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## The New Economic Geography of the Northern Greek Border Regions

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## **"THE NEW ECONOMIC GEOGRAPHY OF THE NORTHERN GREEK BORDER REGIONS"**

Lefteris Topaloglou<sup>1</sup> and George Petrakos<sup>2</sup>

### **Abstract**

In the discussion concerning European integration, border issues pose a significant increase in volume. Despite this fact, there is no systematic insight in the economic processes and dynamics at the Union's external border regions in particular. The present paper attempts to shed some light to the economic and spatial dynamics occurring at the borders, focusing at the Northern Greek cross border area. The questions to be discussed are the following: (a) To what extent do distance and city size affect the type and level of cross border interaction? (b) What role does macro-geography play in the new economic geography of external borders in Europe? (c) Are border regions key players in the economic integration process which takes place in Europe? (d) Does the degree of integration in border regions with EU-15 influence cross border trade and cross border investment patterns? (e) To what extent do initial conditions established in the past affect market dynamics after the removal of borders? (f) Does the existing literature provide adequate interpretation to the questions raised above? The empirical results which are based on the EXLINEA research project show a systematic correlation at the borders between distance and urban system and also between the type and level of economic interaction.

**Key words:** borders, integration, city size, distance, economic geography, cross border

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interaction

## **1. INTRODUCTION**

Numerous academic publications support the hypothesis that the international economy has been wholly "globalised" into a "borderless" world (Ohmae, 1990). However, recent research shows that border-effects remain significant even after substantial reduction of border obstacles. Engel and Rogers (1996) pointed out that the dispersion of prices of similar goods increases with the distance between city pairs, a pattern that holds even within a country. However, when the price comparisons cross national political boundaries even within highly integrated areas such as USA Canada, the dispersion of prices goes far beyond distance. In the same line McCallum (1995), showed that trade between Canadian provinces is 2200 percent larger than between Canadian provinces and U.S. states of similar distance and sizes. Apparently, the above evidence suggests that borders still matter.

In the discussion concerning European integration, border issues pose a significant increase in volume. Nevertheless, this debate focuses mainly on political and socio-cultural aspects in the analysis of the "border phenomenon". Moreover, most economic analyses so far, primarily focus on the impact of integration at state's level. Consequently, there is no systematic insight of the spatial and economic dynamics occurring at the Union's external border regions in particular.

The fact that border regions are located in peripheral areas and not in the centre, introduces the 'core-periphery' approach in theoretical discussion. The neoclassic theory of trade fails to interpret how and why economic activity is concentrated in the centre and thus remains in a 'non dimensional approach', having only the state as the sole unit of analysis. Trade theory considers borders as nothing but tariff obstacles. The Heckscher-Ohlin theorem incorporated the spatial dimension interpreting specialization through interregional trade and factor mobility,

neglecting however, the variables of distance and transport cost. In the new trade theory, even though the hypotheses of economies of scales and monopolistic competition are taken into consideration, rather ambiguous information on the spatial impacts of integration on border regions is provided.

As far as the region of our focus is concerned, the main characteristics of the economic relations of the Balkan countries are cumulative deficits, a distorted geographic distribution of trade, labour intensive export structures, and excessive trade dependence on the EU resulting to an entrapment in inter-industry type of trade (Petrakos, 2003; Petrakos and Jackson, 2001). International experience shows that cross border trade tends to have a significant intra-industry character despite the fact that there are extensive borders between them (Petrakos, 1999). Petrakos and Totev (2000) have shown however, that the level of trade between these countries was very low even before 1989.

This paper attempts to shed some light to the economic and spatial dynamics occurring at the borders, focusing at the Northern Greek cross border area. The questions to be discussed are the following: (a) To what extent do distance and city size affect the type and level of cross border interaction? (b) What role does macro-geography play in the new economic geography of external borders in Europe? (c) Are border regions key players in the economic integration process taking place in Europe? (d) Does the degree of integration in border regions with EU-15 influence cross border trade and cross border investment patterns? (e) To what extent do initial conditions established in the past affect market dynamics after the removal of borders? (f) Does the existing literature provide adequate interpretation to the questions raised above?

What follows in the next section is a literature review referring to the economic geography of border regions. The empirical evidence is presented in the third section. Conclusions are provided in the final section.

## **2. A THEORETICAL REVIEW.**

### ***Borders and geography matter***

Crossing borders involves formalities that take time and often include monetary costs like tariffs. These implicit and explicit costs reduce trade and investment interaction. The existence of borders may also indicate the existence of different languages, or different cultures and perceptions, often representing determinant obstacles to mobility (Topaloglou et al, 2006). Existing literature shows that trade costs would be lower without the "intermediation" of the border line (McCallum, 1995; Helliwell, 1998; Brocker, 1998; Wei, 1996). Trade agreements between countries, and single markets such as the European Union, intend to reduce the barriers and the time needed to cross borders, and therefore fail to increase economic interaction.

Given the above background, an important question arises dealing with the role of distance in the economic geography of borders. It is known that distance between markets influences transportation cost and therefore the cost of imports and exports. Distance may also influence personal contact and communication, which may influence trade. Estimates of the effect of distance show that an increase in the distance between countries is associated with a decrease in the volume of trade (Rauch, 1991; Kinoshita and Campos, 2003). Within this scope, the borders and the obstacles involved can be considered as factors that increase distance. Reversely, the reduction of barriers at the borders will bring an increase in economic interaction resulting from the reduction of the relative distance.

Do geographical coordinates of a border region influence cross border interaction? Within the context of international trade, proximity to foreign markets is advantageous (in terms of transportation cost) for firms which export to these markets. Hence, the geographical location of a border area is associated with access cost to foreign markets. The central or peripheral

character of a border region however, is an issue related to the spatial dimension of the relative analysis. From this point of view, a remote border area at a national scale may turn out to be a central place in an integrated common market. In the European Union in particular, the recent eastward enlargement, has brought forward important spatial consequences in the geographical gravity of borders areas (Resmini, 2003). As a result, the "old" EU's external borders became the "new" internal ones, whilst at the same time the "new" EU's external borders are shifted now in the "old" hinterland of East Europe. Therefore, it seems from the geographical perspective that two new types of border regions are emerging: the central regions and peripheral ones. Within this context, central frontier regions located at the interface of a foreign and a domestic market, enjoy better market access, market potential and market size due to their favourable location (Niebuhr and Stiller, 2002). Petrakos and al (2004), examining the regional characteristics of the EU Accession countries, support that the most developed regions are either metropolitan centers or western border regions. According to the New Economic Geography models, the integration process between two countries increases cross border backward and forward linkages, since firms sell a larger proportion of their output as exports, and consumers derive a higher proportion of their consumption from imports. Under these conditions, geographically disadvantaged border regions cannot benefit as much as others from integration, facing difficult initial conditions such as higher transport costs (Limao and Venables, 2001).

### ***Border regions in a closed economy***

What are the spatial dynamics that occur in border regions due to impenetrable boundaries? In a closed economy, border regions could be characterized as areas of low attractiveness due to their unfavourable geographical conditions (Dimitrov et.al., 2002). Losch (1940) compares

border regions with a desert, where goods can be acquired only by distance. Closed borders distort market size whereas the consequent abolition of borders releases spatial dynamics.

What are the determinant factors which define the attractiveness of border areas? Location theories provide us with valuable information regarding the factors that influence the location decisions of firms. According to the classical theory of central places, every firm and every product or service has its own critical size and volume within the defined economic space, in order to be sustainable (Cristaller, 1933). However, when it comes to borders, market size is distorted and alters the hierarchical structure by restricting the potential for profit maximization and value creation. Therefore, it is a difficult task for firms near the borders to maximize their profits. It is for this reason why proximity at borders discourages the location of enterprises, whereas producers tend to show a preference towards the center of the internal market. In the same line, Hansen (1977) and Hoover, (1963) claim that the larger a country is – therefore with a large market – the fewer the incentives for firms to locate at borders will be. Alesina et. al (2000), mentioned that in the case of trade restrictions, the countries that benefit most are the ones which have an efficient market size. Within this context, border areas perform a low attractiveness. In this case the political boundaries of a country coincide with market borders.

### ***Border regions in integrated economy***

What are the spatial outcomes of economically opened borders? The abolition of border obstacles due to the integration process redefines not only space but market size too. The reduction of cross-border transaction costs increases the accessibility in both sides of the borders. Trade liberalization brings new opportunities in border regions providing better access to foreign markets and cheaper imports enhancing their attraction in terms of location (Brühlhart et al, 2004).

To which extent however, does the market size of the neighbouring country affect the orientation of firms, in an integrated economy? Damijan and Kostevc, (2002), claim that border regions that have a smaller market size tend to gain more from the process of integration due to differences that exist in productive costs and due to low employment levels evident in border regions. There are several studies listed in the literature which provide evidence for the latter argument both in the USA and in Europe (McCallum, 1995; Hanson, 1998; Hanson, 1996; Resmini, 2003).

The most advanced border regions, however, in income terms, are concerned with the fact that the abolition of trade barriers may have negative implications for their development due to their inability to compete successfully in terms of (low) production costs (Topaloglou et. al, 2006). Skepticism, nevertheless, also exists in the less advanced border regions regarding their ability to take advantage of the opportunities offered by economic integration, as they are thought to be poorly adjusted (in terms of economic and institutional structures, human capital and technology) to the conditions and demands of the free-market economic environment (Melachroinos, 2002).

Do city size and city location influence the level of cross border economic interaction in an integrated economy? The answer to this question is not an easy task as there is no evidence in the literature to shed light on this issue. Taking into consideration that there is a positive relationship between market size and city size, we could argue that the urban system at border regions reflects to a certain extent the allocation of economic activities among border cities. Turning back to the Lochian approach, the critical market size of goods and services is identified more or less with the hierarchical structure that exists among urban centres. Consequently, the differences in city sizes reflect differences in the economic activities that



these cities host. Within this scope, large urban centers located close to borders may attract a large amount of economic activities due to agglomeration economies.

On the basis of the analysis mentioned in the theoretical review section, we can argue that there is no systematic theory of borders. Despite the fact of a growing literature on border issues, the existing evidence is limited in order to adequately interpret the spatial impacts of integration in border regions when borders are opening up.

### **3. AN EMPIRICAL RESEARCH ACROSS THE EU's EXTERNAL BORDERS**

#### ***General information of the survey and methodology***

Within the empirical portion of our research we attempt to answer the questions risen in the theoretical part, tracing the new economic geography of the Northern Greek cross border zone. This section provides evidence based on a survey carried out within the framework of the EXLINEA project<sup>3</sup> in nine different cross border areas at EU's external borders as depicted in Map 1.

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<sup>3</sup> The EXLINEA project "Lines of Exclusion as Arenas of Co-operation: Reconfiguring the External Boundaries of Europe" was funded by the European Commission under the 5<sup>th</sup> Action Framework. In total eight European universities and institutions have been involved in the project. In detail: The Free University of Berlin as coordinator (Germany), the University of Thessaly (Greece), the Peipsi Centre for Transboundary Cooperation (Estonia), the Nijmegen Centre for Border Research (The Netherlands), the Karelian Institute of the Joensuu University (Finland), the University of Tartu,(Estonia), the Hungarian Academy of Sciences (Hungary), the University of Warsaw (Poland).

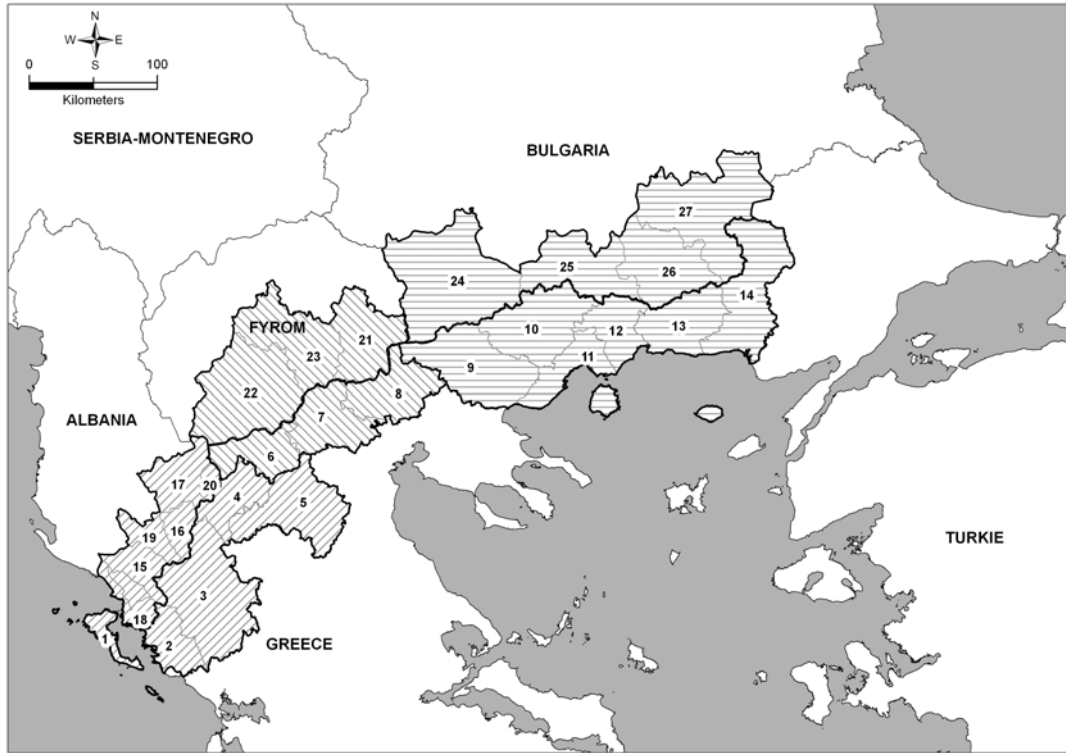
**Map 1.** Cross border study areas of the EXLINEA project



*Source: Authors' Elaboration*

The Greek border area case study refers to the border zones of: (a) Greece-Albania (b) Greece-FYROM and (c) Greece-Bulgaria including a total of 27 NUTS III border regions as illustrated in Map 2 with the table attached.

**Map 2. Case Study: The Northern Greek Border Area**



*Source: Authors' Elaboration*

GREECE - ALBANIA				GREECE - FYROM			GREECE - BULGARIA				
1	Kerkira	18	Gjirokaster	5	Kozani	22	Pelagonia	9	Serres	24	Blagoevgrand
2	Thesprotia	15	Saranta	6	Florina	23	Vardar	10	Drama	25	Smolyan
3	Ioannina	19	Permiti	7	Pella	24	Southeast	11	Kavala	26	Kardjali
4	Kastoria	16	Kolonja	8	Kilkis			12	Xanthi	27	Haskovo
		17	Korca					13	Rodopi		
		20	Devol					14	Evros		

The actual research was part of a wider effort to study the evolution, problems, policies and perceptions prevailing in the old and new external borders of the European Union. The survey was conducted with the use of a standardized questionnaire which included a total of 220 closed questions that required answers in a Likert scale ranging from 1 to 7. All the research teams collected 937 questionnaires whereas 400 of them referred to the Northern Greek border area. More specifically, ninety eight (98) of the above questionnaires refer to the

Albanian-Greek border zone, 124 to the FYRQM-Greek zone and 178 to the Bulgarian-Greek border zone. Table 1, provides summary information on the characteristics and the number of respondents per each border zone in our sample.

**Table 1.** Summary Information of the Research Sample

<b>(a) Public</b>	<b>186</b>	<b>(b) Private</b>	<b>214</b>
Local Authorities	86	Local Chambers	27
Public Agencies	27	Selected large firms	140
Development agencies	47	Consultants	23
Agencies promoting cbc	11	Journalists	6
Universities and Institutions	15	NGOs	18

*Source: Authors' Elaboration*

The analysis and interpretation of the economic cross border interaction focuses firstly on imports, exports, and investments made by border firms in the adjacent country and vice versa. Secondly, we examine the spatial dimension of economic interaction, at the micro-geographical level. In detail, we scrutinize the interaction at the level of: (a) the nearest city on the other side (CITNEAR), (b) the nearest larger city on the other side (CITLARG), (c) the nearby regional markets on the other side (REGNEAR) (d) the more distant regional markets on the other side (REGNFAR), (e) the capital city of the country on the other side (CAPIT) and (f) the other countries (OTHER).

### ***The type and level of economic interaction***

Attempting to answer the question concerning the type and level of cross border economic interaction, we analyze the results referring to cross border trade and cross border investments in relation to each border zone of the area of our focus.

Cross border trade

Tables 2 and 3 provide summary information about the level of cross border exports and imports (mean values) with respect to the spatial level of interaction such as CITNEAR, CITLARG, REGNEAR, REGFAR, CAPIT and OHTER. Apart from the border zones of our case study presented in the first four columns, we aggregated on the one hand the total Greek border zone (west) and the Albanian-Fyrom-Bulgarian border zone on the other (east). Furthermore in the next columns we grouped the regions of the EXLINEA sample, according to their level of integration with EU-15. So the groups of the EU-15 (BEU), New Members States (BNM) and the External Countries (BEX) border regions have been come up. In the last column the total results of the EXLINEA sample is reported. The responses range from 1 (low) to 7 (high), with extreme values representing no exports or imports at all and very satisfactory level of exports or imports respectively.

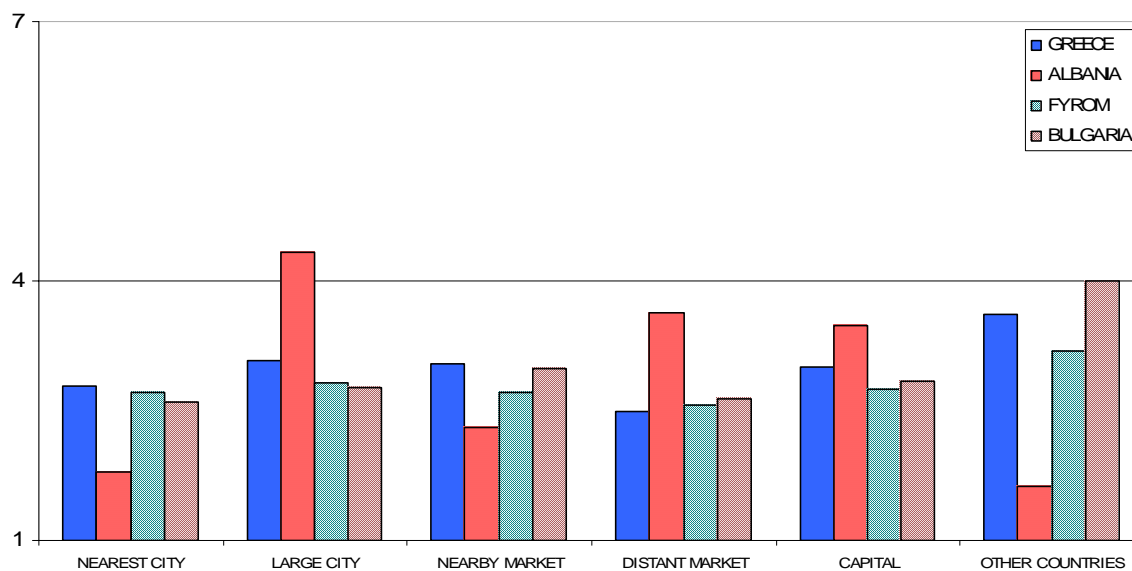
**Table 2.** Cross Border Exports (mean values)

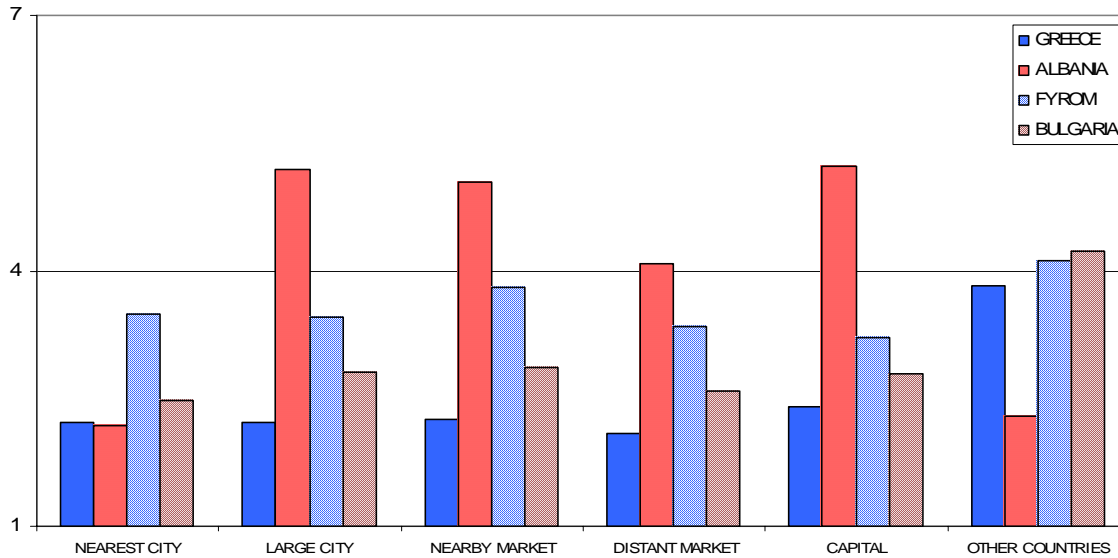
<i>1 = no exports at all</i> <i>7 = very satisfactory level of exports</i>	Greece Albania		Greece FYROM		Greece Bulgaria		Total Greece (ALFYBU)		Non EU	NMS	EU-15	EXLINEA
	GR	AL	GR	FY	GR	BU	West	East	EXT	NMS	EU-15	
<i>No Observations</i>	<b>49</b>	<b>49</b>	<b>83</b>	<b>41</b>	<b>60</b>	<b>118</b>	<b>192</b>	<b>208</b>	<b>338</b>	<b>368</b>	<b>231</b>	<b>937</b>
Cross-border exports to the <i>nearest city</i> on the other side	2.94	1.80	2.84	2.71	2.58	2.59	2.79	2.43	2.97	2.61	2.89	<b>3.0</b>
Cross-border exports to the <i>nearest larger city</i> on the other side	3.18	4.33	3.22	2.83	2.80	2.76	3.08	3.14	3.42	3.01	3.22	<b>3.3</b>
Cross-border exports to other <i>nearby regional markets</i>	2.92	2.31	3.18	2.71	2.95	2.99	3.04	2.77	3.18	2.93	3.10	<b>3.2</b>
Cross-border exports to more <i>distant markets</i> of the country	2.51	3.63	2.45	2.56	2.52	2.64	2.49	2.86	3.16	2.68	2.64	<b>3.0</b>
Cross-border exports to the <i>capital</i> of the country	2.76	3.49	3.21	2.76	2.93	2.84	3.01	2.98	3.01	2.86	3.13	<b>2.8</b>
Exports to <i>other countries</i>	3.51	1.63	3.70	3.20	3.60	4.00	3.62	3.28	3.52	4.12	3.73	<b>3.9</b>

**Table 3.** Cross Border Imports (mean values)

<i>1 = no imports at all</i> <i>7 = very satisfactory level of exports</i>	Greece Albania		Greece FYROM		Greece Bulgaria		Total Greece (ALFYBU)		Non EU	NMS	EU-15	EXLINEA
	GR	AL	GR	FY	GR	BU	West	East	EXT	NMS	EU-15	
<i>No Observations</i>	<b>49</b>	<b>49</b>	<b>83</b>	<b>41</b>	<b>60</b>	<b>118</b>	<b>192</b>	<b>208</b>	<b>338</b>	<b>368</b>	<b>231</b>	<b>937</b>
Cross-border imports from the <i>nearest city</i> on the other side	1.78	2.18	2.09	3.49	2.78	2.48	2.23	2.61	3.09	2.65	2.38	<b>3.1</b>
Cross-border imports from the <i>nearest larger city</i> on the other side	1.94	5.18	2.12	3.46	2.60	2.81	2.23	3.50	3.77	2.88	2.43	<b>3.5</b>
Cross-border imports from other <i>nearby regional markets</i>	1.92	5.04	2.15	3.80	2.68	2.86	2.26	3.56	3.75	2.92	2.59	<b>3.3</b>
Cross-border imports from more <i>distant markets</i> of the country	1.57	4.08	2.06	3.34	2.55	2.59	2.09	3.09	3.52	2.71	2.40	<b>3.4</b>
Cross-border imports from the <i>capital</i> of the country	1.63	5.22	2.55	3.22	2.83	2.80	2.40	3.45	3.71	2.81	2.52	<b>3.5</b>
Imports from <i>other countries</i>	3.57	2.29	3.87	4.12	3.98	4.23	3.83	3.75	3.79	4.54	3.87	<b>4.0</b>

Diagrams 1 and 2 depict graphically the results concerning exports/imports. The vertical axis shows the level of export/import volume whereas value 4 depicts the average grade. The horizontal axis represents the six different spatial dimensions of interaction at the spatial level.

**Diagram 1.** Cross Border Exports

**Diagram 2.** Cross Border Imports

The information provided in the above figures, allow us to make the following observations: First, it is evident that cross border trade is lower than average in most of the cases. Second, in the tables 2 and 3 it is reported that west exports/imports (total of the Greek zone) are lower than BEU and east exports/imports (total of the Albanian-FYROM-Bulgarian zone) are lower than BEX systematically. Third, exports in particular, appear to be at very low levels with the only exception the Albanian exports to the nearest largest city. As far imports are concerned we record by a systematic way the higher volumes on east border zones compared to Greek (west) zone. It is also noticeable that the Albanian imports exhibit the highest rates. Fourth, in Diagrams 1 and 2, comparing the level of trade interaction between the nearby (REGNEAR) and more distant regions (REGFAR), we realize that trade volume referring to closer markets, indicates in all cases higher values. Fifth, the largest cities near the borders, the capitals and the nearby markets exhibit systematically higher export and import performances in the border zone level. Sixth, the trade volume concerning the other countries

with the exception of Albanian case seem to be higher in relation to all other directions.

On the basis of the above observations the following arguments may be drawn: (a) The low export and import volume is associated to a certain extent with the low level of economic performance in peripheral regions with respect to the geographical and economic gravity centers, confirming relative predictions of the literature (Petrakos et al, 2004; Petrakos and Christodoulakis, 2000). (b) The lower level of trade in the Greek case study in relation to the similar groups of the Exlinea project, indicating a geographical pattern where Southeast Europe report lower performances of trade cross border interaction between in relation to other border regions of East Europe. (c) The higher performances of the nearest larger cities, capitals and nearby regions in both exports and imports, allow us to assume that cities with sufficient market size and proximity to borders may attract large amounts of trade activities because of internal and external economies of scale. (d) The systematic higher performances reported in nearby regions compared to more distant ones underlines the significant role of distance in cross border trade interaction (e) The higher level of trade volume referring to the other countries compared to other origins or destinations, indicates that the effects of adjacency have not yet become a dominant factor in the border trade interaction. Thus, we could claim that border regions still maintain trade relations established in the past, when borders were closed.

#### Cross border investment

Tables 4 and 5 provide summary information concerning the cross border investment represented in mean values. In particular Table 4 records cross border investment by local firms on the other side and Table 5 exhibits investments in the local economy by firms originating in the other side.



**Table 4.** Cross border investment by local firms on the other side (mean value)

<i>1 = no investment at all</i> <i>7 = very satisfactory level of exports</i>	Greece Albania		Greece FYROM		Greece Bulgaria		Total Greece (ALFYBU)		Non EU	NMS	EU-15	EXLINEA
	GR	AL	GR	FY	GR	BU	West	East	EXT	NMS	EU-15	
<i>No Observations</i>	<b>49</b>	<b>49</b>	<b>83</b>	<b>41</b>	<b>60</b>	<b>118</b>	<b>192</b>	<b>208</b>	<b>338</b>	<b>368</b>	<b>231</b>	<b>937</b>
Cross-border investment by local firms to the <i>nearest city</i> on the other side	2.37	1.45	2.77	2.71	3.35	1.93	2.85	1.97	2.22	2.02	2.87	2.2
Cross-border investment by local firms to the <i>nearest larger city</i> on the other side	2.76	1.53	3.07	2.46	3.37	2.04	3.08	2.00	2.25	2.36	3.14	2.3
Cross-border investment by local firms to other <i>nearby regional markets</i>	2.82	1.47	3.06	2.76	3.50	2.15	3.14	2.11	2.30	2.33	3.20	2.3
Cross-border investment by local firms to more <i>distant markets</i>	2.06	1.37	2.74	2.63	2.50	2.00	2.49	1.98	2.28	2.08	2.61	2.2
Cross-border investment by local firms to the <i>capital</i> of the country	2.55	1.45	3.01	2.90	2.90	2.14	2.86	2.13	2.29	2.20	2.85	2.3
Investment by local firms to <i>other countries</i>	2.98	1.35	3.15	2.85	2.75	2.66	2.98	2.39	2.62	2.94	3.07	2.5

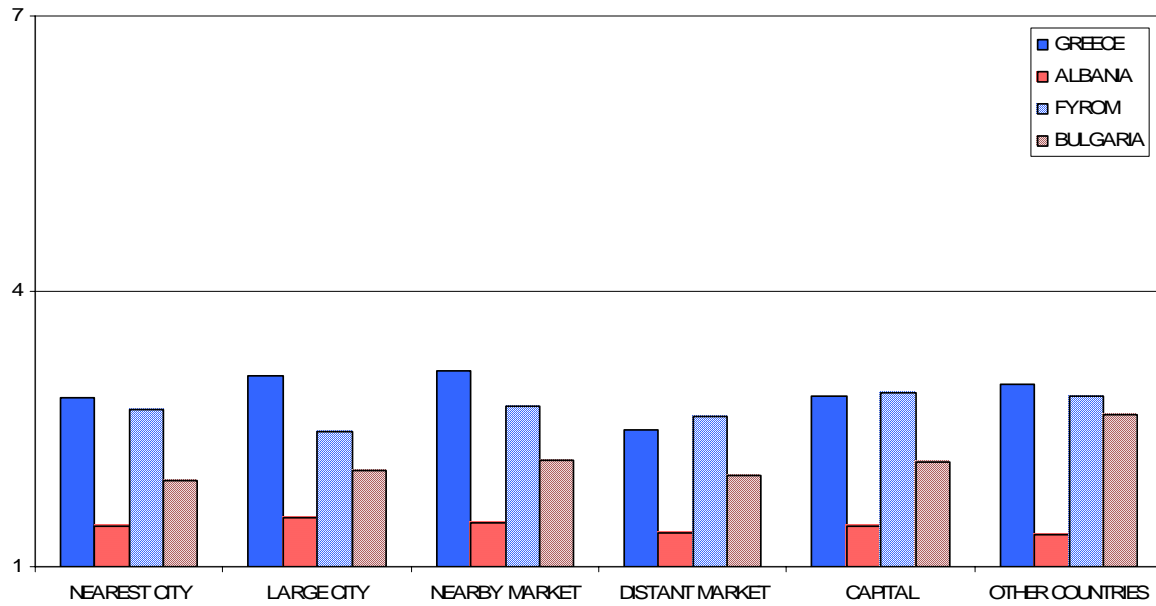
Figure 7 and Figure 8 demonstrate graphically the performance of cross border investment in macro and micro geographical level respectively. In detail, Figure 7 indicates cross border investment by local firms whilst Figure 8 exhibits investment in the local economy by firms originating in the other side. The vertical axis represents the level of investment intensity ranging from 1 to 7 while value 4 shows the average grade. The horizontal axis indicates the spatial dimension of investment at micro geographical level of interaction.

**Table 5.** Investments in the local economy by firms originating in the other side (mean value)

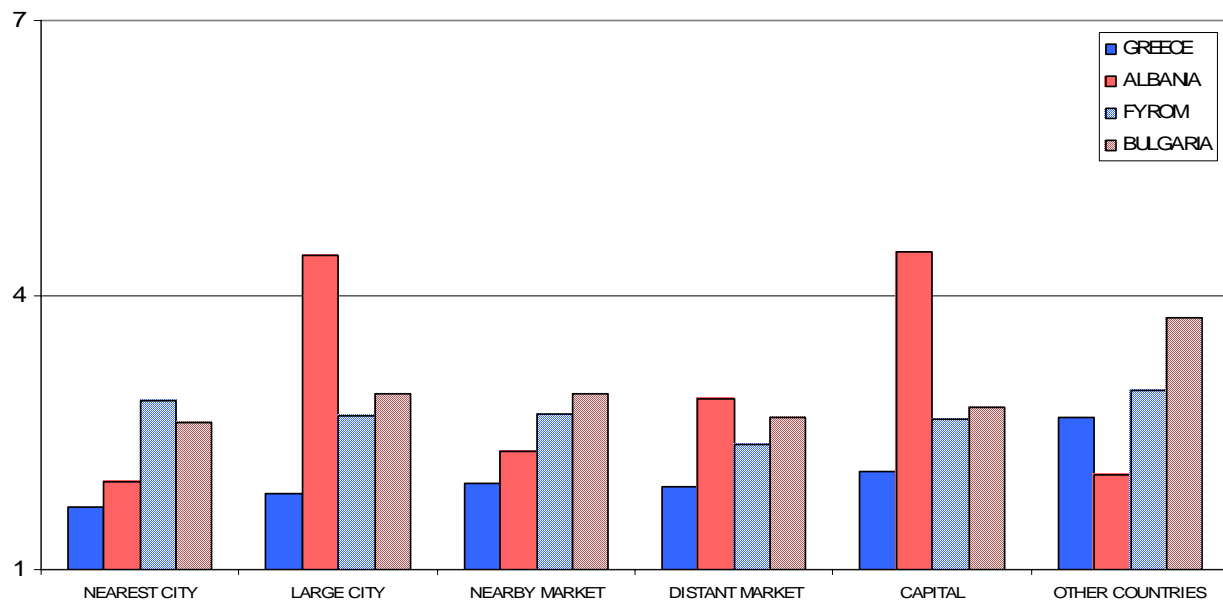
<i>1 = no investment at all</i> <i>7 = very satisfactory level of exports</i>	Greece Albania		Greece FYROM		Greece Bulgaria		Total Greece (ALFYBU)		Non EU	NMS	EU-15	EXLINEA
	GR	AL	GR	FY	GR	BU	West	East	EXT	NMS	EU-15	
<i>No Observations</i>	<b>49</b>	<b>49</b>	<b>83</b>	<b>41</b>	<b>60</b>	<b>118</b>	<b>192</b>	<b>208</b>	<b>338</b>	<b>368</b>	<b>231</b>	<b>937</b>
Investment in the local economy by firms originating in the <i>nearest city</i> on the other side	1.59	1.96	1.82	2.85	1.60	2.61	1.69	2.50	2.45	2.17	1.79	2.5
Investment in the local economy by firms originating in the <i>nearest larger city</i> on the other side	1.61	4.43	2.00	2.68	1.80	2.92	1.84	3.23	3.02	2.40	1.93	2.8
Investment in the local economy by firms originating in other <i>nearby regional markets</i>	1.71	2.29	2.12	2.71	1.90	2.92	1.95	2.73	2.76	2.38	2.02	2.7
Investment in the local economy by firms originating in more <i>distant markets</i>	1.47	2.86	2.07	2.37	2.05	2.66	1.91	2.65	2.81	2.18	1.99	2.9
Investment in the local economy by firms originating in the <i>capital</i> of the country	1.67	4.47	2.33	2.63	2.02	2.77	2.06	3.14	3.10	2.35	2.10	2.9
Investment in the local economy by firms originating in <i>other countries</i>	2.65	2.04	2.84	2.95	2.45	3.75	2.67	3.19	3.41	3.71	2.73	3.9

Diagrams 3 and 4 depict graphically the level of investment by local firms on the other side and vice versa respectively. The vertical axis indicates the level of investment volume whereas value 4 depicts the average grade. Finally, the six different spatial dimensions of interaction are represented on the horizontal axis.

**Diagram 3.** Cross Border Investments by local firms on the other side



**Diagram 4.** Investments in the local economy by firms originating in the other side



On the basis of information in Tables 4 and 5, in combination with the results reported in Diagrams 3 and 4, we may highlight the following: First, the level of cross border investment is below the average grade almost in all cases, indicating a low investment dynamic in border

regions in general. Second, west investments (total of the Greek zone) by local firms and by firms originating in the other side as well, are lower compared to BEU investments by a systematic way. East investments however, in the local economy (total of the Albanian-FYROM-Bulgarian zone) by firms originating in the other side appear to be higher compared to BEX regions in the cases of the nearest city, the nearest larger city and the capital city. Third, despite the fact of low interaction, investments originating from the Greek border regions record higher performances in relation to the other side. Reversely, Albanian, FYROM and Bulgarian regions seem to be investment receivers at a higher level compared to the Greek regions. Forth, similarly to cross border trade, when we compare investment with respect to nearby and more distant regional markets, we detect systematically a higher performance to the markets with better proximity. Fifth, the large cities, the capital cities and the nearby markets appear to be the major senders and receivers of cross border investment. Six, cross border investment referring to the other countries, as with trade, report with the exception of the Albanian case, the highest values compared to the other locations.

Summing up, we may draw the following conclusions: (a) It is evident that border areas do not represent the basic place neither origin or destination for investment. Consequently, it seems that border regions are unable to be senders or receivers of substantial investment capital. (b) The lower level of investments in the Northern Greek border area with regards to the total Exlinea area, intimates a geographical dimension in cross border investments. However, the fact that investments originating in the Greek nearest cities, nearest larger cities and capital cities report higher performances compared to BEX regions, reveals a relative dynamism of the Greek capitals in the opposite border zone. (c) The fact that Greek regions appear to be by a systemic way the biggest senders and the smallest receivers of investment capital compared to the east zone, reveals an association between the level of cross border investment and the

degree of growth. (d) The systemic difference in investment performances between closer and distant regional markets shed light to the significant role of distance in economic relations among adjacent countries. (e) The output also, that the capital cities and the largest cities near the borders exhibit a higher investment dynamism, underlines the role of agglomeration economies which emerged due to sufficient market size. (f) The relative high performances of cross border investment with respect to other countries (OTHER), intimate that apart from the factor of adjacency there are still worthy initial conditions in place referring to the past.

### ***Degree of asymmetry of cross border economic relations***

#### ***Methodology***

Based on the evidence provided in the previous section, two interesting questions arise in relation to the degree of asymmetry in economic relations between the border regions under consideration:

Firstly, do we detect an asymmetry pattern in interaction between Greek-Albanian, Greek-FYROM and Greek-Bulgarian border region? For instance, are the exports originating in Greek border regions to the nearest city of Albanian regions, associated with the exports originating in Albanian regions to the nearest city of Greek regions? In this question, we study three-pair groups as follows: (a) GR-ALB (b) GR-FYR, and (c) GR-BUL. Within each pair group we analyze five identical location pairs: (a) (CITNEAR-CITNEAR) (b) (CITLARG-CITLARG), (c) (CAPIT-CAPIT), (d) (REGNEAR-REGNEAR) and (e) (REGFAR-REGFAR).

At the same level of analysis, is there any asymmetry between different locations? This is the second question arisen. For example, do we detect any significant relationship between imports of Greek regions from the nearest cities and imports of Greek regions from the largest cities accordingly? The pair groups studied here are: (a) (GR-GR), (b) (ALB-ALB), (c) (FYR-FYR) and

(d) (BUL-BUL). Also, we analyze four pairs of different locations as follows: (a) (CITNEAR-CITLARG), (b) (CITNEAR-CAPIT), (c) (CITLARG-CAPIT) and (d) (REGNEAR-REGFAR).

Attempting to answer the questions mentioned above we employ a series of statistical techniques by conducting symmetric measures, running the Gamma and Spearman tests. The Gamma test provides direct answers to question such as "do the inputs determine the outputs?". If Gamma (p-value) is small, there is a strong predictive relationship between the input variables and the output. If Gamma (p-value) is large, the input is irrelevant to output. Having variables that are measured on an ordinal (rank order) scale, we also run the Spearman test in order to capture the covariance between the variables.

#### Cross border trade

Examining the cross border trade pattern, Table 6 provides summary information referring to the statistical outputs of the symmetric measures. In the upper half of the Table the results of symmetric tests between Greek-Albanian, Greek-FYROM and Greek-Bulgarian border region are reported, examining pairs referred to the same variable location (e.g. CITNEAR-CITNEAR). In the lower half of the Table we examine four pair groups with respect to the same country (e.g. GR-GR) and different spatial location (e.g. CITNEAR-CITLARG). Column (1) shows the different pairs of symmetric measures with regards to countries and locations. Column (2) exhibits the number of observations whereas columns (3) to (10) illustrate the results of the Gamma and Spearman tests in relation to exports and imports respectively.

**Table 6.** : Symmetric measures on Cross Border Trade

		Exports					Imports			
		Gamma		Spearman		Gamma		Spearman		
(1)	(2)	N	Value	p-value	Value	p-value	Value	p-value	Value	p-value
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
<b>GR-ALB</b>										
CITNEAR	CITNEAR	49	0.155	0.361	0.121	0.409	0.320	0.085	0.245	0.089
CITLARG	CITLARG	49	-0.317	0.010	-0.342	0.016	-0.044	0.786	-0.039	0.794
REGNEAR	R	49	-0.194	0.167	-0.191	0.189	-0.263	0.151	-0.206	0.156
REGFAR	REGFAR	49	0.255	0.111	0.239	0.098	0.000	1.000	-0.002	0.990
CAPIT	CAPIT	49	-0.172	0.137	-0.178	0.220	-0.139	0.509	-0.102	0.485
<b>GR-FYR</b>										
CITNEAR	CITNEAR	41	0.002	0.990	0.000	0.998	0.099	0.583	0.081	0.619
CITLARG	CITLARG	41	0.043	0.807	0.044	0.786	0.069	0.702	0.053	0.747
REGNEAR	R	41	0.144	0.323	0.159	0.328	0.171	0.309	0.169	0.296
REGFAR	REGFAR	41	0.255	0.111	0.239	0.098	0.132	0.462	0.122	0.453
CAPIT	CAPIT	41	0.205	0.200	0.197	0.224	0.232	0.206	0.215	0.183
<b>GR-BUL</b>										
CITNEAR	CITNEAR	60	-0.096	0.510	-0.087	0.508	-0.069	0.633	-0.063	0.635
CITLARG	CITLARG	60	-0.177	0.368	-0.107	0.414	-0.027	0.848	-0.026	0.842
REGNEAR	R	60	0.138	0.271	0.146	0.264	-0.021	0.886	-0.024	0.854
REGFAR	REGFAR	60	-0.006	0.964	-0.013	0.920	-0.147	0.294	-0.142	0.279
CAPIT	CAPIT	60	0.189	0.167	0.178	0.174	-0.209	0.129	-0.188	0.151
<b>GR-GR</b>										
CITNEAR	CITLARG	191	0.768	0.000	0.743	0.000	0.848	0.000	0.775	0.000
CITNEAR	CAPIT	191	0.667	0.000	0.662	0.000	0.630	0.000	0.591	0.000
CITLARG	CAPIT	191	0.733	0.000	0.724	0.000	0.635	0.000	0.600	0.000
REGNEAR	REGFAR	191	0.714	0.000	0.696	0.000	0.780	0.000	0.727	0.000
<b>ALB-ALB</b>										
CITNEAR	CITLARG	49	-0.037	0.802	-0.063	0.668	-0.128	0.368	-0.145	0.321
CITNEAR	CAPIT	49	-0.032	0.858	-0.028	0.848	-0.275	0.112	-0.229	0.113
CITLARG	CAPIT	49	0.735	0.000	0.717	0.000	0.652	0.000	0.579	0.000
REGNEAR	REGFAR	49	-0.205	0.212	-0.183	0.209	0.214	0.198	0.226	0.118
<b>FYR-FYR</b>										
CITNEAR	CITLARG	41	0.601	0.000	0.554	0.000	0.604	0.000	0.567	0.000
CITNEAR	CAPIT	41	0.608	0.000	0.547	0.000	0.409	0.016	0.387	0.013
CITLARG	CAPIT	41	0.720	0.000	0.682	0.000	0.463	0.003	0.463	0.002
REGNEAR	REGFAR	41	0.686	0.000	0.622	0.000	0.717	0.000	0.729	0.000
<b>BUL-BUL</b>										
CITNEAR	CITLARG	118	0.772	0.000	0.730	0.000	0.839	0.000	0.803	0.000
CITNEAR	CAPIT	118	0.405	0.000	0.397	0.000	0.520	0.000	0.506	0.000
CITLARG	CAPIT	118	0.432	0.000	0.422	0.000	0.555	0.000	0.555	0.000
REGNEAR	REGFAR	118	0.602	0.000	0.568	0.000	0.740	0.000	0.709	0.000

Source: Authors' Elaboration

Based on the information provided in Table 6, the following observations may be highlighted:

First, it is worth noting that no significant relationship is detected between GR-ALB, GR-FYR

and GR-BUL regions, when we examine the same variable location (e.g. CITNEAR-CITNEAR). In the first row for instance, by examining exports and imports with respect to CITNEAR of GR regions against CITNEAR of ALB regions, high Gamma (0,361), (0,085) and Spearman (0,409), (0,089) p-values are reported respectively, indicating that there is no correlation between the two variables. Second, it is quite remarkable that whenever we examine pairs within the same group of border regions in the cases of GR-GR, FYR-FYR and BUL-BUL (demonstrated in the lower half of Table 6) by testing different variable locations (e.g. CITNEAR-CITLARG), we detect significant and positive relationships. Thus, the reported Gamma and Spearman values are always positive and large, while the associated p-values approximate zero. In the case of ALB-ALB pair group however, it is remarkable that no significant associations are detected. Third, a systematic differentiation is highlighted in the degree of symmetry in trade in the lower half of Table 6. More specifically, the level of significance of the tests results within the GR-GR pair group are systematically higher compared to the other pair groups.

#### Cross border investment

Table 7 provides summary information referring to cross border investment by local firms to the other side, as well as investment in the local economy by firms originating in the other side of the borders, demonstrating the same statistical techniques used in Table 6.



**Table 7.** : Symmetric measures on Cross Border Investment

		Investment by local firms				Investment originating in the other side				
		Gamma		Spearman		Gamma		Spearman		
(1)	(2)	N	Value	p-value	Value	p-value	Value	p-value	Value	p-value
		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
<b>GR-ALB</b>										
CITNEAR	CITNEAR	49	0.132	0.635	0.071	0.630	0.271	0.280	0.158	0.277
CITLARG	CITLARG	49	0.523	0.018	0.295	0.040	0.029	0.879	0.071	0.907
REGNEAR	R	49	-0.088	0.973	-0.001	0.993	0.183	0.258	0.138	0.345
REGFAR	REGFAR	49	0.175	0.538	0.093	0.525	-0.390	0.044	-0.269	0.061
CAPIT	CAPIT	49	0.061	0.818	0.029	0.842	0.248	0.214	0.163	0.262
<b>GR-FYR</b>										
CITNEAR	CITNEAR	41	-0.108	0.464	-0.111	0.497	-0.145	0.463	-0.118	0.470
CITLARG	CITLARG	41	0.219	0.290	0.168	0.299	-0.252	0.185	-0.204	0.207
REGNEAR	R	41	0.060	0.725	0.062	0.704	-0.142	0.413	-0.124	0.446
REGFAR	REGFAR	41	0.045	0.757	0.045	0.783	-0.240	0.260	-0.184	0.257
CAPIT	CAPIT	41	0.024	0.891	0.041	0.804	-0.201	0.355	-0.147	0.365
<b>GR-BUL</b>										
CITNEAR	CITNEAR	60	-0.243	0.084	-0.227	0.081	-0.190	0.286	-0.145	0.269
CITLARG	CITLARG	60	-0.039	0.795	-0.046	0.730	-0.047	0.792	-0.040	0.763
REGNEAR	R	60	-0.279	0.042	-0.263	0.041	0.110	0.447	0.092	0.484
REGFAR	REGFAR	60	-0.312	0.014	-0.302	0.019	-0.216	0.183	-0.178	0.174
CAPIT	CAPIT	60	-0.136	0.367	-0.120	0.363	-0.244	0.170	-0.190	0.147
<b>GR-GR</b>										
CITNEAR	CITLARG	191	0.686	0.000	0.679	0.000	0.881	0.000	0.756	0.000
CITNEAR	CAPIT	191	0.573	0.000	0.579	0.000	0.732	0.000	0.612	0.000
CITLARG	CAPIT	191	0.647	0.000	0.643	0.000	0.781	0.000	0.671	0.000
REGNEAR	REGFAR	191	0.730	0.000	0.715	0.000	0.897	0.000	0.813	0.000
<b>ALB-ALB</b>										
CITNEAR	CITLARG	49	0.933	0.004	0.830	0.000	-0.330	0.044	-0.298	0.038
CITNEAR	CAPIT	49	0.948	0.004	0.829	0.000	-0.361	0.014	-0.322	0.024
CITLARG	CAPIT	49	0.921	0.014	0.689	0.000	0.752	0.000	0.714	0.000
REGNEAR	REGFAR	49	0.985	0.004	0.862	0.000	0.618	0.000	0.541	0.000
<b>FYR-FYR</b>										
CITNEAR	CITLARG	41	0.870	0.000	0.798	0.000	0.736	0.000	0.710	0.000
CITNEAR	CAPIT	41	0.540	0.001	0.518	0.001	0.000	0.591	0.000	0.000
CITLARG	CAPIT	41	0.584	0.001	0.518	0.001	0.619	0.000	0.615	0.000
REGNEAR	REGFAR	41	0.707	0.000	0.675	0.000	0.721	0.000	0.636	0.000
<b>BUL-BUL</b>										
CITNEAR	CITLARG	118	0.928	0.000	0.872	0.000	0.734	0.000	0.702	0.000
CITNEAR	CAPIT	118	0.762	0.000	0.695	0.000	0.485	0.000	0.468	0.000
CITLARG	CAPIT	118	0.788	0.000	0.724	0.000	0.428	0.000	0.413	0.000
REGNEAR	REGFAR	118	0.863	0.000	0.797	0.000	0.000	0.000	0.633	0.000

Source: Authors' Elaboration

On the basis of information provided in the above Figure, we can make the following comments: Firstly, when we examine the pair-groups of GR-ALB, GR-FYR and GR-BUL regions reported in the upper half Table 7, no significant correlation is detected. Secondly, examining the pair groups of GR-GR, ALB-ALB, FYR-FYR, and BUL-BUL regions in the lower half of Table 7, we detect positive correlations and statistical significances in all cases. Thirdly, a systematic differentiation is detected in relation to the degree of symmetry in investment, reported in the lower half of Table 7. In detail, despite the fact that all the test outputs exhibit a statistical significance, we observe that the level of statistical significance between pair locations within the GR-GR pair group is systematically lower in respect to the ALB-ALB, FYR-FYR and BUL-BUL groups respectively. It is worth noting, that the exact opposite picture is highlighted in the investment originating in the other side, where a higher level of statistical significance is recorded within the GR-GR pair group.

Summarizing the evidence in this section we may argue that there are three important conclusions related to the level of asymmetry in cross border trade and cross border investment: (a) The fact that in almost all cases no significant associations are detected between GR-ALB, GR-FYR and GR-BUL regions, reflect an asymmetry pattern in cross border interaction. The latter evidence allows us to assume that this asymmetry in interaction is associated with the asymmetry in the degree of European integration of the border regions under consideration. (b) The strong relationships detected in all cases in GR-GR, ALB-ALB, FYR-FYR and BUL-BUL pair groups, suggest that in border areas in particular, a spatial symmetry in economic activities occurs regardless the degree of European integration. (c) The fact also, that such strong relationships as noted earlier, exhibit a systematic differentiation, give rise to the argument that the degree of symmetry in border interaction is associated to a

certain extent with the degree of European integration of the border regions under consideration.

## **5. CONCLUDING REMARKS**

So far we have a growing literature on border region issues. However, the evidence related to the effect of distance and internal and external economies of scale when borders are abolished still remains limited.

This paper has used a recent survey conducted within the framework of the EXLINEA project in nine different cross border areas at EU's external border. The main conclusions derived from the precedent analysis and deserve consideration are the following:

First, the low level of cross border economic interaction reveals the peripheral character of the border regions in EU's external borders. Despite the fact that East-West trade and investment volume in Europe has been intensified since 1989, border areas located in the new EU's external borders in particular, do not seem to participate as key players in this process. Given also the high level of interaction in Europe, we could claim that this cross border interaction pattern generates some sort of "tunnel effects".

Second, the finding that the determinant parameters in the level of cross border interaction, appear to be: the closer regional markets, the capital cities and the largest cities near the borders, reveal that agglomeration dynamics are in place. In detail, the combination of sufficient market size in large urban centers and the favorable location in relative terms, release the internal and external economies of scale. Our results also suggest that city size and distance matter mostly in cross border trade and investment flows regardless to the level of integration with EU-15.

Third, despite the fact that EU's external borders have ceased to be impenetrable for more than fifteen years, the economic relations of border regions with other countries remain important irrespectively to distant location. This evidence suggests that placing a border and removing a border is not a symmetric action in terms of market dynamics due to the significant role of initial conditions.

Fourth, no symmetric behavior across the borders is detected at the macro-geographical level while a symmetric pattern is revealed in interaction at the micro-geographical. This picture gives rise to the argument that there is a significant difference in "orientation" between the border regions in EU-15, in New Member States and in external countries. At the same time however, the significant relationships in "micro-geography", suggest that a future expansion of cross border interaction seems to be in relative proportion including all micro-geographical destinations and sizes. In other words, we could claim that no "sucking effects" but potential symmetric spatial development originating in border regions comes to the surface.

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