

THE MULTIFACETED ECONOMIC AND POLITICAL GEOGRAPHIES OF INTERNAL AND EXTERNAL EU BORDERS

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TRANS-BORDER MOVEMENTS IN NORTHERN GREECE: SEEKING FOR SPATIAL INTERACTIONS

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ABSTRACT

In European spatial development policy, the so-called “culture of mobility” is one of the basic discourses clearly framed by the European Spatial Development Perspective with its main target being ‘transcending spatial distances across Europe’. In the European periphery, such as the border zone between Greece and its neighbouring countries, problems of uneven development, differences in the institutional context and transitional processes make the study of spatial processes in the border regions a matter of special importance. In the Northern Greek border zone, the drastic improvement of road transport infrastructure, with the completion of the EU co-funded Egnatia motorway along with its vertical axes, has not only raised the traditional remoteness and bad accessibility of this zone; it has also affected drastically trans-border connectivity, as it shortened considerably the time distances between border regions. The improved road infrastructure is expected to have significant effects on spatial interactions between trans-border regions in South-East Europe.

This paper analyses the results of an origin-destination study which was held in the 10 cross-border stations of Northern Greece. These cross-border stations connect Greece to Albania, FYROM, Bulgaria and Turkey. The main issues examined are related to questions such as the main characteristics and the gravity of the total movements, as well as the resulted origin-destination spatial structure, with reference to the scope, the frequency and the distance of movements. The main findings of the research show that although these movements are still a fraction of internal trans-regional flows, they are quite important mainly as regards the frequency and the scope of journeys. Other important findings relate to the large differences of cross-border movements between Greece and its neighbouring countries, with the northern ones (FYROM and Bulgaria) having the greatest share, the ones from and towards Albania concerning mostly migrant flows, and those to and from Turkey remaining rather low. A large share of cross-border movements concern trans-border regions and cities, mostly taking place within short distances of up to 50 km. The paper argues that research should go further to investigate the possible links between these regions and specific cities, whereas there is an emerging need for trans-border spatial planning which will encompass transport infrastructure planning.

INTRODUCTION

In European spatial development policy, the so-called “culture of mobility” (Richardson and Jensen 2000) is one of the basic discourses clearly framed by the European Spatial Development Perspective (ESDP, 1999) with its main target being transcending spatial distances across Europe. Factor mobility plays a vital role in the spatial integration process of the European Union. One of the most important prerequisites of this integration is the transportation networks which lead to the accessibility of places and markets, the physical communication between cultures, the flows of goods and the mobility of people. Potentially, it permits people and businesses to move according to their best suitable conditions, and ensures that the resulted economic performance transcends regional and national constraints.

For border regions, borders continue to constitute barriers and opportunities interchangeably. In particular in the European periphery, such as the border zone between Greece and its neighbouring countries, problems of uneven development, differences in the institutional context and transitional processes make the study of spatial processes in the border regions a matter of special importance. In the last decade, a drastic improvement of road transport infrastructure took place in the Northern Greek –in essence, an actual border- zone- because of the construction of the Egnatia Motorway, which started in 1996. Crucial sections of the motorway were gradually being delivered to traffic from 2004 (by the completion of the Kastania bypass between the cities of Veria and Kozani) to 2009, when, finally, in June, the 670 km motorway was put into full operation.

The Egnatia Motorway is, actually, one of the largest transport projects constructed lately in Europe, and it was included among the top priority projects of the Trans European Transport Networks (TENs-T). Through 9 vertical axes, the Egnatia Motorway operates as a collector axis of the Trans-European Network (No7) and the Pan European Transport Corridors that cross SE Europe from North to South. These vertical axes connect the Egnatia Motorway with the Greek-Albanian borders (towards Tirana), Western Bulgaria (towards Sofia), Eastern Bulgaria (Bourgas) and FYROM (towards Skopje). The Egnatia Motorway serves also the connection and road movements between Europe, Greece and Turkey towards the countries of Eastern Europe and Middle East.

The drastic improvement of the road infrastructure raised the traditional remoteness and bad accessibility of the Northern Greek zone, long being one of the major problems of the spatial structure in Greece. The Region of Epirus, for example, due to its geomorphology was one of the most typical cases of remote areas in Europe. The time distance between Thessaloniki-Ioannina is reduced from five to two and a half hours (Observatory-Egnatia Odos S.A. 2009). The road infrastructure improvement also affected drastically the trans-border connectivity, even if improvement interventions did not take place in other parts of the border zone, as it shortened considerably the time distances between the border countries and regions.

Recent literature on cross-border mobility and spatial interaction stresses the need for actual data and figures that would indicate accurate facts and raise specific arguments: “improved territorial knowledge is required to better understand cross-border territories and to design appropriate and adapted policies. There is an expressed need for indicators relating to accessibility, mobility, equipments and services, demography [and so on...]” (EC 2009, 13).

In this context, the present paper analyses the results of an origin-destination study which was held in the 10 cross-border stations of Northern Greece. The investigation took place upon the completion of the Egnatia Motorway (spring-summer 2009), when large parts of its vertical axes were also open to traffic. Therefore, the investigation provides an overview of the impacts of road infrastructure improvement in an initial stage. The main issues examined are the basic characteristics and the gravity of the total movements and the resulted origin-destination spatial structure, with reference to the scope, the frequency and the distance of movements.

BORDERS, MOBILITY AND SPATIAL PLANNING

Poor transport infrastructure constitutes one of the major problems in the border regions and an important barrier for their spatial integration and development. In response to that, the European transport policy contribution to the implementation of the trans-European transport network should be concentrated on the cross-border sections and on bottlenecks (EC 2007, 5). Planning this Community network has essentially meant adding together significant parts of national networks for the different modes and connecting them at national borders (EC 2009a, 5). In that respect, cross-border mobility and interaction could play a vital role in European trans-border planning of transport infrastructure.

On the other hand, the latest territorial cohesion agenda of the EU (EC 2008) points out that transport policy has obvious implications for territorial cohesion through its effect on the location of economic activity and the pattern of settlements. It plays a particularly important role in improving connections to and within less developed regions. The territorial agenda of the EU also acknowledges the crucial importance of cross-border mobility and cooperation that underlines the need of synergies in regional development and spatial planning issues. This is quite evident through the long run of the INTERREG programme and the current transnational cooperation programmes that are funded by the European Regional Development Fund (ERDF) under the European Territorial Cooperation Objective of Cohesion Policy for the period 2007-13.

Besides, the European Spatial Development Perspective has earlier pointed out that “with growing economic and social integration, internal borders are increasingly losing their separating character and more intensive relationships and inter-dependencies are emerging between cities and regions of the Member States. This implies that effects of regional, national or Community projects in one country can have a considerable impact on the spatial structure of other Member States [...] In that respect, spatial planning can help avoid increases in such regional disparities” (ESDP 1999, 7). Even more, cross-border transport is an important theme of cooperation between border regions, as it is assumed to link functional urban areas (FUAs) and potential urban strategic horizons (PUSHs), especially regarding the integration process of enlargement regions that can develop relationships, bonds and ties over national borders (INTERREG 2007, 32).

Some recent publications show significant and important impacts of transport projects in border regions, especially in terms of network efficiency for both sides of a border, and highlight the consequent need for its inclusion in trans-border strategic planning processes (Lopez et al 2009, Pogačar & Sitar 2009). Empirical estimates of the relative importance of the different types of origin-destination connectivity between regions indicates that “the strongest spatial autoregressive effects arise when both origin and destination regions have neighbouring regions located on the transport network” (Le Sage & Polasek 2008, 225). Consequently, a remote border area at a national scale may turn out to be a central place in an integrated common market and space. On the other hand, increasing interconnectivity presents fundamental challenges for the way places are governed, and how states intervene to influence spatial development (Du` Hr, Stead & Zonneveld 2007, 301).

However as Petrakos and Topaloglou (2006, 8) suggest “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”. The present paper deals with this adequacy by providing actual facts and figures concerning the road cross-border mobility, and its basic patterns, between Greek regions and cities, and the neighbouring ones. The overall target of the paper is to detect and bring out the consequences that arise for trans-border spatial interactions and planning. Furthermore, patterns of spatial planning result more from the complex interplay of social and market (individuals and firms) actual interactions over space, than from public policies that arrive usually later to somehow spatially arrange, and capitalise over, these interactions.

THE MAIN SOURCE OF THE STUDY AND BASIC AGGREGATE RESULTS

This paper attempts to analyse the spatial dimensions of the results of an origin-destination (O-D) survey which was conducted by the Egnatia Odos S.A. in the 10 border stations of Northern Greece (Figure 1) under the supervision of the Egnatia Motorway Observatory¹, in cooperation with the Department of Traffic of Egnatia Odos S.A. These ten stations serve all road cross-border movements in Greece. The survey took place in spring-summer 2009, upon the completion of the Egnatia Motorway, when large parts of the vertical axes were also open to traffic. The present research uses the database of the above O-D survey and it provides an overview of the impacts of road infrastructure improvement in an initial stage.

Figure 1. Road infrastructure and the 10 border stations



Considering the basic aggregate data, the average traffic per typical weekday in the 10 border stations is a total of 22,467 vehicles and 50,514 passengers. A 60% of this traffic is gathered at the border stations of Evzoni and Promachonas (Figure 1). The total traffic figure is a little higher than interregional trips via the Egnatia Motorway sections between the region of Central Macedonia (the largest region of the Northern Greek zone) and its neighboring regions (Observatory-Egnatia Odos S.A. 2009). Although this figure may appear to be rather low, there has been an important increase (aprox. 90%) of the average trips per day in the years 2005 – 2009. As far as traffic composition is concerned, during the week days 74,2% is passenger vehicles, 20,1% trucks of all types and 5,7% buses and taxis (in other words public transport). During the weekends, of course, the share of passenger vehicles rises to 77,5%, while the percentage of the other two categories is lower.

The aggregate O-D data show that more than one third of the trips are daily or very frequent trips (1-4 times a week, Table 1). Daily trips, in particular, represent 6,2% of the total trips. Another third of the total trips are frequent trips (1-3 times a month). On the whole, the main trip purpose is tourism and

¹ The Egnatia Motorway Observatory is a special department of the EGNATIA ODOS S.A. Company, in charge of monitoring the spatial impacts of the Egnatia Motorway. The "Survey for transport indicators" (Contract No: 3652) was carried out in 2009 by the following partnership of contractors: (1) NAMA A.E., (2) ERASMOS EPE, and (3) S. EFSTATHIADIS & ASSOCIATES. More information about this survey is provided through the Observatory's web site (<http://observatory.egnatia.gr> – mostly in Greek language) and via email (observe@egnatia.gr).

leisure (45%), although work purposes (commuting and business in general) represent an almost equal share (42.7%). More specifically, 12.1% are “from/to work” trips, a figure which represents the commuting trips, and 30.6% are trips for business purposes (Table 2). Finally, a percentage of 12.2% are trips for other (non classified) purposes (in which shopping was included by the O-D survey). During the weekends, of course, trips for tourism/leisure are more than 50%; although trips “from/to work” (where commuting is included) have a considerable share of almost 5%.

Table 1. Trip frequency (aggregate data)

Trip Frequency	Number of trips	Percentage of trips
Daily	3.125	6,2%
1-4 times per week	14.697	29,2%
1-3 times per month	16.407	32,6%
Other	16.091	32,0%

Table 2. Trip purpose (aggregate data)

Day type	Trip purpose	Trips per day	Percentage of trips per day
weekday	no answer	4.044	-
	from-to work	2.419	12,1%
	bussiness	6.113	30,6%
	tourism - leisure	8.984	45,0%
	other	2.442	12,2%
weekend	no answer	4.309	-
	from-to work	1.078	4,9%
	bussiness	7.315	33,2%
	tourism - leisure	11.478	52,1%
	other	2.166	9,8%

The following analysis is divided into two spatial levels: At first, an examination of the movements on a national level is provided thus focusing on the relations between border countries and, more specifically, between Greece and its neighboring countries, Albania, FYROM, Bulgaria and Turkey. Then, movements are analyzed on a regional level (based on NUTS 3 regions and their main cities) thus covering the trans-border zone per se, in order to provide an understanding of the state of affairs and the potential of trans-border relations. The analysis uses only the data of the typical period, because the summer period affects all the characteristics of the movements in specific ways, such as the number of movements for tourism etc. Special attention is given to differences between weekdays and weekends which feature various aspects of the trans-border relations.

SPATIAL DIMENSIONS OF TRANS-BORDER MOVEMENTS: ANALYSIS ON A COUNTRY LEVEL

Both as an origin and as a destination country, Greece occupies a little less than 50% of the average trips per day (Tables 3 and 4, and Figures 2 and 3). The percentage of these trips is slightly decreased during the weekends. The two northern border countries (Bulgaria and FYROM) represent, as a whole about one third of the average trips per day, with Bulgaria occupying the second and FYROM the third place. Bulgaria is a destination country attracting a higher percentage of trips during weekends, an indication of the increased attractiveness of specific tourist and leisure resorts of this country to Greek

tourists. Similarly, FYROM is a destination country also having a higher percentage during weekends. The west border country, Albania, has a smaller number of trips, a little higher than 8% of the total trips, which decreases to 7.8% in weekends. The east border country, Turkey, by far the largest country among the 4 border countries of Greece, attracts about 3.5% of the total trips, a percentage which increases in weekends, especially as far as the destination trips are concerned. This latter figure again indicates the attractiveness of specific locations, especially near the border zone as tourist /leisure destinations. It should be noted that trips from and to the rest of non-border European countries as a whole amount to approx 7% of the total trips, with this figure decreasing to just 4% in the case of destination trips during weekends.

Table 3. Average trips per day by origin country

Origin Country	weekdays		weekends	
	Trips per day	%	Trips per day	%
Greece	11.302	47,1%	12.564	47,7%
Bulgaria	4.475	18,6%	5.046	19,2%
FYROM	3.472	14,5%	3.828	14,5%
Albania	2.122	8,8%	1.939	7,4%
Turkey	802	3,3%	1.202	4,6%
Central and West Europe	890	3,7%	891	3,4%
Serbia and Montenegro	522	2,2%	453	1,7%
East Europe	404	1,7%	397	1,5%
Asia	6	0,0%	4	0,0%
Other countries	4	0,0%	16	0,1%

Table 4. Average trips per day by destination country

Destination Country	weekdays		weekends	
	Trips per day	%	Trips per day	%
Greece	11.449	47,7%	12.212	46,4%
Bulgaria	4.115	17,1%	4.944	18,8%
FYROM	3.708	15,4%	4.509	17,1%
Albania	2.019	8,4%	2.042	7,8%
Turkey	937	3,9%	1.505	5,7%
Central and West Europe	637	2,7%	397	1,5%
Serbia and Montenegro	576	2,4%	386	1,5%
East Europe	511	2,1%	305	1,2%
Asia	50	0,2%	39	0,1%

On the whole, the above data indicate a high mobility from-towards the northern border, on one hand, and a very low mobility from-towards the eastern border (Figures 2 and 3). This fact highlights the much stronger relations between Greece and the northern border countries (Bulgaria and FYROM) with Albania and the very weak ones with Turkey in the east border. The analysis of the trip frequency and the trip purpose further stresses this point.

Figure 2. Average trips per day by origin country

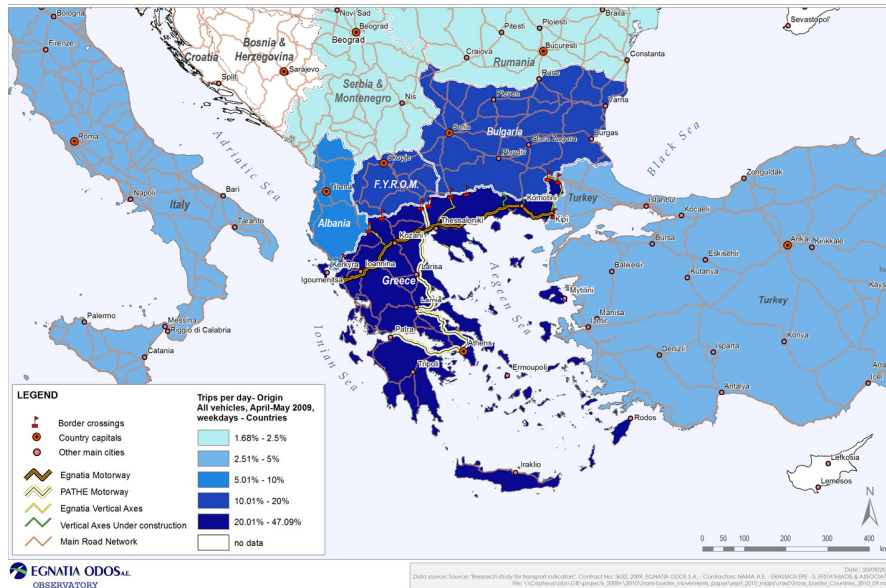
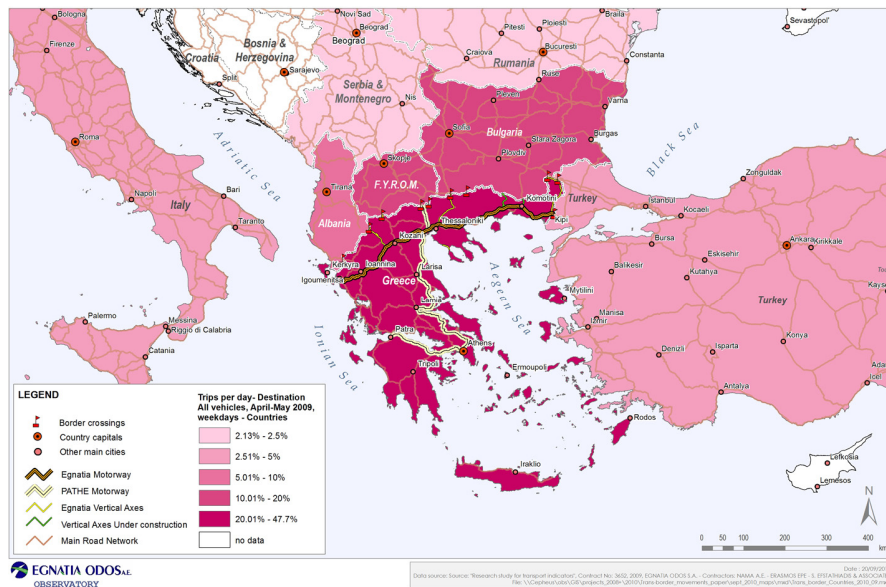


Figure 3. Average trips per day by destination country



It is worth noting that when examining trip frequency per destination country, as far as the daily trips are concerned, FYROM is in the first position with 10% of the total trips per day to this country. Albania, Bulgaria and Greece follow with 9%, 6% and 5% respectively (Table 5). Turkey is in the last position with only 3% of the total trips per day to this country, a figure equal to the percentage of the daily trips to the non-border countries Serbia and Montenegro. The figures in the category “very frequent trips” (i.e. 1-4 trips/week) are also quite important. The figure of very frequent trips to FYROM represents almost half of the total trips per day to this country and a little less than one third in the case of Bulgaria. Again, Turkey as a destination presents a low figure of just 6% of the total trips per day to this country falling in the category of very frequent trips, while the non-border countries Serbia & Montenegro present a much higher figure (28% the total trips per day to these countries).

Table 5. Trip frequency per destination country

Destination Country	Daily	1-4 times a week	1-3 times a month	Other
Greece	5%	25%	34%	35%
FYROM	10%	49%	27%	13%
Bulgaria	6%	31%	34%	30%
Albania	9%	28%	29%	34%
Serbia and Montenegro	3%	28%	35%	34%
Turkey	3%	6%	40%	51%
Central and West Europe	2%	16%	32%	50%
East Europe	0%	21%	25%	54%
Asia	0%	3%	21%	75%

Regarding trip purpose per destination country, during weekdays, in the category “from/to work”, Greece presents the highest figure, since almost 16.8% of the total trips to Greece are for this purpose, with Bulgaria also having a high percentage (14.8%) and Albania a lower, but also important one (7%). On the contrary, in this category, FYROM records a low percentage of only 3.3% of the total trips to this country, a little higher than the corresponding percentage of the trips to Turkey (2.4%). The share of trips for business purposes is higher for Albania (actually representing the main trip purpose to this country) with FYROM presenting the second highest percentage in this category and Greece the third one. On the whole, trips “from/to work” and for business purposes represent 42-46% of the total trips per day in the destination countries Albania, Greece and Bulgaria, 37% in the case of FYROM and a little less than 30% in the case of Turkey. On the other hand, during the weekdays, trips for “tourism and leisure” get the highest percentage in the case of Turkey as a destination, where almost 60% of the total trips per day are for tourism/leisure purposes. FYROM also presents a high percentage of almost 50% of the weekday trips in this category. Bulgaria is in the third place followed by Greece (46% and 43% of the total trips per day to each country respectively) and Albania as a tourism/leisure presents a lower percentage (33% of the total trips per day to this country). Therefore, there is a much stronger mobility for work purposes between Greece and its northern and western border countries, whereas this kind of flows towards the eastern border are still extremely weak if non-existent.

Table 6. Trip purpose per destination country

Destination Country	from-to work	for work reasons	tourism/leisure	other
Greece	16,8%	29,1%	42,6%	11,5%
FYROM	3,3%	33,7%	50,7%	12,3%
Bulgaria	14,8%	28,2%	46,0%	11,1%
Albania	7,0%	41,2%	32,7%	19,1%
Serbia and Montenegro	0,0%	15,8%	84,2%	0,0%
Turkey	2,4%	26,8%	58,6%	12,2%
Central and West Europe	0,0%	21,5%	57,1%	21,5%
East Europe	2,8%	51,7%	30,8%	14,7%
Asia	0,0%	30,0%	50,0%	20,0%

SPATIAL DIMENSIONS OF TRANS-BORDER MOVEMENTS: ANALYSIS ON A REGIONAL LEVEL

In order to study the movements between trans-border regions and the gravity in this specific zone, the analysis was focused on the top ten origin-destination (O-D) pairs; in other words, the pairs that have the highest number of trips (Table 7, Figure 4). During the weekdays, nine out of the ten top O-D pairs concern trips between regions of Northern Greece and the other border countries with the notable exception of Turkey. These nine pairs represent more than 1/3 of the total trips through all border stations. The top O-D pair is Thessaloniki – Skopje representing 8% of the total trips. The distance of these nine pairs varies from 60 km (Serres-Petrich) to 300 km (Thessaloniki-Sofia). It is worth noting that one pair among the top ten ones is Athens-Sofia (2% of the total trips) despite the big distance between these two cities (almost 800 km), a fact that indicates the importance of the crucial position of the capital cities in the trans-border relations.

Table 7. Top ten O-D pairs (weekdays) and road distance

Destination - Origin / weekday	% the total daily movements of the pair	distance (km)
Thessaloniki - Skopje	8%	233
Thessaloniki - Strumica	5%	128
Serres - Petrich	5%	61
Thessaloniki - Sofiya	4%	296
Serres - Sandanski	3%	66
Evros (Alexandroupoli) - Slivengrad	3%	171
Kilkis - Strumica	3%	95
Ioannina - Gjirokaster	2%	86
Athens - Sofiya	2%	795
Drama - Gotse Delchev	2%	75
Total	37%	-

In weekends, all ten O-D pairs concern regions of Northern Greece and the other border countries, among which there is one O-D pair including a Turkish region (Table 8, Figure 5). These ten pairs represent a little less than 40% of the total movements (through all border stations). The top O-D pair is also Thessaloniki – Skopje representing almost 10% of the total trips. Two pairs (Evros – Edirne and Kilkis-Skopje) both in the border zone are not listed in the top ten O-D pairs during the weekdays. It is interesting to note that in weekends, the pair Athens - Sofia is not included in the top ten pairs, apparently because of the specific tourist/leisure oriented trips during weekends as the following analysis shows

Table 8. Top ten O-D pairs (weekends) and road distance

Destination - Origin / Weekends	Percentage of the total average movements per day	distance (km)
Thessaloniki - Skopje	9,9%	233
Thessaloniki - Strumica	3,9%	128
Serres - Sandanski	3,7%	66
Serres - Petrich	3,7%	61
Evros (Alexandroupoli) - Edirne	3,3%	183
Thessaloniki - Sofiya	3,1%	296
Kilkis - Strumica	3,1%	95

Evros (Alexandroupoli) - Slivengrad	2,8%	171
Kilkis-Skopje	2,7%	201
Drama - Gotse Delchev	2,2%	75
Total	38%	-

Figure 4. Average trips per day by final origin NUTS 3 region

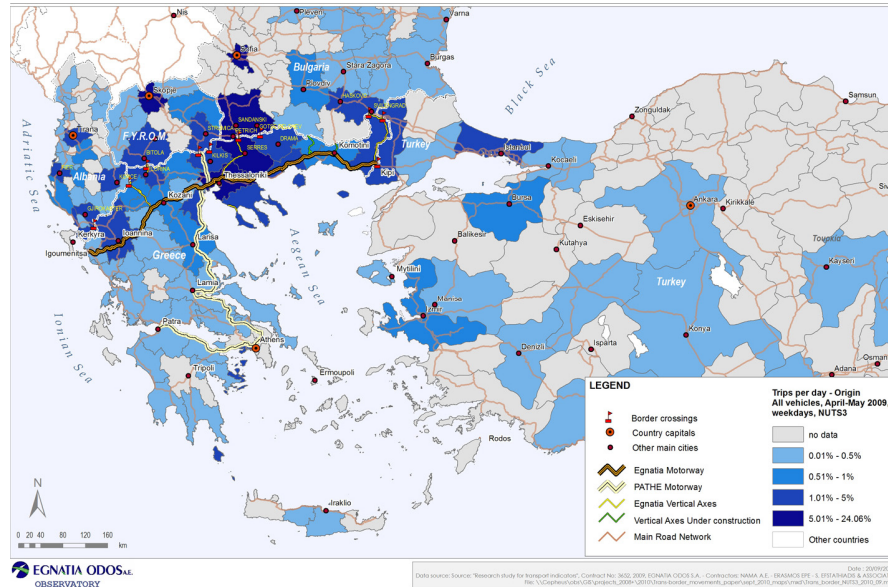
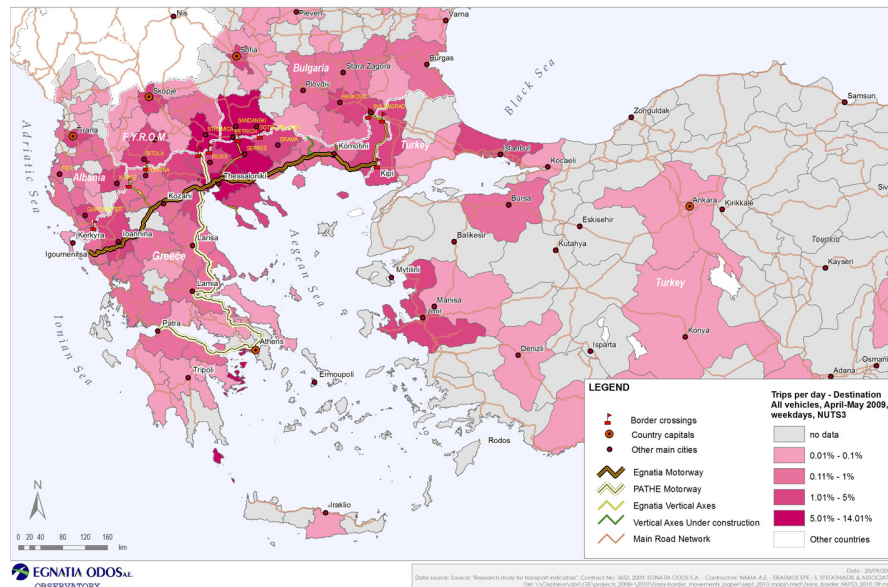


Figure 5. Average trips per day by final destination NUTS 3 region



Looking into a more narrow trans-border zone, the number of vehicles traveling within a zone of up to 50 km from the cross-border stations (all vehicles, typical period, weekday) is a little higher than 10.000, approx 45% of the average vehicles per day that travel through these stations. As far as the 50km trip distance is concerned, Niki cross-border station between Greece and FYROM serves 250 vehicles per day, almost exclusively within a distance of 15km, mainly to Bitola city in FYROM.

Kastanies cross-border station between Greece and Turkey also serves most of the 250 vehicles per day approx within a distance of just 6km, the connection to the city of Edirne in Turkey. On the contrary, at Kipi station, the main border passageway between Greece and Turkey, no trips within a zone of 50km from the station were recorded.

As regards trip frequency, during the weekdays, 9 out of the top 10 O-D pairs perform very frequent movements (daily or 1-4 times a week) at percentages from 48% to 71% (Table 9). Some of these O-D pairs, all concerning border regions, perform daily movements at noticeable percentages ranging from 15% to 30% and higher: Ioannina-Gjirokaster, Kilkis-Strumica, Evros-Slivengrad and Serres- Petrich.

Table 9. Trip frequency of the top ten O-D pairs (weekdays)

Destination - Origin / weekday	daily	1-4 times a week	total very frequent
Thessaloniki - Skopje	3,4%	45,9%	49,3%
Thessaloniki - Strumica	11,2%	59,5%	70,7%
Serres - Petrich	14,9%	44,4%	59,3%
Thessaloniki - Sofiya	2,5%	46,0%	48,5%
Serres - Sandanski	7,9%	25,3%	33,2%
Evros - Slivengrad	16,8%	35,6%	52,4%
Kilkis - Strumica	18,3%	33,6%	51,9%
Ioannina - Gjirokaster	31,2%	28,9%	60,1%
Athens - Sofiya	0,0%	55,0%	55,0%
Drama - Gotse Delchev	16,3%	46,9%	63,2%

In seven out of the ten top O-D pairs, the main trip purpose is tourism/leisure. However, there are three O-D pairs in which the main trip purpose is business (not including the category “from/to work). It is interesting noting that the pair with the highest percentage of business trips (62.5%) is Athens-Sofia, whereas the other two pairs are Ioannina-Gjirokaster (40.1%) and Thessaloniki-Strumica (37.8%) in the border region. As already pointed out, the pair Ioannina- Gjirokaster also records a very high percentage of trips “from/to work”.

In order to analyze more thoroughly the parameter “trip purpose”, through which possible functional relations can be recorded, the data were recalculated with the use of a Location Quotient (LQ_max), which distinguishes the dominant trip purpose and permits us to investigate where each of the top ten O-D pairs specializes, making comparisons with general averages of trip purposes (Tables 10, 11 and Figure 6). During the weekdays, there is no pair that specializes in tourism/leisure; three pairs (Ioannina-Gjirokaster, Evros-Slivengrad and Serres-Petrich), all in the border region, appear to specialize in commuting, as they all present percentages higher than 30% in the category “from/to work”. Two pairs specialize in the category “other” purpose (where shopping is included), Thessaloniki –Strumica and Serres-Sandanski, while the remaining five pairs specialize in the category “business purpose”.

Table 10. Trip purpose specialization of the top ten O-D pairs (weekdays)

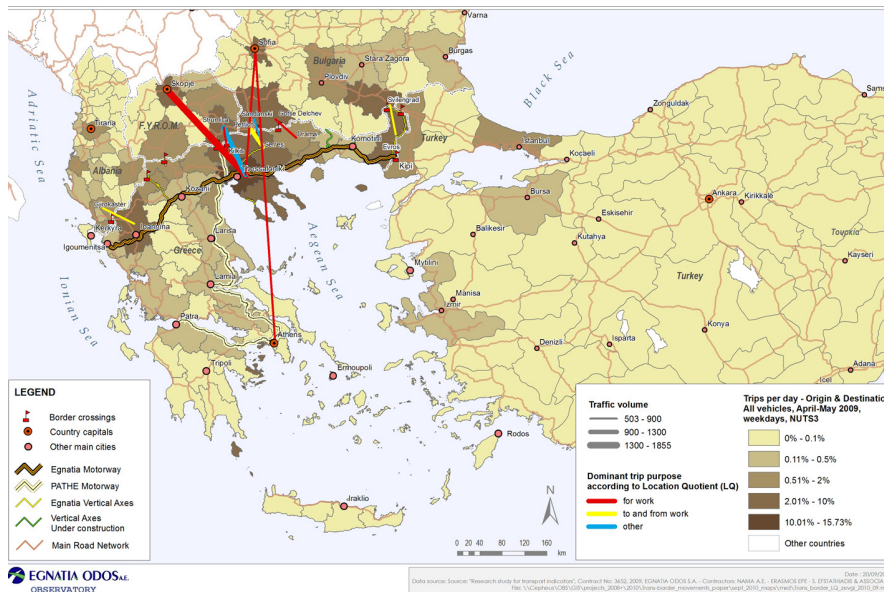
Destination - Origin / weekday	trip purpose - specialisation (LQmax)	% of the total daily movements of the pair
Thessaloniki - Skopje	for work reasons	42,2%
Thessaloniki - Strumica	other	23,4%
Serres - Petrich	from-to work	30,3%
Thessaloniki - Sofiya	for work reasons	41,4%

Serres - Sandanski	other	16,4%
Evros - Slivengrad	from-to work	31,4%
Kilkis - Strumica	for work reasons	42,2%
Ioannina - Gjirokaster	from-to work	37,7%
Athens - Sofiya	for work reasons	62,5%
Drama - Gotse Delchev	for work reasons	36,1%

Table 11. Trip purpose specialization of the top ten O-D pairs (weekends)

Destination - Origin / weekend	trip purpose - specialisation (LQmax)	% the total daily movements of the pair
Thessaloniki - Skopje	other	12,1%
Thessaloniki - Strumica	for work reasons	69,0%
Serres - Sandanski	from-to work	7,7%
Serres - Petrich	from-to work	13,6%
Evros - Edirne	tourism/leisure	91,3%
Thessaloniki - Sofiya	other	19,0%
Kilkis - Strumica	from-to work	33,5%
Evros - Slivengrad	tourism/leisure	72,8%
Kilkis-Skopje	tourism/leisure	65,9%
Drama - Gotse Delchev	from-to work	6,2%

Figure 6. Main cross-border movements



Some important differences are observed in weekends: four O-D pairs appear to have relatively higher percentage in the category “from-to work” with the pair Kilkis-Strumica presenting a very high percentage. In weekends, the two pairs that specialize in the category “other” reasons (where shopping is included) are:

Thessaloniki –Sofia and Thessaloniki-Skopje. These pairs concern trips between the largest city in Northern Greece and the two capitals in the northern border, pairs with the largest distance in the border zone. Finally, one pair (Evros-Edirne on the eastern route) appears to relate to just one trip purpose, tourism/leisure.

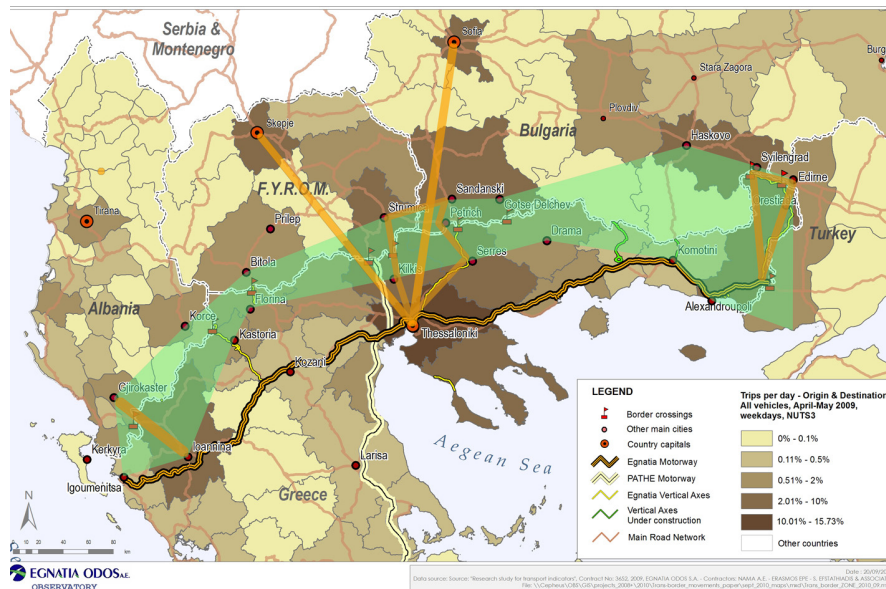
Searching for spatial interactions: Concluding remarks

The improvements of the road infrastructure on the Greek side of the border region brought about a significant increase of the trans-border movements and influenced to a considerable extent their patterns. However, there are important variations in the mobility patterns that reflect precisely the crucial differences in the type of flows between the border countries.

One of the most important findings of the above analysis is related to the large differences of cross-border movements between Greece and its neighboring countries, with the northern ones (Bulgaria and FYROM) having the greatest share, the ones from and towards Albania concerning mostly migrant flows, and those with Turkey remaining low and specified to tourism/leisure purposes. Moreover, there are important differences in the movements between Greece-FYROM and Greece-Bulgaria with the first concerning very frequent movements for tourism/leisure, in particular, and the second concerning frequent movements for business purposes or even commuting.

Another crucial finding is the fact that, although border movements are still a fraction of internal trans-regional flows, they are quite important mainly as regards the frequency and the purpose of the trips. Spatial interaction comes out from, among others, the quantity (i.e. frequency) and the quality (i.e. purpose) of physical mobility of people and goods between places according to trans-regional supply and demand. Of special interest is the fact that a large share of cross-border movements concern trans-border regions, mostly taking place within distances of up to 50 km.

Figure 7. The trans-border mobility zone with mobility peaks



The results of the present research suggest that there is an, emerging but explicit, spatial interaction between several cities and regions because they present high scores in daily or very frequent mobility for work purposes. Such spatial interaction, and, therefore, common spatial planning perspectives, is mostly evident in the trans-border polygon area of Kilkis (GR) – Serres (GR) – Petrich (BG) – Sandanski (BG) – Strumica (FYROM). Apart from the pairs expected to get high scores in terms of flows, i.e. Thessaloniki (GR) – Skopje (FYROM) and Thessaloniki (GR) – Sofia (BG), special interest by the spatial interaction point of view is presented for the pair Ioannina (GR) – Gjirokaster (AL) in the west edge, and the triangle Evros (GR) – Slivengrad (BG) – Edirne (TUR) at the east edge of the trans-border zone (Figure 7).

The above zone is a zone which involves five countries with significant differences in the socio-economic and spatial structure. Apart from the important differences in the welfare level, there are, for example, crucial differences between the size of the cities in this zone. Therefore, research on the subject should go further to investigate the spatial and socio-economic structure of this trans-border zone, the type of the links between these regions and cities and the potential for trans-border spatial planning, which will encompass transport infrastructure planning. Furthermore, the study of the cross-border movements in the border zone should proceed with a new survey that would relate in a more detailed and effective manner the evolving mobility patterns to spatial interaction questions.

REFERENCES

- Du`Hr, S., Stead, D. and Zonneveld W. 2007. The Europeanization of Spatial Planning through Territorial Cooperation. *Planning Practice and Research*, 22:3, 291 – 307.
- EC. 2007. Trans-European networks: Towards an integrated approach. Brussels: Commission of the European Communities, Directorate General for Regional Policy.
- EC. 2008. Green Paper on Territorial Cohesion Turning Territorial Diversity Into Strength. Brussels: Communication From The Commission To The Council, the European Parliament, the Committee of the Regions and the European Economic and Social Committee, {SEC(2008) 2550}.
- EC. 2009. Territorial cohesion: unleashing the territorial potential. *Background Document to the Conference on Cohesion Policy and Territorial Development: Make Use of the Territorial Potential*, Kiruna, Sweden: 10-11 December 2009.
- EC. 2009a. Green Paper TEN-T: A Policy Review: Towards a Better Integrated Trans-European Transport Network at the Service of the Common Transport Policy. Brussels: Commission of the European Communities, Directorate General for Regional Policy.
- ESDP. 1999. European Spatial Development Perspective - Towards a Balanced and Sustainable Development of the Union Territory. Luxembourg: Office for the Official Publications of the European Communities.
- INTERREG. 2007. Cross-Border Cooperation – Cross-Thematic Study of INTERREG and ESPON Activities. Luxembourg: ESPON Coordination Unit.
- Le Sage, J. P. and Polasek, W. 2008. Incorporating Transportation Network Structure in Spatial Econometric Models of Commodity Flows. *Spatial Economic Analysis*, Vol. 3, No. 2, 225 – 245.
- Lopez, E., Monzon, A., Ortega, E. and Mancebo, S. 2009. Assessment of Cross-Border Spillover Effects of National Transport Infrastructure Plans: An Accessibility Approach, *Transport Reviews*, Vol. 29, No. 4, 515–536.

- Observatory-Egnatia Odos S.A. 2009. 6th Annual Report of Indicator Results, Egnatia Odos S.A. (in Greek).
- Pogačar, K and Sitar, M. 2009. Dynamics of Cross-Border Spatial Development: A Case Study of the Maribor 9SI) – Graz (AT) Development Axis. *Geodetski vestnik*, 53/2009 – 3, 489-508.
- Richardson, T. and Jensen, O. 2000. Discourses of mobility and polycentric development: A contested view of European Spatial Planning, *European Planning Studies*, Vol. 8, No. 4, 503-520.
- Topaloglou, L. and Petrakos, G. 2006. Tracing the New Economic Geography of the Borders in Europe. *46th Congress of the European Regional Science Association*, Volos 23-27 August 2006.