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Laura Resmini

**Economic Integration and
Industry Location in
Transition Countries**

Working Paper

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Economic Integration and Industry Location in transition countries

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Abstract

Recent developments in international trade theory predict that increased globalization will be associated with increased locational concentration of economic activities, and hence increased specialisation of national and regional economies. Relative little empirical evidence exists on whether these predictions are correct, mainly as far as Central and Eastern Europe is concerned. This paper aims at analysing the integration-location relationship in four candidate countries during the 1990s. It demonstrates that the economic integration with the EU has changed industry re-location processes within candidate countries, bringing to a spatial organisation of manufacturing productions less inward-oriented and more evenly distributed across regions than it was at the beginning of the transition process.

Keywords: industry location, economic integration, transition countries

JEL codes: R12, F15, P20.

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ECONOMIC INTEGRATION AND INDUSTRY LOCATION IN TRANSITION COUNTRIES

1. Introduction

The past decade has witnessed an unprecedented deepening and widening of the European integration process. In 1995 Austria, Sweden and Finland joined the European Union (EU), bringing the present members to 15. In the meantime, the EU was transforming into a monetary union, yielding the highest level of economic integration which was ever reached by different national entities in the real world. Always during the 1990s, an even more ambitious project was launched, that is, the further enlargement of the EU to Central and Eastern European countries (CEECs). Since the fall of the Berlin wall these countries had started and implemented their processes of transition towards democracy and market economy with the financial and institutional aid of the EU itself. As a first result of these joint efforts, eight CEECs will become full members of the EU on May, 2004.

This process of *institutional* integration has been preceded and supported by an *economic* process of integration, led mainly by two forces, trade and foreign direct investments (FDI).

After the break up of the Council for Mutual Economic Assistance in 1991, CEECs started to liberalise their trade. There was a tremendous expansion of trade, which virtually doubled during the decade. The increased openness of CEECs was accompanied by a dual trend in the pattern of their trade: geographical, with an expansion of trade with the EU, and in terms of products, with a progressive increase in the share of manufactured goods. At the end of the 1990s, the EU was the major trading partner of CEECs, accounting on average for about 65 percent of their total trade, while transition countries yield a share of about 10 percent in the EU's external trade, becoming the second most important trading partner of the EU after the United States. Trade in manufacturing accounts for about 80 percent of total trade, two thirds of which involve miscellaneous products, machinery and transport equipment both on import and export side.

Foreign direct investment transactions in the CEECs experienced significant growth since the beginning of the transition process, bringing financial capitals, technology as well as marketing and organisational knowledge into the host countries. Inward FDI flows soared from USD 572 millions in 1990 to USD 22,824 millions in 2001, not considering the Balkans

and the CIS. Nearly 80 percent of this impressive inflow of FDI came from the EU and about 50 percent of total FDI positions has been attracted by manufacturing.¹

The economic integration process of the CEECs into the EU has been deeply analysed during the past decade, both on trade and FDI side. Today, there is a widespread consensus on the determinants of FDI (Resmini, 2000; Bevan and Estrin, 2000), western multinationals location choices and strategies (Campos and Kinoshita, 2003), changes in CEECs' trade patterns and composition (Djankov and Hoeckman, 1996; Dohrn, 2001 and Weise *et al.*, 2001) and their relationships with FDI (Brenton and Di Mauro, 1997), as well as the stimulating role played first by the EU trade policy and then by the Europe Agreements in shaping the openness process of transition economies (Kamiski, 2001). The most neglected aspect of this impressive exercise of trade and FDI liberalisation concerns its spatial implications.²

Economic integration, i.e. the removal of barriers to trade and factor mobility, in principle allows more efficient patterns of production and yields welfare improvement on aggregate level. However, it may be expected to have distributional effects, since adjusting patterns of production is not costless for the initially segmented economic systems. Recent advances in international economics go in this direction, suggesting that regional free trade agreements may change industry location patterns within and across countries (Krugman, 1991; Hanson, 1996 and 1998).

My objective in this paper is to study the effects of economic integration with the EU on regional patterns of industry location in four candidate countries, namely Bulgaria, Estonia, Hungary and Romania. I look at the two driving forces of economic integration, trade liberalisation and FDI, and analyse two issues. First of all, I consider *where* industries relocate. Location is an important determinant of transport costs and market access. Thus, region's geographical position within the country or along its borders may condition region's adaptation processes to trade liberalisation and market integration. Secondly, I analyse *which* industries relocate in order to understand whether or not industry specific features, such as factor intensities and scale economies, reduce or amplify the impact of the enlargement process, as suggested by the economic literature.

Since the EU aims at "reducing disparities between the levels of development of the various regions" (Treaty of Rome, art. 158), to shed some light onto these issues might be of

¹ Figures for trade and FDI in transition countries have been drawn by Eurostat, *Statistics in focus*, several issues and UNCTAD, *World Investment Report*, various years.

some interest to policy makers, too, especially in the context of designing appropriate regional policies.

The body of the paper contains six sections. Section two provides an overview of the theoretical framework and develops the hypotheses. Since integration is driven by two forces, a distinction is made between trade and FDI effects. Section three presents evidence for the location of the manufacturing activity and multinational firms in the considered countries. Section four contains details of the data, the specification of the model and the methodology adopted to verify the hypotheses. Section five discusses the results, while section six presents a summary and conclusions.

2. Theoretical foundations

2.1 Industry location and trade integration

In the neo-classical trade model, industry location depends on the specialisation of the territorial unit under consideration in line with the comparative advantages, which, in turns, are the results of exogenous differences across locations (geography, factor endowments, technology).

The new trade theories and economic geography models³, emphasise the endogenous nature of location processes which are by-products of pecuniary externalities associated with demand and supply linkages (Krugman, 1995; Krugman and Venables, 1990 and 1995; Venables 1996).

Economic integration, i.e. the lowering of distance costs broadly considered, will in the first group of models sharpen the location's comparative advantage, giving rise to a division of labour across locations. In the second group of models, instead, it may yield to industrial agglomerations. If markets become more integrated, in fact, economies of scale will be better exploited by concentrating the production locally. Thus, large markets will attract more and more economic activity at the expenses of small peripheries. In other words, market size generates a cumulative effect with respect to the location of industry.

The agglomeration story, however, is a little bit more complicated, since not only it involves increasing returns to scale and transportation costs, but also dispersion forces, such as congestion costs and pro-competitive effects. Thus, industry location is the result of a

²Very recently, Petrakos, Maier, and Gorzelak (2000) and Traistaru, Njikamp and Resmini (2003) have started to shed some light onto this issue.

³ See Fujita *et al.*, 2000 and Fujita and Thisse, 2002 for an extensive survey of these models.

complex balance between agglomeration and dispersion forces. This trade-off displays a rich menu of possibilities, when economic integration is taken into consideration.

First of all, economic integration changes the reference market for firms producing in a country. Given transportation costs, trade liberalisation will shift resources to regions with a better access to foreign markets, such as border regions and port cities. However, the presence of agglomeration effects implies that locations' size and specialisation may affect their adaptation processes to economic integration. In particular, it has been demonstrated that agglomeration of the economic activities is more likely to take place in sectors where increasing returns are intense, market power is strong, customers and/or suppliers are easily mobile and trade costs are low (Ottaviano, 2002). The reason is that increasing returns to scale and market power weaken the competitive effect, while a higher degree of mobility of economic agents amplifies the market effect. Trade costs affect both agglomeration and dispersion forces; however, when trade costs are low market access advantages grow while competition effects weaken, eventually leading to agglomeration. The opposite happens with high trade costs.

Plugging these considerations into the case of transition countries, it is likely that the economic integration with the EU has reduced the inward orientation of most of manufacturing activities. As a consequence, domestic markets should have become less important and the relative attractiveness of domestic centres should have been reduced over time. This might have caused movements of economic resources from close economy industry centres to new ones, probably located closer to the EU than the previous ones. Regions bordering directly with present EU members or endowed with ports and infrastructures that allow a direct link with Western markets might be among these new locations. Thus, trade integration with the EU is likely to generate changes in regional specialisation and industry concentration patterns in favour of less centralised regions.

2.2 Industry location and FDI liberalisation

Although this story does not consider the nationality of the firms involved in the agglomeration processes, the simultaneous presence of domestic and foreign firms in the same location may further complicate the picture previously described.

Foreign firms are different from domestic ones, since they have to overcome the extra-costs of operating in another country (Dunning, 1993). These differences consist of a higher productivity – due to a superior technology and knowledge – and wages paid to employees, and a more export orientation than domestic firms (Markusen, 1995). These superior

characteristics should in principle offer important benefits in terms of technology spillovers to host countries, though the transmission process is not automatic. FDI, in fact, may also lead to undesirable outcomes, such as direct (through competition) or indirect crowding-out of local capabilities, as suggested by several scholars and proved by a number of empirical works (Blomstrom and Kokko, 1997; Grabher, 1992).⁴ Applying this reasoning to industry location is very simple: if positive externalities overcome negative effects, domestic firms will have an incentive to locate close to foreign firms. If this is the case, a self-sustaining development process will occur, with backward and forward linkages acting as engines of this cumulative causation process (Rodriguez-Clare, 1996; Markusen and Venables, 1999).

Overall, these considerations indicate that also investment liberalisation may lead to different patterns of industry (de)agglomeration within the host countries. The final result will depend first of all on foreign firms' location choice and then on the type of interaction with domestic firms.

3. The geography of production: facts and relationships

This section provides evidence on the location of the manufacturing sector in Bulgaria, Estonia, Hungary and Romania during the 1990s both at regional and sectoral level. In order to constrain the available information within a tractable range, regions have been classified according to their geographical location along the border (BORDER) or within the country (INT). Moreover, the former have been further disaggregated in regions bordering with the EU-15 (BEU), with other candidate countries (BAC) or with countries not presently involved in the enlargement process (BEX). Capital districts have been considered as separate territorial units, regardless of their geographical location.⁵ Manufacturing activity has been measured in term of employment and figures come from REGSPEC database. Seven branches – roughly corresponding to NACE Rev. 1 one digit classification – have been considered, three of which can be classified as sectors with increasing returns to scale (Francois, 1998).⁶

⁴ See Blomstrom and Kokko, 1997 and ALFARO and Rodriguez-Clare, 2003 for a comprehensive survey on how foreign firms affect host countries' economy at theoretical and empirical level, respectively. UN-ECE, 2001 summarises the existing empirical evidence on FDI and spillovers in the case of CEECs.

⁵ Differently from what happens in the other countries of the sample, Tallinn is not a separate district. Thus, I consider as capital district the whole region which it belongs to, Pohja-Eesti. Therefore, Tallinn's performance is not directly comparable with that of the other capital districts included in the sample.

⁶ A finer sectoral classification was not possible, because of the lack of homogeneous data among countries. See the Appendix for regions' classification and manufacturing sectors' description. REGSPEC database covers five candidate countries and includes several variables at regional level (employment, GDP, number of domestic and foreign firms, population, infrastructures, average earnings, etc.). It has been built on with the financial support of the European PHARE-ACE Program 1998. For further information, see Traistaru and Iara, 2000.

Denoting the employment of industry j in region i at time t as E_{ijt} , I first define a measure of regional relative to overall domestic manufacturing activity as follows:

$$L_{it} = \frac{\sum_j E_{ijt}}{\sum_j \sum_i E_{ijt}} \quad (1)$$

Figure 1 plots regions' shares of total employment in 1992 on the horizontal axis and the average growth rate of these shares in the period 1992-1999 on the vertical axis. What the figure shows is that during the last decade some de-agglomeration processes have occurred.

At the beginning of the period, industry location seemed to follow a core-periphery pattern, with about 50 percent of the manufacturing activity located in internal regions and/or capital districts⁷. In Estonia about 50 percent of the manufacturing activity was located in Tallinn's region and another 30 percent in the other BEU regions.⁸ As far as the other countries are concerned, border regions were penalised almost everywhere, with the lowest levels of manufacturing activity (less than 10 percent) concentrated in Hungarian and Bulgarian regions bordering with western countries and the highest one (about 30 percent) in Hungarian BAC regions.

This picture has changed during the 1990s. Regions which gained the most in terms of employment have been those with the lowest relative shares in 1992, namely BEU regions in Hungary and Bulgaria, BEX regions in Romania and BAC regions in Estonia. Few groups of regions were penalised, namely capital districts with the exception of Sofia, BAC regions in Bulgaria and Hungary and BEU regions in Estonia. These patterns of de-agglomeration have been more intense in Estonia and Hungary, while only marginal changes have affected industry location patterns in Romania, where only the capital district shows negative rate of growth in manufacturing employment.

Hence, in 1999 manufacturing activity seemed to be more evenly distributed between border and internal regions in all countries, though these process of re-location have affected only regions bordering with the EU-15 and with external countries, while BAC regions seem to become less important, with the exception of Estonia.

(Insert fig. 1 about here)

⁷ It is worth noticing that in Hungary the highest concentration of the manufacturing activity was in Budapest, which accounted for about 30 percent of total manufacturing employment. Other internal regions lag behind, with a share of less than 20 percent. The opposite trend characterises Bulgaria and Romania.

⁸ The geographical characteristics of the region have surely contributed to strengthen manufacturing agglomeration patterns in Tallinn and its surroundings.

3.1 The location of the manufacturing sector

Turning to a finer sectoral level, industry location patterns may be analysed from two different standpoints. The first is the *location* of a particular economic activity across regions, while the second concerns the *specialisation* of a particular geographical unit. These are two different interpretations of the same phenomenon, as indicated by the location quotient (Overman, Redding and Venables, 2001):

$$LQ_{ij} = \frac{E_{ij}}{\sum_j E_{ij}} \bigg/ \frac{\sum_i E_{ij}}{\sum_i \sum_j E_{ij}} = \frac{E_{ij}}{\sum_i E_{ij}} \bigg/ \frac{\sum_j E_{ij}}{\sum_i \sum_j E_{ij}} \quad (2)$$

The first is a measure of the location *i*'s *specialisation* in industry *j* relative to the share of the industry in total employment; the second is a measure of the *localisation* of the industry *j* in location *i*, relative to the localisation of the manufacturing activity as a whole in *i*.

The location quotient LQ_{ij} , whatever computed, allows comparisons across industries or locations and takes into account the size of industries or regions. $LQ_{ij} > 1$ indicates that the location *i* (industry *j*) has a share of employment in industry *j* (location *i*) larger than the same share measured at national level. The opposite happens when $LQ_{ij} < 1$.

Table 1 shows the location quotients for the considered countries in 1992 and 1999. Taking a broad perspective, border regions as a whole are relatively specialised in traditional labour intensive sectors, such as textiles, clothing and footwear (B-C) and furniture and other manufacturing products (N), as well as in food and beverages and tobacco (A), while internal regions are relatively specialised in scale intensive productions, such as chemicals (F-H), metal products (I) and metallurgy and transportation equipment (J-M).

A more in depth analysis, however, indicates that regional patterns of industry location show a lot of variation within countries and groups of regions.

In Bulgaria particular types of manufacturing activity are massively localised. I refer to textiles and clothing in BEU and BAC regions and chemicals and oil-refining productions (F-H) in BEX regions. These sectors show an opposite dynamics over the 1990s, increasing for the former and decreasing for the latter. Internal regions maintain their leadership in productions such as wood and paper products (D-E), metal products (I) and transportation equipment and motor vehicles (J-M).

In Hungary industry location patterns are more complex and dynamics. Most of them involve only border regions. In particular, the concentration of textiles and clothing productions has decreased in BEU regions and increased in BEX and BAC regions, while the concentration of food and beverages activities has increased in BAC regions and decreased in

BEU and BEX regions. Finally, BAC regions show an increase in their specialisation in wood and paper productions, while BEX and BEU regions show the opposite trend. It is however worth noticing that though labour intensive productions keep on being located mostly in border regions, the location of these productions in BEU regions has decreased over time in favour of a larger presence of scale intensive productions, such as chemicals, non metal products, motor vehicles and transportation equipment. The opposite trend characterised internal regions.

The re-location of the manufacturing branches in Romania is less marked than that detected in the previous countries. However, during the 1990s, BEX regions have consolidated their specialisation in wood and paper productions, while BAC regions have shown a decreasing specialisation in food and beverages, and an increasing specialisation in textiles, footwear and furniture. Internal regions have consolidated their role as preferred locations for chemicals and metal products.

Finally, Estonia shows a clear pattern of relocation from the most advanced regions of the North (BEU regions) to the South (BAC regions), especially as far as wood and paper productions, chemicals and metal products are concerned. BEU regions, however, reinforce their specialisation in transportation equipment and motor vehicles, in textiles and clothing and footwear productions. These patterns of re-location might be explained by the small size of the country and the improvements in infrastructures, which made distance from domestic and foreign economic centres less severe than in the other countries of the sample.

(insert table 1 about here)

3.2 The location of FDI

As stated above, one of the objectives of this paper is to see whether patterns of location of foreign firms have conditioned those of domestic firms at regional level. In order to achieve this goal, FDI location patterns within each country need to be explored.⁹

The presence of foreign firms has been evaluated on a comparative basis, by considering the location i ratio of foreign (f) over domestic (d) firms relative to the same ratio computed at national level at time t , as follows:

⁹ Foreign firms are here accounted in numbers, since data on employment and or output are not available at the desired level of disaggregation for all countries included in the sample and all over the 1990s. This implies that I can not consider the relative economic weight of foreign firms in each region and country, but only discuss their agglomeration patterns.

$$FDI_{it} = \left(\frac{n_{it}^f}{n_{it}^d} / \frac{\sum_i n_{it}^f}{\sum_i n_{it}^d} \right) \quad (3)$$

$FDI_{it} > 1$ ($FDI_{it} < 1$) implies that at time t location i hosts a percentage of foreign over domestic firms larger (smaller) than the national average, thus suggesting the existence of possible patterns of geographical agglomeration.

Figure 2 shows the 1992 values of the FDI -indexes and their changes over the 1990s for each type of regions. Some interesting features of FDI location patterns appear.

First of all it is readily apparent that capital districts have been the major recipients of FDI . This pattern, common to all countries of the sample, is however more pronounced for the less advanced countries, namely Bulgaria and Romania.

It is not surprising that some foreign investors have a preference for locations that are near the EU border. This is particularly apparent for Hungarian BEU regions where the share of FDI relative to domestic firms has been above the national average since the beginning of the transition process. Moreover, the relative share of FDI in BEU regions has increased over the period at rates everywhere higher than those experienced by other groups of regions, with the exception of Estonia, which still represents a peculiar case.

On dynamic terms, Fig. 2 indicates that during the 1990s the concentration of FDI has increased in all locations but the capital districts, thus indicating patterns of dispersion of foreign firms across regions. Hungary is in contrast with this general trend, since the share of foreign relative to domestic firms has increased only in internal regions and in regions bordering with the EU, thus indicating a process of polarisation of FDI within the country.

This analysis indicates the existence of a sort of learning process of foreign direct investments, the location becoming more remote with respect to the industry centres inherited by the pre-transition period, as suggested by previous analysis on this issue (Altomonte and Resmini, 2002). Next sections will clarify whether and to what extent these patterns of dispersion have changed industry location and regional specialisation in the considered countries.

(Insert fig. 2 about here)

4. Model specification

As discussed above, economic integration with the EU has been driven by two forces, trade and foreign investments. Both are able to affect industry location in candidate countries, which I measure as regional share of employment in sector j at time t .

As far as trade is concerned, recent location theories predict that the reduction of tariffs and other trade barriers reduces the importance of domestic markets and increases that of foreign markets, and especially Western European markets. To test this hypothesis I include in the model three different distance variables:

1. the distance from location i to the capital city ($DIST_{iC}$), which represents the “old” autarky industry centre;
2. the distance from EU border ($DIST_{iEU}$), which picks up the impact on industry location of the “new” open economy core market;
3. the distance from the former Soviet bloc border ($DIST_{iSB}$), in order to control for the existence of legacies from the past.¹⁰

All distance variables consist of real road distances that have been collected using an electronic road atlas. Distance from EU and the former Soviet bloc border has been measured as road distance from location i to the nearest major border crossing, in order to take into account not only geographical proximity, but mainly accessibility to international markets. These three variables should help to understand the existence and the relative strength of inward and outward oriented agglomeration processes. Thus, I not only expect that the coefficients of the distance variables are negative when statistically significant, but also that distance from the EU border accounts for the largest impact to the extent that industry location patterns in transition countries have significantly been affected by the ongoing integration process with the EU.¹¹

The impact of production integration has been estimated by including in the set of the explanatory variables the share of foreign relative to domestic firms in each location, normalized by the national average (FDI_{it}).¹² The impact of FDI on industry location patterns depends on several factors, such as the relative strength of possible localised externalities and competition effects, as well as their market orientation (domestic vs. foreign) and penetration

¹⁰ Although most of the economic linkages inherited by the centrally planned period have been destroyed by the transition process, cross border issues are of critical importance in some countries, because of the historical peculiarities of the border configurations (UN-ECE, 2003).

¹¹ Given the time span of the sample, requiring that the integration process with the EU eliminates the effects of the distance to the capital cities would seem a too strong hypothesis.

¹² The available data do not allow distinguishing the type of externality generated by FDI, i.e. pecuniary vs. technological externalities. However, this finer distinction is not relevant, given the purpose of this work.

strategies. Thus, no *a priori* expectation can be made on the sign of the estimated coefficient. It will be positive to the extent that a large presence of foreign firms in location i is able to stimulate manufacturing activity, and negative if it is not the case. Finally, I include as a measure of the general accessibility of each location a dummy variable which has value of one when the location i is endowed with a port and zero otherwise ($PORT_i$). Since economic integration is easier the higher the accessibility of location i , I expect its coefficient being positive.

The log-linear specification of the estimated regression is as follows:

$$\ln\left(\frac{E_{ijt}}{\sum_i E_{ijt}}\right) = \alpha_0 + \beta_1 \ln(DIST_{iC}) + \beta_2 \ln(DIST_{iEU}) + \beta_3 \ln(DIST_{iSB}) + \beta_4 \ln(FDI_{it}) + \beta_5 PORT_i + \beta_6 IND_j + \beta_7 YEAR_t + \beta_8 REGIO_k + \mu_{ijt} \quad (4)$$

By including additive dummy variables I examine whether any shift of the level of the dependent variable occurs over time ($YEAR_t$) or across sectors (IND_j). The analysis also considers whether there are any specific regional fixed effects able to explain the variation in the regional share of manufacturing employment ($REGIO_k$). More specifically, I control for region-type specific effects, i.e. effects related to the geographical position of each region along the border or within the country¹³.

Data are available for the period 1992-1999, providing 5264 observations (8 year x 94 regions x 7 manufacturing branches), missing values included. However, the panel dimension of the data set can not be fully exploited, given that distance variables vary across locations but not across sectors and over years, and the FDI variable does not vary across sectors. Using fixed effects models would eliminate distance variables, while random effect models are identical to OLS, when the independent variables do not vary within each group of observations (Dwivedi and Srivastava, 1978). Thus, I estimate equation (4) with LSDV techniques.

Eq. (4) has been estimated using different specification of the data. First of all, I use regional data and estimate the model in levels and cumulative differences in order to highlight and compare short term effects and overall long term trends. Secondly, I re-estimate eq. (4.) using sectoral data in order to understand whether and to what extent sectors with different characteristics in terms of factor intensities and scale economies re-locate because of economic integration with the EU.

¹³ Using region dummy variables to control for region fixed effects would introduce perfect multicollinearity.

Some characteristics of the considered countries raise concerns about possible multicollinearity among some of the explanatory variables not detected by the correlation matrix. First of all, infrastructures are generally inward oriented, with the capital cities at the centre of all modes of transport. From there, main rail, road and air lines radiate in all directions all over the country as well as to the main crossing borders. Consequently, the different measures of distance included in the analysis may be correlated each other.¹⁴ Secondly, FDI might be very sensitive to at least two distance variables, namely the distance to the capital cities and the EU border as well as accessibility variable. As indicated by Figure 2, capital districts have attracted a large number of foreign firms since the beginning of the transition process, while the role of proximity to the EU as a determinant of foreign firm location choices has been demonstrated in several studies at both theoretical and empirical level (Brainard, 1997; Resmini, 2000). In order to avoid severe multicollinearity problems, I have first regressed FDI variable on distance and accessibility variables and then used the residuals of this regression as a proxy for FDI in eq. (4).¹⁵

5. Results

5.1 Spatial patterns of agglomeration

Tables 2 and 3 give the first set of estimation results. Eq. (4) has been estimated first for the whole sample (column 1), then for internal and border regions separately (columns 2 and 3) and finally for each type of border regions (columns 4-6), in order to further explore adaptation processes within border regions. Regressions reported in Table 2 are in levels, those in Table 3 in cumulative differences.

Looking first at estimations in levels, the findings strongly support the hypothesis that the economic integration process with the EU has affected industry location patterns in candidate countries. The distance to the EU variable is statistically significant with the expected sign in all regressions it appears. Its quantitative impact is limited, but larger than that exerted by the distance to the capital cities. Each group of regions shows a different sensitivity to the explanatory variables, since the null hypothesis that regions can be pooled is rejected at the

¹⁴ This problem becomes more severe for small countries, such as Estonia and Hungary. Estonia's only international airport is located in Tallinn, where main national and international rail, road and maritime lines departure from.

¹⁵ Residuals, by definition, are the portion of the variation of the dependent variable not explained by the explanatory variables. Thus, in my case, they pick up the effects of FDI not related to distance and accessibility variables on industry location processes.

0.01 level of significance. Thus, the hypothesis that the integration process with the EU has spatial implications is supported by statistical evidence.

Concerning border regions, it is worth noticing that the null hypothesis of equal coefficients for the distance from the EU and the distance from the capital city can not be rejected at the conventional level of significance in the sub-samples of BEU and BEX regions. This means that the impact of the EU markets is as strong as the impact of the autarky internal markets, thus confirming the hypothesis of a trade-off between old and new locations.

There is other evidence that economic integration with the EU matters for industry location. Employment is, *ceteris paribus*, higher where the share of foreign over domestic firms is higher than the national average, as indicated by the coefficients of the FDI variable, which are positive and statistically significant in all regressions but BAC and BEU regions.¹⁶ Concerning the latter, there are several alternative explanations for this phenomenon, which should not necessarily be seen as mutually exclusive. The first is that foreign firms are generally speaking more productive and capital intensive than domestic firms, thus reducing relative shares of employment in regions where they concentrate the most (UN-ECE, 2001). Secondly, FDI may displace domestic firms through direct competition effects in products markets and indirect effects in factor markets (Driffield, 1999; Hamill, 1993). In BEU regions, foreign firms might have captured substantial domestic firms' market shares, forcing them to operate on a smaller scale, reducing output and employment as a response to increasing unit costs.

As expected, a better accessibility promotes industry agglomeration, as indicated by the coefficient of the PORT dummy variable, which is positive and statistically significant at 0.05 level in all specifications it appears with the exception of BEX regions. The evidence for legacy from the past, instead, is weak. The coefficients of the distance from the East border variable are statistically significant with the expected sign only in three regressions, all concerning border regions.

(Insert table 2 about here)

¹⁶ To this respect, BAC regions are the exception, since distance from the capital city is significant but shows a positive sign. Eq. (4), however, does not seem able to explain industry location patterns within BAC regions. The goodness of fit of the model is poor relative to the other sub-samples of border regions, and the explanatory variables are either not significant or erroneously signed. Controlling for country specific effects do not improve the results.

Estimations in cumulative differences (Table 3) show much stronger support for the hypothesis that, on average, economic integration with the EU has changed patterns of industry location in transition countries than regressions in levels. The results show that distance from the EU border and FDI are the only variables able to affect changes in industry location in the considered period. There is also evidence for a more even distribution of the manufacturing activity within each sample of regions, as indicated by the coefficient of the initial share of employment, which is always negative when significant.

Few exceptions concerning border regions perturb this general picture. Manufacturing location patterns are only weakly affected by the integration process with the EU in BEU regions,¹⁷ while are driven only by the distance from the capital city in BEX regions.

(Insert table 3 about here)

5.1.1 The role of time

These results hold, on average, for the whole period considered. However the process of economic integration and trade liberalisation has constantly increased during the 1990s, with major changes affecting its scope and objectives. At the beginning, the EU granted to transition countries the GSP status, only. Immediately thereafter, the Association Agreements were signed. They made tariff preferences permanent and eliminated several other specific and non-specific quantitative restrictions, giving to CEECs a better access to EU markets. Thus, it would be worth to explore whether distance effects vary over time. The hypothesis is that the internal markets proxied by the distance from the capital cities lose their capacity of attraction as the EU markets become more important because of the deepening of the integration process. In order to see that, I re-estimated eq. (4) in levels, allowing coefficients of the two distance variables to vary over time.

Figure 4 plots the estimated coefficients¹⁸. They indicate that trade integration with the EU happened at the very beginning of the transition process, as indicated by the consistent increase in the absolute value of the coefficients of the distance from the EU border in 1993. However, the evidence for the hypothesis that the importance of the EU markets has increased over time is rather weak, since the null hypothesis that coefficients are constant over time can be rejected at the 0.10 level of significance for border regions only. These results support the

¹⁷ Estimation results for BEU regions are very weak because of the lack of sufficient degrees of freedom.

¹⁸ Complete estimations on the parameters to the explanatory variables are not shown, but are available from the author upon request.

idea that the re-orientation of trade flows towards the EU would be happened even in absence of any preferential agreements (Kaminski, 2000).

(insert fig. 4 about here)

5.1.2 The role of capital cities

In the previous analysis, capital cities have not been separated from the rest of the sample. However, in section 3 I show that in candidate countries capital districts had a disproportioned share of manufacturing activities. Thus, previous results might be driven by decomposition effects of the capital districts, with distance effects virtually absent in all other regions. To check this is not the case, I re-estimate eq. (4) without capital districts. Table 4 shows the results.¹⁹

The most striking differences with the corresponding columns of Table 2 regard the distance from the capital cities. While patterns of significance are virtually the same, coefficient magnitudes reduce substantially, further emphasising the role played by the integration process with the EU. This is an indirect estimation of the attraction capacity of large urban centres for the economic activity.²⁰

(insert table 4 about here)

5.2 Sectoral patterns of agglomeration

After having measured the impact of different distance variables on industry agglomeration patterns by groups of regions, I have now to explore which industries are most influenced by them. At this purpose, I separate the initial panel by manufacturing branches. Regressing eq. (4) in levels and in cumulative differences too, I get the results shown in tables 5 and 6, respectively.

Estimations in levels indicate that Food, beverages and tobacco (A) is the only sector totally inward oriented. Only the distance from the capital city is significant with a negative sign, implying that food, beverages and tobacco producers prefer to locate closed to the capital cities because of the presence of a large set of consumers.

¹⁹ Since capital districts are considered internal regions in Hungary, Bulgaria and Romania while Tallinn is located in a region bordering with the present EU-15, the results for BEX and BAC regions are analogous to those in columns (5) and (6) in Table 2.

²⁰ Estimations in cumulative differences do not change when capital cities are not considered. Therefore, results are not reported, but are available from the author upon request.

The findings concerning the other sectors confirm the existence of a trade-off between autarky and open economy locations and the relatively better attractiveness of the EU markets with respect to the domestic market. Distance from the East border, instead, is negative and statistically significant in three sectors only, namely wood and paper productions, metallurgy and transport equipment and motor vehicles, as well as furniture and other manufacturing.

Ceteris paribus, FDI attracts further employment in all sectors but food and beverages and tobacco. Accessibility is able to increase regional share of employment in all sectors but wood and paper products, which is generally much localised, metal productions and furniture. Only BEX and BAC regions differ substantially from internal regions in terms of industry location in each sector.

(Insert table 5 about here)

Looking at the estimations in cumulative differences (table 5), it can be seen that during the 1990s re-location processes within each manufacturing branch have been driven mainly by three factors, namely FDI, the initial level of agglomeration of each sector and the trade integration with the EU. Only, FDI, however, is significant in all sectoral specifications with the expected sign. This indicates that FDI played a role in changing industry concentration patterns inherited by the centrally planned period. These changes seem to go in the direction of a less concentration, as indicated by the negative sign of the initial share variable. Finally, the distance from the EU border affects industry location patterns in the long run, though not in all manufacturing sectors. In particular, scale intensive sectors – i.e. chemicals, metal products, metallurgy and transportation equipment and motor vehicles – seem to be the most sensitive sectors to the distance from the EU, thus confirming the theoretical predictions of the NEG theory.

(insert table 6 about here)

6. Concluding remarks

In this paper I have explored whether the ongoing process of economic integration in Europe has influenced the spatial organisation of production in Bulgaria, Estonia, Hungary and Romania.

Transition countries provide a unique opportunity to study the effects of economic integration on industry location patterns. After the fall of the communism, they opened their economies to trade and foreign investments, bringing to a sudden end of decades of inward oriented (or at least East oriented) policies of industrialisation.

The proximity of the EU has shaped and driven this process of liberalisation. Since the beginning of the transition process there has been a shift in the location of the manufacturing activities. This shift has involved both a spatial decentralisation of employment, as industry moves from autarky industry location centres – capital districts and/or other internal regions – to a number of locations with a better access to the EU markets and a changing in regional specialisation, as manufacturing activities expand in the new open economy locations.

In this paper, I provide empirical evidence on these facts. Consistently with the transportation cost hypothesis, the distance from the EU border has conditioned the location of the manufacturing activities both in the short and in the long run, yielding to a more even distribution of employment across sectors and regions. Distance from the capital cities, instead, does not play any role in the long-run, and in the short run its effects on the distribution of the manufacturing activity across regions are larger than those of the distance from the EU border only in a few limited cases. FDI has played a role in these processes, too. Regional shares of industry employment are higher and grow faster where FDI concentrates the most. Hence, the role allotted in contemporary research on technological spillover and pecuniary externalities receives support in the statistical analysis.

It is, however, even more clearly confirmed that the impact of the East enlargement of the EU is not uniform across regions and sectors, but has been constant over time. Industry location patterns in Eastern regions, especially those which will be the external borders of the enlarged EU, do not seem to have been affected by the distance to the EU border, though sensitive to the presence of FDI. Consistently with the theory, manufacturing sectors involved the most in the relocation processes are those characterised by increasing returns to scale, such as chemicals, transport equipment and motor vehicles. Finally, the lack of variation in the magnitude of the coefficients of distance variables over time indicates that the deepening of the integration process with EU has only marginally affected the economic integration process between Eastern and Western Europe.

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Table 1 – Location quotients by regions and sectors, 1992-99

		A	B-C	D-E	F-H*	I*	J-M*	N
Bulgaria								
INT	1992	0.93	0.83	1.12	0.83	1.10	1.12	1.00
	1999	0.98	0.76	1.23	0.87	1.14	1.16	1.04
BORDER	1992	1.11	1.26	0.81	1.25	0.84	0.81	1.00
	1999	1.04	1.38	0.63	1.20	0.78	0.75	0.93
BAC	1992	1.19	1.19	0.66	1.04	1.02	0.86	1.09
	1999	1.10	1.29	0.53	1.02	1.07	0.82	0.97
BEU	1992	0.85	1.91	1.28	0.50	0.36	0.70	1.18
	1999	0.85	2.23	0.94	0.44	0.25	0.48	1.25
BEX	1992	1.16	0.97	0.75	1.99	0.87	0.81	0.78
	1999	1.07	0.95	0.56	1.93	0.78	0.84	0.68
Hungary								
INT	1992	0.75	0.86	1.08	1.34	1.03	1.25	0.82
	1999	0.76	0.73	1.12	1.27	0.85	1.15	0.95
BORDER	1992	1.26	1.14	0.92	0.65	0.97	0.74	1.19
	1999	1.23	1.26	0.88	0.74	1.14	0.85	1.05
BAC	1992	1.25	0.92	0.83	0.79	1.14	0.89	1.25
	1999	1.38	1.14	0.89	0.88	1.52	0.76	1.09
BEU	1992	1.03	1.98	1.01	0.47	0.39	0.45	0.90
	1999	0.77	1.50	0.65	0.70	0.65	1.06	1.00
BEX	1992	1.51	1.22	1.15	0.33	0.84	0.48	1.23
	1999	1.34	1.32	1.13	0.41	0.64	0.88	0.98
Estonia								
INT	1992	...	...	...	...	...	...	...
	1999	...	...	...	...	...	...	...
BORDER	1992	...	...	...	...	...	...	...
	1999	...	...	...	...	...	...	...
BAC	1992	1.41	0.87	1.26	0.25	0.60	1.06	1.32
	1999	1.02	0.75	1.74	0.80	0.91	0.55	1.21
BEU	1992	0.89	1.03	0.93	1.21	1.11	0.98	0.91
	1999	0.99	1.10	0.72	1.07	1.03	1.17	0.92
BEX	1992	...	...	...	...	...	...	...
	1999	...	...	...	...	...	...	...
Romania								
INT	1992	0.86	0.89	1.06	1.17	1.11	1.04	0.93
	1999	0.97	0.90	1.03	1.19	1.19	1.01	0.94
BORDER	1992	1.26	1.21	0.88	0.69	0.80	0.93	1.13
	1999	1.05	1.17	0.96	0.68	0.67	0.98	1.10
BAC	1992	1.43	1.19	0.78	0.78	0.82	0.90	1.09
	1999	1.22	1.22	0.58	0.78	0.64	0.94	1.10
BEU	1992	...	...	...	...	...	...	...
	1999	...	...	...	...	...	...	...
BEX	1992	1.04	1.23	1.01	0.57	0.78	0.96	1.18
	1999	0.85	1.11	1.41	0.56	0.72	1.02	1.11

* denotes increasing returns sectors (Francois, 1998)

INT=internal regions; BAC=regions bordering with other candidate countries; BEU=regions bordering with present EU members; BEX=regions bordering with external countries.

A= Food, Beverages and Tobacco; B-C= Textiles, Clothing and footwear; D-E= wood and paper products; F-H= oil refinement; chemicals, plastic and rubber products; I = non metal products; J-M = metallurgy, transport equipment and motor vehicles; N = furniture and other manufacturing products n.e.c.

Table 2. Estimation results: eq. (4) by regions (in levels)

	All regions (1)	INT (2)	BORDER (3)	BEU (4)	BEX (5)	BAC (6)
distance to capitals	-0.21 (0.009)***	-0.18 (0.010)***	-0.13 (0.018)***	-0.19 (0.030)***	-0.15 (0.018)***	0.3 (0.072)***
distance to the EU border	-0.3 (0.023)***	-0.49 (0.041)***	-0.037 (0.031)***	-0.16 (0.049)***	-0.12 (0.054)**	-0.69 (0.107)***
distance to the East border	0.01 (0.017)	0.07 (0.032)**	-0.08 (0.024)***	-0.48 (0.044)***	-0.11 (0.040)***	-0.01 (0.034)
FDI	0.29 (0.021)***	0.43 (0.032)***	0.19 (0.028)***	-0.18 (0.059)***	0.44 (0.055)***	0.04 (0.044)
Port	0.29 (0.045)***	0.21 (0.081)**	0.39 (0.055)***	1.89 (0.094)***	0.02 (0.087)	-0.25 (0.068)***
Constant	-1.46 (0.16)***	-0.49 (0.246)**	-1.29 (0.213)***	-0.37 (0.250)***	-2.66 (0.361)***	-1.68 (0.669)**
industry dummies	yes	yes	yes	yes	yes	yes
year dummies	yes	yes	yes	yes	yes	yes
F on H1 [d.f.]	9.06*** [1,5209]	40.65*** [1,2220]	29.66*** [1,2970]	0.21 [1,464]	0.28 [1,877]	42.96*** [1,1591]
F on H2 [d.f.]		91.23*** [1,2220]	70.21 [1,2970]	19.16*** [1,464]	0.02 [1,877]	
F on H3 [d.f.]			9.42*** [19,5190]		9.21*** [19,2687]	
N. of observations	5228	2239	2989	483	896	1610
R squared (adjusted)	0.21	0.32	0.19	0.70	0.19	0.13
Root MSE	1.06	0.91	1.14	0.79	0.94	1.17

Robust standard errors in parenthesis, with ***, ** and * respectively denoting significant at 1%, 5% and 10%. Hypothesis tests are as follows: H₁ indicates H₀: distance to capitals = distance to EU border; H₂ indicates H₀: distance to EU border = distance to East border; H₃ indicates H₀: regions can be pooled. INT= internal regions; BORDER = regions with an international frontier; BEU = regions bordering with EU-15; BEX = regions bordering with a country not involved in the enlargement process; BAC = regions bordering with another candidate country.

Table 3 – Estimation results: eq. (4) by regions (cumulative differences)

	All regions (1)	INT (2)	BORDER (3)	BEU (4)	BEX (5)	BAC (6)
initial share	-0.34 (0.093)***	-0.35 (0.145)**	-0.34 (0.121)***	0.16 (0.204)	-0.20 (0.085)**	-0.43 (0.118)***
distance to capitals	-0.03 (0.022)	-0.04 (0.035)	0.01 (0.035)	0.03 (0.452)	-0.06 (0.025)**	0.05 (0.105)
distance to the EU border	-0.16 (0.044)***	-0.22 (0.070)***	-0.18 (0.057)***	-0.28 (0.145)*	0.13 (0.089)	-0.55 (0.164)***
distance to the East border	0.02 (0.030)	0.12 (0.060)**	-0.05 (0.042)	0.04 (0.141)	0.07 (0.058)	-0.02 (0.119)
FDI	0.22 (0.037)***	0.14 (0.048)***	0.23 (0.051)***	0.07 (0.063)	0.33 (0.081)***	0.23 (0.067)***
Port	-0.06 (0.079)	0.13 (0.183)	-0.10 (0.088)	-	0.03 (0.120)	-0.22 (0.119)*
Constant	-0.08 (0.326)	-0.29 (0.502)	0.10 (0.417)	1.75 (1.605)	-1.32 (0.651)**	1.64 (0.752)**
industry dummies	yes	yes	yes	yes	yes	yes
year dummies	no	no	no	no	no	no
F on H ₃ [d.f.]		1.55* [13, 597]		5.05*** [13,304]		
N. of observations	623	280	343	42	112	189
R squared (adjusted)	0.27	0.27	0.31	0.34	0.22	0.48
Root MSE	0.63	0.59	0.65	0.51	0.51	0.67

Robust standard errors in parenthesis, with ***, ** and * respectively denoting significance at 1%, 5% and 10%. H₃ indicates H₀: regions (internal and border regions, and BEU BEX BAC regions, respectively) can be pooled. INT= internal regions; BORDER = regions with an international frontier; BEU = regions bordering with EU-15; BEX = regions bordering with a country not involved in the enlargement process; BAC = regions bordering with another candidate country.

Table 4. Estimation results: eq. (4) by regions without capital districts (in levels)

	All regions (1)	INT (2)	BORDER (3)	BEU (4)
distance to capitals	-0.10 (0.013)***	-0.10 (0.015)***	-0.05 (0.019)***	-1.51 (0.130)***
distance to the EU border	-0.31 (0.026)***	-0.52 (0.042)***	-0.34 (0.031)***	-0.35 (0.052)***
distance to the East border	-0.01 (0.018)	-0.01 (0.038)	-0.09 (0.024)***	-0.08 (0.056)
FDI	0.22 (0.022)***	0.37 (0.034)***	0.15 (0.029)***	-0.39 (0.062)***
Port	0.17 (0.049)***	-0.08 (0.105)	0.28 (0.059)	1.60 (0.096)***
Constant	-0.87 (0.169)***	-0.36 (0.297)	0.10 (0.417)	5.24 (1.562)***
industry dummies	yes	yes	yes	yes
year dummies	yes	yes	yes	yes
F on H ₁ [d.f.]	40.01*** [1,4992]	65.59*** [1,2052]	44.67*** [1,2921]	75.80*** [1, 415]
F on H ₂ [d.f.]	88.27*** [1,4992]	73.60*** [1, 2052]	47.88*** [1, 2921]	9.29*** [1, 415]
F on H ₃ ^a [d.f.]		8.38*** [19, 4973]		29.35*** [19, 2883]
N. of observations	5011	2071	2940	434
R squared (adjusted)	0.10	0.15	0.12	0.67
Root MSE	1.07	0.93	1.14	0.76

Robust standard errors in parenthesis, with ***, ** and * respectively denoting significant at 1%, 5% and 10%.

Hypothesis tests are as follows: H₁ indicates H₀: distance to capitals = distance to EU border; H₂ indicates H₀: distance to EU border = distance to East border; H₃ indicates H₀: regions can be pooled.

^a In the case of BEU regions, the null hypothesis is that border regions can be pooled. Thus, the test includes also regressions run for BAC and BEX regions. See the corresponding columns in Table 2 for estimated coefficients.

INT= internal regions; BORDER = regions with an international frontier; BEU = regions bordering with EU-15;

Table 5. Regression results: eq. (4) by sectors (in levels)

	all sample	A	B-C	D-E	F-H ^a	I ^a	J-M ^a	N
distance to capitals	-0.20 (0.009)***	-0.37 (0.035)***	-0.16 (0.015)***	-0.11 (0.021)***	-0.25 (0.019)***	-0.15 (0.028)***	-0.21 (0.021)***	-0.15 (0.020)***
distance to the EU border	-0.29 (0.033)***	0.03 (0.127)	-0.23 (0.044)***	-0.28 (0.099)***	-0.40 (0.60)***	-0.54 (0.088)***	-0.39 (0.067)***	-0.20 (0.047)***
distance to the East border	-0.07 (0.019)***	-0.11 (0.065)*	-0.03 (0.031)	-0.17 (0.051)***	0.03 (0.032)	0.08 (0.071)	-0.17 (0.042)***	-0.153 (0.039)***
FDI	0.29 (0.021)***	0.003 (0.065)	0.21 (0.031)***	0.47 (0.053)***	0.26 (0.039)***	0.31 (0.080)***	0.48 (0.049)***	0.30 (0.035)***
Port	0.29 (0.044)***	0.62 (0.178)***	0.39 (0.067)***	0.10 (0.11)	0.52 (0.084)***	0.24 (0.151)	0.22 (0.093)**	-0.04 (0.071)
BEU	-0.08 (0.081)	0.10 (0.30)	0.19 (0.146)	0.12 (0.211)	-0.55 (0.159)***	-1.00 (0.250)***	-0.28 (0.177)	0.83 (0.131)***
BEX	-0.46 (0.043)***	-0.75 (0.169)***	-0.20 (0.063)***	-0.49 (0.106)***	-0.31 (0.074)***	-0.54 (0.141)***	-0.63 (0.11)***	-0.27 (0.077)***
BAC	-0.21 (0.038)***	-0.21 (0.113)*	0.17 (0.058)***	-0.33 (0.115)***	-0.19 (0.072)***	-0.40 (0.139)***	-0.46 (0.10)***	-0.03 (0.067)
Constant	-0.68 (0.200)***	-1.86 (0.786)**	-1.33 (0.282)***	-0.54 (0.526)	-0.34 (0.354)	-0.25 (0.601)	0.48 (0.40)	-1.00 (0.287)***
year dummies	yes	yes	yes	yes	yes	yes	yes	yes
F on H1	5.32** [1,5212]	6.54** [1, 731]	1.70 [1, 731]	2.47 [1, 731]	4.65** [1, 731]	13.72*** [1, 731]	4.50** [1, 731]	0.8 [1, 731]
F on H2	30.25*** [1,5212]	0.87 [1, 731]	12.73*** [1, 731]	0.72 [1, 731]	40.17*** [1, 731]	32.93*** [1, 731]	6.68*** [1, 731]	0.44 [1, 731]
F on H3					28.30*** [16,5116]			
N. of obs.	5228	747	747	747	747	746	747	747
$\overline{R^2}$	0.20	0.19	0.36	0.2	0.4	0.16	0.31	0.37
Root MSE	1.07	1.38	0.61	1.11	0.77	1.37	1.02	0.7

Robust standard errors in parenthesis, with ***, ** and * respectively denoting significant at 1%, 5% and 10%.

Hypothesis tests are as follows: H₁ indicates H₀: distance to capitals = distance to EU border; H₂ indicates H₀: distance to EU border = distance to East border; H₃ indicates H₀: sectors can be pooled.

A=Food, Beverages and Tobacco; B-C=Textiles, Clothing and Footwear; D-E=Wood and Paper products; F-H=Oil refinement, Chemicals, Plastic and Rubber products; I=Non metal products; J-M=Metallurgy, Transport equipment and Motor Vehicles; N=Furniture and other manufacturing n.e.c.

^a indicates scale intensive sectors (Francois, 1998).

Table 6. Regression results: eq. (4) by sectors (in cumulative differences)

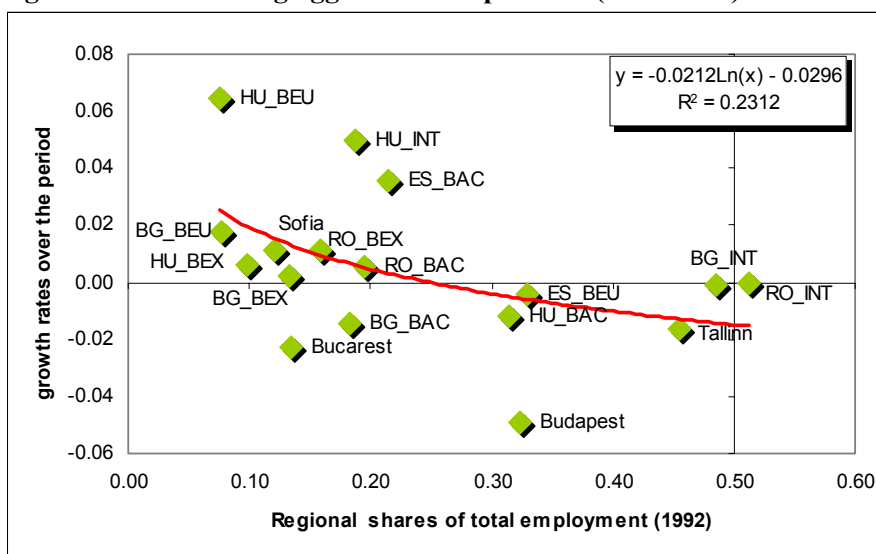
	all sample	A	B-C	D-E	F-H^a	I^a	J-M^a	N
initial shares	-0.33 (0.091)***	-0.31 (0.119)**	-0.13 (0.076)*	-0.58 (0.156)***	-0.24 (0.100)**	-0.41 (0.236)*	-0.11 (0.099)	-0.05 (0.054)
Distance to capitals	-0.01 (0.020)	-0.01 (0.044)	-0.02 (0.016)	-0.02 (0.037)	0.02 (0.044)	0.03 (0.068)	-0.01 (0.047)	0.06 (0.018)***
distance to the EU border	-0.24 (0.060)***	-0.48 (0.209)**	-0.01 (0.041)	-0.25 (0.151)	-0.37 (0.129)***	-0.38 (0.129)***	-0.02 (0.109)	-0.07 (0.051)
distance to the East border	0.004 (0.034)	-0.15 (0.120)	0.03 (0.035)	0.04 (0.103)	0.03 (0.067)	0.04 (0.112)	0.03 (0.076)	0.01 (0.042)
FDI	0.20 (0.036)***	0.18 (0.086)**	0.09 (0.035)**	0.39 (0.121)***	0.13 (0.056)**	0.18 (0.116)	0.21 (0.070)***	0.08 (0.035)**
Port	-0.060 (0.078)	-0.23 (0.306)	-0.09 (0.072)	0.17 (0.208)	0.19 (0.240)	-0.35 (0.235)	-0.20 (0.163)	0.03 (0.122)
BEU	-0.34 (0.150)**	-1.00 (0.584)*	0.07 (0.119)	-0.20 (0.387)	-0.42 (0.360)	-0.98 (0.555)*	-0.08 (0.257)	0.09 (0.127)
BEX	-0.10 (0.082)	-0.30 (0.247)	-0.09 (0.074)	-0.19 (0.227)	0.02 (0.159)	-0.29 (0.316)	0.19 (0.219)	0.05 (0.100)
BAC	-0.15 (0.067)**	-0.08 (0.187)	-0.06 (0.066)	-0.16 (0.196)	-0.24 (0.129)*	-0.28 (0.286)	-0.30 (0.156)*	0.01 (0.074)
Constant	0.44 (0.323)	2.73 (1.112)**	-0.34 (0.335)	-0.42 (0.910)	1.26 (0.713)*	0.74 (1.042)	-0.20 (0.714)	-0.06 (0.345)
F on H1	12.80***	4.25**	0.03	2.13	7.11***	6.81**	0.00	4.46**
[d.f.]	[1, 613]	[1.79]	[1.79]	[1.79]	[1.79]	[1.79]	[1.79]	[1.79]
F on H2	11.65***	1.86	0.76	2.48	6.82**	7.24***	0.12	1.11
[d.f.]	[1, 613]	[1, 79]	[1, 79]	[1, 79]	[1, 79]	[1, 79]	[1, 79]	[1, 79]
F on H3					8.94***			
[d.f.]					[10, 553]			
N. of obs.	623	89	89	89	89	89	89	89
$\overline{R^2}$	0.28	0.43	0.17	0.53	0.29	0.32	0.16	0.14
Root MSE	0.62	0.73	0.27	0.7	0.48	0.88	0.61	0.28

Robust standard errors in parenthesis, with ***, ** and * respectively denoting significance at 1%, 5% and 10%. H₃ indicates that sectors can be pooled.

A=Food, Beverages and Tobacco; B-C=Textiles, Clothing and Footwear; D-E=Wood and Paper products; F-H=Oil refinery, Chemicals, Plastic and Rubber products; I=Non metal products; J-M=Metallurgy, Transport equipment and Motor Vehicles; N=Furniture and other manufacturing n.e.c.

^a indicates scale intensive sectors (Francois, 1998).

Fig. 1 – Manufacturing agglomeration patterns (1992-1999)



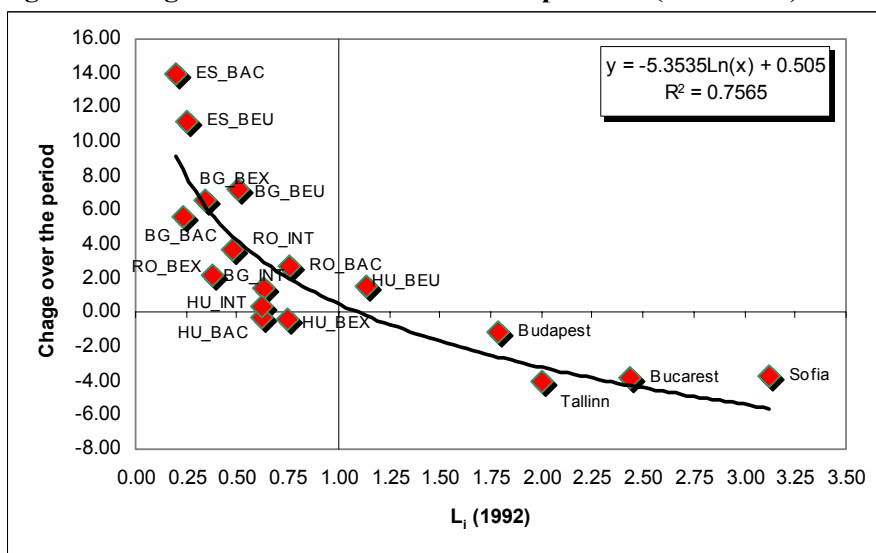
BEU = regions bordering with EU-15; BEX = regions bordering with a country not involved in the enlargement process; BAC = regions bordering with another candidate country.

Interpolation by country:

HU: $y = -0.0513\ln(x) - 0.079 - R^2 = 0.5364$; ES: $y = -0.0706\ln(x) - 0.0759 - R^2 = 0.9562$

BG: $y = -0.0104\ln(x) - 0.0159 - R^2 = 0.3357$; RO: $y = 0.0063\ln(x) + 0.0081 - R^2 = 0.0635$

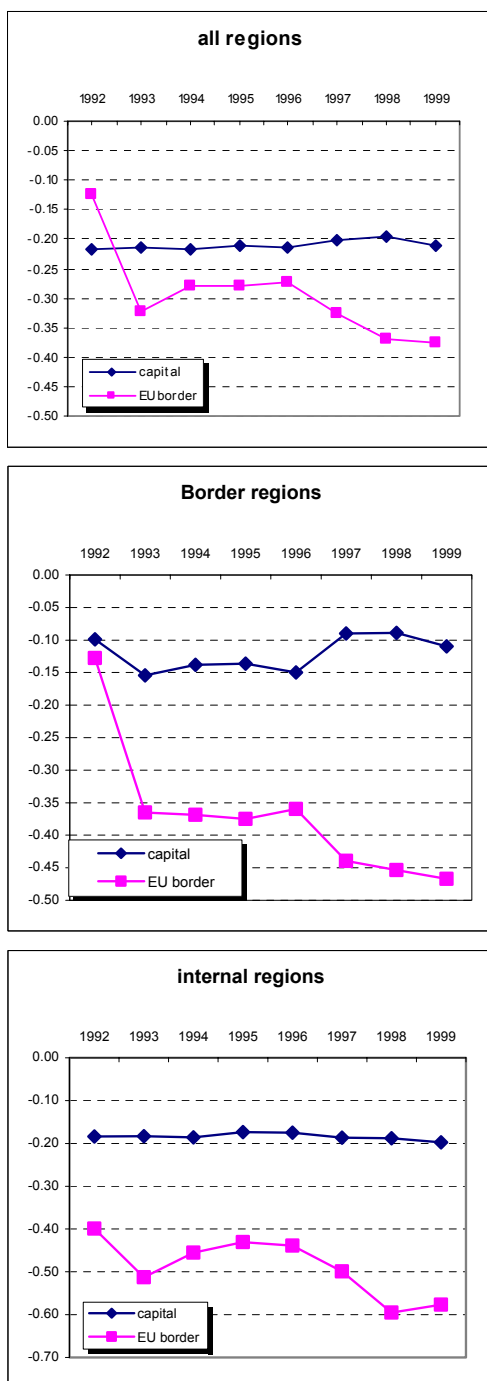
Fig. 2 – Foreign vs. domestic firms location patterns (1992-1999)



$L_i = \left(\frac{n_i^f}{n_i^d} \right) / \left(\frac{\sum_i n_i^f}{\sum_i n_i^d} \right)$, where n_i^f is the number of foreign firms in regions i and n_i^d is the number of domestic firms in region i .

BEU = regions bordering with EU-15; BEX = regions bordering with a country not involved in the enlargement process; BAC = regions bordering with another candidate country.

Fig. 3 – Distance effects over time: capital vs. EU border



F test on $H_0: \beta_t = \bar{\beta}$:

All regions - distance to the capital: $F[7, 5188] = 0.06$; distance to the EU border: $F[7, 5188] = 1.72^*$

Internal regions - distance to the capital $F[7, 2199] = 0.04$; distance to the EU border: $F[7, 2199] = 0.42$

Border regions - distance to the capital $F[7, 2949] = 0.22$; distance to the EU border: $F[7, 2949] = 1.76^*$

* denotes significance at 10%.

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