:

$$FRCI_i = (FL_i / \Sigma_i FL_i) / (WAPOP_i / \Sigma_i WAPOP_i) \quad 0 < FRCI < \infty \quad (1)$$

$$DRCI_i = (DL_i / \Sigma_i DL_i) / (WAPOP_i / \Sigma_i WAPOP_i) \quad 0 < DRCI < \infty \quad (2)$$

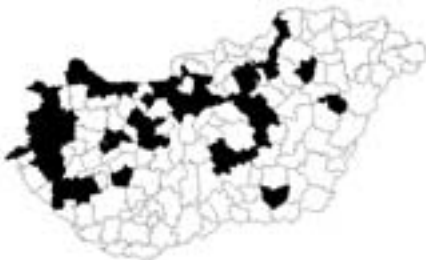
where:

- FL : Number of FIEs employees,
- DL : Number of DE's employees,
- $WAPOP$: working age population,
- (i) = region.

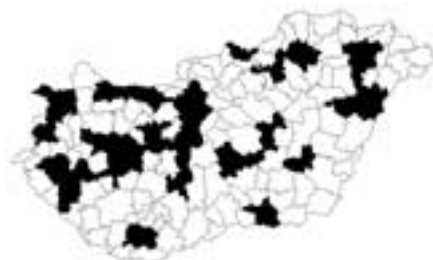
The indexes compare the share of FIE's and DE's jobs located in micro region i with the share of working age population located in region i in the year t . If $FRCI_i$ or $DRCI_i = 1$ in a micro region it means that the share of FIE's or DE's jobs located in the region matches that of the share of the working age population. When the region's FL or DL share is greater than the region's $WAPOP$ share, the concentration of foreign jobs in the region is greater than the concentration of the working age population in the regions. Conversely when $FRCI_i < 1$ or $DRCI_i < 1$ it means that the region's FL share or DL share is less than its share of working age population. The trend of $FRCI$ or $DRCI$ over time gives us a picture of the changing distribution of foreign or domestic firms' jobs at the level of micro-regions.

Figure 3 - Top quartiles of micro regions according to the relative concentration indexes of FIEs and DEs jobs in 2002

Top quartile by FRCI*



Top quartile by DRCI**



* FRCI = relative concentration index of FIE's jobs.

** DRCI = relative concentration index of DE's jobs.

Note: Financial sector excluded.

Source: Institute of Economics, FDI database.

The correlation coefficient between the FIE's and DE's concentration indexes was 0.43 in 2002. It indicates that besides the degree of concentration there are certain differences between the spatial distribution of FIE's and DE's employment. FIGURE 3 shows top quartiles of micro regions according to their relative concentration indexes in the year 2000. One can see that the relative concentration of FIE's jobs is the highest in most of the micro-regions along the Austrian border but also there are several regions of the top quarter in the eastern part of the country as well. The relative concentration of DEs' jobs does not show a clear east-west division.

Determinants of relative concentration of foreign and domestic firms

We can give a more detailed picture of the determinants of spatial concentration of FIEs' and DEs' jobs by estimating the *relative concentration* of jobs by regressions using selected explanatory variables. In the case of Hungary, a series of empirical studies revealed that regional differences in unemployment rates of micro-regions have been determined by three main factors: the industrial past of the regions, the proximity to the western portals and the education level of the local labour force. (Fazekas, 2000; Nemes and Nagy, 2004). Some papers (Hamar, 1999) revealed that regions along the Austrian border attracted exceptionally high FDI inflows from Austria. Using the following four variables¹¹ as proxies of these factors, we calculated repeated cross section regression estimation for the years 1993-2000:

- *EDU* (average number of completed classes in the local population, age 7+) a proxy of the education level of the local labour force,
- *INDUSTRY* (average ratio of employees in industry in the working age population in 1990) a proxy of the industrial heritage of the region,
- *ABORDER* (a dummy variable to identify micro-regions along the Austrian border) a proxy of special social and economic network existing between Austrian and Hungarian regions along the border,
- *DISTANCE* (distance of the region's centre from the most important crossing point at the Austrian border) a proxy of the proximity of the region to the western portals.

This approach produces estimates of the changing explanatory power of each variable over the 10 years by the following way:

$$FRCI_{it} = \alpha_0 + \alpha_1 EDU_{it} + \alpha_2 INDUSTRY_{i,90} + \alpha_3 DISTANCE_i + \alpha_4 ABORDER_i + u \quad (3)$$

$$DRCI_{it} = \beta_0 + \beta_1 EDU_{it} + \beta_2 INDUSTRY_{i,90} + \beta_3 DISTANCE_i + \beta_4 ABORDER_i + z \quad (4)$$

where:

- *FRCI* = relative concentration index of FIE's jobs,
- *DRCI* = relative concentration index of DE's jobs,
- *EDU* = average number of completed classes in the local population, age 7+,

11. Variables used in the equations are described in TABLE A1.2 in the APPENDIX 1.

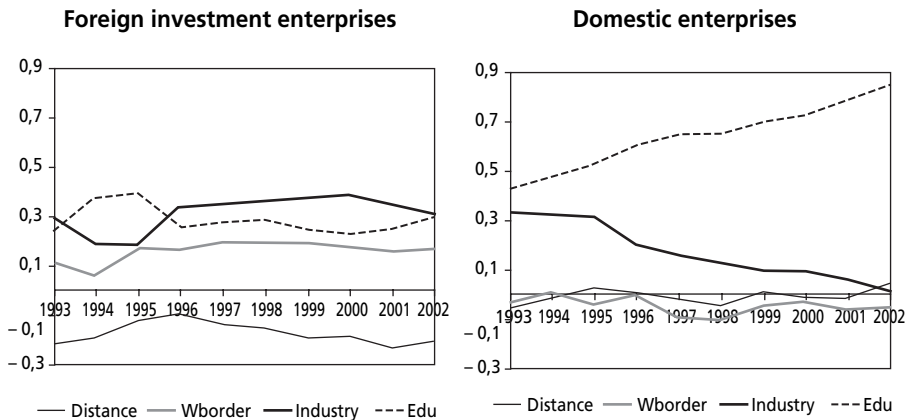
- *INDUSTRY* = average ratio of employees in industry in 1990,
- *DISTANCE* = distance of the region's centre from the Austrian border on road (km),
- *ABORDER* = dummy variable. Austrian border regions = 1, other regions = 0,
- α_k, β_k = regression coefficients,
- u, z = error terms,
- t = years of observation ($t = 1993-2002$),
- i = micro regions ($i = 1-150$).

The objective of the multiple regression estimation was to discover whether the explanatory variables are significant and to estimate the direction and the relative importance of each explanatory variable over recent years. We expect a significant positive impact of *EDU*, *INDUSTRY* and *ABORDER* variables and a significant negative impact of *DISTANCE* variable on the relative concentration of FIE's employment. We expect a significant positive impact of *EDU* and *INDUSTRY* variables and do not expect a significant impact of *DISTANCE* and *ABORDER* variables on the relative concentration of De's employment. The results of the estimations are summarised in TABLE A1.1 in the APPENDIX 1. Adjusted R^2 -s are between 0.38 and 0.51 in the case of foreign firms and between 0.42 and 0.65 in the case of domestic enterprises. FIGURE 4 shows the time path of the standardised correlation coefficients in both groups. These results correspond to most empirical studies on regional distribution of FDI in CEE countries. One can see that:

- *EDUCATION* had significant explanatory power over the years. Both FIEs' and Des' jobs concentrated in regions with an educated local population.
- In the case of domestic firms *DISTANCE* and *ABORDER* variables had no significant effects. The explanatory power of *EDUCATION* increased while the explanatory power of *INDUSTRY* decreased over the period and has had no significant effect over recent years. This tendency corresponds to the changing sector composition (increasing share of service sector and decreasing share of industry) in the group of domestic firms.
- In the case of foreign firms all four variables had significant effects on the relative concentration. FIEs' jobs concentrated in industrial regions close to the western border. *ABORDER* dummy and *EDU* variable had significant positive effect on the FIEs' jobs concentration. Apart from the turbulent first period of transition there were no major changes in the explanatory power of the variables over recent years.

According to our evaluation, one of the most important results is that the education level of the local population is an important determinant of the spatial distribution of both FIEs and DEs employment. Indeed, the effect of the *EDU* variable captures the effects of a number of externalities offered by urbanised regions. Regions with a relatively highly educated population have a high share of the service sector, developed infrastructure, high geographical density of firms, high density of NGOs etc. These variables have no significant effect in addition to the *EDU* variable and when we exchanged the *EDU* variable with any other the explanatory power of the estimation decreased.

Figure 4 - Time path of standardised correlation coefficients of linear regression estimations of relative concentration indexes, 1993-2002



IMPACT OF SPATIAL CONCENTRATION OF FOREIGN AND DOMESTIC FIRMS ON LABOUR MARKET DIFFERENCES

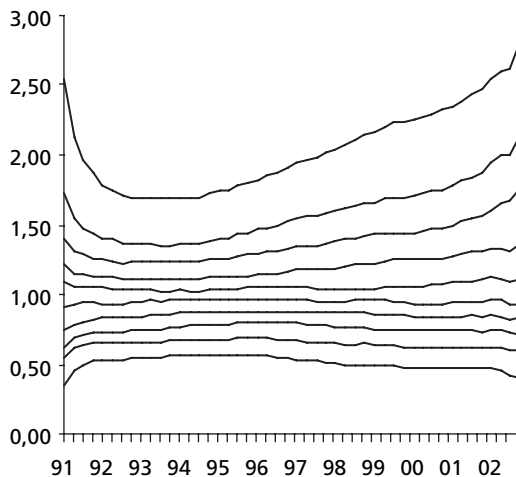
Winners and losers of transition at the level of micro regions

Indicators of regional labour market differences have been showing a steadily increasing trend in terms of the range of relative differences, polarisation and increasing core-periphery division. The Hungarian Central statistical Office provides a macro-region level¹² time series of the Labour Force Surveys and the national accounts. These data show that the decline in economic performance and employment has been much more severe in disadvantaged rural regions of the East and Southwest than in the more urbanised Central and North-western territories. Regional employment or unemployment rate differences at the macro-region level, however, are not particularly large by international comparison and did not tend to increase over recent years. The problem is that, in the case of Hungary, macro- or meso-region level analyses of labour market indicators give a distorted picture. Due to the relatively high travel costs of commuting and the underdeveloped transport infrastructure local labour markets (LLMs) are closed and fragmented in Hungary. The size of LLMs fits more into the category of "micro-regions". Thus, in the following part of the paper, we analyse regional differences at the level of micro regions.

12. There are 7 statistical-planning regions (NUTS-2 units), 19 counties and the capital, Budapest (NUTS-3 level units), 150 statistical micro-regions (NUTS-4 level units) and 3120 settlements (NUTS-5 level units) in Hungary. The average size of micro-regions is 620.2 km², the average number of the local population is 77279 and the average density of population is 108.5 cap./km². On the NUTS classification see: Eurostat, 1995.

Expressing mean registered unemployment rates¹³ of each decile of the 150 micro-regions in the percentage of the median at each period gives us a detailed picture of the time path of the relative unemployment rate differential at micro-regional level (FIGURE 5). We can see that big differences had appeared during the turbulent period surrounding the collapse of the old economy. In the second phase of transition, after a short period of decrease and stagnation, regional differences again began to increase, rising to the latest figures. The widening gap has been mainly generated by the continuously deteriorating position of the high unemployment regions.

Figure 5 - Time path of micro-regional unemployment rate differences, 1991/Q1 – 2002/Q3



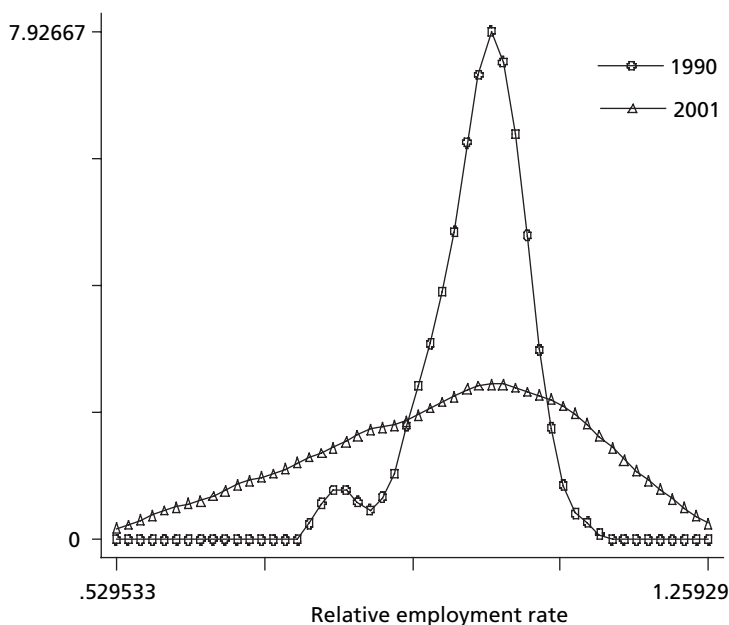
Source: National Employment Office, Unemployment register database.

Growing regional disparities were accompanied by two other important features: high rank stability on the one hand, and polarisation of micro-regions on the other. The majority of micro-regions which were in a relatively good position initially recovered faster from the transitional shock and turned out to be the winners of the post transitional period, while the vast majority of backward regions of the socialist economy were not able to overcome their disadvantageous status even following ten years of transition. High rank stability points to long term, hard-to-change explanatory factors behind the successes and failures of the micro-regions (Ábrahám and Kertesi, 1998; Fazekas, 1996, 2000; Nemes and Nagy, 2004).

13. The small sample size of the HCSO Labour Force Survey does not allow us to calculate micro-region level time series for different labour market status of the local population. Micro-region level registered unemployment rates time series can be calculated from the settlement level (Unemployment Register Data Base of the National Employment Office).

FIGURE 6 shows the Kernel density estimation¹⁴ of relative employment rates of micro-regions in 1990 and 2001. The two lines reflect *polarisation* of micro-regions. Not only the range of the relative employment rates, but also the density of regions at the low and high end of the distribution have increased during the 1990's. This polarisation has led to an emergence of sizeable groups of "extremely high" and "extremely low" employment regions.

Figure 6 - Kernel density of relative employment rates



Source: HCSO, Census 1990 and 2001.

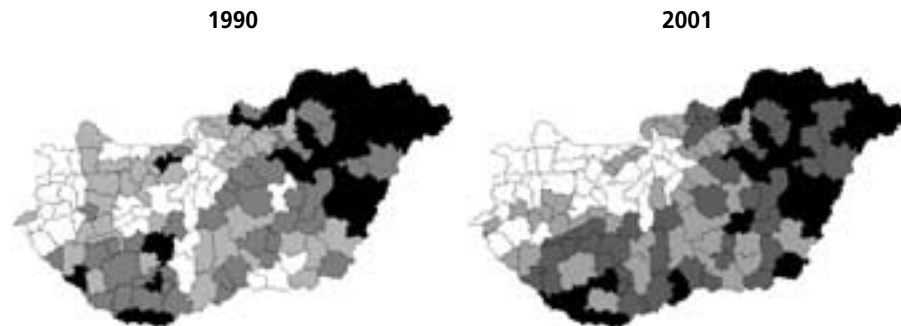
Grouping micro-regions into quartiles according to employment rates¹⁵ gives a simple but clearly defined picture of the "winners" and "losers" of transition at the level of LLMs. The top quartile (high employment) regions had a 65.7 percent employment rate in 2001, covered 20.3 percent of the territory and 38.8 percent of the population of the country. The corresponding figures of the bottom quartile (low employment) regions were: 40.9 percent,

14. Kernel density estimators approximate the density of $f(x)$ from observation on x . The range is divided into intervals and estimates of the density at the centre of intervals are produced. One difference between histograms and kernel density estimates is that the intervals are allowed to overlap. One can think of sliding the interval – called a window – along the range of the data and collecting the center point density estimates. The second difference is that a weight between 0 and 1 is assigned based on the distance from the center of the window and it is the weights that are summed. The function that determines those weights is called the kernel. Kernel density estimates have the advantages of being smooth and of being independent of the choice of origin, corresponding to the location of the bin in the histogram (abbreviated from STATA, Reference Manual, Release 4., p. 481).

15. Employment rate = (employed population / working age (15-64) population) * 100.

24.6 percent and 14.1 percent. FIGURE 7 shows the geographical distribution of top and bottom quartiles of micro-regions in 1990 and 2001. One can see a clear east-west, core-periphery division before and after the transition. The central agglomeration and regions along the main east-west transport routes in the direction of Graz and Vienna have the highest employment rates while most of the low employment regions are located at the periphery, along the East-Slovakian, Ukrainian, Romanian and Croatian borders. Comparing the two maps, it is striking that the core-periphery division of micro-regions has become stronger over the 1990s. The average distance of the high employment regions from the main Austrian border crossing point (Hegyeshalom) decreased from 150 km to 111 km (-26%) while the average distance of the low employment regions increased from 349 to 352 km (+1%)¹⁶. The correlation coefficients between the average employment rates of micro-regions and average distance of the region's centre from the Austrian border changed from -0.54 to -0.77 between 1990-2000.

Figure 7 - Spatial distribution of micro-regions in the four quartiles of employment rates



Note: White: top quartile-high employment micro regions; Black: bottom quartile-low employment micro regions.
Source: HCSO, Census 1990 and 2001.

Impact of FDI on employment in high and low employment regions

TABLE 1 indicates that the spatial concentration of corporate sector employment in the developed urban centres has substantially increased labour market differences during recent years. Allocation preferences of foreign firms had a further important positive impact on these processes. The number in corporate employment increased by 404 thousand (22.2 percent) in Hungary between 1993-2002. This increase referred to the 6.6 percent of the working

16. Distance of the high and low employment regions means the average minimum distance of the region's administrative centres from the Austrian border (Hegyeshalom) on public road weighted by the number of working age population.

age population of the country. More than two thirds of the net job creation was within the group of foreign firms. Number of FIEs employees increased by 91.1 percent while the number of DEs employees increased by 8.8 percent.

Table 1 - Changes of corporate employment in the low and in the high employment regions between 1993-2002

	Changes in the number of employees 1993 = 100 (%)			Changes in the number of employees as a percentage of the working age population (%)		
	DEs	FIEs	Total	DEs	FIEs	Total
Low employment regions Bottom quartile ^a	-14.6	+79.2	-4.6	-2.5	+1.6	-0.9
High employment regions Top quartile ^a	+13.8	+106.0	+30.9	+4.1	+7.1	+11.2
Country total	+8.8	+91.1	+22.2	+2.2	+4.4	+6.6

a. Quartiles of micro regions according to the average of employment rates in 2000.

Note: Financial sector excluded.

Source: Institute of Economics, FDI database.

The number of corporate jobs increased by 31 percent in the high employment regions and decreased by 4.6 percent in the low employment regions. These changes increased the employment rates by 11.2 percentage points in the high employment regions and decreased the employment rate by 0.9 of a percentage point in the low employment regions.

The vast majority (67 percent) of the net increase was within the foreign enterprise sector and 64 percent of the increase of FIEs jobs was concentrated in the high employment regions. The number of the FIEs jobs increased by 106 percent in the high employment regions and increased by 79.2 percent in the low employment regions. These changes increased the employment rates by 7.1 percentage point in the high employment regions and by 1.6 percentage point in the low employment regions. The number of DEs jobs increased by 13.8 percent in the high employment regions and decreased by 14.6 percent in the low employment regions. These changes increased the employment rate by 4.1 percentage points in the high employment regions and decreased the employment rate by 2.5 percentage points in the low employment regions.

Why do not corporate jobs flow towards less developed regions?

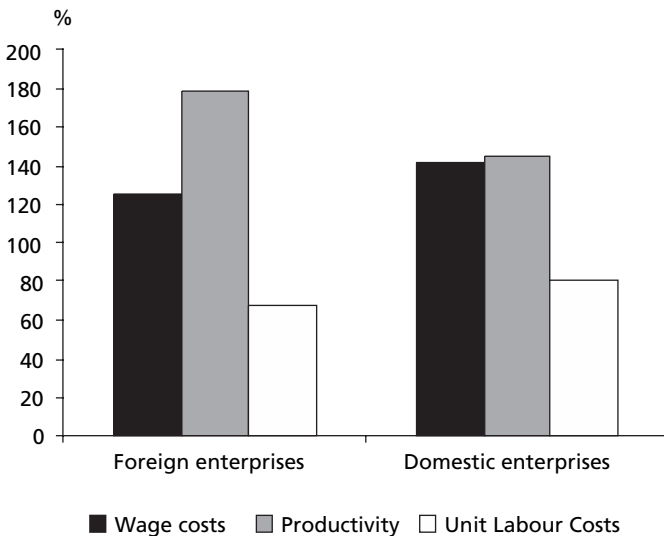
Despite continuous efforts taken by regional policy to attract investment to low employment regions, despite increasing scarcity of skilled labour in high employment regions¹⁷ and despite

17. Regional unemployment/vacancy statistics show increasing scarcity of (skilled) labour in the most developed regions and an increasing stock of job seekers in the depressed regions.

marked wage differences between high and low unemployment regions¹⁸ spatial concentration of FIEs and DEs employment has not decreased over recent years, and corporate jobs have not moved towards low employment regions. On the contrary, low employment regions lost, while high employment regions gained corporate (mostly FIEs) jobs during recent years.

It is not difficult to understand the reluctance of firms to move towards less developed, low employment regions if we compare the regional differences of productivity and the unit labour costs of foreign and domestic firms. FIGURE 8 shows regional differences in wages, productivity and unit labour costs between firms in manufacturing firms operating in high and low employment regions. One can see that there are substantial regional differences in both groups. Wage costs are higher in high employment regions than in low employment regions, but because of the high productivity the unit labour costs of firms operating in high employment regions is less than 80 percent of those settled in low employment regions. Besides region-specific factors (proximity, density of firms, externalities offered by urban agglomerations etc) the regional productivity gap has been influenced by a number of firm specific factors, such as sector composition, technologies and labour/capital ratio. Unfortunately, we do not have sufficient data to separate firms' specific and region specific effects.

Figure 8 - Wage costs and productivity for the firms settled in high employment regions, compared to the firms settled in low employment regions, 2002



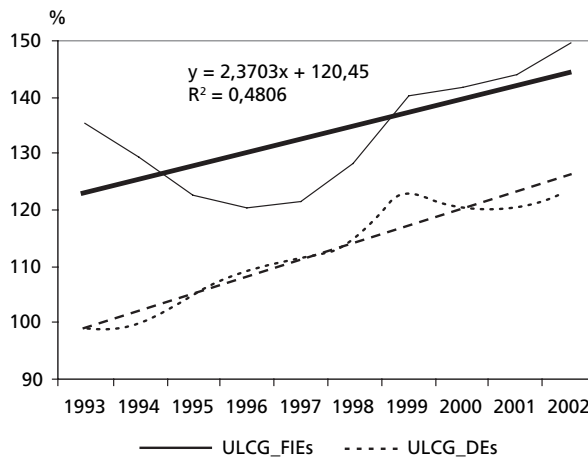
Note: Firms settled in low employment regions = 100.

Source: Institute of Economics, FDI micro-region database.

18. Empirical studies on regional wage differences revealed that due to the increasing regional differences in unemployment and vacancy rates a regional wage curve was born in Hungary and the elasticities of wages towards unemployment rates were more or less the same as in the market economies (Köllő, 2002).

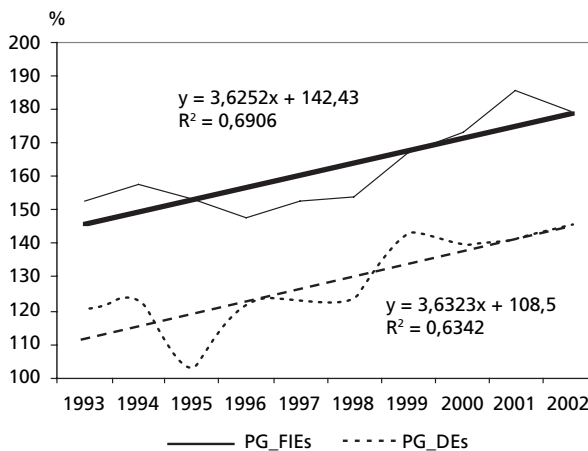
Nevertheless, the time paths of regional gaps in the case of FIEs and DEs reveal a striking tendency. (FIGURES 9 and 10) The regional gaps of productivity and unit labour costs between firms in manufacturing settled in high and low employment regions have substantially increased in both groups over the last ten years.

Figure 9 - Time path of the unit labour costs gap between firms settled in low and high employment regions



Note: ULCG (Unit labour cost gap) = (Average unit labour costs of firms settled in low employment regions)/(average unit labour costs of firms settled in high employment regions)*100.
 Unit labour costs = net sales/total wage costs.

Figure 10 - Time path of the productivity gap between firms settled in low and high employment regions



Note: Productivity gap = (average productivity firms settled in high employment regions)/(average productivity of firms settled in low employment regions)*100.
 Productivity = net sales/employees.

Factors behind the increasing wage, productivity and labour costs gap require a careful analysis which is beyond the scope of this paper. Nevertheless, we are convinced that increasing return to agglomeration is an important element of these effects. Regional spillover effects between firms could be an important element of agglomeration effects. A number of empirical studies indicate that regional productivity differences are reinforced by regional spillover effects between foreign and domestic enterprises (Moretti, 2002). The higher the density of foreign firms in the high employment regions, the stronger the spillover effect towards domestic (and foreign) firms and, as a consequence of this effect, the higher the productivity advantages of these regions are. According to empirical evidence from CEECs and especially from Hungary, the increasing density of FIEs has a significant positive effect on the productivity of domestic firms in the region (Campos, 2001; Sgard, 2001; Schoors and van der Tol, 2002). This could be one of the explanations for the increasing regional productivity gap between firms.

■ CONCLUSIONS AND POLICY IMPLICATIONS

In the previous parts of the paper we described the polarisation and the increasing core-periphery division of local labour markets in Hungary during transition. The driving force of this process was the fast integration of the country into the world economy and massive inflows of foreign direct investments into certain regions of the country. The bulk of net job creation in recent years was within the group of foreign firms and the vast majority of net job creation within the foreign firm sector was concentrated in high employment regions.

Foreign employment is concentrated in industrial regions with a favourable geographical location, and a high level of urbanisation. Domestic firm's employment was also highly concentrated in urbanised regions. Both foreign and domestic firms show stable spatial concentration and pattern of distribution. A large and increasing productivity gap between winner and loser regions is one of the explanations of this stability. Both foreign and domestic firms located in high employment regions are much more productive than firms located in low employment regions. Besides firm- and region specific factors, regional spillover effects between foreign and domestic firms could explain this tendency. Supply side alleviating mechanisms (migration, commuting) are too weak to stop or to decrease further polarisation of local labour markets.

What can we expect in the future and what should be done to stop further deterioration of backward regions? The majority of studies on the impact of the EU accession forecast the increasing attractiveness of accession countries towards FDI inflows. Are there relevant policy options to avoid the situation where further increase of FDI inflows follow the established pattern, i.e. increase regional differences and polarisation?

The second part of the paper demonstrated that the education level of the local population has a crucial impact on the competitiveness of local economies. Thus, one of the most important tasks is to raise education levels even in the remote rural territories of the country. It is a long term and costly program for central and local governments and requires a large scale develop-

ment of the educational infrastructure. Analyses of the explanatory factors of spatial concentration of FIE's jobs show that in addition to the education/urbanisation level and industrial past, the geographical location (i.e. distance from the EU borders) has a crucial impact on the attractiveness of regions. Distance could be decreased by the development of transport infrastructure and some urbanised South-Transdanubian, and North- and East-Hungarian regions could be connected to the most developed Central-Hungarian and West-Transdanubian agglomerations. The most challenging questions for the policy makers: What can be done in the case of remote rural regions along the north-east, east, and southern borders? How will the EU accession affect their position in the years to come? If we take into consideration the spatial consequences of globalisation and agglomeration, it is unrealistic to expect that the further deterioration of these regions could be stopped. There is however, a possibility that EU enlargement will improve the position of certain peripheral border regions. FIGURE 11 shows areas of influence of major cities in cross-border regions in Hungary. We can see that the present state borders deprive some remote rural regions from their historical urban centres.

Figure 11 - Areas of influence of major cities in cross-border regions



Source: Kovács, 1990.

Some of those cities like Kosice, Satu Mare, Oradea, Arad have a great potential to develop following the accession of their respective countries. Disappearing borders after joining the European Union offer a possibility for some remote Hungarian peripheral regions to access the developing local labour markets of urbanised regions located outside the existing border. On the other hand, in some developed border regions there are cities on the Hungarian side of the border (such as Pécs, Debrecen, Győr) which could have positive effects on backward rural regions situated in neighbouring accession countries.

K. F.¹⁹

19. The author expresses his gratitude to the two anonymous referees for their critics and comments on the preliminary versions of the paper.

APPENDIX 1

Table A1.1 - Results from the regression estimation

A. Foreign firms

Dependant variable = FRCI	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
DISTANCE	-0.217 -2.749 0.007	-0.198 -2.499 0.014	-0.120 -4.320 0.000	-0.094 -1.213 0.227	-0.136 -1.876 0.063	-0.149 -2.141 0.034	-0.187 -2.707 0.008	-0.186 -2.715 0.007	-0.228 -3.232 0.002	-0.206 -2.909 0.004
ABORDER	0.118 1.613 0.109	0.060 0.806 0.422	0.182 2.591 0.011	0.167 2.297 0.023	0.201 2.949 0.004	0.201 3.071 0.003	0.200 3.066 0.003	0.188 2.822 0.005	0.160 2.408 0.017	0.172 2.566 0.011
INDUSTRY	0.295 3.844 0.000	0.179 2.339 0.021	0.182 2.506 0.013	0.337 4.509 0.000	0.346 4.955 0.000	0.362 5.409 0.000	0.375 5.646 0.000	0.379 5.597 0.000	0.350 5.186 0.000	0.307 4.518 0.000
EDU	0.232 2.753 0.007	0.376 4.485 0.000	0.403 5.078 0.000	0.265 3.261 0.001	0.275 3.632 0.000	0.283 3.921 0.000	0.251 3.517 0.001	0.237 3.269 0.001	0.256 3.538 0.001	0.301 4.144 0.000
Adjusted R Square	0.377	0.377	0.428	0.390	0.465	0.504	0.510	0.486	0.489	0.484
F	23.240	23.394	28.879	24.774	33.423	38.837	39.778	36.279	36.698	35.878
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000	0.000
Number of observations	149	149	150	150	150	150	150	150	150	150

B. Domestic firms

Dependant variable = FRCI	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
DISTANCE	-0.043 -0.558 0.578	0.000 0.006 0.995	0.027 0.373 0.710	0.009 0.119 0.905	-0.020 -0.278 0.782	-0.040 -0.553 0.581	0.017 0.237 0.813	-0.006 -0.086 0.931	-0.004 -0.058 0.954	0.042 0.708 0.480
ABORDER	-0.023 -0.326 0.745	0.016 0.233 0.816	-0.026 -0.392 0.695	0.006 0.087 0.931	-0.086 -1.290 0.199	-0.088 -1.302 0.195	-0.037 0.561 0.576	-0.017 -0.275 0.783	-0.050 -0.837 0.404	-0.040 -0.711 0.478
INDUSTRY	0.3244 0.393 0.000	0.310 0.000 0.708	0.306 4.389 0.000	0.203 2.941 0.004	0.157 2.293 0.023	0.125 1.810 0.072	0.096 1.423 0.157	0.093 1.452 0.149	0.060 0.985 0.326	0.018 0.315 0.753
EDU	0.419 5.148 0.000	0.466 5.912 0.000	0.511 6.667 0.000	0.583 7.754 0.000	0.627 8.450 0.000	0.631 8.478 0.000	0.674 9.260 0.000	0.701 10.254 0.000	0.756 11.686 0.000	0.819 13.400 0.000
Adjusted R Square	0.418	0.457	0.476	0.483	0.485	0.474	0.492	0.547	0.593	0.645
F	27.76	32.18	34.83	35.60	36.14	34.53	36.83	45.60	54.93	65.88
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of observations	150	150	150	150	150	150	150	150	150	150

Note: Coefficient cells consist of coefficients, t values and significance.

Table A1.2 - Variables used in the analysis

Label	Content	Source
DISTANCE(<i>i</i>)	Average distance of the region's centre from the Austrian border on public road measured in km. (<i>i</i> = 1 – 150)	ANDROUTE database
ABORDER(<i>i</i>)	Dummy variable. (<i>i</i> = 1 – 150) (Austrian border regions = 1, other regions = 0)	
INDUSTRY(<i>t</i> , <i>i</i>)	Average ratio of employees in industry in the working age population in year <i>t</i> , in the micro region <i>i</i> . (<i>t</i> = 90; <i>i</i> = 1 – 150)	HCSO T-star
EDU(<i>t</i> , <i>i</i>)	Average number of completed classes in the local population, age 7+ in year <i>t</i> , in the micro region <i>i</i> . (<i>t</i> = 1990, 2001; <i>i</i> = 1 – 150)	HCSO Census
FL(<i>t</i> , <i>i</i>)	Number of FIEs employees in the micro region in year <i>t</i> , in the micro region <i>i</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	IE FDI database
DL(<i>t</i> , <i>i</i>)	Number of DE's employees in the micro region in year <i>t</i> , in the micro region <i>i</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	IE FDI database
WAPOP(<i>t</i> , <i>i</i>)	Working age (age 18-59) population of the micro region in year <i>t</i> in the micro region <i>i</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	HCSO T-star
FWAGECOSTS(<i>t</i> , <i>i</i>)	Total wage costs of FIEs settled in the micro region in year <i>t</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	IE FDI database
DWAGECOSTS(<i>t</i> , <i>i</i>)	Total wage costs of DEs settled in the micro region in year <i>t</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	IE FDI database
FSALES(<i>t</i> , <i>i</i>)	Total net sales of FIEs settled in the micro region in year <i>t</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	IE FDI database
DSALES(<i>t</i> , <i>i</i>)	Total net sales of DEs settled in the micro region in year <i>t</i> . (<i>t</i> = 1993 – 2002; <i>i</i> = 1 – 150)	IE FDI database

REFERENCES

- Ábrahám, Á., Kertesi, G., 1998. Regional unemployment rate differentials in Hungary 1990-1995 (The changing role of human capital). In: Halpern, L., Wyplosz, Ch. (Eds), *Hungary – Towards a Market Economy*, Cambridge University Press.
- Barrell, R., Holland, D., 2000. Foreign direct investment and enterprise restructuring in Central Europe, *Economics of Transition* 8 (2), 477-504.
- Barrell, R., Holland, D., 2001. Foreign direct investment in Central European manufacturing, in Weresa, M., (Ed), *Foreign Direct Investment in a Transition Economy*, London, SSEES.
- Boeri, T., Scarpetta, S., 1996. Regional mismatch and the transition to a market economy, *Labour Economics* 3, 233-254.

- Bornhorst, F., Commander, S., 2004. Regional unemployment and its persistence in transition countries, IZA Discussion Papers 1074, Institute for the Study of Labour (IZA).
- Campos, N.F., Kinoshita, Y., 2002. Foreign direct investment as technology transferred: Some panel evidence from the transition economies, William Davidson Institute Working Paper 438.
- Elhorst, J.P., 2003. The mystery of regional unemployment differentials: Theoretical and empirical explanations, *Journal of Economic Surveys* 17 (5), 709.
- EUROSTAT, 1995. Nomenclature of territorial units for statistics, Luxembourg, European Commission.
- Fazekas, K., 1996. Types of micro-regions, dispersion of unemployment, and local employment development in Hungary, *Eastern European Economics* 34 (3).
- Fazekas, K., 2000. Regional labour market differentials during transition in Hungary. In: Petracos, G., Maier, G., Gorzelak, G. (Eds), *Integration and Transition in Europe: The Economic Geography of Interaction*, Routledge, London.
- Fazekas, K., 2000b. The impact of foreign direct investment inflows on regional labour markets in Hungary, Budapest Working Papers on the Labour Market, BWP-2000/8, available on www.econ.hu.
- Fujita, M., Krugman, P.R., Venables, A.J., 1999. *The Spatial Economy: Cities, Regions, And International Trade*, MIT Press, Cambridge.
- Gács, V., Huber, P., 2003. Regional labour market problems in the candidate countries: A descriptive analysis, in Adjustment capability of regional labour markets, AccessLab, EU 5 Framework Programme, Workpackage 2, available on <http://accesslab.wifo.ac.at>.
- Günter, J., 2002. The significance of FDI for innovation activities within domestic firms. The case of Central East European transition economies, IWH Discussion Papers 162, Institut für Wirtschaftsforschung Halle.
- Hamar, J., 1999. A külföldi működőtőke beáramlás Magyarországon belüli területi jellemzői, (Regional characteristics of foreign direct investment in Hungary), *Külgazdaság* XLIII, March, 47-69.
- HCSO, 2001. Labour force survey, regional data, 1992-2000, Hungarian Central Statistical Office, Budapest.
- HCSO, 2004. Foreign direct investment in Hungary, 2001-2002, Hungarian Central Statistical Office, Budapest.
- Huber, P., Wörgötter, A., 1999. Local unemployment dynamics in Central and Eastern Europe: A comparison of three countries. In: Crampton, G., (Ed), *Regional Unemployment, Job Matching and Migration*, Pion, London, 35-48.
- Iammarino, S., Santangelo, G.D., 2000. Foreign direct investment and regional attractiveness in the EU integration process. Some evidence for the Italian regions, *European Urban and Regional Studies* 7 (1), 5-18.
- Keune, M. (Ed), 1998. Regional development and employment policy: Lessons from Central and Eastern Europe, ILO-CET, Geneva, Budapest.
- Kinoshita, Y., Campos, N.F., 2002. Why does FDI go where it goes? Evidence from transition economies, IMF Working Paper, WP/03/228, <http://www.imf.org/external/pubs/ft/wp/2003/wp03228.pdf>.
- Konings, J., 2000. The Effects of direct foreign investment on domestic firms: Evidence from firm level panel data in emerging economies, William Davidson Institute Working Paper 344.

Kornai, J., 1980. *Economics of Shortage*, Amsterdam: North-Holland.

Kovács, Z., 1990. A határmenti területek közúthálózatának átalakulása az I. világháború utántó napjainkig" (Transformation of public road network of border regions from the first World War), *Földrajzi Közlemények* 1-2., 3-16.

Köllő, J., 2002. Regional differences in earnings and wage costs. In: Fazekas, K., Koltay, J., (Eds), *The Hungarian labour market – 2002, review and analysis*, IE-HAS Budapest.

Körösi, G., 2003. Job creation and destruction in Hungary, Working Paper WP1/2003, Department of Economics, Central European University.

Krugman, P., 1991a. *Geography and Trade*, Cambridge, MA., MIT Press.

Krugman, P., 1991b. Increasing returns and economic geography, *Journal of Political Economy* 99 (33), 433-99.

Krugman, P., 1991c. History and industry location: The case of the manufacturing belt, *American Economic Review* 81, 80-3.

Mickiewicz, T., Radosevic, S., Varblane, U., 2000. The value of diversity: Foreign direct investment and employment in Central Europe during economic recovery, Working Paper 05/00, Sussex European Institute, University of Sussex, <http://one-europe.ac.uk>.

Moretti, E., 2002. Human capital spillovers in manufacturing: Evidence from plant-level production functions, NBER Working Paper Series, Working Paper 9316, <http://www.nber.org/papers/w9316>.

Nemes Nagy, J., 2000. The new regional structure in Hungary. In: Petracos, G., Maier, G., Gorzelak, G. (Eds), *Integration and Transition in Europe: The Economic Geography of Interaction*, Routledge, London.

Nemes Nagy, J., 2001. New regional patterns in Hungary. In: Measburger, P., Jöns, H. (Eds), *Transformations in Hungary. Essays in Economy and Society*, Physica Verlag, Heidelberg.

Nemes Nagy, J., 2004. The influence of location and education on regional inequalities in Hungary. In: Fazekas, K., Koltay, J. (Eds), *The Hungarian labour market – 2004, review and analysis*, IE-HAS, Budapest.

OECD, 1995. The regional dimension of unemployment in transition countries. A challenge for labour market and social policies, OECD, Paris.

Overman, H.G., Puga, D., 1999. Unemployment clusters across European regions and countries, CEP Discussion Paper 434, Center for Economic Performance, London School of Economics.

Overman, H.G., Puga, D., 2002. Unemployment clusters. Nearness matters within and across Europe's borders, CEP Discussion Paper 434, Center for Economic Performance, London School of Economics.

Peri, G., Cunat, A., 2001. Job creation in Italy: Geography, determinants and perspectives, HWWA Discussion Papers 133.

Padoa Schioppa Kostoris, F., 1999. Regional aspects of unemployment in Europe and Italy, CEPR Discussion Paper Series 2108, Centre for Economic Policy Research.

Padoa Schioppa Kostoris, F., 2002. Unemployment dynamics of the 'Mezzogiorno of Europe': Lessons for the Mezzogiorno of Italy, CEPR Discussion Paper Series 3594, Centre for Economic Policy Research.

Schoors, K., van der Tol, B., 2002. Foreign direct investment spillovers within and between sectors, Evidence from Hungarian data, Ghent University Working Paper 2002/157, http://fetew.ugent.be/AlgEco/Cerise/publications/FDIspillover_rugpaper.pdf.

Sgard, J., 2001. Direct foreign investments and productivity growth in Hungarian firms, 1992-1999, CEPII Working Paper 2001-19, www.cepii.fr.

Suedekum, J., 2004. Increasing return and spatial unemployment disparities, HWWA Discussion Paper 256.

Taylor, J., Bradley, S., 1997. Unemployment in Europe: A comparative analysis of regional disparities in Germany, Italy and the UK, *Kyklos* 50 (2), 221-245.

