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A SOCIO-ECONOMIC TYPOLOGY ON CROSS-BORDER REGIONS AT EUROPEAN SCALE (2000-2012)

Key findings

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Key issues remaining to be addressed

Analysing the **cross-border areas of the European Union** implies dealing with some **methodological issues**: how to characterise cross-border regions? How to measure multicriteria territorial discontinuities? How to specify their evolution across time? How to assess the degree of accessibility between cross-border regions? This study aims at answering to these questions by using the concepts of **socio-economic complementarity** and **mobility potential**. Based on an innovative use of **ESPON** and **OpenStreetMap** databases, this study provides interesting inputs to better understand the dynamics of cross-border areas at a **regional scale** (NUTS2/3).

Report summary

1. Theoretical issues behind a socio-economic typology on cross-border regions at European scale: spatial integration, socio-economic differentials and cross-border relationship profiles.
2. A reproducible methodology to define the cross-border area and the territorial level of observation.
3. Socio-economic typology of territorial discontinuities between cross-border regions, around 2013.
4. Evolution of economic and demographic disparities from 2000 to 2013.
5. Crossing the border: roads crossing the border and road network efficiency.

➤ The final report, as well as 8 technical reports (in French) and the data produced within this project are available at the following URL: http://www.ums-riate.fr/Webriate/?page_id=140

The need of a durable cross-border observation

Launched in the 1990's through INTERREG programme, **European Territorial Cooperation is a corner-stone for building a common European space and integration**. During the 2014-2020 programming period, the EU dedicated 10,1 billion Euros (including 6,6 billion Euros for cross-border cooperation) to achieve this objective.

Despite the existence of real territorial cooperations and the success of local initiatives related to cross-border observation (*Øresund Region, Grande Région*), **comparable data is still missing to assess the quality of existing international cooperations** or to plan new modalities of future agreements. It is still complicated to gather exhaustive and comparable datasets at the level of cross-border territories for launching European studies on these thematic.

Besides the data availability question, the definition of an adapted **methodological framework** to analyse socio-economic trends and dynamics of cross-border areas is another striking issue.

This study carried out by RIATE for the CGET provides several inputs to contribute to the debate using concepts derived from **territorial discontinuities**, meaning the measure of statistical **gaps** between neighbouring territories in economic or demographic term. In fact, the boundary might **materialize a break** between a territory younger or more dynamic compared to its neighbour.

Socio-economic typology of cross-border regions in 2013

After defining an homogeneous territorial division (a combination of NUTS2 and NUTS3) and the width of the cross-border area (60 kms around the international border), observed **discontinuities** allows us to highlight **cooperation potentials** on the basis of 4 indicators: GDP per capita, unemployment rate, share of population under 15 and share of population over 65. These indicators are standardised and adapted to cross-border regions couples (page 2, on the top). The typology based on these couple of cross-border regions highlights several profiles of **socio-economic complementarities** (page 2, bottom of the page):

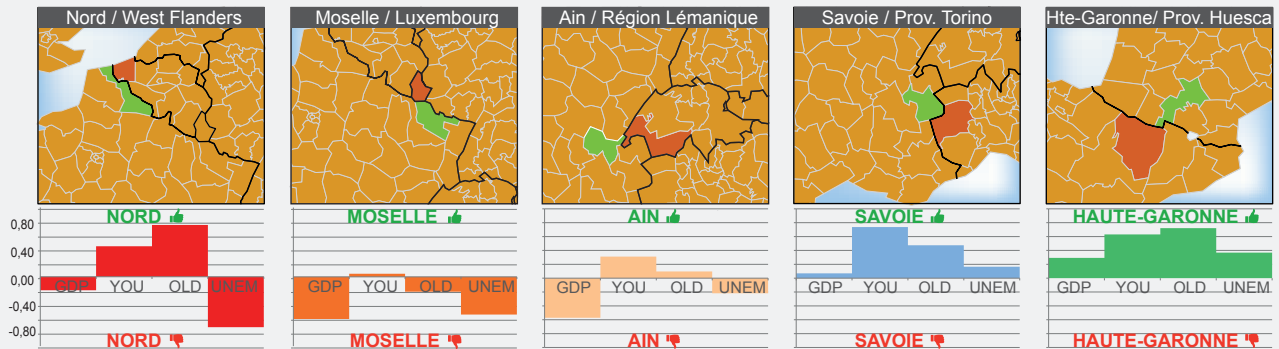
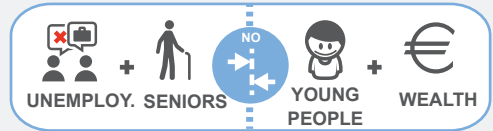
- At different intensities (average value of observed disparities, displayed by the width of the international border), the profiles displayed in warm colours (red, dark orange and light orange) show cross-border regions with complementary socio-economic characteristics: a young population and a high unemployment rate in one side of the boundary; an high GDP per capita and a ageing population on the other side of the boundary.
- The profiles displayed in cold colours (blue, green) show cross-border regions that are cumulating all the advantages on one side and all accumulating disadvantages on the other. *A priori*, these situations are not suitable to set up mutual cooperation.

According to this analysis and chosen indicators, the regions the most adapted to cooperation are located in cross-border territories of Germany (East and West), around Benelux and also between Southern Italy and France or Slovenia.

Complementary regions

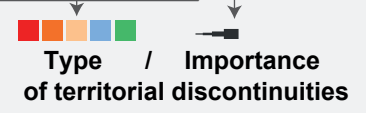


Non-complementary regions

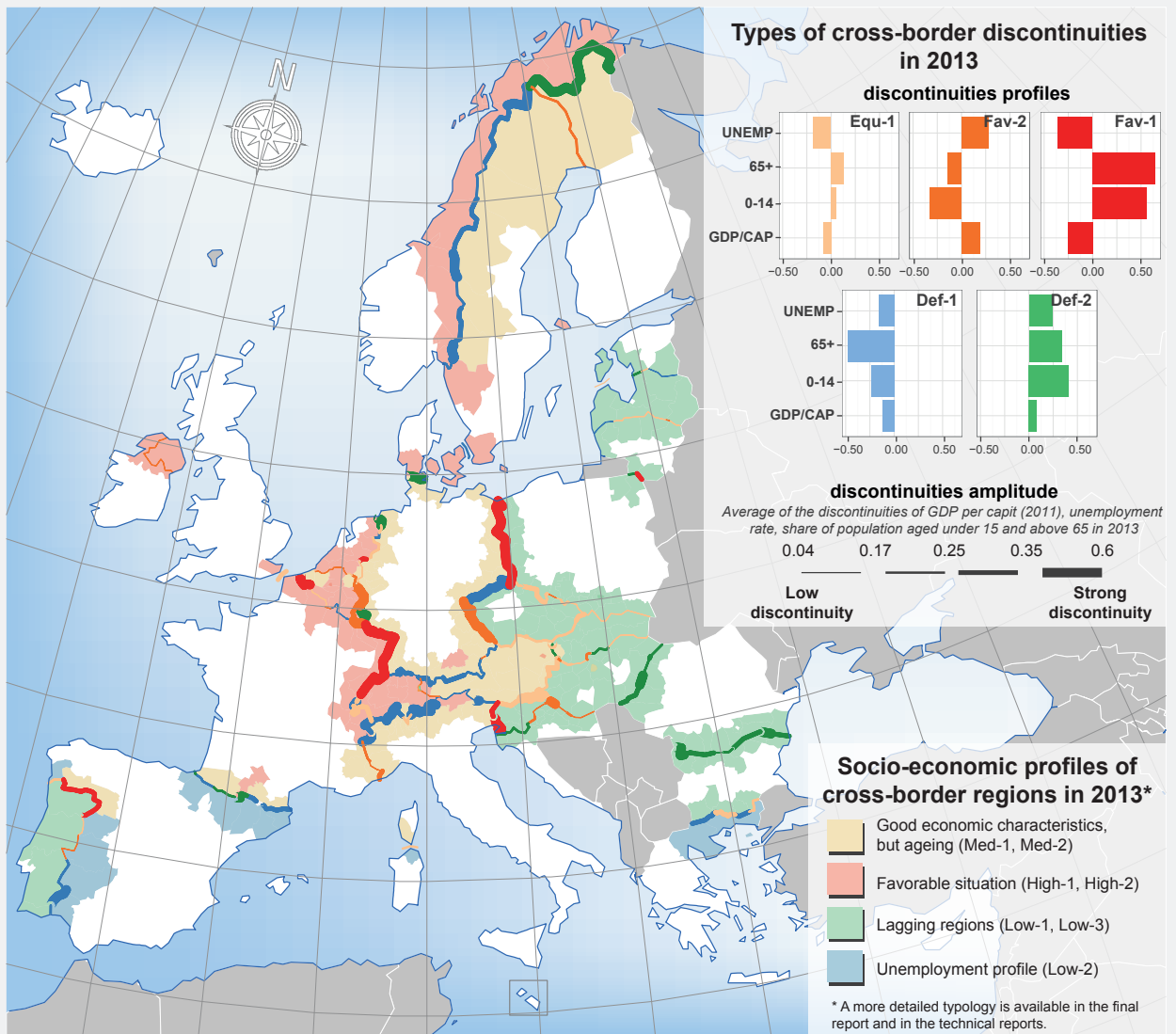


	Region i				Region j				Discontinuity ij					
	GDP	YOU	OLD	UNEM	GDP	YOU	OLD	UNEM	GDP	YOU	OLD	UNEM	DISC	
Nord (FR301)	0,51	0,99	0,90	0,16	Flandres Ouest (BE25)	0,71	0,55	0,15	0,88	-0,19	0,44	0,75	-0,73	0,53
Moselle (FR413)	0,39	0,84	0,72	0,21	Luxembourg (LU00)	1,00	0,79	0,93	0,76	-0,61	0,04	-0,21	-0,54	0,35
Ain (FR711)	0,41	1,00	0,84	0,44	Rég. Lémanique (CH01)	0,98	0,69	0,75	0,65	-0,57	0,31	0,10	-0,22	0,30
Savoie (FR717)	0,68	0,92	0,53	0,43	Prov. Torino (ITC11)	0,61	0,19	0,06	0,27	-0,07	0,74	0,47	0,17	0,36
Haute-Garonne (FR623)	0,75	0,88	0,85	0,43	Prov. Huesca (ES241)	0,46	0,25	0,13	0,06	0,29	0,63	0,72	0,37	0,50

▲ From the theoretical framework on cross-bording complementarities...



... to the typology of cross-border regions ▼



Analysis of existing disparities over time

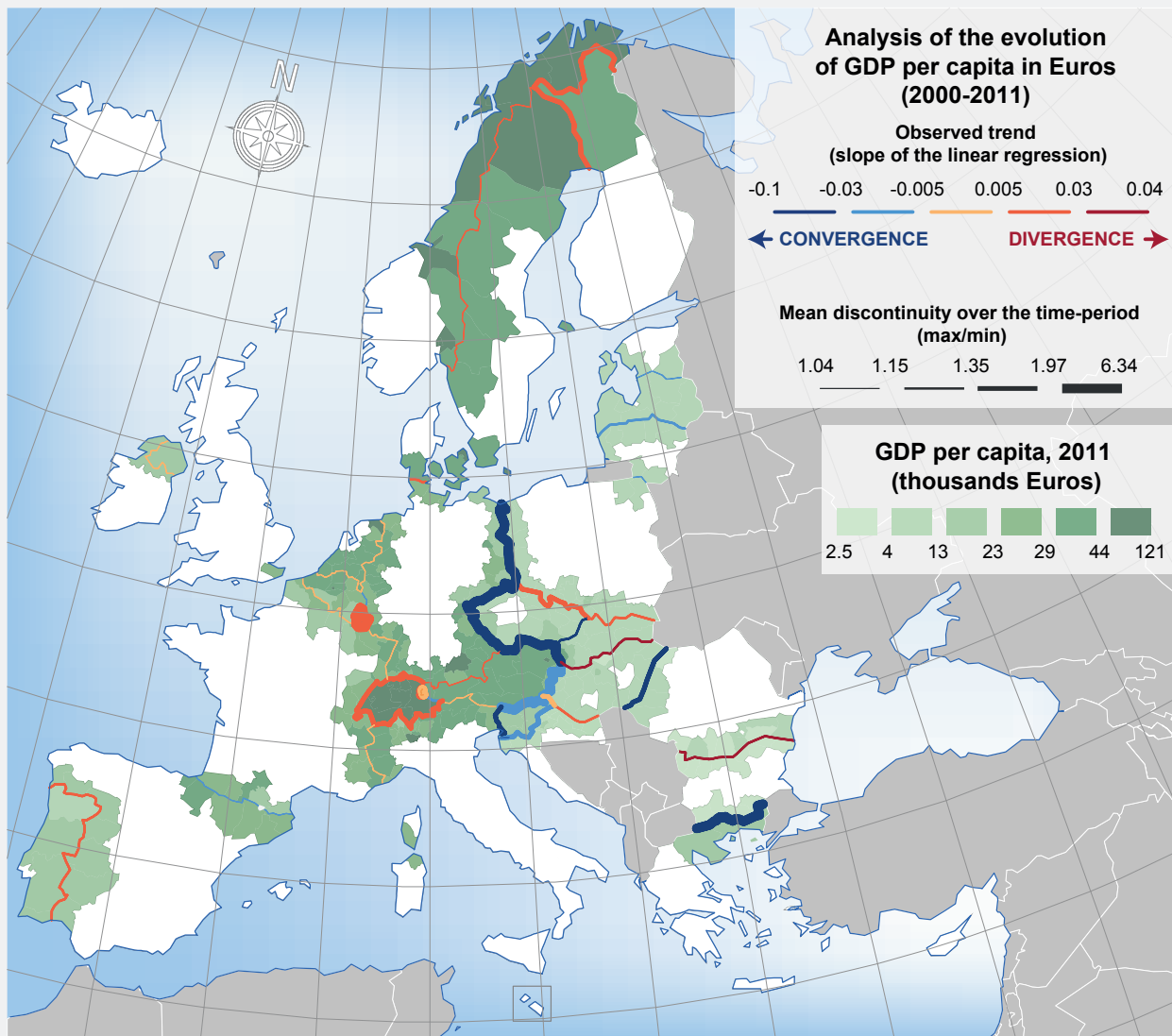
The analysis of the socio-economic evolution (2000-2013) reveals that the degree of **complementarity of cross-border regions experiences slight changes over time**. Nevertheless, the degree of potential complementarity is bigger between Germany and the Netherlands, Denmark and Belgium; or in some part of the boundary between Germany and the Czech Republic.

Focusing on GDP per capita, the analysis of economic trajectories (2000-2011), realised between cross-border regions at national scale, confirms the results of a lot of studies on the topic: a significant economic convergence between the former EU15 and territories located in Central and Eastern Europe is observable. Furthermore, the analysis also highlights **growing economic disparities between Luxembourg, Switzerland, Liechtenstein and their respective cross-border neighbourhoods**. These economic disparities grew significantly since the economic crisis of 2008. Significant economic divergences also appear within cross-border territories of Central and Eastern Europe (Czech Republic/Poland; Slovakia/Hungary; Romania/Bulgaria).

The same methodology has been used for the share of young people (0-14 years) in the total population. It highlights namely a **demographic convergence** between Italian cross-border territories and their respective neighbours (France, Switzerland, Austria, Slovenia) and also between Spanish and French or Polish and German cross-border territories.

The time dimension must also be considered for a better understanding of socio-economic complementarities.

▼ Economic convergence and divergence of cross-border regions in Europe



Mobility potential between cross-border regions

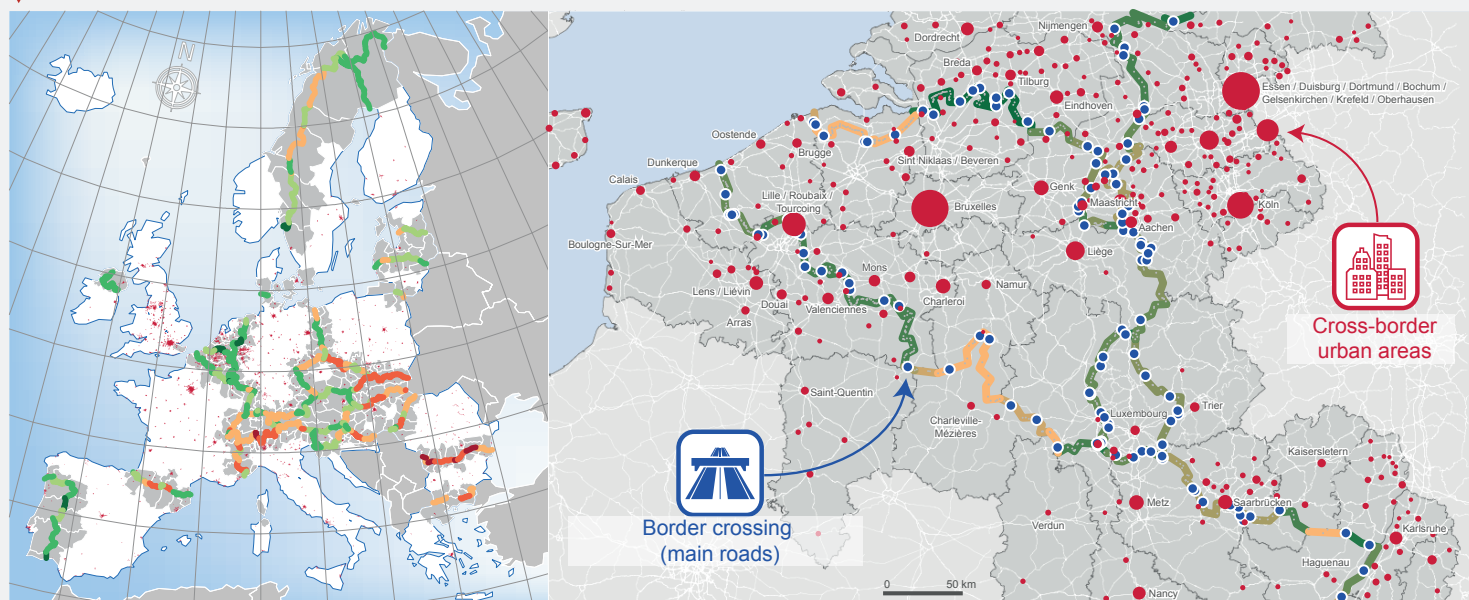
Socio-economic complementarities cannot have an operational use without taking into account **accessibility conditions existing between cross-border territories in Europe**. Two territories sharing a common international border and experiencing very good socio-economic complementarities will likely exchange and cooperate without any roads or public transport links.

The use of the road network provided by OpenStreetMap and the population grid of Geostat allow the setting-up of a **performance index of the road network between cross-border regions**. This index is calculated by weighting the theoretical route (without traffic congestion) between each pair of cross-border NUTS2/3 by the population location. The higher the value of this index, the higher the capacity of interconnexion between inhabitants located at both sides of the international border (road speed high and/or sinuous route).

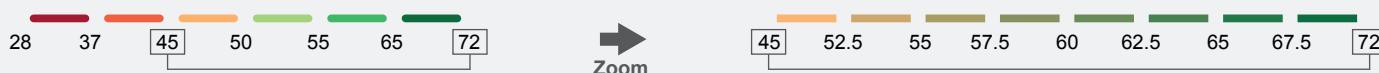
This indicator is displayed below for the European area and for the North of France. **Natural barriers** (Danube, Alps, Carpathians, Pyrenees and Ardennes to lesser extent) **affect substantially performance of road levels**. In other areas (Poland/Germany, Czech Republic/Germany), it is probably the lack of road infrastructures that explains a low performance index.

The confrontation of the road performance indicator with the socio-economic typology on cross-border regions reveals that **regions experiencing good socio-economic complementarities are also the ones which have good road infrastructures linking them**. Several exceptions exist, such as the cross-border territories of France and Switzerland, or Poland and Germany, which are significantly less interconnected, as regard to what we could expect from their degree of socio-economic complementarities.

▼ A synthetic index for measuring the performance of the road network between cross-border regions derived from OpenStreetMap



Performance of the road network between two inhabitants of contiguous cross-border regions (km/h)



Advantages of the approach and perspectives

The approach used in this study allowed to set up a **strong methodological framework adapted to the analysis of international cross-border territories**. Through statistical, spatial and cartographic analysis, it revealed key notions of cross-border cooperation; complementarity and connexity of cross-border areas. **However, several elements may be more detailed in the future:**

- » **From the regional to the local scale** : territories considered in this study are a mix of NUTS2 and NUTS3. It might be interesting to adapt this analysis at a lower geographical level (as the French *Zones d'emploi*) in order to fit the reality of cross-border areas residents and commuters. It rises nevertheless the question of availability of comparable data at a local level in Europe.
- » **Broadening the thematics**: this study used available time-series at NUTS level for the whole of Europe. It would be helpful to extend the analysis with more relevant indicators regarding cross-border dynamics, such as the use of young employment, income levels, land use or levels of education and training. It raises the question of in-depth data collection at regional level in Europe from a thematic point of view.
- » **Improving cross-border accessibility measures**: accessibility indicators built in this study are based on theoretical travel-time by road between cross-border regions. Firstly, it would be useful to take into account the congestion traffic in the indicator calculation; and secondly it would be helpful to extend this analysis to public transport (regularity, time, prices).
- » **Building monitoring tools** : this study has also provided some specifications for implementing a tool that may ensure the monitoring of the magnitude of cross-border discontinuities over time. This tool could be particularly useful for raising awareness of a wider audience to the interest of territorial discontinuities analysis in a political context.

Data sources of the study : ESPON Database, Eurostat et UMS RIATE (2015) for socio-economic indicators ; OSRM (Open Source Routing Machine) and © OpenStreetMap (ODbL) for the road network