

# Disparities and territorial discontinuities in France with its new regions: A multiscale and multidimensional interpretation

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**Abstract** – Since 1 January 2016, the 22 French metropolitan regions have merged to form 13 new regions. The deployment of public policies in these regions with enhanced areas of jurisdiction leads us to wonder about the way in which the merger leads to the reduction of territorial disparities or not. We analyse these disparities using five sociodemographic indicators. Several geographical levels are mobilised: the European Nomenclature of Territorial Units for Statistics (NUTS) and the French employment zones. The main characteristics of the new regions in a national and European context are highlighted using statistical and spatial data analysis methods. Inter-regional contrasts are relatively low in France, in comparison with those prevailing in other European States. The main discontinuities are found between countries rather than between regions within a country. At the national level, some merged regions appear relatively homogeneous (Nouvelle-Aquitaine, Bourgogne-Franche-Comté and Normandie) compared to others more contrasted (Hauts-de-France, Occitanie, Auvergne-Rhône-Alpes and Grand Est). The main territorial discontinuities are observed within the same regions and not between them.

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Reminder:

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The former French regional perimeter, effective from 1972 to 2015, finds its origin with Serge Antoine, a young technocrat of the *Cour des Comptes*, who was entrusted by the State, in 1956, with the project for dividing the regions. In the aftermath of the Second World War, France indeed questioned the relevance of its administrative map, which had become somewhat archaic (the *département* was designed in the aftermath of the revolution to allow residents to perform a round trip to their county town in one day of travel by horse). This is how this geography enthusiast proposed a division based on geographical and statistical criteria (minimum threshold of a million inhabitants per region, telephone links between large cities etc.), respecting, nonetheless, existing departmental limits. With the exception of Corse, which was detached from the Provence-Alpes-Côte d'Azur region in 1972, the division proposed by Serge Antoine, formalised by two decrees in 1959 and 1960, was maintained up to the end of 2015.

In 2015, the territorial reform initiated by the Government<sup>1</sup> transformed French territorial architecture again. France is composed of a superposition of administrative levels: *communes*, *EPCI* (inter-municipal authorities), *départements* and regions. It implies, according to the designers of the reform, political areas of jurisdiction and funding to be shared, but often also redundancies and therefore a loss of public money. Thus, while reinforcing the role of the inter-municipal authorities as of 1 January 2016, the reform substituted the 22 existing metropolitan regions with 13 regions, with 7 of them coming from the merger of the regions without modification of the *départements* which constitute them and increasing their areas of jurisdiction at the same time (Figure I). The Act

1. Via Law no. 2015-29 of 16 January 2015 relating to the demarcation of the regions, the regional and departmental elections and Law no. 2015-991 of 7 August 2015 on the new territorial organisation of the Republic (NOTRe)

Figure I  
The new French regional map



Coverage: metropolitan France.  
Sources: Insee.

of 2 March 1982 had endowed the regions with the general area of jurisdiction clause, which granted a certain power of initiative outside of the areas of intervention specifically provided for by the law. After being removed in 2010 and then reinstated in 2014, this clause was finally abolished by the New Territorial Organisation of the Republic (NOTRe) law for the regions as well as for the départements.

These two levels can therefore no longer intervene in all areas of public action and the region is now endowed with exclusive areas of jurisdiction (economic development, management of European programmes, education/training, land planning, equality of its territories, environment and the management of transport) which are action levers, in particular to limit territorial inequalities. In the field of transport, with respect to non-urban services, school transport, access to the French islands or construction, the regions have thus become solely competent, in place of the départements, while the development and operation of public bus stations continue to be the département's responsibility. In addition to the transfers of areas of jurisdiction in the transport field, the region becomes the territorial authority responsible for economic development on its territory, and no longer just the leading authority for this area of jurisdiction, as was the case before the reform<sup>2</sup>. The region is now solely responsible for the development of two major forward-looking schemes: the regional economic development, innovation and internationalisation plan (SRDEII)<sup>3</sup> and a new regional spatial planning, sustainable development and territorial equality plan<sup>4</sup> (SRADDET).

The motivations for merging regions were, however, much more than in the 1950s, political and economic than geographical or statistical. It was, above all "to endow the French regions with a critical size which would allow them to exercise, at the relevant scale, the strategic areas of jurisdiction which are assigned to them, to compete with comparable authorities in Europe and to achieve efficiency gains" and so to decrease public expenditure (cf. the draft law on regional delimitation, regional and departmental elections, and amending the electoral calendar, 17 June 2014). If the mitigation of disparities between territories could also be a motivation for the legislator, the scientific reflexions carried out on this subject have been, for the most part, *a posteriori* and this criterion was not explicitly taken into account in the choice of the new regions (Jouen, 2015; Amabile *et al.*, 2015;

Brière & Koumarianos, 2015). It is important, however, to document the effects of the merger on the accentuation or, on the contrary, the mitigation of inter- and intra-regional inequalities, as these questions cover issues related to the strengthening of public policies at the regional level.

In this article, the territorial impacts of the merger of regions are studied by using several sociodemographic indicators. The specificity of this analysis lies, furthermore, in the mobilisation of several geographical levels of the European Nomenclature of Territorial Units for Statistics (NUTS) and the intra-regional zoning of the French employment zones. It is in this sense that we can speak of a multiscale and multidimensional interpretation of territorial disparities.

At the European level, it appears that the new regions, the future French NUTS 1 regions, show a rather modest demographic weight compared to the other NUTS 1 regions, while the merger of the regions has resulted in the mitigation of inter-regional contrasts that were already rather moderate before the reform, in comparison with the situation of other European States.

At the national level, the former regions having merged into a same new region might be relatively similar (this is the case, for example, with Nouvelle-Aquitaine) or, on the contrary, very different (this is the case, for example, with Hauts-de-France). The disparities –i.e. the differences between territories– and the territorial discontinuities –i.e. the gaps assessed as the most significant between neighbouring territories– appear stronger within the same regions rather than between regions, often with a strong heterogeneity between employment zones in a same region and strong territorial breaks within the same regions.

In a first part, this article will seek to put the new regions in the European context, within all of the regions constituting the 28 countries

2. During the constitutional revision of 2003, in article 72 it was recorded that "no territorial authority may exercise administrative supervision over another one". However, it was added: "However, when the exercise of an area of jurisdiction requires the cooperation of a number of territorial authorities, the law may authorise one of them or one of their groupings to organise the terms of their collective action". This is how an authority may organise the terms of collective action: it is then the leader.

3. Previously the regional economic development plan (SRDEI).

4. For more details, refer to <http://regions-france.org/observatoire-politiques-regionales/>

of the EU. The aim will be to compare the magnitude of the disparities between French regions with the situation in other Member States. The second part will analyse, at national level, the effects on territorial disparities and discontinuities of the regional reorganisation linked to the change from 22 metropolitan regions to 13.

### **The new French regions in the European context: a modest demographic weight and moderate regional contrasts**

The reform of the territorial map has often been justified by external and European arguments (Jouen, 2015): in particular, the French regions being smaller than their European counterparts (notably the German *Länder*) would not reach the sufficient critical size for international competition. In this context, we will consider the positioning of the new regions in the hierarchy of European regions and we will seek to assess the impact of the new perimeters on the measurement of French inter-regional contrasts, compared to those at play in the other European countries. These investigations require first to specify how the new regions fit into the NUTS nomenclature.

### **The new French regions, by doubling their population, become future NUTS 1 European regions**

At European level, the harmonised definition of the “region”, the cornerstone of community statistics, is based on the Nomenclature of Territorial Units for Statistics (NUTS). This nomenclature comes in four levels, from NUTS 0 corresponding to the State as a whole, up to NUTS 3 level, the smallest level<sup>5</sup>. The Member States of the European Union are invited to propose territorial levels following two normative principles (Eurostat, 2016):

- *Principle 1: the NUTS regulation defines the minimum and maximum population thresholds for the size of the NUTS regions.* This rule aims to make the regions comparable, as far as possible. For the NUTS 2 regions, which is the privileged level for EU regional policy, the average population of the units must be between 800,000 and 3 million inhabitants, whereas for the NUTS 1 regions, these thresholds vary

between 3 and 7 million<sup>6</sup>. There can only be exceptions to these thresholds for geographic, socioeconomic, historical or particular cultural reasons.

- *Principle 2: the NUTS favours administrative regions (...) existing in the Member States.* For the implementation of public policies, it seems to be more coherent to manage European funds at the level of regions which actually have expertise in territorial development, rather than at the level of regions which would only be statistical constructions<sup>7</sup>.

This evolving nomenclature (2003, 2006, 2010 and 2013 versions) changes according to the territorial reforms undertaken by the Member States, which therefore raises the issue of the choice of the right level for the new French regions in the NUTS nomenclature<sup>8</sup>. Indeed, the reform has important consequences on the population of the regions, which can be seen by comparing their European neighbours (Figures II-A and II-B). At NUTS 2 level, notwithstanding the particular case of the smallest states where the NUTS 2 regions are confused with national boundaries, the 22 regions in metropolitan France were already among the most populated areas in Europe, with an average of 2.5 million inhabitants (2.9 million without the overseas départements – the DOM), just behind Italy (2.9 million), and in front of other large States such as Poland (2.4 million), Germany (2.1 million), or even the United Kingdom (1.6 million). These comparisons are not, however, free from the effects of *MAUP (modifiable*

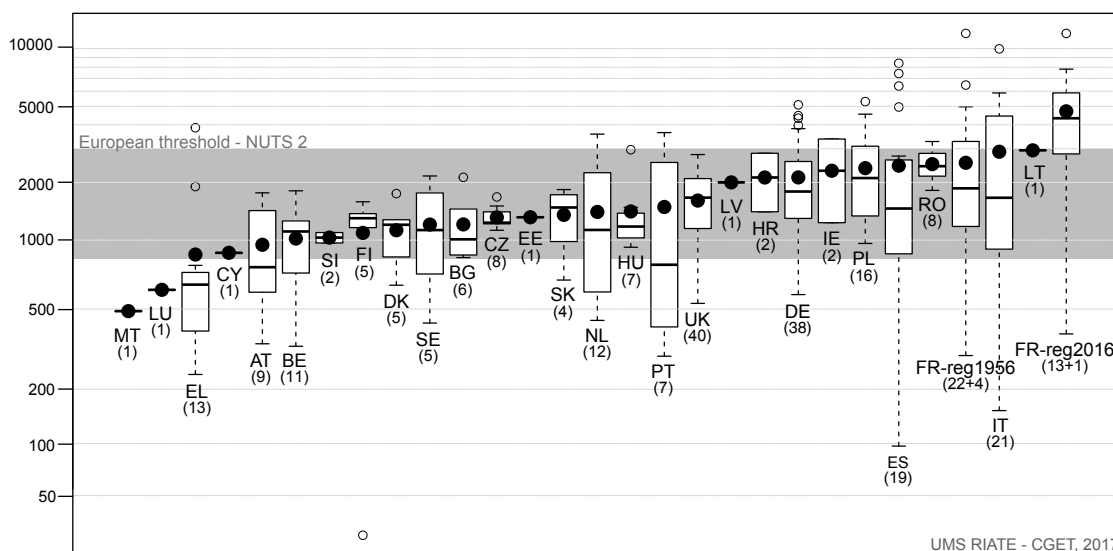
5. In some smaller countries, however, such as Luxembourg and the Baltic countries, the NUTS nomenclature does not take into account intra-national division and the smallest levels overlap with those of the State.

6. However, even within these intervals, there may be strong demographic heterogeneity: some regions may be heavily populated areas, due to the presence of large metropolitan centres, while at the other extreme, some regions have very little population, due to the existence of special laws within their countries (this is particularly the case of the Åland Islands in Finland, of Corse in France or of Sardinia in Italy), specific situations of enclaves (Ceuta and Melilla in Spain) or distant peripheries (the French overseas territories).

7. However, this preferred level of regional policy (NUTS 2) does not correspond to the management levels among the States. For example, because of considerable financial stakes related to this policy, some Member States have chosen a regional geographical level that maximizes the chances of falling within the eligibility thresholds of the European Union cohesion policy. One of the best-known cases is that of Ireland (Lagendijk, 2005): as this country was preparing to lose its regional grant at the start of the 2000s, abruptly moving from the “disadvantaged” statistical class to the “privileged” class, the initiative was taken to divide its territory into two parts - a poor north and a rich south - whose boundaries are completely disconnected from the three historical regions in Ireland (Connacht, Leinster, Munster).

8. Up to now in France, the four NUTS levels have corresponded to the national territory (NUTS 0), to a division into 9 ZEATs (study and territorial development zones, NUTS 1), to 22 regions + 4 DOMs (NUTS 2) until 2011 and then 5 DOMs with the addition of Mayotte, and finally to the départements (NUTS 3).

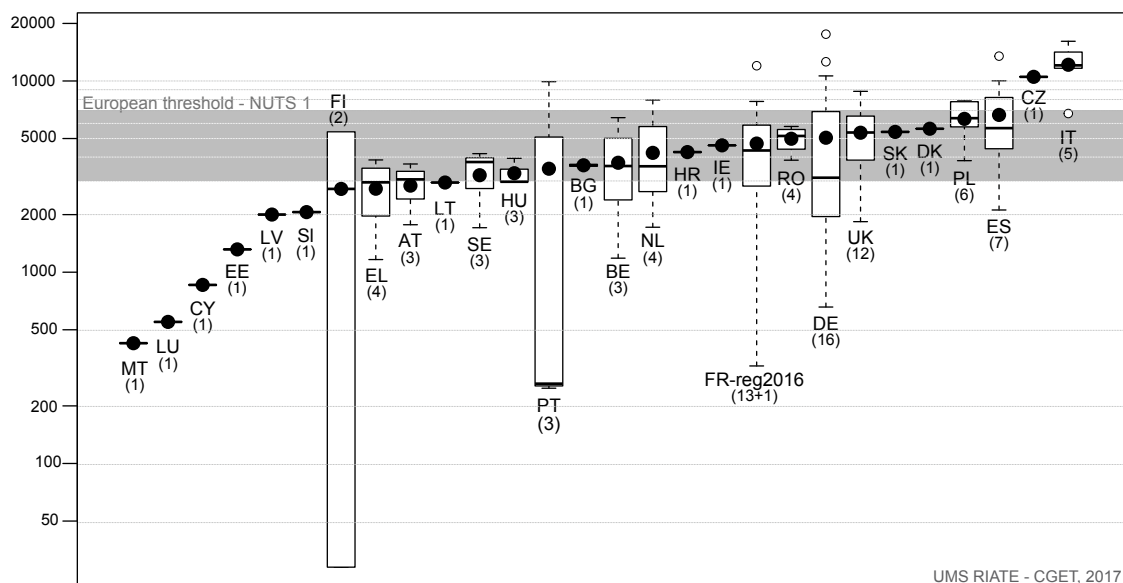
Figure II-A  
Weight of the European NUTS 2 according to the population criterion (2014)



Note: The figure represents, for each of the EU Member States, different parameters of the distribution of regional populations at NUTS 2 level. The bottom side of the box represents the first quartile (Q1), and the top side, the third quartile (Q3). The horizontal line inside the box is the median and the black circle is the mean. The vertical dashed lines extend to the minimum and the maximum values of the data set, as long as these values are not outliers. A value is considered as an outlier (white circle) if it is less than  $Q1-(Q3-Q1)$  or greater than  $Q3+(Q3-Q1)$ . The shaded area corresponds to the demographic thresholds of the NUTS nomenclature in question. The number in brackets gives the number of NUTS in the Member State in question. The 28 Member States are: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), the Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE) and the United Kingdom (UK). For France, FR-reg1956 refers to the former French regions (22 in metropolitan France and 4 overseas, excluding Mayotte) and FR-reg2016 to the future NUTS 1 regions which correspond to the 13 new metropolitan regions in force since 2016 and an entity that brings together all the overseas ones, which are placed on the figure for comparison purposes. Nomenclature of NUTS 2 (version 2013) statistical territorial units of the EU28.

Reading note: Austria (AT) has 9 NUTS 2 regions (9 *Länder*). The average population of NUTS 2 regions in Austria is 945,000 inhabitants; the median population is 722,000 inhabitants. Half of the NUTS 2 regions have between 534,000 and 1,426,000 inhabitants (interquartile interval). Sources: Eurostat, 2016.

Figure II-B  
Weight of the European NUTS 1 according to the population criterion (2014)



Note: The figure represents, for each of the EU Member States, different parameters of the distribution of regional populations at NUTS 1 level. Nomenclature of NUTS 1 (version 2013) statistical territorial units of the EU28.

Reading note: Austria (AT) has 3 NUTS 1 regions. The average population of NUTS 1 regions in Austria is 2,836,000 inhabitants; the median population is 3,057,000 inhabitants. Half of the NUTS 1 regions have between 2,414,000 and 3,368,000 inhabitants (interquartile interval). Sources: Eurostat, 2016.

*areal unit problem*) that is, the effects of scale and zoning related to the influence of spatial breakdown (Openshaw, 1984; appendix) as is illustrated in the case of the United Kingdom where several NUTS 2 regions correspond to urban districts (especially for London, divided into three districts). The new regional breakdown and mergers cause the French regions to move into NUTS 1 category. In fact, the new French regions have 4.7 million inhabitants on average (4.9 million excluding the overseas territories). Among the merged regions, only Bourgogne-Franche-Comté and Normandie, with respectively 2.8 and 3.3 million inhabitants, are relatively small compared to all of the NUTS 1 regions. Most of the new regions have between 5 and 6 million inhabitants, which puts them, for example, at the level of the *Land* of Hesse (Frankfurt), the East of England region and the West Midlands region in the United Kingdom, or even capital city regions such as that of Madrid. As for the Auvergne-Rhône-Alpes region (7.8 million), its size (in terms of population) is similar to that of large regions such as London (8.5 million), West Netherlands (7.9 million), or Poludniowy, which brings together Silesia and Lesser Poland, of which Krakow is the administrative capital (7.9 million).

The new French regions will be the future NUTS 1 regions from 2018 (replacing the ZEATs<sup>9</sup>), while the NUTS 2 regions will still correspond to the former regions<sup>10</sup>, but will no longer have any administrative meaning. Compared to the most populated NUTS 1 regions of the other European States, the new French regions are in last place (Spain 6.6 million, Poland 6.3 million, United Kingdom 5.4 million, Germany 5 million). However, this relatively modest weight can be nuanced when comparing the future French NUTS 1 regions on the first intra-national level of territorial management, which corresponds, according to the States, to NUTS 1 or NUTS 2. The new French regions are closer then, in terms of population, to the German *Länder* (NUTS 1), while being a long way ahead of the Spanish communities (NUTS 2), the Italian regions (NUTS 2) or even the Polish *voivodships* (NUTS 2), which have, on average, between 2.4 and 2.8 million inhabitants. Similar observations could be drawn from comparing the GDPs.

Thus, according to a political-institutional approach, the future French NUTS 1 regions could be, taking into account their expanded areas of jurisdiction, compared to the NUTS 2

regions when the latter correspond to the first trans-national territorial management level<sup>11</sup> (Jouen, 2015).

### **The sociodemographic profile of the new regions in the European context: a relative smoothing out of inter-regional contrasts**

Beyond the issues relating to the demographic weight of the French regions, one may ask what the impact of the new regional perimeters is on the sociodemographic profiles of the regions. Five sociodemographic indicators (the population density, the youth index, the employment rate of 25-64-year-olds, the median standard of living and the change in the number of employed persons since the crisis of 2008, see appendix) have been adopted to assess the impact of these restructurings on the classification of regions, both in relation to other European regions and in relation to the old French regions having merged. In fact, the sociodemographic indicators highlight the current and upcoming issues in a territory as well as the economic indicators. Here, we have also sought to complement the work already conducted on territorial cohesion in an economic perspective (Amabile *et al.*, 2015a; 2015b), by including indicators often used to describe the social and demographic situation of territories in terms of degree of urbanisation, standard of living, age and labour market participation the inhabitants.<sup>12</sup>

As mentioned earlier, the choice of the relevant levels of the nomenclature to carry out the European comparisons is not self-evident. In this article, a statistical criterion of comparable demographic size will be favoured, rather than a politico-institutional criterion leading to selecting zones with comparable areas of jurisdiction. We will therefore directly draw on the logic of Eurostat's nomenclature (comparison at the NUTS 1 level).

Table 1 presents the respective rankings of the seven regions resulting from the merger (NUTS 1) and sixteen former regions that

9. The ZEATs (Zones d'études et d'aménagement du territoire) are territorial units created in 1967 by Insee and Datar. There are 8 of them in metropolitan France.

10. The regions which have not merged simultaneously belong to NUTS 1 and NUTS 2 levels in the nomenclature. The overseas regions (Guadeloupe, French Guiana, Martinique, Mayotte and Réunion) constitute a single entity at NUTS 1, called the "outermost regions", each of which is always a region at NUTS 2 level (and at NUTS 3 level).

11. These geographical administrative management levels fall within the traditions and varied designs of the regionalisation processes depending on the different European Member States (Marcou, 1999; Lagendijk, 2005).

12. For more details on the choice of indicators, refer to appendix.

comprise them (NUTS 2), according to the five indicators chosen. This ranking is expressed using standardised rankings from 0 (the most unfavourable situations) to 100 (the most favourable situations)<sup>13</sup>, so as to allow a direct comparison of the relative positions of regions within groupings of unequal size (103 NUTS 1 and 276 NUTS 2). Well-known traits of the positioning of the French regions in Europe can be found: they are rather poorly placed in terms of the employment rate (ranks 17 to 55, with this last value meaning that 55% of European regions have employment rate that are less favourable than the highest French region), quite favoured in terms of standards of living (ranks

48 to 74), while the demographic situation (21 to 81) and the recent change in employment (28 to 72) present results that are significantly more mixed from one region to another. From a more thorough analysis of each merged region (table 1 and Figure III), four profiles are identified and compared to other European regions:

The **Auvergne-Rhône-Alpes** region stands out with a very favourable situation on all of the indicators; the new region's profile is essentially

13. The rankings have been standardised: they correspond to the absolute value of the rank compared to the total number of observations (103 in the nomenclature of the new regions (NUTS 1), 276 in the nomenclature of the former regions (NUTS 2)), multiplied by 100.

Table 1  
European positioning of the 7 new regions (NUTS 1) compared to the 16 former regions having merged (NUTS 2)

	Median standard of living	Population density	Youth index	Employment rate (25-64 years old)	Change in employment since 2008
<b>Hauts-de-France</b>	<b>48</b>	<b>63</b>	<b>81</b>	<b>16</b>	<b>36</b>
<i>FR22 - Picardie</i>	57	38	64	26	22
<i>FR30 - Nord-Pas-de-Calais</i>	42	76	84	17	42
<b>Occitanie</b>	<b>60</b>	<b>26</b>	<b>55</b>	<b>32</b>	<b>63</b>
<i>FR62 - Midi-Pyrénées</i>	65	19	58	50	52
<i>FR81 - Languedoc-Roussillon</i>	50	38	49	19	82
<b>Grand Est</b>	<b>62</b>	<b>36</b>	<b>56</b>	<b>33</b>	<b>28</b>
<i>FR21 - Champagne-Ardenne</i>	55	12	52	21	17
<i>FR41 - Lorraine</i>	55	37	49	26	28
<i>FR42 - Alsace</i>	65	67	66	55	33
<b>Normandie</b>	<b>66</b>	<b>45</b>	<b>48</b>	<b>39</b>	<b>31</b>
<i>FR23 - Haute-Normandie</i>	63	54	62	32	41
<i>FR25 - Basse-Normandie</i>	63	29	36	43	20
<b>Nouvelle-Aquitaine</b>	<b>68</b>	<b>22</b>	<b>21</b>	<b>48</b>	<b>54</b>
<i>FR53 - Poitou-Charentes</i>	65	22	16	40	35
<i>FR61 - Aquitaine</i>	63	28	44	47	75
<i>FR63 - Limousin</i>	65	10	12	52	22
<b>Bourgogne-Franche-Comté</b>	<b>69</b>	<b>13</b>	<b>29</b>	<b>44</b>	<b>46</b>
<i>FR26 - Bourgogne</i>	68	12	20	41	37
<i>FR43 - Franche-Comté</i>	63	23	52	43	55
<b>Auvergne-Rhône-Alpes</b>	<b>74</b>	<b>46</b>	<b>73</b>	<b>55</b>	<b>72</b>
<i>FR71 - Rhône-Alpes</i>	71	53	81	55	79
<i>FR72 - Auvergne</i>	72	12	23	42	39

Note: precise definition of the indicators in appendix; ranking using standardised ranks (corresponding to the absolute value of the rank compared to the total number of observations (103 in the nomenclature of the new regions (NUTS 1), 275 in the nomenclature of the former regions (NUTS 2)), multiplied by 100.

0 - Worst situation (0% of units below the value of the territorial unit in its nomenclature)

100 - Best situation (100% of the units below the value of the territorial unit in its nomenclature).

Reading note: the youth index of the new Hauts-de-France region reached 81, which means that 81% of European Regions (using the NUTS 1 nomenclature) are less "young"; the index of the former Nord-Pas-de-Calais region stood at 84, which placed this region in an even more favourable European position (using the NUTS 2 classification).

Coverage: former French regions having merged and new regions.

Sources: Eurostat, 2017.

modelled on that of the former Rhône-Alpes region, that demographic weight is predominant in the merged whole (82% of the new region's population). At the national level, the Auvergne-Rhône-Alpes region is therefore placed in the second rank of the new regions in terms of median standard of living (€19,320), after the Île-de-France region, thanks in particular to the presence of the Lyon metropolitan area and its location on the French border. Its employment growth is also higher than the national average. At the European level, the standard of living (rank 74), the recent change in employment (rank 72) and the youth index (rank 73) place the region in the first quarter of the most favoured NUTS 1 regions. This profile is quite similar, for example, to that of the South-West of England, and to a lesser degree, the Saar and the North-East of Italy, with these two regions being nevertheless much less favoured in terms of demographic situation or job creation dynamics.

**Nouvelle-Aquitaine** and **Occitanie** have a fairly favourable profile and are distinguished in particular by a positive change in employment (rank 54 and 63 respectively) and the inhabitants' relatively high standard of living (68 and 60 respectively), even if the median standard of living is lower in Occitanie (€ 17,910, which is lower than the average for metropolitan France) and closer to the profile of West Netherlands or of Thuringia in Germany. The situations in the two regions are, however, more differentiated in terms of the age structure and the employment rate. In Nouvelle-Aquitaine, where there are, on average, 79 young people aged between 15 and 24 for 100 people aged between 54 and 65, the profile is strongly marked by the ageing of the population in Poitou-Charentes and in Limousin, which are among the 15% of the least young regions in European. If according to the standard of living and employment indicators, Nouvelle-Aquitaine shares many traits with Scotland, taking into account its ageing demographic structure, it is closer to central Poland (Lodz region) or western Hungary (Transdanubia). As for Occitanie, its situation for the labour market appears particular, close to the **PACA region** in France or to the vast central region of Italy (from Lazio to Tuscany), where the positive change in employment is combined with a slightly unfavourable employment rate (70.1%).

**Grand Est** and **Normandie** are characterised by quite high levels of living standard (ranks 62 and 66), close to those observed in the Berlin and Brandenburg regions, and a fairly median

demographic profile on the European scale (ranks 56 and 48). They share relatively important difficulties in terms of employment (ranks for employment rate of 34 and 39, 28 and 31 for change in employment), even if the situation on the labour market is significantly better in Grand Est thanks to the former Alsace region, whereas the former Champagne-Ardenne and Lorraine regions face the difficulties of being formerly highly industrial regions. **Bourgogne-Franche-Comté**, although more favoured in terms of standard of living, is close to this profile on the labour market, but it is characterised by a more ageing demographic structure, just like North-East Italy. Similarly, by their favourable situations on the labour market and their average demographic situations, the unchanged **Bretagne** and **Pays de la Loire** regions are relatively close to the new Grand Est region.

Finally, **Hauts-de-France** appears to be both the poorest French region (standard of living rank: 48, median standard of living of € 16,820), the least favoured in terms of employment (rank 17 for a rate of employment of 65% and rank 36 for change in employment, because of the rapid decay of the supply of jobs in Picardie, at a rate of - 1.0% per year), but also the youngest (rank 81, i.e. as many young people aged between 15 and 24 as people aged between 55 and 64), thus reflecting the essential characteristics of the Nord-Pas-de-Calais region. This profile is fairly close to that of Wales, or even the East Netherlands, even if the employment rate is higher by almost 10 points in these regions.

Two metropolitan regions which have not changed scope display very specific characteristics. **Île-de-France** displays a favourable labour market (rank 69 for the employment rate of 75.9% and rank 93 for the standard of living of €22,600) and a relatively young population (rank 92). However, with a - 0.1% average annual change in employment over the 2008-2015 period (rank 49), it is not, from this point of view, one of the most favoured regions in Europe and is overtaken, notably, by the Auvergne-Rhône-Alpes (+ 0.6%) and the Occitanie (+ 0.4%) regions. **Corse**, the second atypical region, presents both a very low rate of employment (rank 10, 61.5%) and a very pronounced decline in employment since the economic crisis (rank 4, - 3.2%) according to the data provided by Eurostat, which do not correspond to those published by Insee.

Through the reorganisation of this classification, the disadvantaged profiles of certain



former regions (Picardie, Auvergne, ...) tend to be mitigated, while the favourable position of several of them (Rhône-Alpes, Aquitaine, ...) tends to be slightly eroded. These developments suggest that there has been a certain smoothing out of inter-regional contrasts as a result of the territorial reform, encouraging to assess more thoroughly the impact of the mergers on the magnitude of regional disparities in France, compared to the other European States.

### A relative homogeneity of French regions compared to the other European regions

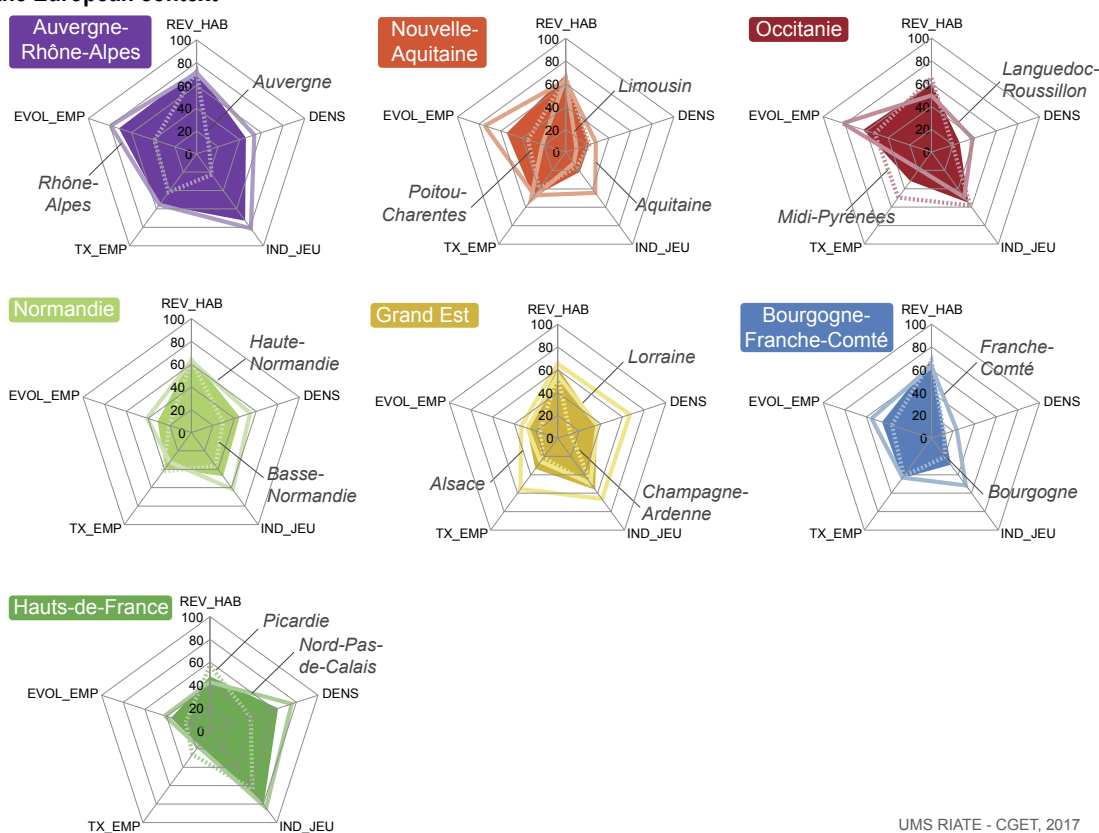
How do the mergers alter the relative position of France in terms of internal heterogeneity compared to the other European States? Here, the comparison is restricted to States which have sufficient regional entities for the measurement of inter-regional inequalities to be relevant<sup>14</sup>.

For the record, it should be remembered first of all that at the NUTS 2 level, it is in metropolitan France that the inter-regional contrasts are the weakest. This is especially true for the differences in median standards of living (coefficient of variation<sup>15</sup> of 0.06), despite the magnitude of the inequalities observed at the two extremes (median standards of living 40% higher in Île-de-France compared to Nord-Pas-de-Calais and Languedoc-Roussillon), which brings the French regions close to the German (c.v. of 0.09, with Upper Bavaria being 45% richer than Mecklenburg), but clearly distinguishes them from that of other States: in Spain, for example, the inter-regional contrasts in standard of living are very high (c.v. of 0.17, standard of living 75% higher in the Basque Country compared to

14. Only the States with more than 10 NUTS 2 or 5 NUTS 1 regions are included in this comparison. In addition, for France, the overseas territories are not taken into account.

15. Coefficient of variation defined by the ratio of the standard deviation to the mean; it increases with the variances; written as c.v. in the rest of the article.

Figure III  
Socio-demographic profiles of the 7 new regions (NUTS 1) and of the merged 16 former regions (NUTS 2) in the European context



UMS RIATE - CGET, 2017

Note: the standardised rank of the NUTS 1 (103 territorial units) or NUTS 2 (275 territorial units) regions is represented (method detailed in the note to table 1). The five income indicators: REV/HAB (net disposable income per capita in 2013, which corresponds to the standard of living), DENS (density of population in 2015), IND\_JEU (youth index in 2015), TX\_EMP (employment rate of 25-64-year olds in 2015), EVOL\_EMP (change in employment 2008-2015) (appendix 1).

Coverage: former French regions having merged and new regions.  
Sources: Eurostat, 2017.

Estremadura), the same as in Italy (c.v. of 0.18, standard of living 75% higher in Lombardy than in Calabria) or to a lesser degree in the United Kingdom (c.v. of 0.15, once the three London districts are combined). Among all of the indicators, it is for the youth index that the dispersion of the values between the French regions is the strongest (c.v. of 0.12), but it remains low in relation to other European countries, with the index ranging from 70 in Limousin to 120 in Île-de-France, whereas the c.v. reaches, for example, 0.18 in the United Kingdom, 0.19 in Germany and 0.26 in Spain. In terms of the employment rate, the situation is particularly homogeneous (c.v. of 0.05), especially when compared to Italy (c.v. of 0.16) and Spain (c.v. of 0.10), while in Germany, the regional indicators are of the same order of magnitude as in France (c.v. of 0.03).

The change to NUTS 1 maintains this relative homogeneity in France. The statistical dispersion of the standard of living still appears to be the lowest there (c.v. of 0.07, standard of living in Île-de-France higher by 34% than in Hauts-de-France), followed by Germany (c.v. of 0.10, gap of 34% between the *Land* of Hamburg and Bavaria on the one hand, and that of Mecklenburg on the other hand), the United Kingdom (c.v. of 0.14, 57% between the Greater London region and Northern Ireland), Spain (c.v. of 0.17, 60% between the Madrid region and Andalusia) and Italy (0.19, 60% between the North-west and the South). As regards the youth index, at NUTS 1 level, the contrasts are significantly attenuated in France (c.v. of 0.10), while in the other States, moving from NUTS 2 to NUTS 1 tends to accentuate the demographic disparities, as is the case in Germany (c.v. 0.25, with indices setting the very old Mecklenburg and Brandenburg against Baden Württemberg and especially the Land of Hamburg).

In total, inter-regional contrasts appear to be especially low in France compared to the other major European States. The change to NUTS 1 has barely altered this finding and sometimes even strengthens it, as is the case for the youth index. The mapping of the greatest inter-regional territorial discontinuities, i.e. the largest gaps measured between neighbouring regions, illustrates it in another way (Figure IV). Furthermore, it invites one to question the relationship between the largest discontinuities and the localisation of international borders. The use of a territorial auto-correlation index allows measuring this effect of national affiliation more precisely (Box1). For the standard of living indicator, the

territorial auto-correlation coefficient which is positive and close to 1 (0.78) shows that the main discontinuities are located at the borders of States and not at the level of regional intra-national limits. In other words, there is indeed a strong effect of national belonging, with regions of a same State being, on average, more similar between themselves, in terms of standard of living, than are the regions of different States, even if this effect is, for a large part, influenced by the very high differentials in standard of living observed at the western borders of the former socialist bloc countries. In France, the main discontinuities occur in Île-de-France on the one hand, and between Grand Est and Luxembourg and the neighbouring German *Länder* on the other hand. For the youth indicator, this territorial auto-correlation coefficient is positive but low (0.09); this time, the international borders effect is only slightly more marked than that of the intra-national borders. At the European level, it is the pronounced ageing of the former GDR (excluding Berlin) which marks the greatest discontinuity with the neighbouring regions, whereas in France, most of the demographic discontinuities correspond to “internal” regional limits in the most urbanised regions.

### **Strong territorial disparities within the thirteen new metropolitan regions**

The change from 22 to 13 metropolitan regions on 1 January 2016 raises the question of a potential change in inter-regional differences. Does the creation of the new regions result from the amalgamation of similar or different regions?

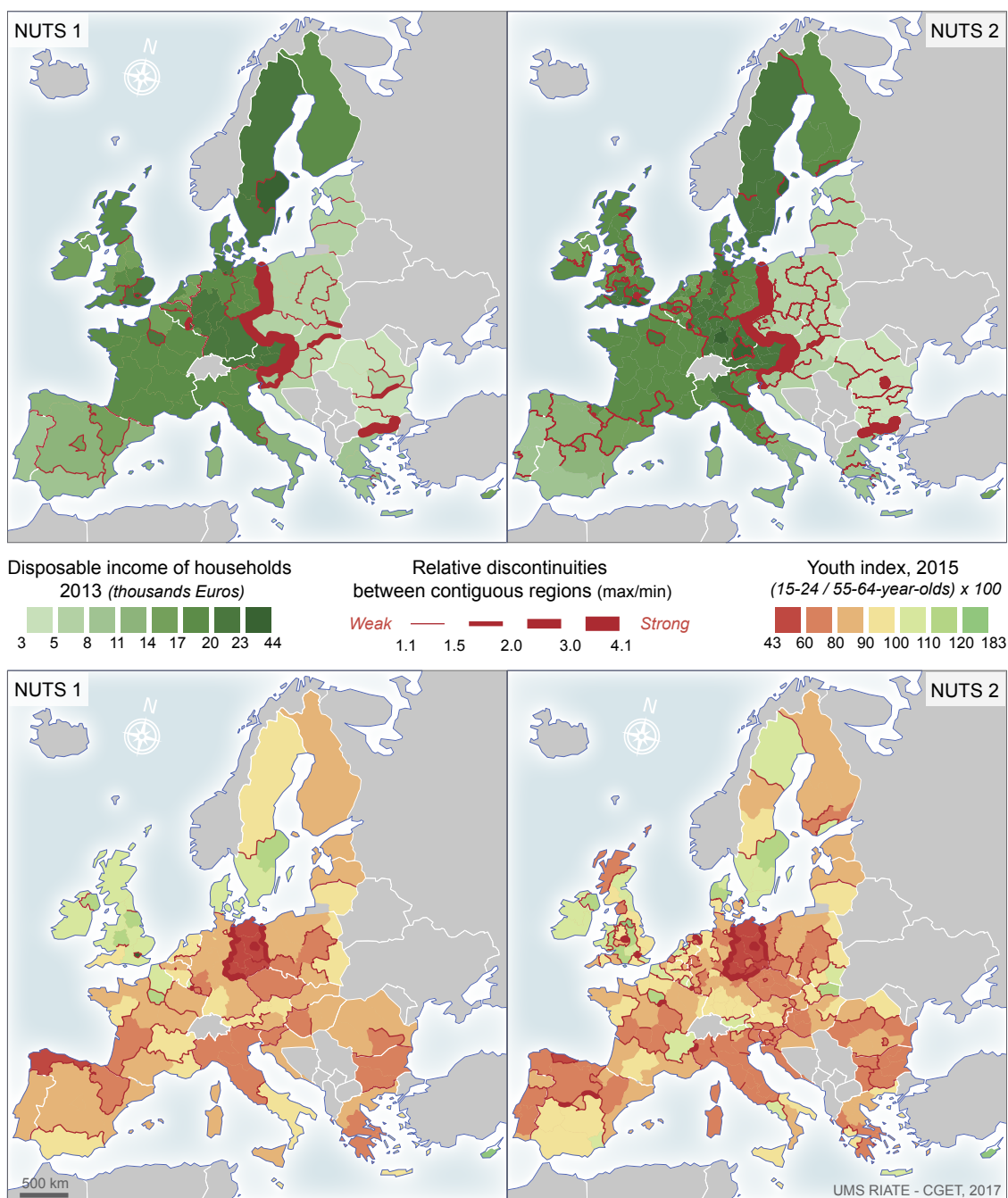
The extent of the disparities between territories depends very heavily on the indicators as well as the degree of precision of the zoning. This is the reason why we will use not only the different dimensions already used in the previous part (demographic situation, situation on the labour market and change in employment), but also several levels of analysis (employment zones in addition to the new and former regions).

### **Do the new regions result from the merger of former similar regions?**

#### *Measurement of the similarities and differences between the former regions*

In order to summarise the proximities between regions, a Principal Component Analysis (PCA)

Figure IV  
Main regional discontinuities according to the standard of living and the youth index



Note: The relative discontinuities correspond to the ratio between the maximum value and the minimum value of the indicator in question by pair of contiguous regions. These charts do not show the greatest relative discontinuities (max/min > 1.1). European Nomenclature of Territorial Units for Statistics NUTS 1 and NUTS 2, excluding outermost regions.

Reading note: the former French regions have been positioned with regard to the NUTS 2 nomenclature (2013 version) of the EU28. This nomenclature includes 275 territorial units. The new French regions have been positioned with regard to the NUTS 1 nomenclature (2013 version) of the EU28. The former NUTS 1 French regions (ZEAT in the 2013 version of the classification) have been replaced by the new French regions; the new French regions will officially integrate NUTS level 1 in 2018. This classification that has been reconstituted for the article includes 103 territorial units.

Sources: Eurostat, 2017.

has been carried out on the former metropolitan regions according to the same five indicators mentioned previously. As Île-de-France is an extreme statistical individual for most of these indicators, it has been placed as a supplementary

individual. The new regions are also positioned as supplementary individuals.

We have identified two main axes of differentiation which contribute to 73% of the total

### Box 1 – Calculation of the territorial autocorrelation index

For a given variable X, the territorial autocorrelation index measures the average dissimilarity  $(X_i - X_j)^2$  for pairs of regions I and J of the same territorial affiliation (here, the countries of the European Union) (DS(Intra)), and for the pairs of regions I and J with a different territorial affiliation (DS(Inter)) (Grasland, 2001).

The territorial autocorrelation coefficient corresponds to:

$$G = 1 - DS(\text{Intra}) / DS(\text{Inter})$$

- If the territorial autocorrelation coefficient G is positive, two regions of the same EU Member State are more

similar to each other than two regions of two separate Member States;

- If the territorial autocorrelation coefficient G is negative, two regions of the same EU Member State are less similar to each other than two regions of two separate Member States;

- If the territorial autocorrelation coefficient G is zero, two regions of the same EU Member State are neither more nor less similar to each other than two regions of two separate Member States.

inertia (Figure V). The first axis contrasts the former regions where the situation on the labour market is favourable (employment rate of 25-64-year-olds and high levels of median standard of living) with those where it is less so. The second axis, which is slightly less discriminating, contrasts dense and young territories with more rural and ageing regions. The change in employment is used as a third factor of spatial differentiation.

A calculation of distances between regions on the map on Figure V (cf. Table 2) points out that the former regions which have been merged are not necessarily the most similar ones. The average distance between two former regions having merged (2.67) is even higher than the average distance between two former regions, whether they have merged or not (2.35).

While some merged regions show similarities, as is the case in Nouvelle-Aquitaine,

Bourgogne-Franche-Comté and Normandie, the former regions comprising Hauts-de-France, Occitanie, Auvergne-Rhône-Alpes or Grand Est are very heterogeneous. The results presented below can be further detailed through other studies carried out on the subject, using other indicators and levels of analysis (Amabile *et al.*, 2015; Brière & Koumarios, 2015). The regional values of the five indicators in the article are represented in appendix.

#### *Proximities between merged regions...*

Nouvelle-Aquitaine is the new region which appears to be the most homogeneous (lowest distance between the former regions) even if the former Aquitaine differs slightly from the other two merged regions by its better situation on the labour market and, in particular, higher standard of living. The two former regions that make up Bourgogne-Franche-Comté are also relatively close to one another. The demographic

Table 2  
Statistical proximity between the former French metropolitan regions having merged

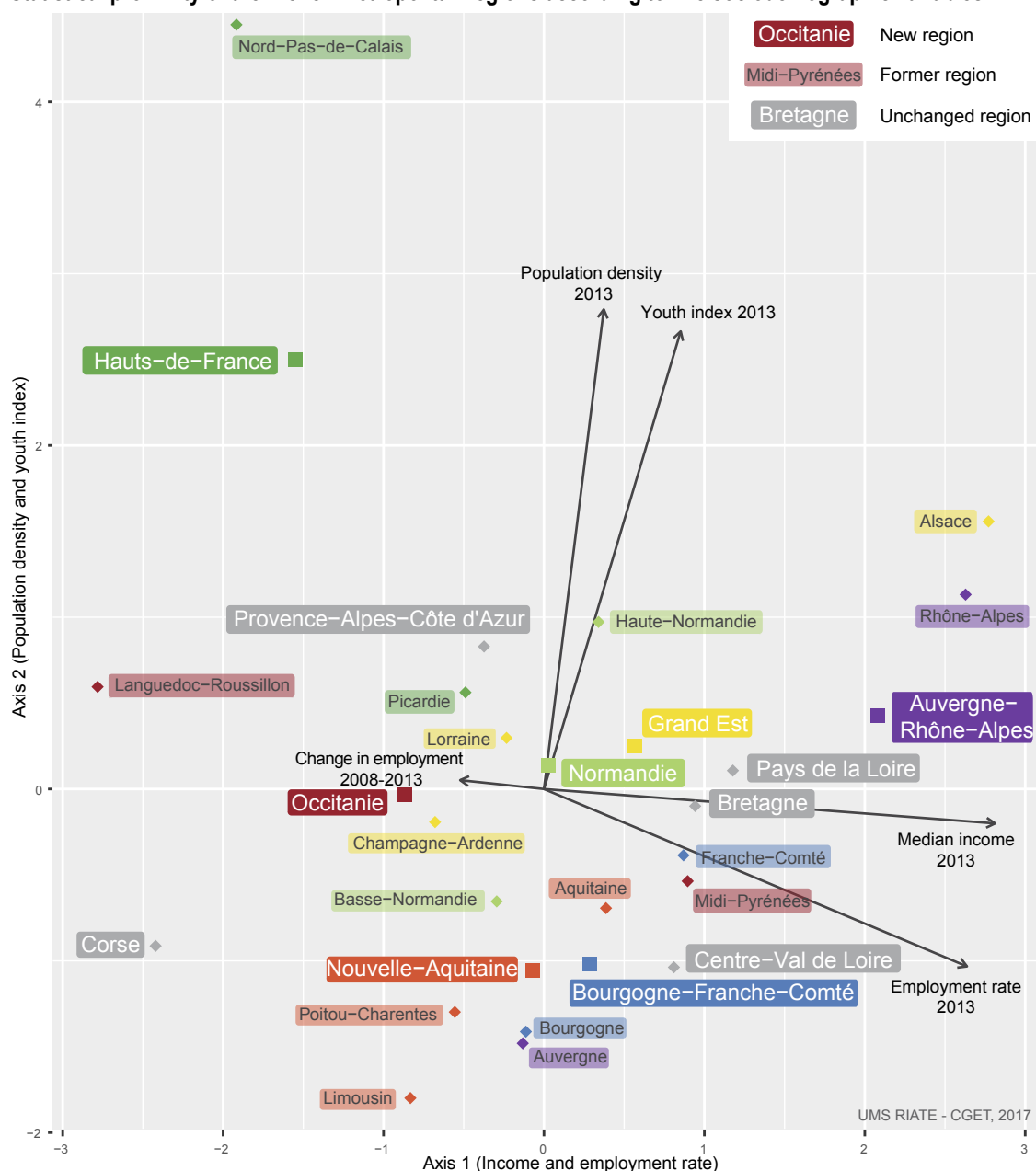
Regions	Average distances between two former regions
Nouvelle-Aquitaine	1.11
Bourgogne-Franche-Comté	1.42
Normandie	1.75
Grand Est	2.60
Auvergne-Rhône-Alpes	3.80
Occitanie	3.85
Hauts-de-France	4.14
<i>Average of average distances between the former regions having merged</i>	2.67
<i>Average distances between two former regions (merged or not)</i>	2.35

Note: For each new region, the average distance between the former regions that compose it is calculated with the Euclidean distances observed between the different points of the system of axes on Figure V. A small distance corresponds to great proximity between the regions and vice versa. Coverage: former and new regions in metropolitan France. Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

situation is roughly the same between these two fairly rural regions. The median employment rate and standards of living in the former regions forming Bourgogne-Franche-Comté are also relatively little contrasted, being close to the national average. Employment is in decline in Bourgogne (- 2.6%) as in Franche-Comté (- 2.4%). The situation on the labour market of the two former Normandie regions is

balanced between a higher standards of living Haute-Normandie (€19,490 versus €18,900) and a Basse-Normandie with a higher employment rate of 25-64-year-olds (70.5% versus 69.6%). However, Basse-Normandie, which is mainly rural, has a less favourable demographic dynamic than its neighbour which benefits from its proximity to Île-de-France. There is also a great proximity between Haute-Normandie

Figure V  
Statistical proximity of the French metropolitan regions according to five sociodemographic variables



Note: This figure represents the first factorial plan of the ACP on the former metropolitan regions (excluding Île-de-France) according to the five variables considered. The former regions have been projected in a new system of axes with two dimensions and the variables of the correlation circle have been superimposed on it (the new regions have been placed as supplementary individuals). The entities belonging to a same new region have been coloured in the same range of colours.  
Coverage: former and new regions in metropolitan France (excluding Île-de-France).  
Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

and Basse-Normandie concerning the fall in the number of jobs (– 1.5% and – 1.4% respectively).

### *... but especially dissimilarities*

If the Grand Est region brings together three relatively homogeneous former regions from the point of view of the age structure (the youth index varies from 90 for the Champagne-Ardenne and Lorraine regions to 96 for the Alsace region), Alsace is clearly distinguished from the other two by a significantly higher density (225 inhab/km<sup>2</sup> versus 52 for Champagne-Ardenne and 100 for Lorraine). Furthermore, Alsace figures among the leading former regions in terms of the median standard of living. On the other hand, the number of jobs has declined since the crisis in the three former regions of Grand Est, the decline being particularly marked in Champagne-Ardenne and Lorraine, which are industrial regions. In Occitanie, the disparities concerning these indicators, in particular the employment rate and the median standards of living, are strong between the former regions of Languedoc-Roussillon and Midi-Pyrénées, largely to the detriment of Languedoc-Roussillon. In addition, the Midi-Pyrénées region is more rural than its neighbour. However, two points bring the two former regions closer –the structure by age group and the employment dynamic, which has resisted the crisis very well, because of their strongly tertiary orientation.

Within the Hauts-de-France region, it is the demographic contrast which prevails with a Nord-Pas-de-Calais region three times more densely populated than Picardie (328 inhab/km<sup>2</sup> versus 99 inhab/km<sup>2</sup>) but also younger. On the contrary, the situation on the labour market is slightly more favourable in Picardie, which benefits from its proximity to Île-de-France; the median standard of living is also higher (€ 18,940 versus € 17,700) although lower compared to the French average. The contrast is very clear between the aged and very sparsely populated Auvergne region, which has an average situation on the labour market and the Rhône-Alpes region which presents opposite characteristics (high standards of living and employment rates, strong employment growth, younger population, high density).

This analysis of sociodemographic disparities within the new regions only takes into account the former regional perimeters. However, even

within the former regions, there are significant spatial differences: for example, between metropolitan centres, their suburbs and isolated areas or even between the border or littoral strips and the interior of the regions. These areas of intra-regional importance may, in particular, explain the positioning of certain regions compared to other ones: the weight of the metropolitan centre of Lille compared to the city of Amiens certainly has a lot of importance in the positioning of the Nord-Pas-de-Calais region compared to Picardie or even the border situation of Franche-Comté very certainly has an impact on its positioning in relation to Bourgogne. That is why, in the next part, we refine our study by analysing disparities within regions.

### **Strong heterogeneity of the territories within the same regions: an analysis of territorial disparities at the level of employment zones**

In order to identify the continuities and changes that exist within former and new regions, we are now focusing on the functional geographic level of employment zones (description in appendix), which is indeed adapted to intra-regional studies, including on local labour markets. The regional administrative level is used to discuss the results in relation to the article's key question.

### *Some groups of homogeneous territories independent of regional perimeters*

A Hierarchical Cluster Analysis (HCA), carried out from the three synthetic indices chosen (demographic situation, situation on the labour market and change in employment, see Box 2), allows identifying five profiles<sup>16</sup> (cf. Table 3; Figure VI and online complement C3) whose spatial configurations reinforce the analyses already carried out<sup>17</sup>.

All regions, with the exception of Corse and Île-de-France, contain employment zones belonging to at least three different profiles, including the regions resulting from the merger of similar former regions: The 'D- M- E'

16. This typology in only five classes does not, however, reflect the entirety of the differences between employment zones since it explains 21% of the total inertia. To explain the entirety of the inertia, as many classes as employment zones should be created, which would not have any benefit for demonstration purposes.

17. Refer, in particular, to the thematic fact sheets on 'youth', 'location of jobs' and 'cohesion' in the fourth report from the Observatoire des Territoires entitled "Quality of life, residents, territories" (2015) as well as its fifth report entitled "Employment and Territories" (2017).

profile<sup>18</sup> (96 employment zones) characterises the employment zones in an unfavourable position for the three indicators used in the analysis and in particular, for change in employment. The territories included in this profile are rural overall and for the most part located on the diagonal ranging from the Meuse (Grand Est) to the Corrèze (Nouvelle-Aquitaine) départements as well as to the west of Ile-de France.

- The ‘D+ M-- E--’ profile (20 employment zones) corresponds to the employment zones which, like the previous profile, suffer from a very unfavourable situation in terms of the employment dynamics and the labour market, but which are fairly densely populated and

young. This category represents more than half of the employment zones of Hauts-de-France (particularly in the former Nord-Pas-de-Calais) but is also present in the Grand Est region and in the former Languedoc-Roussillon region.

- The ‘D- M- E+’ profile (89 employment zones) corresponds to the average profile, is slightly unfavourable in terms of demography and the labour market, but has a small growth in

18. The classes have been named according to the following model: each synthetic index is summarised by a letter (D for demographic situation, M for situation on the employment market and E for change in employment) followed by a sign showing whether the synthetic index is very favourable (++) , favourable (+) unfavourable (-) or very unfavourable (--).

## Box 2 – Calculation of synthetic indices (demography, employment market and employment change) and of the multi-criteria discontinuities between employment zones

### Synthetic indices

In order to simplify the analysis and classification of employment zones (EZ), we have created three synthetic indices corresponding to the three areas of spatial differentiation

highlighted earlier at the regional level, which are also very discriminating at the employment zone level. For example, the demographic synthetic index corresponds to the standardised sum (centred reduced) of the population density and the youth index, once they have been standardised (Table A).

Table A

### Construction of the synthetic indices: an example of the demographic index

ZE	Youth index	Population density	Standardised youth index	Standardised population density	Demographic index	Synthetic demographic index
Mâcon	77.1	93.7	- 0.11	- 0.14	- 0.25	- 0.15
Tergnier	81.3	148.7	0.10	- 0.05	0.05	0.03
Bourges	76.2	53.1	- 0.15	- 0.21	- 0.36	- 0.22
Lille	153.0	1214.9	3.67	1.73	5.39	3.33

Three synthetic indices are thus calculated: the synthetic demographic index, a second one on the situation on the employment market (from standard of living indicators and the employment rate of 25-64-year-olds) and a last one on employment trends since 2008.

### Multi-criteria discontinuities between employment zones

The construction of a multi-criteria discontinuity indicator follows the following process, after the calculation of the synthetic indices:

*Extraction of contiguous employment zones.* Here, the analysis focuses on the contiguous employment zones. For the needs of the analysis, they are attached to the region to which they belong. As some employment zones are sometimes attached to several regions, they have been assigned to the region in which the maximum population is located (underlined below): Mont-de-Marsan (Aquitaine/Midi-Pyrénées), Alençon (Basse-Normandie/Pays-de-la-Loire), Cosne-Clamecy (Bourgogne/Centre),

Mâcon (Bourgogne/Rhône-Alpes), Nogent-le-Rotrou (Basse-Normandie/Centre), Vallée-de-Bresle (Picardie/Haute-Normandie), Roissy-sud-Picardie (Île-de-France/Picardie), Brive-la-Gaillarde (Limousin/Midi-Pyrénées), Avignon (PACA/Languedoc-Roussillon), Saint-Etienne (Rhône-Alpes/Auvergne), Toulouse (Midi-Pyrénées/Languedoc-Roussillon).

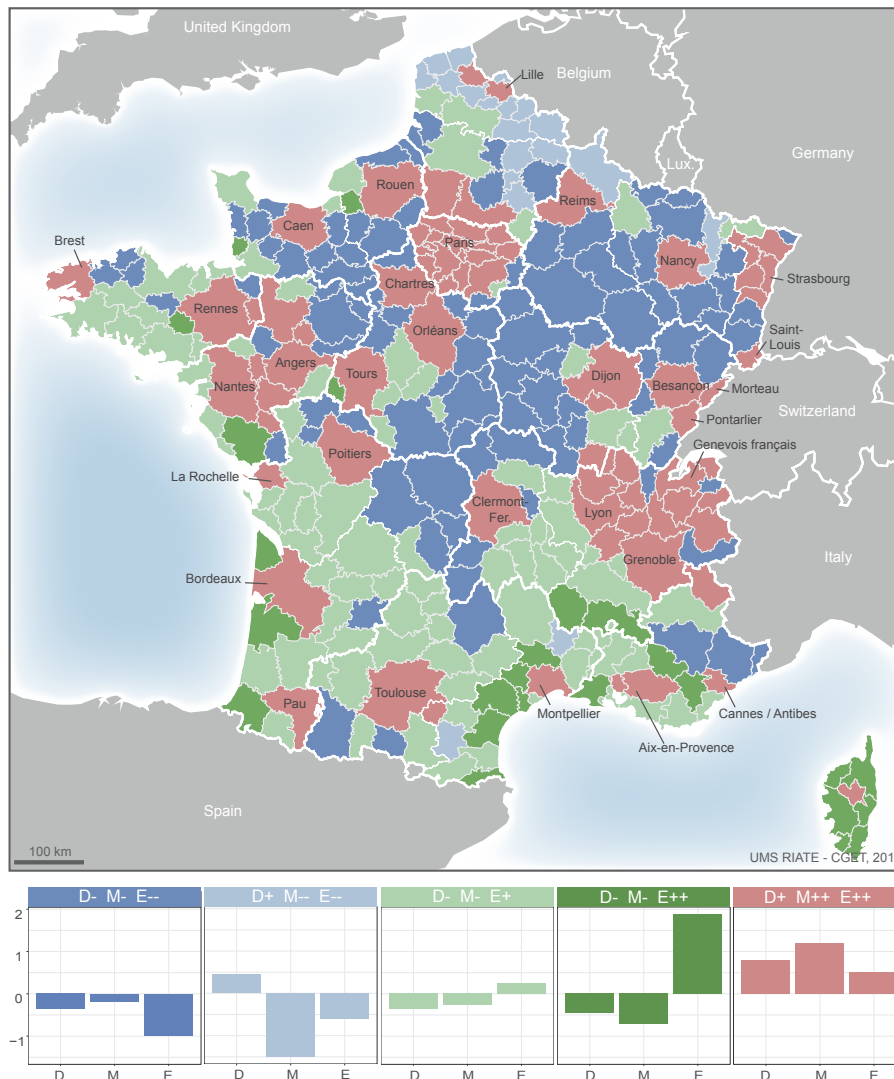
*Calculation of the discontinuities for each pair of contiguous employment zones (803 pairs).* For each of the three standardised variables considered at the end of the extraction, the calculation of the absolute value of the difference between the values of contiguous employment zone pairs enables the variance and thus the discontinuity between the two employment zones in question to be quantified (example of the synthetic demographic index case in Table B). The calculation of the average of the three absolute values of the discontinuities observed mapped in Figure VII enables the magnitude of the discontinuities observed on the three criteria in question to be approximated. →

Box 2 (contd.)

**Table B**  
**Calculation of the discontinuities between two neighbouring employment zones: the example of the synthetic demographic index**

EZ 1	Synthetic demographic index (EZ 1)	EZ 2	Synthetic demographic index (EZ 2)	Demographic discontinuity index of the pair (EZ 1, EZ 2)
Mâcon	- 0.15	Le Creusot-Montceau	- 0.57	$\text{abs}(- 0.15 + 0.57) = 0.42$
Tergnier	0.03	Soissons	- 0.02	$\text{abs}(0.03 + 0.02) = 0.05$
Bourges	- 0.22	Saint-Armand-Montrond	- 1.00	$\text{abs}(- 0.22 + 1) = 0.78$
Lille	3.33	Douai	0.90	$\text{abs}(3.33 - 0.9) = 2.43$

**Figure VI**  
**Hierarchical Cluster Analysis of the demographic dimensions, employment market and change in employment in the employment zones**



Note: the classes have been named according to the following model: each synthetic index is summarised by a letter (D for demographic situation, M for situation on the employment market and E for change in employment) followed by a sign showing whether the synthetic index is very favourable (++), favourable (+) unfavourable (-) or very unfavourable (--). The graph represents the average of the standardised synthetic indices of the employment zones of each class.

Coverage: employment zones in metropolitan France.

Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

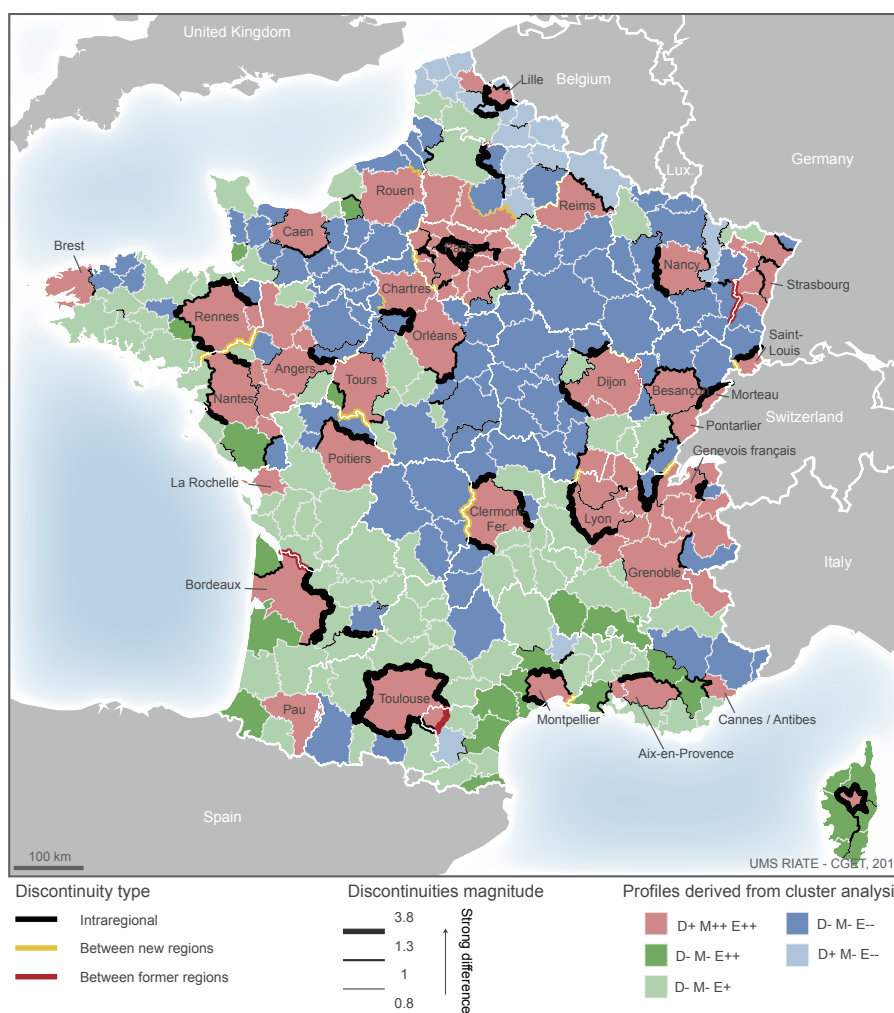


Table 3  
Profiles of the 5 Hierarchical Cluster Analysis classes

Classes	Population density	Youth index	Employment rate (%) (25-64 years old)	Median of the median standard of living (in €) <sup>(1)</sup>	Change in employment since 2008 (%)
D- M- E--	61	76	69.5	18 665	- 3.9
D+ M-- E--	197	93	62.9	17 320	- 2.7
D- M- E+	86	77	68.4	18 750	0.5
D- M- E++	63	70	67.2	18 101	5.7
D++ M++ E+	220	112	74.3	20 582	2.1
Metropolitan France	117	94	71.3	18 901	0.7

<sup>(1)</sup> Due to the non-availability of individual data, the median standard of living is not calculated on the whole of the class, but corresponds to the median of the median standard of living in all employment zones in each class.  
Coverage: employment zones in metropolitan France.  
Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

Figure VII  
Intra- and inter-regional territorial breaks



Note: The methodology describing the construction of the territorial discontinuity indicator is detailed in box 3 and the different profiles coming from the cluster analysis are described in Figure VI.  
Coverage: Employment zones in metropolitan France.  
Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

employment. This class' employment zones are located mainly in the south and the west of the country, slightly more densely populated than those of the 'D- M- E--' class described above, they tend to be located in the periphery of areas of urban employment, also in regions where this profile is not a majority (Rennes, Nantes, Angers, Toulouse...).

- The 'D- M- E++' profile (25 employment zones) characterises the employment zones in which the population is more rural, for which the synthetic demographic indices and the situation on the labour market are quite unfavourable, but which are experiencing very considerable growth in employment. These areas belong to the French countryside having experienced a resurgence of attractiveness in recent years. They are mostly in Corse and in Occitanie, particularly on the Mediterranean boundary of the Languedoc-Roussillon region, but also in a few employment zones of the ocean coastline.

- The 'D++ M++ E+' profile (74 employment zones) corresponds to very favourable indicators on all dimensions. The change in employment has also been favourable, but in smaller proportions than for the previous indicators. This profile is particularly present in Île-de-France, as well as in the former regions of Rhône-Alpes and Alsace, thanks to Strasbourg, but also to its cross-border areas (Haguenau, Saint-Louis...) also present in Franche-Comté (Morteau and Pontarlier) and which explain its position which is slightly better than that of Bourgogne. This type of employment zone is, however, also present in all the other regions.

### ***The main territorial changes are observed at an intra-regional level***

In order to represent the main territorial changes existing between the contiguous employment zones in metropolitan France (Figure VII), a multi-criteria analysis of territorial discontinuities was conducted (see Box 2 for details on the methodology).

As predicted in the previous classification, the main territorial changes at the level of employment zones can be seen in the heart of the former and new regions<sup>19</sup>. The average of the multi-criteria territorial discontinuities (Table 4) is indeed slightly higher within the regions than across regions (0.77 versus 0.66). In addition, the regional redistribution has no noticeable effect on the spatial configuration of these territorial discontinuities, with the average of the inter-regional discontinuities remaining broadly unchanged.

The territorial changes are particularly strong within regions themselves, in particular between urban employment zones and their periphery. In fact, all the employment zones having the maximum discontinuity within each new region contain large metropolitan centres, apart from near the Oyonnax/French Geneva border in Auvergne-Rhône-Alpes and the Corte/Ghisonaccia border in Corse (Table 5).

<sup>19</sup>. However, it is necessary to recall that these conclusions are only valid for the indicators considered with the geographical area of employment zones.

**Table 4**  
**Synthesis of multi-criteria discontinuity values by territorial affiliation type (former/new regions and intra/inter-regional)**

	Type	Value of discontinuities			
		Average	Standard deviation	Min	Max
Former regions (22)	Intra-	0.77	0.51	0.04	3.79
	Inter-	0.66	0.44	0.08	2.59
New regions (13)	Intra-	0.76	0.51	0.04	3.79
	Inter-	0.66	0.44	0.08	2.50

Note: The methodology describing the construction of the territorial discontinuity indicator is detailed in box 3.  
Reading note: the territorial discontinuities between employment zones are, on average, higher when they are located within a same region (average of the coefficient equals to 0.77 for the old regions and 0.76 for the new ones) than when they belong to two different regions (average of the coefficient equals to 0.66, for the former and the new regions).  
Coverage: employment zones in metropolitan France.  
Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

Some multi-criteria discontinuities between employment zones belonging to two former regions having merged are also particularly high (Table 6). This is the case between the employment zones of Toulouse (Midi-Pyrénées) and Limoux or Carcassonne (Languedoc-Roussillon) and, to a lesser extent, for Saint-Dié-des-Vosges (Lorraine) and Molsheim-Obernai and Sélestat (Alsace). The results clearly show the multi-polarisation of certain new regions (Dijon-Besançon, Nancy-Metz-Strasbourg, etc.).

The observation of these strong local discontinuities raises additional issues in some new regions in terms of the treatment of internal territorial disparities, located in specific geographic

perimeters: mainly around one or several metropolitan centres, but also in areas with specific issues, such as cross-border territories.

### From the observation of disparities between territories to territorial cohesion

Regarding the sociodemographic indicators used in this article, the French regions are rather poorly placed in terms of the employment rate, quite favoured in terms of the standard of living, while the demographic situation and the recent change in employment shows more mixed results from one region to the next. However, the inter-regional contrasts appear relatively small in France in comparison with other EU

Table 5  
Maximum discontinuities within the new regions

New region	Employment zone pair	Discontinuity
Île-de-France	Roissy - Sud Picardie / Paris	3.79
Auvergne-Rhône-Alpes	Oyonnax / Le Genevois Français	2.51
Occitanie	Toulouse / Saint-Girons	2.38
Hauts-de-France	Lille / Béthune - Bruay	2.18
Corse	Corte / Ghisonaccia - Aléria	2.14
Bourgogne-Franche-Comté	Dijon / Le Morvan	1.87
Nouvelle-Aquitaine	Bordeaux / Marmande	1.76
Bretagne	Loudéac / Rennes	1.70
Grand Est	Nancy / Saint-Dié-des-Vosges	1.68
Pays de la Loire	Nantes / Challans	1.56
Centre-Val de Loire	Vierzon / Orléans	1.54
PACA	Aix-en-Provence / Cavaillon - Apt	1.40
Normandie	Caen / Flers	1.29

Note: The methodology describing the construction of the territorial discontinuity indicator is detailed in box 3. Only the intra-regional discontinuities have been taken into account here.

Reading note: Discontinuity is at its maximum between the employment zone of Roissy-Sud Picardie and that of Paris.

Coverage: employment zones in metropolitan France.

Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

Table 6  
Maximum discontinuities between the former merged regions

Former region 1	Employment zone 1	Former region 2	Employment zone 2	Discontinuity
Midi-Pyrénées	Toulouse	Languedoc-Roussillon	Limoux	2.59
Midi-Pyrénées	Toulouse	Languedoc-Roussillon	Carcassonne	1.90
Lorraine	Saint-Dié-des-Vosges	Alsace	Molsheim - Obernai	1.80
Aquitaine	Bordeaux	Poitou-Charentes	Jonzac - Barbezieux-Saint-Hilaire	1.60
Lorraine	Saint-Dié-des-Vosges	Alsace	Sélestat	1.52

Note: The methodology describing the construction of the territorial discontinuity indicator is detailed in Box 2.

Reading note: within the new Occitanie region, there is a very strong discontinuity between the Toulouse and Limoux employment zones, which each belong to a different former region (respectively Midi-Pyrénées and Languedoc-Roussillon).

Coverage: employment zones in metropolitan France.

Sources: Insee, RP 2008-2013, FiLoSoFi 2012.

member States –such as Spain, Italy or the United Kingdom– that are at NUTS 2 (former French regions) or NUTS 1 (new regions) level. More generally, the main discontinuities are found more across member States than between regions of the same State. For the standard of living indicator, it is firstly the western borders of the former socialist bloc countries which are showing a considerable discontinuity. For the youth indicator, the effect of international borders is less marked: it is the pronounced ageing of the former GDR which constitutes the greatest discontinuity with neighbouring regions.

In metropolitan France, there is the reverse phenomenon: the main territorial changes are observed within the same regions, in particular between employment zones, both in their former as well as their new perimeter, and not between them. The Hierarchical Cluster Analysis (HCA) has identified five profiles of employment zones which are distinguished according to their demographic situation, their situation on the labour market and the change in employment. Thus, although there is a relative proximity according to these indicators between the former regions that make up Nouvelle-Aquitaine, Bourgogne-Franche-Comté and Normandie, each region, either in its former or in its new perimeter, is composed of territories with very specific sociodemographic characteristics: metropolitan areas *versus* rural or suburban territories, residential areas *versus* industrial areas, cross-border territories or coastlines *versus* interior territories...

It is possible that the same analyses, conducted with other types of indicators, in particular with a more macro-economic than sociodemographic view, and using other territorial levels of analysis, lead to other results. The objective here is to provide research avenues, in particular in terms of methodology, that allow territorial disparities to be observed and analysed within and between the new regions, without exhausting the subject.

Taking into account the diversity of territories within each of the regions is an indispensable tool for the European policy of territorial cohesion<sup>20</sup> (Jouen, 2015; Green Paper on territorial cohesion, 2008; Territorial Agenda of the European Union 2020, 2011). Indeed, this policy encourages the integrated development of territories in order to reduce inequalities between citizens related to their belonging to such or such an area,: it involves considering the territory outside of its administrative boundaries and thinking of it on a coherent and functional

scale while analysing the territorial specificities according to several dimensions (economic but also social, environmental...).

The territorial cohesion policy also encourages the cooperation and coordination of different levels of governance (from the local to the European level), and more widely the interdependencies between territories that allow territorial policies to be conducted effectively, by promoting, for example, the dissemination of the growth of dynamic territories toward those of a more residential nature (Amabile *et al.*, 2015).

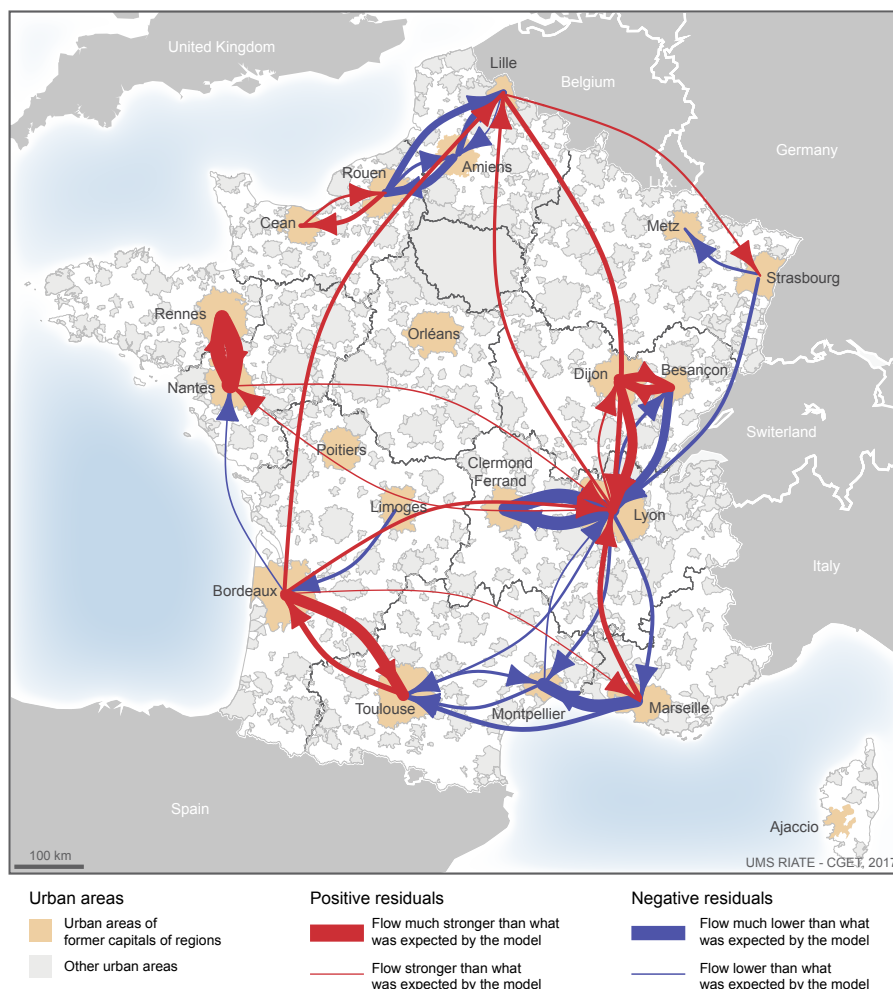
In order to take into account these interdependencies between territories, several methodological avenues could be considered to extend the conclusions of this contribution. The analysis of the spatial organisation of population flows (Figure VIII) is part of this since it shows –by isolating the effects of the population mass of urban areas of the former regional capitals and of the geographical distance that separates them– that there are commuting flows that are bigger than expected, in both directions, between some former regional capitals, Rennes and Nantes, Bordeaux and Toulouse, Lyon and Dijon, pairs which have not been repeated in the same new regions. Conversely, the flows between Lyon and Clermont-Ferrand, for example, are under-represented, while these two cities now belong to the same region. These first graphical outputs deserve to be explored further (change over time, accuracy of the granularity of the indicator thanks to an approach by age or by socioprofessional categories) or even extended thanks to other indicators such as, for example, the financial links between territories.

\* \*  
\*

The French territorial reform of 2015 was not intended, in its initial objectives, to respond to the European ambition of territorial cohesion, which would have involved taking into account the diversity of the territories by getting away from the administrative borders of départements and regions and to rely more on the analysis of the interdependencies between territories. However, territorial cohesion policies do not advise on the ideal method to adopt to create the “optimal” regional perimeters. Must

20. Since 2013, territorial cohesion has been part of the European cohesion policy following the signature of the Treaty of Lisbon and the Europe 2020 strategy.

Figure VIII  
Residual home-to-work flows (excluding the distance and mass effects) between the former regional capitals



Note: This figure is created with a gravity model and uses the zoning into urban areas (group of municipalities consisting of an urban centre with a suburban periphery whose inhabitants work in the urban area). The importance of a home-to-work flow  $F_{ij}$  from an urban area  $i$  to an urban area  $j$  is modelled as being proportional to the distance between the centroid of the two urban areas ( $D_{ij}$ ) and to the labour force of  $i$  ( $P_i$ ) and  $j$  ( $P_j$ ).  $F_{ij} = k \cdot P_i \cdot P_j / D_{ij}^\alpha$ , with  $k$  and  $\alpha$  positive parameters to be estimated. It is therefore possible to estimate, by a linear regression (with the hypothesis that the residuals follow a Poisson distribution), a theoretical flow  $f_{ij}^*$  estimated between the urban area  $i$  and the urban area  $j$  and to deduce the residuals of the regression ( $f_{ij} - f_{ij}^*$ ) from it. Thus, a high residual will correspond to a bigger flow than provided by the model given the number of active people in  $i$  and  $j$  and the distance that separated them. On the contrary, a negative residual will correspond to a weaker relationship than expected.

Coverage: urban areas of the former regional capitals in metropolitan France.

Sources: Insee, RP (2013).

we create regions with internal homogeneity or, on the contrary, encourage intra-regional diversity (cf. Online complement C4)? While the first option facilitates the implementation of regional policies in homogeneous territories in drawing regional boundaries at the level of the main territorial breaks, the second one has the advantage of bringing together complementary territories within each region, thus encouraging their connection.

Finally, the merger of the regions, which is nearly three years old (Law of 16 January 2015), has changed the relative positions of the French regions among the European regions and

rebalanced their weight at the national level. The deployment of public policies on these new territories with enhanced areas of jurisdiction, as well as the preparation, implementation and monitoring of new regional schemes (SRDEII, Regional economic development, innovation and internationalisation plan, and SRADDET, Regional spatial planning, sustainable development and territorial equality plan) will probably have multiple impacts, including on territorial disparities, which will need to be evaluated over the next few years, relying on work comparing different angles of analysis and geographic scales and by highlighting the specific issues at stake in each region. □

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## THE USE OF MULTIPLE INDICATORS AND GEOGRAPHICAL SCALES IN ORDER TO STUDY TERRITORIAL DISPARITIES

### Five indicators to understand the territories

The five indicators used in the article to compare the magnitude of regional contrasts in France and in Europe are described below. We have provided their data sources in square brackets. For a reason of availability of data for the geographical level adapted, the source differs depending on whether the data is produced at a French (employment zones) or European (NUTS 2, NUTS 1) level.

Purely economic indicators, such as GDP, for example, have been put aside for several reasons. First of all, as was particularly pointed out by the Commission on the Measurement of Economic Performance and Social Progress (Stiglitz *et al.*, 2009), sociodemographic indicators (ageing, income...) all show the current and future issues in a territory as well as the economic indicators do. In effect, GDP is centred on production, market and monetary consumption and only, therefore, takes certain activities into account and ignores the effects of productivity on social life and environment. Then, we have sought to complement the work already achieved, dealing with the territorial cohesion in economic terms (Amabile *et al.*, 2015), by expanding the analysis to other indicators. Finally, the economic indicators do not always have a meaning at the intra-regional scale (they are, moreover, for some, such as GDP, not produced), whereas a standard of living indicator lets you better identify the specific local features, in particular in terms of cross-border territories.

**The employment rate** [France: Insee, RP 2013; EU: Eurostat, 2017 on 2015 data] compares the number of people in employment to the number of labour force in a given age group. A high employment rate may correspond to a low unemployment rate and/or to a high activity rate in the territory. We have restricted the employment rate to the 25-64 years-old age group to remove young people, for whom the indicator is difficult to interpret, from the field. A high employment rate of young people can correspond to a place where unemployment is low, but also to a territory where the activity rate of young people is high, due to a low number of these young people in the territory continuing their studies.

**The change in employment** [France: Insee, RP 2008-2013; EU: Eurostat, 2017 on 2008-2015 data] measures the change in the number of employed persons since the crisis (between 2008 and 2013 for the French analyses and between 2008 and 2015 for the European analyses). This indicator provides information on the dynamism of local employment.

**The median standard of living** [France: Insee, *FiLoSoFi* 2012; EU: Eurostat, 2017 on 2013 data] used for the French analyses corresponds to the median disposable income of the household divided by the number of consumer units. It includes income from work, assets, transfers from other households and social benefits (retirement, unemployment...) net of taxes. For the European analyses, the indicator used is the net disposable income of households (compared to the number of inhabitants) which corresponds to the total gross disposable income (income from work, private incomes derived from

investments and property, transfers between households, as well as all social transfers collected in cash, including old age pensions) from which social security contributions and income tax are deducted. This indicator approaches the population's standard of living; it is linked indirectly to the situation of the labour market in the territory.

**The youth index** [France: Insee, RP 2013; EU: Eurostat, 2017 on 2015 data] corresponds here to the comparison of the number of people aged between 15 and 24 to the number of people aged between 55 and 64. This indicator provides information on the demographic structure of the territory but also on the potential for the renewal of the labour force in the ten years to come (excluding residential migration).

**Population density** [France: Insee, RP 2013; EU: Eurostat, 2017 on 2015 data] provides information on the more or less urban character of territories. It summarises, in a single indicator, a large number of socio-demographic phenomena to which it is correlated (access to equipment and services, employment dynamism, youth of the population).

### Three zones to analyse the disparities on multiple scales

Following the analyses to be conducted, different reference zones have been used to increase the geographical granularity. The use of different spatial divisions significantly affects the results of statistical treatment or the visual of a map, a phenomenon that geographers call the MAUP effect (*Modifiable Areal Unit Problem*). In order to interpret the different scales of statistical discontinuities present in the territories, different geographical areas, adapted to the studied phenomenon, will be used.

For analyses in this article, three geographical areas were selected: a functional zoning (defined by statistical criteria) called employment zones defined below and the administrative zoning of the former and new French regions:

- **Employment zones:** an employment zone is a geographical area within which most of the labour force resides and works, and in which establishments may find most of the manpower necessary for the jobs offered. The division into 321 employment zones (metropolitan France and overseas départements) based on the commuting flows of the workforce. This zoning has the advantage of constituting a partition of the territory adapted to the intra-regional studies, in particular on local labour markets.

- **The NUTS 2 regions:** the former French regions have been positioned with regard to the NUTS 2 nomenclature (2013 version) of the EU28. This classification includes 276 territorial units.

- **The NUTS 1 regions:** the new French regions have been positioned with regard to the NUTS 1 nomenclature (2013 version) of the EU28. The former NUTS 1 French regions (ZEAT in the 2013 version of the nomenclature) have been replaced by the new French regions. The new French regions will officially integrate NUTS 1 nomenclature in 2018. This nomenclature includes 103 territorial units.

