Economic integration and regional patterns of industry location in transition countries

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Abstract

Recent developments in international trade theory predict that increased globalization will be associated with increase locational concentration of particular economics 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 exploring and analysing the trade-location relationship in candidate countries during the 1990s. Two empirical evidences are provided: current trends in spatial organisation of manufacturing production and the role played by the economic integration process with the EU in partially or totally shaping such patterns. The econometric results confirm that the proximity to the EU has positively affected industry re-location processes, bringing to a spatial organisation of manufacturing production less inward-oriented than before. Particular emphasis has been devoted to understand these patterns in border regions, which may be disproportionately vulnerable to the enlargement process but also have the potential to exploit geographical proximity to their advantage. This paper confirm the latter hypothesis. Broadly speaking, border regions have increased their shares of national employment and have been changing their patterns of specialisation. The determinants of these re-location processes have been FDI and the proximity to the EU. The only exception is represented by regions bordering with the former Soviet bloc, whose patterns of industry location are still inward-oriented and independent from legacies of the past.

Keywords: industry location, economic integration, transition countries

JEL codes: R12, F15, P20.

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ECONOMIC INTEGRATION AND REGIONAL PATTERNS OF 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 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, there was launched an even more ambitious project, 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 join 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 increasing 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 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 with the EU 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 flows 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 (Kinoshita and Campos, 2003), changes in CEECs' trade patterns and composition (Hoeckman and Djankov, 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 affords 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. Indeed, recent advances in international economics suggest that regional free trade agreements may play a role as a determinant of industry location patterns and dynamics within a country as well as previous regional integration experiences involving industrialised and less developed countries, such as NAFTA, indicate that relocation processes do occur because of trade liberalisation and economic integration (Hanson, 1996 and 1998). As a consequence of these industry relocation processes, some regions might expand and other regions fall. Since the EU considers the promotion of an overall harmonious development a priority of its action, with the aim of "reducing disparities between the levels of development of the various regions" (Treaty of Rome, art. 158), to shed some light on spatial implications of the enlargement process might be of some help in achieving this task.

My objective in this paper is to study the effects of economic integration with the EU on the location of industry 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* industry

[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.

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

relocates. 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* industry relocates in order to understand whether or not sector characteristics, such as factor intensities and scale economies, reduce or amplify the impact of the enlargement process.

The body of the paper contains three sections. Section two provides a short overview of the main theoretical predictions of possible effects of economic integration on agglomeration processes. Since integration is driven by two forces, a distinction is made between trade effects and FDI-driven effects. Section three presents data on the location of manufacturing productions and FDI in the considered countries. Section four develops a model able to test the impact of economic integration on location patterns in the short run and long run perspective, as well. Section five discusses the empirical results, while section 6 concludes.

2. The theory

The spatial organisation of the economic activity becomes a non-trivial economic problem provided that two conditions hold: *i)* it is costly to ship goods across space, i.e. space is not homogeneous; *ii)* it is costly to fragment production, that is, there are increasing returns to scale at plant level. Both these conditions are incompatible with the perfect competition paradigm and generate the well known trade off between proximity and concentration of production (Ottaviano and Thisse, 2003).

These considerations – common to old as well as new location theories[3] – imply that neo-classical trade models are not able to explain how and why industries agglomerate, being based on dimensionless geographical units (countries) and having often neglecting trade costs. Despite that, a prominent scholar in the field recognised that "international trade theory cannot be understood except in relation to and as a part of the general location theory" (Ohlin, 1933; 1968, p. 97). According to him, natural resources and, more generally, production factors are not uniformly distributed across locations, and this uneven distribution explains country specialisation and patterns of

[3] "Old" location theories can be traced out from Christaller (1933), Losch (1940), and Giersch (1949) works, while "new" location theories refer to models developed under the so called New Economic Geography (Krugman, 1991; Fujita, Krugman and Venables, 2000). Since it is now widely recognised that the latter has an intellectual dept towards the former (Krugman, 1998; Fujita, Krugman and Venables 2000; Ottaviano and Thisse, 2003; Neary, 2001), I have decided to treat them jointly.

trade. Where industries locate within each country is not important, given the lack of transportation and trade costs.

Thus, in order to explain the trade-location relationship *within* countries, "second nature" rather than "first nature" characteristics of locations as well as imperfect competition[4] should be emphasised.[5] Next two sections are devoted to explain how recent advances in international economics deal with the trade off between proximity and concentration and how trade liberalisation and FDI may alter industry location processes within countries.

2.1 Industry location and trade

Before considering the effects of international trade on industry location, let me explain how the previously identified forces shape the spatial distribution of economic activities in a close economy.

The economic logic underlying these models is very simple: other things equal, producers tend to concentrate their production in a few locations because of the presence of economies of scale at plant level; at the same time, the presence of non-zero transportation costs require that those locations have a good access to large markets, where market size is measured in terms of consumers/workers living there. This process is self sustaining: a large market (the "core") attracts firms and/or workers, which further increase the size of the market thus attracting more producers and/or workers from the small regions (the "periphery") and so on. Two different mechanisms may generate this self cumulative causation process. The first is based on the relationship between a mobile labour force and the related demand for goods (Krugman, 1991; Krugman and Venables, 1990); the second relies upon vertical linkages between imperfectly competitive upstream and downstream industries (Krugman and Venables 1995; Venables, 1996). Although they yield to the same result in terms of agglomeration, supply-side linkages are more close to the European experience, given the lack of labour mobility between countries (Obstfeld and Peri, 1998). These centripetal forces are balanced by centrifugal ones, such as congestion costs and the relative scarcity of immobile factors of production and non-tradable goods and or

[4] Although Ottaviano (2002) wrote that there are many ways to be imperfect, NEG models are all based on imperfect competition *à la* Dixit and Stigliz (1977).

[5] "First nature" are exogenous characteristics of regions and countries and include physical geography, such as coasts and mountains and climate, as well as endowments of natural resources. "Second nature"

services. Where industries agglomerate is not clear, depending on the relative strength of centripetal and centrifugal forces.

Within this framework, economic integration may change industry location patterns since it affects trade and transportation costs, making easier the cross-border movements of goods, capitals and labour force. A reduction of tariffs and other trade barriers increases foreign demand for locally produced goods. If foreign markets are larger than domestic ones, domestic producers may have an incentive to re-locate in regions with a better access to foreign markets, such as border regions or regions endowed with ports and other infrastructures. However, if close economy industry centres are located far from the borders, firms may be reluctant to relocate, since in doing so they would lose externalities generated by the simultaneous presence of competitors, customers and supplier in the same location.

Consequently, trade liberalisation not necessarily will lead to relocation processes within countries, depending on the relative strengthen of the economic forces at work, i.e. external economies vs. market effects. However, it has been demonstrated that agglomeration of the economic activities is more likely to take place in sector 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 negative effects on the downstream industries, while a higher degree of mobility of economic agents amplifies the positive effects within the upstream sectors. Trade costs, instead, affect both mechanisms, with a stronger effect on firms operating in the upstream sectors.

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 the location of the economic 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 away from the close economy industry centres to the 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 which allow a direct link with western markets might be these new locations.

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characteristics, instead, arise endogenously in the economic space, being related to the geography of distance between economic agents (Krugman, 1993).

2.2 Industry location and FDI

Generally speaking, the issue of whether FDI promotes industry agglomeration or de-agglomeration patterns is linked to whether and how FDI is able to affect domestic firms.

It is widely recognised that FDI has been an important catalyst for transformations in transition countries (UN-ECE, 2001). Indeed, it provided CEECs with financial resources, technologies, know how, all factors necessary to transform and restructure the obsolete local industrial systems inherited from the centrally planned area.

From a theoretical standpoint, these flows of capitals, technologies and knowledge are able to generated positive spillovers to domestic firms through several channels. Blomstrom and Kokko (1997) classified them into formal – direct transfer of technology through joint ventures or licensing – and informal (or not mediated by the market) – imitation and contagion effects – as well as in voluntary or involuntary, according to the active or passive role played by MNEs.

The fact that multinational enterprises may generate spillovers to domestic firms bring us back to traditional location theories according to which technological externalities are an important factor of agglomeration among firms.[6] However, since the exploitation of technological externalities requires a certain degree of geographical proximity, being not mediated by any market mechanism, their effects are able to explain (de)agglomeration phenomena ranging only over a limited geographical space, such as cities and/or highly specialised industrial and scientific districts (Fujita, Thisse, 2002).

Relocation processes that involve a larger geographical space can instead be explained through the exploitation of pecuniary externalities. Through their presence, in fact, a sustained inflow of FDI, as that experimented by some CEECs, may act as a catalyst for other firms – both foreign and domestic – and change the equilibrium location of industrial activities within and across countries, and consequently the patterns of specialisation of the territorial units under consideration.[7]

[6] Marshall (1890) first stressed the importance of localised technological externalities for the formation of clusters.

[7] The importance of pecuniary externalities generated by MNEs has also been stressed recently by UNCTAD, who devoted its last yearly report on foreign investments to this topic. See UNCTAD (2002).

As stated before, pecuniary externalities arise from imperfect competition in presence of market-mediated *linkages* between economic agents.[8] The concept is rooted in the pioneering studies by Hirschman (1958) and has been translated into general equilibrium models with solid microeconomic foundations by NEG scholars (Fujita, Krugman, and Venables 2000).

Three recent papers explore in details MNEs' role in the process of industrial development, namely Rodriguez-Clare (1996), Markusen and Venables (1999) and Matouschek and Venables (1999). According to these models, MNEs producing final goods increase the demand of intermediate inputs locally produced, thus stimulating the efficiency of the whole sector and promoting the production of a greater variety of intermediate goods. Over time, the increased efficiency of the local intermediate sectors is likely to generate the conditions under which a given number of domestic firms producing final goods can make positive profits, thus generating a mechanism of cumulative causation leading to the agglomeration of economic activities. However, the magnitude of this effect strongly depends on the intensity with which multinationals use local intermediates. When inward investment takes place only in assembling activities, with higher value added intermediate products being imported, forward linkages are limited or non-existing. Although advanced methods of production may be used, the lack of such linkages restricts the transfer of demonstration effects and other technological externalities. This stifles the development of the local intermediate sector and therefore prevents the process of agglomeration of industry activities. The same "perverse" effect arises when multinationals prefer to purchase intermediate inputs from other multinationals already present in the host economy rather than from domestic firms**.** In these cases, the lack of forward linkages between multinational and domestic firms leads to the marginalisation of the local economic strengths and to the creation of enclaves of foreign capital in the host economies, totally dis-embedded from the rest of the local economy. Consequently, FDI will appear as so called "cathedrals in the desert", rather than to "bridgehead", able to create core or dynamic regions (Grabher, 1992).

[8] It is worth noticing that externalities by definition arise when market prices do not reflect the true cost and utility values of the interaction between economic agents. However, while in presence of technological externalities some interaction effects are not priced at all, with pecuniary externalities the interaction effects distort prices because of market imperfections. In presence of market power, when the behavior of an economic agent affects prices, it also affects the well being of others (Fujita, Thisse 2002).

As in the case of trade liberalisation, the complex dynamic interactions of domestic and foreign firms can lead to different patterns of (de)agglomeration in a given economy, depending on the starting conditions, the variables included in the model as well as chose parameters. Moreover, these (de)agglomeration patterns might go in the same direction of those generated by trade liberalisation or in the opposite way, depending on market orientation and strategies of foreign firms.

In order to get a clear understanding of the phenomena, thus, it seems appropriate to start from the empirical evidence available up to date on those effects.

3. The data

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. For the purpose of this study, regions have been classified according to their geographical location along the border (BORDER) or within the country (INT). Moreover, the former have been distinguished in regions bordering with the EU (BEU), with other candidate countries (BAC) or with countries not presently involved in the enlargement process (BEX).[9] Manufacturing activity has been measured in term of employment and figures come from REGSPEC database. Seven composite branches have been considered. They roughly correspond to NACE Rev. 1 one digit classification.[10]

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

$$L_i = \frac{\sum_j E_{ij}}{\sum_j \sum_i E_{ij}} \quad (1)$$

Figure 1 shows the dynamics of the distribution of the manufacturing activity across regions over the 1990s. Overall, the figure shows that during the last decade some relocation activity occurred in all the considered countries, though with a different intensity, as indicated by the estimated regression lines reported under the figure. The only exception seems to be Romania, where the empirical evidence indicates a rather weak tendency towards a strengthening of the agglomeration process.

[9] This classification has been introduced by Eurostat (EC, 2002).

[10] A finer sectoral classification was not possible, because of the lack of homogeneous data among countries. See the Appendix for region and sector description.

At the beginning of the integration process, regional patterns of industry location seemed to follow a centre-periphery structure, with about 50 percent of the manufacturing activity located in internal regions, and mainly in the capital cities[11]. In Estonia about 50 percent of the manufacturing activity was located in Tallinn and another 30 percent in the other BEU regions.[12] Border regions were penalised almost everywhere, with the lowest levels of manufacturing activity concentrated in Hungarian and Bulgarian regions bordering with western countries and the highest one in Hungarian BAC regions, not considering Estonia.

This picture has changed during the 1990s, when manufacturing activity moved from capital cities to border regions. 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. These patterns of de-agglomeration have been particularly strong in Estonia – where manufacturing activity moved from the more industrialised Northern regions to the less advanced Southern regions – and in Hungary, where manufacturing activities have moved from Budapest and to a lesser extent from BAC regions to other internal regions. In Romania, no big changes occurred. In 1999, about half of the manufacturing activity was still located in internal regions; however, it is worth noticing that some manufacturing activity relocated from Bucharest to border regions.

Hence, in 1999 manufacturing activity seemed to be more evenly distributed between border and internal regions in all countries, with BEU and BEX regions catching up with consistent increases in relative shares of national employment and BAC regions lagging behind, not considering Estonia.

(insert fig. 1 about here)

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

[11] It is worth noting that in Hungary the highest concentration of the manufacturing activity was in Budapest, which accounted for about 30 percent of total manufacturing activity. Other internal regions lag behind. The opposite trend characterises Bulgaria and Romania.

[12] Differently from what happens in the other countries of my sample, Tallinn is not a separate district. It encompasses to Pohja-Eesti, one of the regions bordering with Finland. The geographical location has surely contributed to strengthen manufacturing agglomeration patterns in Tallinn and its surrounding.

unit. In both cases, a convenient measure of concentration is the location quotient (Overman, Redding and Venables, 2001):

$$L_{ij} = \frac{E_{ij}}{\sum_j E_{ij}} \Big/ \frac{\sum_i E_{ij}}{\sum_i \sum_j E_{ij}} = \frac{E_{ij}}{\sum_i E_{ij}} \Big/ \frac{\sum_j E_{ij}}{\sum_i \sum_j E_{ij}} \qquad (2)$$

These are two different interpretation of the same phenomenon. 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 activity as a whole in *i*. Reading the location quotient matrix by rows implies to adopt the first interpretation, by columns, the second one.

The location quotient L_{ij} is the most commonly used indicator for pinning down regional patterns of industries, because of its simple properties and its easy interpretation. In fact, it allows comparisons across industries or locations and takes into account the size of regions and industries. $L_{ij} > 1$ 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 $L_{ij} < 1$.

Tables 1 and 2 shows the location quotient matrix for the considered countries in 1992 and 1999, respectively. Taking a broad perspective, border regions as a whole are relatively specialised in traditional labour intensive sectors, such as food and beverages and tobacco (A) textiles, clothing and footwear (B-C), and furniture and other manufacturing products (N), while internal regions are relatively specialised in more value-added 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 vary within countries and regions.

In Bulgaria particular types of manufacturing activity are massively localised. I refer to textiles and clothing in BEU regions and chemicals and oil-refining productions in BEX regions. These sectors show an opposite dynamics over the 1990s, increasing for the former and decreasing for the latter. BAC regions have reinforced their specialisation in textiles and clothing and footwear production over the 1990s, while internal regions maintains their leadership in productions such as wood and paper products, metal products and transportation equipment and motor vehicles.

In Hungary industry location patterns are more complex and dynamics. Most of them involve only border regions. Tables 1 and 2 show that relative employment in

textiles and clothing productions has decreased in BEU regions and increased in BEX and BAC regions, without major changes in internal regions. Moreover, in BAC regions, relative employment has increased in food and beverages and decreased in textiles and clothing productions. BEX regions show opposite trends in both sectors. It is however worth noting 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 productions with a higher value-added, such as chemicals, non metal products, motor vehicles and transportation equipment. According to the location indexes, those productions have been moving from 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 show a relative specialisation in food and beverages, textiles, footwear and furniture. Internal regions consolidate their role as the preferred location for chemicals, metal products, transportation equipment and motor vehicles.

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, instead, reinforces their specialisation in transportation equipment and motor vehicles, in textiles and clothing and footwear productions. This pattern 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 tables 1 and 2 about here)

3.2 The location of FDI

As stated above, one of the objectives of this paper is to see whether patters of location of foreign firms have conditioned those of domestic firms at regional level. Foreign firms are here accounted in numbers, since more valuable data in terms of employment and or output are not available for the considered countries all over the 1990s. This implies that I can not consider the importance of foreign firms in each regions' economy, but only discuss whether or not they concentrate in particular locations.

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:

$$F_i = \left(\frac{n_i^f}{n_i^d} \Big/ \frac{\sum_i n_i^f}{\sum_i n_i^d} \right) \qquad (3)$$

$F_i>1$ ($F_i<1$) implies that location *i* hosts a percentage of foreign over domestic firms higher (smaller) than the national average, thus suggesting the existence of possible patterns of geographical agglomeration.

Figure 2 shows the initial value of the F_i-index and its changes over the 1990s for border and internal regions. Some interesting features of FDI location patterns appear.

The first finding is that FDI is strongly biased in favour of the capital cities, compared with their share of domestic firms. This effect is most evident for Sofia and Tallinn.

The second features is that proximity to the EU matters in FDI location process. Hungarian BEU regions show a concentration of FDI above the national average since the beginning of the transition process, while FDI location patterns have been biased in favour of BEU regions over the 1990s.

On a dynamic terms, Fig. 1 finally indicates that FDI patterns of agglomeration into the capital cities have weakened considerably during the 1990s. The concentration of FDI has increased in all locations but the capital cities, thus indicating a convergence pattern within countries even in terms of FDI location. In contrast with this general trend, the share of foreign relative to domestic firms has fallen in Hungarian BAC and BEX regions, thus increasing patterns of polarisation within the country.

Overall, these findings suggest that the regional concentration of FDI in the considered countries is high and that foreign investments favour mainly capital cities and regions close to the EU. However, FDI concentration patterns have declined within countries and over time. These results are consistent with previous studies on the location of FDI in transition countries (Altomonte and Resmini, 2002; Fazekas, 2003; Deichman, and Henderson, 2000) and confirm the catching up role played by border regions, mainly those located along the EU border.

(insert fig. 2 about here)

4. Model specification

This section analyses whether and to what extent the process of integration with the EU has determined the patterns of re-location of the manufacturing industry discussed in the previous section.

As discussed above, economic integration with the EU occurred through two channels, trade and foreign investments. Both traditional and new 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.

The presence of foreign firms has an ambiguous effect on domestic firms' incentive to relocate. It 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 strategies.

To test these hypotheses in the case of transition countries, I specify a log-linear relationship between regions' shares in total employment at sector level and distance from "old" and "new" markets.[13] At this purpose, I consider the capital cities as old markets and the EU as the new ones. However, trade liberalisation has interested all countries, those of the former Soviet bloc included. Thus, it can not be excluded that regions fare from the EU gravitate around Eastern rather than Western markets.[14] To test this hypothesis, I also consider distance to the East trading partners. The estimated regression assumes the following general specification:

$$\log\left(\frac{E_{ijt}}{\sum_i E_{ijt}}\right) = \alpha_0 + \beta_1 \log(D_{ic}) + \beta_2 \log(D_{iEU}) + \beta_3 \log(D_{iest}) + \beta_4 \log(FDI_{it}) + \beta_5 PORT_i + \mu_{ijt} \qquad (4)$$

where $D_{i.}$ is the geographical distance – measured as road distance (km) – between location *i* and the capital city, the EU and the East markets, respectively. As far as distance from the EU and the former Soviet bloc is concerned, I measured the road distance from location *i* to the nearest major border crossing, in order to take into account not only closeness but also accessibility to international markets. Generally speaking, these three distance variables should help to understand the existence and the relative strength of the inward and outward oriented agglomeration processes. Consequently, I expect that distant variables are negatively correlated with the

[13] Transport costs, and more generally trade costs, increase with distance, so they can be proxied by geographical distance between location *i* and the targeted market.
[14] Possible cross border economic co-operation on the East side has been suggested by Fazekas (2003).

dependent variable to the extent that location *i* gravitates around the capital city, the EU or the former Soviet bloc markets.

FDI_{it} is the share of foreign firms on domestic firms in location *i* relative to the same percentage at national level. It catches the role played by FDI, the second driving force of economic integration, in manufacturing re-location processes. The potential impact may be positive or negative depending on the relative strength of localised economies and competition effects generated by the entry of foreign firms in location *i*. Finally, $PORT_i$ is a dummy variable which has value of one when the location *i* is endowed with a port and zero otherwise. Since economic integration is easier the higher the accessibility of location *i*, I expect it to be positively correlated with the dependent variables.

Data are available for the period 1992-1999, providing 5264 observations (8 year x 94 regions x 7 manufacturing branches), missing values included. I also include dummy variables to control for time and sector specific effects as well as a dummy variable to pick up exogenous region characteristics that might affect industry location. 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 country[15]. 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.

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

[15] Using region dummy variables to control for region fixed effects would introduce perfect multicollinearity.

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.[16] Secondly, FDI might be very sensitive to at least two distance variables, namely the distance to the capital cities and to the EU border as well as accessibility variable. As indicated by Figure 2, capital cities 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 firms location choices has been demonstrated in several studies at both theoretical and empirical level (Brainard, 1997; Resmini, 2000). While the first problem does not seem solvable at this stage of the analysis, in order to keep the second under control, 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).[17]

5. Empirical results

5.1 Regional patterns of industry location

Table 3 gives estimation results on regions' shares of relative employment in each manufacturing branch. Eq. (4) has been estimated for the whole sample (column 1), and then for different sub-samples of regions, namely internal and border regions (columns 2 and 3), and then for different types of border regions (columns 4-6).

Looking first at estimations in levels, the findings strongly support the idea that there is a trade off between old and new markets. In all regressions distance to the capital city and the EU border are negative and statistically significant at the 1 percent level. However, the quantitative effect of distance from the EU is higher than that exerted by distance from the capital city. This result holds on average, and for internal and border regions when considered separately. Also distance from the East border is able to condition industry location in transition countries, though its quantitative effect is very moderate, especially as far internal regions are concerned.

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

[16] This problems 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.

domestic firms is higher than the national average, as indicated by the coefficients of the FDI variable, which are positive and statistically significant both for internal and border regions. Moreover, a better accessibility of location *i* increases industry location, as indicated by the positive and significant coefficient of the PORT dummy variable.

Finally, sectoral specific effects do exist, while industry location does not seem to be affected by progresses in the transition process, proxied by time dummies. Regional heterogeneity is also supported by data. Industry location patterns in regions bordering the EU do not seem to behave differently from those occurring in internal regions – as indicated by the coefficient of the BEU dummy variable in column (1) which is not significant – while diverging from those experienced by other border regions. When considering border regions only (columns 3), the coefficient of BEU dummy is significant at the 1 percent level and positive, thus indicating that relative employment is higher in BEU regions than in other border regions, all else equals.

(insert table 3 about here)

To further explore heterogeneity among border regions, I regress eq. (4) in each sub sample of border regions (columns 4-6 in table 3). Results are interesting, indicating that despite ten years of increasing economic integration with the EU, distance from the capital city is still able to condition the location of economic activity in border regions. Although coefficients of distance variables are all negative and significant, the quantitative impact of the distance to the capital city is always larger than those exerted by the other distance variables.[18] Distance from the former Soviet bloc, however, is significant only in the sub-sample of BEX regions. This second set of regressions also confirms the role played by FDI in conditioning re-location patterns of manufacturing productions. However, a share of foreign relative to domestic firms higher than the national average increases relative employment in BEX regions but reduces it in BEU regions. There are several alternative explanations for this, 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,

[17] Residuals, by definition, are the portion of the variation of the dependent variables not explained by the explanatory variables. Thus, they pick up the effects of FDI not related to distance and accessibility variables on industry location processes.

[18] 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,

FDI may displace domestic firms through competition effects in products markets and indirect effects in factor markets (Driffield, 1999; Hamill, 1993; Altomonte and Resmini, 2002b). 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.

Estimations in cumulative differences show much stronger support for the hypothesis that economic integration with the EU has changed patterns of industry location in transition countries than regressions in levels. This implies that the underlying trends can be better observed in the long run. Among distance variables, only $DIST_{EU}$ is significant with a negative sign in all regressions but BEX regions, indicating that major changes in regional patterns of specialisation have occurred in regions close to the EU. Also FDI has played a positive and significant role in the re-location processes of the manufacturing sector in all regions but BEU ones. These results confirm also the existence of a trend towards a more dispersed location of manufacturing activity within countries, as indicated by the negative and significant sign of the coefficients of the initial share variable.

Overall these results support the hypothesis that economic integration with the EU has affected industry location patterns in transition countries. Although capital cities maintain their power of attraction for manufacturing producers, trade liberalisation with the EU and the location of foreign firms within the countries are able to partially offset this effect. 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 GSP status to transition countries. 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 different distance effects are increasing or decreasing over time. In order to see that I re-estimated eq. (4) in levels, allowing coefficients of distance variables to vary over time.[19]

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and the explanatory variables are either not significant or erroneously signed. Controlling for country specific effects do not improve the results.

[19] Results are not reported but are available upon request. Very briefly, I could not reject the null hypothesis that distance coefficients were constant for the period 1992-1999 in the following cases:

Figure 3 plots the estimated coefficients over time. It clearly indicates that over the 1990s, industry location patterns have been increasingly conditioned by distance from the EU, and less conditioned by distance from capital cities. Both these effects are more marked in the second half of the decade, when Europe Agreements came into force, thus deepening economic integration.

(insert fig. 3 about here)

5.2 Sectoral patterns of regional agglomeration

After having measured the impact of different distance variables on industry agglomeration patterns by groups of regions, I have to explore now 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 table 4.

Estimations in levels indicate that Food, beverages and tobacco 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 productions prefer to locate closed to the capital cities because of the presence of a large set of consumers.

The finding 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 very localised, metal productions and furniture. Only BEX and BAC regions differ substantially from internal regions in terms of industry location in each sector.

During the 1990s, manufacturing sectors have been characterised by intense re-location processes driven mainly by two factors, namely FDI and the initial level of agglomeration of each sector in the different locations. Both variables are significant in all sectoral specifications with the expected sign.[20] This implies, on the one hand, the

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distance to the East border in all sub-samples but border wholly considered, and distance to the EU border in BEX regions.

[20] Metallurgy, transport equipment and motor vehicles, and furniture represent an exception.

trend towards a more evenly distribution of manufacturing activities; on the other hand, the role played by FDI in changing industry location patterns inherited by the centrally planned period.

As far as distance variables are concerned, only $DIST_{EU}$ has affected industry location patterns in the long run, though not in all manufacturing sectors. In particular, scale intensive sectors have been the most sensitive to distance from the EU, thus confirming theoretical predictions of the NEG theory.

(insert table 4 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 some candidate countries, namely 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.

In this paper, I provide three empirical evidence on this fact. First of all, I have shown that industry location patterns have changed over the transition period, yielding to a more evenly distribution of manufacturing activities across regions. Secondly, I have demonstrated that the proximity to the EU has played a role in this relocation processes. Consistently with the transportation cost hypothesis, employment growth has been higher in regions close to the EU, and the distance from the EU border has become more and more important over the considered period. Distance from the capital cities, instead, does not play any role in industry re-location processes and its importance maintains constant over time. Thirdly, FDI has played a role in these processes. Regional shares of industry employment are higher and grow faster where FDI concentrates the most.

These results, however, do not hold for all regions and sectors. Eastern regions, those bordering with the countries of the former Soviet Bloc not presently involved in the integration process with the EU, still gravitate on the domestic markets, while historical legacies, proxied by distance from the East border, do not seem to play any role in industry re-location processes. 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.

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Table 1 Location quotient matrix, 1992

		A	B-C	D-E	F-H	I	J-M	N
BG	INT	0.93	0.83	1.12	0.83	1.10	1.12	1.00
	BORDER	1.11	1.26	0.81	1.25	0.84	0.81	1.00
	BAC	1.19	1.19	0.66	1.04	1.02	0.86	1.09
	BEU	0.85	1.91	1.28	0.50	0.36	0.70	1.18
	BEX	1.16	0.97	0.75	1.99	0.87	0.81	0.78
ES	INT							
	BORDER							
	BAC	1.41	0.87	1.26	0.25	0.60	1.06	1.32
	BEU	0.89	1.03	0.93	1.21	1.11	0.98	0.91
	BEX							
HU	INT	0.75	0.86	1.08	1.34	1.03	1.25	0.82
	BORDER	1.26	1.14	0.92	0.65	0.97	0.74	1.19
	BAC	1.25	0.92	0.83	0.79	1.14	0.89	1.25
	BEU	1.03	1.98	1.01	0.47	0.39	0.45	0.90
	BEX	1.51	1.22	1.15	0.33	0.84	0.48	1.23
RO	INT	0.86	0.89	1.06	1.17	1.11	1.04	0.93
	BORDER	1.26	1.21	0.88	0.69	0.80	0.93	1.13
	BAC	1.43	1.19	0.78	0.78	0.82	0.90	1.09
	BEU							
	BEX	1.04	1.23	1.01	0.57	0.78	0.96	1.18

INT= internal regions; BAC = regions bordering with accession countries; BEU = regions bordering with the EU;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 Location quotient matrix, 1999

		A	B+C	D+E	FGH	I	JKLM	N
BG	INT	0.98	0.76	1.23	0.87	1.14	1.16	1.04
	BORDER	1.04	1.38	0.63	1.20	0.78	0.75	0.93
	BEU	0.85	2.23	0.94	0.44	0.25	0.48	1.25
	BEX	1.07	0.95	0.56	1.93	0.78	0.84	0.68
	BAC	1.10	1.29	0.53	1.02	1.07	0.82	0.97
ES	INT							
	BORDER							
	BEU	0.99	1.10	0.72	1.07	1.03	1.17	0.92
	BEX							
	BAC	1.02	0.75	1.74	0.80	0.91	0.55	1.21
HU	INT	0.76	0.73	1.12	1.27	0.85	1.15	0.95
	BORDER	1.23	1.26	0.88	0.74	1.14	0.85	1.05
	BEU	0.77	1.50	0.65	0.70	0.65	1.06	1.00
	BEX	1.34	1.32	1.13	0.41	0.64	0.88	0.98
	BAC	1.38	1.14	0.89	0.88	1.52	0.76	1.09
RO	INT	0.97	0.90	1.03	1.19	1.19	1.01	0.94
	BORDER	1.05	1.17	0.96	0.68	0.67	0.98	1.10
	BEU							
	BEX	0.85	1.11	1.41	0.56	0.72	1.02	1.11
	BAC	1.22	1.22	0.58	0.78	0.64	0.94	1.10

INT= internal regions; BAC = regions bordering with accession countries; BEU = regions bordering with the EU;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 3 Econometric evidence I: industry agglomeration patterns by groups of regions

	POOL		INT		BORDER		BEU(*)		BEX		BAC	
	levels	cum. diff	levels	cum. diff	levels	cum. diff	levels	cum. diff	levels	cum. diff	levels	cum. diff
initial share	-	-0.3391	-	-0.3476	-	-0.3426	-	0.1695	-	-0.1984	-	-0.4274
		(0.0923)***		(0.1445)**		(0.1211)***		(0.2036)		(0.0854)**		(0.1181)***
dist_c	-0.1996	-0.011	-0.1849	-0.0435	-0.1668	0.0049	-1.5889	0.0267	-0.1515	-0.0566	0.2975	0.0491
	*(0.0091)****	*(0.0209)*	*(0.0100)****	*(0.0354)*	*(0.0197)****	*(0.0353)*	*(0.1224)****	*(0.4520)*	*(0.0179)****	*(0.0248)***	*(0.0724)****	*(0.1051)*
dist_eu	-0.2888	-0.2384	-0.4865	-0.2201	-0.2493	-0.1819	-0.3574	-0.2769	-0.1167	0.1335	-0.6948	-0.5481
	*(0.0318)****	*(0.0605)****	*(0-0412)****	*(0.0699)****	*(0.0484)****	*(0.0567)****	*(0.0504)****	*(0.1447)**	*(0.5439)***	*(0.0893)*	*(0.1068)****	*(0.1647)****
dist_est	-0.0745	0.0037	0.069	0.12	-0.1359	-0.0473	0.0263	0.0357	-0.1084	0.0727	-0.0143	-0.0185
	*(0.0190)****	*(0.0339)*	*(0.0315)***	*(0.0602)***	*(0.0250)****	*(0.0422)*	*(0.0587)*	*(0.1411)*	*(0.3985)****	*(0.0576)*	*(0.0339)*	*(0.0529)*
fdi	0.2916	0.2005	0.426	0.1357	0.2153	0.2257	-0.2963	0.0667	0.4427	0.3286	0.0402	0.2301
	*(0.0202)****	*(0.0362)****	*(0.0317)****	*(0.0483)****	*(0.0275)****	*(0.0514)****	*(0.0708)****	*(0.0631)*	*(0.0552)****	*(0.0815)****	*(0.0442)*	*(0.0675)****
port	0.2911	-0.0602	0.2073	0.1299	0.3569	-0.0974	-	-	0.0236	0.0325	-0.2545	-0.2198
	*(0.0431)****	*(0.0779)*	*(0.0816)***	*(0.1826)*	*(0.0534)****	*(0.0884)*			*(0.0871)*	*(0.1195)*	*(0.0675)****	*(0.1193)**
beu	-0.0843	-0.3427	-	-	0.2065	-	-	-	-	-	-	-
	(0.08)	*(0.1510)***			*(0.0978)***							
bex	-0.4567	-0.0992	-	-	-0.2906	-	-	-	-	-	-	-
	*(0.0426)****	*(0.08183)*			*(0.0459)***							
bac	-0.207	-0.1477	-	-	-	-	-	-	-	-	-	-
	*(0.0378)****	*(0.06671)*										
constant	-1.0034	0.395	-0.4925	-0.2872	-1.4308	0.0973	5.0613	1.7464	-2.666	-1.325	-1.6809	1.6414
	*(0.2051)****	*(0.3537)*	*(0.2464)***	*(0.5016)*	*(0.2924)****	*(0.4171)*	*(0.5330)****	*(1.6049)*	*(0.3605)****	*(0.6515)***	*(0.6688)***	*(0.7515)***
industry	$F_{(6,5206)}$=30.72***	$F_{(6,607)}$=1.05	$F_{(6,2220)}$=3.34***	$F_{(6,\ 267)}$=0.38	$F_{(6,2968)}$=34.12***	$F_{(6,\ 330)}$=1.72	$F_{(6,318)}$=55.16***	$F_{(6,30)}$=0.49	$F_{(6,877)}$=11.55***	$F_{(6,\ 99)}$=0.97	$F_{(6,1591)}$=20.68***	$F_{(6,189)}$=1.99*
year	$F_{(7,5206)}$=0.37	-	$F_{(7,2220)}$=0.31	-	$F_{(7,2968)}$=0.41	-	$F_{(7,318)}$=0.83		$F_{(7,877)}$=0.26	-	$F_{(7,1591)}$=0.09	-
obs.	5228	623	2239	280	2989	343	336	42	896	112	1610	189
R2	0.23	0.28	0.32	0.26	0.20	0.31	0.53	0.34	0.19	0.22	0.13	0.48
root MSE	1.05	0.62	0.91	0.59	1.13	0.64	0.77	0.51	0.93	0.51	1.16	0.67

(*)Estonia has been excluded by the analysis because of severe multicollinearity problems between $DIST_C$ and $DIST_{EU}$ variables.
Robust standard errors in parenthesis.
Significant at *** 1 per cent, ** 5 percent and * 10 percent level.

Table 4 Econometric evidence II: industry agglomeration patterns by sectors

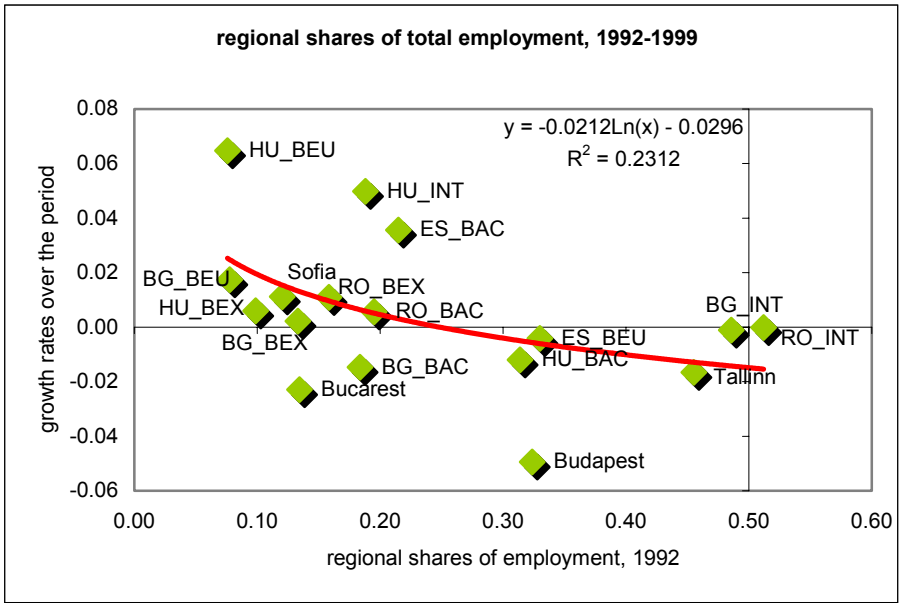
	A		B-C		D-E		F-H		I		J-M		N	
	levels	**cum. diff.**	**levels**	**cum diff.**	**levels**	**cum diff.**	**levels**	**cum diff.**	**levels**	**cum diff.**	**levels**	**cum diff.**	**levels**	**cum diff.**
initial share		-0.319		-0.141		-0.563		-0.226		-0.41		-0.091		-0.048
		*(0.119)***		*(0.077)**		*(0.174)****		*(0.102)***		*(0.236)**		*(0.102)*		*(0.058)*
dist_c	-0.3679	0.019	-0.1608	-0.008	-0.1143	0.022	-0.2461	0.032	-0.1466	0.063	-0.2148	0.012	-0.1468	0.068
	*(0.0345)****	*(0.046)*	*(0.0151)****	*(0.019)*	*(0.0207)****	*(0.050)*	*(0.0185)****	*(0.045)*	*(0.0280)****	*(0.074)*	*(0.0212)****	*(0.054)*	*(0.0198)****	*(0.018)****
dist_eu	0.0253	-0.502	-0.2316	-0.03	-0.2833	-0.317	-0.4036	-0.389	-0.5442	-0.41	-0.3862	-0.044	-0.1991	-0.081
	(0.1274)	*(0.209)***	*(0.0445)****	*(0.043)*	*(0.0988)****	*(0.161)**	*(0.0597)****	*(0.131)****	*(0.0877)****	*(0.128)****	*(0.0671)****	*(0.114)*	*(0.0473)****	*(0.052)*
dist_est	-0.1079	-0.147	-0.0317	-0.036	-0.1726	0.024	0.0348	0.028	0.0827	0.045	-0.1721	0.027	-0.1533	0.009
	*(0.0650)**	*(0.119)*	*(0.0309)*	*(0.037)*	*(0.0511)****	*(0.107)*	*(0.0323)*	*(0.067)*	*(0.0705)*	*(0.117)*	*(0.0421)****	*(0.079)*	*(0.0393)****	*(0.043)*
fdi	0.0028	0.324	0.215	0.161	0.4712	0.497	0.2622	0.16	0.3087	0.341	0.4787	0.284	0.3021	0.125
	(0.0647)	*(0.154)***	*(0.0306)****	*(0.055)****	*(0.0528)****	*(0.205)***	*(0.0399)****	*(0.084)**	*(0.0794)****	*(0.161)***	*(0.0492)****	*(0.104)****	*(0.0351)****	*(0.061)***
port	0.6176	-0.227	0.3914	-0.093	0.085	0.175	0.5255	0.185	0.2425	-0.357	0.2153	-0.202	-0.0389	0.029
	*(0.1778)****	*(0.313)*	*(0.0674)****	*(0.077)*	*(0.1064)*	*(0.228)*	*(0.0839)****	*(0.247)*	*(0.1518)*	*(0.228)*	*(0.0927)***	*(0.166)*	*(0.0713)*	*(0.119)*
beu	0.0963	-1.087	0.1878	0.021	0.1249	-0.404	-0.5529	-0.483	-0.9981	-1.081	-0.2788	-0.174	0.83	0.045
	(0.2978)	*(0.578)**	*(0.1464)*	*(0.113)*	*(0.215)*	*(0.388)*	*(0.1596)****	*(0.353)*	*(0.2502)****	*(0.526)***	*(0.1768)*	*(0.256)*	*(0.1318)****	*(0.133)*
bex	-0.7505	-0.286	-0.1956	-0.085	-0.4942	-0.194	-0.3059	0.017	-0.5436	-0.27	-0.634	0.202	-0.2709	0.055
	*(0.1697)****	*(0.247)*	*(0.0634)****	*(0.077)*	*(0.1062)****	*(0.243)*	*(0.0741)****	*(0.164)*	*(0.1411)****	*(0.312)*	*(0.1092)****	*(0.227)*	*(0.0774)****	*(0.100)*
bac	-0.2062	-0.1	0.1745	-0.07	-0.335	-0.209	-0.1879	-0.257	-0.404	-0.3	-0.4629	-0.327	-0.0255	0.002
	*(0.1130)**	*(0.185)*	*(0.0584)****	*(0.066)*	*(0.1154)****	*(0.197)*	*(0.0718)****	*(0.133)**	*(0.1386)****	*(0.289)*	*(0.0995)****	*(0.163)***	*(0.0670)*	*(0.074)*
constant	-1.8558	2.34	-1.3324	-0.531	-0.5477	-0.713	-0.3428	1.163	-0.2496	0.338	0.5755	-0.426	-1.002	-0.18
	*(0.7862)***	*(1.098)***	*(0.2821)****	*(0.371)*	*(0.5258)*	*(1.007)*	*(0.3545)*	*(0.756*	*(0.6013)*	*(1.14)*	*(0.4012)*	*(0.058)*	*(0.2869)****	*(0.391)*
year	$F_{(7,731)}$=0.16	-	$F_{(7,731)}$=0.07	-	$F_{(7,731)}$=0.06	-	$F_{(7,731)}$=0.31	-	$F_{(7,730)}$=0.22	-	$F_{(7,731)}$=0.09	-	$F_{(7,731)}$=0.07	-
obs.	747	89	747	89	747	89	747	89	746	89	747	89	747	89
R^2	0.19	0.43	0.36	0.18	0.20	0.50	0.40	0.27	0.16	0.32	0.31	0.14	0.37	0.13
root MSE	1.38	0.73	0.61	0.27	1.11	0.74	0.76	0.49	1.37	0.88	1.02	0.62	0.7	0.28

Robust standard errors in parenthesis.

Significant at *** 1 per cent, ** 5 percent and * 10 percent level.

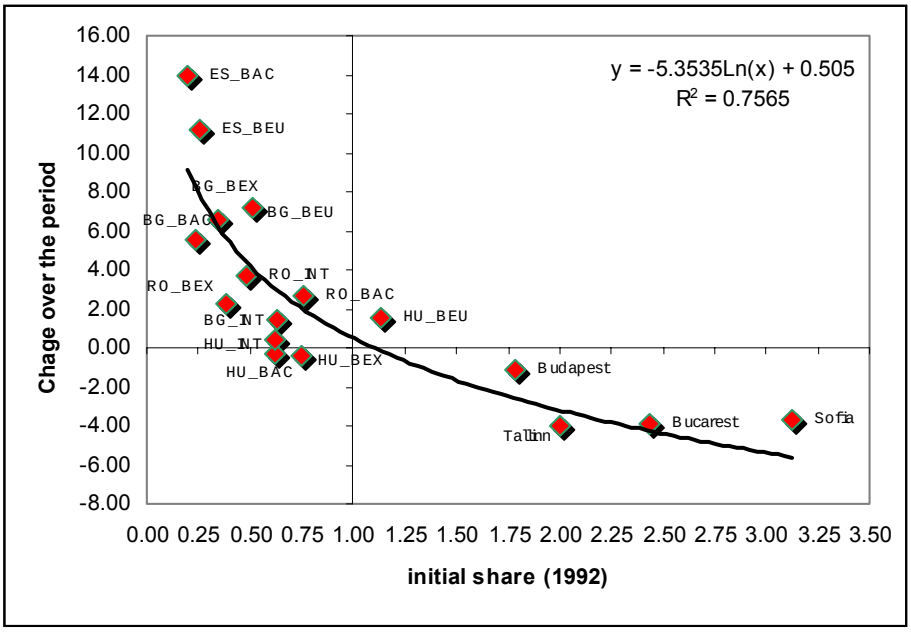
A= Food, Beverages and Tobacco; B-C= Textiles, Clothing and footwear; D-E= wood and paper products; F-H= oil refinement; chemicals, plastic and rubber products; I = non metal products; J-M = metallurgy, transport equipment and motor vehicles; N = furniture and other manufacturing products n.e.c.

Figure 1 - Empirical evidence I: Manufacturing agglomeration patterns, 1992-1999



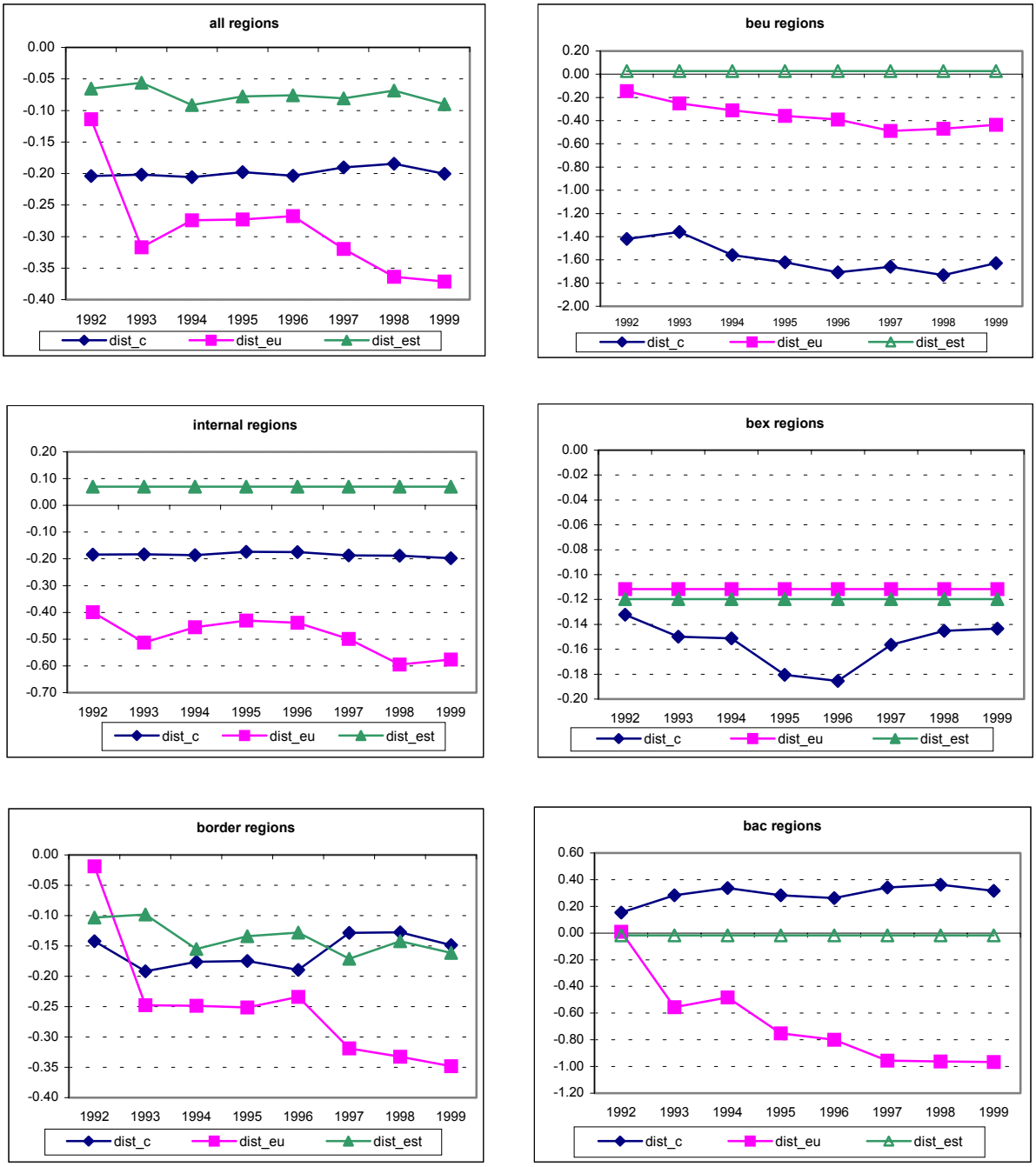
HU: y = -0.0513Ln(x) - 0.079 - R^2 = 0.5364
ES: y = -0.0706Ln(x) - 0.0759 - R^2 = 0.9562
BG: y = -0.0104Ln(x) - 0.0159 - R^2 = 0.3357
RO: y = 0.0063Ln(x) + 0.0081 - R^2 = 0.0635

Figure 2. Empirical evidence II: foreign firms' location patterns, 1992-1993



$L_i = \left(\frac{n_i^f}{n_i^d} \Big/ \frac{\sum_i n_i^f}{\sum_i n_i^d} \right)$, 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*.

Fig. 3 Estimated coefficients for distance variables over time



Estimated equation:

$$\log\left(\frac{E_{ijt}}{\sum_i E_{ijt}}\right) = \alpha_0 + \beta_{1t}\log(D_{ic}) + \beta_{2t}\log(D_{iEU}) + \beta_{3t}\log(D_{iest}) + \beta_4\log(FDI_{it}) + \beta_5 PORT_i + \mu_{ijt}$$

Appendix

Region Classification by country (NUTS III)

	BEU	BEX	BAC	INT
Bulgaria				
	Blagoevgrad; Kardjali; Smolyan; Haskovo;	Bourgas; Kustendil; Pernik; Yambol; Sofia region;	Vidin; Vtratza; Dobrich; Montana; Pleven; Russe; Silistra; Veliko Tarnovo;	Varna; Gabrovo; Lovech; Pazardjik; Plovdiv; Razgrad; Sliven; Sofia; Stara Zagora; Targoviste; Shumen
Estonia				
	Norther Estonia; North-Eastern Estonia; Western Estonia		Central Estonia; Southern Estonia	
Hungary				
	Győr-Moson-Sopron; Vas	Baranya; Somogy; Bács-Kiskun	Komárom-Esztergom; Zala; Borsod-Abaúj-Zemplén; Nógrád; Hajdú-Bihar; Szabolcs-Szatmár-Bereg; Békés; Csongrád	Budapest; Pest; Fejér; Veszprém; Tolna; Heves; Jász-Nagykun-Szolnok
Romania				
		Botosani; Iasi; Suceava; Vaslui; Galati; Tulcea; Caras-Severin; Maramures	Constanta; Calarasi; Giurgiu; Teleorman; Dolj; Mehedinti; Olt; Arad; Timis; Bihor; Satu Mare	Bacau; Neamt; Braila; Buzau; Vrancea; Arges; Dambovita; Ialomita; Prahova; Gorj; Valcea; Hunedoara; Bistrita-Nasaud; Cluj; Salaj; Alba; Brasov; Covasna; Harghita; Mures; Sibiu; Mun. Bucuresti (inclusiv Ilfov)

BEU = regions bordering with present EU-15; BAC = regions bordering with candidate countries; BEX = regions bordering with external countries; INT= internal regions.

Source: Resmini (2003).

Manufacturing sectors

Nace Rev. 1	Description
A	Food, Beverages and Tobacco
B-C	Textiles, Clothing and Leather products
D-E	Wood, paper and printing products
F-H	Refined petroleum, chemistry and plastic and rubber products
I	Non metal products
J-M	Metallurgy; machinery and equipment; electrical and optical equipment; transport equipment
N	Furniture and other manufacturing products n.e.c.